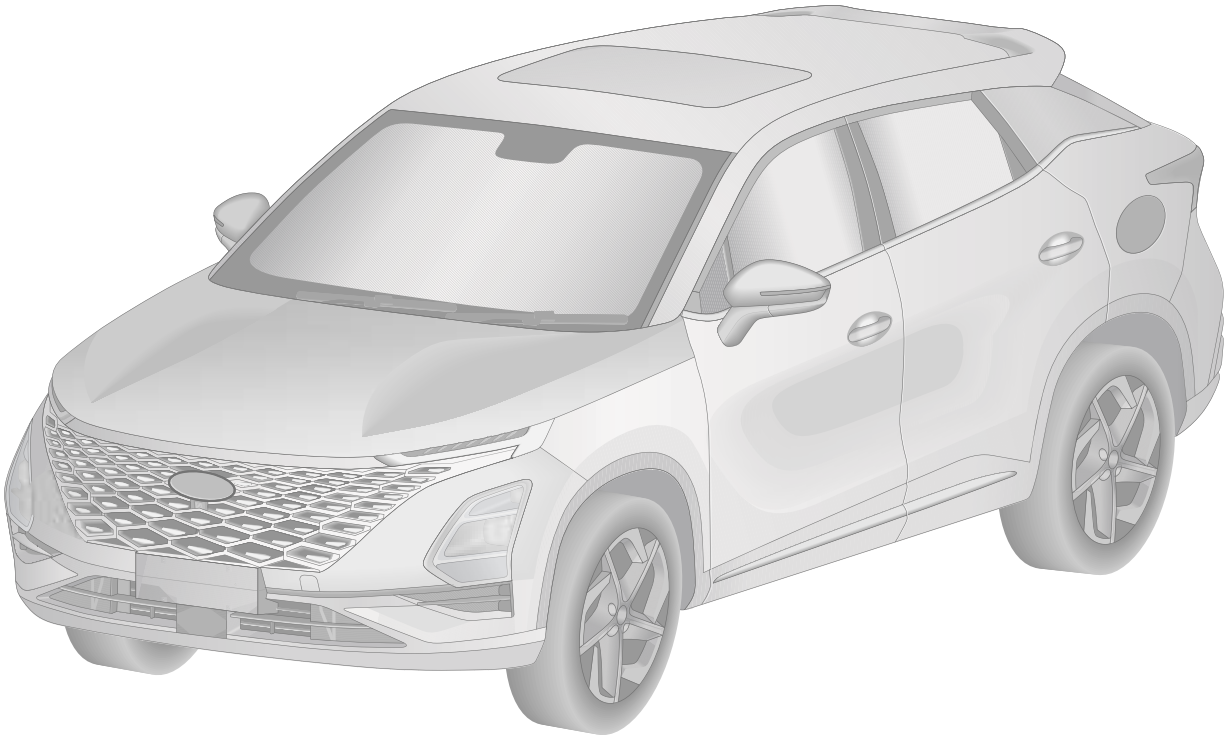
Vehicle interior and exterior

Exterior



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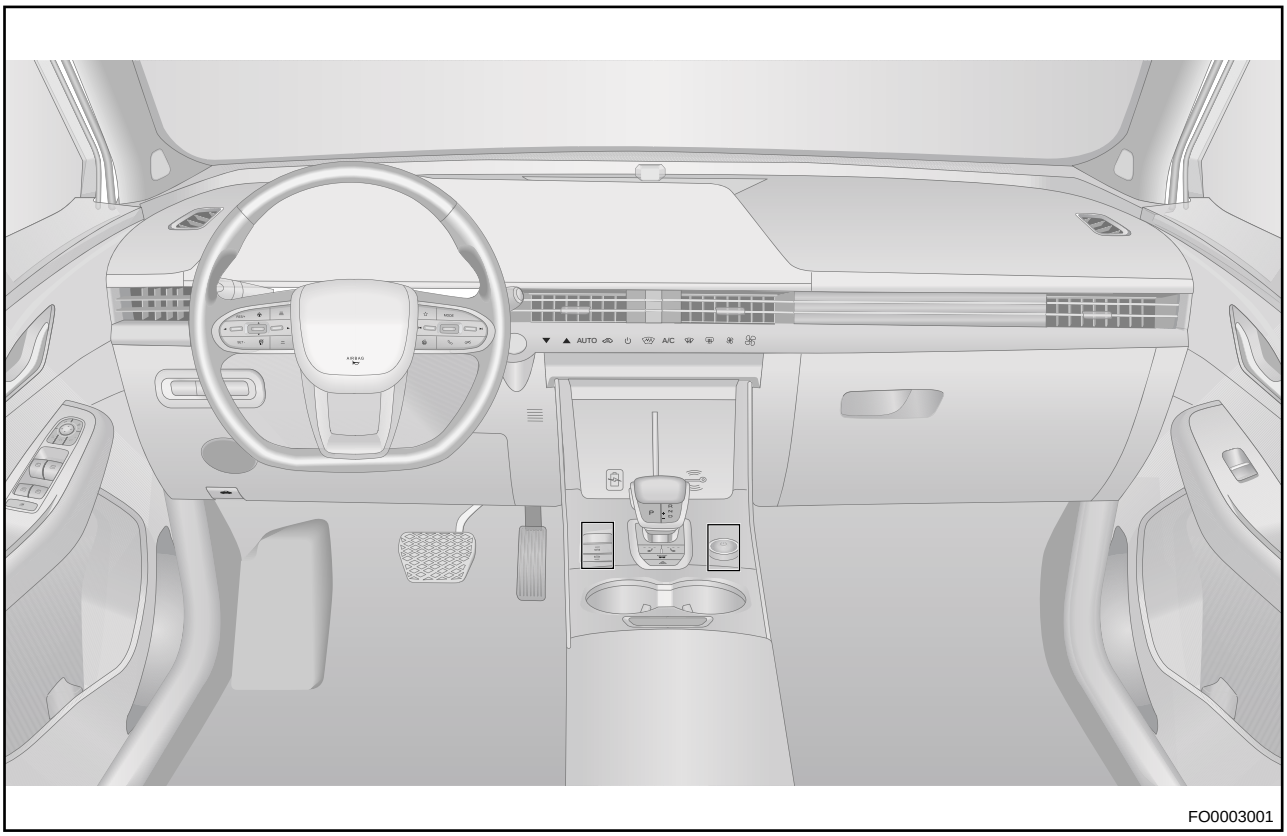
Interior



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CHERY T19C Service Manual 2022

FOREWORD

This manual contains on-vehicle diagnosis and service procedures for Chery T19C

It is very important to read and be familiar with this manual thoroughly for proper repair and maintenance. This manual should be kept in a handy place for quick and easy reference.

The contents in this manual, including all illustrations and specifications, are current at the time of printing. As modifications affecting repair and maintenance occur, relevant information supplementary to this volume will be made available at Chery dealers.

This manual only
applies to models listed
below: T19C 1.5T+CVT25

CAUTION:
This manual is only for specialized technicians. If non-specialized or uncertified individuals perform repairs and maintenance privately only referring to this manual or without proper equipment and tools, it may cause damage to customer's vehicle and injury to you and other persons nearby.

In order to prevent dangerous operation and damage to vehicle, be sure to follow the instructions shown below:

- Contents in this manual must be read thoroughly. Have a good understanding of all the contents written in "PRECAUTION" of "INTRODUCTION" section.
- Before performing repair procedures, be sure to put on protective tools properly to avoid personal injury.
- When performing repair procedures, be sure to use specified and recommended tools to prevent damage to customer's vehicle. Before operating, be sure to confirm the safety of technicians to avoid personal injury.
- If a part needs to be replaced, use Chery genuine part with the same part number. Do not use any inferior quality part.
- Observe WARNING and CAUTION in this manual carefully, in order to effectively avoid the risk of personal injury and vehicle damage due to improper operation during service and maintenance.

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INTRODUCTION

GENERAL INFORMATION

How to Use This Manual

This manual describes the repair process of the vehicle in 11 major parts, including Introduction, Maintenance, Engine, Drive Train, Suspension and Axle, Brake, Steering, Heating and A/C system, Supplemental Restraint System, Electrical, Body, etc. Each chapter describes a specific part of vehicle component.
There is a catalogue of all chapters on the first page of this manual. Each specific chapter generally contains the following contents: General Information (system overview, component principle description, special tools and equipment, fastener torque list, module pin definition, etc.), Diagnosis and Testing (fault symptom table, matching learning, DTC diagnosis process, etc.), and On-vehicle Service (inspection and adjustment, disassembly and installation).

1. This manual includes all necessary procedures for service operations.

   These procedures can be divided into following three categories:

   - Diagnosis.
   - Removal and installation, replacement, disassembly and assembly, inspection and adjustment.
   - Inspection.

   Following procedures are omitted from this manual. However, they must be performed:

   - Use a transmission tray or lifter to perform operations.
   - Clean all removed parts.
   - Perform a visual check.

   Warning/Caution/Hint

Warning	This indicates that injuries to you or other people may happen.
Caution	This indicates that damage to repairing components may happen.
Hint	Provide additional information to help you with service operations.

2. Service procedure

   Illustrations for service procedures are used to identify components, show the assembling relevance of parts, and explain the visual check for parts. Removal and installation procedures are explained in words.

   Service procedures include:

   - Detailed removal and installation instruction
   - Illustration
   - Torque specifications
   - Technical specifications

   Sometimes, the illustrations of similar models are used. In this case, minor details may be different from actual vehicle.

3. Diagnosis procedure

   Diagnosis procedures are divided as below:

   - Diagnostic Trouble Code (DTC)

     DTC is an important hint when troubleshooting is difficult to simulate. The malfunction can be diagnosed quickly and accurately by performing specified DTC diagnosis and check.
   - Problem Symptoms Table

     Malfunction locations can be determined quickly by troubleshooting in accordance with symptom type.

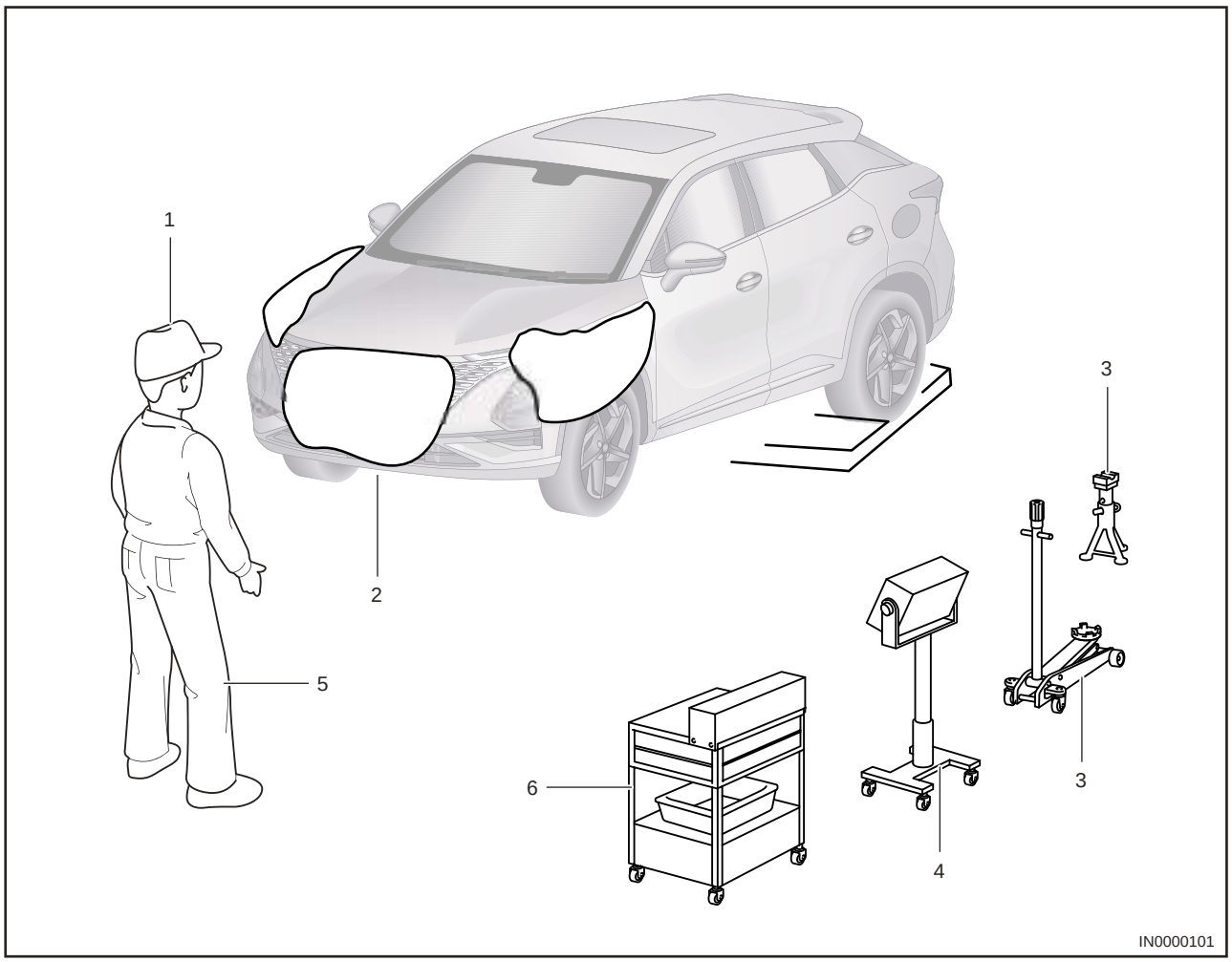
4. Specification

This manual categorizes specifications as below:

- Torque specifications
- Clearance specifications
- Capacity specifications

PREPARATION

1. Preparation for vehicle service



1	Attire	• Always wear a clean uniform. • A hat and safety shoes must be worn.
2	Vehicle Protection	• Before starting work, prepare radiator grille cover, wing cover, seat cover and floor mat.
3	Safety Operation	• When working with two or more persons, be sure to check safety each other. • When working with engine running, make sure to provide ventilation for exhausting gas in the workshop. • When repairing high temperature, high pressure, rotating, moving, or vibrating parts, be sure to wear appropriate safety equipment and take extra care not to injure yourself or others. • When jacking up vehicle, be sure to support specified location with a safety stand.

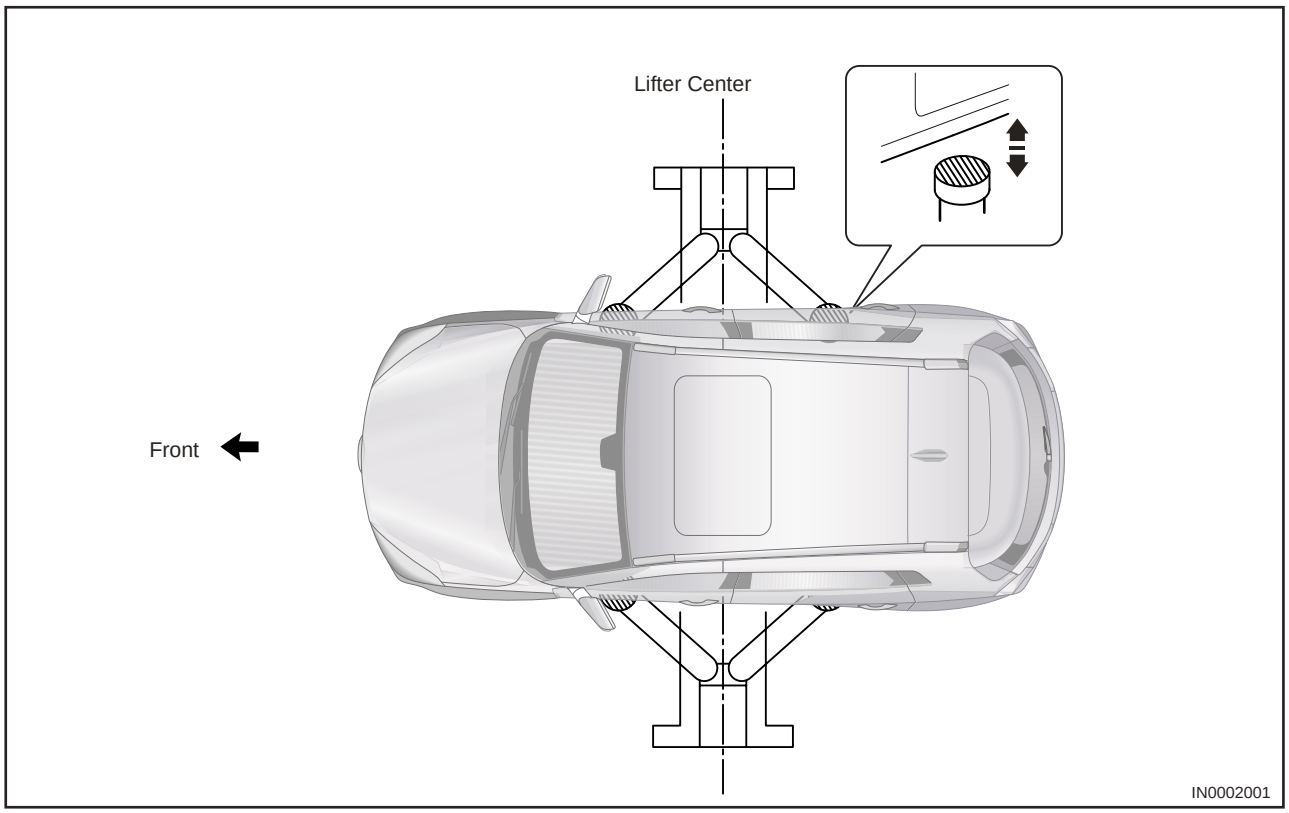
		• Use appropriate safety equipment to lift vehicle.
4	Preparation for Tools and Measuring Gauge	• Before starting work, prepare a tool stand, special tools, gauge, oil and replacement parts.
5	Removal and Installation, Disassembly and Assembly Operations	• Diagnose after thoroughly understanding proper service procedures and reported problem. • Before removing parts, inspect general condition of assembly to check for deformation or damage. • Take notes for complicated assembly. For example, record total number of electrical connections, bolts or hoses that are removed. • Add matchmarks to ensure that each component is assembled to its original position. Temporarily mark hoses and their joints if necessary. • Clean and wash removed parts if necessary and assemble them after a thorough inspection.
6	Removed Parts	• Place removed parts in a separate box to avoid mixing them up with new parts or contaminating new parts. • For non-reusable parts (such as gaskets, O-rings, and self-locking nuts), replace them with new ones as instructed in this manual. • Retain removed parts for inspection, if requested by customers.

2. Jacking up and supporting vehicle

⚠ **Warning**
Care must be taken when jacking up and supporting vehicle.

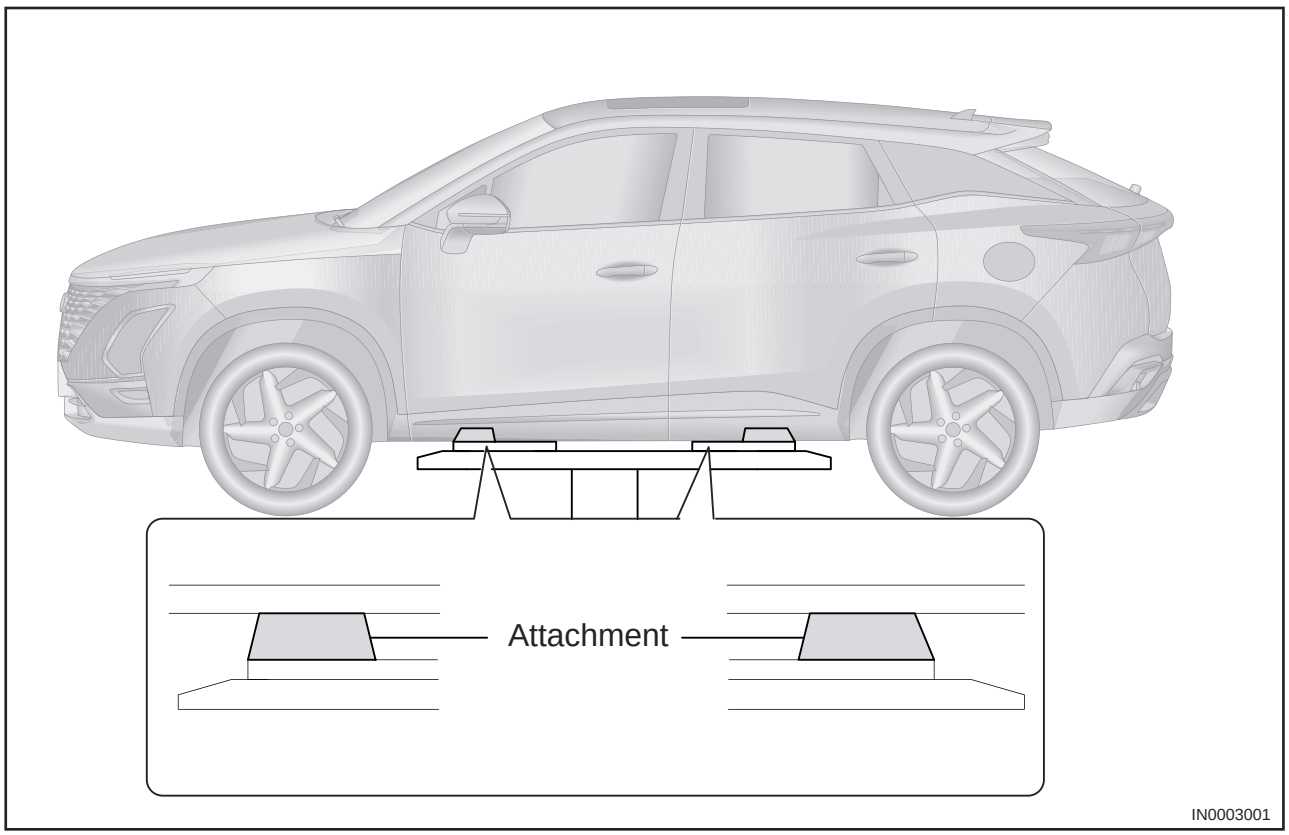
Be sure to jack up and support vehicle at proper locations.

a. Precautions for using a swing arm type lift
   - Follow safety procedures described in the instruction manual.
   - Keep vehicle stable when using a lift to prevent vehicle from tilting during operation. Stabilize vehicle by adjusting the length of lift arm and vehicle position.



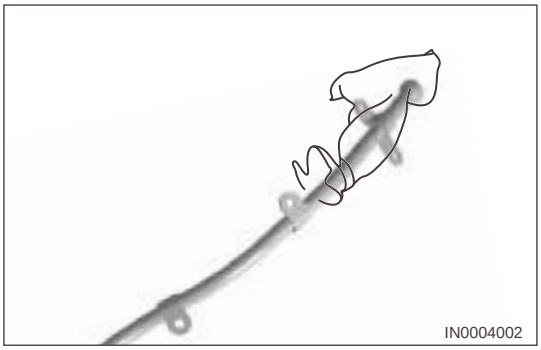
b. Precautions for using a plate type lift

- Follow safety procedures described in the instruction manual.
- Use plate type lift attachments (rubber lifting blocks) on the plate surface.



Service Operation

1. How to use fasteners
   - Using incorrect fasteners may cause damage to components. Injury and death may occur without observing the instructions below.
   - Reference values of fasteners and torque specifications in this service manual use metric unit.
   - Recycling all fasteners (nuts, bolts, etc.) during maintenance and service operation is important for assembly.
2. Remove parts
   When repairing malfunction, try to determine the cause. Before starting work, parts or sub-assemblies that have to be removed and replaced should be confirmed first. After removing parts, block all holes and ports to prevent foreign objects from entering.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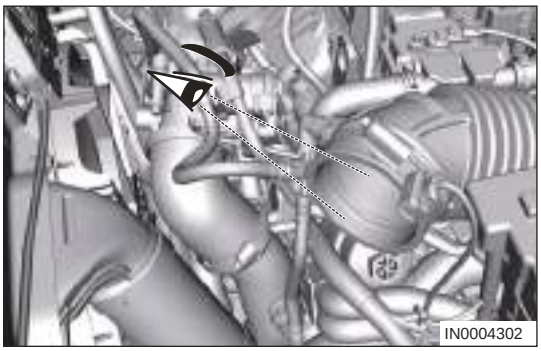
3. Disassemble components
   If disassembly procedures are complicated and multiple parts need to be disassembled, make sure that disassembly methods won't affect the performance or appearance of parts. Identify each part for assembly.
4. Installation check
   After removal, it is necessary to check if there is foreign matter that enters new or used parts when installing new part or resetting used part, preventing unnecessary damage to the vehicle.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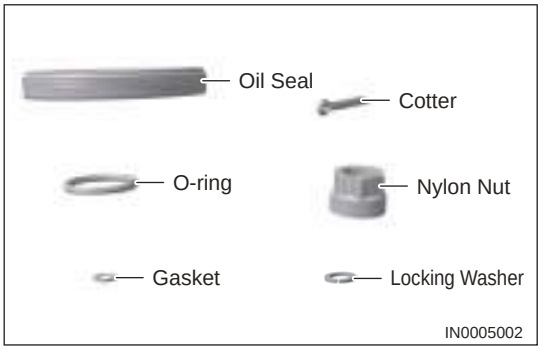
5. Check parts
   After removal, check each part for deformation, damage or other problems.
6. Arrange parts
   Carefully arrange all disassembled parts to make assembly easier. Always separately arrange replaced parts and reusable parts, and make marks on them.
7. Clean parts
   Make a thorough and careful cleaning for reusable parts.

⚠ Caution
Blowing out the dirt or other particles with compressed air may hurt your eyes. Be sure to wear goggles during operation.

8. Assemble components

When assembling parts, always strictly use standard values (-tightening torque and clearance value, etc.). If following parts need to be replaced, replace them with new ones.

- Oil seal
- Gasket
- O-ring
- Lock washer
- Cotter pin
- Nylon nut



9. Lubrication and seal
   Use seal gum and gasket based on position.

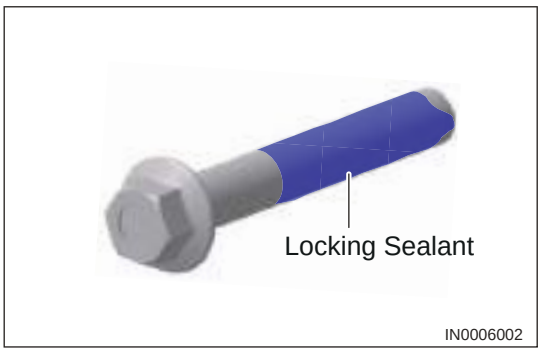
   If seal gum is applied, install components before the seal gum dries to prevent leakage.

   Apply lubricant to the movable area and friction area of components.

   During assembly, apply permitted lubricant or grease to the specified area (such as oil seal).

10. Adjustment
    Use proper meter and tester for adjustment.

11. Pre-coated parts
    Pre-coated parts are bolts and nuts that are coated with seal lock adhesive in the factory. If a pre-coated part is retightened, loosened, or moved in any way, be sure to reapply the specified adhesive.



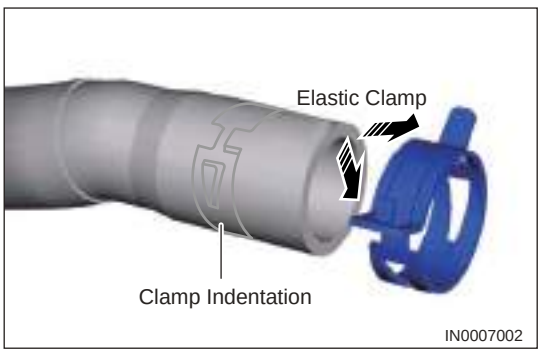
12. Rubber parts and rubber hoses
    Avoid gasoline or oil dripping on rubber parts or rubber hoses.

13. Hose clamp

    Before removing a hose, observe the position of clamp so as to reinstall it to the same position.

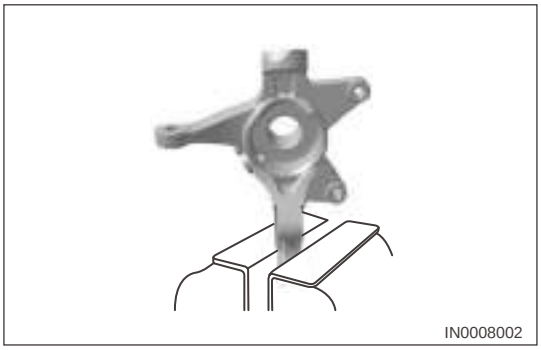
    Replace deformed or dented clamps with new ones. When reusing a hose, fix the clamp on the clamp track portion of hose.

    For elastic clamp, push tabs in direction of arrow as shown in illustration after installation to widen the tabs slightly.



14. Vise

When using a vise, install protective plates on jaws of vise to prevent parts from being damaged.



15. Dynamometer
When testing vehicle on dynamometer, pay attention to the following:

- Place a fan in front of vehicle. It is best to use a fan of which the power changes in proportion to vehicle speed.
- Connect an exhaust gas ventilator.

⚠ Caution
Exhaust gas may cause injury and death. There is odorless, colorless Carbon Oxide (CO) in the exhaust gas. People will faint and get poisoned after inhaling it.

- Cool the exhaust pipe with a fan.
- Keep the area around vehicle clean and tidy.
- Monitor engine coolant thermometer.

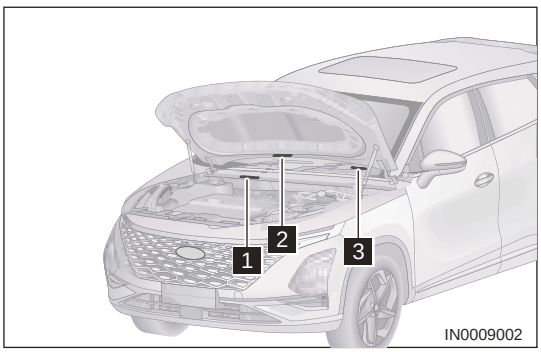
VEHICLE INFORMATION

1. Vehicle Identification Information

①Vehicle Identification Number (VIN) is engraved on lower right of engine compartment drip channel garnish.

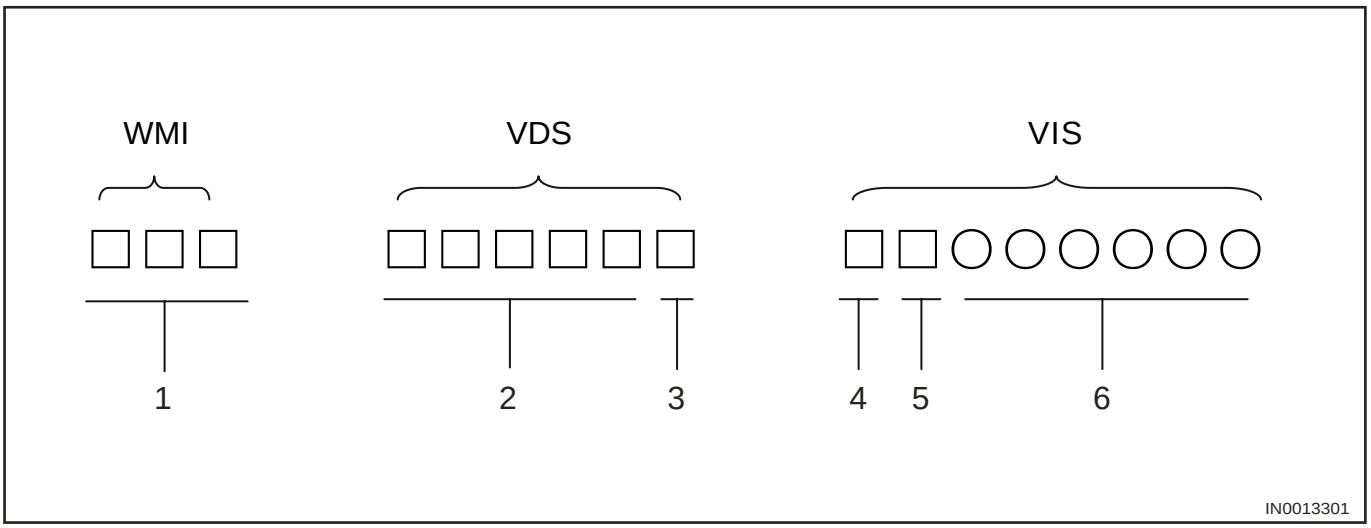
②Vehicle Identification Number (VIN) label is located on hood as shown in the illustration.

③ Vehicle Identification Number (VIN) label is located on upper left of driver side instrument panel, and can be seen from the outside through the front windshield.



2. Vehicle Identification Number (VIN)

Vehicle Identification Number (VIN) consists of World Manufacturer Identifier (WMI), Vehicle Descriptor Section (VDS) and Vehicle Indicator Section (VIS), with a total of 17-digit characters. Refer to the following details:



□: represents a letter or a number (letters I, O and Q cannot be used); ○: represents a number.

No.	Definition
1	World Manufacturer Identifier
2	Vehicle Features
3	Accuracy Check Digit
4	Model Year
5	Production Plant
6	Sequential Number

- The first three digits of VIN represent world manufacturer identifier.

No.	WMI Code	Vehicle Category
1	LVV	Category M1 (for vehicle type number started with 7)

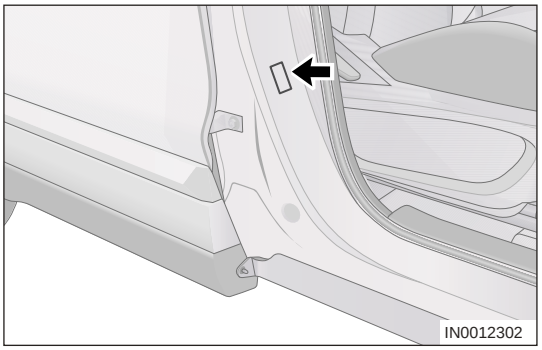
- Fourth digit of VIN represents vehicle type.
  - Letter “D” means all vehicles in category M1.
- Fifth digit of VIN represents vehicle body type and drive type.
  - Letter "B" means 5-door 2-box 4 × 2 type.
- Sixth digit of VIN represents transmission type.
  - “1” means manual transmission.
  - “2” means automatic transmission.
- Seventh digit of VIN represents dynamic characteristics.
  - “1” means gasoline engine that is 1.5 - 2.0 L (2.0 L excluded).
- Eighth digit of VIN represents restraint system.
  - “B” means seat belt and airbag.
- Ninth digit of VIN represents check digit.
  - It is used to check the accuracy of VIN record, and made out through computation after confirming the other sixteen digits of VIN.
- Tenth digit of VIN represents model year.
  - “K” represents 2019.
- Eleventh digit of VIN represents assembly plant code.

- “D” represents Chery Automobile Co., Ltd.

• Last six digits of VIN represent production sequence number.
  - This number means real production serial number of this model.

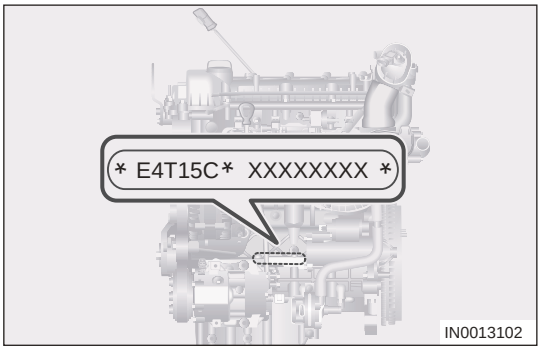
3. Vehicle data plate

   The vehicle data plate is fixed on right quarter outer panel.



4. Engine number

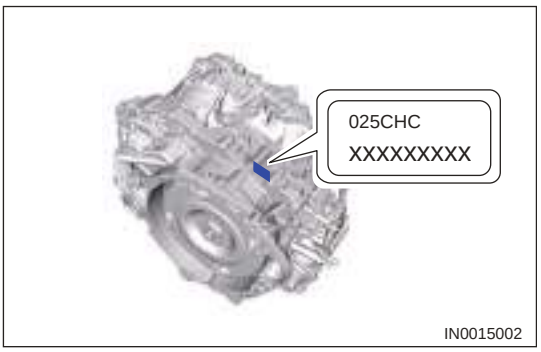
   Figure: Engine number (E4T15C) is located at the position on cylinder block as shown in the illustration.



5. Transmission number

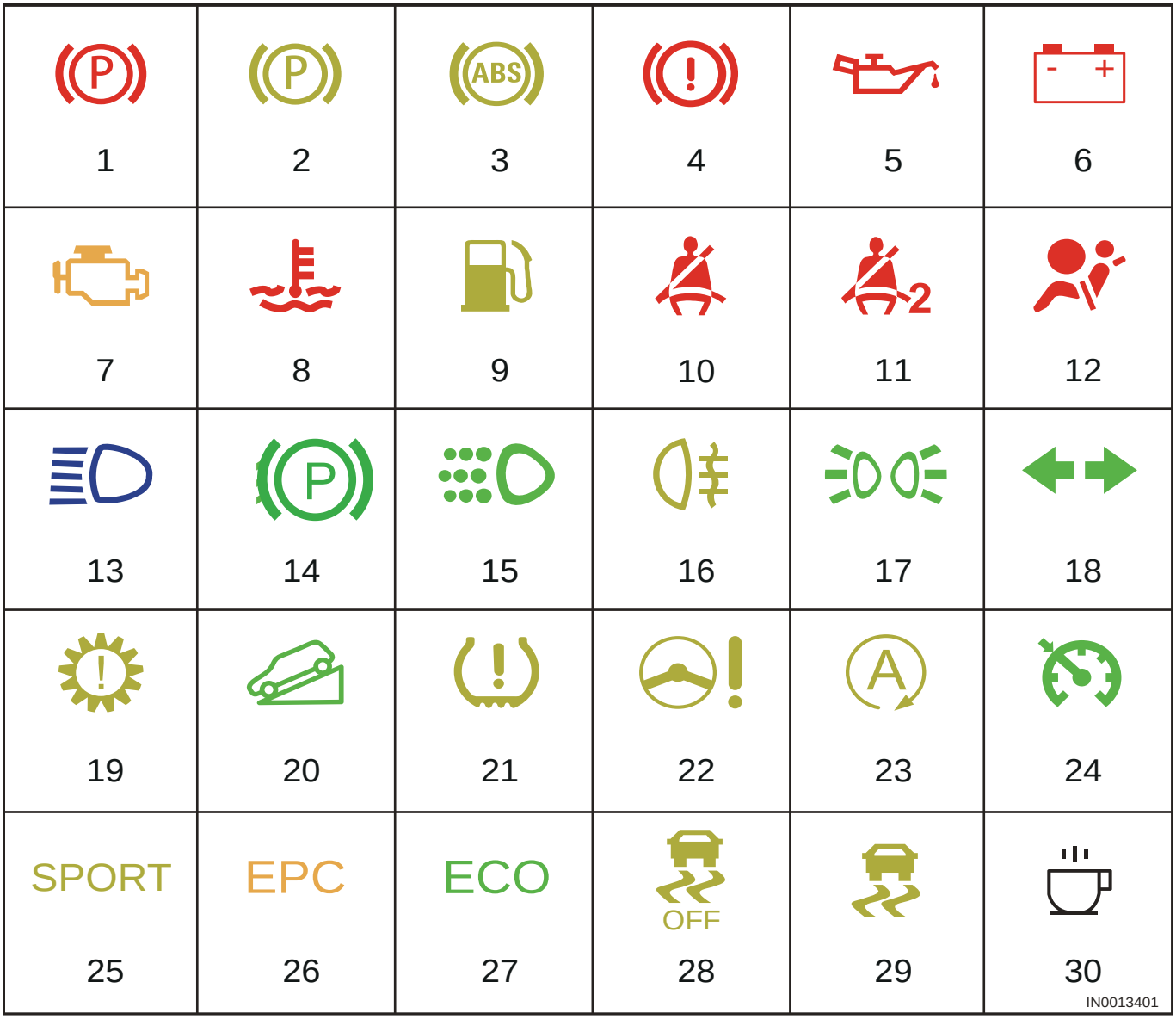
   Transmission number (for MT models) is stamped on transmission case.

   Transmission type specification(738DHA) is stamped on transmission case.



Symbols

The symbols below are instrument cluster display symbols and some international standard symbols.



1	Parking Brake Indicator	16	Rear Fog Indicator
2	EPB Warning Light	17	Position Indicator
3	ABS Warning Light	18	Turn Signal Indicator
4	Brake System Warning Light	19	Transmission Malfunction Warning Light
5	Engine Oil Pressure Warning Light	20	HDC Indicator
6	Charging System Warning Light	21	Tire Pressure Malfunction Indicator
7	Engine Malfunction Indicator	22	Electronic Steering System Warning Light
8	High Coolant Temperature Warning Light	23	Start and Stop System Indicator

9	Low Fuel Level Warning Light	24	Cruise Indicator
10	Driver Seat Belt Reminder Light	25	SPORT Mode Indicator
11	Front Passenger Seat Belt Reminder Light	26	EPC Warning Light
12	SRS Warning Light	27	ECO Mode Indicator
13	Headlight High Beam Indicator	28	ESP OFF Indicator
14	Automatic Parking Indicator	29	ESP Warning Light
15	Daytime Running Indicator	30	Fatigue Driving Warning Light

 1	 2	 3	 4	 5	 6
 7	 8	 9	 10	 11	 12
13	 14	 15	 16	 17	 18 IN0013501

1	Electronic Parking Brake System (EPB) Malfunction Indicator	10	Idle Start and Stop System Malfunction Indicator
2	Auto Emergency Brake System (AEB) Indicator	11	Hill Descent Control System (HDC) Indicator
3	Lane Keeping Assist System (LKA) Malfunction Indicator	12	Gasoline Particulate Filter (GPF) Malfunction Indicator
4	Idle Start and Stop System Indicator	13	Intelligent Headlight Control (IHC) Indicator
5	Anti-lock Brake System (ABS) Malfunction Indicator	14	Lane Keeping Assist System (LKA) Indicator

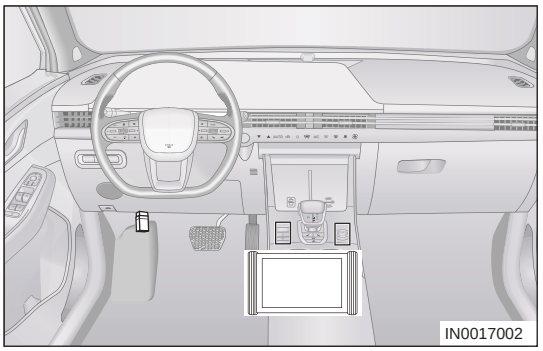
6	Gasoline Particulate Filter (GPF) Indicator	15	Traffic Congestion Assistance System (TJA) / Integrated Cruise Assistance System (ICA) Malfunction Indicator
7	Automatic Parking System (AUTO HOLD) Indicator	16	Engine Warm Indicator
8	Auto Emergency Brake System (AEB) Malfunction Indicator	17	Hill Descent Control System (HDC) Malfunction Indicator
9	Lane Departure Warning System (LDW) Indicator	18	Rear Seat Belt Indicator

CIRCUIT DIAGNOSIS INFORMATION

1. How to Use Tester

   Connect tester cable to DLC, turn ignition switch ON and try to use tester. If communication malfunction appears on the display, it indicates that vehicle or tester is defective.

   - If communication is normal when the tester is connected to another vehicle, inspect DLC on original vehicle.
   - If communication is still not possible when the tester is connected to another vehicle, the tester itself is probably defective.



2. ECM Control System Troubleshooting

   This model uses ECM control system. Most malfunction inspection procedures only involve in checking circuits of ECM control system one by one. An adequate understanding of the system and a basic knowledge of electricity are enough to perform effective troubleshooting, accurate diagnosis and necessary repairs.

3. Diagnosis and Troubleshooting

   a. Diagnosis basis and troubleshooting methods

Procedure Type	Detail	Troubleshooting Method
Diagnosis based on DTC	Diagnosis procedure is based on DTC.	Use eliminating method to determine malfunctioning parts in accordance with DTC detection conditions. Inspect relevant parts with tester and eliminate possible malfunctions one by one.
Diagnosis based on symptoms (no DTCs stored)	Diagnosis procedure is based on problem symptoms	Inspect relevant parts with tester and eliminate possible malfunctions one by one. Inspect relevant parts with tester and eliminate possible malfunctions one by one.

   b. Detailed troubleshooting steps

Step	Description
1	Obtain detailed information when electrical malfunction occurs.
2	Operate affected system, and perform a road test as necessary.
	Confirm malfunction parameter.
	If it is impossible to duplicate malfunction, refer to "Electrical Malfunction Simulation Test".
3	Collect proper diagnosis materials, which include:
	Circuit Diagram
	System Schematic Diagram Relevant Chapter in Service Manual
	Service Bulletin
	Perform diagnosis according to system operation knowledge and customer feedback that we possess.
4	Check if there is any bonding, loose connector or damaged wire harness in the system. Determine related circuits and components, and diagnose according to circuit diagram and wire harness layout diagram.
5	Repair circuit and replace component as necessary.
6	Operate system in all modes. Confirm that system can operate normally in all conditions. Confirm that you have not inadvertently created new malfunctions during your diagnosis or repair steps.

4. Circuit Simulation Test

   Non-regular malfunctions and other malfunctions that cannot be detected through a road test can be detected by circuit simulation test. Possible vehicle malfunction can be determined efficiently by simulating condition/environment when the malfunction occurs.

   Simulation test can be classified into following 7 types:

   - Vehicle vibration test
   - Thermosensitive test
   - Freezing test
   - Leakage test
   - Load test
   - Cold/hot start test
   - Voltage drop test

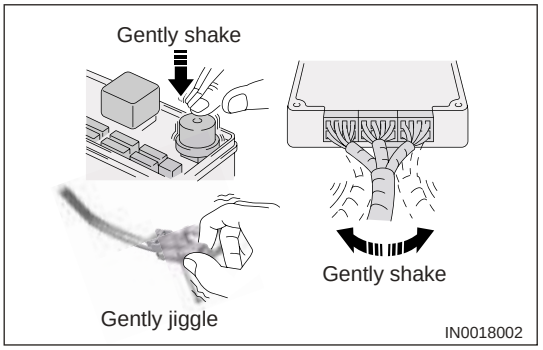
   Hint:
   It is extremely important to listen carefully to customer's description about the malfunction for simulating the conditions when symptoms occur.

5. Vehicle vibration test

   When vehicle is running on an uneven road or engine is vibrating (A/C is on and engine is idling), malfunctions may occur. In this case, check conditions related to vibration. Check following areas on vehicle:

a. Connector and wire harness

Determine connectors and wire harnesses that may affect the electrical system being inspected. When monitoring whether the system has malfunctions that are being simulated, vibrate or wiggle each connector and wire harness slightly. This test may show loose or poor electrical connections.



Hint:
When a connector is exposed to humid environment, a layer of corrosive film may be formed on its terminals. With connector connected, this condition may not be found by visual check. If an intermittent malfunction occurs, it may be caused by corrosion. It is recommended that terminals of relevant connectors in system should be checked and cleaned after disconnecting the connectors.

b. Sensors and relays

Slightly vibrate sensors and relays in system being checked. The sensors or relays that are loose or poorly installed may be found through this test.

c. Engine compartment

- There are many reasons for electrical malfunction that occurred due to vehicle vibration, and it is necessary to check following conditions:
  - Connectors are not installed correctly.
  - Wire harness is not long enough, so it is extended when engine is vibrating or shaking.
  - Wire harness hangs over brackets or movable components.
  - Ground wire is loose, dirty or corrosive.
  - Wire harness is too close to high temperature components.
- To inspect components under the engine hood, first confirm if ground connection is in perfect condition (refer to the grounding inspection described below). First confirm that system is correctly grounded. Then slightly vibrate the wire harness or components as previously instructed method to check if connection is loose. Refer to the circuit diagram to check continuity of wire harness.

d. Backside of instrument panel

- Improper wire clamping will cause wire harnesses to be entangled when installing accessories. Vibration of vehicle will cause wire harnesses near the bracket or mounting screw to wind excessively.
- When vehicle vibrates, unclamped or loose wire harness will be stuck in seat components (such as slide guide). When wire harness passes through the underside of mounting area, check if it is damaged or stuck.

6. Thermosensitive test

In hot weather or after vehicle is parked for a short time, some users may worry about the vehicle condition. At this time, it is necessary to perform thermosensitive test. Perform test by heating components with a heat gun or equivalent.

⚠ Caution

- DO NOT heat components to a temperature higher than 60°C (140°F).
- If malfunction occurs when performing heating test for components, replace or properly insulate the components as necessary.

7. Freezing test

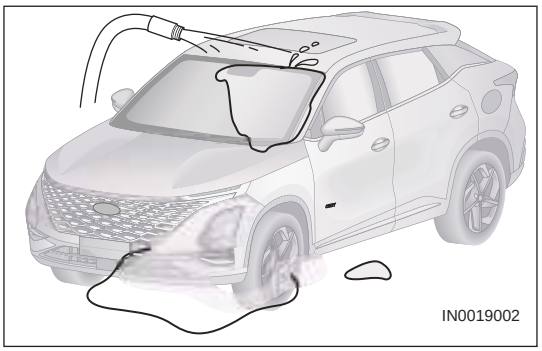
If malfunction disappears after warming up vehicle in winter, it may be caused by freeze of some parts in the wire harness/electrical system. Use following two methods to check this condition:

Method 1: Put vehicle outdoors overnight. Make sure that temperature is low enough to duplicate the malfunction. Perform a quick and thorough diagnosis for component that may be affected in the morning.

Method 2: Put suspected part in refrigerating room and wait until it is frozen. Reinstall the part to vehicle and check if malfunction reoccurs. If malfunction occurs, repair or replace the component.

8. Leakage test

Malfunction may occur only during high humidity or in rainy or snowy weather. In this case, malfunction may occur due to the water entering electrical parts. Leakage can be checked by spraying water to vehicle (similar to car wash).



9. Load test

Malfunction occurs only when electrical equipment is turned on. Turn on electrical equipment (A/C, rear window defogger, radio and fog lights, etc.) one by one and determine the relationship between electrical equipment and malfunction. Determine the malfunction by a load test.

10. Cold/hot start test

Some malfunctions occur in cold start and disappear when engine warms up. In this case, park vehicle without operation for a whole night and restart it the next day. Perform test and determine the cause quickly.

11. Voltage drop test

Generally, voltage drop test is used to find out the possible causes that affect normal function of electrical components or circuits.

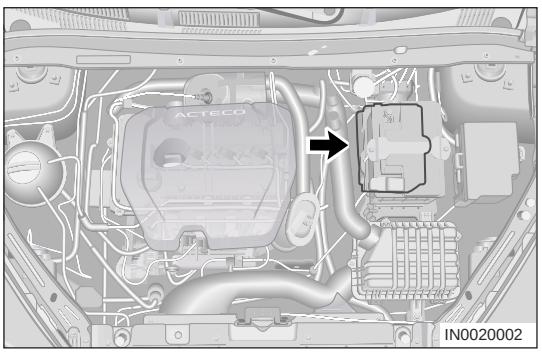
Check circuit with a digital multimeter.

If resistance of single wire harness measured by a digital multimeter is very low (0 Ω˛ or close to 0 Ω˛), the wire harness or circuit is normal.

Unnecessary resistance in circuit may be caused by poor, loose grounding, corrosive switch contact and loose wire harness connector or adapter.

12. Precautions for Control Module and Electrical Components Inspection

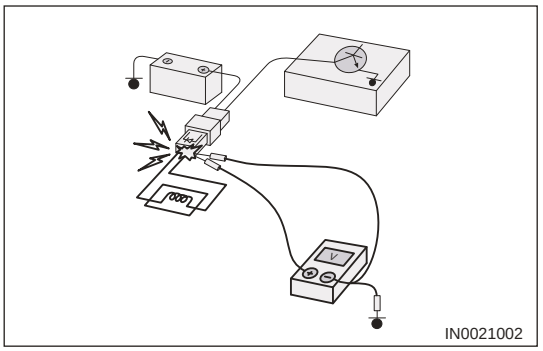
- Before performing electrical operations, turn ENGINE START STOP switch to LOCK and disconnect negative battery cable (arrow), then wait for 2 minutes until backup power supply of airbag module is depleted (w/ airbag system).



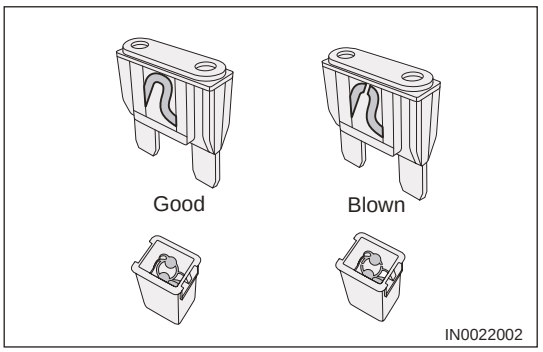
- Disconnecting battery cable will delete the clock, audio and DTC records. Therefore, it is necessary to confirm these records before disconnecting the cable.
- Never connect electrodes of battery terminals reversely.
- ?Only install components that meet the vehicle specifications.

13. Inspect input and output conditions of components and their functions before replacing control module.

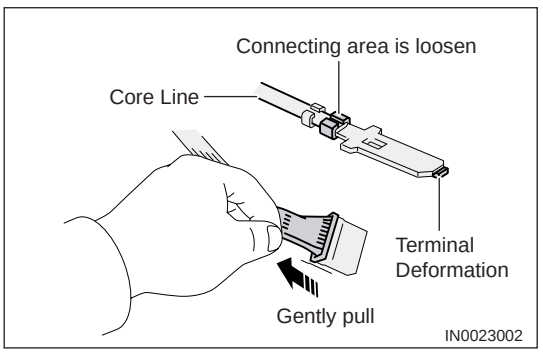
- When disconnecting components:
  - Do not use excessive force when disconnecting connectors.
  - If connector is installed with a tightening bolt, loosen bolt and then disconnect the connector by hand.
- When connecting components:
  - Make sure that terminals are not bent or damaged, and then connect connectors correctly before installation.
  - Tighten bolt until painted area of connector is flush with the surface when installing connector with a tightening bolt.
- Never drop or hit control modules to prevent excessive impact.
- Avoid that condensation is formed on control modules due to extreme change of temperature, and keep them free from water drop or rain. If water is found on the control module, dry it thoroughly and then install it to vehicle.
- Be careful not to allow fluid to adhere to control module connectors.
- Avoid cleaning the control module with volatile fluid.
- When using digital multimeter, be careful not to get testing probes to contact with each other to result in a short circuit. Avoid damaging the battery due to short circuit in power transistor inside a control module.



14. Check fuse
    - Check that fuse wire is connected.
    - If fuse wire is blown, confirm that there is no short in circuit.
    - A fuse with the same rated amperage must be used for replacing.



15. How to Check Connector
    - Many electrical malfunctions are caused by electrical connections or wire malfunctions, and also may be caused by the bonding of components or relays. Before determining if malfunction is caused by components or wire harness assembly, check if connection of the connectors is good.



16. Check connector with a digital multimeter
    - Damaged connectors and poor connections are caused by incorrect connector detection during circuit inspection.

- Probes of digital multimeter may be connected incorrectly with socket of connector. To detect the connector correctly, use a “T” shaped pin and follow procedures below. To obtain optimal connection, clamp the "T" shaped needle with a spring clamp.
  a. Detect from wire harness side
     - If there is a back cover for connector, remove the back cover before detecting terminal.
     - Do not detect the water-proof connector from wire harness side. Failure to do this may damage the seal between wire harness and connector.
  b. Detect from terminal side
     - Female terminal: Do not insert any object that is bigger than male terminal into the female connector.
     - Male terminal: Carefully detect contact surfaces of each terminal with a “T” shaped needle. Do not bend the terminal.

17. Check terminal contact spring for proper tension

- Contact spring on terminal may produce intermittent signals in circuit.
- If intermittent open circuit occurs, follow procedures below to check open wire harness and contact spring on female terminal.
  - Use a male terminal matched with female terminal.
  - Disconnect the suspected defective connector and secure terminal side upward.
  - When securing wire harness of male terminal, try to insert male terminal into female terminal.
  - Move connector and check if male terminal can be inserted easily.

  Hint:
  If male terminal can be inserted into female terminal easily, replace the female terminal.

MAINTENANCE

MAINTENANCE ITEMS

Maintenance Schedule Table

The maintenance schedule lists vehicle maintenance items that need to be carried out. Please go to Chery authorized service station for maintenance according to mileage in maintenance schedule.For general area, maintenance interval is 10,000 km or 12 months (whichever comes first) after first maintenance is performed.If you vehicles always used in severe driving conditions, you should follow the maintenance requirement each 5,000 km or 6 months (whichever comes first).Only Castrol oil (SN 5W-30; SP 5W-30) and Fuchs (C5 0W-20) can reach the maintenance requirement every 15,000 km or 1 year, Please follow the recommendation of Chery authorized service station.I: Inspect, adjust, clean or replace if necessary; R: Replace.

For general driving conditions*											
Maintenance Items	Months	12	24	36	48	60	72	84	96	108	120
	Km×1,000	10	20	30	40	50	60	70	80	90	100
For general driving conditions*											
Maintenance Items	**Months**	**6**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**
	Km×1,000	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Meter Indicating System		I	I	I	I	I	I	I	I	I	I
Video and Entertainment System		I	I	I	I	I	I	I	I	I	I
Diagnostic Tester Inspection		I	I	I	I	I	I	I	I	I	I
Front Wiper Blades		I	I	I	I	I	I	I	I	I	I
Rear Wiper Blades		I	I	I	I	I	I	I	I	I	I
Wiper System		I	I	I	I	I	I	I	I	I	I
Cooling Effect		I	I	I	I	I	I	I	I	I	I
Air Conditioning System		I	I	I	I	I	I	I	I	I	I
Air Conditioning Filter		I	I	I	I	I	I	I	I	I	I
Coolant Level		I	I	I	I	I	I	I	I	I	I
Freezing Point of Coolant		I	I	I	I	I	I	I	I	I	I
Brake Fluid		It is recommended to replace every 2 years or 40,000 km (whichever comes first)									

For general driving conditions*											
Maintenance Items	**Months**	**6**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**
	Km×1,000	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Brake Fluid Level		I	I	I	I	I	I	I	I	I	I
Water Content of Brake Fluid		I	I	I	I	I	I	I	I	I	I
Engine Oil and Oil Filter		R	R	R	R	R	R	R	R	R	R
Engine Oil Level		I	I	I	I	I	I	I	I	I	I
Transmission Fluid (7DCT)		Replace every 60,000 km									
Transmission Fluid (CVT)		40,000 km for the first time, no need to replace after that.									
Transmission Fluid Level		I	I	I	I	I	I	I	I	I	I
Fuel Filter		External fuel filter: Replace every 30,000 km; Internal fuel filter: The integrated fuel pump is maintenance free type(troubleshoot the cause of failure).									
Battery Voltage		I	I	I	I	I	I	I	I	I	I
Shock Absorber		I	I	I	I	I	I	I	I	I	I
Propeller Shaft and Boot		I	I	I	I	I	I	I	I	I	I
Torque of Chassis Bolt		I	I	I	I	I	I	I	I	I	I
Steering Gear		I	I	I	I	I	I	I	I	I	I
Steering Column		I	I	I	I	I	I	I	I	I	I
Steering Link, Ball and Boot		I	I	I	I	I	I	I	I	I	I
Tire Appearance		I	I	I	I	I	I	I	I	I	I
Tire Pattern		I	I	I	I	I	I	I	I	I	I
Tire Inflation Pressure		I	I	I	I	I	I	I	I	I	I
Spare Tire Inflation Pressure		I	I	I	I	I	I	I	I	I	I
Torque of Wheel Bolt		I	I	I	I	I	I	I	I	I	I
Tire Rotation		It is recommended to rotate tires every 10,000 km (the optimal adjustment range is 5,000 - 7,000 km).									
Spark Plug		I	I	I	I	I	I	I	I	I	I

For general driving conditions*										
Maintenance Items	**Months**	**6**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**
	Km×1,000	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Brake Plate		I	I	I	I	I	I	I	I	I	I
Air Filter		I	I	I	I	I	I	I	I	I	I
Drive Belt		I	I	I	I	I	I	I	I	I	I
Engine Oil Pan and Drain Bolt		I	I	I	I	I	I	I	I	I	I
Transmission Housing Body		I	I	I	I	I	I	I	I	I	I
Related Fluid Line (such as: steering, braking and fuel etc.) and Wire Harness		I	I	I	I	I	I	I	I	I	I
Charcoal Canister Filter (If Equipped)		Replace every 3 years or 60,000km (whichever comes first)									
Timing Chain (If Equipped)		Maintenance-free (except for the cause of failure).									
Battery		Maintenance-free (except for the cause of failure).									
Throttle Valve		It is recommended to clean every 15,000 km.									
Four-wheel Alignment		Check four-wheel alignment every 20,000 km and adjust if necessary.									
Fuel Vapor Rubber Pipe		It is recommended to replace every 10 years or 500,000 km (whichever comes first).									
Refueling Hose of Fuel		It is recommended to replace every 5 years or 200,000 km for products made of ordinary rubber (such as NBR+PVC/CSM, etc.) (whichever comes first); It is recommended to replace every 10 years or 500,000 km for products made of fluororubber (whichever comes first). It is recommended to replace the above hoses timely which may cause performance defect such as crack.									
*: We recommend that you ask your Chery authorized service station for the actual maintenance schedule applied to your vehicle.											

Hint:

- The frequency of scheduled inspection and maintenance services in the table is minimal. However, it may be necessary that they be performed more frequently depending on road conditions, weather, atmospheric conditions and vehicle usage. These conditions may differ from one country to another. Therefore, there may be special requirement in your country. We recommend that you ask your Chery authorized service station for the actual maintenance schedule applied to your vehicle.
- Continue periodic maintenance beyond 100,000 km or 120 months by returning to the third column of the maintenance schedule and adding 100,000 km or 120 months to the column headings.
- For some countries, there may be special maintenance specifications. We recommend that you ask your Chery authorized service station for the actual maintenance specifications applied to your vehicle.

⚠ Caution

- The engine oil and oil filter should be replaced more frequently if the vehicle drives under severe conditions mentioned in the following examples*.
- It should be checked every 5,000 km or 6 months (whichever comes first) if the vehicle drives under severe conditions mentioned in the following examples*.
- The lubricant should be replaced every 5,000 km or 6 months (whichever comes first) if the vehicle drives in the following areas.
  - High humidity areas.
  - Mountainous areas.
  - Extremely cold and hot areas.
  - Drive on rough roads (bumpy roads, gravel roads, snow, etc.) for a long time.
  - Drive on mountain roads, uphill/downhill for a long time.
  - Drive the vehicle for a short distance frequently.
  - In many cases, drive in high temperature (higher than 32℃), heavy traffic urban road.
  - When used as a police car, taxi, commercial vehicle, trailer, etc.
- The air filter and air conditioning filter should be replaced more frequently if the vehicle drives under severe conditions mentioned in the following examples*.

*Examples of severe driving conditions:

- Drive in extremely cold and hot weather (only for engine oil, engine oil level, steering and suspension system).
- Drive the vehicle for a short distance frequently (only for engine oil, engine oil level, disc brake pads and discs /front and rear axle boots and axle shaft joint portions, brake lining and drums).
- Drive on dusty roads (only for air cleaner element, disc brake pads and discs /- front and rear axle boots and axle shaft joint portions, brake lining and drums, air filter element for the climate control system).
- Drive on rough and/or muddy roads (only for disc brake pads and discs /front and rear axle boots and axle shaft joint portions, brake lining and drums, air filter element for the climate control system).
- Drive in areas where road salt or other corrosive materials are used (only for fuel system, lines and connections, disc brake pads and discs/front and rear axle boots and axle shaft joint portions, brake lining and drums, inspect brake lines and check operations of parking and service brake system, steering and suspension system).
- In the coastal areas (only for fuel system, lines and connections, disc brake pads and discs /front and rear axle boots and axle shaft joint portions, brake lining and drums, inspect brake lines and check operations of parking and service brake system, steering and suspension system).

Maintenance Schedule Table

The maintenance schedule table lists the maintenance items to be performed by the vehicle. Please go to Chery sales service provider for inspection according to the mileage stipulated in maintenance schedule.

Fluid Name	Specification	After-sale Maintenance
Oil (SQRE4T15C)	Castrol SN 5W-30Castrol SP 5W-30Lukoil SN 5W-40Total SN +/SP 5W-30Royal Dutch Shell SN+ 5W-30Royal Dutch Shell SN 5W-40Fuchs SN 5W-40	4.7 ± 0.2 L (replace the oil and oil filter at the same time)
Oil (SQRF4J16)	Castrol SN 5W-30Castrol SP 5W-30	4.3 ± 0.2 L (replace the oil and oil filter at the same time)
Transmission Fluid (730DHB)	Sinopec DCTF-GS	4.25 ± 0.2 L
Transmission Fluid (025CHC)	Royal Dutch Shell CVTF WCF-1	7.3 ± 0.2 L
Coolant	Full Organic Antifreeze (LEC-II)	9 ± 0.5 L
Brake Fluid	DOT4	/
Spark plug	3707AAG	/

⚠ Warning

- Only use recommended fluid by Chery. Using other specifications may damage vehicle other systems.
- The above filling amount is for reference only. The specific filling amount is subject to the actual vehicle measurement.
- After the brake fluid is drained, it is needed to perform brake line air bleeding. The amount of brake fluid consumed during the air bleeding process is not fixed for each vehicle. Approximately 1L- of brake fluid is required to replace the brake fluid.

Adjustment Item

Adjustment item list:

Adjustment Item	Note
Front Combination Light Adjustment	/

INSPECTION ITEMS

Off-vehicle Inspection

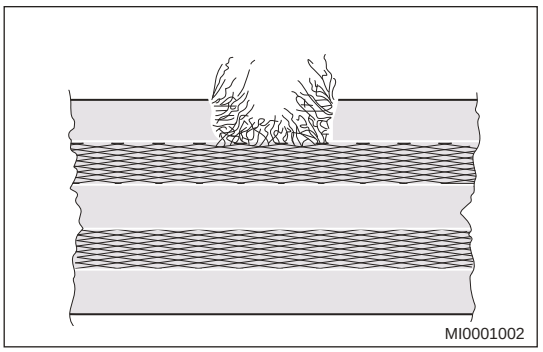
1. Check the wheel nut.
    c. Check wheel nuts for looseness or missing. Tighten if necessary.
2. Check the wheel and tire (spare tire included)
3. Tire rotation
    a. It is recommended to perform tire rotation every 10000 km (the optimum adjustment and rotation mileage is 5000 - 7000 km). However, the best suitable time for tire rotation differs depending on driver’ s driving habits and road conditions.
4. Check wiper blades
5. Check hood and doors
    a. Check the hood.
    b. Check the front door.
    c. Check the rear door.
    d. Check back door lock

On-vehicle Inspection

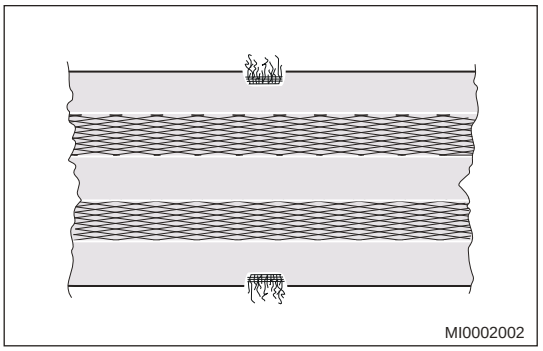
1. Check seat belt
    a. Check the seat belt buckle and retractor.
        - Pull out the seat belt quickly and repeatedly when the seat belt is static. If the seat belt retractor cannot lock the seat belt at one time during inspection, replace the seat belt assembly.
        - Engage the tab on the seat belt buckle, and pull the seat belt by hand repeatedly to check the engagement. If the buckle cannot lock the seat belt at one time, replace the seat belt assembly.

> **⚠ Caution**
>
> When checking impacted vehicle, be sure to check seat belt system. If there is any damage or malfunction in the seat belt system, replace it.

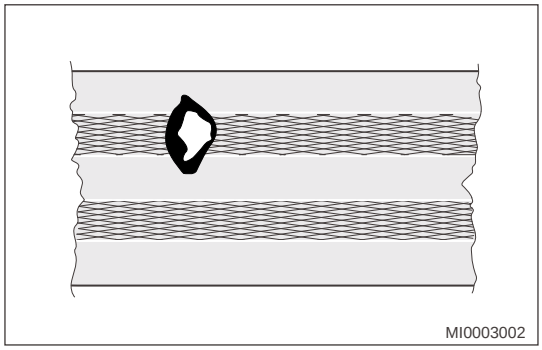
    b. Pull out the seat belt and check the belt for oil stains or damage. Clean or replace if necessary.
    c. Replace the seat belt as soon as possible if any of the following occurs.
        - Seat belt is broken, torn or worn.



        - Edge of seat belt webbing is broken.



- There is a burnt mark of cigarette butt on the seat belt.



2. Check horn
   - Check that the horn operates.
3. Check vehicle lights
   - Check that the headlights, brake lights, taillights, turn signal lights and other vehicle lights illuminate or blink. Furthermore, check the brightness of vehicle lights.
4. Check windshield
   - Check for scratches, dents or wear.
5. Check windshield wiper and washer
   - Check that washers are properly aligned. Also, check that washer fluid hits the center of operating range of each wiper on the windshield.
   - Check whether any wiper blade is damaged. Replace the wiper blades if necessary.
6. Check windshield defroster
   - Turn on A/C defroster mode switch, check that air comes out of front defroster outlets.
   - Press the rear defroster switch for a period of time, then check that the rear windshield heats.

⚠ Caution
DO NOT touch the heated rear windshield for a long time to prevent burns.

7. Check rear view mirror
   - Check that the rear view mirrors are securely installed.
8. Check sun visor
   - Check that the sun visors are securely installed and move freely.
9. Check seat
   - Check the front seat assembly.
   - Check the rear seat assembly.
10. Check clutch pedal
11. Check accelerator pedal
    - Check that the accelerator pedal operates smoothly. Check that the pedal does not have uneven resistance or does not get stuck in certain position.

Engine Compartment Inspection

1. Check engine oil level
2. Check engine drive belt
3. Check engine for oil leakage

a. Turn off all electrical equipment and the ignition switch, and remove the key.
b. Support and raise the vehicle.
c. Check crankshaft pulley for oil stains. If there are oil stains, check engine crankshaft front oil seal for leakage. If there are leaks, replace the crankshaft front oil seal.
d. Check oil pan and drain plug for oil stains. Repair or replace related parts if necessary.
e. Check transmission filler plug, drain plug and case for oil stains. Repair or replace related parts if necessary.
f. If leakage occurs to the crankshaft front oil seal after repair, it may be caused by 3 reasons as follows:
   - Crankshaft thrust washer wears.
   - Crankcase ventilation system blocks.
   - Engine oil is excessive.

4. Check battery
   - Check battery and battery voltage.
   - Check the charging system charging voltage.
5. Check the windshield washer fluid.
   a. If washer nozzle cannot spray washer fluid, the fluid reservoir may be empty. In this case, stop operating washer and add washer fluid to a proper level immediately.

> **⚠ Caution**
>
> DO NOT use water as washer fluid when ambient temperature is below 0°C, otherwise, washer may be damaged due to the frozen water.

6. Check the coolant level.
   a. When engine is cold, check if the coolant level is between “MAX” and “MIN” lines. If the level is below the “MIN” line, it is necessary to add coolant between “MAX” and “MIN” marks.

7. Check cooling system hose
   - Check that there are no cracks, kinks, corrosion or loose connections on the cooling system hose.

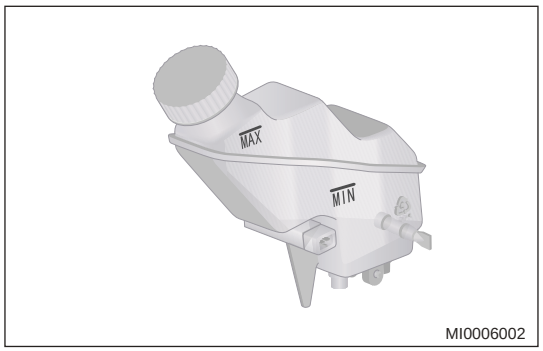
Brake System Inspection

> **⚠ Caution**
>
> Generally, brake fluid level will change slightly because of the wear of brake pad, but it must be kept between “MIN” and “MAX” lines.

1. Check brake fluid level

Hint:

- When the brake fluid level drops near the “MIN” line, the wear of brake pad may approach its limit.
- After the brake pad is replaced, the brake fluid level should be at the upper part between “MAX” and MIN lines.
  a. Perform visual inspection with the driver airbag assembly removed from vehicle. Check wire harnesses for cuts and cracks, and if connectors are chipped. Check steering wheel for deformation.
  b. Make sure there is no air in the brake system and the depressing feel of brake pedal is well. Perform brake bleeding procedures if necessary.
  c. Check if the brake fluid level is between “MAX” and “MIN” lines.
  d. If the brake fluid level drops to the “MIN” line or below, add brake fluid and check the brake system for leakage.



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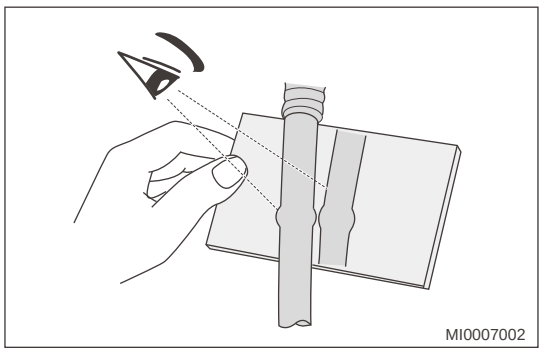
2. Check brake pedal
3. Check brake lines and hoses

Hint:
Work in a well-lighted area. Turn front wheels to the rightmost or leftmost position before inspection.

a. As shown in the illustration, check the entire circumferential surface of brake lines and hoses with a mirror. Check for the following conditions:
   - Damage
   - Wear
   - Deformation
   - Cracks
   - Corrosion
   - Leakage
   - Bending
   - Twists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b. Check all the clamps for tightness and check the connections for leakage.
c. Check that the hoses and lines are not near the sharp edges, moving parts or exhaust system.

4. Check parking brake
   - Check that the parking brake can hold the vehicle steadily on a slight slope.
5. Check front disc brake assembly
6. Check rear disc brake assembly

Chassis Inspection

1. Check front axle hub
2. Check front control arm and control arm ball pin
3. Check rear axle hub
4. Check front stabilizer bar assembly, rubber mounting and rubber boot
5. Check rear coil spring assembly

6. Check exhaust pipe
   - Visually check the pipes, hanger blocks and connections for serious corrosion, leakage or damage.

Final Inspection

1. Check operation of body parts
   a. Hood.
      - Hood support rod is proper.
      - Hood locks securely when closed.
   b. Front and rear doors.
      - Door locks operate properly.
      - Doors close properly.
   c. Back door.
      - Door lock operates properly.
      - Back door closes properly.
   d. Seats.
      - Seats are adjusted freely and locked securely in any position.
      - Front seatback can be locked securely in any position.
      - Rear seatbacks can be locked securely after folding down.
2. Be sure to deliver a clean vehicle. Focus on the following items:
   - Steering wheel
   - Shift lever
   - All switch knobs
   - Door handles
   - Seat

Specifications (parameters standard for four-wheel alignment)

Items		Specified Value
Front Wheel	Front Wheel Camber	-25′ ± 45′
	Kingpin Caster Angle	4°14′ ±60′
	Kingpin Inclination Angle	11°30′ ±60′
	Front Wheel Toe-in	5′ ± 5′
Rear Wheel	Front Wheel Camber	-1°20′ ±30′
	Front Wheel Toe-in	10′ ±20′
Side-slip Value		⩽ 3 m/km

SQRE4T15C ENGINE MANAGEMENT SYSTEM

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SQRE4T15C ENGINE MANAGEMENT SYSTEM

SQRE4T15C ENGINE MANAGEMENT SYSTEM

Warnings and precautions

Precautions

In order to avoid dangerous operation and damage to the vehicle before repair in this section, always follow the instructions below before repair:

1. Digital multimeter can only be used to perform inspection for electronic injection system.
2. Use genuine components to perform service work, otherwise appropriate electronic injection system operation cannot be guaranteed.
3. Only use unleaded gasoline during service.
4. Please observe normative service and diagnostic flowchart to perform service work.
5. Never disassemble or remove components of electronic injection system during service.
6. When holding electronic elements (electronic control unit, sensor etc.), take extra care not to drop them on the ground.
7. Set up a consciousness of environmental protection and dispose of waste effectively that is produced during service.
8. Never use an needle multimeter to check electronic fuel injection system circuit.
9. Never use high power test light to measure when testing each pin voltage signal of sensor.
10. It is recommended that the measurement status when testing each pin voltage signal of sensor is on-line measurement.
11. It is recommended to use voltage drop method when measuring sensor, actuator connecting wire harness.
12. Do not causally remove any electronic injection system component or its connector from its installation position to prevent damaging accidentally, or foreign matter, such as moisture, oil from entering connectors, which will affect the normal operation of electronic injection system.
13. Be sure to turn ignition switch off when disconnecting and connecting connectors. Otherwise electronic elements may be damaged.
14. When simulating hot operating condition of malfunction and performing other service work that may cause temperature to rise, never allow temperature of electronic control unit to exceed 80℃.
15. As the supplying pressure of electronic injection system is high, high pressure resistant fuel pipes are adopted for all fuel lines. Fuel pressure in fuel lines is still high even when the engine is not running. Therefore, be careful not to casually remove fuel pipes during service; When it is necessary to service fuel system, discharge pressure in the fuel system before removing fuel pipes. The way to discharge pressure is as follows: After removing fuel pump controller power supply fuse, start engine and idle it until the engine stops running by itself. Removal of fuel pipes should be performed in a well-ventilated area by professional service men.
16. Do not energize electric fuel pump when removing it from fuel tank to prevent electric sparks, which will cause a fire.
17. It is not allowed to perform running test for fuel pump under dry state or in water. Otherwise service life will be reduced. In addition, do not inversely connect fuel pump positive and negative poles.
18. When performing inspection to ignition system, perform spark jump test only when necessary and make sure that the test time is as short as possible. Do not open the throttle during detection, otherwise a large amount of unburned gasoline will enter the exhaust pipe, thus damaging the three-way catalytic converter.
19. Since the adjustment of idle speed is completely completed by electronic injection system, manual adjustment is not required. Throttle limit screw of throttle body has been adjusted properly at the factory, and users are not allowed to change its original position at will.
20. Do not connect battery with its polarity reversed to prevent damage to electronic elements. This system adopts negative ground.

21. Never remove battery cable when engine is running.
22. The positive, negative battery cable wires and electronic control unit must be removed before performing welding on vehicle.
23. Do not puncture wire outer coat to detect electric signals input and output by components.

General Information

System Basic Principle

SQRE4T15C engine electronic control system of model adopts UAES ME17U6.1. The system mainly consists of Engine Control Unit (ECU), sensors and actuators, which controls intake air amount, injection volume and ignition timing, etc. when engine is operating. In the engine management system, sensors are used as the input part to measure various physical signals (temperature and pressure, etc.), and converts them into corresponding electrical signals; the function of ECU is to receive the input signals from sensors and perform calculation according to set procedure, producing corresponding control signals and outputting them to power drive circuit. The power drive circuit drives each actuator to perform various actions, thus making the engine run according to the preset program. Also, the trouble diagnosis system of ECU monitors each component and control function in this system. Once detecting and confirming a fault, it will store the trouble code. When detecting that fault has been eliminated, it will return to use normal value.The most important characteristic of ME17U6.1 engine electronic control management system is the use of torque based control strategy. The main purpose of the torque based control strategy is to associate a large number of different control objectives. This is the only way to flexibly choose to integrate various functions into different variants of ECU according to engine and vehicle model.

Basic Management Function of Engine

1. System structure based on torque.
2. Cylinder load is determined by intake pressure sensor.
3. Improved air-fuel mixture control function in static and dynamic conditions.
4. λ closed-loop control.
5. Fuel is injected from each cylinder sequentially.
6. Ignition timing, including cylinder-by-cylinder knock control.
7. Emission control function.
8. Catalytic converter heating.
9. Canister control.
10. Idle control.
11. Limp home.

Additional Function

1. Immobilizer function.
2. Communication with torque and external system (example: gear train or vehicle dynamic control).

Diagnosis On-line OBD

1. Complete a series of OBD functions.
2. Management system for diagnostic functions.

Torque structure: ME17U6.1 system based on torque control

In ME17U6.1 torque-based engine management system, all internal and external demands of engine are defined with the torque or efficiency requirements of the engine as shown in figure 2-3. By converting the various demands of engine into control variables for torque or efficiency, these variables are then first processed in central torque demand coordinator module.ME17U6.1 system can prioritize these conflicting requirements and execute the most important requirement. Obtain engine control parameters such as required fuel injection time and ignition timing with torque conversion module. The execution of this control variable has no effect on other variables. This is the advantage of the torque-based control system. Similarly, when engine matching is performed, due to the variable independence of the torque control

system, only the engine data is relied on when matching the engine characteristic curve and pulse diagram, and there is no interference with other functional functions and variables, thus avoiding repeated calibration, simplifying the matching process and reducing the matching cost.

Main features of ME17U6.1 system:

- New torque-variable engine functional structure is most compatible with other systems and has strong expandability.
- New modular software structure and hardware structure with strong portability.
- Model-based engine basic characteristic diagram is independent of each other, and simplifies the calibration process.
- Sequential fuel injection with phase sensor is used to improve emissions.
- Anti-theft function is incorporated in system.
- Improve driving performance through centralized coordination of various torque requirements.
- 32 bits CPU, 40 MHz clock frequency.

Control Signal: Input/Output Signal of ME17U6.1 System

Main sensor input signals of ECU in ME17U6.1 system

- Intake pressure signal.
- Electronic accelerator pedal signal.
- Intake temperature signal.
- Throttle rotation angle signal.
- Coolant temperature signal.
- Engine speed signal.
- Phase signal.
- Knock sensor signal.
- Oxygen sensor signal.
- A/C pressure signal.
- Boost pressure signal.

Control signals in ME17U6.1 system

- Electronic throttle opening.
- Injection timing and fuel injection duration.
- Fuel pump relay.
- Canister control valve opening.
- Ignition coil closing angle and ignition advance angle.
- A/C compressor relay.
- Cooling fan relay.
- Electronic waste gate actuator.

System Function

Start control

During starting, special calculation methods are used to control the filling, fuel injection and ignition timing. At the beginning of the process, the air in intake manifold is still, and the internal pressure of intake manifold is shown to be ambient pressure.The specific “injection timing” is designated as the initial injection pulse in a similar process.The fuel injection is changed according to engine temperature to promote the formation of oil film on intake manifold and cylinder wall, so the mixture should be enriched when the engine reaches a certain speed. Once the engine starts to run, the system starts to reduce the start and thicken immediately, until the start condition ends to completely cancel the start and thicken.

Ignition angle is constantly adjusted with starting conditions. It varies with engine temperature, intake air temperature and engine speed.

Heating control of engine warm-up and three-way catalyst

After engine is started at low temperature, cylinder volume, fuel injection and electronic ignition are adjusted to compensate higher engine torque request; And this process continues until temperature rises to a proper threshold.In this stage, rapid heating of three-way catalytic converter is the most important, since rapid transition to operation of three-way catalytic converter can greatly reduce exhaust emissions. Under this working condition, adopt moderate retard ignition advanced angle and use exhaust gas to perform “three-way catalytic converter heating”.

Acceleration/deceleration and motored fuel cut-off control

When the throttle opening increases, some of the injected fuel is absorbed by oil film. Therefore, it is necessary to inject the corresponding fuel amount to compensate and prevent the mixture from becoming lean during acceleration. Once the load factor is reduced, the additional fuel contained in the oil film on intake manifold wall will be released again, so the corresponding injection duration must be reduced during deceleration.Wheel drag or traction condition indicates that the power provided by engine at the flywheel is negative. In this case, engine friction and pump air loss can be used to slow down the vehicle. When the engine is in wheel drag or traction condition, the fuel is cut off to reduce fuel consumption and exhaust emissions, and more importantly to protect the three-way catalyst.Once the speed has been reduced to a specific recovery of the fuel supply speed above idle speed, the fuel injection system is resupplied. In fact, the ECU program has a range of recovery speed. They vary according to engine temperature, dynamic change of engine speed, etc., and they are calculated to prevent the speed from falling to the specified minimum threshold.Once the injection system is resupplied, the system begins to use the initial injection pulse to supply the fuel and rebuild the oil film on the intake manifold wall. After recovery of fuel injection, the torque-based control system increases the engine torque slowly and smoothly (smooth transition).

Idle control

Engine does not provide torque to the flywheel at idle. To ensure stable operation of the engine at as low an idle speed as possible, the closed-loop idle speed control system must maintain the balance between the generated torque and the engine power consumption. The idle speed requires a certain amount of power to meet the load requirements of all aspects. They include internal friction from the engine crankshaft and valve gear and auxiliary components such as the water pump.ME17U6.1 system uses torque based control strategy to determine engine output torque requested by maintaining required idling speed in all working conditions according to closed loop idle control. This output torque increases as engine speed reduces, and reduces as engine speed increases. System responses to the new “interference factor” through requesting higher torque, such as turning on/off air conditioning compressor or shifting of automatic transmission. When engine temperature is low, torque is also needed to be increased to compensate higher internal friction and/or maintain higher idling speed. The sum of these required output torque will be transmitted to torque coordinator which will process, calculate and obtain corresponding volumetric density, mixture contents and ignition timing.

λ closed-loop control

Exhaust aftertreatment in three-way catalytic converter is an effective method for reducing concentration of harmful substance in exhaust gas. Three-way catalytic converter can reduce hydrocarbon (HC), carbon monoxide (CO) and oxynitride (NO_2) up to 98% or more, and convert them into water (H_2O), carbon dioxide (CO_2) and nitrogen (N_2). However, such high efficiency can be achieved only within small range of engine excess air coefficient λ=1, λ closed loop control is aimed to ensure mixture concentration within this range.λ closed loop control system functions only when oxygen sensor is equipped. Oxygen sensor on side of three-way catalytic converter monitors oxygen content in exhaust gas, lean mixture (λ > 1) will generate about 100 mV sensor voltage, and rich mixture (λ < 1) will generate about 900 mV sensor voltage. When (λ = 1), sensor voltage will jump. λ closed loop control responses to input signal (λ > 1 = lean mixture, λ < 1 = rich mixture) to correct control variable, a correction factor is generated as a multiplier to correct the fuel injection duration.

Evaporative emission control

Due to external transfer of radiant heat and returned fuel heat, the fuel in fuel tank is heated and forms fuel vapor. Due to limits of evaporative emission regulations, these vapors containing a large amount of HC components are not allowed to be discharged directly into the atmosphere. In system, fuel vapor will be

collected in activated carbon canister through guide pipe and enters into engine and participates in the combustion process through scour at the right moment. Flow rate of scour airflow is realized by ECU controlling canister control valve. This control operates only under closed loop working condition of λ closed loop control system.

Knock control

System detects characteristic vibration at moment knock occurs through knock sensor installed in proper position of engine, and converts it into electrical signal to transmit it to ECU for processing. ECU uses special processing method to detect if knock occurs in each combustion cycle in each cylinder. Once knock is detected, knock closed loop control is triggered. After knock danger is eliminated, ignition of affected cylinder will be gradually advanced to predetermined ignition advance angle.Knock control threshold has good adaptability to different working conditions and different grades of fuel.

System Malfunction Diagnosis Function Introduction

Malfunction information record

Electronic control unit constantly monitors sensors, actuators, related circuits, malfunction indicator light, battery voltage and so on, and even electronic control unit itself. And it performs reliability detection for sensor output signal, actuator drive signal and internal signals (such as λ closed loop control, coolant temperature, knock control, idle speed control and battery voltage control, etc.). Once a certain step failure or untrusted signal value is found, electronic control unit will immediately set malfunction information record in RAM malfunction memory. Malfunction information record is stored in the form of trouble code and displays in the order in which malfunctions occurred.Frequency of malfunction can be divided into “steady state malfunction” and “intermittent malfunction” (for example, due to a short break of the wire harness or poor contact of the connector).

Malfunction light description and its control strategy

1. Activation of MIL light follows the below principles:
   a. ENGINE START STOP switch is turned to ON (not started), and MIL remains on.
   b. After the engine is started, if there is no malfunction request for turning on MIL in malfunction memory, MIL goes off.
   c. There is malfunction request for turning on MIL in malfunction memory, or there is request for turning on MIL at outside of ECU, MIL will turn on.
   d. When there is a MIL flashing request at outside of ECU, or there is a MIL flashing request in misfire cause, or there is malfunction request that flashes MIL as necessary in malfunction memory, MIL will flash at a frequency of 1Hz.
2. On vehicles equipped with an electronic throttle system, there is EPC indicator light that used to indicate engine electronic control system related faults besides MIL light. In general, EPC indicator light is used to indicate (electronic accelerator and electronic throttle) related faults.
3. Activation of EPC indicator light follows the below principles:
   e. ENGINE START STOP switch is turned to ON (not started), and EPC remains on.
   f. After the engine is started, if there is no malfunction request for turning on EPC indicator light in malfunction memory, EPC indicator light goes off.
   g. There is malfunction request for turning on EPC in malfunction memory, or there is request for turning on EPC at outside of ECU, EPC will turn on.

Diagnostic tester display

1. Engine parameter display:
   a. Engine speed, coolant temperature, throttle opening, ignition advance angle, injection pulse width, intake pressure, intake temperature, vehicle speed, system voltage, injection correction, canister scour rate, idle air control, oxygen sensor waveform;
   b. Target speed, relative engine load, ambient temperature, ignition closing time, evaporator temperature, intake air flow, fuel consumption amount;
   c. Throttle valve position sensor signal voltage, coolant temperature sensor signal voltage, intake temperature sensor signal voltage, intake pressure sensor signal voltage, knock sensor terminal 1 signal voltage, knock sensor terminal 2 signal voltage.

2. Actuator test function:
   a. Malfunction light, fuel pump, A/C relay, fan, canister purge valve and throttle opening.
3. Version information display:
   a. Frame number (VIN), ECU hardware number, ECU software number.
4. Malfunction display:
   a. Intake temperature/pressure sensor, boost temperature/pressure sensor, engine coolant temperature sensor, throttle valve position sensor, oxygen sensor, oxygen sensor heating line, air-fuel ratio correction, fuel injector of each cylinder, fuel pump, knock sensor, speed sensor, phase sensor, canister control valve, cooling fan relay, vehicle speed signal, idle speed, electronic throttle body, system voltage, ECU, A/C compressor relay, evaporator temperature sensor, malfunction light.

System features

- Multi-point sequential injection system.
- New torque-variable engine functional structure is most compatible with other systems and has strong expandability.
- New modular software structure and hardware structure with strong portability.
- Phase sensor signal is adopted (phase sensor).
- Signal plate with 60-2 teeth is used to identify speed signal (speed sensor).
- Electronic throttle body idle speed control is used.
- Realized idle torque closed-loop control.
- Cylinder-by-cylinder independent knock control (knock sensor).
- Equipped with function of heating and protecting catalytic converter.
- Equipped with limp home function, etc.

Control Strategy

A/C control strategy

1. 8s after engine is started, A/C compressor is allowed to operate. Within 8s of engine starting, even if the A/C request switch is pressed, A/C compressor will not engaged.
2. When coolant temperature is higher than 115 degrees, A/C is powered off. When coolant temperature is below 113 degrees, A/C control resumes. When coolant temperature is between 106 and 114 degrees, A/C control status does not change.
3. When engine speed exceeds 6520 rpm or below 560 rpm, A/C is powered off. A/C control resumes when engine speed is between 640 rpm and 6320 rpm. When the engine speed is in range of 6320 - 6520 rpm and 560 - 640 rpm, A/C maintains the previous state.
4. When the battery voltage is lower than 9.5 V, A/C is powered off, and A/C control resumes when battery voltage is higher than 11 V; When the battery voltage is higher than 16 V, A/C is powered off, and A/C control resumes when battery voltage is lower than 15 V.
5. Due to the large A/C engine torque consumption, this model has developed an accelerated disconnection A/C strategy. When the accelerator pedal is depressed firmly, A/C will be powered off to ensure dynamic property when overtaking. When the A/C is disconnected for more than a certain period of time or the driver accelerator pedal opening is reduced, A/C will be turned on again.

Fan control strategy

1. Fan control strategy when engine is running normally:

   Hint:
   This model equipped with a two-speed fan, and ECU judges and controls different fan speeds based on water temperature, A/C pressure signal and vehicle speed signal.

a. Speed limit thresholds of fan to stop rotation in each state are as follows:
   - When coolant temperature is higher than 94℃ and vehicle speed is lower than 80, low speed fan operates; After coolant temperature is lower than 91℃, low speed fan stops operating.
   - When coolant temperature is higher than 105℃ and vehicle speed is lower than 80, high speed fan operates; After coolant temperature is lower than 102℃, high speed fan stops operating.
   - When coolant temperature is higher than 110℃ and vehicle speed is higher than 80, high speed fan operates; After coolant temperature is lower than 107℃, high speed fan stops operating.

b. Fan control strategy after stalling:
   - If coolant temperature is higher than 101℃ or air temperature in manifold is higher than 70℃ after engine stalls, fan will operate at high speed.
   - If coolant temperature is lower than 98℃ or air temperature in manifold is lower than 67℃, fan stops operating at high speed.
   - Fan operates at most 40s after stalling.

Three-way catalytic converter protection control strategy

1. When engine is operating normally, if exhaust pipe model temperature exceeds 880℃, exhaust temperature concentration protection function is activated, and ECU reduces the exhaust temperature by increasing the air-fuel ratio.
2. When exhaust pipe temperature drops below 830℃, concentration protection stops operating and the air-fuel ratio returns to normal.
3. When engine is operating normally, if catalytic converter central model temperature exceeds 900℃, catalytic converter protection function is activated and ECU reduces the catalytic converter temperature by increasing the air-fuel ratio.
4. When catalytic converter central temperature drops below 850℃, concentration protection stops operating and air-fuel ratio returns to normal.

Canister solenoid valve control strategy

1. Canister solenoid valve opening conditions:
   a. Engine coolant temperature is higher than 60℃.
   b. Engine air-fuel ratio control has entered the closed loop.
   c. Canister solenoid valve trouble-free.
2. Canister solenoid valve opening control:
   a. Openings of canister solenoid valve are different at different engine speeds and loads. ECU calculates the current opening of canister solenoid valve according to the conditions such as engine speed, load, and air-fuel ratio fluctuation.

Oxygen sensor heating logic

1. Oxygen sensor must reach a certain temperature in order to work normally, usually at 350℃ to 900℃. It is not enough to heat by exhaust temperature only. Therefore, there is a fuse inside oxygen sensor for heating specially. Heating with low power before dew point and heating with high power or even full-power after the dew point. So that the oxygen sensor can reach the operating temperature as soon as possible.
2. Dew point mark is an important input for oxygen sensor heating, mainly to protect the oxygen sensor.

3. Physical background of dew point. After the engine is started and exhaust system temperature is lower for a certain period of time, water vapor may condense on exhaust system. If the oxygen sensor ceramic body exceeds a certain temperature during this period, and condensation splashes on oxygen sensor ceramic body, condensation may cause the ceramic body to break. Therefore, it is necessary to monitor oxygen sensor temperature and exhaust pipe wall temperature near the oxygen sensor in real time when engine is started. Waste water is always condensing on the exhaust pipe wall in general. When the temperature of exhaust pipe wall reaches a certain value, it will stagnate for a period of time or the rate of rise will be slower due to the condensation of water vapor and overlap of the evaporation process. Temperature at this point is called the dew point temperature. If the wall temperature continues to rise, water vapor in the exhaust will no longer condense and evaporate on exhaust pipe wall.

Knock control strategy

1. Knock control is activated when engine coolant temperature exceeds 40℃ and engine load is more than 36%.
2. ECU performs knock control through feedback signal from knock sensor. When knock is detected, ECU delays the ignition angle by a fixed step of -3 degrees, and the maximum delay of ignition angle is 12 degrees. If no new knock is detected for several consecutive combustions, the delayed ignition angle will recover with a step size of 0.75 until the delayed ignition angle is fully recovered or a new knock is detected.
3. If there is a knock sensor failure, ECU will reduce the output ignition angle of the engine to ensure the safety of engine.

Ignition control strategy

1. Ignition coil charging control:
   a. Ignition coil magnetization time determines the ignition energy of the spark plug. Normally the supply voltage is close to 14V when the vehicle is working normally. If the vehicle generator is not working properly, the supply voltage may be much lower than 14V, and may even drop to 6V or lower. In order to get the same ignition energy, the ECU will change the charging time of primary coil.
2. Ignition advance angle calculation:
   a. Ignition angle control when starting: During the start-up stage of engine, system uses a separated ignition angle MAP to control the starting reliability of engine. When engine is started, system switches to normal ignition angle control mode.
   b. Ignition advance angle control at idle speed: Engine ignition angle does not operate at the optimum ignition angle when idling, but instead operates at an angle less than the optimal ignition angle. If the engine idle fluctuates or the external impact occurs, ECU can quickly correct the ignition angle to ensure the stability of idle speed.
   c. Ignition advance angle control during normal driving: When the engine is running at a constant speed, the engine is operating at the maximum ignition angle allowed under this operating condition.
   d. Ignition advance angle control during acceleration and deceleration: In order to ensure the smoothness during acceleration and deceleration, the ECU controls the ignition angle for torque intervention during acceleration and deceleration.

Fuel pump control strategy

1. When the ignition switch is turned to ON for the first time, ECU controls the operation of oil pump. After the oil pump flow reaches the set fuel supply, oil pump stops operating. If the engine has not been started, after the engine has been stopped for more than 100 seconds, oil pump will operate again after the ignition switch turned to ON each time and after three consecutive operations, oil pump will no longer operate after ignition switch turned to ON.
2. When ECU detects the engine starting, it will control the operation of oil pump.
3. When the engine is running normally, ECU controls oil pump to work continuously.

Specifications

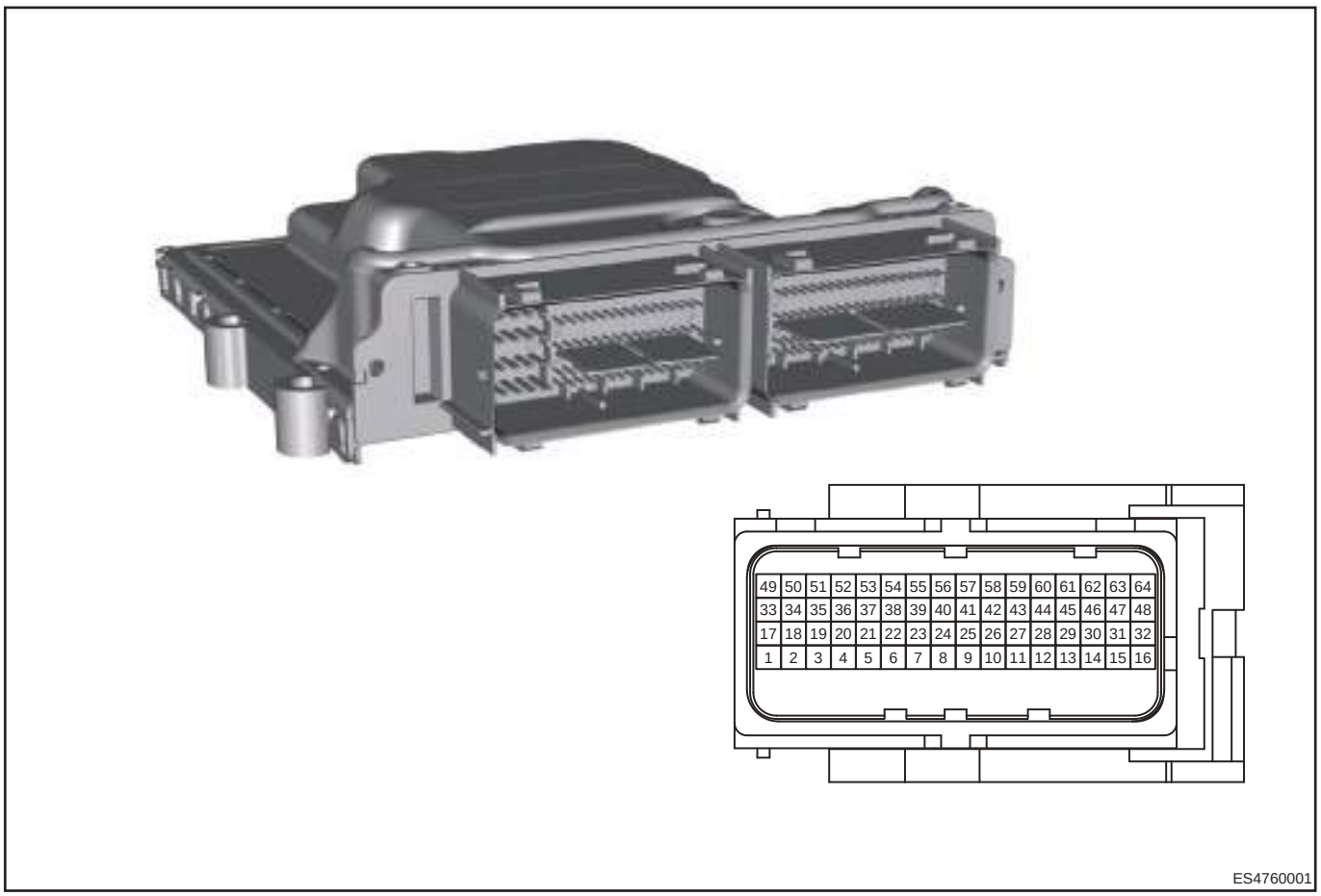
Torque Specifications

Description	Torque (N·m)
Intake Pressure Sensor Fixing Bolt	7 ± 1
Knock Sensor Fixing Bolt	20 ± 5
Engine Speed Sensor Fixing Bolt	8 ± 2
Camshaft Position Sensor Fixing Bolt	8 + 3
VVT Control Valve Fixing Bolt	8 ± 2
ECU Fixing Bolt	8 ± 2
Coolant temperature sensor	15 ± 1

Circuit Diagram

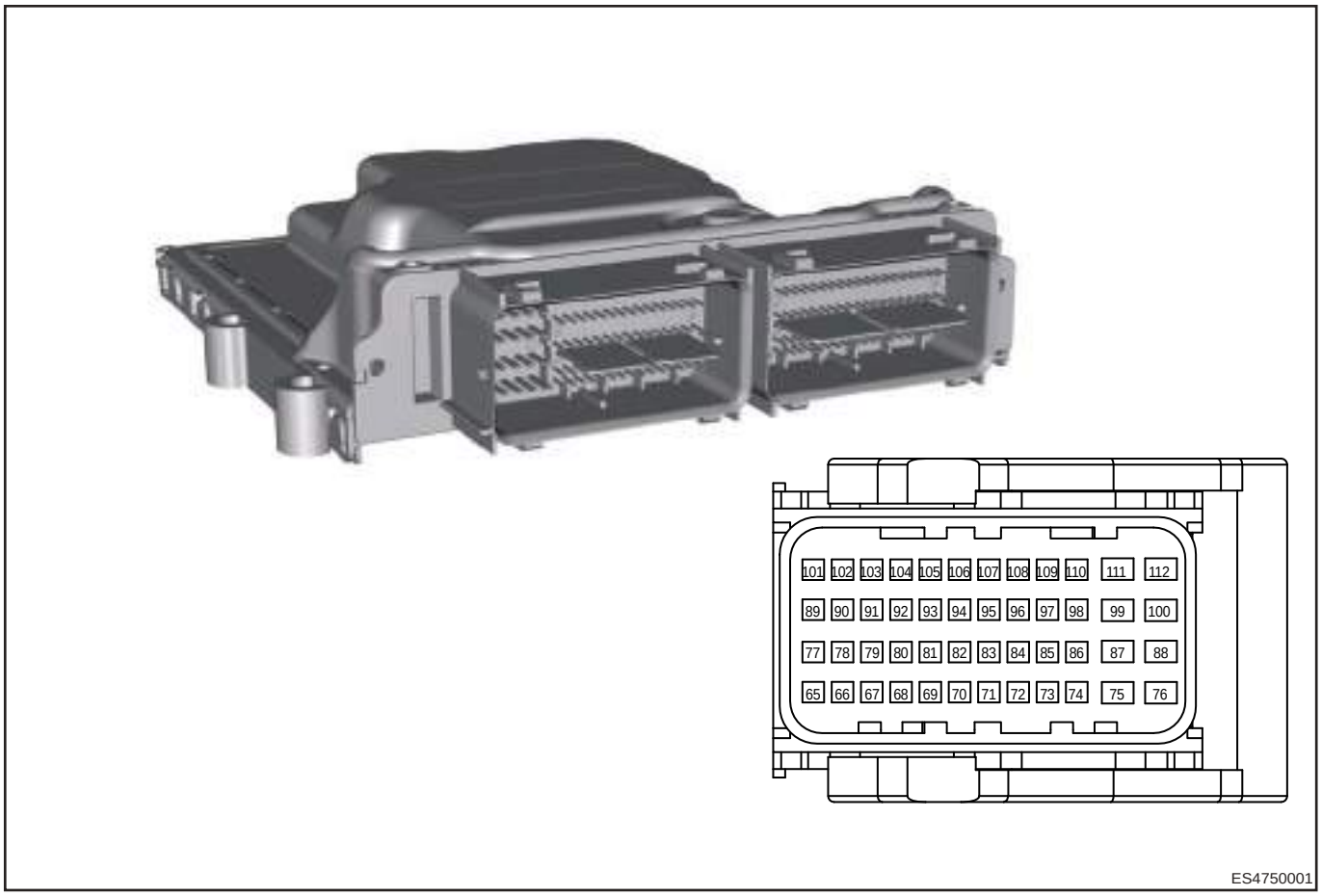
Terminal Definition

Terminal Definition



Pin	Definition	Pin	Definition
1	PCAN H	33	-
2	Front Oxygen Sensor Feedback Voltage	34	-
3	-	35	IGN Power
4	-	36	Electronic Accelerator Pedal Power Source
5	Main Relay	37	Electronic Accelerator Pedal Power Source
6	-	38	-
7	Electronic Accelerator Pedal Ground	39	-
8	-	40	-
9	Spiral Cable Signal	41	Oil Pump Relay
10	High/Low Pressure Switch	42	A/C Compressor Relay
11	Front Oxygen Sensor Virtual Ground Voltage	43	Rear Oxygen Sensor Ground
12	Absolute Brake Vacuum Sensor Signal	44	-
13	2nd Path Water Temp Sensor Signal	45	Electronic Accelerator Pedal Signal
14	Front Oxygen Sensor Control Signal	46	Boost Pressure Sensor Signal
15	Power Source	47	Sensor Ground
16	Power Source	48	Rear Oxygen Sensor Heating
17	PCAN L	49	-
18	-	50	-
19	Sensor Power Source	51	Fan Control High Speed
20	Power Source	52	-
21	Rear Oxygen Sensor Signal	53	-
22	-	54	Vacuum Pump Relay
23	Brake Switch Normal Close Signal	55	-
24	Medium Pressure Switch	56	Fan Control Low Speed
25	Brake Switch Normal Open Signal	57	-
26	-	58	-
27	-	59	Electronic Accelerator Pedal Ground
28	Front Oxygen Sensor Correction Resistance	60	3rd Path Water Temp Signal
29	-	61	-

Pin	Definition	Pin	Definition
30	Electronic Accelerator Pedal Signal	62	Boost Pressure Sensor Signal
31	Exhaust Bypass Valve Motor +	63	Ground 2
32	Exhaust Bypass Valve Motor -	64	Ground 1



Pin	Definition	Pin	Definition
65	-	89	Knock Sensor Signal
66	-	90	Knock Sensor Ground
67	Cylinder 2 Injection Nozzle	91	Intake Pressure and Temperature Sensor Signal
68	Cylinder 1 Injection Nozzle	92	Electronic Water Pump 1
69	Variable Camshaft Timing (Exhaust)	93	Phase Sensor Signal 2
70	-	94	Canister Control Valve
71	Variable Camshaft Timing Valve (Intake)	95	Phase Sensor Ground
72	Cylinder 3 Injection Nozzle	96	Engine Speed Sensor Signal
73	Ignition Coil 2	97	-
74	Cylinder 4 Injection Nozzle	98	Phase Sensor Power Source

Pin	Definition	Pin	Definition
75	-	99	Electronic Throttle Body Actuator Motor +
76	Front Oxygen Sensor Heating	100	Electronic Throttle Body Actuator Motor -
77	Electronic Throttle Body Signal	101	Cooling Temperature Sensor Signal
78	Electronic Throttle Body Signal	102	Intake Pressure and Temperature Sensor Signal
79	Exhaust Bypass Valve Signal	103	Tank Pressure Sensor Signal
80	-	104	-
81	Ignition Coil 1	105	Phase Sensor Signal 1
82	Ignition Coil 3	106	Electronic Water Pump 2
83	Ignition Coil 4	107	Electronic Throttle Body Power Source
84	Engine Speed Sensor Ground	108	Engine Speed Sensor Power Source
85	Sensor Ground	109	Sensor Power Supply
86	Electronic Throttle Body Ground	110	-
87	-	111	Ground
88	Electronic Thermostat	112	Ground

Diagnosis & Test

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Possible Cause
Engine does not crank or cranks slowly while starting.	Battery
	Starter
	Wire harness or ENGINE START STOP switch
	Starter Relay
	ECU, TCU
	Engine mechanical
Engine cranks normally but cannot start successfully while starting.	No fuel in tank
	Fuel Pump
	Fuel injector
	Engine speed sensor

Symptom	Possible Cause
	Ignition coil
	Engine immobilizer
	ECU
	Engine mechanical
Difficult to start with hot engine	Engine speed sensor
	Ignition coil
	Fuel Pump
	Coolant temperature sensor
	Engine mechanical
	Camshaft sensor
Difficult to start with cold engine	Fuel Pump
	Coolant temperature sensor
	Fuel injector
	Ignition coil
	Engine mechanical
Engine speed is normal, but it is difficult to start at anytime.	Fuel quality
	Fuel Pump
	Coolant temperature sensor
	Fuel injector
	Ignition coil
	Intake passage
	Ignition timing
	Spark plug
	Engine mechanical
Engine starts normally, but idles roughly at anytime.	Fuel quality
	Fuel Pump
	Coolant temperature sensor
	Fuel injector
	Electronic throttle body
	Intake passage
	Ignition timing

Symptom	Possible Cause
	Spark plug
	Engine mechanical
Engine starts normally, but idles roughly after warming up.	Fuel quality
	Coolant temperature sensor
	Electronic throttle body
	Intake passage
	Spark plug
	Engine mechanical
Engine starts normally, but idles roughly or stalls with part load (for example, A/C is ON).	Electronic Throttle
	Generator
Engine starts normally, but idle speed is too high.	Electronic throttle body
	Intake pipe air leaked
	Coolant temperature sensor
Low engine speed or stalls when accelerating	Intake pressure sensor
	Intake pipe
	Exhaust pipe
	Ignition timing
	Throttle position sensor
	Fuel injector
	Spark plug
Slow response when accelerating	Intake pressure sensor
	Intake pipe
	Exhaust pipe
	Ignition timing
	Throttle position sensor
	Fuel injector
	Spark plug
Lack of power and poor performance when accelerating.	Intake pressure sensor
	Intake pipe
	Exhaust pipe
	Ignition timing

Symptom	Possible Cause
	Throttle position sensor
	Fuel injector
	Spark plug

DTC Confirmation Procedure

Confirm that battery voltage is normal before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn ENGINE START STOP switch to ON.
- Use the diagnostic tester to record and clear DTCs stored in engine system.
- Turn ENGINE START STOP switch to OFF and wait for several seconds.
- Turn ENGINE START STOP switch to “ON”, and then select read DTC.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Check engine system components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition
P049900	EVAP System Vent Valve Control Circuit High
P049800	EVAP System Vent Valve Control Circuit Low
P044700	EVAP System Vent Valve Stuck Closed
P242200	EVAP System Vent Valve Stuck Closed
P150000	EMS Received Crash Signal
P150100	Airbag Communicate Message Unplausible
P209100	“B” Camshaft Position Actuator Control Circuit High Bank 1
P209000	“B” Camshaft Position Actuator Control Circuit Low Bank 1
P001300	“B” Camshaft Position Actuator Control Circuit Open Bank 1
P000B00	“B” Camshaft Position Slow Response Bank 1
P005A00	“B” Camshaft Profile Control Performance/ Stuck Off Bank 1
P064500	A/C Compressor Relay Control Circuit
P064700	A/C Compressor Relay Control Circuit High
P064600	A/C Compressor Relay Control Circuit Low
P258D00	Vacuum Pump Control Circuit "A" High
P258C00	Vacuum Pump Control Circuit "A" Low
P258A00	Vacuum Pump Control Circuit Open
P050F00	Brake Assist Vacuum Too Low
P057100	Brake Signal Synchronization Error
U015187	Lost Communication with Restraints Control Module
U016487	Lost Communication With CLM
U014087	Lost Communication with BCM
U015587	Lost Communication with ICM
U021487	Lost Communication with Passive Entry Passive Start (PEPS)
U012687	Lost Communication with SAM
P218324	Engine Coolant Temperature Sensor 2 Circuit Range/Performance
P218323	Engine Coolant Temperature Sensor 2 Circuit Range/Performance

DTC	DTC Definition
P218500	Engine Coolant Temperature Sensor 2 Circuit High
P218400	Engine Coolant Temperature Sensor 2 Circuit Low
P059700	Thermostat Heater Control Circuit Open
P059900	Thermostat Heater Control Circuit High
P059800	Thermostat Heater Control Circuit Low
P012800	Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)
U012987	Lost Communication with ESP Module
U010187	Lost Communication with TCM
P012300	Electronic Throttle Position Sensor 1 Signal Circuit Voltage Too High
P012200	Electronic Throttle Position Sensor 1 Signal Circuit Voltage Too Low
P012100	Throttle Position Sensor 1 Performance Non-plausible
P057500	Cruise Control Input Signal Not Plausible
P057800	Clamping Switch of Cruise Control
P022300	Electronic Throttle Position Sensor 2 Signal Circuit Voltage Too High
P022200	Electronic Throttle Position Sensor 2 Signal Circuit Voltage Too Low
P022100	Throttle Position Sensor 2 Performance Non-plausible
P151000	Diagnostic Fault Check Knock Control Signal Evaluation
P045128	EVAP System Pressure Sensor/Switch Circuit Range Performance
P045300	EVAP System Pressure Sensor&Switch Circuit High
P045200	EVAP System Pressure Sensor&Switch Circuit Low
P04512A	EVAP System Pressure Sensor&Switch Circuit Range Performance
P045125	EVAP System Pressure Sensor&Switch Circuit Range Performance
P155500	Throttle Actuator Electrical Malfunction
P210300	Electronic Throttle Drive Level Malfunction (Short Circuit)

DTC	DTC Definition
P211800	Electronic Throttle Drive Level Malfunction (-Overheating or Overcurrent)
P210600	Electronic Throttle Drive Level Malfunction (Non-plausible)
P210000	Electronic Throttle Drive Level Malfunction (Open Circuit)
P155400	Return Spring Check Max Error
P156100	Not Plausible Error of DV-E Position Deviation
P155C00	Throttle Limphome Position Self Learning Error
P155D00	Throttle PID Adjustment Max Error
P155E00	Throttle PID Adjustment Min Error
P155000	Throttle Self Learning Condition Not Fulfilled
P155F00	System Voltage Cannot Meet the Electronic Throttle Self-learning Condition
P156600	Throttle Mechanism Bottom Dead Center Relearning Error
P155100	Not Plausible Error of UMA Learning
P013300	O2 Sensor Circuit Slow Response Bank 1 Sensor 1
P062F41	Internal Control Module EEPROM Error
P062F42	Internal Control Module EEPROM Error
P062F43	Internal Control Module EEPROM Error
P208900	“A” Camshaft Position Actuator Control Circuit High Bank 1
P208800	“A” Camshaft Position Actuator Control Circuit Low Bank 1
P001000	“A” Camshaft Position Actuator Control Circuit Open Bank 1
P000A00	"A" Camshaft Position Slow Response Bank 1
P003C00	“A” Camshaft Profile Control Performance/ Stuck Off Bank 1
P050B00	Cold Start Ignition Timing Performance
P050B20	Cold Start Ignition Timing Performance
P026200	Cylinder 1 Injector "A" Circuit High
P026100	Cylinder 1 Injector "A" Circuit Low
P020100	Cylinder 1 - Injector Circuit Open

DTC	DTC Definition
P026800	Cylinder 3 Injector "A" Circuit High
P026700	Cylinder 3 Injector "A" Circuit Low
P020300	Cylinder 3 - Injector Circuit Open
P027100	Cylinder 4 Injector "A" Circuit High
P027000	Cylinder 4 Injector "A" Circuit Low
P020400	Cylinder 4 - Injector Circuit Open
P026500	Cylinder 2 Injector "A" Circuit High
P026400	Cylinder 2 Injector "A" Circuit Low
P020200	Cylinder 2 - Injector Circuit Open
P138824	Ambient Air Temperature Sensor "A" Multiple Check
P138823	Ambient Air Temperature Sensor "A" Multiple Check
P034100	Camshaft Position Sensor "A" Circuit Range/ Performance Bank 1 or Single Sensor
P001676	Crankshaft Position - Camshaft Position Correlation Bank 1 Sensor A
P034300	Camshaft Position Sensor "A" Circuit High Bank 1 or Single Sensor
P034200	Camshaft Position Sensor "A" Circuit Low Bank 1 or Single Sensor
P001678	Crankshaft Position - Camshaft Position Correlation Bank 1 Sensor A
P036600	Camshaft Position Sensor “B” Circuit Range/ Performance (Bank1)
P001776	Crankshaft Position - Camshaft Position Correlation Bank 1 Sensor B
P036800	Camshaft Position Sensor “B” Circuit High (Bank1)
P036700	Camshaft Position Sensor “B” Circuit Low (Bank1)
P001778	Crankshaft Position - Camshaft Position Correlation Bank 1 Sensor B
P033900	Crankshaft Position Sensor “A” Circuit Intermittent
P261700	Crankshaft Position Signal Output Circuit Open
P057500	Cruise Control Input Signal Not Plausible
P057800	Clamping Switch of Cruise Control

DTC	DTC Definition
P058500	Cruise Control A/D Conversion Malfunction
P217700	System Too Lean Off Idle Bank 1
P217800	System Too Rich Off Idle Bank 1
P046300	Fuel Level Sensor "A" Circuit High
P046200	Fuel Level Sensor “A” Circuit Low
U067600	Lost Communication with Fuel Level Sensor "A"
P25B000	Fuel Level Sensor "A" Stuck
P128400	Fuel Level Sensor "A" Circuit Range Performance
P046129	Fuel Level Sensor "A" Circuit Range Performance
P048000	Fan 1 Control Circuit
P048100	Fan 2 Control Circuit
P069200	Fan 1 Control Circuit High
P069400	Fan 2 Control Circuit High
P069100	Fan 1 Control Circuit Low
P069300	Fan 2 Control Circuit Low
P013400	O2 Sensor Circuit No Activity Detected Bank 1 Sensor 1
P219600	O2 Sensor Signal Biased/Stuck Rich Bank 1 Sensor 1
P219500	O2 Sensor Signal Biased/Stuck Lean Bank 1 Sensor 1
P013800	Downstream oxygen sensor signal circuit short to power supply
P013700	Downstream oxygen sensor signal circuit short to ground
P223200	O2 Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2
P013600	O2 Sensor Circuit Bank 1 Sensor 2
P005400	HO2S Heater Resistance Bank 1 Sensor 2
P003800	HO2S Heater Control Circuit High Bank 1 Sensor 2
P003700	HO2S Heater Control Circuit Low Bank 1 Sensor 2
P003600	HO2S Heater Control Circuit Bank 1 Sensor 2
P013A00	O2 Sensor Slow Response - Rich to Lean Bank 1 Sensor 2
P227100	O2 Sensor Signal Biased&Stuck Rich Bank 1 Sensor 2

DTC	DTC Definition
P227000	O2 Sensor Signal Biased&Stuck Lean Bank 1 Sensor 2
P223100	O2 Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 1
P003200	HO2S Heater Control Circuit High Bank 1 Sensor 1
P003100	HO2S Heater Control Circuit Low Bank 1 Sensor 1
P003000	HO2S Heater Control Circuit Bank 1 Sensor 1
P005300	HO2S Heater Resistance Bank 1 Sensor 1
P005326	HO2S Heater Resistance Bank 1 Sensor 1
P013500	O2 Sensor Heater Circuit Bank 1 Sensor 1
P064D17	Internal Control Module O2 Sensor Processor Performance Bank 1
P064D16	Internal Control Module O2 Sensor Processor Performance Bank 1
P064D81	Internal Control Module O2 Sensor Processor Performance Bank 1
P064D00	Internal Control Module O2 Sensor Processor Performance Bank 1
P035100	Ignition Coil "A" Primary Control Circuit Open
P035300	Ignition Coil "C" Primary Control Circuit Open
P035400	Ignition Coil "D" Primary Control Circuit Open
P035200	Ignition Coil "B" Primary Control Circuit Open
P230100	Ignition Coil “A” Primary Control Circuit High
P230700	Ignition Coil “C” Primary Control Circuit High
P231000	Ignition Coil “D” Primary Control Circuit High
P230400	Ignition Coil “B” Primary Control Circuit High
P230000	Ignition Coil “A” Primary Control Circuit Low
P230600	Ignition Coil “C” Primary Control Circuit Low
P230900	Ignition Coil “D” Primary Control Circuit Low
P230300	Ignition Coil “B” Primary Control Circuit Low
P062900	Fuel Pump “A” Control Circuit High
P062800	Fuel Pump “A” Control Circuit Low
P062700	Fuel Pump “A” Control Circuit Open
P032600	Knock Sensor Signal Circuit Voltage Too High
P032500	Knock Sensor Signal Circuit Voltage Too Low

DTC	DTC Definition
P070400	Clutch Switch Input Circuit
P032800	Knock/Combustion Vibration Sensor 1 Circuit High Bank 1 or Single Sensor
P032700	Knock/Combustion Vibration Sensor 1 Circuit Low Bank 1 or Single Sensor
P032815	Knock/Combustion Vibration Sensor 1 Circuit High Bank 1 or Single Sensor
P032714	Knock/Combustion Vibration Sensor 1 Circuit Low Bank 1 or Single Sensor
P124A00	Wastegate Actuator “A” Control Circuit Shorted
P2ABD00	Turbocharger/Supercharger Waste Gate Actuator "A" Driver Current/Temperature Too High
P124B00	Electric Waste Gate (E-WG) Actuator Control Chip SPI Bus Error
P024300	Turbocharger/Supercharger Waste Gate Solenoid "A"
P023400	Turbocharger/Supercharger Overboost Condition
P029900	Turbocharger/Supercharger "A" Underboost Condition
P050A22	Cold Start Idle Control System Performance
P050A21	Cold Start Idle Control System Performance
P050D00	Cold Start Rough Idle
P050700	Idle Control System RPM - Higher Than Expected
P050600	Idle Control System RPM - Lower Than Expected
P050500	Idle Control System
P262600	O2 Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1
P223700	O2 Sensor Positive Current Control Circuit Open Bank 1 Sensor 1
P013200	O2 Sensor Circuit High Voltage Bank 1 Sensor 1 (UN, VM, IA, IP)
P013100	O2 Sensor Circuit Low Voltage Bank 1 Sensor 1 (UN, VM, IA, IP)
P224300	O2 Sensor Reference Voltage Circuit Open Bank 1 Sensor 1
P225100	O2 Sensor Negative Current Control Circuit Open Bank 1 Sensor 1
P013000	O2 Sensor Circuit Bank 1 Sensor 1

DTC	DTC Definition
P030000	Random/Multiple Cylinder Misfire Detected
P154000	Engine Torque Control Adaption at Limit
P030100	Cylinder 1 Misfire Detected
P030300	Cylinder 3 Misfire Detected
P030400	Cylinder 2 Misfire Detected
P030200	Cylinder 2 Misfire Detected
P036300	Cylinder Selective Fuel Cutoff Active due to Catalyst Damaging Misfire
P070000	Transmission Control System (MIL Request)
P06AA00	Control Module Internal Temperature "B" Too High
P068600	ECM/PCM Power Relay Control Circuit Low
P153000	Function Monitoring: Fault of ECM ADC - Null Load Test Pulse
P153100	Function Monitoring: Fault of ECM ADC - Test Voltage
P157000	Function Monitoring:Fault of ECU Monitoring Module Error
P060D00	Internal Control Module Accelerator Pedal Position Performance
P152000	Function Monitoring: Check of Predicted Air Mass Failed
P152100	Function Monitoring: Fault of ECU Check of Injection Cut-off
P152200	Function Monitoring: Fault of ECU in Check of Cylinder Individual Fuel Corrections
P061C00	Internal Control Module Engine RPM Performance
P152300	Function Monitoring: Fault of ECU or Sensor in Mixture Check
P152700	Function Monitoring: Monitoring of ICO From Level1
P152800	Function Monitoring: Monitoring of ICO From Level2
P152400	Function Monitoring: Fault of ECU Comparison of Lambda and Operation Mode
P152500	Function Monitoring: Fault of ECU or Sensor in rl-Comparison
P152900	Function Monitoring: Fault of Starter Control
P061A00	Internal Control Module Torque Performance

DTC	DTC Definition
P152600	Function Monitoring: Fault of ECU Ignition Timing
P157600	OverVoltage of ECU VDD5
P157700	UnderVoltage of ECU VDD5
P001400	"B" Camshaft Position - Timing Over-Advanced or System Performance Bank 1
P001100	"A" Camshaft Position - Timing Over-Advanced or System Performance Bank 1
P021900	Engine Overspeed Condition
P157800	Diagnostic Fault Check to Report "WDA Active"
P157300	Diagnostic Fault Check to Report "WDA active" Due to Errors in Query/Response Communication
P157500	Diagnostic Fault Check to Report "WDA active" Due to Overvoltage Detection
P218700	System Too Lean at Idle Bank 1
P218800	System Too Rich at Idle Bank 1
P055800	Brake Booster Pressure Sensor Circuit High
P055700	Brake Booster Pressure Sensor Circuit Low
P145000	Brake Booster Pressure Sensor Circuit Range/ Performance (High)
P145100	Brake Booster Pressure Sensor Circuit Range/ Performance (Low)
P120000	Manifold Absolute Pressure Sensor Circuit Range/ Performance
P120100	Manifold Absolute Pressure Sensor Circuit Range/ Performance
P00C721	Intake Air Pressure Measurement System - Multiple Sensor Correlation Bank 1
P00C722	Intake Air Pressure Measurement System - Multiple Sensor Correlation Bank 1
P010800	Manifold Absolute Pressure Sensor Circuit High
P010700	Manifold Absolute Pressure Sensor Circuit Low
P010621	Manifold Absolute Pressure Sensor Circuit Range/ Performance
P010601	Manifold Absolute Pressure Sensor Circuit Range/ Performance
P01062A	Manifold Absolute Pressure Sensor Circuit Range/ Performance
P046800	EVAP Purge Flow Sensor Circuit High

DTC	DTC Definition
P046700	EVAP Purge Flow Sensor Circuit Low
P128500	EVAP Purge Flow Sensor Circuit Range Performance
P128600	EVAP Purge Flow Sensor Circuit Range Performance
P222900	Barometric Pressure Sensor "A" Circuit High
P222800	Barometric Pressure Sensor "A" Circuit Low
P223000	Barometric Pressure Sensor "A" Circuit Intermittent/Erratic
P120200	Barometric Pressure Sensor "A" Circuit Range/ Performance
P120300	Barometric Pressure Sensor “A” Circuit Range/ Performance
P222722	Barometric Pressure Sensor "A" Circuit Range/ Performance
P222721	Barometric Pressure Sensor “A” Circuit Range/ Performance
P023800	Turbocharger/Supercharger Boost Sensor "A" Circuit High
P023700	Turbocharger/Supercharger Boost Sensor "A" Circuit Low
P120400	Turbocharger/Supercharger Boost Sensor "A" Circuit Range/Performance
P120500	Turbocharger/Supercharger Boost Sensor "A" Circuit Range/Performance
P023622	Turbocharger/Supercharger Boost Sensor "A" Circuit Range/Performance
P023621	Turbocharger/Supercharger Boost Sensor "A" Circuit Range/Performance
P212300	Pedal Pos.Sensor 1 Circ. High Input
P212800	Throttle/Pedal Position Sensor/Switch “E” Circuit High
P212200	Throttle/Pedal Position Sensor/Switch “D” Circuit Low
P212700	Throttle/Pedal Position Sensor/Switch “E” Circuit Low
P201000	Intake Manifold Runner Control Circuit High Bank 1
P200900	Intake Manifold Runner Control Circuit Low Bank 1
P200800	Intake Manifold Runner Control Circuit/Open Bank 1

DTC	DTC Definition
P261000	ECM/PCM Engine Off Timer Performance
P061500	Starter Relay “A” Circuit
P061700	Starter Relay “A” Circuit High
P213800	Throttle/Pedal Position Sensor/Switch “D”/ “E” Voltage Correlation
P064100	Sensor Reference Voltage "A" Circuit Open
P065100	Sensor Reference Voltage "B" Circuit Open
P063442	Control Module Internal Temperature "A" Too High
P00CE24	Intake Air Temperature Sensor 1 Multiple Check Bank 1
P00CE23	Intake Air Temperature Measurement System - Multiple Sensor Correlation Bank 1
P011300	Intake Air Temperature Sensor 1 Circuit High Bank 1
P011200	Intake Air Temperature Sensor 1 Circuit Low Bank 1
P011400	Intake Air Temperature Sensor 1 Circuit Intermittent Bank 1
P138024	Intake Air Temperature Sensor 2 Multiple Check Bank1
P138023	Intake Air Temperature Measurement System - Multiple Sensor Correlation Bank 2
P009800	Intake Air Temperature Sensor 2 Circuit High Bank 1
P009700	Intake Air Temperature Sensor 2 Circuit Low Bank 1
P009900	Intake Air Temperature Sensor 2 Circuit Intermittent Bank 1
P044200	EVAP System Leak Detected (Small Leak)
P045500	EVAP System Leak Detected (Large Leak)
P04F000	EVAP System High Pressure Purge
P049600	EVAP System High Purge Flow
P049700	EVAP System Low Purge Flow
P045900	Evaporative Emission System Purge Control Valve Circuit High
P045800	Evaporative Emission System Purge Control Valve Circuit Low

DTC	DTC Definition
P044400	Evaporative Emission System Purge Control Valve Circuit Open
P01E424	Engine Coolant Temperature Sensor 3 Circuit Range/Performance
P01E423	Engine Coolant Temperature Sensor 3 Circuit Range/Performance
P01E600	Engine Coolant Temperature Sensor 3 Circuit High
P01E500	Engine Coolant Temperature Sensor 3 Circuit Low
P050C24	Cold Start Engine Coolant Temperature Performance
P050C23	Cold Start Engine Coolant Temperature Performance
P011800	Engine Coolant Temperature Sensor 1 Circuit High
P011700	Engine Coolant Temperature Sensor 1 Circuit Low
P011900	Engine Coolant Temperature Sensor 1 Circuit Intermittent
P011623	Engine Coolant Temperature Sensor 1 Circuit Range/Performance
P011626	Engine Coolant Temperature Sensor 1 Circuit Range/Performance
P007200	Ambient Air Temperature Sensor Circuit "A" Low
P007300	Ambient Air Temperature Sensor Circuit "A" High
P007000	Ambient Air Temperature Sensor Circuit "A"
P209700	Post Catalyst Fuel Trim System Too Rich Bank 1
P209600	Post Catalyst Fuel Trim System Too Lean Bank 1
P042000	Catalyst System Efficiency Below Threshold Bank 1
P069000	ECM/PCM Power Relay Sense Circuit High
P056300	System Voltage High
P056200	System Voltage Low
P056000	System Voltage Unstable
P241400	O2 Sensor Exhaust Sample Error Bank 1 Sensor 1
P256500	Turbocharger Boost Control Position Sensor "A" Circuit High
P256400	Turbocharger Boost Control Position Sensor "A" Circuit Low
P063443	Control Module Internal Temperature "A" Too High

DTC	DTC Definition
P121200	Vehicle Speed Sensor "A" Circuit Range/ Performance
P050300	Vehicle Speed Sensor "A" Circuit Intermittent/ Erratic/High
P050000	Vehicle Speed Sensor "A" Circuit
P050166	Vehicle Speed Sensor "A" Circuit Range/ Performance
P050165	Vehicle Speed Sensor "A" Circuit Range/ Performance
P161300	EMS Anti-theft Configuration Inconsistent with Model
P051300	Incorrect Immobilizer Key
P063300	Immobilizer Key Not Programmed-ECU/PCM
P161000	No Response Received by ECM/PCM After Challenge Sent
P161200	Internal Error When Writing Data to EEPROM
P161100	Invalid Initial Value in EEPROM
P024477	Turbocharger/Supercharger Wastegate Actuator "A" Range/Performance
P024437	Turbocharger/Supercharger Wastegate Actuator "A" Range/Performance
P003A00	Turbocharger/Supercharger Boost Control "A" Position Exceeded Learning Limit
P130100	Auxiliary Water Pump Dry Run Error
P261D00	Coolant Pump "B" Control Circuit High
P261C00	Coolant Pump "B" Control Circuit Low
P261A00	Coolant Pump "B" Control Circuit Open
P130300	Auxiliary Water Pump Out Of Voltage Error
P130400	Auxiliary Water Pump Over Current
P130500	Auxiliary Water Pump Over Temperature Error
P130600	Auxiliary Water Pump Feedback Signal High
P130700	Auxiliary Water Pump Feedback Signal Low
P130800	Auxiliary Water Pump Stall Error
P130900	Auxiliary Water Pump Under Voltage

P049900 Canister Vent Valve Control Circuit Short to Power Supply

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Canister vent valve control circuit is short to power supply.
   - Canister vent valve control circuit pin corresponding to ECU terminal is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Canister vent valve control circuit is short to power supply.	Yes	Repair wire harness
		No	Next
2	Canister vent valve control circuit pin corresponding to ECU terminal is short to power supply.	Yes	Check and repair ECU
		No	Diagnostic Help

P049800 Canister Vent Valve Control Circuit Short to Ground

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Canister vent valve control circuit is short to ground.
   - Canister vent valve control circuit pin corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Canister vent valve control circuit is short to ground.	Yes	Repair wire harness
		No	Next
2	Canister vent valve control circuit pin corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P044700 Canister Vent Valve Control Circuit Open

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Connector is not connected securely or is in poor contact.
   - Canister vent valve control circuit is open.
   - Canister vent valve control circuit power supply terminal is open or short to ground.
   - Canister vent valve control circuit fuse is blown or damaged.
   - Canister vent valve control circuit pin corresponding to ECU terminal is open or there is an internal circuit damage.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
2	Canister vent valve control circuit is open.	Yes	Repair wire harness

No.	Operation Step	Test Result	Subsequent Step
		No	Next
3	Canister vent valve control circuit power supply terminal is open or short to ground.	Yes	Repair wire harness
		No	Next
4	Canister vent valve control circuit fuse is blown or damaged.	Yes	Repair relay
		No	Next
5	Canister vent valve control circuit pin corresponding to ECU terminal is open or there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P242200 Canister Vent Valve Stuck Closed Problem

DTC reporting condition: Fuel tank pressure is lower than threshold.

1. Possible cause:
   - Voltage of canister vent valve pin is low, which makes the canister vent valve close.
   - Canister vent valve is stuck at normally closed position and cannot be opened.
   - Canister vent valve pipe is blocked.
   - Canister valve is stuck at normally open position.
   - Fuel tank pressure sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”		Next
2	Read and store fault freeze frame information.		Next
3	Keep sensor connector normal. Using a multimeter, check if voltage of canister vent valve pin is low and if it is short to ground.	Yes	Check wire harness and connector
		No	Next
4	Remove canister vent valve pipe and observe if it is blocked.	Yes	Replace pipe
		No	Next
5	Check if canister vent valve hardware is stuck at closed position.	Yes	Replace canister vent valve
		No	Next
6	Check if canister valve is stuck at normally open position.	Yes	Check canister valve wire harness and connector or replace canister valve
		No	Next
7	Replace fuel tank pressure sensor, start vehicle and run it for 10 minutes to check if malfunction reappears.	Yes	Diagnostic Help
		No	End

P150100 Airbag Communication Message Implausible

DTC reporting condition: Verification of signal sent from airbag controller to engine ECU is not passed.

1. Possible cause:
   - There is wire harness interference or unreliable signal transmission.
   - Verification of signal sent from airbag controller to engine ECU is not passed, and check if signal is abnormal.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	There is wire harness interference or unreliable signal transmission.	Yes	Interference is shielded
		No	Next
2	Verification of signal sent from airbag controller to engine ECU is not passed, and check if signal is abnormal.	Yes	Check airbag controller
		No	Diagnostic Help

P209100 “B” Camshaft Position Actuator Control Circuit High Bank 1

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Exhaust VVT control solenoid valve signal terminal is short to power supply.
   - Exhaust VVT control solenoid valve signal terminal pin corresponding to ECU terminal is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Exhaust VVT control solenoid valve signal terminal is short to power supply.	Yes	Repair wire harness
		No	Next
2	Exhaust VVT control solenoid valve signal terminal pin corresponding to ECU terminal is short to power supply.	Yes	Check and repair ECU
		No	Diagnostic Help

P209000 “B” Camshaft Position Actuator Control Circuit Low Bank 1

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Exhaust VVT control solenoid valve signal terminal is short to ground.
   - Exhaust VVT control solenoid valve power supply terminal is short to ground.
   - Exhaust VVT control solenoid valve signal terminal pin corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Exhaust VVT control solenoid valve signal terminal is short to power supply.	Yes	Repair wire harness
		No	Next

No.	Operation Step	Test Result	Subsequent Step
2	Exhaust VVT control solenoid valve signal terminal pin corresponding to ECU terminal is short to power supply.	Yes	Repair wire harness
		No	Next
3	Exhaust VVT control solenoid valve signal terminal pin corresponding to ECU is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P001300 “B” Camshaft Position Actuator Control Circuit Open Bank 1

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Pin corresponding to exhaust VVT control circuit is open.
   - Connector is in poor contact or is open.
   - Actuator side circuit is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Pin corresponding to exhaust VVT control circuit is open.	Yes	Repair, replace wire harness
		No	Next
2	Connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
3	Exhaust VVT circuit is damaged.	Yes	Replace VVT
		No	Next
4	ECU control pin corresponding to VVT is malfunctioning.	Yes	Check and repair ECU
		No	Diagnostic Help

P000B00 “B” Camshaft Position Slow Response Bank 1

DTC reporting condition: Actual position of VVT has poor following performance to the target position.

1. Possible cause:
   - OCV oil valve pressure is insufficient.
   - OCV oil valve is blocked or leaks.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if operating condition of cam phase regulator is normal (dirt blockage, oil leakage, sticking).	Yes	Next
		No	Perform necessary check, repair and maintenance
2	Check if operating condition of OCV oil control valve is normal.	Yes	Diagnostic Help

No.	Operation Step	Test Result	Subsequent Step
		No	Perform necessary check, repair and maintenance

P005A00 “B” Camshaft Profile Control Performance/Stuck Off Bank 1

DTC reporting condition: Actual position of VVT cannot be moved near the target position.

1. Possible cause:
   - OCV oil valve pressure is insufficient.
   - OCV oil valve is blocked or leaks.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if operating condition of cam phase regulator is normal (dirt blockage, oil leakage, sticking).	Yes	Next
		No	Perform necessary check, repair and maintenance
2	Check if operating condition of OCV oil control valve is normal.	Yes	Diagnostic Help
		No	Perform necessary check, repair and maintenance

P064500 A/C Compressor Relay Circuit Fault

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Connector is not connected securely or is in poor contact.
   - A/C compressor relay control circuit is open.
   - A/C compressor relay control circuit power supply terminal is open or short to ground.
   - A/C compressor relay fuse is blown or damaged.
   - A/C compressor control pin corresponding to ECU terminal is open or there is an internal circuit damage.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
2	A/C compressor relay control circuit is open.	Yes	Repair wire harness
		No	Next
3	A/C compressor relay control circuit power supply terminal is open or short to ground.	Yes	Repair wire harness
		No	Next
4	A/C compressor relay fuse is blown or damaged.	Yes	Repair relay
		No	Next

No.	Operation Step	Test Result	Subsequent Step
5	A/C compressor control pin corresponding to ECU terminal is open or there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P064700 A/C Compressor Relay Control Circuit High

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - A/C compressor relay circuit is short to power supply.
   - A/C compressor relay pin corresponding to ECU terminal is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	A/C compressor relay circuit is short to power supply.	Yes	Repair wire harness
		No	Next
2	A/C compressor relay pin corresponding to ECU terminal is short to power supply.	Yes	Check and repair ECU
		No	Diagnostic Help

P064600 A/C Compressor Relay Control Circuit Low

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - A/C compressor relay circuit is short to ground.
   - A/C compressor relay pin corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	A/C compressor relay circuit is short to ground.	Yes	Repair wire harness
		No	Next
2	A/C compressor relay pin corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P057100 Brake Pedal Signal Synchronization Malfunction

DTC reporting condition: When synchronization error occurs between two brake signals Brk_stMn and Brk_stRed for more than 1 second and consecutive times exceeds Brk_cntrSynErrThd_C, a fault will be reported.

1. Troubleshooting method:

Step	Operation	Yes	No
1	Collect brake switch main signal Brk_stMn and brake redundancy signal Brk_stRed, and check if they meet the requirements of UMC: Stroke of two asynchronous sections cannot be too long	Replace vehicle controller, and then go to step 3.	Go to step 2
2	Check if brake pedal wire harness is connected reliably and if mechanical structure of brake pedal is abnormal.	Replace wire harness or brake pedal, and then go to step 3.	Go to step 3
3	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troubleshooted, and system is normal.	Replace vehicle controller

P012800 Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)

DTC reporting condition: Coolant temperature does not reach the standard opening temperature of thermostat.

1. Possible cause:
   - Thermostat is in normally open position.
   - The measured value of coolant temperature sensor is offset.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if thermostat is in normally open position or is damaged.	Yes	Check and repair thermostat
		No	Next
2	Coolant temperature sensor signal pin terminal corresponding to ECU is short to power supply, open or there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P012300 Electronic Throttle 1st Path Signal Voltage Maximum Problem / P022300 Electronic Throttle 2nd Path Signal Voltage Maximum Problem

DTC reporting condition: The voltage value of a certain path of throttle signal is higher than a certain value for a certain time.

1. Possible cause:
   - Electronic throttle 1st path / 2nd path signal circuit is short to 5 V power supply.
   - Open in electronic throttle signal ground wire will cause two faults to be reported at the same time.
2. DTC clearing condition: DTC is deleted after 40 consecutive warm-up cycles without faults.
3. Troubleshooting method:

Step	Operation	Yes	No
1	Collect two signal voltage values of electronic throttle ThrVlv_uRawSens1B1, ThrVlv_uRawSens2B1, and observe if it is pulled near 5 V.	Go to step 2	Repeat the measurement until it reappears
2	The actions such as unplugging and plugging connector, shaking wire harness, etc. will affect the occurrence frequency of faults.	Go to step 3	Go to step 4
3	Verify if wire harness resistance is the cause by electronic throttle flying wire connection.	Replace wire harness, and then go to step 5	Go to step 4
4	Replace throttle body to determine if there is an internal problem in throttle.	Go to step 5	Replace vehicle controller, and then go to step 5
5	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troubleshooted, and system is normal	Replace vehicle controller

P012100 Electronic Throttle 1st Path Signal Voltage Not Plausible Fault / P022100 Electronic Throttle 2nd Path Signal Voltage Not Plausible Fault

DTC reporting condition: Compare the 1st path signal of electronic throttle body with the difference value measured by 5 V minus 2nd path signal, if the deviation exceeds threshold and it is confirmed by a period of time, compare the two paths signals with the signal after inflation pressure conversion respectively, if the deviation from the main charging signal exceeds a certain value and it is confirmed by a period of time, fault will be reported from the path.

1. Possible cause:
   - 1st and 2nd path signal circuits of electronic throttle are short.
   - Resistance on 5 V power supply line or GND line of electronic throttle causes 5 V signal terminal voltage to be pulled down or zero voltage to be increased.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Collect and observe if the voltage sum of two DVE signals ThrVlv_uRawSens1B1 and ThrVlv_ uRawSens2B1 deviates from 5 V.	Go to step 2	Repeat the measurement until it reappears
2	The actions such as unplugging and plugging connector, shaking wire harness, etc. will affect the occurrence frequency of faults.	Go to step 3	Go to step 5
3	Measure the voltage drop of each section on wire harness through AD-Scan. If wire harness is ideal, there is no voltage drop, and if there is a voltage drop, it means that there is resistance in wire harness or connector.	Go to step 4	Go to step 5

Step	Operation	Yes	No
4	Verify if wire harness is the cause by electronic throttle flying wire connection.	Replace wire harness, and then go to step 6	Go to step 5
5	Replace throttle body to determine if there is an internal problem in throttle.	Go to step 6	Replace vehicle controller, and then go to step 6
6	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troubleshooted, and system is normal	Replace vehicle controller

P151000 Diagnostic Fault Check Knock Control Signal Evaluation

DTC reporting condition: The occurrence number of window length error is greater than 4, and the occurrence number of window output without measurement is greater than 28.

1. Possible cause:
   - Sensor is damaged.
   - ECU is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if knock sensor is damaged.	Yes	Replace sensor
		No	Next
2	Check if ECU is damaged.	Yes	Check and repair ECU
		No	Diagnostic Help

P045128 EVAP System Pressure Sensor/Switch Circuit Range Performance

DTC reporting condition: The difference between fuel tank pressure value and the reference fuel tank pressure value during cold start exceeds threshold.

1. Possible cause:
   - Fuel tank pressure sensor is damaged.
   - Pipe from fuel tank to canister is blocked.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Replace fuel tank pressure sensor, check if malfunction reappears.	Yes	End
		No	Next
4	Check if pipe from fuel tank to canister is blocked.	Yes	Replace pipe

No.	Operation Step	Test Result	Subsequent Step
		No	Next
5	Replace ECU, check if malfunction reappears.	Yes	Diagnostic Help
		No	End

P045300 Fuel Tank Pressure Sensor Signal Short to Power Supply

DTC reporting condition: Pressure sensor voltage signal exceeds 4.8 V.

1. Possible cause:
   - Fuel tank pressure sensor signal terminal is short to power supply.
   - Fuel tank pressure sensor signal pin corresponding to ECU terminal is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Use a multimeter to measure if fuel tank pressure signal circuit voltage is close to or equal to 5 V.	Yes	Replace sensor
		No	Next
4	Measure if wire harness terminal voltage corresponding to fuel tank pressure signal is close to or equal to 5 V.	Yes	Check wire harness
		No	Next
5	Check if intake pressure sensor signal pin corresponding to ECU terminal is short to power supply, or if there is an internal circuit damage.	Yes	Check and repair or replace ECU
		No	Diagnostic Help

P045200 Fuel Tank Pressure Sensor Signal Short to Ground

DTC reporting condition: Pressure sensor voltage signal is lower than 0.2 V.

1. Possible cause:
   - Fuel tank pressure sensor signal terminal is short to ground.
   - Fuel tank pressure sensor signal pin corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Use a multimeter to measure if fuel tank pressure signal circuit voltage is close to or equal to 0V.	Yes	Replace sensor
		No	Next
4	Measure if wire harness terminal voltage corresponding to fuel tank pressure signal is close to or equal to 0V.	Yes	Check wire harness
		No	Next

No.	Operation Step	Test Result	Subsequent Step
5	Check if intake pressure sensor signal pin corresponding to ECU terminal is short to ground, or if there is an internal circuit damage.	Yes	Check and repair or replace ECU
		No	Diagnostic Help

P04512A EVAP System Pressure Sensor&Switch Circuit Range Performance

DTC reporting condition: The difference between maximum fuel tank pressure and minimum fuel tank pressure is lower than threshold.

1. Possible cause:
   - Charcoal canister solenoid valve is stuck at normally closed position or normally open position.
   - Pipe from fuel tank to canister is blocked or disconnected.
   - Pipe from canister to canister valve is blocked or disconnected.
   - Fuel tank pressure sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check if charcoal canister solenoid valve is stuck at normally closed position or normally open position.	Yes	Replace canister solenoid valve
		No	Next
4	Check if pipe from fuel tank to canister is blocked/ disconnected.	Yes	Replace pipe
		No	Next
5	Check if pipe from canister to canister valve is blocked/ disconnected.	Yes	Replace pipe
		No	Next
6	Replace fuel tank pressure sensor. Start vehicle and run it for 10 minutes to check if malfunction reappears.	Yes	Diagnostic Help
		No	End

P045125 EVAP System Pressure Sensor&Switch Circuit Range Performance

DTC reporting condition: The fluctuation amount of fuel tank pressure exceeds threshold continually.

1. Possible cause:
   - Fuel tank pressure sensor is damaged.
   - Canister valve is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next

No.	Operation Step	Test Result	Subsequent Step
3	Replace fuel tank pressure sensor, start vehicle again, wait for 10 minutes to check if malfunction reappears.	Yes	Next
		No	End
4	Replace ECU. Start vehicle again, wait for 10 minutes to check if malfunction reappears.	Yes	Next
		No	End
5	Check canister valve wire harness and replace canister valve, start vehicle again, wait for 10 minutes to check if malfunction reappears.	Yes	Diagnostic Help
		No	End

P155400/ P155500/P156100 Electronic Throttle Spring Inspection Malfunction Minimum, Maximum / Deviation Between Throttle Target Opening Angle and Actual Opening Angle

DTC reporting condition: After ignition switch is turned to ON, the system will command DVE to open to a certain opening by ECU, and check if DVE can be reached within the specified time, and then check if DVE can be returned within the specified time; if it cannot reach the specified position within the specified time, it is determined as P1555; if it cannot return to the specified range within the specified time after opening, it is determined as P1554. When ECU drives throttle, ECU will always compare the target opening with the actual throttle feedback opening. When deviation between the target and the actual exceeds a certain value and it is confirmed after a period of time, it will be determined as P1561.

1. Possible cause:
   - Electronic throttle drive motor pin is open or short somewhere.
   - Electronic throttle body valve plate is dirty or there are foreign matters, so that the valve plate is stuck.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Check if the actual opening ThrVlv_ratActIntB1 is consistent with the target opening ThrVlv_ratDesB1.	Go to step 2	Repeat the measurement until it reappears
2	The actions such as unplugging and plugging connector, shaking wire harness, etc. will affect the occurrence frequency of faults.	Go to step 3	Go to step 4
3	Verify if wire harness is the cause by electronic throttle flying wire connection.	Replace wire harness, and then go to step 5	Go to step 4
4	Replace throttle body to determine if there is an internal problem in throttle.	Go to step 5	Replace vehicle controller, and then go to step 5
5	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troubleshooted, and system is normal	Replace vehicle controller

P155C00 Electronic Throttle Limphome Position Self-learning Error

DTC reporting condition: NLP position learned by throttle is out of the reasonable range, and a fault is reported.

1. Possible cause:
   - Throttle or ECU is abnormal during throttle self-learning.
2. Troubleshooting method:

Step	Operation	Yes	No
1	In an environment with temperature greater than 5 degrees, turn ignition switch to ON again, wait for 40 seconds, observe if throttle can complete the self-learning once again	Go to step 2	Replace ECU or throttle
2	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troubleshooted, and system is normal	Replace ECU or throttle

P155D00/P155E00 Electronic Throttle PID Adjustment Malfunction

DTC reporting condition: When throttle duty ratio exceeds the limit for a short time, P155E (DVERmin) will be reported; When throttle duty ratio exceeds the limit for a long time, P155D (DVERmax) will be reported.

1. Possible cause:
   - Electronic throttle drive motor pin is open or short somewhere.
   - Electronic throttle body valve plate is dirty or there are foreign matters, so that the valve plate resistance is large or valve plate is stuck.
   - Throttle drive chip in ECU is abnormal.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Observe if fault occurs together with P1561 (DFC_ DVELnpl).	It is likely that motor pin is faulty, go to step 2	There may be a number of causes: Throttle valve plate is stuck by foreign matter (the possibility is greater); It may be caused by throttle drive motor pin failure; It may also be caused by the hardware failure in DVE drive module in ECU (the possibility is small), go to step 2
2	Replace throttle body to determine if there is an internal problem in throttle.	Go to step 4	Go to step 3
3	Replace ECU to determine if there is a throttle drive module failure in ECU.	Go to step 4	Troubleshoot other DTCs
4	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troubleshooted, and system is normal	Replace vehicle controller

P013300 O2 Sensor Circuit Slow Response Bank 1 Sensor 1

DTC reporting condition: The dynamic factor of upstream oxygen sensor is less than the threshold.

1. Possible cause:
   - Oxygen sensor is aging and response becomes slower.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check intake system and exhaust system for air leakage.	Yes	Repair leaking area
		No	Next
4	Replace the upstream LSU oxygen sensor. Check if malfunction reappears after returning vehicle to customer.	Yes	Diagnostic Help
		No	End

P062F42, P062F43 EEPROM Writing or Reading Failure

DTC reporting condition: EEPROM reading and writing operations fail.

1. Possible cause:
   - The data written by PAV is incomplete.
   - Storage structure changes after software is refreshed.
   - Flash module is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	After ECU is completely powered off, no faults will be reported.	Yes	End
		No	Next
2	Replace ECU.	Yes	Check and repair ECU

P208900 “A” Camshaft Position Actuator Control Circuit High Bank 1

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Intake VVT control solenoid valve signal terminal is short to power supply.
   - Intake VVT control solenoid valve signal terminal pin corresponding to ECU terminal is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Intake VVT control solenoid valve signal terminal is short to power supply.	Yes	End
		No	Next
2	Intake VVT control solenoid valve signal terminal pin corresponding to ECU terminal is short to power supply.	Yes	Check and repair ECU
		No	Diagnostic Help

P208800 “A” Camshaft Position Actuator Control Circuit Low Bank 1

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Intake VVT control solenoid valve signal terminal is short to ground.
   - Intake VVT control solenoid valve power supply terminal is short to ground.
   - Intake VVT control solenoid valve signal terminal pin corresponding to ECU is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Intake VVT control solenoid valve signal terminal is short to ground.	Yes	Repair wire harness
		No	Next

No.	Operation Step	Test Result	Subsequent Step
2	Intake VVT control solenoid valve power supply terminal is short to ground.	Yes	Repair wire harness
		No	Next
3	Intake VVT control solenoid valve signal terminal pin corresponding to ECU is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P001000 Control Circuit of Camshaft Control Valve (Inlet)

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Intake VVT control circuit corresponding pin is open.
   - Connector is in poor contact or is open.
   - Actuator side circuit is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Intake VVT control circuit corresponding pin is open.	Yes	Repair, replace wire harness
		No	Next
2	Connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
3	Intake VVT circuit is damaged.	Yes	Replace VVT actuator
		No	Next
4	ECU control pin corresponding to VVT is malfunctioning.	Yes	Check and repair ECU
		No	Diagnostic Help

P000A00 "A" Camshaft Position Slow Response Bank 1

DTC reporting condition: Actual position of VVT has poor following performance to the target position.

1. Possible cause:
   - OCV oil valve pressure is insufficient.
   - OCV oil valve is blocked or leaks.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if operating condition of cam phase regulator is normal (dirt blockage, oil leakage, sticking).	Yes	Next
		No	Perform necessary check, repair and maintenance

No.	Operation Step	Test Result	Subsequent Step
2	Check if operating condition of OCV oil control valve is normal.	Yes	Diagnostic Help
		No	Perform necessary check, repair and maintenance

P003C00 “A” Camshaft Profile Control Performance/Stuck Off Bank 1

DTC reporting condition: Actual position of VVT cannot be moved near the target position.

1. Possible cause:
   - OCV oil valve pressure is insufficient.
   - OCV oil valve is blocked or leaks.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if operating condition of cam phase regulator is normal (dirt blockage, oil leakage, sticking).	Yes	Next
		No	Perform necessary check, repair and maintenance
2	Check if operating condition of OCV oil control valve is normal.	Yes	Diagnostic Help
		No	Perform necessary check, repair and maintenance

P050B00 Cold Start Ignition Timing Performance

DTC reporting condition: The ignition angle efficiency during parking idling catalytic converter heating exceeds the set threshold.

1. Possible cause:
   - There are other DTCs such as throttle failure or misfire failure, resulting in a decrease in intake air flow and abnormity in ignition angle efficiency;
   - The electronic throttle is stuck in a position with a small opening;
   - Check if intake manifold is leaking; exhaust resistance is too large; supplying pressure is too low;
   - ECU is malfunctioning;
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Using a diagnostic tester, check if there are other faults such as misfire faults and throttle faults.	Yes	Troubleshoot these faults
		No	Next
2	The electronic throttle is stuck in a position with a small opening.	Yes	Repair throttle system
		No	Next

No.	Operation Step	Test Result	Subsequent Step
3	Check if intake manifold is leaking; exhaust resistance is too large; supplying pressure is too low;	Yes	Troubleshoot corresponding system faults
		No	Next
4	If ECU is malfunctioning	Yes	Replace ECU
		No	Diagnostic Help

P034100 Intake Camshaft Phaser Sensor Signal Improper

DTC reporting condition: Sensor signal failure counter of intake camshaft phase sensor exceeds the threshold.

1. Possible cause:
   - Connector is not connected securely or disconnected;
   - Relative installation position between intake phase sensor and its signal plate does not meet the installation requirements;
   - There is mechanical malfunction in intake phase signal plate teeth.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
2	Check wire harness for external interference.	Yes	Shield the wire harness
		No	Next
3	Check if relative installation position between intake phase sensor and its signal plate does not meet the installation requirements (such as too far, misaligned, etc.)	Yes	Reinstall it
		No	Next
4	Check for mechanical malfunction in intake phase signal plate teeth	Yes	Replace phase signal plate
		No	Diagnostic Help

P034300 Camshaft Position Sensor “A” Circuit High Bank 1 or Single Sensor

DTC reporting condition: Sensor signal failure counter of intake camshaft phase sensor exceeds the threshold.

1. Possible cause:
   - Intake phase sensor ground terminal is malfunctioning;
   - Intake phase sensor signal terminal is short to power supply;
   - Intake phase sensor signal terminal ECU pin is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Unplug connector from intake phase sensor on wire harness, and use a multimeter to check if the voltage between power supply terminal and ground terminal pin of phase sensor is about 12 V.	Yes	Next
		No	Step 3
2	Check if the voltage between signal terminal and power supply terminal pin of intake phase sensor is 12 V.	Yes	Repair wire harness
		No	Step 4
3	Check if intake phase sensor ground terminal pin is open or short to power supply.	Yes	Repair wire harness
		No	Next
4	Check if intake phase sensor signal terminal pin is short to power supply or open.	Yes	Repair wire harness
		No	Next
5	Check if intake phase sensor signal terminal pin corresponding to ECU is short to power supply or open, or if there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P034200 Camshaft Position Sensor “A” Circuit Low Bank 1 or Single Sensor

DTC reporting condition: Sensor signal failure counter of intake camshaft phase sensor exceeds the threshold.

1. Possible cause:
   - Intake phase sensor power supply is malfunctioning;
   - Intake phase sensor signal terminal is short to ground;
   - Intake phase sensor signal terminal ECU pin is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Unplug connector from intake phase sensor on wire harness, and use a multimeter to check if the voltage between power supply terminal and ground terminal pin of phase sensor is about 12 V.	Yes	Next
		No	Step 3
2	Check if the voltage between signal terminal and ground terminal pin of intake phase sensor is 0 V.	Yes	Repair wire harness
		No	Step 4
3	Check if intake phase sensor power supply terminal pin is open or short to ground, and if ground terminal pin is in poor contact.	Yes	Repair wire harness
		No	Next
4	Check if intake phase sensor signal terminal pin is short to ground.	Yes	Repair wire harness
		No	Next
5	Check if intake phase sensor signal terminal pin corresponding to ECU is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P036600 Exhaust Camshaft Phaser Sensor Signal Improper

DTC reporting condition: Sensor signal failure counter of exhaust camshaft phase sensor exceeds the threshold.

1. Possible cause:
   - Connector is not connected securely or disconnected;
   - Relative installation position between exhaust phase sensor and its signal plate does not meet the installation requirements;
   - There is mechanical malfunction in exhaust phase signal plate teeth.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
2	Check wire harness for external interference.	Yes	Shield the wire harness
		No	Next
3	Check if relative installation position between exhaust phase sensor and its signal plate does not meet the installation requirements (such as too far, misaligned, etc.).	Yes	Reinstall it
		No	Next
4	Check for mechanical malfunction in exhaust phase signal plate teeth.	Yes	Replace phase signal plate
		No	Diagnostic Help

P001776 Crankshaft Position - Camshaft Position Correlation Bank 1 Sensor B

DTC reporting condition: The absolute value of relative position self-learning deviation between exhaust camshaft and crankshaft is greater than 20° crankshaft angle.

1. Possible cause:
   - Installation deviation;
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if relative installation position of crankshaft and exhaust camshaft is correct.	Yes	Diagnostic Help
		No	Reinstall correctly

P036800 Exhaust Camshaft Phase Signal Circuit Short to Power Supply

DTC reporting condition: Sensor signal failure counter of exhaust camshaft phase sensor exceeds the threshold.

1. Possible cause:
   - Exhaust phase sensor ground terminal is malfunctioning.
   - Exhaust phase sensor signal terminal is short to power supply.
   - Exhaust phase sensor signal terminal ECU pin is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Unplug connector from exhaust phase sensor on wire harness, and use a multimeter to check if the voltage between power supply terminal and ground terminal pin of phase sensor is about 12 V.	Yes	Next
		No	Step 3
2	Check if the voltage between signal terminal and power supply terminal pin of exhaust phase sensor is 12 V.	Yes	Repair wire harness
		No	Step 4
3	Check if exhaust phase sensor ground terminal pin is open or short to power supply.	Yes	Repair wire harness
		No	Next
4	Check if exhaust phase sensor signal terminal pin is short to power supply or open	Yes	Repair wire harness
		No	Next
5	Check exhaust phase sensor signal terminal pin corresponding to ECU is short to power supply, open, or there is an internal circuit damage	Yes	Check and repair ECU
		No	Diagnostic Help

P036700 Exhaust Camshaft Phase Signal Circuit Voltage Short to Ground

DTC reporting condition: Sensor signal failure counter of exhaust camshaft phase sensor exceeds the threshold.

1. Possible cause:
   - Exhaust phase sensor power supply is malfunctioning.
   - Exhaust phase sensor signal terminal is short to ground.
   - Exhaust phase sensor signal terminal ECU pin is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Unplug connector from exhaust phase sensor on wire harness, and use a multimeter to check if the voltage between power supply terminal and ground terminal pin of phase sensor is about 12 V.	Yes	Next
		No	Step 3
2	Check if the voltage between signal terminal and ground terminal pin of exhaust phase sensor is 0 V.	Yes	Repair wire harness
		No	Step 4
3	Check if exhaust phase sensor power supply terminal pin is open or short to ground, ground terminal pin is in poor contact.	Yes	Repair wire harness
		No	Next
4	Check if exhaust phase sensor signal terminal pin is short to ground.	Yes	Repair wire harness
		No	Next
5	Check exhaust phase sensor signal terminal pin corresponding to ECU is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P033900 Crankshaft Position Sensor "A"

DTC reporting condition: The absolute value of deviation between exhaust camshaft and crankshaft is greater than 15° crankshaft angle.

1. Possible cause:
   - Connector is not connected securely or detached.
   - Signal terminal is open.
   - Sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connector is not connected securely or detached.	Yes	Reconnect it
		No	Diagnostic Help
2	Speed sensor signal terminal is open.	Yes	Repair, replace wire harness or sensor
		No	Next
3	Sensor signal terminal pin is short to power supply or ground, or short circuit between pins.	Yes	Repair wire harness
		No	Next
4	Sensor is damaged.	Yes	Replace sensor
		No	Next
5	Fault in pin corresponding to speed sensor signal on ECU.	Yes	Check and repair ECU
		No	Diagnostic Help

P046129 Fuel Level Sensor Unreasonable Malfunction

DTC reporting condition: There is a large difference between fuel level change and calculated fuel consumption.

1. Possible cause:
   - ECU CAN signal is abnormal.
   - Fuel level sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to "ON".		Next
2	Read and store fault freeze frame information.		Next
3	Check if CAN signal is normal.	No	Repair CAN signal
		Yes	Next
4	Replace ECU, check if malfunction reappears.	Yes	Next
		No	End

No.	Operation Step	Test Result	Subsequent Step
5	Replace fuel level sensor, check if malfunction reappears.	Yes	Diagnostic Help
		No	End

P209700 Post Catalyst Fuel Trim System Too Rich Bank 1

DTC reporting condition: Offset value of upstream oxygen characteristic based on downstream oxygen exceeds the upper limit threshold.

1. Possible cause:
   - Upstream oxygen has a negative characteristic offset (richer).
   - A certain degree of aging occurs in downstream oxygen.
   - There is air leakage in intake and exhaust systems.
   - Catalytic converter is severely deteriorated.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check intake system and exhaust system for air leakage.	Yes	Repair leaking area
		No	Next
4	Replace the upstream LSU oxygen sensor. Check if malfunction reappears after returning vehicle to customer.	Yes	Next
		No	End
5	Replace downstream oxygen sensor, check if malfunction reappears.	Yes	Next
		No	End
6	Check if catalytic converter is deteriorated.	Yes	Next
		No	Diagnostic Help
7	Replace catalytic converter, check if malfunction reappears.	Yes	Diagnostic Help
		No	End

P209600 Post Catalyst Fuel Trim System Too Lean Bank 1

DTC reporting condition: Offset value of upstream oxygen characteristic based on downstream oxygen is lower than the lower limit threshold.

1. Possible cause:
   - Upstream oxygen has a positive characteristic offset (lean).
   - A certain degree of aging occurs in downstream oxygen.
   - There is air leakage in intake and exhaust systems.
   - Catalytic converter is severely deteriorated.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check intake system and exhaust system for air leakage.	Yes	Repair leaking area
		No	Next
4	Replace the upstream LSU oxygen sensor. Check if malfunction reappears after returning vehicle to customer.	Yes	Next
		No	End
5	Replace downstream oxygen sensor, check if malfunction reappears.	Yes	Next
		No	End
6	Check if catalytic converter is deteriorated.	Yes	Next
		No	Diagnostic Help
7	Replace catalytic converter, check if malfunction reappears.	Yes	Diagnostic Help
		No	End

P013800 O2 Sensor Circuit High Voltage Bank 1 Sensor 2

DTC reporting condition: The voltage range of downstream oxygen sensor is greater than 1.2 V.

1. Possible cause:
   - Signal circuit of downstream oxygen sensor is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Do not disconnect oxygen sensor connector and measure if voltage of downstream oxygen sensor wire oxygen sensor terminal No.1 wire (white, heater power supply positive) is 12 V.	Yes	Next
		No	Check wire harness and connector
4	Do not disconnect oxygen sensor connector and measure if voltage of downstream oxygen sensor wire oxygen sensor terminal No.2 wire (white, heater power supply grounded) is 12 V.	Yes	Next
		No	Check wire harness and connector
5	Do not disconnect oxygen sensor connector, measure if voltage between downstream oxygen sensor wire ECU terminal No.4 wire (black, oxygen sensor signal wire) and No.3 wire (gray, oxygen sensor signal grounded) is about 0.45 V.	Yes	Next
		No	Replace oxygen sensor
6	Start and keep vehicle idling until coolant temperature reaches normal value. Do not disconnect oxygen sensor connector, measure if	Yes	Next
		No	Replace oxygen sensor

No.	Operation Step	Test Result	Subsequent Step
	voltage between downstream oxygen sensor wire harness ECU terminal No.4 wire (black, oxygen sensor signal wire) and No.3 wire (gray, oxygen sensor signal grounded) is changed in range of 0 V - 1 V.		
7	Disconnect downstream oxygen sensor connector and measure if there is short circuit between sensor terminal No. 1 wire (white, heater power supply positive) and No. 4 wire (black, oxygen sensor signal wire) with a multimeter.	Yes	Replace oxygen sensor
		No	Next
8	Connect downstream oxygen sensor connector properly, repeat steps 5-6 and check if voltage signal changes between 0.44 V and 0.46 V, 0 V and 1 V respectively.	Yes	End
		No	Diagnostic Help

P013700 O2 Sensor Circuit Low Voltage Bank 1 Sensor 2

DTC reporting condition: The voltage range of downstream oxygen sensor is less than 0.06 V.

1. Possible cause:
   - Signal line of downstream oxygen sensor is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Do not disconnect oxygen sensor connector, measure if voltage between downstream oxygen sensor wire ECU terminal No.4 wire (black, oxygen sensor signal wire) and No.3 wire (gray, oxygen sensor signal grounded) is about 0.45 V.	Yes	Next
		No	Check wire harness and connector
4	Start and keep vehicle idling until coolant temperature reaches normal value. Do not disconnect oxygen sensor connector, measure if voltage between downstream oxygen sensor wire ECU terminal No.4 wire (black, oxygen sensor signal wire) and No.3 wire (gray, oxygen sensor signal grounded) is changed in range of 0 V - 1 V.	Yes	Next
		No	Replace oxygen sensor
5	Disconnect downstream oxygen sensor connector and check for short circuit in sensor terminal No.3 wire (gray, oxygen sensor signal grounded) and No.4 wire (black, oxygen sensor signal wire) with a multimeter.	Yes	Replace oxygen sensor
		No	Diagnostic Help
6	Connect downstream oxygen sensor connector properly, repeat steps 3-4 and check if voltage signal changes between 0.44 V and 0.46 V, 0 V and 1 V respectively.	Yes	End
		No	Diagnostic Help

P223200 O2 Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2

DTC reporting condition: Within a certain number of times that downstream oxygen sensor heater is turned off, the change in voltage of downstream oxygen sensor is greater than the threshold.

1. Possible cause:
   - The wire harness and connector of downstream oxygen sensor are abnormal.
   - Oxygen sensor terminal heater power supply ground is short to oxygen sensor signal line
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Do not disconnect oxygen sensor connector and measure if heater power supply positive voltage of downstream oxygen sensor wire harness oxygen sensor terminal is 12 V.	Yes	Next
		No	Check wire harness and connector
4	Do not disconnect oxygen sensor connector and measure if heater power supply ground voltage of downstream oxygen sensor wire harness oxygen sensor terminal is 12 V.	Yes	Next
		No	Check wire harness and connector
5	Do not disconnect oxygen sensor connector and measure if voltage between downstream oxygen sensor wire harness ECU terminal oxygen sensor signal line and oxygen sensor signal ground is about 0.45 V.	Yes	Next
		No	Check wire harness and connector
6	Start and keep vehicle idling until coolant temperature reaches normal value. Do not disconnect oxygen sensor connector and measure if voltage between oxygen sensor signal line and oxygen sensor signal ground of downstream oxygen sensor wire harness ECU terminal jumps between 0 V and 1 V.	Yes	Next
		No	Replace oxygen sensor
7	Start and keep vehicle idling until coolant temperature reaches normal value. Disconnect downstream oxygen sensor connector and check for short circuit between oxygen sensor terminal heater power supply ground and oxygen sensor signal line.	Yes	Replace oxygen sensor
		No	Diagnostic Help
8	Connect downstream oxygen sensor connector properly, repeat steps 5-6 and check if voltage signal changes between 0.44 V and 0.46 V, 0 V and 1 V respectively.	Yes	End
		No	Diagnostic Help

P013600 O2 Sensor Circuit Bank 1 Sensor 2

DTC reporting condition: The voltage range of downstream oxygen sensor exceeds the limit.

1. Possible cause:
   - Oxygen sensor signal line is short to heater power supply ground line.
   - Oxygen sensor is damaged.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Do not disconnect oxygen sensor connector and measure if voltage of downstream oxygen sensor wire oxygen sensor terminal No.1 wire (white, heater power supply positive) is 12 V.	Yes	Next
		No	Check wire harness and connector
4	Do not disconnect oxygen sensor connector and measure if voltage of downstream oxygen sensor wire oxygen sensor terminal No.2 wire (white, heater power supply grounded) is 12 V.	Yes	Next
		No	Check wire harness and connector
5	Do not disconnect oxygen sensor connector, measure if voltage between downstream oxygen sensor wire ECU terminal No.4 wire (black, oxygen sensor signal wire) and No.3 wire (gray, oxygen sensor signal grounded) is about 0.45 V.	Yes	Next
		No	Check wire harness and connector
6	Start and keep vehicle idling until coolant temperature reaches normal value. Do not disconnect oxygen sensor connector, measure if voltage between downstream oxygen sensor wire ECU terminal No.4 wire (black, oxygen sensor signal wire) and No.3 wire (gray, oxygen sensor signal grounded) is changed in range of 0 V - 1 V.	Yes	Next
		No	Replace oxygen sensor
7	Start and keep vehicle idling until coolant temperature reaches normal value. Disconnect downstream oxygen sensor connector, and check for short circuit between oxygen sensor terminal No.2 wire (white, heater power grounded) and No.4 wire (- black, oxygen sensor signal wire).	Yes	Replace oxygen sensor
		No	Diagnostic Help
8	Connect downstream oxygen sensor connector properly, repeat steps 5-6 and check if voltage signal changes between 0.44 V and 0.46 V, 0 V and 1 V respectively.	Yes	End
		No	Diagnostic Help

P005400 HO2S Heater Resistance Bank 1 Sensor 2

DTC reporting condition: The current internal resistance value is greater than the threshold value of corresponding working condition.

1. Possible cause:
   - Heater circuit is malfunctioning.
   - Oxygen sensor resistance is aging.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Do not disconnect oxygen sensor connector and measure if voltage of downstream oxygen sensor wire oxygen sensor terminal No.1 wire (white, heater power supply positive) is 12 V.	Yes	Next
		No	Check wire harness and connector
4	Do not disconnect oxygen sensor connector and measure if voltage of downstream oxygen sensor wire oxygen sensor terminal No.2 wire (white, heater power supply grounded) is 12 V.	Yes	Next
		No	Check wire harness and connector
5	Disconnect downstream oxygen sensor wire connector to remove downstream oxygen sensor. Place the oxygen sensor at room temperature to cool it down. Measure if resistance between sensor terminal No.1 interface (white, heater power supply positive) and No.2 interface (white, heater power supply grounded) is higher than 15 Ω with a multimeter when temperature of oxygen sensor cools down to room temperature ①.	Yes	Replace oxygen sensor
		No	Diagnostic Help

P003800 O2 Sensor Heater Control Circuit High (Downstream of the Catalyzer)

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Downstream oxygen sensor heater control circuit pin terminal is short to power supply.
   - Downstream oxygen sensor heater pin corresponding to ECU terminal is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if downstream oxygen sensor heater control circuit pin terminal is short to power supply.	Yes	Repair wire harness
		No	Next
2	Check if downstream oxygen sensor heater pin corresponding to ECU terminal is short to power supply.	Yes	Check and repair ECU
		No	Diagnostic Help

P003700 O2 Sensor Heater Control Circuit Low (Downstream of the Catalyzer)

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Downstream oxygen sensor heater control circuit pin terminal is short to ground.
   - Downstream oxygen sensor heater control circuit power supply terminal is grounded.
   - Downstream oxygen sensor heater pin corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if downstream oxygen sensor heater control circuit pin terminal is short to ground.	Yes	Repair wire harness
		No	Next
2	Check if downstream oxygen sensor heater control circuit power supply terminal is grounded.	Yes	Repair wire harness
		No	Next
3	Check if downstream oxygen sensor heater pin corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P003600 HO2S Heater Control Circuit Bank 1 Sensor 2

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Connector is not connected securely or is in poor contact.
   - Downstream oxygen sensor heater control pin is open.
   - Downstream oxygen sensor heater power supply terminal is not connected to main relay.
   - Sensor is damaged.
   - Downstream oxygen sensor heater pin corresponding to ECU terminal is open, or there is an internal circuit damage.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
2	Check if downstream oxygen sensor heater control pin is open.	Yes	Repair wire harness
		No	Next
3	Check if downstream oxygen sensor heater circuit power supply terminal is not connected to main relay.	Yes	Repair wire harness
		No	Next
4	Check if sensor is damaged.	Yes	Replace sensor
		No	Next
5	Check if downstream oxygen sensor heater pin corresponding to ECU terminal is open, or there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P013A00 O2 Sensor Slow Response - Rich to Lean Bank 1 Sensor 2

DTC reporting condition: The transition time of downstream oxygen sensor voltage signal from rich to lean exceeds the threshold.

1. Possible cause:
   - Downstream oxygen sensor is aging.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Replace downstream oxygen sensor and connect wire harness properly. Start and keep vehicle idling until coolant temperature reaches normal value. Release accelerator pedal to coast after vehicle speed reaches about 70 many times, the fault reappears.	Yes	Diagnostic Help
		No	End

P227100 O2 Sensor Signal Biased&Stuck Rich Bank 1 Sensor 2

DTC reporting condition: Downstream oxygen voltage is low continuously.

1. Possible cause:
   - There is air leakage in exhaust system.
   - Oxygen sensor is aging.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check exhaust system for leakage, gasket for damage.	Yes	Repair leaking area
		No	Next
4	Downstream oxygen sensor: Puncture wire harness connector near ECU terminal No.4 wire insulation layer (black, oxygen sensor signal wire) with red pole of multimeter, and puncture wire harness connector near ECU terminal No.3 wire insulation layer (gray, oxygen sensor signal grounded) with black pole of multimeter. Check if voltage is in range of 0.44 V - 0.46 V.	Yes	Next
		No	Replace oxygen sensor
5	Start and keep vehicle idling until coolant temperature reaches normal value. Downstream oxygen sensor: Puncture wire harness connector near ECU terminal No.4 wire insulation layer (black, oxygen sensor signal wire) with red pole of multimeter, and puncture wire harness connector near ECU terminal No.3 wire insulation layer (gray, oxygen sensor signal grounded) with black pole of multimeter. Check if voltage changes in range of 0 V - 1 V.	Yes	Next
		No	Replace oxygen sensor

No.	Operation Step	Test Result	Subsequent Step
6	Start and keep vehicle idling until coolant temperature reaches normal value. Depress and release accelerator pedal frequently and alternately for 90 s, at the same time, puncture downstream oxygen sensor wire harness connector near ECU terminal No.4 wire insulation layer (black, oxygen sensor signal wire) with red pole of multimeter, and puncture wire harness connector near ECU terminal No.3 wire insulation layer (gray, oxygen sensor signal grounded) with black pole of multimeter. Check if voltage is beyond ② range of 0.55 V - 0.65 V.	Yes	End
		No	Diagnostic Help

P227000 O2 Sensor Signal Biased&Stuck Lean Bank 1 Sensor 2

DTC reporting condition: Downstream voltage is high continuously.

1. Possible cause:
   - There is air leakage in exhaust system.
   - Oxygen sensor is aging.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check exhaust system for leakage, gasket for damage.	Yes	Repair leaking area
		No	Next
4	Downstream oxygen sensor: Puncture wire harness connector near ECU terminal No.4 wire insulation layer (black, oxygen sensor signal wire) with red pole of multimeter, and puncture wire harness connector near ECU terminal No.3 wire insulation layer (gray, oxygen sensor signal grounded) with black pole of multimeter. Check if voltage is in range of 0.44 V - 0.46 V.	Yes	Next
		No	Replace oxygen sensor
5	Start and keep vehicle idling until coolant temperature reaches normal value. Downstream oxygen sensor: Puncture wire harness connector near ECU terminal No.4 wire insulation layer (black, oxygen sensor signal wire) with red pole of multimeter, and puncture wire harness connector near ECU terminal No.3 wire insulation layer (gray, oxygen sensor signal grounded) with black pole of multimeter. Check if voltage changes in range of 0 V - 1 V.	Yes	Next
		No	Replace oxygen sensor

No.	Operation Step	Test Result	Subsequent Step
6	Start and keep vehicle idling until coolant temperature reaches normal value. Depress and release accelerator pedal frequently and alternately for 90 s, at the same time, puncture downstream oxygen sensor wire harness connector near ECU terminal No.4 wire insulation layer (black, oxygen sensor signal wire) with red pole of multimeter, and puncture wire harness connector near ECU terminal No.3 wire insulation layer (gray, oxygen sensor signal grounded) with black pole of multimeter. Check if voltage is beyond ① range of 0.55 V - 0.65 V.	Yes	End
		No	Diagnostic Help

P223100 O2 Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 1

DTC reporting condition: Within a certain number of times that upstream oxygen sensor heater is turned off, the change in voltage of upstream oxygen sensor is greater than the threshold.

1. Possible cause:
   - The wire harness and connector of upstream oxygen sensor are abnormal.
   - Oxygen sensor terminal heater power supply ground is short to oxygen sensor signal line.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Do not disconnect oxygen sensor connector and measure if voltage of upstream oxygen sensor wire harness oxygen sensor terminal No.1 wire (white, heater power supply positive) is 12 V.	Yes	Next
		No	Check wire harness and connector
4	Do not disconnect oxygen sensor connector and measure if voltage of upstream oxygen sensor wire harness oxygen sensor terminal No.2 wire (white, heater power supply grounded) is 12 V.	Yes	Next
		No	Check wire harness and connector
5	Do not disconnect oxygen sensor connector and measure if voltage between upstream oxygen sensor wire harness ECU terminal oxygen sensor signal line and oxygen sensor signal ground is about 0.45 V.	Yes	Next
		No	Check wire harness and connector
6	Start and keep vehicle idling until coolant temperature reaches normal value. Do not disconnect oxygen sensor connector and measure if voltage between oxygen sensor signal line and oxygen sensor signal ground of upstream oxygen sensor wire harness ECU terminal jumps between 0 V and 1 V.	Yes	Next
		No	Replace oxygen sensor
7	Start and keep vehicle idling until coolant temperature reaches normal value. Disconnect upstream oxygen sensor connector and check for	Yes	Replace oxygen sensor
		No	Diagnostic Help

No.	Operation Step	Test Result	Subsequent Step
	short circuit between oxygen sensor heater power supply and oxygen sensor signal line.		
8	Connect upstream oxygen sensor connector properly, repeat steps 5-6 and check if voltage signal changes between 0.44 V and 0.46 V, 0 V and 1 V respectively.	Yes	End
		No	Diagnostic Help

P003200 HO2S Heater Control Circuit High Bank 1 Sensor 1

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Upstream oxygen sensor heater control circuit pin terminal is short to power supply.
   - Upstream oxygen sensor heater pin corresponding to ECU terminal is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if upstream oxygen sensor heater control circuit pin terminal is short to power supply.	Yes	Repair wire harness
		No	Next
2	Check if upstream oxygen sensor heater pin corresponding to ECU terminal is short to power supply.	Yes	Check and repair ECU
		No	Diagnostic Help

P003100 HO2S Heater Control Circuit Low Bank 1 Sensor 1

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Upstream oxygen sensor heater control circuit pin terminal is short to ground.
   - Upstream oxygen sensor heater control circuit power supply terminal is grounded.
   - Upstream oxygen sensor heater pin corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if upstream oxygen sensor heater control circuit pin terminal is short to ground.	Yes	Repair wire harness
		No	Next
2	Check if upstream oxygen sensor heater control circuit power supply terminal is grounded.	Yes	Repair wire harness
		No	Next
3	Check if upstream oxygen sensor heater pin corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P003000 HO2S Heater Control Circuit Bank 1 Sensor 1

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Connector is not connected securely or is in poor contact.
   - Open circuit in upstream oxygen sensor heater control circuit pin terminal.
   - Upstream oxygen sensor heater control circuit power supply terminal is not connected to main relay.
   - Sensor is damaged.
   - Upstream oxygen sensor heater pin circuit corresponding to ECU terminal is open, or there is an internal circuit damage.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
2	Open circuit in upstream oxygen sensor heater control circuit pin terminal.	Yes	Repair wire harness
		No	Next
3	Upstream oxygen sensor heater control circuit power supply terminal is not connected to main relay.	Yes	Repair wire harness
		No	Next
4	Sensor is damaged.	Yes	Replace sensor
		No	Next
5	Upstream oxygen sensor heater pin circuit corresponding to ECU terminal is open, or there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P005300 Upstream Oxygen Sensor Heater Circuit Failure

DTC reporting condition: The current internal resistance value is greater than the threshold value of corresponding working condition.

1. Possible cause:
   - Heater circuit is malfunctioning.
   - Oxygen sensor resistance is aging.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Do not disconnect oxygen sensor connector and measure if voltage of upstream oxygen sensor wire harness oxygen sensor terminal No.1 wire (white, heater power supply positive) is 12 V.	Yes	Next
		No	Check wire harness and connector

No.	Operation Step	Test Result	Subsequent Step
4	Do not disconnect oxygen sensor connector and measure if voltage of upstream oxygen sensor wire harness oxygen sensor terminal No.2 wire (white, heater power supply grounded) is 12 V.	Yes	Next
		No	Check wire harness and connector
5	Disconnect upstream oxygen sensor wire connector to remove upstream oxygen sensor. Place the oxygen sensor at room temperature to cool it down. Measure if resistance between sensor terminal No.1 interface (white, heater power supply positive) and No.2 interface (white, heater power supply grounded) is higher than 15 Ω with a multimeter when temperature of oxygen sensor cools down to room temperature ①.	Yes	Replace oxygen sensor
		No	Diagnostic Help

P005326 HO2S Heater Resistance Bank 1 Sensor 1

DTC reporting condition: The temperature of ceramic body is lower than the target temperature.DTC clearing condition: The temperature of ceramic body is no less than the target temperature

1. Possible cause:
   - Oxygen sensor is malfunctioning.
   - Wire harness is malfunctioning.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check if oxygen sensor connector is abnormal.	Yes	Replace connector
		No	Next
4	Disconnect upstream oxygen sensor wire harness connector to remove upstream oxygen sensor. Place the oxygen sensor at room temperature to cool it down. Measure if resistance between sensor terminal heater power supply positive and heater power supply ground is greater than 3 Ω with a multimeter when temperature of oxygen sensor cools down to room temperature ①.	Yes	Replace oxygen sensor
		No	Next
5	Check if there is contact resistance in oxygen sensor heater wire harness.	Yes	Replace wire harness
		No	Diagnostic Help

P013500 O2 Sensor Heater Circuit Bank 1 Sensor 1

DTC reporting condition: There is electrical malfunction in heater pole of upstream oxygen sensor.

1. Possible cause:
   - Oxygen sensor is malfunctioning.

- Wire harness is malfunctioning.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check if oxygen sensor connector is abnormal.	Yes	Replace connector
		No	Next
4	Disconnect upstream oxygen sensor wire harness connector to remove upstream oxygen sensor. Place the oxygen sensor at room temperature to cool it down. Measure if resistance between sensor terminal heater power supply positive and heater power supply ground is greater than 3 Ω with a multimeter when temperature of oxygen sensor cools down to room temperature.	Yes	Replace oxygen sensor
		No	Next
5	Check if there is contact resistance in oxygen sensor heater wire harness.	Yes	Replace wire harness
		No	Diagnostic Help

P064D00 LSU Integrated Chip Failure

DTC clearing condition: Chip communication self-diagnosis.

1. Possible cause:

- LSU oxygen sensor is damaged.
- ECU internal communication is abnormal.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Replace oxygen sensor, check if malfunction reappears.	Yes	Next
		No	End
4	Replace ECU, check if malfunction reappears.	Yes	Diagnostic Help
		No	End

P064D16 Internal Control Module O2 Sensor Processor Performance Bank 1

DTC reporting condition: Chip power supply voltage is lower than the threshold.

1. Possible cause:

- Oxygen sensor is malfunctioning.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Replace ECU. Start and keep vehicle idling until coolant temperature reaches normal value. The fault reappears.	Yes	Diagnostic Help
		No	End

P064D17 Internal Control Module O2 Sensor Processor Performance Bank 1

DTC clearing condition: The oxygen sensor voltage is higher than the threshold.

1. Possible cause:
   - Oxygen sensor voltage is lower than the threshold.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Replace ECU. Start and keep vehicle idling until coolant temperature reaches normal value. The fault reappears.	Yes	Diagnostic Help
		No	End

P064D81 Internal Control Module O2 Sensor Processor Performance Bank 1

DTC reporting condition: Chip self-diagnosis.

1. Possible cause:
   - Oxygen sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Replace ECU. Start and keep vehicle idling until coolant temperature reaches normal value. The fault reappears.	Yes	Diagnostic Help
		No	End

P035100 Ignition Coil "A" Primary Control Circuit Open P035200 Ignition Coil "B" Primary Control Circuit Open P035300 Ignition Coil "C" Primary Control Circuit Open P035400 Ignition Coil "D" Primary Control Circuit Open

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:

- Ignition coil circuit is short to ground or open.
- Ignition coil control pin corresponding to ECU is short to ground or open.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if ignition coil circuit is short to ground or open.	Yes	Repair wire harness
		No	Next
2	Check if ignition coil control pin corresponding to ECU is short to ground or open.	Yes	Check and repair ECU
		No	Diagnostic Help

P230100 Ignition Coil “A” Primary Control Circuit High P230400 Ignition Coil “B” Primary Control Circuit High P230700 Ignition Coil “C” Primary Control Circuit High P231000 Ignition Coil “D” Primary Control Circuit High

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Ignition coil circuit is short to power supply.
   - Ignition coil power supply terminal is short to power supply.
   - Ignition coil control pin corresponding to ECU is short to power supply
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if corresponding ignition coil circuit is short to power supply.	Yes	Repair wire harness
		No	Next
2	Check if ignition coil control pin corresponding to ECU is short to power supply.	Yes	Check and repair ECU
		No	Diagnostic Help

P230000 Ignition Coil “A” Primary Control Circuit Low P230300 Ignition Coil “B” Primary Control Circuit Low P230600 Ignition Coil “C” Primary Control Circuit Low P230900 Ignition Coil “D” Primary Control Circuit Low

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Connector is short to ground.
   - Ignition coil circuit is short to ground.
   - Ignition coil control pin corresponding to ECU is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if connector is short to ground.	Yes	Reconnect it

No.	Operation Step	Test Result	Subsequent Step
		No	Next
2	Check if corresponding ignition coil circuit is short to ground.	Yes	Repair, replace wire harness or ignition coil
		No	Next
3	Check if ignition coil control pin corresponding to ECU is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P062900 Fuel Pump Module "A" Control Circuit High

DTC reporting condition: Hardware circuit self-diagnosis.

1. Possible cause:
   - Low pressure oil pump control circuit is short to power supply;
   - Low pressure oil pump pin corresponding to ECU is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if actuator terminal is short to power supply.	Yes	Repair wire harness
		No	Next
2	Check if actuator pin corresponding to ECU terminal is short to power supply.	Yes	Check and repair ECU
		No	Diagnostic Help

P062800 Fuel Pump “A” Control Circuit Low

DTC reporting condition: Hardware circuit self-diagnosis.

1. Possible cause:
   - Low pressure oil pump control circuit is short to ground;
   - Low pressure oil pump pin corresponding to ECU is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if actuator terminal is short to ground.	Yes	Repair wire harness
		No	Next
2	Check if actuator pin corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P062700 Fuel Pump Module "A" Control Circuit Open

DTC reporting condition: Hardware circuit self-diagnosis.

1. Possible cause:

- Low pressure oil pump control circuit is open;
- Low pressure oil pump pin corresponding to ECU is open.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if actuator terminal is open.	Yes	Repair wire harness
		No	Next
2	Check if actuator pin corresponding to ECU terminal is open.	Yes	Check and repair ECU
		No	Diagnostic Help

P032600 Knock Sensor 1 Circ. High Input

DTC reporting condition: Knock background noise is greater than the maximum signal threshold of noise.

1. Possible cause:
   - Sensor is damaged.
   - ECU is damaged.
   - Engine is abnormal.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if knock sensor is damaged.	Yes	Replace sensor
		No	Next
2	Check if ECU is damaged.	Yes	Check and repair ECU
		No	Next
3	If engine is abnormal.	Yes	Check engine
		No	Diagnostic Help

P032500 Knock Sensor 1 Circ. Low Input

DTC reporting condition: The average value of knock sensor port voltage is less than 0.7 V.

1. Possible cause:
   - Connector is not connected securely or detached.
   - Signal terminal is open.
   - Sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if connector is not connected securely or is in poor contact.	Yes	Reconnect or replace connector
		No	Next
2	Check if knock sensor signal terminal is short to ground or open.	Yes	Repair wire harness

No.	Operation Step	Test Result	Subsequent Step
		No	Next
3	Check if knock sensor connecting wire harness is non-standard shielding wire and is subjected to electromagnetic interference.	Yes	Use standard shielding wire
		No	Next
4	Check if knock sensor is damaged.	Yes	Replace sensor
		No	Next
5	Check if knock sensor pin or circuit corresponding to ECU terminal is damaged.	Yes	Check and repair ECU
		No	Diagnostic Help

P024300 Turbocharger Waste Gate Control Circuit Open

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Control valve drive circuit is open.
   - Connector is not connected securely or detached.
   - Pin corresponding to ECU is open.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connector is not connected securely or detached.	Yes	Reconnect it
		No	Next
2	Waste gate control valve drive circuit pin is open.	Yes	Repair wire harness
		No	Next
3	Waste gate control valve power supply terminal is open.	Yes	Repair wire harness
		No	Next
4	Drive pin corresponding to ECU is open, or there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P023400 Turbocharger Boost Pressure Too High

DTC reporting condition: The boost pressure is higher than the target pressure plus a certain offset.

1. Possible cause:
   - Turbocharger relief valve is damaged.
   - Exhaust by-pass valve is damaged (normally closed state).
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Turbocharger relief valve is damaged.	Yes	Replace relief valve

No.	Operation Step	Test Result	Subsequent Step
		No	Next
2	Exhaust by-pass valve is damaged (normally closed state).	Yes	Replace exhaust valve
		No	Diagnostic Help

P029900 Turbocharger Boost Pressure Too High

DTC reporting condition: The actual boost pressure is higher than the target boost pressure minus a certain offset.

1. Possible cause:
   - The pipeline between compressor outlet and throttle leaks.
   - The pipeline between turbine and exhaust pipe leaks.
   - Exhaust by-pass valve or discharge valve is failed.
   - Turbocharger is damaged.
   - Working part such as compressor impeller is dirty or damaged.
   - Exhaust manifold leaks or is blocked.
   - Air filter is dirty.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	The pipeline between compressor outlet and throttle leaks.	Yes	Repair pipeline
		No	Next
2	The pipeline between turbine and exhaust pipe leaks.	Yes	Repair pipeline
		No	Next
3	Exhaust manifold leaks or is blocked.	Yes	Repair pipeline
		No	Next
4	Air filter is dirty.	Yes	Clean, replace air filter
		No	Next
5	Exhaust by-pass valve or discharge valve is failed and it is in normally open status.	Yes	Replace faulty parts
		No	Next
6	Working part such as compressor impeller is dirty or damaged.	Yes	Clean, replace faulty parts
		No	Next
7	Turbocharger is damaged.	Yes	Replace turbocharger
		No	Diagnostic Help

P050A21 Cold Start Idle Control System Performance

DTC reporting condition: Idle control speed is lower than the target idle by 100 r/min.

1. Possible cause:
   - The electronic throttle is stuck in a position with small opening.
   - If intake manifold leaks; fuel injector is blocked; exhaust resistance is excessive; oil supply pressure is low.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if electronic throttle is stuck in smaller opening position due to ice or oil.	Yes	Repair or replace electronic throttle
		No	Next
2	If intake manifold leaks; fuel injector is blocked; exhaust resistance is excessive; oil supply pressure is low.	Yes	Perform necessary repair
		No	Diagnostic Help

P050A22 Cold Start Idle Control System Performance

DTC reporting condition: Idle control speed is lower than the target idle by 100 r/min.

1. Possible cause:
   - The electronic throttle is stuck in a position with large opening.
   - If intake manifold leaks; fuel injector is blocked; oil supply pressure is high.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if electronic throttle is stuck in larger open position due to ice or oil.	Yes	Repair or replace electronic throttle
		No	Next
2	If intake manifold leaks; fuel injector leaks; oil supply pressure is high.	Yes	Perform necessary repair
		No	Diagnostic Help

P050D00 Cold Start Rough Idle

1. Possible cause:
   - The electronic throttle is stuck in a position with small opening.
   - Air leakage in system; leakage in fuel injector; excessively high fuel supply pressure.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if electronic throttle is stuck in larger open position due to ice or oil.	Yes	Repair or replace electronic throttle
		No	Next

No.	Operation Step	Test Result	Subsequent Step
2	Air leakage in system; leakage in fuel injector; excessively high fuel supply pressure.	Yes	Perform necessary repair
		No	Diagnostic Help

P223700 O2 Sensor Positive Current Control Circuit Open Bank 1 Sensor 1

DTC reporting condition: Closed-loop control oscillation is greater than the threshold.

1. Possible cause:
   - Oxygen sensor is malfunctioning.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check if oxygen sensor wire harness and connector are disconnected or poorly connected.	Yes	End
		No	Next
4	Replace upstream oxygen sensor. Start and keep vehicle idling until coolant temperature reaches normal value. The fault reappears.	Yes	Diagnostic Help
		No	End

P013000 Upstream Oxygen Sensor Compensation Circuit Open

DTC reporting condition: Under the conditions of low exhaust temperature and oil cut off, oxygen sensor voltage signal is high for a long time.

1. Possible cause:
   - Upstream oxygen sensor compensation circuit is open.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check for poor contact in pin corresponding to green wire at oxygen sensor connector.	Yes	Check and repair connector
		No	Next
2	Check for continuity of oxygen sensor wire harness to check if the line is open.	Yes	Replace wire harness
		No	Next
3	Check for abnormal pin at connector between wire harness and ECU, which may result in poor contact.	Yes	Check and repair ECU or wire harness terminal connector
		No	Replace oxygen sensor

No.	Operation Step	Test Result	Subsequent Step
4	Clear DTC, start and keep vehicle idling until coolant temperature reaches normal value. Check if malfunction is reported again.	Yes	Next
		No	End
5	Check for abnormality in LSU processing circuit in ECU.	Yes	Check and repair or replace ECU
		No	Diagnostic Help

P030000 Random/Multiple Cylinder Misfire Detected P030100 Cylinder 1 Misfire Detected P030200 Cylinder 2 Misfire Detected P030300 Cylinder 3 Misfire Detected P030400 Cylinder 4 Misfire Detected P036300 Cylinder Selective Fuel Cutoff Active due to Catalyst Damaging Misfire

DTC reporting condition: Misfire counter exceeds the threshold.

1. Possible cause:
   - Ignition coil circuit is malfunctioning.
   - Fuel injector circuit is malfunctioning.
   - Fuel injector control pin or ignition coil pin corresponding to ECU is malfunctioning.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check for DTCs related to injector in corresponding cylinder.	Yes	Go to DTCs related to injector in corresponding cylinder
		No	Next
2	Connector is not connected securely or detached.	Yes	Reconnect it
		No	Next
3	Check if ignition coil signal terminal is open or short to ground or power supply.	Yes	Repair or replace wire harness
		No	Next
4	Check if ignition coil power supply terminal is open or short to ground.	Yes	Repair or replace wire harness
		No	Next
5	Check if ignition coil grounded terminal is open or short to power supply.	Yes	Repair or replace wire harness
		No	Next
6	Check if ignition coil itself is malfunctioning.	Yes	Replace ignition coil
		No	Next
7	Check if spark plug is abnormal.	Yes	Replace spark plug.

No.	Operation Step	Test Result	Subsequent Step
		No	Next
8	Check if ignition coil control pin corresponding to ECU is open, or there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P154000 Engine Torque Control Adaption at Limit

DTC reporting condition: Application layer torque limit is continuously activated for more than 600 seconds.

1. Possible cause:
   - Security monitoring data is not set correctly or there is internal fault in ECU.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Check if security monitoring data is not set correctly.	Modify monitoring data, go to step 2	Go to step 2
2	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troublesho-oted, and system is normal	Replace vehicle controller

P070000 TCU Requests to Illuminate MIL Light

DTC reporting condition: TCU requests to Illuminate MIL light.

1. Possible cause:
   - TCU is malfunctioning.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if TCU fault memory is faulty.	Yes	Check and repair TCU
		No	Diagnostic Help

P06AA00 Main relay Temperature Over Temperature Fault

DTC reporting condition: Main relay detects over temperature (>150°C) or over current (>0.6 A).

1. Possible cause:
   - External relay or wire harness is short.
   - Internal resistance of relay is too small.
   - Component is invalid.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	After ECU is completely powered off, no faults will be reported.	Yes	End
		No	Next
2	Check if relay is damaged, wire harness is short.	Yes	Check and repair wire harness
		No	Next
3	Replace ECU.	Yes	Check and repair ECU

P153000 Function Monitoring: Fault of ECU ADC - Null Load Test Pulse P153100 Function Monitoring: Fault of ECU ADC - Test Voltage P157300 Monitoring Fault Reaction Error P157500 Diagnostic Fault Check to Report "WDA active" Due to Overvoltage Detection

DTC reporting condition: Error occurs in underlying data of hardware.

1. Possible cause:
   - ECU internal fault.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Replace ECU	Go to step 2	Troubleshoot other DTCs
2	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troublesho-oted, and system is normal	

P060D00 Accelerator Pedal Second Layer Monitoring Failure

DTC reporting condition: In the second layer monitoring, when the deviation of two paths of pedal signals exceeds the limit, a fault will be reported.

1. Possible cause:
   - ECU data settings are incorrect, usually because the EGAS security monitoring function is not matched or preset.
   - During data setting, the application layer data of pedal module does not match the monitoring layer data.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Communicate with EGAS security monitoring matching engineer to confirm if it is necessary to perform security monitoring presets or matching	After matching is completed, go to step 3	Go to step 2
2	Confirm if pedal model has been changed with the customer	Match it again, go to step 3 after completion	Check matching data, go to step 3
3	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troublesho-oted, and system is normal	Replace vehicle controller

P152000 Function Monitoring: Check of Predicted Air Mass Failed P152100 Function Monitoring: Fault of ECU Check of Injection Cut-off P152200 Function Monitoring: Fault of ECU in Check of Cylinder Individual Fuel Corrections P152500 Function Monitoring: Fault of ECU or Sensor in rl-Comparison P152300 Function Monitoring: Fault of ECU or Sensor in Mixture Check P152400 Function Monitoring: Fault of ECU Comparison of Lambda and Operation Mode

DTC reporting condition: In the second layer monitoring, it is recognized that there is a deviation between the calculation of load to fuel injection volume in the calculation of ECU application layer and the calculation of monitoring layer, a fault is reported.

1. Possible cause:
   - ECU data settings are incorrect, usually because the EGAS security monitoring function is not matched or preset.
   - Error occurs in calculation of load to fuel injection volume in the calculation of application layer.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Communicate with EGAS security monitoring matching engineer to confirm if it is necessary to perform security monitoring presets or matching.	After matching is completed, go to step 3	Go to step 2
2	Check if calculation process of load to fuel injection in the calculation of application layer is incorrect.	Match it again, go to step 3 after completion	Replace vehicle controller
3	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troublesho-oted, and system is normal	Replace vehicle controller

P061C00 Electronic Throttle Security Monitoring Function Failure (Second Layer Engine Speed Monitoring Failure)

DTC reporting condition: The monitoring layer speed signal is inconsistent with the application layer speed signal.

1. Possible cause:
   - ECU internal fault.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Replace ECU.	Go to step 2	Troubleshoot other DTCs
2	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troublesho-oted, and system is normal	

P152700 Function Monitoring: Monitoring of ICO From Level1 P152800 Function Monitoring: Monitoring of ICO From Level2

DTC reporting condition: The monitoring layer has identified an abnormal safety oil cut.

1. Possible cause:
   - ECU internal fault.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Replace ECU.	Go to step 2	Troubleshoot other DTCs
2	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troublesho-oted, and system is normal	

P152900 Function Monitoring: Fault of Starter Control

DTC reporting condition: The second layer monitoring identifies an abnormal start and stop function.

1. Possible cause:
   - ECU internal fault.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Replace ECU.	Go to step 2	Troubleshoot other DTCs
2	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troublesho-oted, and system is normal	

P061A00 Security Monitoring Torque Overlimit

DTC reporting condition: In the second layer monitoring, when actual torque calculated by ECU exceeds the second layer allowable torque for more than 520 ms, a fault is reported.

1. Possible cause:
   - ECU data settings are incorrect, usually because the EGAS security monitoring function is not matched or preset.
   - External torque increase request is not considered during data setting.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Communicate with EGAS security monitoring matching engineer to confirm if it is necessary to perform security monitoring presets or matching.	After matching is completed, go to step 3	Go to step 2
2	Confirm if there is an external torque increase request with the customer (ESP torque increase request, TCU torque increase request, etc.).	Match it again, go to step 3 after completion	Check matching data, go to step 3
3	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troublesho-oted, and system is normal	Replace vehicle controller

P157600 OverVoltage of ECU VDD5

DTC reporting condition: 5 V power supply voltage in ECU is too high and out of the limit.

1. Possible cause:
   - ECU internal fault.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Replace ECU.	Go to step 2	Troubleshoot other DTCs
2	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troublesho-oted, and system is normal	

P157700 UnderVoltage of ECU VDD5

DTC reporting condition: 5 V power supply voltage in ECU is too low and out of the limit.

1. Possible cause:
   - ECU internal fault.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Replace ECU.	Go to step 2	Troubleshoot other DTCs
2	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troublesho-oted, and system is normal	

P001400 “B” Camshaft Position - Timing Over-Advanced or System Performance Bank 1

DTC reporting condition: When starting, deviation between exhaust camshaft and locked position exceeds the threshold.

1. Possible cause:
   - Exhaust VVT lock pin is abnormal.
   - There is a wire harness interference.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check if lock pin is damaged.	Yes	Replace VVT assembly
		No	Next
4	Check wire harness for external interference.	Yes	Shield the wire harness
		No	Diagnostic Help

P001100 "A" Camshaft Position - Timing Over-Advanced or System Performance Bank 1

DTC reporting condition: When starting, deviation between intake camshaft and locked position exceeds the threshold.

1. Possible cause:
   - Intake VVT lock pin is abnormal.
   - There is a wire harness interference.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check if lock pin is damaged.	Yes	Replace VVT assembly
		No	Next
4	Check wire harness for external interference.	Yes	Shield the wire harness
		No	Diagnostic Help

P021900 Engine Overspeed

DTC reporting condition: The maximum engine speed is greater than 7500 r/min.

1. Possible cause:
   - Engine speed is increased artificially beyond the maximum safe speed.
   - Electronic accelerator pedal is stuck in a position with large opening, and cannot return to original position.
   - The throttle is stuck in a position with larger opening.
   - The speed calculation is incorrect.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Is the engine speed increased artificially beyond the maximum safe speed?	Yes	Clear DTCs and end operations
		No	Next
2	If electronic accelerator pedal is stuck in a position with large opening, and cannot return to original position.	Yes	Check and repair electronic accelerator pedal
		No	Next
3	If throttle is stuck in a position with large opening and cannot close.	Yes	Check and repair throttle
		No	Next

No.	Operation Step	Test Result	Subsequent Step
4	Check if speed sensor and speed calculation are correct.	Yes	Correct error
		No	Diagnostic Help

P157800 Monitoring Module Inquiry Error

DTC reporting condition: Check underlying close path of software.

1. Possible cause:
   - ECU internal fault.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Replace ECU	Go to step 2	Troubleshoot other DTCs
2	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troubleshooted, and system is normal	

P218700 System Too Lean at Idle Bank 1 P218800 System Too Lean at Idle Bank 1

DTC reporting condition: The self-learning factor exceeds the threshold.

1. Possible cause:
   - Oil circuit system hardware leaks or is blocked.
   - Intake pipe is malfunctioning.
   - Oxygen sensor wire harness connector circuit is malfunctioning.
   - Oxygen sensor is malfunctioning.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Connect fuel pressure gauge (the connection position is the front end of fuel distribution pipe assembly inlet pipe), start engine and check if fuel pressure is normal when fuel pressure is under idling conditions and when fuel pressure regulator vacuum tube is removed.	Yes	Next
		No	Check oil supply system
4	Check fuel injector for leakage or blockage with special tool.	Yes	Perform troubleshooting
		No	Next

No.	Operation Step	Test Result	Subsequent Step
5	Check fuel condition and ask customer if specified number of gasoline is filled. After refueling, does the vehicle work abnormally?	Yes	Replace fuel
		No	Next
6	If intake pipe is blocked, leaking, squashed or damaged; if canister control valve is stuck; if valve clearance is abnormal; if throttle body is contaminated, causing the air passage to be blocked.	Yes	Check, repair and clean throttle body
		No	Next
7	Check if ignition coil, cylinder wire, and spark plug work abnormally.	Yes	Perform troubleshooting
		No	Next
8	Do not disconnect oxygen sensor connector and measure if voltage of upstream oxygen sensor wire harness oxygen sensor terminal No.1 wire (white, heater power supply positive) is 12 V.	Yes	Next
		No	Check wire harness and connector
9	Do not disconnect oxygen sensor connector and measure if voltage of upstream oxygen sensor wire harness oxygen sensor terminal No.2 wire (white, heater power supply grounded) is 12 V.	Yes	Next
		No	Check wire harness and connector
10	Puncture wire harness connector near ECU terminal No.1 wire insulation layer (white, heater power source positive) with red pole of multimeter, and puncture wire harness connector near ECU terminal No.2 wire insulation layer (white, heater power source grounded) with black pole of multimeter. Check if voltage between two ends is about 12 V.	Yes	Next
		No	Check relay fuse
11	Do not disconnect oxygen sensor connector, measure if voltage between downstream oxygen sensor wire ECU terminal No.4 wire (black, oxygen sensor signal wire) and No.3 wire (gray, oxygen sensor signal grounded) is about 0.45 V.	Yes	Next
		No	Replace oxygen sensor
12	Start and keep vehicle idling until coolant temperature reaches normal value. Puncture wire harness connector near ECU terminal No.4 wire insulation layer (black, oxygen sensor signal wire) with red pole of multimeter, and puncture wire harness connector near ECU terminal No.3 wire insulation layer (gray, oxygen sensor signal grounded) with black pole of multimeter. Check if voltage is between 0 V and 1 V.	Yes	Next
		No	Replace oxygen sensor
13	Disconnect upstream oxygen sensor connector and check for short circuit between sensor terminal No.3 connector (gray, oxygen sensor signal grounded) and No.4 connector (black, oxygen sensor signal wire) with a multimeter.	Yes	Replace oxygen sensor
		No	Next

No.	Operation Step	Test Result	Subsequent Step
14	Disconnect upstream oxygen sensor connector and check for short circuit between sensor terminal No.3 connector (gray, oxygen sensor signal grounded) and No.4 connector (black, oxygen sensor signal wire) with a multimeter.	Yes	End
		No	Diagnostic Help

P055800 Brake Booster Pressure Sensor Circuit High

DTC reporting condition: Sensor voltage is higher than the threshold.

1. Possible cause:
   - Brake vacuum sensor signal terminal is short to power supply or open.
   - Brake vacuum sensor reference ground terminal is open.
   - Brake vacuum sensor signal pin terminal corresponding to ECU terminal is short to power supply or open.
   - Sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”. Do not start engine, use a multimeter to measure if voltage between brake vacuum sensor signal terminal and ground is close to or equal to 5 V.	Yes	Next
2	Turn ignition switch to “OFF” and check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
3	Check if brake vacuum sensor signal terminal is short to power supply or open.	Yes	Repair wire harness
		No	Next
4	Check if sensor reference ground terminal is open.	Yes	Repair wire harness
		No	Next
5	Check if sensor is damaged.	Yes	Replace sensor
		No	Next
6	Check if brake vacuum sensor signal pin terminal corresponding to ECU terminal is short to power supply or open, or if there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P055700 Brake Booster Pressure Sensor Circuit Low

DTC reporting condition: Sensor voltage is lower than the threshold.

1. Possible cause:
   - Brake vacuum sensor signal terminal is short to ground.
   - Sensor 5 V reference voltage terminal is open.
   - Brake vacuum sensor signal pin terminal corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”. Do not start engine, use a multimeter to measure if voltage of brake vacuum sensor signal terminal is close to or equal to 0 V.	Yes	Next
2	Turn ignition switch to “OFF”, check if brake vacuum sensor signal terminal is short to ground.	Yes	Repair wire harness
		No	Next
3	Check if sensor 5 V reference voltage terminal is open.	Yes	Repair wire harness
		No	Next
4	Check if brake vacuum sensor signal pin terminal corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P219500 O2 Sensor Signal Biased/Stuck Lean Bank 1 Sensor 1

DTC reporting condition: Downstream control integral value exceeds the upper limit.

1. Possible cause:
   - There is air leakage in exhaust system.
   - Oxygen sensor is aging.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check intake system and exhaust system for air leakage.	Yes	Repair leaking area
		No	Next
4	Replace the upstream LSU oxygen sensor. Check if malfunction reappears after returning vehicle to customer.	Yes	Diagnostic Help
		No	End

P219600 O2 Sensor Signal Biased/Stuck Lean Bank 1 Sensor 1

DTC reporting condition: Downstream control integral value exceeds the lower limit.

1. Possible cause:
   - There is air leakage in exhaust system.
   - Oxygen sensor is aging.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next

No.	Operation Step	Test Result	Subsequent Step
3	Check intake system and exhaust system for air leakage.	Yes	Repair leaking area
		No	Next
4	Replace the upstream LSU oxygen sensor. Check if malfunction reappears after returning vehicle to customer.	Yes	Diagnostic Help
		No	End

P120000 Manifold Absolute Pressure Sensor Circuit Range/Performance P120100 Manifold Absolute Pressure Sensor Circuit Range/Performance P120400 Turbocharger/Supercharger Boost Sensor "A" Circuit Range/Performance P120500 Turbocharger/Supercharger Boost Sensor "A" Circuit Range/Performance P023622 Turbocharger/Supercharger Boost Sensor "A" Circuit Range/Performance P023621 Turbocharger/Supercharger Boost Sensor "A" Circuit Range/Performance

DTC reporting condition: Boost pressure value exceeds the reasonable threshold.

1. Possible cause:
   - Sensor is icy and oily.
   - Sensor is aging.
   - Intake pipe is disconnected or leaks seriously.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Turn ignition switch to “OFF”, check if there is any freeze, oil stain, etc. on measurement terminal of sensor, which will affect normal measurement.	Yes	Repair, replace sensor
		No	Next
3	Check if boost pressure sensor installation position is incorrect, intake pipe is disconnected or seriously leaked.	Yes	Repair intake pipe, sensor
		No	Diagnostic Help

P00C721 Intake Air Pressure Measurement System - Multiple Sensor Correlation Bank 1 P00C722 Intake Air Pressure Measurement System - Multiple Sensor Correlation Bank 1

DTC reporting condition: Intake pressure value exceeds the reasonable threshold.

1. Possible cause:
   - Sensor is icy and oily.
   - Sensor is aging.
   - Intake pipe is disconnected or leaks seriously.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Do not start engine, and observe if “Intake Pressure” item in data flow is seriously deviated from ambient pressure by about 101 kpa (specific value is related to current pressure).	Yes	Repair, replace sensor
		No	Next
3	Turn ignition switch to “OFF”, check if there is any freeze, oil stain, etc. on measurement terminal of sensor, which will affect normal measurement.	Yes	Repair, replace sensor
		No	Next
4	Check if intake pressure sensor installation position is incorrect, intake pipe is disconnected or seriously leaked.	Yes	Repair intake pipe, sensor
		No	Diagnostic Help

P010700 Intake Manifold Pressure Sensor Short to Ground

DTC reporting condition: Sensor voltage is lower than the threshold.

1. Possible cause:
   - Intake pressure sensor signal terminal is short to ground.
   - Sensor 5 V reference voltage terminal is open.
   - Intake pressure sensor signal pin terminal corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”. Do not start engine, use a multimeter to measure if voltage of intake manifold pressure sensor signal terminal is close to or equal to 0 V.	Yes	Next
2	Turn ignition switch to “OFF”, check if pressure sensor signal terminal is short to ground.	Yes	Repair wire harness
		No	Next
3	Check if sensor 5 V reference voltage terminal is open.	Yes	Repair wire harness
		No	Next
4	Check if intake pressure sensor signal pin terminal corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P010800 Intake Manifold Pressure Sensor Short to Power Supply

DTC reporting condition: Intake manifold pressure sensor is short to power supply.

1. Possible cause:
   - Intake manifold pressure sensor signal terminal is short to power supply or open.
   - Sensor reference ground terminal is open.
   - Intake pressure sensor signal pin terminal corresponding to ECU terminal is short to power supply or open.

- Sensor is damaged.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to "ON". Do not start engine, use a multimeter to measure if voltage between intake manifold pressure sensor signal terminal and ground is close to or equal to 5 V.	Yes	Next
2	Turn ignition switch to "OFF" and check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
3	Check if intake manifold pressure sensor signal terminal is short to power supply or open.	Yes	Repair wire harness
		No	Next
4	Check if sensor reference ground terminal is open.	Yes	Repair wire harness
		No	Next
5	Check if sensor is damaged.	Yes	Replace sensor
		No	Next
6	Check if intake pressure sensor signal pin terminal corresponding to ECU terminal is short to power supply or open, or if there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P01062A Manifold Abs.Pressure Performance Non-plausible

DTC reporting condition: The difference between intake pressure value and pressure value at the start-up initialization is always less than 20 hPa.

1. Possible cause:

- Sensor is icy and oily.
- Installation position of sensor is incorrect.
- Intake pipe is disconnected or leaks seriously.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to "ON".		Next
2	Do not start engine, and observe if "Intake Pressure" item in data flow is seriously deviated from ambient pressure by about 101 kpa (specific value is related to current pressure).	Yes	Repair, replace sensor
		No	Next
3	Turn ignition switch to "OFF", check if there is any freeze, oil stain, etc. on measurement terminal of sensor, which will affect normal measurement.	Yes	Repair, replace sensor
		No	Next

No.	Operation Step	Test Result	Subsequent Step
4	Check if intake pressure sensor installation position is incorrect, intake pipe is disconnected or seriously leaked.	Yes	Repair intake pipe, sensor
		No	Diagnostic Help

P046800 EVAP Purge Flow Sensor Circuit High

DTC reporting condition: The voltage signal of high load desorption pipeline pressure sensor exceeds 4.88 V.

1. Possible cause:
   - Pressure sensor signal terminal is short to power supply.
   - High load desorption pipeline pressure sensor signal pin corresponding to ECU terminal is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Use a multimeter to measure if high load desorption pipeline pressure sensor signal line voltage is close to or equal to 5 V.	Yes	Repair, replace sensor
		No	Next
4	Measure if pressure sensor wire harness terminal voltage is close to or equal to 5 V.	Yes	Check wire harness
		No	Next
5	Check if high load desorption pipeline pressure sensor signal pin terminal corresponding to ECU terminal is short to power supply, or if there is an internal circuit damage.	Yes	Check, repair or replace ECU
		No	Diagnostic Help

P046700 EVAP Purge Flow Sensor Circuit Low

DTC reporting condition: The voltage signal of high load desorption pipeline pressure sensor is lower than 0.2 V.

1. Possible cause:
   - Pressure sensor signal terminal is short to ground.
   - High load desorption pipeline pressure sensor signal pin corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next

No.	Operation Step	Test Result	Subsequent Step
3	Use a multimeter to measure if high load desorption pipeline pressure sensor signal line voltage is close to or equal to 0V.	Yes	Replace sensor
		No	Next
4	Measure if pressure sensor wire harness terminal voltage is close to or equal to 0V.	Yes	Check wire harness
		No	Next
5	Check if high load desorption pipeline pressure sensor signal pin terminal corresponding to ECU terminal is short to ground, or if there is an internal circuit damage.	Yes	Check, repair or replace ECU
		No	Diagnostic Help

P128500 EVAP Purge Flow Sensor Circuit Range Performance

DTC reporting condition: The pressure signal of high load desorption pipeline pressure sensor exceeds the threshold.

1. Possible cause:
   - Pressure sensor signal terminal is short to power supply.
   - High load desorption pipeline pressure sensor signal pin corresponding to ECU terminal is short to power supply.
   - High load desorption pipeline pressure sensor is damaged.
   - The low load desorption pipeline check valve is damaged and cannot function properly.
   - Venturi tube is disconnected.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Use a multimeter to measure if high load desorption pipeline pressure sensor signal line voltage is close to or equal to 5 V.	Yes	Replace sensor
		No	Next
4	Measure if pressure sensor wire harness terminal voltage is close to or equal to 5 V.	Yes	Check wire harness
		No	Next
5	Check if high load desorption pipeline pressure sensor signal pin terminal corresponding to ECU terminal is short to power supply, or if there is an internal circuit damage.	Yes	Check, repair or replace ECU
		No	Next
6	Replace high load desorption pipeline pressure sensor, start vehicle and drive with a heavy load, check if malfunction reappears.	Yes	Next
		No	End
7	Replace low load desorption pipeline check valve, start vehicle and drive with a heavy load, check if malfunction reappears.	Yes	Next
		No	End
8	Check if venturi tube is disconnected.	Yes	Replace venturi tube

No.	Operation Step	Test Result	Subsequent Step
		No	Diagnostic Help

P128600 EVAP Purge Flow Sensor Circuit Range Performance

DTC reporting condition: The pressure signal of high load desorption pipeline pressure sensor is lower than the threshold.

1. Possible cause:
   - Pressure sensor signal terminal is short to ground.
   - High load desorption pipeline pressure sensor signal pin corresponding to ECU terminal is short to ground.
   - High load desorption pipeline pressure sensor is damaged.
   - Venturi tube or high load desorption pipeline check valve is blocked.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Use a multimeter to measure if high load desorption pipeline pressure sensor signal line voltage is close to or equal to 0V.	Yes	Replace sensor
		No	Next
4	Measure if pressure sensor wire harness terminal voltage is close to or equal to 0V.	Yes	Check wire harness
		No	Next
5	Check if high load desorption pipeline pressure sensor signal pin terminal corresponding to ECU terminal is short to ground, or if there is an internal circuit damage.	Yes	Check, repair or replace ECU
		No	Next
6	Replace high load desorption pipeline pressure sensor, start and drive vehicle, check if malfunction reappears.	Yes	Next
		No	End
7	Replace high load desorption pipeline check valve or venturi tube, start and drive vehicle, check if malfunction reappears.	Yes	Diagnostic Help
		No	End

P222900 Barometric Pressure Sensor "A" Circuit High P222800 Barometric Pressure Sensor "A" Circuit Low Problem

DTC reporting condition: The sensor sends fault information by itself.

1. Possible cause:
   - The built-in ambient pressure sensor in ECU is malfunctioning.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if ambient pressure sensor signal valve is too high or low.	Yes	Check and repair ECU
		No	Diagnostic Help

P223000 Barometric Pressure Sensor Signal Failure P222722 Barometric Pressure Sensor "A" Circuit Range/Performance P222721 Barometric Pressure Sensor "A" Circuit Range/Performance P120200 Barometric Pressure Sensor "A" Circuit Range/Performance P120300 Barometric Pressure Sensor "A" Circuit Range/Performance

DTC reporting condition: The sensor sends fault information by itself.

1. Possible cause:
   - The built-in ambient pressure sensor in ECU is malfunctioning.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if ambient pressure sensor signal valve is significantly different from the current atmospheric pressure.	Yes	Check and repair ECU
		No	Diagnostic Help

P023700 Turbocharger/Supercharger Boost Sensor "A" Circuit Low

DTC reporting condition: Boost pressure sensor voltage is lower than 0.15 V.

1. Possible cause:
   - Sensor signal terminal pin is short to ground.
   - Sensor signal terminal pin corresponding to ECU is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Sensor signal terminal pin is short to ground.	Yes	Repair wire harness
		No	Next
2	Sensor power supply terminal pin is short to ground.	Yes	Repair wire harness
		No	Next
3	Offset or damage to sensor resistance and other characteristics.	Yes	Replace sensor
		No	Next
4	Sensor signal terminal pin corresponding to ECU is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P023800 Turbocharger/Supercharger Boost Sensor “A” Circuit High

DTC reporting condition: Boost pressure sensor voltage is higher than 4.85 V.

1. Possible cause:
   - Sensor signal terminal pin is short to power supply or open.
   - Connector is not connected securely or detached.
   - Sensor signal terminal pin corresponding to ECU is short to power supply or open.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connector is not connected securely or detached.	Yes	Reconnect it
		No	Next
2	Sensor signal terminal pin is short to power supply or open.	Yes	Repair wire harness
		No	Next
3	Sensor power supply terminal and grounded terminal pin are open.	Yes	Repair wire harness
		No	Next
4	Offset or damage to sensor resistance and other characteristics.	Yes	Replace sensor
		No	Next
5	Sensor signal terminal pin corresponding to ECU is short to power supply or open, or there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P212300/ P212800 Accelerator Pedal 1st/2nd Path Signal Voltage Too High Fault

DTC reporting condition: A path of pedal voltage value is higher than APP_uRaw1SRCHigh_C / APP_ uRaw2SRCHigh_C and lasts for TUPWGO.

1. Possible cause:
   - The ground wire GND of accelerator pedal 1st/2nd path signal is open.
   - 1st/2nd path signal wires of accelerator pedal are short to 5 V power supply.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Collect two paths of accelerator pedal voltage values APP_uRaw1, APP_uRaw2, and observe if it is pulled near 5 V when fault reappears.	Go to step 2	Repeat the measurement until it reappears
2	The actions such as unplugging and plugging connector, shaking wire harness, etc. will affect the occurrence frequency of faults.	Go to step 3	Go to step 4
3	Verify if wire harness is the cause by accelerator pedal flying wire connection.	Replace wire harness, and then go to step 5	Go to step 4
4	Replace pedal, check if it is caused by pedal.	Replace pedal, and then go to step 5	Replace vehicle controller, and then go to step 5

Step	Operation	Yes	No
5	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troubleshooted, and system is normal	Replace vehicle controller

P212200/P212700 Accelerator Pedal 1st/2nd Path Signal Voltage Too Low Fault

DTC reporting condition: A path of pedal voltage value is lower than APP_uRaw1SRCLow_C / APP_uRaw2SRCLow_C and lasts for TUPWGU.

1. Possible cause:
   - The 5 V power supply line of accelerator pedal 1st/2nd path signal is open.
   - The accelerator pedal 1st/2nd path signal line is open.
   - The accelerator pedal 1st/2nd path signal line is short to GND.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Collect two paths of accelerator pedal voltage values APP_uRaw1, APP_uRaw2, and observe if it drops near zero when fault reappears.	Go to step 2	Repeat the measurement until it reappears
2	The actions such as unplugging and plugging connector, shaking wire harness, etc. will affect the occurrence frequency of faults.	Go to step 3	Go to step 4
3	Verify if wire harness is the cause by accelerator pedal flying wire connection.	Replace wire harness, and then go to step 5	Go to step 4
4	Replace pedal, check if it is caused by pedal.	Replace pedal, and then go to step 5	Replace vehicle controller, and then go to step 5
5	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troubleshooted, and system is normal	Replace vehicle controller

P261000 ECM/PCM Engine Off Timer Performance

DTC reporting condition: In ECU power-on stage, engine off timer data is unreasonable.

1. Possible cause:
   - Engine off timer data is unreasonable.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Turn key to OFF position until power supply of ECU is completely cut off, then turn key to ON position to check if the fault is troubleshooted.	Yes	Troubleshoot the fault
		No	Consult ECU supplier

P213800 Two-way Signal Deviation of Accelerator Pedal Out of Limit Fault

DTC reporting condition: Compare the two paths of accelerator pedal signal voltage, when the deviation exceeds the threshold and it is confirmed after a period of time, a fault is reported.

1. Possible cause:
   - There is a short circuit or resistance between accelerator pedal 1st and 2nd path signal lines.
   - There is resistance on accelerator pedal 1st/2nd path 5 V power supply line or GND line, which causes 5 V voltage of pedal terminal to be pulled down or zero voltage to be increased.
2. Troubleshooting method:

Step	Operation	Yes	No
1	Collect two paths of accelerator pedal voltage values APP_uRaw1, APP_uRaw2, and observe if the relationship between them is twice at the moment the fault reappears.	Go to step 2	Repeat the measurement until it reappears
2	The actions such as unplugging and plugging connector, shaking wire harness, etc. will affect the occurrence frequency of faults.	Go to step 3	Go to step 5
3	Measure the voltage drop of each section on wire harness through AD-Scan. If wire harness is ideal, there is no voltage drop, and if there is a voltage drop, it means that there is resistance in wire harness or connector.	Go to step 4	Go to step 5
4	Verify if wire harness resistance is the cause by accelerator pedal flying wire connection.	Replace wire harness, and then go to step 6	Go to step 5
5	Replace pedal to determine if there is an internal problem in pedal.	Replace pedal, and then go to step 6	Replace vehicle controller, and then go to step 6
6	Clear DTC, restart vehicle and check if DTC is cleared.	Malfunction is troubleshooted, and system is normal	Replace vehicle controller

P064100 5 V Power Supply Module 1 Fault

DTC reporting condition: 5 V power supply module 1 has an overvoltage or undervoltage problem.

1. Possible cause:

- 5 V power supply module 1 has an overvoltage or undervoltage problem.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	There is wire harness signal interference.	Yes	Shield the wire harness
		No	Consult ECM supplier

P065100 5 V Power Supply Module 2 Fault

DTC reporting condition: 5 V power supply module 2 has an overvoltage or undervoltage problem.

1. Possible cause:

- 5 V power supply module 2 has an overvoltage or undervoltage problem.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	There is wire harness signal interference.	Yes	Shield the wire harness
		No	Consult ECM supplier

P063400 Cooling Fan Drive Chip Overheating

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:

- Cooling fan relay control circuit is short to power supply.
- Cooling fan relay control pin corresponding to ECU terminal is short to power supply.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Cooling fan relay control circuit is short to power supply.	Yes	Shield the wire harness
		No	Consult ECM supplier
2	If there is a fault in the internal chip of ECU.	Yes	Check and repair ECU
		No	Diagnostic Help

P00CE24 Cold Start Calibration of Manifold Intake Air Temperature Sensor Unreasonable (Positive Deviation) P00CE23 Cold Start Calibration of Supercharged Intake Air Temperature Sensor Unreasonable (Positive Deviation) P138024 Cold Start Calibration of Supercharged Intake Air Temperature Sensor Unreasonable

(Positive Deviation) P138023 Cold Start Calibration of Supercharged Intake Air Temperature Sensor Unreasonable (Positive Deviation)

DTC reporting condition: Intake temperature sensor greatly deviates from the average model during cold start.

1. Possible cause:
   - Internal resistance of intake temperature sensor is unreasonable.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if there is contact resistance in wire harness.	Yes	Repair wire harness
		No	Next
2	Check if internal resistance value of sensor greatly deviates from the normal value.	Yes	Replace sensor
		No	Diagnostic Help

P011400 Poor Contact in Intake Manifold Temperature Sensor Circuit

DTC reporting condition: Temperature sensor voltage is higher than 4.9 V.

1. Possible cause:
   - Intake manifold temperature sensor signal is in poor contact.
   - Connector is in poor contact.
   - Intake manifold temperature sensor signal pin corresponding to ECU terminal is in poor contact.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Use a multimeter to measure if voltage between intake manifold temperature sensor signal terminal and ground is close to or equal to 5 V.	Yes	Next
2	Turn ignition switch to “OFF” and check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
3	Check if sensor signal terminal is in poor contact.	Yes	Repair wire harness
		No	Next
4	Check if intake manifold temperature sensor signal pin corresponding to ECU terminal is in poor contact.	Yes	Check and repair ECU
		No	Diagnostic Help

P011300 Intake Manifold Temperature Sensor Signal Voltage Too High

DTC reporting condition: Temperature sensor voltage is higher than 4.9 V.

1. Possible cause:
   - Intake manifold pressure sensor signal terminal is short to power supply or open.
   - Sensor reference ground is open.
   - Intake manifold temperature sensor signal pin corresponding to ECU terminal is short to power supply or open, or there is an internal circuit damage.

- Sensor is damaged

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Use a multimeter to measure if voltage between intake manifold temperature sensor signal terminal and ground is close to or equal to 5 V.	Yes	Next
2	Turn ignition switch to “OFF” and check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
3	Check if sensor signal terminal is short to power supply or open.	Yes	Repair wire harness
		No	Next
4	Check if sensor reference ground is open.	Yes	Repair or replace wire harness or sensor
		No	Next
5	Check if sensor is damaged.	Yes	Replace sensor
		No	Next
6	Check if intake manifold temperature sensor signal pin corresponding to ECU terminal is short to power supply or open, or if there is an internal circuit damage	Yes	Check and repair ECU
		No	Diagnostic Help

P009800 Intake Air Temperature Sensor 2 Circuit High Bank 1

DTC reporting condition: Temperature sensor voltage is higher than 4.9 V.

1. Possible cause:
   - Boost temperature sensor signal terminal is short to power supply or open.
   - Sensor reference ground is open.
   - Boost temperature sensor signal pin corresponding to ECU terminal is short to power supply or open, or there is an internal circuit damage.
   - Sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”. Do not start engine, and observe if “Intake Temperature Sensor Measured Value” in data flow is too low. If value is lower than normal condition, observe minimum intake manifold temperature range. You can also use a multimeter to measure if voltage between boost temperature sensor signal terminal and ground is close to or equal to 5 V.	Yes	Next
2	Turn ignition switch to “OFF” and check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next

No.	Operation Step	Test Result	Subsequent Step
3	Check if sensor signal terminal is short to power supply or open.	Yes	Repair wire harness
		No	Next
4	Check if sensor reference ground is open.	Yes	Repair, replace wire harness or sensor
		No	Next
5	Check if sensor is damaged.	Yes	Replace sensor
		No	Next
6	Check if boost temperature sensor signal pin corresponding to ECU terminal is short to power supply or open, or if there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P009700 Intake Air Temperature Sensor 2 Circuit Low Bank 1

DTC reporting condition: Temperature sensor voltage is lower than 0.1 V.

1. Possible cause:
   - Boost temperature sensor signal terminal is short to ground.
   - Boost temperature sensor signal pin corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”. Do not start engine, and observe if “Intake Temperature Sensor Measured Value” in data flow is too low. If value is lower than normal condition, observe minimum intake manifold temperature range. You can also use a multimeter to measure if voltage between boost temperature sensor signal terminal and ground is close to or equal to 5 V.	Yes	Next
2	Turn ignition switch to “OFF” and check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
3	Check if sensor signal terminal is short to ground.	Yes	Repair wire harness
		No	Next
4	Check if boost temperature sensor signal pin corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P009900 Intake Air Temperature Sensor 2 Circuit Intermittent Bank 1

DTC reporting condition: Boost temperature sensor voltage is intermittently higher than 4.9 V.

1. Possible cause:
   - Boost temperature sensor signal terminal is in poor contact.
   - Connector is in poor contact.

- Boost temperature sensor signal pin corresponding to ECU terminal is in poor contact.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to "ON". Do not start engine, and observe if "Intake Temperature Sensor Measured Value" in data flow is too low. If value is lower than normal condition, observe minimum boost temperature range. You can also use a multimeter to measure if voltage between boost temperature sensor signal terminal and ground is close to or equal to 5 V.	Yes	Next
2	Turn ignition switch to "OFF" and check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
3	Check if sensor signal terminal is in poor contact.	Yes	Repair wire harness
		No	Next
4	Check if boost temperature sensor signal pin corresponding to ECU terminal is in poor contact.	Yes	Check and repair ECU
		No	Diagnostic Help

P044200 EVAP System Leak Detected (Small Leak)

DTC reporting condition: Vacuum attenuation gradient of evaporation system exceeds the threshold.

1. Possible cause:

- Fuel tank cap is not tightened or there is leaking port.
- Canister vent valve cannot be closed completely.
- Leakage exists among oil tank - pipeline - canister valve - canister solenoid valve - canister vent valve.
- Canister solenoid valve cannot be completely closed.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to "ON".		Next
2	Read and store fault freeze frame information.		Next
3	Check if fuel tank cap is tightened.	No	End
		Yes	Next
4	Check for leakage/blockage in fuel tank - pipeline - canister valve - canister solenoid valve - canister ventilation valve, and if connector is installed correctly.	No	End
		Yes	Next
5	Check if canister vent valve can be completely closed, which can be achieved by shorting to pin.	No	Replace canister vent valve
		Yes	Next

No.	Operation Step	Test Result	Subsequent Step
6	Check if canister solenoid valve is completely closed with power ON.	No	End
		Yes	Diagnostic Help

P045500 EVAP System Leak Detected (Large Leak)

DTC reporting condition: Vacuum degree during evaporation system vacuuming cannot reach the target vacuum degree.

1. Possible cause:
   - Fuel tank cap is not tightened or there is leaking port.
   - Canister vent valve cannot be closed completely.
   - Leakage exists among oil tank - pipeline - canister valve - canister solenoid valve - canister vent valve.
   - Canister solenoid valve cannot be completely closed.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check if fuel tank cap is tightened.	No	End
		Yes	Next
4	Check for leakage/blockage in fuel tank - pipeline - canister valve - canister solenoid valve - canister ventilation valve, and if connector is installed correctly.	No	End
		Yes	Next
5	Check if canister vent valve can be completely closed, which can be achieved by shorting to pin.	No	Replace canister vent valve
		Yes	Next
6	Check if canister solenoid valve is completely closed with power ON.	No	End
		Yes	Diagnostic Help

P04F000 EVAP System High Pressure Purge Line Performance

DTC reporting condition: The pressure fluctuation of high load desorption pipeline does not reach the threshold.

1. Possible cause:
   - High load desorption pipeline, check valve, venturi tube and connection between canister valve and engine are blocked or disconnected.
   - Check valve of low load pipeline is damaged and cannot function properly.
   - Canister valve is stuck at normally open position or normally closed position.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check if desorption pipeline, check valve (if equipped), venturi tube (if equipped) and connection between canister valve and engine are blocked or disconnected.	No	Go to step 5
		Yes	Next
4	Replace the corresponding line.	No	End
5	Check if low load pipeline check valve is damaged and cannot function properly.	Yes	Replace low load pipeline check valve
		No	Next
6	Check if canister valve hardware is stuck at normally closed/normally open position.	No	Diagnostic Help
		Yes	Next
7	Replace canister valve.		End

P044400 Evaporative Emission System Purge Control Valve Circuit Open

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Connector is not connected securely or is in poor contact.
   - Canister control valve circuit is open.
   - Canister control valve circuit corresponding to ECU is open
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
2	Canister control valve signal terminal pin is open.	Yes	Repair wire harness
		No	Next
3	Canister control valve power supply terminal pin is open.	Yes	Repair wire harness
		No	Next
4	Canister control valve is damaged.	Yes	Replace canister valve
		No	Next
5	Canister control terminal pin corresponding to ECU terminal is open, or there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P050C24 Cold Start Engine Coolant Temperature Performance P050C23 Cold Start Engine Coolant Temperature Performance

DTC reporting condition: Cold start of coolant temperature sensor 1 greatly deviates from the model value.

1. Possible cause:
   - Connector is not connected securely or is in poor contact. Internal resistance of coolant temperature sensor is unreasonable.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if there is contact resistance in wire harness.	Yes	Repair wire harness
		No	Next
2	Check if internal resistance value of sensor greatly deviates from the normal value.	Yes	Replace sensor
		No	Diagnostic Help

P011800 Cold Start Engine Coolant Temperature Performance

DTC reporting condition: Coolant temperature sensor 1 voltage is higher than 4.9 V.

1. Possible cause:
   - Connector is not connected securely or is in poor contact.
   - Coolant temperature sensor signal terminal is short to power supply or open.
   - Coolant temperature sensor signal pin corresponding to ECU terminal is short to power supply or open.
   - Sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”. Do not start engine and observe if “Intake Temperature Sensor Measured Value” in data flow is much lower than current ambient temperature. You can also use a multimeter to measure if voltage between coolant temperature sensor 1 signal terminal and ground is close to or equal to 5V.	Yes	Next
2	Turn ignition switch to “OFF” and check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
3	Check if sensor signal terminal is short to power supply or open.	Yes	Repair wire harness
		No	Next
4	Sensor reference ground is open.	Yes	Repair wire harness
		No	Next
5	Sensor is damaged.	Yes	Replace sensor
		No	Next

No.	Operation Step	Test Result	Subsequent Step
6	Coolant temperature sensor signal pin terminal corresponding to ECU is short to power supply, open or there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P011700 Coolant Temperature Sensor 1 Signal Voltage Low

DTC reporting condition: Coolant temperature sensor 1 voltage is lower than 0.09 V.

1. Possible cause:
   - Coolant temperature sensor 1 signal terminal is short to ground.
   - Coolant temperature sensor 1 signal pin corresponding to ECU terminal is short to ground.
   - Sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”. Do not start engine and observe if “Intake Temperature Sensor Measured Value” in data flow is much lower than current ambient temperature. You can also use a multimeter to measure if voltage between coolant temperature sensor 1 signal terminal and ground is close to or equal to 0 V.	Yes	Next
2	Turn ignition switch to “OFF” and check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
3	Check if sensor is damaged.	Yes	Replace sensor
		No	Next
4	Check if coolant temperature sensor 1 signal pin terminal corresponding to ECU is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P011900 Engine Coolant Temperature Sensor 1 Circuit Intermittent

DTC reporting condition: Coolant temperature sensor voltage jumps.

1. Possible cause:
   - Coolant temperature sensor signal terminal circuit is in poor contact.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if coolant temperature sensor signal terminal circuit is in poor contact.	Yes	Repair wire harness
		No	Diagnostic Help

P011623 Engine Coolant Temperature Sensor 1 Circuit Range/Performance

DTC reporting condition: Coolant temperature sensor 1 signal is less than the lowest model value by 30℃/ coolant temperature sensor 1 signal remains unchanged.

1. Possible cause:
   - Internal resistance of coolant temperature sensor is unreasonable.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if there is contact resistance in wire harness.	Yes	Repair wire harness
		No	Next
2	Check if internal resistance value of sensor greatly deviates from the normal value.	Yes	Replace sensor
		No	Diagnostic Help

P042000 Catalyst System Efficiency Below Threshold Bank 1

DTC reporting condition: Calculated value of catalyst converter oxygen storage capacity is lower than the threshold.

1. Possible cause:
   - Check exhaust system for leakage, gasket for damage.
   - The catalytic converter is deteriorated.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check exhaust system for leakage, gasket for damage.	Yes	Repair leaking area
		No	Next
4	Replace the catalytic converter. Check if malfunction reappears after returning vehicle to customer.	Yes	Diagnostic Help
		No	End

P069000 ECM/PCM Power Relay Sense Circuit High

DTC reporting condition: The voltage behind main relay is higher than the threshold.

1. Possible cause:
   - Alternator system is malfunctioning.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check if there is a problem in alternator system.	Yes	Repair alternator
		No	Diagnostic Help

P056300 System Battery Voltage High

DTC reporting condition: Power supply voltage value is higher than 20 V.

1. Possible cause:
   - Engine wire harness grounded point is malfunctioning.
   - Alternator regulator is malfunctioning, and motor power generation cannot be controlled effectively.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch “OFF”. Measure battery voltage with a multimeter and check if it is too high.	Yes	Next
2	Check if engine wire harness grounded point is malfunctioning.	Yes	Repair wire harness
		No	Next
3	Alternator regulator is malfunctioning, and motor power generation cannot be controlled effectively.	Yes	Repair regulator
		No	Diagnostic Help

P056200 Battery Voltage Low

DTC reporting condition: Power supply voltage value is lower than 6 V.

1. Possible cause:
   - All ECU pins connecting to battery or main relay are open.
   - Battery leaks or is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch “OFF”. Measure battery voltage with a multimeter and check if it is too low.	Yes	Next
2	Check if all ECU pins connecting to battery or main relay are open.	Yes	Repair wire harness
		No	Next
3	Check if engine wire harness grounded point is malfunctioning.	Yes	Repair wire harness
		No	Next
4	Regulator is invalid.	Yes	Repair regulator
		No	Next
5	Battery leaks or is damaged.	Yes	Replace battery
		No	Next
6	Alternator is malfunctioning.	Yes	Repair alternator
		No	Diagnostic Help

P056000 Battery Voltage Unreasonable

DTC reporting condition: Battery voltage is lower than the threshold.

1. Possible cause:
   - Battery is depleted.
   - Alternator is malfunctioning.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check if battery is depleted and cannot be used properly after charging.	Yes	Replace battery
		No	Next
4	Check if there is a problem in alternator system.	Yes	Repair alternator
		No	Diagnostic Help

P241400 O2 Sensor Exhaust Sample Error Bank 1 Sensor 1

DTC reporting condition: LSU senses faults such as lean, no circuit and lean target air-fuel ratio.

1. Possible cause:
   - LSU is exposed to the air or LSU connector is in poor contact.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if oxygen sensor is not installed correctly, installed outside the exhaust manifold and exposed into air.	Yes	Reinstall oxygen sensor
		No	Next
2	Check if adjusting resistance in oxygen sensor connector is invalid, the resistance is infinite.	Yes	Replace connector
		No	Next
3	Check oxygen sensor processing circuit part inside ECU, resistance between IA and IP circuit is infinite.	Yes	Check and repair or replace ECU
		No	Diagnostic Help

P063400 Cooling Fan Drive Chip Overheating

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Cooling fan relay control circuit is short to power supply.
   - Cooling fan relay control pin corresponding to ECU terminal is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Cooling fan relay control circuit is short to power supply.	Yes	Repair wire harness
		No	Next
2	If there is a fault in the internal chip of ECU.	Yes	Check and repair ECU
		No	Diagnostic Help

P121200 Vehicle Speed Sensor Performance Failure (Vehicle Speed Exceeds Maximum Range)

DTC reporting condition: Overvoltage (>6.5 V) occurs in 6 V power supply input of chip power supply.

1. Possible cause:
   - ESP sends incorrect vehicle speed signal;
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if CAN signal sent by ESP is too high.	Yes	Check and repair ESP
		No	Diagnostic Help

P050000 Vehicle Speed Sensor Input Signal Failure

DTC reporting condition: CAN vehicle speed signal error is received by ECU.

1. Possible cause:
   - ESP sends incorrect vehicle speed signal;
   - ESP loses communication with ECU vehicle speed signal frame.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if communication between ESP and ECU is lost.	Yes	Check and repair CAN
		No	Next
2	Check if CAN signal sent by ESP is always 0.	Yes	Check and repair ESP
		No	Diagnostic Help

P050165 Vehicle Speed Sensor "A" Circuit Intermittent/Erratic/High

DTC reporting condition: Vehicle speed sensor performance is malfunctioning (vehicle speed is too low when vehicle coasts and fuel is cut off).

1. Possible cause:
   - There is a wire harness interference;
   - Vehicle speed sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check wire harness for external interference.	Yes	Shield the wire harness
		No	Next
4	Check if vehicle speed sensor is damaged.	Yes	Replace vehicle speed sensor
		No	Diagnostic Help

P261D00 Coolant Pump "B" Control Circuit High

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Turbine cooling electronic water pump control circuit is short to power supply;
   - Turbine cooling electronic water pump control pin corresponding to ECU terminal is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Turbine cooling electronic water pump control circuit is short to power supply.	Yes	Repair wire harness
		No	Next
2	Turbine cooling electronic water pump control pin corresponding to ECU terminal is short to power supply.	Yes	Check and repair ECU
		No	Diagnostic Help

P261C00 Coolant Pump "B" Control Circuit Low

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Turbine cooling electronic water pump control circuit is short to ground;
   - Turbine cooling electronic water pump control pin corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Turbine cooling electronic water pump control circuit is short to ground.	Yes	Repair wire harness
		No	Next
2	Turbine cooling electronic water pump control pin corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P025D00 Fuel Pump Module "A" Control Circuit High

DTC reporting condition: Hardware circuit self-diagnosis.

1. Possible cause:
   - Low pressure oil pump control circuit is short to power supply;
   - Low pressure oil pump pin corresponding to ECU is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if actuator terminal is short to power supply.	Yes	Repair wire harness
		No	Next
2	Check if actuator pin corresponding to ECU terminal is short to power supply.	Yes	Check and repair ECU
		No	Diagnostic Help

P025A00 Fuel Pump Module "A" Control Circuit Open

DTC reporting condition: Hardware circuit self-diagnosis.

1. Possible cause:
   - Low pressure oil pump control circuit is open;
   - Low pressure oil pump pin corresponding to ECU is open.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if actuator terminal is open.	Yes	Repair wire harness
		No	Next
2	Check if actuator pin corresponding to ECU terminal is open.	Yes	Check and repair ECU
		No	Diagnostic Help

P124A00 Booster Exhaust Gate Control Valve Control Circuit A Short

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Waste gate control valve drive circuit pin is short to ground;
   - Drive pin corresponding to ECU is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Waste gate control valve control circuit is short to power supply.	Yes	Repair wire harness
		No	Next
2	Waste gate control circuit pin corresponding to ECU terminal is short to power supply.	Yes	Check and repair ECU
		No	Diagnostic Help

P2ABD00 Supercharged Waste Gate Control Valve Control Circuit A Current/ Temperature Too High

DTC reporting condition: Supercharged waste gate control valve control circuit A current exceeds limit/ temperature is too high.

1. Possible cause:
   - Supercharged waste gate control valve control circuit is short to ground or short to power supply;
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if supercharged waste gate control valve control circuit is short.	Yes	Repair wire harness
		No	Next
2	Check if TMM control circuit pin corresponding to ECU is short.	Yes	Check and repair ECU
		No	Diagnostic Help

P00BD00 Air Flow Through Air Flow Meter Exceeds Upper Limit of Reasonable Range P00BC00 Air Flow Through Air Flow Meter Exceeds Lower Limit of Reasonable Range

DTC reporting condition: Intake flow value exceeds the reasonable range.

1. Possible cause:
   - Sensor is icy and oily.
   - Sensor is aging.
   - Intake pipe is disconnected or leaks seriously.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Check the sensor for damage or contact resistance.	Yes	Repair, replace sensor
		No	Next
3	Turn ignition switch to “OFF”, check if there is any freeze, oil stain, etc. on measurement terminal of sensor, which will affect normal measurement.	Yes	Repair, replace sensor
		No	Next
4	Check if air flow sensor installation position is incorrect, intake pipe is disconnected or seriously leaked.	Yes	Repair intake pipe, sensor
		No	Diagnostic Help

P010122 Mass or Volume Air Flow "A" Circuit Range/Performance - Air Flow Too High P010121 Mass or Volume Air Flow Sensor "A" Circuit Range/Performance P01012A Mass or Volume Air Flow Sensor "A" Circuit Range/Performance

DTC reporting condition: Intake flow value exceeds the reasonable range.

1. Possible cause:
   - Sensor is icy and oily.
   - Sensor is aging.
   - Intake pipe is disconnected or leaks seriously.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Check the sensor for damage or contact resistance.	Yes	Repair, replace sensor
		No	Next
3	Turn ignition switch to “OFF”, check if there is any freeze, oil stain, etc. on measurement terminal of sensor, which will affect normal measurement.	Yes	Repair, replace sensor
		No	Next
4	Check if air flow sensor installation position is incorrect, intake pipe is disconnected or seriously leaked.	Yes	Repair intake pipe, sensor
		No	Diagnostic Help

P010200 Air Flow Meter Circuit Voltage Too Low

DTC reporting condition: Air flow meter circuit voltage is lower than the threshold.

1. Possible cause:
   - Sensor circuit is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if air flow meter circuit is short to ground.	Yes	Repair sensor or wire harness
		No	Diagnostic Help

P010300 Air Flow Meter Circuit Voltage Too High

DTC reporting condition: Air flow meter circuit voltage is higher than the threshold.

1. Possible cause:
   - Sensor circuit is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if air flow meter circuit is short to power supply.	Yes	Repair sensor or wire harness
		No	Diagnostic Help

P010000 Air Flow Meter Signal Period is 0

DTC reporting condition: The signal period of air flow meter is 0.

1. Possible cause:
   - Sensor circuit is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if air flow meter circuit is short to power supply or ground.	Yes	Repair sensor or wire harness
		No	Diagnostic Help

P053200 A/C Refrigerant Pressure Sensor "A" Circuit Low

DTC reporting condition: Sensor voltage is lower than the threshold.

1. Possible cause:
   - Air conditioning pressure sensor signal terminal is short to ground.
   - Sensor 5 V reference voltage terminal is open.
   - Air conditioning pressure sensor signal pin terminal corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”. Do not start the engine, use a multimeter to measure if the voltage of air conditioning pressure sensor signal terminal is close to or equal to 0 V.	Yes	Next
2	Turn ignition switch to “OFF”, check if pressure sensor signal terminal is short to ground.	Yes	Repair wire harness
		No	Next
3	Check if sensor 5 V reference voltage terminal is open.	Yes	Repair wire harness
		No	Next
4	Check if intake pressure sensor signal pin terminal corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P053300 A/C Refrigerant Pressure Sensor "A" Circuit High

DTC reporting condition: Sensor voltage is higher than the threshold.

1. Possible cause:

- Intake manifold pressure sensor signal terminal is short to power supply or open.
- Sensor reference ground terminal is open.
- Intake pressure sensor signal pin terminal corresponding to ECU terminal is short to power supply or open.
- Sensor is damaged

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”. Do not start engine, use a multimeter to measure if voltage between intake manifold pressure sensor signal terminal and ground is close to or equal to 5 V.	Yes	Next
2	Turn ignition switch to “OFF” and check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
3	Check if intake manifold pressure sensor signal terminal is short to power supply or open.	Yes	Repair wire harness
		No	Next
4	Check if sensor reference ground terminal is open.	Yes	Repair wire harness
		No	Next
5	Check if sensor is damaged.	Yes	Replace sensor
		No	Next
6	Check if intake pressure sensor signal pin terminal corresponding to ECU terminal is short to power supply or open, or if there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P256400 Turbocharger Boost Control Position Sensor "A" Circuit Low

DTC reporting condition: The voltage of turbocharger electronic waste gate position sensor is below the limit.

1. Possible cause:
   - Sensor circuit is short to ground. Sensor is frozen and oily.
   - Pin corresponding to ECU is short to ground.

2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check if electronic waste gate position sensor wire harness is short to ground.	Yes	End
		No	Diagnostic Help

P256500 Turbocharger Boost Control Position Sensor "A" Circuit High

DTC reporting condition: The voltage of turbocharger electronic waste gate position sensor is higher than the limit.

1. Possible cause:
   - Sensor circuit is short to power supply or open.
   - Pin corresponding to ECU is short to power supply or open.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check if electronic waste gate position sensor wire harness is short to power supply or open.	Yes	End
		No	Diagnostic Help

P003A00 First Zero Self-Learning Error of Turbocharger Electronic Wastegate

DTC reporting condition: The zero point voltage learned for the first time exceeds the upper or lower limit.

1. Possible cause:
   - Actuator status is inconsistent with SPEC.
   - The closed position of actuator is blocked by foreign objects.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Push the turbocharger to closed position manually, read position voltage to check if it is out of the range of SPEC.	Yes	Replace turbocharger assembly
		No	Check for occasional sticking
2	Check for foreign matter near turbocharger closed position.	Yes	Remove foreign objects
		No	Check for occasional sticking

P024477 Turbocharger/Supercharger Wastegate Actuator "A" Range/Performance

DTC reporting condition: Deviation between target position and actual position of turbocharger electronic waste gate exceeds the threshold.

1. Possible cause:
   - Actuator status is inconsistent with SPEC.
   - The closed position of actuator is blocked by foreign objects.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON” .		Next
2	Read and store fault freeze frame information.		Next
3	Check if electronic waste gate is stuck.	Yes	Replace electronic waste gate
		No	Next
4	Check if wire harness and connector are aging	Yes	End
		No	Diagnostic Help

P024437 Turbocharger/Supercharger Wastegate Actuator "A" Range/Performance

DTC reporting condition: The duty radio of turbocharger electronic waste gate control exceeds the limit.

1. Possible cause:
   - Actuator status is inconsistent with SPEC.
   - The closed position of actuator is blocked by foreign objects.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON” .		Next
2	Read and store fault freeze frame information.		Next
3	Check if electronic waste gate is stuck.	Yes	Replace electronic waste gate
		No	Next
4	Check if wire harness and connector are aging.	Yes	End
		No	Diagnostic Help

P138124 Intake Air Temperature Sensor 3 Multiple Check Bank 1 P138123 Intake Air Temperature Measurement System - Multiple Sensor Correlation Bank 3

DTC reporting condition: Clutch water pump control circuit is open.

1. Possible cause:
   - Clutch water pump control circuit pin is open.
   - Clutch water pump power supply terminal is not connected to main relay.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if clutch water pump control circuit pin terminal is short to ground.	Yes	Repair wire harness
		No	Next

No.	Operation Step	Test Result	Subsequent Step
2	Check if clutch water pump control circuit pin corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P00EA00 Air Filter Rear Temperature Sensor 3 Circuit Voltage Too Low

DTC reporting condition: Temperature sensor voltage is lower than 0.1 V.

1. Possible cause:
   - Air filter rear temperature sensor signal terminal is short to ground.
   - Air filter rear temperature sensor signal pin corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”. Do not start engine, and observe if “Intake Temperature Sensor Measured Value” in data flow is too low. If value is lower than normal condition, observe minimum air filter rear temperature range. You can also use a multimeter to measure if voltage between air filter rear temperature sensor signal terminal and ground is close to or equal to 5 V.	Yes	Next
2	Turn ignition switch to “OFF” and check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
3	Check if sensor signal terminal is short to ground.	Yes	Repair wire harness
		No	Next
4	Check if air filter rear temperature sensor signal pin corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P00EB00 Intake Air Temperature Sensor 3 Circuit High Bank 1

DTC reporting condition: Temperature sensor voltage is higher than 4.9 V.

1. Possible cause:
   - Air filter rear temperature sensor signal terminal is short to power supply or open.
   - Sensor reference ground is open.
   - Air filter rear temperature sensor signal pin corresponding to ECU terminal is short to power supply or open, or there is an internal circuit damage.
   - Sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”. Do not start engine, and observe if “Intake Temperature Sensor Measured Value” in data flow is too low. If value is lower than normal condition, observe minimum air filter rear temperature range. You can also use a multimeter to measure if voltage between air filter rear temperature sensor signal terminal and ground is close to or equal to 5 V.	Yes	Next
2	Turn ignition switch to “OFF” and check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
3	Check if sensor signal terminal is short to power supply or open.	Yes	Repair wire harness
		No	Next
4	Check if sensor reference ground is open.	Yes	Repair, replace wire harness or sensor
		No	Next
5	Check if sensor is damaged.	Yes	Replace sensor
		No	Next
6	Check if air filter rear temperature sensor signal pin corresponding to ECU terminal is short to power supply or open, or if there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P00EC00 Intake Air Temperature Sensor 3 Circuit Intermittent Bank 1

DTC reporting condition: Air filter rear temperature sensor voltage is intermittently higher than 4.9 V.

1. Possible cause:
   - Air filter rear temperature sensor signal terminal is in poor contact.
   - Connector is in poor contact.
   - Air filter rear temperature sensor signal pin corresponding to ECU terminal is in poor contact.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”. Do not start engine, and observe if “Intake Temperature Sensor Measured Value” in data flow is too low. If value is lower than normal condition, observe minimum air filter rear temperature range. You can also use a multimeter to measure if voltage between air filter rear temperature sensor signal terminal and ground is close to or equal to 5 V.	Yes	Next
2	Turn ignition switch to “OFF” and check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next

No.	Operation Step	Test Result	Subsequent Step
3	Check if sensor signal terminal is in poor contact.	Yes	Repair wire harness
		No	Next
4	Check if air filter rear temperature sensor signal pin corresponding to ECU terminal is in poor contact.	Yes	Check and repair ECU
		No	Diagnostic Help

P007000 Ambient Air Temperature Sensor Circuit "A"

DTC reporting condition: Ambient temperature sensor signal received by ECU is incorrect.

1. Possible cause:
   - ECU CAN signal or A/C CAN signal is abnormal.
   - Ambient temperature sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check if CAN signal is normal.	No	Repair ECU CAN signal or A/C CAN signal
		Yes	Next
4	Replace ECU, check if malfunction reappears.	Yes	Next
		No	End
5	Replace ambient temperature sensor, check if malfunction reappears.	Yes	Diagnostic Help
		No	End

P007200 Ambient Air Temperature Sensor Circuit "A" Low

DTC reporting condition: Ambient temperature sensor circuit continuity self-diagnosis.

1. Possible cause:
   - Ambient temperature sensor wire harness connection is abnormal.
   - Ambient temperature sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Using a multimeter, check if sensor pin voltage is normal; check if CAN signal is normal	No	Replace sensor
		Yes	Next

No.	Operation Step	Test Result	Subsequent Step
4	Check if wire harness is normal.	No	Repair wire harness
		Yes	Next
5	Replace ECU, check if malfunction reappears.	Yes	Diagnostic Help
		No	End

P007300 Ambient Air Temperature Sensor Circuit "A" High

DTC reporting condition: Ambient temperature sensor signal circuit continuity self-diagnosis.

1. Possible cause:
   - Ambient temperature sensor wire harness connection is abnormal.
   - Ambient temperature sensor is damaged.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Using a multimeter, check if sensor pin voltage is normal; check if CAN signal is normal	No	Replace sensor
		Yes	Next
4	Check if wire harness is normal.	No	Repair wire harness
		Yes	Next
5	Replace ECU, check if malfunction reappears.	Yes	Diagnostic Help
		No	End

P150A00 Active Speed Limitation Input Signal Not Plausible P150B00 Clamping Switch of Active Speed Limitation Input Signal P150C00 Active Speed Limitation A/D Conversion Malfunction

DTC reporting condition: Active speed limit control switch circuit signal is unreasonable.

1. Possible cause:
   - Active speed limit controller connector is not connected securely or is in poor contact.
   - Active speed limit controller control circuit is open.
   - Each button for active speed limit control is stuck at "Normally Pressed" state.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Active speed limit controller connector is not connected securely or is in poor contact.	Yes	Repair wire harness
		No	Next
2	Active speed limit controller control circuit is open.	Yes	Repair wire harness

No.	Operation Step	Test Result	Subsequent Step
		No	Next
3	Each button for active speed limit control is stuck at "-Normally Pressed" state.	Yes	Repair button
		No	Next
4	Active speed limit control pin corresponding to ECU is open, or circuit is malfunctioning.	Yes	Check and repair ECU
		No	Diagnostic Help

P262600 O2 Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1

DTC reporting condition: After heating control in oxygen sensor start stage ends, sensor voltage when oil is cut off is higher than 4.8 V.

1. Possible cause:
   - IA line is disconnected.
   - Sensor or wire harness connector is malfunctioning.
   - Sensor is invalid, such as ceramic body is damaged.
   - Adjustable resistance of Lambda connector is invalid (resistance between IA line and IP line is infinite).
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if pin corresponding to green (IA) line at oxygen sensor connector is in poor contact.	Yes	Repair wire harness
		No	Next
2	Check for continuity of oxygen sensor wire harness to check if the line is open.	Yes	Repair wire harness
		No	Next
3	Check for abnormal pin at connector between wire harness and ECU, which may result in poor contact.	Yes	Repair button
		No	Next
4	Replace LSU oxygen sensor, start vehicle and run it until coolant temperature reaches the normal value, drive in a steady state at about 50 yards of 2nd gear , release accelerator pedal 3 to 4 times, check if malfunction reappears.	Yes	Check and repair ECU
		No	Diagnostic Help
5	Check for abnormality in LSU processing circuit in ECU.	Yes	Check and repair or replace ECU
		No	Diagnostic Help

P124B00 Electric Waste Gate (E-WG) Actuator Control Chip SPI Bus Error

DTC reporting condition: E-WG control circuit communication protocol is malfunctioning.

1. Possible cause:
   - E-WG control circuit communication is malfunctioning.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if there is a problem in E-WG control circuit.	Yes	Check and repair circuit
		No	Diagnostic Help

U010187 Lost Communication with TCM

DTC reporting condition: ECU receiving TCM message times out.

1. Possible cause:
   - TCM connector is not connected securely or is disconnected.
   - Transmission line between TCM and ECU is damaged or interrupted.
   - TCM is damaged and signal cannot be transmitted to ECU normally.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	TCM connector is not connected securely or is disconnected.	Yes	Reconnect it
		No	Next
2	There is wire harness signal interference.	Yes	Shield the wire harness
		No	Next
3	Transmission line between TCM and ECU is damaged or interrupted.	Yes	Repair wire harness
		No	Next
4	Check if there is CAN hardware circuit fault.	Yes	Refer to repair procedures of U0001
		No	Next
5	TCM is damaged and signal cannot be transmitted to ECU normally.	Yes	Consult the TCM supplier
		No	Diagnostic Help

P051300 / P063300 / P161000 / P161100 / P161200 / P161300 Immobilizer Malfunction

DTC reporting condition: Immobilizer data authentication is failed.

1. Possible cause:
   - ECU does not perform immobilizer matching or immobilizer status is wrong.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Immobilizer connector is not connected securely or disconnected.	Yes	Reconnect it
		No	Next
2	Immobilizer circuit is malfunctioning.	Yes	Repair wire harness

No.	Operation Step	Test Result	Subsequent Step
		No	Next
3	If ECU has been replaced, check if anti-theft authentication code is incorrect or not updated.	Yes	Refresh anti-theft code
		No	Next
4	Immobilizer is malfunctioning.	Yes	Consult the immobilizer supplier
		No	Next
5	Immobilizer module circuit corresponding to ECU terminal is malfunctioning.	Yes	Check and repair ECU
		No	Diagnostic Help

P261D00 Coolant Pump "B" Control Circuit High

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Turbine cooling electronic water pump control circuit is short to power supply.
   - Turbine cooling electronic water pump control pin corresponding to ECU terminal is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Turbine cooling electronic water pump control circuit is short to power supply.	Yes	Repair wire harness
		No	Next
2	Turbine cooling electronic water pump control pin corresponding to ECU terminal is short to power supply.	Yes	Check and repair ECU
		No	Diagnostic Help

P261C00 Coolant Pump "B" Control Circuit Low

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Turbine cooling electronic water pump control circuit is short to ground.
   - Turbine cooling electronic water pump control pin corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Turbine cooling electronic water pump control circuit is short to ground.	Yes	Repair wire harness
		No	Next
2	Turbine cooling electronic water pump control pin corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P261A00 Coolant Pump "B" Control Circuit Low

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Turbine cooling electronic water pump control circuit is open.
   - Connector is not connected securely or detached.
   - Turbine cooling electronic water pump control pin corresponding to ECU terminal is open.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connector is not connected securely or detached.	Yes	Reconnect it
		No	Next
2	Turbine cooling electronic water pump control circuit pin is open.	Yes	Repair wire harness
		No	Next
3	Drive pin corresponding to ECU is open, or there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P003200 HO2S Heater Control Circuit High Bank 1 Sensor 1

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Upstream oxygen sensor heater control circuit pin terminal is short to power supply.
   - Upstream oxygen sensor heater pin corresponding to ECU terminal is short to power supply.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if upstream oxygen sensor heater control circuit pin terminal is short to power supply.	Yes	Repair wire harness
		No	Next
2	Check if upstream oxygen sensor heater pin corresponding to ECU terminal is short to power supply.	Yes	Check and repair ECU
		No	Diagnostic Help

P003100 HO2S Heater Control Circuit Low Bank 1 Sensor 1

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Upstream oxygen sensor heater control circuit pin terminal is short to ground.
   - Upstream oxygen sensor heater control circuit power supply terminal is grounded.
   - Upstream oxygen sensor heater pin corresponding to ECU terminal is short to ground.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if upstream oxygen sensor heater control circuit pin terminal is short to ground.	Yes	Repair wire harness
		No	Next
2	Check if upstream oxygen sensor heater control circuit power supply terminal is grounded.	Yes	Repair wire harness
		No	Next
3	Check if upstream oxygen sensor heater pin corresponding to ECU terminal is short to ground.	Yes	Check and repair ECU
		No	Diagnostic Help

P003000 HO2S Heater Control Circuit Bank 1 Sensor 1

DTC reporting condition: Drive channel self-diagnosis is malfunctioning.

1. Possible cause:
   - Connector is not connected securely or is in poor contact.
   - Open circuit in upstream oxygen sensor heater control circuit pin terminal.
   - Upstream oxygen sensor heater control circuit power supply terminal is not connected to main relay.
   - Sensor is damaged.
   - Upstream oxygen sensor heater pin circuit corresponding to ECU terminal is open, or there is an internal circuit damage.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Check if connector is not connected securely or is in poor contact.	Yes	Reconnect it
		No	Next
2	Open circuit in upstream oxygen sensor heater control circuit pin terminal.	Yes	Repair wire harness
		No	Next
3	Upstream oxygen sensor heater control circuit power supply terminal is not connected to main relay.	Yes	Repair wire harness
		No	Next
4	Sensor is damaged.	Yes	Replace sensor
		No	Next
5	Upstream oxygen sensor heater pin circuit corresponding to ECU terminal is open, or there is an internal circuit damage.	Yes	Check and repair ECU
		No	Diagnostic Help

P013300 O2 Sensor Circuit Slow Response Bank 1 Sensor 1

DTC reporting condition: The dynamic factor of upstream oxygen sensor is less than the threshold.

1. Possible cause:
   - Oxygen sensor is aging and response becomes slower.
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Check intake system and exhaust system for air leakage.	Yes	Repair leaking area
		No	Next
4	Replace the upstream LSU oxygen sensor. Check if malfunction reappears after returning vehicle to customer.	Yes	Diagnostic Help
		No	End

P013100 O2 Sensor Circuit Low Voltage Bank 1 Sensor 1

DTC reporting condition: Signals of upstream oxygen sensor signal lines IA, IP, UN, VM are zero.

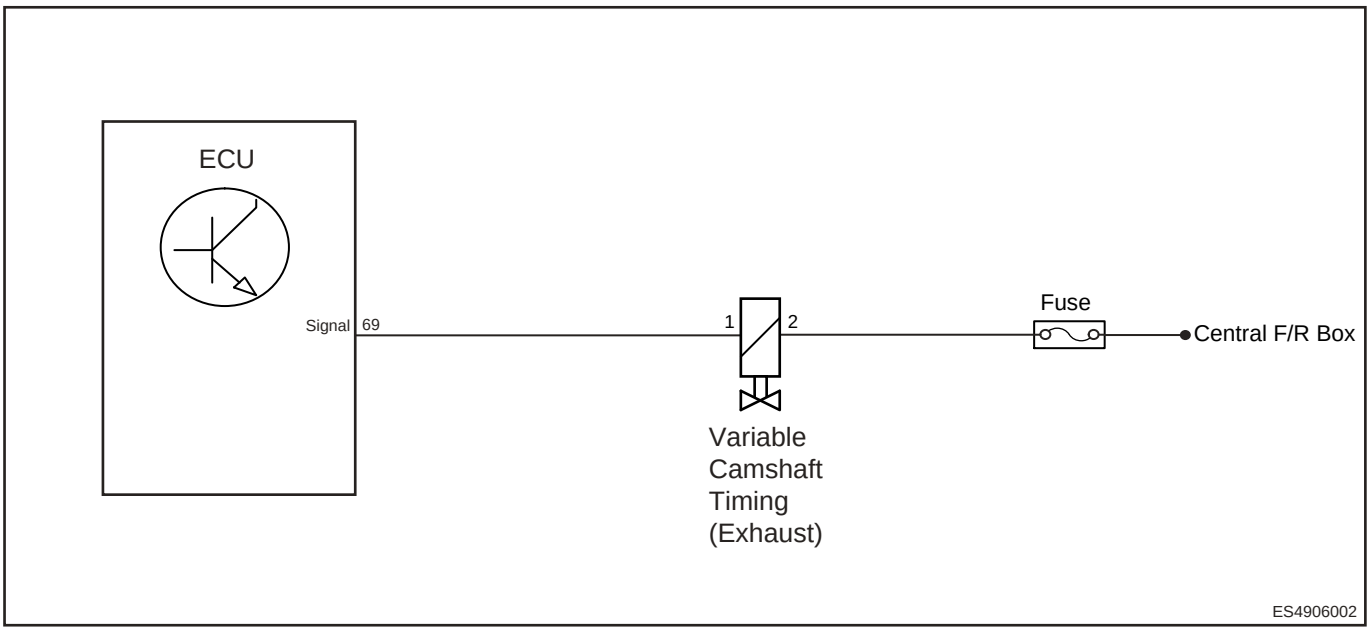
1. Possible cause:
   - Upstream oxygen sensor signal circuit voltage is too low (APE IPE RE lines are short to ground).
2. Troubleshooting method:

No.	Operation Step	Test Result	Subsequent Step
1	Connect diagnostic tester, turn ignition switch to “ON”.		Next
2	Read and store fault freeze frame information.		Next
3	Start vehicle, idle it and slightly change accelerator pedal opening for a period of time, pierce wire harness connector with red tip of a multimeter to close to red (IP), yellow (VM), green (IA), and black (UN) wire insulation layer of ECU terminal, connect black tip to ground, and check if voltage is short.	Yes	Next
		No	Check wire harness and connector
4	Replace LSU oxygen sensor, and track the progress to check if fault is reported again.	Yes	Next
		No	End
5	Check for abnormality in LSU processing circuit in ECU.	Yes	Check and repair or replace ECU
		No	Diagnostic Help

DTC Diagnosis Procedure

DTC	**P2091 00**	**“B” Camshaft Position Actuator Control Circuit High Bank 1**
DTC	**P2090 00**	**“B” Camshaft Position Actuator Control Circuit Low Bank 1**
DTC	**P0013 00**	**“B” Camshaft Position Actuator Control Circuit Open Bank 1**
DTC	**P000B 00**	**“B” Camshaft Position Slow Response Bank 1**
DTC	**P005A 00**	**“B” Camshaft Profile Control Performance/Stuck Off Bank 1**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P209100	“B” Camshaft Position Actuator Control Circuit High Bank 1	/	/	/	/	• Variable Camshaft Timing (Exhaust) • Wire harness or connector • ECU	/	Engine malfunction light comes on
P209000	“B” Camshaft Position Actuator Control Circuit Low Bank 1	/	/	/	/		/	
P001300	“B” Camshaft Position	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Actuator Control Circuit Open Bank 1							
P0-00B00	“B” Camshaft Position Slow Response Bank 1	/	/	/	/		/	
P0-05A00	“B” Camshaft Profile Control Performance/ Stuck Off Bank 1	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Oil Pressure Inspection**

(a) Check if oil pressure is normal.

NG → **Repair oil pressure fault.**

OK

2	Check fuse

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check if variable camshaft timing (exhaust) fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

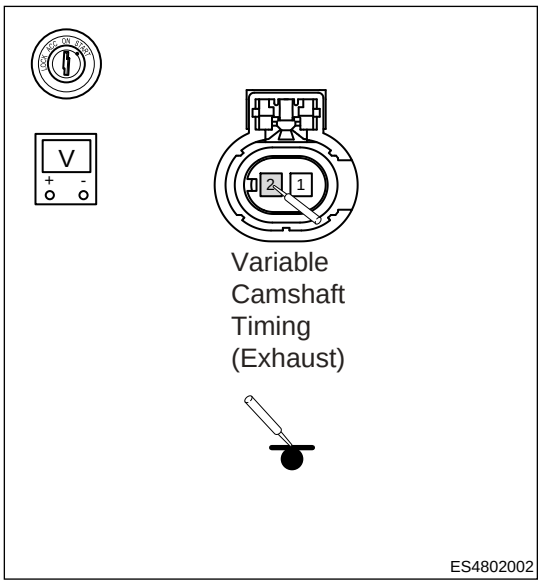
OK

3	Check variable camshaft timing (exhaust) power supply

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Variable camshaft timing (exhaust) (2) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Check for open fault in variable camshaft timing (exhaust) power supply.**

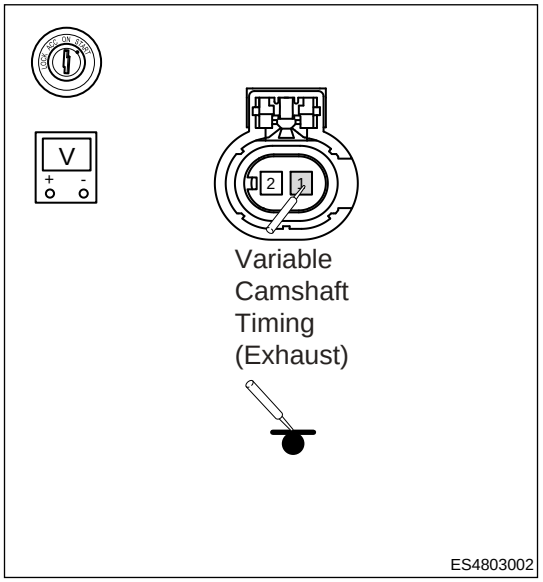
OK

4	Check variable camshaft timing (exhaust) control circuit

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Variable camshaft timing (exhaust) (1) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short to power supply in variable camshaft timing (exhaust) control circuit.**

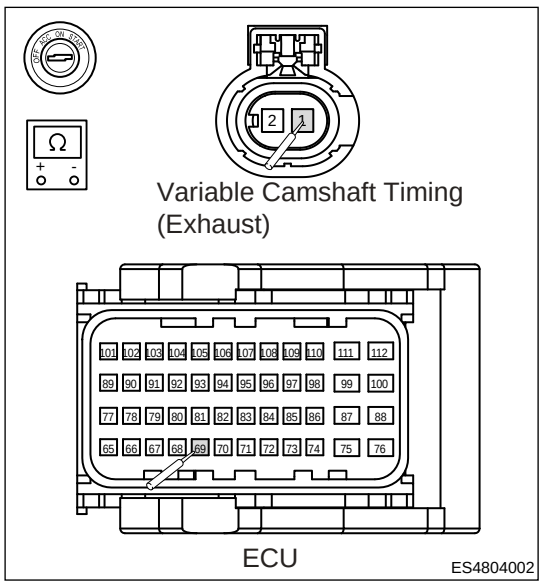
OK →

5	Check variable camshaft timing (exhaust) control circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Variable camshaft timing (exhaust) (1) - ECU (69)	Always	Less than 1 Ω
Variable camshaft timing (exhaust) (1) - Body ground	Always	∞



NG → **Repair variable camshaft timing (exhaust) control circuit fault.**

OK →

6	Check variable camshaft timing (exhaust) connector

(a) Check if variable camshaft timing (exhaust) connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK

7	**Check variable camshaft timing (exhaust)**

(a) Remove the variable camshaft timing (exhaust).

(b) Check variable camshaft timing (exhaust) for blockage, oil leakage or seizing.

(c) Check the variable camshaft timing (exhaust).

Battery Connection	Condition	Specified Condition
Positive to variable camshaft timing (exhaust) 1 pin - Negative to variable camshaft timing (exhaust) 2 pin	12 V ON	Control valve should move quickly

NG → **Replace variable camshaft timing (exhaust).**

OK

8	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

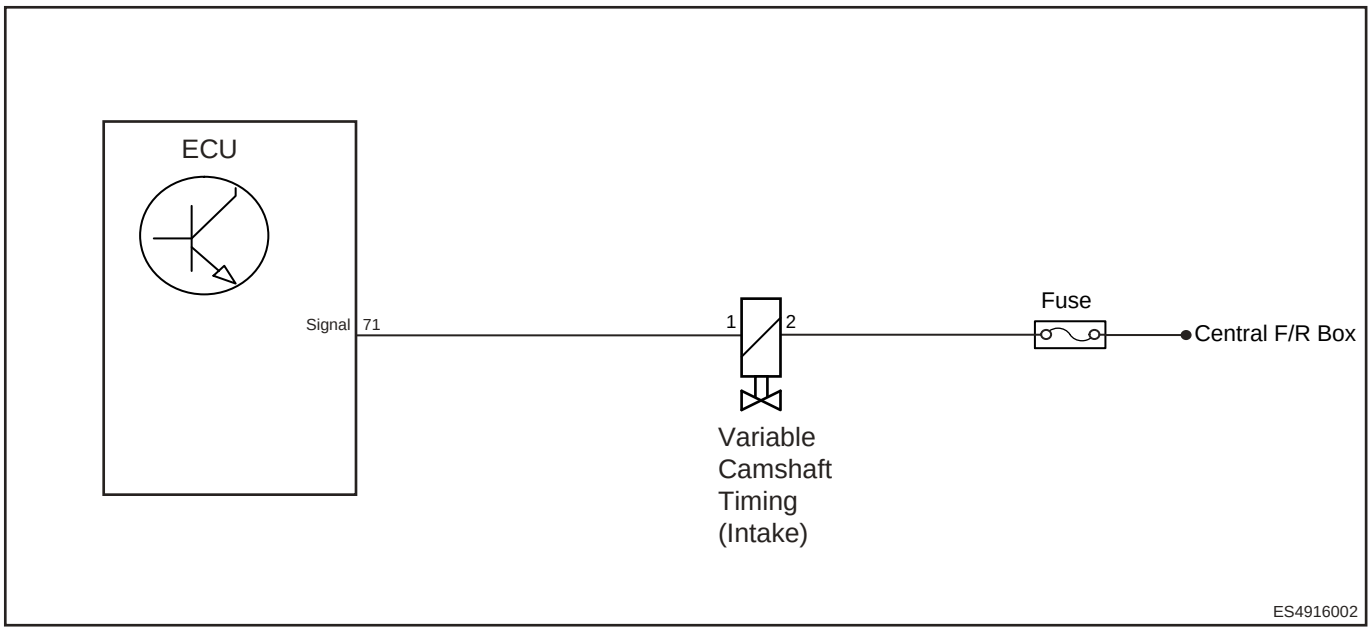
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P2089 00**	**“A” Camshaft Position Actuator Control Circuit High Bank 1**
DTC	**P2088 00**	**“A” Camshaft Position Actuator Control Circuit Low Bank 1**
DTC	**P0010 00**	**“A” Camshaft Position Actuator Control Circuit Open Bank 1**
DTC	**P000A 00**	**"A" Camshaft Position Slow Response Bank 1**
DTC	**P003C 00**	**“A” Camshaft Profile Control Performance/Stuck Off Bank 1**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P208900	"A" Camshaft Position Actuator Control Circuit High Bank 1	/	/	/	/	• Variable Camshaft Timing (Intake) • Fuse • Wire harness or connector • ECU	/	Engine malfunction light comes on
P208800	"A" Camshaft Position Actuator Control Circuit Low Bank 1	/	/	/	/		/	
P001000	"A" Camshaft Position	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Actuator Control Circuit Open Bank 1							
P0-00A00	"A" Camshaft Position Slow Response Bank 1	/	/	/	/		/	
P0-03C00	"A" Camshaft Profile Control Performance/ Stuck Off Bank 1	/	/	/	/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Oil Pressure Inspection**

(a) Check if oil pressure is normal.

NG → **Repair oil pressure fault.**

OK

2	Check fuse

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check if variable camshaft timing (intake) fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

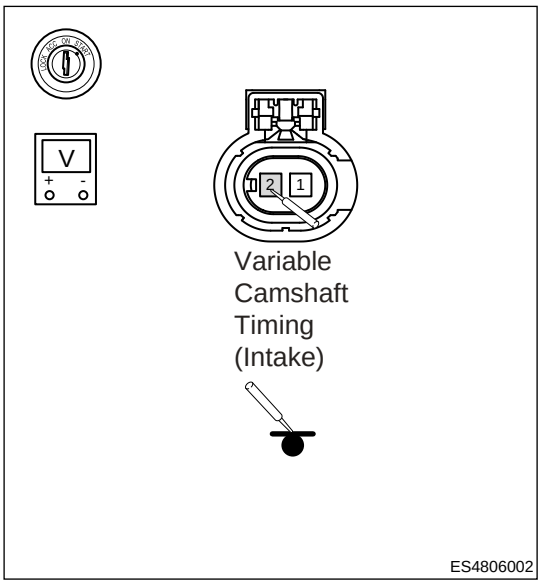
OK

3	Check variable camshaft timing (intake) power supply

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Variable camshaft timing (intake) (2) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair open fault to power supply in variable camshaft timing (intake).**

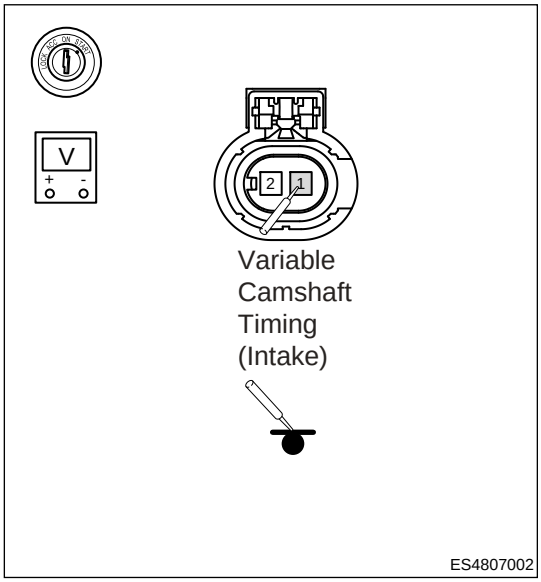
OK

4	Check variable camshaft timing (intake) power supply control circuit

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Variable camshaft timing (intake) (1) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short to power supply in variable camshaft timing (intake) control circuit.**

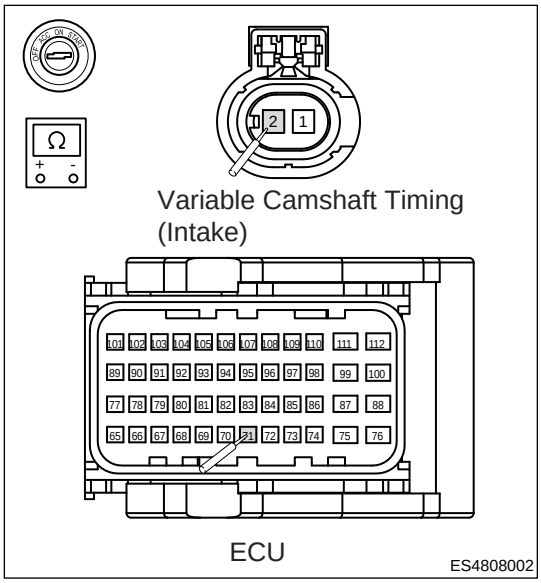
OK →

5	Check variable camshaft timing (intake) control circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Variable camshaft timing (intake) (1) - ECU (71)	Always	Less than 1 Ω



NG → **Repair variable camshaft timing (intake) control circuit fault.**

OK →

6	Check variable camshaft timing (intake) connector

(a) Check if variable camshaft timing (intake) connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK ↓

7	**Check variable camshaft timing (intake)**

(a) Remove the variable camshaft timing (intake).
(b) Check variable camshaft timing (intake) for blockage, oil leakage or seizing.
(c) Check the variable camshaft timing (intake).

Battery Connection	Condition	Specified Condition
Positive to variable camshaft timing (intake) 2 pin - Negative to variable camshaft timing (intake) 1 pin	12 V ON	Control valve should move quickly

NG → **Replace variable camshaft timing (intake).**

OK ↓

8	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P050A 22**	**Cold Start Idle Control System Performance**
DTC	**P050A 21**	**Cold Start Idle Control System Performance**
DTC	**P050B 00**	**Cold Start Ignition Timing Performance**
DTC	**P050B 20**	**Cold Start Ignition Timing Performance**

DTC	P050D 00	Cold Start Rough Idle
DTC	P0420 00	Catalyst System Efficiency Below Threshold Bank 1

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P050A22	Cold Start Idle Control System Performance	/	/	/	/	• Electronic Throttle • Oil supply system • Intake system • Fuel injector • ECU	/	Engine malfunction light comes on
P050A21	Cold Start Idle Control System Performance	/	/	/	/		/	
P050B00	Cold Start Ignition Timing Performance	/	/	/	/		/	
P050B20	Cold Start Ignition Timing Performance	/	/	/	/		/	
P050D00	Cold Start Rough Idle	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-42000	Catalyst System Efficiency Below Threshold Bank 1	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check electronic throttle**

(a) Check if electronic throttle is stuck in maximum position due to ice or oil.

NG → **Repair or replace electronic throttle.**

OK ↓

2	**Check intake system**

(a) Check intake system for air leakage.

NG → **Repair intake system.**

OK ↓

3	**Check oil supply system**

(a) Check if oil supply pressure is normal.

NG → **Repair oil supply system.**

OK ↓

4	Check fuel injector

(a) Check if fuel injector leaks.

NG → **Replace fuel injector.**

OK

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0030 00**	**HO2S Heater Control Circuit Bank 1 Sensor 1**
DTC	**P0031 00**	**HO2S Heater Control Circuit Low Bank 1 Sensor 1**
DTC	**P0032 00**	**O2 Sensor Heater Control Circuit High (Upstream of the Catalyzer)**
DTC	**P0053 00**	**HO2S Heater Resistance Bank 1 Sensor 1**
DTC	**P0131 00**	**O2 Sensor Circuit Low Voltage Bank 1 Sensor 1**
DTC	**P0132 00**	**O2 Sensor Circuit High Voltage Bank 1 Sensor 1**
DTC	**P0133 00**	**O2 Sensor Circuit Slow Response Bank 1 Sensor 1**
DTC	**P0134 00**	**O2 Sensor Circuit No Activity Detected Bank 1 Sensor 1**
DTC	**P2231 00**	**O2 Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 1**

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-030 00	HO2S Heater Control Circuit Bank 1 Sensor 1	/	/	/	/	• Upstream Oxygen Sensor • Wire harness or connector • ECU	/	Engine malfunction light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-03100	HO2S Heater Control Circuit Low Bank 1 Sensor 1	/	/	/	/		/	
P0-03200	HO2S Heater Control Circuit High Bank 1 Sensor 1	/	/	/	/		/	
P0-05300	HO2S Heater Resistance Bank 1 Sensor 1	/	/	/	/		/	
P0-13100	O2 Sensor Circuit Low Voltage Bank 1 Sensor 1	/	/	/	/		/	
P0-13200	O2 Sensor Circuit	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	High Voltage Bank 1 Sensor 1							
P013300	O2 Sensor Circuit Slow Response Bank 1 Sensor 1	/	/	/	/		/	
P013400	O2 Sensor Circuit No Activity Detected Bank 1 Sensor 1	/	/	/	/		/	
P223100	O2 Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 1	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

(a) Check if upstream oxygen sensor fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

OK ↓

2	**Check upstream oxygen sensor connector**

(a) Check if upstream oxygen sensor is not connected securely or loose.

NG → **Reinstall or repair, replace connector.**

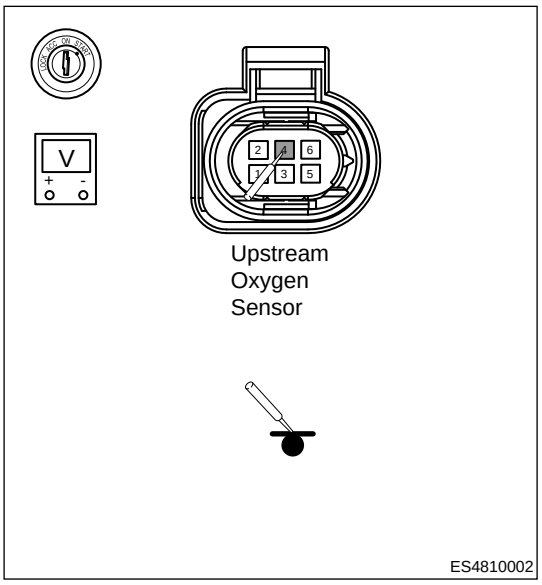
OK ↓

3	**Check upstream oxygen sensor heater power supply voltage**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Upstream oxygen sensor (4) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Check wire harness between upstream oxygen sensor (4) and main relay.**

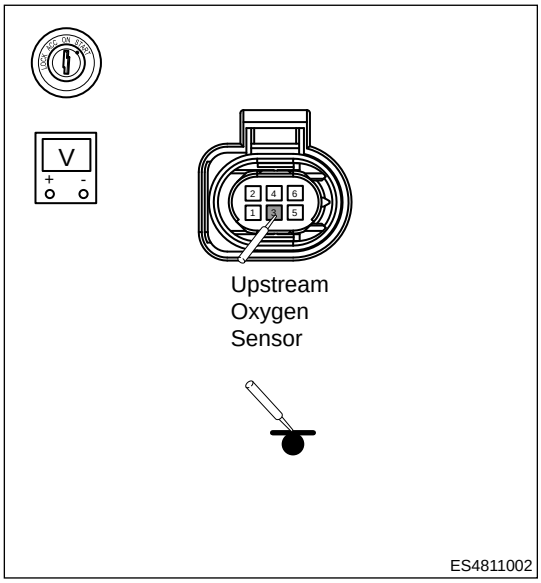
OK

4	Check upstream oxygen sensor heater voltage

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Upstream oxygen sensor (3) - Body ground	Always	Changed between 0.8 and 0.9V



NG → **Repair or replace related wire harness**

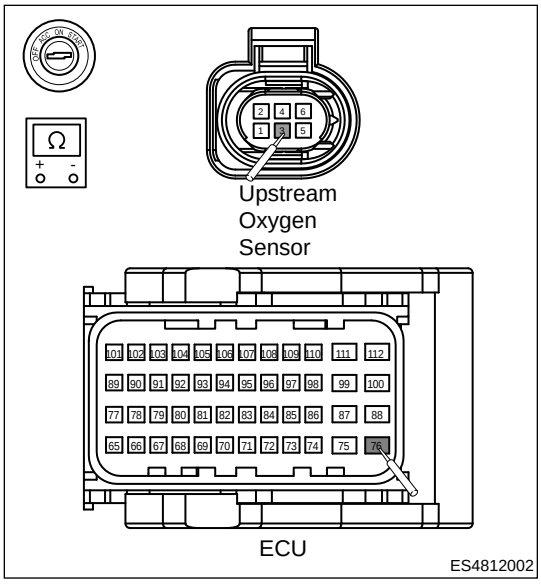
OK

5	Check upstream oxygen sensor heater wire harness

(a) Disconnect the upstream oxygen sensor connector.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Upstream oxygen sensor (3) - ECU (76)	Always	Less than 1 Ω



NG → **Repair or replace wire harness.**

OK

6	Check upstream oxygen sensor heater resistance

(a) Disconnect the upstream oxygen sensor connector.
(b) Disconnect the ECU connector.
(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Upstream oxygen sensor (3) - Upstream oxygen sensor (4)	At room temperature	4 - 5 Ω

NG → **Replace oxygen sensor.**

OK →

7	Reconfirm DTCs

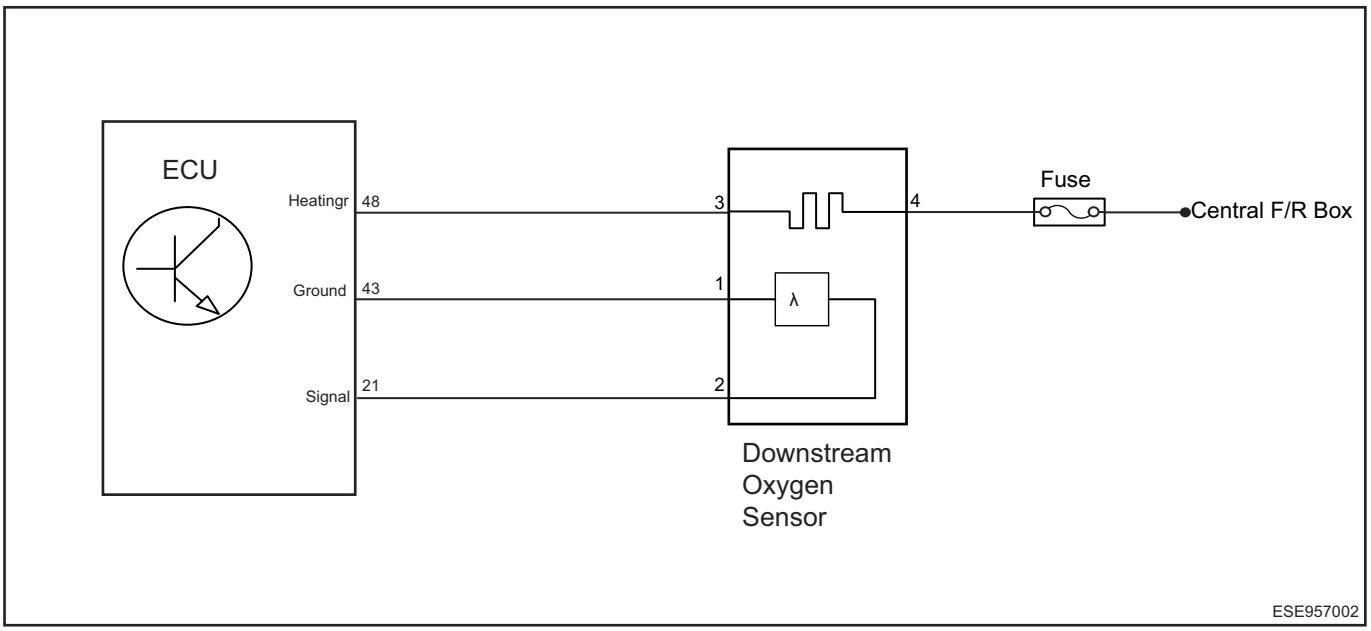
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0036 00**	**HO2S Heater Control Circuit Bank 1 Sensor 2**
DTC	**P0037 00**	**HO2S Heater Control Circuit Low Bank 1 Sensor 2**
DTC	**P0038 00**	**HO2S Heater Control Circuit High Bank 1 Sensor 2**
DTC	**P0054 00**	**HO2S Heater Resistance Bank 1 Sensor 2**
DTC	**P0136 00**	**O2 Sensor Circuit Bank 1 Sensor 2**
DTC	**P0137 00**	**Downstream oxygen sensor signal circuit short to ground**
DTC	**P0138 00**	**Downstream oxygen sensor signal circuit short to power supply**
DTC	**P013A 00**	**O2 Sensor Slow Response - Rich to Lean Bank 1 Sensor 2**
DTC	**P2232 00**	**O2 Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2**
DTC	**P2270 00**	**O2 Sensor Signal Biased&Stuck Lean Bank 1 Sensor 2**
DTC	**P2271 00**	**O2 Sensor Signal Biased&Stuck Rich Bank 1 Sensor 2**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-03600	HO2S Heater Control Circuit Bank 1 Sensor 2	/	/	/	/	• Downstream Oxygen Sensor • Wire harness or connector • ECU	/	Engine malfunction light comes on
P0-03700	HO2S Heater Control Circuit Low Bank 1 Sensor 2	/	/	/	/		/	
P0-03800	HO2S Heater Control Circuit High	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Bank 1 Sensor 2							
P0-05400	HO2S Heater Resistance Bank 1 Sensor 2	/	/	/	/		/	
P0-13600	O2 Sensor Circuit Bank 1 Sensor 2	/	/	/	/		/	
P0-13700	Downstream oxygen sensor signal circuit short to ground	/	/	/	/		/	
P0-13800	Downstream oxygen sensor signal circuit short to power	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	supply							
P0-13A00	O2 Sensor Slow Response - Rich to Lean Bank 1 Sensor 2	/	/	/	/		/	
P2-23200	O2 Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	/	/	/	/		/	
P2-27000	O2 Sensor Signal Biased&-Stuck Lean Bank 1 Sensor 2	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P2-27100	O2 Sensor Signal Biased&-Stuck Rich Bank 1 Sensor 2	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

(a) Check if downstream oxygen sensor fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

OK

2	**Check downstream oxygen sensor connector**

(a) Check if downstream oxygen sensor is not connected securely or loose.

NG → **Reinstall or repair, replace connector.**

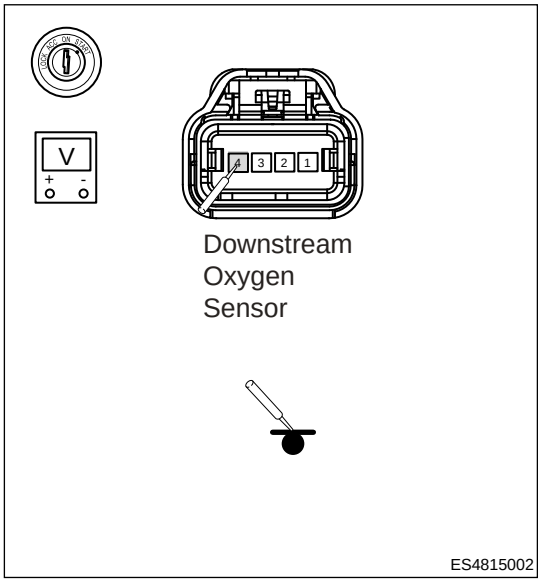
OK

3	**Check downstream oxygen sensor heater power supply voltage**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Downstream oxygen sensor (4) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Check wire harness between downstream oxygen sensor (4) and engine compartment relay box.**

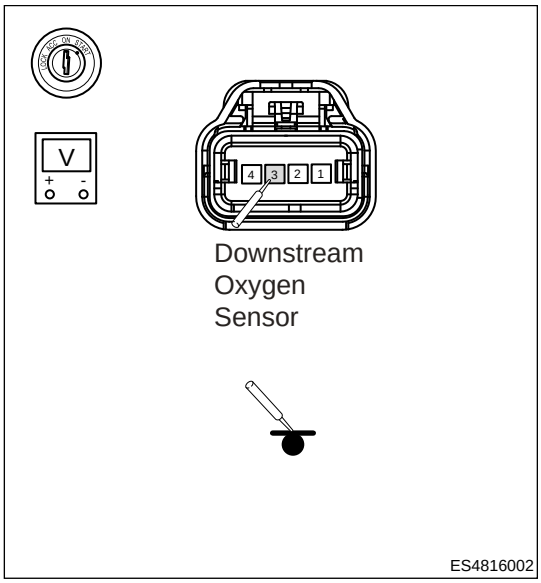
OK →

4	**Check downstream oxygen sensor heater voltage**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Downstream oxygen sensor (3) - Body ground	Always	12 V



NG → **Repair or replace related wire harness**

OK →

5	**Check downstream oxygen sensor heating resistance**

(a) Disconnect the downstream oxygen sensor connector.
(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Downstream oxygen sensor (3) - Downstream oxygen sensor (4)	Always	Less than 1 Ω

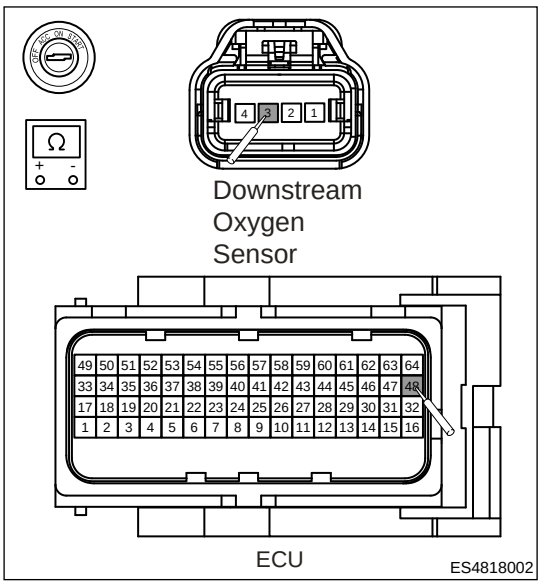
NG → **Repair or replace related wire harness**

OK

6	Check downstream oxygen sensor heater heating wire harness

(a) Disconnect the downstream oxygen sensor connector.
(b) Disconnect the ECU connector.
(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Downstream oxygen sensor (3) - ECU (48)	Always	Less than 1 Ω



NG → **Repair or replace wire harness.**

OK

7	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	P2195 00	O2 Sensor Signal Biased/Stuck Lean Bank 1 Sensor 1
DTC	P2196 00	O2 Sensor Signal Biased/Stuck Rich Bank 1 Sensor 1

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P2-19500	O2 Sensor Signal Biased/ Stuck Lean Bank 1 Sensor 1	/	/	/	/	• There is air leakage in exhaust system • Upstream oxygen sensor	/	Engine malfunction light comes on
P2-19600	O2 Sensor Signal Biased/ Stuck Rich Bank 1 Sensor 1	/	/	/	/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check exhaust system**

(a) Check exhaust system for leakage, gasket for damage.

NG → **Repair leaking area.**

OK

2	**Check upstream oxygen sensor connector**

(a) Check if upstream oxygen sensor is not connected securely or loose.

NG → **Reinstall or repair, replace connector.**

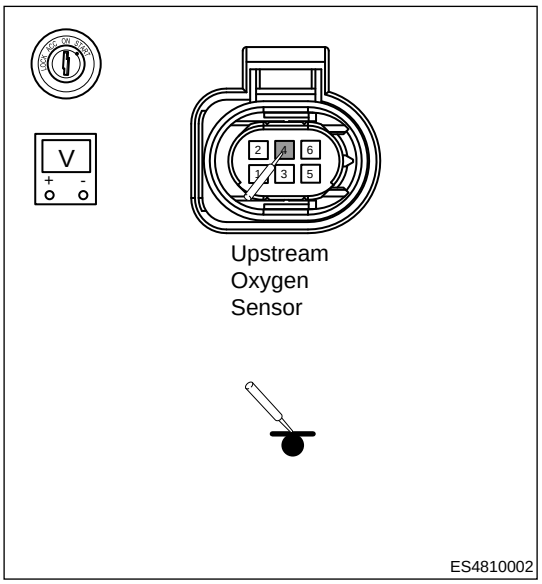
OK

3	**Check upstream oxygen sensor heater power supply voltage**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Upstream oxygen sensor (4) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Check wire harness between upstream oxygen sensor (4) and main relay.**

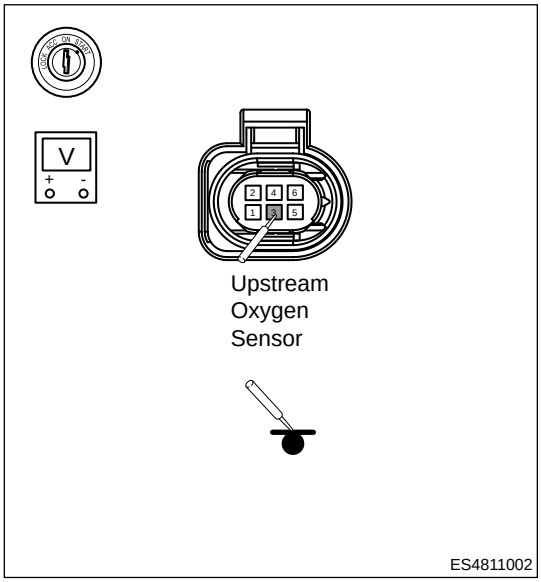
OK

4	**Check upstream oxygen sensor heater voltage**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Upstream oxygen sensor (3) - Body ground	Always	Changed between 0.8 and 0.9V



NG → **Repair or replace related wire harness**

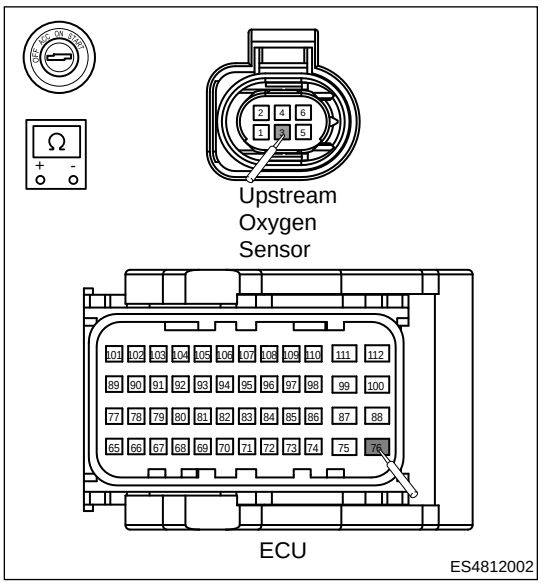
OK

5	**Check upstream oxygen sensor heater wire harness**

(a) Disconnect the upstream oxygen sensor connector.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Upstream oxygen sensor (3) - ECU (76)	Always	Less than 1 Ω



NG → **Repair or replace wire harness.**

OK

6	**Check upstream oxygen sensor heater resistance**

(a) Disconnect the upstream oxygen sensor connector.
(b) Disconnect the ECU connector.
(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Upstream oxygen sensor (3) - Upstream oxygen sensor (4)	At room temperature	4 - 5 Ω

NG → **Replace oxygen sensor.**

OK

7	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	P2096 00	Post Catalyst Fuel Trim System Too Lean Bank 1
DTC	P2097 00	Post Catalyst Fuel Trim System Too Rich Bank 1

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P2-09600	Post Catalyst Fuel Trim System Too Lean Bank 1	/	/	/	/	• There is air leakage in exhaust system • Upstream oxygen sensor • Downstream oxygen sensor • Catalytic converter is deteriorated	/	Engine malfunction light comes on
P2-09700	Post Catalyst Fuel Trim System Too Rich Bank 1	/	/	/	/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check intake and exhaust systems**

(a) Check intake and exhaust systems for leakage, gasket for damage.

NG → **Repair air leakage in intake and exhaust systems.**

OK ↓

2	**Check upstream oxygen sensor**

(a) Check if upstream oxygen sensor is normal.

NG → **Replace upstream oxygen sensor.**

OK

3	Check downstream oxygen sensor

(a) Check if downstream oxygen sensor is normal.

NG → **Replace downstream oxygen sensor.**

OK

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new catalytic converter to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P00C7 21**	**Intake Air Pressure Measurement System - Multiple Sensor Correlation Bank 1**
DTC	**P00C7 22**	**Intake Air Pressure Measurement System - Multiple Sensor Correlation Bank 1**
DTC	**P0106 22**	**Manifold Absolute Pressure Sensor Circuit Range/Performance**
DTC	**P0106 21**	**Manifold Absolute Pressure Sensor Circuit Range/Performance**
DTC	**P0106 2A**	**Manifold Absolute Pressure Sensor Circuit Range/Performance**
DTC	**P1200 00**	**Manifold Absolute Pressure Sensor Circuit Range/Performance**
DTC	**P1201 00**	**Manifold Absolute Pressure Sensor Circuit Range/Performance**
DTC	**P0107 00**	**Manifold Absolute Pressure Sensor Circuit Low**
DTC	**P0108 00**	**Manifold Absolute Pressure Sensor Circuit High**

Control Schematic Diagram

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-0C721	Intake Air Pressure Measurement System - Multiple Sensor Correlation Bank 1	/	/	/	/	• Intake Pressure/ Temperature Sensor • Wire harness or connector • ECU	/	Engine malfunction light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-0C722	Intake Air Pressure Measurement System - Multiple Sensor Correlation Bank 1	/	/	/	/		/	
P0-03800	HO2S Heater Control Circuit High Bank 1 Sensor 2	/	/	/	/		/	
P0-05400	HO2S Heater Resistance Bank 1 Sensor 2	/	/	/	/		/	
P0-13600	O2 Sensor Circuit Bank 1 Sensor 2	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-13700	Downstream oxygen sensor signal circuit short to ground	/	/	/	/		/	
P0-13800	Downstream oxygen sensor signal circuit short to power supply	/	/	/	/		/	
P0-13A00	O2 Sensor Slow Response - Rich to Lean Bank 1 Sensor 2	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P2-23200	O2 Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check installation of intake pressure/temperature sensor**

(a) Check intake pressure/temperature sensor connector for poor contact or looseness.

NG → **Reinstall or repair or replace intake pressure/temperature sensor.**

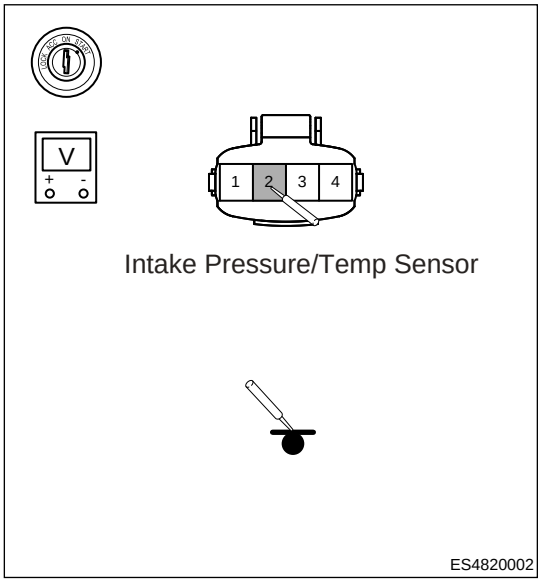
OK

2	**Check intake pressure/temperature sensor power supply voltage**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Intake pressure/ temperature sensor (2) - Body ground	ENGINE START STOP switch ON	5 V



NG → **Check and repair wire harness between intake pressure sensor power supply wire and ECU**

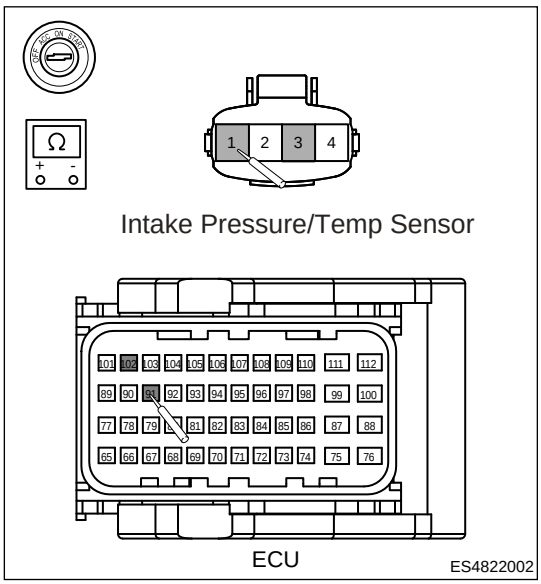
OK →

3	Check intake pressure/temperature sensor signal circuit

(a) Disconnect intake pressure/temperature sensor and ECU connectors.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
ECU (91) - Intake pressure/ temperature sensor (1)	Always	Less than 1 Ω
ECU (102) - Intake pressure/ temperature sensor (3)	Always	Less than 1 Ω



NG → **Repair or replace related wire harness**

OK →

4	Read data flow of intake pressure/temperature sensor

(a) Observe if "Intake Pressure" item in data flow seriously deviated from ambient pressure by about 101 kpa (value changes with current atmospheric pressure).

NG → **Repair or replace intake pressure/ temperature sensor.**

OK

5	Check intake pressure/temperature sensor

(a) Check sensor connection part for debris, ice, oil and damage.

NG → **Replace intake pressure/temperature sensor.**

OK

6	Check intake system

(a) Check if intake pressure/temperature sensor installation position is incorrect, intake pipe is disconnected or seriously leaked.

NG → **Repair faulty components of intake system.**

OK

7	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

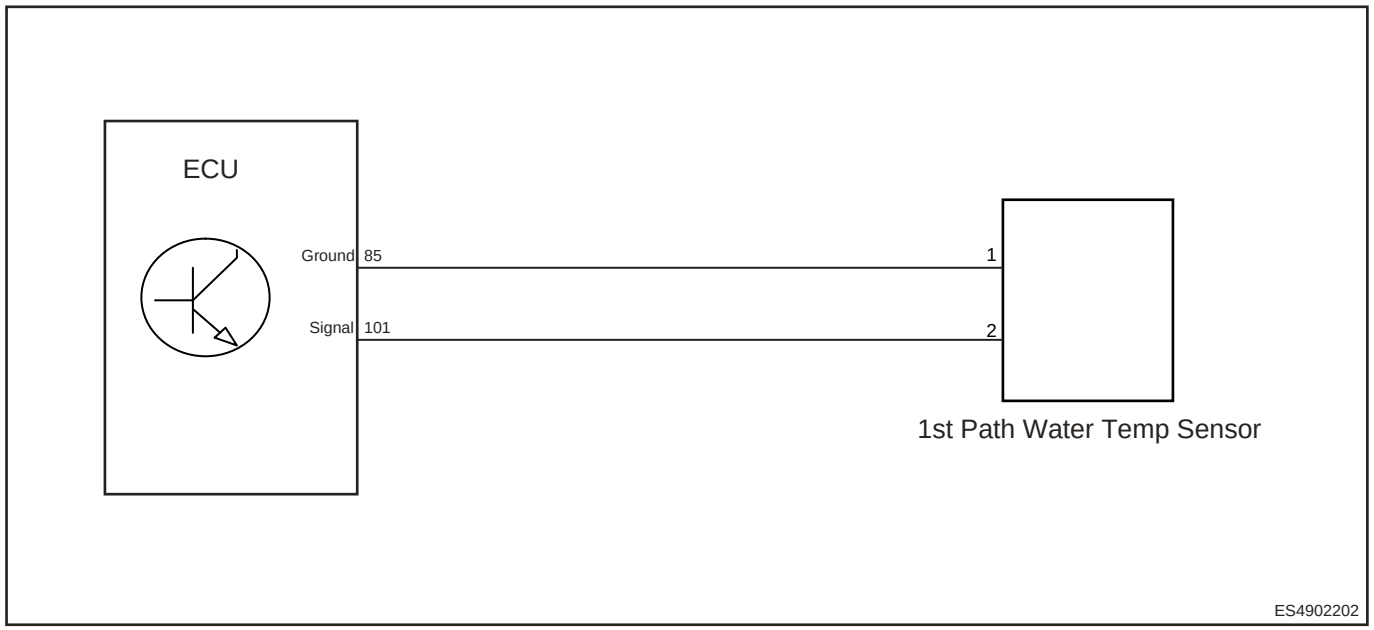
NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0116 23**	**Engine Coolant Temperature Sensor 1 Circuit Range/ Performance**
DTC	**P0116 26**	**Engine Coolant Temperature Sensor 1 Circuit Range/ Performance**
DTC	**P0117 00**	**Engine Coolant Temperature Sensor 1 Circuit Low**
DTC	**P0118 00**	**Engine Coolant Temperature Sensor 1 Circuit High**
DTC	**P0119 00**	**Engine Coolant Temperature Sensor 1 Circuit Intermittent**

DTC	**P050C 24**	**Cold Start Engine Coolant Temperature Performance**
DTC	**P050C 23**	**Cold Start Engine Coolant Temperature Performance**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P011623	Engine Coolant Temperature Sensor 1 Circuit Range/ Performance	/	/	/	/	• Coolant temperature sensor • Wire harness or connector • ECU	/	Engine malfunction light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P011626	Engine Coolant Temperature Sensor 1 Circuit Range/ Performance	/	/	/	/		/	
P011700	Engine Coolant Temperature Sensor 1 Circuit Low	/	/	/	/		/	
P011800	Engine Coolant Temperature Sensor 1 Circuit High	/	/	/	/		/	
P011900	Engine Coolant Temperature Sensor 1	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Circuit Intermittent							
P050C24	Cold Start Engine Coolant Temperature Performance	/	/	/	/		/	
P050C23	Cold Start Engine Coolant Temperature Performance	/	/	/	/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

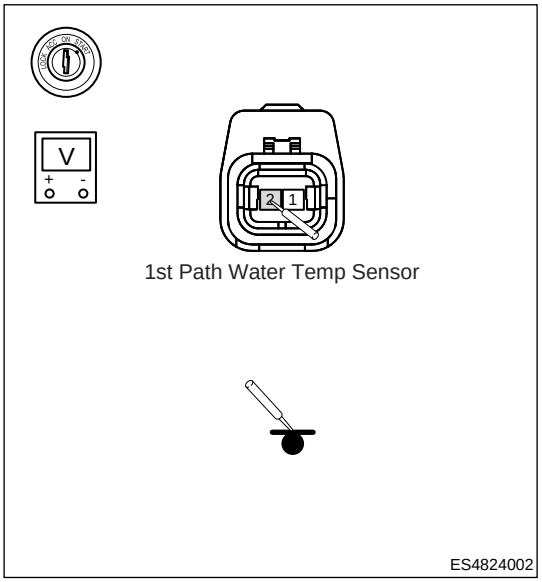
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check coolant temperature sensor 1 power supply voltage**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Coolant temperature sensor 1 (2) - Body ground	ENGINE START STOP switch ON	5 V



NG → **Check and repair wire harness between coolant temperature sensor and ECU**

OK →

2	**Check engine coolant temperature sensor 1**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check for open.

Multimeter Connection	Condition	Specified Condition
Coolant temperature sensor 1 (1) - Coolant temperature sensor 1 (2)	Always	Resistance is 2.5 kΩ ± 5% at normal temperature (20 ˚C), 300 - 400 Ω in boiled water (80 ˚C) (value changes with boiled water temperature)

NG → **Clean or replace engine coolant temperature sensor 1.**

OK →

3	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

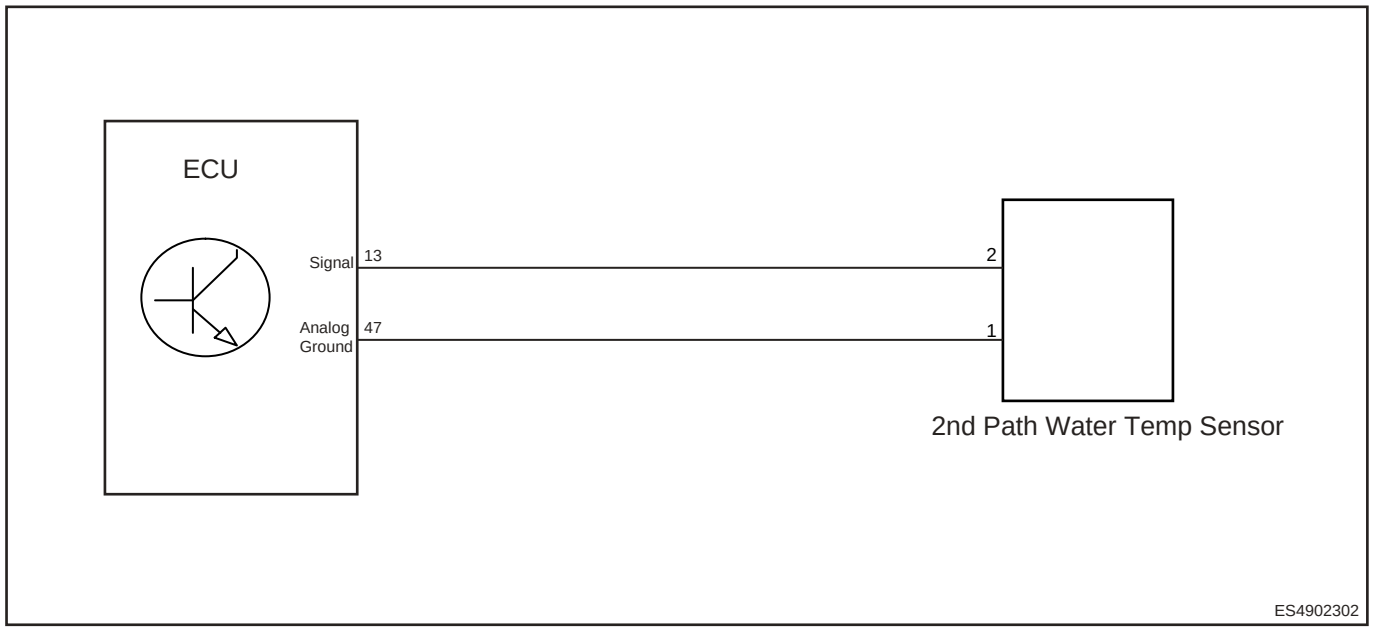
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P2183 24**	**Engine Coolant Temperature Sensor 2 Circuit Range/ Performance**
DTC	**P2183 23**	**Engine Coolant Temperature Sensor 2 Circuit Range/ Performance**
DTC	**P2184 00**	**Engine Coolant Temperature Sensor 2 Circuit Low**
DTC	**P2185 00**	**Engine Coolant Temperature Sensor 2 Circuit High**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P2-18324	Engine Coolant Temperature Sensor 2 Circuit Range/ Performance	/	/	/	/	• Coolant temperature sensor 2 • Wire harness or connector • ECU	/	Engine malfunction light comes on
P2-18323	Engine Coolant Temperature Sensor 2 Circuit Range/ Performance	/	/	/	/		/	
P2-18400	Engine Coolant Temperature Sensor 2 Circuit Low	/	/	/	/		/	
P2-18500	Engine Coolant Temperature	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Sensor 2 Circuit High							

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

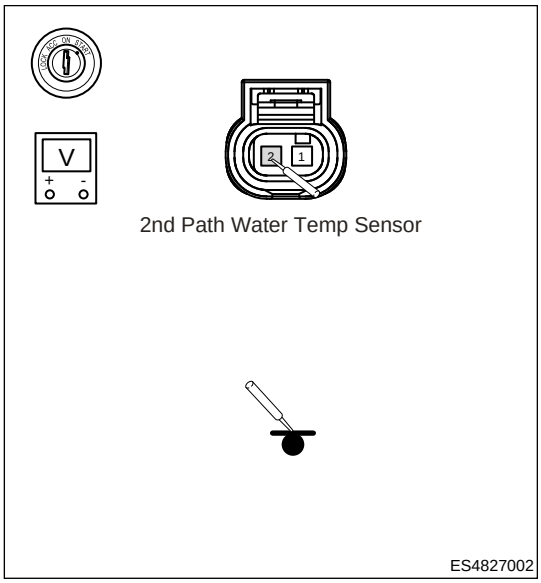
Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check 2nd coolant temperature sensor power supply voltage**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
2nd coolant temperature sensor (2) - Body ground	ENGINE START STOP switch ON	5 V



NG → **Check and repair wire harness between 2nd coolant temperature sensor and ECU.**

OK →

2	**Read 2nd coolant temperature sensor data flow**

(a) Turn ENGINE START STOP switch to ON.
(b) Do not start engine, read "Coolant Temperature Sensor Measured Value" and check if it is within the normal range.

OK → **Check and repair wire harness between 2nd coolant temperature sensor and ECU.**

NG

3	**Check engine 2nd coolant temperature sensor**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check for open.

Multimeter Connection	Condition	Specified Condition
2nd coolant temperature sensor (1) - 2nd coolant temperature sensor (2)	Always	Resistance is 2.5 kΩ ± 5% at normal temperature (20 ˚C), 300 - 400 Ω in boiled water (80 ˚C) (value changes with boiled water temperature)

NG → **Clean or replace 2nd coolant temperature sensor.**

OK

4	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

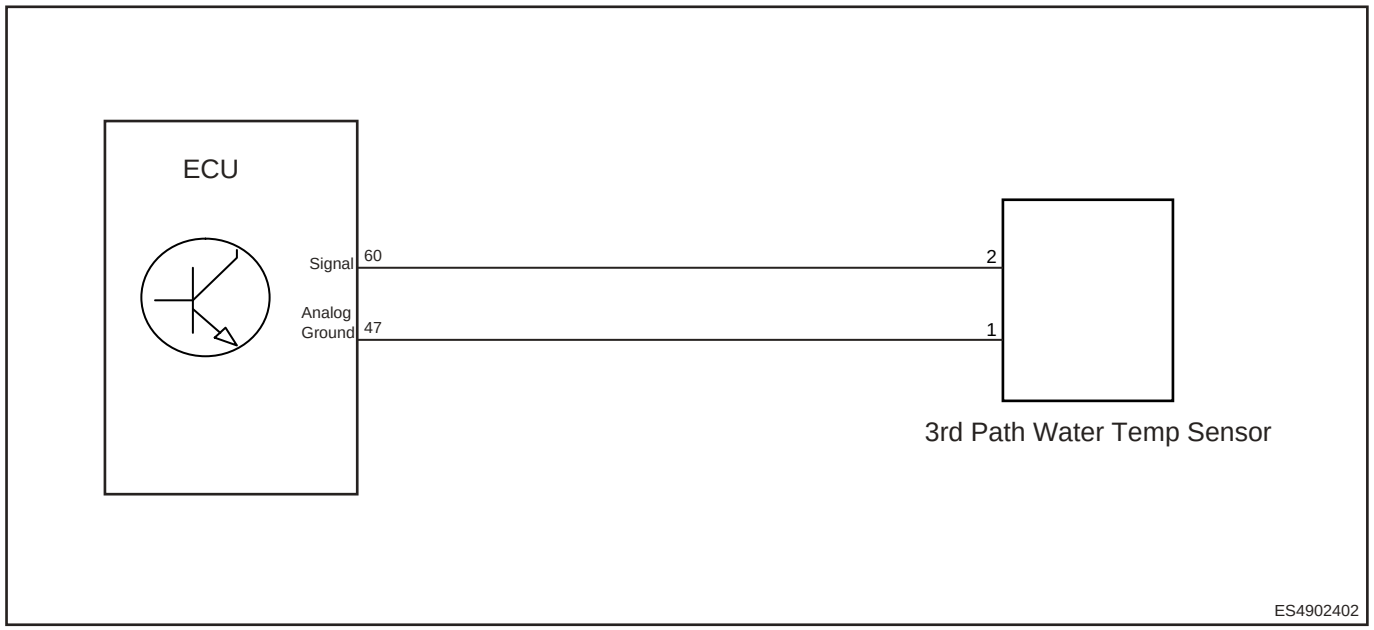
NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P01E4 24**	**Engine Coolant Temperature Sensor 3 Circuit Range/ Performance**
DTC	**P01E4 23**	**Engine Coolant Temperature Sensor 3 Circuit Range/ Performance**

DTC	**P01E5 00**	**Engine Coolant Temperature Sensor 3 Circuit Low**
DTC	**P01E6 00**	**Engine Coolant Temperature Sensor 3 Circuit High**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P01E424	Engine Coolant Temperature Sensor 3 Circuit Range/ Performance	/	/	/	/	• Coolant temperature sensor 3 • Wire harness or connector • ECU	/	Engine malfunction light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P01E423	Engine Coolant Temperature Sensor 3 Circuit Range/ Performance	/	/	/	/		/	
P01E500	Engine Coolant Temperature Sensor 3 Circuit Low	/	/	/	/		/	
P01E600	Engine Coolant Temperature Sensor 3 Circuit High	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

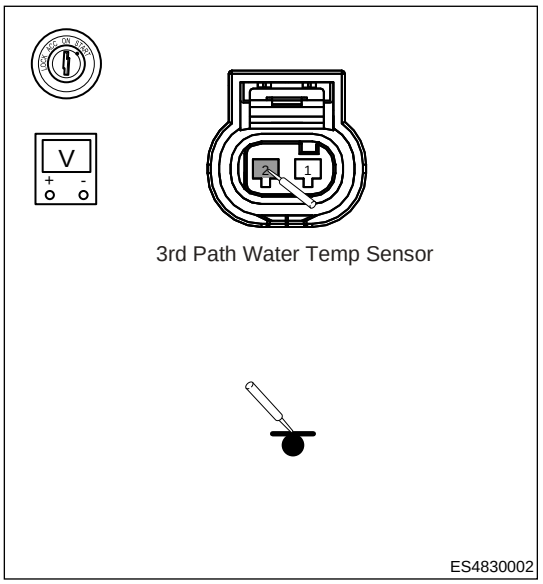
Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check 3rd coolant temperature sensor power supply voltage**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
3rd coolant temperature sensor (2) - Body ground	ENGINE START STOP switch ON	5 V



NG → **Check and repair wire harness between 3rd coolant temperature sensor and ECU.**

OK →

2	**Read 3rd coolant temperature sensor data flow**

(a) Turn ENGINE START STOP switch to ON.

(b) Do not start engine, read "Coolant Temperature Sensor Measured Value" and check if it is within the normal range.

OK → **Check and repair wire harness between 3rd coolant temperature sensor and ECU.**

NG →

3	**Check engine 3rd coolant temperature sensor**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check for open.

Multimeter Connection	Condition	Specified Condition
3rd coolant temperature sensor (1) - 3rd coolant temperature sensor (2)	Always	Resistance is 2.5 kΩ ± 5% at normal temperature (20 ˚C), 300 - 400 Ω in boiled water (80 ˚C) (value changes with boiled water temperature)

NG → **Clean or replace engine 3rd coolant temperature sensor.**

OK

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

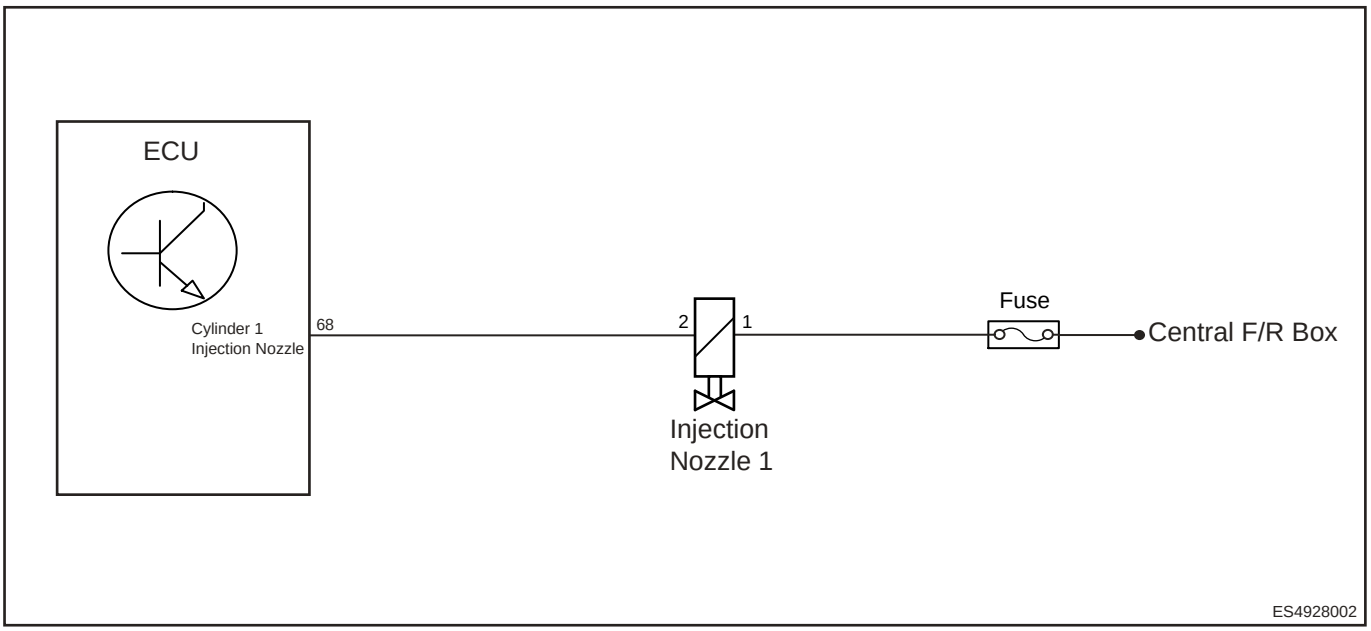
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0262 00**	**Cylinder 1 Injector "A" Circuit High**
DTC	**P0261 00**	**Cylinder 1 Injector "A" Circuit Low**
DTC	**P0201 00**	**Cylinder 1 - Injector Circuit Open**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-26200	Cylinder 1 Injector "A" Circuit High	/	/	/	/	• Fuel Injector 1 • Fuse • Wire harness or connector • ECU	/	Engine malfunction light comes on
P0-26100	Cylinder 1 Injector "A" Circuit Low	/	/	/	/		/	
P0-20100	Cylinder 1 - Injector Circuit Open	/	/	/	/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

(a) Check if fuel injector fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

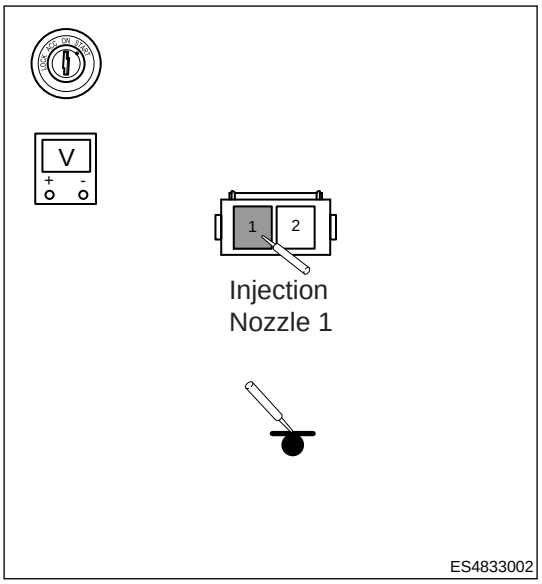
OK

2	**Check fuel injector 1 power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Cylinder 1 fuel injector (1) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair open fault in fuel injector 1 power supply.**

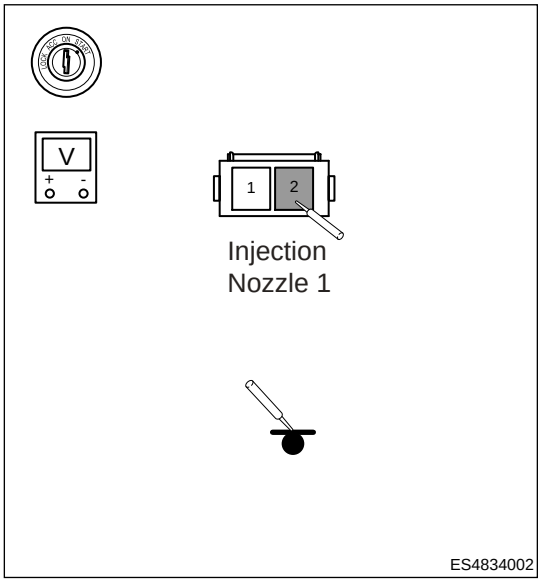
OK

3	**Check fuel injector 1 control circuit**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Cylinder 1 fuel injector (2) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in fuel injector 1 control circuit.**

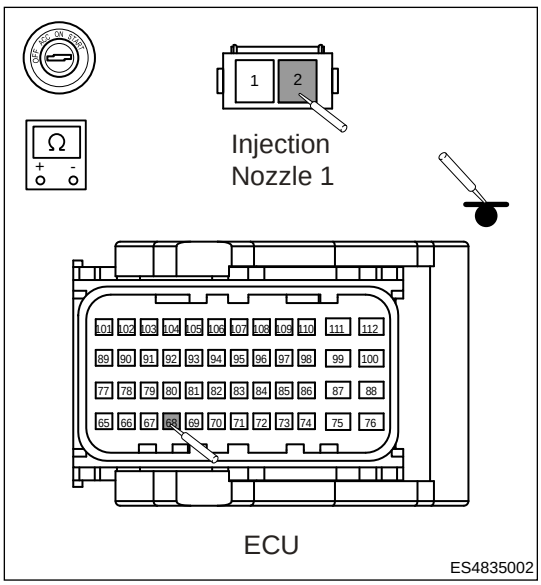
OK →

4	Check fuel injector 1 control circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Cylinder 1 fuel injector (2) - ECU (68)	Always	Less than 1 Ω
Cylinder 1 fuel injector (2) - Body ground	Always	∞



NG → **Repair fuel injector 1 control circuit fault.**

OK →

5	Check fuel injector 1 connector

(a) Check if fuel injector 1 connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK

6	**Check fuel injector 1**

(a) Check if fuel injector 1 is normal.

NG → **Replace the fuel injector 1.**

OK

7	**Reconfirm DTCs**

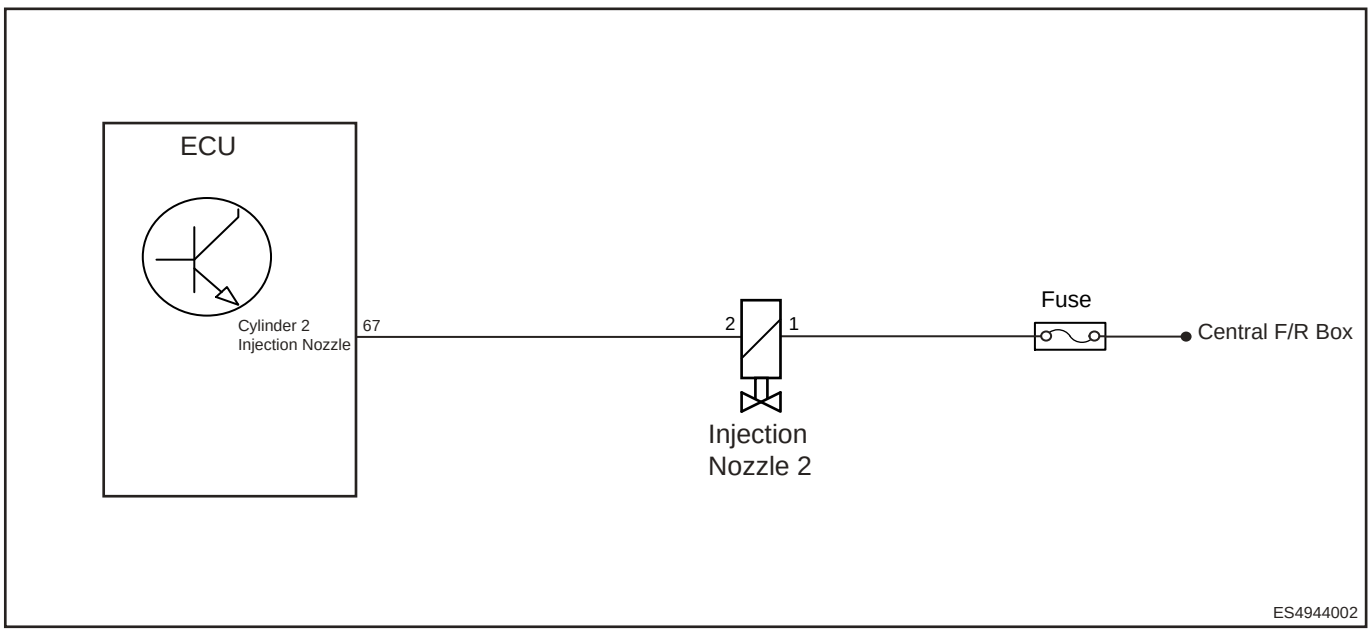
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0265 00**	**Cylinder 2 Injector "A" Circuit High**
DTC	**P0264 00**	**Cylinder 2 Injector "A" Circuit Low**
DTC	**P0202 00**	**Cylinder 2 - Injector Circuit Open**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P026500	Cylinder 2 Injector "A" Circuit High	/	/	/	/	• Fuel Injector 2 • Fuse • Wire harness or connector • ECU	/	Engine malfunction light comes on
P026400	Cylinder 2 Injector "A" Circuit Low	/	/	/	/		/	
P020200	Cylinder 2 - Injector Circuit Open	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

(a) Check if fuel injector fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

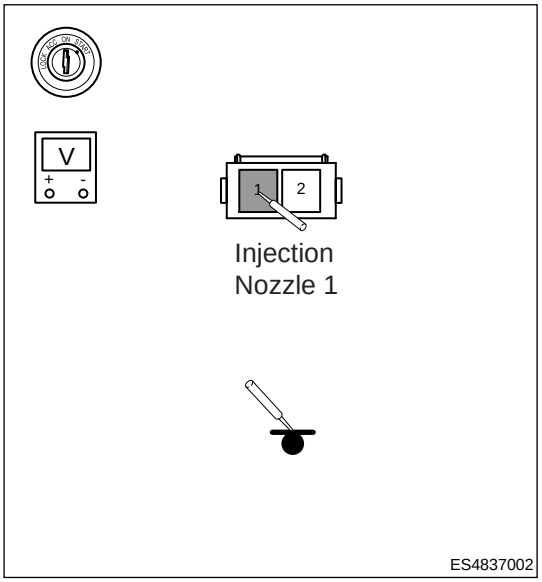
OK

2	**Check fuel injector 2 power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Cylinder 1 fuel injector (2) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair open fault in fuel injector 2 power supply.**

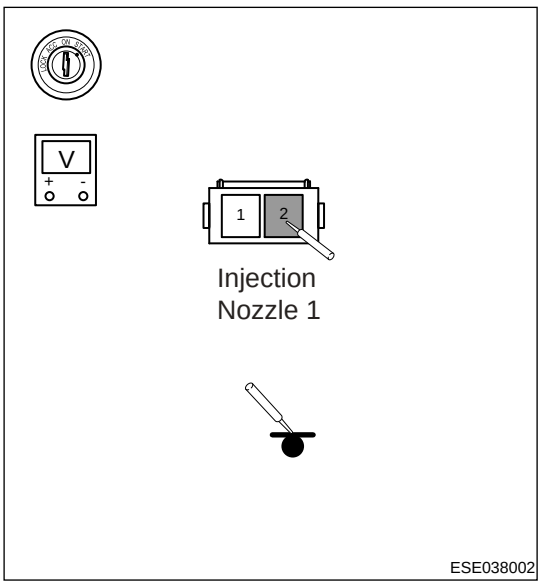
OK →

3	**Check fuel injector 2 control circuit**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Cylinder 2 fuel injector (2) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in fuel injector 2 control circuit.**

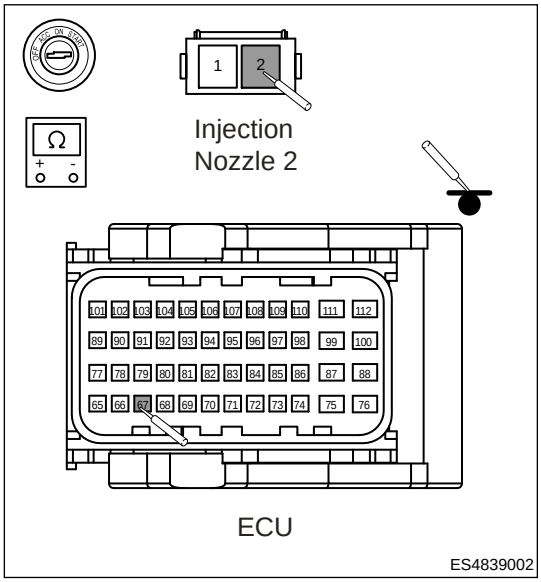
OK →

4	**Check fuel injector 2 control circuit**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Cylinder 2 fuel injector (2) - ECU (67)	Always	Less than 1 Ω
Cylinder 2 fuel injector (2) - Body ground	Always	∞



NG → **Repair fuel injector 2 control circuit fault.**

OK ↓

5	**Check fuel injector 2 connector**

(a) Check if fuel injector 2 connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK ↓

6	**Check fuel injector 2**

(a) Check if fuel injector 2 is normal.

NG → **Replace the fuel injector 2.**

OK ↓

7	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

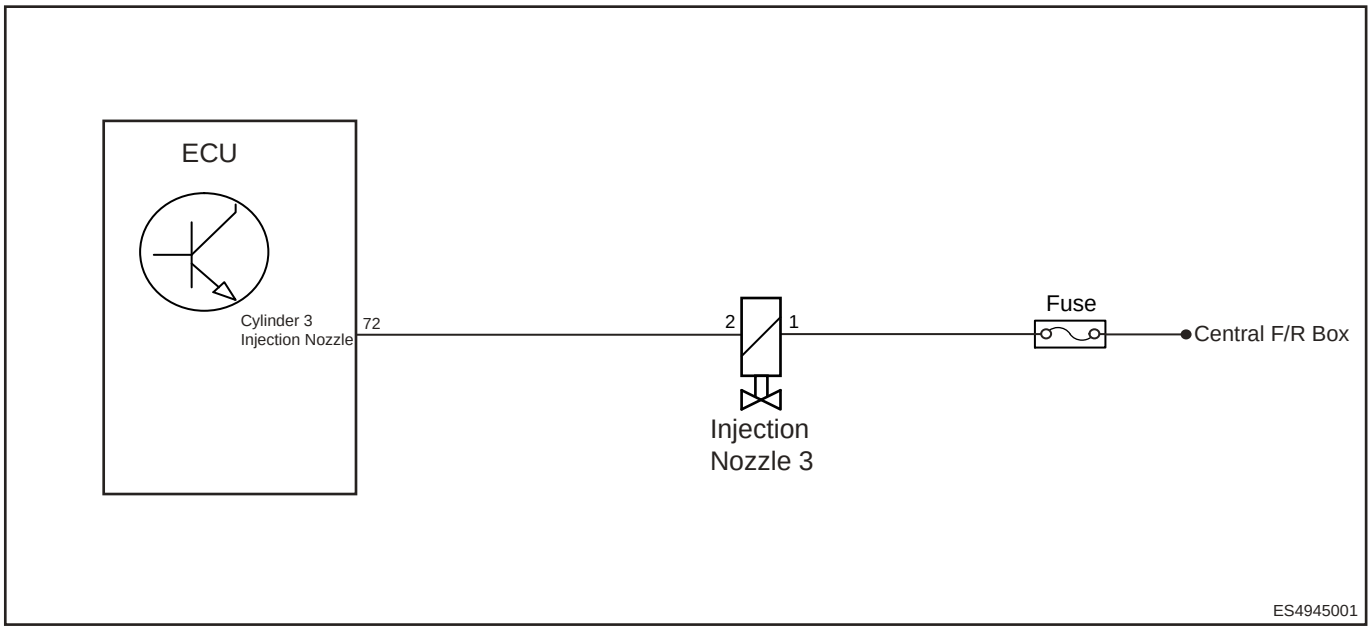
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0268 00**	**Cylinder 3 Injector "A" Circuit High**
DTC	**P0267 00**	**Cylinder 3 Injector "A" Circuit Low**
DTC	**P0203 00**	**Cylinder 3 - Injector Circuit Open**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-268 00	Cylinder 3 Injector "A" Circuit High	/	/	/	/	• Fuel Injector 3 • Fuse • Wire harness or connector • ECU	/	Engine malfunction light comes on
P0-267 00	Cylinder 3 Injector "A" Circuit Low	/	/	/	/		/	
P0-203 00	Cylinder 3 - Injector Circuit Open	/	/	/	/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check if fuel injector fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

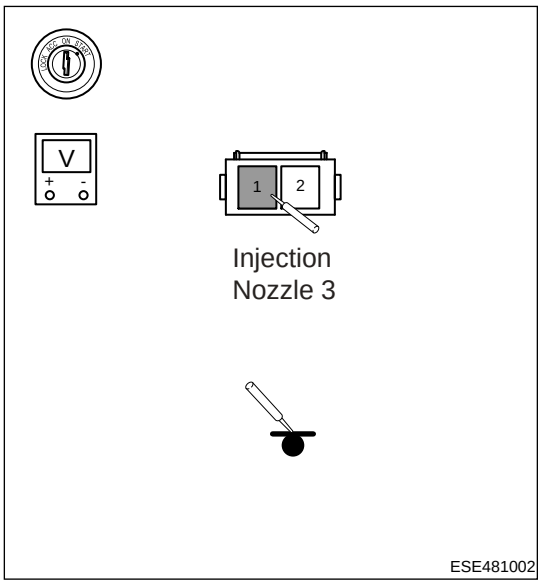
OK

2	**Check fuel injector 3 power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Cylinder 3 fuel injector (1) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair open fault in fuel injector 3 power supply.**

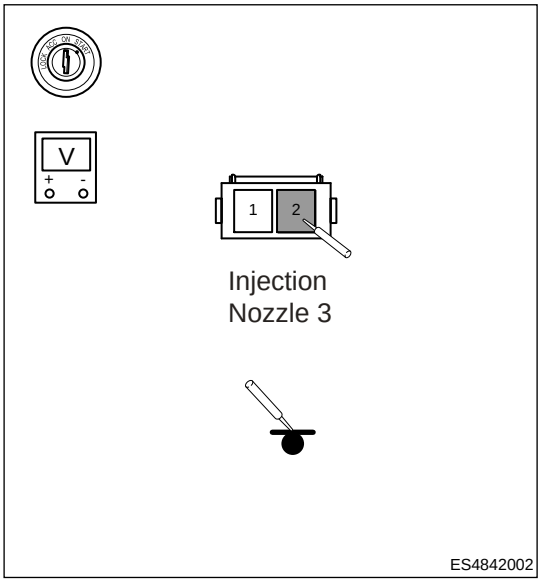
OK

3	**Check fuel injector 3 control circuit**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Cylinder 3 fuel injector (2) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in fuel injector 3 control circuit.**

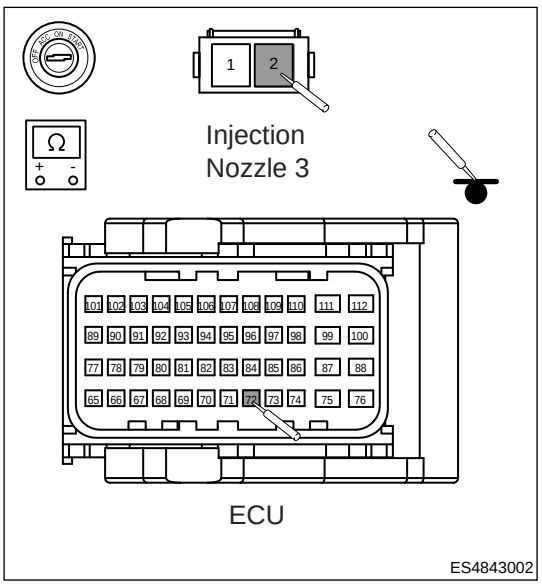
OK →

4	Check fuel injector 3 control circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Cylinder 3 fuel injector (2) - ECU (72)	Always	Less than 1 Ω
Cylinder 3 fuel injector (2) - Body ground	Always	∞



NG → **Repair fuel injector 3 control circuit fault.**

OK →

5	Check fuel injector 3 connector

(a) Check if fuel injector 3 connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK

6	**Check fuel injector 3**

(a) Check if fuel injector 3 is normal.

NG → **Replace the fuel injector 3.**

OK

7	**Reconfirm DTCs**

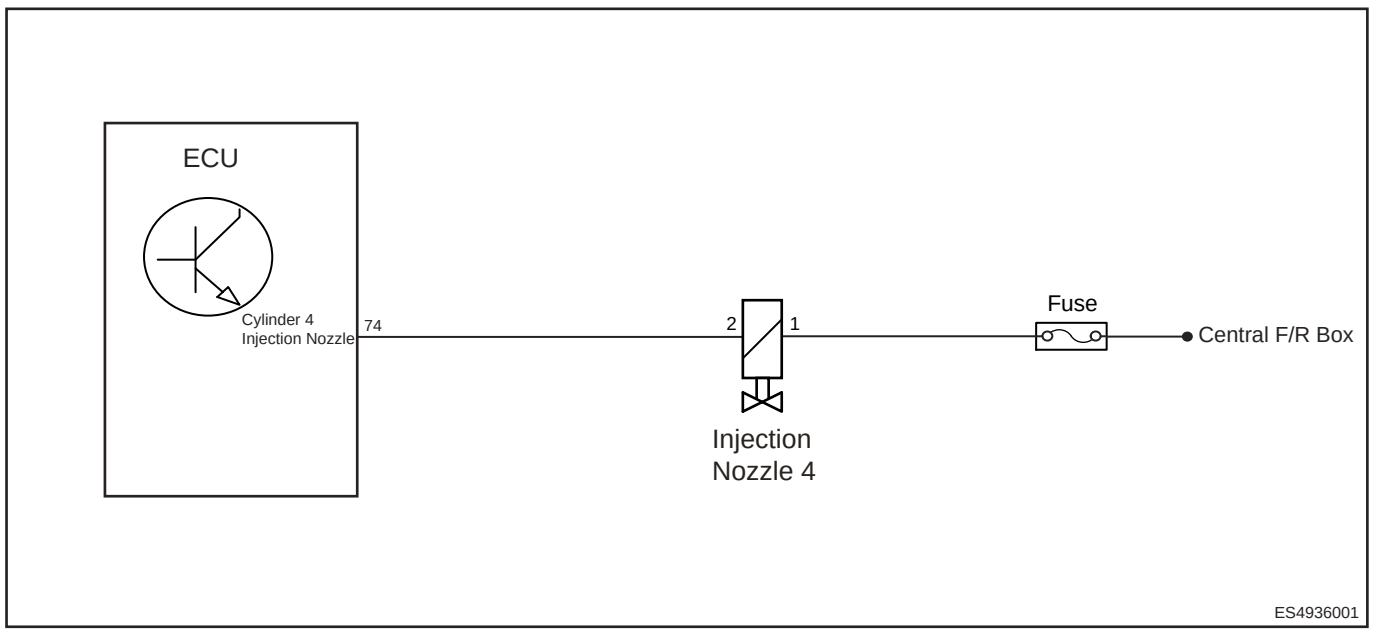
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0271 00**	**Cylinder 4 Injector "A" Circuit High**
DTC	**P0270 00**	**Cylinder 4 Injector "A" Circuit Low**
DTC	**P0204 00**	**Cylinder 4 - Injector Circuit Open**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-27100	Cylinder 4 Injector "A" Circuit High	/	/	/	/	• Fuel Injector 4 • Fuse • Wire harness or connector • ECU	/	Engine malfunction light comes on
P0-27000	Cylinder 4 Injector "A" Circuit Low	/	/	/	/		/	
P0-20400	Cylinder 4 - Injector Circuit Open	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Check if fuel injector fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

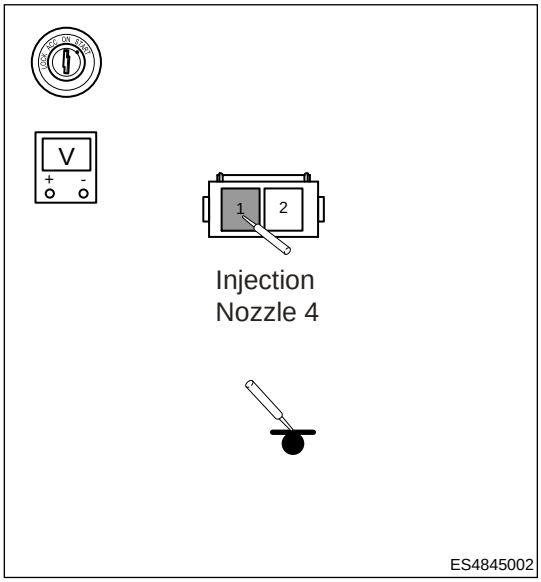
OK

2	**Check fuel injector 4 power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Cylinder 4 fuel injector (1) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair open fault in fuel injector 4 power supply.**

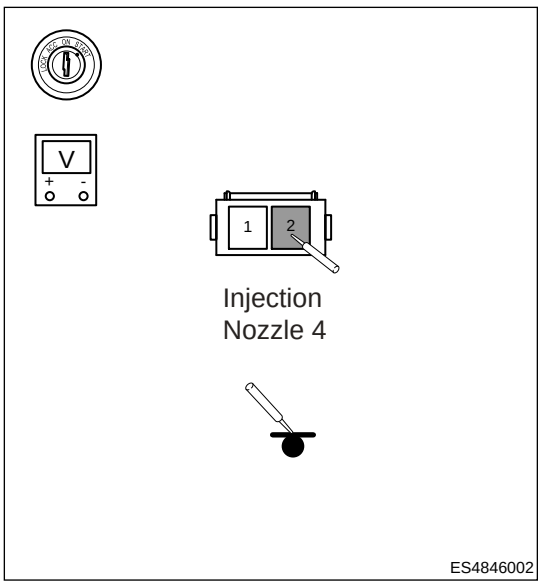
OK →

3	**Check fuel injector 4 control circuit**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Cylinder 4 fuel injector (2) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in fuel injector 4 control circuit.**

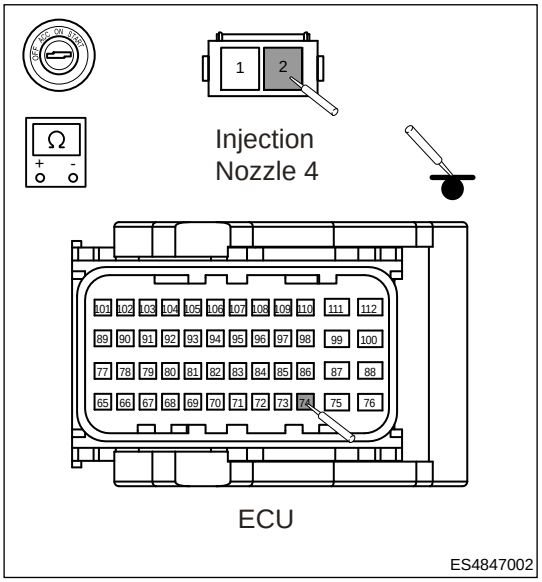
OK →

4	**Check fuel injector 4 control circuit**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Cylinder 4 fuel injector (2) - ECU (74)	Always	Less than 1 Ω
Cylinder 4 fuel injector (2) - Body ground	Always	∞



NG → **Repair fuel injector 4 control circuit fault.**

OK ↓

5	**Check fuel injector 4 connector**

(a) Check if fuel injector 4 connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK ↓

6	**Check fuel injector 4**

(a) Check if fuel injector 4 is normal.

NG → **Replace the fuel injector 4.**

OK ↓

7	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

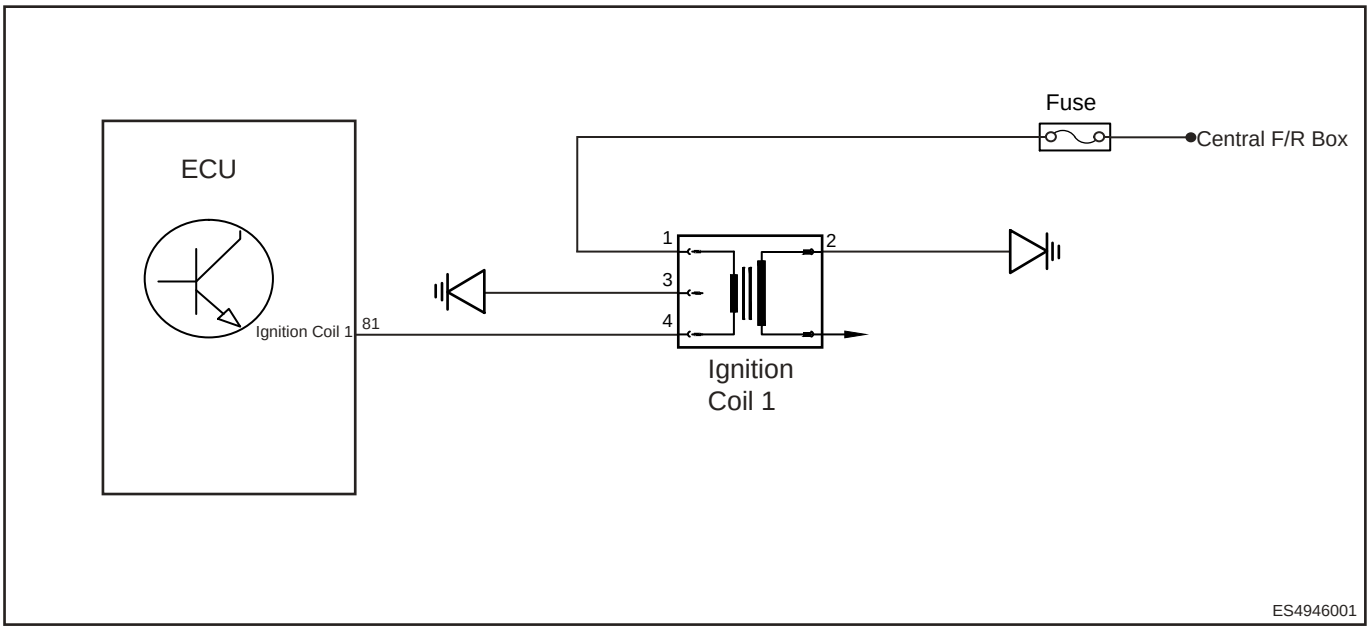
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0351 00**	**Ignition Coil "A" Primary Control Circuit Open**
DTC	**P2301 00**	**Ignition Coil “A” Primary Control Circuit High**
DTC	**P2300 00**	**Ignition Coil “A” Primary Control Circuit Low**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-351 00	Ignition Coil "A" Primary Control Circuit Open	/	/	Drive channel self-diagnosis is malfunctioning	/	• Ignition Coil-1 • Fuse • Wire harness or connector • ECU	/	Engine malfunction light comes on
P2-301 00	Ignition Coil “A” Primary Control Circuit High	/	/	Drive channel self-diagnosis is malfunctioning	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P2-30000	Ignition Coil "A" Primary Control Circuit Low	/	/	Drive channel self-diagnosis is malfunctioning	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check if ignition coil fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

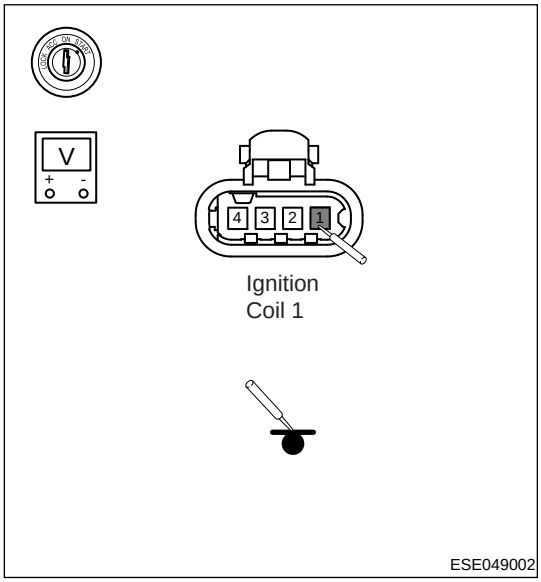
OK

2	**Check ignition coil-1 power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-1 (1) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair open fault to power supply in ignition coil-1.**

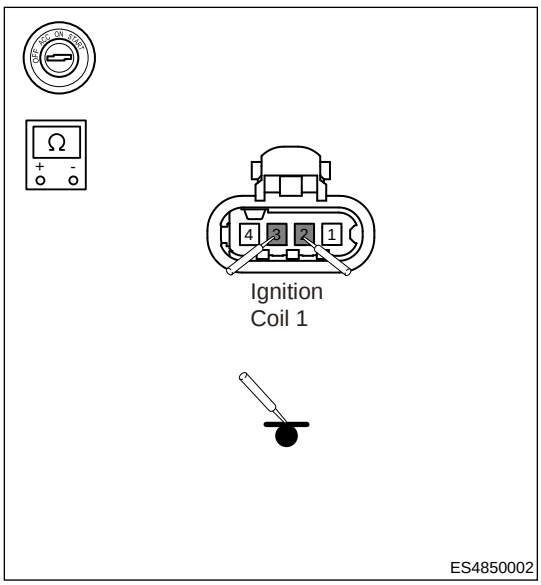
OK →

3	**Check ignition coil-1 ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-1 (2) - Body ground	Always	Less than 1 Ω
Ignition coil-1 (3) - Body ground	Always	Less than 1 Ω



NG → **Repair open fault to ground in ignition coil-1.**

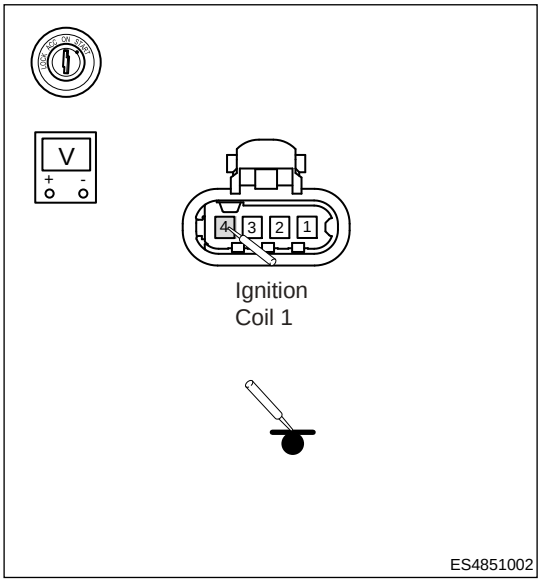
OK →

4	**Check ignition coil-1 control circuit**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-1 (4) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in ignition coil-1 control circuit**

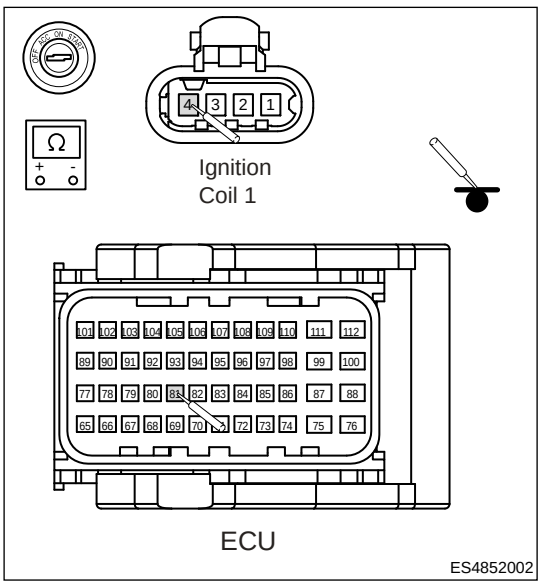
OK →

5	Check ignition coil-1 control circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-1 (4) - ECU (81)	Always	Less than 1 Ω
Ignition coil-1 (4) - Body ground	Always	∞



NG → **Repair ignition coil-1 control circuit fault.**

OK →

6	Check ignition coil-1 connector

(a) Check if ignition coil-1 connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK

7	**Check ignition coil-1**

(a) Check if ignition coil-1 is normal.

NG → **Replace ignition coil-1.**

OK

8	**Reconfirm DTCs**

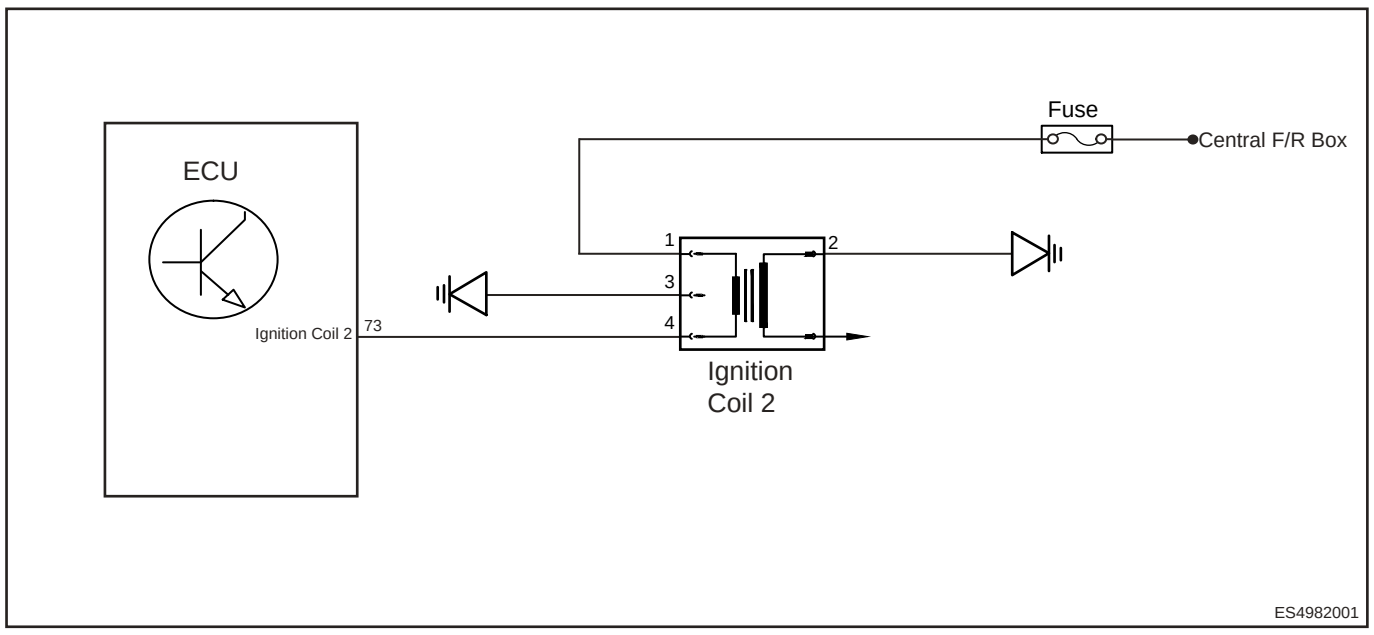
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0352 00**	**Ignition Coil "B" Primary Control Circuit Open**
DTC	**P2304 00**	**Ignition Coil "B" Primary Control Circuit High**
DTC	**P2303 00**	**Ignition Coil "B" Primary Control Circuit Low**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-35200	Ignition Coil "B" Primary Control Circuit Open	/	/	Drive channel self-diagnosis is malfunctioning	/	• Ignition Coil-2 • Fuse • Wire harness or connector • ECU	/	Engine malfunction light comes on
P2-30400	Ignition Coil “B” Primary Control Circuit High	/	/	Drive channel self-diagnosis is malfunctioning	/		/	
P2-30300	Ignition Coil “B” Primary Control Circuit Low	/	/	Drive channel self-diagnosis is malfunctioning	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check if ignition coil fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

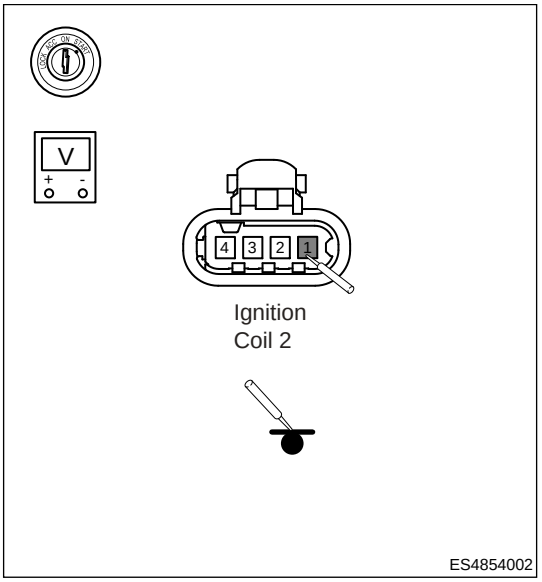
OK

2	**Check ignition coil-2 power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-2 (1) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair open fault to power supply in ignition coil-2.**

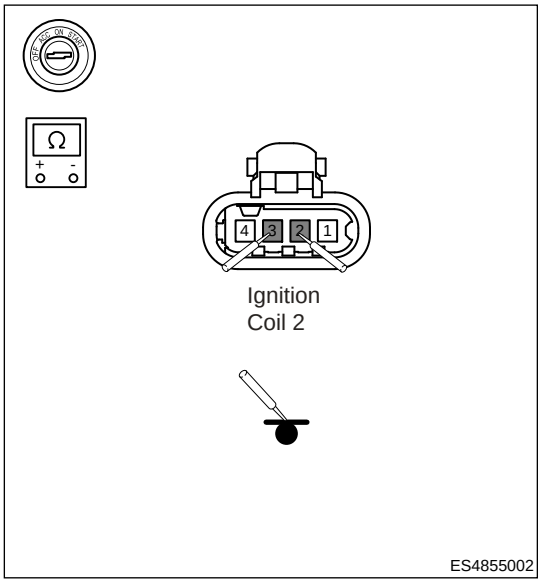
OK

3	**Check ignition coil-2 ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-2 (2) - Body ground	Always	Less than 1 Ω
Ignition coil-2 (3) - Body ground	Always	Less than 1 Ω



NG → **Repair open fault to ground in ignition coil-2.**

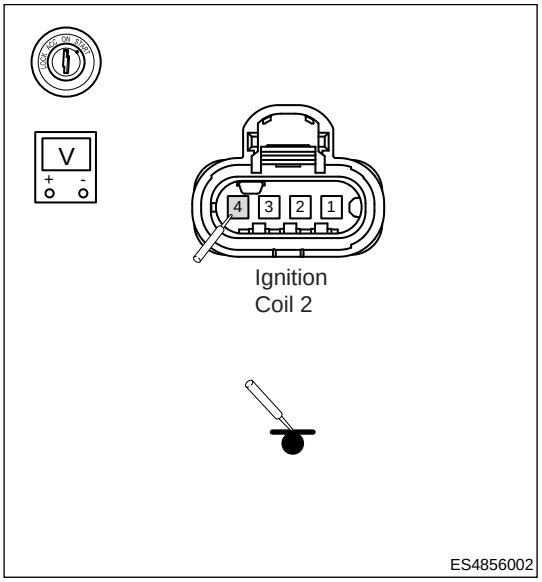
OK

4	**Check ignition coil-2 control circuit**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-2 (4) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in ignition coil-2 control circuit**

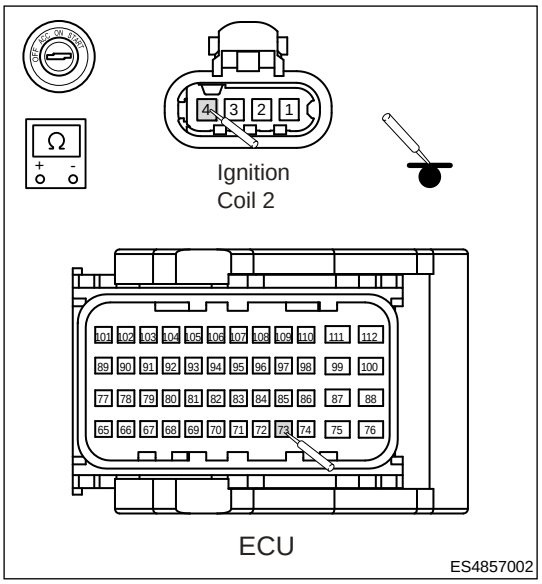
OK

5	**Check ignition coil-2 control circuit**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-2 (4) - ECU (73)	Always	Less than 1 Ω
Ignition coil-2 (4) - Body ground	Always	∞



NG → **Repair ignition coil-2 control circuit fault.**

OK

6	Check ignition coil-2 connector

(a) Check if ignition coil-2 connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK

7	Check ignition coil-2

(a) Check if ignition coil-2 is normal.

NG → **Replace ignition coil-2.**

OK

8	Reconfirm DTCs

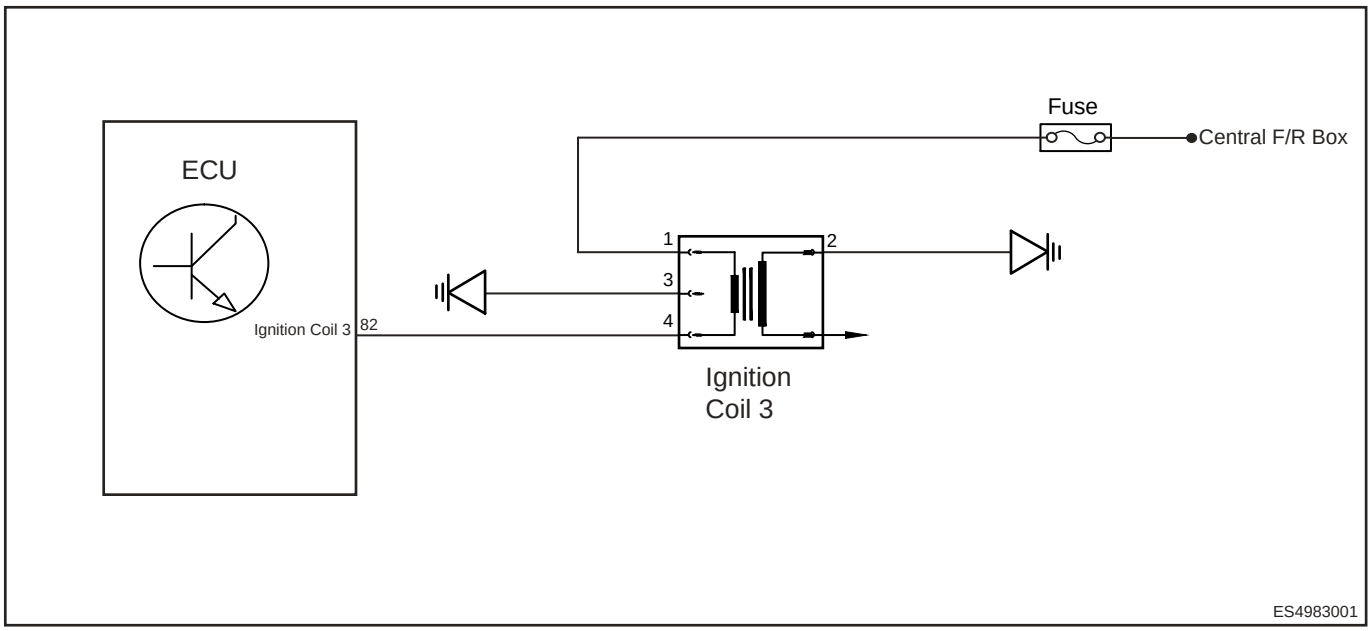
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0353 00**	**Ignition Coil "C" Primary Control Circuit Open**
DTC	**P2307 00**	**Ignition Coil "C" Primary Control Circuit High**
DTC	**P2306 00**	**Ignition Coil "C" Primary Control Circuit Low**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P035300	Ignition Coil "C" Primary Control Circuit Open	/	/	Drive channel self-diagnosis is malfunctioning	/	• Ignition Coil-3 • Fuse • Wire harness or connector • ECU	/	Engine malfunction light comes on
P230700	Ignition Coil “C” Primary Control Circuit High	/	/	Drive channel self-diagnosis is malfunctioning	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P2-30600	Ignition Coil "C" Primary Control Circuit Low	/	/	Drive channel self-diagnosis is malfunctioning	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check if ignition coil fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

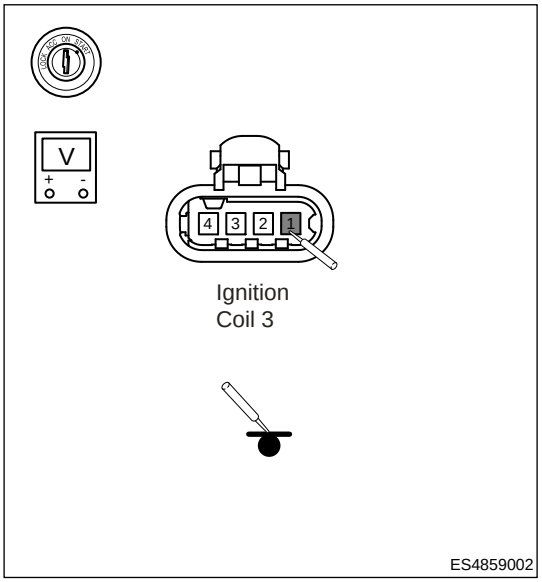
OK

2	**Check ignition coil-3 power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-3 (1) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair open fault to power supply in ignition coil-3.**

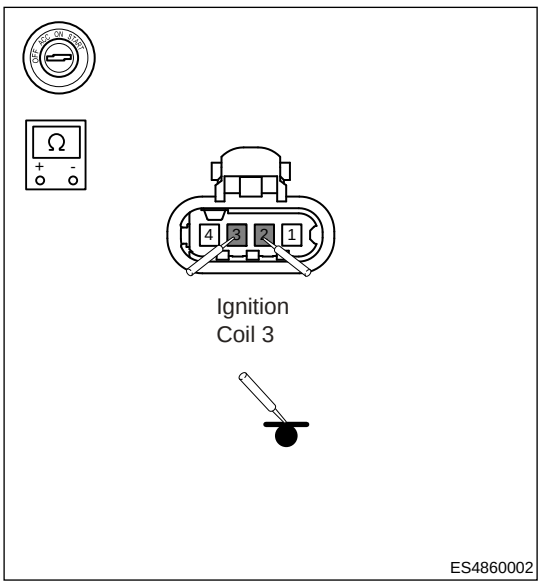
OK →

3	Check ignition coil-3 ground

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-3 (2) - Body ground	Always	Less than 1 Ω
Ignition coil-3 (3) - Body ground	Always	Less than 1 Ω



NG → **Repair open fault to ground in ignition coil-3.**

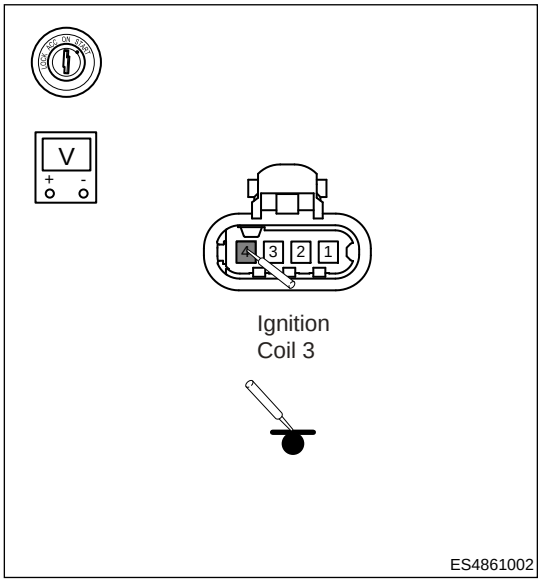
OK →

4	Check ignition coil-3 control circuit

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-3 (4) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in ignition coil-3 control circuit**

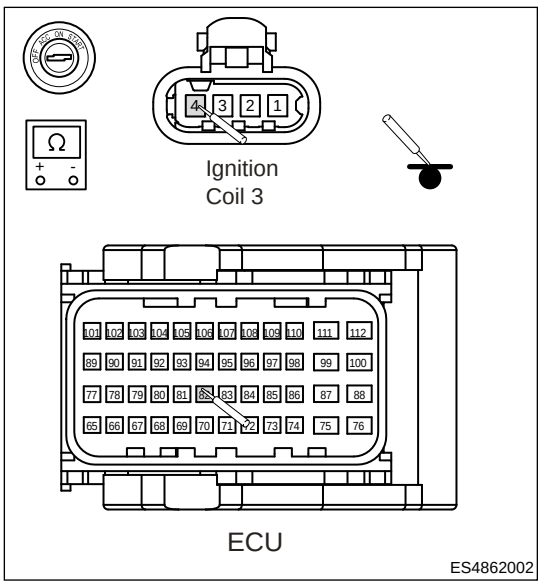
OK →

5	Check ignition coil-3 control circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-3 (4) - ECU (82)	Always	Less than 1 Ω
Ignition coil-3 (4) - Body ground	Always	∞



NG → **Repair ignition coil-3 control circuit fault.**

OK →

6	Check ignition coil-3 connector

(a) Check if ignition coil-3 connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK

7	**Check ignition coil-3**

(a) Check if ignition coil-3 is normal.

NG → **Replace ignition coil-3.**

OK

8	**Reconfirm DTCs**

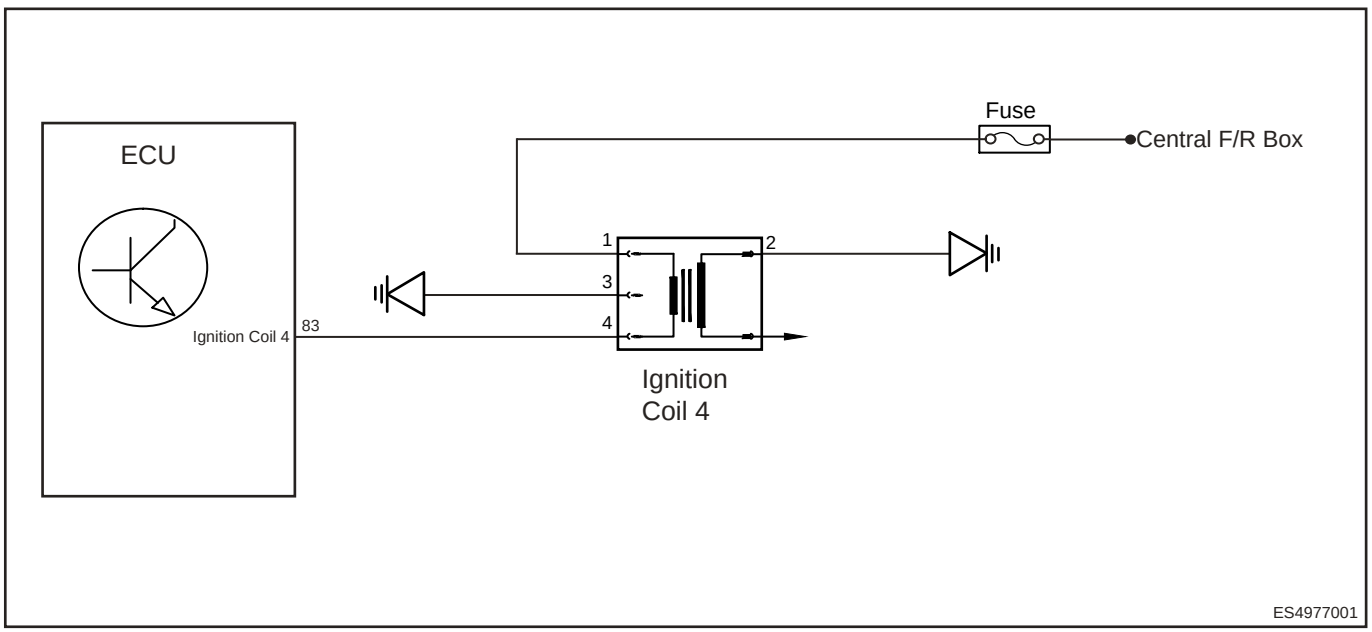
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0354 00**	**Ignition Coil "D" Primary Control Circuit Open**
DTC	**P2310 00**	**Ignition Coil "D" Primary Control Circuit High**
DTC	**P2309 00**	**Ignition Coil "D" Primary Control Circuit Low**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-35400	Ignition Coil "D" Primary Control Circuit Open	/	/	Drive channel self-diagnosis is malfunctioning	/	• Ignition Coil-4 • Fuse • Wire harness or connector • ECU	/	Engine malfunction light comes on
P2-31000	Ignition Coil “D” Primary Control Circuit High	/	/	Drive channel self-diagnosis is malfunctioning	/		/	
P2-30900	Ignition Coil “D” Primary Control Circuit Low	/	/	Drive channel self-diagnosis is malfunctioning	/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

(a) Check if ignition coil fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

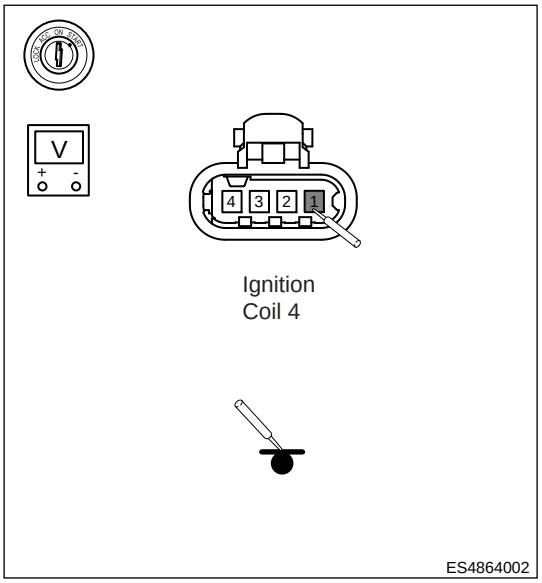
OK

2	Check ignition coil-4 power supply

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-4 (1) - Body ground	ENGINE START STOP switch ON	12 V



NG

Repair open fault to power supply in ignition coil-4.

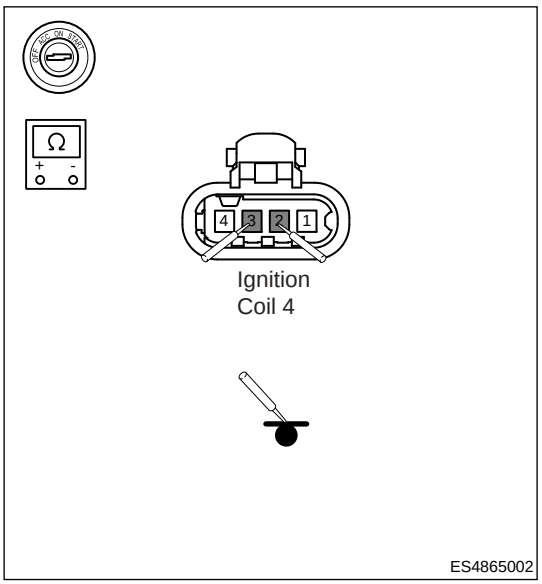
OK

3	Check ignition coil-4 ground

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-4 (2) - Body ground	Always	Less than 1 Ω
Ignition coil-4 (3) - Body ground	Always	Less than 1 Ω



NG

Repair open fault to ground in ignition coil-4.

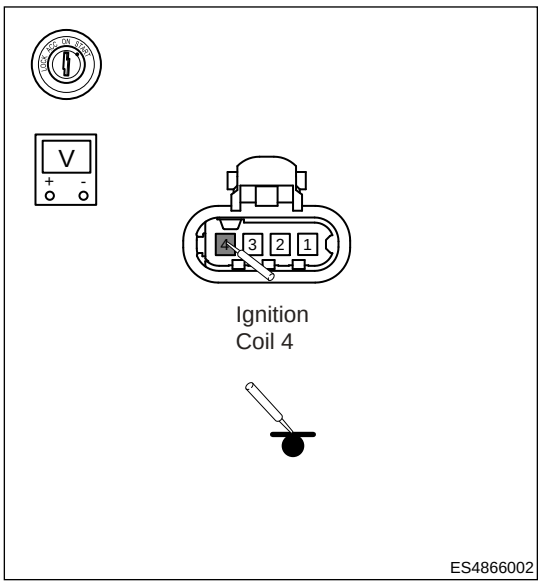
OK

4	Check ignition coil-4 control circuit

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-4 (4) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in ignition coil-4 control circuit**

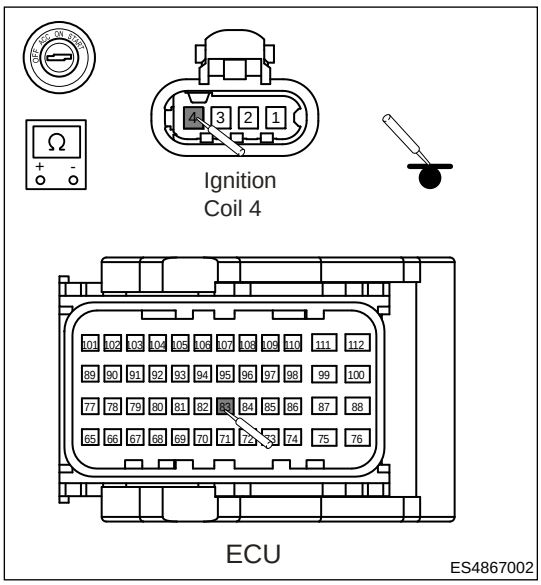
OK

5	Check ignition coil-4 control circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Ignition coil-4 (4) - ECU (83)	Always	Less than 1 Ω
Ignition coil-4 (4) - Body ground	Always	∞



NG → **Repair ignition coil-4 control circuit fault.**

OK

6	**Check ignition coil-4 connector**

(a) Check if ignition coil-4 connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK ↓

7	**Check ignition coil-4**

(a) Check if ignition coil-4 is normal.

NG → **Replace ignition coil-4.**

OK ↓

8	**Reconfirm DTCs**

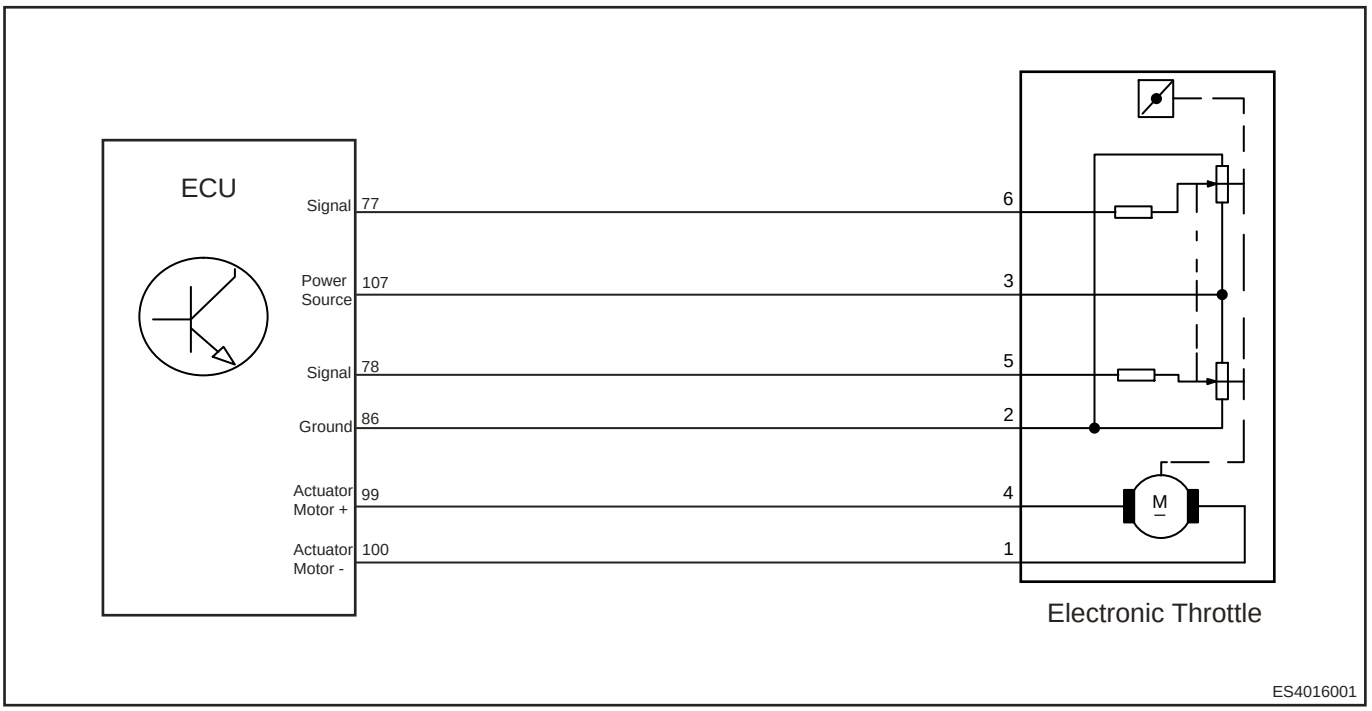
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P1555 00**	**Throttle Actuator Electrical Malfunction**
DTC	**P1554 00**	**Return Spring Check Max Error**
DTC	**P1561 00**	**Not Plausible Error of DV-E Position Deviation**

Control Schematic Diagram


ECU
Signal
77
Power Source
107
Signal
78
Ground
86
Actuator Motor +
99
Actuator Motor -
100
6
3
5
2
4
1
M
Electronic Throttle
ES4016001

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P1-55500	Throttle Actuator Electrical Malfunction	/	/	After ignition switch is turned to ON, the system will command DVE to open to a certain opening by ECU, and check if DVE can be reached within the specified time, and then check if DVE can be returned within the specified time; if it cannot reach the specified position within the specified time, it is determined as P1555; if it cannot return to the specified range within the specified time after opening, it is determined as P1554. When ECU drives throttle, ECU will always compare the target opening with the actual throttle feedback opening. When deviation between the target and the	DTC is deleted after 40 consecutive warm-up cycles without faults	• Electronic Throttle • Wire harness or connector • ECU	/	Engine malfunction light comes on
P1-55400	Return Spring Check Max Error	/	/				/	
P1-56100	Not Plausible Error of DVE Position Deviation	/	/				/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
				actual exceeds a certain value and it is confirmed after a period of time, it will be determined as P1561.				

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check electronic throttle connector**

(a) Check if electronic throttle connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

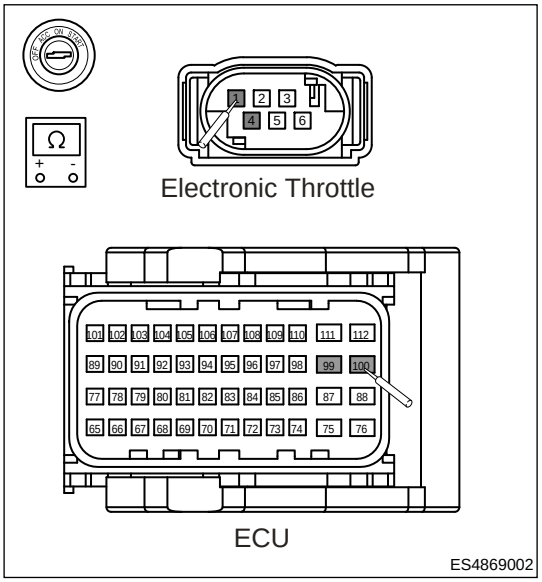
OK

2	**Check electronic throttle motor wire harness**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Electronic throttle (1) - ECU (100)	Always	Less than 1 Ω
Electronic throttle (4) - ECU (99)	Always	Less than 1 Ω



NG → **Repair electronic throttle motor wire harness.**

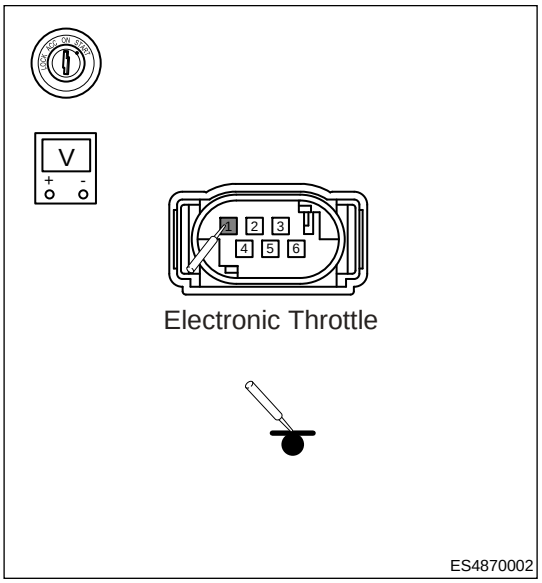
OK

3	Check voltage of electronic throttle connector

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Electronic throttle (1) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in electronic throttle connector.**

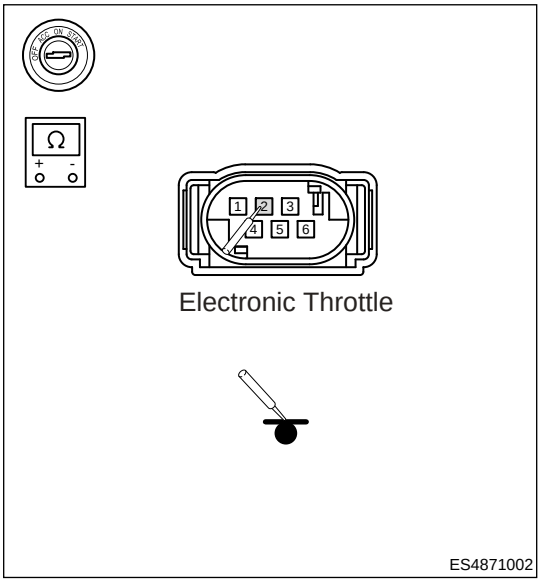
OK

4	Check electronic throttle connector resistance

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Electronic throttle (2) - Body ground	Always	Ground



NG → **Repair short to ground in electronic throttle connector wire harness**

OK →

5	Check electronic throttle

(a) Check if electronic throttle is normal.

NG → **Replace electronic throttle.**

OK →

6	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

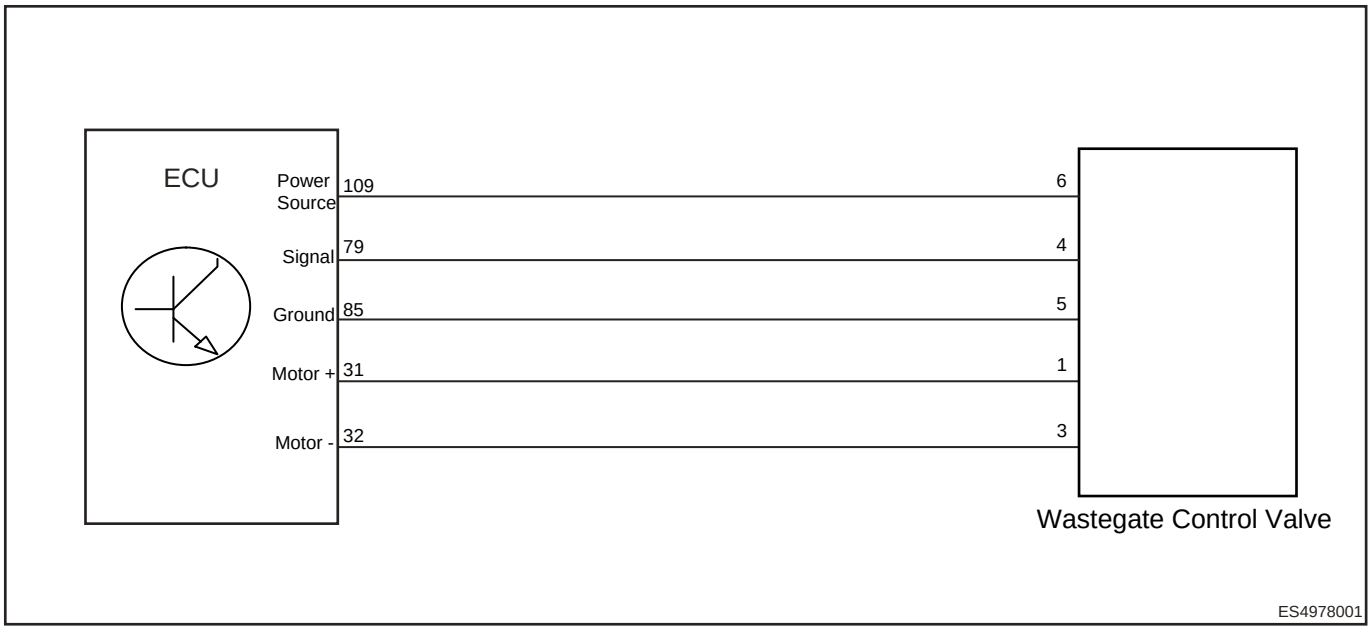
NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P2565 00**	**Turbocharger Boost Control Position Sensor "A" Circuit High**
DTC	**P2564 00**	**Turbocharger Boost Control Position Sensor "A" Circuit Low**
DTC	**P0244 77**	**Turbocharger/Supercharger Wastegate Actuator "A" Range/ Performance**

DTC	**P0244 37**	**Turbocharger/Supercharger Wastegate Actuator "A" Range/ Performance**
DTC	**P003A 00**	**Turbocharger/Supercharger Boost Control "A" Position Exceeded Learning Limit**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P256500	Turbocharger Boost Control Position Sensor "A" Circuit High	/	/	Vehicle power-on	/	• Electronic Waste Gate • Wire harness or connector • ECU	/	Engine malfunction light comes on
P256400	Turbocharger Boost Control Position Sensor "A" Circuit Low	/	/		/		/	
P024477	Turbocharger/ Supercharger Wastegate Actuator "A" Range/	/	/	Ignition switch is turned ON, 9 V≤ battery voltage ≤ 16 V	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Performance							
P0-24437	Turbocharger/ Supercharger Wastegate Actuator "A" Range/ Performance	/	/		/		/	
P0-03A00	Turbocharger/ Supercharger Boost Control "A" Position Exceeded Learning Limit	/	/		/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

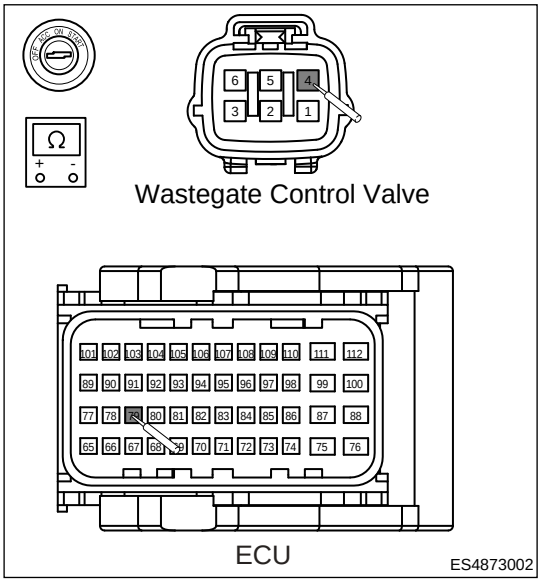
1	**Check electronic waste gate control circuit**

(a) Disconnect ECU connector and electronic waste gate connector.

(b) Turn ENGINE START STOP switch to OFF.

(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Electronic waste gate (4) - ECU (79)	Always	Less than 1 Ω



NG → **Repair electronic waste gate control wire harness.**

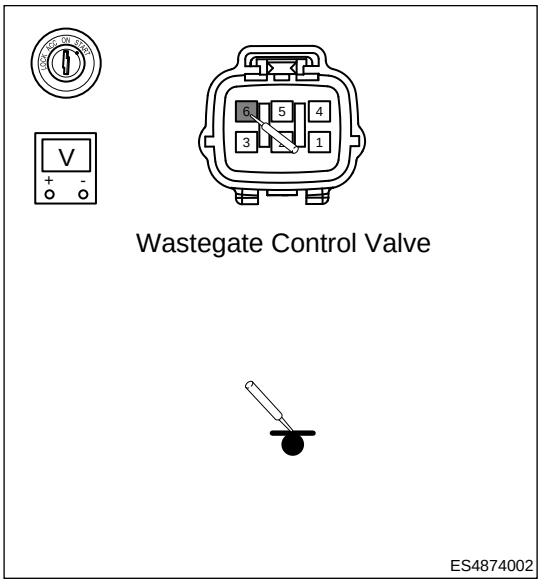
OK

2	**Check electronic waste gate wire harness voltage**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Electronic waste gate (6) - Body ground	ENGINE START STOP switch ON	5 V



NG → **Repair short fault to power supply in electronic waste gate wire harness.**

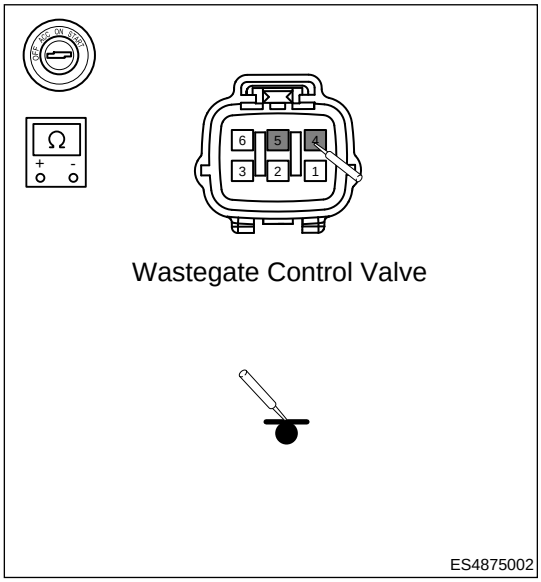
OK

3	**Check electronic waste gate wire harness resistance**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Electronic waste gate (4) - Body ground	Always	∞
Electronic waste gate (5) - Body ground	Always	∞



NG → **Repair short fault to ground in electronic waste gate wire harness.**

OK ↓

4	**Check electronic waste gate connector**

(a) Check if electronic waste gate is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK ↓

5	**Check electronic waste gate**

(a) Check if electronic waste gate is normal.

NG → **Replace electronic waste gate.**

OK ↓

6	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

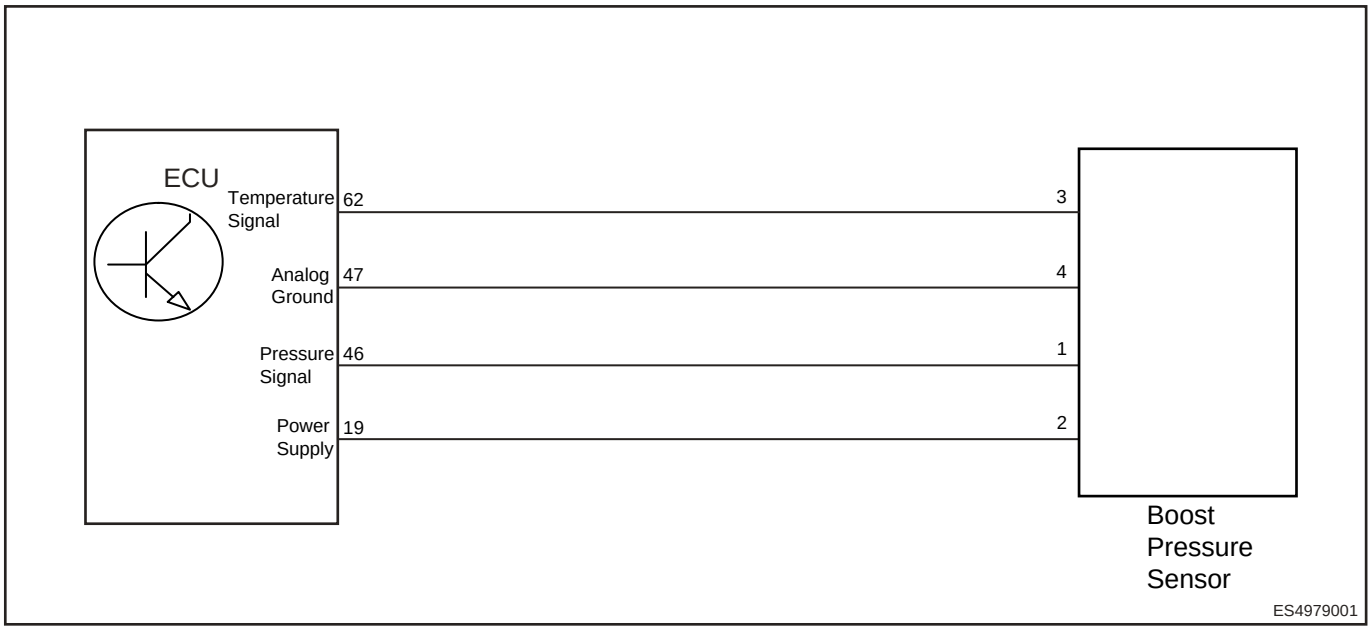
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0234 00**	**Turbocharger/Supercharger Overboost Condition**
DTC	**P0299 00**	**Turbocharger/Supercharger "A" Underboost Condition**
DTC	**P0238 00**	**Turbocharger/Supercharger Boost Sensor "A" Circuit High**
DTC	**P0237 00**	**Turbocharger/Supercharger Boost Sensor "A" Circuit Low**
DTC	**P1204 00**	**Turbocharger/Supercharger Boost Sensor "A" Circuit Range/ Performance**
DTC	**P1205 00**	**Turbocharger/Supercharger Boost Sensor "A" Circuit Range/ Performance**
DTC	**P0236 22**	**Turbocharger/Supercharger Boost Sensor "A" Circuit Range/ Performance**
DTC	**P0236 21**	**Turbocharger/Supercharger Boost Sensor "A" Circuit Range/ Performance**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P023400	Turbocharger/Supercharger Overboost Condition	/	/	/	/	• Boost pressure/temperature sensor • Wire harness or connector • ECU	/	Engine malfunction light comes on
P029900	Turbocharger/Supercharger "A" Underboost Condition	/	/	/	/		/	
P023800	Turbocharger/Supercharger Boost Sensor "A" Circuit High	/	/	/	/		/	
P023700	Turbocharger/Supercharger Boost Sensor "A" Circuit Low	/	/	/	/		/	
P120400	Turbocharger/Supercharger	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Boost Sensor "A" Circuit Range/ Performance							
P120500	Turbocharger/ Supercharger Boost Sensor "A" Circuit Range/ Performance	/	/	/	/		/	
P023622	Turbocharger/ Supercharger Boost Sensor "A" Circuit Range/ Performance	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P023621	Turbocharger/ Supercharger Boost Sensor "A" Circuit Range/ Performance	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check turbocharger assembly line**

(a) Check if boost pressure sensor is installed in place.
(b) Check each pipeline of turbocharger assembly for cracks or falling off.

NG → **Check and repair wire harness between boost pressure sensor and ECU.**

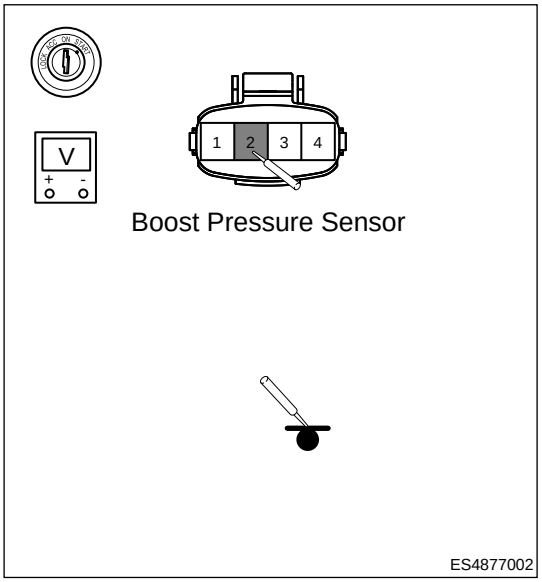
OK

2	**Check boost pressure/temperature sensor power supply circuit voltage**

(a) Turn ENGINE START STOP switch to ON and start engine.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Boost pressure/ temperature sensor (2) - Body ground	Always	5 V



NG → **Check and repair wire harness between boost pressure sensor and ECU.**

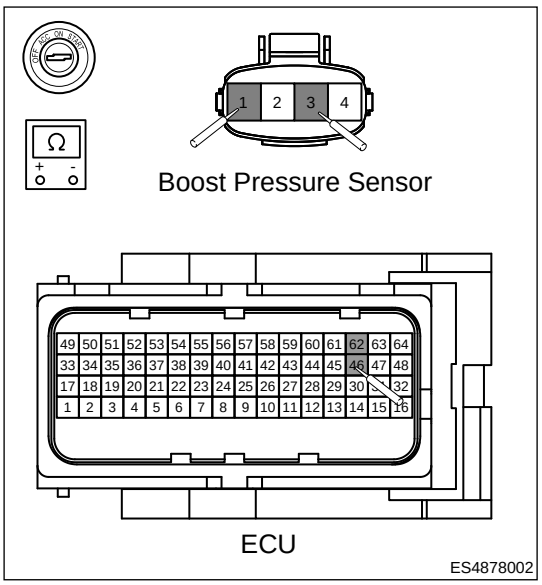
OK →

3	Check boost pressure/temperature sensor signal circuit

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Boost pressure/ temperature sensor (1) - ECU (46)	Always	Less than 1 Ω
Boost pressure/ temperature sensor (3) - ECU (62)	Always	Less than 1 Ω



NG → **Check and repair wire harness between boost pressure sensor and ECU.**

OK →

4	Check boost pressure/temperature sensor

(a) Check sensor connection part for debris and damage.

NG → **Clean or replace boost pressure/ temperature sensor.**

OK

5	Check boost relief valve

(a) Check boost relief valve for damage or poor connection.

NG → **Clean or replace boost relief valve.**

OK

6	Check exhaust gas by-pass valve

(a) Check exhaust by-pass valve for damage or poor connection.

NG → **Clean or replace exhaust by-pass valve.**

OK

7	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

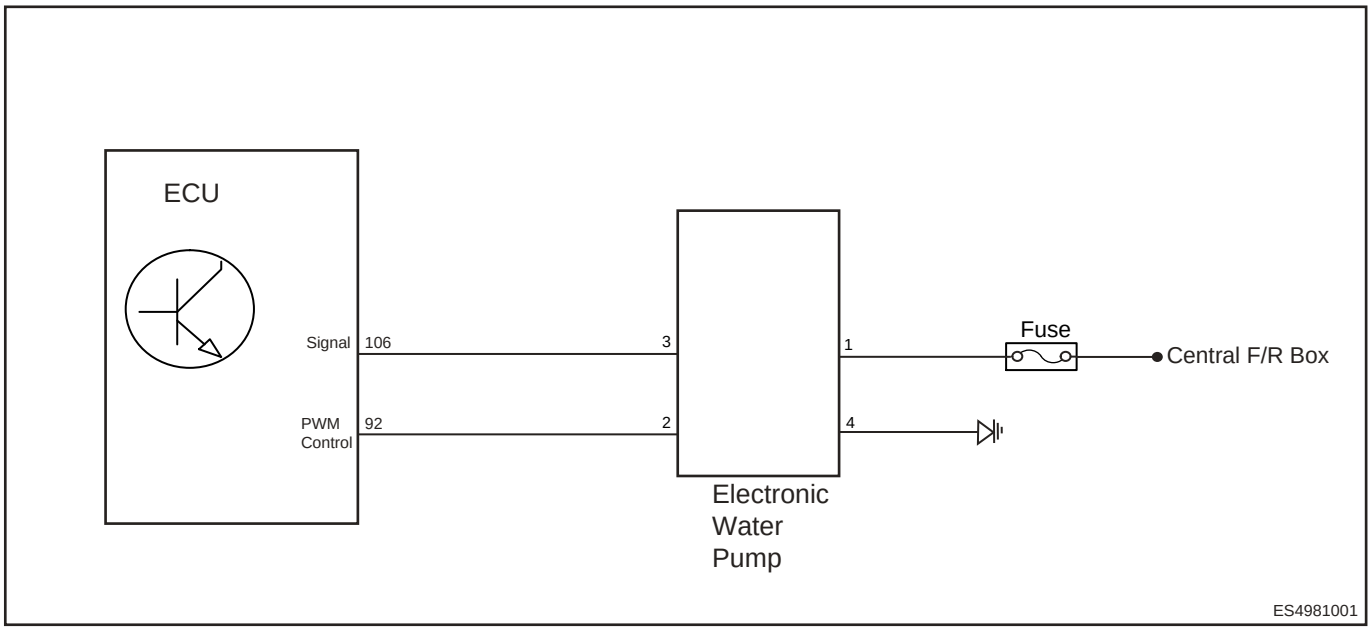
NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	P1301 00	Auxiliary Water Pump Dry Run Error
DTC	P261D 00	Coolant Pump "B" Control Circuit High
DTC	P261C 00	Coolant Pump "B" Control Circuit Low
DTC	P261A 00	Coolant Pump "B" Control Circuit Open
DTC	P1303 00	Auxiliary Water Pump Out Of Voltage Error
DTC	P1304 00	Auxiliary Water Pump Over Current
DTC	P1305 00	Auxiliary Water Pump Over Temperature Error
DTC	P1306 00	Auxiliary Water Pump Feedback Signal High
DTC	P1307 00	Auxiliary Water Pump Feedback Signal Low

DTC	P1308 00	Auxiliary Water Pump Stall Error
DTC	P1309 00	Auxiliary Water Pump Under Voltage

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P1-301 00	Auxiliary Water Pump Dry Run Error	/	/	/	/	• Electric Water Pump • Wire harness or connector • ECU	/	Engine malfunction light comes on
P2-61D 00	Coolant Pump "B" Control Circuit High	/	/	/	/		/	
P2-61C 00	Coolant Pump "B" Control Circuit Low	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P2-61A00	Coolant Pump "B" Control Circuit Open	/	/	/	/		/	
P1-30300	Auxiliary Water Pump Out Of Voltage Error	/	/	/	/		/	
P1-30400	Auxiliary Water Pump Over Current	/	/	/	/		/	
P1-30500	Auxiliary Water Pump Over Temperature Error	/	/	/	/		/	
P1-30600	Auxiliary Water Pump Feedback Signal High	/	/	/	/		/	
P1-30700	Auxiliary Water Pump Feedback	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Signal Low							
P1-30800	Auxiliary Water Pump Stall Error	/	/	/	/		/	
P1-30900	Auxiliary Water Pump Under Voltage	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

(a) Check if battery terminals are corroded or loose.
(b) Check battery voltage with a digital multimeter.

NG → **Check and repair battery.**

OK

2	**Check fuse**

(a) Check if electric water pump fuse is blown or no power.

NG → **Replace electric water pump fuse or check the cause for no power.**

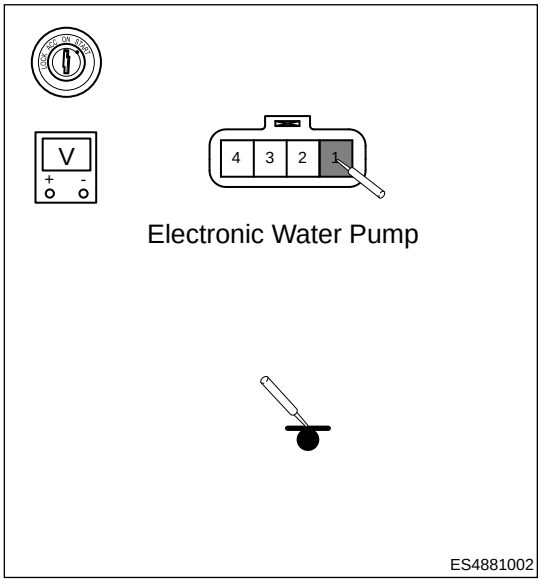
OK

3	**Check electric water pump power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Electric water pump (1) - Body ground	Always	12 V



NG → **Repair or replace wire harness between electric water pump terminal (1) and engine compartment fuse and relay box.**

OK →

4	Check electric water pump control circuit

(a) Turn ENGINE START STOP switch to OFF.

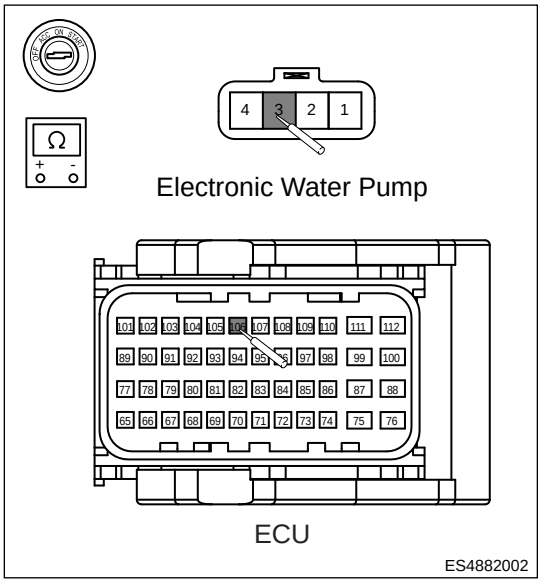
(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Electric water pump (3) - ECU (106)	Always	Less than 1 Ω

(c) Turn ENGINE START STOP switch to ON.

(d) Perform the resistance inspection

Multimeter Connection	Condition	Specified Condition
Electric water pump (3) or ECU (106) - Body ground	Always	∞
Electric water pump (3) or ECU (106) - Battery positive	Always	∞



NG → **Repair or replace wire harness or connector (ECU - electric water pump).**

OK

5	Check electric water pump signal feedback circuit

(a) Turn ENGINE START STOP switch to OFF.

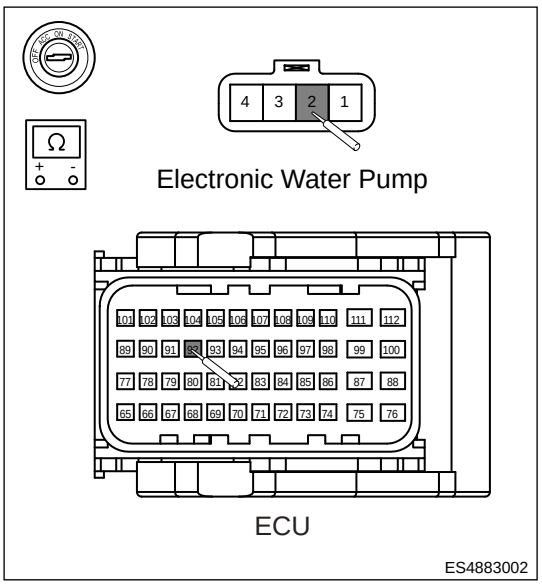
(b) Perform the resistance inspection

Multimeter Connection	Condition	Specified Condition
Electric water pump (2) - ECU (92)	Always	Less than 1 Ω

(c) Turn ENGINE START STOP switch to ON.

(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Electric water pump (2) or ECU (92) - Body ground	Always	∞
Electric water pump (2) or ECU (92) - Battery positive	Always	∞



NG → **Repair or replace wire harness or connector (ECU - electric water pump).**

OK

6	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

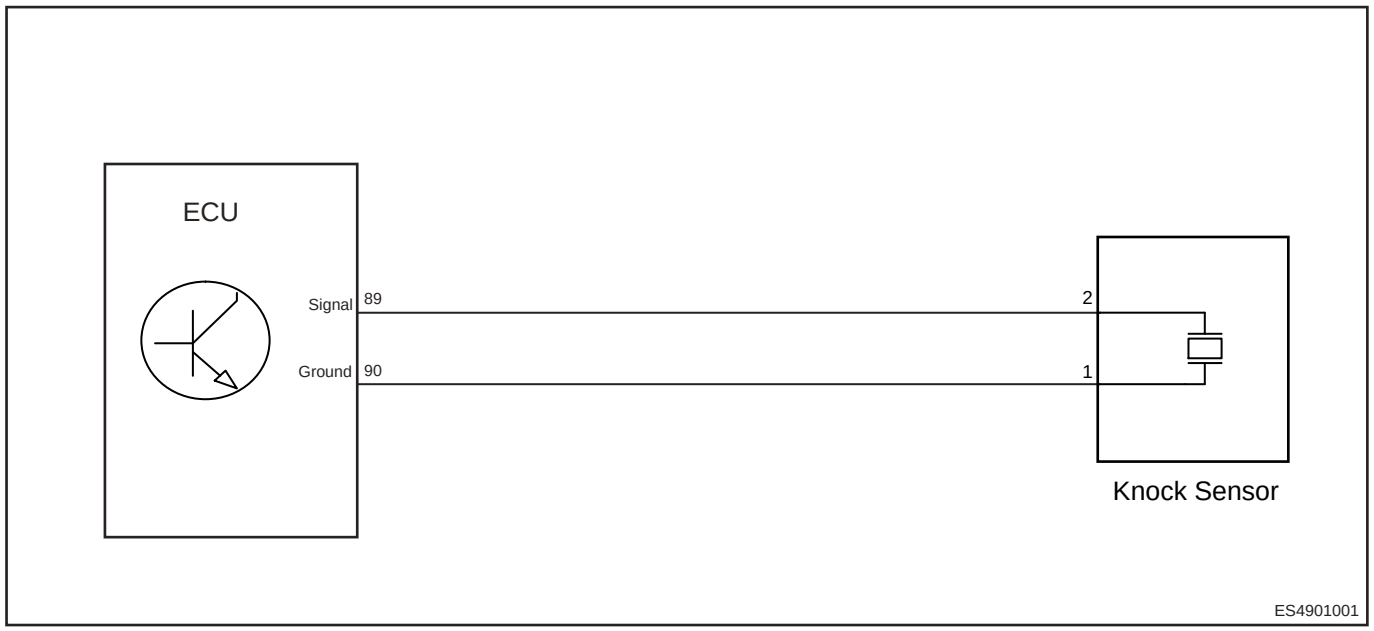
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0325 00**	**Knock Sensor Signal Circuit Voltage Too Low**
DTC	**P0328 00**	**Knock/Combustion Vibration Sensor 1 Circuit High Bank 1 or Single Sensor**
DTC	**P0327 00**	**Knock/Combustion Vibration Sensor 1 Circuit Low Bank 1 or Single Sensor**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P032500	Knock Sensor Signal Circuit Voltage Too Low	/	/	/	/	• Knock Sensor • Wire harness or connector • ECU	/	Engine malfunction light comes on
P032800	Knock/ Combustion Vibration Sensor 1 Circuit High Bank 1 or Single Sensor	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-32700	Knock/ Combustion Vibration Sensor 1 Circuit Low Bank 1 or Single Sensor	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

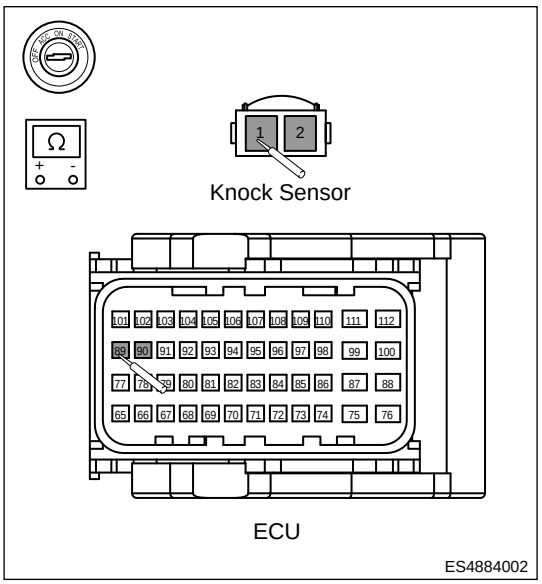
1	**Check knock sensor signal circuit**

(a) Disconnect ECU connector and knock sensor connector.

(b) Turn ENGINE START STOP switch to OFF.

(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
ECU (89) - Knock sensor (2)	Always	Less than 1 Ω
ECU (90) - Knock sensor (1)	Always	Less than 1 Ω



NG → **Repair or replace wire harness.**

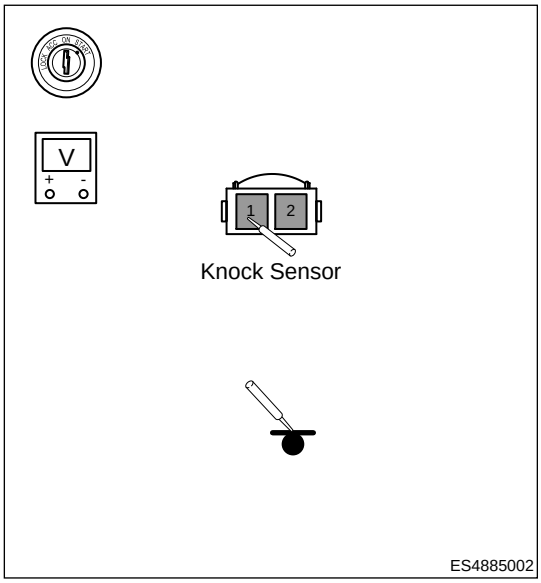
OK

2	Check knock sensor connector voltage

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Knock sensor (2) - Body ground	ENGINE START STOP switch ON	0 V
Knock sensor (1) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in knock sensor connector**

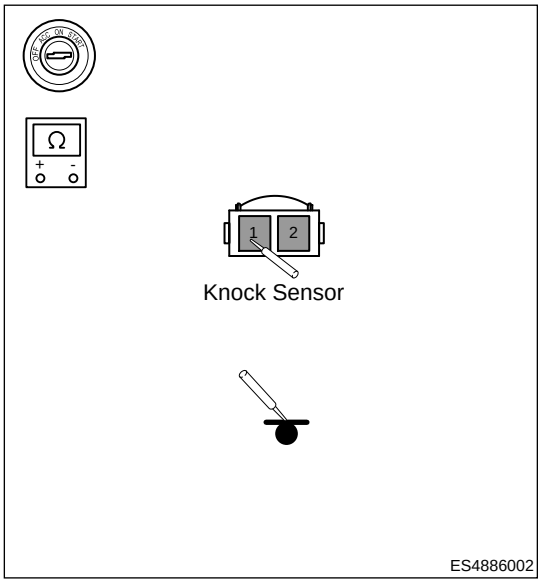
OK

3	Check knock sensor connector resistance

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Knock sensor (2) - Body ground	Always	∞
Knock sensor (1) - Body ground	Always	∞



NG → **Repair short fault to ground in knock sensor connector wire harness.**

OK

4	Check knock sensor connector

(a) Check if knock sensor connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK

5	Check knock sensor

(a) Check if knock sensor is normal.

NG → **Replace knock sensor.**

OK

6	Reconfirm DTCs

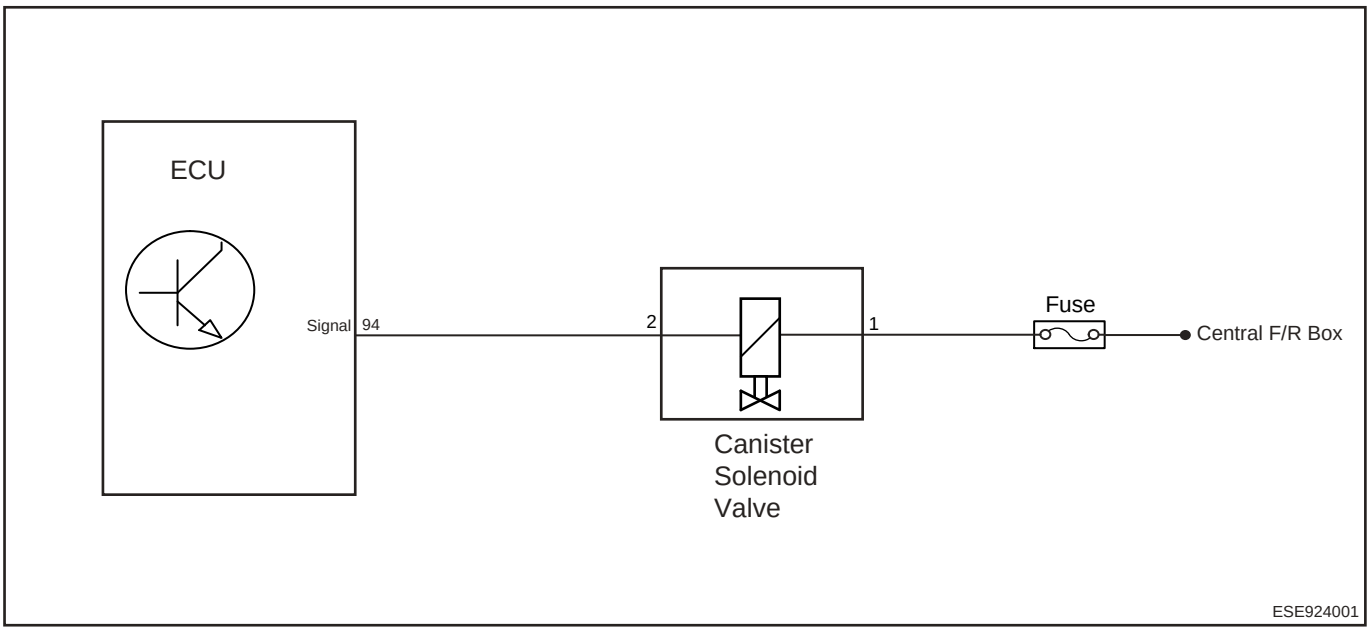
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P04F0 00**	**EVAP System High Pressure Purge Line Performance**
DTC	**P0496 00**	**EVAP System High Purge Flow**
DTC	**P0497 00**	**EVAP System Low Purge Flow**
DTC	**P0459 00**	**Evaporative Emission System Purge Control Valve Circuit High**
DTC	**P0458 00**	**Evaporative Emission System Purge Control Valve Circuit Low**
DTC	**P0444 00**	**Evaporative Emission System Purge Control Valve Circuit Open**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-4F000	EVAP System High Pressure Purge Line Performance	/	/	Ignition switch ON	/	• Canister Control Valve • Fuse • Wire harness or connector • ECU	/	Engine malfunction light comes on
P0-49600	EVAP System High Purge Flow	/	/		/		/	
P0-49700	EVAP System Low Purge Flow	/	/		/		/	
P0-45900	Evaporative Emission System	/	/		/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Purge Control Valve Circuit High							
P0-45800	Evaporative Emission System Purge Control Valve Circuit Low	/	/		/		/	
P0-44400	Evaporative Emission System Purge Control Valve Circuit Open	/	/		/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check if fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

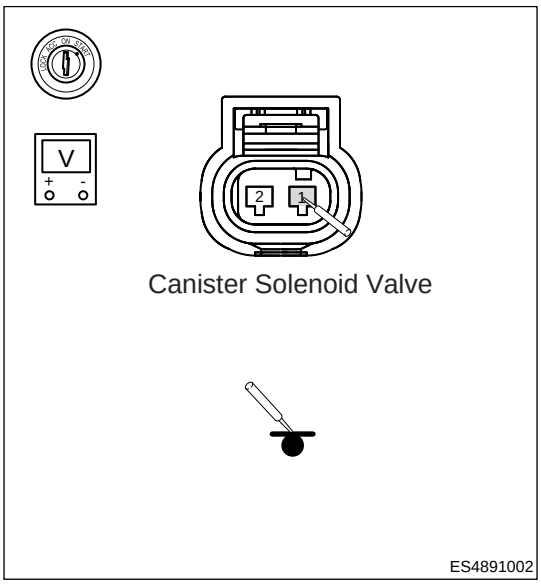
OK

2	**Check canister control valve power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Canister control valve (1) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair open fault in canister control valve power supply.**

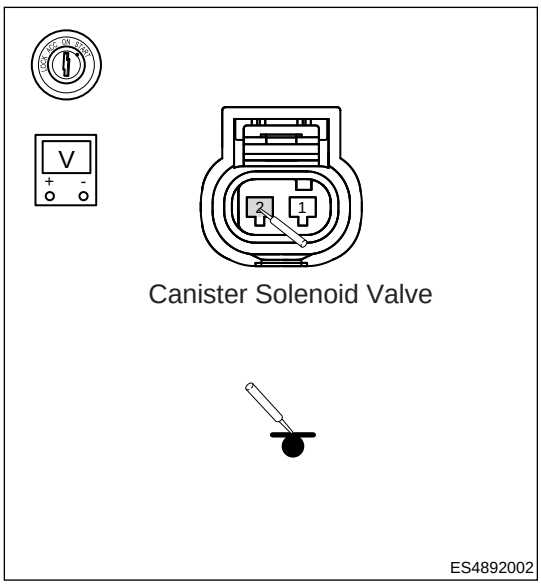
OK

3	**Check canister control valve control circuit**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Canister control valve (2) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in canister control valve control circuit.**

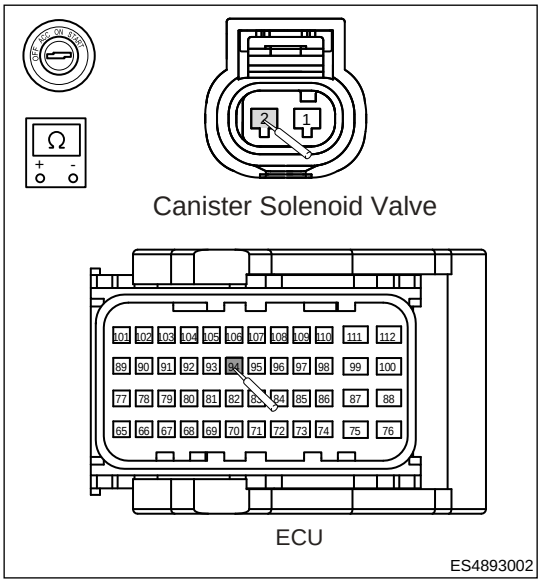
OK

4	**Check canister control valve control circuit**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Canister control valve (2) - ECU (94)	Always	Less than 1 Ω
Canister control valve (2) - Body ground	Always	∞



NG → **Repair canister control valve control circuit fault.**

OK

5	**Check canister control valve connector**

(a) Check if canister control valve connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK

6	**Check canister control valve**

(a) Disconnect the canister control valve.

(b) Check the canister control valve.

Battery Connection	Condition	Specified Condition
Power supply positive to canister control valve No. 1 pin – Power supply negative to canister control valve No. 2 pin	12 V not connected	Canister control valve is not venting
	12 V connected	Canister control valve is venting

NG → **Replace canister control valve.**

OK

7	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0442 00**	**EVAP System Leak Detected (Small Leak)**
DTC	**P0455 00**	**EVAP System Leak Detected (Large Leak)**

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-44200	EVAP System Leak Detected (-Small Leak)	/	/	0℃ < ambient temperature < 45℃, ratio of intake manifold pressure to ambient pressure < 0.6406, ambient pressure >= 70000 Pa, -4000 Pa < fuel tank pressure < 2000 Pa, 11 V < system voltage < 16 V, engine starting time > 700s, gas mixture is stable and there is no fault, engine idling control activated, vehicle speed <= 4 km/h, 2-0.5*1.5 L < fuel level < 45 +0.5*1.5 L, all fuel injectors activated, air-fuel ratio closed-loop control activated, mass and flow through canister valve meet the conditions, 0℃ < coolant temperature when engine starts < 45℃, engine starting time > 150s, delay time for	/	• Canister Control Valve • Canister Closed Valve • Fuel tank cap • Pipe • ECU	/	Engine malfunction light comes on
P0-45500	EVAP System Leak Detected (-Large Leak)	/	/		/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
				entering diagnosis when canister exits high load >= 20s				

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuel tank cap**

(a) Check if fuel tank cap is not tightened.

NG → **Tighten fuel tank cap.**

OK ↓

2	**Check canister control valve**

(a) Disconnect the canister control valve.
(b) Check the canister control valve.

Battery Connection	Condition	Specified Condition
Power supply positive to canister control valve No. 2 pin – Power supply negative to canister control valve No. 1 pin	12 V not connected	Canister control valve is not venting
	12 V connected	Canister control valve is venting

NG → **Replace canister control valve.**

OK ↓

3	**Check canister closed valve**

(a) Check if canister closed valve is normal.

NG → **Replace canister closed valve.**

OK

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	P0219 00	Engine Overspeed Condition

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0219 00	Engine Overspeed Condition	/	/	Engine starts	/	• Electronic Accelerator Pedal • Electronic Throttle • Speed Sensor • ECU	/	Engine malfunction light comes on

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	General inspection

(a) Check if the engine speed increased artificially beyond the maximum safe speed.

NG → **Clear DTCs.**

OK

2	Check electronic accelerator pedal

(a) Check if electronic accelerator pedal is in the maximum position, and cannot return to original position.

NG → **Replace electronic accelerator pedal.**

OK

3	Check electronic throttle

(a) Check if electronic throttle is stuck in the maximum position.

NG → **Replace electronic throttle.**

OK

4	Check speed sensor

(a) Check if speed sensor and speed calculation are correct.

NG → **Replace speed sensor.**

OK

5	Reconfirm DTCs

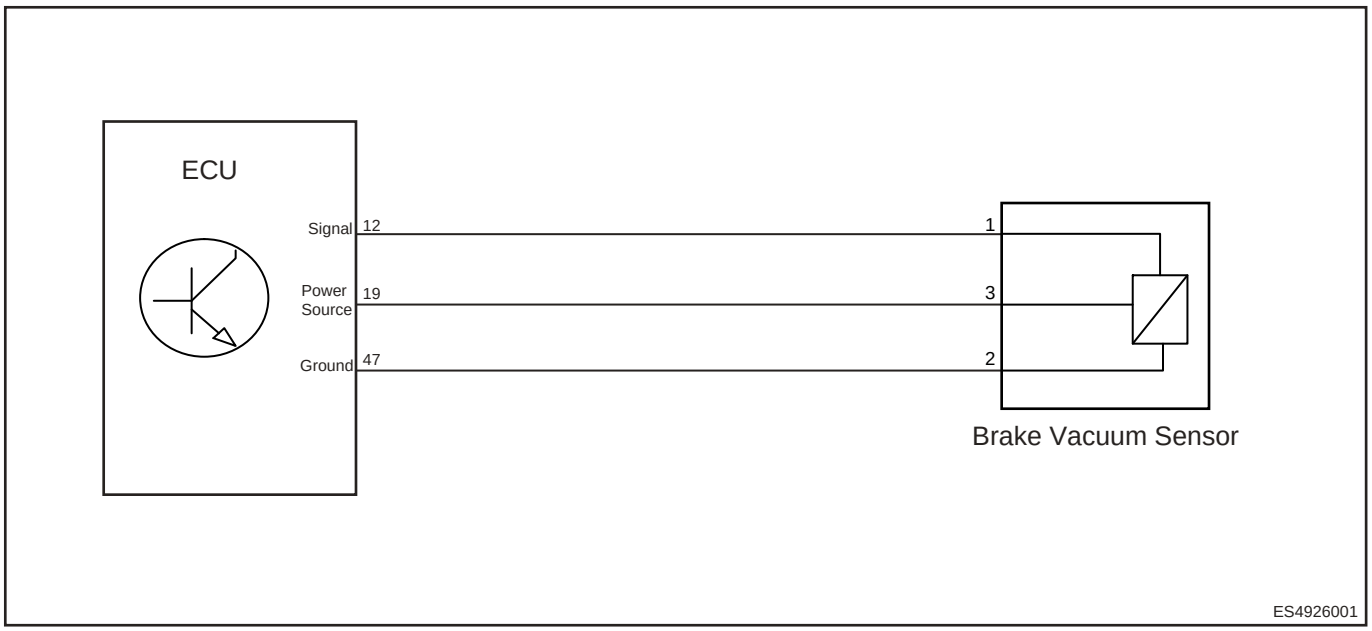
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0558 00**	**Brake Booster Pressure Sensor Circuit High**
DTC	**P0557 00**	**Brake Booster Pressure Sensor Circuit Low**
DTC	**P1450 00**	**Brake Booster Pressure Sensor Circuit Range/Performance (High)**
DTC	**P1451 00**	**Brake Booster Pressure Sensor Circuit Range/Performance (Low)**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P055800	Brake Booster Pressure Sensor Circuit High	/	/	Vehicle power-on	/	• Brake Vacuum Sensor • Wire harness or connector • ECU	/	Engine malfunction light comes on
P055700	Brake Booster Pressure Sensor Circuit Low	/	/		/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P1-45000	Brake Booster Pressure Sensor Circuit Range/ Performance (High)	/	/		/		/	
P1-45100	Brake Booster Pressure Sensor Circuit Range/ Performance (Low)	/	/		/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

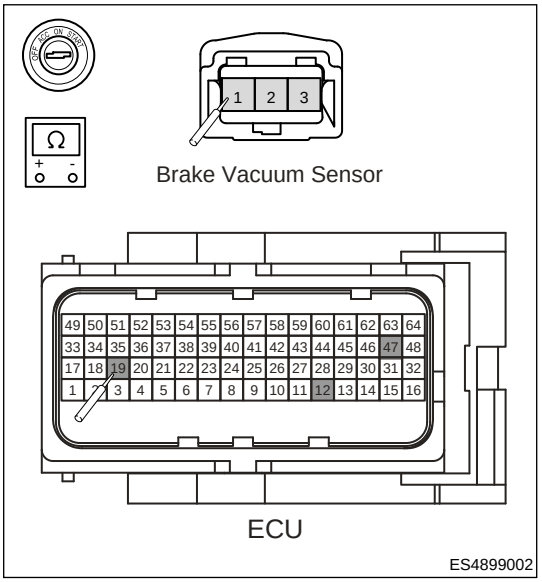
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check brake vacuum sensor wire harness**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Brake vacuum sensor (1) - ECU (12)	Always	Less than 1 Ω
Brake vacuum sensor (2) - ECU (47)	Always	Less than 1 Ω
Brake vacuum sensor (3) - ECU (19)	Always	Less than 1 Ω



NG → **Repair open fault in brake vacuum sensor wire harness.**

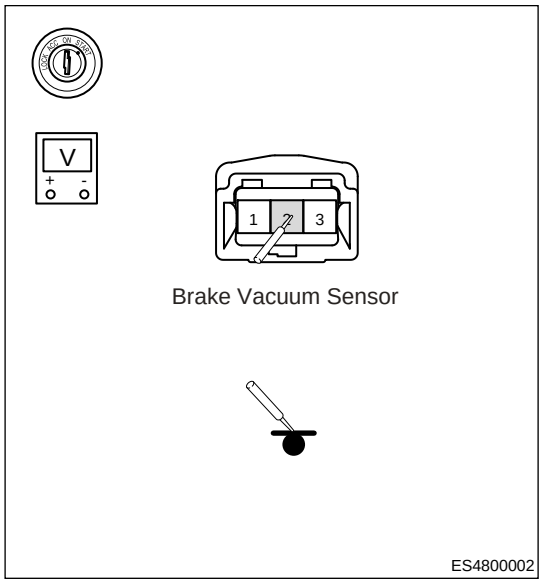
OK →

2	Check voltage between brake vacuum sensor wire harness and ground

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Brake vacuum sensor (2) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in brake vacuum sensor wire harness.**

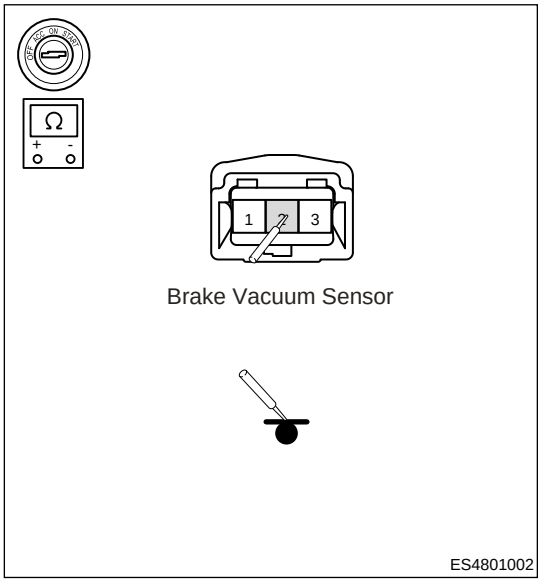
OK →

3	Check resistance between brake vacuum sensor wire harness and ground

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Brake vacuum sensor (2) - Body ground	Always	⩽ 1 Ω



NG → **Repair short fault to ground in brake vacuum sensor wire harness.**

OK ↓

4	Check brake vacuum sensor connector

(a) Check if brake vacuum sensor connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK ↓

5	Check brake vacuum sensor

(a) Check if brake vacuum sensor is normal.

NG → **Replace brake vacuum sensor.**

OK ↓

6	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	P0571 00	Brake Signal Synchronization Error

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0571 00	Brake Signal Synchronization Error	/	/	Brake switch malfunction counter > 20	/	• Brake Switch	/	Engine malfunction light does not come on

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check fuse

(a) Check if fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

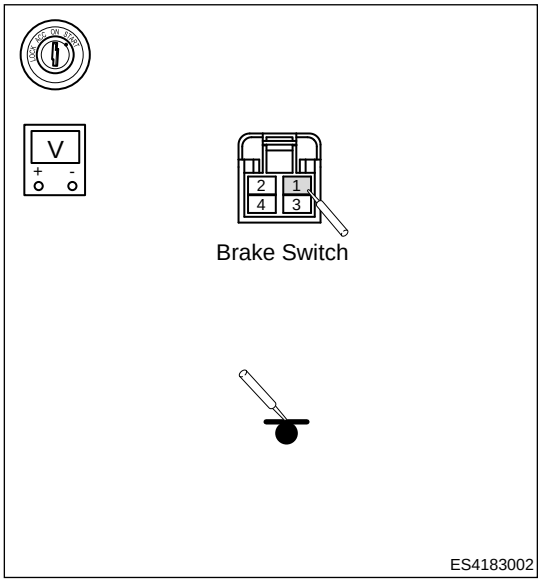
OK

2	Check brake switch power supply circuit

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Brake switch (1) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair open fault in brake switch power supply circuit.**

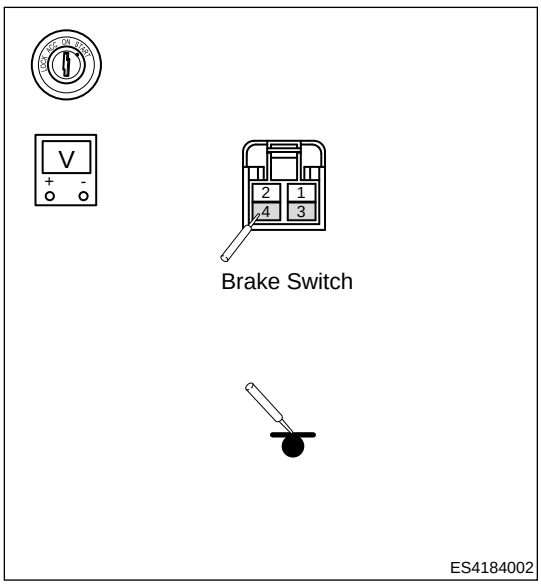
OK →

3	**Check voltage of brake switch signal wire harness**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Brake switch (3) - Body ground	ENGINE START STOP switch ON	0 V
Brake switch (4) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in brake switch signal wire harness.**

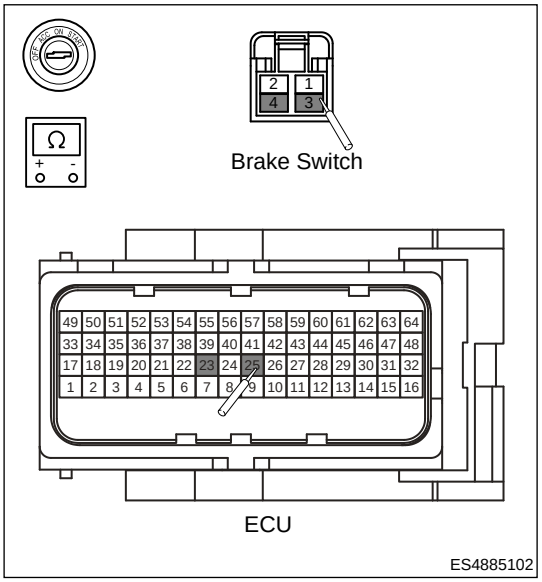
OK →

4	**Check brake switch signal wire harness resistance**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Brake switch (3) - ECU (25)	Always	Less than 1 Ω
Brake switch (4) - ECU (23)	Always	Less than 1 Ω



NG → **Repair open fault in brake switch signal wire harness.**

OK ↓

5	Check brake switch connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace connector.**

OK ↓

6	Check brake switch

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect brake switch connector and check resistance.

Multimeter Connection	Condition	Specified Condition
Brake switch pin 1 - Brake switch pin 3	Not depressed	∞
	Depressed	Less than 1 Ω
Brake switch pin 2 - Brake switch pin 4	Not depressed	Less than 1 Ω
	Depressed	∞

NG → **Replace brake switch.**

OK ↓

7	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

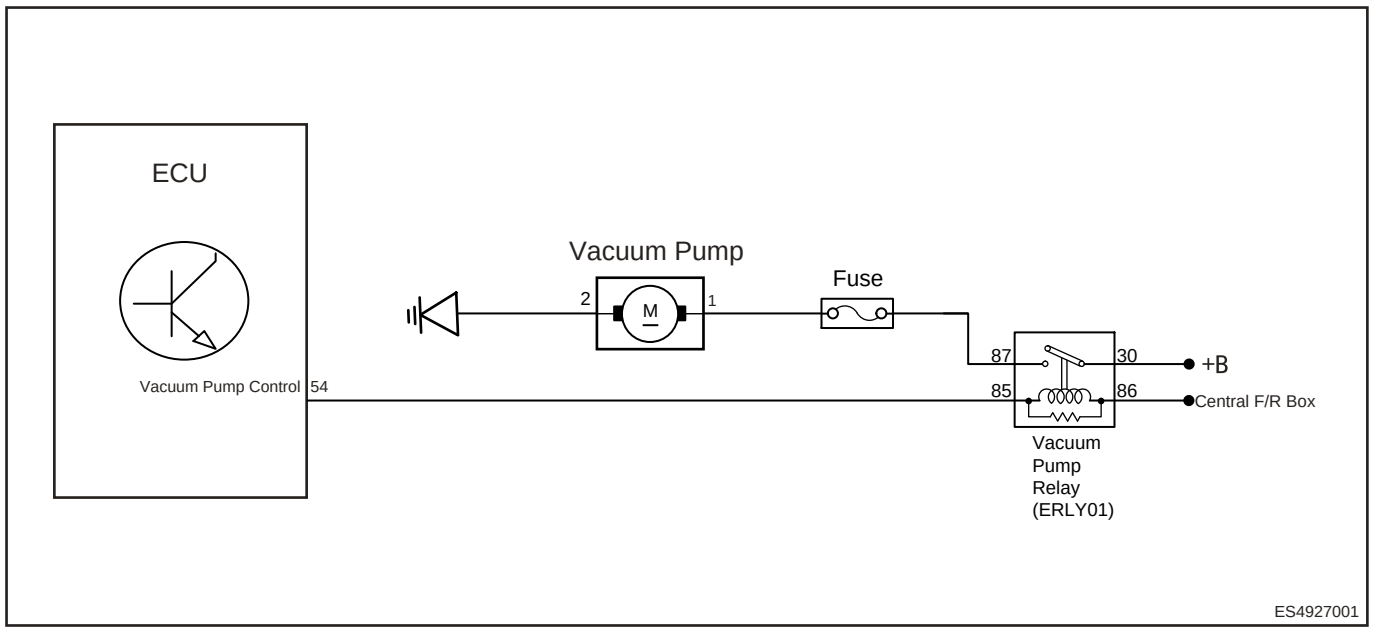
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P258D 00**	**Vacuum Pump Control Circuit "A" High**
DTC	**P258C 00**	**Vacuum Pump Control Circuit "A" Low**
DTC	**P258A 00**	**Vacuum Pump Control Circuit Open**
DTC	**P050F 00**	**Brake Assist Vacuum Too Low**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P2-58D00	Vacuum Pump Control Circuit "A" High	/	/	Ignition switch is turned ON, 9 V> battery voltage<= 16 V	/	• Brake vacuum pump • Wire harness or connector • ECU • Battery	/	Engine malfunction light comes on
P2-58C00	Vacuum Pump Control Circuit "A" Low	/	/		/		/	
P2-58A00	Vacuum Pump Control Circuit Open	/	/		/		/	
P0-50F00	Brake Assist Vacuum Too Low	/	/		/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check vacuum pump relay and fuse**

(a) Check if fuse is blown or no power.

(b) Check if relay terminal is corroded or broken.

(c) Directly apply battery voltage to 2 relay control terminals, check if relay closes.

NG → **Repair or replace fuse or relay or check the cause for no power.**

OK

2	Check electric vacuum pump connector

(a) Check if electric vacuum pump connector is loose or in poor contact.

NG → **Repair or replace connector.**

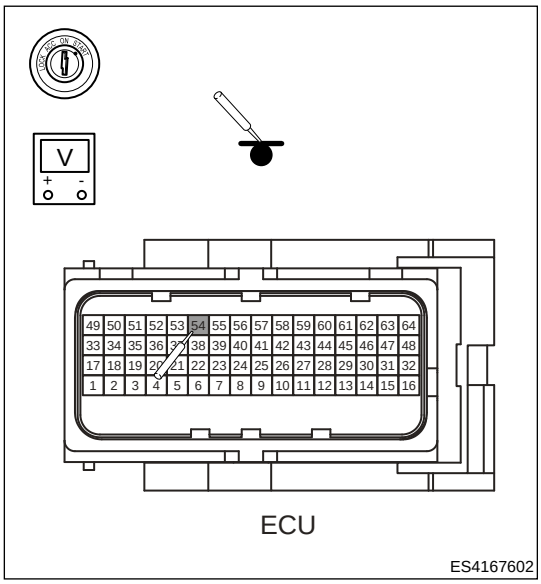
OK

3	Check electric vacuum pump control circuit

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
ECU (54) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in vacuum pump relay control circuit.**

OK

4	Check vacuum pump relay control circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Vacuum pump relay (85) - ECU (54)	Always	Less than 1 Ω
Vacuum pump relay (85) - Body ground	Always	∞

NG → **Repair vacuum pump relay control circuit fault.**

OK

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P2123 00**	**Pedal Pos.Sensor 1 Circ. High Input**
DTC	**P2122 00**	**Throttle/Pedal Position Sensor/Switch "D" Circuit Low**
DTC	**P2127 00**	**Throttle/Pedal Position Sensor/Switch "E" Circuit Low**
DTC	**P2128 00**	**Throttle/Pedal Position Sensor/Switch "E" Circuit High**
DTC	**P2138 00**	**Throttle/Pedal Position Sensor/Switch "D" / "E" Voltage Correlation**

Control Schematic Diagram

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P2-12300	Pedal Pos. Sensor 1 Circ. High Input	/	/	Power-on	/	• Electronic Accelerator Pedal • Wire harness or connector • ECU	/	Engine malfunction light comes on
P2-12200	Throttle/ Pedal Position Sensor/ Switch “D” Circuit Low	/	/		/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check electronic accelerator pedal position sensor

(a) Check if electronic accelerator pedal position sensor is connected normally.

NG → **Reinstall or repair, replace connector.**

OK ↓

2	Clear and read DTCs again

(a) Connect diagnostic tester, and then turn ENGINE START STOP switch to ON.

(b) Clear DTCs, and then slowly and quickly depress the accelerator pedal several times.

OK → **End.**

NG ↓

3	Read data flow of accelerator pedal voltage signal

(a) Connect diagnostic tester connector, read data flow of accelerator pedal 1 and 2 voltage signal.

(b) Then slowly depress the accelerator pedal, observe if the voltage values displayed on two digital multimeters change with the depression amount of accelerator pedal.

NG → **Repair or replace wire harness corresponding to unchanged voltage signal.**

OK ↓

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P2177 00**	**System Too Lean Off Idle Bank 1**
DTC	**P2178 00**	**System Too Rich Off Idle Bank 1**

DTC	P2187 00	System Too Lean at Idle Bank 1
DTC	P2188 00	System Too Rich at Idle Bank 1

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P2177 00	System Too Lean Off Idle Bank 1	/	/	The self-learning factor exceeds the threshold.	/	• Oil supply system • Intake system • Ignition system • Upstream Oxygen Sensor • Downstream Oxygen Sensor • Wire harness or connector • ECU	/	Engine malfunction light comes on
P2178 00	System Too Rich Off Idle Bank 1	/	/		/		/	
P2187 00	System Too Lean at Idle Bank 1	/	/		/		/	
P2188 00	System Too Rich at Idle Bank 1	/	/		/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check oil supply system

(a) Check if fuel system is normal.

NG → **Repair oil supply system.**

OK

2	**Check gasoline**

(a) Check if gasoline number is normal.

NG → **Replace gasoline.**

OK

3	**Check fuel injector**

(a) Check fuel injector for leakage or blockage.

NG → **Replace fuel injector.**

OK

4	**Check ignition system**

(a) Check if ignition coil and spark plug work normally.

NG → **Repair or replace ignition coil or spark plug.**

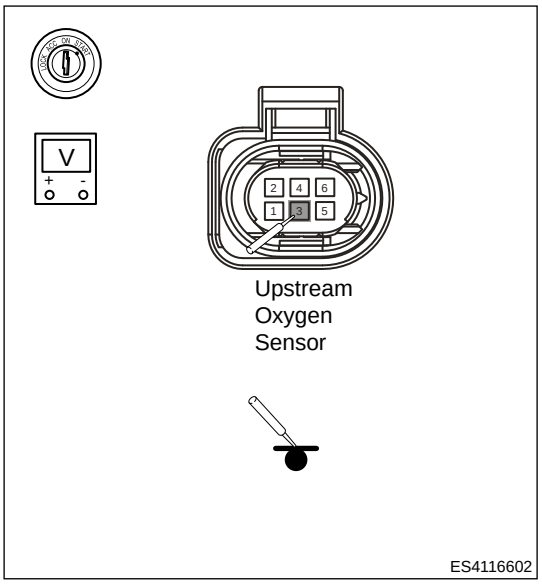
OK

5	**Check upstream oxygen sensor heater power supply voltage**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Upstream oxygen sensor (3) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Check wire harness between upstream oxygen sensor (3) and main relay**

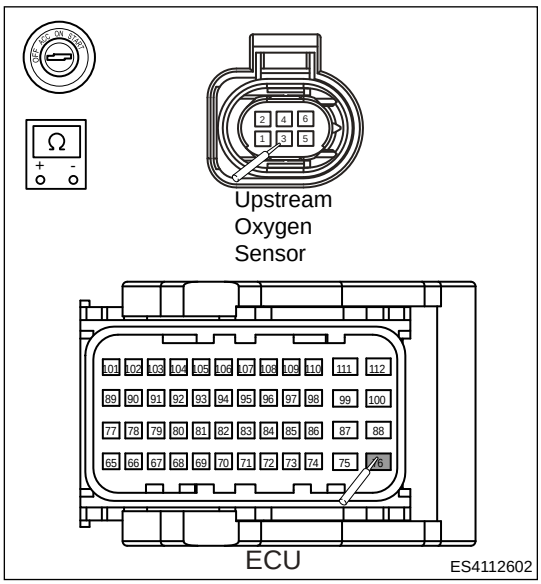
OK

6	**Check upstream oxygen sensor heater wire harness**

(a) Disconnect the upstream oxygen sensor connector.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Upstream oxygen sensor (3) - ECU (76)	Always	Less than 1 Ω



NG → **Repair or replace wire harness.**

OK

7	**Check upstream oxygen sensor heater resistance**

(a) Disconnect the upstream oxygen sensor connector.

(b) Disconnect the ECU connector.

(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Upstream oxygen sensor (3) - Upstream oxygen sensor (4)	At room temperature	4 - 5 Ω

NG → **Replace oxygen sensor**

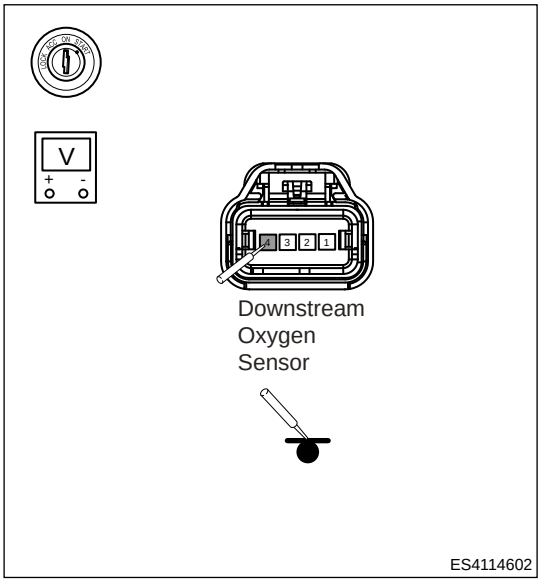
OK

8	**Check downstream oxygen sensor power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Downstream oxygen sensor (4) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair short fault to power supply in downstream oxygen sensor signal circuit.**

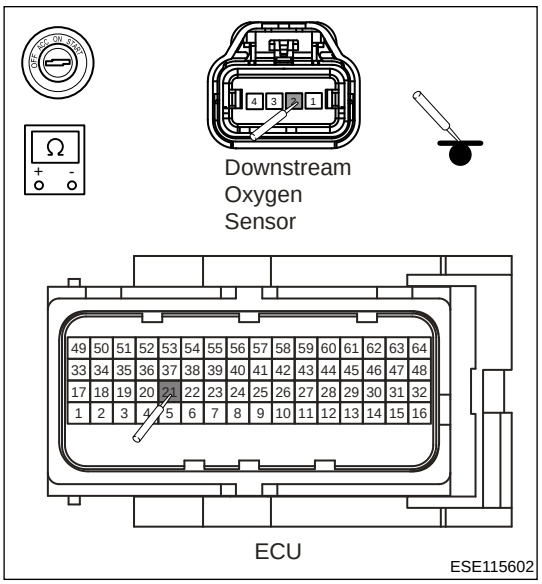
OK →

9	Check downstream oxygen sensor signal circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Downstream oxygen sensor (2) - ECU (21)	Always	Less than 1 Ω
Downstream oxygen sensor (2) - Body ground	Always	∞



NG → **Repair downstream oxygen sensor signal circuit fault.**

OK →

10	Check downstream oxygen sensor connector

(a) Check if downstream oxygen sensor connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK ↓

11	**Check downstream oxygen sensor signal voltage changes in dynamic condition**

(a) Start vehicle and run it until coolant temperature reaches normal value, then keep the engine idling.

(b) Reconnect oxygen sensor connector, measure if voltage between downstream oxygen sensor wire harness 1 and 2 jumps between 0 V and 1 V, and changes 5 to 8 times within 10 seconds.

Multimeter Connection	Condition	Specified Condition
Downstream oxygen sensor 1 - Downstream oxygen sensor 2	Always	0 V -1 V (change 5 to 8 times within 10 seconds)

NG → **Replace downstream oxygen sensor.**

OK ↓

12	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0480 00**	**Fan 1 Control Circuit**
DTC	**P0691 00**	**Fan 1 Control Circuit Low**
DTC	**P0692 00**	**Fan 1 Control Circuit High**

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-48000	Fan 1 Control Circuit	/	/	/	/	• Cooling fan low speed control relay • Wire harness or connector • ECU	/	Engine malfunction light comes on
P0-69100	Fan 1 Control Circuit Low	/	/	/	/		/	
P0-69200	Fan 1 Control Circuit High	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check cooling fan fuse**

(a) Check if cooling fan fuse is blown or no power.

NG → **Replace fuse or check the cause for no power.**

OK

2	**Check cooling fan control relay power supply voltage**

(a) Measure voltage of cooling fan low speed control relay connector terminal (using a digital multimeter).
(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Fan relay 1 (1) - Body ground	Always	12 V

NG → **Repair or replace engine compartment fuse and relay box.**

OK ↓

3	**Check cooling fan control circuit**

(a) Disconnect the cooling fan ECU connector.
(b) Disconnect the cooling fan motor connector.
(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
ECU (56) - Fan relay 2 (4)	Always	Less than 1 Ω

(d) Check for short to ground in ECU terminal corresponding to cooling fan.
(e) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
ECU (56) - Body ground	Always	∞

NG → **Repair or replace ECU.**

OK ↓

4	**Check circuit between cooling fan and engine compartment fuse and relay box**

(a) Disconnect the cooling fan connector.
(b) Check circuit between cooling fan and engine compartment fuse and relay box.
(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Cooling fan (2) - B-145	Always	Less than 1 Ω

(d) Check for short to ground in circuit between cooling fan and engine compartment fuse and relay box.
(e) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Cooling fan (2) or B-145 - Body ground	Always	∞

NG → **Repair or replace ECU.**

OK

5	Check cooling fan motor

(a) Directly apply battery voltage to cooling fan motor, check if cooling fan motor operates (do not run the motor in dry state or water for a long time).

NG → **Repair or replace cooling fan motor.**

OK

6	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0481 00**	**Fan 2 Control Circuit**
DTC	**P0693 00**	**Fan 2 Control Circuit Low**
DTC	**P0694 00**	**Fan 2 Control Circuit High**

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0480 00	Fan 2 Control Circuit	/	/	/	/	• Cooling fan high speed control relay • Wire harness or connector • ECU	/	Engine malfunction light comes on
P0693 00	Fan 2 Control Circuit Low	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-69400	Fan 2 Control Circuit High	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check cooling fan fuse**

(a) Check if cooling fan fuse is blown or no power.

NG → **Replace fuse or check the cause for no power.**

OK ↓

2	**Check cooling fan control relay power supply voltage**

(a) Measure voltage of cooling fan high speed control relay connector terminal (using a digital multimeter).
(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Fan relay 1 (4) - Body ground	ENGINE START STOP switch ON	12 V

NG → **Repair or replace engine compartment fuse and relay box.**

OK ↓

3	**Check cooling fan control circuit**

(a) Disconnect the cooling fan ECU connector.
(b) Disconnect the cooling fan motor connector.
(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Cooling fan (51) - Fan relay 2 (1)	Always	Less than 1 Ω

(d) Check for short to ground in ECU terminal corresponding to cooling fan.
(e) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Cooling fan (51) - Body ground	Always	∞

NG → **Repair or replace ECU.**

OK ↓

4	Check circuit between cooling fan and engine compartment fuse and relay box

(a) Disconnect the cooling fan connector.
(b) Check circuit between cooling fan and engine compartment fuse and relay box.
(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Cooling fan (3) - B-146	Always	Less than 1 Ω

(d) Check for short to ground in circuit between cooling fan and engine compartment fuse and relay box.
(e) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
B-146 or cooling fan (3) - Body ground	Always	∞

NG → **Repair or replace ECU.**

OK ↓

5	Check cooling fan motor

(a) Directly apply battery voltage to cooling fan motor, check if cooling fan motor operates (do not run the motor in dry state or water for a long time).

NG → **Repair or replace cooling fan motor.**

OK

6	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

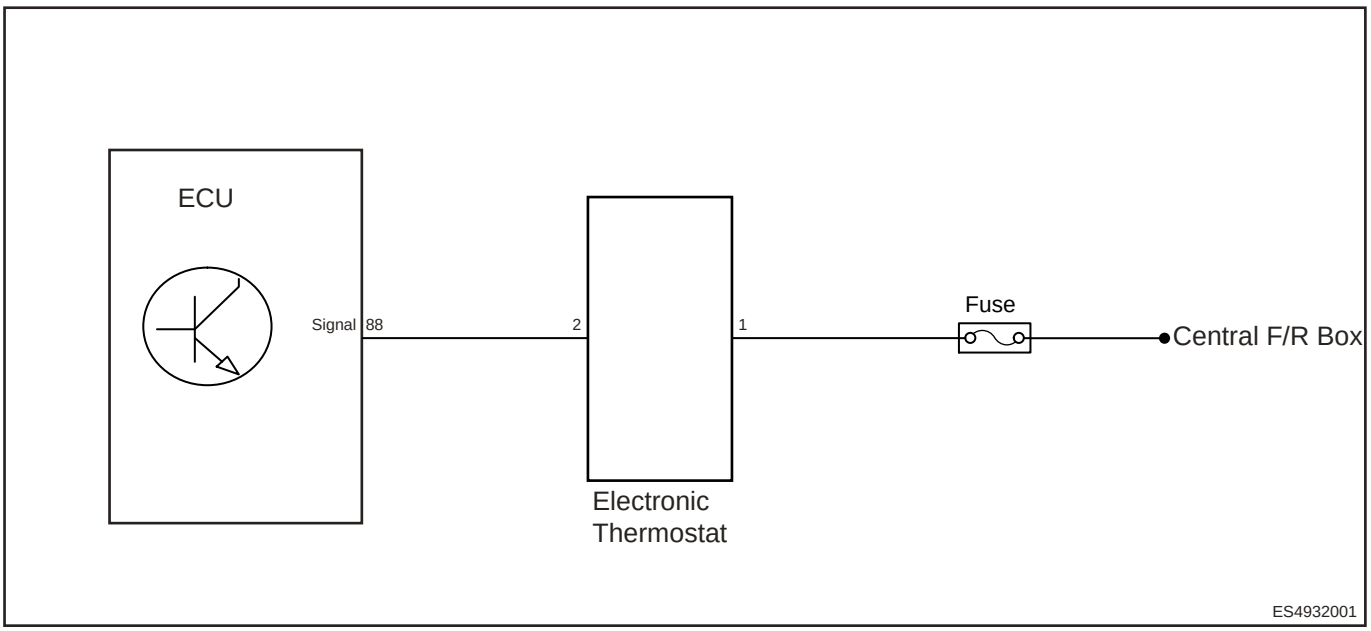
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0597 00**	**Thermostat Heater Control Circuit Open**
DTC	**P0599 00**	**Thermostat Heater Control Circuit High**
DTC	**P0598 00**	**Thermostat Heater Control Circuit Low**
DTC	**P0128 00**	**Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-59700	Thermostat Heater Control Circuit Open	/	/	ECU is power-on, 9 V < battery voltage ⩽ 16 V, shutting off path inspection is completed, drive level is in operating status, 2 driving cycles, idlingSpeed > 400 rpm, duration after vehicle power-on < 1800 s, ambient temperature ⩾ - 10 °C, -10°C ⩽ coolant temperature at initial start ⩽ calibration amount 58°C	/	• Electronic Thermostat • Coolant Temperature Sensor • ECU	/	Engine malfunction light comes on
P0-59900	Thermostat Heater Control Circuit High	/	/		/		/	
P0-59800	Thermostat Heater Control Circuit Low	/	/		/		/	
P0-12800	Coolant Thermostat (-Coolant Temperature Below Thermostat Regulating Temperature)	/	/		/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

(a) Check if battery terminals are corroded or loose.
(b) Check battery voltage (Not less than 12 V) with a digital multimeter.

NG → **Check and repair battery.**

OK ↓

2	**Check electronic thermostat fuse**

(a) Check if fuse is blown or no power.

NG → **Replace fuse or check the cause for no power.**

OK ↓

3	**Check electronic thermostat connector**

(a) Check if electronic thermostat connector is loose or in poor contact.

NG → **Repair or replace connector.**

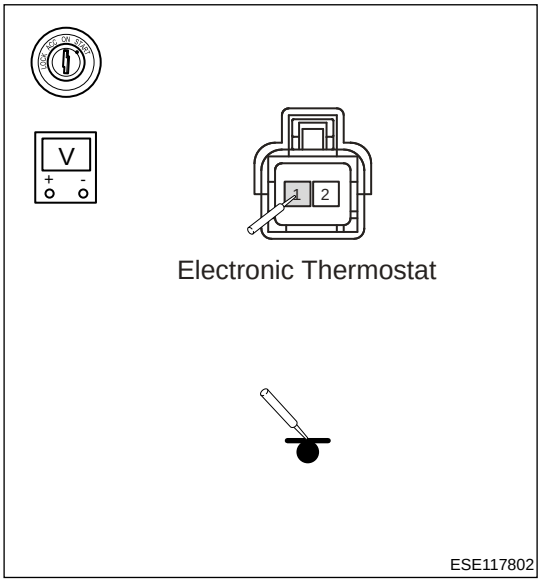
OK ↓

4	**Check electronic thermostat power supply voltage**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Electronic thermostat (1) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair wire harness fault of electronic thermostat power supply.**

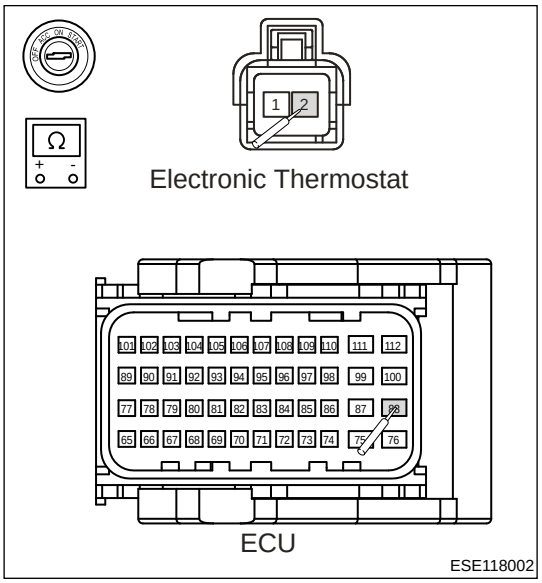
OK →

5	Check electronic thermostat control circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
ECU (88) - Electronic thermostat (2)	Always	Less than 1 Ω



NG → **Replace wire harness or connector.**

OK →

6	Check electronic thermostat

(a) Measure resistance of electronic thermostat, and check for short or open in it.

NG → **Replace electronic thermostat.**

OK

7	**Reconfirm DTCs**

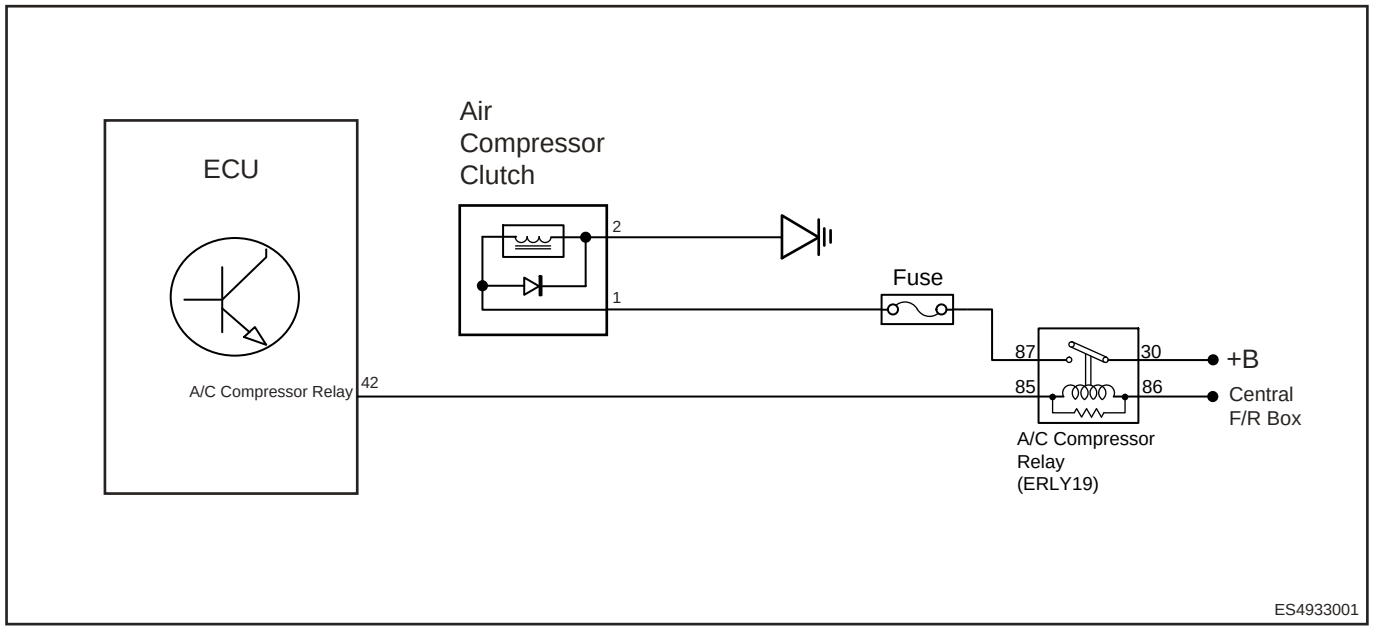
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0645 00**	**A/C Compressor Relay Control Circuit**
DTC	**P0647 00**	**A/C Compressor Relay Control Circuit High**
DTC	**P0646 00**	**A/C Compressor Relay Control Circuit Low**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P064500	A/C Compressor Relay Control Circuit	/	/	Ignition switch is turned ON, 9 V> battery voltage<= 16 V	/	• A/C compressor relay. • Wire harness or connector • ECU • Battery	/	Engine malfunction light does not come on
P064700	A/C Compressor Relay Control Circuit High	/	/		/		/	
P064600	A/C Compressor Relay Control Circuit Low	/	/		/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check A/C compressor relay**

(a) Check if A/C compressor relay is normal.

NG → **Replace A/C compressor relay**

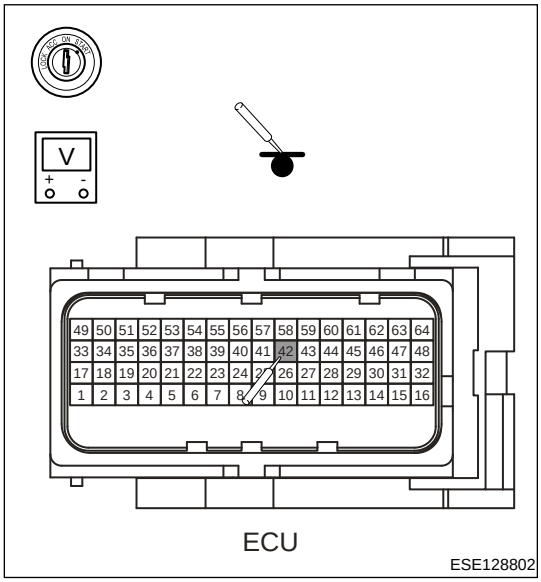
OK ↓

2	**Check compressor control circuit**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
ECU (42) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in compressor relay control circuit.**

OK →

3	Check compressor relay control circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Relay (85) - ECU (42)	Always	Less than 1 Ω
Relay (85) - Body ground	Always	∞

NG → **Repair compressor relay control circuit fault.**

OK →

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0560 00**	**System Voltage Unstable**
DTC	**P0562 00**	**System Voltage Low**
DTC	**P0563 00**	**System Voltage High**

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0560 00	System Voltage Unstable	/	/	Vehicle speed > 20 s, time after starting > 180 s	/	• Generator • Battery • ECU	/	Engine malfunction light comes on

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Checking Alternator**

(a) Check if alternator voltage is between 12 and 14 V.

NG → **Replace generator.**

OK

2	**Check battery**

(a) Check if battery is leaking or damaged.

NG → **Replace battery.**

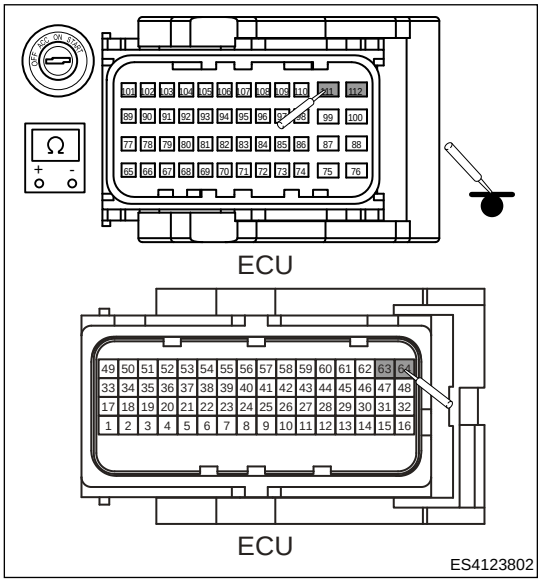
OK

3	**Check ECU ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Battery Connection	Condition	Specified Condition
ECU (63) - Body ground	Always	Less than 1 Ω
ECU (64) - Body ground	Always	Less than 1 Ω
ECU (111) - Body ground	Always	Less than 1 Ω
ECU (112) - Body ground	Always	Less than 1 Ω



NG → **Repair open fault in ECU ground wire harness.**

OK →

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**U0073 88**	**Control Module Communication Bus "A" Off**
DTC	**U0101 87**	**Lost Communication with TCM**
DTC	**U0126 87**	**Lost Communication with SAM**
DTC	**U0129 87**	**Lost Communication with ESP Module**
DTC	**U0140 87**	**Lost Communication with BCM**
DTC	**U0151 87**	**Lost Communication with Restraints Control Module**
DTC	**U0155 87**	**Lost Communication with ICM**
DTC	**U0164 87**	**Lost Communication With CLM**
DTC	**U0214 87**	**Lost Communication with Passive Entry Passive Start (PEPS)**

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
U007388	Control Module Communication Bus "A" Off	/	/	ENGINE START STOP switch ON, power-on time > 2.5s, 8.95 V + 0.09 V < battery voltage < 16.02V +0.09 V	/	• Wire harness or connector • CAN fault	/	Engine malfunction light comes on
U010187	Lost Communication with TCM	/	/		/		/	
U012687	Lost Communication with SAM	/	/		/		/	
U012987	Lost Communication with ESP Module	/	/		/		/	
U014087	Lost Communication with BCM	/	/		/		/	
U015187	Lost Communication with Restraints Control Module	/	/		/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
U0-15587	Lost Communication with ICM	/	/		/		/	
U0-16487	Lost Communication With CLM	/	/		/		/	
U0-21487	Lost Communication with Passive Entry Passive Start (PEPS)	/	/		/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**(Refer to CAN system)**

DTC	**P1212 00**	**Vehicle Speed Sensor "A" Circuit Range/Performance**
DTC	**P0503 00**	**Vehicle Speed Sensor "A" Circuit Intermittent/Erratic/High**
DTC	**P0500 00**	**Vehicle Speed Sensor "A" Circuit**
DTC	**P0501 66**	**Vehicle Speed Sensor "A" Circuit Range/Performance**
DTC	**P0501 65**	**Vehicle Speed Sensor "A" Circuit Range/Performance**

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P1-21200	Vehicle Speed Sensor "A" Circuit Range/ Performance	/	/	Starting completed	/	• ESP • CAN line	/	Engine malfunction light comes on
P0-50300	Vehicle Speed Sensor "A" Circuit Intermittent/ Erratic/ High	/	/	10 km/h < vehicle speed < 250km/h	/		/	
P0-50000	Vehicle Speed Sensor "A" Circuit	/	/		/		/	
P0-50166	Vehicle Speed Sensor "A" Circuit Range/ Performance	/	/	Fuel cut-off, engine coolant >-10℃, 1520 rpm ⩽ engine speed ⩽ 4000 rpm	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P050165	Vehicle Speed Sensor "A" Circuit Range/ Performance	/	/	Engine coolant temperature > -10 ℃, all intake valves are in activated states and two camshaft cycles have elapsed after fuel cut-off, engine speed > 2000 rpm, intake load > 86.25%	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check CAN signal sent by ESP**

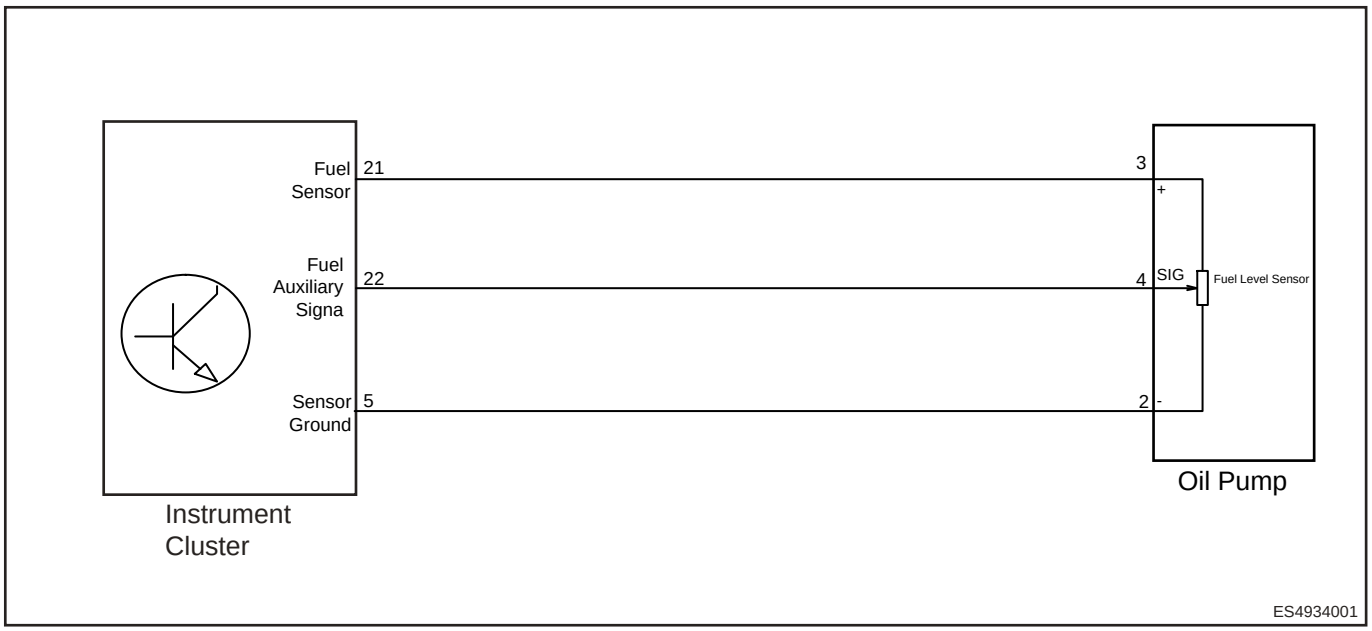
(a) Check if CAN signal sent by ESP is too high.

NG → **Replace ESP.**

OK → **Check CAN communication system**

DTC	**P0460 00**	**Fuel Level Sensor "A" Circuit**
DTC	**P0461 29**	**Fuel Level Sensor "A" Circuit Range Performance**
DTC	**P0462 00**	**Fuel Level Sensor “A” Circuit Low**
DTC	**P0463 00**	**Fuel Level Sensor "A" Circuit High**
DTC	**P25B0 00**	**Fuel Level Sensor "A" Stuck**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P046300	Fuel Level Sensor "A" Circuit High	/	/	/	/	• Fuel Level Sensor • Wire harness or connector • Instrument cluster	/	Engine malfunction light comes on
P046200	Fuel Level Sensor “A” Circuit Low	/	/	/	/		/	
U067600	Lost Communication with Fuel Level Sensor "A"	/	/	/	/		/	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P046129	Fuel Level Sensor "A" Circuit Range Performance	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

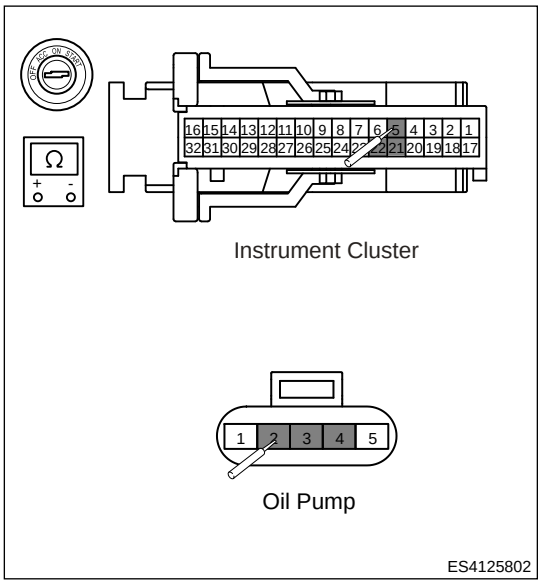
Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check oil level sensor wire harness**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Instrument cluster (21) - Fuel pump (3)	Always	Less than 1 Ω
Instrument cluster (5) - Fuel pump (2)	Always	Less than 1 Ω
Instrument cluster (22) - Fuel pump (4)	Always	Less than 1 Ω



NG → **Repair open fault in oil level sensor wire harness.**

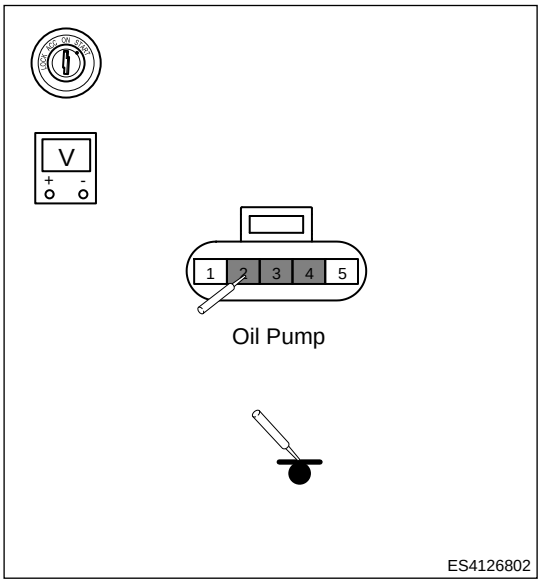
OK

2	Check oil level sensor connector voltage

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Fuel pump (2) - Body ground	ENGINE START STOP switch ON	0 V
Fuel pump (3) - Body ground	ENGINE START STOP switch ON	0 V
Fuel pump (4) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short fault to power supply in oil level sensor connector.**

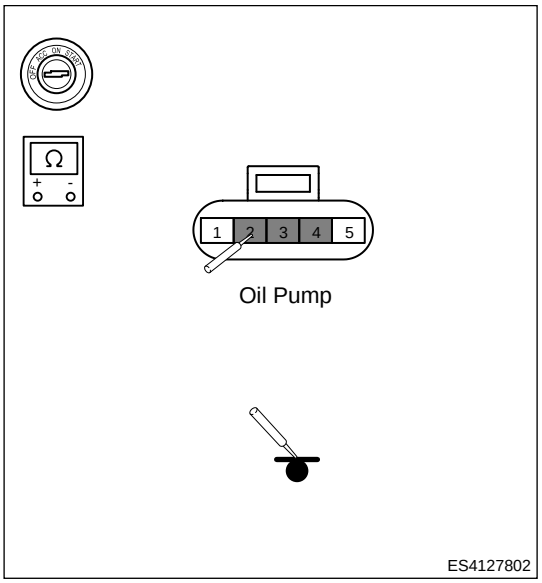
OK

3	Check oil level sensor connector resistance

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Fuel pump (2) - Body ground	Always	∞
Fuel pump (3) - Body ground	Always	∞
Fuel pump (4) - Body ground	Always	∞



NG → **Repair short fault to ground in oil level sensor connector wire harness.**

OK

4	Check oil level sensor connector

(a) Check if oil level sensor connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK

5	Check oil level sensor

(a) Check if oil level sensor is normal.

NG → **Replace oil level sensor.**

OK

6	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

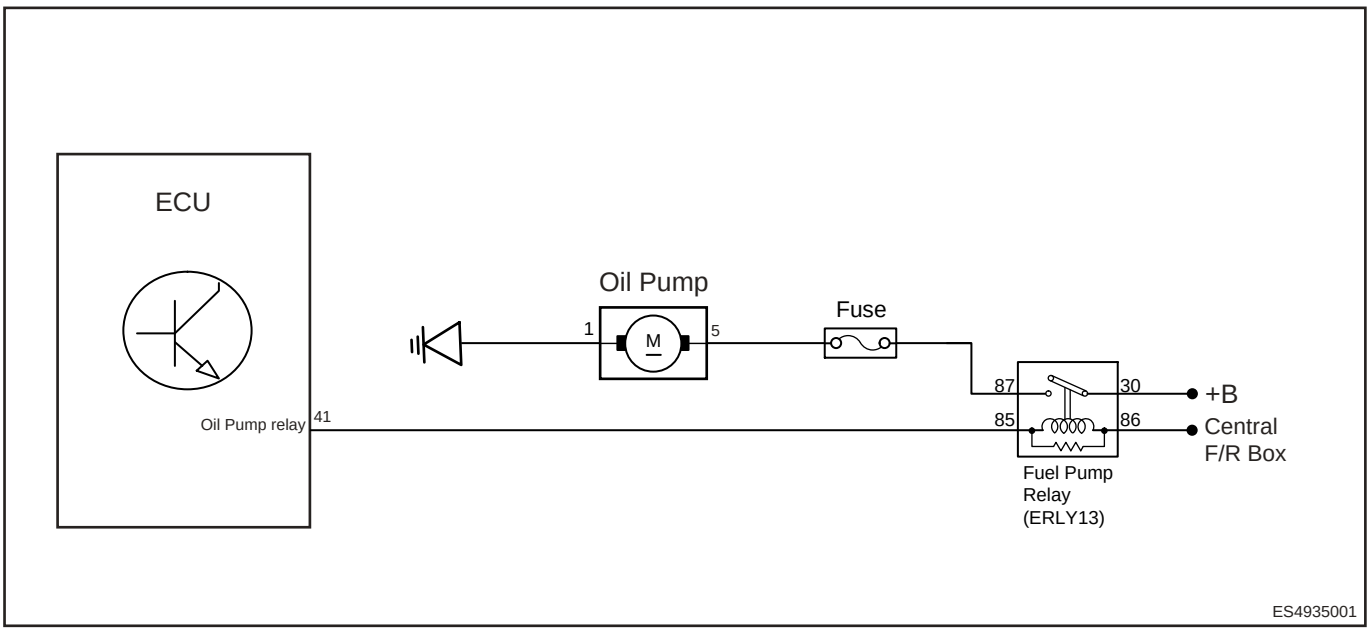
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new instrument cluster to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0629 00**	**Fuel Pump "A" Control Circuit High**
DTC	**P0628 00**	**Fuel Pump "A" Control Circuit Low**
DTC	**P0627 00**	**Fuel Pump "A" Control Circuit Open**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-62700	Fuel Pump "A" Control Circuit Open	/	/	/	/	• Fuel pump relay • Wire harness or connector • Instrument cluster	/	Engine malfunction light comes on
P0-62800	Fuel Pump "A" Control Circuit Low	/	/	/	/		/	
P0-62900	Fuel Pump "A" Control Circuit High	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

(a) Check if battery terminals are corroded or loose.
(b) Check battery voltage with a digital multimeter.

NG → **Check and repair battery.**

OK

2	**Check fuel pump relay and fuse**

(a) Check if fuel pump fuse is blown or no power.
(b) Check if relay terminal is corroded or broken.
(c) Directly apply battery voltage to 2 relay control terminals, check if relay closes.
(d) Turn ENGINE START STOP switch to ON.
(e) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Fuel pump relay (30) - Body ground	Always	12 V
Fuel pump relay (86) - Body ground	ENGINE START STOP switch ON	12 V

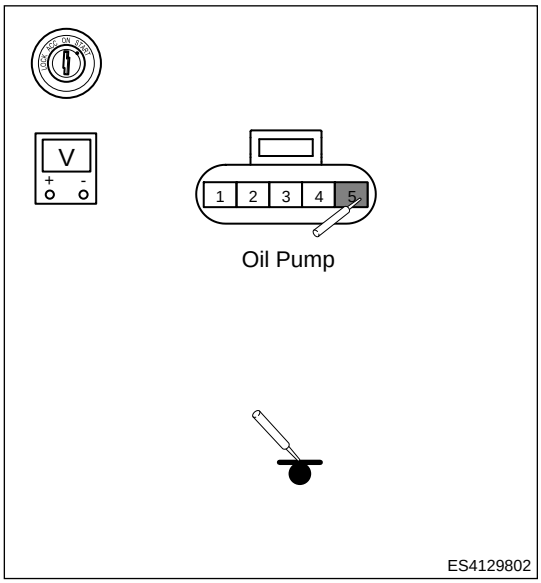
NG → **Repair or replace fuse or relay**

OK

3	Check fuel pump circuit voltage

(a) Turn ENGINE START STOP switch to ON.
(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Fuel pump (5) - Body ground	Always	12 V



NG → **Repair or replace wire harness.**

OK

4	Check fuel pump connector

(a) Check if fuel pump connector is infirmly connected or poorly contacted.

NG → **Repair or replace connector.**

OK

5	Check fuel pump relay control circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Fuel pump relay (85) - ECU (41)	Always	Less than 1 Ω

(c) Perform the resistance inspection

Multimeter Connection	Condition	Specified Condition
Fuel pump relay (85) or ECU (41) - Body ground	Always	∞

NG → **Replace oil level sensor.**

OK

6	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	P0339 00	Crankshaft Position Sensor “A” Circuit Intermittent
DTC	P2617 00	Crankshaft Position Signal Output Circuit Open

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-33900	Crankshaft Position Sensor "A" Circuit Intermittent	/	/	Speed sensor signal failure counter exceeds the threshold	/	• Speed Sensor • Wire harness or connector • ECU	/	Engine malfunction light comes on
P2-61700	Crankshaft Position Signal Output Circuit Open	/	/	Speed sensor signal failure counter exceeds the threshold	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

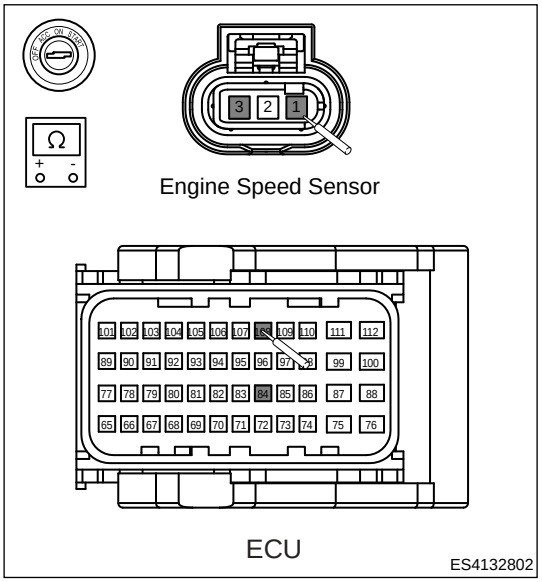
Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check speed sensor power supply wire harness**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Speed sensor (1) - ECU (108)	Always	Less than 1 Ω
Speed sensor (3) - ECU (84)	Always	Less than 1 Ω



NG → **Repair speed sensor power supply wire harness.**

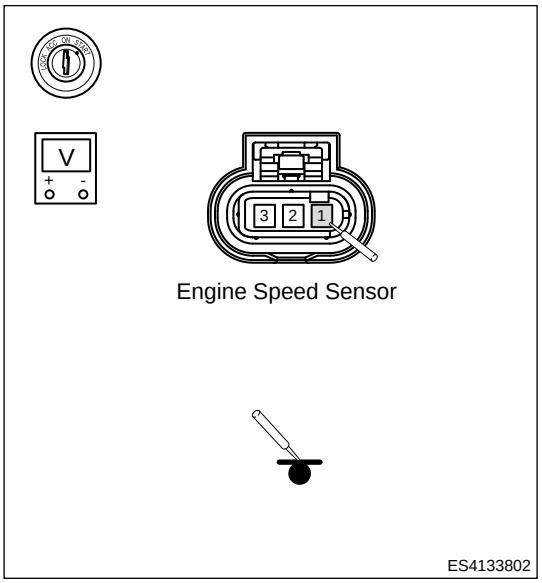
OK ↓

2	**Check speed sensor power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Speed sensor (1) - Body ground	ENGINE START STOP switch ON	5 V



NG → **Replace ECU.**

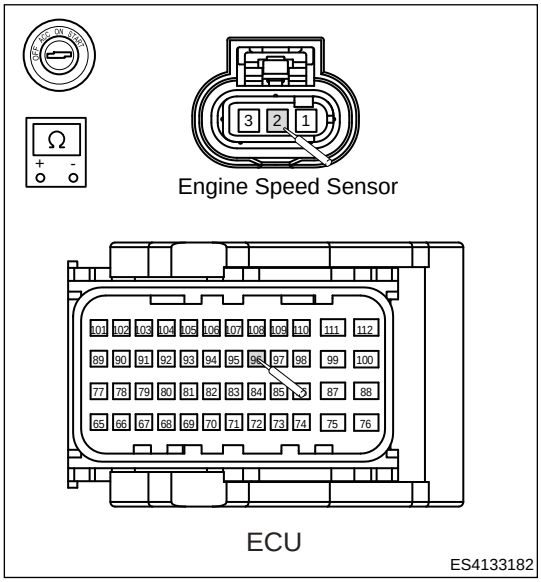
OK ↓

3	**Check speed sensor signal wire harness**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Speed sensor (2) - ECU (96)	Always	Less than 1 Ω



NG → **Repair speed sensor signal wire harness.**

OK ↓

4	Check speed sensor connector

(a) Check if speed sensor connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK ↓

5	Check speed sensor

NG → **Replace speed sensor.**

OK ↓

6	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P050A 21**	**Idle Control System**
DTC	**P0506 00**	**Idle Control System RPM - Lower Than Expected**
DTC	**P0507 00**	**Idle Control System RPM - Higher Than Expected**

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P050A 21	Idle Control System	/	/	/	/	• Electronic Throttle • Oil supply system • Exhaust system • Fuel injector • ECU	/	Engine malfunction light comes on
P050600	Idle Control System RPM - Lower Than Expected	/	/	/	/		/	
P050700	Idle Control System RPM - Higher Than Expected	/	/	/	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check electronic throttle**

(a) Check if electronic throttle is stuck in minimum position due to ice or oil.

NG → **Repair or replace electronic throttle.**

OK

2	Check exhaust system

(a) Check exhaust system for blockage.

NG → **Repair exhaust system.**

OK

3	Check oil supply system

(a) Check if oil supply pressure is normal.

NG → **Repair oil supply system.**

OK

4	Check fuel injector

(a) Check fuel injector for blockage.

NG → **Replace fuel injector.**

OK

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0685 00**	**ECM/PCM Main Relay Control Circuit Open**
DTC	**P0687 00**	**ECM/PCM Main Relay Control Circuit Short to Power Supply**
DTC	**P0686 00**	**ECM/PCM Power Relay Control Circuit Low**
DTC	**P0689 00**	**Main Relay Voltage Too Low**

Control Schematic Diagram

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P068500	ECM/PCM Main Relay Control Circuit Open	/	/	/	/	• Main Relay • Wire harness or connector • ECU	/	Engine malfunction light comes on
P068700	ECM/PCM Main Relay Control Circuit Short to Power Supply	/	/	/	/		/	
P068600	ECM/PCM Power Relay Control Circuit Low	/	/	/	/		/	
P068900	Main Relay Voltage Too Low	/	/	/	/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check main relay**

(a) Check if main relay is damaged.

NG → **Replace main relay.**

OK ↓

2	**Check main relay control wire harness**

(a) Disconnect the ECU connector.
(b) Turn ENGINE START STOP switch to OFF.
(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
ECU (5) - Body ground	Always	∞

NG → **Repair or replace main replay wire harness.**

OK ↓

3	**Reconfirm DTCs**

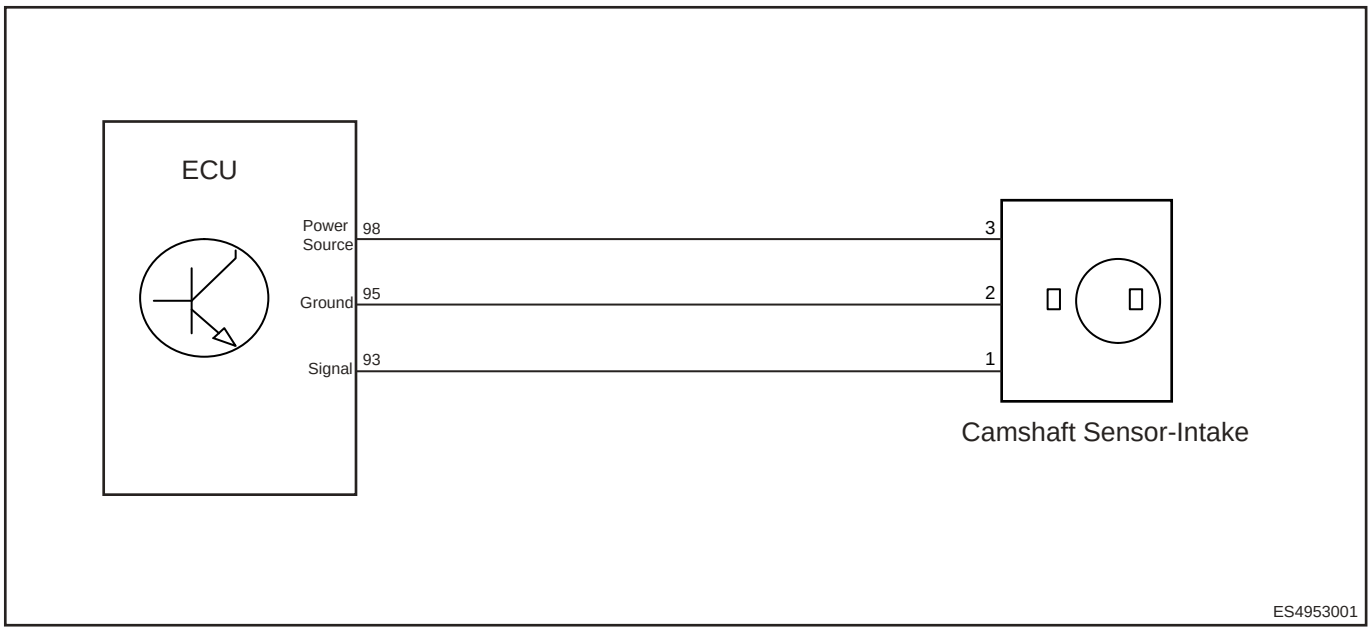
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0343 00**	**Camshaft Position Sensor "A" Circuit High Bank 1 or Single Sensor**
DTC	**P0342 00**	**Camshaft Position Sensor "A" Circuit Low Bank 1 or Single Sensor**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P034300	Camshaft Position Sensor "A" Circuit High Bank 1 or Single Sensor	/	/	Sensor signal failure counter of intake camshaft phase sensor exceeds the threshold	/	• Intake camshaft sensor • Wire harness or connector • ECU	/	Engine malfunction light comes on
P034200	Camshaft Position Sensor "A" Circuit Low Bank 1 or Single Sensor	/	/	Sensor signal failure counter of intake camshaft phase sensor exceeds the threshold	/		/	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.

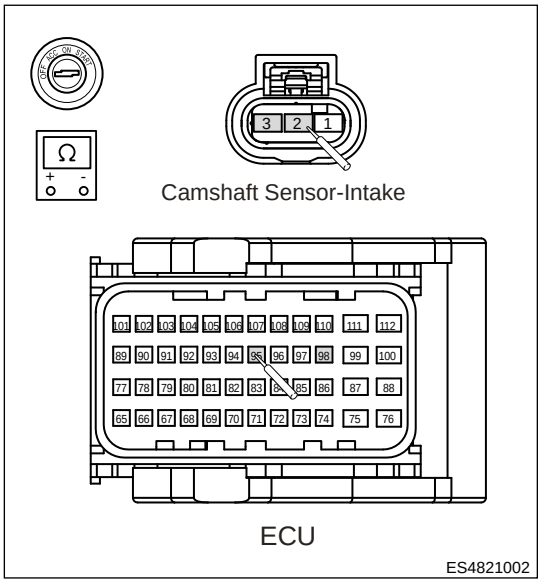
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check intake camshaft sensor power supply wire harness**

(a) Turn ENGINE START STOP switch to OFF.
(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Intake camshaft sensor (2) - ECU (95)	Always	Less than 1 Ω
Intake camshaft sensor (3) - ECU (98)	Always	Less than 1 Ω



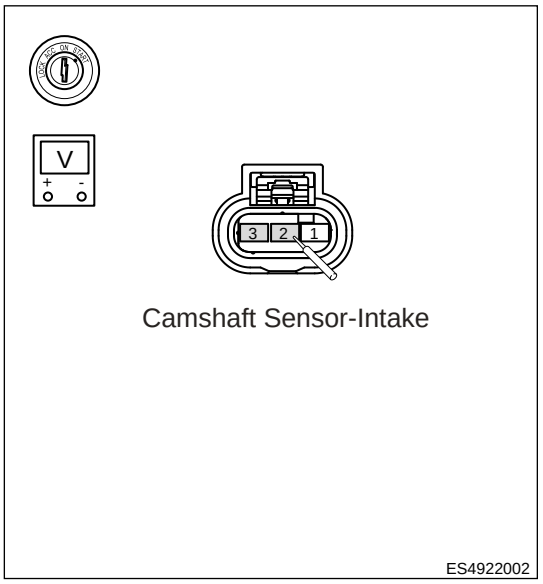
NG → **Repair intake camshaft sensor power supply wire harness.**

OK →

2	**Check intake camshaft sensor power supply**

(a) Turn ENGINE START STOP switch to ON.
(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Intake camshaft sensor (2) - Intake camshaft sensor (3)	ENGINE START STOP switch ON	5 V



NG → **Repair intake camshaft sensor power supply wire harness.**

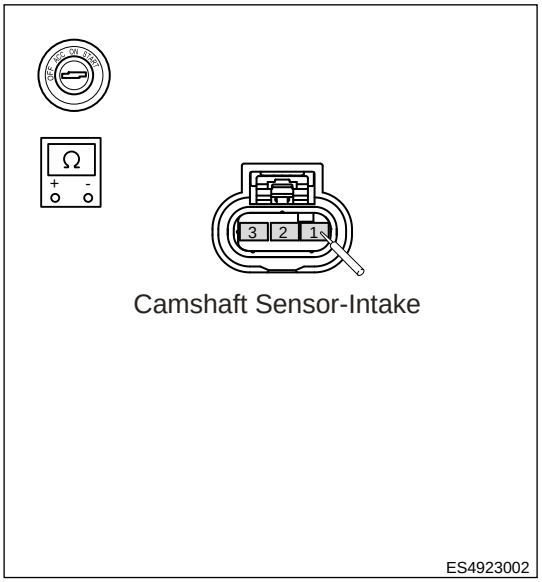
OK

3	**Check intake camshaft sensor signal wire harness**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Intake camshaft sensor (1) - Intake camshaft sensor (2)	Always	∞
Intake camshaft sensor (1) - Intake camshaft sensor (3)	Always	∞



NG → **Repair intake camshaft sensor signal wire harness.**

OK

4	**Check intake camshaft sensor connector**

(a) Check if intake camshaft position sensor connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK

5	**Check intake camshaft sensor**

(a) Check if intake camshaft sensor is normal.

NG → **Replace intake camshaft sensor.**

OK

6	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	P0341 00	Camshaft Position Sensor "A" Circuit Range/Performance Bank 1 or Single Sensor

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0341 00	Camshaft Position Sensor "A" Circuit Range/ Performance Bank 1 or Single Sensor	/	/	Sensor signal failure counter of intake camshaft phase sensor exceeds the threshold	/	• Intake camshaft sensor • Camshaft signal plate • ECU	/	Engine malfunction light comes on

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check intake camshaft sensor connector

(a) Check if intake camshaft position sensor connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK

2	Check intake camshaft sensor

(a) Check if intake camshaft sensor is normal.

NG → **Replace intake camshaft sensor.**

OK

3	Check intake camshaft signal plate

(a) Check intake camshaft signal plate for damage, tooth missing, etc.

NG → **Replace intake camshaft.**

OK

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	P0366 00	Camshaft Position Sensor “B” Circuit Range/Performance(-Bank 1)

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-36600	Camshaft Position Sensor "B" Circuit Range/ Performance(-Bank 1)	/	/	Sensor signal failure counter of exhaust camshaft phase sensor exceeds the threshold	/	• Exhaust camshaft sensor • Camshaft signal plate • ECU	/	Engine malfunction light comes on

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check exhaust camshaft sensor connector**

(a) Check if exhaust camshaft sensor connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK

2	**Check exhaust camshaft sensor**

(a) Check if exhaust camshaft sensor is normal.

NG → **Replace exhaust camshaft sensor.**

OK

3	**Check exhaust camshaft signal plate**

(a) Check exhaust camshaft signal plate for damage, tooth missing, etc.

NG → **Replace exhaust camshaft.**

OK

4	Reconfirm DTCs

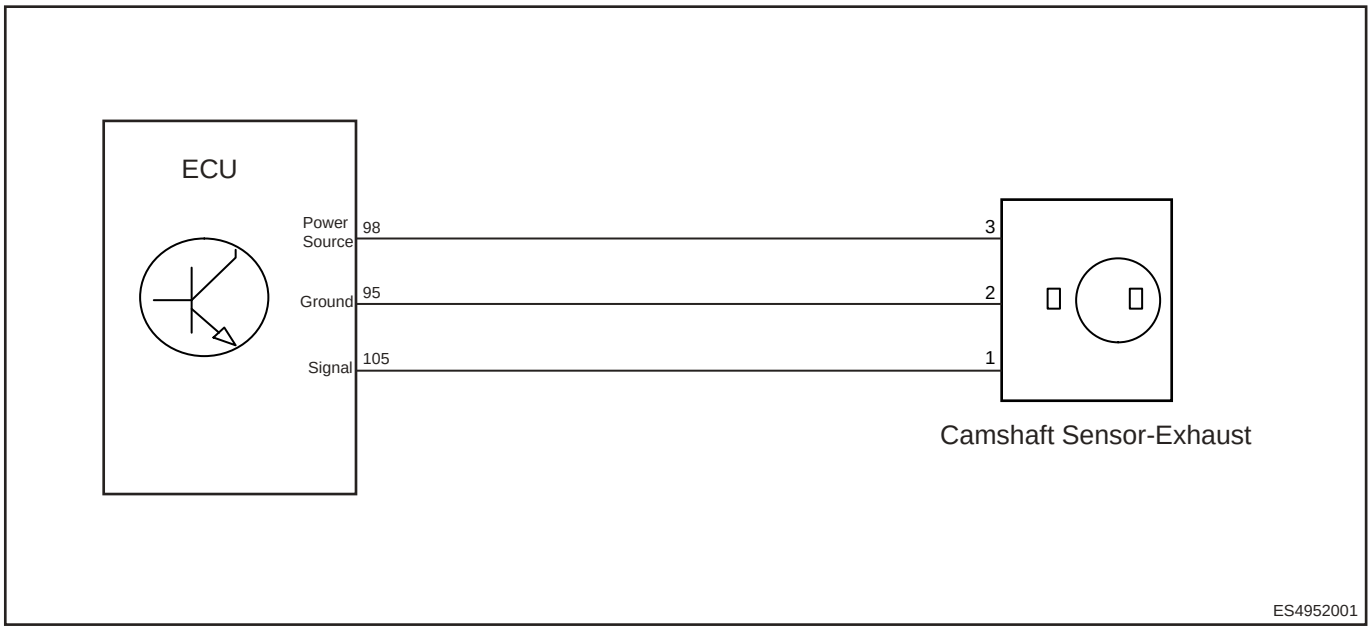
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**P0368 00**	**Camshaft Position Sensor "B" Circuit High (Bank 1)**
DTC	**P0367 00**	**Camshaft Position Sensor "B" Circuit Low (Bank 1)**

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
P0-36800	Camshaft Position Sensor "B" Circuit High (Bank 1)	/	/	Sensor signal failure counter of exhaust camshaft phase sensor exceeds the threshold	/	• Exhaust camshaft sensor • Wire harness or connector • ECU	/	Engine malfunction light comes on
P0-36700	Camshaft Position Sensor "B" Circuit Low (Bank 1)	/	/	Sensor signal failure counter of exhaust camshaft phase sensor exceeds the threshold	/		/	

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

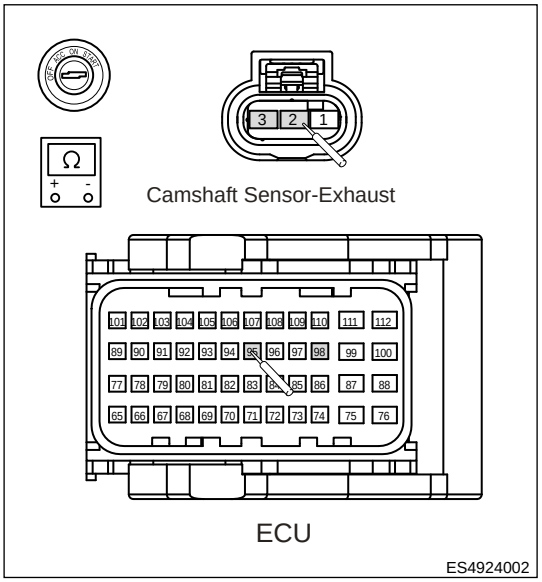
Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check exhaust camshaft sensor power supply wire harness**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Exhaust camshaft sensor (2) - ECU (95)	Always	Less than 1 Ω
Exhaust camshaft sensor (3) - ECU (98)	Always	Less than 1 Ω



NG → **Repair exhaust camshaft sensor power supply wire harness.**

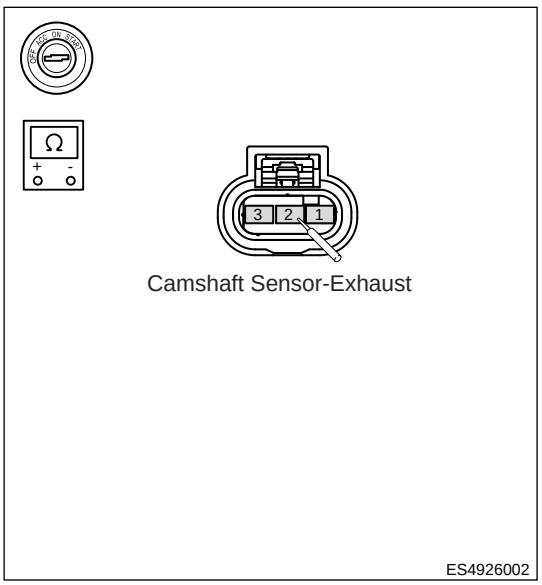
OK

2	**Check exhaust camshaft sensor signal wire harness**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Exhaust camshaft sensor (1) - Exhaust camshaft sensor (2)	Always	∞
Exhaust camshaft sensor (1) - Exhaust camshaft sensor (3)	Always	∞



NG → **Repair exhaust camshaft sensor signal wire harness.**

OK

3	**Check exhaust camshaft sensor connector**

(a) Check if exhaust camshaft sensor connector is not connected securely or is in poor contact.

NG → **Reinstall or repair, replace connector.**

OK

4	Check exhaust camshaft sensor

(a) Check if exhaust camshaft sensor is normal.

NG → **Replace exhaust camshaft sensor.**

OK

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

On-vehicle Service

Electronic throttle body

Description
Electronic throttle body is a critical part for engine intake system. Its main function is to control intake air volume by adjusting intake passage area according to driver’ s driving intention to meet intake requirements in different engine operating conditions, and send back position signals of throttle valve plate to control unit to achieve accurate control.

1	Motor Negative	4	Motor Positive
2	Sensor Ground	5	Signal 2
3	Sensor Power Supply	6	Signal 1

Operation
Electric throttle body consists of four parts: drive module, train module, executive module and feedback module, and all components are integrated into the same throttle valve housing. Throttle feedback module uses two redundant structures. When malfunction occurs, throttle valve plate will stop at the limp home position (above mechanical bottom dead center) determined by mechanical way. Electronic throttle body performs control only by corresponding electronic control unit or electronic test circuit. In principle, it is necessary to ensure that the throttle valve plate does not operate dynamically to the mechanical dead center.

Throttle Self-learning
Be sure to perform throttle body self-learning once after installing electronic throttle body (turn ENGINE START STOP switch to ON, wait for 15 seconds and turn it back to OFF, then vehicle can be ignited normally). Start vehicle and observe if it operates normally after self-learning is finished.

Common Problem Symptoms and Judgment Methods

Common problem symptoms caused by electronic throttle body itself are: lack of power when accelerating, seizure or frequent return of throttle valve plate. EPC light comes on (use diagnostic tester to read related electronic throttle DTCs), vehicle speed does not increase even if accelerator pedal is fully depressed.

1. General problem causes:
   - ECU detects incorrectly due to improper harness or sensor operation, and electronic throttle is forcibly controlled in small opening condition;
   - Internal components (such as magnetic steel) are cracked due to dropping or hitting during use or repair;
   - Vibration level at engine manifold is out of specified range;
   - Excessive carbon deposit in electronic throttle body due to use of engine or vehicle.
2. Repair precaution:
   - Never hit electronic throttle body during service, and never use it after dropping;
   - It can be verified by simply measuring resistance change of terminals and crossover test if malfunction occurs caused by electronic throttle body.
3. Simple detection method for electronic throttle body malfunction:
   a. Judgment methods for specific mechanical damage: Valve plate should be in default position with power off and can rotate smoothly when flipping it by hand. If catching occurs, it indicates that internal components may be damaged.
   b. Perform the simple measurement for throttle internal sensor in following steps:

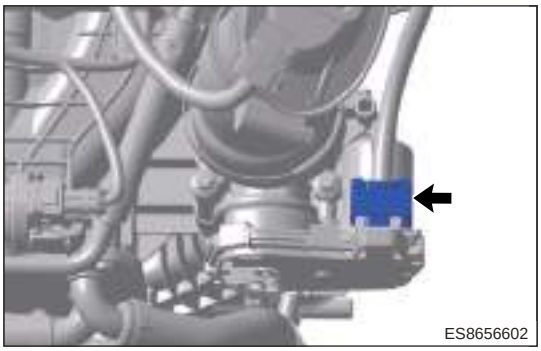
Step	Operation	Test Value	Test Result	Subsequent Step
1	Apply 5V direct current to terminal 3 (+) and 2 (-), close valve plate to full close manually, and measure voltages between terminals 5 and 2, and between terminals 6 and 2 with voltage band of multimeter. Voltage between terminals 6 and 2 is within 0.25 V and 0.75 V, voltage between terminals 5 and 2 is within 4.25 V and 4.75 V, and the sum of both voltages is about 5 V	/	Yes	Next
		/	No	Replace electronic throttle
2	Apply 5V direct current to terminal 3 (+) and 2 (-), turn valve plate to full open manually, and measure voltages between terminals 5 and 2, and between terminals 6 and 2 with voltage band of multimeter. Voltage between terminals 6 and 2 is within 4.4 V and 4.9 V, voltage between terminals 5 and 2 is within 0.1 V and 0.6 V, and the sum of both voltages is about 5 V	/	Yes	Next
		/	No	Replace electronic throttle
3	Turn the multimeter to ohm band, directly measure resistance of copper windings on DC motor between terminals 1 and 4. It is usually between 1.5 and 3.0 Ω at normal temperature, this value does not change with the valve plate opening.	/	Yes	Check wire harness or perform diagnostic help
		/	No	Replace electronic throttle

4. DTC troubleshooting:
   a. If DTC P0121, P0122 or P0123 is output, refer to methods in previous DIAGNOSIS & TESTING section to perform test.

b. If DTC P2106 is output, it indicates that electronic throttle is not malfunctioning, perform ECU and throttle self-learning again, and do not replace electronic throttle.
c. If it is other malfunction related to electronic throttle, unplug and plug connector again, remove carbon on throttle, to confirm that there is no foreign matter during valve plate opening or closing. Perform other related inspection.

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the electronic throttle.
   a. Disconnect electronic throttle connector (arrow), remove 4 fixing bolts and electronic throttle.



Hint:

- Before removing throttle, make sure the ENGINE START STOP switch is turned to OFF and always keep vehicle power off, otherwise it will cause idling problems.
- Do not remove the electrified electronic throttle body.
- Do not remove the electronic throttle body until the vehicle is cooled to room temperature to prevent the overheating antifreeze from wetting the black cap and connectors etc.
- During the removal, the mounting bolts shall be removed diagonally and the force shall be uniform and vertical. The upper and lower mounting surfaces shall not be damaged, and also ensure that the electronic throttle body does not drop or hit.
- The power of return spring inside electronic throttle body is greater, be careful not to clamp your hand during pushing valve plate slightly.

Installation

1. Installation is in the reverse order of removal.

Absolute Brake Vacuum Sensor

Description

Absolute brake vacuum sensor is installed on brake vacuum tube.

1	Sensor Voltage Signal Output	3	To 5 V Power Supply
2	Ground		

Installation Position

1. Pressure sensor is installed on brake vacuum tube.
2. Installation precautions:
   a. Always make sure the O-ring is not damaged during installation. Apply a light coat of oil to O-ring surface before installation, and do not use silicon grease.
   b. Press sensor detecting sleeve into installation hole manually during installation, and do not install sensor with striking tool.
   c. Tightening torque during installation: 4 - 7 N·m is recommended.
   d. Connect wire harness with specified matched connector.

Operation
Absolute pressure sensing element consists of a piece of silicon chip. Etch a piece of pressure diaphragm on silicon chip. There are 4 piezoresistors on pressure diaphragm, and the 4 piezoresistors form a Wheatstone bridge as strain element. Except for the pressure diaphragm, silicon chip is also integrated with signal processing circuit and temperature compensating circuit. Reference vacuum chamber is integrated into silicon chip, and absolute pressure in reference space is near zero. This will form a microelectronic mechanical system. The pressure to be measured acts on side which can sense pressure on silicon film from top side. Thickness of silicon chip is only several micrometer (μm), so the silicon chip will deform mechanically as pressure changes, and 4 piezoresistors will also deform, thus changing the resistance. Voltage signal linearly related to the pressure is generated after processing by signal processing circuit of silicon chip.

Common Problem Symptoms and Judgment Methods
Problem symptom: Vacuum booster does not operate properly.

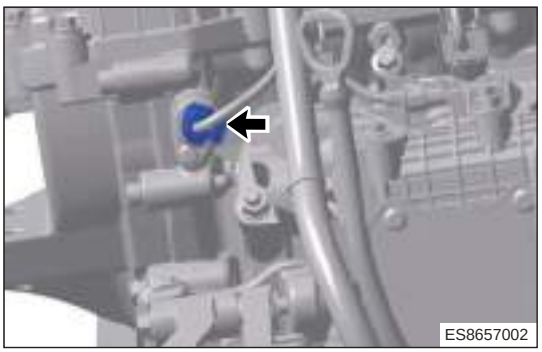
1. General problem causes:
   - Chip is damaged due to abnormal high voltage or reverse large current during operation;
   - Pressure component is damaged during service;
   - Chip is corroded and damaged due to external environment;
   - Sensor itself malfunction.
2. Precautions during service:
   - Do not impact pressure component with high pressure gas during service;
   - Check if alternator output voltage and current are normal when there is a fault and replacing sensor.

VVT Control Valve

Operation
There are two solenoid valves in camshaft phaser assembly, one is the intake solenoid valve and the other is the exhaust solenoid valve. The main function is that solenoid valve is controlled by ECU, different oil passages can be opened and the phase can be changed ultimately depending on operating conditions; Variable valve timing technology can improve the power performance of engine and fuel economy by adjusting the timing of valve closing according to different operating status of engine.

Removal
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the intake VVT control valve.
   a. Disconnect intake VVT control valve connector (arrow), and then remove intake VVT control valve fixing bolt.

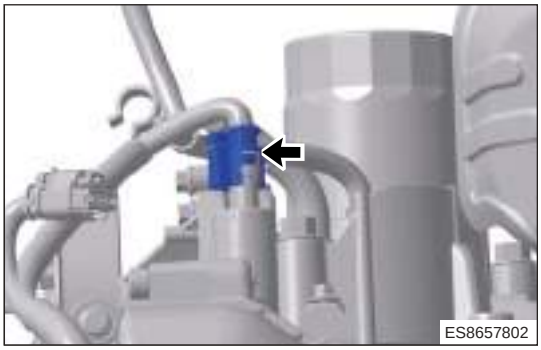
      Tightening torque: 8 ± 2 N·m



   b. Remove the intake VVT control valve.
4. Remove the exhaust VVT control valve.

a. Disconnect exhaust VVT control valve connector (-arrow), and then remove exhaust VVT control valve fixing bolt.

Tightening torque: 8 ± 2 N·m



b. Remove the exhaust VVT control valve.

Inspection

1. Observe if there is oil stain or oil sludge on control valve. If so, clean it in time.
2. Measure resistance of solenoid valve with a multimeter. Normal value: 8 ± 0.5 Ω (at 20℃).

Coolant temperature sensor

Description

Coolant temperature sensor is a negative temperature coefficient sensor.Coolant temperature sensor terminal: Sensor has 2 terminals, and they can be interchanged.

Installation Position

Coolant temperature sensors are installed on engine thermostat seat and radiator assembly respectively.

Operation

NTC thermistor packaged inside temperature sensor is used for coolant temperature sensor, its resistance changes in accordance with ambient temperature, thus accurately reflecting the small changes in outside temperature. The temperature of contact medium can be reflected by measuring its output resistance, and the signals from both terminals of resistor are output to ECU. Engine load can be obtained by ECU according to output signal of the sensor, thus judging the engine operating condition.

Installation Precautions

1. Uniformly apply anaerobic seal gum to threads before installation.
2. Pre-tighten it manually during installation, so as to avoid sensor thread damage caused by wrong tooth engagement of thread. Tighten it with socket wrench after manual pre-tightening.
3. If the coolant temperature sensor is installed with level wrench, make sure that the wrench is perpendicular to the axis of sensor during installation, to avoid damage to coolant temperature sensor due to excessive lateral force.

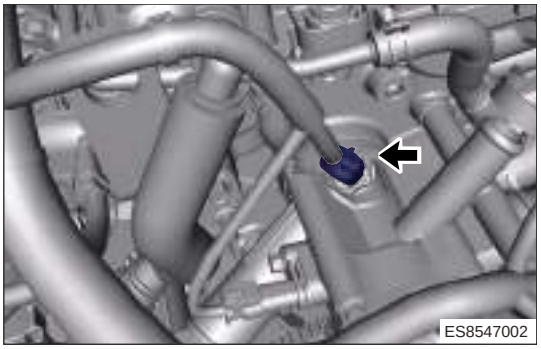
Removal

⚠ Caution
• Always make sure engine is cold before operating cooling system. Never open expansion tank cap or remove drain cock plug, when engine is operating or cooling system temperature is high. High-pressurized hot engine coolant and steam may flow out and cause serious burns.

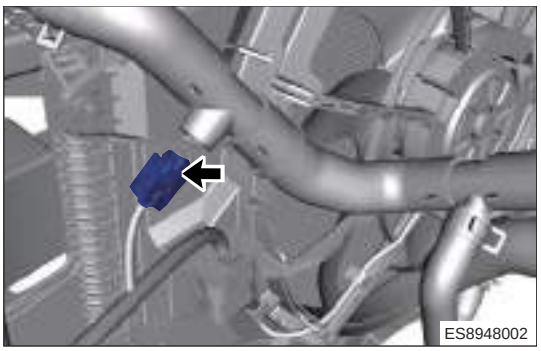
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the coolant temperature sensor.

a. Disconnect coolant temperature sensor 1 connector (-arrow) and remove coolant temperature sensor.

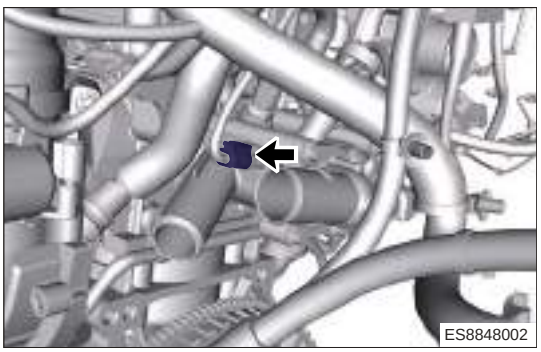
Tightening torque: 15 ± 1 N • m



b. Disconnect coolant temperature sensor 2 connector (-arrow) and remove coolant temperature sensor.



c. Disconnect coolant temperature sensor 3 connector (-arrow) and remove coolant temperature sensor.



Common Problem Symptoms and Judgment Methods

Common problem symptoms related to this sensor: abnormal water temperature indication, difficult to start, fan constantly runs, etc.

1. General problem causes:
   - Abnormal high voltage or reverse large current during operation;
   - Sensor housing is damaged, water enters inside during service.
2. Precautions during service: Check if alternator output voltage and current are normal when there is a fault and replacing sensor.
3. Simple detection method for coolant temperature sensor malfunction:

a. Disconnect wire harness connector (remove connector), turn digital multimeter to ohm band, connect two probes to two terminals of sensor respectively, rated resistance is 2.5 KΩ ± 5% at 20℃, blow air to sensor with a hair dryer (be careful not to get too close), obverse the changes of resistance, it should decrease with the increase of temperature.

Step	Operation	Test Value	Test Result	Subsequent Step
1	Remove coolant temperature sensor wire harness connector, use a multimeter to measure if resistance between two terminals of sensor is normal	The resistance between the two terminals is determined according to ambient temperature near sensor when testing	Yes	Next
			No	Replace coolant temperature sensor
2	Remove coolant temperature sensor wire harness connector, turn ENGINE START STOP switch to ON, measure the voltage between two terminals of coolant temperature sensor wire harness	5 ± 0.5 V	Yes	Diagnostic Help
			No	Check for continuity and ground of wire harness

Installation

1. Installation is in the reverse order of removal.

Knock Sensor

Description

1. Knock sensor is installed on cylinder block. It is used to detect engine vibration caused by detonation.

Operation

1. Knock sensor is installed on cylinder block, and used to detect engine vibration caused by detonation. You can install one or more. The sensitive element of knock sensor is a piezoelectric ceramic. Vibration of engine cylinder block is transferred to the piezoelectric ceramic through a mass block in the sensor. Due to the pressure generated by vibration of mass block, the piezoelectric ceramic generates a voltage at both electrode faces, and converts the vibration signal to an A/C voltage signal to output it. As intensity of vibration increases, knock sensor output voltage increases accordingly.
2. Because frequency of vibration signal caused by engine knocking is far more than that of normal engine vibration signal, Engine Control Unit (ECU) can distinguish between knock or non-knock signals by processing these signals from knock sensor.

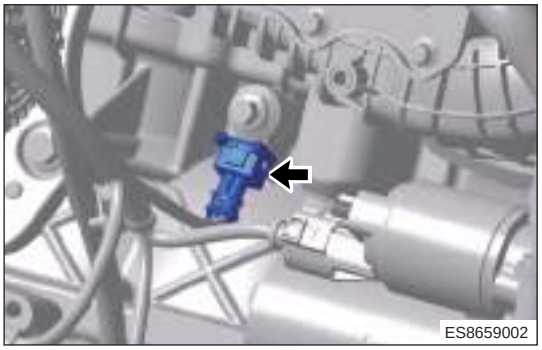
Installation Precautions

Because frequency of vibration signal caused by engine knocking is far more than that of normal engine vibration signal, Engine Control Unit (ECU) can distinguish between knock or non-knock signals by processing these signals from knock sensor.

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the knock sensor.

a. Disconnect knock sensor connector (arrow), and remove knock sensor.



Common Problem Symptoms and Judgment Methods

Problem symptom: poor acceleration, etc.

1. General problem causes: Liquids such as oil, coolant, brake fluid and water contacted with sensor will cause corrosion to the sensor.
2. Simple detection method for knock sensor malfunction:

Step	Operation	Test Value	Test Result	Subsequent Step
1	Turn multimeter to ohm band, detect resistance between terminals 1 and 2 of knock sensor, resistance is (4.9 ± 20%) MΩ at normal temperature	/	Yes	Next
		/	No	Replace knock sensor
2	Turn multimeter to mV band, use a small hammer to tap near knock sensor, there should be a voltage signal	/	Yes	Check wire harness or perform diagnostic help
		/	No	Replace sensor

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Never install any kinds of gasket and washer between sensor and engine block. Only the metal part of sensor can contact with engine block directly.
- Be careful not to allow liquids such as oil, coolant and brake fluid to contact the sensor for a long periods of time.
- DO NOT apply lubricant, grease or seal gum when installing knock sensor. Keep engine block clean and dry, and never allow any foreign matter (such as oil) on the installation area of knock sensor.
- Never tap knock sensor when installing it.

Oxygen Sensor

Description

1. Upstream oxygen sensor is LSU 4.9 and downstream oxygen sensor is LSF 4.2.

Operation

1. Sensing element of LSF oxygen sensor is a ceramic planar body with pores, and the outside of ceramic body is surrounded by engine exhaust, and the inside is ventilated. Sensing ceramic body wall is a type of solid electrolyte with heating electrodes inside. Operation of oxygen sensor is realized by converting the concentration difference of oxygen ions inside and outside the sensing ceramic body into voltage signals for output. When the temperature of sensing ceramic body reaches 350 ℃, it will have the characteristics of solid electrolyte. Oxygen ions can freely pass through it due to special material of ceramic body. It is precisely by taking advantage of this characteristic, it converts the concentration difference into the potential difference, thus forming the electrical signal output. If the gas mixture is rich, oxygen ion concentration difference in and out of the ceramic is high, electric potential difference is high, a large number of oxygen ions move from the inside to the outside, and the output voltage is higher (approximately 800mV-1000mV); If the mixture concentration is too lean, oxygen ion concentration difference in and out of the ceramic is low, electric potential difference is low, only a small amount of oxygen ion moves from the inside to the outside, and the output voltage is lower (approximately 100mV). Signal voltage changes abruptly at about the theoretical equivalent air fuel ratio (λ=1).
2. LSU oxygen sensor is much more advanced than LSH and LSF in function. It is a ceramic body principle and a “micro pump” for oxygen ion transportation. Pump provides enough oxygen to the electrodes on the contact side of the exhaust to maintain a constant voltage on both sides, about 450mV. Electric energy consumption of the pump is converted into the excess air coefficient by the electronic controller, output current is almost linear with λ. λ = 0.65 ~ ∞, so it is also called linear oxygen sensor. It can not only determine whether λ is greater than 1 or less than 1, but also measure in the thin and thick areas The specific value of λ can be determined, so the excess air coefficient in a wide range (broadband) can be measured, and the continuous control of λ < 1 to λ > 1 can be realized.

Installation Position

Upstream oxygen sensor is installed on front of pre-catalytic converter, and downstream oxygen sensor is installed behind the three-way catalytic converter.

Installation Precautions

1. Applying detergent, oily liquid or volatile solid to the oxygen sensor connector is prohibited.
2. Oxygen sensor shall be installed on the exhaust pipe at a position that can represent the exhaust gas composition and can meet the specified temperature limit. Installation position should be as close to the engine as possible. Upstream oxygen sensor is installed on front of exhaust pipe three-way catalytic converter, and downstream oxygen sensor is installed behind the three-way catalytic converter.
3. Installation method of oxygen sensor: Oxygen sensor shall be installed at an included angle of 10 degrees or more to the horizontal plane with the sensor tip facing downward to prevent condensed water from accumulating between the sensor housing and the sensing ceramic tube during cold start.
4. The sensor mounting probe does not face the airflow direction.
5. When installing the oxygen sensor, it should be handled with care and not allowed to fall to the ground, because there are ceramics inside the oxygen sensor and it is fragile.
6. During installation, do not wipe off the special anti-high temperature grease in the tightening thread.

LSF Characteristic Data

Description	New Status		After 500 Hours of Platform Test	
Exhaust temperature when characteristic data is established	350°C	850°C	350°C	850°C
Sensing element voltage (mV) when λ=0.97 (CO=1%)	800 ± 55	700 ± 55	800 ± 60	700 ± 60
Sensing element voltage (mV) when λ=1.10	50 ± 30	50 ± 30	50 ± 40	50 ± 40

Description	New Status		After 500 Hours of Platform Test	
Sensing element internal resistance (kW)	⩽ 0.5	⩽ 0.25	⩽ 1	⩽ 0.5
Response Time (ms) (600 mV to 300 mV)	< 250	< 250	< 400	< 250
Response Time (ms) (300mV to 600mV)	< 100	< 60	< 200	< 60

LSF Sensor Electrical Data

Description		Value	Unit
Power supply voltage on connector	Rated voltage	12	V
	Continuous operating voltage	12-14	V
	Operating voltage which can be maintained 1% of the total life at most (- exhaust temperature ⩽ 850°C)	15	V
	Operating voltage which can be maintained 75 seconds at most (- exhaust temperature ⩽ 350°C)	18	V
	Test voltage	13	V
Heating power for 13 V of operating voltage, and 350°C of exhaust temperature		7	W
Short time heating current at 13 V of operating voltage and -40 ˚C of ambient temperature		⩽ 2.1	A

LSU Characteristic Data

Description	New	After Platform Test
λ signal accuracy when λ = 1.7	1.70 ± 0.05	1.70 ± 0.15
λ signal accuracy when λ = 0.8	0.80 ± 0.01	0.80 ± 0.04

LSU Sensor Electrical Data

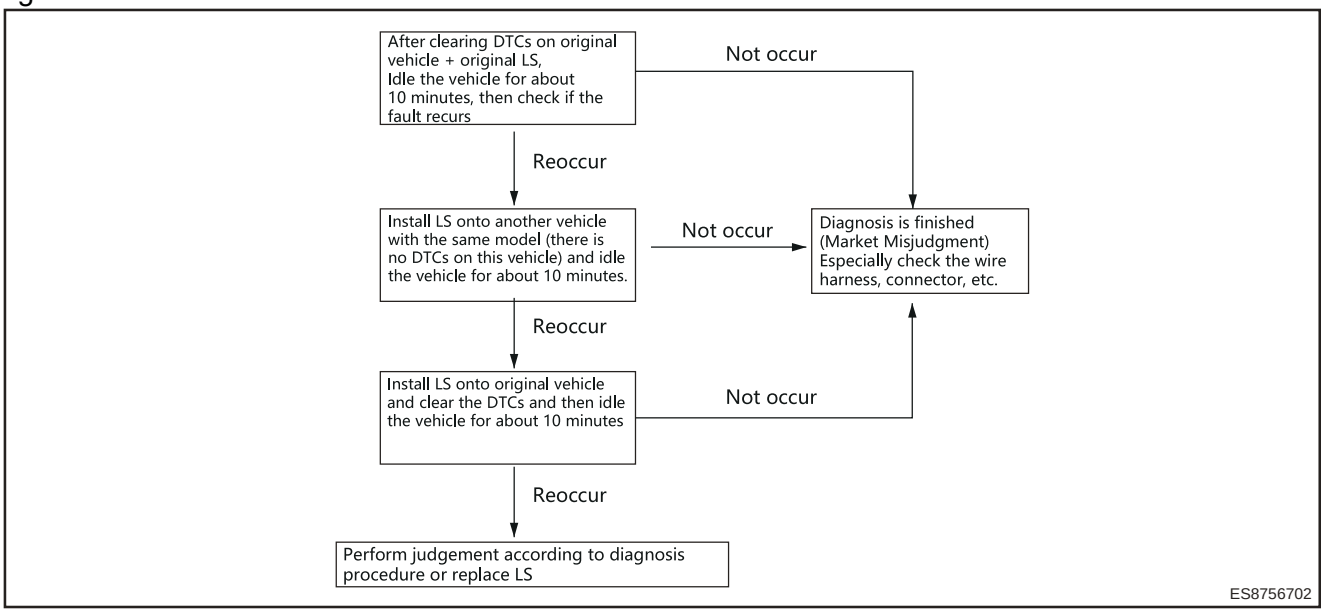
Description		Value	Unit
Power supply voltage on connector	Rated voltage	7.5	V
	Continuous operating voltage	⩽ 12	V
	Maximum system power supply voltage	⩽ 16.5	V

Description		Value	Unit
	Short time voltage peak value within 60 ms (10 times in life cycle, ceramic temperature ⩾ 20 ℃)	18	V
	Minimum system power supply voltage	⩾ 10.8	V
Heating power for 7.5 V of operating voltage		7.5	W

Common Problem Symptoms and Judgment Methods

1. Problem symptoms: Poor engine idle, poor acceleration, emissions exceeding, excessive fuel consumption, etc.
2. Main problem causes:
   - Poor wire harness: connector terminal looseness, rust, terminal uneven; or wire breakage, poor connection, etc., resulting in oxygen sensor signal failure and oxygen sensor heating failure displayed on diagnostic tester;
   - Mechanical shock (such as flying rock) damage to the sensor;
   - Moisture, condensation or contaminants enters inside the sensor, causing the sensor failure or poor signal;
   - Post-combustion of exhaust pipe due to the misfire, causing the oxygen sensor sensing element to be burned;
   - Oxygen sensor “poisoning” (such as Pb, S, Br, Si or Mn).
3. Simple measurement method for downstream oxygen sensor:
   - (Remove the connector) Turn digital multimeter to ohm band, connect two probes to sensor pin 1# (white) and pin 2# (white) respectively, the resistance should be 7 ～ 11 Ω at normal temperature.
   - (Connect the connector) Under idling status and waiting until temperature of oxygen sensor reaches its operation temperature (350℃), turn digital multimeter to DC voltage band, connect two probes to sensor pin 3# (gray) and pin 4# (black) respectively, voltage should rapidly fluctuates between 0.1 and 0.9 V at the same time.

4. Upstream oxygen sensor detection method:
   - In order to avoid misjudgment, for LS with intact appearance, cross-verification method should be adopted to further confirm whether LS itself is invalid. The cross-verification method is shown in the figure.



Removal

1. Refer to Emission Control System.

> **⚠ Caution**
>
> - Applying detergent, oily liquid or volatile liquid to the oxygen sensor connector is prohibited.
> - The oxygen sensor wire harness must not be twisted, taut, or attached to objects with sharp edge or high temperature.

Installation

1. Refer to Emission Control System.

> **⚠ Caution**
>
> - Applying detergent, oily liquid or volatile liquid to the oxygen sensor connector is prohibited.
> - The oxygen sensor wire harness must not be twisted, taut, or attached to objects with sharp edge or high temperature.

Camshaft position sensor

Description

There are two camshaft position sensors, which are installed on cylinder head behind camshaft.

1	Output Signal Wire	3	To 5 V Power Supply
2	Ground		

Operation

Camshaft position sensor is a Hall type sensor. A phaser is installed on camshaft. When phaser is in high teeth, the applicable circuit outputs high voltage; when phaser is in missing teeth, the applicable circuit outputs low voltage. As a result, the crankshaft phase information is provided to Engine Control Unit

(ECU), so that the compression top dead center and exhaust top dead center of crankshaft can be distinguished.

Installation Precautions

1. The sensor must always be in the original packaging material before installation or test.
2. Take out the sensor from packaging material, check the sensor and ensure that it must not be damaged or contaminated.
3. Apply mineral oil to phase sensor O-ring, then press the sensor (do not tap with tool) and tighten with fixing bolt.
4. Never repair the sensor.

⚠ Caution
• The sensor contains strong magnet. Since most electronic storage devices (such as disk, tape.) are sensitive to magnetic fields, they must be stored separately from the permanent magnets.

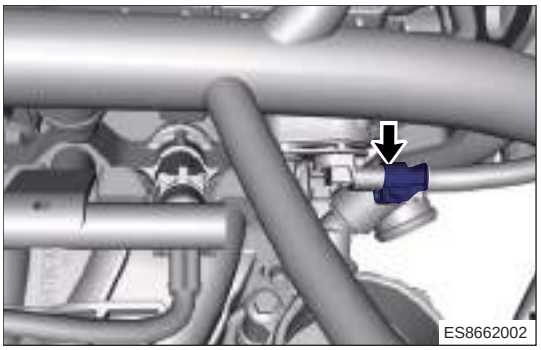
Common Problem Symptom

Problem symptoms: difficult to start engine, engine speed limited, etc.

Removal

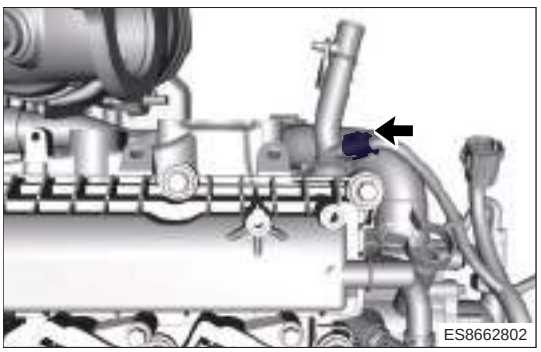
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the intake camshaft position sensor.
   a. Disconnect intake camshaft position sensor connector (arrow) and remove intake camshaft position sensor fixing bolt.

      Tightening torque: 8 ± 1N·m



4. Remove the exhaust camshaft position sensor.
   a. Disconnect exhaust camshaft position sensor connector (arrow) and remove exhaust camshaft position sensor fixing bolt.

      Tightening torque: 8 ± 1N·m



Installation

1. Installation is in the reverse order of removal.

⚠ Caution
• Sensor should be pressed into mounting hole. Never use tools (such as a hammer) to strike sensor into mounting hole forcibly.

Engine speed sensor

Description
Engine speed sensor is installed on transmission case and against flywheel teeth. It is used to detect the speed and position of crankshaft.

Operation
This sensor is installed on engine block, and used to detect crankshaft position and speed. Rotation of the signal plate causes the magnetic field at the induction point inside the speed sensor to alternate. The alternating magnetic field is induced by the differential Hall chip, and the induced alternating magnetic signal is converted into an electrical signal by the internal processing circuit of the sensor to output.

Installation Precautions
1. The sensor must always be in the original packaging material before installation or test.
2. Take out the sensor from packaging material, check the sensor and ensure that it must not be damaged or contaminated.
3. Press the sensor (do not tap with tool), and then secure it with fixing bolt and gasket.
4. Never repair the sensor.

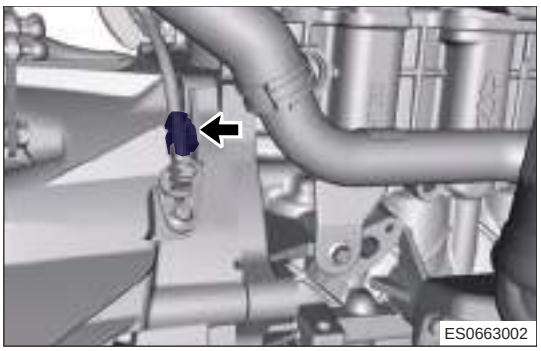
⚠ Caution

- The sensor contains strong magnet. Since most electronic storage devices (such as disk, tape.) are sensitive to magnetic fields, they must be stored separately from the permanent magnets. Users with cardiac pacemakers should take precautions before operation.

Common Problem Symptoms and Judgment Methods
1. Problem symptoms: Engine cannot start, etc.
2. Repair precaution:
   - Never repair the sensor!
   - Press in engine speed sensor rather than tapping during service.
3. Simple detection method for speed sensor malfunction:
   a. (Remove the connector) Turn LCR meter to ohm band (in-line mode, test frequency is 10 kHz), connect two probes to sensor connector terminals 1 and 3, rated resistance is 100 Ω ± 20%; Turn LCR meter to capacitance band (in-parallel mode, est frequency is 1 kHz), connect two probes to sensor connector terminals 1 and 3, rated capacitance is 100 nF ± 20%;Turn LCR meter to capacitance band (in-parallel mode, est frequency is 1 kHz), connect two probes to sensor connector terminals 2 and 3, rated capacitance is 4.7 nF ± 20%.

Removal
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the engine speed sensor.
   a. Disconnect engine speed sensor connector (arrow), and remove engine speed sensor fixing bolt.

      Tightening torque: 8 ± 2 N·m



Installation

1. Installation is in the reverse order of removal.

> ⚠ **Caution**
>
> - Ensure that the sensor is clean and the sensor is allowed to be removed from the package before it is installed in the engine or test bench. Users with cardiac pacemakers should take precautions before operation.
> - The sensor is only allowed to be pressed into installation hole by press-in. It is not allowed to install the sensor with a tapping tool (such as hammer).
> - If the engine speed sensor falls, never pick it up to install and it need to return to factory for testing.

Fuel Rail Injector Assembly

Operation

1. Fuel distribution pipe assembly is installed to intake manifold to store and distribute fuel.
2. Fuel distribution pipe assembly consists of fuel distribution pipe and fuel injector etc. Fuel distribution pipe is connected to fuel supply pipe through pipe joint to receive the fuel from fuel tank. Fuel injector sprays fuel into the intake passage accurately under the control of ECU electric pulse.

> ⚠ **Caution**
>
> - Excessive storage of gasoline can cause it to oxidize and deteriorate, which may cause the injector to become clogged or even damaged.

Precautions

1. Removal precautions:
   - If it is necessary to remove the fuel rail assembly, unplug the fuel injector connector, remove fixing bolt, and remove the wire harness from wire harness clamp; then grasp the injector with both hands and gently remove the fuel rail assembly from intake manifold, and the O-ring should not remain in cylinder head.
   - Clean the dirt on the outer surface of fuel rail assembly to prevent the dirt from being introduced into the fuel rail assembly during reassembly, resulting in damage to other components.
   - If the injector O ring is damaged during reassembly, never use it.
2. Installation precautions:
   - Make sure the fuel distribution pipe assembly is intact, undamaged, or uncontaminated, and there are no cracks, scars, grooves, burrs and rust on tube joint surface before use. Do not install fuel distribution pipe assembly that does not meet the requirement.
   - Lubricate the lower O-ring of fuel injector with clean lubricant before assembly.
   - Fuel injector should be prevented from being subjected to excessive impact during assembly, and tighten the mounting bolt until fuel injector is installed in place.
   - If it is necessary to secure wire harness, avoid deformation or damage of wire harnesses bracket caused by excessive shock to fuel distribution pipe assembly during installation.
   - When removing fuel distribution pipe assembly from engine and reinstalling it, it is necessary to replace fuel injector lower O-ring.
   - When the temperature is below zero, try to avoid installation or maintenance of fuel distribution pipe assembly, so as to avoid fuel leakage.
   - For after-sale maintenance, it is only allowed to replace the assembly.

Common Problem Symptoms and Judgment Methods

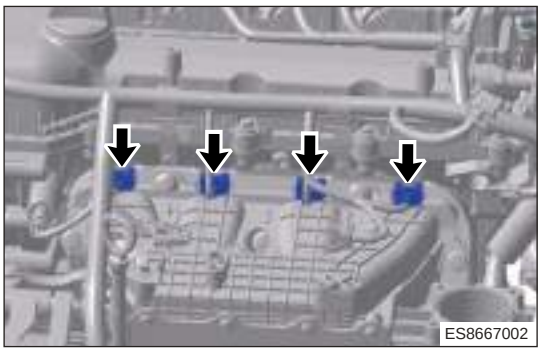
1. Problem symptoms: fuel leaks into engine compartment, which may cause vehicle burning in severe case.

2. Repair precaution:
   - Weld cracking of fuel distribution pipe;
   - Aging of injector o-ring;
   - Poor connection between fuel pipe and fuel distribution pipe assembly.
3. Simple detection method for fuel rail injector malfunction:
   - Remove fuel distribution pipe assembly from engine, apply compressed air of 4.5 bar from oil inlet port, place the injector connector upward, and immerse the fuel distribution pipe assembly into water so that the injection end of the injector does not contact with water. Observe if there is air bubble in the fuel rail injector assembly. If there are air bubbles in the fuel rail, there is a risk of fuel rail leakage.

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the fuel rail injector assembly.
   a. Disconnect 4 injector connectors (arrow), and remove fixing bolts from fuel rail injector assembly.

      Tightening torque: 8 ± 2 N·m



Installation

1. Installation is in the reverse order of removal.

Intake pressure sensor

Description

Intake pressure sensor is installed on intake manifold.

1	Ground Signal	3	To 5 V Power Supply
2	Temperature Signal	4	Pressure Signal

Operation

1. Intake manifold absolute pressure sensing element consists of a piece of silicon chip. Etch a piece of pressure diaphragm on silicon chip. There are 4 piezoresistors on pressure diaphragm, and the 4 piezoresistors form a Wheatstone bridge as strain element. Except for the pressure diaphragm, silicon chip is also integrated with signal processing circuit and temperature compensating circuit. Reference vacuum chamber is integrated into silicon chip, and absolute pressure in reference space is near zero. This will form a microelectronic mechanical system. Intake manifold absolute pressure to be measured acts on side which can sense pressure on silicon film from top side. Thickness of silicon chip is only several micrometers (μm), so the silicon chip will deform mechanically as intake manifold absolute pressure changes, and 4 piezoresistors will also deform, thus changing the resistance. Voltage signal linearly related to the pressure is generated after processing by signal processing circuit of silicon chip. Intake temperature sensing element is a negative temperature coefficient (NTC) resistor, whose resistance changes with the intake temperature. This sensor sends a voltage of intake temperature change to controller.

2. In other words, pressure sensing element and temperature sensing element are integrated into intake pressure/temperature sensor, which are used to detect actual intake pressure and temperature in intake manifold during engine running, and engine electronic control unit module calculates instantaneous intake air volume of engine quickly based on data provided by intake pressure/ temperature sensor and signals from other sensors of engine electronic control system.

Installation Precautions

1. The sensor is designed to be installed on the plane of intake manifold of engine. The pressure connecting pipe protrudes into the intake manifold, sealing the atmosphere with an O-ring.
2. If it is installed to the vehicle in a suitable way (if extracting pressure from intake manifold, pressure connecting pipe will tilt downward, etc.), thus ensuring that no condensation will form on the pressure sensitive element.
3. Drilling and fixing on intake manifold must be performed in accordance with the delivery drawings to ensure long-term sealing and be able to withstand erosion of media.
4. The reliable contact of the connector electrical connection is related to the material quality and dimension accuracy of the matching connector on the wire harness, expect for the influence of component connector.

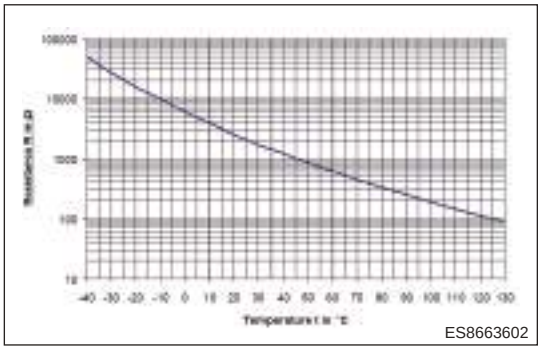
Common Problem Symptoms and Judgment Methods

1. Common problem symptoms related to this sensor: flameout, poor engine idle, etc.
2. General problem causes:
   - Abnormal high voltage or reverse large current during operation;
   - Pressure chip is damaged during service.
3. Precautions during service:
   - Never impact vacuum element with high pressure gas during service;
   - Check if alternator output voltage and current are normal when there is a fault and replacing sensor.

4. Simple measurement method:

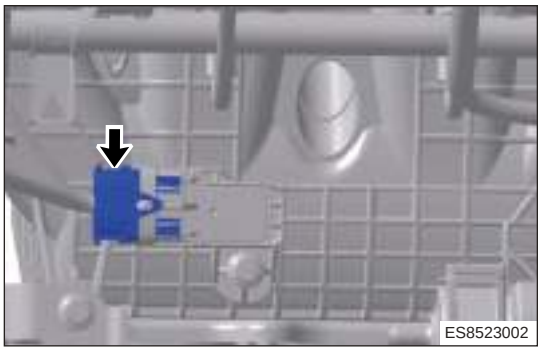
Step	Operation	Test Value	Test Result	Subsequent Step
1	Temperature sensor part: Remove intake pressure/temperature sensor wire harness connector, and measure resistance of terminals 1 and 2 of sensor separately with a multimeter;	The resistance of terminals 1 and 2 are determined according to ambient temperature near the sensor at the time of test. (rated resistance is 2.5 kΩ ± 5% at 20 ℃, and refer to temperature-resistance characteristic curve below for details)	Yes	Next
	Measurement can also be performed by simulating. Specific operations are to send wind to the sensor with blow drier (be careful that blow drier shouldn't be too close to the sensor) and observe the changes of sensor resistance. The resistance should reduce at the moment.		No	Replace intake pressure/ temperature sensor
2	Pressure sensor part: measure resistance between terminals 1 and 4, terminals 3 and 4 of intake pressure/temperature sensor;	Resistance between terminals 1 and 4, terminals 3 and 4 is 1.5 ± 0.5 kΩ	Yes	Next
			No	Replace intake pressure/ temperature sensor
3	Pressure sensor part: Connect intake pressure/temperature sensor wire harness connector, turn ENGINE START STOP switch to ON, the voltage between terminals 1 and 3 of intake pressure/temperature sensor wire harness should be 5 ± 0.5 V;	/	Yes	Diagnostic Help
	Under idling status, measure voltage of terminal 4 of sensor with a multimeter, the voltage should be about 0.7 V (value changes with model); under unloaded status, slowly open the throttle, the voltage of terminal 4 has not changed too much; quickly open the throttle, the voltage of terminal 4 can reach about 4 V instantaneously (value changes with model), and then drops to about 1.8 V (value changes with model).		No	Check for continuity and ground of wire harness

5. Temperature - resistance curve of intake pressure/ temperature sensor



Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the intake pressure/temperature sensor.
   a. Disconnect the intake pressure/temperature sensor connector (arrow).
   b. Remove fixing bolt and intake pressure/temperature sensor.



Installation

1. Installation is in the reverse order of removal.

Ignition coil

Description

Ignition coil converts low voltage of primary winding into high voltage of secondary winding, and discharges spark plug electrode to produce sparks which will ignite the combustible air-fuel mixture in cylinder.

1	Positive Power Supply Wire	3	Ground Wire
2	Ground Wire	4	ECU Control Signal

Operation

Ignition coil consists of primary winding, secondary winding, iron core and housing etc. When the ground passage of a primary winding is on, this primary winding is charged. If ECU cuts off the primary winding circuit, the charging will be suspended, and a high voltage will be induced in the secondary winding at same time, cause spark plugs to discharge.

Technical Characteristic Parameters

Primary Current	8.5AX (1 ± 8%)
Secondary Voltage	⩾ 37 KV (40 pF ± 5 pF of load)
Load	1000 ± 20V
Ignition Energy	⩾ 90mJ

Problem Symptoms and Judgment Methods

1. Problem symptoms: engine jitter, engine cannot start normally, misfire, etc.
2. General problem causes: burned due to excessive current, damaged by external force, etc.
3. Service precautions: It is prohibited to use high-voltage cable to perform ignition spark test during repair; otherwise it may cause damage to electronic controller.
4. Simple measurement method:
   a. Remove connector, turn digital multimeter to ohm band, connect two probes to two terminals of primary winding respectively, the resistance should be 0.5 ～ 0.64 Ω at normal temperature.
   b. When connecting to secondary winding, the resistance is 8.36 ～ 10.64 kΩ.

Removal

1. Refer to Ignition System for removal part.

Installation

1. Refer to Ignition System for installation part.

Fuel injector

Description

Fuel injector is located on the cylinder head near intake valve, and nozzle end is located directly above the intake port.

1	Positive Power Supply Wire	2	ECU Control Ground

Operation

In the non-operating condition, the injector spring presses the needle valve set against the valve seat and seals the fuel injection port. When the ECU drives the fuel injector to operate, the electromagnetic coil energizes and generates electromagnetic force, and the needle valve set is sucked up, and separated from valve seat set, and the fuel is atomized and sprayed through the orifice plate. When the injection pulse is cut off, the pressure of return spring returns and closes the needle valve.

Problem Symptoms and Judgment Methods

1. Problem symptoms: poor engine idle, poor acceleration, engine cannot start (different to start), etc.

⚠ Caution

- A failure phenomenon is that injector body surface is wet after the vehicle is running for a while, customer will misunderstand that “leakage” occurs in injector, in fact, it is the phenomenon of thermal diffusion of lubricant (applied to injector O-ring) on the injector body. It does not affect the use of injector. This phenomenon will not occur again after drying.

2. General problem causes:
   a. Lack of maintenance. Since the fuel added to fuel tank last time is stored too long, and it is more than 2 months, fuel colloidal material is produced due to fuel oxidation, so that abnormal injection or no fuel injection due to accumulation of colloidal material in fuel injector, resulting in injector failure.

⚠ Caution

- If the customer does not drive the vehicle frequently, it is suggested to store a small amount of fuel in the tank. The purpose is to consume the fuel in the tank in time, and avoid fuel deterioration in tank as much as possible.

3. Simple detection method for injector malfunction:

a. Check if the injector itself is malfunctioning.
b. Check the cause of fuel leakage in the injector.
c. Check if the fuel injector is leaked oil.
d. Check if the fuel leakage is caused by fuel rail.
e. Turn digital multimeter to ohm band (remove connector), connect two probes to two terminals of fuel injector respectively, the rated resistance should be 12 ± 1 Ω at 20℃. Resistance is 12 ± 3 Ω at normal temperature.

Removal

1. Refer to FUEL SUPPLY SYSTEM.

Installation

1. Refer to FUEL SUPPLY SYSTEM.

Engine Control Unit (ECU)

Operation

Engine Control Unit (ECU) is a pre-programmed microprocessor digital computer, which is used to adjust ignition timing, air-fuel ratio, emission control device, speed control, A/C compressor and idle speed etc. Engine Control Unit (ECU) enables the program to suit ever-changing operation conditions.

Installation Precautions

1. Pay attention to static electricity protection during installation.
2. Take care to protect connector terminals.
3. Avoid water stains entering the connector during installation.

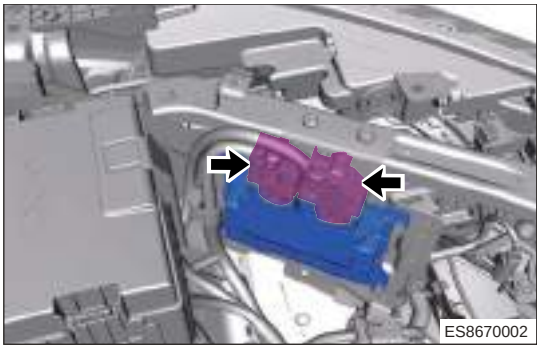
Common Problem Symptoms and Judgment Methods

1. Problem symptoms: Engine idles roughly, poor acceleration, engine cannot start, too high idle speed, exhaust exceeding, different to start, A/C failure, injector control failure, stalls, etc.
2. General problem causes:
   - ECU internal parts are burned and faulty due to the electrical overload of external device;
   - Circuit board is rusted due to water enters ECU.
3. Repair precaution:
   - Do not remove ECU casually during service;
   - Disconnect the negative battery cable for more than 1 minute before removing ECU;
   - Make sure to remove ECU before performing welding operation, and the removed ECU should be stored carefully;
   - Do not install any wire on ECU connecting wire.
4. Simple measurement method:
   a. Connect ECU connector, turn ENGINE START STOP switch to ON, use diagnostic tester to read engine DTCs and datastream or record;
   b. Remove ECU connector, check if ECU and its connecting wire are in good condition, mainly check if ECU power supply wire and ground wire are normal;
   c. Check if the external sensor is operating properly, output signal is reliable and its circuit is in good condition;
   d. Check if the actuator is operating properly and its circuit is in good condition;
   e. Perform test with a new ECU to check if fault reoccurs.

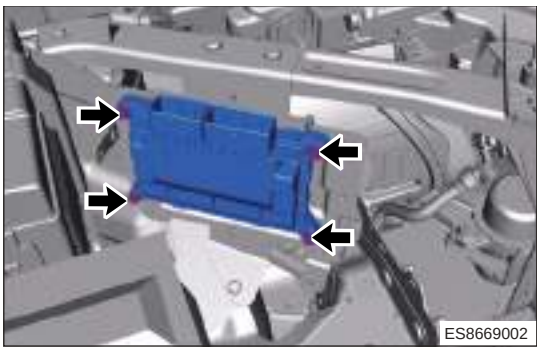
Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the Engine Control Unit (ECU).

a. Disconnect the ECU connectors (arrow).



b. Remove 4 fixing bolts (arrow) and ECU.
Tightening torque: 8 ± 2 N·m



Installation

1. Installation is in the reverse order of removal.

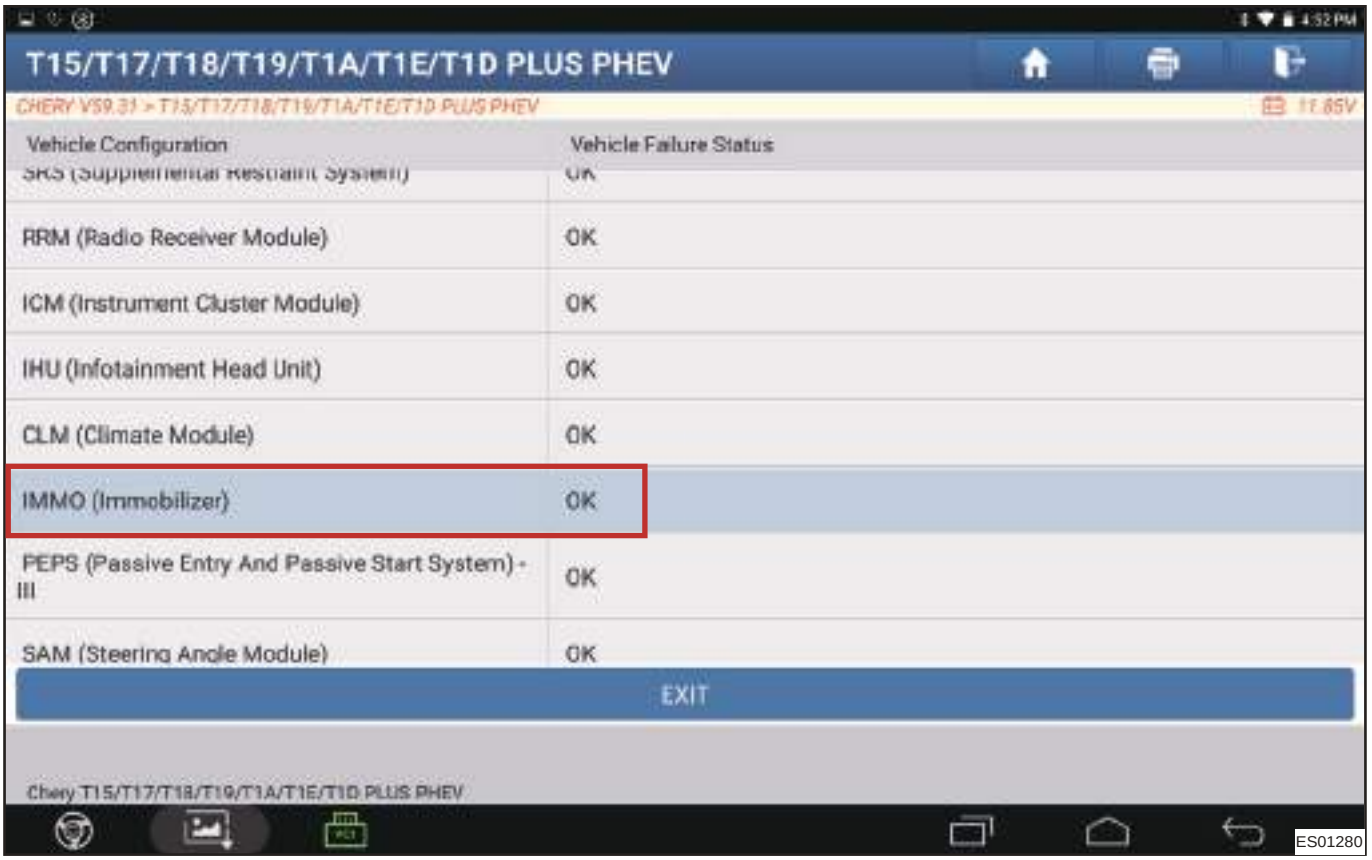
⚠ Caution
• Pay attention to static electricity protection during installation. • Take care to protect connector terminals. • To prevent water droplets from accumulating on connector joint, face it down.

Matching Learning

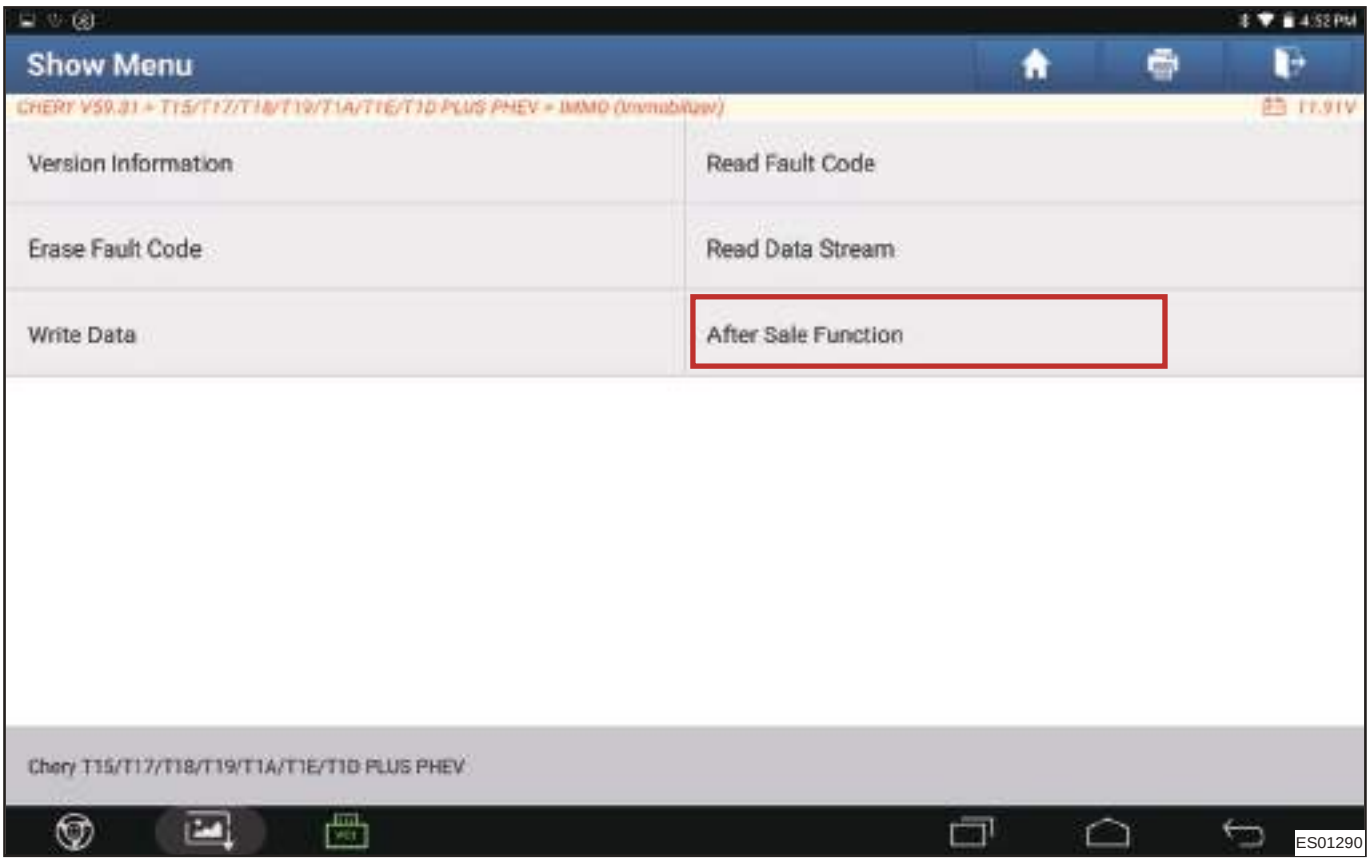
Write VIN Code

1. Connect diagnostic tester, and select corresponding model.

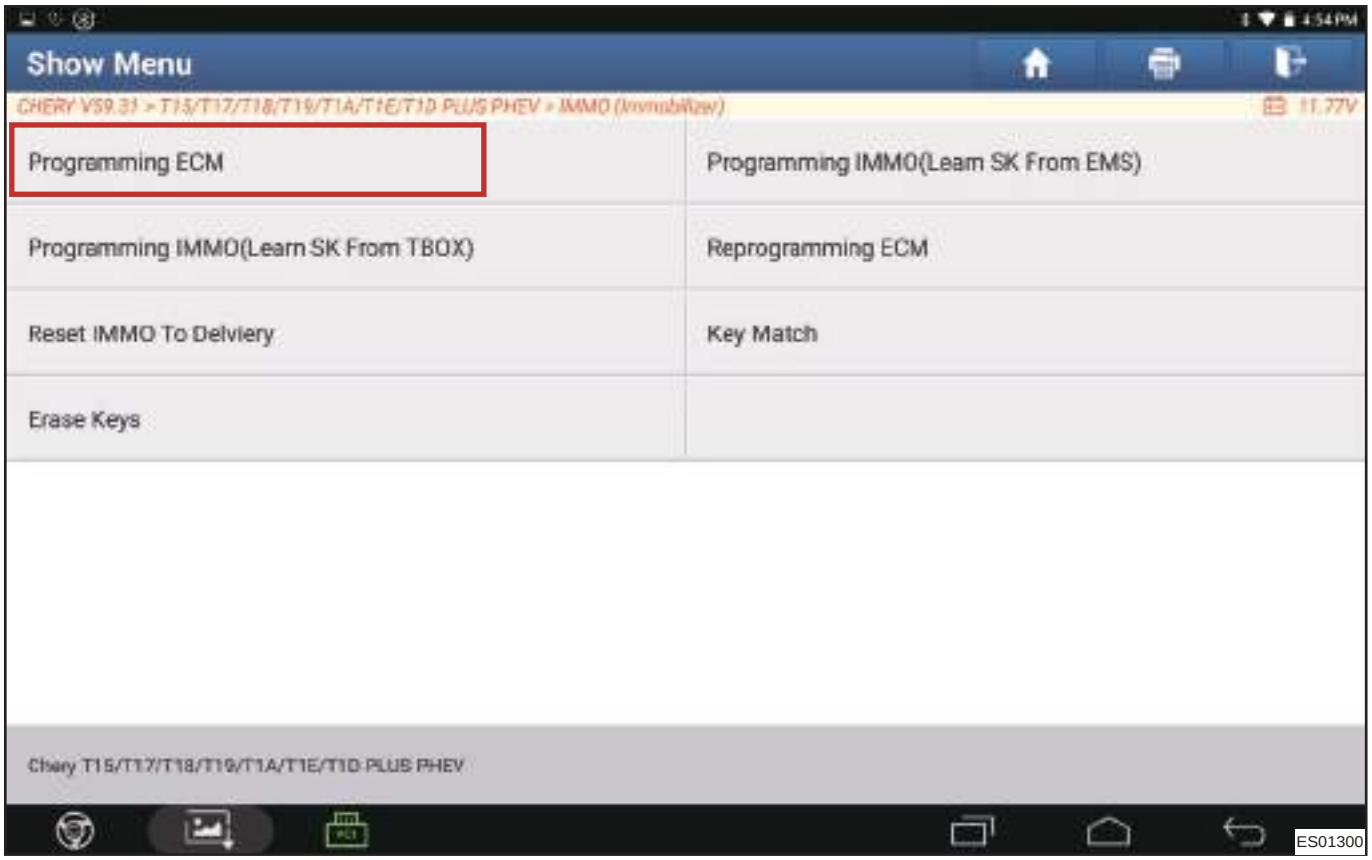
2. Click “IMMO (Immobilizer)”.



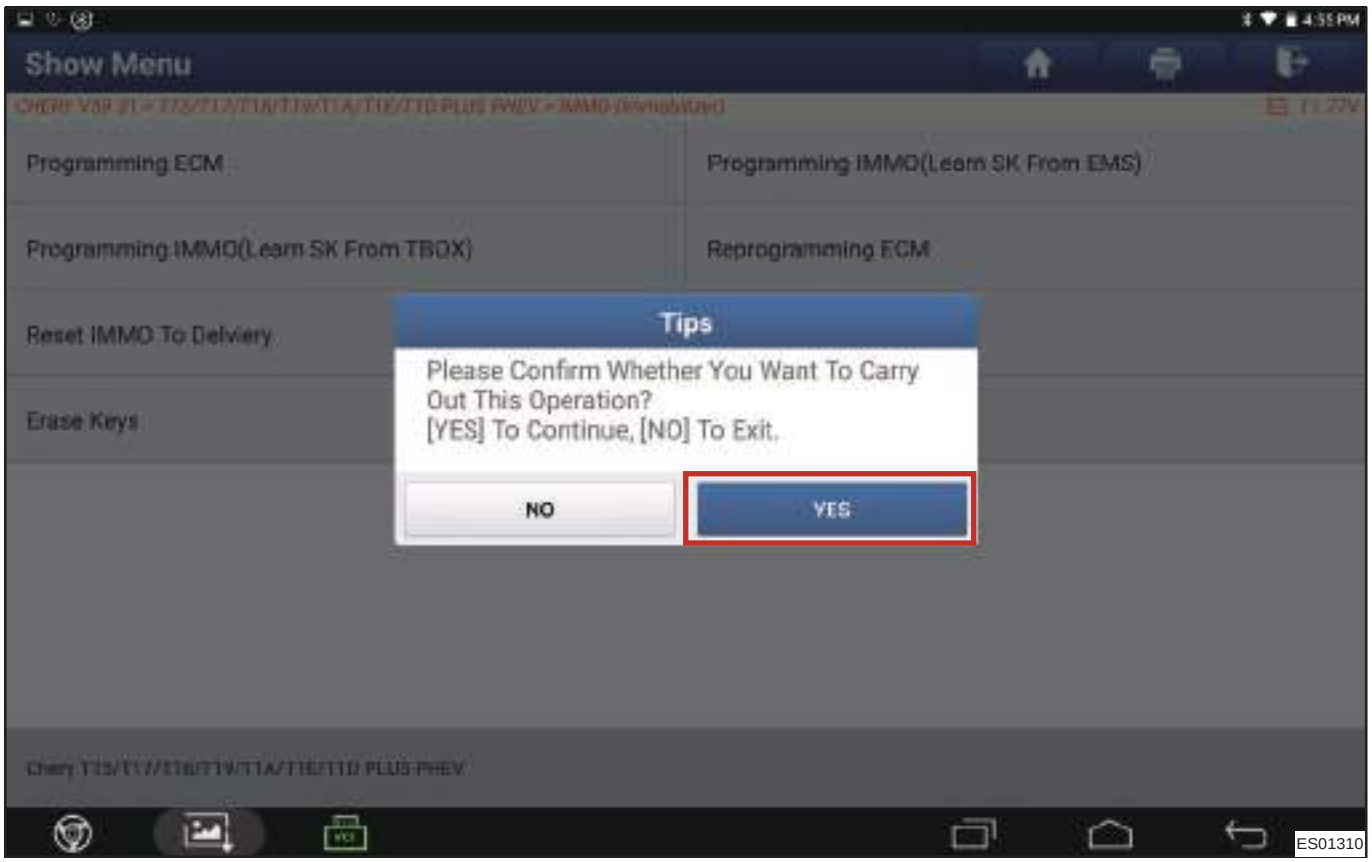
3. Click “Immobilizer Matching”.



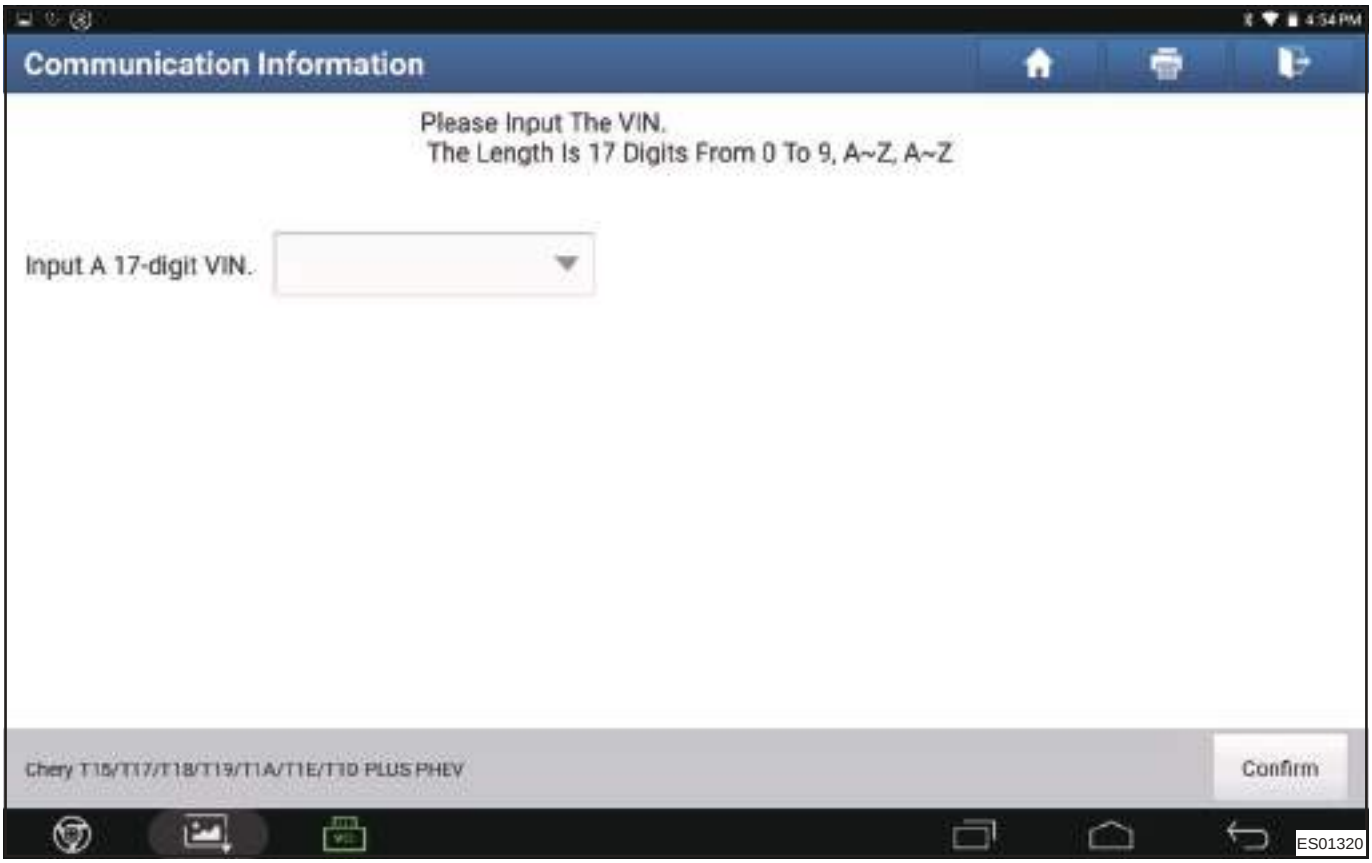
4. Click “Programming Engine Control Module (ECM)”.



5. Display shows execution condition, confirm it and click “Yes”.

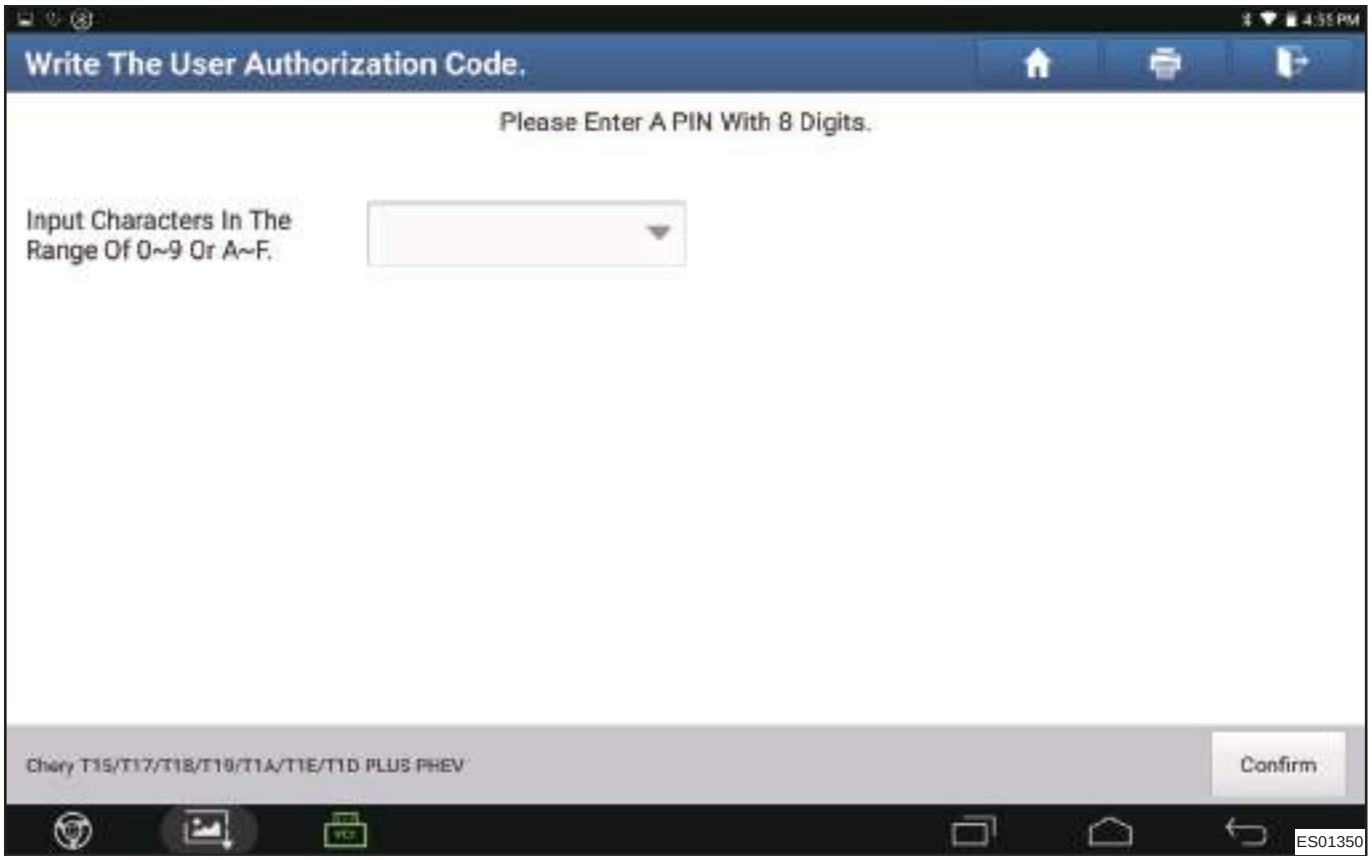


6. Input 17-digit VIN code, and click “OK”.

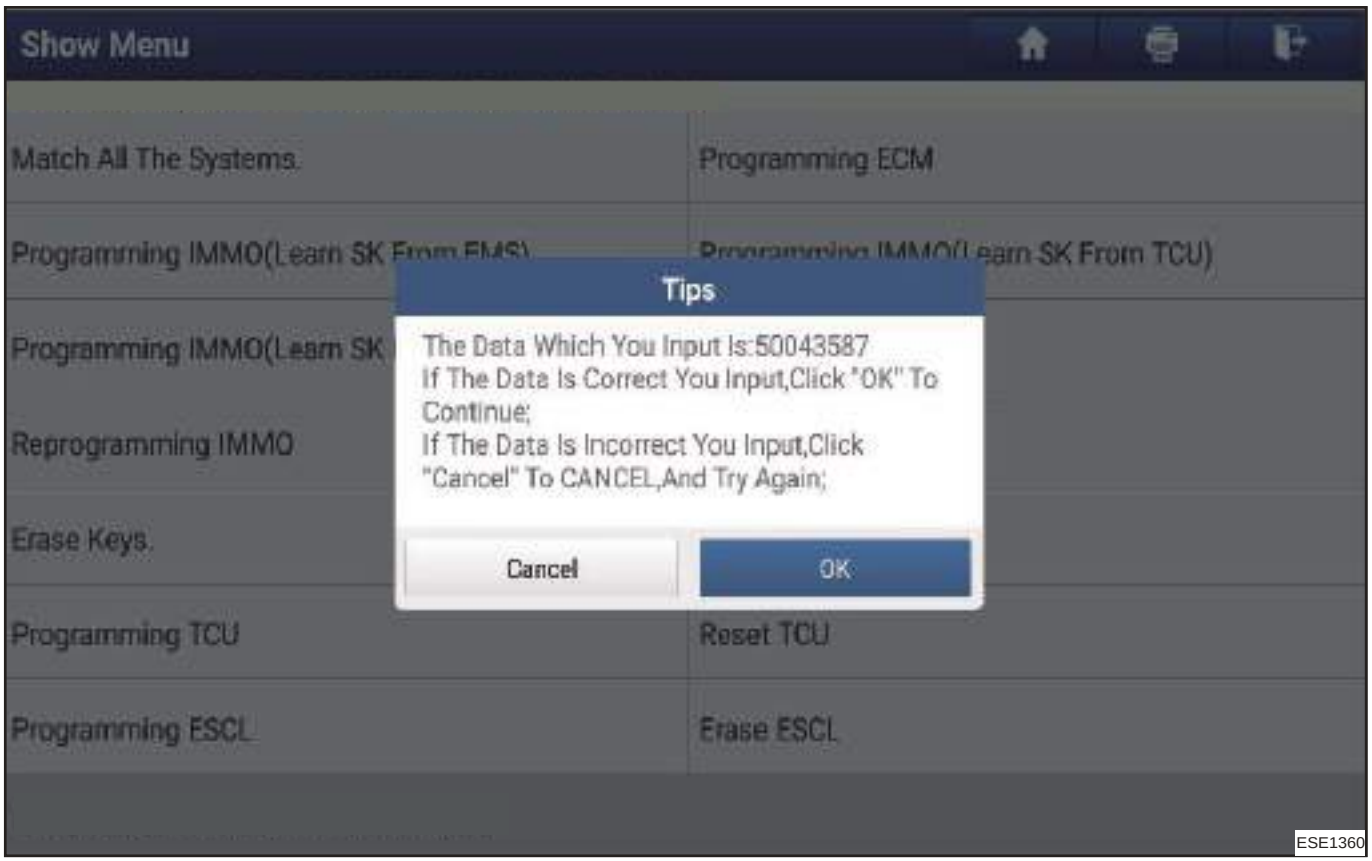


7. Confirm and click “OK”.
8. Display shows that VIN is written successfully, then click “OK”.

9. After entering 8-digit anti-theft security code, click “OK”.



10. After entering 8-digit anti-theft security code again, click “OK”.



11. Display shows that write user authorization code successfully! Click “OK”.

12. Display shows that Engine Control Module (ECM) is programmed successfully, then click “OK”.

Diagnosis & Testing

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Valve mechanism noise	Engine oil (oil level high or low, oil lean or rich)
	Rocker arm (abnormal wear)
	Hydraulic lifter assembly (fails and wear)
	Valve spring seat (excessive runout)
	Valve (excessive clearance between valve and guide)
	Camshaft (Bend, deformation, abnormal wear, axial/radial clearance increased)
Connecting rod noise	Engine oil (insufficient oil, low viscosity, low pressure)
	Connecting rod (misaligned)
	Bend, deformation of connecting rod
	Connecting rod bearing shell (excessive radial clearance)
	Connecting rod journal (out-of roundness)
Main bearing noise	Engine oil (insufficient oil, low viscosity, low pressure)
	Main bearing shell (excessive clearance)
	Crankshaft axial clearance (excessive)
	Crankshaft journal (out-of roundness or worn)
	Flywheel or clutch (loose)
Oil loss or spark plug blockage	Piston ring (worn, scratched or damaged)
	Piston ring groove (carbon deposited)
	Valve oil seal (worn or damaged)
	Valve (excessive clearance between valve and guide)

Inspection

1. Check the coolant.
2. Check the engine oil.
3. Check the battery.

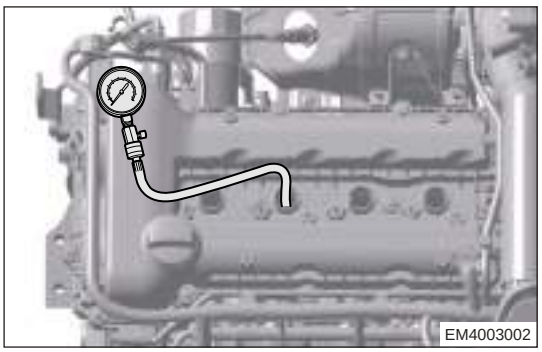
4. Check the air filter element.
   a. Remove the air filter element.
   b. Visually check that there is no dirt, blockage or damage in the air filter element.

      Hint:
      If there is any dirt or blockage in air filter element, clean it with compressed air.
      If any dirt or blockage remains, even after cleaning air filter element with compressed air, replace it.
5. Check the spark plug.
6. Test cylinder compression pressure.
   - Cylinder pressure is the main index to judge engine operation and also can be used to definitely judge whether some system of engine operates well or not. Therefore, it is necessary to perform cylinder pressure measurement when servicing engine.
   - Ensure battery is fully charged and engine starter is in good operating condition. Otherwise, indicated compression pressure used for diagnosis may be invalid.

⚠ Caution

- Recommended compression pressure is only used as a guide for diagnosing engine malfunction.
- Never determine cause of low pressure by disassembling engine unless there are some malfunctions.
- Use a cylinder pressure gauge with accurate reading and reset it to zero, or it will influence accuracy of reading.

   a. Turn off all electrical equipment and ENGINE START STOP switch.
   b. Remove the ignition coil.
   c. Remove the spark plug.
   d. Slowly screw the cylinder pressure gauge connector vertically into the spark plug mounting hole. Do not tighten it excessively to prevent difficult removal.



   e. With transmission in P/N (for CVT models) position, depress accelerator pedal fully, then start engine and keep it racing for 3 to 5 seconds; Record the measured pressure value.
   f. Press the bleeder button of cylinder pressure gauge to reset it to zero. Use same method to repeat this test three times and then calculate average value. Cylinder pressure value is within 7 - 10 bar (180 - 250 r/min).

⚠ Caution

- DO NOT screw the cylinder pressure gauge excessively to prevent difficult removal.
- During measurement, do not turn ENGINE START STOP switch to “START” for more than 10 seconds. Otherwise, engine may be damaged.
- Ensure battery is fully charged when cranking engine. Correct cylinder pressure can be measured only when engine is running at 180 - 250 r/min.
- Use same method to measure pressure of other cylinders.

Standard cylinder pressure value is within 7 - 10 bar (180 - 250 r/min). The value will drop slightly with usage of engine, but the lowest value cannot be below 7 bar and pressure difference between each

cylinder should not be above 3 bar.If engine cylinder pressure is lower than standard value, it indicates that cylinder pressure is insufficient. Add a small amount of engine oil to cylinder through spark plug hole and perform measurement again.If pressure increases after adding oil, piston ring or cylinder bore may be worn or damaged. If pressure remains low, the valve may be stuck or damaged, or there may be air leakage in cylinder head gasket.

g. Install the spark plug.
h. Connect all injector connectors.
i. Install the ignition coil.

7. Test cylinder head gasket for leakage.

Hint:
Cylinder head gasket leakage may be present between adjacent cylinder and water jacket or from an oil passage to the external of engine.

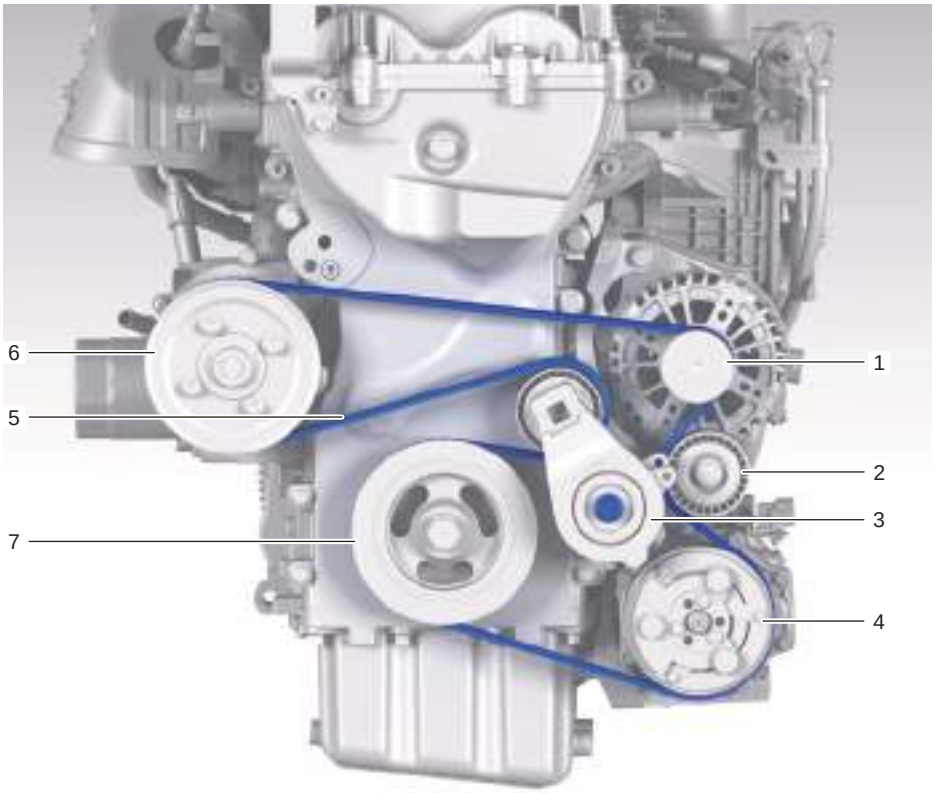
a. Possible trouble symptoms caused by cylinder head gasket leakage between adjacent cylinders are as follows:
   - Engine power loss.
   - Engine stall.
   - Low fuel economy.

b. Possible trouble symptoms caused by cylinder head gasket leakage between cylinder and adjacent water jacket are as follows:
   - Engine overheats.
   - Coolant loss.
   - Excessive steam (white smoke) emitted from exhaust system.
   - Coolant foaming.

On-vehicle Service

Accessory Pulley

Description



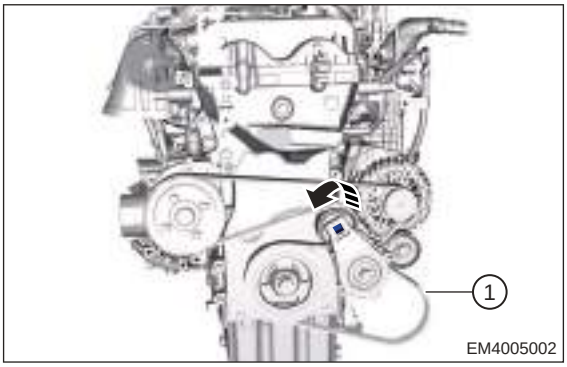
1	Alternator Assembly	5	Accessory Drive Belt
2	Idler Pulley Assembly	6	Water Pump Pulley
3	Tensioner Assembly	7	Crankshaft Pulley
4	Compressor Assembly		

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the accessory drive belt.

a. Insert tip of ratchet rod into tensioner pin hole (arrow) and pull it upward in direction of arrow as shown in illustration, then remove accessory drive belt assembly (1).

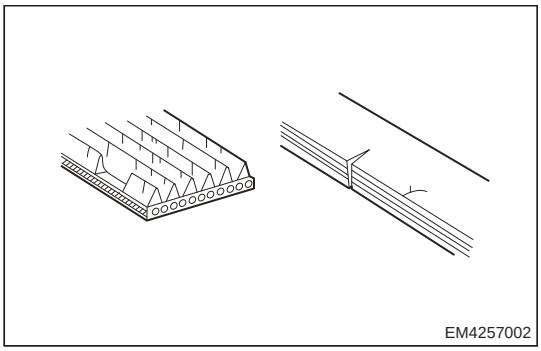
Hint:
Prevent hand from contacting belt tensioner when raising it upward, causing unnecessary hurt.



Inspection

1. Visually check accessory drive belt for excessive wear and cords for wear, etc. If any of these defects is found, replace accessory drive belt.

Hint:
If accessory drive belt has chunks missing from ribs, it should be replaced.
After installing accessory drive belt, check that it fits properly in the ribbed grooves. Check that belt has not slipped out of grooves on bottom of the crankshaft pulley by hand.



Installation

⚠ Caution
• Before installation, remove the dirt from accessory drive belt. • Rotate crankshaft after installation, make sure that accessory drive belt is installed in place and does not interfere with other separate parts.

1. Installation is in the reverse order of removal.

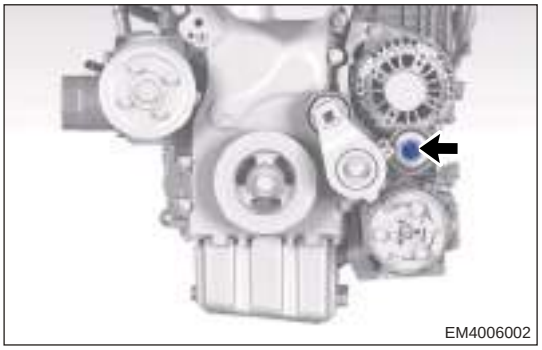
Idler Pulley Assembly

Removal

⚠ Caution
• Be sure to wear necessary safety equipment to prevent accidents when repairing. • Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the accessory drive belt.
4. Remove the idler pulley assembly.

a. Remove fixing bolt (arrow) from idler pulley assembly.
Tightening torque: 50 + 5 N m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b. Remove the idler pulley assembly.

Inspection

1. Rotate idler pulley by hands and check if rotation is smooth and if abnormal noise occurs.
2. Wiggle idler pulley in axial and radial directions to check bearing for looseness.
3. Check if there is damage on idler pulley assembly operating surface.

Installation

⚠ Caution

- After installation, turn crankshaft to run accessory drive belt several circles, and check if crankshaft turns smoothly and belt runs well. If it cannot turn smoothly, reinstall accessory drive belt.
- Make sure to correctly install accessory drive belt, and it does not interfere with other components.

1. Installation is in the reverse order of removal.

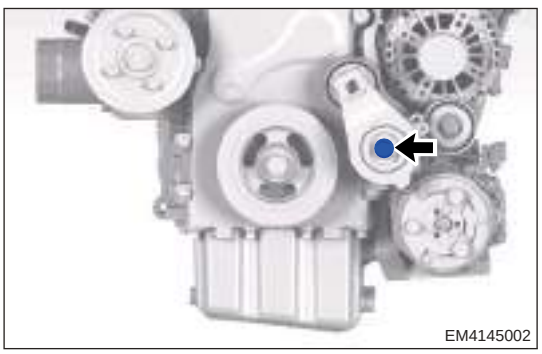
Tensioner Assembly

Removal

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the accessory drive belt.
4. Remove the tensioner assembly.
   a. Remove the tensioner assembly fixing bolt (arrow).
   Tightening torque: 40 + 5 N m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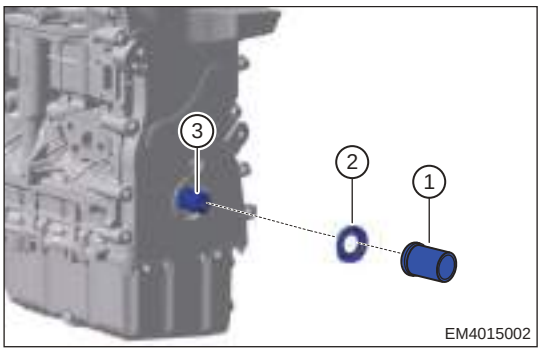
   b. Remove the tensioner assembly.

1. Install the crankshaft front oil seal.
   a. Install new oil seal (2) to crankshaft (3), then install new oil seal evenly and fully into oil seal retainer with a crankshaft front oil seal installer (1).

      Hint:
      Oil seal surface should be lower than timing chain cover oil seal hole end surface by 0 ～ 1 mm.
      Ensure that oil seal lip has no damage during assembly.
      Never allow tilting it by more than 5°, oil seal external rubber breakage or flanges during oil seal press fitting.



   b. Other installation procedures are in the reverse order of removal.

Flywheel

Removal

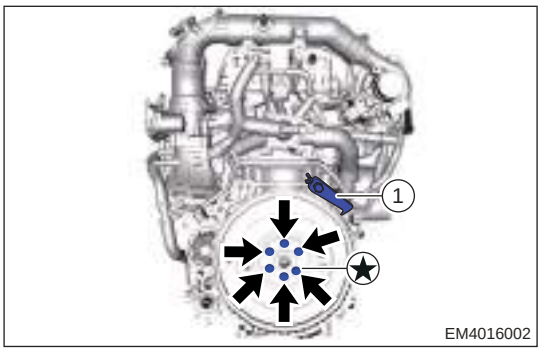
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the automatic transmission assembly.
4. Remove the flywheel assembly.
   a. Install flywheel holding tool (1) to lock flywheel.
   b. Remove 6 fixing bolts (arrow) and flywheel assembly.

      Tightening torque: 1st step: 35 ± 5 N·m; 2nd step: 45° ± 5°

      Hint:
      Pay attention to personal safety during operation.
      DO NOT remove all fixing bolts without any auxiliary measures.
      Flywheel fixing bolts must be disposed after removal. Never reuse them.



Inspection

1. Check if crankshaft position signal gear is distorted or deformed. If damaged, replace flywheel. Clean signal gear before installation.
2. Check if starter driven gear ring is worn. If excessively worn, replace flywheel.

Installation

⚠ Caution

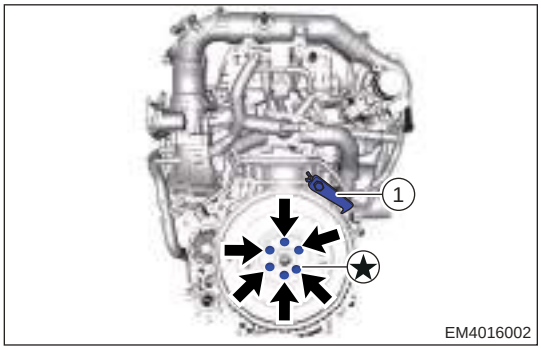
- Six bolt holes on the flywheel have asymmetrical positions. During installation, pay attention to that flywheel fixing bolts are aligned with crankshaft bolt holes.
- Lightly push flywheel after alignment during assembly. Do not tap flywheel with a hammer.
- Replace flywheel fixing bolts with new ones.

1. Install the flywheel.

a. When installing flywheel assembly, pretighten fixing bolts (arrow), and install flywheel holding tool, then tighten each flywheel bolt diagonally in order.

Tightening torque: 1st step: 25 ± 5 N·m 2nd step: 30° ± 5°

★ - Non-reusable Parts



Crankshaft Rear Oil Seal

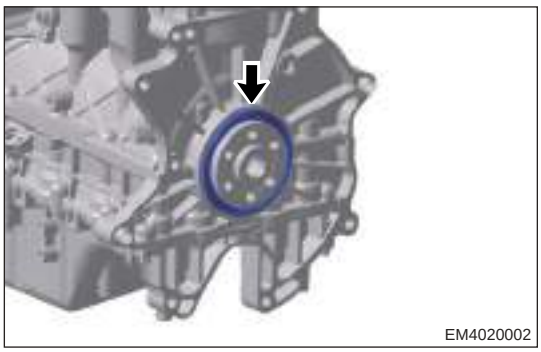
Removal

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the transmission assembly.
4. Remove the flywheel assembly.
5. Remove the crankshaft rear oil seal.
   a. Using a screwdriver with the tip wrapped with protective tape, remove crankshaft rear oil seal (arrow).

   Hint:
   Be careful not to scratch cylinder block, when removing oil seal.



Installation

⚠ Caution

- Be sure to clean dirt around oil seal retainer and on inside wall before installation.
- Check oil seal for damage before installation. If there is any damage, replace it.
- Be sure to prevent the lip of crankshaft rear oil seal from being scratched during installation.
- Be careful not to damage oil seal retainer during installation.

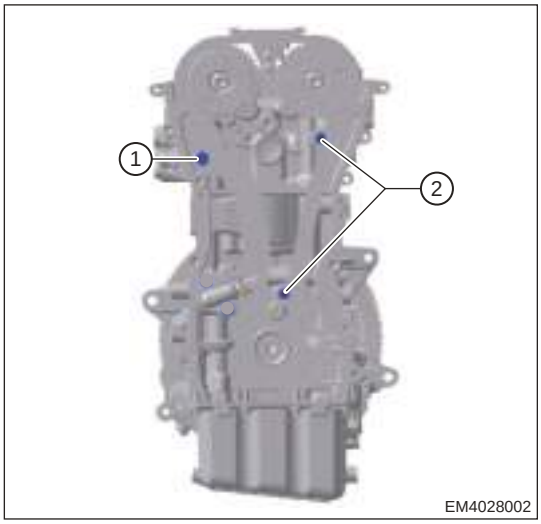
1. Install the crankshaft rear oil seal.
   a. Apply engine lubricant to crankshaft oil seal outer retainer and lip.

c. Remove fixing bolt (1) and movable guide rail assembly.

Tightening torque: 9 + 3 N m

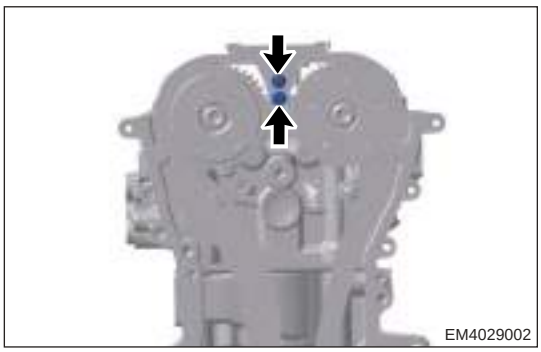
d. Remove 2 fixing bolts (2) and fixing guide rail assembly.

Tightening torque: 9 + 3 N m



e. Remove 2 fixing bolts (arrow) and upper guide rail assembly.

Tightening torque: 9 + 3 N m



f. Remove the engine timing chain assembly.

⚠ Caution

- Mark front side and back side of chain with a marking pen after removing chain, so as to keep same direction during installation. Long time movement in one direction of timing chain will cause wear difference between two sides of chain, so it is necessary to remove and install the chain in same direction.

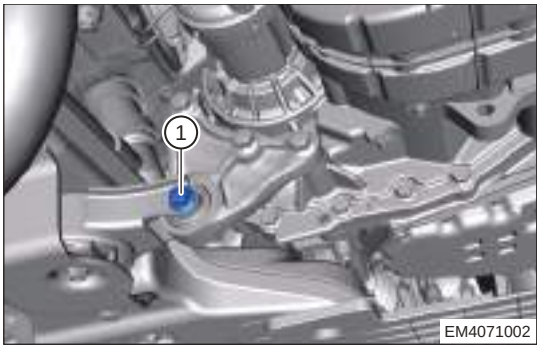
Inspection

1. Check the timing chain.
   a. Check the timing chain in detail, the timing chain and the engine life, if the tooth surface without serious wear or crack, you can continue to use.
   b. If the timing chain is to be replaced, the full set of sprockets, chains and guide rails should be replaced together.
2. Inspect the engine timing chain movable guide rail.
   a. Measure depth of engine timing chain movable guide rail with a vernier caliper.

      Hint:
      Wear limit is 1 mm.
3. Check tensioner.

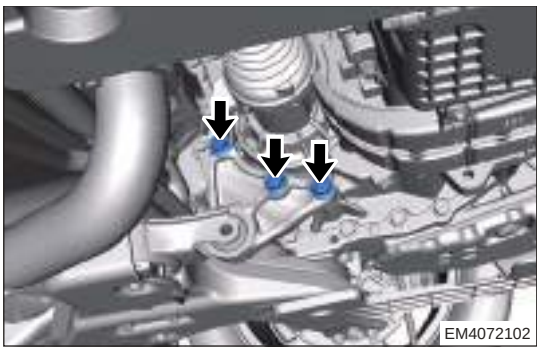
a. Remove the through bolt (1) between rear mounting cushion assembly I and rear mounting cushion assembly.

Tightening torque: 120 ± 10 N m



b. Remove 2 coupling bolts (arrow) between rear mounting cushion assembly I and transmission.

Tightening torque: 80 ± 5 N m

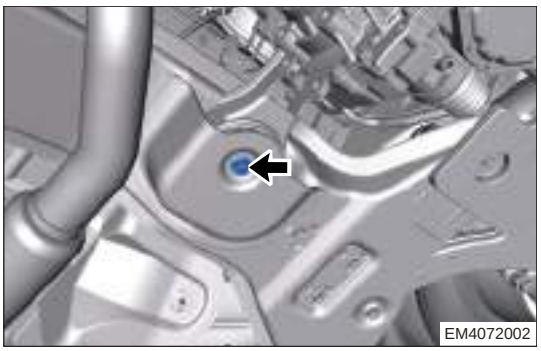


c. Remove rear mounting cushion assembly I.

4. Remove the rear mounting cushion assembly.

a. Remove the coupling bolt (arrow) between rear mounting cushion assembly and sub frame.

Tightening torque: 120 ± 10 N m



b. Remove rear mounting cushion assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution
• Pre-tighten 2 or 3 threads manually first during assembly of bolts and nuts, then pre-tighten and tighten it to specified torque with a tool.

Left Mounting Assembly

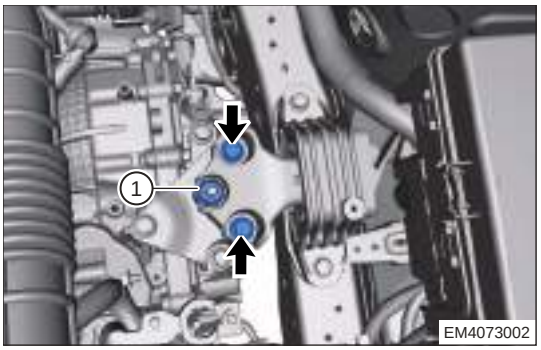
Removal

⚠ Caution
• Be sure to wear necessary safety equipment to prevent accidents when repairing. • Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.

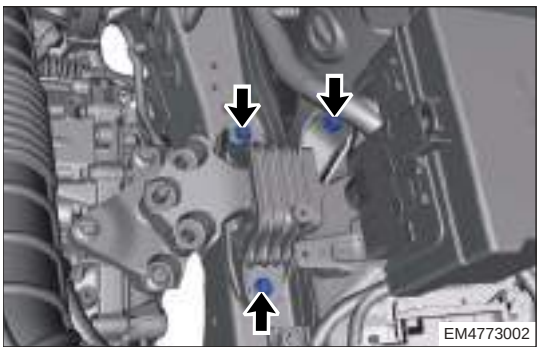
2. Disconnect the negative battery cable.
3. Remove the air filter assembly.
4. Remove the battery assembly.
5. Remove the battery tray bracket.
6. Remove the left mounting cushion assembly.
   a. Remove 2 fixing nuts (arrow) and 1 coupling bolt (1) between left mounting cushion assembly and left mounting bracket.

      Tightening torque: 100 ± 10 N m



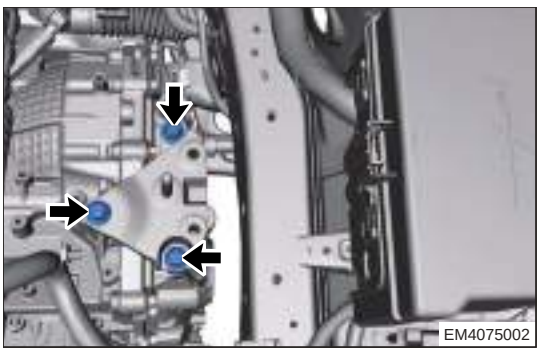
   b. Remove 3 fixing bolts (arrow) between left mounting cushion assembly and left side rail wheel house assembly.

      Tightening torque: 65 ± 5 N m



7. Remove the left mounting bracket.
   a. Remove 4 fixing bolts (arrow) between left mounting bracket and transmission case.

      Tightening torque: 65 ± 5 N m



   b. Remove the left mounting bracket.

Installation

1. Installation is in the reverse order of removal.

Right Mounting Assembly

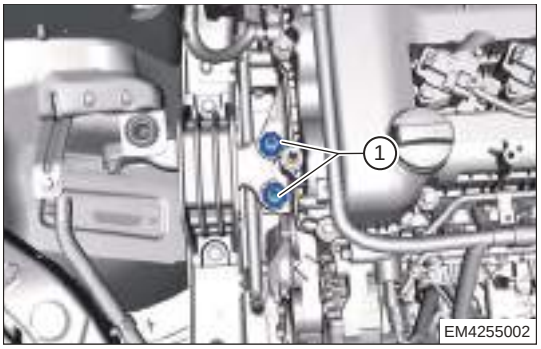
Removal

> **⚠ Caution**
>
> - Be sure to wear necessary safety equipment to prevent accidents when repairing.
> - Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.

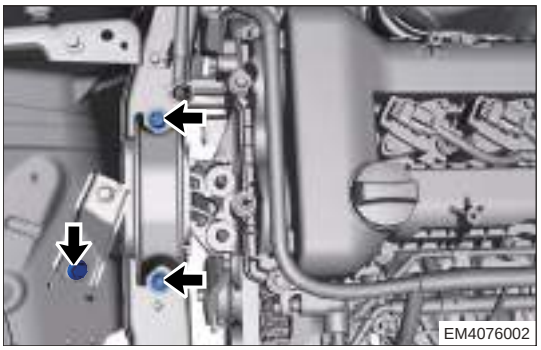
2. Disconnect the negative battery cable.
3. Remove the expansion tank assembly.
4. Remove the engine right mounting cushion assembly.
   a. Remove 2 fixing nuts (1) between right mounting cushion assembly and engine.

      Tightening torque: 100 ± 10 N m



   b. Remove 3 coupling bolts (arrow) between right mounting cushion assembly and body.

      Tightening torque: 65 ± 5 N m



   c. Remove the engine right mounting cushion assembly.

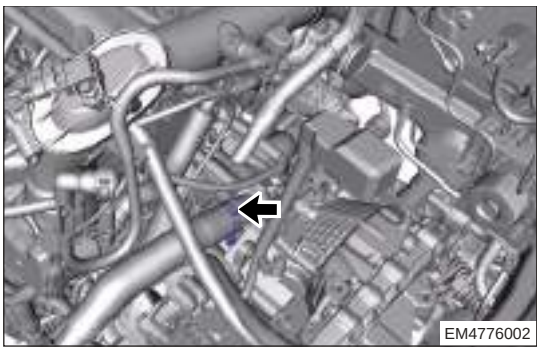
Installation

1. Installation is in the reverse order of removal.

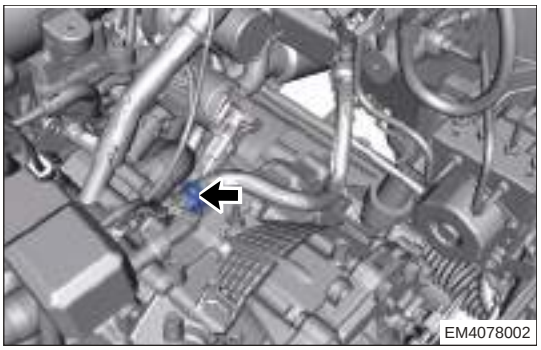
⚠ Caution

- When installing right side rail wheel house on right mounting cushion assembly, first tighten the other locating bolt on side rail, and finally tighten the bolt on wheel house.
- Pre-tighten 2 or 3 threads manually first during assembly of bolts and nuts, then pre-tighten and tighten them to specified torque with a tool.

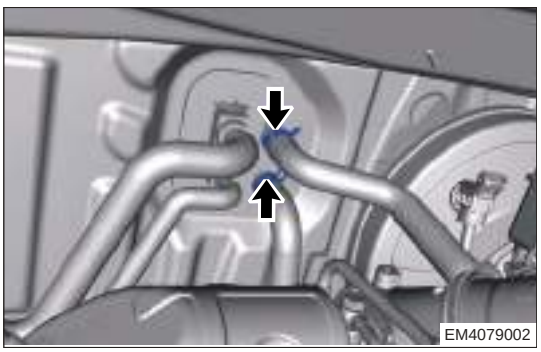
7. Drain the transmission oil.
8. Drain the coolant.
9. Recover the refrigerant.
10. Remove the electric water pump and mounting bracket.
11. Remove the precatalytic converter assembly.
12. Remove the turbocharger assembly.
13. Disconnect engine inlet and outlet hoses.
    a. Loosen elastic clamps (arrow) and disconnect connections between engine inlet and outlet hoses and thermostat seat.



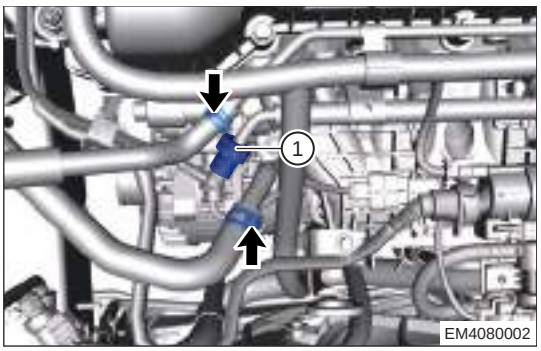
14. Disconnect the vacuum pipe.
    a. Loosen elastic clamp (arrow) and disconnect connection between brake vacuum hose and brake vacuum steel pipe.



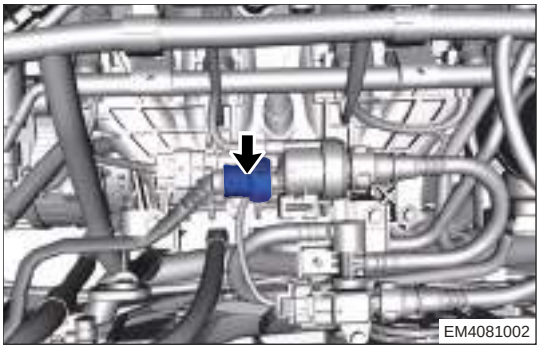
15. Disconnect connection between hose and heater core.
    a. Loosen elastic clamp (arrow) and disconnect connection between heater core inlet/outlet hose and heater core.



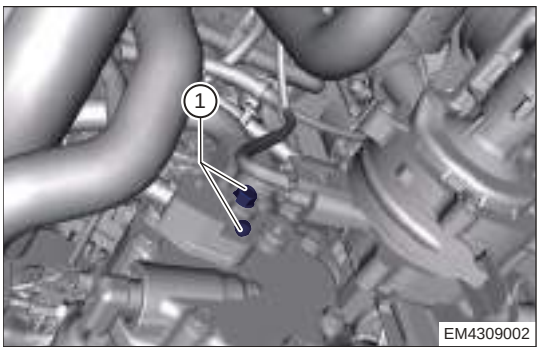
16. Loosen 2 elastic clamps (arrow) and disconnect water pipe.
17. Disconnect connection (1) between inlet pipe and fuel rail injector assembly.



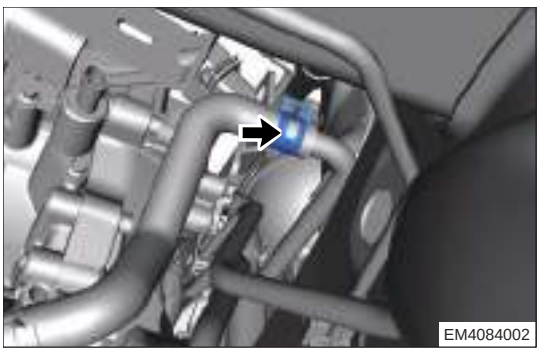
18. Disconnect connection (arrow) between fuel vapor pipe and canister solenoid valve.



19. Disconnect all wire harnesses.
20. Remove the front wheel.
21. Remove the drive shaft.
22. Remove the sub frame assembly.
23. Disconnect the transmission oil cooling pipe.
    a. Remove the tightening clamp and disconnect transmission oil cooling pipe.
24. Disconnect the A/C compressor high and low pressure pipes.
    a. Remove coupling bolts (1) between high/low pressure pipes and A/C compressor assembly, and disconnect high and low pressure pipes.

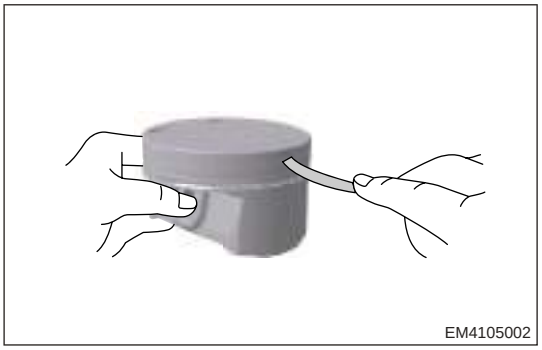


25. Disconnect the water supply pipe.
    a. Loosen elastic clamp (arrow) and disconnect connection between expansion tank water supply pipe and oil filter module assembly.



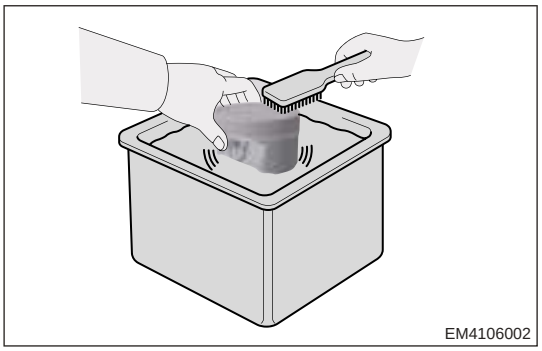
26. Lower vehicle to the position where engine assembly can be placed steadily in maintenance platform.
27. Remove the rear mounting assembly.
28. Remove the left mounting assembly.
29. Remove the right mounting assembly.
30. Check that engine assembly is separated with external components.
31. Raise vehicle to the position where engine assembly can be separated from body.
32. Remove engine wire harness and battery wire harness from engine.
33. Separate transmission assembly from engine assembly.
34. Install engine assembly to engine service platform.

b. Using a piston ring, remove carbon deposits from piston ring grooves.



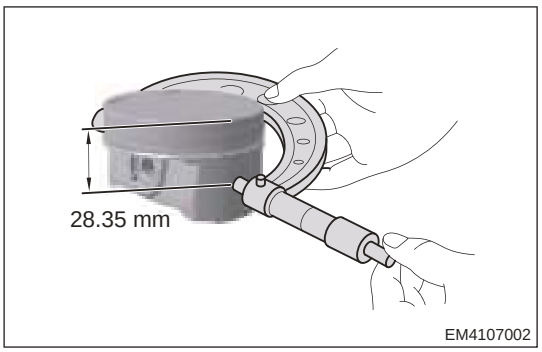
c. Using a brush and solvent, thoroughly clean piston.

Hint:
DO NOT use a wire brush to clean.



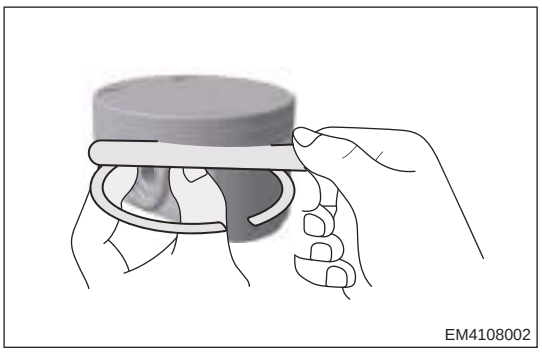
d. Measure the piston diameter with a micrometer at 10 mm of lower end of the piston skirt along the vertical direction of piston pin.

Measurement Item	Specification (mm)
Piston Diameter	76.950 ± 0.009



4. Check clearance between piston ring and ring groove side:
   a. Using a feeler gauge, measure clearance between new piston ring and ring groove side.

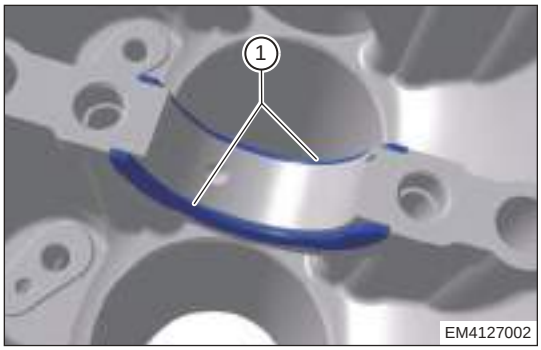
Measurement Item	Specification (mm)	Limit Value (mm)
First Compression Ring Side Clearance	0.02 - 0.065	0.13
Second Compression Ring Side Clearance	0.02 - 0.06	0.12



Hint:
If piston ring side clearance exceeds specified range, replace piston ring and piston assembly.

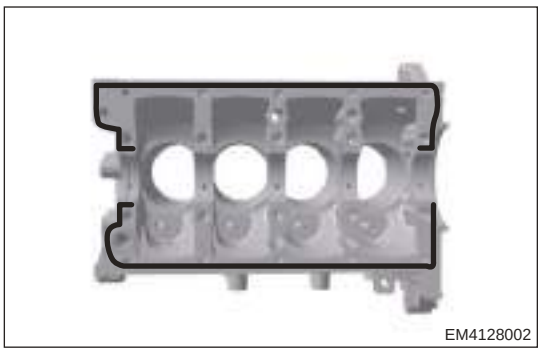
5. Check the piston ring end gap:

a. Clean thrust washers and cylinder block inner wall before installation.
b. Apply engine oil to thrust washers.
c. There are 2 thrust washers on the cylinder, which are installed on the front and rear thrust surfaces of 3rd main bearing seat respectively.
d. As shown in illustration, the side of crankshaft thrust washers (1) without groove should face cylinder block side while the other side with groove should face crankshaft side.



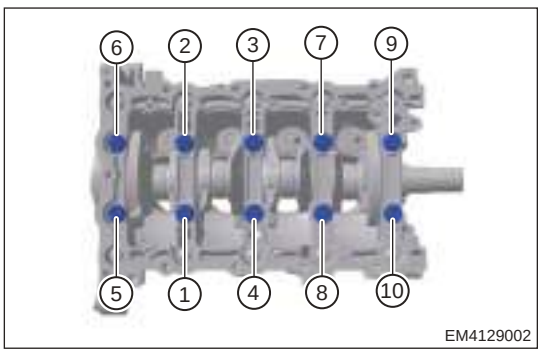
4. Install the crankshaft.
   a. Apply seal gum to installation surface of crankshaft frame before installation.

      Hint:
      DO NOT apply seal gum to bearing shell when applying seal gum.
      Seal gum should not be applied too thick. Avoid seal gum entering bearing shell installation area due to compression.



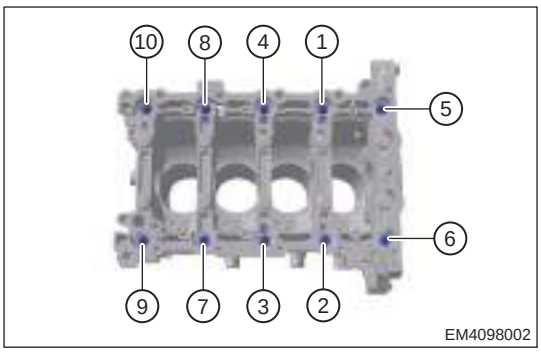
   b. Place crankshaft on cylinder block carefully.
   c. Install crankshaft main bearing cap fixing bolts in place by hands, and then tighten 10 crankshaft main bearing cap fixing bolts in order shown in illustration.

      Tightening torque: 1st step: 45 ± 5 N·m; 2nd step: 180° ± 10°



   d. Evenly tighten 10 crankshaft frame fixing bolts in order shown in illustration.

      Tightening torque: 27 ＋ 3 N m



5. Assemble piston and piston connecting rod.

   Hint:
   Apply clean engine oil to outer surface of piston pin and inner surface of piston hole before assembly.

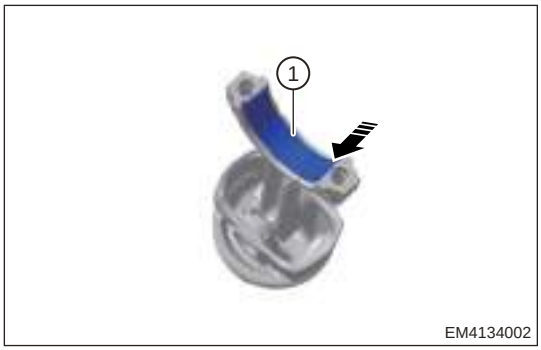
c. Rotate piston ring several turns after addling engine oil to piston ring groove, and note that the position of ring notch should be the same with that described above; clean crankshaft connecting rod journal and cylinder with a non-woven fabric cloth.

7. Install the connecting rod bearing shells.

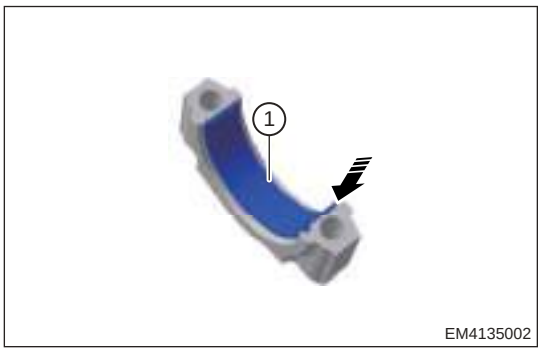
⚠ Caution

- Apply a coat of engine oil to inner surface of connecting rod bearing shell before installation.
- Back side of connecting rod bearing shell should be clean without any foreign matter during assembly.

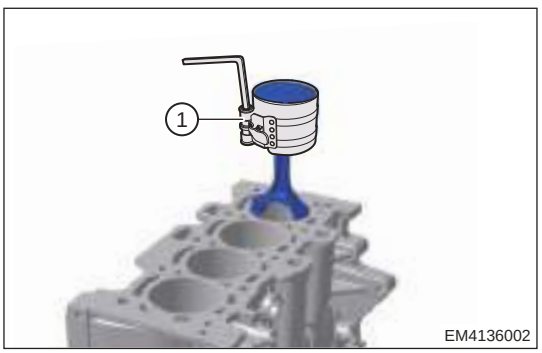
a. Carefully install the connecting rod bearing upper shell (1) in direction of arrow, and keep notch of each connecting rod bearing upper shell face the cutout of connecting rod bearing.



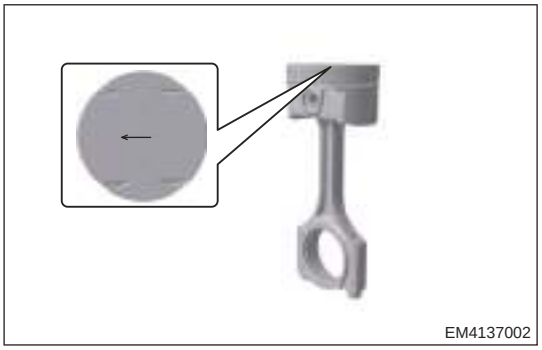
b. Carefully install connecting rod bearing lower shell (1) in direction of arrow, and keep notch of each connecting rod bearing lower shell face the cutout of connecting rod bearing cap.



8. Install the piston connecting rod assembly.
   a. Rotate crankshaft to top dead center of cylinder 1 and cylinder 4.
   b. Apply a coat of engine oil to piston surface and cylinder inner wall.
   c. As shown in illustration, install piston connecting rod assembly to cylinder with piston installer (1).

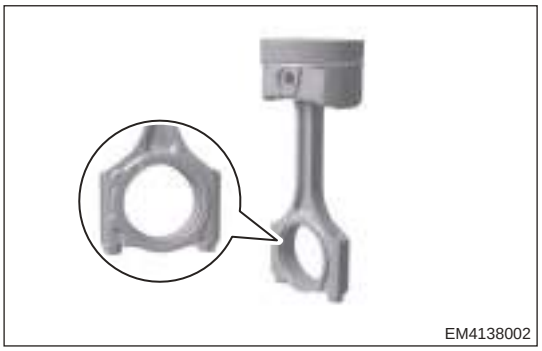


d. Pay attention to front marks on piston and connecting rod during assembly, without being reversed.


EM4137002

9. Install the connecting rod bearing cap.

Hint:
Protrusion points on connecting rod and connecting rod bearing cap are in same side.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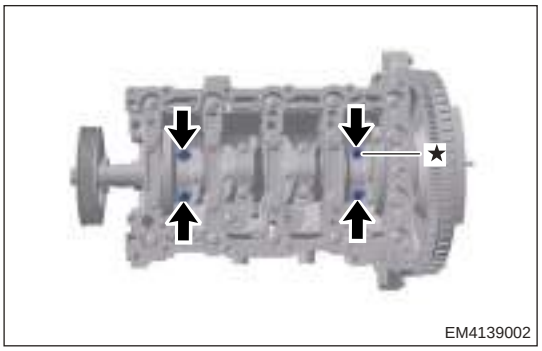
a. Install connecting rod bearing caps in place, and screw connecting rod bearing cap fixing bolts (arrow) by hands, then tighten connecting rod bearing cap fixing bolts in 2 steps with a torque wrench.

Tightening torque: 1st step: 15 + 3 N·m 2nd step: 60° ± 5°

Hint:
Apply a small amount of engine lubricant to connecting rods, connecting rod bearing caps and thread joint surfaces.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10. Other assembly is in the reverse order of disassembly.

SQRE4T15C INTAKE SYSTEM

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair:

1. Temperature in engine compartment is very high when engine is running. Before removal, you must make sure that engine has shut off, and engine compartment has cooled down sufficiently, otherwise, there is a risk of scald injury.

Precautions

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair:

1. Wasted air filter element should be handled by the specialized department according to local laws and regulations. Never discard it at will.
2. Check for foreign matter in air filter and hose when installing. Avoid inhaling foreign matter after engine running, causing damage to the components.
3. After removing electronic throttle, block intake manifold intake port with suitable blocking pieces to prevent foreign matter from entering, causing damage to the components.

Installation

1. Clean the air filter upper housing and lower housing.
2. Install a new air filter element.
3. Other installation procedures are in the reverse order of removal.

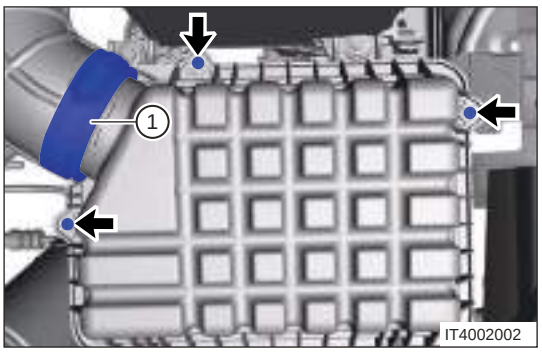
⚠ Warning
• Wasted air filter element should be handled by the specialized department according to local laws and regulations. Never discard it at will.

Air Filter Assembly

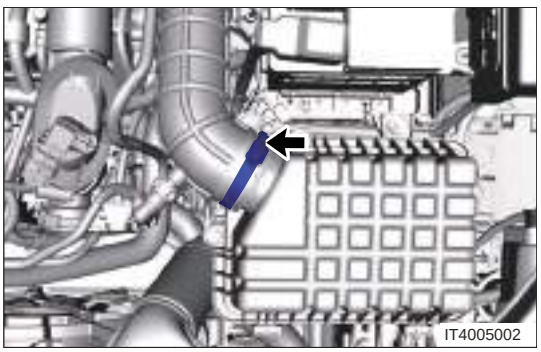
Removal

⚠ Caution
• Be sure to wear necessary safety equipment to prevent accidents when repairing.

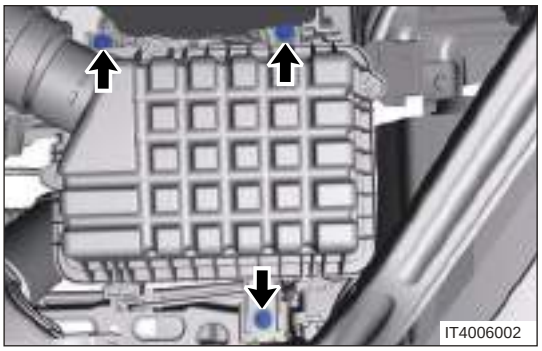
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the air filter assembly.
   a. Remove 2 fixing bolts (arrow) from air direct pipe.



   b. Loosen worm clamp (arrow) and disconnect connection between air filter and intake hose.
      Tightening torque: 3 ± 0.5 N·m



   c. Remove 3 fixing bolts (arrow) from air filter assembly.
      Tightening torque: 7 ± 1 N·m



d. Remove the air filter assembly.

Hint:
After removing air filter assembly, block intake hose with suitable blocking pieces to prevent foreign matter from entering, causing damage to the components.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution
• Check for foreign matter in air filter and hose when installing, avoid inhaling foreign matter after engine running, causing damage to components.

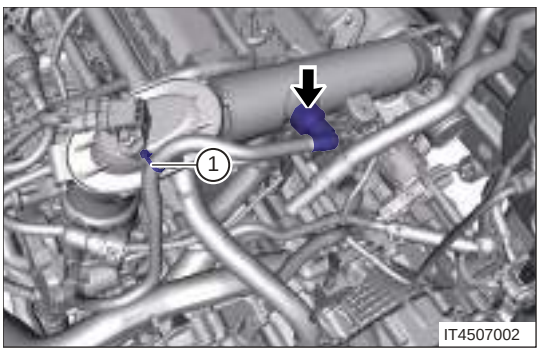
Muffler and Muffler Hose

Removal

⚠ Caution
• Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the intake hose assembly.
4. Remove the muffler assembly.

a. Disconnect the canister solenoid valve outlet pipe II assembly (arrow) and detach fixing clip (1).



b. Remove engine wire harness and fixing clip (arrow) from muffler assembly.

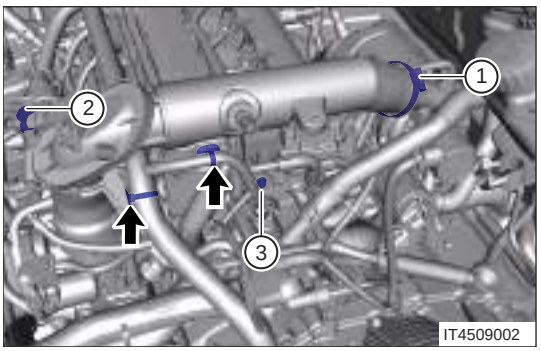
c. Loosen worm clamp (1), disconnect the connection between muffler assembly and turbocharger.

Tightening torque: 5 ± 1 N · m

d. Disconnect the boost pressure sensor connector (2).

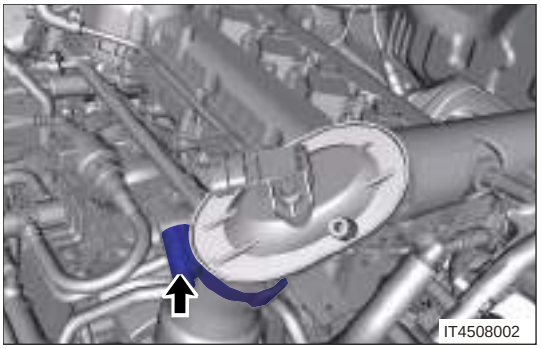
e. Remove the muffler assembly fixing bolt (3).

Tightening torque: 9 ± 1.5 N · m



f. Loosen worm clamp (arrow), disconnect the connection between muffler assembly and muffler hose.

Tightening torque: 5 ± 1 N · m



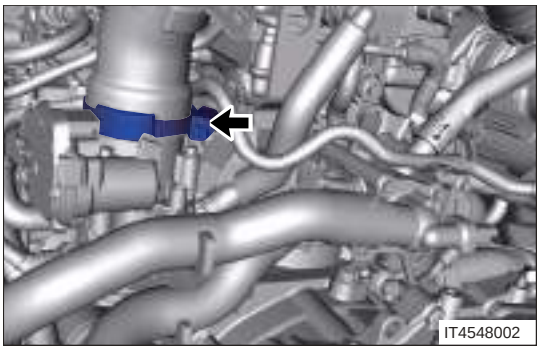
g. Remove the muffler assembly.

Hint:
After removing muffler assembly, block outlet side of turbocharger with suitable blocking pieces to prevent foreign matter from entering, causing damage to the components.

5. Remove the muffler hose.

a. Loosen worm clamp (arrow) and disconnect the connection between muffler hose and throttle assembly.

Tightening torque: 3 ± 0.5 N · m



b. Remove the muffler hose assembly.

Hint:
After removing muffler hose assembly, block throttle with suitable blocking pieces to prevent foreign matter from entering, causing damage to the components.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution
• Check for foreign matter in muffler and hose when installing. Avoid inhaling foreign matter after engine running, causing damage to the components.

Electric Throttle Assembly

On-vehicle Inspection

1. Check the electronic throttle assembly.
   a. When flipping it by hand with power off and it can rotate smoothly. If catching occurs, it indicates that internal components may be damaged, and replace the electronic throttle assembly.
   b. Connect the diagnostic tester to diagnostic interface.
   c. Turn ENGINE START STOP switch to ON and turn on the diagnostic tester.

d. Read datastream on diagnostic tester.

Hint:
Accelerator pedal released

Datastream Name	Specification (V)
Sensor voltage from throttle potentiometer 1	0.77
Sensor voltage from throttle potentiometer 2	4.23

Hint:
Accelerator pedal depressed fully

Datastream Name	Specification (V)
Sensor voltage from throttle potentiometer 1	4.27
Sensor voltage from throttle potentiometer 2	0.73

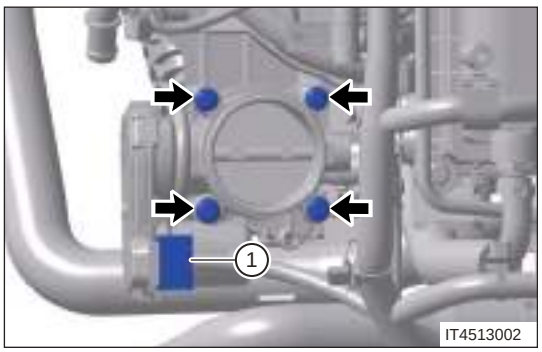
If result is not as specified, check wire harness, ECM, or replace electronic throttle assembly.

Removal

⚠ Caution

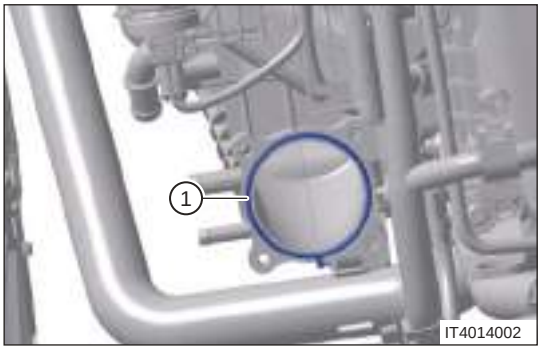
- Temperature in engine compartment is very high when engine is running. Before removal, you must make sure that engine has shut off, and engine compartment has cooled down sufficiently, otherwise, there is a risk of scald injury.
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the muffler and muffler hose.
4. Remove the electronic throttle assembly.
   a. Disconnect the electronic throttle assembly connector (1).
   b. Remove 4 fixing bolts (arrow) from electronic throttle assembly.
      Tightening torque: 8 ± 1 N · m



   c. Remove the electronic throttle assembly.

d. Remove throttle gasket (1) from intake manifold assembly.

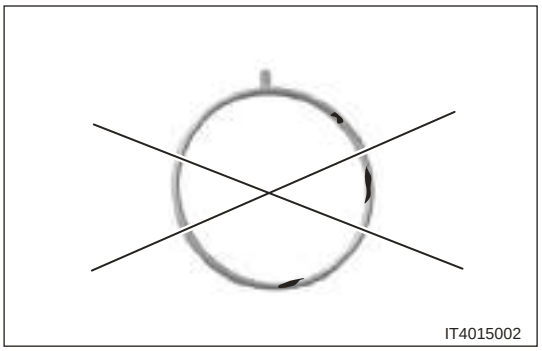


⚠ Caution

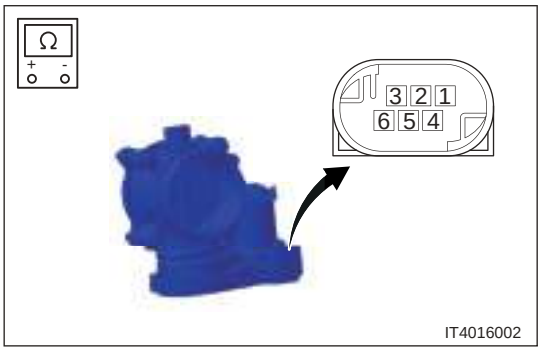
- After removing throttle assembly, block intake manifold intake port with suitable blocking pieces to prevent foreign matter from entering, causing damage to the components.

Inspection

1. Check electronic throttle assembly gasket for wear or deterioration. If there is wear or deterioration, replace electronic throttle assembly gasket.



2. Check the electronic throttle assembly. Measure resistance of electronic throttle assembly according to the right table.



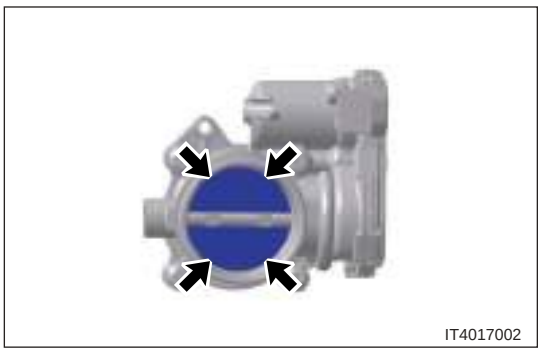
Multimeter Connection Terminal	Standard Condition
Terminal 2 - Terminal 3	1.067 kΩ (resistance at ambient temperature)
Terminal 6 - Terminal 2	As throttle opens, resistance between terminals 6 and 2 increases. And resistance between terminals 6 and 3 decreases.
Terminal 6 - Terminal 3	
Terminal 5 - Terminal 2	As throttle opens, resistance between terminals 5 and 2 decreases. And resistance between terminals 5 and 3 increases.
Terminal 5 - Terminal 3	

Cleaning

1. Cleaning tools.

a. Thin stick: Used to support throttle valve plate for cleaning the carbon deposited on contact wall between valve plate and throttle. Please use plastic, wooden or bamboo thin stick. Do not use metal thin stick to avoid scratching or deforming the valve plate.
b. Clean cloth or paper towel.

2. Cleaning process.
   a. Remove electronic throttle assembly, and make the valve plate face upward in free condition. Avoid cleaner flowing into electronic element through valve plate shaft, resulting in functional failure.
   b. Start to clean when it is as shown in illustration.
   c. Apply appropriate amount of cleaner to the inner wall of throttle valve body, and wipe off the carbon with clean cloth.


IT4017002

   d. Support the throttle valve plate with a thin stick, and clean the carbon on valve plate and throttle valve body inner wall.
   e. Turn over throttle, and clean with the same procedures as above. Repeat several times until it is clean.
   f. Push the valve plate by hand, and check if it rotates smoothly. If it is stuck, clean again according to the cleaning procedures.
   g. After cleaning, wipe off the cleaner in throttle valve body with absorbent paper.


IT4018002

⚠ Caution

- Cleaner is a kind of flammable and corrosive fluid. Follow safety cautions to prevent accidents, and avoid skin contacting with cleaner.
- Pay attention to that the amount of cleaner should not be too much, so as to overflows into sensor and motor, resulting in functional failure.

Installation

⚠ Caution

- Clean fitting surface of electronic throttle assembly.
- Perform throttle self-learning procedures after installation. After self-learning is completed, start the vehicle and check for proper operation.

1. Installation is in the reverse order of removal.

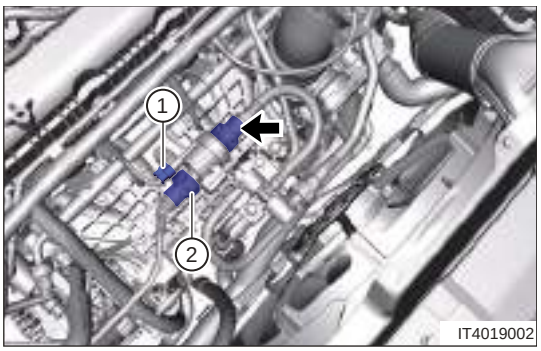
Intake Manifold Assembly

Removal

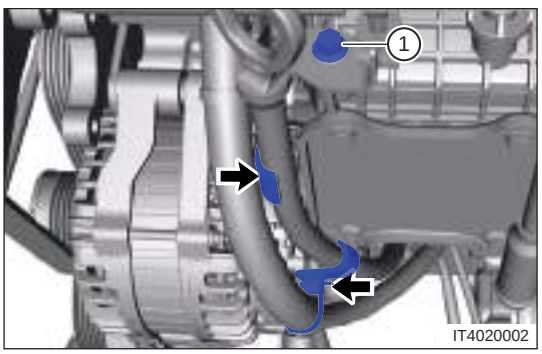
⚠ Caution

- Temperature in engine compartment is very high when engine is running. Before removal, you must make sure that engine has shut off, and engine compartment has cooled down sufficiently, otherwise, there is a risk of scald injury.
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Release the fuel system pressure.
2. Turn off all electrical equipment and ENGINE START STOP switch.
3. Disconnect the negative battery cable.
4. Remove the fuel rail injector assembly.
5. Remove the air filter assembly.
6. Remove the muffler assembly and muffler hose.
7. Remove the electronic throttle assembly.
8. Remove the charcoal canister solenoid valve assembly.
   a. Disconnect the charcoal canister solenoid valve connector (1).
   b. Disconnect connection between fuel vapor pipe (2) and canister solenoid valve.
   c. Disconnect the connection between canister solenoid valve outlet pipe (arrow) and canister solenoid valve.



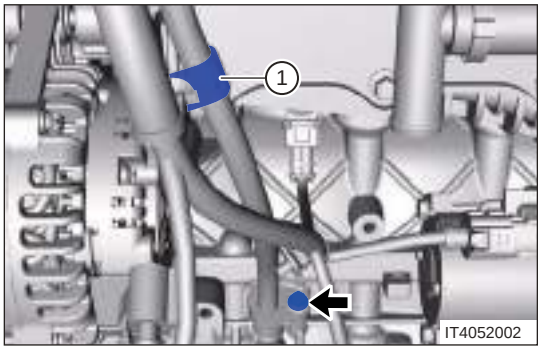
   d. Remove the canister solenoid valve assembly.
9. Remove the oil dipstick guide assembly.
   a. Disconnect the engine wire harness fixing clips (arrow).
   b. Remove fixing bolt (1) between oil dipstick guide and intake manifold assembly.



c. Disconnect the engine wire harness fixing clip (1).

d. Remove coupling bolt (arrow) between oil dipstick guide and cylinder block frame assembly.

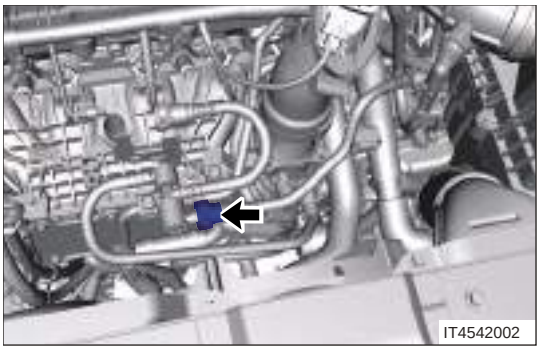
Tightening torque: 8 + 3 N m



e. Remove the oil dipstick tube assembly.

10. Remove canister desorption pressure sensor.

a. Disconnect the canister solenoid valve outlet pipe assembly (arrow).



11. Remove the intake manifold assembly.

a. Loosen clamping ring (1) and disconnect the connection between outlet pipe set - intercooler and intercooler assembly.

b. Loosen elastic clamp (2) and disconnect the connection between outlet pipe set - intercooler and low temperature radiator inlet pipe.

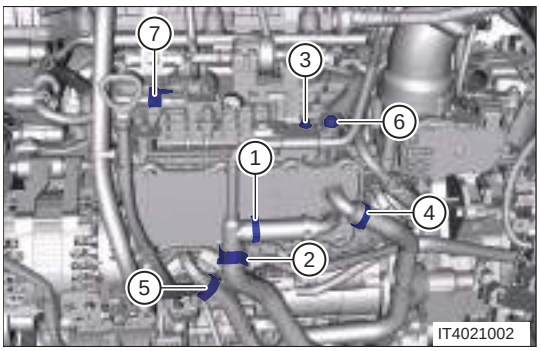
c. Remove fixing bolt (3) and outlet pipe set - intercooler.

d. Loosen clamping ring (4) and disconnect the connection between inlet pipe set and intercooler assembly.

e. Loosen elastic clamp (5) and disconnect the connection between water inlet steel pipe and low temperature radiator outlet pipe set.

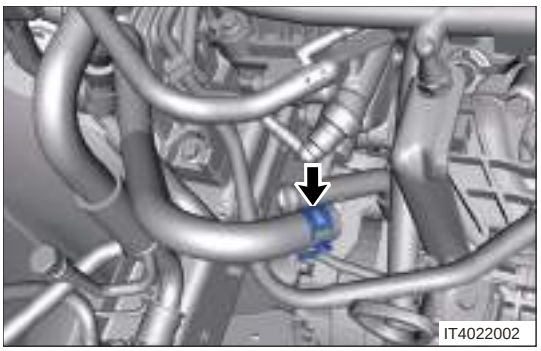
f. Remove fixing bolt (6) from brake vacuum pipe bracket.

Tightening torque: 8 + 3 N m



g. Disconnect the intake pressure/temperature sensor connector (7).

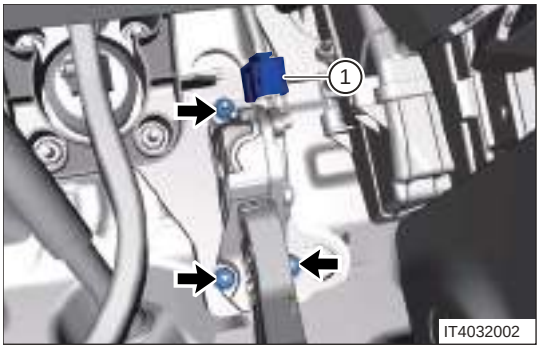
h. Loosen elastic clamp (arrow) and disconnect the connection between expansion tank water outlet pipe set and water inlet steel pipe.



a. Disconnect the electronic accelerator pedal connector (1).

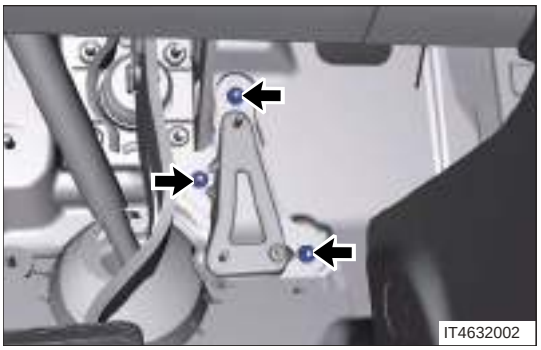
b. Remove 3 fixing nuts (arrow) from electronic accelerator pedal.

Tightening torque: 9 ± 1.5 N · m



c. Remove the electronic accelerator pedal.

d. Remove 3 fixing nuts (arrow) from electronic accelerator pedal bracket.



e. Remove the electronic accelerator pedal bracket.

Installation

1. Installation is in the reverse order of removal.

SQRE4T15C EXHAUST SYSTEM

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair:

2. Before repairing the exhaust system, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.

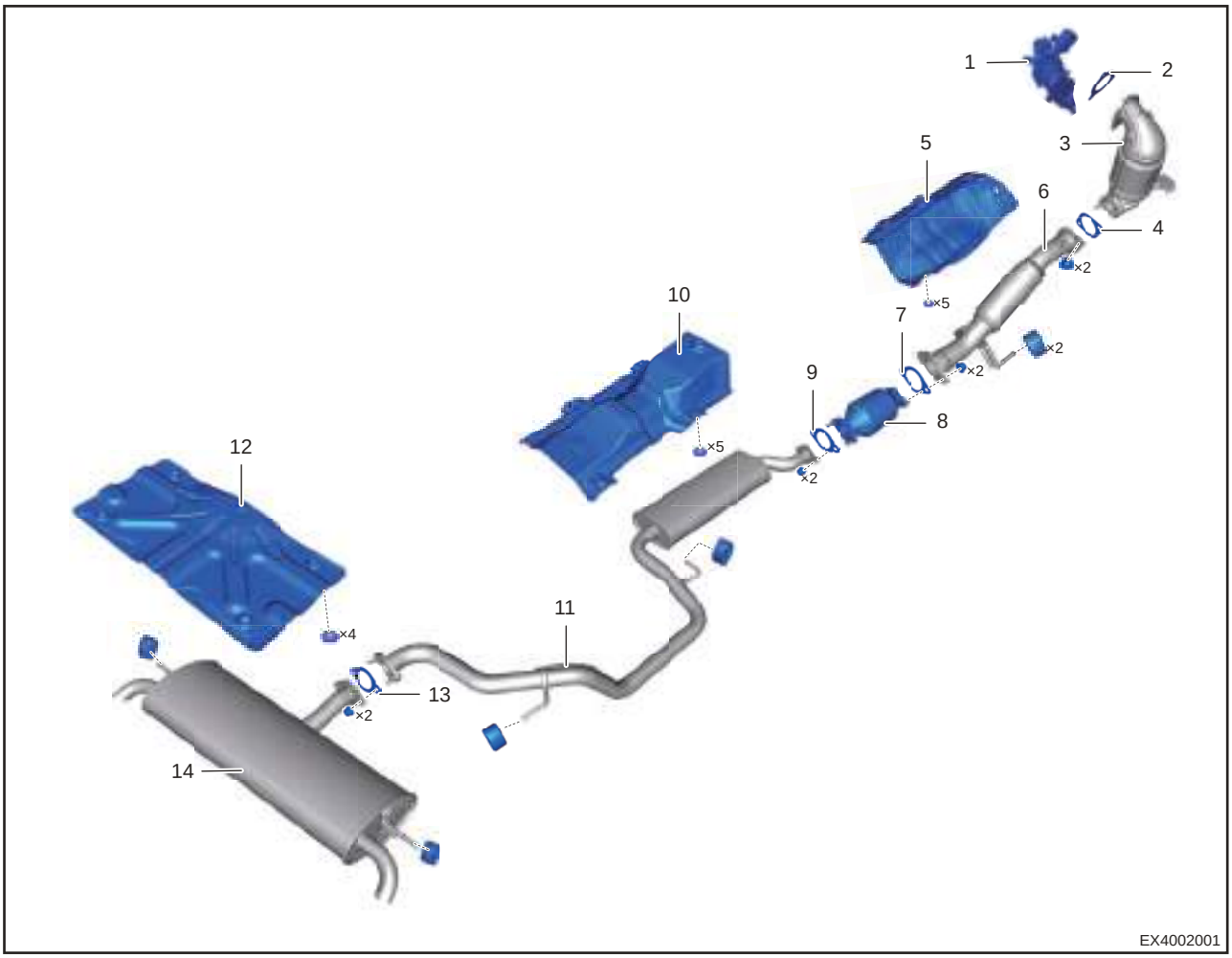
Precautions

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair:

1. If exhaust gasket is damaged, replace it, and remove foreign matters on joints and threads.
2. Check exhaust gas for leakage. If gas leaks, tighten malfunctioning part to prevent leakage. Replace damaged parts as necessary.

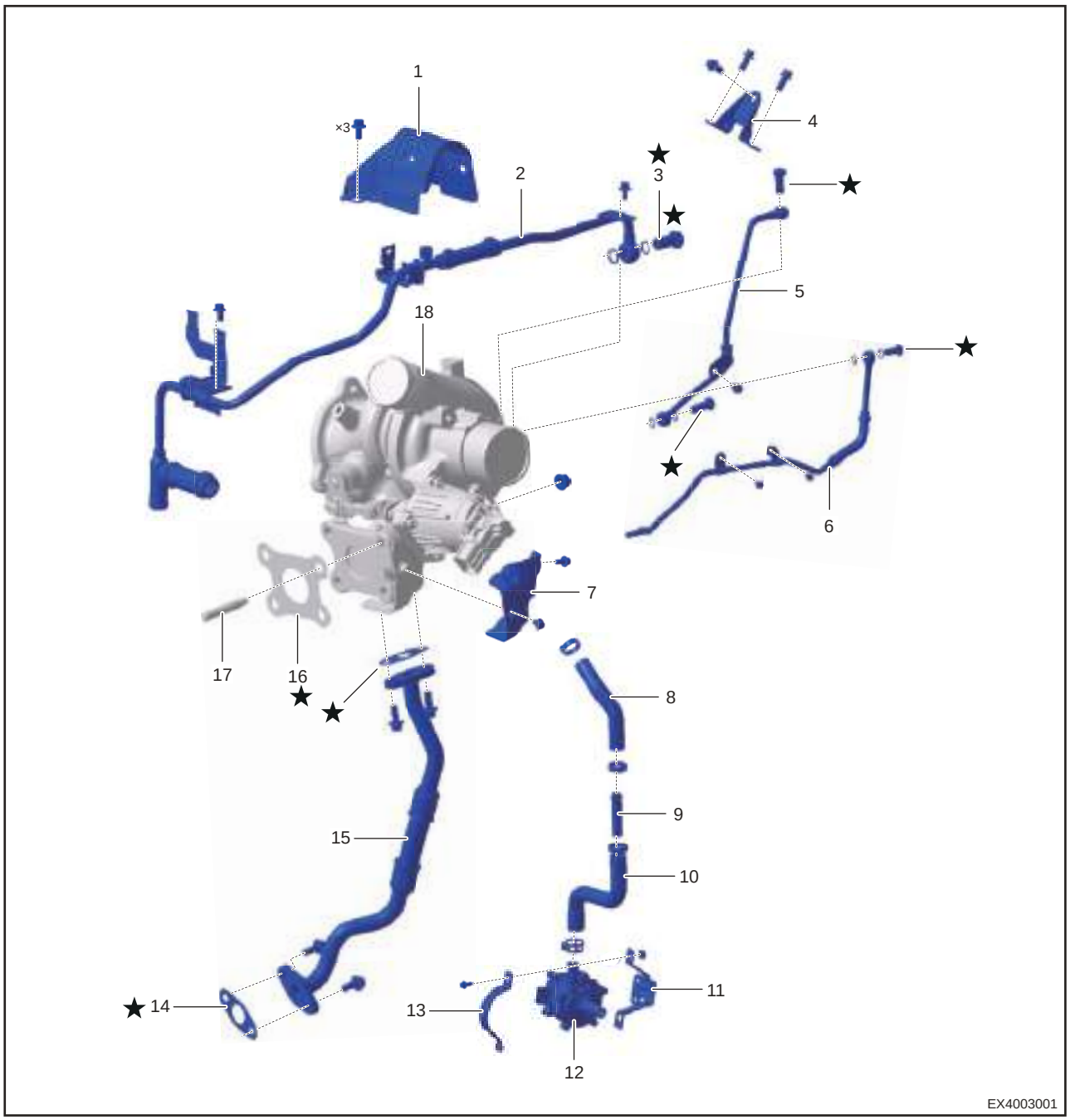
General Information

System Exploded Diagram



1	Turbocharger Assembly	8	Main Catalytic Converter Assembly
2	Catalytic Converter Washer	9	Gasket
3	Precatalytic Converter Assembly	10	Front Muffler Heat Insulator
4	Gasket behind Precatalytic Converter	11	Front Muffler Assembly
5	Muffler Heat Insulator Ⅱ	12	Muffler Heat Insulator Ⅰ
6	Front Exhaust Pipe Assembly	13	Gasket
7	Gasket	14	Rear Muffler Assembly

Turbocharger



1	Turbocharger Heat Insulator	11	Electric Water Pump Bracket 1
2	Turbocharger Water Outlet Pipe Set	12	Electric Water Pump Assembly
3	Hollow Bolt	13	Electric Water Pump Bracket 2
4	Turbocharger Bracket	14	Oil Return Pipe Washer
5	Turbocharger Inlet Pipe	15	Turbocharger Oil Return Pipe
6	Turbocharger Water Inlet Pipe Set	16	Turbocharger Washer
7	Turbocharger Heat Insulator Ⅱ	17	High Temperature Stud
8	Water Outlet Hose	18	Turbocharger
9	Water Outlet Hose Connection	★	Non-reusable Part
10	Water Outlet Hose		

Functional Principle

System Operation

- Exhaust system controls engine exhaust, reducing vehicle emissions by precatalytic converter and main catalytic converter, and eliminating exhaust noise by muffler. When exhaust system discharges exhaust gas, oxygen sensor monitors oxygen content in exhaust gas. Engine control module adjusts air-fuel ratio of combustible gas mixture to control vehicle emissions and achieve optimal fuel economy according to feedback signals of oxygen sensor and combining with other sensor signals.
- Turbocharger use motor to drive the turbo impeller to rotate, then drive compressor impeller to pressurize the air pressed through air filter and send it into cylinder. As more air enters into cylinder, more fuel is allowed to be injected, which results in higher engine power. In addition, the turbocharger can also make the engine obtain power compensation when working at high altitude.

Specifications

Torque Specifications

Description	Torque (N·m)
High Temperature Stud	15 ± 2.5
High Temperature Nut	27 ± 4
Turbocharger Corresponding Water Inlet Threaded Hole Hollow Bolt	25 + 3
Turbocharger Oil Return Pipe Hexagon Flange Face Bolt	8 + 3
Heat Insulator Bolt	8 + 3
Turbocharger Bracket Fixing Bolt	33 ± 3.5
Turbocharger Fixing Nut	25 ± 5
Electronic Water Pump Assembly Fixing Bolt	8 + 3
Electronic Water Pump Bracket Fixing Bolt	8 + 3
Front Exhaust Pipe Assembly Fixing Nut	45 ± 5

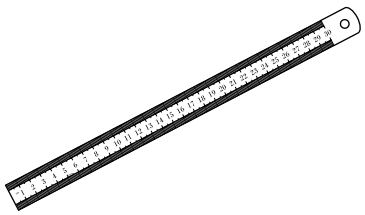
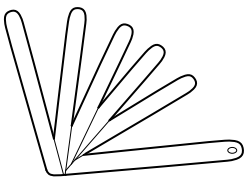
Description	Torque (N·m)
Main Catalytic Converter Fitting Nut	45 ± 5
Front Muffler Assembly Fixing Nut	45 ± 5
Rear Muffler Assembly Fixing Nut	45 ± 5

Non-reusable Part

Non-reusable Part	
High Temperature Nut (Turbocharger)	Replacement required
Turbocharger Washer	Replacement required
Washer (Hollow Bolt)	Replacement required
Oil Return Pipe Washer	Replacement required

Tools

General Tools

Tool Name	Tool Drawing
Precision Straightedge	 RCH0063006
Feeler Gauge	 RCH006006

Diagnosis & Testing

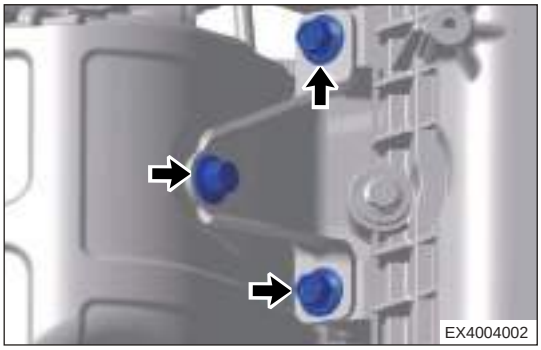
Problem Symptoms Table

Warning

- Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

a. Remove 3 fixing bolts (arrow) from turbocharger fixing bracket.

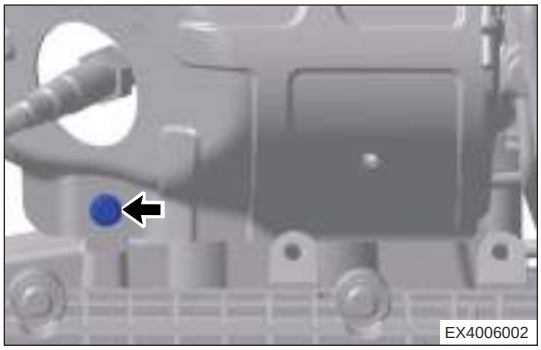
Tightening torque: 33 ± 3.5 N·m



b. Remove the turbocharger fixing bracket.

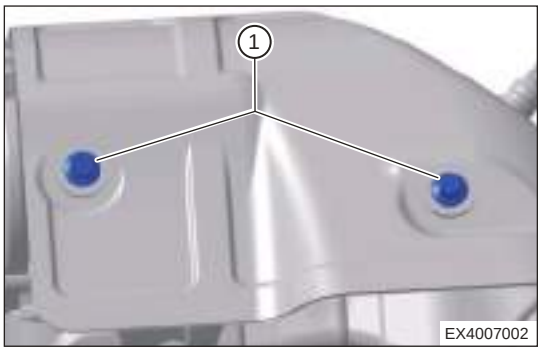
4. Remove the turbocharger heat insulator.
   a. Disconnect the upstream oxygen sensor connector.
   b. Remove turbocharger heat insulator fixing bolt (arrow).

      Tightening torque: 9 ± 1.5 N·m



   c. Remove 2 fixing bolts (1) from turbocharger heat insulator.

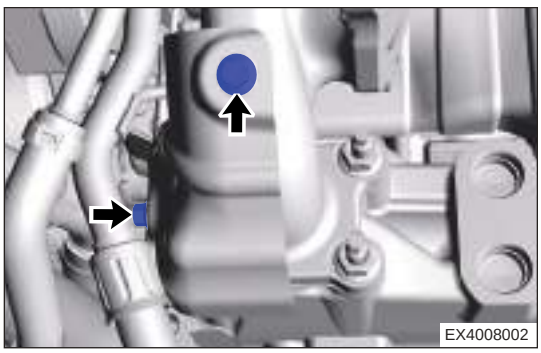
      Tightening torque: 8 ± 3 N·m



   d. Remove turbocharger heat insulator assembly.

5. Remove the turbocharger heat insulator Ⅱ.
   a. Remove 2 fixing bolts (arrow) from turbocharger heat insulator Ⅱ.

      Tightening torque: 8 + 3 N m



   b. Remove turbocharger heat insulator Ⅱ.

Installation

1. Installation is in the reverse order of removal.

Turbocharger Assembly

Removal

⚠ Warning

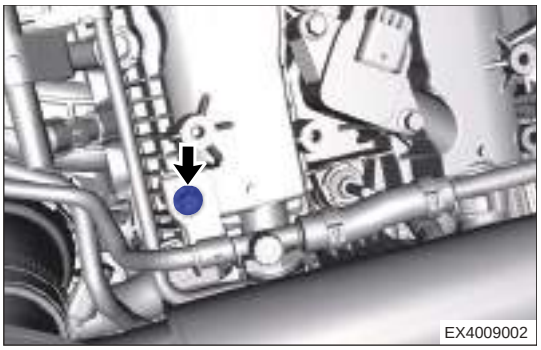
- Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.

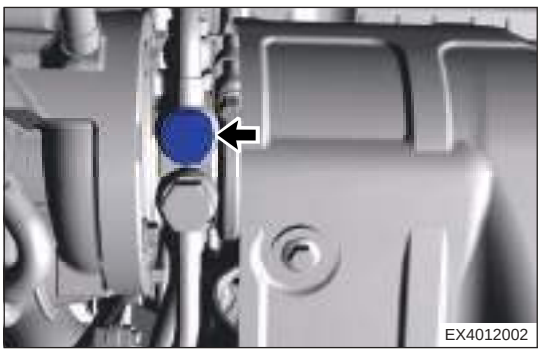
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Drain the coolant.
4. Remove the muffler assembly.
5. Remove the precatalytic converter assembly.
6. Remove the intake hose.
   a. Loosen worm clamp and disconnect intake hose assembly.
7. Remove turbocharger water outlet pipe set assembly.
   a. Remove 1 fixing bolt (arrow) between turbocharger outlet hose bracket and muffler.

      Tightening torque: 8 + 3 N m



   b. Remove the hollow bolt (arrow) between turbocharger water outlet pipe set and turbocharger assembly.

      Tightening torque: 20 + 3 N m



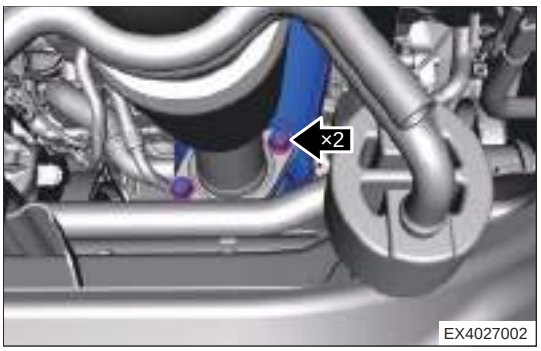
   c. Remove the turbocharger water outlet pipe set.

      Hint:
      Pay attention not to drop upper and lower washers of hollow bolt during removal and do not reuse them.
8. Remove the turbocharger water inlet pipe set assembly.

a. Raise the vehicle to a proper position.

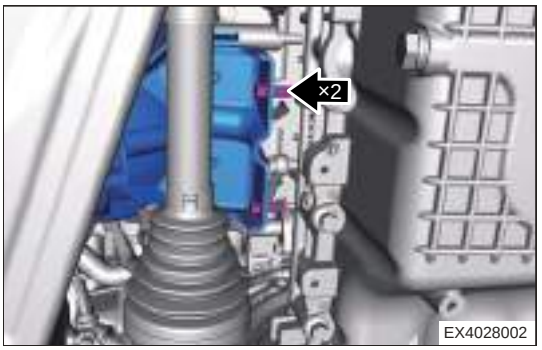
b. Remove 2 fixing nuts (arrow) between precatalytic converter assembly and front exhaust pipe.

Tightening torque: 45 ± 5 N·m



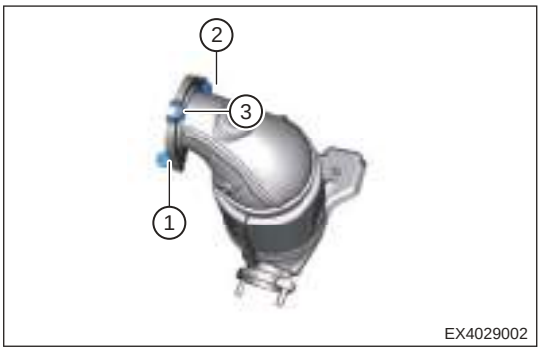
c. Remove 2 fixing bolts (arrow) from precatalytic converter assembly bracket.

Tightening torque: 25 ± 3.5 N·m



d. Remove 3 fixing nuts (1) (2) (3) between precatalytic converter assembly and turbocharger.

Hint:
Replace the nut with a new one after each removal/ installation, and not reuse it.



e. Remove the precatalytic converter assembly.

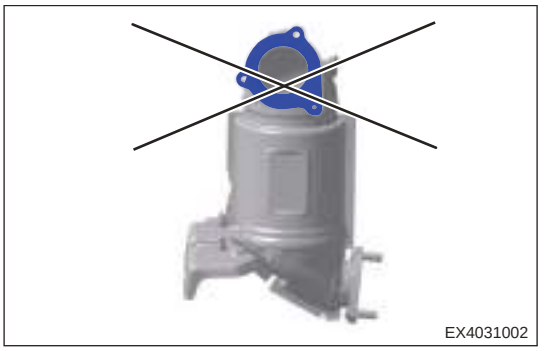
f. Remove the upstream oxygen sensor from precatalytic converter assembly.

Tightening torque: 45 ± 5 N·m

Inspection

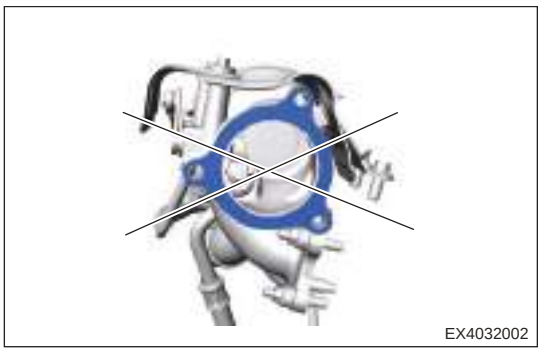
1. Inspect warpage on precatalytic converter connection surface:

a. Using a precision straightedge and feeler gauge, measure the connection surface between precatalytic converter body and turbocharger, replace it if the surface warpage is above 0.5 mm.

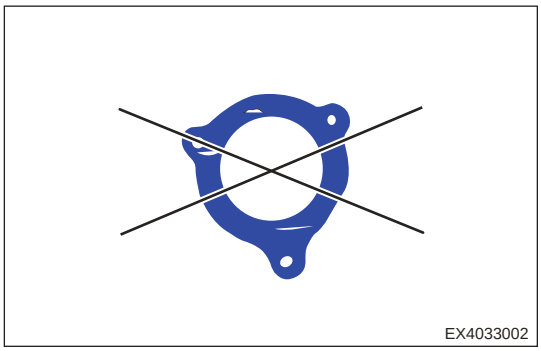


b. Check precatalytic converter internal carrier for cracked or blocked. Replace precatalytic converter assembly if damaged.

2. Check bending on turbocharger connection surface:
   a. Using a precision straightedge and feeler gauge, measure the connection surface between turbocharger body and precatalytic converter, replace it if the surface bending is above 0.04 mm.


EX4032002

3. Check the gasket:
   a. Check the gasket, there should be no scratches or rough, otherwise replace it.


EX4033002

Installation

⚠ Caution

- If gasket is damaged, replace it, and remove foreign matters on joints and threads.
- If there is any crack or leakage in precatalytic converter assembly, replace it.
- Check that there is no exhaust gas leakage in connecting part of upstream oxygen sensor.
- Check that there is no exhaust gas leakage between precatalytic converter assembly and turbocharger, precatalytic converter assembly and front exhaust pipe assembly after installation.

1. Installation is in the reverse order of removal.

Front Exhaust Pipe Assembly

Removal

⚠ Warning

- Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.

⚠ Caution

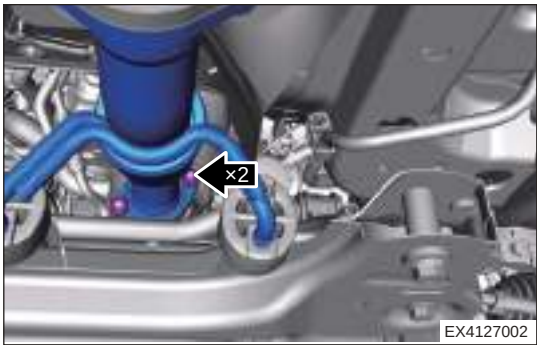
- Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Raise vehicle to a proper height.
4. Remove the front exhaust pipe assembly.

a. Take off and disconnect downstream oxygen sensor connector from bracket.

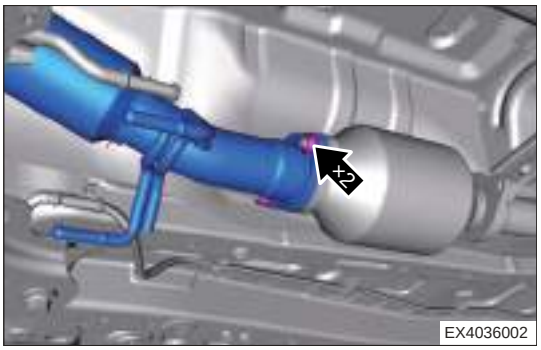
b. Remove 2 fixing nuts (arrow), then disconnect connection between front exhaust pipe assembly and precatalytic converter assembly, and take off the gasket from connecting part.

Tightening torque: 45 ± 5 N m

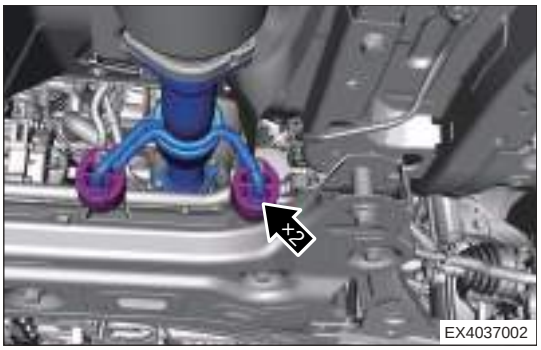


c. Remove 2 coupling nuts (arrow), then disconnect connection between front exhaust pipe assembly and main catalytic converter assembly, and take off the gasket from connecting part.

Tightening torque: 45 ± 5 N • m



d. Separate 2 fixing hanger blocks (arrow) between front exhaust pipe assembly and body hook.



e. Remove the front exhaust pipe assembly.

f. Remove downstream oxygen sensor from front exhaust pipe assembly.

Tightening torque: 45 ± 5 N m

Installation

⚠ Warning

- If gasket is damaged, replace it, and remove foreign matters on joints and threads.
- Check exhaust gas for leakage. If gas leaks, tighten malfunctioning part to prevent leakage. Replace damaged parts as necessary.
- Check that there is no exhaust gas leakage in connecting part of downstream oxygen sensor.

1. Installation is in the reverse order of removal.

Main Catalytic Converter Assembly

Removal

Warning

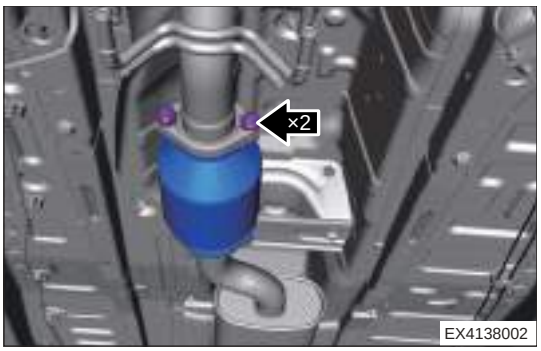
- Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.

Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.

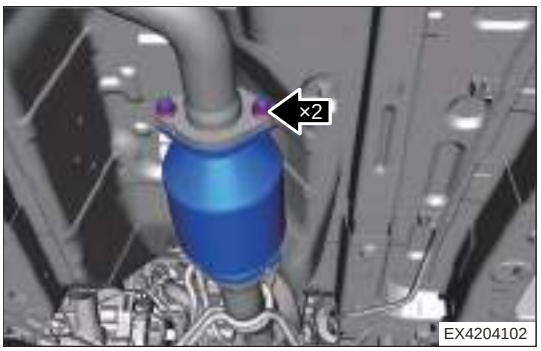
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Raise the vehicle to a proper position.
3. Remove the main catalytic converter and front muffler.
   a. Remove 2 coupling nuts (arrow), then disconnect connection between main catalytic converter assembly and front exhaust pipe.

      Tightening torque: 45 ± 5 N·m



   b. Remove 2 coupling nuts (arrow), then disconnect connection between main catalytic converter assembly and front muffler assembly.

      Tightening torque: 45 ± 5 N·m



   c. Carefully remove the main catalytic converter assembly.

Inspection

1. Check main catalytic converter assembly.
   a. Check if there are cracks or leakage on main catalytic converter assembly. If so, please replace main catalytic converter assembly.

Installation

Caution

- If gasket is damaged, replace it, and remove foreign matters on joints and threads.

1. Installation is in the reverse order of removal.

Front Muffler Assembly

Removal

Warning

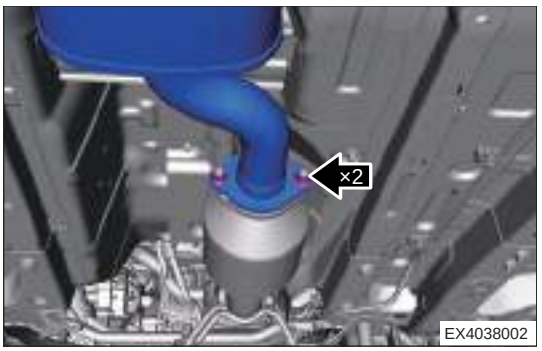
- Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.

Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.

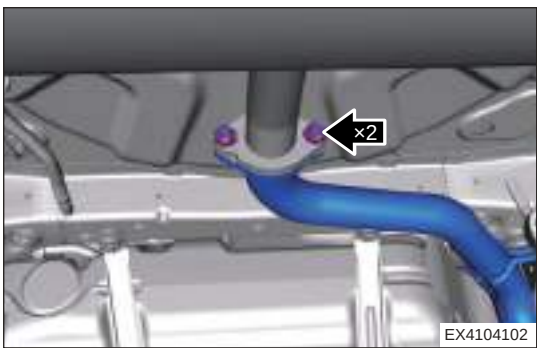
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Raise the vehicle to a proper position.
3. Remove the front muffler assembly.
   a. Remove 2 coupling nuts (arrow), then disconnect connection between main catalytic converter assembly and front muffler assembly.

      Tightening torque: 45 ± 5 N·m

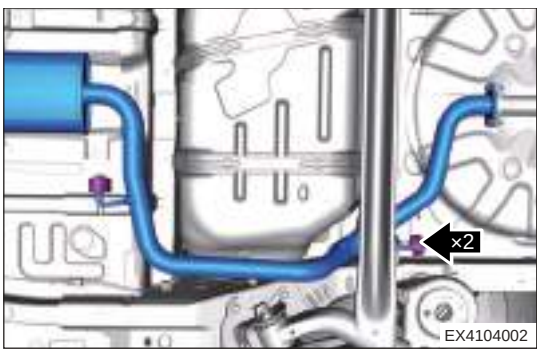


   b. Remove 2 coupling nuts (arrow), then disconnect connection between front muffler assembly and rear muffler assembly.

      Tightening torque: 45 ± 5 N·m



   c. Disengage 2 fixing hanger blocks (arrow) from front muffler assembly.



   d. Carefully remove the front muffler assembly.

Inspection

1. Inspect front muffler assembly.

a. Inspect if there are cracks or leakage on front muffler assembly surface. Replace the front muffler assembly if necessary.

Installation

⚠ Caution
• If gasket is damaged, replace it, and remove foreign matters on joints and threads.

1. Installation is in the reverse order of removal.

Rear Muffler Assembly

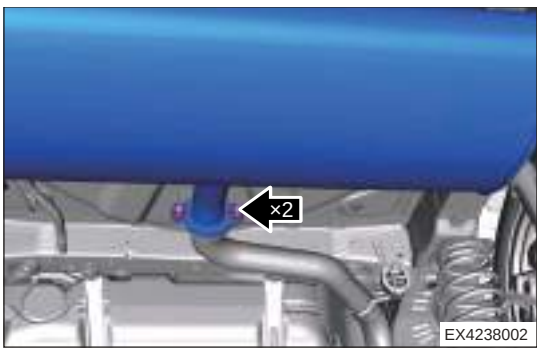
Removal

⚠ Warning
• Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.

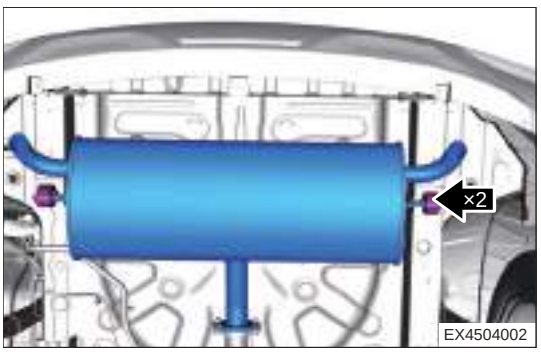
⚠ Caution
• Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Raise the vehicle to a proper position.
3. Remove the rear muffler assembly.
   a. Remove 2 coupling nuts (arrow), then disconnect connection between rear muffler assembly and front muffler assembly.

      Tightening torque: 45 ± 5 N • m



   b. Disengage 2 fixing hanger blocks (arrow) from rear muffler assembly.



   c. Carefully remove the rear muffler assembly.

Inspection

1. Inspect rear muffler assembly.
   a. Inspect if there are cracks or leakage on rear muffler assembly surface. Replace it if necessary.

Installation

⚠ Caution
• If gasket is damaged, replace it, and remove foreign matters on joints and threads.

1. Installation is in the reverse order of removal.

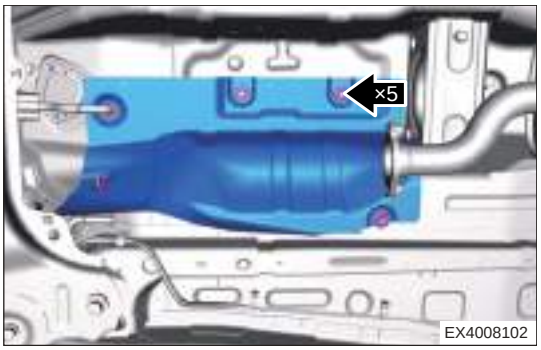
Muffler Heat Insulator II

Removal

⚠ Warning
• Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.

⚠ Caution
• Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Raise vehicle to a proper height.
4. Remove the muffler heat insulator II.
   a. Remove 5 clamping washers (arrow) from muffler heat insulator II.



   b. Remove the muffler heat insulator II.

Inspection

1. Inspect the muffler heat insulator II.
   a. Inspect if there are cracks on muffler heat insulator II. If so, replace muffler heat insulator II.

Installation

1. Installation is in the reverse order of removal.

Front Muffler Heat Insulator

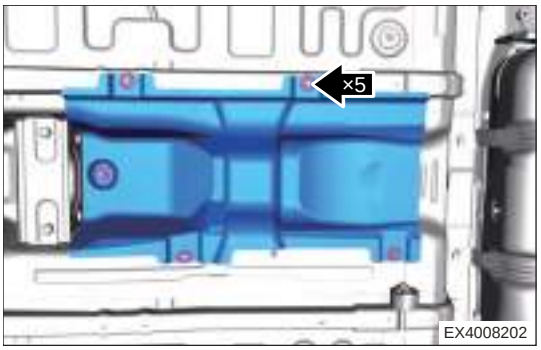
Removal

⚠ Warning
• Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and ENGINE START STOP switch
2. Disconnect the negative battery cable
3. Raise vehicle to a proper height.
4. Remove the front muffler heat insulator
   a. Remove 5 clamping washers (arrow) from front muffler heat insulator.



   b. Remove the front muffler heat insulator.

Inspection

1. Inspect the front muffler heat insulator
   a. Inspect if there are cracks on front muffler heat insulator. If so, replace front muffler heat insulator.

Installation

1. Installation is in the reverse order of removal.

Muffler Heat Insulator Ⅰ

Removal

⚠ Warning

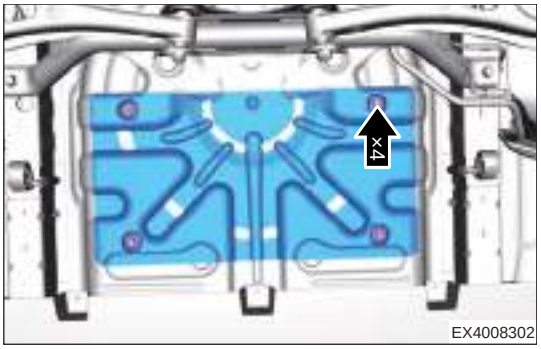
- Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable
3. Raise vehicle to a proper height.
4. Remove the muffler heat insulator Ⅰ.

a. Remove 4 clamping washers (arrow) from muffler heat insulator Ⅰ.



b. Remove the muffler heat insulator Ⅰ.

Inspection

1. Inspect the muffler heat insulator Ⅰ.
   a. Inspect if there are cracks on muffler heat insulator Ⅰ. If so, replace muffler heat insulator Ⅰ.

Installation

1. Installation is in the reverse order of removal.

SQRE4T15C IGNITION SYSTEM

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair:

1. It is prohibited to use short circuit spark test to test ignition function during repair, otherwise it may damage the module.
2. During using, do not remove ignition coil from spark plug with bare hands with power on, and do not contact the metal part and rubber guide rod directly, to avoid electric shock.
3. Make sure that ground wire of ignition coil assembly is short to the nearest GND separately from ECU and other electrical device to reduce signal interfere as possible.
4. Ensure that connector or wire harness has no damage; the wire harness connector is connected correctly. Ensure that wire harness and connector have no short circuit or poor contact.

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair:

1. DO NOT remove the spark plugs when engine is hot; failure to do this may cause damage to the spark plug thread holes on cylinder head.
2. When installing spark plug and ignition coil, check if there is impurities in cylinder head mounting holes, and if the inner wall is smooth.
3. Do not make paint mark on spark plug assembly ceramic body. If there is paint or other organic mark, it is necessary to clean. Never apply grease such as lubricant and anti-rust oil etc. on spark plug assembly. If so, it is required to clean it.
4. Before removal, remove the dirt and foreign matter around ignition coil and ignition coil mounting hole to prevent them from dropping into cylinders.
5. After removing or when replacing ignition coil, do not place ignition coil on the ground or other dusty places, otherwise, dust or foreign matter may enter rubber guide and lead to ignition coil failure.
6. When replacing spark plug, remove and install ignition coil carefully. Do not rotate ignition coil (avoid scratching rubber guide).
7. Do not separate ignition coil rubber guide and ignition coil body. If so, it may cause the decrease of seal performance and fuel gas enter and corrode inner structure when reinstalling.

Symptom	Possible Cause
	Spark plug
	Intake camshaft phaser control valve
	Exhaust camshaft phaser control valve
	Wire harness
	ECU
Knock	Ignition coil assembly
	Knock sensor
	ECU
Difficult to start	Battery
	Ignition coil assembly
	Spark plug
	Engine speed sensor
Engine hesitation, power drop, unstable performance	Ignition coil assembly
	Engine speed sensor
	Intake camshaft phaser control valve
	Exhaust camshaft phaser control valve
	Spark plug
	Camshaft position sensor
	ECU
Rough, unstable idling or stall	Ignition coil assembly
	Camshaft position sensor
	Spark plug
	ECU

Repair Precautions

Visual inspection can reduce the unnecessary test and diagnostic time, so pay attention to the following inspection items:

1. Check the line and hose for obvious looseness, and if they are disconnected or routed improperly.
2. Make sure that the battery connections are clean and fixed firmly.
3. Check if the generator wire and belt are installed correctly and securely.
4. Check if the engine wire harness connectors are inserted fully.
5. Check if all electrical connectors are installed correctly and securely.
6. Check the following electrical connections:

a. Crankshaft position sensor.
b. Oxygen sensor.
c. Intake pressure/temperature sensor.
d. Ignition coil.
e. Oil pressure switch.
f. Charcoal canister solenoid valve.
g. Camshaft position sensor.
h. Electronic throttle.
i. Intake Variable Valve Timing (VVT) control valve.
j. Exhaust Variable Valve Timing (VVT) control valve.
k. Fuel injector.

7. Check the routing of all vacuum hoses.
8. Confirm that the following vacuum hoses are connected securely without any leakage.
   a. Charcoal canister solenoid valve.
   b. PCV valve.
   c. Brake booster.
9. Check electric fuel pump hose and wire connections to make sure that they are connected securely.

Spark Plug Common Problems

Inspection

OK

1. Spark plug porcelain small end is between white and yellowish, gray or brownish.
2. Air-fuel ratio and ignition time are normal, there is no misfire, and cold-start enriching function is normal.

Carbon Accumulation

A layer of velvety black charcoal smoke attaches on the insulator small end, electrode and spark plug body		
Cause	Result	Treatment
Mixture is excessively rich due to improper adjustment of air fuel mixture.	Poor starting ability	Check air filter and adjust air-fuel ratio and cold starting system.
Traveling distance of vehicle is too short, engine temperature is low, and combustion is incomplete.		
Fuel quality is poor or fuel deteriorates, fuel is abnormal.		
Spark plug type is incorrect.		

Oil Dirt

A layer of black oily charcoal smoke and dirt attach on the insulator small end, electrode and spark plug body		
Cause	Result	Treatment
Piston ring has bad elasticity or is worn excessively, and oil breaks into combustion chamber.	Difficult to start	Check and repair engine, or replace spark plug.

A layer of black oily charcoal smoke and dirt attach on the insulator small end, electrode and spark plug body		
Excessive matching clearance between piston skirt and cylinder wall causes oil breaking and air leakage.		
Air leakage occurs due to incorrect installation of piston ring in direction of inside and outside tangent angle, causing oil breaking into combustion chamber.		
Excessive clearance occurs between valve stem and valve guide due to excessive wear, or valve guide oil seal fails, causing oil leakage.		
Oil level is too high and oil breaks into combustion chamber.		

Lead Deposits

Brownish yellow enamels or greenish deposits exist on the insulator small end		
Cause	Result	Treatment
The fuel additive contains lead, when engine runs under high load conditions with throttle partially opened for a long time, enamel is formed.	Causing misfire	Replace spark plug.

Red Deposits

There are severe red brown deposits on insulator skirt and electrodes, and clear radial discharge traces can be seen on the surface of insulator small end		
Cause	Result	Treatment
In the unleaded gasoline, Mn-based anti-riot agent MMT is used instead of lead tetraethyl, the oxide of Mn after combustion adheres on the surface of insulator and electrode.	At high temperature, these deposits are easily conductive, resulting in flashover on insulator skirt surface, unstable combustion, high engine speed, and jitter under heavy load conditions.	Use qualified fuel, replace spark plug.

On-vehicle Service

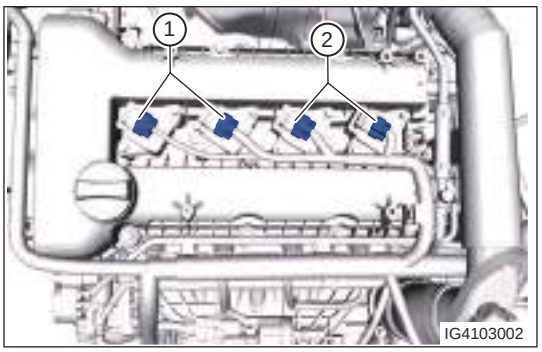
Ignition Coil Assembly

Removal

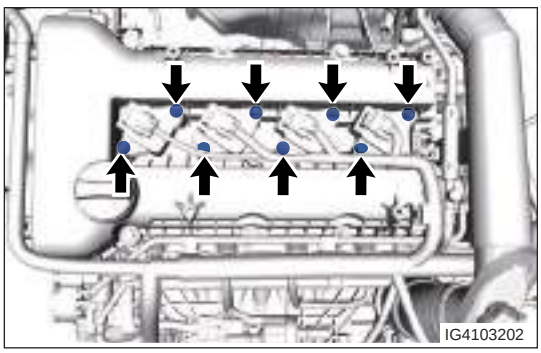
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.
- It is prohibited to use short circuit spark test to test ignition function during repair, otherwise it may damage the module.
- During using, do not remove ignition coil from spark plug with bare hands with power on, and do not contact the metal part directly, to avoid electric shock.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the ignition coil assembly.
   a. Disconnect the ignition coil assembly connector (1), and move away the wire harness from ignition coil assembly.
   b. Disconnect the ignition coil assembly connector (2), and move away the wire harness from ignition coil assembly.



   c. Remove 8 fixing bolts (arrow) from ignition coil assembly.
      Tightening torque: 9 ± 1 N · m

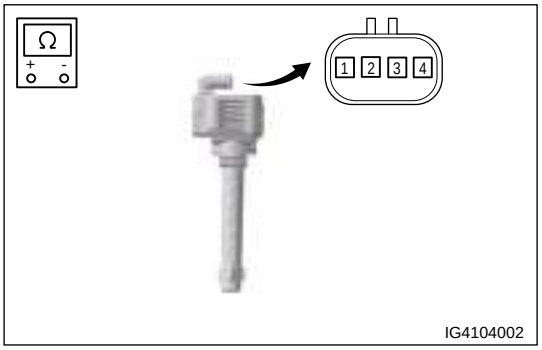


   d. Remove 4 ignition coil assemblies.

Inspection

1. Inspect the resistance of ignition coil.

a. Turn digital multimeter to ohm band, and check the resistance between terminals.



Terminal	Terminal Definition
1	Power supply
2	Ground
3	Ground
4	Control signal

Multimeter Connecti-on	Condition	Specification (Ω)	
		UAES	Wodeer
Terminal 1 - Terminal 2	Normal temperatu-re	1.27 MΩ ± 10%	12.77 KΩ ± 10%
Terminal 1 - Terminal 3		∞	∞
Terminal 1 - Terminal 4		1.27 MΩ ± 10%	13.72 KΩ ± 10%
Terminal 2 - Terminal 3		∞	∞
Terminal 2 - Terminal 4		1.1 KΩ ± 10%	0.95 KΩ ± 10%
Terminal 3 - Terminal 4		∞	∞

Hint:
Replace ignition coil if result difference is great.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Make sure that the connection of ignition coil high-voltage output terminal and spark plug is reliable, or it may cause high-voltage leakage, resulting in poor ignition.
- Before installation, check the mounting hole of cylinder head spark plug, and no impurities can be brought in during assembly.
- Install the ignition coil into cylinder head cover mounting hole and press it to close to mounting boss on cylinder head cover. Never turn ignition coil to left/right after pressing and do not tap ignition coil with a hammer etc.

a. If there is a thick spark with blue-white color and popping occurs between spark plug and engine body and also spark generated between center electrode and side electrode, that indicates ignition system is normal.
b. If there is a thick spark with blue-white color between spark plug and engine body and no spark between center electrode and side electrode, but spark is in inside of center electrode, that indicates inside of spark plug is damaged.
c. If the spark is red and short or there is no spark, check ignition coil or others.

Installation

⚠ Caution

- Check the spark plug type to confirm if it is suitable.
- Please install spark plug with a special spark plug socket, and never damage the normal spark plug gap.
- Avoid to install the spark plug from higher position from mounting hole during installation to prevent spark plug side electrode gap from damaging, resulting in poor ignition.
- Always tighten the spark plug according to specified torque using a torque wrench when installing and replacing it.

1. Install the spark plug.
   a. Install 4 spark plugs respectively into the cylinder head mounting holes for pre-tightening, and then retighten the spark plugs with a torque wrench.
      Tightening torque: 20 ± 3 N • m
2. Other installation procedures are in the reverse order of removal.

SQRE4T15C EMISSION SYSTEM

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair:

1. Temperature in engine compartment is very high when engine is running. Before removal, you must make sure that engine has shut off, and engine compartment has cooled down sufficiently, otherwise, there is a risk of scald injury.
2. Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.

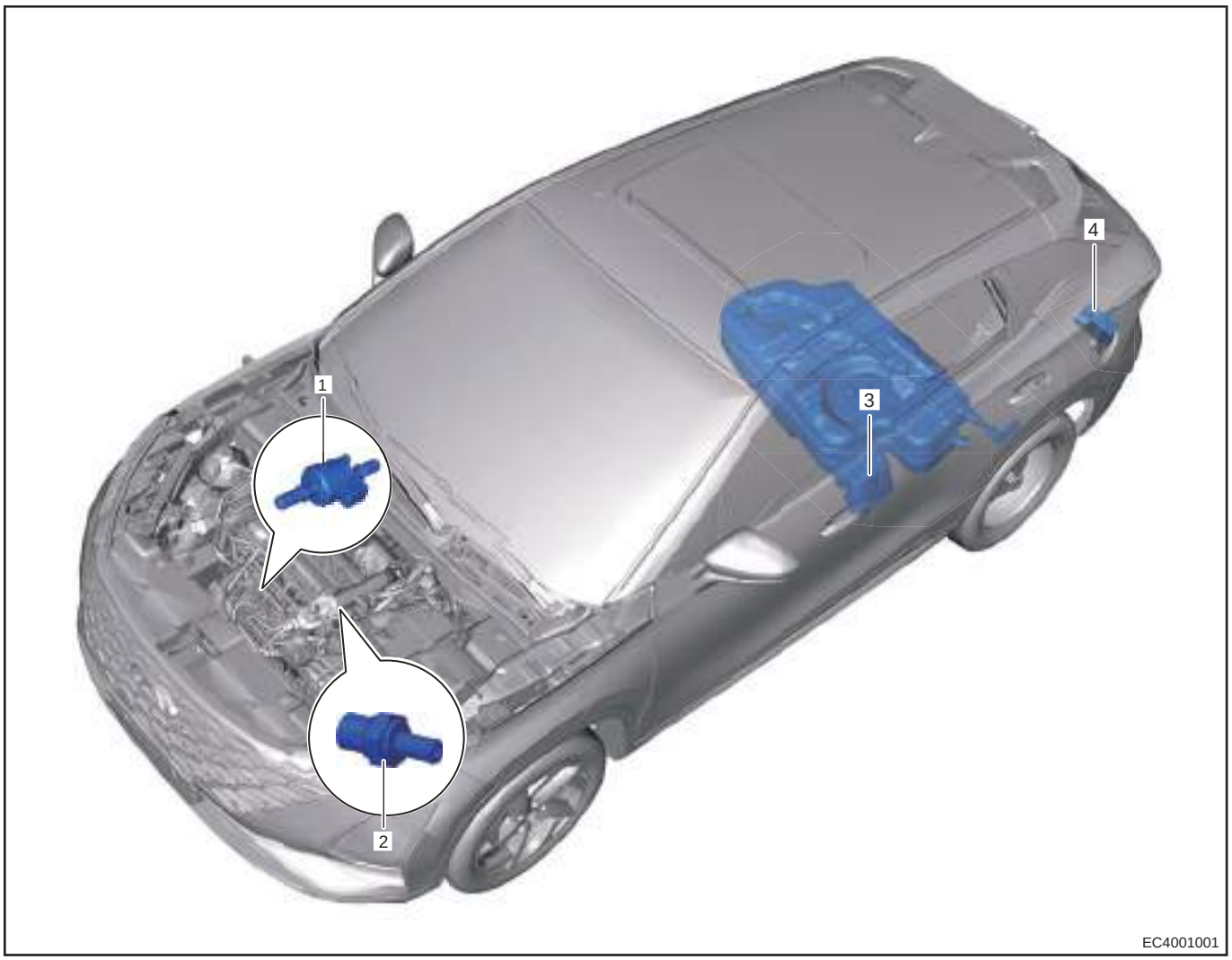
Precautions

In order to avoid dangerous operation and damage to the vehicle before repair in this section, always follow the instructions below before repair:

1. Specified grease must be used and use of other grease will lead to oxygen sensor poisoning. New parts has been applied with grease and grease must be applied on mounting threads during reassembly.
2. Unneeded activated charcoal canister assembly should be handled by the specialized department according to local laws and regulations. Never discard it at will.
3. If the oxygen sensor falls, never pick it up to install and it needs to return to factory for testing.

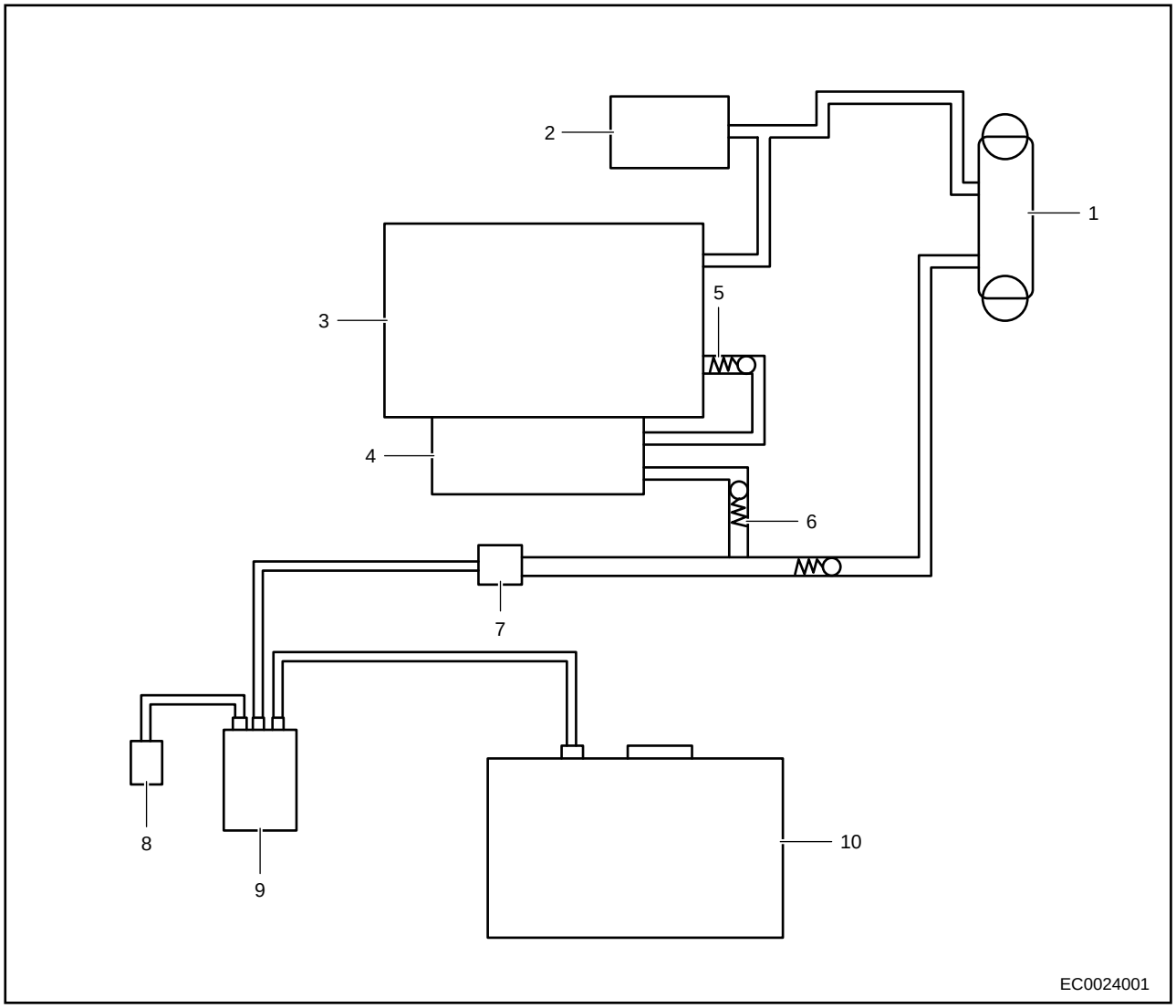
General Information

System Exploded Diagram



1	Activated Charcoal Canister Solenoid Valve	3	Activated Charcoal Canister Assembly
2	PCV Valve	4	Activated Charcoal Canister Filter

Emission Control System Schematic Diagram



1	Intake Hose	6	Turbocharger
2	Engine	7	Intake Manifold
3	PCV Valve	8	Check Valve
4	Charcoal Canister Solenoid Valve	9	Charcoal Canister Filter
5	Activated Charcoal Canister	10	Fuel Tank

Functional Principle

System Operation

- Emission control system recovers and burns fuel vapor to prevent the vapor in fuel tank from being discharged into the atmosphere. It monitors the oxygen content in exhaust gas, so as to guarantee the maximum efficiency of catalytic converter assembly in converting the HC, CO and NOx in exhaust gas. Activated charcoal canister assembly plays an important role in the emission control system. It is used to absorb and filter moisture and fuel vapor. Fresh air enters the top of activated charcoal canister assembly, meanwhile fuel vapor enters the bottom of activated charcoal canister through fuel vapor pipe. When engine stops operating, the fuel vapor and fresh air will be stored in activated charcoal

canister assembly. When engine runs and charcoal canister solenoid valve opens timely, the fuel vapor will enter intake manifold and burns in the cylinder.

- Oxygen sensor consists of upstream oxygen sensor and downstream oxygen sensor. Upstream oxygen sensor is installed on pre-catalytic converter assembly, and downstream oxygen sensor is installed on front exhaust pipe assembly. Oxygen sensor can detect the oxygen content in exhaust gas, and determine whether combustible air-fuel mixture is completely burnt out or not, so as to guarantee the maximum efficiency of catalytic converter assembly in converting the HC, CO and NOx in exhaust gas.
- Two desorption pipelines are equipped in this model. One desorption pipeline is connected to intake manifold through canister solenoid valve, which is low load desorption pipeline; The other desorption pipeline is connected to supercharger intake pipeline through canister solenoid valve, which is high load desorption pipeline.
- Low load desorption mode: When the pressure in intake manifold is lower than atmospheric pressure, after the canister solenoid valve operates, the fuel vapor in charcoal canister is desorbed directly by the pipeline connected to intake manifold.
- High load desorption mode: When the pressure in intake manifold is higher than atmospheric pressure, the fuel vapor in charcoal canister is desorbed by the pipeline connected to supercharger inlet pipe. In order to increase the effect of high load desorption, a venturi tube is installed in high load desorption pipeline to increase the desorption flow.

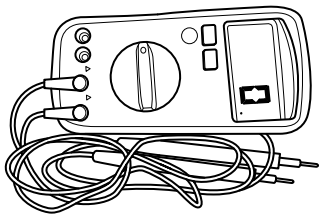
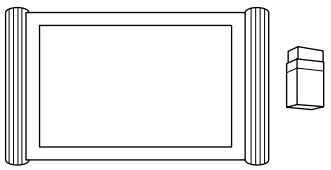
Specifications

Torque Specifications

Description	Torque (N·m)
Upstream Oxygen Sensor	45 ± 5
Downstream Oxygen Sensor	45 ± 5
Coupling Bolt Between Activated Charcoal Canister Filter and Body	7 ± 1
PCV Valve Tightening Torque	4 ± 1

Tools

General Tools

Tool Name	Tool Drawing
Digital Multimeter	 RCH0002006
X-431 PAD Diagnostic Tester	 RCH0001006

Diagnosis & Testing

Leakage Inspection

Visually check that hoses and connections have no leaks or damage.

⚠ Caution

- Removal of engine oil dipstick, filler cap, PCV hose and other components or other problems in them may cause the engine to run improperly. Air suction caused by disconnections, looseness or cracks in intake system pipes related to throttle assembly will result in engine failure or abnormal operation. Replace the parts as necessary.

Fuel Tank Cap Assembly Inspection

1. Visually check that fuel tank cap assembly is not deformed or damaged.
2. If result is not as specified, replace the fuel tank cap assembly.

On-vehicle Service

Charcoal Canister Solenoid Valve

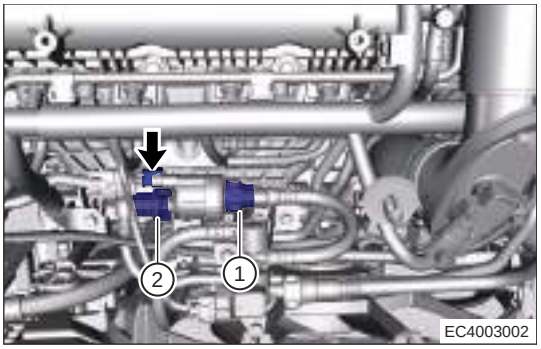
Removal

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and ENGINE START STOP switch.

2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the canister solenoid valve.
   a. Disconnect the canister solenoid valve connector (arrow).
   b. Disconnect the connection between canister solenoid valve assembly and canister solenoid valve outlet pipe (1) and fuel vapor pipe (2).



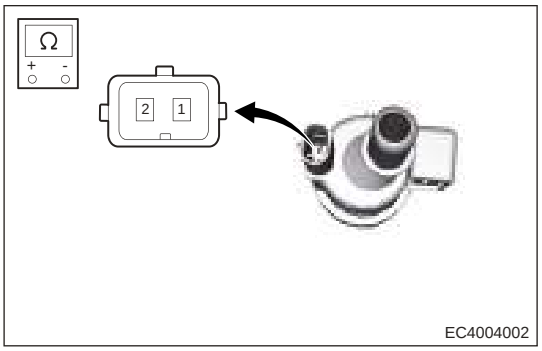
   c. Remove the canister solenoid valve.

Inspection

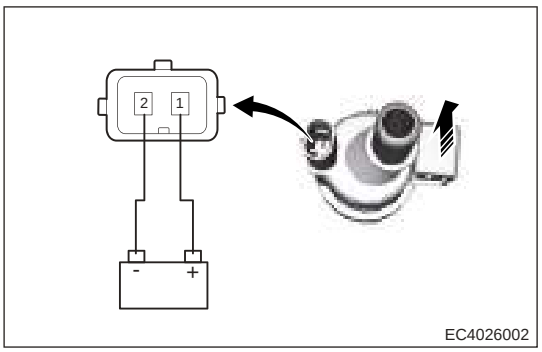
1. Check resistance of canister solenoid valve.
   a. Measure the resistance between 2 terminals of canister solenoid valve with a digital multimeter.

Multimeter Connection	Measurement Temperature	Specification (Ω)
Terminal 1 - Terminal 2	20°C	16 ± 2

Hint:
If resistance is not as specified, replace the canister solenoid valve assembly.



2. Check if the canister solenoid valve opens normally and is blocked.
   a. Connect the positive battery (+) to canister solenoid valve No. 1 pin and connect the negative battery (-) to canister solenoid valve No. 2 pin. Check if the canister solenoid valve can open. After it opened, bleed air to direction of canister solenoid valve (arrow), and air flows easily.



Installation

1. Installation is in the reverse order of removal.

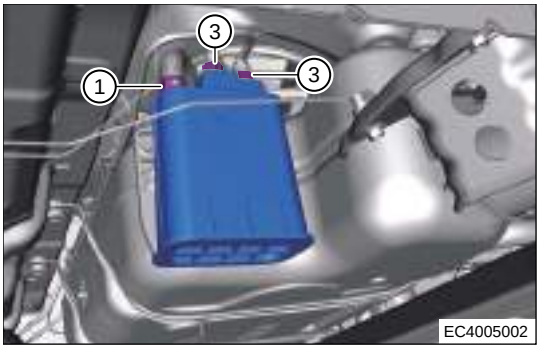
Activated Charcoal Canister Assembly

Removal

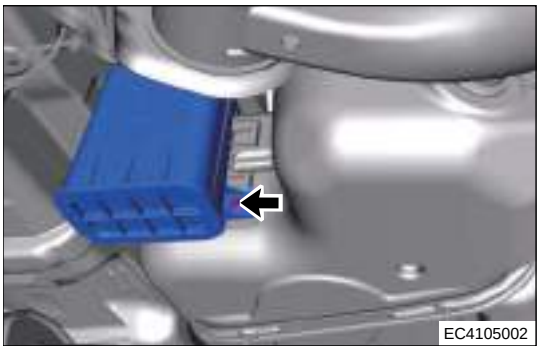
⚠ Caution
• Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and the ENGINE START STOP switch. Wait until engine cools down.
2. Disconnect the negative battery cable.

3. Raise the vehicle to a proper position.
4. Remove fuel tank fixing strap and lower fuel tank to a proper position.
5. Remove the activated charcoal canister assembly.
   a. Loosen elastic clamp (1), and disconnect connection of activated charcoal canister breather pipe.
   b. Disconnect connection between fuel vapor pipe Ⅰ (2) and activated charcoal canister assembly.
   c. Disconnect connection between fuel vapor pipe Ⅱ (3) and activated charcoal canister assembly.

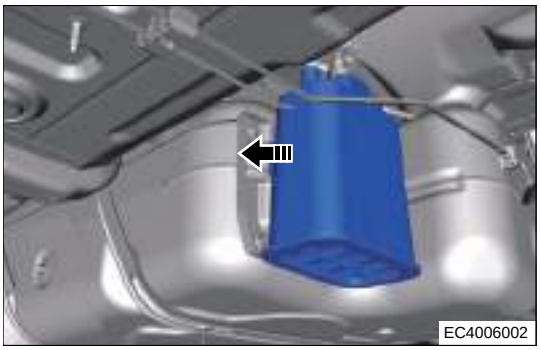


   d. Remove 1 fixing bolt (arrow) from activated charcoal canister assembly.

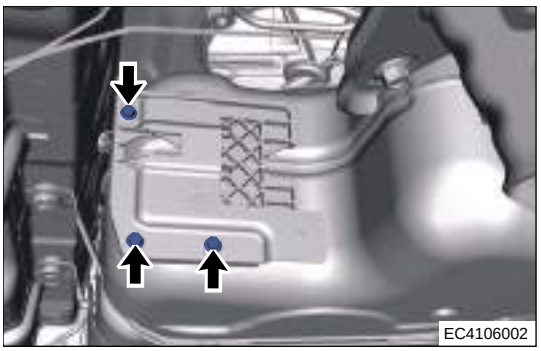


   e. Remove the activated charcoal canister assembly from bracket in direction of arrow.

      Hint:
      Unneeded activated charcoal canister assembly should be handled by the specialized department according to local laws and regulations. Never discard it at will.



   f. Remove 3 fixing bolts (arrow), and remove activated charcoal canister mounting bracket.



6. Remove the activated charcoal canister filter.
   a. Remove the rear left tire.
   b. Remove the rear left wheel house protector.

c. Loosen elastic clamp (arrow), and disconnect the connection between filter and breather hose.

d. Remove the fixing bolt (arrow) from activated charcoal canister filter.

Tightening torque: 7 + 1 N m

e. Remove the activated charcoal canister filter.

Installation

⚠ Caution
• Positioning distance from hose end to elastic clamp is 3 to 5 mm.

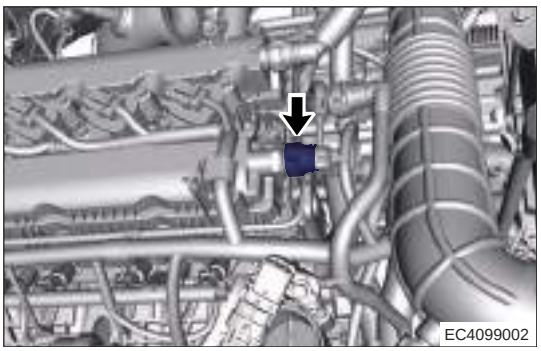
1. Installation is in the reverse order of removal.

PCV Valve

Removal

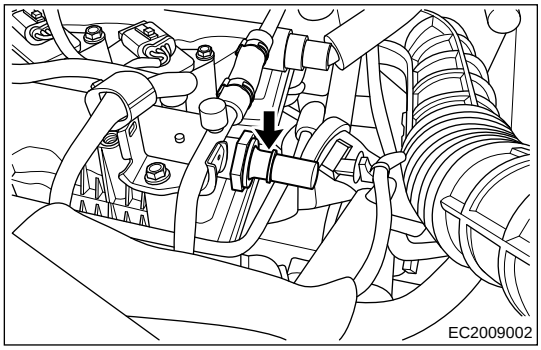
⚠ Caution
• Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Remove the engine trim cover.
3. Remove the PCV valve.
   a. Disconnect connection (arrow) between crankcase ventilation hose and PCV valve.



b. Loosen and remove the PCV valve (arrow) from cylinder head cover.

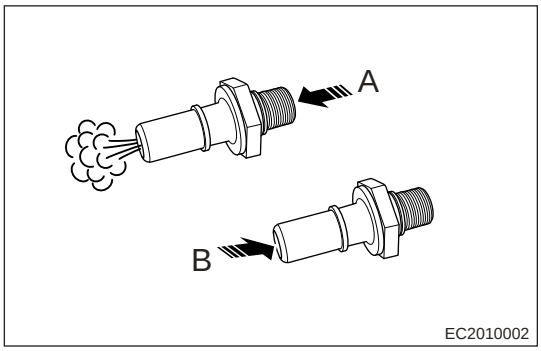
Tightening torque: 4 ± 1 N·m



Inspection

1. Install a clean hose to PCV valve.
2. Check the PCV valve operation.
   a. Bleed air into the cylinder head cover side, and check that air A flows easily.
   b. Blow air into the intake manifold side, and check that air B flows difficultly.

   Hint:
   If result is not as specified, replace PCV valve.



⚠ Caution

- DO NOT suck air through PCV valve. Petroleum substances inside the PCV valve are hazardous to your health.

3. Remove the clean hose from PCV valve.

Installation

1. Installation is in the reverse order of removal.

Upstream Oxygen Sensor

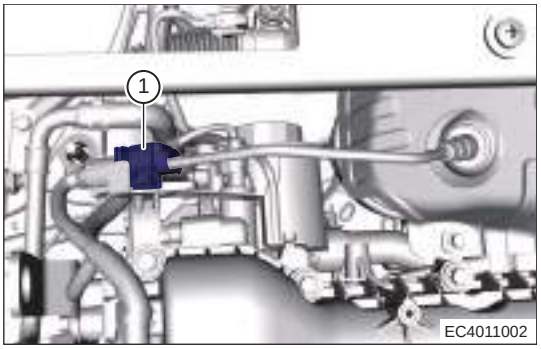
Removal

⚠ Caution

- Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.
- Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the upstream oxygen sensor.

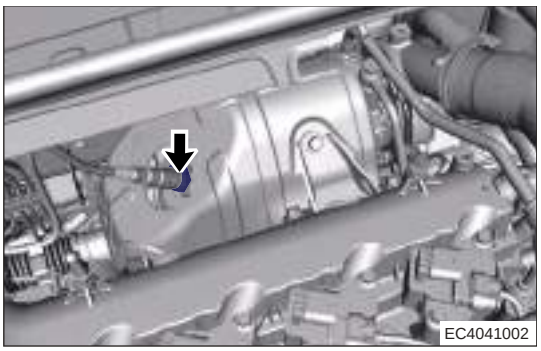
a. Take off and disconnect the upstream oxygen sensor connector (1) from bracket.



b. Remove the upstream oxygen sensor (arrow) from tip of precatalytic converter.

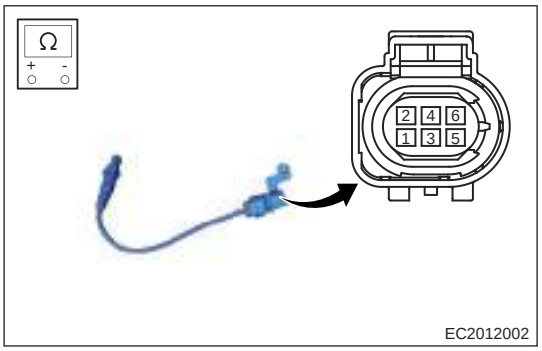
Tightening torque: 45 ± 5 N·m

Hint:
Remove it with special tool oxygen sensor socket.



Inspection

1. Check the upstream oxygen sensor.
   a. Measure the resistance of upstream oxygen sensor with a digital multimeter.



Multimeter Connection	Specified Condition
Terminal 1	Pump current
Terminal 2	Virtual ground
Terminal 3	Heater negative
Terminal 4	Heater positive
Terminal 5	Corrected resistance
Terminal 6	Nernst voltage

Multimeter Connection	Condition	Specified Condition
Terminal 3 - Terminal 4	Normal temperature	3 - 4 Ω
Terminal 1 - Terminal 5	Normal temperature	110 - 115 Ω

Hint:
If result is not as specified, replace the upstream oxygen sensor.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Specified grease must be used and use of other grease will lead to oxygen sensor poisoning. New parts have been applied with grease and grease must be applied on mounting threads during reassembly.

Material number

5964080112 (120 g/pot) or 5964080145 (450 g/pot)

⚠ Warning

If the oxygen sensor falls, never pick it up to install and it needs to return to factory for testing.

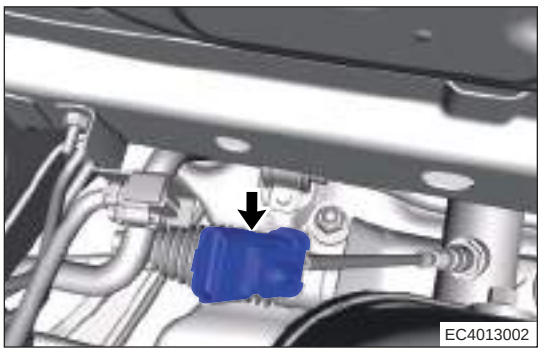
Downstream Oxygen Sensor

Removal

⚠ Caution

- Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.
- Be sure to wear necessary safety equipment to prevent accidents when repairing.

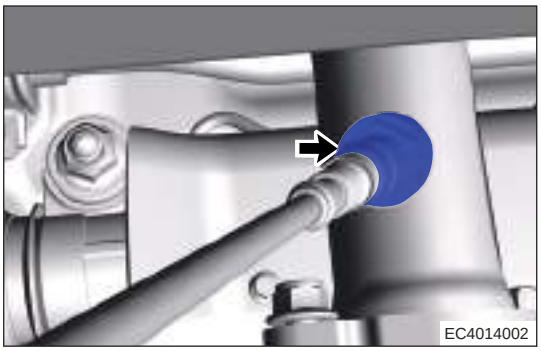
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the downstream oxygen sensor.
   a. Disconnect the downstream oxygen sensor connector (arrow).



   b. Raise the vehicle to a proper position.
   c. Remove downstream oxygen sensor (arrow) from main catalytic converter assembly.

      Tightening torque: 45 ± 5 N·m

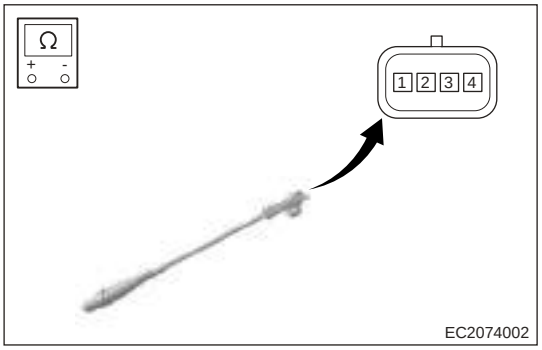
      Hint:
      Remove it with special tool oxygen sensor socket.



Inspection

1. Check the downstream oxygen sensor.

a. Measure the resistance of downstream oxygen sensor with a digital multimeter.



Multimeter Connection	Specified Condition
Terminal 1	Ground
Terminal 2	Signal
Terminal 3	Heating control
Terminal 4	Power supply

Multimeter Connection	Condition	Specified Condition
Terminal 3 - Terminal 4	20 ˚C	5 - 22 Ω
Terminal 1 - Terminal 2	Always	No continuity
Terminal 1 - Terminal 4		
Terminal 2 - Terminal 3		
Terminal 2 - Terminal 4		

Hint:
If result is not as specified, replace the downstream oxygen sensor.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Specified grease must be used and use of other grease will lead to oxygen sensor poisoning. New parts have been applied with grease and grease must be applied on mounting threads during reassembly.

Material number

5964080112 (120 g/pot) or 5964080145 (450 g/pot)

⚠ Warning

If the oxygen sensor falls, never pick it up to install and it needs to return to factory for testing.

SQRE4T15C COOLING SYSTEM

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. Temperature of cooling system is very high when engine is running. Before removal, make sure that engine has stopped running and cooling system has cooled down sufficiently, otherwise, there is a risk of scald injury.
2. Never open expansion tank cap or remove drain cock plug, when engine is operating or cooling system temperature is high. High-pressurized hot engine coolant and steam may flow out and cause serious burns.
3. If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

Precautions

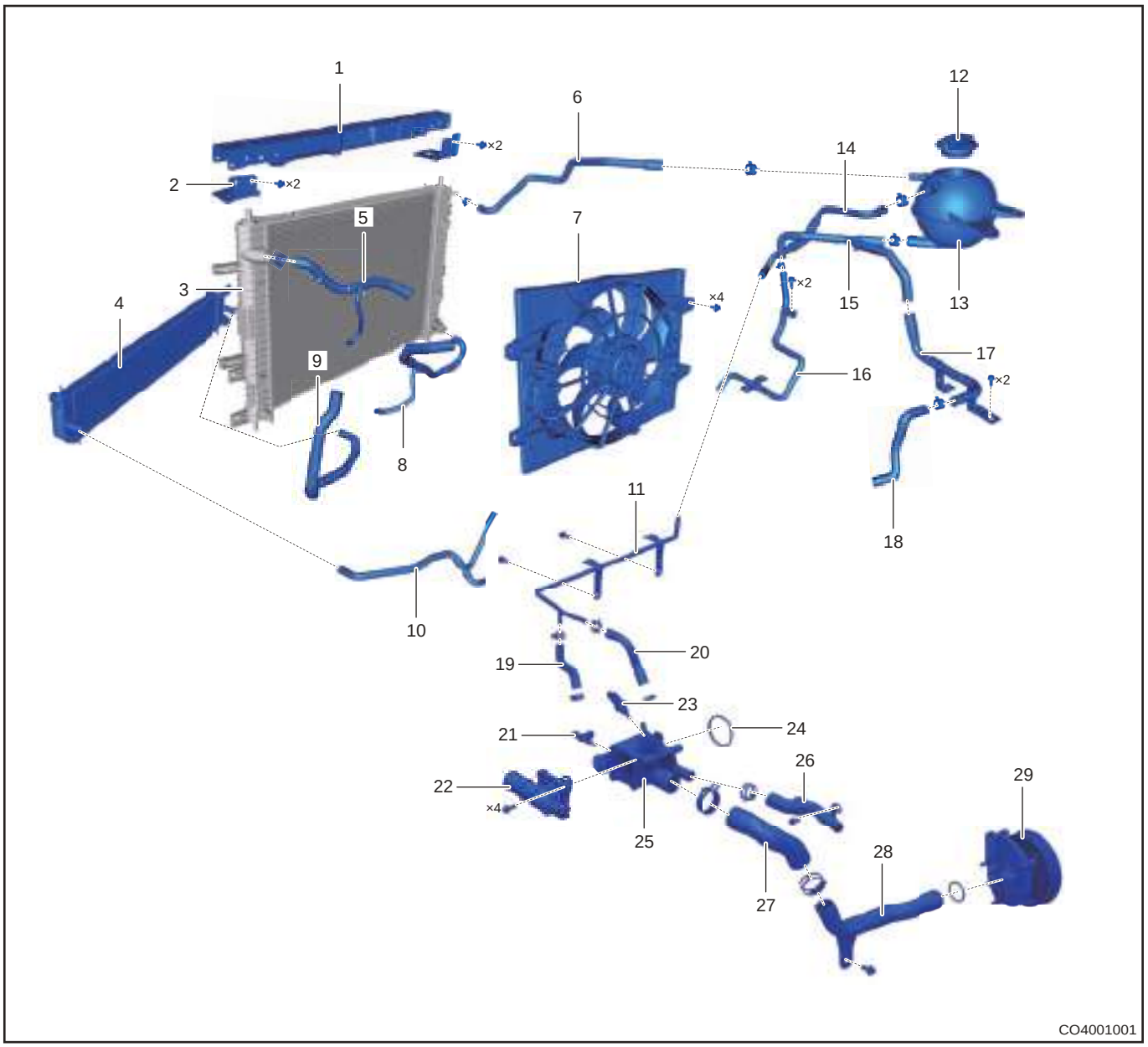
In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

1. When testing cooling system, please pressurize the system to specified pressure. Otherwise, system components may be damaged.
2. DO NOT mix different colors or types of coolant.
3. Please select coolant which is suitable for local climate in different areas.
4. Be sure to wear necessary safety equipment to prevent accidents when repairing.
5. Try to prevent body paint surface from being scratched during removal and installation.

System Overview

System Components Diagram

Engine Cooling System



1	Tank Upper Crossmember Body	16	Water Pipe 2 - Expansion Tank to Water Pump
2	Tank Mounting Bracket	17	Water Pipe - Expansion Tank to Water Pump Ⅱ
3	Radiator Assembly	18	Water Pipe - Expansion Tank to Water Pump Ⅲ
4	Low Temperature Radiator Assembly	19	Engine Discharge Hose Ⅲ
5	Engine Outlet Pipe	20	Engine Discharge Hose Ⅰ

6	Water Pipe - Radiator to Expansion Tank	21	Coolant Temperature Sensor Outlet
7	Cooling Fan Assembly	22	Electronic Thermostat
8	Engine Inlet Pipe	23	Coolant Temperature Sensor Inlet
9	Low Temperature Radiator Inlet Pipe	24	Seal Ring - Thermostat Seat
10	Low Temperature Radiator Outlet Pipe	25	Thermostat Seat Assembly
11	Discharge Steel Pipe	26	Heating Pipe Assembly
12	Expansion Tank Cap	27	Small Circulation Water Pipe
13	Expansion Tank Body	28	Cooling Pipe Assembly
14	Water Pipe - Engine to Expansion Tank	29	Water Pump
15	Water Pipe - Expansion Tank to Water Pump		

Functional Principle

System Operation

- Engine cooling system adjusts engine operating temperature by the flow of coolant and makes engine operate normally under various operating conditions.
- Engine cooling system is a forced circulation system, which supplies circulation pressure for cooling system by water pump and forces coolant to circulate in the engine cylinder block, and distributes excessive heat to radiator by the flow of coolant, and radiates it to the air by cooling fan. Also, engine cooling system provides heat to the heater core in cabin to improve driving comfort.

Specifications

Torque Specifications

Description	Torque (N·m)
Expansion Tank Fixing Bolt	5 ± 1
Electronic Thermostat Housing Fixing Bolt	8 + 3
Thermostat Seat Fixing Bolt	8 + 3
Coolant Temperature Sensor	15 ± 1
Cooling Fan Fixing Bolt	5 ± 1
Water Pump Fixing Bolt	8 + 3
Coupling Bolt Between Radiator and Condenser	7 ± 1
Water Pump Pulley Fixing Bolt	20 + 5
Discharge Steel Pipe Fixing Bolt	8 + 3

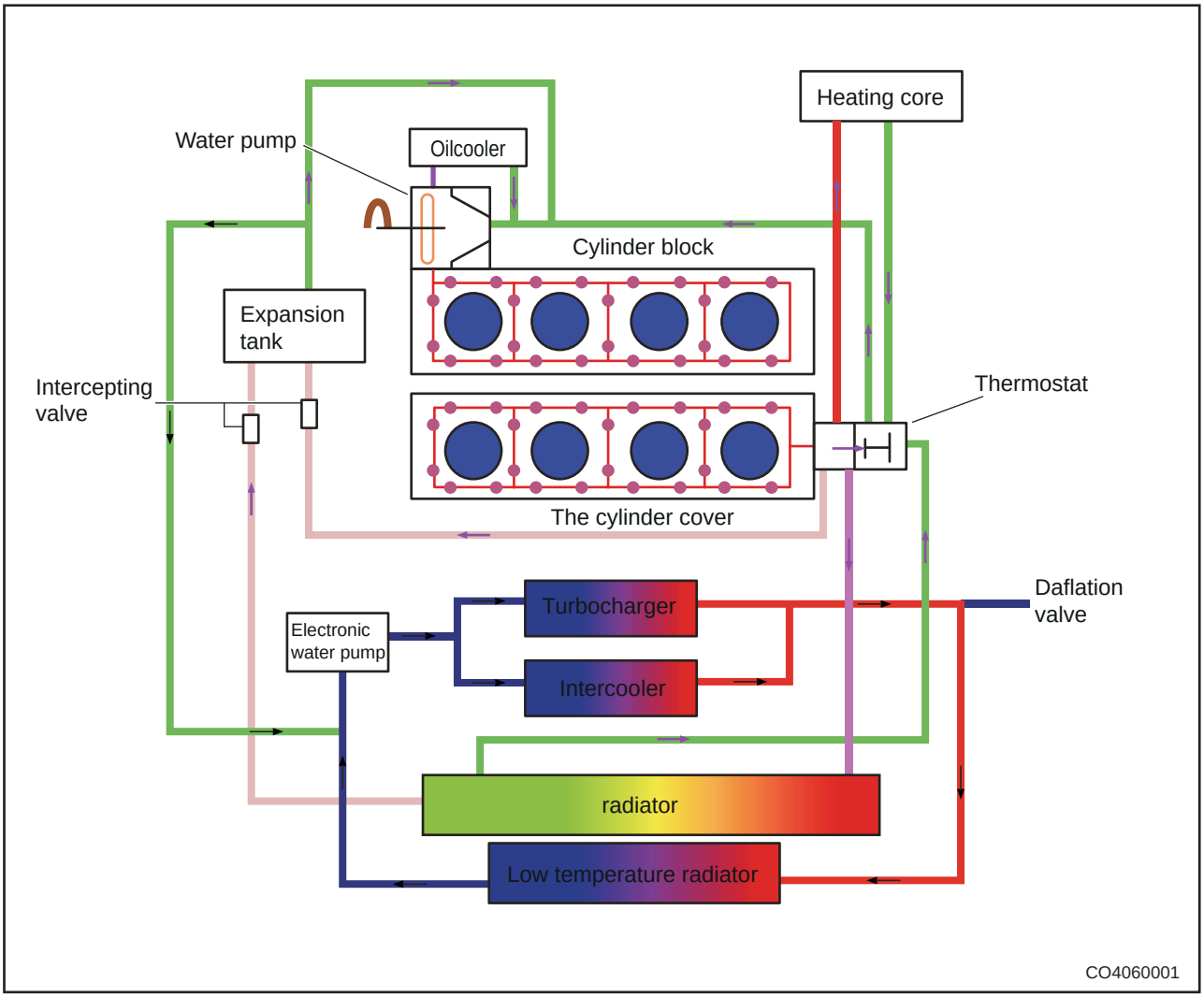
Coolant Capacity

Coolant	Capacity (L)
Full Organic Antifreeze (LEC-II)	9 ± 0.5 L

Coolant Freezing Point

Items	Freezing Point Value (℃)
Coolant	-40

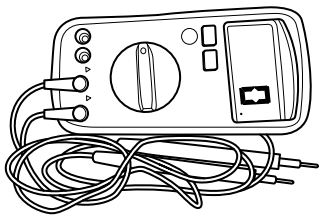
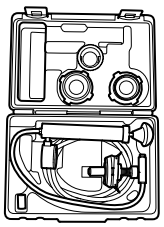
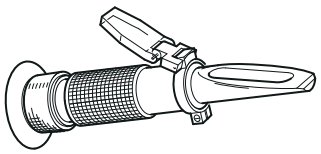
Cooling System Operation Flowchart



- Small circulation: When coolant temperature is below 82 ± 2 ℃, electronic thermostat assembly closes. Coolant only circulates inside the cylinder block and warms up other engine parts that need heat. Water pump assembly circulates engine coolant through cylinder block, oil cooler assembly, turbocharger and cylinder head. The coolant does not radiate heat through radiator.
- Large circulation: When coolant temperature is higher than 95 ℃, electronic thermostat assembly opens fully and all coolant flowing out of cylinder block enters radiator for radiating. It then returns to cylinder block for circulation by water pump. Due to radiating in radiator, engine coolant temperature decreases quickly to prevent engine from overheating.

Tools

General Tools

Tool Name	Tool Drawing
Digital Multimeter	 RCH0002006
Cooling System Pressure Tester	 RCH005506
Freezing Point Tester	 RCH000706

Diagnosis & Testing

Problem Symptoms Table

⚠ Caution
• Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Insufficient coolant	Coolant pipe (deteriorated and leaks)
	Expansion tank (leaks)
	Radiator (leaks)
	Heater core (leaks)

Symptom	Suspected Area
	Electronic thermostat assembly (improperly sealed)
	Thermostat seat assembly (cracked and damaged)
	Water pump (leaks)
	Engine cylinder head gasket (damaged)
	Engine cylinder head (cracked and leaks)
	Engine cylinder block (water jacket leaks and cylinder block cracked)
Engine overheating	Low coolant level
	Air resistance exists in pipe
	Expansion tank cap (damaged)
	Engine control module fault
	Cooling fan fault
	Radiator fault
	Electronic thermostat assembly fault
Engine overcooling	Electronic thermostat assembly fault
	Cooling fan fault
Unable to reach normal engine temperature	Cooling fan (constantly operating)
	Electronic thermostat assembly fault
Cooling fan does not operate or abnormal air speed	Cooling fan fault
	Wire harness
	Engine control module fault

Cooling System Leakage Test

⚠ Warning

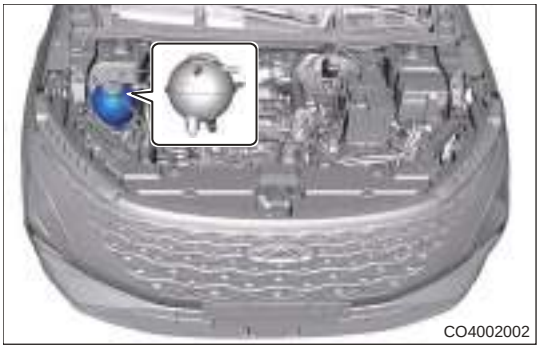
- Always make sure engine is cold before operating cooling system. Never open expansion tank cap or remove drain cock plug, when engine is operating or cooling system temperature is high. High-pressurized hot engine coolant and steam may flow out and cause serious burns.

⚠ Caution

- When testing cooling system, please pressurize the system to specified pressure. Otherwise, system components may be damaged.
- Before testing cooling system, do not perform operation until coolant temperature drops to normal level. Otherwise, it may cause scald.

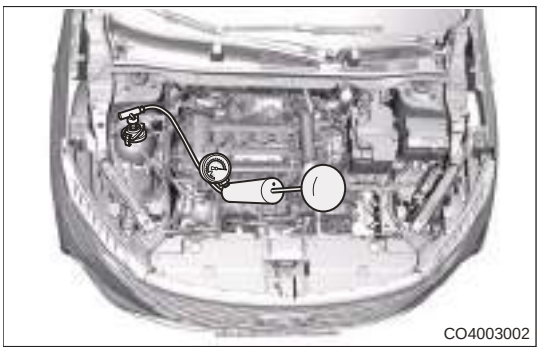
1. Turn off all electrical equipment and ENGINE START STOP switch.

2. Check if coolant level is between "MAX" and "MIN" lines. If coolant level is below "MIN" line, add coolant.



3. Connect cooling system pressure tester to coolant pressure release cap opening (expansion tank cap opening) and tighten it slowly.

   Hint:
   Make sure there is no leakage in connecting part of coolant system pressure tester, in order to avoid pressure leakage during test.



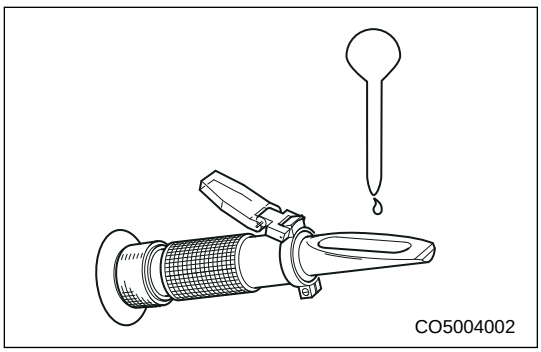
4. Pressurize cooling system to 1.2 bar with the cooling system pressure tester, and then observe the pressure changes. If system pressure does not drop within 2 minutes, it indicates there is no leakage in system. If pressure changes greatly, it indicates that there is a leakage in system; find the leaking area and perform troubleshooting.

Coolant Freezing Point Test

⚠ Caution

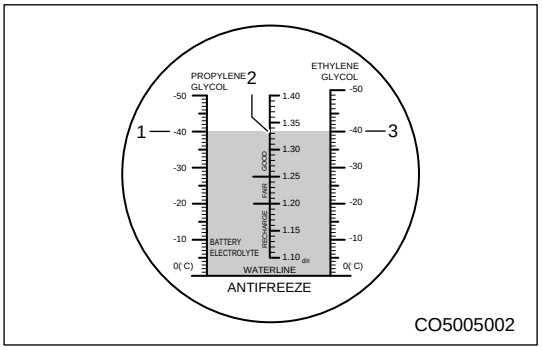
- DO NOT mix different colors or types of coolant.
- Please select coolant which is suitable for local climate in different areas.
- Please read measured value at the scale line. In order to distinguish the scale line more clearly, drip a drop of water on the glass of freezing point tester with a pipette, then the scale line can be clearly distinguished via a “waterline”.

5. As shown in illustration, drip a drop of coolant on the glass of freezing point tester with a pipette, and then observe freezing point value of coolant.



6. As shown in illustration, observe scale 3 of freezing point tester to read ethylene glycol coolant freezing point value. The freezing point value must be kept at -40 °C (value varies with geography, climate or freezing point).

   Hint:
   If freezing point is beyond the specified value, replace the coolant.
   Scale 1 is used to measure the freezing point value of propylene glycol coolant, and scale 2 is used to measure the battery electrolyte concentration.



On-vehicle Service

Coolant Replacement

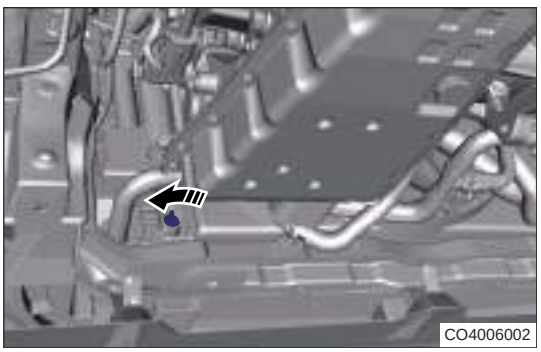
Engine System Coolant Draining

⚠ Warning

- Never remove expansion tank cap when engine is operating or temperature is higher. Otherwise, it may cause scald.
- Be careful when opening expansion tank cap, the high-pressurized hot engine coolant and steam may flow out and cause serious burns.
- Wait until the engine has cooled down, and then cover the expansion tank cap with a piece of damp cloth and turn it one turn slowly (counterclockwise). Step back when releasing cooling system pressure. After confirming that all pressure has been released, turn the expansion tank cap with cloth covered and remove it.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the expansion tank cap when engine temperature and radiator temperature are low.
4. Remove the engine lower protector assembly.
5. Drain the coolant.
   a. Put a coolant collector under the vehicle, loosen elastic clamp (arrow) and disconnect connection between engine inlet pipe and radiator assembly.

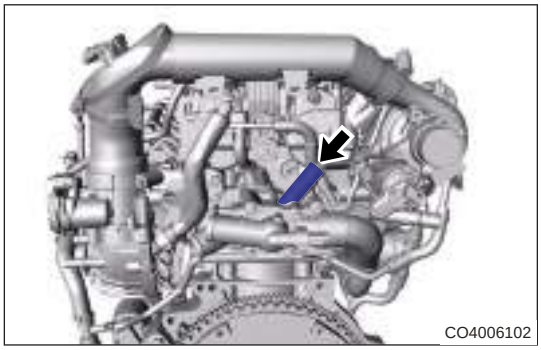
      Hint:
      Put a drainage device or similar tool at the radiator outlet, so that coolant can flow into the collector smoothly.



   b. After coolant stops flowing, connect engine inlet pipe and install elastic clamp.

      Hint:
      Tighten drain cock plug to prevent leakage.
      Wasted coolant should be handled by the specialized department according to local laws and regulations. Never discard it at will.

c. Remove the cooling water inlet and outlet pipe at the engine end and the heating pipe in the engine hood, use the compressed air to aim at the heating water outlet (arrow) and blow out the residual coolant in the engine block and cylinder head, and then use the compressed air to blow out the residual coolant in the heating core.



d. Successively connect the removed engine / heating pipes with clamps according to the state before removal.

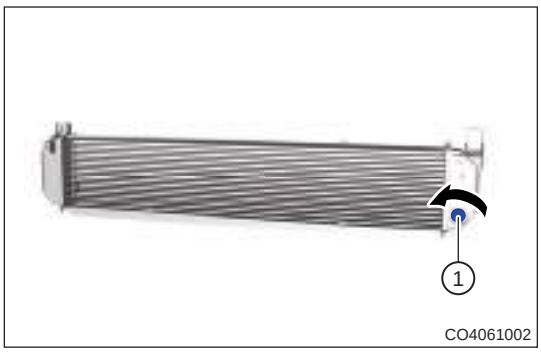
Low Temperature System Coolant Draining

⚠ Warning

- Never remove expansion tank cap when engine is operating or temperature is higher. Otherwise, it may cause scald.
- Be careful when opening expansion tank cap, the high-pressurized hot engine coolant and steam may flow out and cause serious burns.
- Wait until the engine has cooled down, and then cover the expansion tank cap with a piece of damp cloth and turn it one turn slowly (counterclockwise). Step back when releasing cooling system pressure. After confirming that all pressure has been released, turn the expansion tank cap with cloth covered and remove it.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Remove the expansion tank cap when engine temperature and radiator temperature are low.
3. Remove the front bumper assembly.
4. Drain the coolant.
   a. Put a coolant collector under the vehicle, disconnect the low temperature radiator inlet pipe and drain the coolant in low temperature radiator.

      Hint:
      Put a drainage device or similar tool at the low temperature radiator outlet, so that coolant can flow into the collector smoothly.



   b. After coolant stops flowing, connect low temperature radiator inlet pipe and install elastic clamp.

      Hint:
      Wasted coolant should be handled by the specialized department according to local laws and regulations. Never discard it at will.
      Carry out turbocharging inter-cooling system bleeding after filling coolant.

Coolant Adding

Description	Capacity (L)
Red Organic Coolant	8.5 ± 0.3

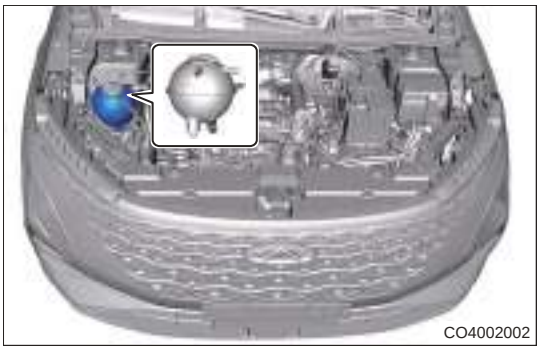
⚠ Warning

- Only use coolant that meets Chery specifications.
- If it is necessary to add coolant when engine is hot, loosen expansion tank cap slightly first to release internal pressure and loosen the cap completely after waiting for a while, and then add coolant.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

⚠ Caution

- DO NOT use inferior coolant.
- DO NOT mix different colors or types of coolant.
- Be careful when adding coolant; avoid spilling coolant on any area of engine.

1. Open expansion tank cap and add coolant until coolant level reaches the “MAX” line.


CO4002002

2. Tighten expansion tank cap, start and run engine. Maintain engine speed between 2000 and 2500 rpm to warm up the engine until cooling fan operates.

⚠ Caution

If there is no coolant in expansion tank after engine just starts, perform the followings:

- Stop the engine;
- Wait until coolant cools down;
- Add coolant to "MAX" line on expansion tank.

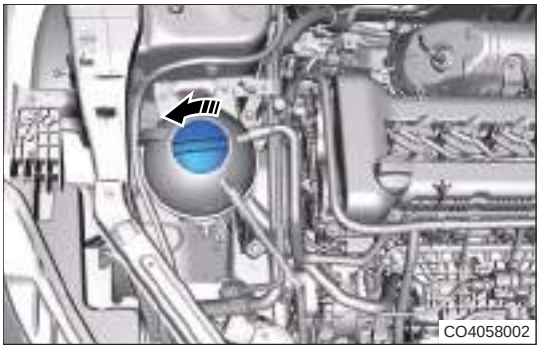
3. Stop engine and wait until coolant temperature drops to the ambient temperature. Check that coolant level is between “MAX” and “MIN” lines. If coolant level is below the “MIN” line, repeat all the above procedures. If coolant level is above the “MAX” line, drain coolant until the level is between “MAX” and “MIN” lines.

Turbocharging Inter-cooling System Bleeding

⚠ Caution

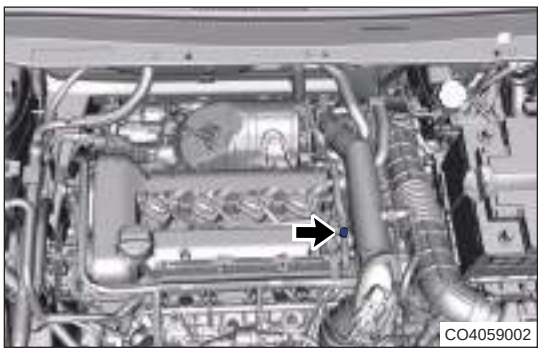
- Carry out turbocharging inter-cooling device cooling system bleeding after replacing coolant or removing and installing turbocharging inter-cooling system related components.
- Never loosen outlet pipe set upper pressure cap in warmed up engine, to prevent coolant from spilling out, causing burns.
- Please wear protection equipment and gloves.

1. Rotate expansion tank cap counterclockwise in cold engine.



2. Unscrew the outlet pipe set upper pressure cap (arrow) counterclockwise.

   Hint:
   There is grommet inside the pressure cap, take care not to lose it after removing.



3. Connect one end of the proper pipe to exhaust port, and place other end to expansion tank.

   Hint:
   A thin pipe of about 1.5 meters or a gas pipe can be used for antifreeze bleeding.

4. Add the coolant.
5. Let the engine in an idling condition; Wait for electric water pump to operate.
6. When a large amount of coolant flows out (without gas), stop the engine, wait until the system is cooled, install and tighten the pressure cap.

   Hint:
   Clean up the spilled coolant, to prevent coolant from entering spark plug installation hole.
   Check if the pressure cap is properly sealed.
7. Add coolant to between MIN and MAX lines (if the coolant is less).
8. Tighten the expansion tank cap.
9. Start the and run engine. Maintain engine speed between 2000 and 2500 rpm to warm up the engine until cooling fan operates.
10. Check each pipe for leaks, lack of antifreeze, if so, handle it.

    Hint:
    Do not open the expansion tank cap at high engine temperature to prevent burns.
11. Use diagnostic tester, check for electronic injection system DTCs (especially electric water pump DTCs).

    Hint:
    If there is electric water pump idling DTC, such as Charge Air Cooler Coolant Pump Dry Run, it indicates that coolant is not sufficient in inter-cooling system, add coolant and perform bleeding.

Tank Upper Crossmember Assembly

Removal

Warning

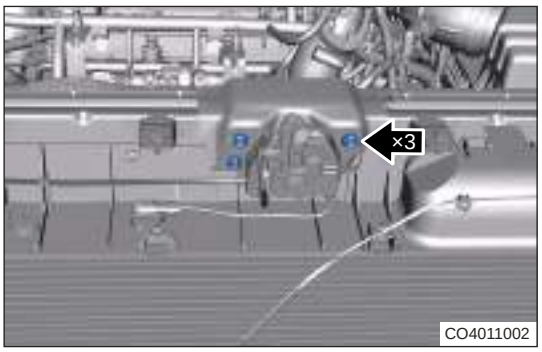
- Perform removal procedures with front compartment at low temperature after cooling fan stops completely, otherwise, rotating cooling fan or hot components of front compartment may cause serious injury.

Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.

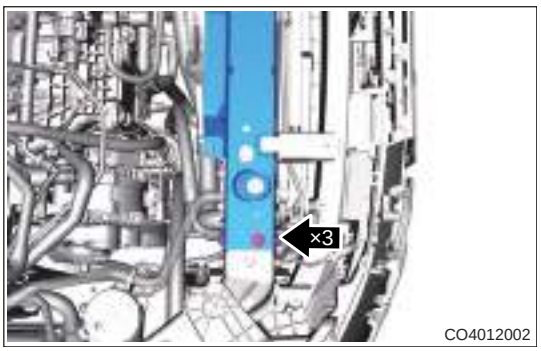
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the upper air deflector.
5. Remove the air filter assembly.
6. Remove the tank upper crossmember assembly.
   a. Remove 3 fixing nuts (arrow) from engine hood lock assembly.

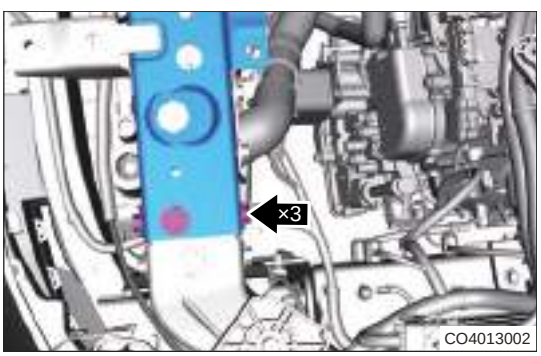
      Tightening torque: 9 ± 1 N·m



   b. Remove 6 fixing bolts (arrow) from tank upper crossmember.

      Tightening torque: 9 ± 1 N·m





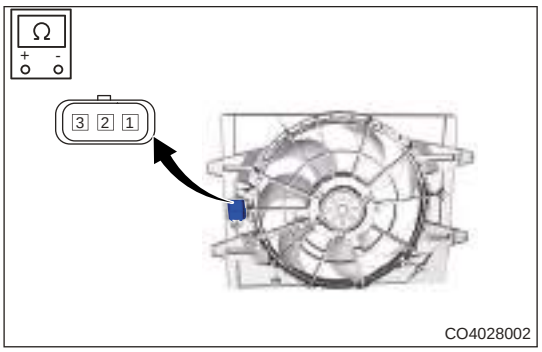
   c. Remove the tank upper crossmember assembly.

Cooling Fan Assembly

On-vehicle Inspection

1. Using a digital multimeter, measure resistance of cooling fan.
   a. Cooling fan

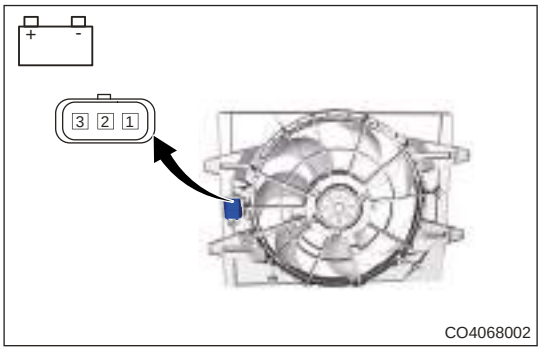
Measurement Condition	Condition	Specification (Ω)
Terminal 1 - Terminal 2	Normal temperature (20 ˚C)	0.8 ± 0.1
Terminal 1 - Terminal 3	Normal temperature (20 ˚C)	0.6 ± 0.1



Hint:
If inspection result is not as specified, replace cooling fan assembly.

2. Connect battery positive (+) and negative (–) to cooling fan connector terminal as shown in table below, to observe if cooling fan runs smoothly.
   a. Cooling fan

Measurement Condition	Condition	Specified Condition
Battery positive (+) - Terminal 2	Always	Runs at low speed
Battery negative (–) - Terminal 3		
Battery positive (+) - Terminal 3	Always	Runs at high speed
Battery negative (–) - Terminal 1		



Hint:
If inspection result is not as specified, replace cooling fan assembly.

Removal

⚠ Warning

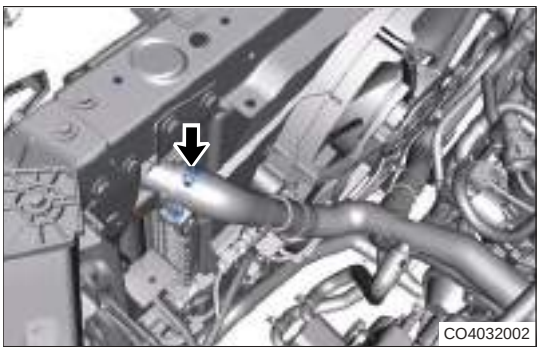
- Perform removal procedures with engine compartment at low temperature, after cooling fan stops completely, to prevent accidents.

⚠ Caution

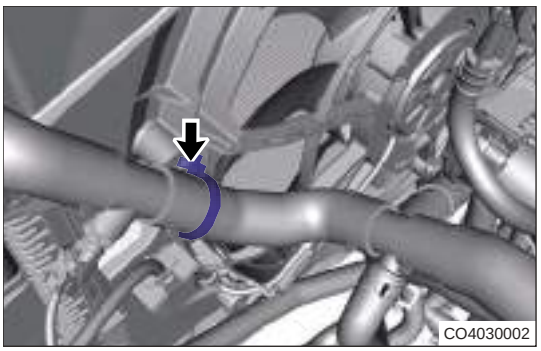
- Be sure to wear necessary safety equipment to prevent accidents when repairing.

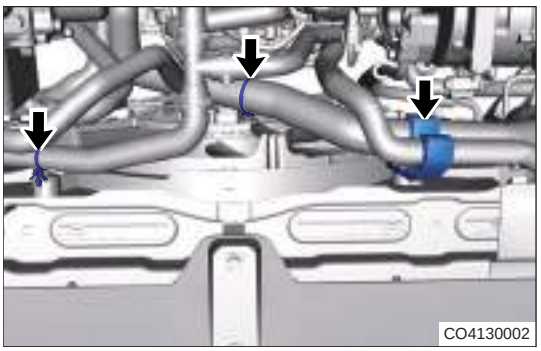
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.

3. Remove the air filter assembly.
4. Remove the cooling fan assembly.
   a. Loosen the elastic clamp (arrow) and disconnect water pipe.



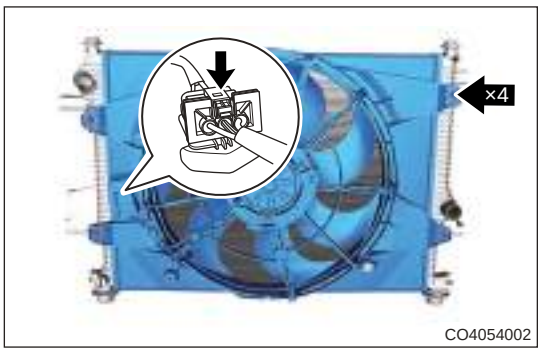
   b. Disengage fixing clip of water pipe from cooling fan assembly.





   c. Disconnect the cooling fan connector (arrow).
   d. Remove 4 fixing bolts (arrow) from cooling fan assembly.

      Tightening torque: 5 ± 1 N·m



   e. Remove the cooling fan assembly.

Inspection

1. Check cooling fan blade for dirt. If so, clean the cooling fan.
2. Check cooling fan blade for missing, cracks, etc. If so, replace cooling fan.

Installation

⚠ Caution
• Check that coolant has been added to the specified level after installation.

1. Installation is in the reverse order of removal.

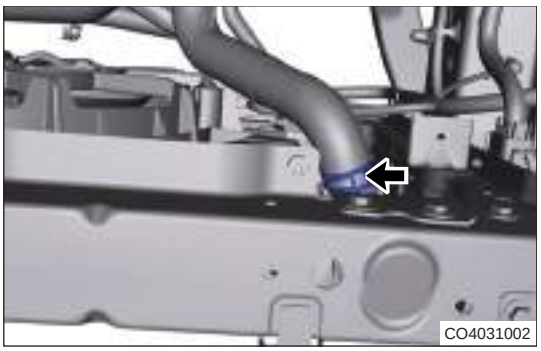
Radiator Assembly

Removal

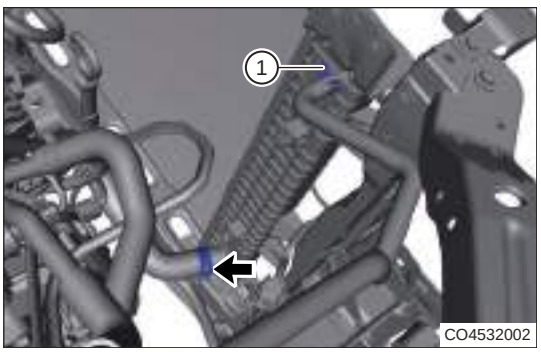
⚠ Warning
• Always make sure engine is cold before operating cooling system. Never open expansion tank cap or remove drain cock plug, when engine is operating or cooling system temperature is high. High-pressurized hot engine coolant and steam may flow out and cause serious burns. • If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

⚠ Caution
• Be sure to wear necessary safety equipment to prevent accidents when repairing.

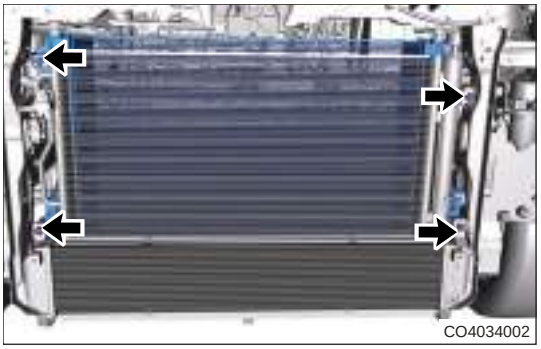
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Drain the coolant.
4. Remove the front bumper assembly.
5. Remove the cooling fan assembly.
6. Remove the radiator assembly.
   a. Loosen elastic clamp (arrow) and disconnect connection between engine outlet hose and radiator assembly.



   b. Loosen elastic clamp (1) and disconnect connection between radiator discharge hose and radiator assembly.
   c. Loosen elastic clamp (arrow) and disconnect connection between engine inlet pipe and radiator assembly.



d. Remove 4 fixing bolts (arrow) from radiator assembly.
Tightening torque: 5 ± 1 N·m



e. Carefully remove the radiator assembly.

Inspection

1. Check radiator surface for dirt. If occurs, clean radiator surface.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- When connecting engine outlet pipe and radiator, align the "工" mark on pipe port with boss, and align center position of elastic clamp tabs with "I" position of "工" mark, align the edge of elastic clamp with lower edge of "二" position of "工" mark.
- When connecting engine inlet pipe and radiator, align the "土" mark on pipe port with boss, and align center position of elastic clamp tabs with "I" position of "土" mark, align the edge of elastic clamp with lower edge of "二" position of "土" mark.
- Check that coolant has been added to specified level after installation, and check for leakage at the removal and installation position.

Water Pump Assembly

Removal

⚠ Warning

- Always make sure engine is cold before operating cooling system. Never open expansion tank cap or remove drain cock plug, when engine is operating or cooling system temperature is high. High-pressurized hot engine coolant and steam may flow out and cause serious burns.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

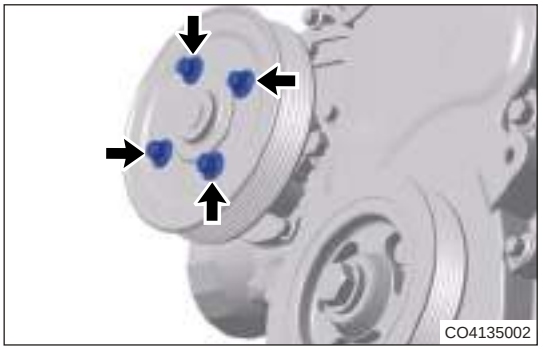
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Drain the coolant.
4. Move away the accessory drive belt.
5. Remove the water pump assembly.

a. Remove 4 fixing bolts (arrow) from water pump pulley, and remove water pump pulley assembly.

Tightening torque: 20 + 5 N m



b. Remove 5 fixing bolts (arrow) from water pump assembly.

Tightening torque: 8 + 3 N m

c. Remove the water pump assembly.

Inspection

1. Check if water pump bearing is excessive looseness; If there is excessive looseness, replace water pump assembly.

Installation

⚠ Caution

- Clean installation surface of water pump assembly.
- If water pump is damaged, replace rather than attempt to repair it.
- Check that coolant has been added to the specified level after installation.
- Perform cooling system pressure test after adding coolant, to check cooling system for leakage.

Electric Water Pump Assembly

Removal

⚠ Warning

- Before operation, it is necessary to ensure that the engine cooling system is in a low temperature state. When the engine is hot, the high-pressure overheated coolant may flow out, causing serious personal injury.
- If your body accidentally comes into contact with coolant. Wash immediately with water. If it is serious, please go to the hospital.

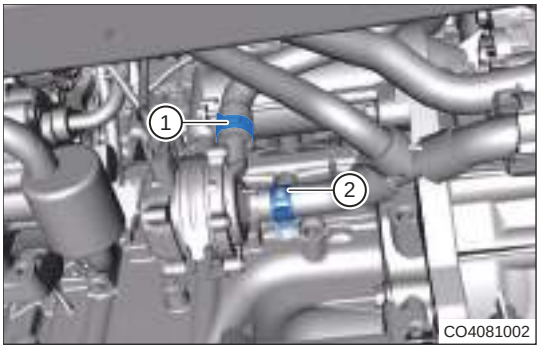
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Drain the coolant.
4. Remove the electric water pump inlet and outlet pipes.

a. Loosen elastic clamp (1) and disconnect connection between electric water pump assembly and electric water pump outlet hose.

b. Loosen elastic clamp (2) and disconnect connection between electric water pump inlet hose and electric water pump assembly.

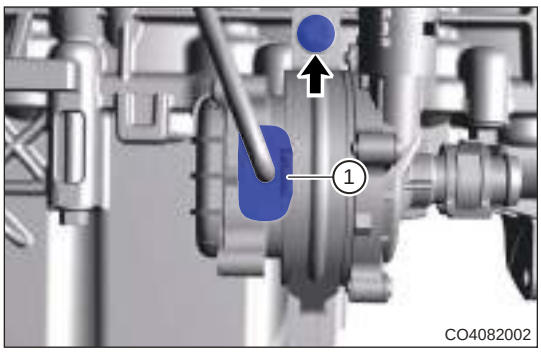


5. Remove the electric water pump assembly.

a. Disconnect the electric water pump assembly connector (1).

b. Remove 1 fixing bolt (arrow) from electric water pump assembly.

Tightening torque: 8 + 3 N m

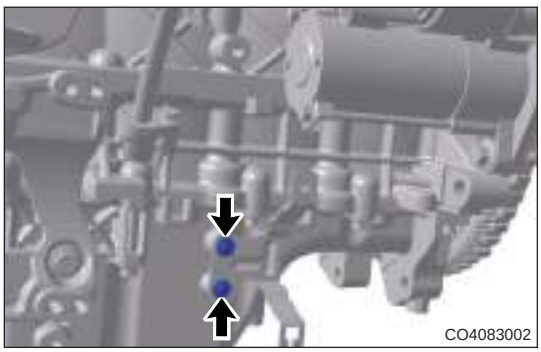


c. Remove the electric water pump assembly.

6. Remove the electric water pump assembly mounting bracket.

a. Remove 2 fixing bolts (arrow) from electric water pump assembly bracket.

Tightening torque: 8 + 3 N m



b. Remove the electric water pump assembly bracket.

Installation

1. Installation is in the reverse order of removal.

> **⚠ Caution**
>
> - After installation, check that coolant has been added to standard level, carry out turbocharging inter-cooling system bleeding and check for leakage at the removal and installation position.

Low Temperature Radiator Assembly

Removal

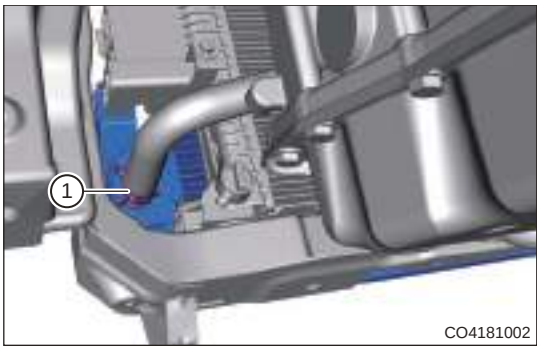
⚠ Warning

- Before operation, it is necessary to ensure that the engine cooling system is in a low temperature state. When the engine is hot, the high-pressure overheated coolant may flow out, causing serious personal injury.
- If your body accidentally comes into contact with coolant. Wash immediately with water. If it is serious, please go to the hospital.

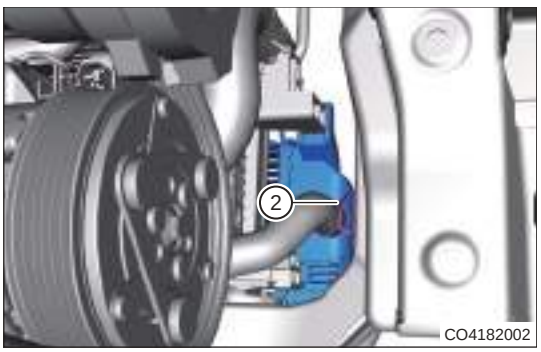
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Drain the coolant.
5. Remove the low temperature radiator assembly.
   a. Loosen elastic clamp (1) and disconnect the low temperature radiator outlet pipe.



   b. Loosen elastic clamp (2) and disconnect the low temperature radiator inlet pipe.



   c. Remove 2 fixing bolts (arrow) from low temperature radiator assembly.
      Tightening torque: 5 ± 1 N·m
   d. Carefully remove the low temperature radiator assembly.

Installation

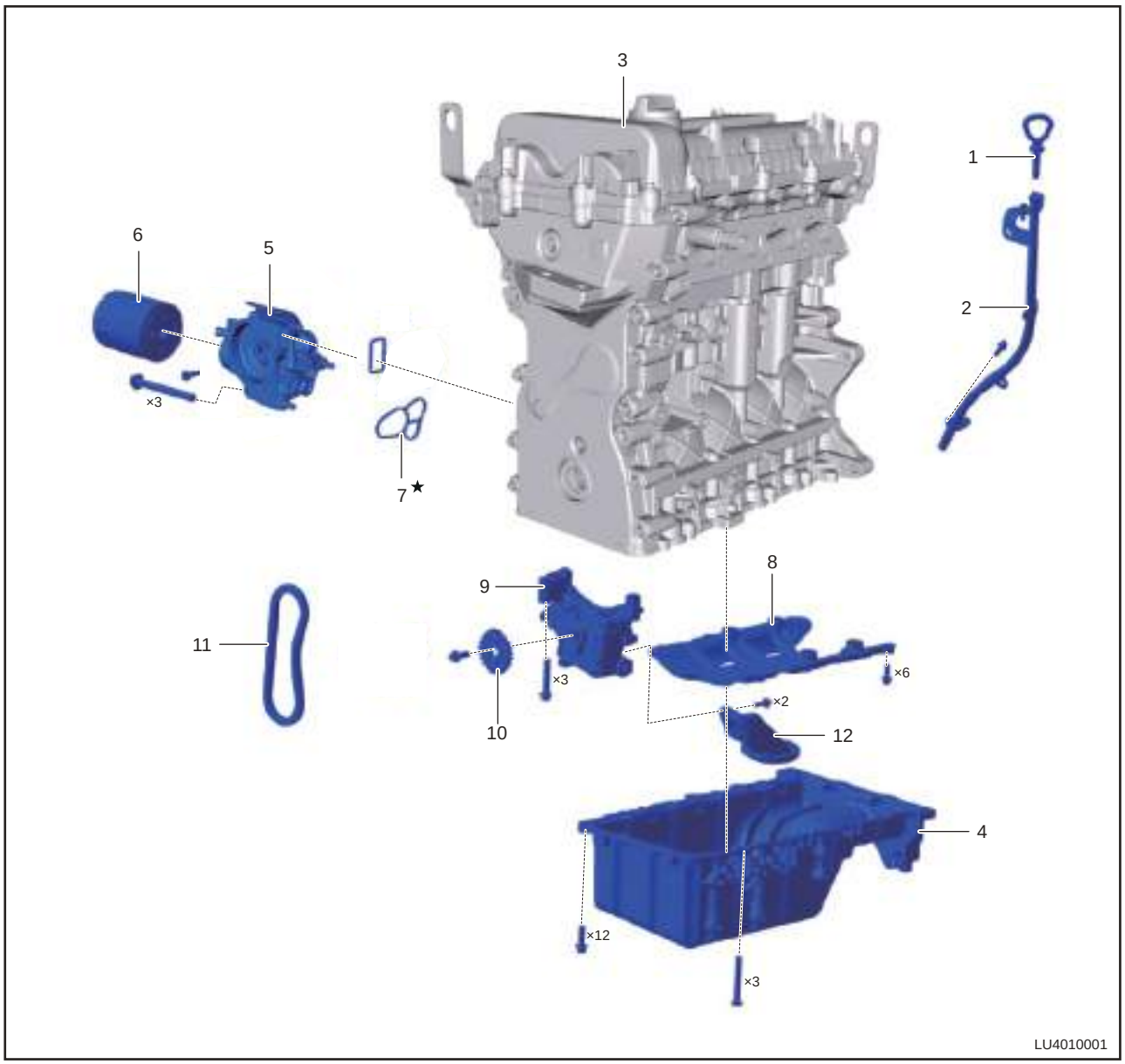
1. Installation is in the reverse order of removal.

⚠ Caution

- After installation, check that coolant has been added to standard level, carry out turbocharging inter-cooling system bleeding and check for leakage at the removal and installation position.

General Information

System Exploded Diagram



1	Oil Dipstick	8	Oil Deflector
2	Oil Dipstick Tube	9	Oil Pump Assembly
3	Fuel Filler Door	10	Oil Pump Sprocket
4	Oil Pan	11	Oil Pump Drive Chain
5	Oil Filter Module Assembly	12	Oil Strainer
6	Oil Filter Assembly	★	Non-reusable Part
7	Seal Ring		

Functional Principle

System Operation

When engine is operating, an oil pump driven by crankshaft, sucks oil from oil pan and pumps it at pressure through an oil filter. This filtered oil then flows through oil passages, to moving surfaces of all engine drive parts and forms oil films between moving surfaces to reduce friction and finally returns to the oil pan, thus reducing friction resistance between drive parts, power consumption and increasing reliability and durability of engine operation.

⚠ Warning
Prolonged and repeated contact with engine oil will result in the removal of natural oils from skin, leading to dryness, irritation and dermatitis. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Precautions should be followed when replacing engine oil to minimize the risk of your skin making contact with used engine oil:

- Wear protective clothing and gloves;
- Wash your skin thoroughly with soap and water, or use waterless hand cleaner to remove any used engine oil;
- Never use gasoline, thinners or solvents.

Specifications

Oil Specifications

Description	Specifications
Engine Type	SQRE4T15C
Oil Capacity (Replace Oil and Oil Filter Meanwhile)	4.2 ± 0.2 L
Oil Type	• Castrol SN 5W-30 • Castrol SP 5W-30 • Lukoil SN 5W-40 • Total SN+/SP 5W-30 • Royal Dutch Shell SN + 5W-30 • Royal Dutch Shell SN 5W-40 • Fuchs SN 5W-40

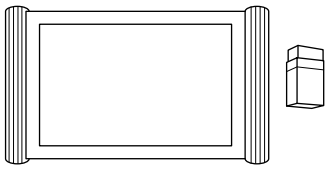
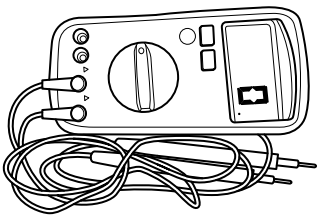
Torque Specifications

Description	Torque (N·m)
Drain Plug - Oil Pan	35 ± 3
Oil Filter	After it is 22 - 25 or seal ring is fitted to flange, rotate (3/4 - 1 lap)
Oil Pressure Switch	12 - 15
Oil Deflector Fixing Bolt	8 + 3
Oil Collector Fixing Bolt	8 + 3
Oil Pump Fixing Bolt	20 + 5

Description	Torque (N·m)
Oil Pan Fixing Bolt	20 + 5
Oil Filter Module	40 + 5
Oil Dipstick Tube	8 + 3

Tools

General Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Digital Multimeter	 RCH0002006

Diagnosis & Testing

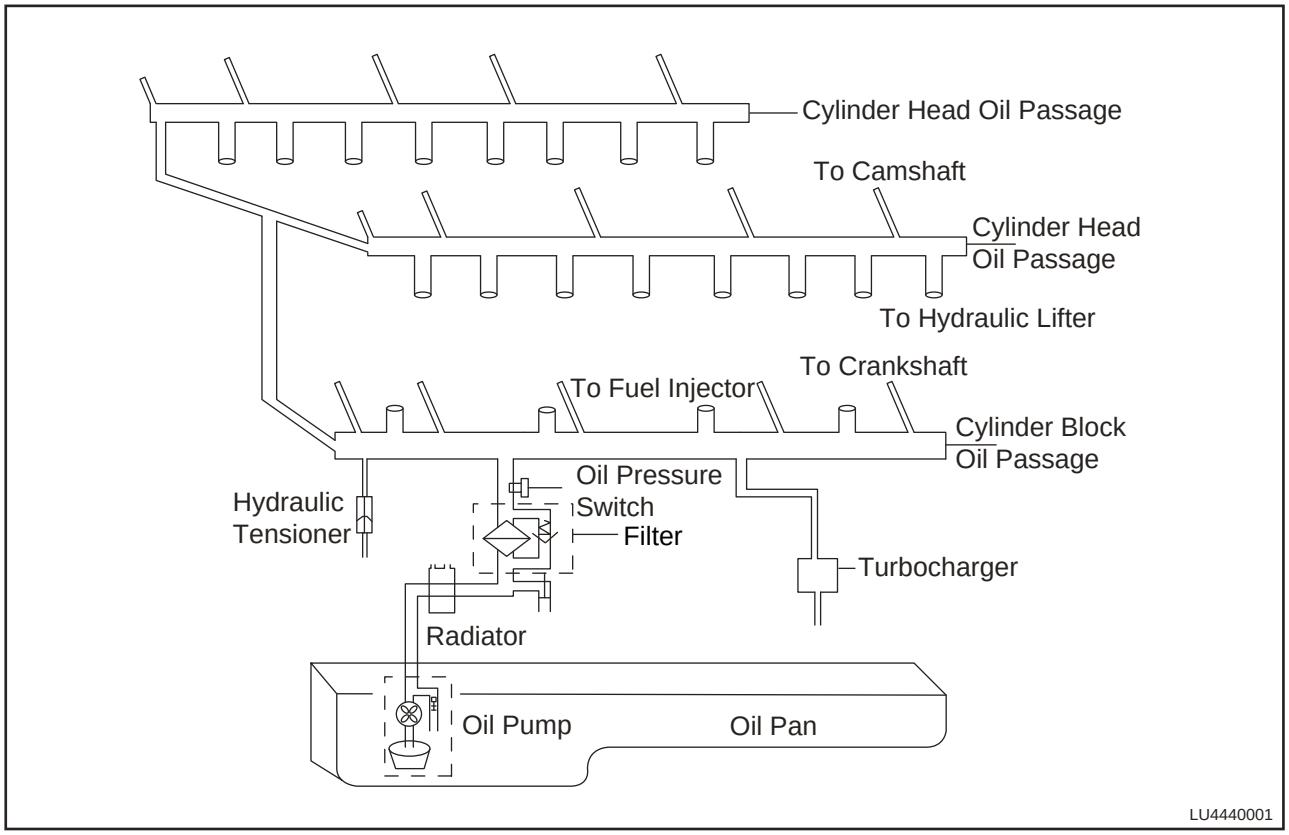
Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Possible Cause
Low pressure in lubrication system	Oil pan (dirty, leaky)
	Oil strainer (mesh dirty, blocked)
	Oil pump fault
	Line (blocked)
High oil consumption	Engine oil (excessive oil filling capacity)
	Oil filter module (leaked)
	Crankshaft front oil seal (damaged)

Symptom	Possible Cause
	Crankshaft rear oil seal (damaged)
	Oil pressure switch
	Oil drain plug (leaked)
	Oil pan (leaked)
	Engine oil leakage (cylinder head gasket damaged)
	Each engine seal surface leakage
Oil pressure warning light comes on	Engine oil (insufficient oil, low oil viscosity)
	Oil filter element (blocked)
	Oil strainer (blocked)
	Crankshaft front oil seal (damaged)
	Crankshaft rear oil seal (damaged)
	Oil pressure switch (damaged)
	Instrument cluster (oil pressure warning light)
	Cylinder block (cracks occur in water jacket, resulting in coolant leaking into oil pan, which will cause oil dilution)
	Line (blocked)

Schematic Diagram of Lubrication



Inspection of Engine Oil Level

⚠ Caution
• Check oil level indicated by oil dipstick, when engine is stopped after it reaches operating temperature.

2. Park vehicle on level ground, stop the engine after warming up and wait for 5 minutes.
3. Open the hood and pull out the oil dipstick and wipe it clean with a piece of cloth.

⚠ Caution
• Please put a piece of cloth under the oil dipstick end to prevent oil from splashing onto engine or body.

4. Reinsert the oil dipstick in place and leave it for 3 seconds to 5 seconds.
5. Pull out the oil dipstick again and check if oil level is proper.

   Hint:
   If engine oil level is too low, check for leakage and add oil up to the level mark.

7. Install the oil pressure switch.

   Hint:
   Apply a small amount of seal gum to threads when installing the oil pressure switch.
8. Connect the oil pressure switch connector and check engine oil for leakage.

On-vehicle Service

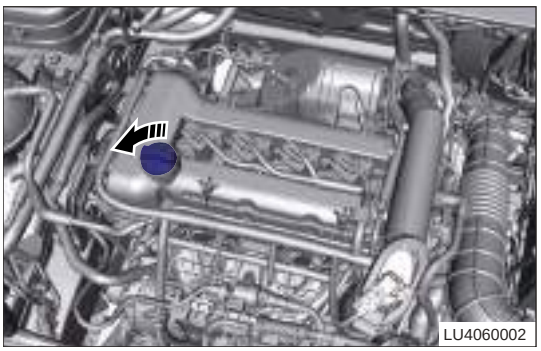
Engine Oil Replacement

Engine Oil Draining

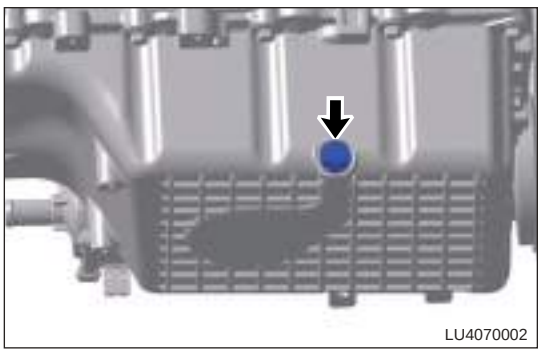
⚠ Warning

- Before operation. Wait for the engine to cool down completely.
- Prolonged and repeated contact with engine oil will result in the removal of natural oils from skin, leading to dryness, irritation and dermatitis. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Therefore, always take proper skin protection measures when performing vehicle service.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Open the oil filler door.
   a. Turn the oil filler cap counterclockwise to open.



4. Raise the vehicle to a proper position.
   a. Remove drain plug (arrow) counterclockwise, and drain oil into a container.



⚠ Caution

- Apply a certain pushing force to drain plug while loosening the plug by hand, and have the drain plug attached to thread tightly to prevent oil from overflowing in advance. Move away your hand quickly to prevent burn by oil with a certain temperature.
- Wasted engine oil should be handled by specialized department according to local laws and regulations. Never discard it at will

b. Wipe off the drain plug and tighten it.
Tightening torque: 35 ± 3 N • m

⚠ Caution

- The drain plug gasket must be replaced each time the drain plug is removed.

Engine Oil Adding

1. Only use engine oil that meets Chery specifications.

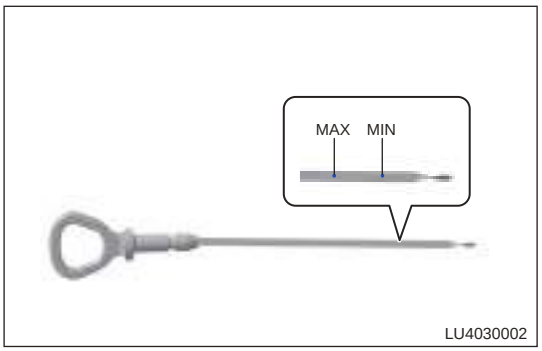
⚠ Caution

- DO NOT use inferior engine oil.
- DO NOT mix different types of engine oil.
- Be careful not to spill engine oil on any part of the engine when adding engine oil.

a. Add a proper amount of oil, and check that oil level is between "MIN" mark and "MAX" mark with oil dipstick.

b. Turn off the engine after running for 1 to 2 minutes, park vehicle on a level surface and wait for approximately 5 minutes. Check if oil level is between “MIN” mark and “MAX” mark. Refill oil if necessary.

c. Check the vehicle for leakage after replacing oil.



Oil Filter

Removal

⚠ Warning

- DO NOT remove oil filter element until engine cools down.
- Prolonged and repeated contact with engine oil will be harmful to your skin. If engine oil spills on your skin, wash it off immediately with water. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Therefore, always take proper skin protection measures when performing vehicle service.

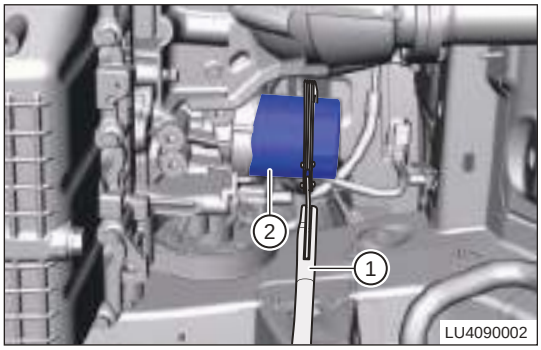
⚠ Caution

- Use oil filter installer when replacing oil filter to avoid deformation.
- Oil filter is close to exhaust pipe, avoid burns during installation and removal.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Raise the vehicle to a proper position.
3. Drain engine oil.
4. Remove the oil filter.

a. Use oil filter remover (1) to remove oil filter (2).

Tightening torque: 22 - 25 N m



b. Remove the oil filter assembly.

⚠ Caution

- The removed oil filter should be handled by specialized department according to local laws and regulations. Never discard it at will.

Installation

⚠ Caution

- Check and clean installation surface between oil filter and oil filter bracket.
- Apply a coat of clean engine oil to oil filter seal ring.
- Use a special tool to tighten oil filter.
- It is necessary to clean oil left on components after installing oil filter.

1. Installation is in the reverse order of removal.

Oil Pressure Switch

Removal

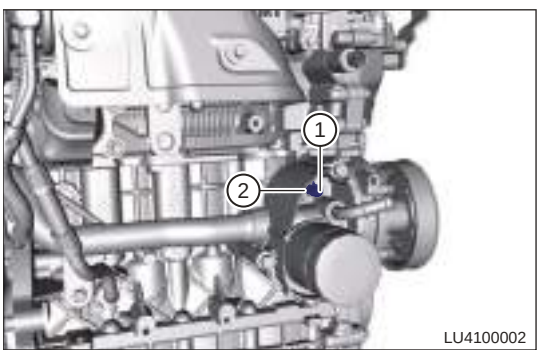
⚠ Caution

- DO NOT remove oil pressure switch until engine cools down.
- Prolonged and repeated contact with engine oil will be harmful to your skin. If engine oil spills on your skin, wash it off immediately with water. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Therefore, always take proper skin protection measures when performing vehicle service.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the oil pressure switch.

a. Disconnect the oil pressure switch connector (1) and remove oil pressure switch (2).

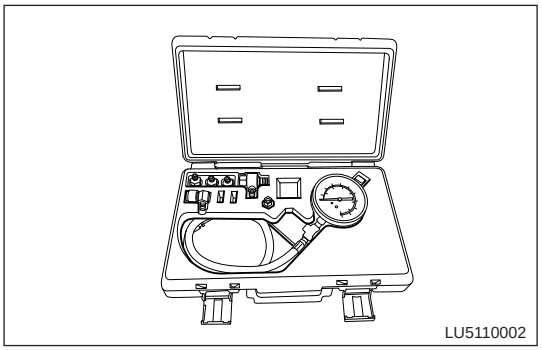
Tightening torque: 20 ± 2 N · m



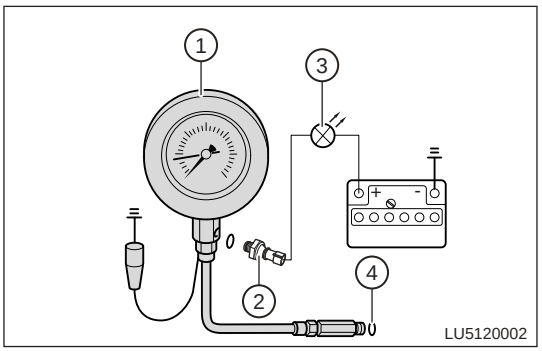
Inspection

⚠ Caution
• Before inspecting oil pressure switch, please make sure that oil level is proper and coolant temperature is above 90℃, and that oil filter is used within 5000 Km.

1. Inspect oil pressure switch.
   a. Use an oil pressure tester as shown in the illustration.


LU5110002

   b. Install the oil pressure tester into the threaded hole (4) of oil pressure switch as shown in the illustration.
   c. Install the oil pressure switch (2) onto the tester (1) and connect the LED lamp (3).
   d. LED (3) does not turn on when engine is not started. If it turns on, replace the oil pressure switch.
   e. After starting engine, observe the pressure reading on tester. LED (3) turns on when oil pressure reaches 94 Kpa, if it does not turn on, replace the oil pressure switch.



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Installation

1. Remove the oil and impurities on the oil pressure switch and its threaded hole.
2. Apply a small amount of seal gum to threads when installing the oil pressure switch.
   a. Use a torque wrench to tighten it to specified torque, as shown in illustration, there is a gap (a) about 2 to 5 mm between oil pressure switch flange surface and oil filter module housing.

      Tightening torque: 20 ± 2 N · m


LU4130002

3. Other installation procedures are in the reverse order of removal.

⚠ Caution
• Apply seal gum on threads when assembling oil pressure switch.

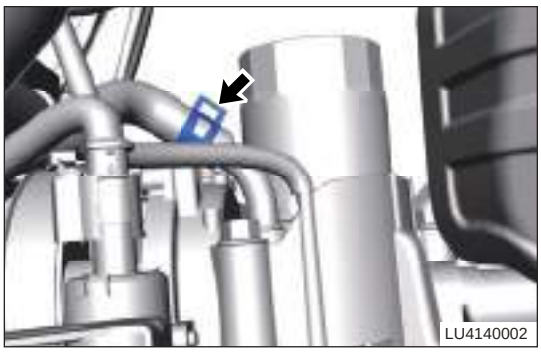
Oil Filter Module Assembly

Removal

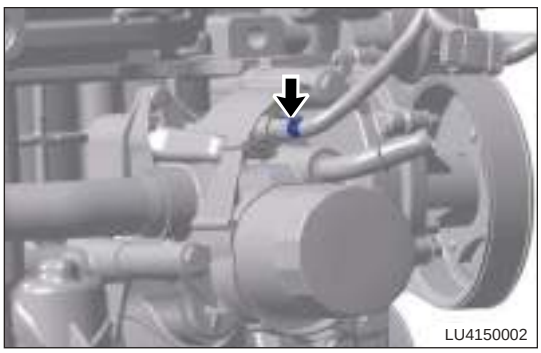
Warning

- DO NOT remove oil filter module assembly until engine cools down.
- There will be residual coolant inside engine during removal and installation, if your skin contacts coolant directly, clean it with water immediately. If it is serious, please go to hospital.
- Prolonged and repeated contact with engine oil will be harmful to your skin. If engine oil spills on your skin, wash it off immediately with water. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Therefore, always take proper skin protection measures when performing vehicle service.

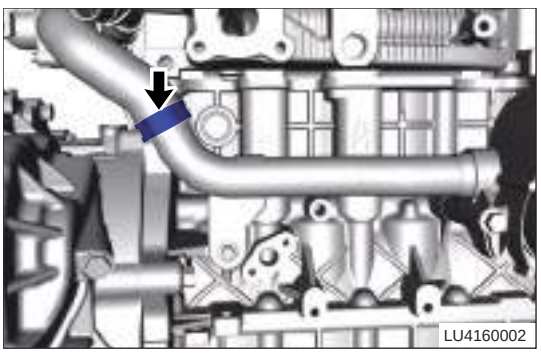
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the engine accessory belt.
4. Drain the oil.
5. Drain the coolant.
6. Remove the oil filter module assembly.
   a. Loosen elastic clamp (arrow), disconnect connection between water supply hose and oil filter module assembly.



   b. Disconnect the oil pressure switch connector.



   c. Loosen the elastic clamp (arrow) and disconnect connection between small circulation hose and cooling pipe I assembly.



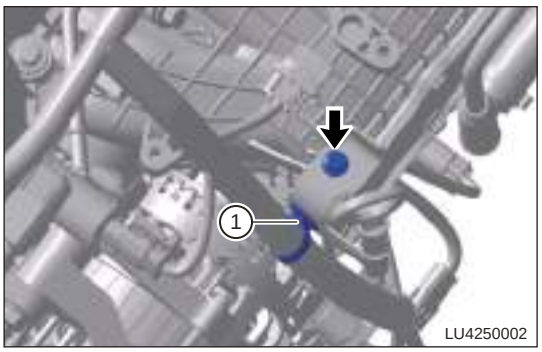
Oil Tube Assembly

Removal

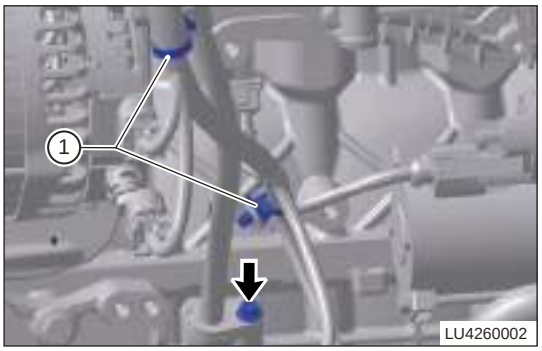
⚠ Warning

- Prolonged and repeated contact with engine oil will be harmful to your skin. If engine oil spills on your skin, wash it off immediately with water. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Therefore, always take proper skin protection measures when performing vehicle service.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the oil tube assembly.
   a. Disconnect the engine wire harness fixing clip (1).
   b. Remove coupling bolt (arrow) between oil tube and intake manifold assembly.



   c. Disconnect the engine wire harness fixing clip (1).
   d. Remove coupling bolt (arrow) between oil tube and engine frame assembly.



   e. Remove the oil tube assembly.

Installation

⚠ Caution

- Check O-ring before assembly to make sure it is not damaged, otherwise replace with a new one.
- Apply a small amount of lubricant to O-ring before assembly.
- When inserting dipstick tube into frame installing hole, insert lower end as far as possible along shaft line direction. If it tilts, it may be difficult to assemble O-ring, even damage O-ring.

1. Installation is in the reverse order of removal.

System Exploded Diagram

1	ENGINE START STOP Switch	3	Battery
2	Engine Compartment Fuse and Relay Box	4	Starter

Starting system consists of battery, ignition switch and starter, etc. Starting system converts electrical energy from battery into mechanical energy, allowing engine to crank initially, and disconnects power transmission between starter and engine when engine runs normally.

Operation

- Solenoid control mechanism: The driver operates the relay (solenoid switch) through the starting switch, while the relay operates the starter electromagnetic switch and driven gear.
- At starting, ensure that the starter power is transferred to the crankshaft through the flywheel; After starting, when the engine starts to work, immediately cut off the power transmission route, so that the engine can not reverse through the flywheel to drive starter high-speed rotation.
- DC motor: Converts electrical energy from battery into electromagnetic moment.
- Gear train: When the engine starts, the electromagnetic torque of motor is transferred to the flywheel of engine.When the engine is started, the starter is separated from the engine automatically.
- Solenoid switch: Controls engagement and disengagement between starter drive gear and engine flywheel gear and switches on/off the motor circuit; Also the solenoid switch has function of additional resistance of short circuit ignition coil when starting.

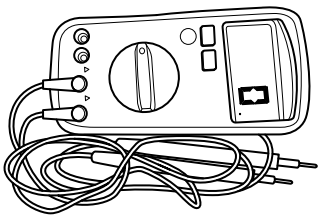
Specifications

Torque Specifications

Description	Torque (N·m)
Starter Fixing Bolt	45 ± 5

Tools

General Tools

Tool Name	Tool Drawing
Digital Multimeter	 RCH0002006

Diagnosis & Testing

Problem Symptoms Table

Hint:

- Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
When ignition switch is turned to START, solenoid switch makes a "clanking" sound and engine cannot start.	Battery (depleted)
	Starter (solenoid switch)
Starter does not run	Battery (depleted)
	Starter relay

Symptom	Suspected Area
	Starting system wire harness
	Starting switch
	Starter
	ECU
Starter runs weakly	Battery (depleted)
	Starter
Starter is racing	Starter (incorrect installation, internal fault)
	Flywheel ring gear (gear teeth broken)

On-vehicle Inspection

Starter Relay

1. Check the starter relay:
   a. Remove the starter relay from engine compartment fuse and relay box.
   b. Replace with a good relay for ignition, if ignition is successful, it means starter relay is damaged.

Ground Inspection

1. Power assembly ground and body ground inspection.
   a. Check the power and body ground wire fixing bolts for looseness, and the ground parts should be in good contact with no heat or burnt smell.

Precautions for Starting System

1. Before starting engine, shift transmission to P/N, and apply parking brake while depressing clutch pedal.
2. Make sure that battery is fully charged to reduce repeat operating time of starter.
3. Do not start engine for more than 5 seconds each time, repeated starting interval should not be less than 10 - 15 seconds, and consecutive starting is not allowed for more than 3 times.
4. If starter cannot stop, turn off ignition switch immediately, or remove the negative battery terminal cable to find the problem.
5. Check the starter circuit frequently to make sure that each wire of starting system is connected securely and in good insulation.
6. Generally, perform maintainable service for starter when servicing the vehicle. Also, maintenance interval can be shortened or extended depending on actual conditions.
7. Disconnect the negative battery terminal cable before removing starter.

On-vehicle Service

Starter Assembly

Removal

⚠ Caution

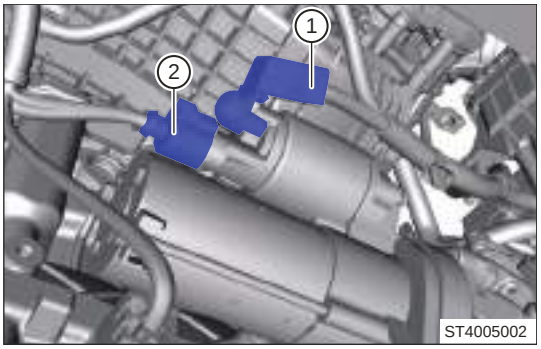
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.

2. Disconnect the negative battery cable.
3. Remove the air filter assembly.
4. Remove the starter assembly.
   a. Open positive cable fixing nut rubber protector (1) from starter. Remove the fixing bolt.

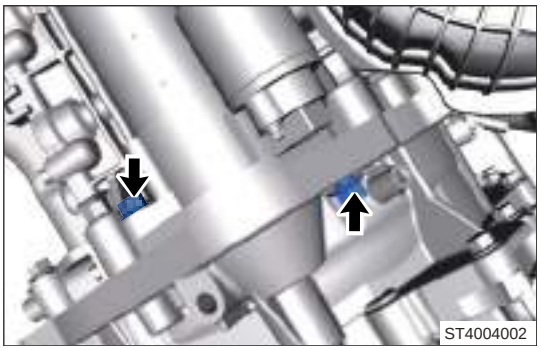
      Tightening torque: 13 ± 2 N · m

   b. Disconnect the starter assembly connector (2).



   c. Remove 2 fixing bolts (arrow) between starter assembly and transmission assembly.

      Tightening torque: 45 ± 5 N m

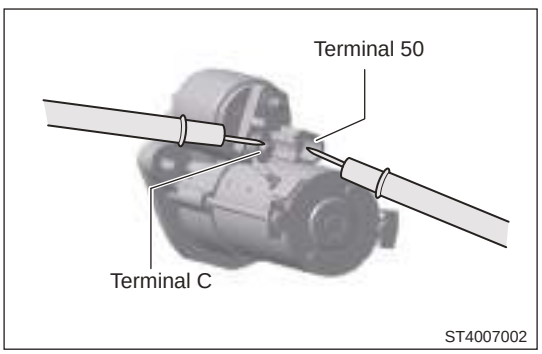


   d. Remove the starter assembly.

Inspection

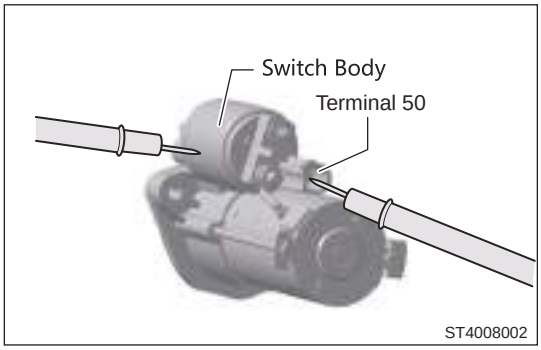
1. Check the starter clutch.
   a. Rotate the clutch pinion gear clockwise to check that it can turn freely. Rotate the clutch pinion gear counterclockwise to check that it locks. If result is not as specified, replace the starter.

2. Check the starter solenoid switch.
   a. Check the pull-in coil.
      - Measure the resistance between terminal 50 and terminal C.
      - Standard resistance should be below 2Ω. If the resistance is abnormal, replace the starter assembly.



b. Check the hold-in coil.

- Measure the resistance between terminal 50 and starter solenoid switch body.
- Standard resistance should be below 2Ω. If the resistance is abnormal, replace the starter assembly.



3. Check the starter assembly

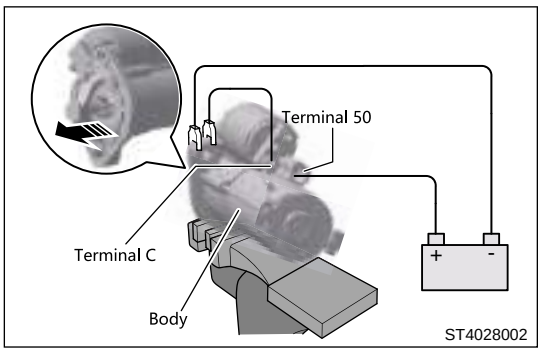
⚠ Caution

- These measurements must be performed within 3 to 5 seconds to avoid coil burnout.
- Place the starter assembly onto a vise. The jaws of vise should be covered by aluminum sheet or brass plate; otherwise, the starter assembly will be easily damaged when clamping it.

a. Perform pull-in test.

- Remove the nut and disconnect the field coil lead from terminal C.
- As shown in illustration, connect battery to solenoid switch, and check that starter clutch pinion sticks out normally.

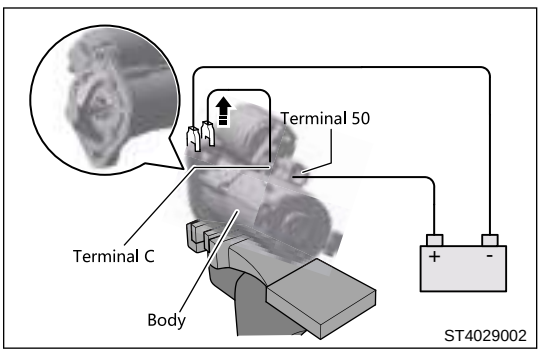
If starter clutch pinion does not move, replace the starter assembly.



b. Perform hold-in test.

- Keep the starter clutch pinion sticking out and the connection condition of battery mentioned above, and disconnect the negative battery cable from terminal C.
- Check if starter clutch pinion keeps sticking out.

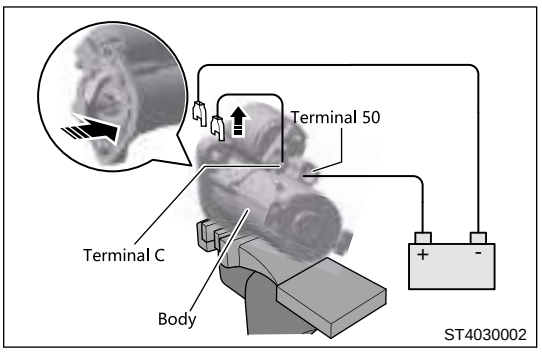
If starter clutch pinion moves inward, replace the starter assembly.



c. Check if starter clutch pinion returns back.

- Disconnect the negative battery cable from starter body. Check that starter clutch pinion returns back.

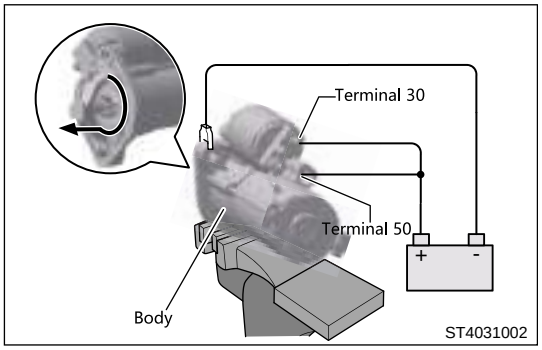
If starter clutch pinion does not return back, replace the starter assembly.



d. Check if starter rotates smoothly.

- Connect the field coil lead to terminal C, and tighten it with a nut.
- As shown in illustration, connect battery to starter. Check that starter rotates smoothly when the starter clutch pinion moves outward.

If result is not as specified, replace the starter assembly.



Installation

1. Installation is in the reverse order of removal.

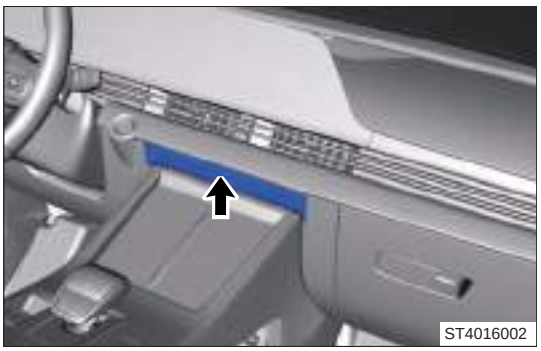
ENGINE START STOP Switch

Removal

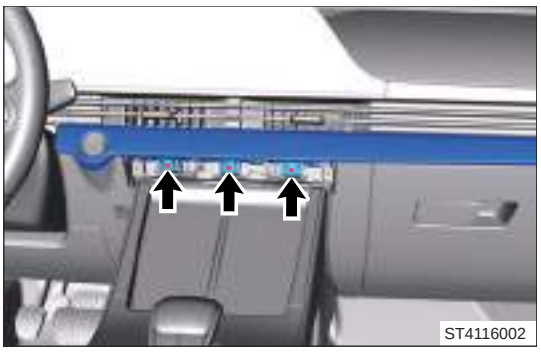
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent interior from being scratched during removal and installation.

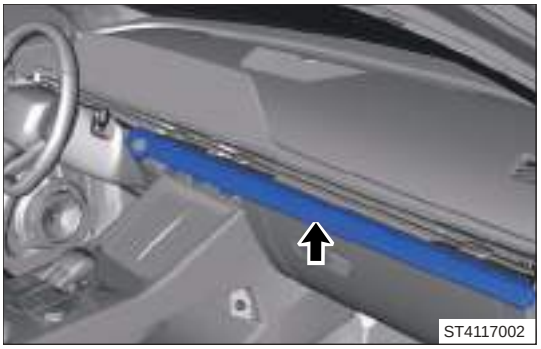
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the ENGINE START STOP switch
   a. Using an interior crow plate, remove auxiliary fascia console body bolt cover plate.



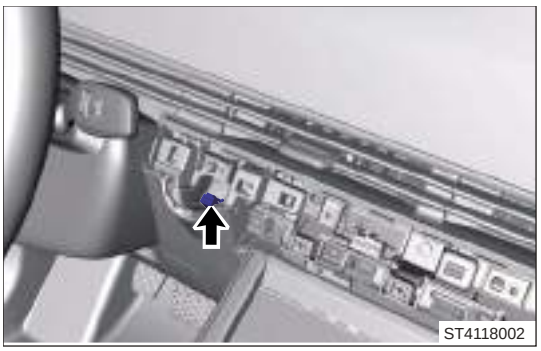
   b. Remove 3 fixing screws (arrow) from auto A/C control panel.



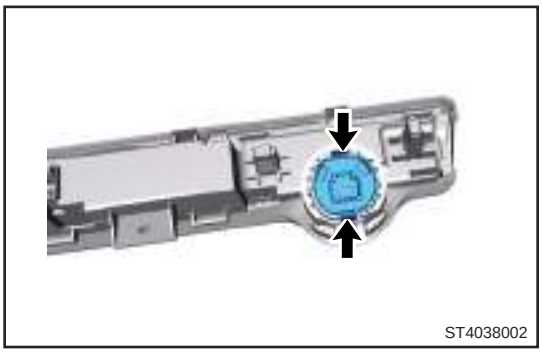
c. Using an interior crow plate, remove auto A/C control panel assembly.



d. Disconnect the ENGINE START STOP switch connector (arrow).



e. Push fixing clips on both sides of ENGINE START STOP switch and remove ENGINE START STOP switch.



Inspection

1. Check the continuity of ENGINE START STOP switch.
   a. Using a digital multimeter, check the continuity of ENGINE START STOP switch according to the table below.

Multimeter Connection	Switch Condition	Specified Condition
Terminal 1 - Terminal 2	Not pressed	No continuity
Terminal 3 - Terminal 2	Not pressed	No continuity
Terminal 1 - Terminal 2	Pressed	Continuity
Terminal 3 - Terminal 2	Pressed	Continuity

Hint:
If measure result is not as specified, replace the ENGINE START STOP switch.

2. Check the ENGINE START STOP switch indicator.
   a. Press ENGINE START STOP switch and observe if ENGINE START STOP switch lights is normal.

      Hint:
      If the positive (+) lead and negative (-) lead are incorrectly connected, ENGINE START STOP switch indicator will not illuminate.
      If the battery voltage is too low, ENGINE START STOP switch indicator will not illuminate.

Multimeter Connection	Specified Condition
Battery positive (+) → Terminal 4	White (not illuminate)
Battery negative (-) → Terminal 2	
Battery positive (+) → Terminal 5	Green
Battery negative (-) → Terminal 2	
Battery positive (+) → Terminal 8	Amber
Battery negative (-) → Terminal 2	

      If measure result is not as specified, replace the ENGINE START STOP switch.

Installation

1. Installation is in the reverse order of removal.

SQRE4T15C CHARGING SYSTEM

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair:

1. Battery acid is highly corrosive, so it is necessary to wear protective gloves and goggles when working.
2. Do not dump the battery, because acid may spill from vent hole.
3. Never throw the used battery into household garbage. There is risk of explosion.

Precautions

In order to avoid dangerous operation and damage to the vehicle before repair in this section, always follow the instructions below before repair:

1. Deliver the used battery to designated recycling site.
2. Never allow the children approaching acid and battery.

General Information

System Exploded Diagram

1	Alternator Assembly	3	Engine Compartment Fuse and Relay Box
2	Battery Assembly	4	ECU

Alternator is a key component of the charging system. It is a device that converts mechanical energy into electrical energy and generates DC voltage through a rectifying circuit, as one of main power sources of the vehicle. The alternator operates as a complete assembly. If alternator fails for any reason, the entire unit must be replaced.

Operation

- Alternator is a silicon rectifying alternator, which mainly consists of rotor, stator and rectifier.
- When direct current flows to rotor winding, rotor claws energize magnetic field to produce alternating induced electromotive force. The stator is installed on the outside of rotor, which is secured together with the front and rear end covers of alternator. When the rotor of the generator is rotated by the drive belt, the magnetic pole lines cut the stator winding, causing a change in the magnetic flux in the stator winding, and an alternating induced electromotive force is generated in the stator winding, thereby generating alternating current. Three-phase alternating current generated by alternator is converted to direct current from alternating current by rectifier, and direct current is transmitted to the vehicle electrical system and battery.

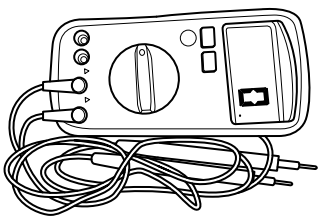
Specifications

Battery Specifications

Engine Type	Specifications
SQRE4T15C	12 V 60 Ah

Tools

General Tools

Tool Name	Tool Drawing
Digital Multimeter	 RCH000206

Special Tools

Tool Name	Tool Drawing
Battery Tester	 RCH0090006

Diagnosis & Testing

Diagnosis Specification for Alternator Malfunction

⚠ Warning

- Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Operation Content	Operation Description
Appearance inspection: Confirm if there is any washer fluid, coolant, oil, sludge and other foreign matters adhered.	If the washer fluid, coolant, oil enters rotor slip ring, brush holder, it will cause oxidization to alternator rotor slip ring and poor contact to brush, resulting in charging light remaining on or flashing.
Turn over the center of alternator belt by hand and observe if the max. turning angle is over 90°.	Loose belt will cause low alternator speed, resulting in low electric energy production or failing to generate energy; if the angle is over 90°，adjust the belt tension.
Measure battery voltage with a multimeter.	Confirm if the battery is depleted (more than 12 V). If so, unplug the generator excitation coil connector and retest the battery voltage (more than 12 V). If such condition still exists, charge the battery.
Confirm if there is any looseness, short circuit, dirt on alternator B+, excitation end, battery pile line and ground line and also confirm if the connectors are connected firmly.	Confirm if the wire harness is connected normally. Poor contact will cause that the alternator voltage is high, the indicator light doesn’t come on, remains on or flashes. If there is any looseness, please tighten it firmly.

Charging indicator light remains on (do not generate electricity or power is low, vehicle cannot start, etc.)	
Operation Content	Operation Description
Unplug the alternator connector, start the engine and depress the accelerator (engine speed is above 1500rpm), turn off the vehicle load, measure B+ voltage to ground with multimeter and observe 2-3 minutes.	If B+ voltage is about 13.8V, the alternator operates normally. It may be LIN communication malfunction. Please check the LIN communication setting in ECU. If B+ voltage is the battery voltage, it indicates alternator malfunction. Replace the alternator.
If the alternator operates normally, reconnect the alternator connector, start the engine and keep it idling, turn on some electrical load on vehicle, such as A/C, headlight, etc. Meanwhile, depress the accelerator pedal or decelerate the vehicle. Measure B+ voltage to ground with multimeter and observe 2-3 minutes.	When vehicle load or speed changes, the alternator normal voltage should change within 10.6-16 V. If the charging indicator remains on, check if LIN communication is normal with an oscilloscope or other test software.

Charging indicator flashes (unstable electricity generation)	
Operation Content	Operation Description
Start the engine and keep it idling, remove alternator excitation coil and observe if the meter indicator flashes.	If the light flashes, it indicates that some excitation coil has outer leakage and intermittently ground. Check the circuit malfunction.

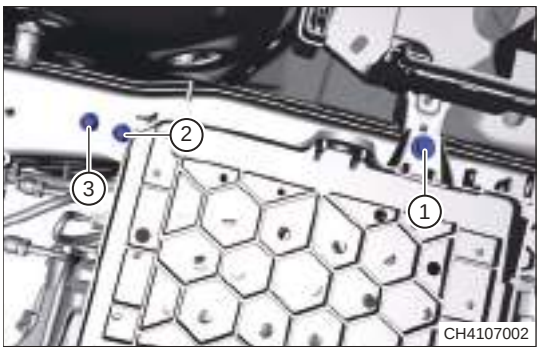
Indicator does not come on during self-check	
Operation Content	Operation Description
Turn ENGINE START STOP switch to “ON” position, remove the engine excitation coil and measure the alternator excitation coil terminal voltage to ground with multimeter.	If the voltage is 0, it indicates that the excitation coil circuit is open. Check the excitation coil circuit; if the voltage is equal to battery voltage, it indicates that excitation coil circuit is normal and there may be alternator malfunction. Replace the alternator.

Adjusting voltage is high (headlight and other electrical appliances used on vehicle are burnt out)	
Operation Content	Operation Description
Start the engine and keep it idling, measure B+ voltage to ground with multimeter and observe 2-3 minutes to check if the max. value exceeds 16 V.	If so, it indicates that the regulator in alternator is damaged which causes voltage out of control. Replace the alternator.

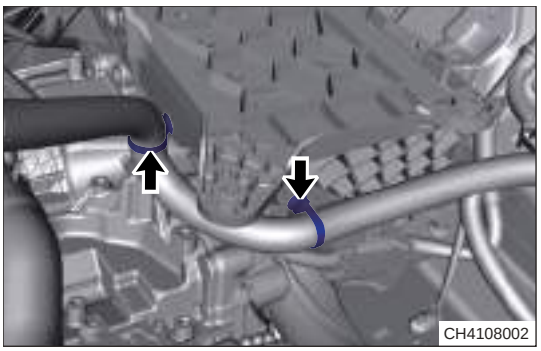
Charging System Charging Voltage Inspection

1. Leave vehicle under no load test condition and idle the engine. Measure battery voltage with a digital multimeter. Standard voltage: 13.5 V - 14.8 V; If result is not as specified, replace the alternator.

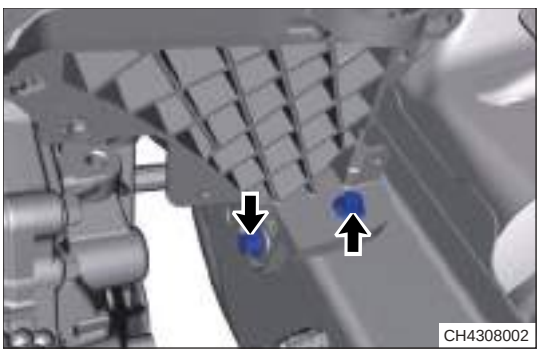
3. Remove the air filter assembly.
4. Remove the battery tray.
   a. Remove the battery tray fixing bolt (1).
      Tightening torque: 9 ± 1 N · m
   b. Remove the battery tray fixing bolt (2) and (3).
      Tightening torque: 25 ± 4 N · m



   c. Remove each wire harness fixing clips (arrow) from battery tray.



   d. Remove 2 fixing bolts (arrow) from battery tray.
      Tightening torque: 25 ± 4 N · m



   e. Remove the battery tray.

Installation

1. Installation is in the reverse order of removal.

Generator

Removal

⚠ Caution
• Be sure to wear necessary safety equipment to prevent accidents when repairing.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Move away the accessory drive belt.
5. Remove the idler pulley assembly.
6. Remove the alternator mounting bracket.

a. Remove 4 fixing bolts (arrow) from alternator mounting bracket.

Tightening torque: 40 + 5 N m

b. Remove the alternator mounting bracket.

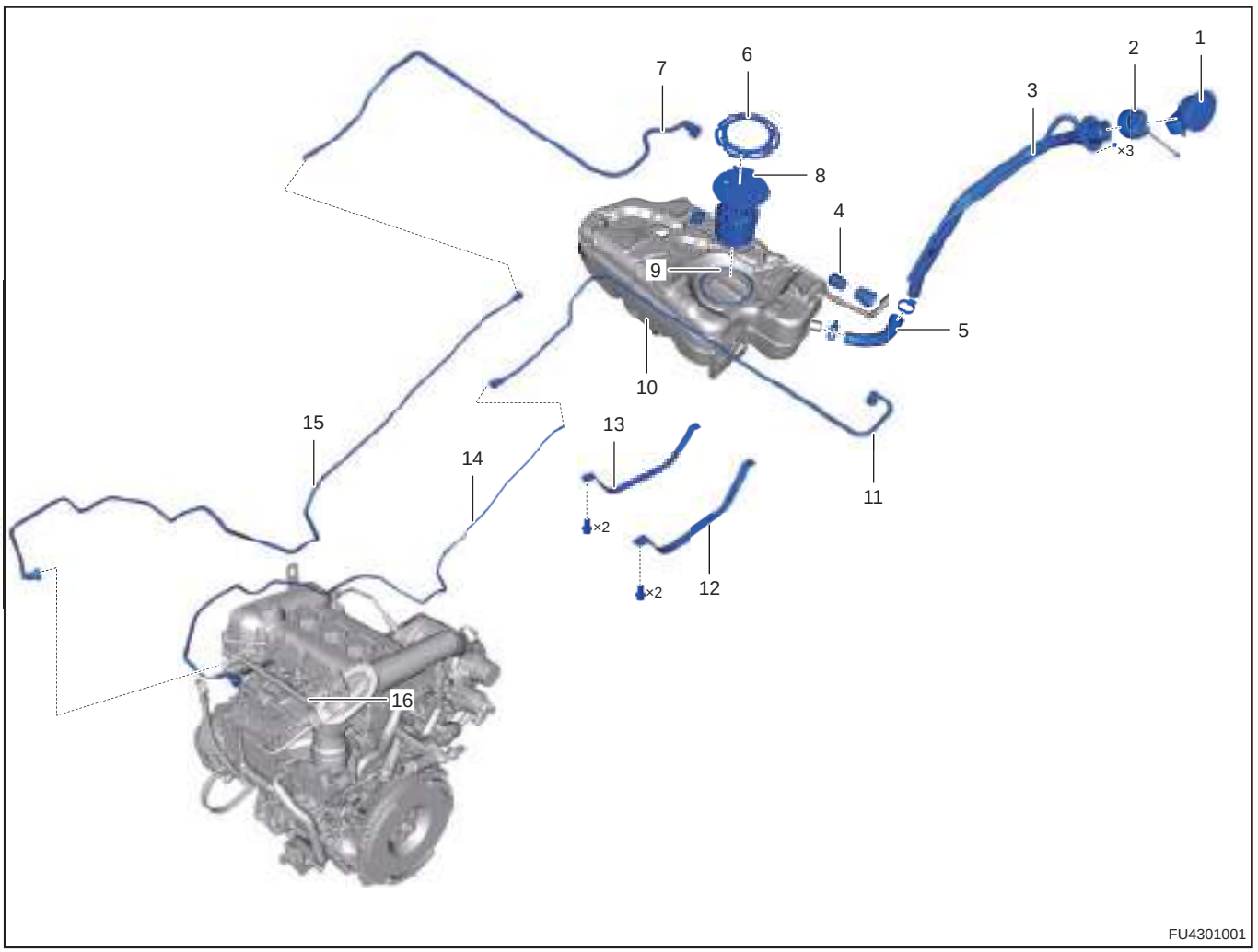
Installation

1. Installation is in the reverse order of removal.
2. Inspection.
   a. Start the engine.

      Hint:
      If battery warning light comes on, charging system may have a malfunction.
   b. When engine is running, use digital multimeter to check the output voltage of alternator and record it.
   c. If the voltage is between 13.5 - 14.8 V, the alternator is normal.

General Information

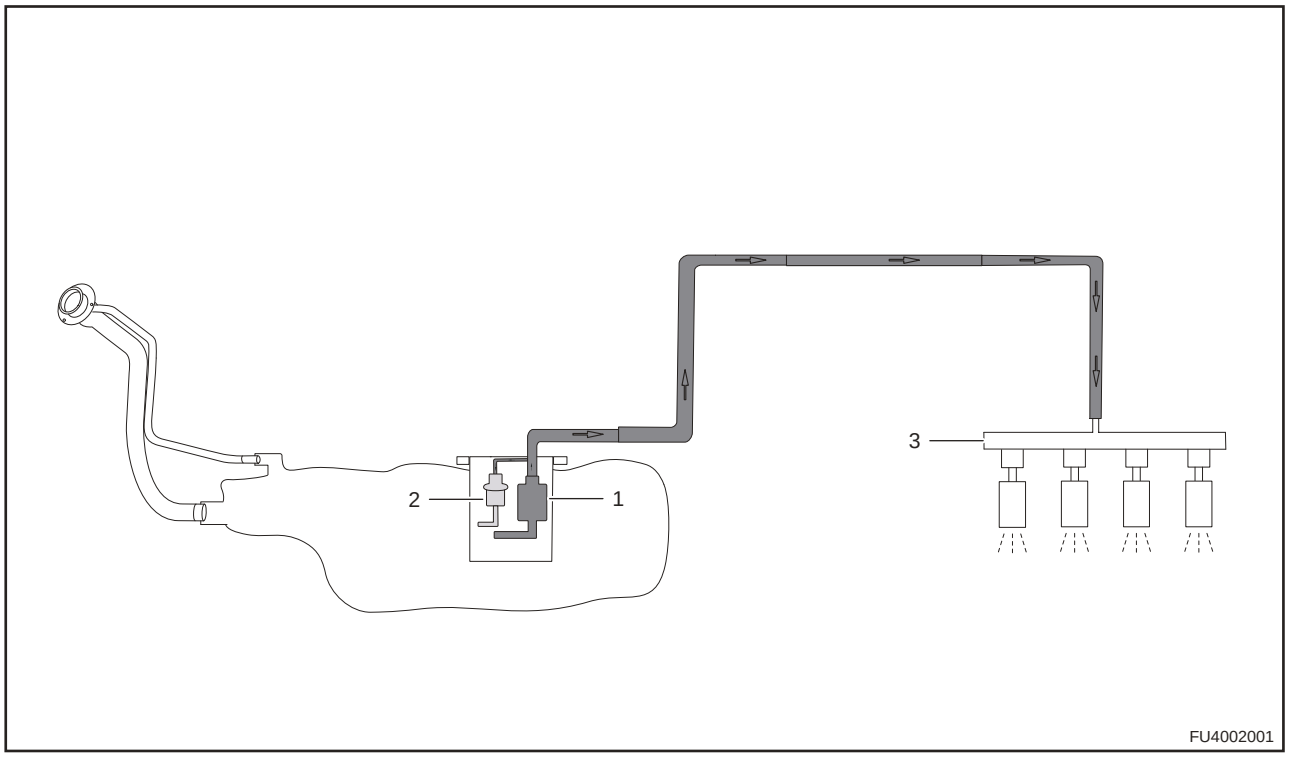
System Exploded Diagram



1	Fuel Filler Cap Assembly	9	Fuel Tank Seal Ring
2	Fuel Tank Cap Assembly	10	Fuel Tank Assembly
3	Filler Tube Assembly	11	Fuel Tank Vapor Pipe Ⅱ
4	Fuel Breather Hose Boot	12	Fuel Tank Fixing Strap Ⅱ
5	Fuel Filler Hose	13	Fuel Tank Fixing Strap Ⅰ
6	Fuel Tank Pressure Cap	14	Fuel Tank Vapor Pipe Ⅲ
7	Inlet Pipe Ⅰ Assembly	15	Inlet Pipe II Assembly
8	Electric Fuel Pump Assembly	16	Fuel Rail Injector Assembly

Functional Principle

System Control Schematic Diagram



1	Electric Fuel Pump Assembly	3	Fuel Rail Injector Assembly
2	Electric Fuel Pump Assembly Pressure Regulator		

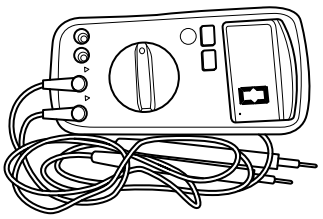
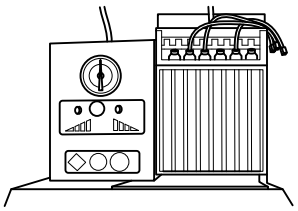
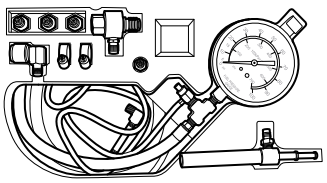
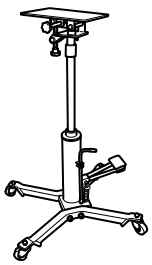
When engine operates properly, the electric fuel pump assembly (1) sucks fuel from fuel tank. Some fuel enters the fuel rail (3) and is supplied to injectors, some fuel flows back to the electric fuel pump assembly pressure regulator (2) directly. When fuel supply system pressure is high, the diaphragm spring in the regulator is jacked up by pressure, then the valve opens and fuel flows out from regulator. When pressure reaches normal value, the regulator shuts off and fuel stops flowing out. Finally, the system pressure reaches a steady state.

System Operation

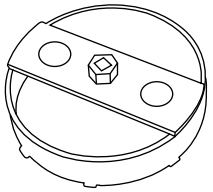
Fuel supply system consists of fuel tank, electric fuel pump assembly, delivery pipes, fuel rail and injectors, which is used for fuel storage, filtration, delivery and injection. The function of fuel supply system is to provide gasoline with sufficient pressure to fuel injectors by using electric fuel pump assembly, and the injector sprays a certain amount of gasoline which burnt mixed with gas to the top of intake valve in intake manifold in accordance with control signals from ECU.

Tools

General Tools

Tool Name	Tool Drawing
Digital Multimeter	 RCH0002006
Fuel System Pressure Tester	 RCH0062006
Injector Tester	 RCH004806
Transmission Carrier	 RCH0005006

Special Tools

Tool Name	Part No.	Tool Drawing
Fuel Pump Pressure Cap Remover	CH-30090	 RCH0004006

Diagnosis & Testing

Problem Symptoms Table

⚠ Warning

- Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Possible Cause
Fuel pressure in fuel supply system is too low	Electric fuel pump assembly (strainer blocked or fuel pressure regulator damaged)
	Low fuel level
Fuel pressure in fuel supply system is too high	Fuel injector (clogged)
	Electric fuel pump assembly (fuel pressure regulator damaged)
Electric fuel pump assembly has loud noise or a delay in operating	Low fuel level
	Electric fuel pump assembly relay
	Electric fuel pump assembly
Fuel tank flat	Charcoal canister solenoid valve operates all the time
	Activated charcoal canister (blocked)
	Charcoal canister filter ineffective
	Fuel tank ineffective
Fuel injector is clogged or leaked	Poor fuel quality
	Excessive impurities in fuel tank
	Fuel injector is damaged
Fuel injector does not work	Fuel supply system line (damaged)
	Fuel injector (short in coil)

Symptom	Possible Cause
	Electric fuel pump assembly (damaged)
	Wire harness

Fuel System Pressure Releasing

Operation Step

⚠ Warning

- When engine is not operating, the fuel pressure in fuel supply system is still high. Before repairing or disconnecting the fuel line or fuel supply system components, it is necessary to release the fuel supply system pressure to prevent fuel from spraying out accidentally. Failure to follow these instructions may result in serious personal injury.

1. Perform the following procedures to release the fuel pressure in fuel supply system:
   a. Recognize and remove the electric fuel pump assembly relay from engine compartment fuse and relay box.
   b. Start and run the engine until it stalls.
   c. Restart the engine until it does not run.
   d. Turn ENGINE START STOP switch to OFF.
   e. Disconnect the negative battery cable.
   f. Insert the electric fuel pump assembly relay into the original place.

Fuel System Pressure Test

Fuel Pressure Specifications

SQRE4T15C	Pressure (kPa)
Fuel Rail Fuel Pressure - Key (ON)	When power is on, pressure of fuel supply system is kept at 400 kPa - key (ON). For the new vehicle, after it is added with a certain fuel, make sure that measured fuel pressure on fuel rail at 13 seconds can reach 90% or higher of rated pressure.
Fuel Rail Fuel Pressure - Engine Idling	Make sure that supply fuel under normal system pressure (at least 400 kPa).
Fuel Rail Fuel Pressure - Key (OFF)	Turn off oil pump after it runs for 5 minutes, test changes of pressure in oil outlet of oil pump within 48 hours, the pressure should be not less than 1 KPa; When system pressure is 80%, turn power and oil outlet off, the maximum pressure will not drop more than 10% in 1min.

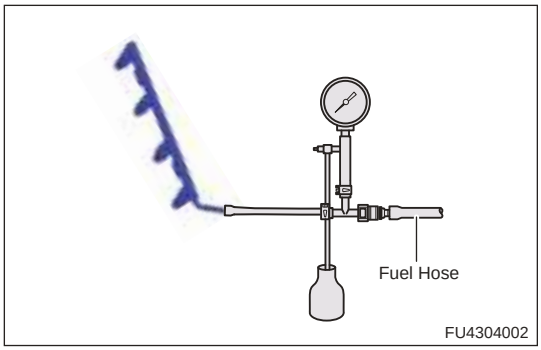
⚠ Warning

- When operating the fuel supply system, work area should be in good ventilation and keep fire sources or open flames away from the work area, in which fire extinguisher should be equipped.
- Before operating the fuel supply system, please touch the vehicle body to discharge static electricity; failure to do so will cause a fire, even result in an explosion.
- Before removing and installing fuel pipes, release the fuel supply system pressure.

⚠ Caution

- Make sure that battery voltage is not less than 12V.
- There is sufficient fuel in fuel tank for test.
- Make sure that fuel supply system lines are securely connected, preventing the fuel supply system from leaking.

1. Detect the fuel system pressure.
2. Disconnect the oil inlet pipe connector and connect the fuel supply system pressure tester between oil inlet pipe and fuel rail.



3. Start engine and run it at idle, and then read the value on pressure tester.
   a. Standard pressure at idle should be 400 kPa.
   b. If measured pressure value is lower than 380 kPa or higher than 420 kpa, check vehicle fuel supply line for leakage or kink, injector for blockage, function of electric fuel pump for abnormality.

      Hint:
      Replace injector or electric fuel pump assembly if necessary.

Fuel Flow Test

⚠ Caution

- When fuel pressure is normal during idling, the test of fuel flow can be performed.

1. Test method:
   a. Disconnect the inlet pipe Ⅱ connector and connect the fuel supply system pressure tester between inlet pipe Ⅱ and fuel rail.
   b. Start engine, increase engine speed (such as throttle fully opens), if the pressure of pressure gauge is lower than 0.1 Mpa (100 kPa) of system pressure, flow is insufficient.
   c. If flow is insufficient, line blockage or bend, fuel pump wear or mesh blockage may be the problem cause.

      Hint:
      Replace the electric fuel pump first if necessary. If line is blocked or bent, check, repair or replace it and retest flow, if it is eligible, the problem is eliminated. If it is ineligible, replace fuel pump and wash impurities in fuel tank.

On-vehicle Service

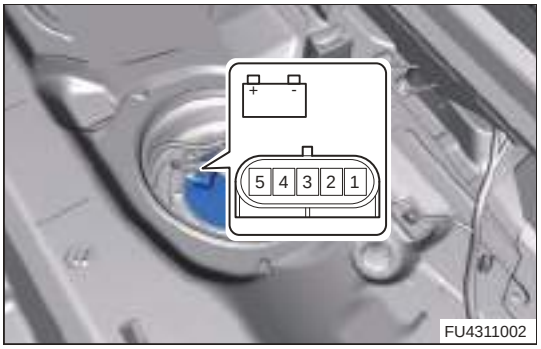
Electric Fuel Pump Assembly

On-vehicle Inspection

1. Check the electric fuel pump assembly operation.
   a. Remove electric fuel pump assembly protective cap and disconnect electric fuel pump assembly connector.

b. Apply battery voltage to terminals 1 and 5, and check if electric fuel pump operates within 10 seconds.

Battery Connection	Status
Battery positive (+) to Terminal 5	Operating current
Battery negative (-) to Terminal 1	



Hint:

- These tests must be finished within 10 seconds to prevent the coils from being burnt.
- Leave the electric fuel pump assembly as far as possible from the battery.
- Always switch voltage on and off on the battery side, rather than the electric fuel pump assembly side.
- If the electric fuel pump assembly does not operate, replace it.

Removal

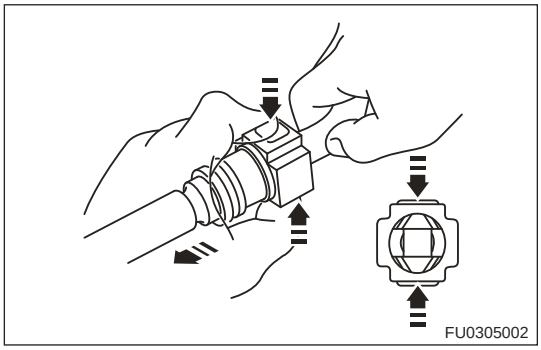
⚠ Warning

- Before operating the fuel supply system, please touch the vehicle body to discharge static electricity; failure to do so will cause a fire, even result in an explosion.
- When operating the fuel supply system, work area should be in good ventilation and keep fire sources or open flames away from the work area, in which fire extinguisher should be equipped.
- After performing the procedures for fuel system pressure release, there still remains some fuel in fuel line. When disconnecting fuel line, cover the joint with a piece of cloth or equivalent to prevent fuel from spraying out.
- If fuel leakage occurs when operating the fuel supply system, please handle the leaked fuel in time.

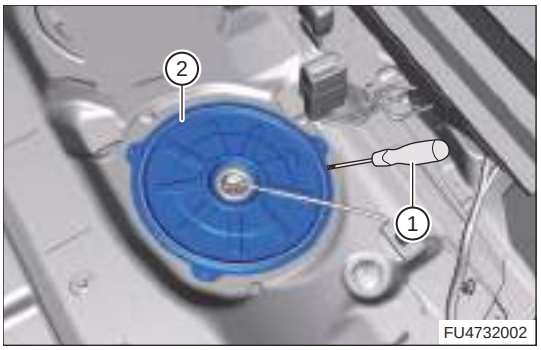
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Operation staff should wear protective glasses and rubber gloves during repair and avoid inhaling much fuel gas.
- Only use parts approved by Chery Automobile Co., Ltd. to replace the electric fuel pump assembly.
- As electric fuel pump assembly radiates through fuel, low fuel level in fuel tank will directly shorten the service life of electric fuel pump assembly.
- Keep electric fuel pump assembly and work area clean when replacing electric fuel pump assembly; otherwise the electric fuel pump assembly element will be clogged.
- DO NOT damage the disconnected fuel system line or connectors. Cover the line joints or connectors with plastic bags or equivalent, preventing foreign matter from entering.
- Keep fuel tank and line clean.

Disconnection way for all fuel pipe coupling joints in following procedures is shown in the illustration:



1. Release the fuel system pressure.
2. Turn off all electrical equipment and ENGINE START STOP switch.
3. Disconnect the negative battery cable.
4. Open the fuel tank cap assembly and discharge the fuel vapor in fuel tank.
5. Remove the second row seat assembly.
6. Remove the electric fuel pump assembly.
   a. Using a screwdriver (1) wrapped with protective tape, pry off electric fuel pump assembly protective cap (2).



   b. Disconnect the electric fuel pump assembly connector (arrow).

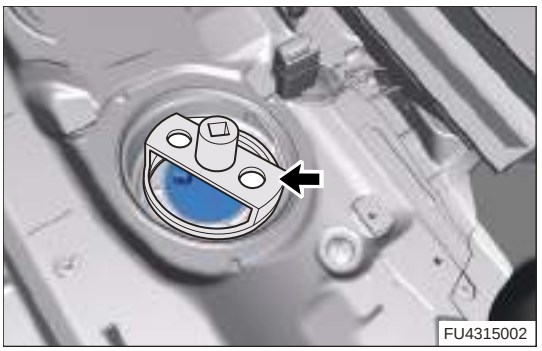
   c. Disconnect connection between inlet pipe (arrow) and electric fuel pump assembly.

⚠ Caution

- Before disconnecting the joints, remove all dirt from electric fuel pump assembly pressure cap.
- DO NOT forcefully bend or twist fuel line.

d. Using fuel pump pressure cap remover, remove pressure cap as shown in illustration.

e. Remove electric fuel pump assembly and dispose of fuel in electric fuel pump assembly.



⚠ Caution

- Operate carefully when taking the electric fuel pump assembly out of fuel tank, preventing damaging lines.
- Cover the electric fuel pump assembly completely with a plastic bag or equivalent to prevent foreign matter from entering.
- Electric fuel pump assembly can be put into a container and taken out of the cabin, thus preventing fuel in the pump from dropping into the cabin.
- It is not allowed to perform running test for electric fuel pump assembly under dry state or in water. Otherwise service life will be reduced. In addition, do not inversely connect electric fuel pump assembly positive and negative poles.

Installation

⚠ Warning

- DO NOT connect the power during installation. Work area should be in good ventilation and keep fire sources or open flames away.
- Replace fuel tank seal ring with a new one when installing electric fuel pump assembly, align it with installation position of fuel tank and do not run the electric fuel pump assembly with no fuel in fuel tank, preventing damaging electric fuel pump assembly.
- Before connecting the hose, check if there is any damage or foreign matter on the hose or joint.
- During installation, push in fuel pipe connector until a click sound is heard, then check that fuel pipe joint clip is on the collar of fuel pipe joint. After installing the pipe joint clip, check that fuel pipe joint cannot be pulled out. Be careful not to damage joint. If clip is damaged, replace it.
- Turn ignition switch to ON (without starting engine) to apply fuel pressure to fuel system, and then check connections for leakage.

1. Install fuel pump and fuel pump seal ring to fuel tank.
2. Using a fuel tank pressure cap special tool, tighten fuel tank pressure cap in clockwise direction.

   Tightening torque: 400 N·m

⚠ Caution

- When installing electric fuel pump assembly into fuel tank, it is necessary to install float rod assembly into fuel tank carefully at first to avoid deformation as collision.

Filler Tube Assembly

Removal

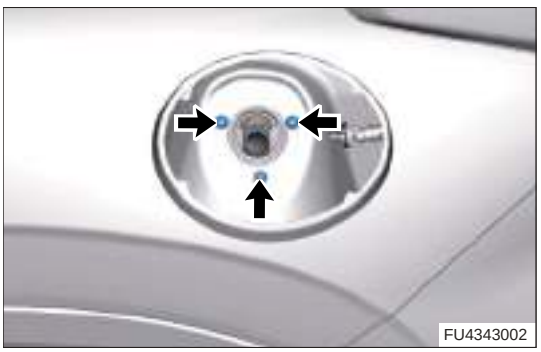
Warning

- Before operating the fuel supply system, please touch the vehicle body to discharge static electricity; failure to do so will cause a fire, even result in an explosion.
- When operating the fuel supply system, work area should be in good ventilation and keep fire sources or open flames away from the work area, in which fire extinguisher should be equipped.
- If fuel leakage occurs when operating the fuel supply system, please handle the leaked fuel in time.

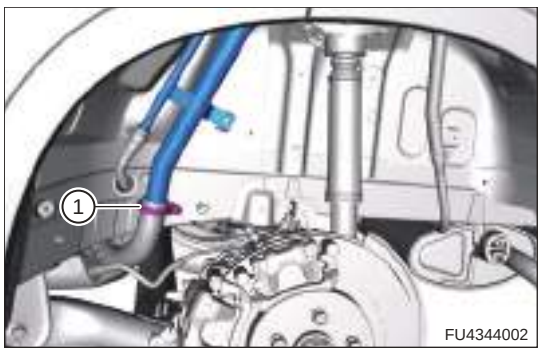
Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.

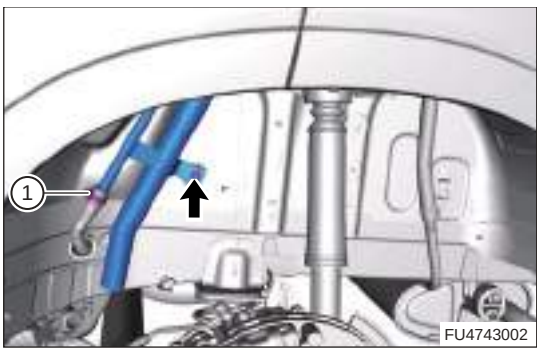
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Remove the rear left tire assembly.
3. Remove the rear left wheel house protector assembly.
4. Open fuel filler cap, and rotate fuel tank cap assembly counterclockwise to remove it.
5. Remove the filler tube assembly.
   a. Remove 3 fixing bolts (arrow) from upper part of filler tube assembly.



   b. Loosen worm clamp (1) and disconnect the connection of fuel filler hose.



   c. Loosen worm clamp (1) and disconnect the connection between fuel vapor pipe and filler tube assembly.
   d. Removal 1 fixing bolt (arrow) between fuel filler pipe assembly and lower part of body.



e. Remove the filler tube assembly.

⚠ Caution

Cover the joints with plastic bags after disconnecting the fuel filler hose and fuel breather hose, in order to prevent foreign matter from entering the fuel tank and fuel from evaporating or leaking.

Installation

1. Install the filler tube assembly.
2. Install 1 fixing bolt between lower part of filler tube assembly and body.

   Tightening torque: 7 ± 1 N·m

3. Connect fuel vapor pipe.
4. Connect filler hose assembly, and tighten worm clamp.

   Tightening torque: 3 ± 0.5 N·m

5. Install 3 fixing bolts between upper part of filler tube assembly and body.

   Tightening torque: 7 ± 1 N·m

6. Install the fuel tank cap assembly.
7. Install the rear left wheel house protector.
8. Install the rear left tire.

⚠ Caution

- When assembling hose, make sure that hose is not twisted and kinked.
- Note that when you hear a sound of “click” during disconnecting and connecting quick connector, it indicates that it is installed in place.

Fuel Tank

Removal

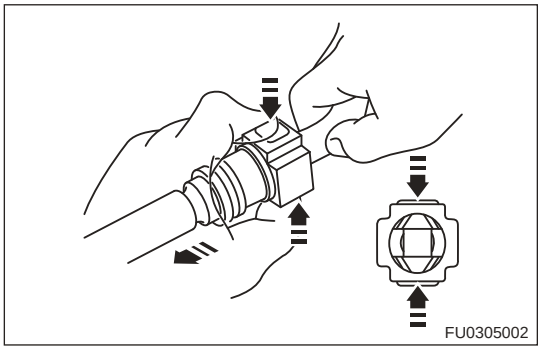
⚠ Warning

- Before operating the fuel supply system, please touch the vehicle body to discharge static electricity; failure to do so will cause a fire, even result in an explosion.
- When operating the fuel supply system, work area should be in good ventilation and keep fire sources or open flames away from the work area, in which fire extinguisher should be equipped.
- After performing the procedures for fuel system pressure release, there still remains some fuel in fuel line. When disconnecting fuel line, cover the joint with a piece of cloth or equivalent to prevent fuel from spraying out.
- If fuel leakage occurs when operating the fuel supply system, please handle the leaked fuel in time.

⚠ Caution

- DO NOT damage the disconnected fuel system line or connectors. Cover the line joints or connectors with plastic bags or equivalent, preventing foreign matter from entering.
- Be sure to wear necessary safety equipment to prevent accidents when repairing.

Disconnection way for all fuel pipe coupling joints in following procedures is shown in the illustration.

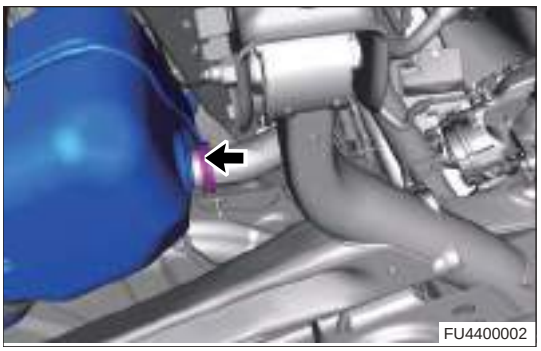


1. Release the fuel system pressure.
2. Turn off all electrical equipment and ENGINE START STOP switch.
3. Disconnect the negative battery cable.
4. Remove the rear seat cushion.
5. Open fuel tank cap to discharge fuel vapor.
6. Disconnect the electric fuel pump connector.
   a. Remove the electric fuel pump assembly protective cap.
   b. Disconnect the electric fuel pump assembly connector (1).

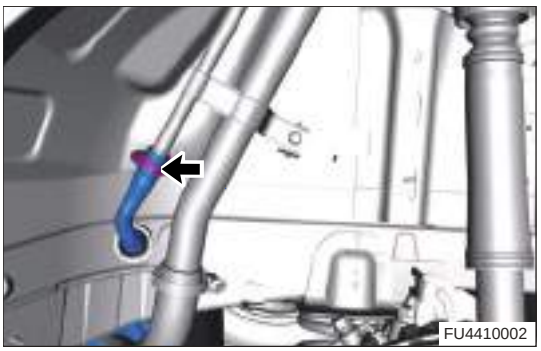
7. Remove the fuel tank assembly.
   a. Loosen worm clamp (arrow) and disconnect connection between fuel filler hose and fuel tank assembly.

      Hint:

      - Before disconnecting the joints, remove all dirt from electric fuel pump assembly pressure cap.
      - DO NOT forcefully bend or twist fuel line.



   b. Disconnect connection between fuel vapor pipe (- arrow) and filler tube assembly.



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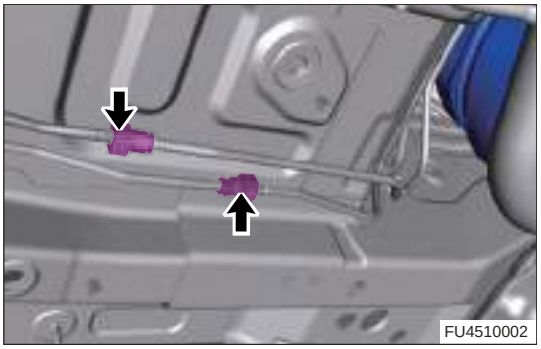
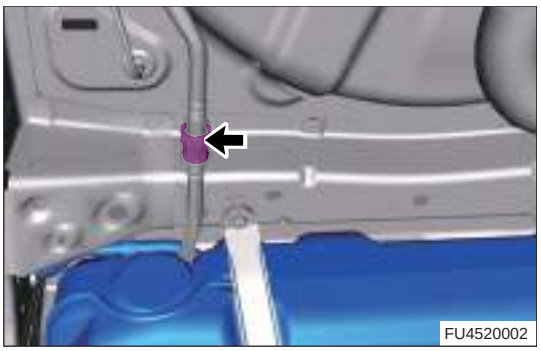
c. Disconnect connection (arrow) between fuel vapor pipe Ⅱ and fuel vapor pipe Ⅲ.

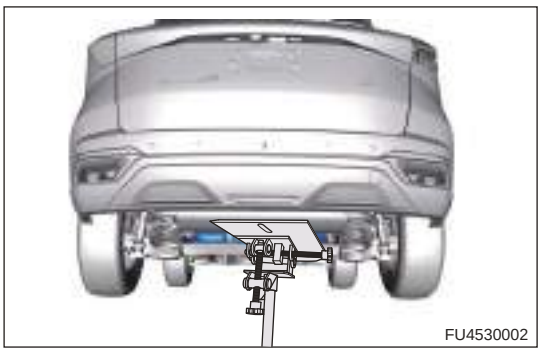
d. Disconnect connection (arrow) between inlet pipe Ⅰ and inlet pipe Ⅱ.



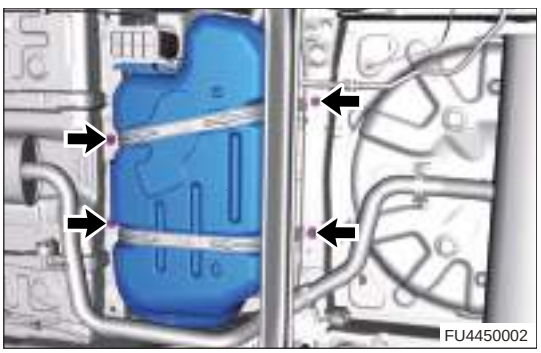
e. Disconnect connection (arrow) of activated charcoal canister breather pipe assembly.



8. Support fuel tank assembly with a transmission carrier.



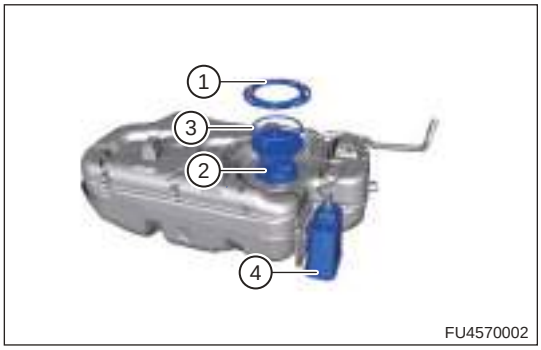
9. Remove 4 fixing bolts (arrow) between fuel tank left and right fixing straps and body.



10. Slowly lower transmission carrier to remove fuel tank assembly.

a. Remove fuel pump pressure cap (1), electric fuel pump assembly (2) and fuel tank seal ring (3) from fuel tank assembly.

b. Remove the activated charcoal canister assembly (4).



Installation

⚠ Caution

- Return fuel lines and vent lines on fuel tank to their original positions, or the fuel lines will be damaged due to friction generated by vehicle body shock, causing fuel leak.
- Before connecting the hose, check if there is any damage or foreign matter on the hose or joint.
- During installation, push in fuel pipe connector until a click sound is heard, then check that fuel pipe joint clip is on the collar of fuel pipe joint. After installing the pipe joint clip, check that fuel pipe joint cannot be pulled out. Be careful not to damage joint. If clip is damaged, replace it.
- Turn ignition switch to ON (without starting engine) to apply fuel pressure to fuel system, and then check connections for leakage.

1. Installation is in the reverse order of removal.

Fuel Rail Injector Assembly

Removal

⚠ Warning

- Before operating the fuel supply system, please touch the vehicle body to discharge static electricity; failure to do so will cause a fire, even result in an explosion.
- When operating the fuel supply system, work area should be in good ventilation and keep fire sources or open flames away from the work area, in which fire extinguisher should be equipped.
- After performing the procedures for fuel system pressure release, there still remains some fuel in fuel line. When disconnecting fuel line, cover the joint with a piece of cloth or equivalent to prevent fuel from spraying out.
- If fuel leakage occurs when operating the fuel supply system, please handle the leaked fuel in time.

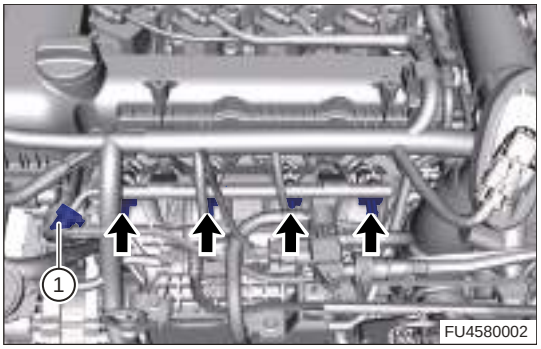
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- DO NOT damage the disconnected fuel system line or connectors. Cover the line joints or connectors with plastic bags or equivalent, preventing foreign matter from entering.
- Injector is a part of high accuracy, featuring good anti-clogging, anti-pollution and atomization, so be careful not to damage the injector during removal of fuel rail.

1. Release the fuel supply system pressure.
2. Turn off all electrical equipment and ENGINE START STOP switch.
3. Disconnect the negative battery cable.
4. Remove the engine trim cover.
5. Remove the fuel rail injector assembly.

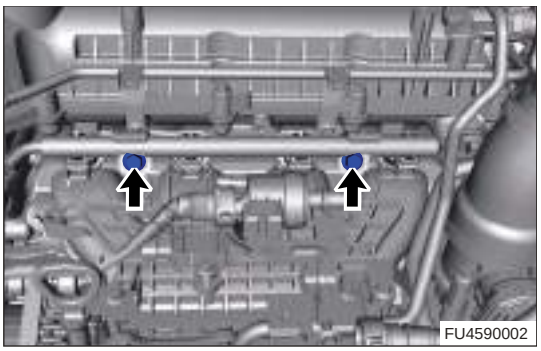
a. Disconnect connection (1) between inlet pipe II assembly and fuel rail injector assembly.

b. Disconnect connectors (arrow) from each cylinder injector assembly.



c. Remove 2 fixing bolts (arrow) from fuel rail injector assembly.

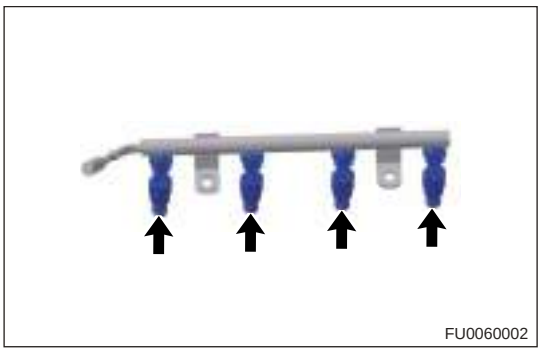
Tightening torque: 20 + 5 N · m



d. Remove the fuel rail injector assembly.

6. Separate the injector and fuel rail.

a. Remove injector fixing clips and remove injectors (-arrow) from fuel rail.



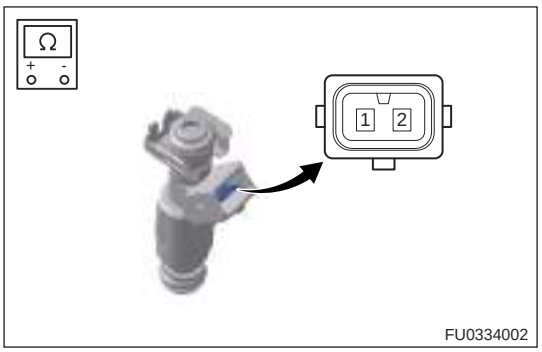
Inspection

1. Check the resistance of injector.

a. Disconnect the injector connector.

b. Measure resistance between 2 terminals (injector side) of injector with a digital multimeter.

Multimeter Connection	Measurement Temperature	Specification (Ω)
Terminal 1 - Terminal 2	20°C	12



2. Check leakage test and injection test of injector.

a. Remove injector and then install the injector to injector cleaning analyzer, adjust the pressure to operation pressure, and observe the injector for leakage, if so, sealing is poor.

b. If there is no cleaning analyzer, a free-unpick cleaning device also can be used, adjust pressure to 4 bar, and place a white paper under injector. Observe the injector for leakage.

⚠ Caution

- When assembling injector, grease will be applied to sealing ring to install injector easily, if the part is in high temperature for a long time, grease will melt, and adsorb around injector, so it may be wrong when judging injector for leakage. It is recommend to clean around injector to check injector for leakage.

c. If the color of one injector nozzle is different from the color of other injector nozzles, the injector may be leaked or have a poor atomization.

d. Fuel injection angle.

- Poor atomization: Fuel injected by injector is radial, and injection angle from injection nozzle is irregular.
- Good atomization: Fuel injected from injector is fuel mist, and injection angle from injection nozzle is cone.

Installation

⚠ Caution

- Install a new O-ring sealing on injector.
- Before installing the injector, apply clean grease or oil to the O-ring sealing surface for easy installation, preventing damage to the O-ring.
- When applying grease or oil, do not contaminate the injector internal and injection holes.
- It is not allowed to use any tool (hammer, etc.) to strike the injector when installing it.

1. Installation is in the reverse order of removal.

Fuel Filler Cap Assembly

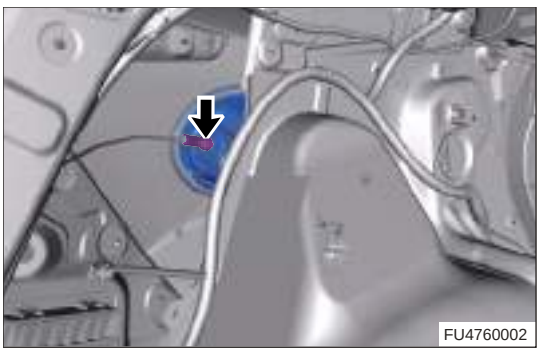
Removal

⚠ Caution

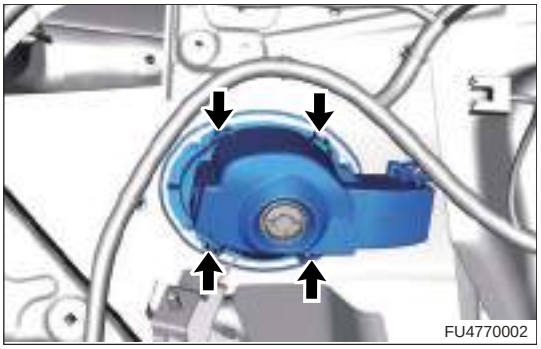
- Try to prevent body interior from being scratched when removing fuel filler cap assembly.

1. Release the fuel supply system pressure.
2. Turn off all electrical equipment and ENGINE START STOP switch.
3. Disconnect the negative battery cable.
4. Remove the filler tube assembly.
5. Remove the left C-pillar lower protector assembly.
6. Remove the fuel filler cap assembly.

a. Disengage fuel filler cap cable (arrow) from the fuel filler cap assembly.



b. Disengage 4 fixing clips of fuel filler cap assembly from vehicle sheet metal.



Installation

1. Installation is in the reverse order of removal.

025CHC

025CHC

025CHC TRANSMISSION CONTROL SYSTEM

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. Be sure to wear necessary safety equipment to prevent accidents when removing and repairing.

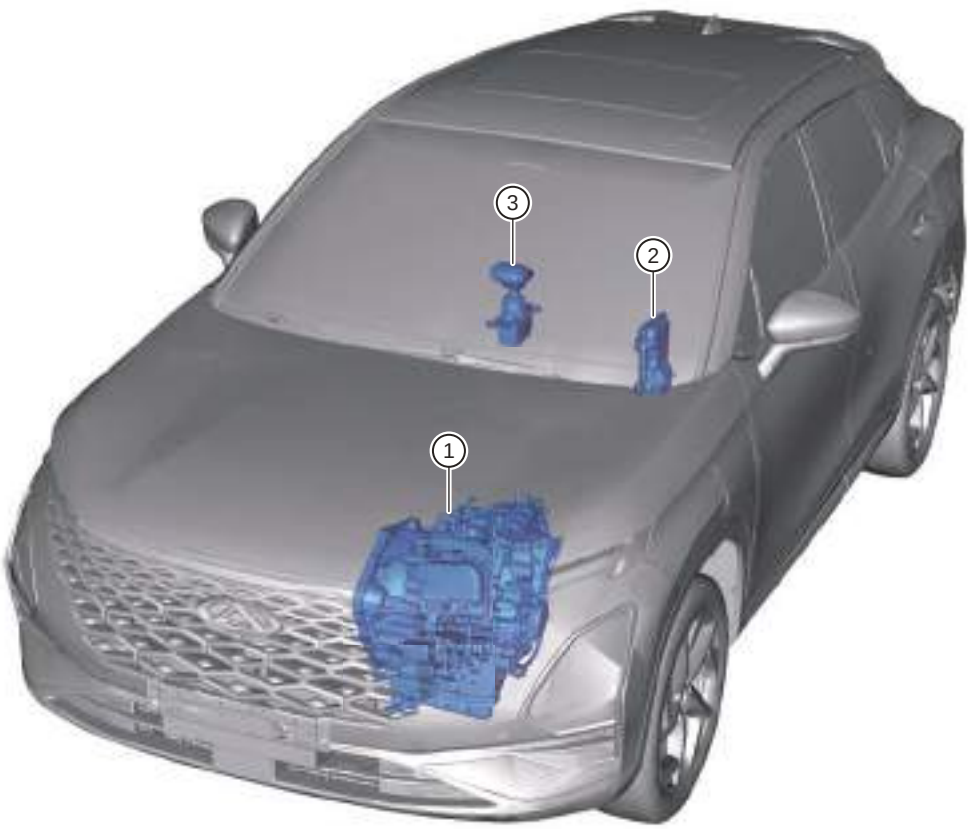
Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

1. During removal and installation of TCU, antistatic equipment should be worn to avoid damage to electronic components in TCU.

System Overview

System Components Diagram



CM2001001

1	Transmission Assembly	2	TCU Module
3	Electronic Shift Module Assembly		

System Principle

CVT realizes stepless speed change by continuously changing the contact diameter between the drive and driven conical pressure plates and the steel belt. Operation is as follows:

1. Transmission Control Unit (TCU) sends command signals to the solenoid valves in hydraulic system according to the requirements under the vehicle driving conditions (vehicle speed, load, engine speed, etc.).

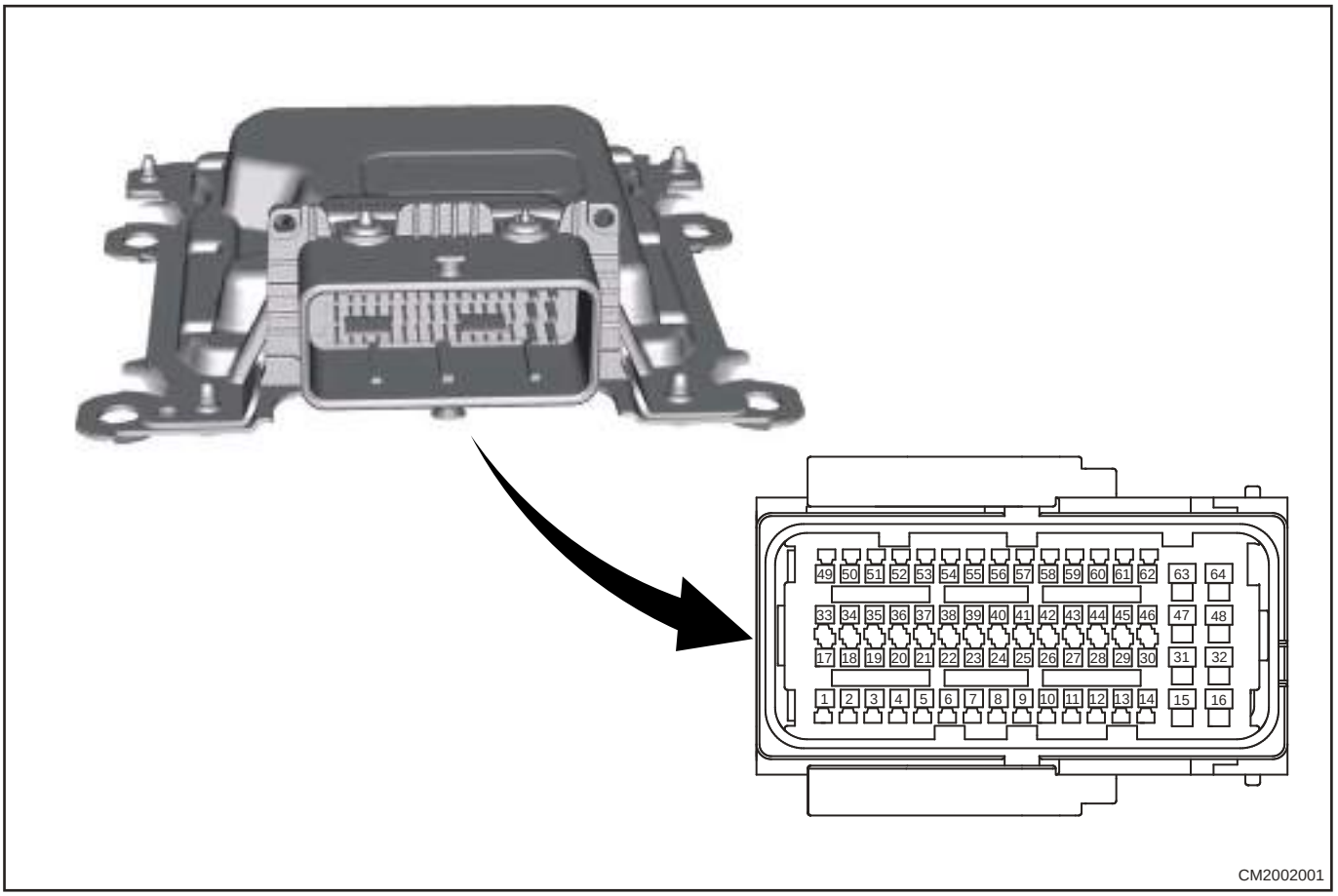
2. The solenoid valve continuously adjusts the operating state according to the commands from TCU. The combination of solenoid valves in different operating states enables the flow direction and pressure of the hydraulic oil to be adjusted and changed in time, and precisely controls the action of hydraulic actuators (e.g. cylinders, pistons, spool valves, etc.).
3. When the piston cavity pressure of hydraulic drive and driven conical pressure plates is continuously changed, the conical pressure plate generates corresponding axial movement according to the pressure changes, thereby changing the rotating radius of the steel belt, realizing continuous change of the transmission speed ratio and achieving the purpose of stepless speed change.

System Circuit Diagram

Terminal Definition

Transmission Module Terminal Definition

Transmission Control Unit (TCU) receives the input signals from switches and sensors, primarily controls the operation of shift and lock solenoids. The drive gear is regulated by an electronic shift system. TCU processes the input signal and adjusts the transmission hydraulic system by using received information.



PIN	Definition	PIN	Definition
1	NC	33	Input Pulley Shaft Pressure Control Valve Low Side
2	NC	34	NC
3	NC	35	NC
4	NC	36	Hydraulic Torque Converter Control Valve Low Side

PIN	Definition	PIN	Definition
5	Transmission Oil Temperature Sensor Signal	37	NC
6	Output Pulley Shaft Oil Pressure Sensor Signal	38	NC
7	Private CAN Low	39	Range Sensor 1
8	Private CAN High	40	NC
9	NC	41	Turbine Speed Sensor Signal
10	NC	42	NC
11	All Vehicle CAN Low	43	NC
12	All Vehicle CAN High	44	Input Pulley Shaft Speed Sensor Ground
13	NC	45	NC
14	NC	46	Output Pulley Shaft Speed Sensor Power Supply
15	Main Oil Pressure Control Valve High Side	47	KL_30
16	Input/Output Pulley Shaft Pressure Control Valve High Side	48	KL_30
17	NC	49	NC
18	NC	50	Clutch Control Valve Low Side
19	Output Pulley Shaft Oil Pressure/ Temperature Sensor Ground	51	Output Pulley Shaft Pressure Control Valve Low Side
20	Input Pulley Shaft Oil Pressure/Range Sensor Ground	52	Main Oil Pressure Control Valve Low Side
21	ECO Mode	53	NC
22	Input Pulley Shaft Oil Pressure Sensor Signal	54	NC
23	NC	55	NC
24	NC	56	Range Sensor 2
25	NC	57	Turbine/Output Pulley Shaft Speed Sensor Ground
26	Output Pulley Shaft Speed Sensor Signal	58	Input Pulley Shaft Speed Sensor Signal
27	NC	59	NC
28	NC	60	NC
29	Input Pulley Shaft Oil Pressure/Range Sensor Power Supply	61	Turbine Speed Sensor Power Supply

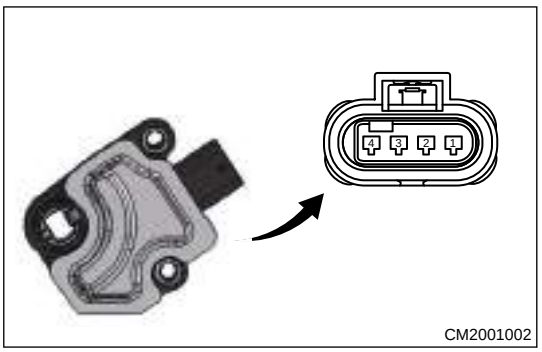
PIN	Definition	PIN	Definition
30	Output Pulley Shaft Oil Pressure Sensor Power Supply	62	Input Pulley Shaft Speed Sensor Power Supply
31	KL15	63	Power Supply Ground 1
32	Hydraulic Torque Converter/Clutch Control Valve High Side	64	Power Supply Ground 2

Note: NC is the null pin, KL15 is the switch power, KL30 is the battery power

Wire Harness and Sensor Terminal Definition

1. Range Sensor
   a. Pin Definition

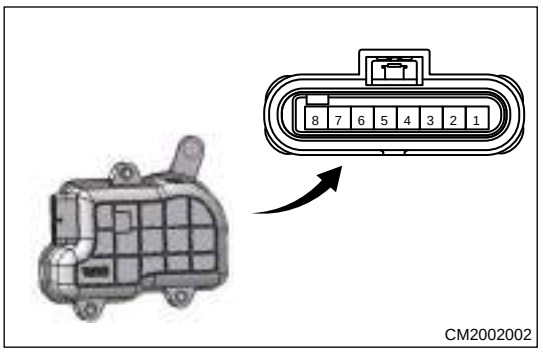
PIN	Definition
1	Power Supply (VCC)
2	Output Signal 1 (GEAR1)
3	Signal Ground (GND)
4	Output Signal 2 (GEAR2)



2. Electronic Shift Actuator
   a. Pin Definition

PIN	Definition
1	Power Supply (VCC)
2	/
3	CAN Signal Low (CANL)
4	CAN Signal High (CANH)
5	/
6	/
7	KL15 Ignition (IGN)
8	Ground (GND)

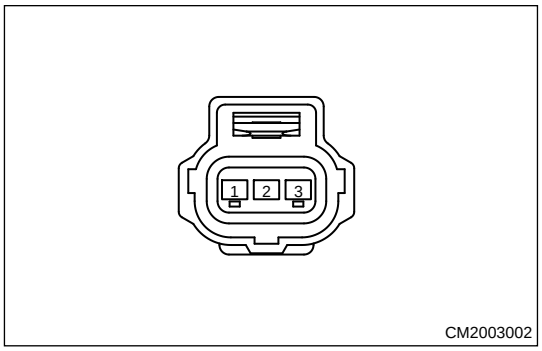
Gear switch performs gear shifting according to gear position information sent by TCU.



3. Speed Sensor
   a. Pin Definition

PIN	Definition
1	Signal Ground (GND)
2	Output Signal (Vout)
3	Power Supply (VCC)

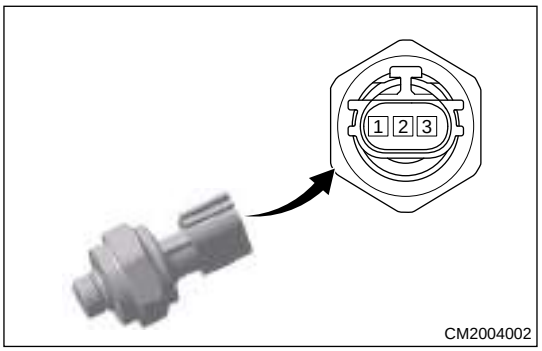
The speed sensor of 025CHC continuously variable transmission uses two models, a total of three speed sensors.



4. Oil Pressure Sensor
   a. Pin Definition

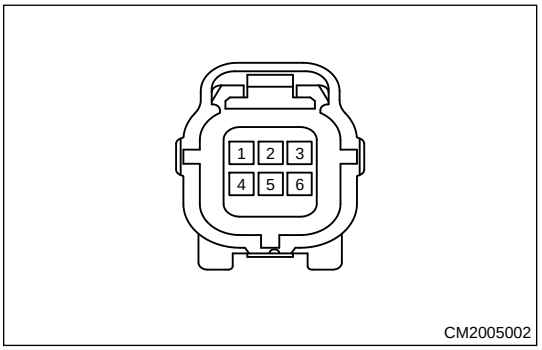
PIN	Definition
1	Signal Ground (GND)
2	Output Signal (Vout)
3	Power Supply (VCC)

025CHC transmission uses two oil pressure sensors (-input shaft, output shaft) in total:



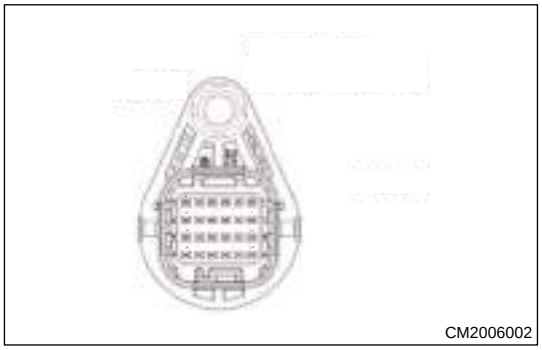
5. Transmission Peripheral Wire Harness Assembly
   a. Pin Definition

PIN	Definition
1	Output Pulley Shaft Pressure Sensor Ground
2	Output Pulley Shaft Pressure Sensor Signal
3	Output Pulley Shaft Pressure Sensor Power Supply
4	Output Pulley Shaft Speed Sensor Power Supply
5	Output Pulley Shaft Speed Sensor Signal
6	Output Pulley Shaft Speed Sensor Ground



6. Wire Harness Main Connector

a. Pin Definition



PIN	Definition
1	Null
2	Null
3	Null
4	Null
5	Null
6	Null
7	Oil Temperature Signal +
8	Oil Temperature Signal -
9	Input Shaft Solenoid Valve Signal +
10	Input Shaft Solenoid Valve Signal -
11	TC Solenoid Valve Signal +
12	TC Solenoid Valve Signal -
13	Main Oil Pressure Solenoid Valve Signal +
14	Main Oil Pressure Solenoid Valve Signal -
15	Clutch Solenoid Valve Signal +
16	Clutch Solenoid Valve Signal -
17	Output Shaft Solenoid Valve Signal +
18	Output Shaft Solenoid Valve Signal -
19	Null
20	Null
21	Null
22	Null
23	Null
24	Null

Resistance:

a. When measuring PIN9 - PIN10 at 20℃, the resistance is 5.3 ± 0.3 Ω;

b. When measuring PIN11 - PIN12 at 20℃, the resistance is 5 + 0.2/-0.4 Ω;

c. When measuring PIN13 - PIN14 at 20℃, the resistance is 5.3 ± 0.3 Ω;

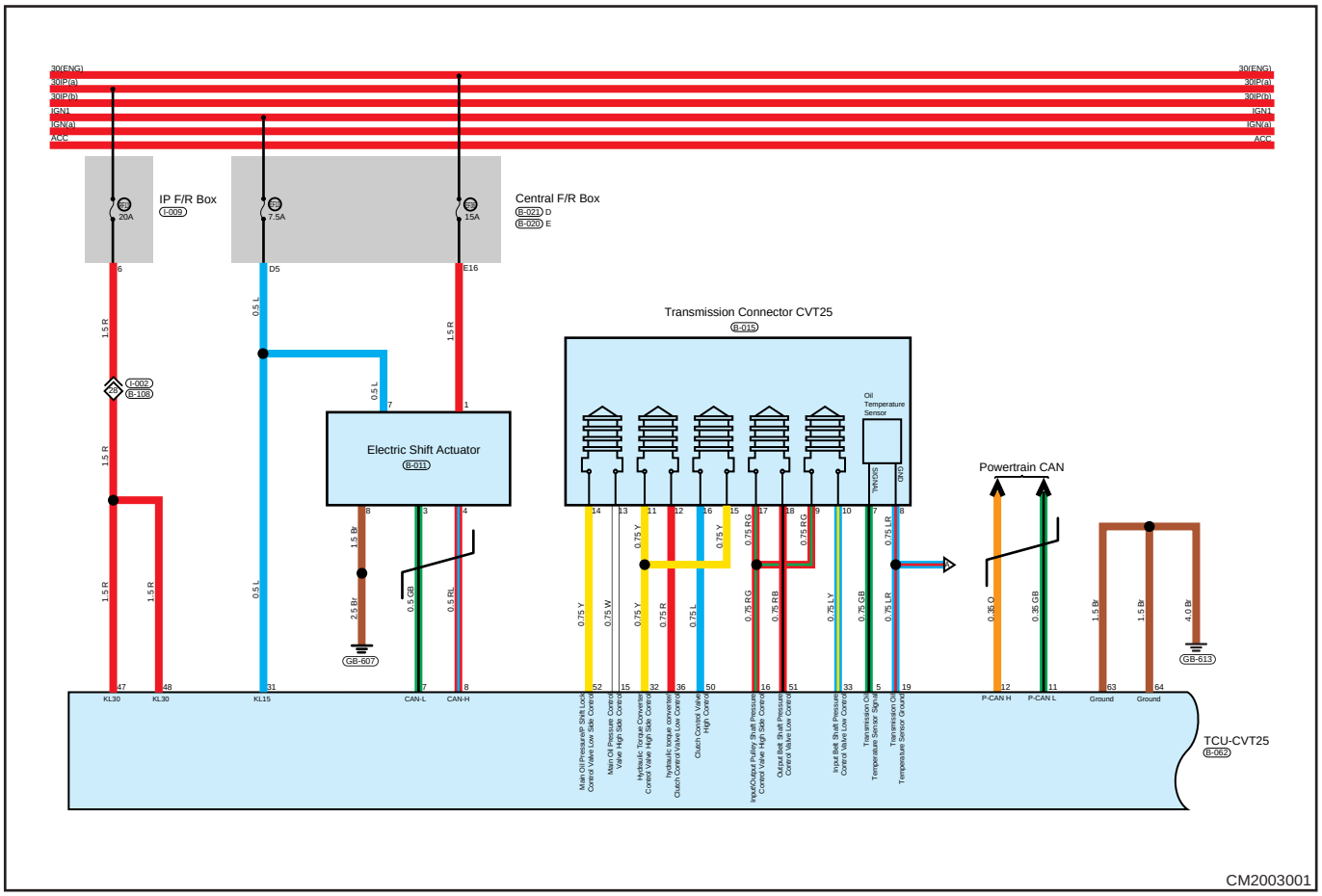
d. When measuring PIN15 - PIN16 at 20℃, the resistance is 5.3 ± 0.3 Ω;

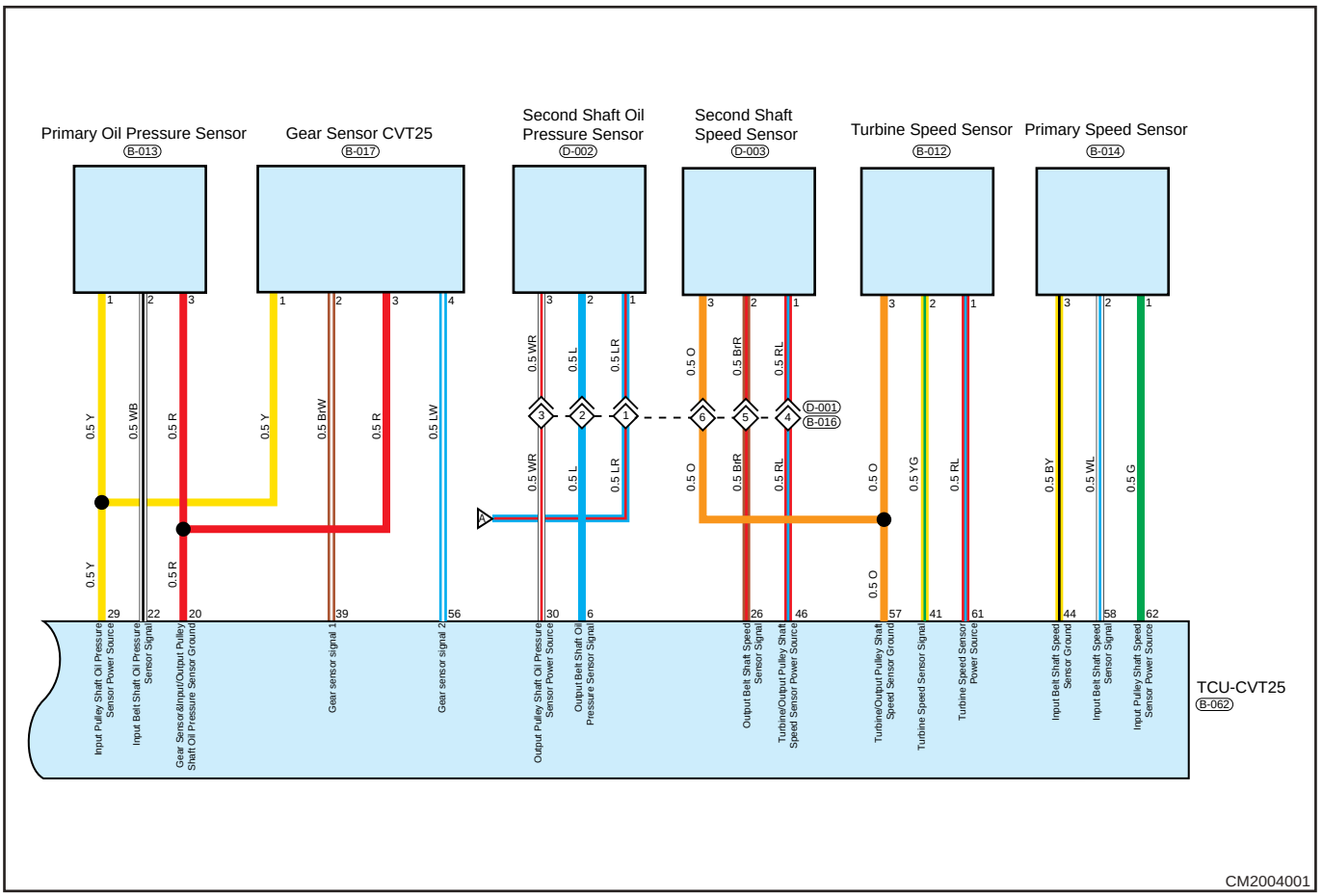
e. When measuring PIN17 - PIN18 at 20℃, the resistance is 5.3 ± 0.3 Ω;

f. Measure resistance of PIN7 - PIN8, refer to the following table for the relationship between resistance and transmission oil temperature:

Temperature (˚C)	-40	-30	-20	-10	0	10	20	25	40
Resistance (KΩ)	120.33	66.77	38.65	23.24	14.45	9.26	6.10	5.00	4.12
Temperature (˚C)	40	50	60	70	80	90	100	110	120
Resistance (KΩ)	2.85	2.01	1.44	1.06	0.78	0.59	0.45	0.35	0.28

Circuit Diagram





DIAGNOSIS & TEST

DTC Diagnosis Description

The possible cause of most faults is due to the poor connection of sensors and wire harness connectors. Therefore, it is necessary to thoroughly check if the connectors and lines corresponding to each fault are loose, poorly connected, winding, corroded, with dirt, aging and other abnormalities.
In view of the fact that some faults may be caused by the failure to clear the history faults in TCU after maintenance, it is necessary to clear DTCs first:

Clear DTCs:

1. IG is in OFF position;
2. Connect the diagnostic tester;
3. IG is in ON position;
4. Diagnostic tester enters the automatic transmission (CVT) system, read the DTC;
5. Clear DTCs;
6. Then operate the vehicle according to the fault activation conditions:
   a. Vehicle is normally driven, and the vehicle speed is required to be ⩾ 40kph;
   b. Decelerate until the vehicle stops, turn off the vehicle and KL15 power, lock the vehicle, and wait for three minutes;
   c. Start again, vehicle is normally driven, and the vehicle speed is required to be ⩾ 40kph;
7. Check if DTC occurs again;
8. Transmission system resumes;
9. Exit the diagnostic tester system;
10. Disconnect the diagnostic tester;

11. IG is in OFF position;

⚠ Caution
• For emission type faults, after troubleshooting, three driving cycles must be performed to clear DTCs.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggle test.
- Check for broken, bent, protruded or corroded terminals.
- Inspect sensors and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Use data recorder and/or oscilloscope to help diagnose intermittent malfunctions.
- Remove the Transmission Control Unit (TCU) from malfunctioning vehicle and install it to a new vehicle to perform a test. If DTC cannot be cleared, TCU is malfunctioning. If DTC can be cleared, reinstall TCU to original vehicle.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

- Remove ground bolt or nut.
- Check all contact surfaces for tarnish, dirt and rust, etc.
- Clean as necessary to ensure that contact is in good condition.
- Reinstall ground bolt or nut securely.
- Check if any additional accessories interfere with ground circuit.
- If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

System Diagnosis Procedure

Hint:

- Use following procedures to troubleshoot the transmission control system.

1	**Vehicle brought to workshop**

Next

2	**Check battery voltage**

Check if battery voltage is normal.
Standard voltage: Not less than 12 V.

NG → **Replace battery**

OK

3	**Customer problem analysis**

Next

4	**Read DTCs**

NG → **Perform repair according to problem symptoms table**

OK

5	**Read DTCs (current DTC and history DTC)**

NG → **Troubleshoot according to Intermittent DTC malfunction procedures**

OK

6	**Repair according to Diagnostic Trouble Code (DTC) chart**

Next

7	**Adjust, repair or replace**

Next

8	**Conduct test and confirm malfunction has been repaired**

Next → **End**

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Maintenance Advice
P096200	Line Solenoid Short to GND	TCU detects that the solenoid valve is short to power supply, short to ground or open, the fault is established	• Wire harness or connector failure • Line Solenoid Failure • TCU failure	• Check wire harness or connector • Replace main oil pressure control solenoid valve • Replace TCU
P096300	Line Solenoid Short to BAT			
P096000	Line Solenoid Open Load			
P095900	Line Solenoid Performance failure			
P096600	Primary Solenoid Short to GND	TCU detects that the solenoid valve is short to power supply, short to ground or open, the fault is established	• Wire harness or connector failure • Primary Solenoid Failure • TCU failure	• Check wire harness or connector • Replace transmission valve body assembly • Replace TCU
P096700	Primary Solenoid Short to BAT			
P096400	Primary Solenoid Open Load			
P097200	Primary Solenoid Performance failure			
P097000	Secondary Solenoid Short to GND	TCU detects that the solenoid valve is short to power supply, short to ground or open, the fault is established	• Wire harness or connector failure • Output Pulley Control Solenoid Fault • TCU failure	• Check wire harness or connector • Replace transmission valve body assembly • Replace TCU
P097100	Secondary Solenoid Short to BAT			
P096800	Secondary Solenoid Open Load			
P097300	Secondary Solenoid Performance failure			
P272000	Clutch Solenoid Short to GND	TCU detects that the solenoid valve is short to power supply, short to ground or open, the fault is established	• Wire harness or connector failure • Clutch Control Solenoid Valve Fault • TCU failure	• Check wire harness or connector • Replace transmission solenoid valve assembly • Replace TCU
P272100	Clutch Solenoid Short to BAT			
P271800	Clutch Solenoid Open Load			
P271600	Clutch Solenoid Performance failure			
P272900	TCC Solenoid Short to GND	TCU detects that the solenoid valve is short to power supply, short to	• Wire harness or connector failure • TCC Solenoid Failure	• Check wire harness or connector • Replace transmission
P273000	TCC Solenoid Short to BAT			

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Maintenance Advice
P272700	TCC Solenoid Open Load	ground or open, the fault is established	• TCU failure	solenoid valve assembly • Replace TCU
P272500	TCC Solenoid Performance failure			
P084300	Primary Pressure Sensor Short to BAT	When the transmission input pulley pressure exceeds the set threshold, the fault is established	• Incorrect installation of input pulley pressure sensor • Input pulley pressure sensor fault • Wire harness or connector failure • TCU failure	• Reinstall input pulley pressure sensor • Replace the input pulley pressure sensor • Check wire harness or connector • Replace TCU
P084200	Primary Pressure Sensor Short to GND			
P084800	Secondary Pressure Sensor Short to BAT	When the transmission output pulley sensor oil pressure exceeds the set threshold, the fault is established	• Incorrect installation of output pulley shaft pressure sensor • Output pulley shaft pressure sensor • Wire harness or connector failure • TCU failure	• Reinstall output pulley shaft pressure sensor • Replace output pulley shaft pressure sensor • Check wire harness or connector • Replace TCU
P084700	Secondary Pressure Sensor Short to GND			
P171000	Primary Pressure Sensor Supply Abnormal	When the transmission pressure sensor voltage exceeds the set threshold, the fault is established	• Wire harness or connector failure • Input pulley pressure sensor fault • TCU failure	• Check wire harness or connector • Replace the input pulley pressure sensor • Replace TCU
P171100	Secondary Pressure Sensor Supply Abnormal	When the transmission pressure sensor voltage is lower than or higher than the set threshold, the fault is established	• Wire harness or connector failure • Output Pulley Pressure Sensor Fault • TCU failure	• Check wire harness or connector • Replace output pulley pressure sensor • Replace TCU
P079200	Input Pulley Speed Sensor Fault	When the input speed exceeds the set threshold during driving, the fault is established	• Incorrect installation of input pulley shaft speed signal sensor	• Reinstall input pulley shaft speed signal sensor correctly • Replace input pulley shaft

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Maintenance Advice
			• Input pulley shaft speed signal sensor fault • Wire harness or connector failure	speed signal sensor • Check wire harness or connector
P072100	Output Pulley Speed Sensor Fault	When the output speed exceeds the set threshold during driving, the fault is established	• Incorrect installation of output pulley shaft speed signal sensor • Output pulley shaft speed signal sensor fault • Wire harness or connector failure	• Reinstall output pulley shaft speed signal sensor correctly • Replace output pulley shaft speed signal sensor • Check wire harness or connector
P071600	Turbine speed sensor fault	When the turbine speed exceeds the set threshold during driving, the fault is established	• Incorrect installation of turbine speed sensor • Turbine speed sensor fault • Turbine speed sensor wire harness or connector failure • TCU failure	• Reassembly turbine speed sensor • Replace turbine speed sensor • Check turbine speed sensor wire harness or connector • Replace TCU
P094000	Oil Temperature Sensor Short to BAT/OL	When the CVT oil temperature sensor voltage exceeds the threshold, the fault is established	• Oil Temperature Sensor Fault • Wire harness or connector failure • TCU failure	• Replace oil temperature sensor • Check wire harness or connector • Replace TCU
P093900	Oil Temperature Sensor Short to GND			
P070600	Range Switch Signal Out of Range	When TCU detects that there are multiple P/R/N/D gear signals simultaneously or no gear signals, the fault is established	• Wire harness or connector failure • Abnormality in electronic shift actuator • Abnormality in range sensor • TCU failure	• Check wire harness and connector • Check electronic shift actuator • Check range sensor • Replace TCU
P280300	Range Sensor SCB	When the range sensor signal is short to power supply, the fault is established		

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Maintenance Advice
P280200	Range Sensor SCG/ OL	When the range sensor signal is short to ground or open, the fault is established		
P280500	Range Sensor Signal Check	When the checksum error occurs for range sensor signal, the fault is established		
P073000	Ratio Error	When the absolute value of the difference between target ratio and actual ratio is greater than the set threshold, the fault is established	• Transmission electrical appliances fail • Transmission hydraulic system failure • Abnormality in engine actual torque • Abnormal wear of transmission components	• Replace invalid transmission electrical appliances • Check and repair transmission hydraulic system • Check engine actual torque • Replace abnormally worn components of transmission
P279700	Primary Pressure Control Issue	When the difference between target oil pressure and actual oil pressure is greater than the set threshold, the fault is established	• Pulley pressure sensor signal fault • Pulley pressure control solenoid valve fault • Hydraulic system fault	• Replace pulley pressure sensor • Replace transmission valve body assembly • Check and repair hydraulic system
P279800	Secondary Pressure Control Issue			
P081E00	Clutch (Reverse) Slip	When the forward/ reverse clutch input and output speed difference has a large slip differential speed after engaging or locking, the fault is established	• Turbine speed sensor fault • Clutch Control Solenoid Valve Fault • Hydraulic system leakage • Clutch lining damaged	• Replace turbine speed sensor • Replace valve body assembly • Check and repair hydraulic system • Replace clutch lining
P081100	Clutch (Drive) Slip			
P089400	TCC Slip	When there is a large slip differential speed between engine speed and turbine speed after the hydraulic torque converter locking clutch is engaged,	• Hydraulic torque converter locking control solenoid valve fault • Wire harness or connector failure	• Replace hydraulic torque converter locking control solenoid valve

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Maintenance Advice
		the fault is established	• Hydraulic control circuit fault • Hydraulic torque converter fault	• Check wire harness or connector • Check and repair hydraulic control circuit • Replace hydraulic torque converter
P021800	Trans Oil Temperature Out of Range	When the oil temperature is higher than 128℃, the fault is established	• Oil Temperature Sensor Fault • Transmission cooling system failure	• Replace oil temperature sensor • Check and repair transmission cooling system
P176700	Trans Oil Temperature Critical	When the oil temperature is higher than 135℃, the fault is established		
P086300	Solenoid Driver Communication Failure	TCU detects the corresponding abnormality, triggering the diagnosis	• The vehicle abnormality causes TCU can not operate normally, such as the power supply is abnormal • TCU failure	• Check battery • Check wire harness or connector • Replace TCU
P062F00	NVM (Non Volatile Memory) Failure			
P162F00	NVM (Non Volatile Memory) Abnormal			
P060400	RAM (Random Access Memory) Abnormal			
P060500	ROM (Read Only Memory) Abnormal			
P160C00	PLL Fault			
P060B00	ADC Fault			
P060700	Time Slice Fault			
P060A00	Monitor Unit Fault			
P160B00	VDD Out of Range			
P061300	Safety Other Fault			
U014087	Lost Communication with BCM	TCU cannot obtain or receive the signal on CAN network	• Relevant controller sensor failure • Abnormal vehicle CAN network	• Check relevant controller sensor • Refer to CAN Network Diagnosis of vehicle
U010087	Lost Communication with ECM			
U012987	Lost communication with BSM			

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Maintenance Advice
U012687	Lost Communication with SAM			
U014687	Lost Communication with CGW			
U119387	Lost Communication with EGS			
U042281	Invalid Data from BCM			
U040181	Invalid Data from ECM			
U041881	Invalid Data from BSM			
U042881	Invalid Data from SAM			
P175000	Invalid Engine Speed Signal			
P175100	Invalid Engine Actual Torque Signal			
P175200	Invalid Brake Pedal Signal			
P175300	Invalid Gas Pedal Signal			
P175400	Invalid Vehicle Speed Signal			
P175500	Invalid Front Left Speed Signal			
P175600	Invalid Front Right Speed Signal			
P175700	Invalid Rear Left Speed Signal			
P175800	Invalid Rear Right Speed Signal			
P175900	Invalid Engine Coolant Signal			
P176000	Invalid Odormeter Signal			
P176100	ABS Invalid			
P176200	Invalid Master Cylinder Pressure Signal			

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Maintenance Advice
P095600	Manual Mode Fault	• When in P gear, any signal of M, M+, M- is detected, the fault is established • When in D gear, three signals of M, M+, M- are detected at the same time, the fault is established • When in D gear, two signals of M +, M- are detected, the fault is established	• Wire harness or connector failure • Abnormality in manual mode switch • TCU operates abnormally	• Check wire harness or connector • Replace manual mode switch • Replace TCU
U007388	TCU Bus Off	CAN network fails, and TCU cannot communicate with other controllers	• Short in vehicle CAN bus wire harness • CAN modules of other nodes in the vehicle CAN network are abnormal • TCU internal is abnormal	• Check CAN bus • Check CAN modules of other nodes in the vehicle CAN network • Replace TCU
P071500	Unreasonable Turbine Speed Signal	After TCU detects that the sensor signal change rate is greater than the set threshold, the fault is established	• Wire harness or connector failure • Sensor failure • TCU failure	• Check wire harness or connector • Replace sensor • Replace TCU
P079100	Unreasonable Primary Speed Signal			
P072000	Unreasonable Secondary Speed Signal			
P093700	Unreasonable Oil Temperature Signal	When engine is cold, after TCU detects that the deviation between oil temperature sensor signal and ambient temperature is greater than the set threshold, the fault is established	• Wire harness or connector failure • Oil Temperature Sensor Fault	• Check wire harness or connector • Replace oil temperature sensor

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Maintenance Advice
P084000	Unreasonable Primary Pressure Signal	After TCU detects that the sensor signal is greater than the set threshold when the vehicle is powered on and the engine is not started, the fault is established	• Input/output pulley shaft pressure sensor fault • Wire harness or connector failure • TCU failure	• Replace input/ output pulley shaft pressure sensor • Check wire harness or connector • Replace TCU
P084500	Unreasonable Secondary Pressure Signal			
P178000	SBW CAN Bus Off	The communication between SBW and TCU is abnormal, triggering a fault	• Wire harness or connector failure • TCU failure • SBW fault	• Check wire harness or connector • Replace TCU • Replace SBW
P178100	Lost Communication with TCU			
P178200	Invalid Data From TCU			
P178300	SBW Safety Fault	The electronic shift actuator detects the corresponding abnormality, triggering a fault	• SBW triggers a fault due to the vehicle abnormality, for example, the abnormal KL30 power off • SBW Mechanical Fault	• Check wire harness or connector • Replace SBW
P178400	SBW Internal Communication Fault			
P178500	SBW External Input Fault	The electronic shift actuator power supply is overvoltage or undervoltage, triggering a fault	• Undervoltage or overvoltage • SBW fault	• Check power supply voltage • Check wire harness or connector • SBW fault
P178600	SBW Electrical Fault	The electronic shift actuator detects the corresponding abnormality, triggering a fault	• SBW triggers a fault due to the vehicle abnormality, for example, the abnormal KL30 power off • SBW Mechanical Fault	• Check wire harness or connector • Replace SBW
P178700	SBW Over Temperature	The internal temperature of electronic shift actuator is too high, triggering an alarm	• The electronic shift actuator is damaged • The shift of electronic shift actuator is blocked • Abnormal vehicle cooling system	• Check and repair electronic shift actuator • Check and repair vehicle cooling system

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Maintenance Advice
P178800	SBW Not Self-learning	The electronic shift actuator detects the corresponding abnormality, triggering a fault	• SBW triggers a fault due to the vehicle abnormality, for example, the abnormal KL30 power off • SBW Mechanical Fault	• Check wire harness or connector • Replace SBW
P178900	SBW PID Control Fault			
P179000	SBW Mechanical Fault	The electronic shift actuator detects that the shift angle change is too small after receiving the shift command or the gear angle change is too large when the shift command is not received	• The electronic shift connecting rod is not installed in place • Electronic shift actuator failure	• Reinstall electronic shift connecting rod • Replace electronic shift actuator
P172500	Lost Communication with SBW	The communication between SBW and TCU is abnormal, triggering a fault	• Wire harness or connector failure • TCU failure • SBW fault	• Check wire harness or connector • Replace TCU • Replace SBW
P172600	Invalid Data From SBW			
P172700	SBW Wrong Action	When the actual gear of electronic shift actuator does not match the target gear, a fault is triggered	• The electronic shift connecting rod is not installed in place • Physical factors prevent electronic shift actuator from shifting • Electronic shift actuator hardware problem	• Check electronic shift connecting rod • Check electronic shift actuator for gear shift • Replace electronic shift actuator
P172888	TCU CAN2 Bus Off	The communication between SBW and TCU is abnormal, triggering a fault	• Wire harness or connector failure • TCU failure • SBW fault	• Check wire harness or connector • Replace TCU • Replace SBW
P173100	EGS Request Invalid	TCU cannot obtain or receive the signal on CAN network	• Relevant controller sensor failure	• Check relevant controller sensor • Refer to CAN Network

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Maintenance Advice
			• Abnormal vehicle CAN network	Diagnosis of vehicle
P088300	TCU System Over Voltage	Voltage is too high: Circuit voltage is higher than 16 V	• Wire harness or connector failure • Battery failure • TCU failure	• Check wire harness and connector • Check battery • Replace TCU
P088200	TCU System Under Voltage	Voltage is too low: Circuit voltage is lower than 9 V		
P171900	EOL Anti-theft Configuration not Done	Anti-theft verification fails and triggers fault	• Anti-theft configuration is not done • Anti-theft verification fails	• Check Anti-theft System • Rematch anti-theft system
P172000	Anti-theft Verification Fails			
P060D00	MCU Self-check Failure	TCU detects the corresponding abnormality, triggering the diagnosis	• The vehicle abnormality causes TCU can not operate normally, such as the power supply is abnormal • TCU failure	• Check battery • Check wire harness or connector • Replace TCU
P070200	Safety Cut Off Test Failure	TCU detects the corresponding abnormality, triggering the diagnosis	• The vehicle abnormality causes TCU can not operate normally, such as the battery voltage is too low, the two poles of the battery are in poor contact, and the ground contact is poor, etc. • TCU internal circuit is abnormal	• Check battery • Check wire harness or connector • Replace TCU

DTC Diagnosis Procedure

DTC	P088300	TCU System Over Voltage
DTC	P088200	TCU System Under Voltage

Description
The operating voltage of TCU system is the vehicle KL30 input voltage, that is, the battery voltage.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Measure battery voltage**

(a) Using a multimeter, check if the voltage of the two poles of battery is normal.

NG → **Repair or replace as needed, and perform DTC clearing operation**

OK ↓

2	**Check wire harness and connector**

(a) Turn ignition switch to OFF.
(b) Disconnect TCU and wire harness connector.
(c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG → **Repair or replace wire harness or connector as needed; Perform DTC clearing operation**

OK ↓

3	**Check TCU power supply**

(a) Pull out the TCU connector, use a multimeter to measure the voltage of TCU connector terminal KL30 to ground, requirement: 9 - 16 V.

NG → **Repair or replace wire harness or connector as needed; Perform DTC clearing operation**

OK ↓

4	**Reconfirm DTCs**

(a) Connect the negative battery cable.
(b) Use diagnostic tester to clear DTCs.
(c) Start the engine.
(d) Check if the same DTCs are output

OK

Same DTCs are not output

OK	**System operates normally**
NG	**Replace TCU control module assembly**

DTC	**P070600**	**Range Switch Signal Out of Range**
DTC	**P280300**	**Range Sensor SCB**
DTC	**P280200**	**Range Sensor SCG/OL**
DTC	**P280500**	**Range Sensor Signal Check**

Description

The transmission range sensor (PRND) signal is processed by TCU. It is mainly used to judge the driver's intention and provide important information for clutch engagement and transmission control function.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ **Caution**
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

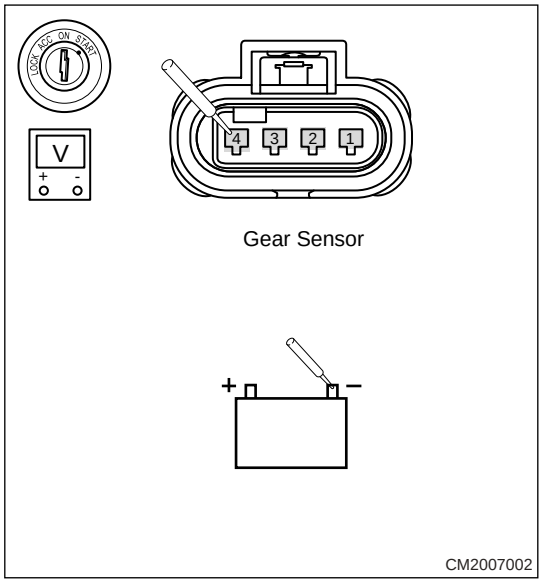
1	**Check wire harness and connector**

(a) Disconnect the negative battery cable.
(b) Check if related wire harnesses are worn, pinched or broken.
(c) Check if related connector terminals are loose, broken, bent or corrosive.

(d) Disconnect the range sensor connector.

(e) Vehicle power is turned on.

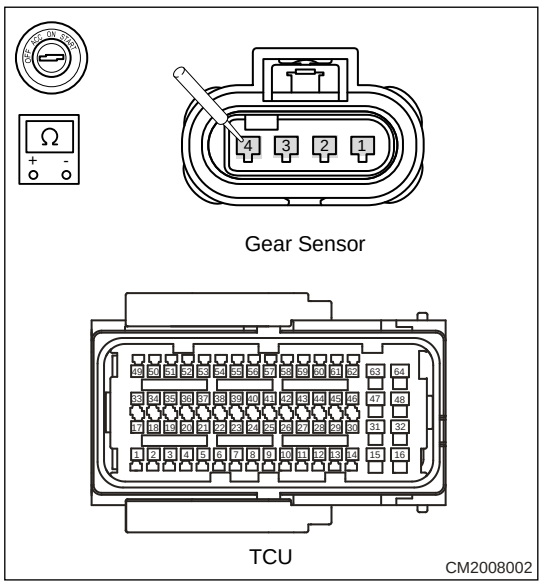
(f) Use a multimeter to measure voltage of each terminal of range sensor connector.
   a. Check voltage between terminals 2, 4 of range sensor connector and body ground, it should be 0 V;
   b. Check voltage between terminal 3 of range sensor connector and body ground, it should be 0 V;
   c. Check voltage between terminal 1 of range sensor connector and body ground, it should be 5 V.



(g) Disconnect the negative battery cable.

(h) Disconnect the TCU connector.

(i) Use a multimeter to measure resistance between terminals 1, 2, 3, 4 of range sensor connector and TCU connector (connected terminals) to check for an open or short in the wire harness between range sensor and TCU.



NG → **Repair or replace wire harness or connector as needed**

OK

2	**Check range sensor**

(a) Replace range sensor with a new one to compare and verify.

OK → **Replace range sensor**

NG

3	Reconfirm DTCs

(a) Connect the negative battery cable.
(b) Use diagnostic tester to clear DTCs.
(c) Start the engine.
(d) Check if the same DTCs are output

OK

Same DTCs are not output

OK → **System operates normally**

NG → **Replace TCU control module assembly**

DTC	**P086300**	**Solenoid Driver Communication Failure**
DTC	**P062F00**	**NVM Broken**
DTC	**P162F00**	**NVM Save Failure**
DTC	**P060400**	**RAM Fault**
DTC	**P060500**	**ROM Fault**
DTC	**P160C00**	**PLL Fault**
DTC	**P060B00**	**AD Fault**
DTC	**P060700**	**Time Slice Fault**
DTC	**P060A00**	**Monitor Unit Fault**
DTC	**P160B00**	**VDD Out of Range**
DTC	**P061300**	**Safety Other Fault**
DTC	**P060D00**	**MCU Self-check Failure**

Description
If the above faults occur during TCU operation, TCU will operate abnormally due to internal faults of TCU or external factors.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Reconfirm DTCs

(a) Turn KL15 power off for vehicle, wait for ten minutes after vehicle locked, then power on; use diagnostic tester to clear (DTC).

(b) Check if the same DTCs are output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	U007388	TCU Bus Off

Description

TCU is a node on the CAN network and communicates with other nodes of the vehicle through CAN.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Refer to CAN Network Diagnosis of vehicle.

DTC	P070200	Safety Cut Off Test Failure

Description

If this fault occurs during TCU operation, TCU will operate abnormally due to internal faults of TCU or external factors.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Clear DTCs

(a) Turn off the vehicle, release the brake, turn off the emergency flasher, unplug the diagnostic tester, etc., lock the vehicle and wait for three minutes, then power on and start vehicle, and check if the current drive cycle fault becomes history fault.

OK → **Perform DTC clearing operation**

NG

2	Check wire harness and connector

(a) Turn ignition switch to OFF, check TCU and TCU wire harness terminal connector, and confirm that they are installed in place and connected properly.

(b) Disconnect TCU connector, and check each PIN for looseness, disengagement, corrosion, aging or damage, etc.

NG → **Repair or replace wire harness or connector as needed**

OK

3	Reconfirm DTCs

(a) Connect all the connectors.

(b) Connect the negative battery cable.

(c) Use diagnostic tester to clear DTCs.

(d) Start the engine.

(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	P095600	Manual Mode Fault

Description

The transmission manual mode signal is mainly used to judge the driver's intention and provide important information for clutch engagement and transmission control function.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the TCU connector.

(c) Check each PIN for looseness, disengagement, corrosion, aging or damage, etc.

NG → **Repair or replace wire harness or connector**

OK

2	Check shift mechanism

(a) Check if shift mechanism operates normally.

NG → **Repair or replace shift mechanism**

OK

3	Reconfirm DTCs

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	P071600	Turbine speed sensor fault

Description
The turbine speed signal is processed by TCU circuit and is a pulse signal. TCU calculates the turbine speed based on the pulse signal. It is mainly used for hydraulic torque converter locking, clutch engagement and transmission control function.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

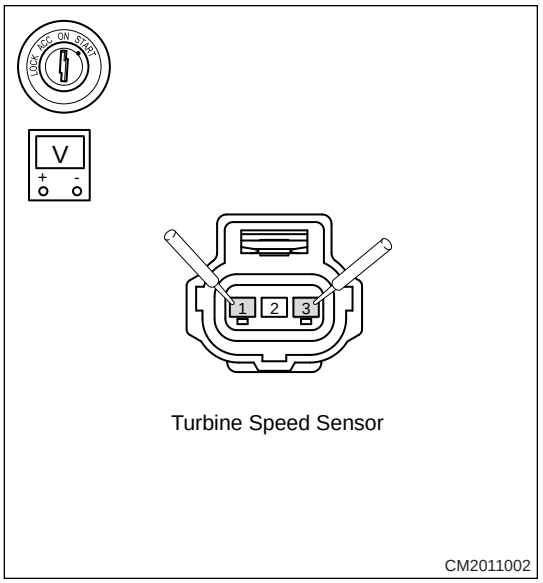
1	Check wire harness and connector

(a) Turn ignition switch to OFF.
(b) Disconnect the turbine speed sensor connector and TCU connector.
(c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

2	**Check turbine speed sensor power supply voltage**

(a) Turn ignition switch to OFF.
(b) Disconnect the turbine speed sensor connector.
(c) Turn ignition switch to ON.
(d) Use a multimeter to measure the voltage between terminal 1 and terminal 3 of turbine speed sensor connector, it should be 9 V.



NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

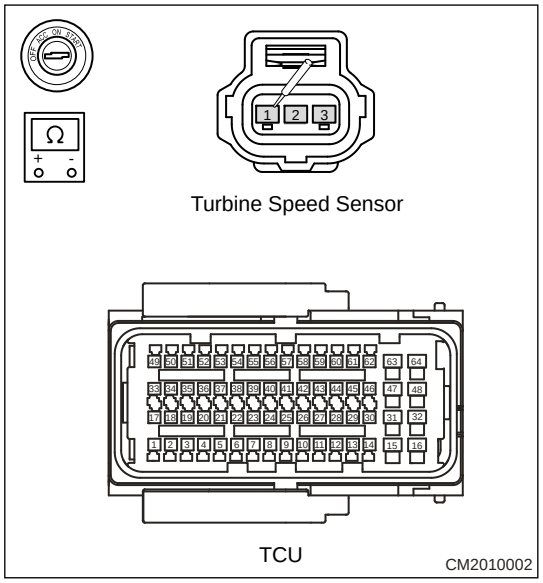
3	**Check wire harness and connector (Turbine sensor - TCU)**

(a) Turn ignition switch to OFF.

(b) Disconnect the TCU connector.

(c) Disconnect the turbine speed sensor connector.

(d) Use a multimeter to check for continuity between TCU connector (connected terminals) and terminals 1, 2, 3 of turbine speed sensor to check for an open or short in the wire harness between turbine speed sensor and TCU.



NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

4	**Check turbine speed sensor**

(a) Replace turbine speed sensor with a new one to compare and verify.

OK → **Replace turbine speed sensor**

NG

5	**Confirm DTCs again**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module**

DTC	P079200	Input Pulley Speed Sensor Fault

Description
The input pulley shaft speed signal is processed by TCU circuit and is a pulse signal. TCU calculates the input pulley speed based on the pulse signal. It is mainly used for hydraulic torque converter locking, clutch engagement and transmission control function.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check wire harness and connector

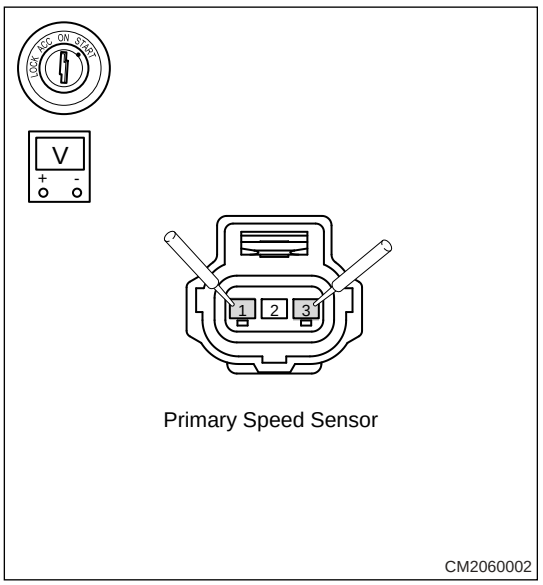
(a) Turn ignition switch to OFF.
(b) Disconnect the input pulley speed sensor connector and TCU connector.
(c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

2	Check input pulley speed sensor power supply voltage

(a) Turn ignition switch to OFF.
(b) Disconnect the input pulley speed sensor connector.
(c) Turn ignition switch to ON.
(d) Use a multimeter to measure the voltage between terminal 1 and terminal 3 of input pulley speed sensor connector, it should be 9 V.



NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

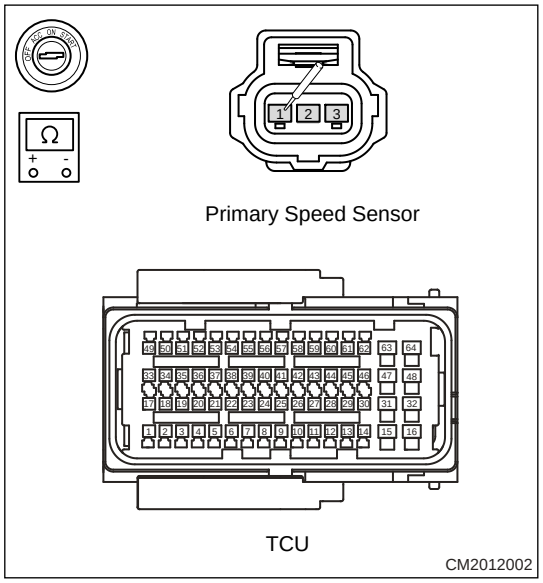
3	Check wire harness and connector (Input pulley speed sensor - TCU)

(a) Turn ignition switch to OFF.

(b) Disconnect the TCU connector.

(c) Disconnect the input pulley speed sensor connector.

(d) Use a multimeter to check for continuity between TCU connector (connected terminals) and terminals 1, 2, 3 of input pulley speed sensor connector to check for an open or short in the wire harness between input pulley speed sensor and TCU.



NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

4	Check input pulley speed sensor

(a) Replace input pulley speed sensor with a new one to compare and verify.

OK → **Replace input pulley speed sensor**

NG

5	Confirm DTCs again

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module**

DTC	P072100	Output Pulley Speed Sensor Fault

Description

The output pulley shaft speed signal is processed by TCU circuit and is a pulse signal. TCU calculates the output pulley speed based on the pulse signal. It is mainly used for vehicle speed and transmission control function.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check wire harness and connector

(a) Turn ignition switch to OFF.

(b) Disconnect the output pulley speed sensor connector and TCU connector.

(c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

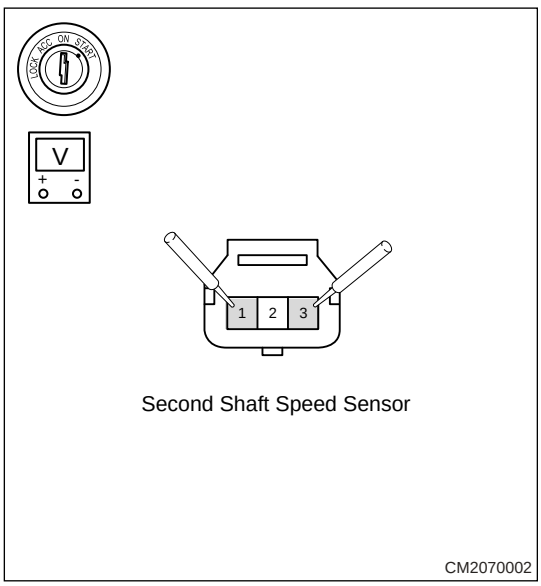
2	Check output pulley speed sensor power supply voltage

(a) Turn ignition switch to OFF.

(b) Disconnect the output pulley speed sensor connector.

(c) Turn ignition switch to ON.

(d) Use a multimeter to measure the voltage between terminal 1 and terminal 3 of output pulley speed sensor connector, it should be 9 V.



NG

Repair or replace as needed; Using diagnostic tester, clear history DTC

OK

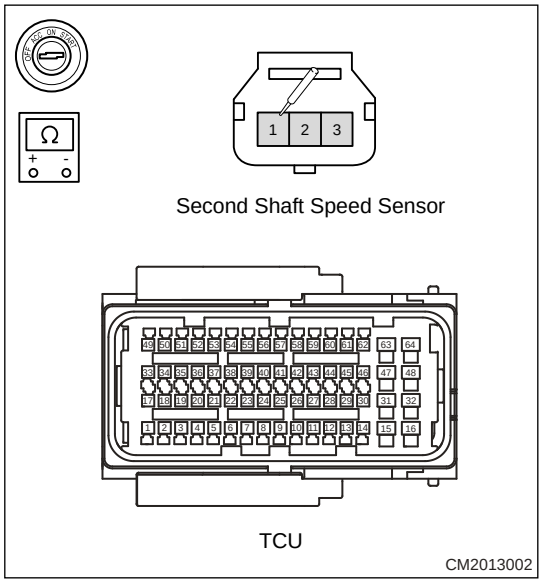
3	**Check wire harness and connector (Output pulley speed sensor - TCU)**

(a) Turn ignition switch to OFF.

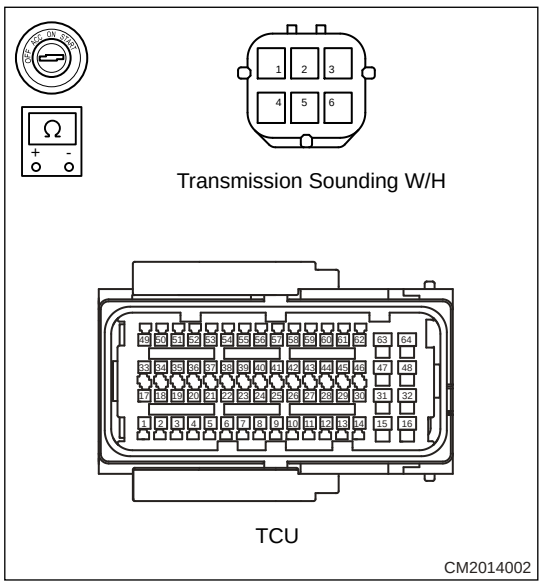
(b) Disconnect the TCU connector.

(c) Disconnect the output pulley speed sensor connector.

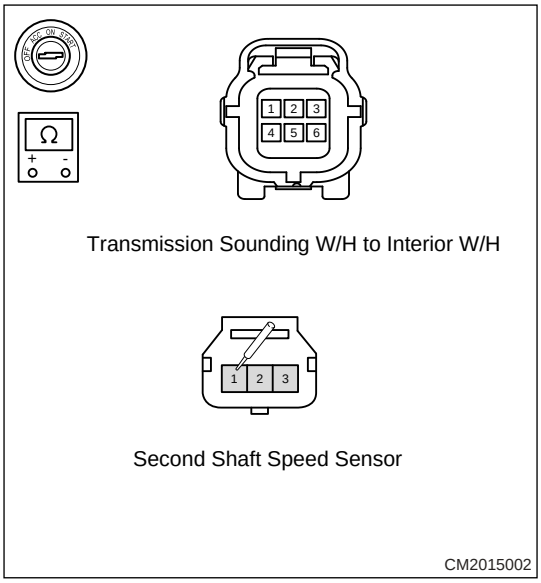
(d) Use a multimeter to check for continuity between TCU connector (connected terminals) and terminals 1, 2, 3 of output pulley speed sensor to check for an open or short in the wire harness between output pulley speed sensor and TCU.



(e) Use a multimeter to check for continuity between TCU connector (connected terminals) and transmission peripheral sensor adapter connector (connected terminals) to check for an open in the wire harness between TCU and sensor adapter connector.



(f) Use a multimeter to check for continuity between transmission wire harness connector (connected terminals) and terminals 1, 2, 3 of output pulley speed sensor connector to check for an open in the wire harness between transmission wire harness connector and output pulley speed sensor.



NG → **Repair or replace wire harness or connector**

OK ↓

4	**Check output pulley speed sensor**

(a) Replace output pulley speed sensor with a new one to compare and verify.

OK → **Replace output pulley speed sensor**

NG ↓

5	**Confirm DTCs again**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	**P084300**	**Primary Pressure Sensor Signal Short to BAT**
DTC	**P084200**	**Primary Pressure Sensor Signal Short to GND**

Description
TCU detects the transmission input pulley shaft pressure through input pulley shaft pressure sensor.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check wire harness and connector**

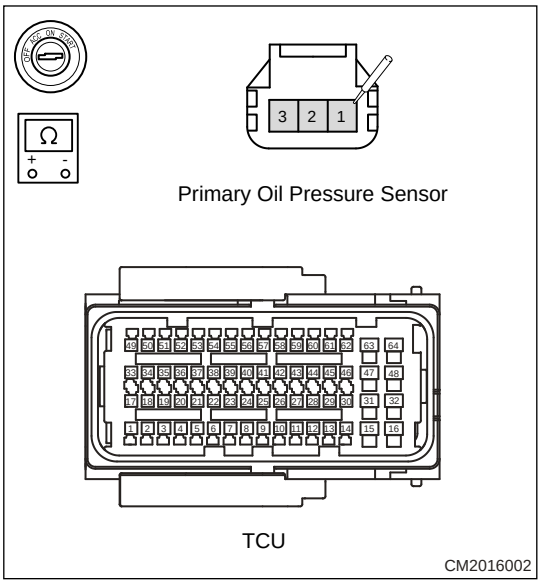
(a) Turn ignition switch to OFF.
(b) Disconnect the input pulley shaft pressure sensor connector and TCU connector.
(c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

2	**Check wire harness and connector (Input pulley pressure sensor - TCU)**

(a) Turn ignition switch to OFF.
(b) Disconnect the TCU connector.
(c) Disconnect the input pulley pressure sensor connector.
(d) Use a multimeter to check for continuity and resistance between TCU connector (connected terminals) and terminals 1, 2, 3 of input pulley pressure sensor connector to check if input pulley pressure sensor is short to ground or power supply.



NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

3	Check input pulley pressure sensor

(a) Replace input pulley pressure sensor with a new one to compare and verify.

OK → **Replace input pulley oil pressure sensor**

NG

4	Confirm DTCs again

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	P171000	Primary Pressure Sensor Supply Abnormal

Description
TCU detects the transmission input pulley shaft pressure through pressure sensor.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check wire harness and connector

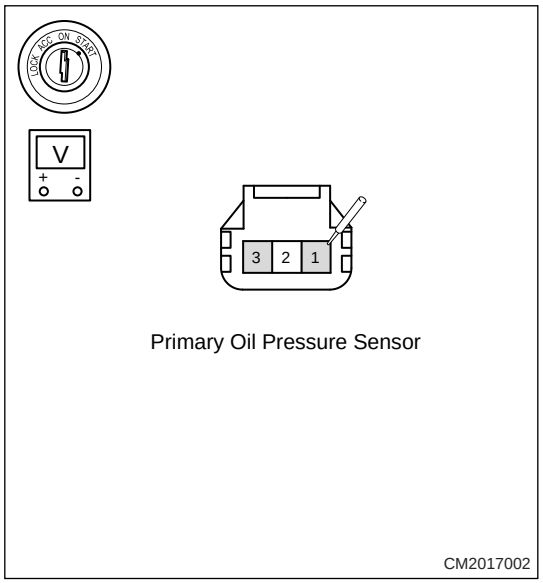
(a) Turn ignition switch to OFF.
(b) Disconnect the input pulley pressure sensor connector and TCU connector.
(c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

2	**Check input pulley pressure sensor power supply voltage**

(a) Turn ignition switch to OFF.
(b) Disconnect the input pulley pressure sensor connector.
(c) Turn ignition switch to ON. Use a multimeter to measure the voltage between terminal 1 and terminal 3 of input pulley pressure sensor connector, it should be 5 V under normal conditions.



NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

3	**Check input pulley pressure sensor**

(a) Replace input pulley pressure sensor with a new one to compare and verify.

NG → **Replace the input pulley pressure sensor**

OK

4	**Confirm DTCs again**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK	**Confirm that system is normal**
NG	**Replace TCU control module assembly**

DTC	**P084800**	**Secondary Pressure Sensor Short to BAT**
DTC	**P084700**	**Secondary Pressure Sensor Short to GND**

Description
TCU detects the transmission output pulley shaft pressure through output pulley shaft pressure sensor.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ **Caution**
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check wire harness and connector**

(a) Turn ignition switch to OFF.
(b) Disconnect the output pulley pressure sensor connector and TCU connector.
(c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG	**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

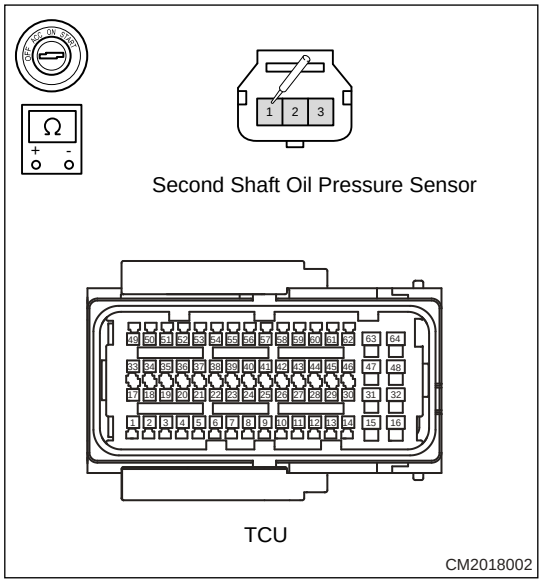
2	**Check wire harness and connector (Output pulley pressure sensor - TCU)**

(a) Turn ignition switch to OFF.

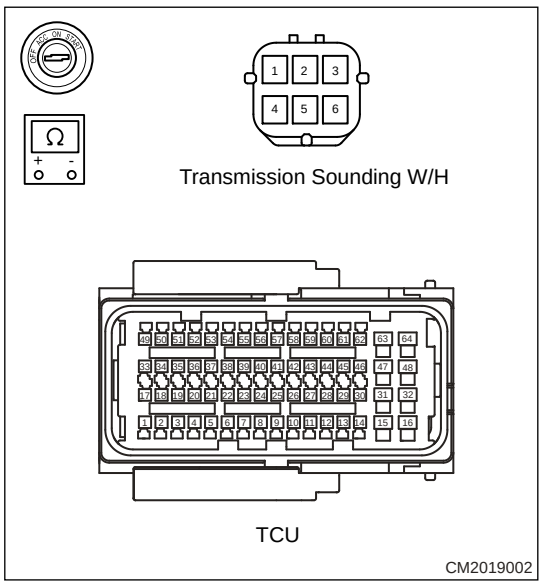
(b) Disconnect the TCU connector.

(c) Disconnect the output pulley pressure sensor connector.

(d) Use a multimeter to check for continuity and resistance between TCU connector (connected terminals) and terminals 1, 2, 3 of output pulley pressure sensor to check for an open or short.



(e) Use a multimeter to check for continuity and resistance between TCU connector (connected terminals) and transmission peripheral sensor adapter connector (- connected terminals) to check for an open or short.



NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

3	**Check output pulley pressure sensor**

(a) Replace output pulley pressure sensor with a new one to compare and verify.

OK → **Replace output pulley pressure sensor**

NG

4	Confirm DTCs again

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	P171100	Secondary Pressure Sensor Supply Abnormal

Description
TCU detects the transmission output shaft pressure through pressure sensor.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check wire harness and connector

(a) Turn ignition switch to OFF.
(b) Disconnect the output pulley pressure sensor connector and TCU connector.
(c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

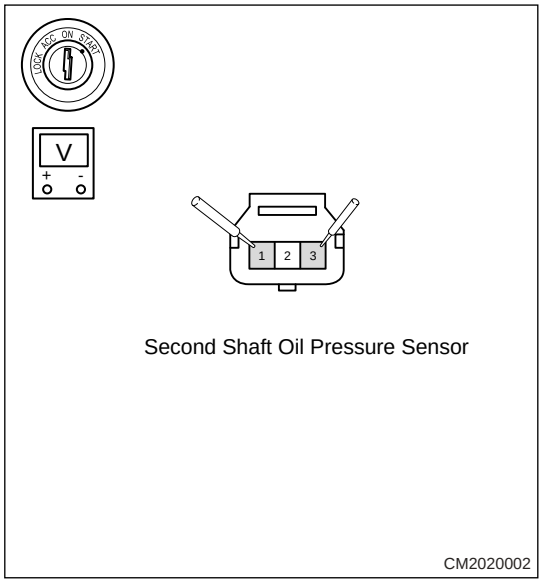
2	Check wire harness and connector (Output pulley pressure sensor - TCU)

(a) Turn ignition switch to OFF.

(b) Disconnect the output pulley shaft pressure sensor connector.

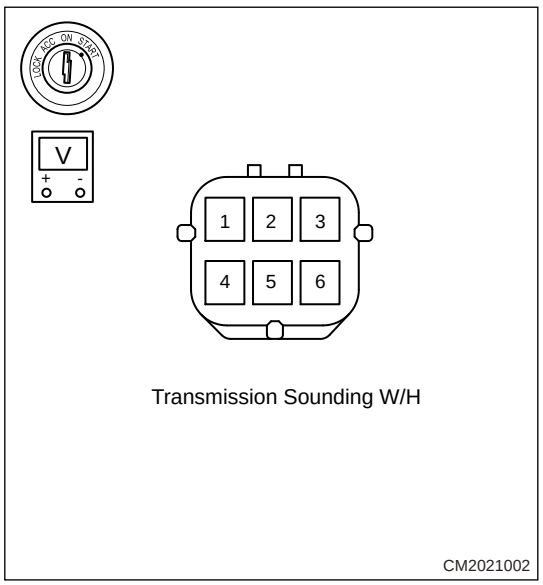
(c) Turn ignition switch to ON.

(d) Use a multimeter to measure the voltage between terminal 1 and terminal 3 of output pulley pressure sensor connector, it should be 5 V under normal conditions.



(e) Disconnect the transmission wire harness terminal sensor adapter connector.

(f) Use a multimeter to measure the voltage between the connector terminals at the transmission wire harness terminal corresponding to the terminals 1, 3 of output pulley pressure sensor connector.



NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

3	**Check output pulley pressure sensor**

(a) Replace output pulley pressure sensor with a new one to compare and verify.

OK → **Replace output pulley pressure sensor**

NG

4	Confirm DTCs again

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	P096200	Line Solenoid Short to GND
DTC	P096300	Line Solenoid Short to BAT
DTC	P096000	Line Solenoid Open Load
DTC	P095900	Line Solenoid Performance failure

Description
TCU adjusts the system pressure by controlling this solenoid valve.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check wire harness and connector

(a) Turn ignition switch to OFF.
(b) Check TCU connector and transmission valve body assembly connector, confirm that they are installed in place and connected properly.
(c) Disconnect transmission valve body assembly connector and TCU connector.
(d) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

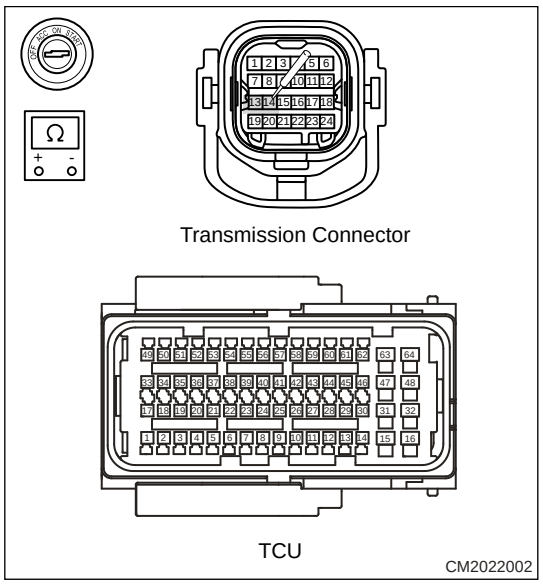
2	Check wire harness and connector (Main oil pressure control solenoid valve - TCU)

(a) Turn ignition switch to OFF.

(b) Disconnect the TCU connector.

(c) Disconnect transmission valve body assembly connector.

(d) Check for continuity between TCU wire harness connector (connected terminals) and terminals 13, 14 of transmission valve body assembly connector to check for an open or short.



NG → **Repair or replace wire harness or connector**

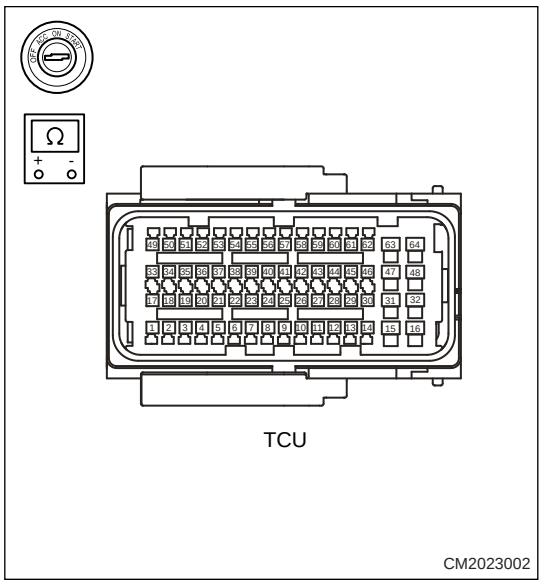
OK

3	Check main oil pressure control solenoid valve

(a) Disconnect the negative battery cable.

(b) Disconnect the TCU connector.

(c) Use a multimeter to measure the resistance between the main oil pressure control solenoid valve terminals corresponding to TCU connector, resistance range at normal temperature: 5.3 ± 0.3 Ω.



NG → **Replace transmission solenoid valve assembly**

OK

4	Confirm DTCs again

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	**P096600**	**Primary Solenoid Short to GND**
DTC	**P096700**	**Primary Solenoid Short to BAT**
DTC	**P096400**	**Primary Solenoid Open Load**
DTC	**P097200**	**Primary Solenoid Performance failure**

Description
TCU adjusts the system pressure by controlling this solenoid valve.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check wire harness and connector

(a) Turn ignition switch to OFF.

(b) Check TCU connector and transmission valve body assembly connector, confirm that they are installed in place and connected properly.

(c) Disconnect transmission valve body assembly connector and TCU connector.

(d) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

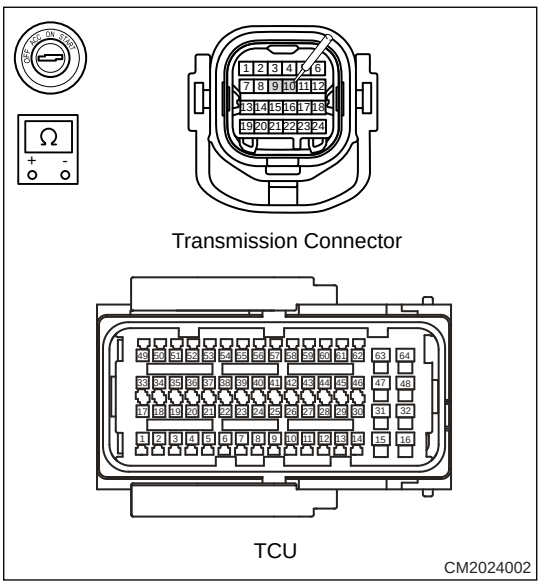
2	**Check wire harness and connector (Input pulley control solenoid valve - TCU)**

(a) Turn ignition switch to OFF.

(b) Disconnect the TCU connector.

(c) Disconnect transmission valve body assembly connector.

(d) Use a multimeter to check for continuity between TCU connector (connected terminals) and terminals 9, 10 of transmission valve body assembly connector to check for an open or short.



NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

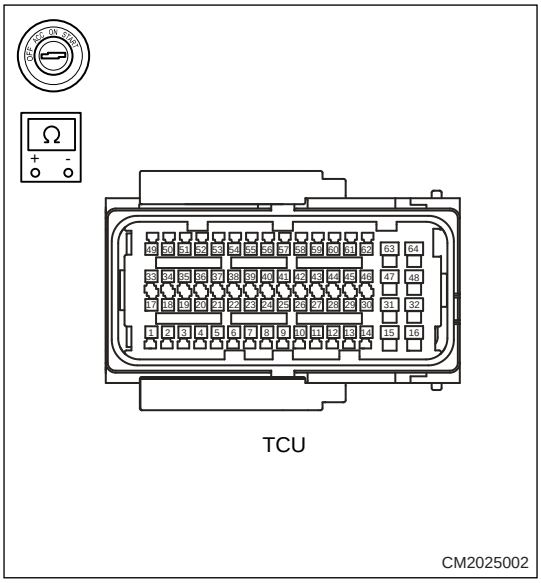
OK

3	**Check input pulley control solenoid valve**

(a) Turn ignition switch to OFF.

(b) Disconnect the TCU connector.

(c) Use a multimeter to measure the resistance between the terminals of the input pulley control solenoid valve corresponding to TCU connector, resistance range at normal temperature: 5.3 ± 0.3 Ω.



NG → **Replace transmission solenoid valve assembly**

OK

4	**Confirm DTCs again**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	**P097000**	**Secondary Solenoid Short to GND**
DTC	**P097100**	**Secondary Solenoid Short to BAT**
DTC	**P096800**	**Secondary Solenoid Open Load**
DTC	**P097300**	**Secondary Solenoid Performance failure**

Description
TCU adjusts the system pressure by controlling this solenoid valve.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.

- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check wire harness and connector**

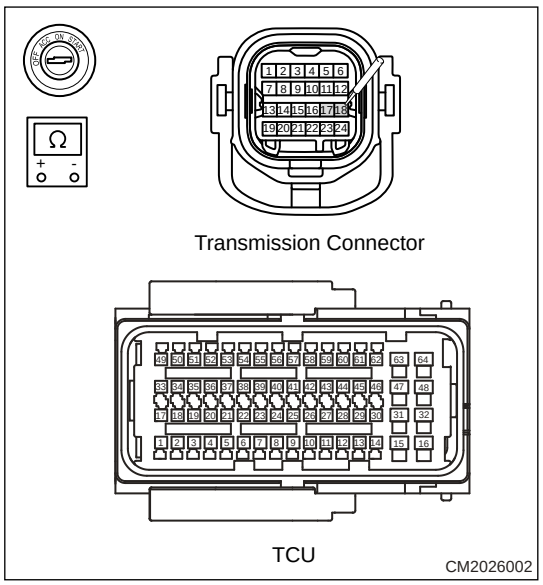
(a) Turn ignition switch to OFF.
(b) Check TCU connector and transmission valve body assembly connector, confirm that they are installed in place and connected properly.
(c) Disconnect transmission valve body assembly connector and TCU connector.
(d) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

2	**Check wire harness and connector (Output pulley control solenoid valve - TCU)**

(a) Turn ignition switch to OFF.
(b) Disconnect the TCU connector.
(c) Disconnect transmission valve body assembly connector.
(d) Use a multimeter to check for continuity between TCU connector (connected terminals) and terminals 17, 18 of transmission valve body assembly connector to check for an open or short.



NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

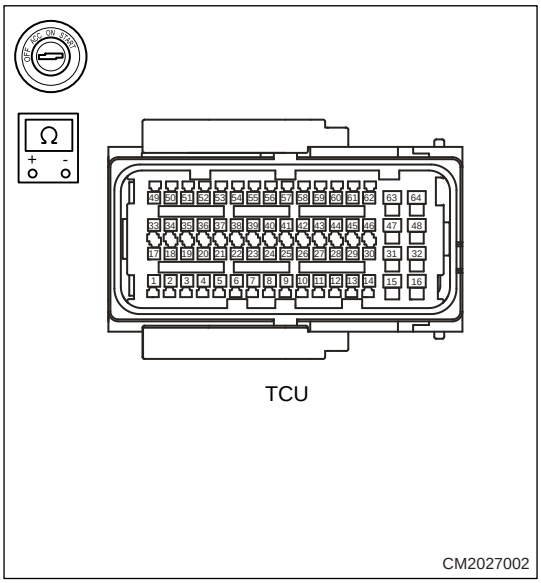
OK

3	Check output pulley control solenoid valve

(a) Turn ignition switch to OFF.

(b) Disconnect the TCU connector.

(c) Use a multimeter to measure the resistance between the corresponding terminals of the output pulley control solenoid valve on TCU connector, resistance range at normal temperature: 5.3 ± 0.3 Ω.



NG → **Replace transmission solenoid valve assembly**

OK →

4	Confirm DTCs again

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	**P272900**	**TCC Solenoid Short to GND**
DTC	**P273000**	**TCC Solenoid Short to BAT**
DTC	**P272700**	**TCC Solenoid Open Load**
DTC	**P272500**	**TCC Solenoid Performance failure**

Description
TCU adjusts the system pressure by controlling this solenoid valve.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check wire harness and connector

(a) Turn ignition switch to OFF.

(b) Check TCU connector and transmission valve body assembly connector, confirm that they are installed in place and connected properly.

(c) Disconnect transmission valve body assembly connector and TCU connector.

(d) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

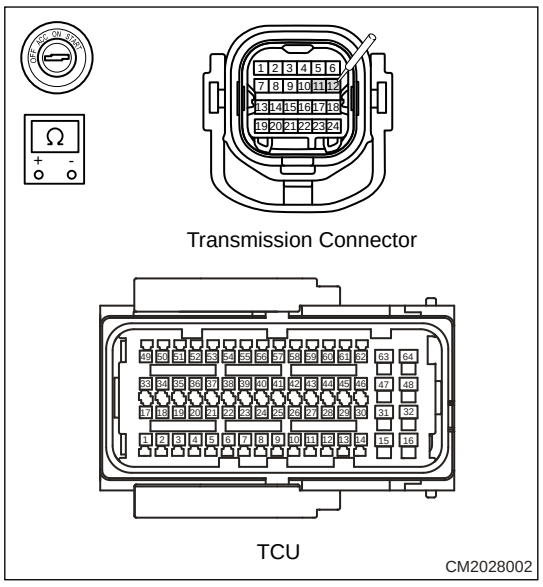
2	Check wire harness and connector (Hydraulic torque converter control solenoid valve - TCU)

(a) Turn ignition switch to OFF.

(b) Disconnect the TCU connector.

(c) Disconnect transmission valve body assembly connector.

(d) Use a multimeter to check for continuity between TCU connector (connected terminals) and terminals 11, 12 of transmission valve body assembly connector to check for an open or short.



NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

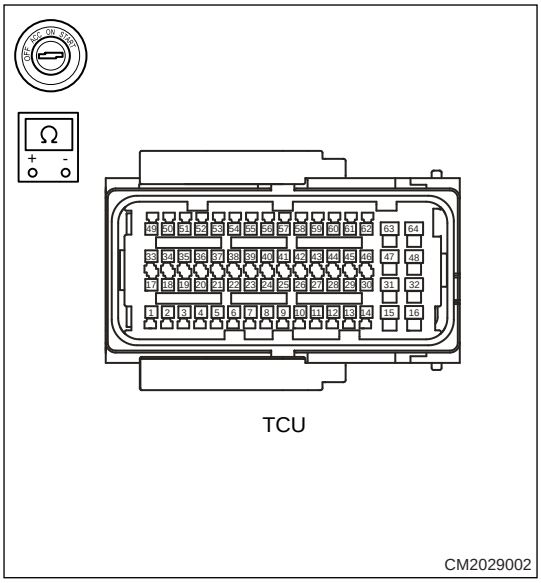
OK

3	Check hydraulic torque converter control solenoid valve

(a) Turn ignition switch to OFF.

(b) Disconnect the TCU connector.

(c) Use a multimeter to measure the resistance between the terminals of torque converter control solenoid valve corresponding to TCU connector, resistance range at normal temperature: 5.3 + 0.2/ – 0.4 Ω.



NG → **Replace transmission solenoid valve assembly**

OK

4	Confirm DTCs again

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	**P272000**	**Clutch Solenoid Short to GND**
DTC	**P272100**	**Clutch Solenoid Short to BAT**
DTC	**P271800**	**Clutch Solenoid Open Load**
DTC	**P271600**	**Clutch Solenoid Performance failure**

Description
TCU adjusts the system pressure by controlling this solenoid valve.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check wire harness and connector**

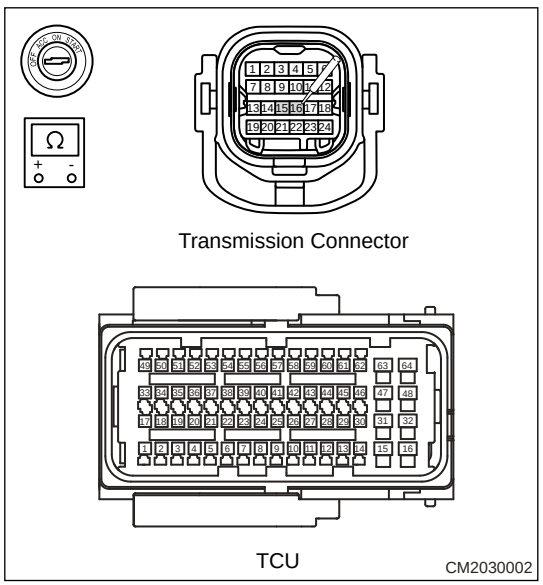
(a) Turn ignition switch to OFF.
(b) Check TCU connector and transmission valve body assembly connector, confirm that they are installed in place and connected properly.
(c) Disconnect transmission valve body assembly connector and TCU connector.
(d) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

2	**Check wire harness and connector (Clutch control solenoid valve - TCU)**

(a) Turn ignition switch to OFF.
(b) Disconnect the TCU connector.
(c) Disconnect transmission valve body assembly connector.
(d) Use a multimeter to check for continuity between TCU connector (connected terminals) and terminals 15, 16 of transmission valve body assembly connector to check for an open or short.



NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

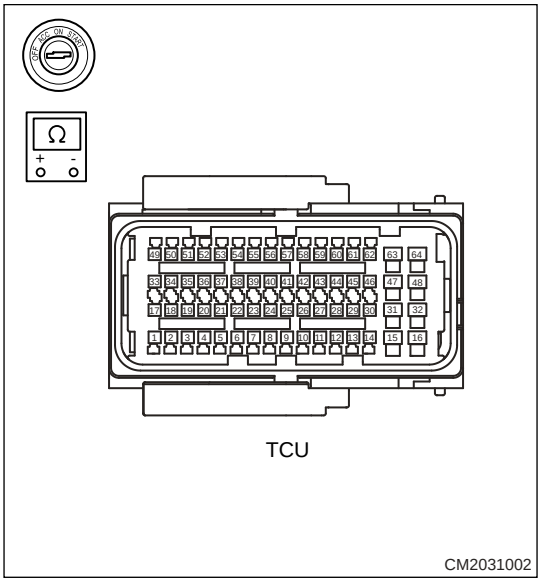
OK

3	Check clutch control solenoid valve

(a) Turn ignition switch to OFF.

(b) Disconnect the TCU connector.

(c) Use a multimeter to measure the resistance between the terminals of clutch control solenoid valve corresponding to TCU connector, resistance range at normal temperature: 5.3 ± 0.3 Ω.



NG → **Replace transmission solenoid valve assembly**

OK

4	Confirm DTCs again

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	**P094000**	**Oil Temperature Sensor Short to BAT/OL**
DTC	**P093900**	**Oil Temperature Sensor Short to GND**

Description
TCU detects the transmission fluid temperature through oil temperature sensor.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check wire harness and connector**

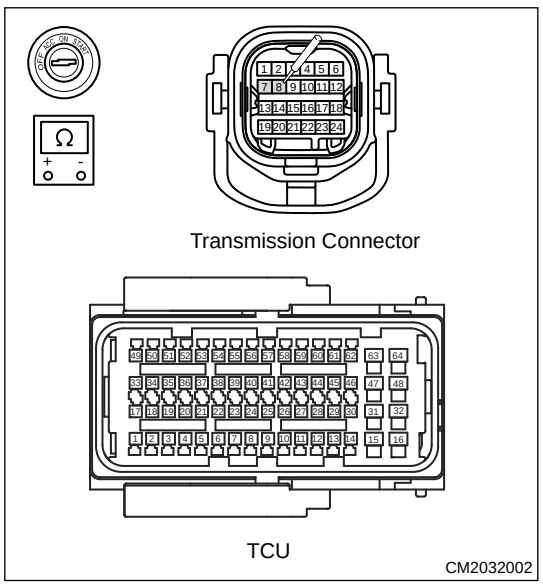
(a) Turn ignition switch to OFF.
(b) Check TCU connector and transmission valve body assembly connector, confirm that they are installed in place and connected properly.
(c) Disconnect transmission valve body assembly connector and TCU connector.
(d) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

2	**Check wire harness and connector (Oil temperature sensor - TCU)**

(a) Turn ignition switch to OFF.
(b) Disconnect the TCU connector.
(c) Disconnect transmission solenoid valve assembly connector.
(d) Use a multimeter to check for continuity between TCU connector (connected terminals) and terminals 7, 8 of transmission valve body assembly connector to check for an open or short.

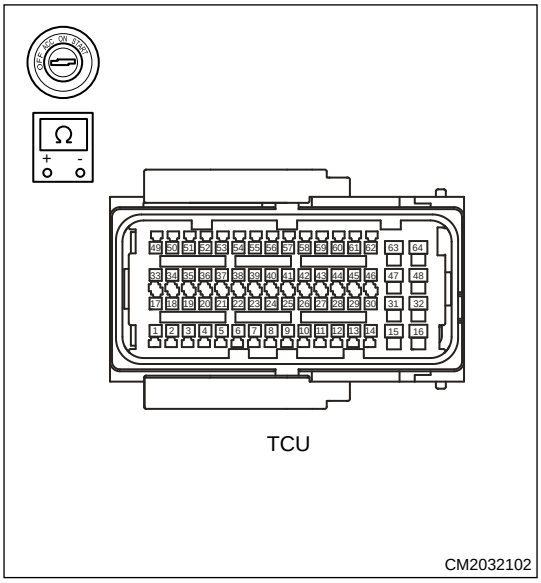


NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

3	**Check oil temperature sensor**

(a) Connect the transmission solenoid valve connector, use a multimeter to measure the resistance between the terminals of oil temperature sensor corresponding to TCU connector, and refer to the following table for the relationship between resistance and temperature:



Temperature (°C)	-40	-30	-20	-10	0	10	20	25	30
Resistance (KΩ)	120.33	66.77	38.65	23.24	14.45	9.26	6.10	5.00	4.12
Temperature (°C)	40	50	60	70	80	90	100	110	120
Resistance (KΩ)	2.85	2.01	1.44	1.06	0.78	0.59	0.45	0.35	0.28

NG → **Replace oil temperature sensor**

OK

4	**Confirm DTCs again**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	**P021800**	**Trans Oil Temperature Out of Range**
DTC	**P176700**	**Trans Oil Temperature Critical**

Description
TCU detects the transmission fluid temperature through oil temperature sensor.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check wire harness, connector and oil temperature sensor**

(a) Refer to the operation of P094000 and P093900.

NG → **Repair or replace wire harness or connector, oil temperature sensor**

OK ↓

2	**Check cooling system**

(a) Check if transmission oil cooler installation and line connection, etc. are abnormal.
(b) Check if vehicle cooling system is abnormal.

NG → **Repair or replace faulty area**

OK ↓

3	Confirm DTCs again

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	P081E00	Clutch (Reverse) Slip
DTC	P081100	Clutch (Drive) Slip

Description
The clutch control is used to achieve quick, smooth engagement of D/R gear.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check turbine speed sensor

(a) Refer to inspection method for turbine speed sensor.

NG → **Repair or replace wire harness, connector or sensor as needed**

OK

2	Check clutch control solenoid valve

(a) Refer to inspection method for clutch solenoid valve fault.

NG → **Repair or replace wire harness, connector or clutch solenoid valve as needed**

OK

3	Check hydraulic system for leakage

(a) Check if clutch pressure is normal.

NG → **Replace or repair faulty area**

OK

4	Check clutch lining

(a) Check if clutch lining is normal.

NG → **Replace clutch lining**

OK

5	Confirm DTCs again

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	P089400	TCC Slip

Description
TCU obtains the hydraulic torque converter locking control target according to the current driving mode, vehicle speed and accelerator pedal signal, and realizes the locking clutch closing control.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check hydraulic torque converter locking control solenoid valve and wire harness**

(a) Refer to inspection method for hydraulic torque converter locking control solenoid valve DTC.

NG → **Repair or replace as needed**

OK ↓

2	**Check hydraulic control circuit**

(a) Check hydraulic torque converter hydraulic control circuit.

NG → **Repair or replace as needed**

OK ↓

3	**Check hydraulic torque converter**

(a) Check hydraulic torque converter.

NG → **Replace or repair it as needed**

OK ↓

4	**Confirm DTCs again**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	**P071500**	**Unreasonable Turbine Speed Signal**
DTC	**P079100**	**Unreasonable Primary Speed Signal**
DTC	**P072000**	**Unreasonable Secondary Speed Signal**

Description
TCU detects the transmission turbine speed, input pulley speed and output pulley speed signals through turbine speed sensor, input pulley speed sensor and output pulley speed sensor.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ **Caution**
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check wire harness and connector**

(a) Refer to P071600 wire harness troubleshooting method for P071500.
(b) Refer to P079200 wire harness troubleshooting method for P079100.
(c) Refer to P072100 wire harness troubleshooting method for P072000.

NG → **Repair or replace as needed**

OK ↓

2	**Check sensor**

(a) Replace turbine speed sensor with a new one to compare and verify.
(b) Replace input/output pulley shaft speed sensor with a new one to compare and verify.

OK → **Replace sensor**

NG ↓

3	**Confirm DTCs again**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK	**Confirm that system is normal**
NG	**Replace TCU control module assembly**

DTC	P093700	Unreasonable Oil Temperature Signal

Description
TCU detects the transmission turbine speed, input pulley speed and output pulley speed signals through turbine speed sensor, input pulley speed sensor and output pulley speed sensor.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check wire harness and connector

(a) Refer to P093900 and P094000 wire harness troubleshooting method for P093700.

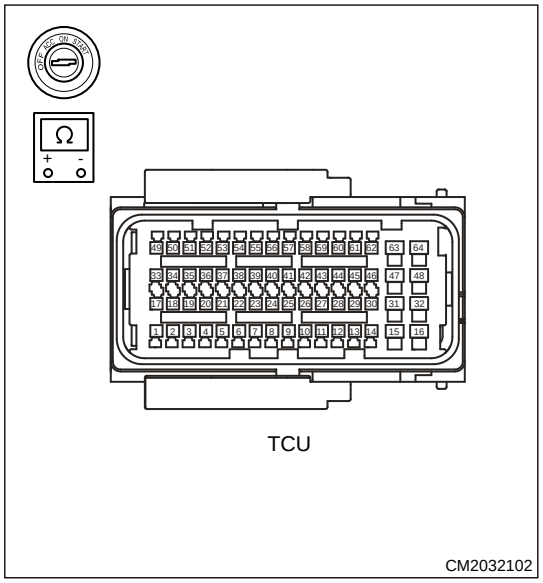
NG	**Repair or replace as needed**

OK

2	Check oil temperature sensor

(a) Turn ignition switch to OFF.
(b) Disconnect the TCU connector.

(c) Use a multimeter to measure the resistance between the terminals of oil temperature sensor corresponding to TCU connector.



Refer to the following table for the relationship between resistance and transmission oil temperature:

Temperature (°C)	-40	-30	-20	-10	0	10	20	25	40
Resistance (KΩ)	120.33	66.77	38.65	23.24	14.45	9.26	6.10	5.00	4.12
Temperature (°C)	40	50	60	70	80	90	100	110	120
Resistance (KΩ)	2.85	2.01	1.44	1.06	0.78	0.59	0.45	0.35	0.28

NG → **Repair or replace as needed**

OK

3	**Confirm DTCs again**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	**P279700**	**Primary Pressure Control Issue**
DTC	**P279800**	**Secondary Pressure Control Issue**

Description
TCU controls the pulley shaft oil pressure according to the current oil pressure and the target oil pressure to realize gear ratio control.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ **Caution**
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check input/output pulley shaft pressure sensor**

(a) Refer to inspection method for input/output pulley pressure sensor.

NG → **Repair or replace as needed**

OK ↓

2	**Check input/output pulley shaft pressure control solenoid valve**

(a) Refer to inspection method for input/output pulley shaft pressure control solenoid valve.

NG → **Repair or replace as needed**

OK ↓

3	**Check hydraulic system**

(a) Make sure that the CAN communication is normal. After 10 seconds of starting the engine, use the refresh tool to collect a piece of data. Data collection requirements:
  (i) P/N idling data.
  (ii) The normal driving data of the vehicle, the vehicle speed is required to be more than 40 km/h.
(b) Analyze the data.

NG → **Repair or replace as needed**

OK

4	Confirm DTCs again

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	P084000	Unreasonable Primary Pressure Signal
DTC	P084500	Unreasonable Secondary Pressure Signal

Description
TCU detects the transmission input shaft and output shaft pressure signals through input shaft and output shaft pressure sensors.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check input/output pulley shaft pressure sensor wire harness or connector

(a) Refer to P084200 and P084300 wire harness troubleshooting method for P084000.
(b) Refer to P084700 and P084800 wire harness troubleshooting method for P084500.

NG → **Repair or replace as needed**

OK

2	Verify input/output pulley shaft pressure sensor

(a) Replace input/output pulley shaft pressure sensor with a new one to verify.

OK	**Replace input/output pulley shaft pressure sensor**

NG

3	**Confirm DTCs again**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK	**Confirm that system is normal**
NG	**Replace TCU control module assembly**

DTC	**P073000**	**Ratio Error**

Description
TCU obtains the target ratio according to the current driving mode, vehicle speed and accelerator pedal signal, the actual ratio is calculated according to the input pulley shaft speed and the output pulley shaft speed, and the transmission control module realizes ratio control through comprehensive feedback control according to the above information.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check transmission electrical appliances**

(a) Refer to inspection method for input/output pulley shaft speed signal.
(b) Refer to inspection method for input/output pulley shaft pressure sensor.
(c) Refer to inspection method for input/output pulley shaft pressure control valve.

NG	**Repair or replace as needed**

OK

2	Check hydraulic system

(a) Refer to inspection method for input/output pulley pressure signal.

NG → **Repair or replace as needed**

OK ↓

3	Check engine torque

(a) Check and troubleshoot engine torque.

NG → **Repair or replace as needed**

OK ↓

4	Check transmission components

(a) Check and analyze the transmission.

NG → **Repair or replace abnormally worn components of transmission as needed**

OK ↓

5	Confirm DTCs again

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace TCU control module assembly**

DTC	**U014087**	**Lost Communication with BCM**
DTC	**U010087**	**Lost Communication with ECM**
DTC	**U012987**	**Lost communication with BSM**

DTC	**U012687**	**Lost Communication with SAM**
DTC	**U042281**	**BCM Data Received Abnormal**
DTC	**U040181**	**ECM Data Received Abnormal**
DTC	**U041881**	**BSM Data Received Abnormal**
DTC	**U042881**	**SAM Data Received Abnormal**
DTC	**P175000**	**Invalid Engine Speed Signal**
DTC	**P175100**	**Invalid Engine Actual Torque Signal**
DTC	**P175200**	**Invalid Brake Pedal Signal**
DTC	**P175300**	**Invalid Gas Pedal Signal**
DTC	**P175400**	**Invalid Vehicle Speed Signal**
DTC	**P175500**	**Invalid Front Left Speed Signal**
DTC	**P175600**	**Invalid Front Right Speed Signal**
DTC	**P175700**	**Invalid Rear Left Speed Signal**
DTC	**P175800**	**Invalid Rear Right Speed Signal**
DTC	**P175900**	**Invalid Engine Coolant Signal**
DTC	**P176000**	**Invalid Odormeter Signal**
DTC	**P176100**	**ABS Invalid**
DTC	**P176200**	**Invalid Master Cylinder Pressure Signal**
DTC	**U014687**	**Lost Communication with CGW**
DTC	**U119387**	**Lost Communication with EGS**
DTC	**P173100**	**EGS Request Invalid**

Description
TCU performs information interaction with other controllers through vehicle CAN.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ **Caution**
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

(a) Check the resistance of corresponding fuse.

Standard resistance: Less than 1 Ω

NG → **Replace fuse**

OK

2	**Check sensor**

(a) Check whether the corresponding sensor and wire harness are abnormal.

NG → **Repair or replace wire harness or corresponding sensor**

OK

3	**Check CAN network**

(a) Check if vehicle CAN network is abnormal.

OK → **Confirm that system is normal**

NG → **Check and repair CAN network**

DTC	**P178300**	**SBW Safety Fault**
DTC	**P178400**	**SBW Internal Communication Fault**
DTC	**P178600**	**SBW Electrical Fault**
DTC	**P178800**	**SBW Not Self-learning**
DTC	**P178900**	**SBW PID Control Fault**

Description
The above faults occur during the operation of electronic shift actuator, indicating that the electronic shift actuator system is operating abnormally.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check electronic shift actuator

(a) Turn off vehicle KL15 power, wait for three minutes, disconnect the positive battery terminal.
(b) Power on again and start, perform multiple shift tests.

NG → **Replace SBW**

OK → **Confirm if the system is normal. Use diagnostic tester to clear history DTC**

DTC	**P178100**	**Lost Communication with TCU**
DTC	**P178200**	**Invalid Data From TCU**
DTC	**P172500**	**Lost Communication with SBW**
DTC	**P172600**	**Invalid Data From SBW**
DTC	**P172888**	**TCU CAN2 Bus Off**
DTC	**P178000**	**SBW CAN Bus Off**

Description
SBW performs information interaction with TCU through CAN2.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check wire harness and connector

(a) Turn off the vehicle, release the brake, turn off the emergency flasher, unplug the diagnostic tester, etc., lock the vehicle and wait for three minutes, then disconnect the positive battery terminal.
(b) Disconnect SBW connector, and check each pin of SBW connector for looseness, disengagement, bending, corrosion, aging or damage, etc.
(c) Disconnect TCU connector, and check each pin of TCU connector for looseness, disengagement, bending, corrosion, aging or damage, etc.
(d) Connect SBW connector and TCU connector, power on again and start, perform multiple shift tests.

NG → **Repair or replace as needed; Using diagnostic tester, clear history DTC**

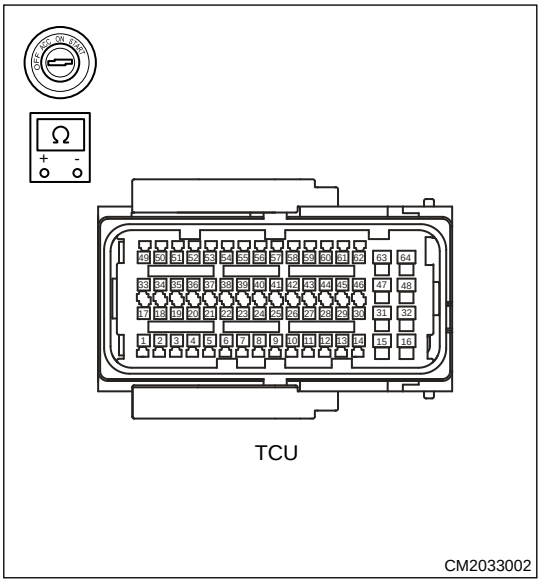
OK →

2	Check wire harness and connector

(a) Turn ignition switch to OFF.

(b) Disconnect the TCU connector.

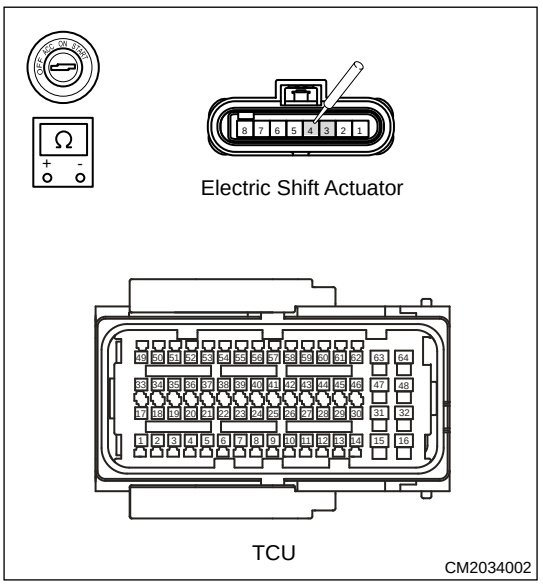
(c) Use a multimeter to measure the resistance between CAN lines corresponding to TCU wire harness connector terminal. Standard resistance is about 120 Ω.



(d) Disconnect the electronic shift actuator connector.

(e) Use a multimeter to check for continuity between TCU wire harness connector (connected terminals) and terminals 3, 4 of electronic shift actuator connector to check for an open or short.

(f) Use a multimeter to check for continuity between TCU wire harness connector and terminals 3, 4 corresponding to electronic shift actuator connector.



NG → **Repair or replace wire harness or connector as needed**

OK

3	**Check electronic shift actuator (SBW)**

(a) Replace electronic shift actuator with a new one to compare and verify.

NG → **Replace SBW**

OK

4	Confirm DTCs again

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK	**Confirm that system is normal**
NG	**Replace TCU control module assembly**

DTC	P171900	EOL Anti-theft Configuration Not Done

Description
TCU checks according to the vehicle off-line EOL information and if the current vehicle is equipped with PEPS module.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check TCU

(a) Check if it is the original TCU, for example: check if the VIN of the vehicle is consistent with the VIN stored inside the TCU.

Inconsistent	**Determine the source of TCU, check the model by reading the TCU software version, and make anti-theft matching again**
Consistent	**Check TCU EOL information (Refer to vehicle Repair Manual for fault inspection, such as reading the EOL matching status)**

DTC	P172000	Anti-theft verification fails

Description
TCU and IMMO verify anti-theft algorithm, control P gear unlock.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check TCU

(a) Check if it is the original TCU, for example: check if the VIN of the vehicle is consistent with the VIN stored inside the TCU.

Inconsi-stent → **Determine the source of TCU, check the model by reading the TCU software version, and make anti-theft matching again**

Consiste-nt

2	Check TCU anti-theft matching information

(a) Refer to vehicle Repair Manual for fault inspection.

NG → **Anti-theft rematching**

OK

3	Check PEPS controller module

(a) Check if PEPS module is on-line.

NG → **Refer to to PEPS system to check and repair**

OK

4	**Check IMMO controller module**

(a) Check IMMO controller module.

NG → **Repair or replace as needed**

DTC	**P179000**	**SBW Mechanical Fault**

Description
The electronic shift detects an abnormal shift and cannot shift.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check shift connecting rod installation position.**

(a) Disconnect the negative battery.
(b) Adjust electronic shift connecting rod position.
(c) Perform gear self-learning again.
(d) Power on and start, perform multiple shift tests.

OK → **Using diagnostic tester, clear history DTC. Confirm that system is normal**

NG → **Replace SBW**

DTC	**P178700**	**SBW Over Temperature**

Description
Temperature is monitored inside the electronic shift actuator.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check cooling system

(a) Power off and lock the vehicle, open the engine compartment cover to cool down for a period of time, then power on and start, and check the shift.
(b) Check vehicle cooling system.

NG → **Repair or replace as needed**

OK ↓

2	Check electronic shift actuator

(a) Check electronic shift actuator for blocking detection.

NG → **Repair or replace as needed**

OK ↓

3	Replace electronic shift actuator

(a) Replace electronic shift actuator with a new one to compare and verify.

OK → **Replace SBW**

DTC	P172700	SBW Wrong Action

Description
The electronic shift actuator will shift to the specified gear after receiving the shift command.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check electronic shift actuator

(a) Check if the shift rocker arm of electronic shift actuator is blocked.

NG → **Repair or replace as needed**

OK ↓

2	**Perform electronic shift self-learning again**

(a) Refer to the electronic shift self-learning to relearn.
(b) Power off then power on again and start, perform multiple shift tests.

NG → **Replace SBW**

OK → **Confirm if the system is normal. Use diagnostic tester to clear history DTC**

DTC	P178500	SBW External Input Fault

Description
The power supply voltage will affect the operation of electronic shift actuator.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

⚠ Caution

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check electronic shift actuator**

(a) Turn ignition switch to OFF.
(b) Disconnect SBW and wire harness terminal connector, and check each PIN for looseness, disengagement, corrosion, aging or damage, etc.

NG → **Repair or replace as needed**

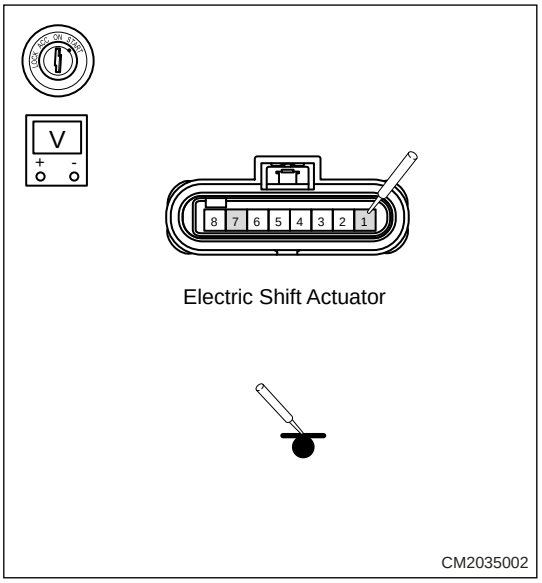
OK ↓

2	**Check wire harness**

(a) Disconnect the electronic shift actuator connector.

(b) Turn ignition switch to ON.

(c) Use a multimeter to measure voltage between terminals 1, 7 of electronic shift actuator connector and body ground, it should be 9 - 16 V.



NG → **Repair or replace as needed**

OK

3	**Replace electronic shift actuator**

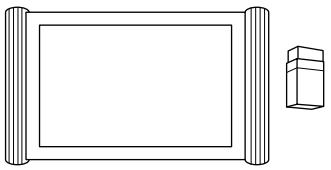
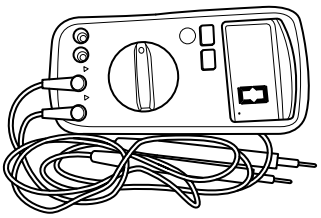
(a) Replace electronic shift actuator with a new one to compare and verify.

OK → **Replace SBW**

On-vehicle Service

Tools

General Tools

Tool Name	Tool Drawing
Diagnostic Tester	 S00001
Digital Multimeter	 S00002

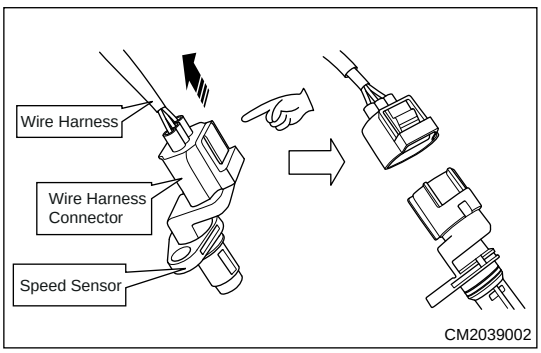
Speed Sensor Connector

Removal

⚠ Caution

- The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit.
- Make sure that the connector is inserted into place while installing: When it is inserted in place, it will make a "click" sound.

1. Press the connector lock mechanism (arrow).



2. Remove the wire harness connector.
3. Removal is completed.

Installation

1. Installation is in the reverse order of removal.

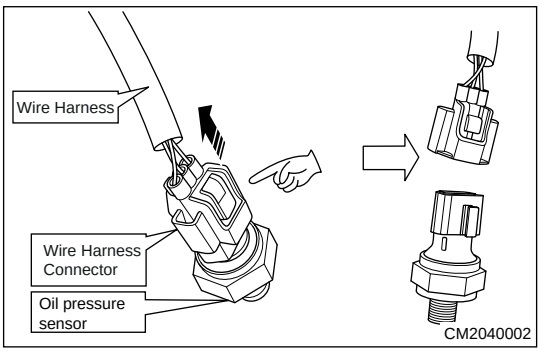
⚠ Caution
• Connectors must be installed in place.

Oil Pressure Sensor Connector

Removal

⚠ Caution
• The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit. • Make sure that the connector is inserted into place while installing: When it is inserted in place, it will make a "click" sound.

1. Press the connector lock mechanism (arrow).



2. Remove the wire harness connector.
3. Removal is completed.

Installation

1. Installation is in the reverse order of removal.

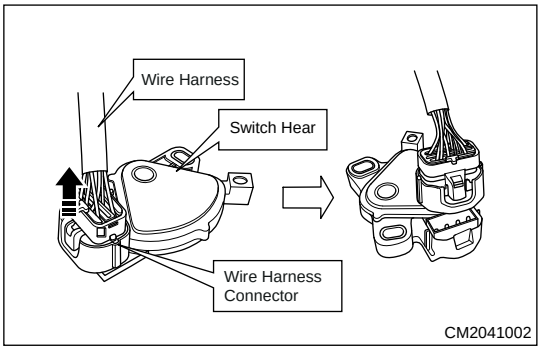
⚠ Caution
• Connectors must be installed in place.

Range Switch Connector

Removal

⚠ Caution
• The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit. • Make sure that the connector is inserted into place while installing: When it is inserted in place, it will make a "click" sound.

1. Press the connector lock mechanism (arrow).



2. Remove the wire harness connector.
3. Removal is completed.

Installation

1. Installation is in the reverse order of removal.

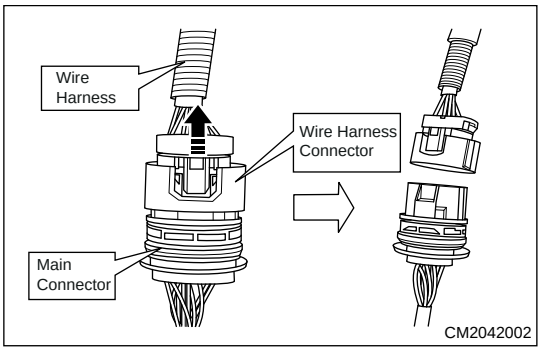
⚠ Caution
• Connectors must be installed in place.

Wire Harness Main Connector

Removal

⚠ Caution
• The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit. • Make sure that the connector is inserted into place while installing: When it is inserted in place, it will make a "click" sound.

1. Press the connector lock mechanism (arrow), and flip the handle upward.
2. Pull up the wire harness connector at the same time.



3. Remove the wire harness connector.
4. Removal is completed.

Installation

1. Installation is in the reverse order of removal.

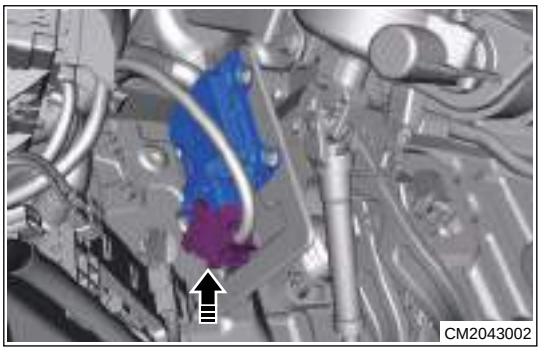
⚠ Caution

- Make sure that the connector is inserted into place while installing, when it is inserted in place, it will make a "click" sound.
- In the process of disassembly and assembly, alignment is required to avoid the occurrence of bending of pins.

Transmission Control Module

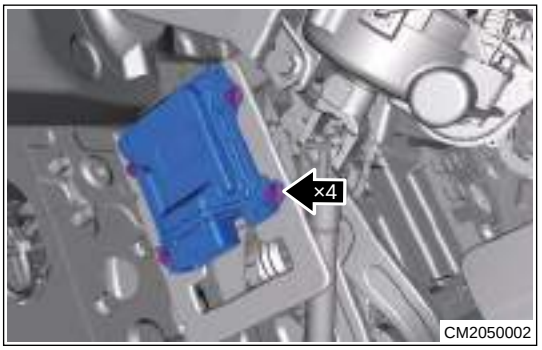
Removal

1. Turn off electrical equipments and engine switch.
2. Disconnect the negative battery cable.
3. Disconnect the transmission control module connector.



4. Remove 4 fixing bolts (arrow) from transmission control module.

   Tightening torque: 6 ± 1 N·m



5. Removal is completed.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Replace TCU with a new one to perform transmission self-learning.

Matching Learning

Transmission Self-Learning
Transmission self-learning should be performed in following conditions, failure to do so may cause unsmooth gear shifting and starting:

1. For the first driving of a new vehicle;
2. Replace TCU with a new one;

3. Replace valve body assembly, hydraulic torque converter, forward and reverse clutch set and transmission.

The transmission needs to clear the self-learning value with diagnostic tester after replacing the above components. After the vehicle power is turned off and then start again, perform self-learning according to the self-learning steps;
The specific operation of hydraulic torque converter lock clutch self-learning is as follows:

1. Start the engine and shift to D;
2. Accelerate the vehicle to 50 kph;
3. Release the accelerator pedal and do not depress the brake pedal. The vehicle will slide to below 10 kph;
4. Repeat steps 2 and 3 for three times;
5. Turn off the ignition key and self-learning is completed after waiting for 10 seconds.

The specific operation of forward clutch self-learning is as follows:

1. Release the parking brake after starting the engine;
2. Depress the brake pedal and shift to N, shift to D after waiting for 2 seconds, release brake pedal after waiting for 10 seconds in D, and to creep speed;
3. Repeat step 2 for more than five times;
4. Turn off the ignition key and self-learning is completed after waiting for 10 seconds.

The specific operation of reverse clutch self-learning is as follows:

1. Release the parking brake after starting the engine;
2. Depress the brake pedal and shift to N, shift to R after waiting for 2 seconds, release brake pedal after waiting for 10 seconds in R, and to creep speed;
3. Repeat step 2 for more than five times;
4. Turn off the ignition key and self-learning is completed after waiting for 10 seconds.

⚠ **Caution**
• In order to achieve a good driving effect under various operating conditions, it is necessary to perform self-learning under high temperature, low temperature and normal temperature.

Electronic Shift Actuator Self-learning
Transmission self-learning should be performed in following conditions, otherwise there will be abnormal shifts:

1. Replace electronic shift actuator.
2. Electronic shift actuator was removed and installed again (such as replace the valve body).
3. Electronic shift part fault code alarms (such as P179000, P173100).

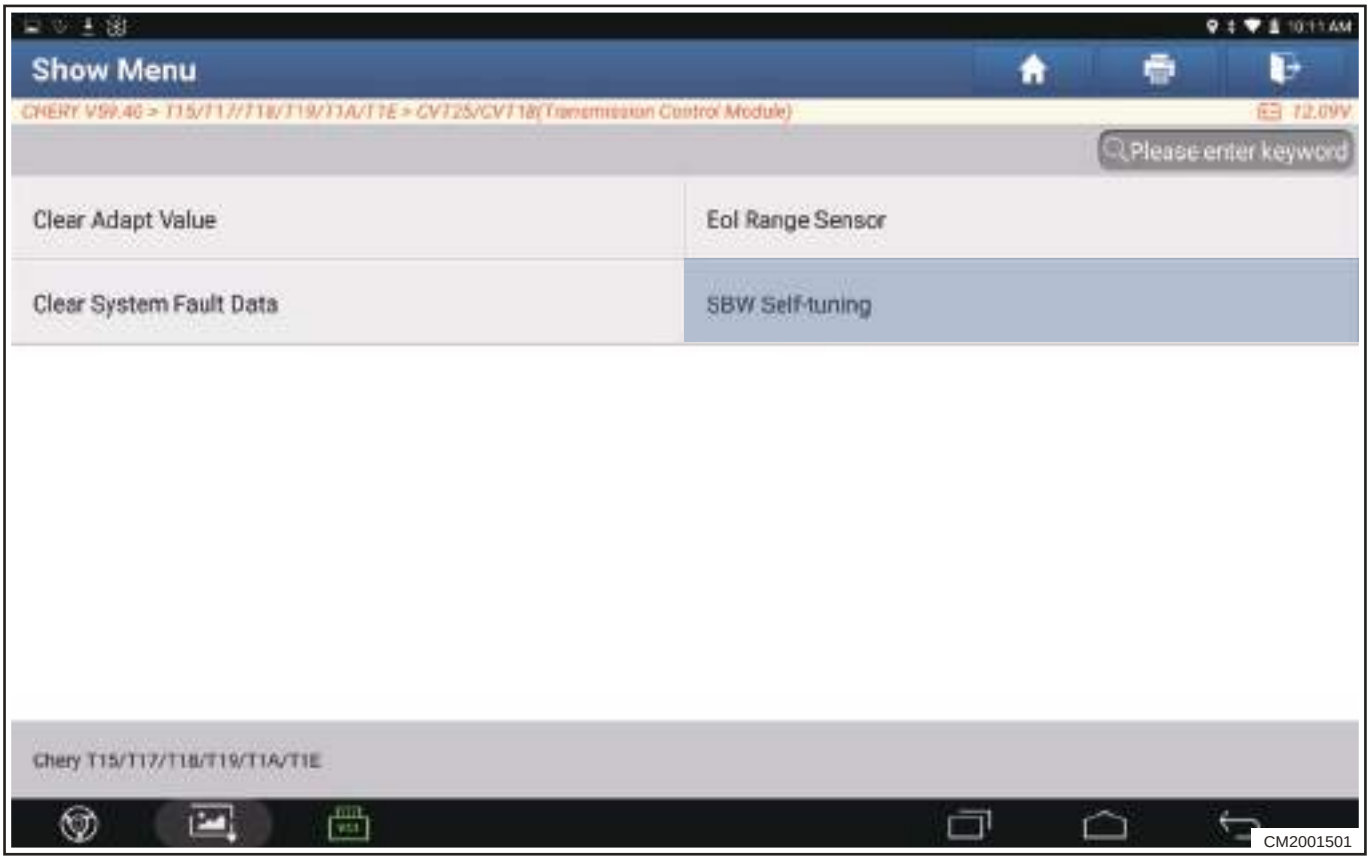
The specific operation of self-learning is as follows:

1. Vehicle power is turned on without starting;
2. First shift to N;
3. Then shift to P;
4. Finally shift to N;
5. Perform self-learning with diagnostic tester (It is required to perform self-learning in N);
   a. Select “T19C” vehicle model on diagnostic tester

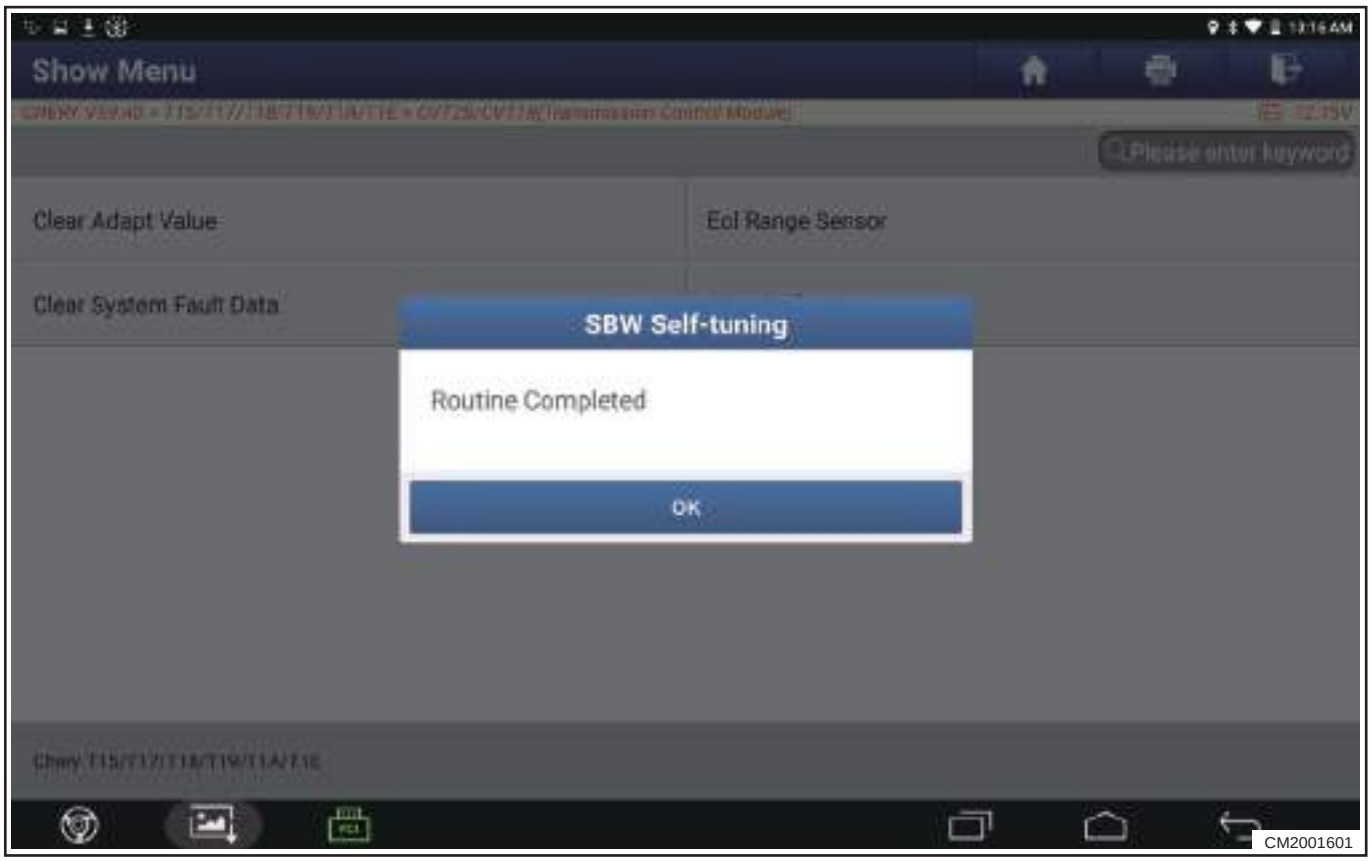
b. Select “CVT25 (Transmission Control Unit)”

c. Select “Special Function”

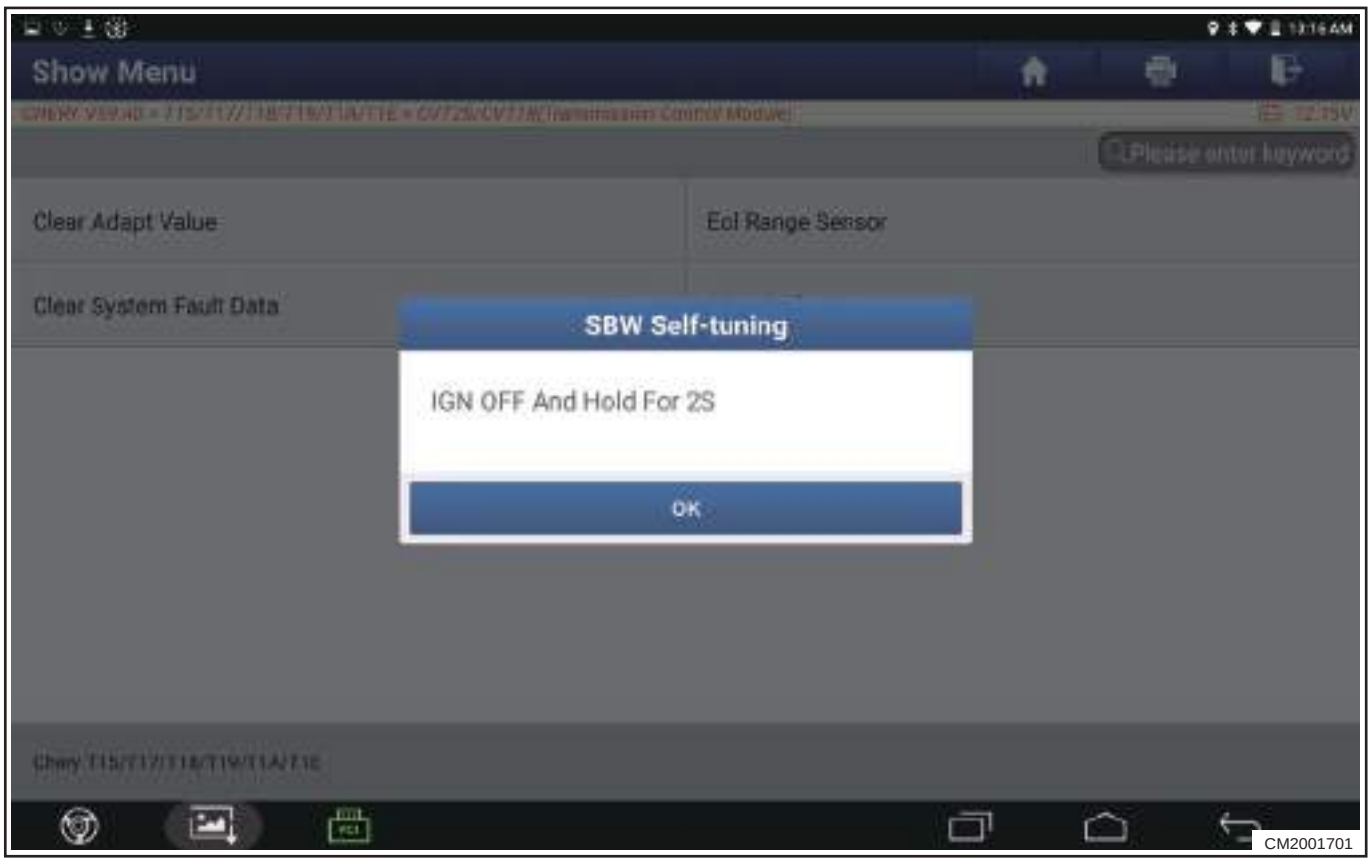
d. Select “SBW Self-learning”



e. After conditions of learning are met, learning is successful



f. Vehicle power is turned off normally and self-learning is completed



⚠ Caution

- The diagnostic tester prompts that the self-learning has failed, first check whether the meter displays N gear.
- If it is not in N, first shift to N position, and then repeat the self-learning according to the above steps.
- If it is in N, adjust the electronic shift connecting rod according to the data, and then perform self-learning again according to the above steps.

025CHC TRANSMISSION ASSEMBLY

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. Be sure to wear necessary safety equipment to prevent accidents when removing and repairing.
2. Appropriate force should be applied when removing transmission. Be careful not to operate roughly.

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

1. The components of automatic transmission require high precision. During the disassembly and assembly process, you must be careful not to cause scratches or damage to these components.
2. During the process of engine and transmission separation, pay attention not to damage the peripheral accessories of transmission. If there is any damage, replace it according to the requirements.
3. When inserting the propeller shaft or pulling out the differential, the differential oil seal must not be damaged. If there is any damage, it must be replaced with a new oil seal.
4. The replaced components and oil must be disposed of in accordance with relevant local regulations.
5. To avoid oil contamination, the container used to store transmission oil must be a special container (the container must not be used to store other liquids or items), and the container must be kept clean.
6. In case of oil spillage, the transmission oil needs to be added depends on the actual situation.
7. The oil is a part of transmission system. It must be sent back to manufacturer together with transmission for further analysis if required.

System Overview

Description

Brief Introduction

Continuously Variable Transmission (CVT) is widely used in mid-class to high-class vehicles all over the world due to its good shifting performance. 025CHC+electronic shift series automatic transmission can not only realize the best matching between drive train and engine operating condition within a fairly wide speed ratio range, but also improve the fuel economy of vehicle. At the same time, it also synchronously has functions such as start and stop.

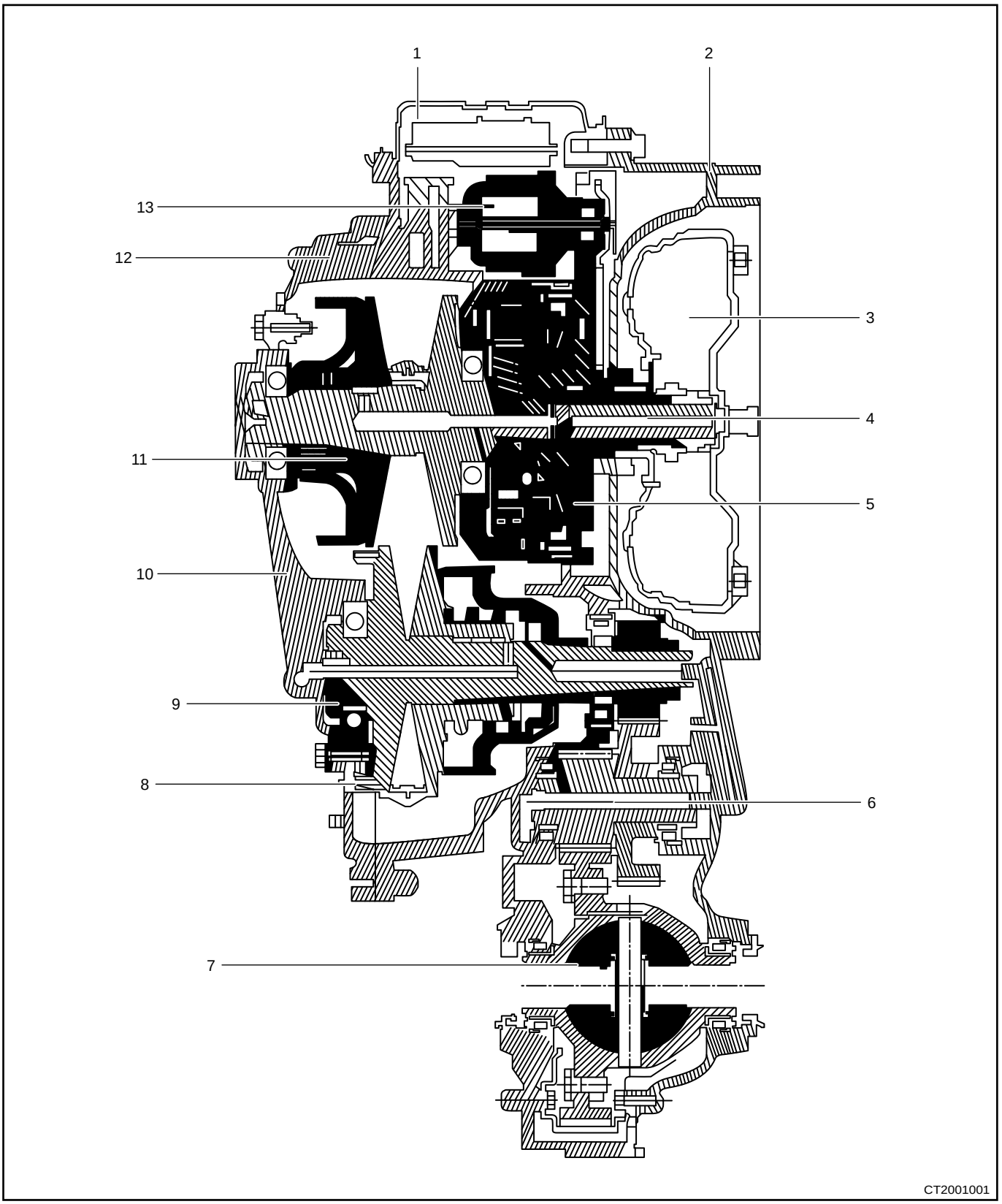
Basic Principle

CVT realizes stepless speed change by continuously changing the contact diameter between the drive and driven conical pressure plates and the steel belt. Operation is as follows:

1. Transmission Control Unit (TCU) sends command signals to the solenoid valves in hydraulic system according to the requirements under the vehicle driving conditions (vehicle speed, load, engine speed, etc.).
2. The solenoid valve continuously adjusts the operating state according to the commands from TCU. The combination of solenoid valves in different operating states enables the flow direction and pressure of the hydraulic oil to be adjusted and changed in time, and precisely controls the action of hydraulic actuators (e.g. cylinders, pistons, spool valves, etc.).
3. When the piston cavity pressure of hydraulic drive and driven conical pressure plates is continuously changed, the conical pressure plate generates corresponding axial movement according to the pressure changes, thereby changing the rotating radius of the steel belt, realizing continuous change of the transmission speed ratio and achieving the purpose of stepless speed change.

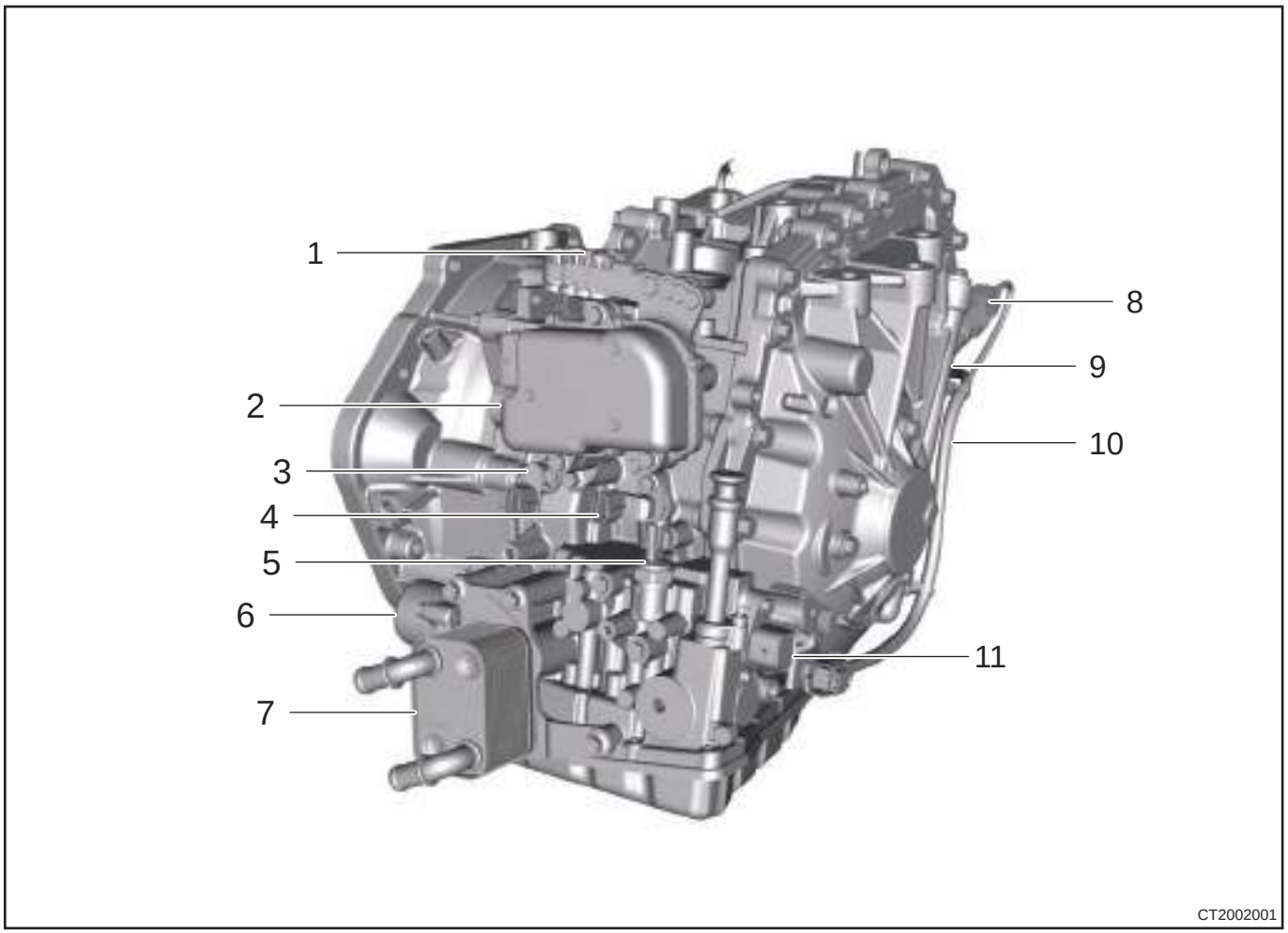
Components Diagram

Transmission Internal Construction



1	Transmission Case Assembly	2	Torque Converter Case Assembly
3	Hydraulic Torque Converter Assembly	4	Input Shaft Assembly
5	Forward Clutch Assembly	6	Output Shaft Assembly
7	Differential Assembly	8	Steel Belt
9	Output Pulley Shaft Assembly	10	Rear Case Assembly
11	Input Pulley Shaft Assembly	12	Transmission Case Assembly
13	Oil Pump Assembly		

External Components Diagram



1	Range Sensor	2	Electronic Shift Actuator
3	Speed Sensor (Turbine)	4	Speed Sensor (Input Shaft)
5	Oil Pressure Sensor (Primary Shaft)	6	External Filter Case
7	Oil Cooler	8	Oil Pressure Sensor (Second Shaft)

9	Speed Sensor (Output Shaft)	10	Transmission Peripheral Wire Harness Assembly
11	Wire Harness Connector (Valve Body Wire Harness)		

Gear Position Introduction

P (Parking) Gear
Lock the transmission output shaft to prevent the drive wheel from rotating and cooperate with the parking brake when the vehicle stops for a long time.

- When the transmission is in P (or N) gear, the engine can be started, and cannot be started in other gears;
- Shift to P gear only after the vehicle is completely stopped, otherwise the mechanical part of transmission may be damaged;
- Do not use P gear instead of parking brake, and only after the vehicle is completely stopped, pull the parking brake first and then shift to P;
- Do not park on a large slope. The safe parking slope is not more than 30%.

R (Reverse) Gear
Use this gear to drive backwards.

- Before shifting the shift lever to or out from R, it is necessary to confirm that the vehicle is completely stopped. Otherwise, the transmission may be damaged.

N (Neutral) Gear
When shifting to N, both the drive wheel and the transmission are in free and idling state, which is suitable for the vehicle to stop for a short time.

- When the transmission is in N (or P) gear, the engine can be started, and cannot be started in other gears;
- If the parking brake is not pulled or the brake pedal is not depressed in N gear, the vehicle can roll on slope, which may cause an accident;
- It is forbidden to shift to N gear while vehicle is running at high speed and engine is stalling and neutral coasting, otherwise the transmission may be damaged.

D (Driving) Gear
In normal forward mode of transmission, stepless speed change can be realized, when in this gear, the transmission will automatically select the appropriate speed ratio according to driver's intention.

- Confirm that the vehicle is completely stopped before shifting to D;
- Confirm the surrounding environment and personnel safety before driving in D.

M (Manual Mode) Gear
Push the shift lever to M position to execute M mode by default:

- “+”: Push the shift lever to “+” once to increase the transmission by one gear;
- “-”: Push the shift lever to “-” once to decrease the transmission by one gear;

The CVT transmission with n simulated forward gears (the number of simulated gears varies according to demand), which can be switched between M and D gears by pushing the shift lever regardless of whether the vehicle is stationary or running. Unlike the manual transmission, gear shifting is allowed when the accelerator pedal is depressed.
The driver can manually shift up and down to achieve a shift effect similar to that of a manual transmission and experience more driving pleasure.

⚠ Caution

- In manual mode, you can switch between 1 to n forward gears in sequence (the number of simulated gears varies according to your needs).
- In manual mode, the driver must perform gear shifting under appropriate working conditions to prevent the engine speed from approaching the red line and running under high load for a long time.
- In manual mode, when the vehicle speed decreases, it will automatically downshift; when the engine speed is too high, the transmission will automatically upshift.
- Shifting in manual mode needs to meet certain throttle conditions and speed conditions. If the conditions are not met, even if the shift lever is pushed, the transmission will not shift.

Use for Transmission

025CHC CVT includes: 1 parking gear (P gear), 1 reverse gear (R gear), 1 neutral gear (N gear) and 1 forward gear (D gear), which can be shifted by the shift lever.
According to configuration, 025CHC CVT can also provide: M (manual mode), (SPORT) SPORT mode and (ECO) ECO mode.

⚠ Caution

- Manual mode can be switched by shift lever.
- Mode priority: Manual mode has the highest priority. SPORT mode and ECO mode cannot be triggered at the same time. When manual mode and SPORT mode (or ECO mode) are triggered at the same time, the system defaults to manual mode.

Before using a vehicle equipped with 025CHC CVT, you need to know the following information:

1. Before shifting transmission from stop gear (N or P) to driving gear (D or R), set engine to idling status, depress brake pedal or apply parking brake, and release brake pedal and parking brake after gear shifting completes, then vehicle enters driving status;
2. When engine speed exceeds idling speed, do not shift transmission from stop gear (N or P) to driving gear (D or R);
3. If accelerator pedal is depressed suddenly at start-up, the transmission will delay upshifting so that it runs in high speed range, ensuring high power output;
4. If accelerator pedal is depressed suddenly during driving, the transmission will quickly shift to low gear, engine speed and power will increase;
5. Vehicles equipped with automatic transmission cannot be started by traction or pushing. If the battery is depleted, it is necessary to use a jumper cable to charge the battery to start the vehicle.

ECO Mode
Press the ECO mode button and TCU selects ECO mode program. Press the mode button again to exit ECO mode.

⚠ Caution

- You can decide if you need the ECO mode according to different vehicle needs.

SPORT Mode
Press the SPORT mode button and TCU selects SPORT mode program. Press the mode button again to exit SPORT mode.

⚠ Caution

- You can decide if you need the SPORT mode according to different vehicle needs.

Vehicle Towing

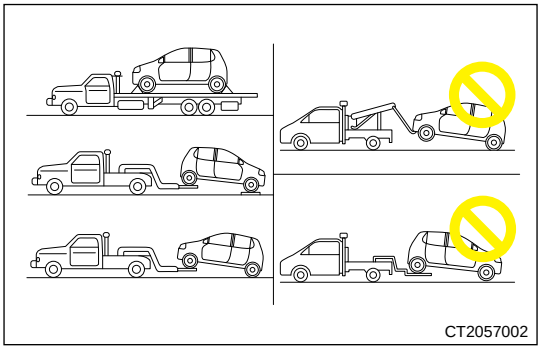
1. Towing using the correct method can avoid unnecessary secondary damage to the vehicle.

   a. Use flatbed truck or large flatbed trolley to tow the vehicle after it is fully supported.
   b. Use hard traction to lift the non-drive wheel while using a small flatbed (ground wheel) to lift the drive wheel and transport it

   c. Use hard traction to lift the drive wheel and transport it.

⚠ Caution

- Do not use soft traction to pull the drive wheel.
- Do not use soft traction to pull the non-drive wheel.



ON-VEHICLE SERVICE

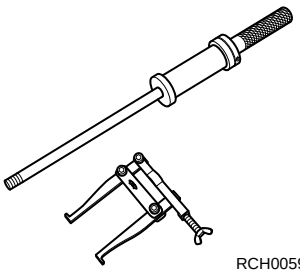
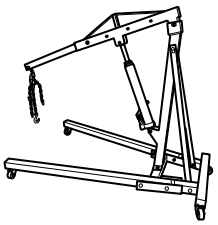
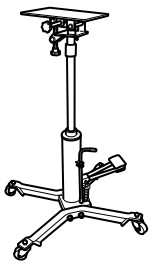
Specifications

Basic Parameters

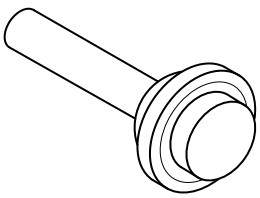
Items	Parameters
Type	025CHC+electronic shift
Type	Continuously Variable Transmission (CVT)
Layout	Transverse front-drive
Start Clutch Device	Hydraulic torque converter
Control Method	Electronic hydraulic control
Dimensions (L × W × H)	365 mm × 442 mm × 647 mm
Factory weight (-including 1.8 L remaining oil)	87 kg
Central Distance	197mm
Maximum Allowable Input Torque	250 N·m
Final Drive Ratio	6.08
Pulley Speed Ratio Range	0.38 ~ 2.69
Fluid Type	CVTF WCF-1 (CVTF for short)
Transmission Fluid Capacity	7.3 ± 0.2 L

Tools

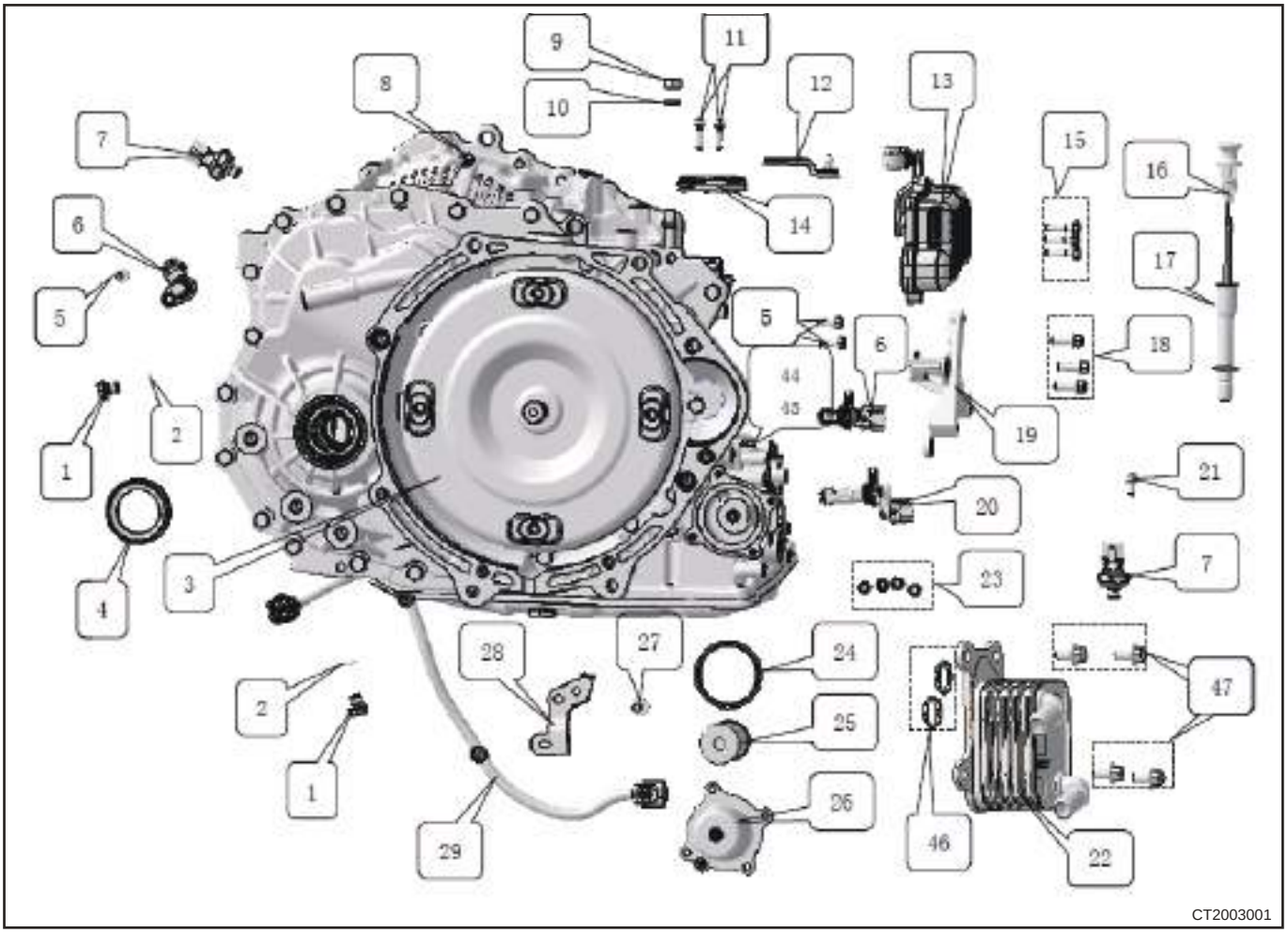
General Tools

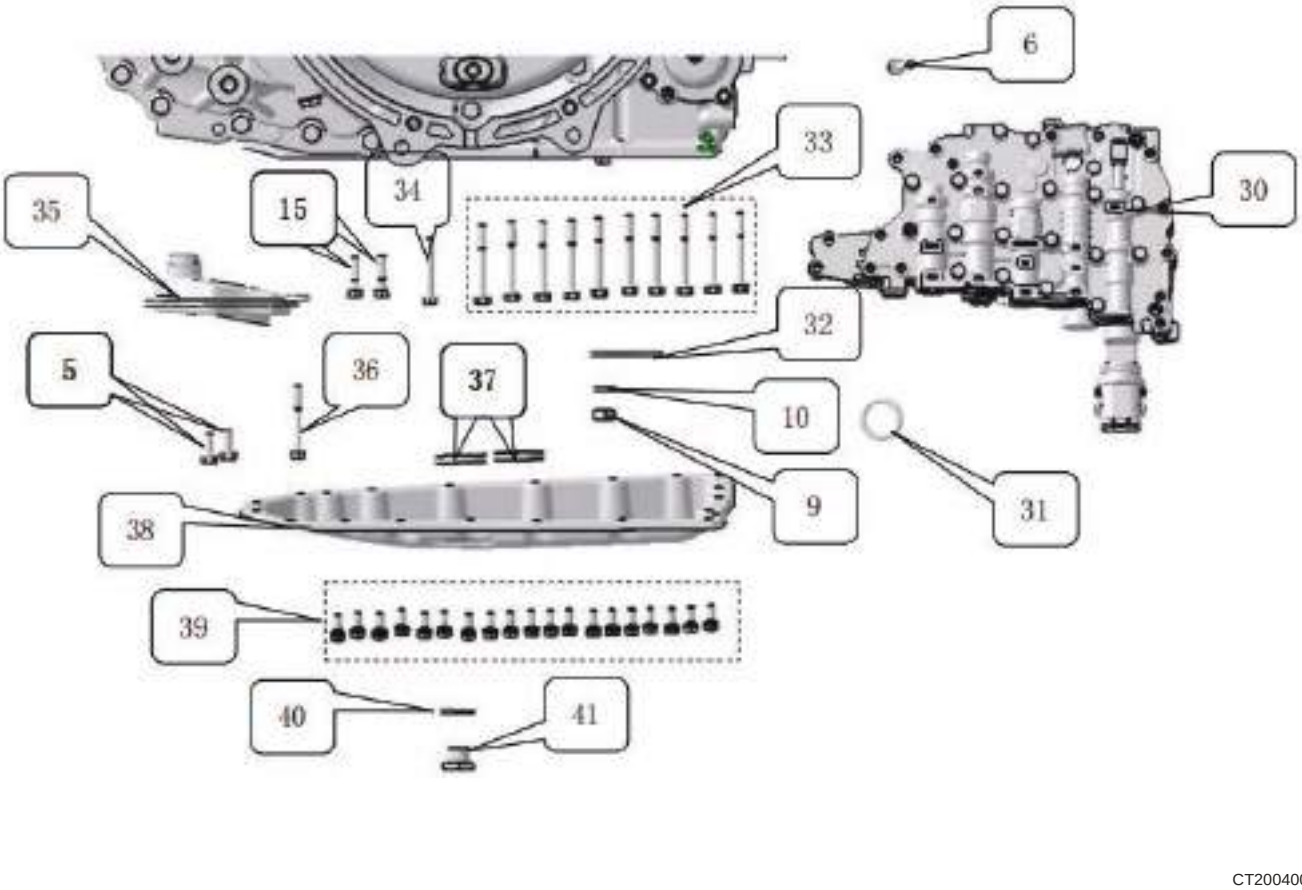
Tool Name	Tool Drawing
Bearing Puller	 RCH0059006
Engine Hoist	 S00032
Transmission Carrier	 RCH0005006

Special Tool

Tool Name	Tool Drawing
Differential Oil Seal Installer	 RCH0009006

Repairable List

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CT2004001

CT2005001

No.	Part No.	Part Name	Quanti-ty	Note
1	019CHA-1502172	Oil Pressure Detection Bolt	2	19 ~ 25 N·m
2	019CHA-1502171	Oil Pressure Detection Bolt (M12) O-ring	2	
3	/	Hydraulic Torque Converter Assembly	1	☆
4	019CHA-1502106	Differential Oil Seal	2	★
5	Q1880616F36	Hexagon Flange Bolt - Extra Large Series M6X16	6	8 ~ 10 N·m
6	025CHA-1504240 025CHA-1504240BA	Speed Sensor (Short)	2	Interconvertible
7	025CHA-1504210	Oil Pressure Sensor Assembly	2	
8	025CHA - 1502126	Breather Cap	1	
9	Q341C10F36	Nut	2	18 ~ 25 N·m
10	Q40310F9	Spring Washer_M10	2	★
11	Q218B0622F36	Inner Hexagon Socket Cap Screw	2	8 ~ 10 N·m

No.	Part No.	Part Name	Quanti-ty	Note
12	025CHA-1506606 0CF25A-1506606BA	Rocker Arm - Transmission	1	Interconvertible
13	025CHA-1506600 0CF25A-1506600BA	Electronic Shift Module Assembly	1	Interconvertible
14	025CHA-1504220 0CF25A-1504220BA	Range Sensor	1	Interconvertible
15	Q1860625F36	Hexagon Flange Bolt - Extra Large Series	5	8 ~ 10 N·m
16	025CHA-1503210	Oil Dipstick Set	1	
17	025CHA-1503220	Oil Dipstick Sleeve Pipe Set	1	
18	Q1820820F36	Hexagon Flange Bolt	3	19 ~ 25 N·m
19	025CHA-1506604 0CF25A-1506604BA	Electronic Shift Actuator Bracket	1	Interconvertible
20	025CHA-1504230 025CHA-1504230BA	Speed Sensor (Long)	1	Interconvertible
21	Q218B0612F36	Inner Hexagon Socket Cap Screw		8 ~ 10 N·m
22	0CF28AE-1501140	Oil Cooler	1	
23	Q1860620F36	Hexagon Flange Bolt M6x20	4	8 ~ 10 N·m
24	025CHA-1506531	Gasket - External Filter and Transmission Case	1	
25	025CHA-1506510	External Filter Assembly	1	
26	025CHA-1506501	External Filter Case	1	
27	Q1820814F36	Hexagon Flange Bolt	1	20 ~ 26 N·m
28	025CHA-1504118	Fixing Bracket - Peripheral Wire Harness Assembly	1	
29	025CHA-1506500BA	Transmission Peripheral Wire Harness Assembly	1	
30	025CHA-1506100	Valve Body and Wire Harness Assembly	1	
31	025CHA-1502606	Valve Body and Transmission Case O-Ring	1	
32	025CHA-1506532	Manual Shift Valve Drive Arm	1	
33	Q1860655F36	Hexagon Flange Bolt - Extra Large Series	10	8 ~ 10 N·m
34	Q1860645F36	Hexagon Flange Bolt - Extra Large Series	1	8 ~ 10 N·m
35	025CHA-1506400 0CF25A-1506400BA	Filter Assembly - Oil Pump	1	

No.	Part No.	Part Name	Quanti-ty	Note
36	Q1860650F36	Hexagon Flange Bolt - Extra Large Series	1	8 ~ 10 N·m
37	025CHA-1506522	Magnet	2	
38	025CHA-1506521	Valve Body Case	1	★
39	Q1410616F61	Hexagon Head Bolt and Conical Spring Washer Set M6 x 16	19	8 ~ 10 N·m
40	QR523-1701103	Drain Plug Flat Washer	1	★
41	QR523-1701102	Drain Plug	1	
42	025CHA-1509103	Input Shaft to Hydraulic Torque Converter O-ring	1	
43	025CHA-1502204	Hydraulic Torque Converter Oil Seal	1	★
44	019CHA-1502182	Oil Pressure Detection Bolt	4	8 ~ 10 N·m
45	019CHA-1502181	Oil Pressure Detection Bolt (M8) O-ring	4	
46	0CF18A-1509103	Seal Ring - External Oil Cooler and Case	2	
47	Q1820816F36	Hexagon Flange Bolt	4	13 ~ 15 N·m
48	025CHA-1502201X	Torque Converter Case	1	
49	025CHA-1502230	Differential Lower Oil Deflector Assembly	1	
50	025CHA-1504133	Positioning Bolt	7	8 ~ 10 N·m
51	025CHA-1502202	Oil Guide Pipe	1	
52	025CHA-1502203	Oil Guide Pipe Bracket	1	
53	FQ1420616F34E	Hexagon Head Bolt and Spring Washer Set M6×16	1	8 ~ 10 N·m
54	/	Differential Assembly	1	
55	/	Output Shaft Assembly	1	
56	025CHA-1502205	Differential Upper Oil Deflector	1	
57	Q32006F36	Hexagon Flange Nut M6	2	8 ~ 10 N·m
58	025CHA-1502616	Sprocket Oil Deflector	1	
59	513MHA-1701508	Differential Rear Bearing Adjusting Shim	1	Option
60	025CHA-1508500 0CF25A-1508500BA	Chain	1	Interconvertible
61	025CHA-1508400	Driven Sprocket Assembly	1	

No.	Part No.	Part Name	Quanti-ty	Note
62	025CHA-1502602	Pressure Plate	1	
63	025CHA-1508301	Drive Sprocket	1	
64	025CHA-1502608	Hexagon Flange Bolt	2	20 ~ 26 N·m
65	025CHA-1502617	Chain Oil Deflector	1	
66	Q1860835F36	Hexagon Flange Bolt - Extra Large Series	1	20 ~ 26 N·m
67	019CHA-1502117	Bearing Baffle Plate O-ring	1	
68	025CHA-1508100 025CHA-1508100BA	Oil Pump Assembly	1	
69	Q218B0870F36	Inner Hexagon Socket Cap Screw	3	20 ~ 26 N·m
70	025CHA-1502601	Sprocket Snap Ring	1	
71	025CHA-1509200	Planet Carrier Assembly	1	
72	025CHA-1509300	Sun Gear Set	1	
73	025CHA-1502604	Forward Clutch Thrust Bearing	1	Option
74	025CHA-1502618	Planetary Gear Train Thrust Bearing	3	
75	025CHA-1509100	Input Shaft and Forward Clutch Assembly	1	
76	FQ186C1035F36	Hexagon Flange Bolt - Extra Large Series	23	42 ~ 54 N·m
77	025CHA-1502603	Washer between Drive Sprocket and Oil Separator	1	
78	025CHA-1508206	Forward Clutch Seal Ring	2	
79	Q1860830F36	Hexagon Flange Bolt - Extra Large Series	7	20 ~ 26 N·m
80	025CHA-1508210	Oil Separator Assembly	1	
81	025CHA-1502108	Output Shaft Adjusting Shim	1	Option
82	025CHA-1504130	Gear Positioning Steel Sheet Set	1	
83	025CHA-1502127	Breather Pipe	1	★
84	/	Case Seal Gum	/	△
85	025CHA-4004011	Automatic Transmission Oil (CVTF WCF-1)	7.3 L	△

Hint:

- ★ means that this part is a non-reusable part, that is, if it is necessary to be disassembled during the maintenance, it must be replaced with a new one.
- ☆ Not all general parts of the series.
- △ Both automatic transmission oil and case seal gum are designated octane number, do not mix them!

⚠ Caution
• The automatic transmission is a high-precision component, which has extremely high requirements for cleanliness. Therefore, in the process of repairing and replacing the transmission components, ensure that the site is clean and wear clean gloves (or clean hands) to operate.

Transmission Oil Maintenance

Maintenance Period

Automatic transmission oil is a very important component that provides hydraulic transmission, lubrication, cooling and other functions during the operation of automatic transmission.

1. In order to extend the service life of the transmission, it is required to replace the transmission oil and external filter assembly once when the vehicle is traveling 40,000 km, and then it is not necessary to replace it.

Transmission oil standard

1. Transmission oil selection standard:

Transmission Oil Type	Standard Capacity
CVTF WCF-1	7.3 L ± 0.2 L

Oil Status Inspection

1. The new transmission oil should be light yellow, but light yellow is not the quality indicator of the oil. As the vehicle is used, the color of the oil will gradually deepen and eventually become light brown:
   - If the oil is dark brown with burnt smell, change it and check vehicle condition;
   - If the oil is milky white or turbid, it indicates that the water enters the oil; change the oil, check the leakage point and confirm whether the transmission is damaged.
   - If the oil is black and mixed with a large amount of powder, there is abnormal wear in CVT, and the transmission needs to be checked and repaired.

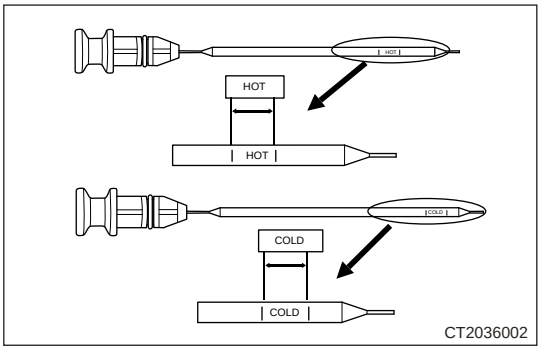
⚠ Caution
• The transmission oil must not be replaced by other oil to avoid damage to the transmission.

Transmission oil level inspection

Please check the oil level in the following order:

1. After the vehicle has been running on the road for a period of time, the transmission oil temperature reaches 80 ± 5°C or 25 ± 5°C (it can be measured with a diagnostic tester);
2. Stop the vehicle on a level surface and pull up the parking brake handle;
3. When the engine is running at idle speed, depress and hold the brake pedal, shift the gears in the order of R, N and D for three cycles (A reciprocating motion for each cycle), each gear is kept for 5 s, and finally shift the shift lever to "P" or "N" position;
4. Wipe off dust and oil stains, etc. around the oil dipstick and sleeve;
5. Pull out the oil dipstick from oil dipstick sleeve, wipe it with lint-free paper and insert it into the sleeve to prevent foreign matter from falling into the transmission.

6. Pull out the oil dipstick and record the scale position. If the oil level is within the corresponding scale range, the oil level is normal. If the oil level is not within corresponding scale range, refill or drain oil until oil level is in the middle of corresponding range to achieve best performance of the transmission.



7. Finally, insert the oil dipstick into the sleeve and ensure that it is installed in place.

⚠ Caution

- It is not allowed to increase the automatic transmission oil temperature by depressing on the accelerator rapidly at idling.
- Please use the "HOT" mark on transmission oil dipstick as the standard for measuring the quantity of transmission oil. The "COLD" (or "C") mark is for reference only.
- Under the hot oil condition of transmission, the temperature of engine, radiator and its piping system is very high, fan may start with it, so care should be taken to avoid burns during operation.
- If the transmission oil level is too low, the transmission oil pump will suck in air while running, resulting in each clutch or brake working badly due to insufficient working pressure.
- If the transmission oil level is too high, the rotating parts of transmission will stir liquid to produce foam while rotating at high speed, which can also result in each clutch or brake working badly due to insufficient working pressure.

Transmission Oil Draining/Refilling

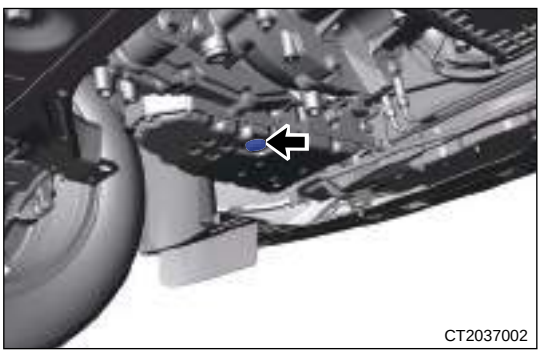
Transmission Oil Draining

⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing or inspecting the lifted vehicle.

1. Raise vehicle with a lift.

2. Remove the transmission drain plug.



⚠ Caution

- Filler plug washer is non-reusable component, and replace it after each removal.

3. Drain the transmission oil.
4. Reinstall and tighten the drain plug, do not miss the seal washer.
   Tightening torque: 42 - 50 N·m

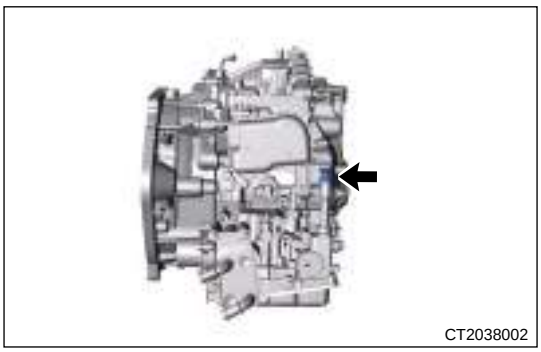
Transmission Oil Refilling

⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing or inspecting the lifted vehicle.

1. Confirm that the drain plug is tightened, do not miss the seal washer.

2. Pull out the oil dipstick set and fill the new transmission oil from oil dipstick set mounting port.



⚠ Caution

- When replacing, the filling amount is the drained transmission oil amount.
- If it is a new transmission, it is not necessary to drain the oil. Add 5.5 ± 0.1 L of oil directly.

3. Check the oil level as required after filling.
4. Install the oil dipstick set.

⚠ Caution

- When wiping the oil dipstick set, use lint-free paper to prevent foreign matter from falling into the transmission.
- There are high-temperature parts in engine compartment. To avoid accidents, remember not to spill ATF on high-temperature parts.
- After the automatic transmission oil is filled, the spilled oil must be wiped.
- When replacing the automatic transmission oil, the oil cooler on vehicle needs to be cleaned.
- The replaced automatic transmission oil needs to be recycled with recycling tools to avoid environmental pollution.

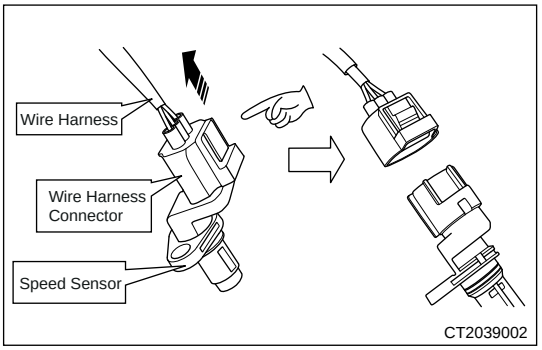
Speed Sensor Connector

Removal

⚠ Caution

- The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit.

1. Pull up the wire harness connector (arrow) while pressing and holding the connector lock mechanism (- finger direction).



2. Separate the wire harness connector.
3. Removal is completed.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Make sure that the connector is inserted into place while installing: When it is inserted in place, it will make a "click" sound.
- In the process of disassembly and assembly, alignment is required to avoid the occurrence of bending of pins.

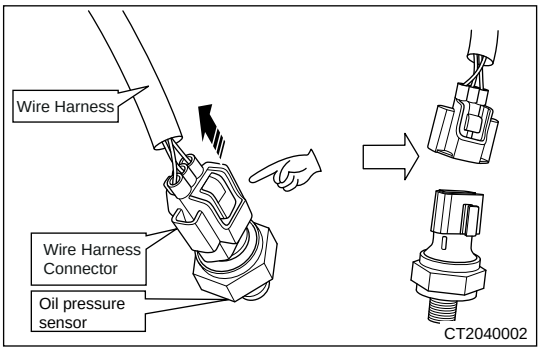
Oil Pressure Sensor Connector

Removal

⚠ Caution

- The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit.

1. Pull up the wire harness connector (arrow) while pressing and holding the connector lock mechanism (- finger direction).



2. Separate the wire harness connector.
3. Removal is completed.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Make sure that the connector is inserted into place while installing: When it is inserted in place, it will make a "click" sound.
- In the process of disassembly and assembly, alignment is required to avoid the occurrence of bending of pins.

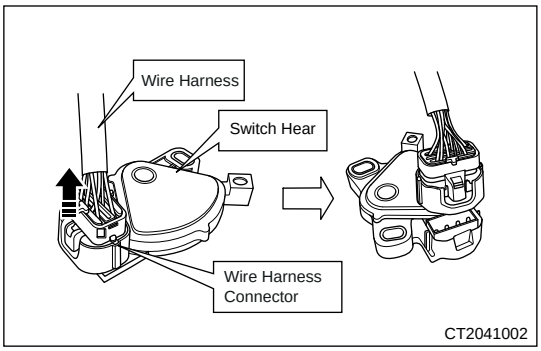
Range Sensor Connector

Removal

⚠ Caution

- The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit.

1. Press the connector lock mechanism (arrow).



2. Separate the wire harness connector.
3. Removal is completed.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- When the range sensor is installed and the wire harness connector is inserted into place, please be sure to push the gray locking mechanism on the connector into place to lock the installation position of the connector and the range sensor.
- Make sure that the connector is inserted into place while installing: When it is inserted in place, it will make a "click" sound.
- In the process of disassembly and assembly, alignment is required to avoid the occurrence of bending of pins.

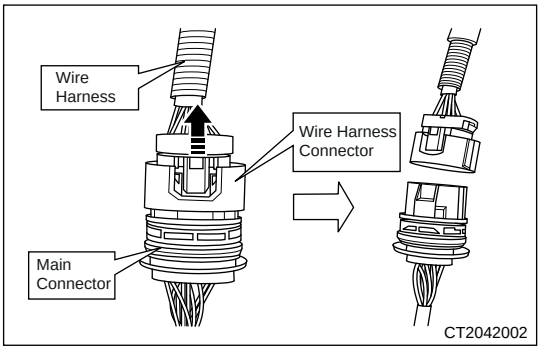
Wire Harness Main Connector

Removal

⚠ Caution

- The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit.

1. Press the connector lock mechanism (arrow), and flip the handle upward.
2. Pull up the wire harness connector at the same time.



3. Separate the wire harness connector.
4. Removal is completed.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Make sure that the connector is inserted into place while installing, when it is inserted in place, it will make a "click" sound.
- In the process of disassembly and assembly, alignment is required to avoid the occurrence of bending of pins.

Differential Oil Seal

Removal

Hint:

- Use same procedures for right and left sides.
- Removal procedures listed below are for left side.

1. Drain the transmission oil.
2. Remove the front left wheel.
3. Remove the left drive shaft.
4. Remove left drive shaft oil seal from transmission assembly.

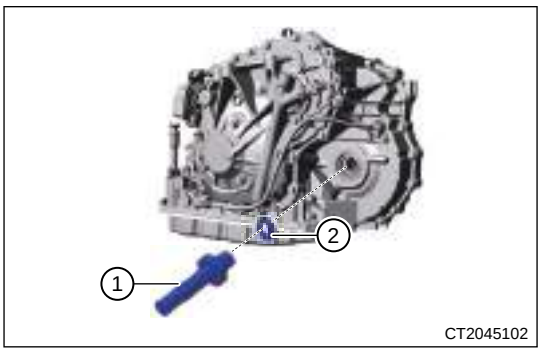
⚠ Caution

- Drive shaft oil seal is a non-reusable component, and replace it after removal.

5. Removal is completed.

Installation

1. Apply appropriate amount of automatic transmission oil to the inner and outer race of oil seal.
2. Align the oil seal with the transmission, and install it to the transmission with differential oil seal installation fixture.



3. Add the specified transmission oil.

⚠ Caution

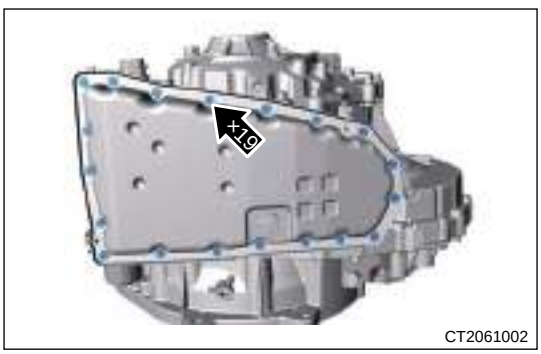
- Due to the interference fit between the oil seal and the transmission, it will inevitably be deformed and damaged during removing, and the deformed and damaged parts cannot be used continuously.
- Uniform force is required during oil seal installation, and the oil seal should not be deformed or damaged.
- The components of automatic transmission require high precision. During the disassembly and assembly process, you must be careful not to cause scratches or damage to these components, such as the machined surface of the case, etc.
- When connecting the propeller shaft, an oil seal protective sleeve must be used to prevent the splines and snap rings on propeller shaft from damaging the oil seal.
- Verticality shall be ensured during oil seal assembly, and the end surface shall not be tilted.

Valve Body Case

Removal

1. Turn off electrical equipments and engine switch.
2. Disconnect the negative battery cable.
3. Remove the engine lower protector assembly.
4. Drain the transmission oil.
5. Remove 19 coupling bolts between valve body case and transmission case.

   Tightening torque: 8 - 10 N·m



6. Remove the valve body case assembly.

Hint:

- Seal gum is applied between valve body case and transmission case. If it is hard to remove, tap it lightly to loosen it before removing, and appropriate force should be applied to avoid damage.

Installation

1. Installation is in the reverse order of removal.

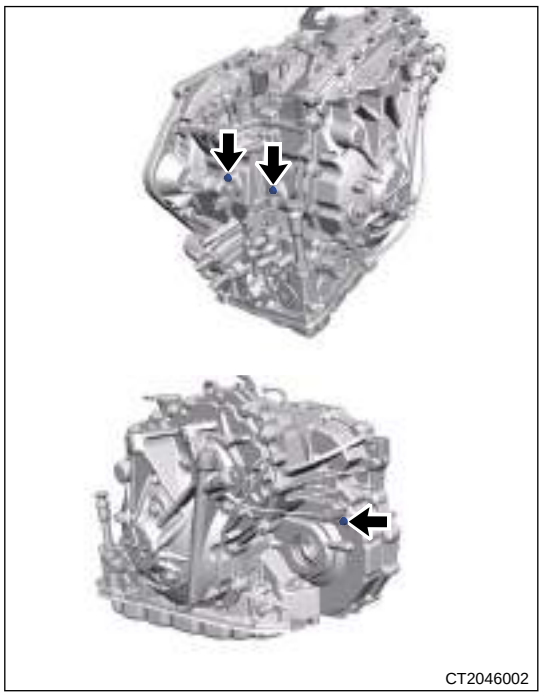
⚠ Caution
• Before installation, wipe the case joint surface clean. • Before installation, wipe two magnets in valve body clean and install them in the specified positions. • Apply seal gum to the flange surface of valve body case, and the application line needs to be located on the sealing surface inside the bolt mounting hole.

2. Add the specified transmission oil.

Speed Sensor

Removal

1. Turn off electrical equipments and engine switch.
2. Disconnect the negative battery cable.
3. Remove the air filter assembly.
4. Remove the battery tray assembly.
5. Disconnect the speed sensor connector.
6. Remove fixing bolts and speed sensor.



Installation

1. Install speed sensor and tighten bolts in place.

   Tightening torque: 8 - 10 N·m

⚠ Caution

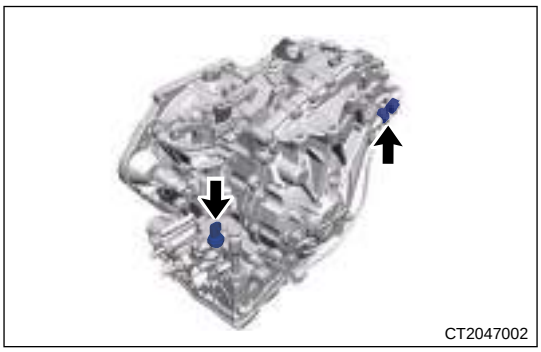
- Apply proper amount of automatic transmission oil to sensor O-ring.
- When connecting connector, check the pin connecting condition to confirm that the inserted pin is not bent or damaged, and then connect the connector.

2. Other installation procedures are in the reverse order of removal.

Oil Pressure Sensor

Removal

1. Turn off electrical equipments and engine switch.
2. Disconnect the negative battery cable.
3. Remove the air filter assembly.
4. Remove the battery tray assembly.
5. Disconnect the oil pressure sensor connector.
6. Remove the oil pressure sensor.



Installation

1. Install the oil pressure sensor and tighten it in place.
   Tightening torque: 15 - 22 N·m

⚠ Caution

- Apply proper amount of automatic transmission oil to sensor O-ring.

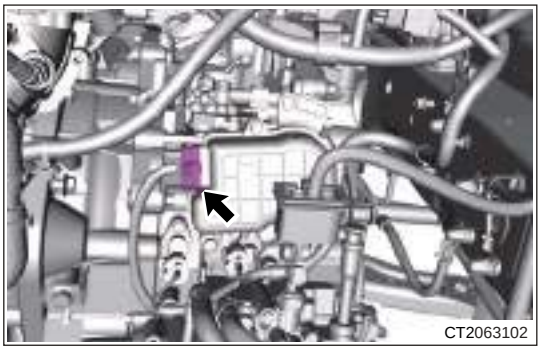
2. Other installation procedures are in the reverse order of removal.

Electronic Shift Module

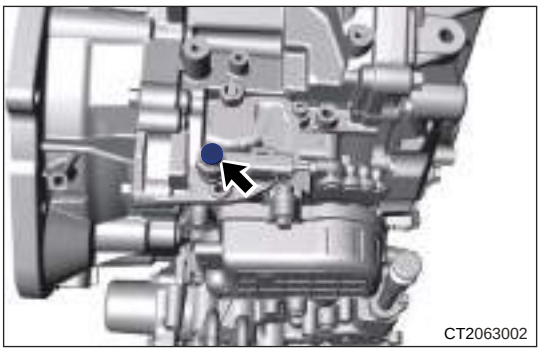
Removal

1. Turn off electrical equipments and engine switch.
2. Disconnect the negative battery cable.
3. Remove the air filter assembly.

4. Disconnect the electronic shift module connector.

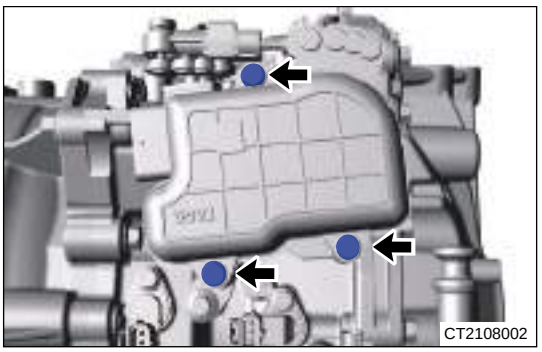


5. Press connecting rod mechanism (arrow), disconnect the connecting rod mechanism and gear shift mechanism.



6. Remove 3 fixing bolts (arrow) from electronic shift module.

   Tightening torque: 8 - 10 N·m



7. Remove the electronic shift module.

Installation

⚠ Warning

- Make sure that the connector is inserted into place while installing: When it is inserted in place, it will make a "click" sound.
- In the process of disassembly and assembly, alignment is required to avoid the occurrence of bending of pins.
- After electronic shift actuator was replaced or removed and installed again, it is necessary to perform electronic shift actuator self-learning.

1. Installation is in the reverse order of removal.

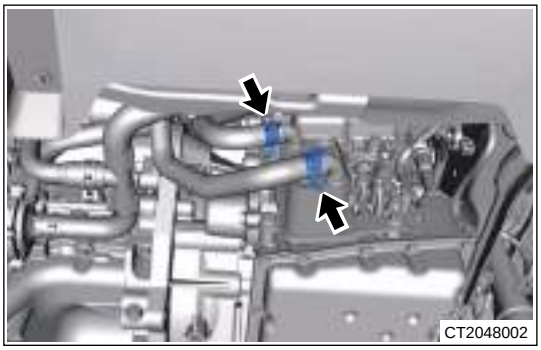
Oil Cooler

Removal

⚠ Caution

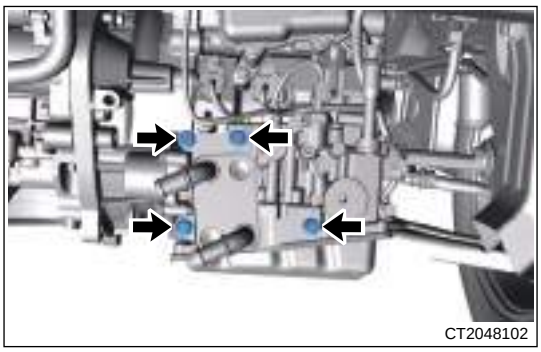
- During removal and installation, do not operate violently to avoid damaging the transmission oil pipe assembly.
- Avoid foreign objects entering the transmission from the oil pipe assembly nozzle.
- The transmission cooling hose is connected to the internal oil passage of the transmission, so it is necessary to ensure that the inside of hose is clean.

1. Drain the transmission oil.
2. Drain the coolant.
3. Remove the water tank lower protector assembly.
4. Remove clamps from cooling pipe inlet hose, separate cooling pipe inlet hose from oil cooler assembly.



5. Remove 4 fixing bolts from oil cooler.

   Tightening torque: 13 ~ 15 N·m



6. Remove oil cooler and seal ring.

Installation

⚠ Caution

- Seal ring is a vulnerable product. For reused seal ring, always confirm that seal ring is free from scratches and damage before assembly, and remember not to miss it.

1. Assemble seal ring to the corresponding sealing groove of transmission case in place.
2. Firmly press oil cooler against seal ring and install it in place, then tighten 4 fixing bolts.

   Tightening torque: 13 ~ 15 N·m

3. Other installation procedures are in the reverse order of removal.

⚠ Caution

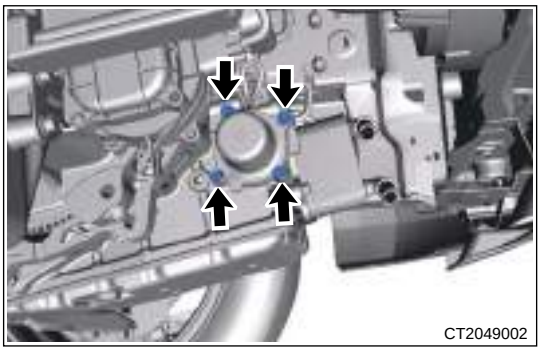
- The clamp must be clamped in the correct position during installation.

External Filter Assembly

Removal

1. Drain the transmission oil.
2. Remove the engine lower protector assembly.
3. Remove 4 fixing bolts between external filter case and transmission.

   Tightening torque: 8 - 10 N·m



4. Remove the external filter case.
5. Remove the external filter assembly.
6. Remove the gasket (external filter and transmission case).

Installation

1. Insert the external filter assembly opening into the corresponding boss on transmission case.
2. Apply the external filter gasket with CVTF and install it on the transmission case.
3. Cover the external filter case, and the holes are aligned with the holes of transmission case.
4. Install 4 fixing bolts between external filter case and transmission.

   Tightening torque: 8 - 10 N·m

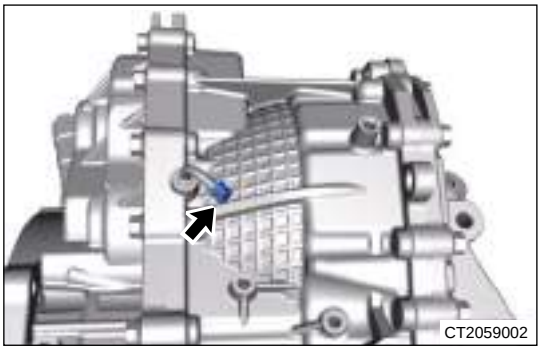
5. Install the engine lower protector assembly.
6. Fill the specified transmission oil.

Breather Cap

Removal

1. Turn off electrical equipments and engine switch.
2. Disconnect the negative battery cable.
3. Remove the air filter assembly.

4. Unplug breather cap (arrow) from transmission assembly directly.



5. Removal is completed.

Installation

1. Installation is in the reverse order of removal.

Transmission Assembly

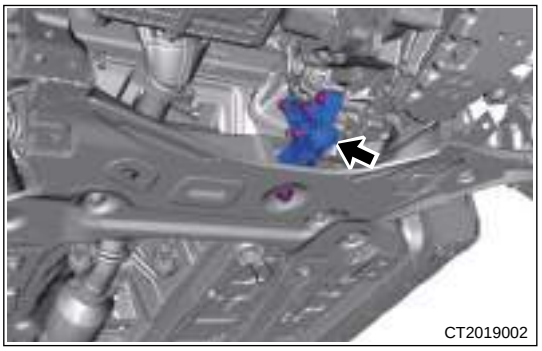
Removal

⚠ Caution

- Before removal of power assembly, first drain transmission oil.
- When disassembling the transmission, make sure that the coupling bolt between the hydraulic torque converter and the flexible disc is removed first. The hydraulic torque converter is separated together with the transmission from the engine, engine and transmission are kept as coaxial as possible to avoid the hydraulic torque converter from detaching or falling off.
  a.If the hydraulic torque converter accidentally falls off and needs to be reinstalled, do not forcibly install it to avoid damaging the internal components of transmission.
  a.The hydraulic torque converter is a high-precision component with high requirements for moment of inertia. If it is accidentally bumped and deformed, it needs to be replaced with a new one.
- During separation of engine and transmission, pay attention not to damage the peripheral accessories of transmission, such as rubber cooling pipe, pressure sensor, etc. If there is any damage, it is necessary to replace it according to requirements.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the battery.
4. Remove the battery tray.
5. Remove the air filter assembly.
6. Remove the crankshaft position sensor.
   a. Disconnect the crankshaft position sensor connector.
   b. Remove fixing bolt from crankshaft position sensor.
      Tightening torque: 6 ± 1 N·m
   c. Remove the crankshaft position sensor.

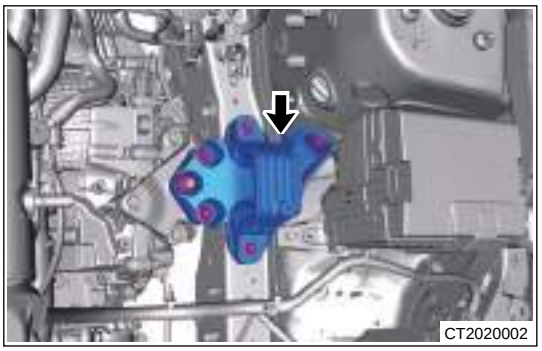
7. Remove the front wheel tire.
8. Remove the engine lower protector.
9. Drain the coolant.
10. Drain the transmission oil.
11. Remove the drive shaft.
12. Remove the transmission ground wire, disconnect the speed sensor connector and the oil pressure sensor connector, and move away the wire harness.
13. Disconnect the range sensor connector and the electronic shift actuator module connector.
14. Remove the cooling pipe hose assembly.
15. Remove the rear mounting cushion and bracket.


CT2019002

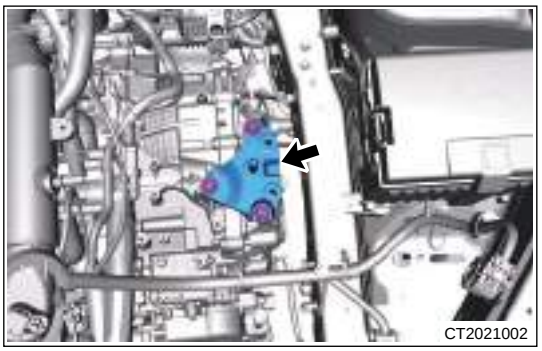
⚠ Caution

- During removal and installation, do not operate violently to avoid damaging the transmission.
- Before removing and installing the tightening bolts, it is necessary to check whether the threaded holes of the transmission are damaged. If there is any abnormality, it needs to be repaired.

16. Use an engine equalizer to hang the engine.
17. Remove the left mounting cushion.


CT2020002

18. Remove the left mounting bracket.


CT2021002

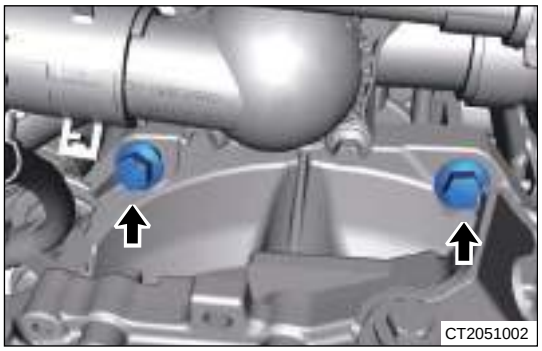
⚠ Caution

- During removal and installation, do not operate violently to avoid damaging the transmission.
- Before removing and installing the tightening bolts, it is necessary to check whether the threaded holes of the transmission are damaged. If there is any abnormality, it needs to be repaired.

19. Separate engine and transmission.

a. Remove 2 fixing bolts between upper part of transmission and engine.

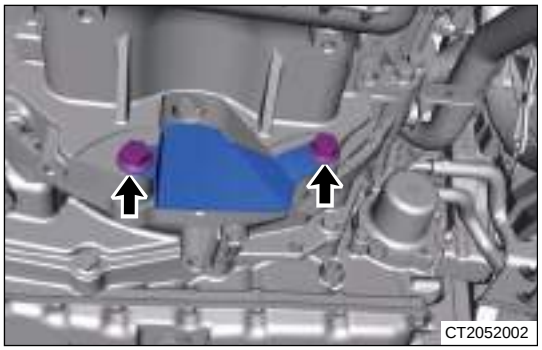
Tightening torque: 60 ± 5 N·m



b. Remove the starter.

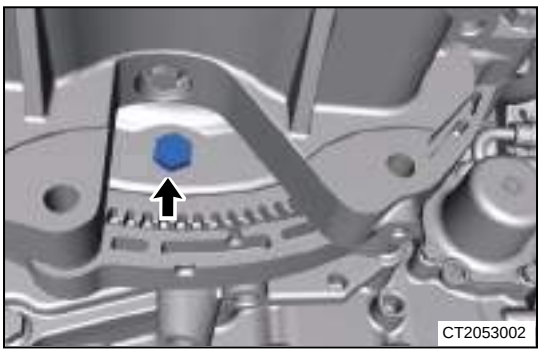
c. Remove 2 fixing bolts between dust plate and transmission, and remove the dust plate.

Tightening torque: 50 ± 5 N·m



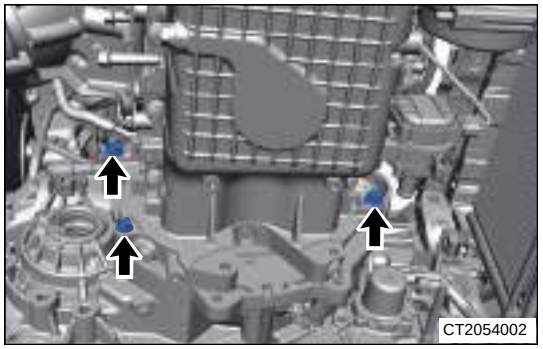
d. Remove the hydraulic torque converter fixing bolts (4 in total, evenly distributed in the circumference).

Tightening torque: 55 ± 5 N·m



e. Remove 3 fixing bolts between transmission and engine.

Tightening torque: 60 ± 5 N·m



f. Remove the transmission assembly.

Installation

⚠ Caution

- During assembly, attention should be paid to ensure that the hydraulic torque converter does not come out.
  a.If the hydraulic torque converter accidentally falls off, it needs to be reinstalled under the guidance of relevant technicians, do not forcibly install it to avoid damaging the internal components of transmission.
  b.The hydraulic torque converter is a high-precision component with high requirements for moment of inertia. If it is accidentally bumped and deformed, it needs to be replaced with a new one.
  c.A 1.5 mm thick dust gasket is also designed between transmission and engine for some vehicles, install it in place.

1. Installation is in the reverse order of removal.
2. Add the specified transmission oil.
3. Add the specified coolant.

Hydraulic torque converter

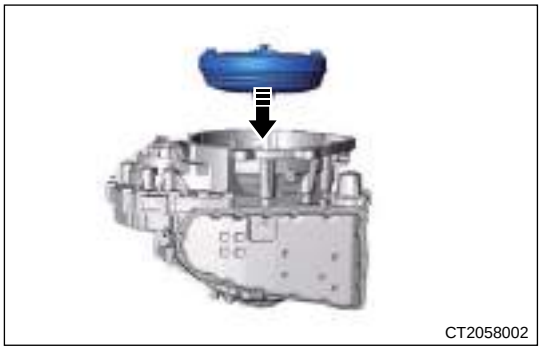
Removal

1. Remove the transmission assembly.
2. Install 2 M10 bolts to hydraulic torque converter and take out hydraulic torque converter carefully.

Installation

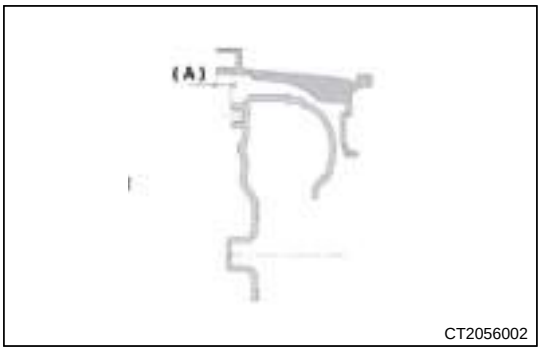
1. Apply proper amount of automatic transmission oil to hydraulic torque converter claws accessory.

2. Align hydraulic torque converter claws with mounting slots inside transmission, and install it into transmission smoothly.


CT2058002

3. Rotate hydraulic torque converter gently so that claws on hydraulic torque converter completely enter sprocket groove.

4. Check the installation dimension A of hydraulic torque converter. The dimension A is required to be ⩾ 11.7 mm.



CT2056002

⚠ Caution

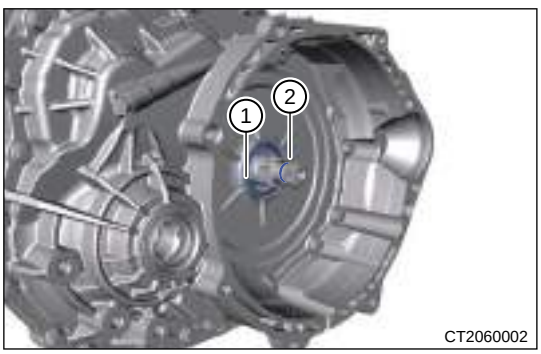
- Prevent dust or oil stains and other foreign matters from entering into transmission through hydraulic torque converter oil seal.
- Prevent hydraulic torque converter from damaging hydraulic torque converter oil seal .
- Hydraulic torque converter has high requirements for moment of inertia. Please operate with care and do not cause scratches or damage.

Transmission Disassembly and Assembly

Disassembly

1. Remove the hydraulic torque converter assembly.

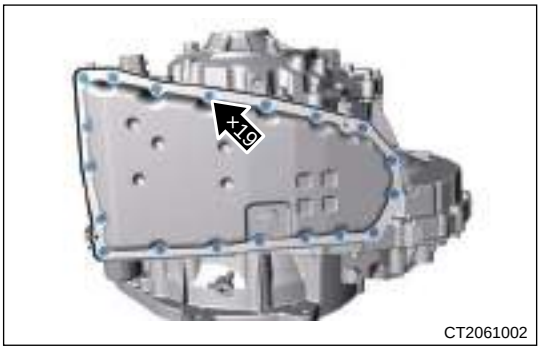
2. Remove hydraulic torque converter oil seal (1), remove O-ring input shaft to hydraulic torque converter (2).



CT2060002

3. Remove 19 fixing bolts (arrow) and valve body case.

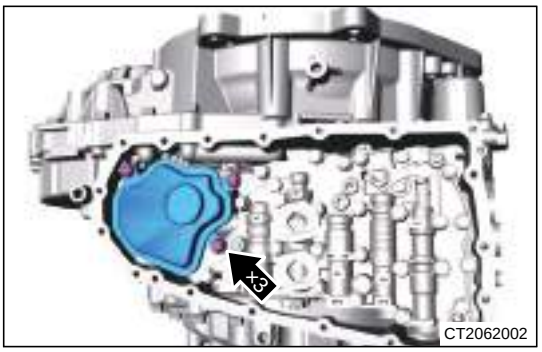
   Tightening torque: 8 - 10 N·m



CT2061002

4. Remove valve body case, remove 3 fixing bolts (arrow) from filter assembly.

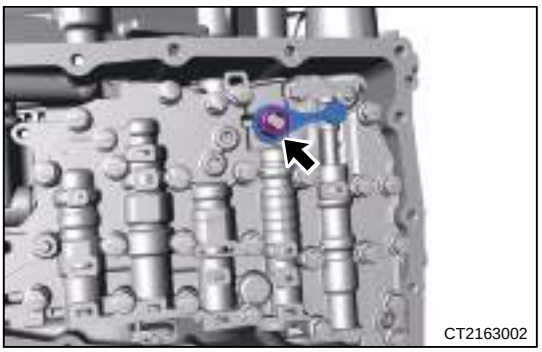
   Tightening torque: 8 - 10 N·m



CT2062002

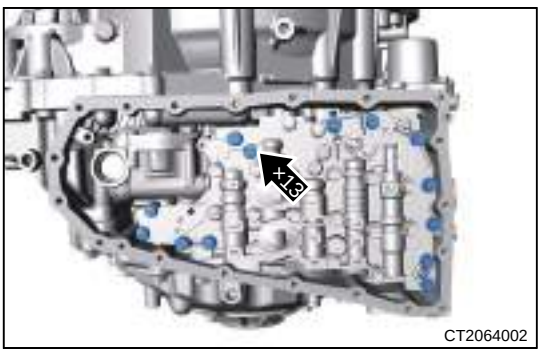
5. Remove fixing nut (arrow) from manual shift valve drive arm.

   Tightening torque: 18 - 25 N·m


CT2163002

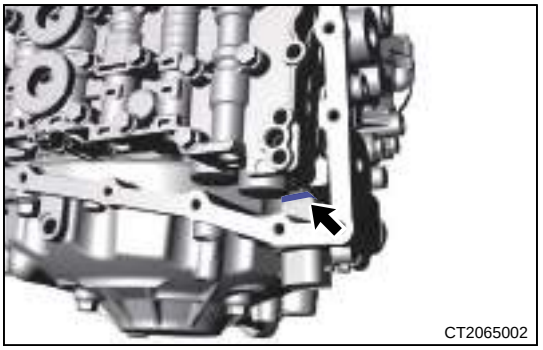
6. Remove 13 fixing bolts (arrow) from valve body and wire harness assembly.

   Tightening torque: 8 - 10N·m



CT2064002

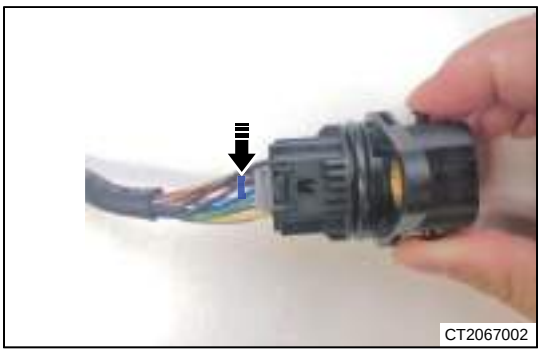
7. Disconnect connector (arrow) from valve body and wire harness assembly.


CT2065002

a. Unplug the connector lock mechanism (arrow) first.


CT2066002

b. Press connector lock mechanism (arrow) to unplug connector.


CT2067002

c. Remove the valve body and wire harness assembly.

8. Remove 23 fixing bolts (arrow) from torque converter case.

Tightening torque: 42 - 54 N·m

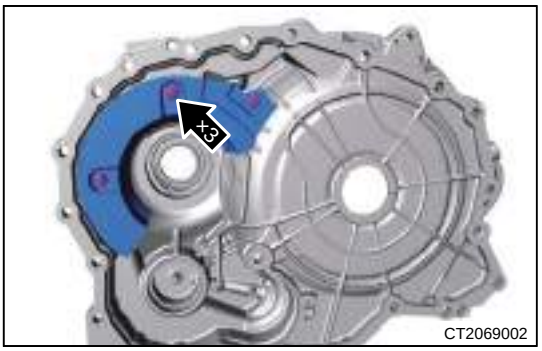

CT2068002

⚠ Warning

- Because the transmission seal gum has strong adhesive force in dry state, it is necessary to use crowbar and small hammer here.
- There are three tapping points reserved on transmission case, which should be struck evenly and gently. Violent operation is strictly prohibited.

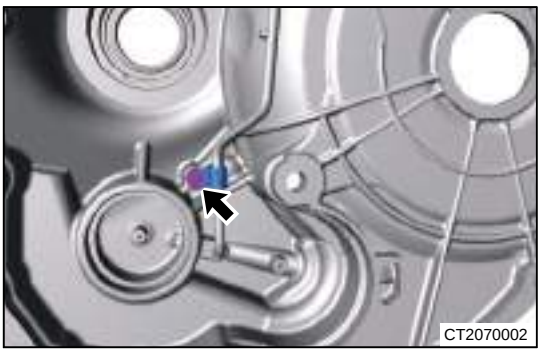
9. Remove 3 fixing bolts of differential upper oil deflector from torque converter case, and remove differential upper oil deflector.

   Tightening torque: 8 - 10 N·m

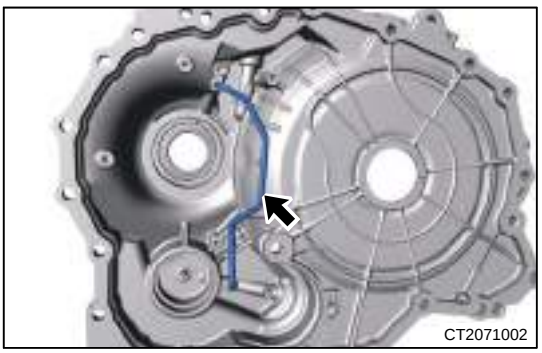


10. Remove fixing bracket bolt (arrow) of oil guide pipe from torque converter case.

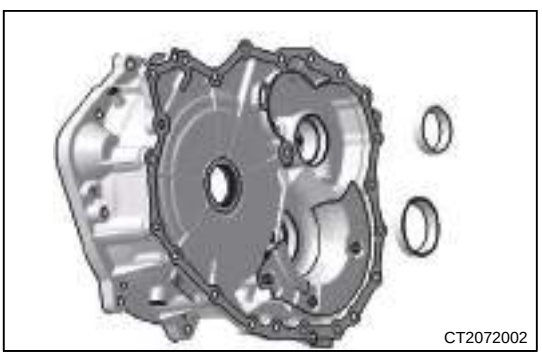
    Tightening torque: 8 - 10 N·m



11. Remove oil guide pipe (arrow) from torque converter case.



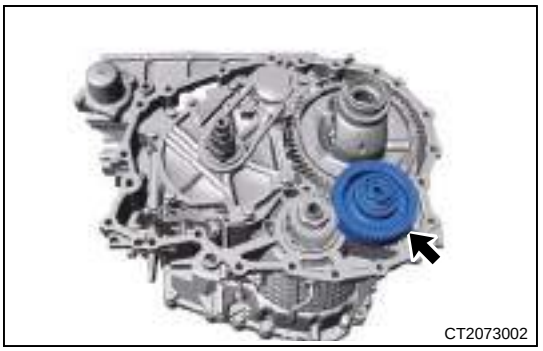
12. Remove the differential bearing outer race, output shaft bearing outer race with a puller.



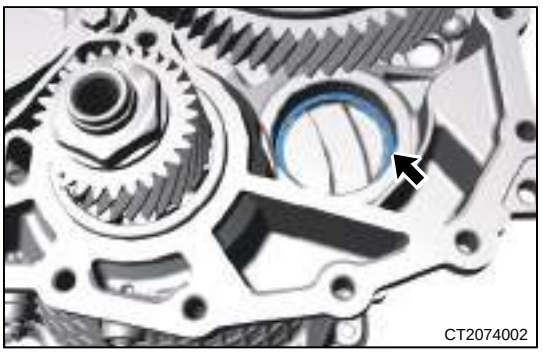
⚠ Warning

- The outer race of output shaft bearing and the outer race of differential bearing are disposable parts.
- Do not damage sealing/mounting surface of torque converter case when removing three bearing outer races.

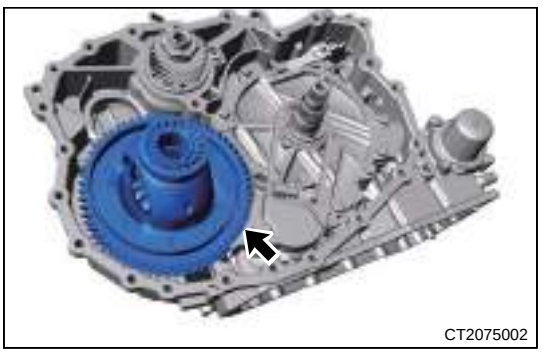
13. Remove the output shaft assembly (arrow).



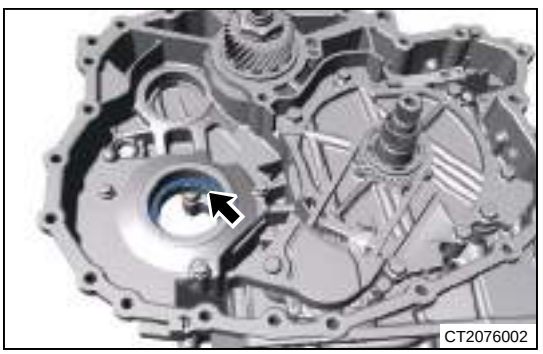
14. Remove the output shaft adjusting shim (arrow)



15. Remove the differential assembly (arrow).

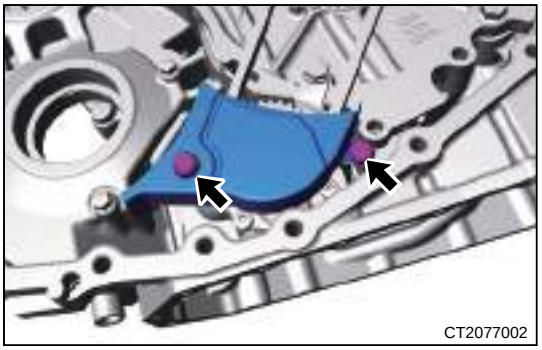


16. Remove the differential rear bearing adjusting shim (arrow).



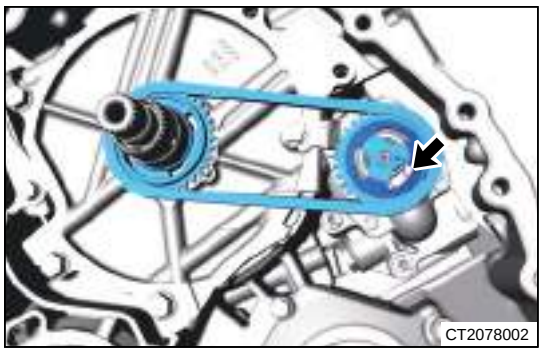
17. Remove 2 fixing bolts (arrow) and sprocket oil deflector.

    Tightening torque: 8 - 10 N·m



18. Remove drive/driven sprocket and chain.

    a. Rotate driven sprocket to expose snap ring (arrow), then use snap spring calipers to support snap ring sprocket bearing and lift up driven sprocket at the same time.

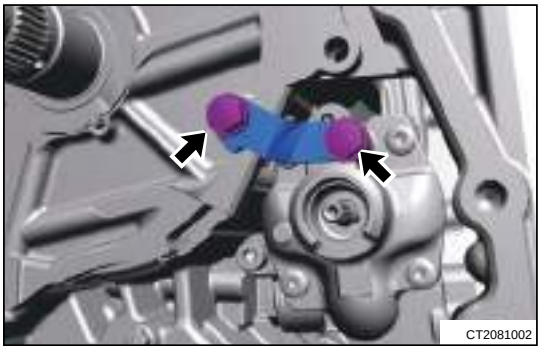


    b. Remove driven sprocket assembly, chain and drive sprocket synchronously.

    c. Remove the washer between drive sprocket and oil separator.

19. Remove 2 fixing bolts (arrow) and pressing plate.

    Tightening torque: 20 ~ 26 N·m



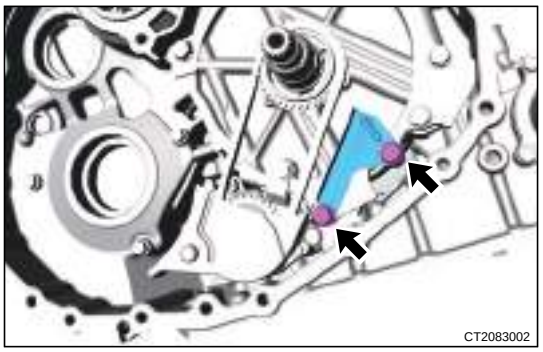
20. Remove 3 fixing bolts (arrow) and differential lower oil deflector assembly.

    Tightening torque: 8 - 10 N·m

21. Remove the oil separator assembly.

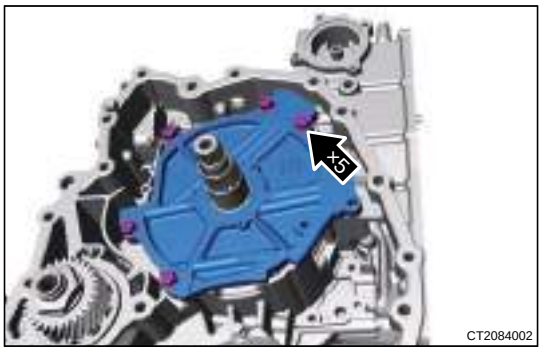
    a. Remove 2 fixing bolts (arrow) and chain oil deflector.

       Tightening torque: 20 - 26 N·m



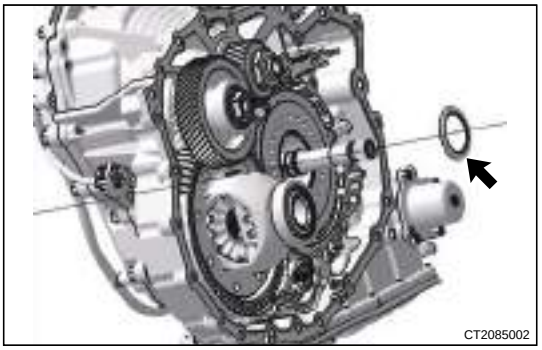
    b. Remove 5 fixing bolts (arrow) and oil separator assembly.

       Tightening torque: 20 - 26 N·m



    c. Remove 2 forward clutch seal ring from oil separator assembly.

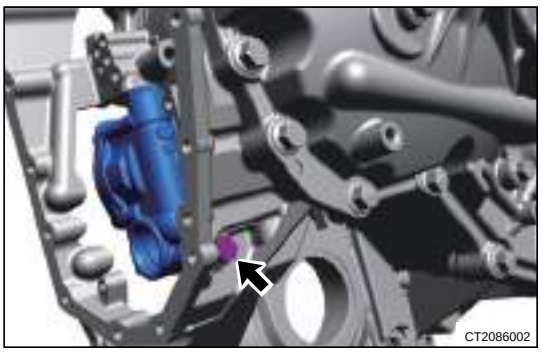
22. Remove the forward clutch thrust bearing (arrow).



23. Remove the oil pump assembly.

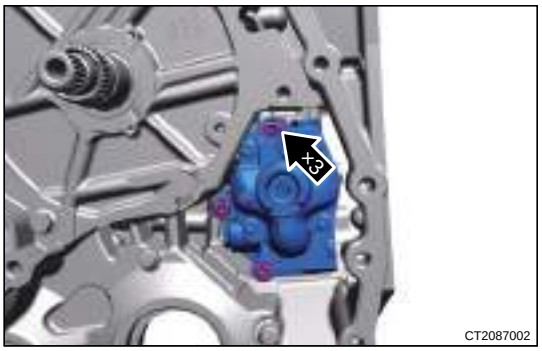
a. Remove 1 fixing bolt (arrow) from oil pump assembly, remove bolt and O-ring bearing deflector.

Tightening torque: 20 - 26 N·m



b. Remove 3 fixing bolts (arrow) and oil pump assembly.

Tightening torque: 20 - 26 N·m



Assembly

1. Install oil pump assembly, apply CVTF to O-ring and put it into groove of oil pump bolt mounting hole of transmission case.

   Tightening torque: 20 - 26 N·m

2. Install the forward clutch thrust bearing.

   a. Select proper forward clutch thrust bearing, and apply appropriate amount of automatic transmission oil, and put it in place.

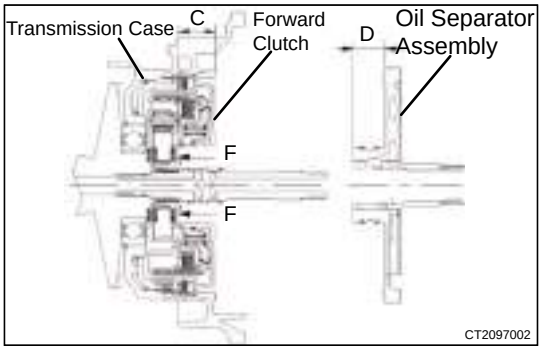
b. Forward clutch thrust bearing selection.

a. As shown in above illustration, apply a force of 1050 ± 50 N in direction of F.

b. Measure distance C.

c. Measure distance D on oil separator assembly.

d. Calculate E = C - D, then select and install thrust bearing according to the table below.



E	Selected Part No.	Bearing Thickness (± 0.05)
4.274 ⩽ E ＜ 4.452	025CHA-1502604AA	3.924
4.452 ⩽ E ＜ 4.629	025CHA-1502604AB	4.102
4.629 ⩽ E ＜ 4.807	025CHA-1502604AC	4.279
4.807 ⩽ E ＜ 5.007	025CHA-1502604AD	4.457

⚠ Warning

- The installation direction of thrust bearing is upward as shown in illustration below.

3. Install the oil separator assembly.

a. Apply CVTF to two forward clutch seal rings, and install them in two sealing grooves on oil separator assembly in place.

b. Install oil separator assembly with seal ring to transmission case.

c. Place chain oil deflector in the corresponding position on oil separator assembly.

d. Screw in 7 hexagon flange bolts (install chain oil deflector) and tighten them diagonally.

Tightening torque: 20 - 26 N·m

⚠ Warning

- Remove O-ring input shaft to torque converter before removing oil separator assembly.
- To replace oil separator assembly, it is necessary to re-select forward clutch thrust bearing.

4. Install the differential lower oil deflector assembly.

Tightening torque: 8 - 10 N·m

5. Install the pressure plate.

Tightening torque: 8 - 10 N·m

6. Install drive/driven sprocket and chain.

   a. Install washer between drive sprocket and oil separator, and put three claws into three grooves of oil separator.

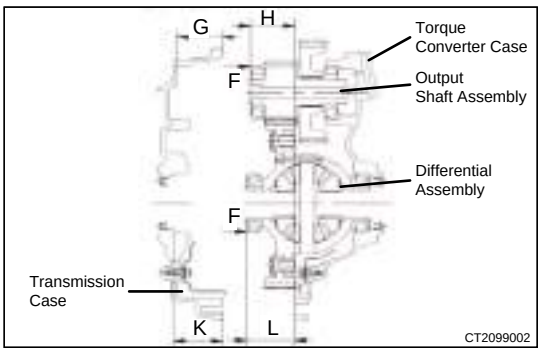
   b. At the same time, install sprocket chain. After drive sprocket is installed in place (the side with greater height from end face to tooth surface is upward), use snap spring calipers to support sprocket bearing snap ring, and at the same time press down driven sprocket assembly. After driven sprocket is installed in place, release snap spring calipers and confirm that snap ring is stuck in snap ring groove of sprocket bearing.

   c. Install the sprocket oil deflector.
      Tightening torque: 8 - 10 N·m

7. Install output shaft assembly, and differential assembly.

   a. According to requirements, select appropriate size of differential bearing adjusting shim and put it into bearing seat.
   b. According to requirements, select appropriate size of output shaft bearing adjusting shim and put it into bearing seat.

   c. Output shaft adjusting shim selection.
      a. Place torque converter case assembly (the joint surface with transmission case upward) on workbench and fix it.
      b. Install output shaft assembly to torque converter case in place.
      c. Measure distances G and H in above illustration respectively.
      d. When measuring distance H, apply a pressure of 300 ± 25 N on outer race of bearing and rotate for several turns.
      e. Calculate J = G - H, then select shim according to the table below, and install it after applying CVTF.



J	Selected Part No.	Shim Thickness (± 0.01)
0.74 ≤ J < 0.77	025CHA-1502108AA	0.88
0.77 ≤ J < 0.8	025CHA-1502108AB	0.91
0.8 ≤ J < 0.83	025CHA-1502108AC	0.94
0.83 ≤ J < 0.86	025CHA-1502108AD	0.97
0.86 ≤ J < 0.89	025CHA-1502108AE	1
0.89 ≤ J < 0.92	025CHA-1502108AF	1.03
0.92 ≤ J < 0.95	025CHA-1502108AG	1.06
0.95 ≤ J < 0.98	025CHA-1502108AH	1.09
0.98 ≤ J < 1.01	025CHA-1502108AJ	1.12
1.01 ≤ J < 1.04	025CHA-1502108AK	1.15
1.04 ≤ J < 1.07	025CHA-1502108AL	1.18
1.07 ≤ J < 1.1	025CHA-1502108AM	1.21
1.1 ≤ J < 1.13	025CHA-1502108AN	1.24
1.13 ≤ J < 1.16	025CHA-1502108AP	1.27
1.16 ≤ J < 1.19	025CHA-1502108AQ	1.3
1.19 ≤ J < 1.22	025CHA-1502108AR	1.33
1.22 ≤ J < 1.25	025CHA-1502108AS	1.36
1.25 ≤ J < 1.28	025CHA-1502108AT	1.39

d. Differential rear bearing adjusting shim selection.
e. Place torque converter case assembly (the joint surface with transmission case upward) on workbench and fix it.
f. Install differential assembly to torque converter case in place.
g. Measure distances K and L in above illustration respectively.
h. When measuring distance L, apply a pressure of 300 ± 25 N on outer race of bearing and rotate for several turns.
i. Calculate M = K - L, then select shim according to the table below, and install it after applying CVTF.

M	Selected Part No.	Shim Thickness (± 0.012)
0.72 ≤ M < 0.8	513MHA-1701508AA	0.93
0.8 ≤ M < 0.87	513MHA-1701508AB	1.01
0.87 ≤ M < 0.95	513MHA-1701508AC	1.08
0.95 ≤ M < 1.02	513MHA-1701508AD	1.16
1.02 ≤ M < 1.1	513MHA-1701508AE	1.23
1.1 ≤ M < 1.18	513MHA-1701508AF	1.31
1.18 ≤ M < 1.26	513MHA-1701508AG	1.39

8. Install new differential bearing outer race and output shaft bearing outer race.

9. Install differential upper oil deflector, oil guide pipe and oil guide bracket to hydraulic torque converter case.
   Tightening torque: 8 - 10 N·m

10. Install the torque converter case.

    a. Lay CVT transmission case flat, clean original gum on sealing surface of transmission case, and there should be no convex residual gum on sealing surface.

    b. Apply new specified seal gum (Loctite 5460).

⚠ Warning

- Make sure there are no foreign matters in transmission cavity, and make sure scraping gum does not fall into transmission cavity.
- When cleaning original seal gum on sealing surface of transmission case, do not scratch sealing surface of transmission case.
- Application line needs to be located on sealing surface of case inside bolt mounting hole.
- Ensure quality of gum application, there should be no broken gum, uneven coating, bubble in application line.

    c. Install 23 fixing bolts to torque converter case.
    Tightening torque: 42 - 54 N·m

⚠ Caution

- For a new torque converter case, it needs to install two oil pressure detection bolts and corresponding O-rings.
  Tightening torque: 19 - 25 N·m

11. Install the valve body and wire harness assembly.

⚠ Warning

- Make sure O-ring valve body and transmission case are intact.
- Before installing valve body and wire harness assembly, confirm O-ring valve body and transmission case are installed in place.
- When electronic shift actuator connecting rod is assembled to transmission rocker arm, rocker arm transmission position must be consistent with that when it is separated.
- It is necessary to learn after removing and installing electronic shift module assembly.

12. Install the filter assembly.
    Tightening torque: 8 - 10 N m

13. Install the valve case assembly.
    Tightening torque: 8 - 10 N·m

14. Install hydraulic torque converter oil seal, install O-ring input shaft to hydraulic torque converter.
15. Install hydraulic torque converter assembly.

Matching and Learning

Electronic Shift Actuator Self-learning
Transmission self-learning should be performed in following conditions, otherwise there will be abnormal shifts:

1. Replace electronic shift actuator.
2. Electronic shift actuator was removed and installed again.
3. Electronic shift part fault code alarms.

The specific operation of self-learning is as follows:

1. Vehicle power is turned on without starting;
2. First shift to N;
3. Then shift to P;
4. Finally shift to N;
5. Perform self-learning with diagnostic tester (It is required to perform self-learning in N);
6. Vehicle power is turned off normally and self-learning is completed.

⚠ Caution

- The diagnostic tester prompts that the self-learning has failed, first check whether the meter displays N gear.
- If it is not in N, first shift to N position, and then repeat the self-learning according to the above steps.
- If it is in N, adjust the electronic shift connecting rod according to the data, and then perform self-learning again according to the above steps.

Transmission Self-Learning
Transmission self-learning should be performed in following conditions, failure to do so may cause unsmooth gear shifting and starting:

1. For the first driving of a new vehicle;
2. Replace TCU with a new one;
3. Replace valve body assembly, hydraulic torque converter, forward and reverse clutch set and transmission.

The transmission needs to clear the self-learning value with diagnostic tester after replacing the above components. After the vehicle power is turned off and then start again, perform self-learning according to the self-learning steps;
The specific operation of hydraulic torque converter lock clutch self-learning is as follows:

1. Start the engine and shift to D;
2. Accelerate the vehicle to 50 kph;
3. Release the accelerator pedal and do not depress the brake pedal. The vehicle will slide to below 10 kph;
4. Repeat steps 2 and 3 for three times;
5. Turn off the ignition key and self-learning is completed after waiting for 10 seconds.

The specific operation of forward clutch self-learning is as follows:

1. Release the parking brake after starting the engine;
2. Depress the brake pedal and shift to N, shift to D after waiting for 2 seconds, release brake pedal after waiting for 10 seconds in D, and to creep speed;
3. Repeat step 2 for more than five times;
4. Turn off the ignition key and self-learning is completed after waiting for 10 seconds.

The specific operation of reverse clutch self-learning is as follows:

1. Release the parking brake after starting the engine;

2. Depress the brake pedal and shift to N, shift to R after waiting for 2 seconds, release brake pedal after waiting for 10 seconds in R, and to creep speed;
3. Repeat step 2 for more than five times;
4. Turn off the ignition key and self-learning is completed after waiting for 10 seconds.

⚠ **Caution**
• In order to achieve a good driving effect under various operating conditions, it is necessary to perform self-learning under high temperature, low temperature and normal temperature.

ELECTRONIC SHIFT

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. When removing electronic shift module assembly, be sure to wear safety equipment to prevent accidents.

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

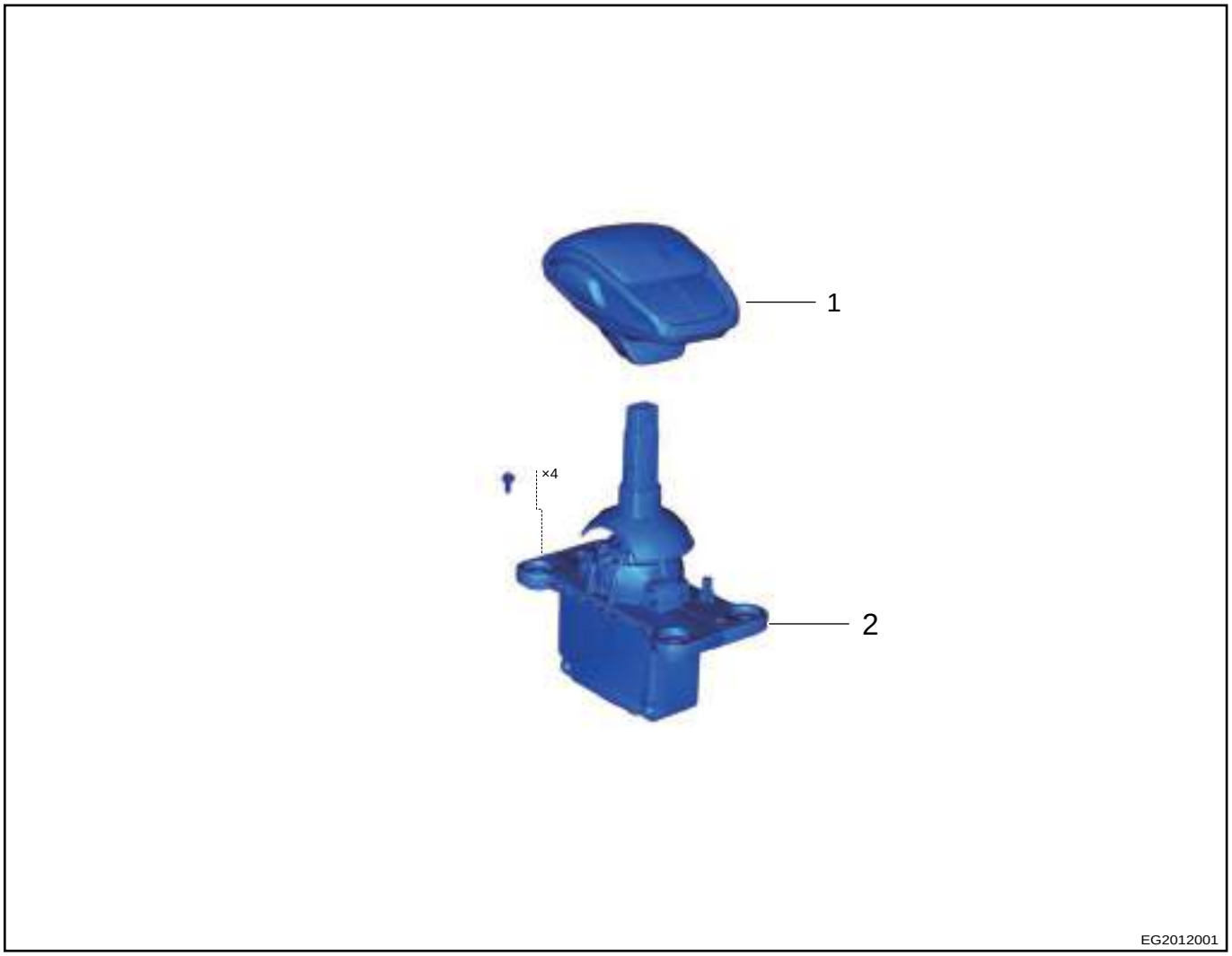
1. Appropriate force should be applied, when removing upper cover plate assembly. Be careful not to operate roughly.

System Overview

System Description

Electronic shift module (EGS) and the transmission is not the traditional mechanical way, but a safer and faster electronic control mode, eliminating the traditional mechanical shift mode, all using electronic signals to substitute. Its advantage is that the driver's wrong shift operation will be judged by the computer to see if it will cause damage to the transmission, so as to better protect the transmission and correct the bad shift habits. As a luxurious, high-technology configuration, electronic shift lever eliminates the traditional mechanical shifting mechanism and provides us with a more convenient operation.

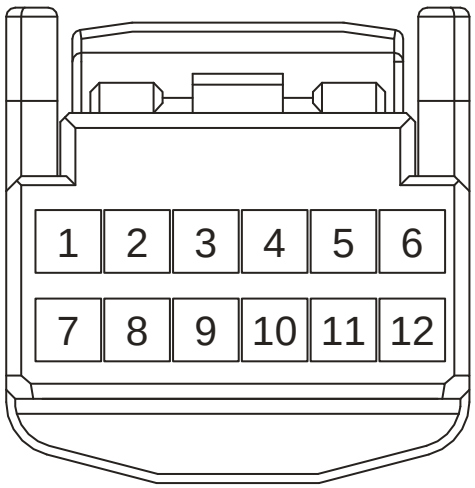
System Diagram



1	Shift Lever Assembly	2	Electronic Shift Module Assembly

System Circuit Diagram

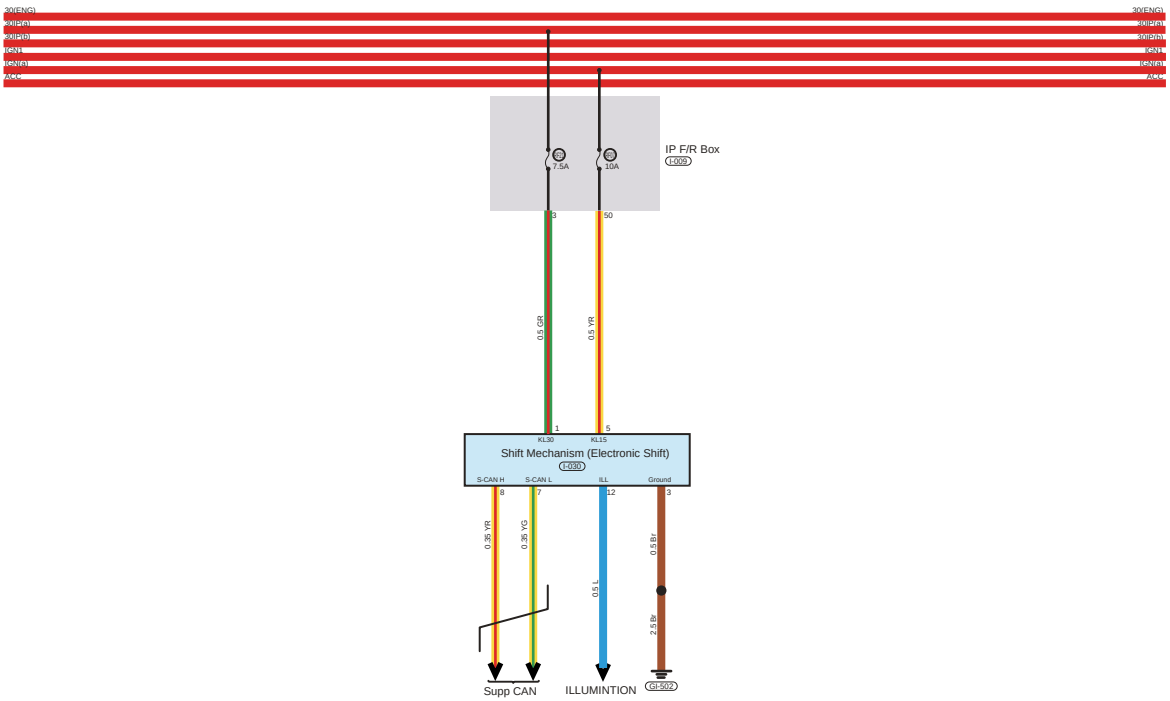
Automatic Gear Shift Mechanism Terminal Definition



EG2045001

Terminal No.	Description	Terminal No.	Description
1	KL30	7	S-CAN L
2	-	8	S-CAN H
3	Ground	9	-
4	-	10	-
5	KL15	11	-
6	-	12	ILL

Circuit Diagram



Diagnosis & Testing

Problem Symptoms Table

Hint:

- Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Problem	Suspected Area
Automatic Shift Control Mechanism Lost Communication With EMS Automatic Shift Control Mechanism Lost Communication With TCU Automatic Shift Control Mechanism Lost Communication With BSM Automatic Shift Control Mechanism Lost Communication With ICM Automatic Shift Control Mechanism Lost Communication With BCM	Wire harness or connector is damaged
	CAN bus hardware circuit malfunction
	Damaged electronic shift lever
	EGS module
	It is possible that associated module had been replaced when battery is not removed

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Turn ENGINE START STOP switch to ON.

- Use the diagnostic tester to record and clear DTCs stored in the system.
- Turn ENGINE START STOP switch to OFF and wait several seconds.
- Turn ENGINE START STOP switch to ON and check DTCs in the system again.
- If DTC is detected, it indicates current malfunction.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Check for broken, bent, protruded or corroded terminals.
- Check electronic shift control system components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

- Remove ground bolt or nut.
- Check all contact surfaces for tarnish, dirt and rust, etc.
- Clean as necessary to ensure that contact is in good condition.
- Reinstall ground bolt or nut securely.
- Check if any additional accessories interfere with ground circuit.
- If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnosis Procedure

Hint:

- Use following procedures to troubleshoot the electronic shift system.

1	**Vehicle brought to workshop**

Next

2	**Check battery voltage**

Check if battery voltage is normal.
Standard Condition
Standard voltage: Not less than 12 V.

NG → **Replace battery**

OK

3	**Customer problem analysis**

Next

4	**Read DTCs**

NG → **Perform repair according to problem symptoms table**

OK

5	**Read DTCs (current DTC and history DTC)**

NG → **Troubleshoot according to Intermittent DTC malfunction procedures**

OK

6	**Repair according to Diagnostic Trouble Code (DTC) chart**

Next

7	**Adjust, repair or replace**

Next

8	**Conduct test and confirm malfunction has been repaired**

Next → **End**

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Possible Cause	Maintenance Advice
C1950-16	Battery Voltage Below Threshold	• Power supply system failure • Wire harness or connector is damaged • EGS failure	• Check and repair power supply system • Check wire harness or connector • Replace EGS
C1951-17	Battery Voltage Above Threshold		
C1952-00	FW Stuck	• Wire harness or connector failure • EGS failure	• Check wire harness or connector • Replace EGS
C1953-00	BW Stuck		
C1954-00	TIP+ Stuck		
C1955-00	TIP- Stuck		
C1956-49	Light Detection Fault		
C1957-49	Heavy Detection Fault		
C1958-48	Program Cycle Violated		
C1959-13	Park Button 1 Open Circuit		
C195A-11	Park Button 1 Short to GND		
C195B-12	Park Button 1 Short to Power Supply		
C195C-92	Park Button Stuck		
C195D-13	Park Button 2 Open Circuit		
C195E-11	Park Button 2 Short to GND		
C195F-12	Park Button 2 Short to VCC		
C1960-92	Park Button 2 Pressed for 60s		
C1961-38	Invalid PWM for Overlight		
C1962-46	Calibration Parameters be Corruped	• Calibration Parameters be Corruped • EGS failure	• Recalibrate again • Replace EGS
U0073-88	CAN Bus Off	• CAN network failure • EGS failure	• Check and repair CAN network • Replace EGS
U0100-87	Lost Communication with EMS		
U0101-87	Lost Communication with TCU		
U0129-87	Lost Communication with BSM		

DTC	DTC Definition	Possible Cause	Maintenance Advice
U0155-87	Lost Communication with ICM		
U0401-81	Invalid Data Received from EMS-Invalid Serial Data Received		
U0402-81	Invalid Data Received from TCU		
U0418-81	Invalid Data Received from BSM-Invalid Serial Data Received		
U0423-81	Invalid Data Received from ICM		
U0140-87	Lost Communication with BCM		

DTC Diagnosis Procedure

DTC	C1950-16	Battery Voltage - Circuit Voltage Below Threshold
DTC	C1951-17	Battery Voltage - Circuit Voltage Above Threshold

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check battery voltage

(a) Check if battery voltage is normal.
(b) Check battery voltage with multimeter voltage band.

NG → **Check and repair battery**

OK

2	Check EGS module power supply fuse

(a) Check if “EGS module” power supply fuse in instrument panel fuse and relay box is blown.

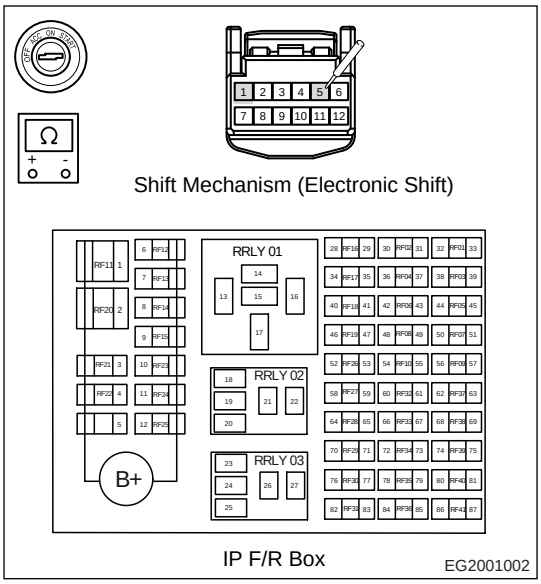
NG → **Replace fuse**

OK

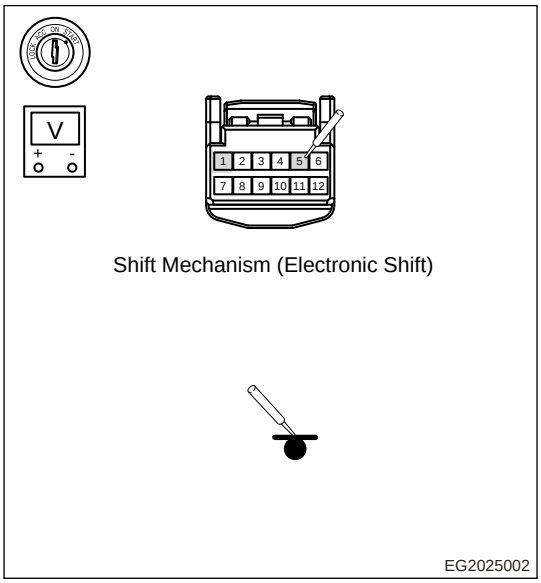
3	**Check supply circuit**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the electronic shift module connector.

(d) Use digital multimeter to measure resistance between terminal 1, 5 of electronic shift module and instrument panel fuse and relay box (connected terminals) to check circuit for open.



(e) Use a multimeter to measure voltage between terminals 1, 5 of electronic shift module and body ground, it should be not less than 12 V.



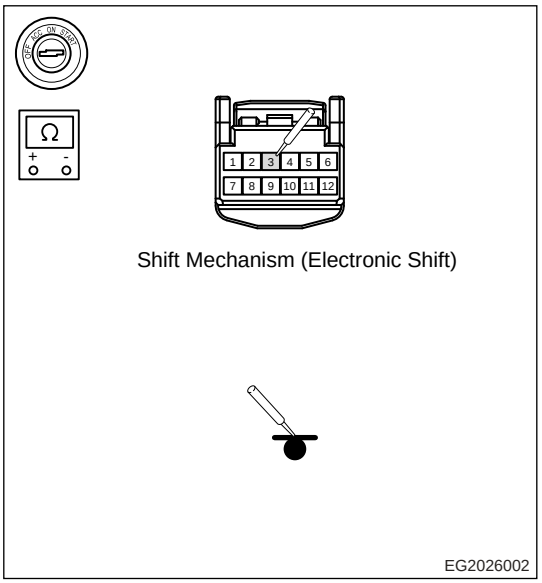
NG → **Repair or replace related wire harness**

OK

4	Check EGS shift module ground

(a) Turn ENGINE START STOP switch to ON.

(b) Using voltage band of multimeter to measure resistance between terminal 3 of electronic shift module and body ground to check ground wire for open.



NG → **Check wire harness or deal with ground points**

OK

5	Reconfirm DTCs

(a) Connect all connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to ON.
(d) Check if DTC exists.

OK → **Confirm system is normal**

NG → **Replace EGS shift module assembly**

DTC	**C1952-00**	**FW Stuck**
DTC	**C1953-00**	**BW Stuck**
DTC	**C1954-00**	**TIP+ Stuck**
DTC	**C1955-00**	**TIP Stuck**
DTC	**C1956-49**	**Light Detection Fault**
DTC	**C1957-49**	**Heavy Detection Fault**
DTC	**C1958-48**	**Program Cycle Violated**

DTC	**C1959-13**	**Park Button 1 Open Circuit**
DTC	**C195A-11**	**Park Button 1 Short to GND**
DTC	**C195B-12**	**Park Button 1 Short to VCC**
DTC	**C195C-92**	**Park Button 1 Pressed for 60s**
DTC	**C195D-13**	**Park Button 2 Open Circuit**
DTC	**C195E-11**	**Park Button 2 Short to GND**
DTC	**C195F-12**	**Park Button 2 Short to VCC**
DTC	**C1960-92**	**Park Button 2 Pressed for 60s**
DTC	**C1961-38**	**Invalid PWM for Overlight**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Turn ENGINE START STOP switch to ON.
- Use the diagnostic tester to record and clear DTCs stored in the system.
- Turn ENGINE START STOP switch to OFF and wait several seconds.
- Turn ENGINE START STOP switch to ON and check the DTCs in system again.
- If DTC is detected, it indicates current malfunction.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

⚠ **Caution**
• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check shift lever and shift module connector**

(a) Turn off all electrical equipment and ENGINE START STOP switch.
(b) Disconnect the negative battery cable.
(c) Disconnect shift lever/shift module connector.
(d) Check if wire harnesses are worn, pierced, pinched or partially broken.
(e) Check for broken, bent, protruded or corroded terminals.

NG → **Repair or replace shift lever/shift module**

OK

2	**Check EGS module power supply fuse**

(a) Check if “EGS module” power supply fuse in instrument panel fuse and relay box is blown.

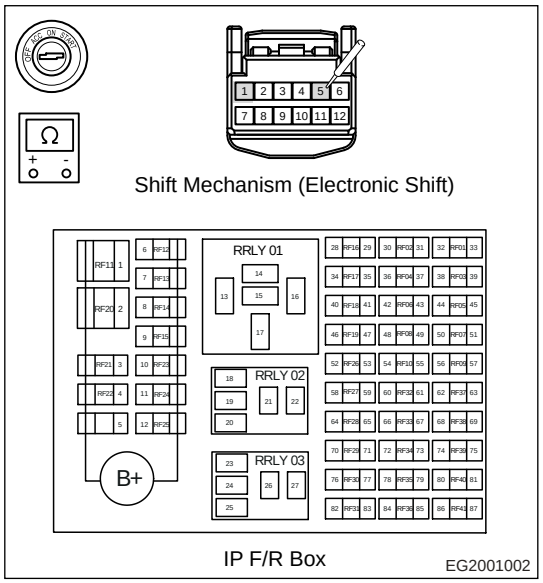
NG → **Replace fuse**

OK

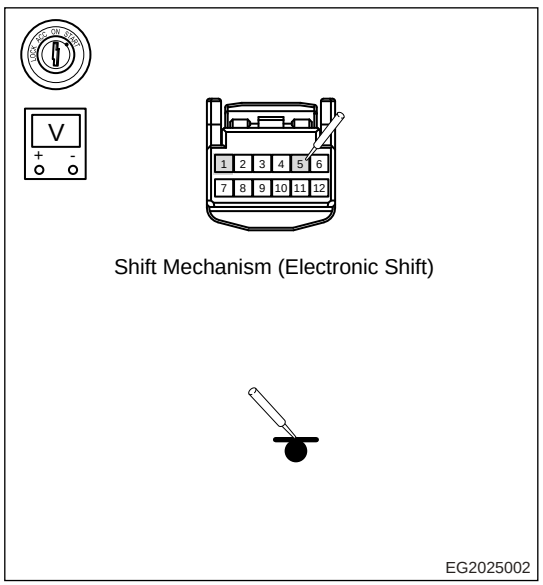
3	**Check supply circuit**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the electronic shift module connector.

(d) Using voltage band of multimeter to measure resistance between terminal 1, 5 of electronic shift module and instrument panel fuse and relay box (connected terminals) to check circuit for open.



(e) Use a multimeter to measure voltage between terminals 1, 5 of electronic shift module and body ground, it should be not less than 12 V.



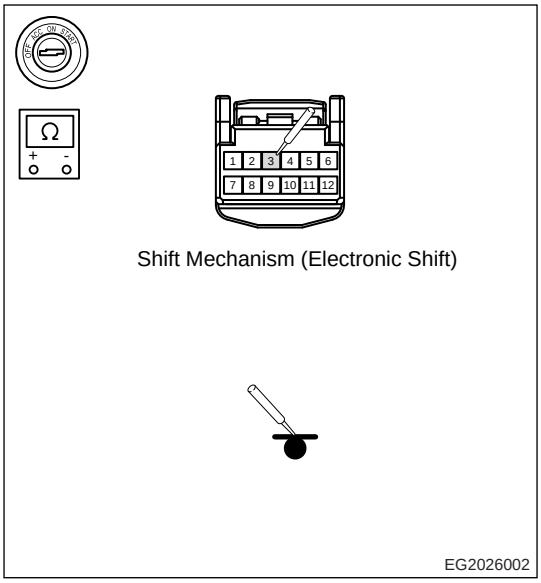
NG → **Repair or replace related wire harness**

OK

4	Check EGS shift module ground

(a) Turn ENGINE START STOP switch to ON.

(b) Use a multimeter to measure resistance between terminal 3 of electronic shift module and body ground to check ground wire for open.



NG → **Check wire harness or deal with ground points**

OK

5	Reconfirm DTCs

(a) Connect all connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to ON.
(d) Check if DTC exists.

OK → **Confirm system is normal**

NG → **Replace EGS shift module assembly**

DTC	**U0073-88**	**Control Module Communication Bus Off CAN Busoff**
DTC	**U0100-87**	**Lost Communication With EMS**
DTC	**U0101-87**	**Lost Communication With TCU**
DTC	**U0129-87**	**Lost Communication With BSM**

DTC	**U0155-87**	**Lost Communication With ICM**
DTC	**U0140-87**	**Lost Communication With BCM**

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Turn ENGINE START STOP switch to ON.
- Use the diagnostic tester to record and clear DTCs stored in the system.
- Turn ENGINE START STOP switch to OFF and wait several seconds.
- Turn ENGINE START STOP switch to ON and check the DTCs in system again.
- If DTC is detected, it indicates current malfunction.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

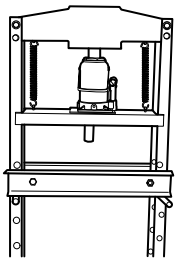
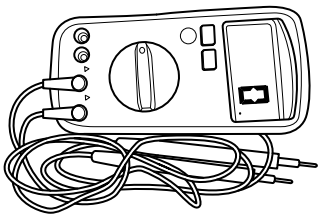
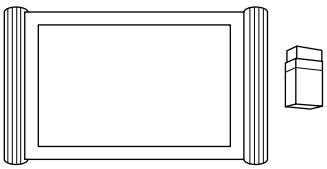
Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**(Refer to CAN system)**

On-vehicle Service

Tools

General Tools

Tool Name	Tool Drawing
Interior Crow Plate	 S00020
Digital Multimeter	 S00002
X-431 PAD Diagnostic Tester	 S00001

Specifications

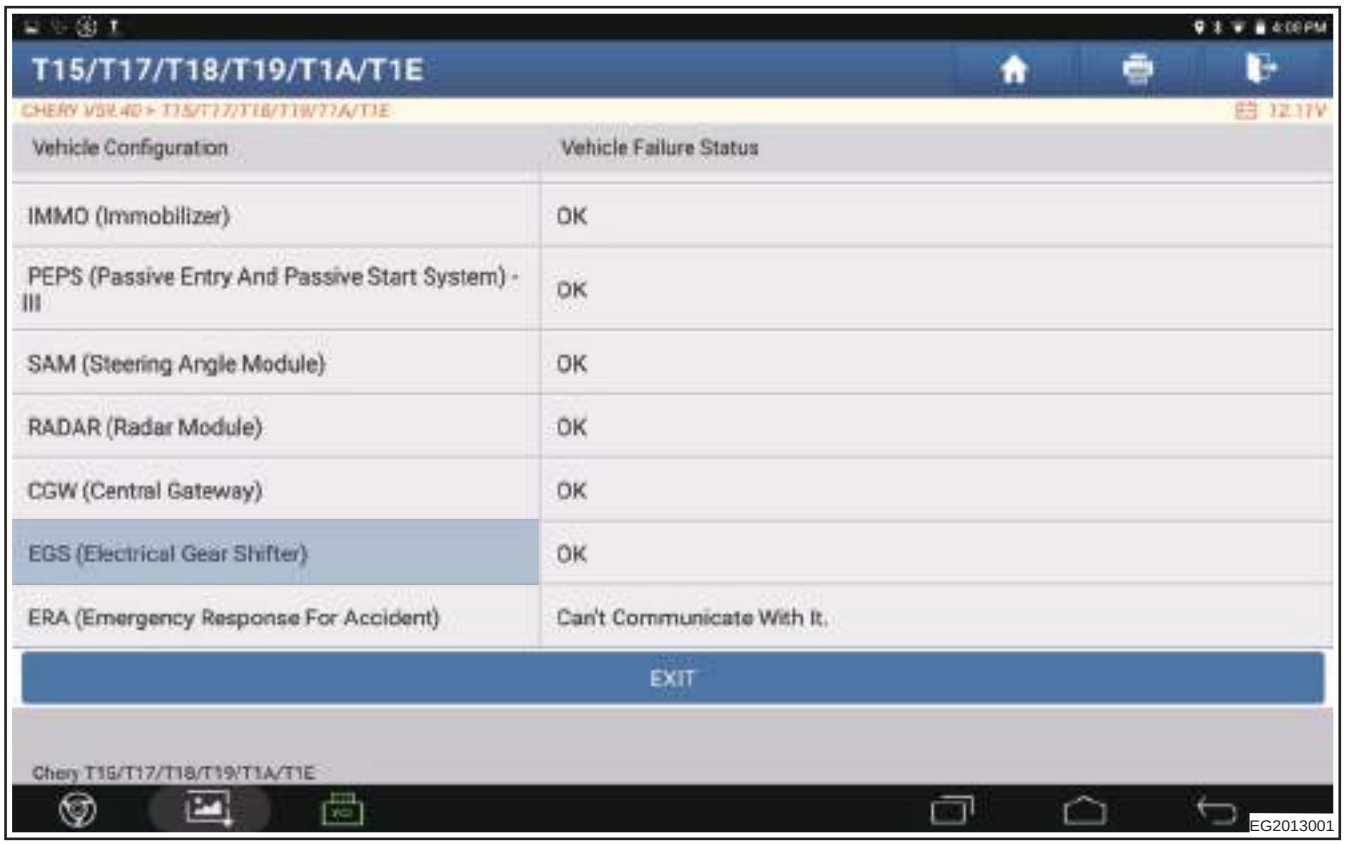
Torque Specifications

Item	Tightening torque
Automatic Shift Control Mechanism Fixing Screw	1.5 ± 0.5 N·m
Electronic Shift Control Mechanism Fixing Bolt	5 ± 1 N·m

Method for Distinguishing Manufactures of Electronic Shift Lever

Warning
• When removing shift lever assembly, be sure to wear safety equipment to prevent accidents. • Appropriate force should be applied, when removing shift lever assembly. Be careful not to operate roughly.

1. Connect the diagnostic tester.
2. Turn the ENGINE START STOP switch to ON.
3. Operate diagnostic tester to enter EGS system.



4. Click “Version Information”.

5. Read manufacturer code.

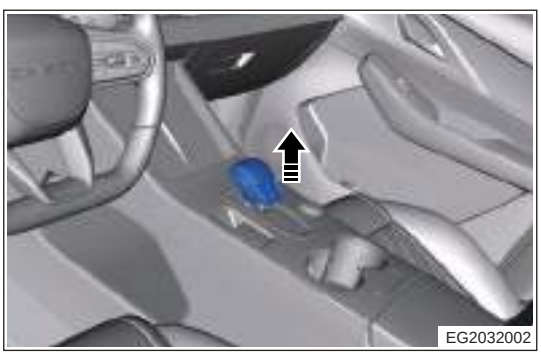
a.6BS belongs to Wuhu Qifeng, and 7AR belongs to Ficosa.

Shift Lever Assembly

Removal

Warning
• When removing shift lever assembly, be sure to wear safety equipment to prevent accidents. • Appropriate force should be applied, when removing shift lever assembly. Be careful not to operate roughly.

1. Disconnect the negative battery cable.
2. Remove the shift lever assembly (6BS).
   a. Remove shift lever assembly in direction of arrow.



Installation

⚠ Caution

- Insert shift lever assembly along the direction of shift lever of shift control mechanism, until shift lever reaches the lower limit (there will be a slight sound of a snap ring in place), and shift lever can not be pushed down.
- Slightly apply force to push the lever upward after assembly, confirm it is assembled in place.
- Do not hit the lever to avoiding damaging connector.

1. Installation is in the reverse order of removal.

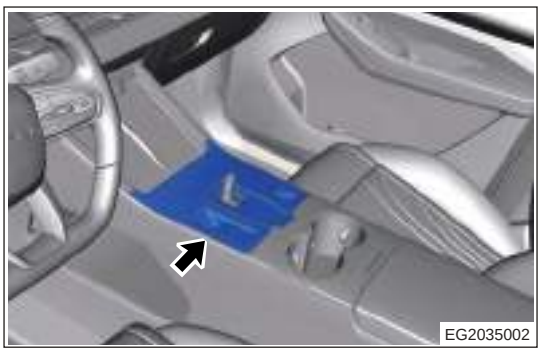
Electronic Shift Mechanism Assembly

Removal

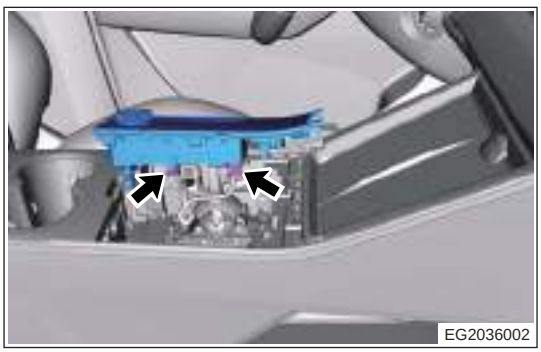
⚠ Warning

- When removing shift control mechanism assembly, be sure to wear safety equipment to prevent accidents.
- Appropriate force should be applied, when removing shift control mechanism assembly. Be careful not to operate roughly.

1. Turn ignition switch to OFF.
2. Disconnect the negative battery cable.
3. Remove the shift knob assembly.
4. Pry off auxiliary fascia console control panel assembly (-arrow) carefully with an interior crow plate.



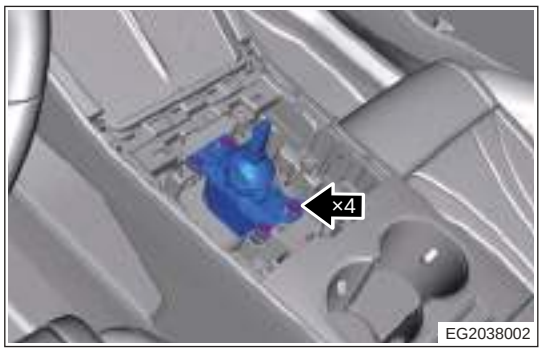
5. Disconnect each switch connector (arrow), and remove upper cover plate assembly.



6. Disconnect the electronic shift control mechanism assembly wire harness connector (arrow).

7. Remove 4 fixing bolts (arrow) from electronic shift control mechanism assembly, then remove electronic shift control mechanism assembly.

   Tightening torque: 5 ± 1 N m



Installation

⚠ Caution

- After replacing electronic shift mechanism assembly, use the diagnostic tester to write VIN code.
- Insert shift lever assembly along the direction of shift lever of shift control mechanism, until shift lever reaches the lower limit (there will be a slight sound of a snap ring in place), and shift lever can not be pushed down.
- Slightly apply force to push the lever upward after assembly, confirm it is assembled in place.
- Do not hit the lever to avoiding damaging connector.

1. Installation is in the reverse order of removal.

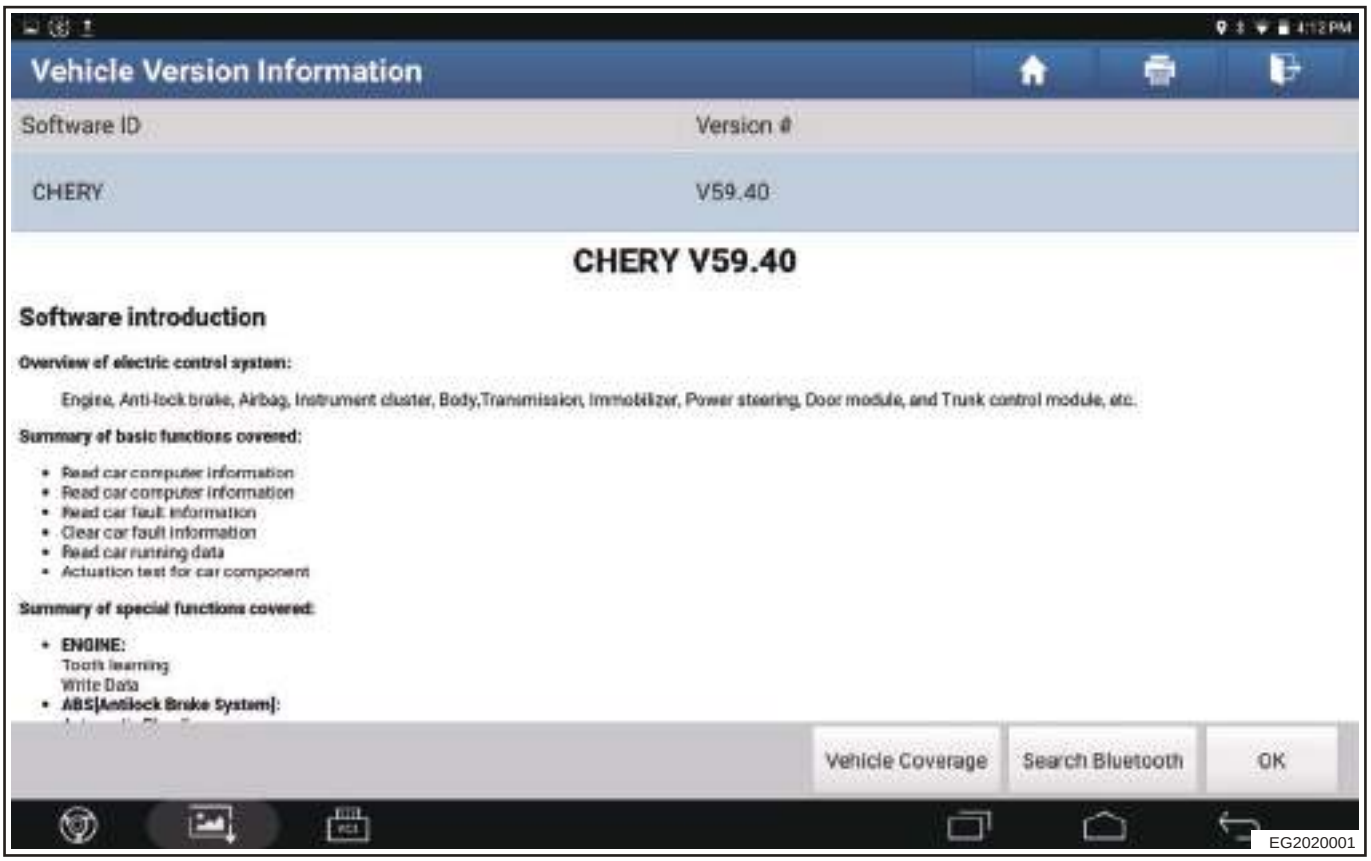
Matching Learning

Write VIN Code

Hint:

- After replacing electronic shift mechanism assembly, use the diagnostic tester to write VIN code.

1. Connect diagnostic tester, and select “CHERY”.
2. Select Vehicle Version Information (Version ≥ V59.40), and click “OK”.



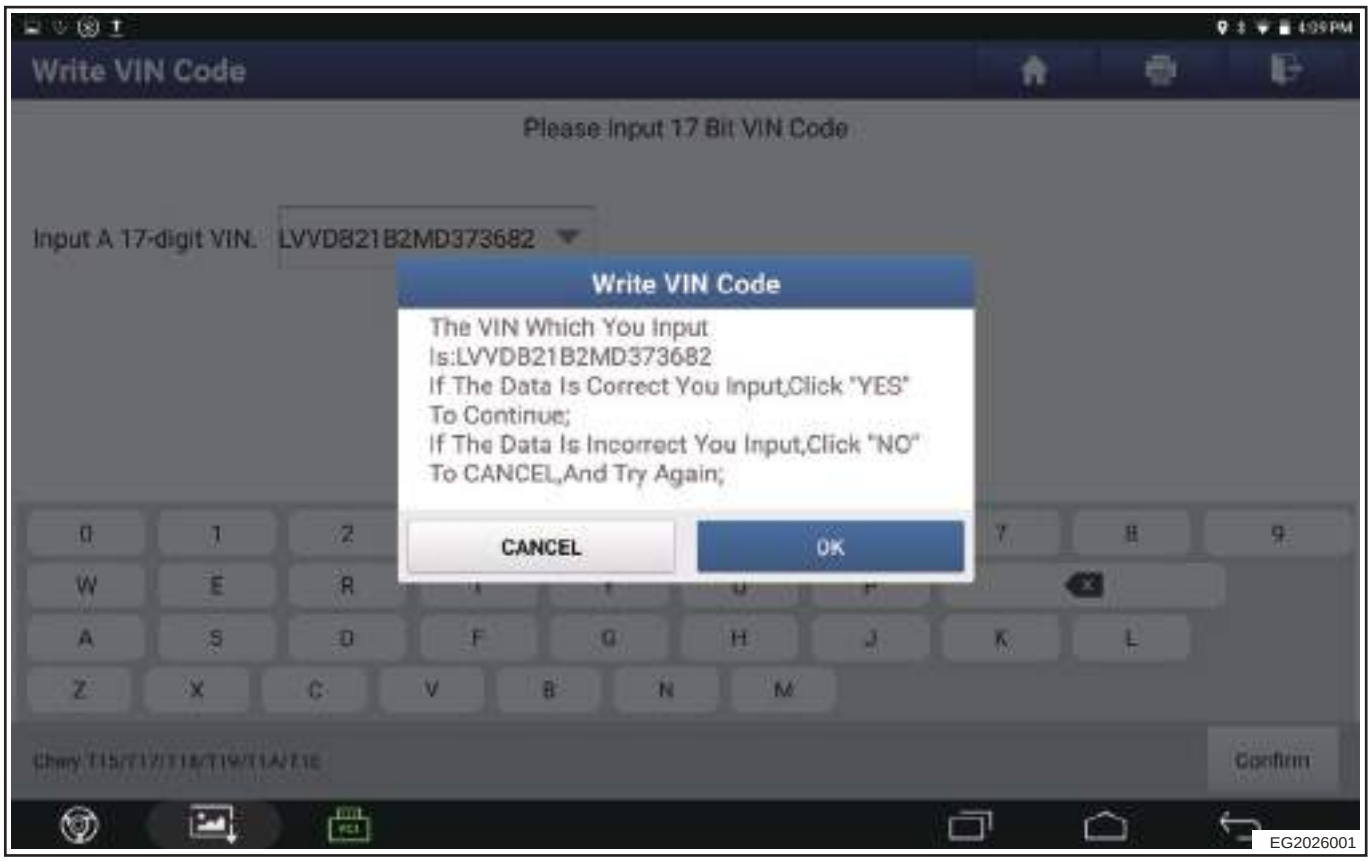
3. Select “T19” model.

4. Select “EGS (Electrical Gear Shifter)”.

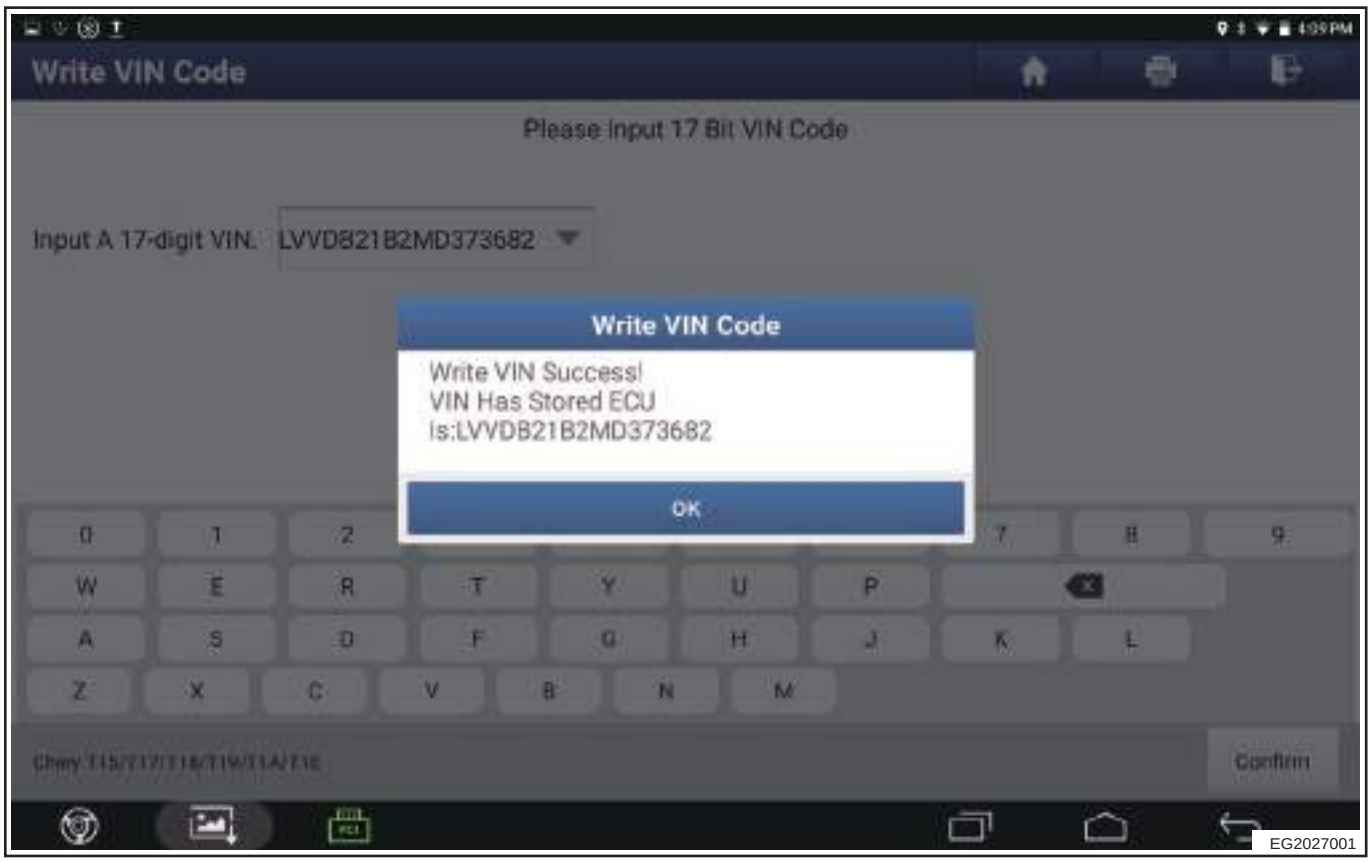
5. Select “Special Function”.

6. Select “Write VIN Code”.

7. Write VIN code. After confirming information, click “OK”.



8. Interface shows “Write VIN Success!”, click “OK”.



DRIVE SHAFT

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. Be sure to wear safety equipment to prevent accidents, when removing drive shaft assembly.

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

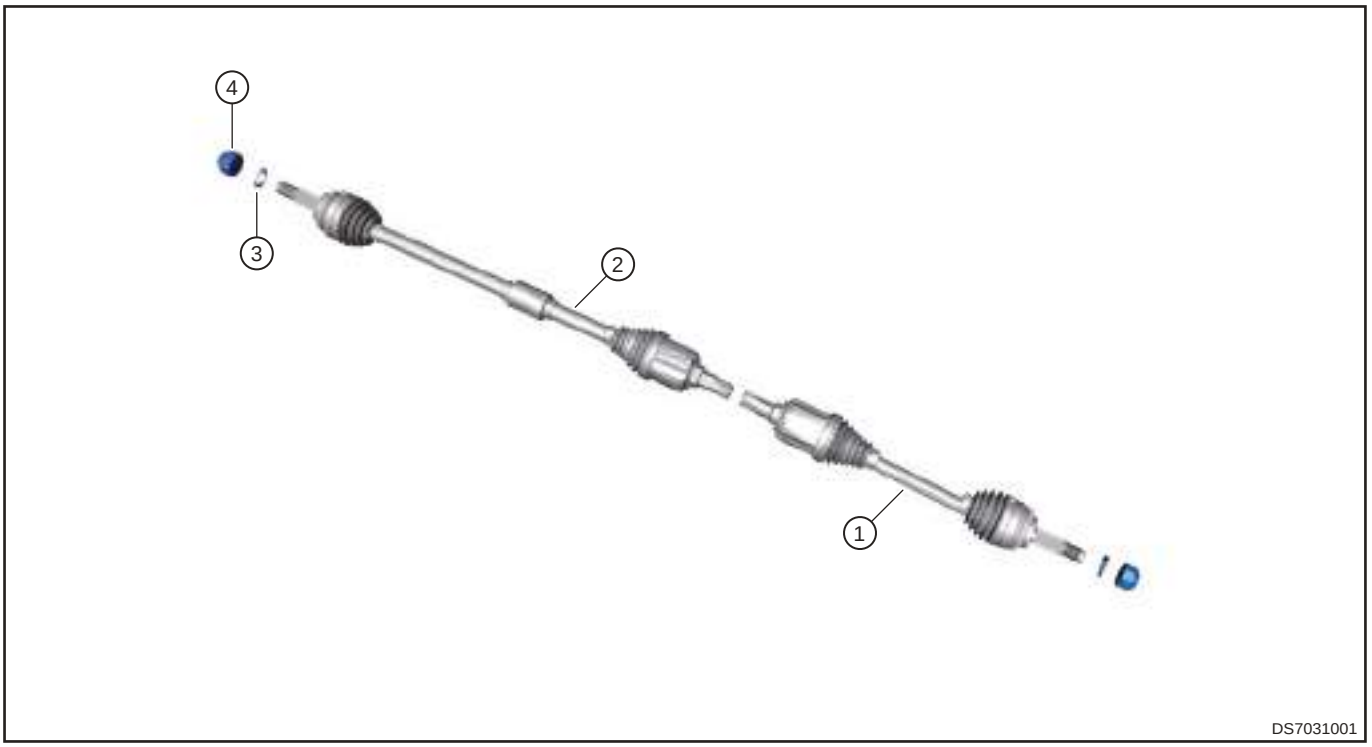
1. Appropriate force should be applied, when removing drive shaft assembly. Be careful not to operate roughly.
2. When loosening staked part of nut, it is necessary to loosen it completely, otherwise, threads of drive shaft assembly will be damaged.

System Overview

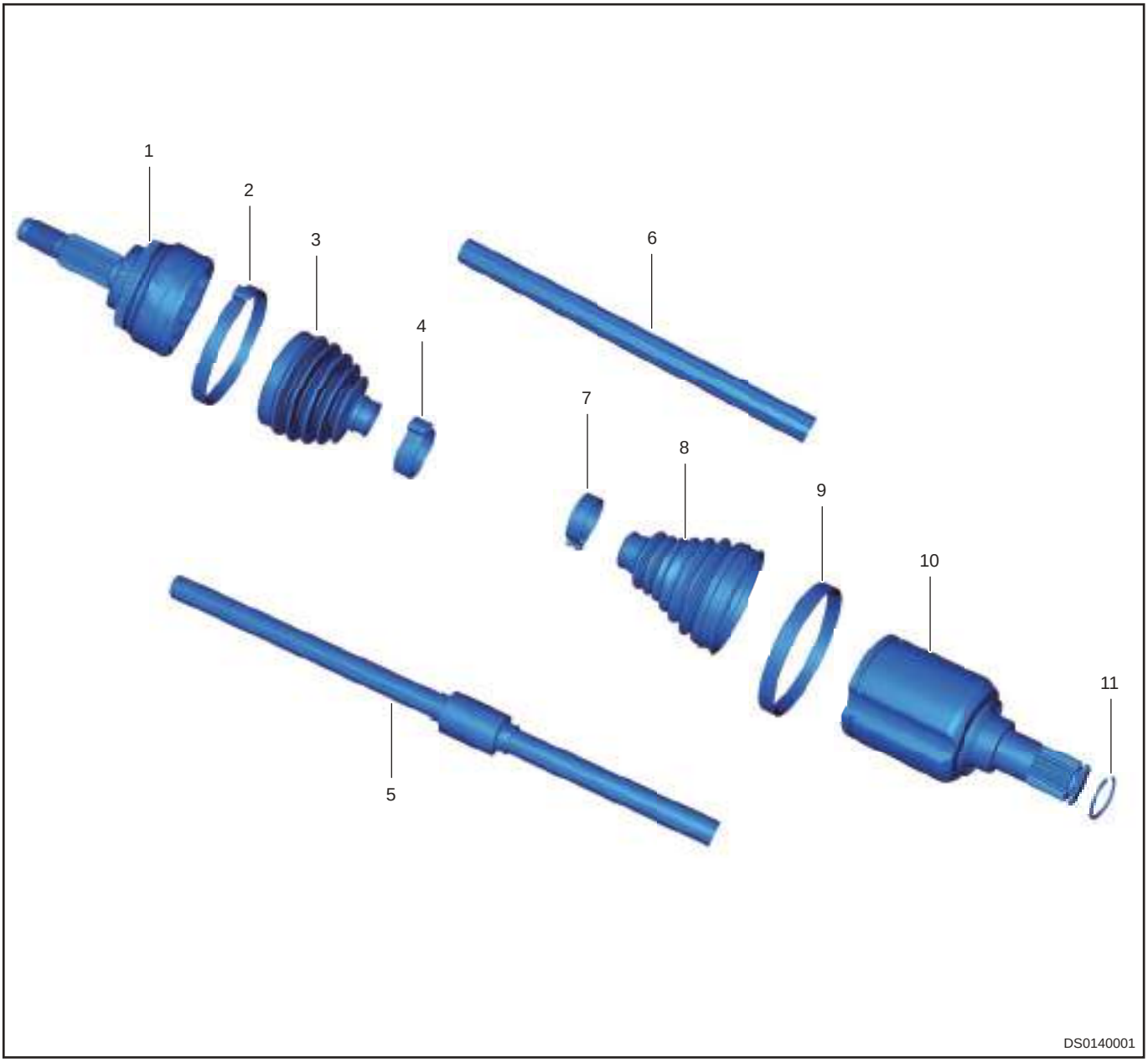
System Description

Drive shaft, which is a solid shaft, transmits torque between differential and drive wheels. Generally, the inner end of drive shaft is connected with drive shaft gear by spline, and the outer end is connected with wheel hub. Drive shaft transmits torque from differential to wheels, thus rotating the wheels to run vehicle.

System Components Diagram



1	Front Left Drive Shaft Assembly	3	Washer
2	Front Right Drive Shaft Assembly	4	Hexagon Flange Face Self-locking Nut



1	Outer Ball Cage	7	Inner Ball Cage Small Clamp
2	Outer Ball Cage Large Clamp	8	Inner Ball Cage Boot
3	Outer Ball Cage Boot	9	Inner Ball Cage Large Clamp
4	Outer Ball Cage Small Clamp	10	Inner Ball Cage
5	Front Right Drive Shaft Assembly Body	11	Differential Spring Retainer
6	Front Left Drive Shaft Assembly Body		

On-vehicle Service

Drive Shaft Assembly

Hint:

- Use same removal and installation procedures for left drive shaft and right drive shaft assembly.
- Removal procedures listed below are for left drive shaft.

Removal

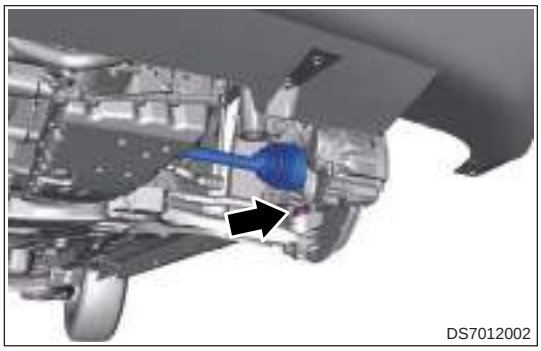
⚠ Warning

- Be sure to wear safety equipment to prevent accidents, when removing front left drive shaft assembly.
- Appropriate force should be applied, when removing front left drive shaft assembly. Be careful not to operate roughly.

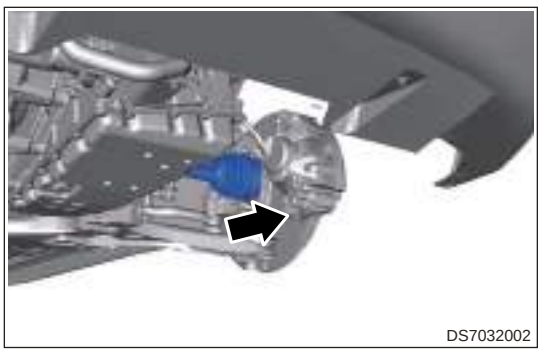
1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front left wheel.
4. Drain the transmission oil.
5. Remove front left drive shaft locking nut (arrow) while applying brake.


DS7011002

6. Remove coupling nut (arrow) between front left steering knuckle and control arm ball pin, and separate control arm ball pin from steering knuckle with tools.


DS7012002

7. Detach the front left drive shaft outer ball cage spline from spline groove of front hub.


DS7032002

8. Carefully pry out the inner ball cage spline inserted into transmission end with crowbar.

9. Remove the front left drive shaft assembly.

Installation

⚠ Caution

- Do not pull shaft lever and outer ball cage end during assembly to avoid inner ball cage tripod joint slipping out excessively from interior of housing. Otherwise, inner end boot will be squeezed when it is intruded again, causing oil leakage and affecting its service life. Confirmation method after assembling in place: When an obvious metallic sound between drive shaft and transmission positioning surface is heard, hold the inner ball cage sliding sleeve and pull it outward. If it cannot be pulled out, it indicates that it has been installed in place.
- When the inner ball cage is inserted into transmission, be careful not to make spline to scratch differential oil seal, or it will cause damage to oil seal main lip.
- Take particular care to prevent contact and collision between the sealing boot and hard objects such as tools rack and chassis parts during the assembly and transport; If there are any damages or scratch traces of the boot during assembly, the sample must be replaced and do not assemble it to vehicle privately.
- Do not hold the sealing boot with hands to prevent wrinkles from forming on sealing boot during installation.
- Protect the threads, spline and installation surface to prevent from forming defects such as nick, scratch.
- Make sure that there is no excessive pivot angle, excessive impact, excessive stretch and excessive compression on both ends of universal joint during fixture and assembly operation to avoid contact between drive shaft internal end sealing boot and tripod universal joint.
- Serious tensile deformation of boot is strictly prohibited during assembly.

1. Insert the front left drive shaft inner ball cage spline into transmission output end so that snap ring drops in transmission left output end snap spring groove.

⚠ Caution

- Check if snap spring retainer is assembled in place after assembly.

2. Insert outer ball cage spline of front left drive shaft assembly into spline groove of front hub, and install hexagon flange self-locking nut.
3. Install the coupling nut between front left steering knuckle and control arm ball pin.
4. Tighten the axle front left drive shaft locking nut while applying brake.

   Tightening torque:
   270 ± 20 N·m
5. Fill the transmission oil.
6. Install the front left wheel.

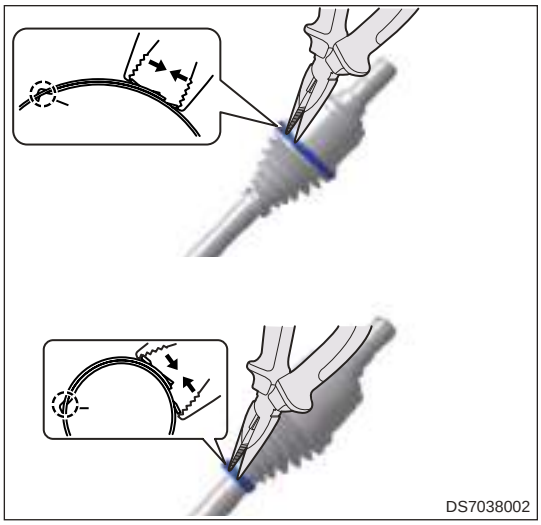
Inner Ball Cage

Removal

⚠ Warning

- DO NOT put matchmarks on the rotating surface of rotary drum.
- Operate carefully to prevent dust boot from being damaged.

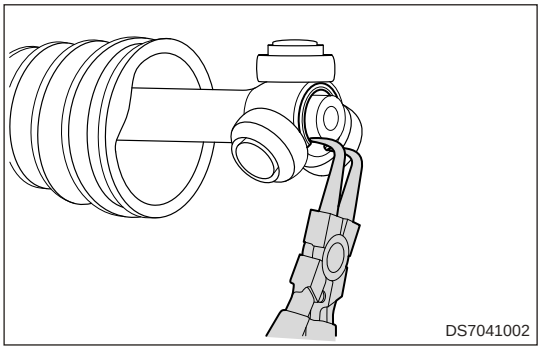
1. Remove the drive shaft assembly.
2. Using needle nose pliers, remove the inner ball cage dust boot clamps.



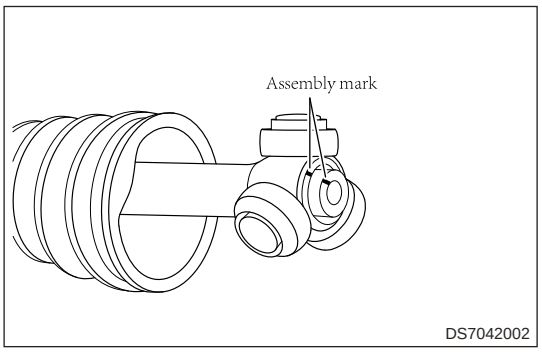
3. Separate the dust boot from inner ball cage in direction of arrow.

4. Remove the inner ball cage in direction of arrow, and place it on a piece of clean cloth.

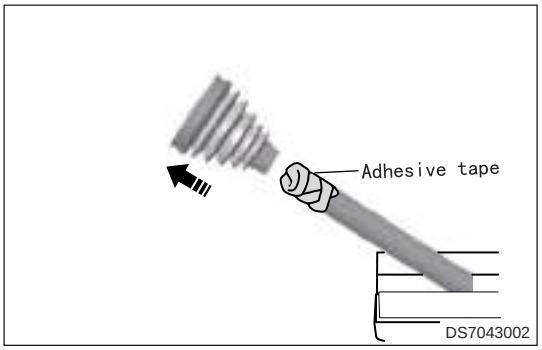
5. Using snap spring calipers, remove the positioning snap spring of tripod.



6. Put matchmarks on the tripod and drive shaft, and remove the tripod.



7. Wrap tape on the spline of drive shaft, and remove dust boot.



8. Remove the tape.

Installation

⚠ Caution

- Check if spline of drive shaft is in good condition. If it is deformed or damaged, replace it.
- Check if dust boot is in good condition. If it is scratched or broken, replace it.
- Check if positioning snap spring of tripod is deformed. If it is deformed, replace it.
- Refill grease during installation, and install with a new clamp.

1. Wrap tape on the spline of drive shaft, and install dust boot.
2. Install the tripod based on matchmarks on the tripod and drive shaft.
3. Using snap spring calipers, install the positioning snap spring of tripod.
4. Install the inner ball cage.
5. Using needle nose pliers, install the inner ball cage dust boot clamp.

Outer Ball Cage

Removal

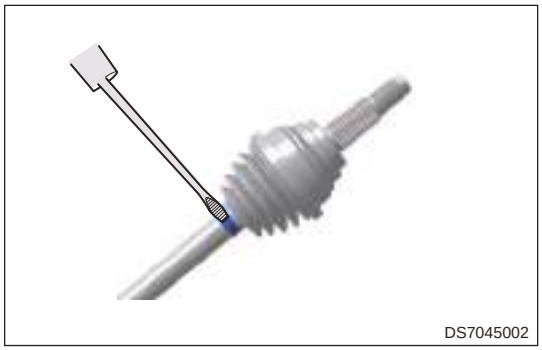
⚠ Warning

- Use same disassembly and assembly procedures for outer ball cage of left / right drive shaft assemblies.

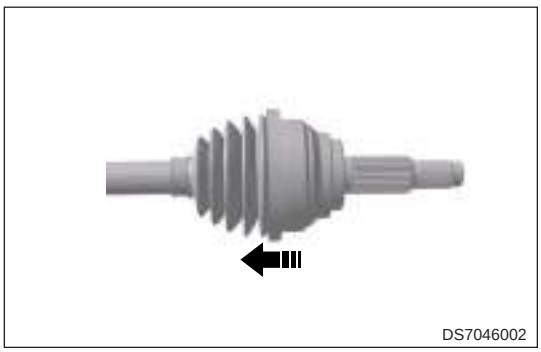
1. Remove the drive shaft assembly.
2. Using a screwdriver, pry out striker of outer ball cage dust boot outer clamp and remove outer ball cage dust boot outer clamp.


DS7044002

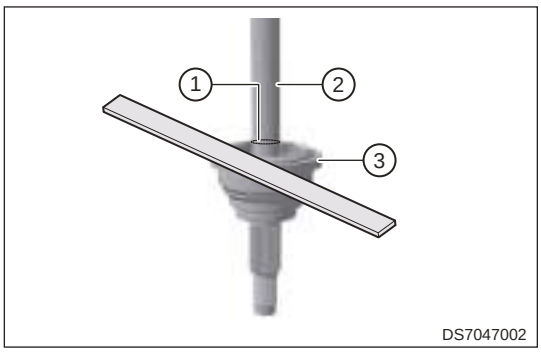
3. Using a screwdriver, pry out striker of outer ball cage dust boot inner clamp and remove outer ball cage dust boot inner clamp.


DS7045002

4. Slide the outer dust boot carefully into the inner ball cage side in direction of arrow.

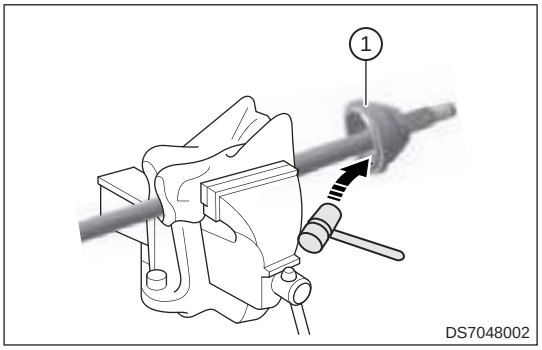

DS7046002

5. Put matchmarks (1) on area at same height as drive shaft assembly (2) and edge of outer ball cage (3) for correct installation.

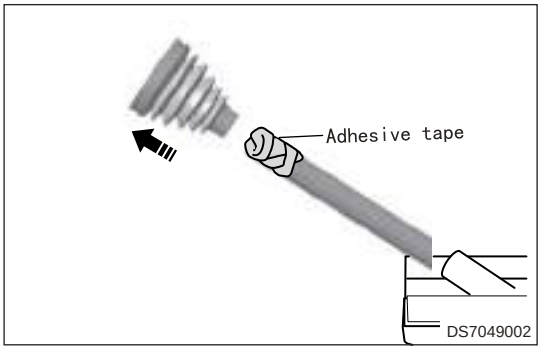


DS7047002

6. Wrap the drive shaft assembly with a piece of cloth and put it onto a vise. Secure the vise to prevent drive shaft assembly from shaking. Expand the internal positioning snap spring of outer ball cage with snap spring calipers, then tap outer ball cage with a hammer and remove outer ball cage (1).



7. Remove the left drive shaft from vise.
8. Remove the internal positioning snap spring of outer ball cage.
9. Wrap tape on the spline of drive shaft, and remove dust boot.



10. Remove the tape.

Installation

⚠ Caution

- Check if spline of drive shaft is in good condition. If it is deformed or damaged, replace it.
- Check if dust boot is in good condition. If it is scratched or broken, replace it.
- Refill grease during installation, and install with a new clamp.

1. Wrap tape on the spline of drive shaft, and install dust boot.
2. Install outer ball cage and internal positioning snap spring.
3. Install the outer ball cage dust boot.
4. Install the outer ball cage dust boot inner clamp.
5. Install the outer ball cage dust boot outer clamp.

SUSPENSION

FRONT SUSPENSION

Warnings and Precautions

Warning

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair:

1. Be sure to wear necessary safety equipment to prevent accidents.
2. Check if safety lock of lift is locked when repairing chassis parts.
3. It is not allowed to weld or modify suspension loading parts and guide parts.
4. When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.
5. Operate carefully when removing and installing coil spring, to prevent spring from jumping out and causing personal injury.

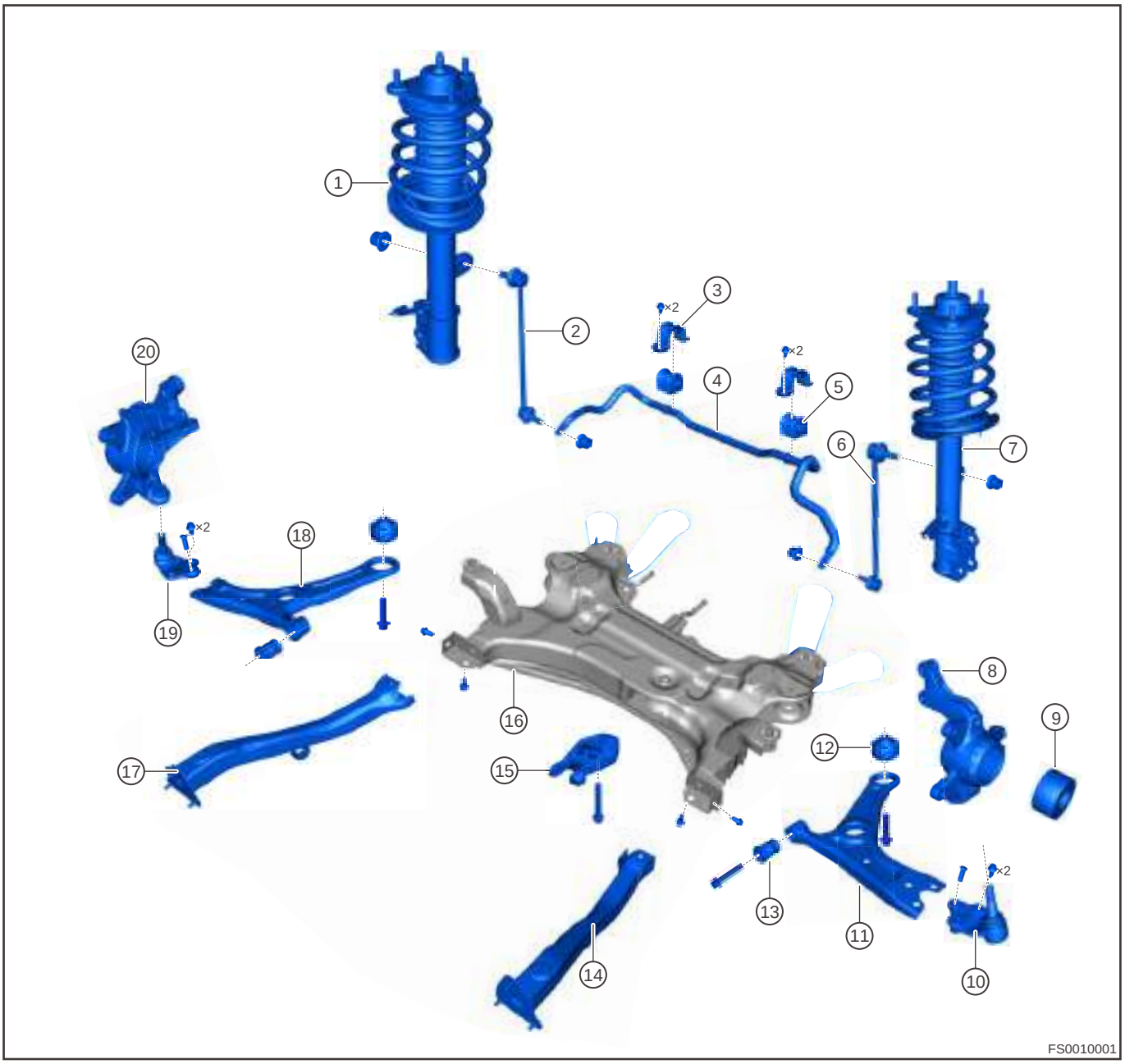
Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair:

1. Be sure to tighten coupling bolts and nuts to specified torques.
2. Make sure that ball pin assembly rotates smoothly without any sticking after installation.
3. Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.
4. Before pressing in, apply grease on the outside of front control arm assembly rubber bushing to prevent control arm assembly rubber bushing from being damaged.
5. Align dowel pin of top end connecting plate with body positioning hole when installing front left shock absorber assembly.
6. Please note that opening of retainer must face opening of front wheel speed sensor, when installing front hub bearing retainer.
7. When removing front sub frame welding assembly, an engine equalizer needs to be used to support engine and transmission assembly securely to prevent them from being damaged.
8. When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

System Overview

System Component Diagram



1	Front Right Strut Assembly	11	Front Left Control Arm Welding Assembly
2	Front Right Connecting Rod Assembly	12	Control Arm Rear Bushing Assembly
3	Front Stabilizer Bar Clamp	13	Front Rubber Bushing Assembly
4	Front Stabilizer Bar	14	Left Welding Side Rail Assembly
5	Front Stabilizer Bar Bushing	15	Rear Mounting Lower Cushion
6	Front Left Connecting Rod Assembly	16	Front Sub Frame Assembly

7	Front Left Strut Assembly	17	Right Welding Side Rail Assembly
8	Front Left Steering Knuckle	18	Front Right Control Arm Welding Assembly
9	Front Hub Bearing	19	Front Right Control Arm Ball Pin Assembly
10	Front Left Control Arm Ball Pin Assembly	20	Front Right Steering Knuckle

Front suspension of this model uses Macpherson independent suspension (toe-in is adjustable and height is non-adjustable), which is equipped with lateral stabilizer, cylindrical coil spring, double action telescopic shock absorber.

Component Operation Description

Front Control Arm Welding Assembly

As a guide and power transmission element for suspension system of vehicle, control arm transmits various power acting on wheels to vehicle body and keeps wheels moving in a certain trail. Control arm elastically connects wheels and vehicle body together with ball joint or bushing.


FS0012002

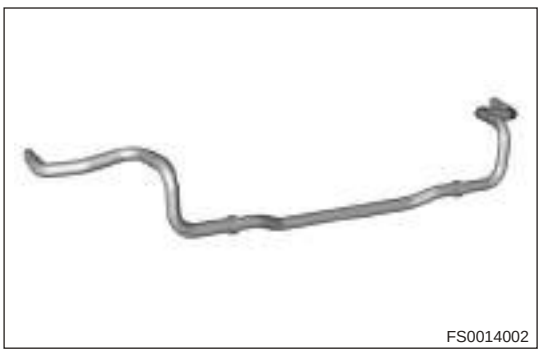
Front Strut Assembly

It filters and eliminates vibration from roads to improve driving stability and bring people a sense of comfort and stability.


FS0013002

Front Stabilizer Bar

Lateral stabilizer bar functions to prevent excessive lateral incline while vehicle is turning and keeps vehicle body in balance as much as possible. It aims to reduce lateral incline level of vehicle and improve smoothness. When vehicle is turning, vehicle body inclines and suspension on both sides have inconsistent bounce. The outer suspension will press against stabilizer bar to twist it, then elastic force from bar body will prevent wheel from lifting, so that vehicle body can be kept in balance as much as possible, thus realizing the lateral stability function.


FS0014002

Front Sub Frame Assembly

Sub frame can reduce impact on vehicle body due to road shock and enhance connection rigid of suspension system and improve driving comfort and stability, making a strong and compact chassis during driving. It bears the deformation conditions such as loaded bend, longitudinal torsion, lateral bend and horizontal lozenging, etc. in place of vehicle body, which improves torsion resistance ability of vehicle body. Also, the force will be directly applied on it in a collision to improve vehicle safety performance.

On-vehicle Service

Problem Symptoms Table

Hint:

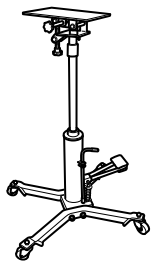
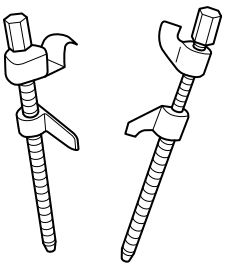
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

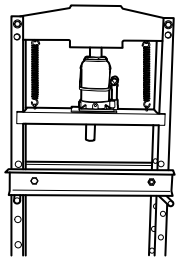
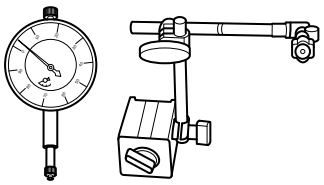
Symptom	Suspected Area
Vehicle pulls	Front tire (worn or improperly inflated)
	Front wheel alignment (incorrect)
	Control arm ball pin assembly (loose)
	Steering tie rod (loose or worn)
	Front hub bearing (excessively worn)
	Steering gear (misaligned or damaged)
	Suspension components (worn)
Droop	Vehicle (overloaded)
	Front coil spring (too soft)
	Front shock absorber assembly (worn or damaged)
	Front suspension components (excessively worn or deformed)
	Front tire (improperly inflated)
	Front wheel alignment (incorrect)
Sways/pitches	Front tire (worn or improperly inflated)
	Front stabilizer bar assembly (bent or broken)
	Front shock absorber assembly (worn or damaged)
Wheel shimmy	Front tire (worn or improperly inflated)

Symptom	Suspected Area
	Front wheel (out of balance)
	Front shock absorber assembly (worn or damaged)
	Front wheel alignment (incorrect)
	Control arm ball pin assembly (loose)
	Front hub bearing (excessively worn)
	Steering gear (misaligned or damaged)
Abnormal tire wear	Front tire (improperly inflated)
	Front wheel alignment (incorrect)
	Front shock absorber assembly (worn or deformed)
	Front suspension components (worn or deformed)

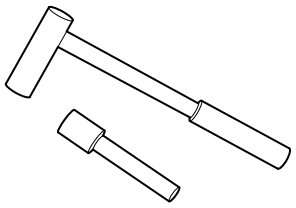
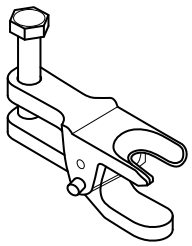
Tools

General Tools

Tool Name	Tool Drawing
Transmission Carrier	 S00004
Spring Compressor	 S00016

Tool Name	Tool Drawing
Hydraulic Press	 S00010
Dial Indicator and Magnetic Holder	 RCH0023006

Special Tools

Tool Name	Part No.	Tool Drawing
Front Shock Absorber Nut Remover	ECH-0001	 RCH0022006
Tie Rod Ball Remover	ECH-0002	 S00019
Bearing Remover Special Tool	ECH-0004	 RCH0011006

Specifications

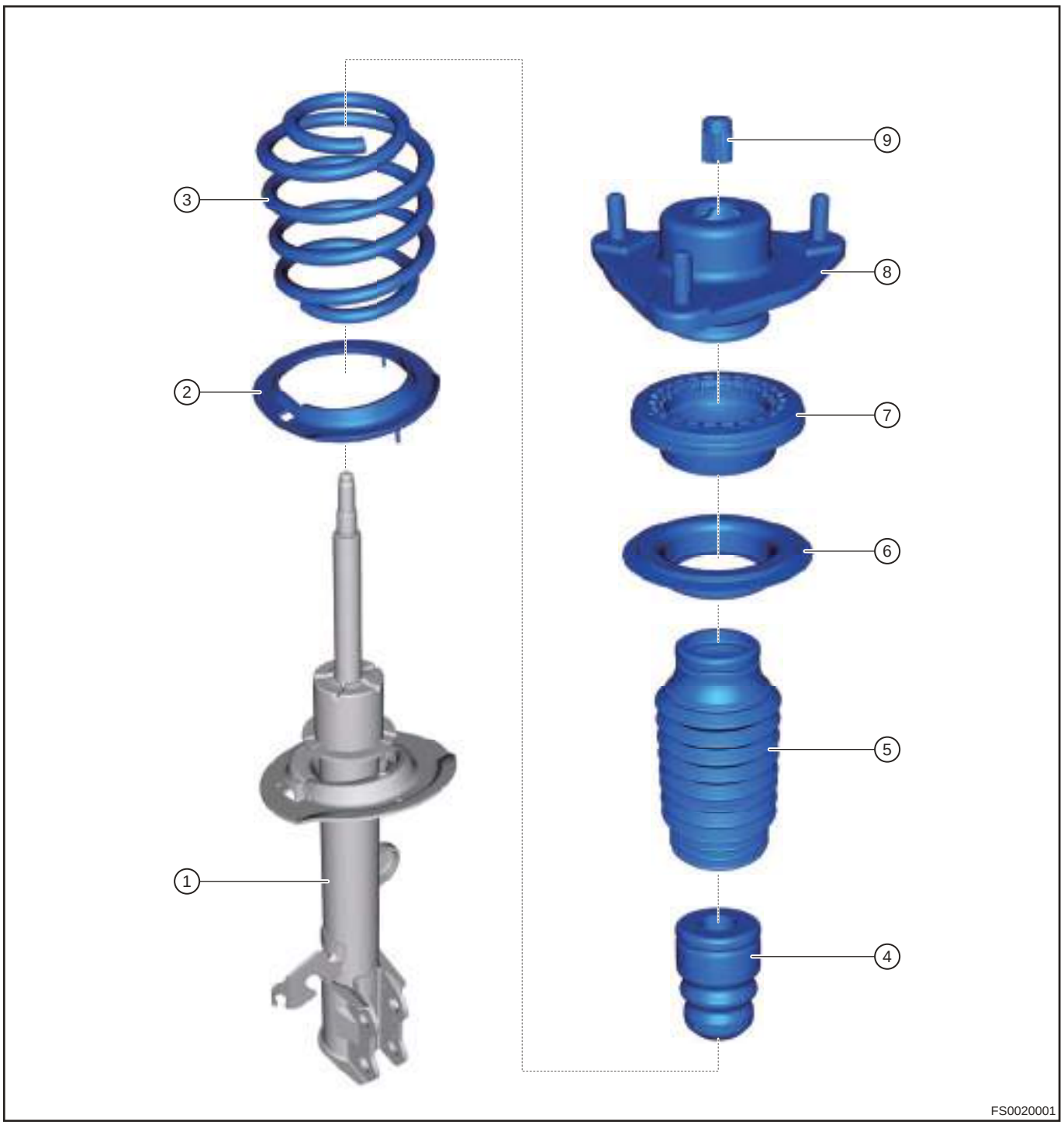
Torque Specifications

Item	Tightening Torque
Coupling Nut Between Front Connecting Rod Assembly and Front Shock Absorber Assembly	60 ± 6 N·m
Coupling Nut Between Front Shock Absorber Assembly and Front Steering Knuckle Assembly	240 ± 24 N·m
Coupling Nut Between Front Shock Absorber Assembly and Body	60 ± 6 N·m
Front Shock Absorber Assembly Locking Nut	70 ± 3 N·m
Coupling Bolt Between Front Control Arm Assembly and Front Sub Frame Assembly	150 ± 10 N·m + (90 ± 2°)
Coupling Nut Between Front Control Arm Assembly and Front Sub Frame Assembly	160 ± 11 N·m + (60 ± 1.5°)

Item	Tightening Torque
Coupling Nut Between Front Control Arm Ball Pin and Front Steering Knuckle	95 ± 10 N·m
Coupling Nut Between Front Stabilizer Bar Assembly and Front Connecting Rod Assembly	60 ± 5 N·m
Fixing Bolt Between Front Stabilizer Bar and Sub Frame	25 ± 3 N·m
Fixing Bolt Between Front Dust Guard and Front Steering Knuckle Assembly	8 ~ 13 N·m
Front Brake Disc Fixing Bolt	7 - 9 N·m
Fixing Bolt Between Front Wheel Speed Sensor and Front Steering Knuckle Assembly	9 ± 1.5 N·m
Coupling Nut Between Steering Tie Rod Outer Ball Assembly and Front Steering Knuckle Assembly	45 ± 5 N·m
Drive Shaft Fixing Nut	270 ± 20 N·m
Fixing Bolt Between Steering Gear Assembly and Front Sub Frame Assembly	110 ± 8 N·m + (240 ± 5°)
Fixing Bolt Between Front Sub Frame Assembly and Body	180 ± 18

Front Strut Assembly

Description



1	Front Shock Absorber Assembly	6	Front Spring Upper Cushion
2	Front Spring Lower Cushion	7	Bearing Assembly
3	Front Coil Spring Assembly	8	Connection Bracket Assembly

4	Front Buffer Block	9	Front Shock Absorber Cover Cap
5	Front Dust Boot		

On-vehicle Inspection

1. Check the front shock absorber assembly.
   a. Park vehicle on level ground, and bounce vehicle up and down, then check if vehicle shakes up and down when body bounds. If vehicle shakes up and down consecutively, shock absorber assembly may be damaged and should be replaced.
2. Check front shock absorber assembly for leakage
   a. As shock absorber assembly operates frequently during vehicle driving, oil gas is formed due to temperature rise of shock absorber, which then adheres to dust boot. This is a normal phenomenon, and it is not necessary to replace the shock absorber assembly.
   b. If following conditions occur:
      - Oil traces in circumferential direction are uneven;
      - Oil traces reach lower connecting positions.

      Above conditions indicate that there may be leakage in shock absorber assembly, and it is necessary to replace the shock absorber assembly.
   c. If it is difficult to accurately judge shock absorber assembly for leakage from appearance. Perform road test after wiping off oil on the surface of malfunctioning shock absorber. Under normal road conditions, drive vehicle for 5 to 10 minutes and perform inspection. If there are oil traces at the shock absorber assembly surface, it indicates that oil leakage exists, and it is necessary to replace the shock absorber assembly.

Removal

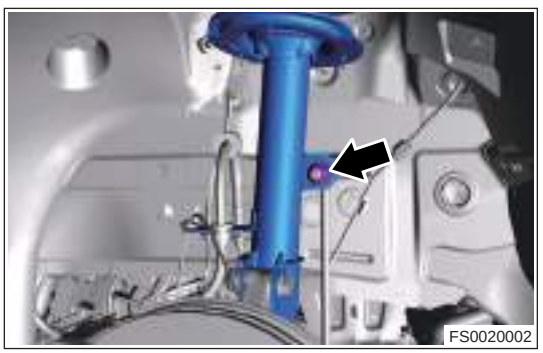
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

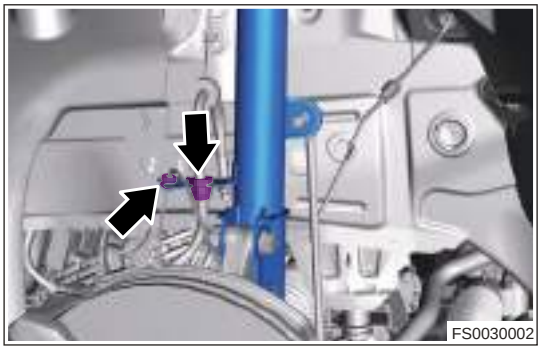
⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Make sure that safety lock of lift has been locked, when removing and installing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing and installing chassis parts, replace self-locking nuts and rusted nuts for safety.
- Operate carefully when removing and installing coil spring, to prevent spring from jumping out and causing personal injury.

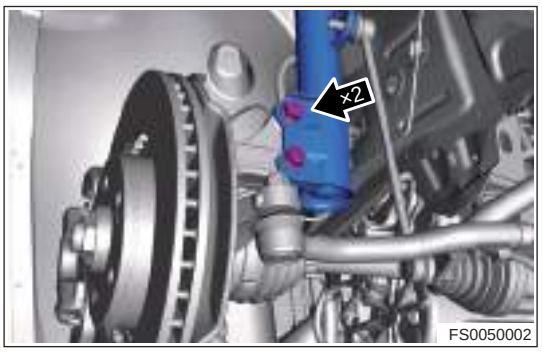
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left wheel.
4. Remove coupling nut (arrow) between front left connecting rod assembly and front left shock absorber assembly.



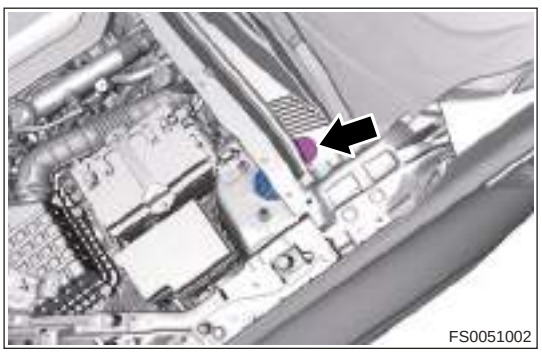
5. Disengage the front left wheel speed sensor wire harness and front left brake hose assembly from front left shock absorber assembly.



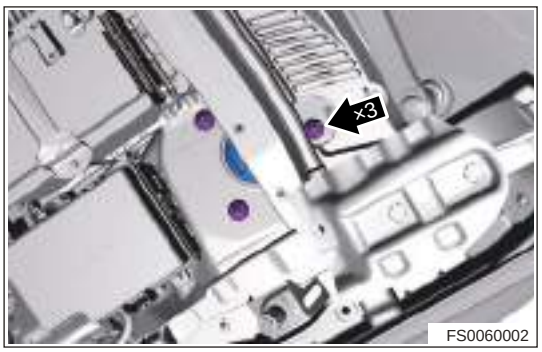
6. Remove 2 coupling bolts and nuts between front left shock absorber assembly and front left steering knuckle assembly.



7. Remove the shock absorber blockage cover from front windshield trim cover plate.



8. Remove 3 coupling nuts between front left shock absorber assembly and vehicle body.



9. Remove the front left shock absorber assembly with front coil spring.

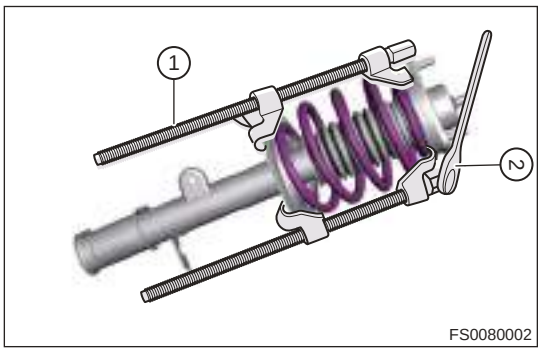
Disassembly

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Remove the front shock absorber cover cap from front left shock absorber assembly.

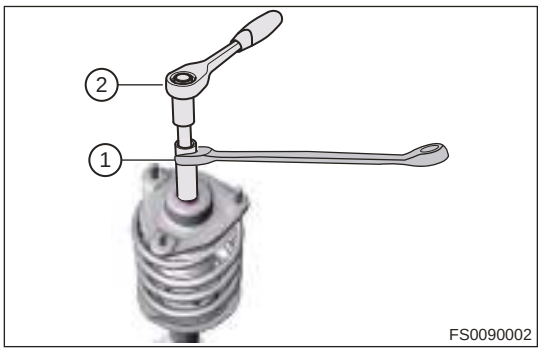
2. Using spring compressor (1) and wrench (2), tighten the end lever of spring compressor to compress the front coil spring.



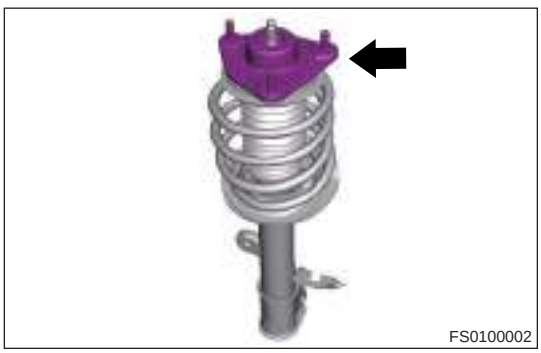
⚠ Warning

- When removing front coil spring, compress spring until locking nut can be rotated. DO NOT compress spring more than necessary, avoid damaging spring and personal injury.

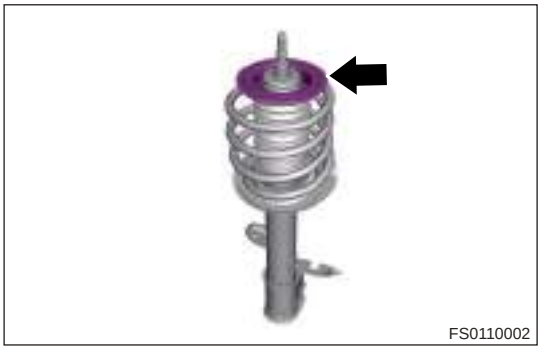
3. Hold the end of front left shock absorber assembly lever with a shock absorber nut remover (1), and then remove the locking nut from front left shock absorber assembly with a wrench (2).



4. Remove front strut upper connecting plate assembly (w/ insulator) from upper part of front left shock absorber assembly.



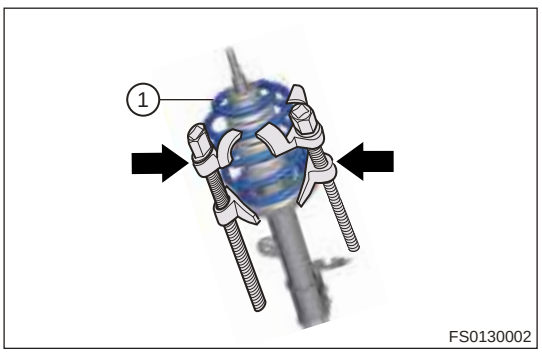
5. Remove bearing assembly from upper part of front left shock absorber assembly.


FS0110002

6. Remove front spring upper cushion from upper part of front left shock absorber assembly.


FS0120002

7. Remove front coil spring (1) with spring compressor from front left shock absorber assembly. Slowly loosen spring compressor, and carefully remove front coil spring.



FS0130002

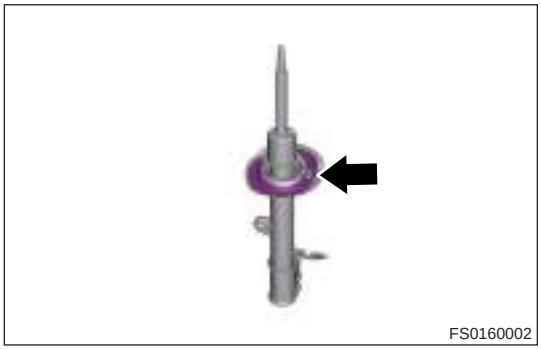
8. Remove front dust boot from upper part of front left shock absorber assembly.


FS0140002

9. Detach front buffer block from front left shock absorber assembly, and remove it.


FS0150002

10. Remove front spring lower cushion from lower end of front left shock absorber assembly strut.

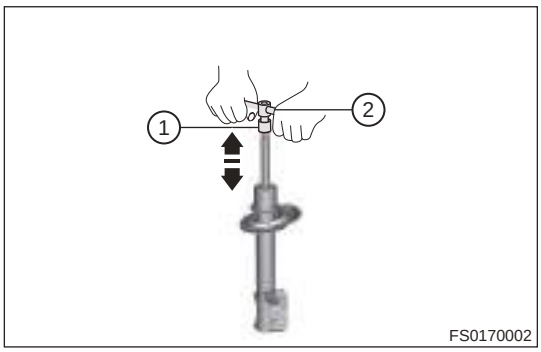


Inspection

1. Check the front shock absorber.

   Manual inspection:

   a. Install the locking nut (1) to the upper end of front shock absorber strut and then install T-wrench (2) or equivalent.



   b. Compress and extend front shock absorber strut several times by hands in direction of arrow as shown in illustration. Check that there is no abnormal resistance or unusual sound during operation. If there is any abnormality, replace the front shock absorber assembly with a new one.

2. Check the other components of front shock absorber assembly.
   a. Check front shock absorber cover cap, front spring upper cushion, front dust boot, front buffer block and front spring lower cushion for cracks, wear or deformation. Replace it as necessary.
   b. Check front strut upper connecting plate assembly (w/ insulator) and bearing assembly for damage. Replace it as necessary.
   c. Check front coil spring for wear, cracks or deformation. Replace it as necessary.
3. Check the front shock absorber spring.
   a. Check rear coil spring for wear, cracks or permanent deformation due to excessive use. Replace it as necessary.

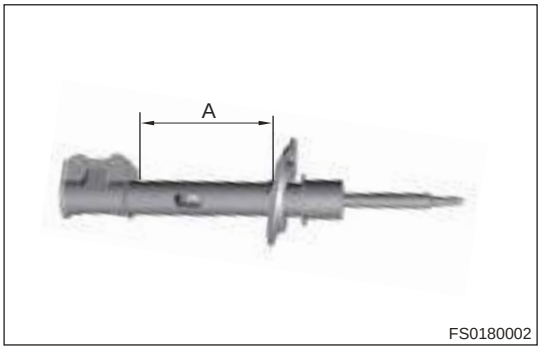
Disposal

⚠ Warning

- Do not drill at high temperature and heat, and be sure to pay attention to safety!
- Shock absorber assembly contains nitrogen and oil, which are under high pressure. As hydraulic oil is explosive easily when exposed to heat, the surface is wet with water first before drilling or cutting.
- Be careful when drilling or cutting, because mental chips may fly about. Always perform operations with proper safety equipment to avoid personal injury.
- Before handling, be sure to wear goggles and release pressure inside shock absorber assembly to avoid personal injury.

1. Extend the front shock absorber assembly strut fully, and clamp it in a vise at an angle.

2. Using a drill or equivalent, make a hole slowly at area A shown in the illustration, to discharge gas and hydraulic oil in the front shock absorber assembly.



3. Handle front shock absorber assembly properly after discharging gas and hydraulic oil.

Hint:
Recycle disposed front shock absorber assembly according to local environmental regulations.

Assembly

⚠ Caution

- Be sure to tighten bolt to specified torque.
- Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.
- Please note that opening of retainer must face opening of front wheel speed sensor, when installing front hub bearing retainer.

1. Install the front spring lower cushion.
2. Install the front buffer block.
3. Install the front dust boot.
4. Install the front coil spring.
5. Install the front spring upper cushion.
6. Install the bearing assembly.
7. Install the front strut upper connecting plate assembly (w/ insulator).
8. Install the front shock absorber cover cap.
9. Using spring compressor (1) and wrench (2), tighten the end lever of spring compressor to compress the front coil spring.
10. Hold the end of front left shock absorber assembly lever with shock absorber nut remover (1), and then tighten locking nut to front left shock absorber assembly with wrench (2).

    Torque: 70 ± 3 N·m

11. Install the front shock absorber cover cap.

Installation

⚠ Caution

- Be sure to tighten coupling bolts and nuts to specified torque.
- Align dowel pin of top end connecting plate with body positioning hole when installing front left shock absorber assembly.
- Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

1. Installation is in the reverse order of removal.

Front Control Arm Ball Pin Assembly

Removal

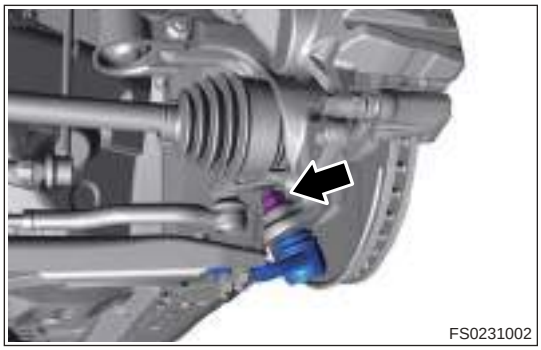
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

Hint:
Use same procedures for right and left sides. Procedures listed below are for left side.

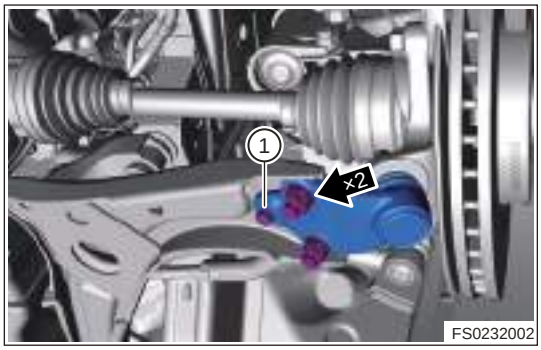
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left wheel.
4. Remove the coupling nut between front left control arm assembly ball pin and front left steering knuckle assembly.

   Torque: 95 ± 10 N·m


FS0231002

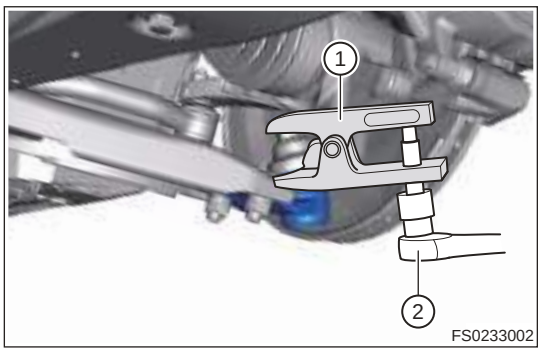
5. Remove 2 fixing nuts and 1 fixing bolt (1) between front left control arm and front left control arm ball pin.

   Torque: 150 ± 10 N·m



FS0232002

6. Use the ball remover (1), turn the wrench (2) to detach the front control arm ball pin and steering knuckle.



FS0233002

7. Remove the front left control arm ball pin assembly.

Installation

⚠ Caution

- Be sure to tighten coupling bolts and nuts to specified torques.
- Make sure that ball pin assembly rotates smoothly and there is no sticking after installation.
- Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

1. Installation is in the reverse order of removal.

Front Control Arm Assembly

Removal

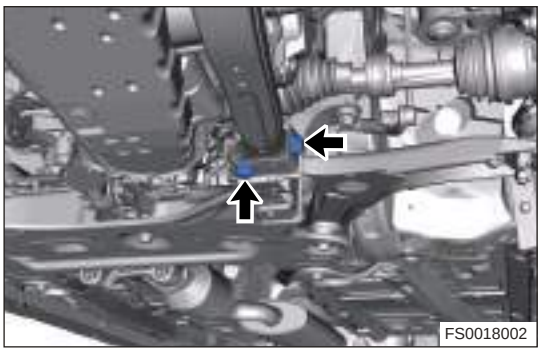
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

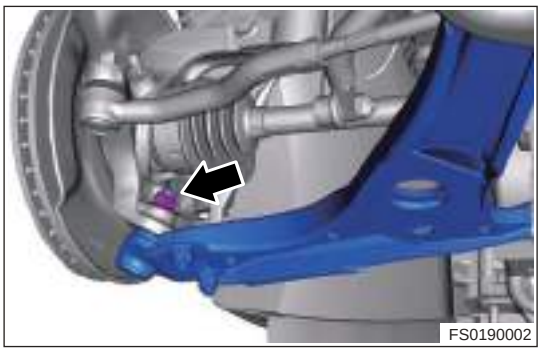
⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left wheel.
4. Remove the engine compartment lower protector assembly.
5. Remove 2 coupling bolts (arrow) between front left side rail and front sub frame, and remove front left side rail.

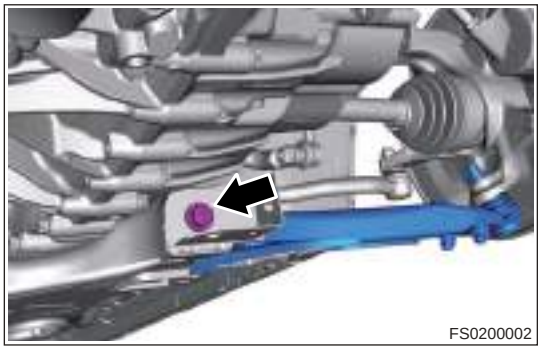

FS0018002

6. Remove nut between front left control arm ball pin and front left steering knuckle.

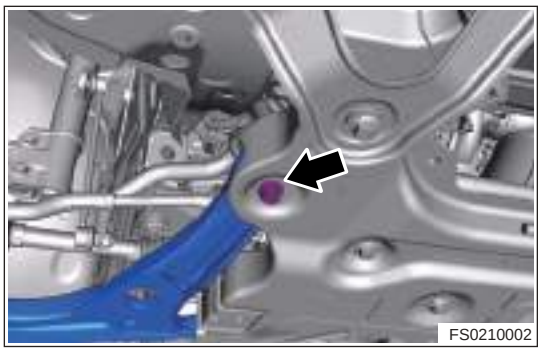

FS0190002

Hint:
If it is difficult to remove control arm ball pin end from steering knuckle, detach ball pin in combination with a ball pin remover.

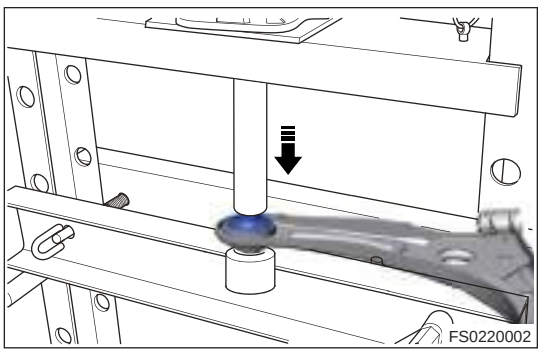
7. Remove coupling bolt between front part of front left control arm assembly and front sub frame welding assembly.



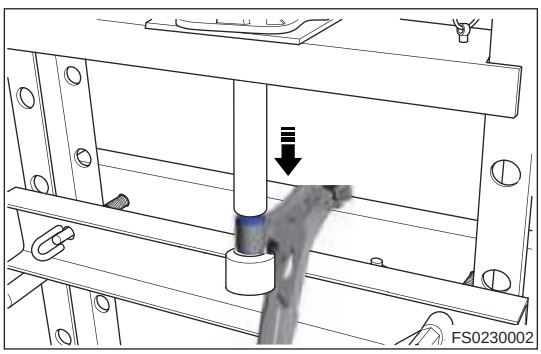
8. Remove coupling bolt between rear part of front left control arm assembly and front sub frame welding assembly.



9. Remove the front left control arm assembly.
10. Remove the front control arm front rubber bushing assembly.
    a. Place the front control arm assembly on a hydraulic press, install front control arm remover and adapter, and press out and remove front control arm front rubber bushing assembly with hydraulic press.



11. Remove the front control arm rear rubber bushing assembly.
    a. Place the front control arm assembly on a hydraulic press, install front control arm remover and adapter, and press out and remove front control arm rear rubber bushing assembly with hydraulic press.



Installation

⚠ Caution

- Be sure to tighten coupling bolts and nuts to specified torques.
- Make sure that ball pin assembly rotates smoothly without any sticking after installation.
- Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

1. Place the front control arm assembly on a hydraulic press, install front control arm remover and adapter, and install front control arm rear rubber bushing assembly with hydraulic press.

⚠ Caution

- Before pressing in, apply grease on the outside of front control arm assembly rubber bushing to prevent control arm assembly rubber bushing from being damaged.

2. Install front left control arm to a proper position.
3. Install coupling bolt between rear part of front left control arm assembly and front sub frame welding assembly.

   Torque: 180 ± 18 N·m

4. Install coupling bolt between front part of front left control arm assembly and front sub frame welding assembly.

   Torque: 180 ± 18 N·m

5. Install nut between front left control arm ball pin and front left steering knuckle.

   Torque: 95 ± 10 N·m

6. Install the front left side rail.
7. Install 2 coupling bolts (arrow) between front left side rail and front sub frame.

   Torque: 120 ± 12 N·m

8. Install coupling bolt (arrow) between front left side rail and tank lower crossmember.

   Torque: 180 ± 18 N·m

9. Install the engine lower protector assembly.
10. Install the front left wheel.
11. Connect the negative battery cable.

Front Connecting Rod Assembly

Removal

Hint:

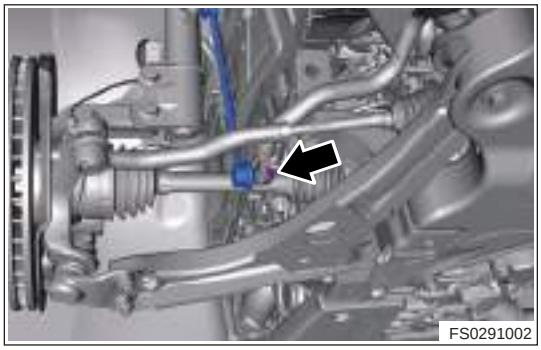
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Warning

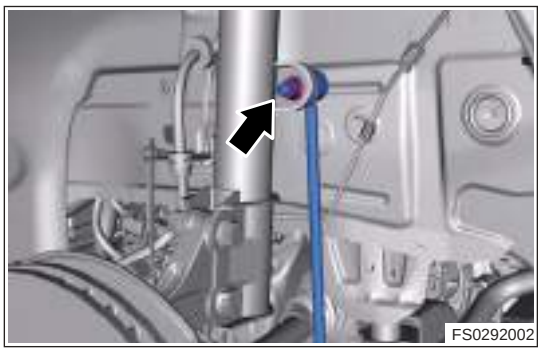
- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left wheel.

4. Remove coupling nut between front left stabilizer bar assembly and lower part of front left connecting rod assembly.



5. Remove coupling nut between front left connecting rod assembly and upper part of front left shock absorber assembly, and remove front left connecting rod assembly.



Inspection

1. Check front connecting rod assembly bush for wear, cracks, deformation, damage or grease leakage. Replace it as necessary.
2. Check if end of front connecting rod assembly rotates smoothly. Replace it as necessary.

Installation

1. Install coupling nut between front left connecting rod assembly and lower part of front left shock absorber assembly.

   Torque: 60 ± 6 N·m

2. Install coupling nut between front left stabilizer bar assembly and upper part of front left connecting rod assembly.

   Torque: 60 ± 6 N·m

3. Install the front left wheel.
4. Connect the negative battery cable.

Front Steering Knuckle

Removal

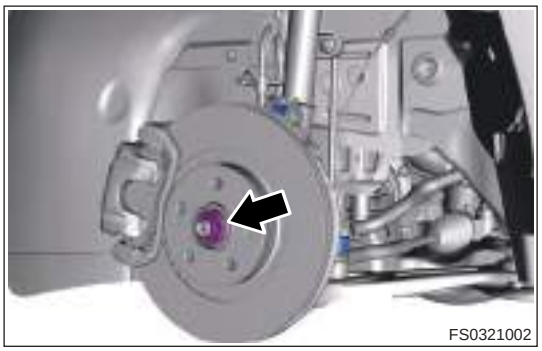
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify bearing parts of wheel suspension and guide parts of wheel.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

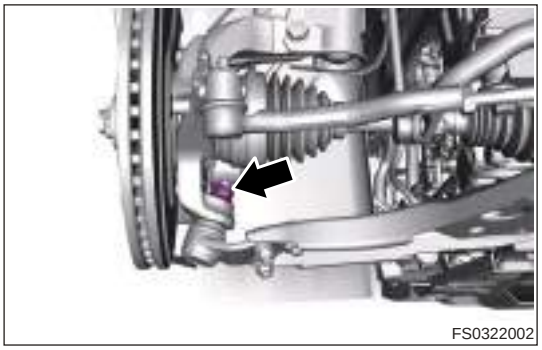
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left wheel.
4. Remove fixing nut from front left drive shaft.


FS0321002

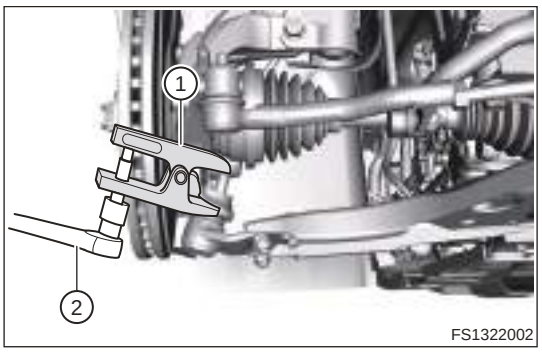
⚠ Caution

- It is necessary to loosen staked part of nut completely, otherwise it will damage threads of drive shaft assembly.

5. Remove the front left brake caliper assembly.
6. Remove fixing nut between front left control arm assembly ball pin and front left steering knuckle assembly.

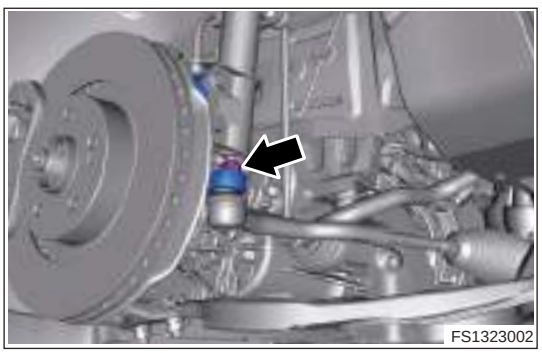

FS0322002

7. Install ball pin separator (1), and tighten ball pin separator bolt with a wrench (2) to separate lower control arm ball pin from steering knuckle assembly.

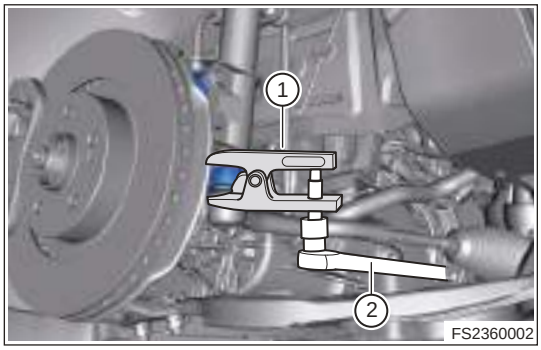


FS1322002

8. Remove fixing nut between left steering tie rod outer ball pin assembly and front left steering knuckle assembly.


FS1323002

9. Install ball pin separator (1), and tighten ball pin separator bolt with wrench (2) to separate steering tie rod ball pin from steering knuckle assembly.

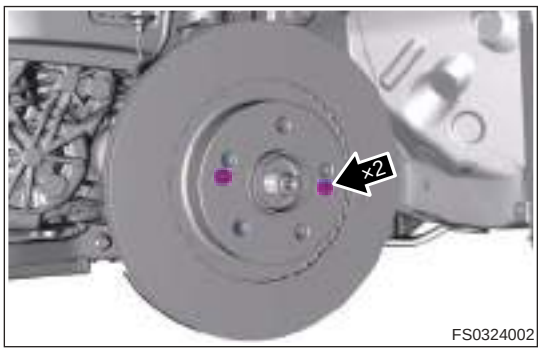


10. Remove fixing bolt between front left wheel speed sensor and front left steering knuckle assembly, and disengage the front left wheel speed sensor carefully.

⚠ Caution

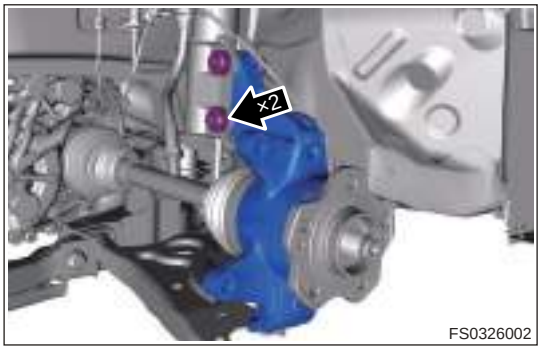
- Keep head and installation hole of sensor free of foreign matter.

11. Remove 2 fixing bolts and front left brake disc.



12. Remove 3 fixing bolts between front left dust guard and front left steering knuckle assembly, and remove the front left dust guard.

13. Remove 2 coupling bolts and nuts between front left shock absorber assembly and front left steering knuckle assembly.



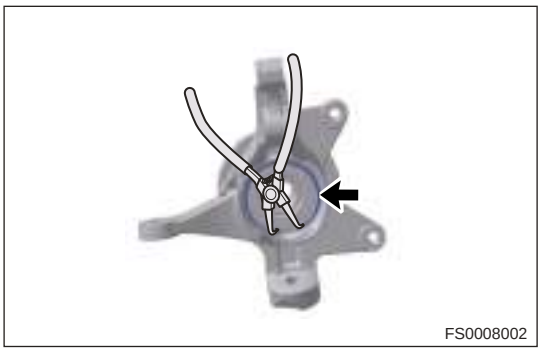
14. Disengage the left drive shaft and remove the front left steering knuckle assembly.

Disassembly

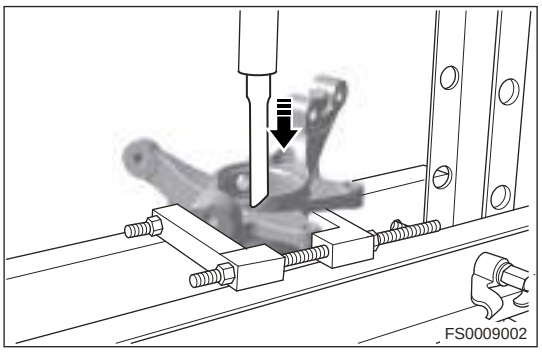
⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents, when disassembling the front steering knuckle assembly, front hub, front hub bearing.
- Appropriate force should be applied, when disassembling front steering knuckle assembly, front hub, front hub bearing. Be careful not to operate roughly.

1. Remove the front hub bearing retainer.

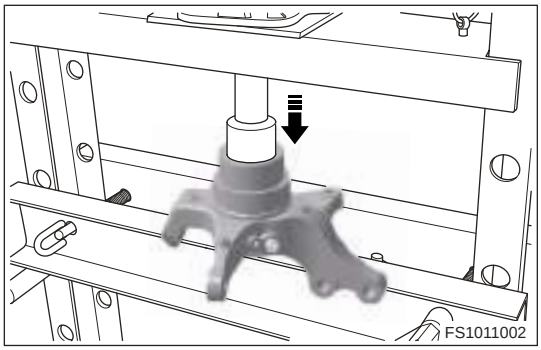


2. Place front steering knuckle assembly on a hydraulic press, install bearing remover and adapter, and press out front hub with hydraulic press.



3. Remove the front hub carefully.

4. Place steering knuckle assembly on a hydraulic press, install bearing remover and adapter, and press out front hub bearing with hydraulic press.



5. Remove the front hub bearing carefully.

Inspection

After installing front steering knuckle assembly, front hub and front hub bearing, check front steering knuckle and dust guard.

1. Check front steering knuckle for wear, cracks, deformation or damage. Replace as necessary.
2. Check dust guard for dirt, wear, cracks, deformation or damage. Replace as necessary.

Reassembly

1. Place steering knuckle assembly on a hydraulic press, install bearing remover and adapter, and carefully press front hub bearing into steering knuckle with hydraulic press.
2. Install the front hub bearing retainer.
3. Place steering knuckle assembly on a hydraulic press, install bearing remover and adapter, and carefully press front hub into steering knuckle with hydraulic press.

Installation

⚠ Caution

- Be sure to tighten coupling bolts and nuts to specified torques.
- Check that hub assembly rotates smoothly without any sticking after installation.
- Check wheel alignment after installation. Adjust wheel alignment to the standard range as necessary.

1. Align drive shaft accurately into front hub bearing of steering knuckle.
2. Install 2 coupling bolts and nuts between front left shock absorber assembly and front left steering knuckle assembly.

   Torque: 240 ± 24 N·m

3. Install 3 fixing bolts between front left dust guard and front left steering knuckle assembly.
   Torque: 8 - 13 N·m

4. Install 2 fixing bolts on the front left brake disc.
   Torque: 7 - 9 N·m

Hint:
Apply anaerobic seal gum to threads when installing fixing bolt of front brake disc.

5. Install fixing bolt between front left wheel speed sensor and front left steering knuckle assembly.
   Torque: 9 ± 1.5 N·m

6. Install fixing nut between front left control arm assembly ball pin and front left steering knuckle assembly.
   Torque: 95 ± 10 N·m

7. Install fixing nut between left steering tie rod outer ball pin assembly and front left steering knuckle assembly.
   Torque: 45 ± 5 N·m

8. Install the front left brake caliper assembly.
9. Install fixing nut to front left drive shaft.
   Torque: 270 ± 20 N·m

10. Install the front left wheel.
11. Connect the negative battery cable.

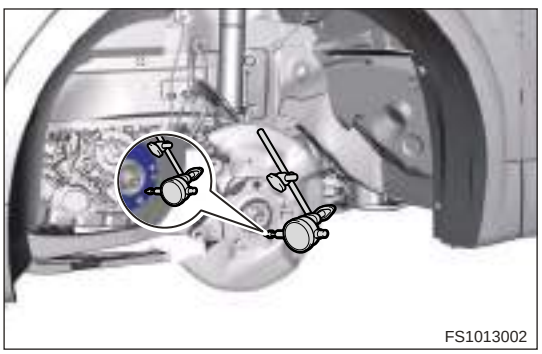
Front Hub Bearing

Hint:

- Use same procedures for right and left sides. Procedures listed below are for left side.

On-vehicle Inspection

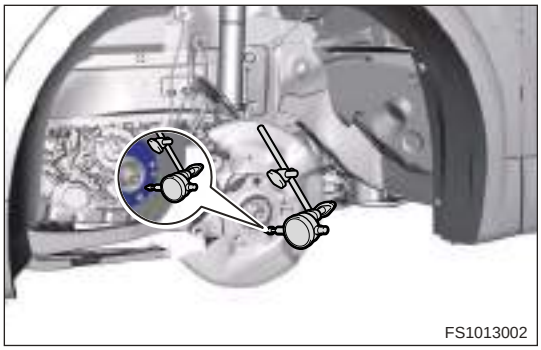
1. Remove the front left wheel.
2. Remove the front left brake caliper assembly.
3. Remove the front left brake disc.
4. Check looseness near center of the front hub assembly with a dial indicator.


FS1013002

⚠ Caution

- Ensure that dial indicator is perpendicular to measurement surface.
- If looseness exceeds maximum value, replace the front hub bearing.

5. Check runout of the front hub assembly surface with a dial indicator.


FS1013002

⚠ Caution

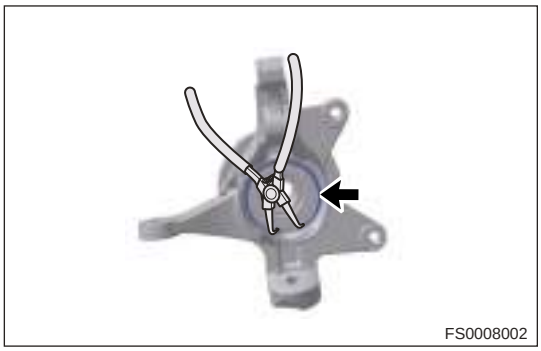
- Ensure that dial indicator is perpendicular to measurement surface.
- If runout exceeds maximum value, replace front hub bearing.

Removal

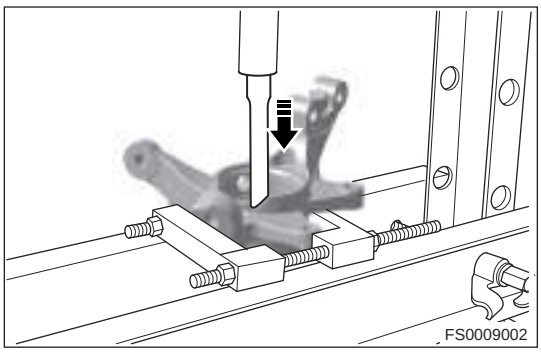
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify bearing parts of wheel suspension and guide parts of wheel.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

1. Remove the front left steering knuckle assembly.
2. Remove the front hub bearing retainer.

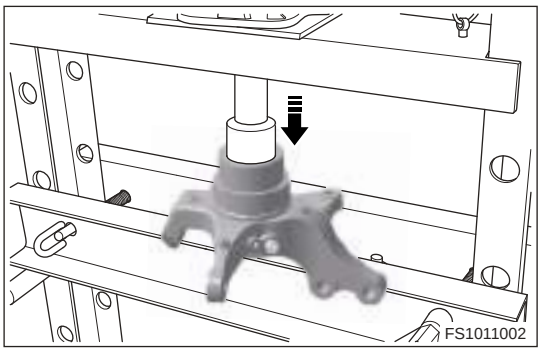

FS0008002

3. Place front steering knuckle assembly on a hydraulic press, install bearing remover and adapter, and press out front hub with hydraulic press.


FS0009002

4. Remove the front hub carefully.

5. Place steering knuckle assembly on a hydraulic press, install bearing remover and adapter, and press out front hub bearing with hydraulic press.



6. Remove the front hub bearing carefully.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Please note that opening of retainer must face opening of front wheel speed sensor, when installing front hub bearing retainer.
- Be sure to tighten coupling bolts and nuts to specified torques.
- Check that hub assembly rotates smoothly without any sticking after installation.
- Check wheel alignment after installation. Adjust wheel alignment to the standard range as necessary.

Front Sub Frame Welding Assembly

Removal

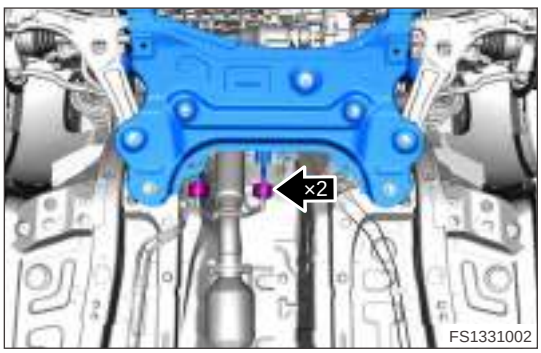
⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify bearing parts of wheel suspension and guide parts of wheel.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.
- When removing front sub frame welding assembly, an engine equalizer needs to be used to support engine and transmission assembly securely to prevent them from being damaged.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front wheel.
4. Remove the engine compartment lower protector assembly.
5. Remove left and right side rail assemblies.
6. Using an engine equalizer, support engine and transmission assembly securely.
7. Remove 1 fixing bolt between rear mounting upper body and lower body.

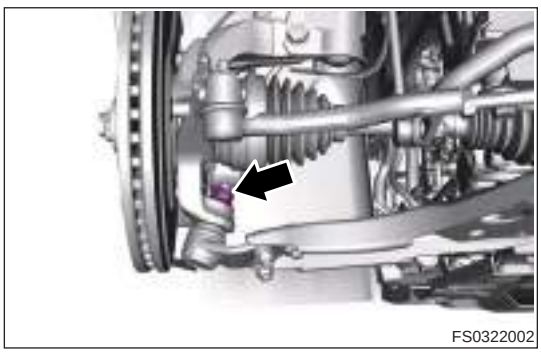

FS0330002

8. Detach 2 exhaust pipe fixing rubber lugs from front sub frame welding assembly.

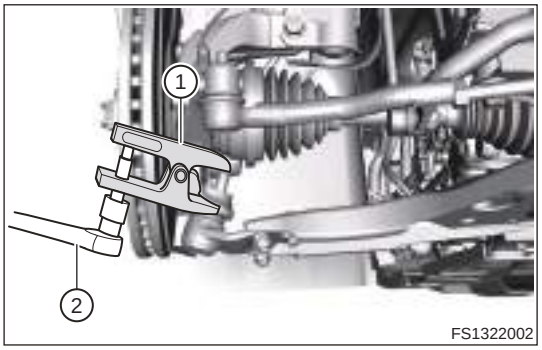


FS1331002

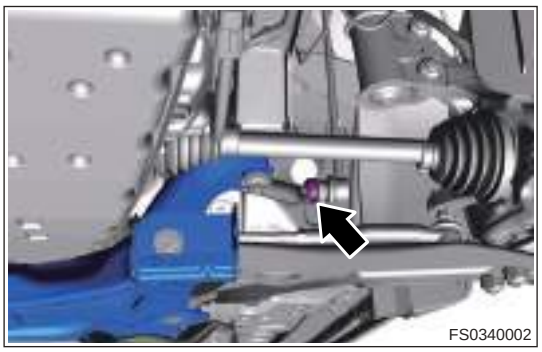
9. Remove nut between front left control arm assembly ball pin and front left steering knuckle assembly.


FS0322002

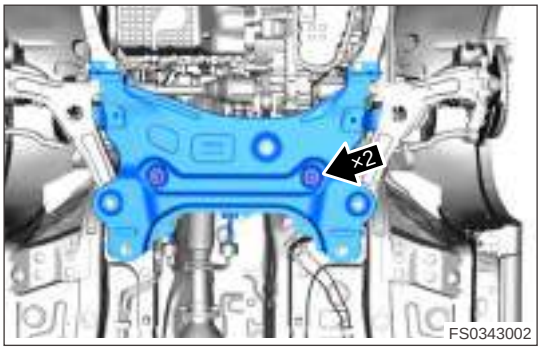
10. Install ball pin separator (1), and tighten ball pin separator bolt with a wrench (2) to separate lower control arm ball pin from steering knuckle assembly (use same removal procedures for right side).



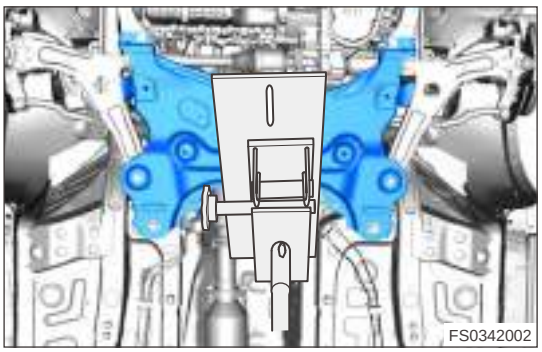
11. Remove coupling nut between front left connecting rod and front stabilizer bar. Separate front left connecting rod and front stabilizer bar (use same removal procedures for right side).



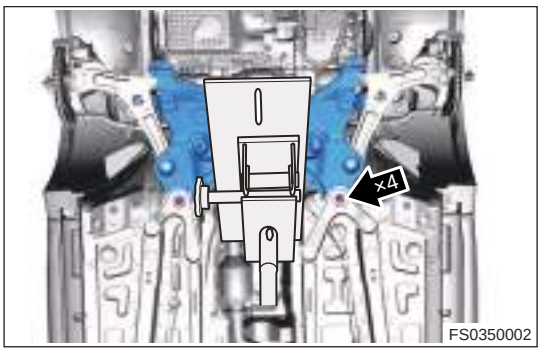
12. Remove 2 fixing bolts (arrow) between steering gear and front sub frame.



13. Using a transmission carrier, support the sub frame welding assembly.



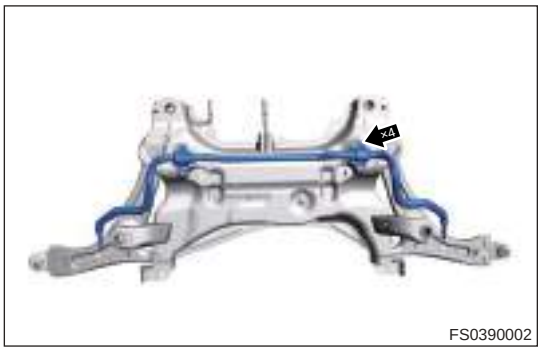
14. Remove 4 fixing bolts between front sub frame and vehicle body.



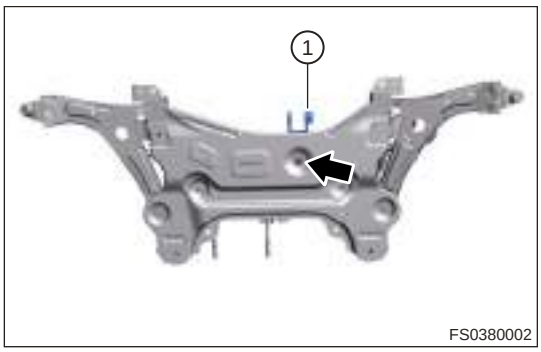
15. Slowly lower the sub frame welding assembly with stabilizer bar.

Disassembly

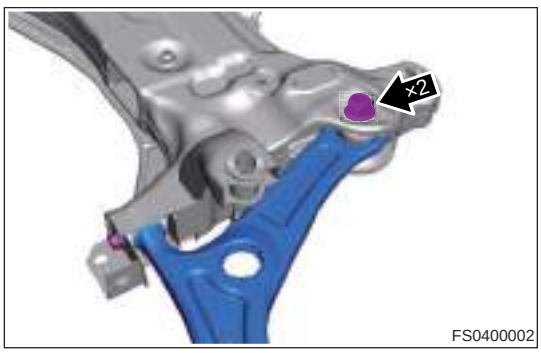
1. Remove the front stabilizer bar assembly.
   a. Remove 4 fixing bolts from front stabilizer bar assembly.



   b. Remove the front stabilizer bar assembly.
2. Remove the rear mounting lower body.
   a. Remove 1 fixing bolt and rear mounting lower body.



3. Remove the front left control arm assembly.
   a. Remove 2 fixing bolts between front left control arm assembly and sub frame, and remove front left control arm assembly.



4. Remove the front right control arm assembly.
   a. Remove 2 fixing bolts between front right control arm assembly and sub frame, and remove front right control arm assembly.

Assembly

1. Install 2 fixing bolts between front right control arm assembly and sub frame.
   Torque: 180 ± 18 N·m
2. Install 2 fixing bolts between front left control arm assembly and sub frame.
   Torque: 180 ± 18 N·m
3. Install 4 fixing bolts to stabilizer bar assembly.
   Torque: 25 ± 3 N·m

Installation

⚠ Caution
• Be sure to tighten coupling bolts and nuts to specified torques. • Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

1. Using a transmission carrier, support the sub frame welding assembly to a proper position.
2. Install 4 fixing bolts between front sub frame assembly and vehicle body.
   Torque: 180 ± 18 N·m
3. Install 2 fixing bolts between steering gear assembly and front sub frame assembly.
   Torque: 110 ± 8 N·m + 240 ± 5°
4. Install the nut between front left control arm assembly ball pin and front left steering knuckle assembly (use same procedures for right side).
   Torque: 95 ± 10 N·m
5. Install coupling nut between front connecting rods (left and right) and front stabilizer bar.
6. Install the rear mounting upper body.
7. Install left and right side rail assemblies.
8. Install the engine compartment lower protector assembly.
9. Install the front wheel.
10. Connect the negative battery cable.

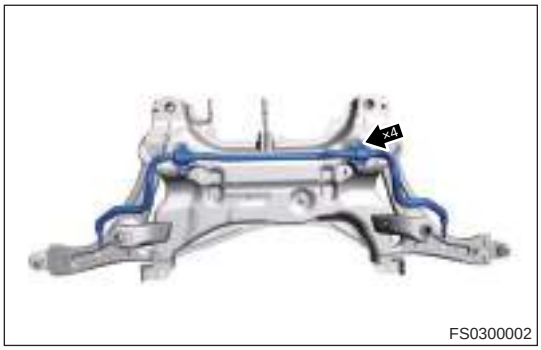
Front Stabilizer Bar Assembly

Removal

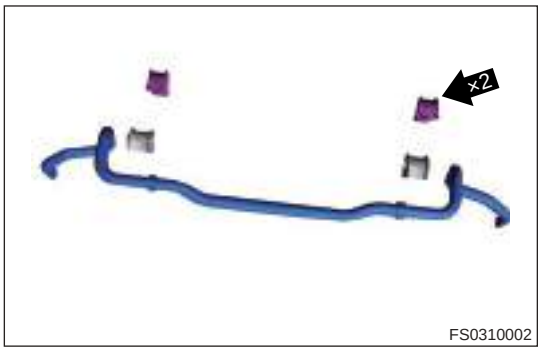
⚠ Warning
• Be sure to wear necessary safety equipment to prevent accidents. • Check if safety lock of lift is locked when repairing chassis parts. • It is not allowed to weld or modify suspension loading parts and guide parts. • When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the front left wheel.
5. Remove the front right wheel.
6. Remove the engine compartment lower protector assembly.

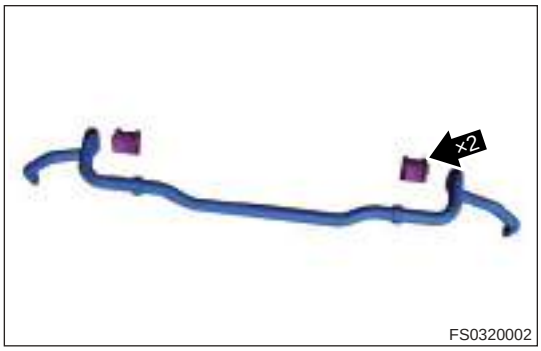
7. Remove the front sub frame welding assembly.
8. Remove 4 fixing bolts between front stabilizer bar and sub frame.



9. Detach left and right fixing clamps from front stabilizer bar assembly.



10. Detach left and right rubber supports from front stabilizer bar assembly.



Inspection

1. Check front stabilizer bar assembly fixing clamps for wear, cracks, deformation or damage. Replace it as necessary.
2. Check front stabilizer bar assembly rubber supports for dirt, wear, cracks, deformation or damage. Replace it as necessary.

Installation

⚠ Caution
• Be sure to tighten coupling bolts and nuts to specified torques. • Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

1. Install left and right rubber supports to front stabilizer bar assembly.
2. Install two fixing clamps between front stabilizer bar assembly and front sub frame assembly.
3. Install 4 fixing bolts between front stabilizer bar and sub frame.

   Torque: 25 ± 3 N·m

4. Install the front sub frame welding assembly.

5. Install the engine compartment lower protector assembly.
6. Install the front wheel.
7. Install the front bumper assembly.
8. Connect the negative battery cable.

REAR SUSPENSION（Non-independent suspension）

Warnings and Precautions

Warning

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair:

1. Be sure to wear necessary safety equipment to prevent accidents.
2. Check if safety lock of lift is locked when repairing chassis parts.
3. It is not allowed to weld or modify suspension loading parts and guide parts.
4. When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

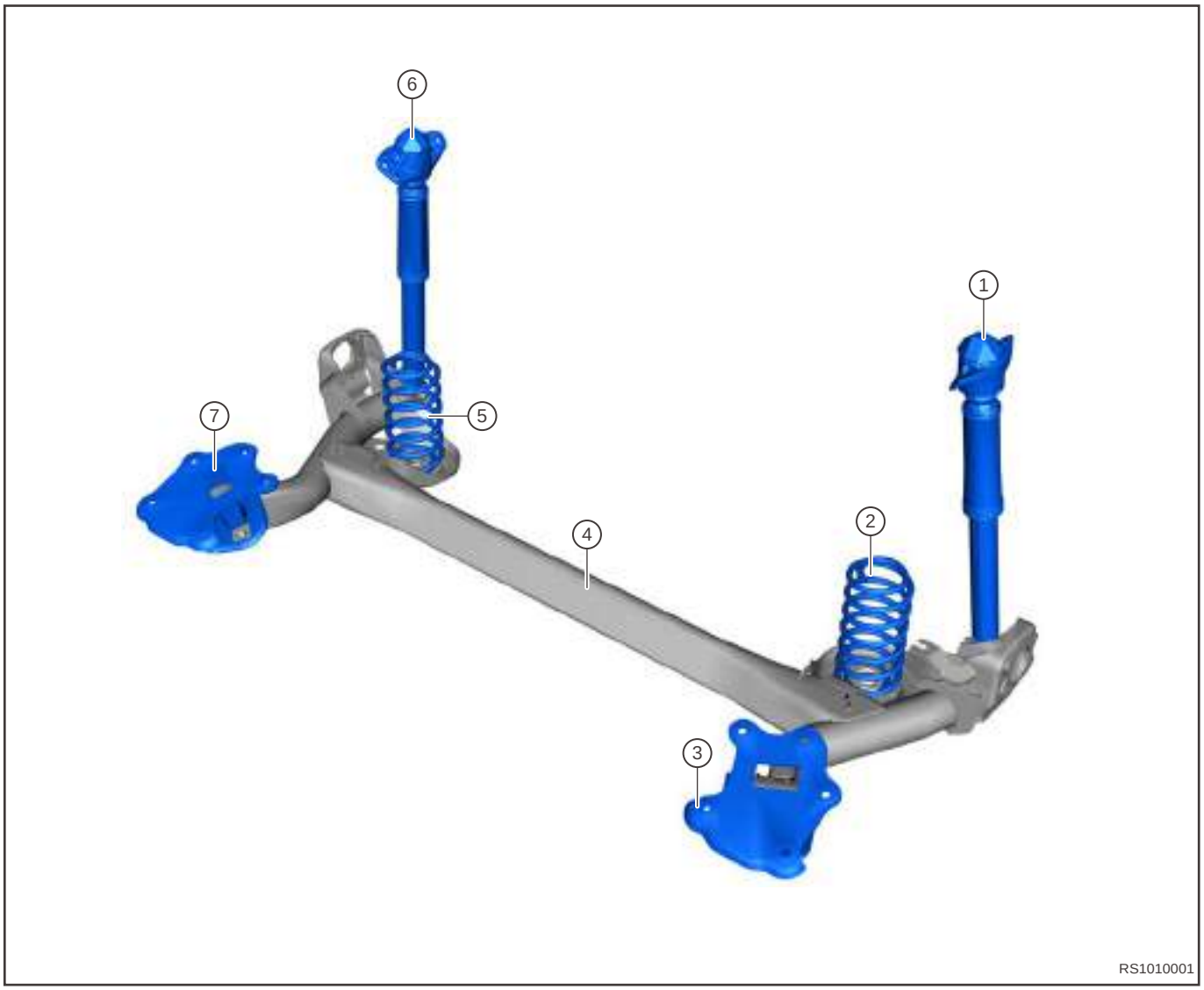
Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair:

1. Be sure to tighten coupling bolts and nuts to specified torques.
2. Align the protrusion of rear coil spring lower cushion with the positioning hole of rear lower control arm during installation.
3. Before assembling control arm assembly, apply grease on the outside of control arm assembly rubber bushing to prevent control arm assembly rubber bushing from being damaged.
4. Due to rubber bushing deformation, tightened bolt will exit false torque, so it is necessary to retighten the tightened bolt.
5. After installation, lower vehicle and bounce vehicle up and down several times to stabilize rear suspension.
6. Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.
7. When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

System Overview

System Component Diagram



1	Rear Left Shock Absorber Assembly	5	Rear Right Coil Spring Assembly
2	Rear Left Coil Spring Assembly	6	Rear Right Shock Absorber Assembly
3	Rear Left Shaft Bracket Assembly	7	Rear Right Shaft Bracket Assembly
4	Rear Shaft Assembly		

Axles are connected to the integral body through suspensions, and wheels are installed at both ends. Its function is to transmit force in all directions between integral body and wheels.

On-vehicle Service

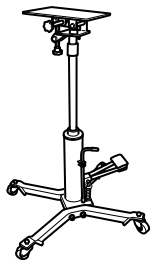
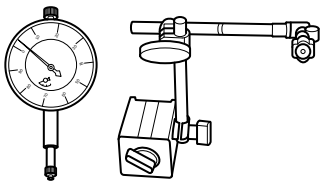
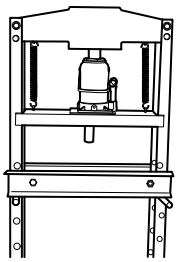
Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Vehicle pulls	Rear tire (worn or improperly inflated)
	Rear wheel alignment (incorrect)
	Rear hub bearing (excessively worn)
	Rear suspension components (worn or deformed)
	Steering gear (misaligned or damaged)
	Suspension component (worn)
Rear wheel shimmy	Rear tire (worn or improperly inflated)
	Rear wheel (out of balance)
	Rear shock absorber assembly (worn or damaged)
	Rear wheel alignment (incorrect)
	Rear hub bearing (worn)
Droop	Vehicle (overloaded)
	Rear coil spring (too soft)
	Rear shock absorber assembly (worn or damaged)
	Rear suspension components (excessively worn or deformed)
	Rear wheel alignment (incorrect)
	Rear tire (improperly inflated)
Sways/pitches	Rear tire (worn or improperly inflated)
	Rear shock absorber assembly (worn or deformed)

Tools

General Tools

Tool Name	Tool Drawing
Transmission Carrier	 S00004
Dial Indicator and Magnetic Holder	 S00018
Hydraulic Press	 S00010

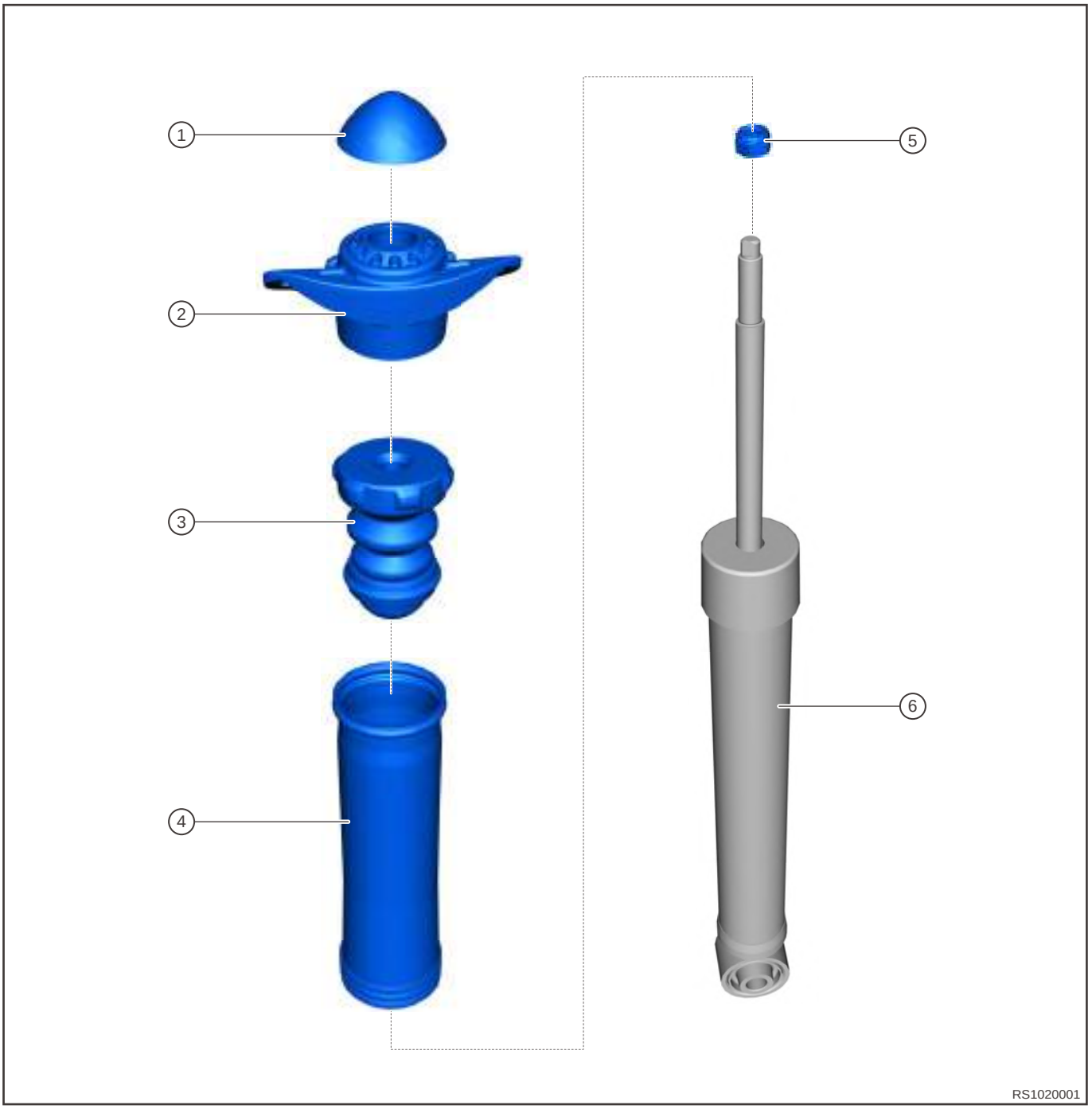
Torque

Torque Specifications

Item	Tightening Torque (N · m)
Coupling Bolt Between Rear Shaft Bushing and Mounting Bracket	180 ± 18
Coupling Bolt Between Rear Shaft Bracket and Body	60 ± 6
Coupling Bolt Between Rear Shock Absorber and Rear Shaft Assembly	160 ± 16
Coupling Nut Between Rear Shock Absorber and Rear Shaft Assembly	160 ± 16
Coupling Bolt Between Rear Shock Absorber and Body	60 ± 6

Rear Shock Absorber Assembly

Description



1	Rear Shock Absorber Cover Cap	4	Rear Dust Boot
2	Rear Shock Absorber Upper Connecting Plate Assembly (w/ Insulator)	5	Shock Absorber Locking Nut
3	Rear Buffer Block	6	Rear Shock Absorber Assembly

On-vehicle Inspection

1. Check the rear shock absorber assembly.
   a. Park vehicle on level ground, and bounce vehicle up and down, then check if vehicle shakes up and down when body bounds. If vehicle shakes up and down consecutively, shock absorber assembly may be damaged and should be replaced.
2. Check rear shock absorber assembly for leakage
   a. As shock absorber assembly operates frequently while driving vehicle, shock absorber fluid temperature rises and oil gas is formed and adheres to dust boot. This is a normal phenomenon, and it is not necessary to replace the shock absorber assembly.
   b. If following conditions occur:
      - Oil traces in circumferential direction are uneven;
      - Oil traces reach lower connecting positions.

      Above conditions indicate that there may be leakage in shock absorber assembly, and it is necessary to replace the shock absorber assembly.
   c. If it is difficult to accurately judge shock absorber assembly for leakage from appearance. Perform road test after wiping off oil on the surface of malfunctioning shock absorber. Under normal road conditions, drive vehicle for 5 to 10 minutes and perform inspection. If there are oil traces at the shock absorber assembly surface, it indicates that oil leakage exists, and it is necessary to replace the shock absorber assembly.

Removal

Hint:

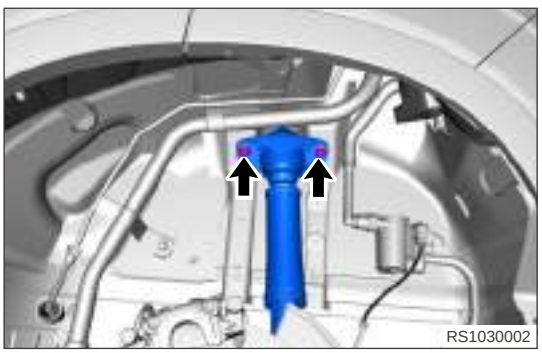
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

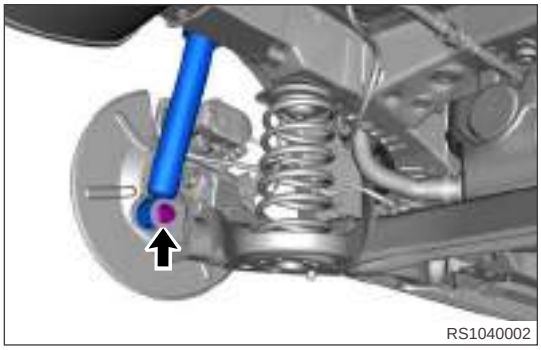
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left wheel.
4. Remove the rear left wheel house protector.
5. Remove 2 coupling bolts between upper part of rear left shock absorber assembly and body.

   Torque: 60 ± 6 N·m



6. Remove coupling bolt between lower part of rear left shock absorber assembly and rear shaft assembly.

   Torque: 160 ± 16 N·m


RS1040002

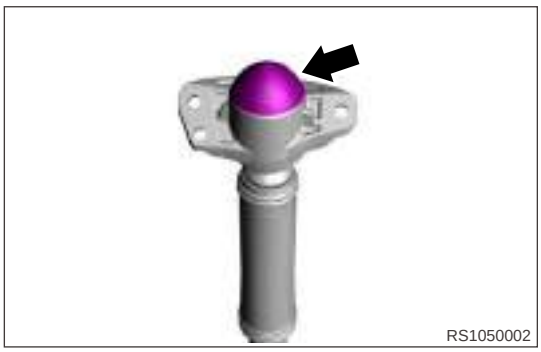
7. Remove the rear left shock absorber assembly.

Disassembly

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Remove the rear left shock absorber cover cap.


RS1050002

2. Remove fixing nut from rear left shock absorber assembly.


RS1060002

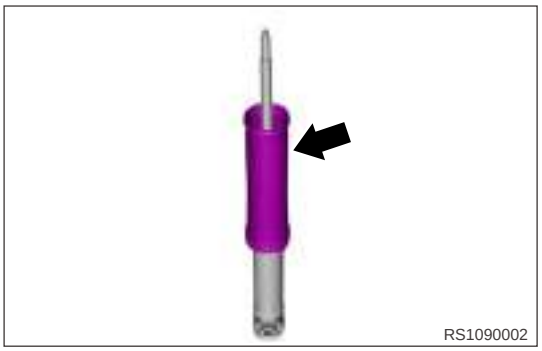
3. Remove the rear left shock absorber upper connecting plate assembly (w/ insulator).


RS1070002

4. Remove the rear buffer block.

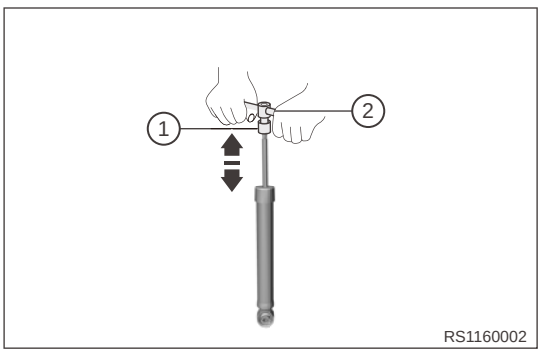

RS1080002

5. Remove the rear dust boot.


RS1090002

Inspection

1. Check the rear shock absorber assembly.
   Manual inspection:
   a. Install the nut (1) to the upper end of rear shock absorber assembly strut, and then install the T-wrench (2) or equivalent.



RS1160002

   b. Compress and extend the rear shock absorber assembly strut several times by hands in direction of arrow as shown in illustration. Check that there is no abnormal resistance or unusual sound during operation. If there is any abnormality, replace the rear shock absorber assembly with a new one.
2. Check the other components of rear shock absorber assembly.
   a. Check rear dust boot, rear buffer block and rear shock absorber cover cap for cracks, wear or deformation. Replace it as necessary.
   b. Check rear coil spring for wear, cracks or deformation. Replace it as necessary.

Reassembly

1. Install the rear dust cover.
2. Install the rear buffer block.
3. Install the rear left shock absorber upper connecting plate assembly (w/ insulator).
4. Install fixing nut to rear left shock absorber assembly.

   Torque: 33 ± 3 N·m

5. Install the rear left shock absorber cover cap.

Installation

⚠ Caution

- Be sure to tighten coupling bolts and nuts to specified torques.
- Bounce vehicle up and down several times to stabilize rear suspension after installation.
- When rear shock absorber device is connected with rear left steering knuckle, ensure that angle is 5.7° ± 1°, and bar code is outward near the brake side.

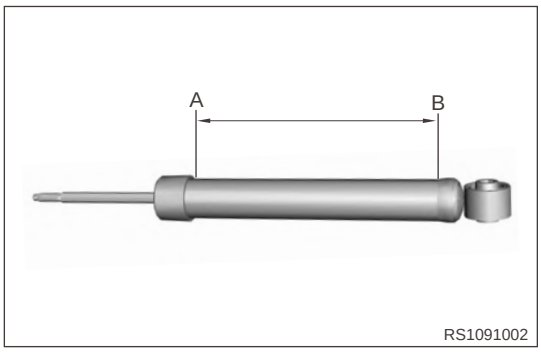
1. Installation is in the reverse order of removal.

Disposal

⚠ Warning

- Do not drill at high temperature and heat, and be sure to pay attention to safety!
- Shock absorber assembly contains nitrogen and oil, which are under high pressure. As hydraulic oil is explosive easily when exposed to heat, the surface is wet with water first before drilling or cutting.
- Be careful when drilling or cutting, because mental chips may fly about. Always perform operations with proper safety equipment to avoid personal injury.
- Before handling, be sure to wear goggles and release pressure inside shock absorber assembly to avoid personal injury.

1. Extend the rear shock absorber assembly strut fully.
2. Using a drill, make a hole between A and B in the strut as shown in the illustration, to discharge gas from rear shock absorber assembly and hydraulic oil.



3. After discharging gas and hydraulic oil from rear shock absorber assembly, handle the rear shock absorber assembly properly.

Hint:
Recycle disposed rear shock absorber assembly according to local environmental regulations.

Rear Coil Spring

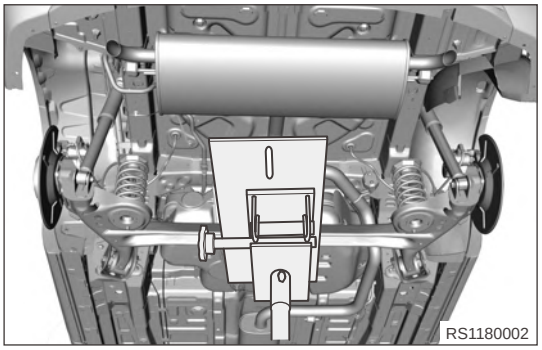
Removal

⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

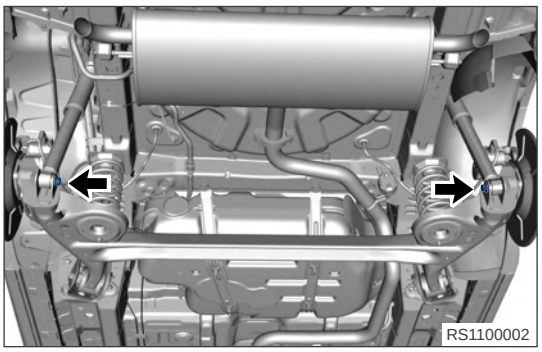
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear wheel.

4. Support the rear shaft assembly with a transmission carrier securely.

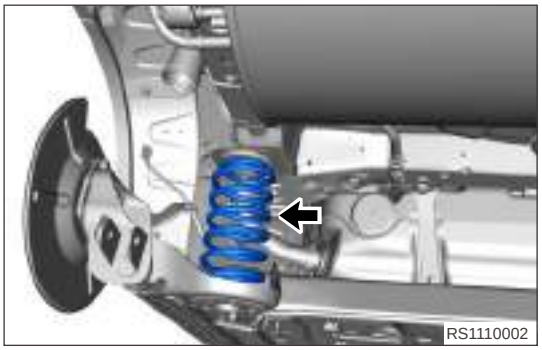


5. Remove coupling bolts and nuts between rear shock absorber assembly and rear shaft assembly.

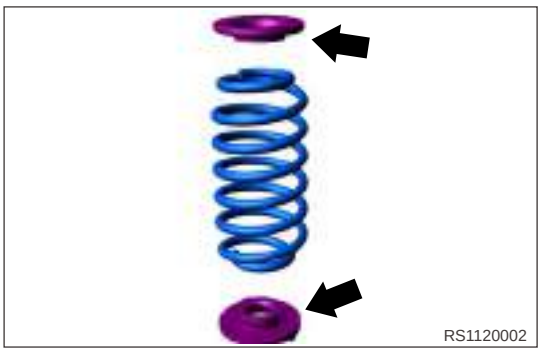
   Torque: 160 ± 16 N·m



6. Lower the transmission carrier slowly to an appropriate height and remove the rear coil spring carefully.



7. Remove the rear coil spring upper and lower cushions.



Inspection

1. Check rear coil spring for wear, cracks or permanent deformation due to excessive use. Replace it as necessary.
2. Check rear coil spring upper cushion and lower cushion for dirty, wear, cracks, deformation or damage. Replace it as necessary.
3. Check the free length of rear coil spring.

Installation

⚠ Caution

- Be sure to tighten coupling bolts and nuts to specified torques.
- Align the protrusion of rear coil spring lower cushion with the positioning hole of rear lower control arm during installation.
- After installation, lower vehicle and bounce vehicle up and down several times to stabilize rear suspension.
- Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

1. Installation is in the reverse order of removal.

Rear Shaft Bracket

Removal

Hint:

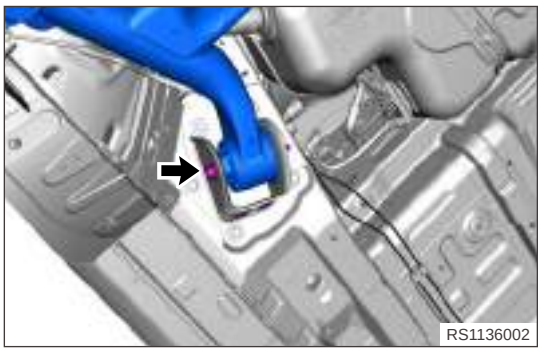
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing and installing chassis parts, replace self-locking nuts and rusted nuts for safety.

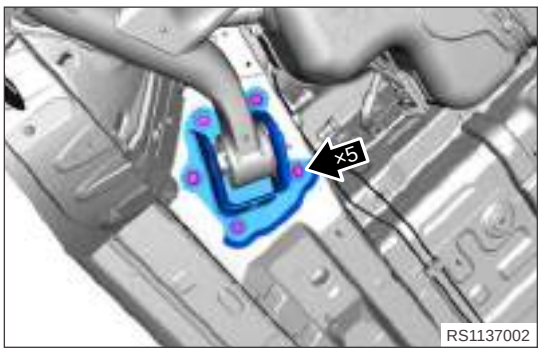
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Support the rear shaft assembly with a transmission carrier securely.
4. Remove mandrel bolt (arrow) between left side of rear shaft assembly and rear shaft bracket.

   Tightening torque: 180 ± 18 N · m



5. Remove 5 fixing bolts (arrow) between rear left shaft bracket and body.

   Tightening torque: 60 ± 6 N · m



6. Remove the rear left shaft bracket.

Installation

⚠ Caution

- Be sure to tighten coupling bolts and nuts to specified torques.

1. Installation is in the reverse order of removal.

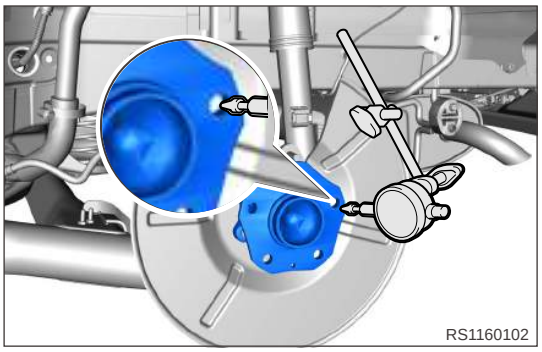
Rear Hub Bearing Assembly

On-vehicle Inspection

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

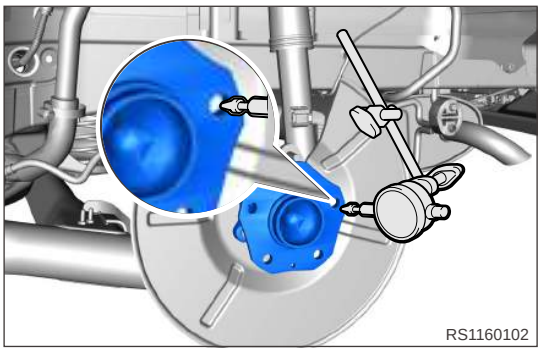
1. Remove the rear left wheel.
2. Remove the rear left brake caliper assembly.
3. Remove the rear left brake disc.
4. Check looseness of rear hub bearing.
   a. Check looseness near center of the rear hub bearing with a dial indicator.



⚠ Caution

- Ensure that dial indicator is perpendicular to measurement surface.
- If looseness exceeds maximum value, replace the rear hub bearing assembly.

5. Check the rear hub bearing runout.
   a. Check runout of the rear hub bearing assembly surface with a dial indicator.



⚠ Caution

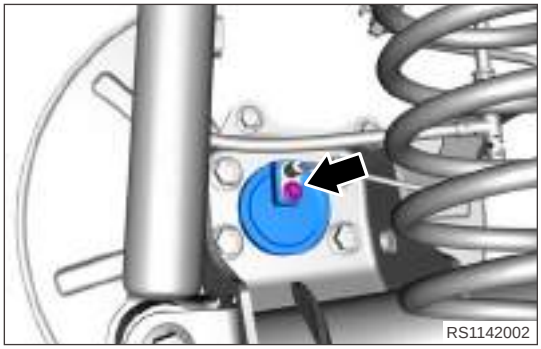
- Ensure that dial indicator is perpendicular to measurement surface.
- If runout exceeds maximum value, replace the rear hub bearing assembly.

Removal

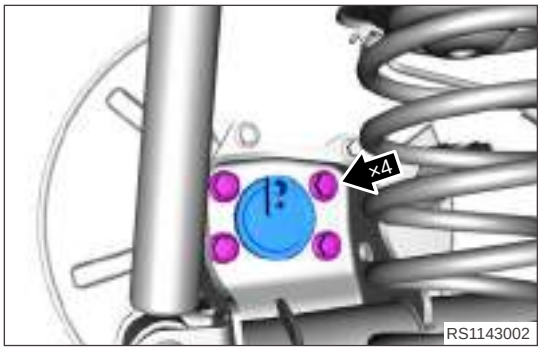
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left wheel.
4. Remove the rear left brake caliper assembly.
5. Remove the rear left brake disc.
6. Remove fixing bolt between rear left wheel speed sensor and rear hub bearing unit, and remove rear left wheel speed sensor carefully.



7. Remove 4 fixing bolts between rear hub bearing and rear left steering knuckle.



8. Remove the rear hub bearing.

Installation

⚠ Caution
• Be sure to tighten bolt to specified torque. • Check wheel alignment after installation. Adjust wheel alignment to the standard range as necessary.

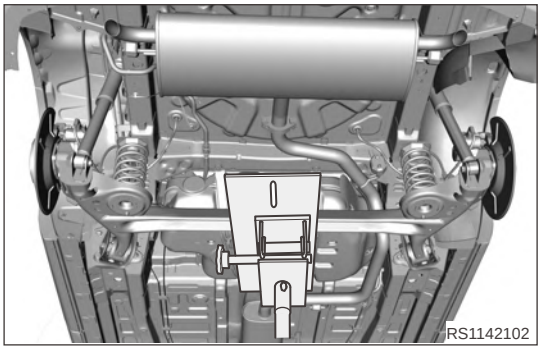
1. Installation is in the reverse order of removal.

Rear Shaft Assembly

Removal

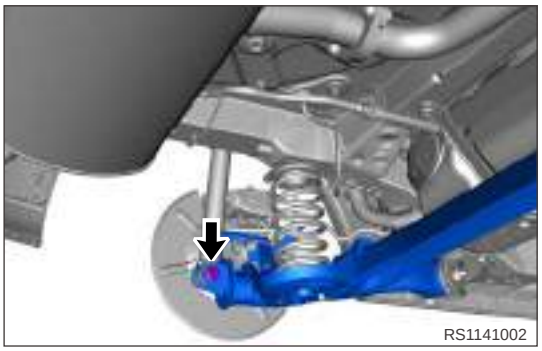
⚠ Warning
• Be sure to wear necessary safety equipment to prevent accidents. • Check if safety lock of lift is locked when repairing chassis parts. • It is not allowed to weld or modify bearing parts of wheel suspension and guide parts of wheel. • When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove rear left and rear right wheels.
4. Remove left and right wheel speed sensors.
5. Remove rear left and rear right brake caliper assemblies.
6. Remove rear left and rear right brake discs.
7. Remove rear left and rear right hub shaft assemblies.
8. Install transmission carrier to support rear shaft assembly.


RS1142102

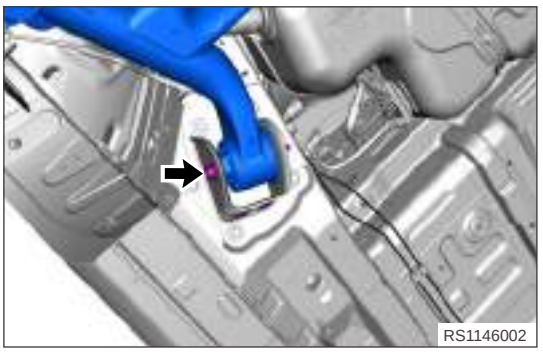
9. Remove coupling bolt and nut (arrow) between rear left shock absorber assembly and rear shaft assembly. Use same removal procedure for right side.

   Tightening torque: 160 ± 16 N·m


RS1141002

10. Remove the mandrel bolt (arrow) between left side of rear shaft assembly and rear shaft bracket. Use same removal procedure for right side.

    Tightening torque: 180 ± 18 N·m


RS1146002

11. Slowly lower the transmission carrier, and remove the rear shaft assembly.

Installation

⚠ Caution
• Be sure to tighten bolt to specified torque. • Check wheel alignment after installation. Adjust wheel alignment to the standard range as necessary.

1. Installation is in the reverse order of removal.

REAR SUSPENSION（independent suspension）

Warnings and Precautions

Warning

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair:

1. Be sure to wear necessary safety equipment to prevent accidents.
2. Check if safety lock of lift is locked when repairing chassis parts.
3. It is not allowed to weld or modify suspension loading parts and guide parts.
4. When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

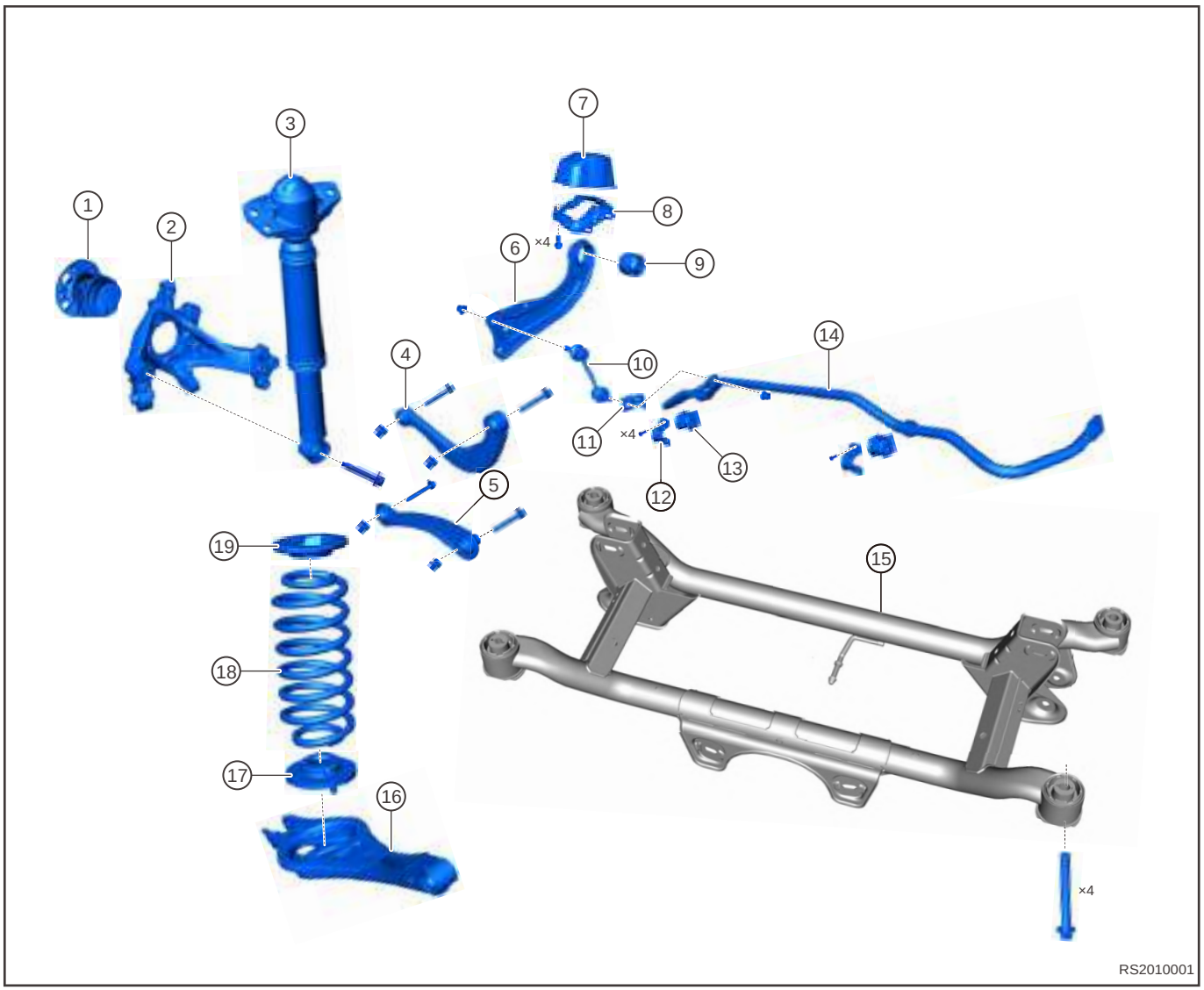
Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair:

1. Be sure to tighten coupling bolts and nuts to specified torques.
2. Align the protrusion of rear coil spring lower cushion with the positioning hole of rear lower control arm during installation.
3. Before assembling control arm assembly, apply grease on the outside of control arm assembly rubber bushing to prevent control arm assembly rubber bushing from being damaged.
4. Due to rubber bushing deformation, tightened bolt will exit false torque, so it is necessary to retighten the tightened bolt.
5. After installation, lower vehicle and bounce vehicle up and down several times to stabilize rear suspension.
6. Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.
7. When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

System Overview

System Component Diagram



1	Rear Hub Bearing	11	Rear Connecting Rod Shield
2	Rear Left Steering Knuckle	12	Rear Stabilizer Bar Clamp
3	Rear Shock Absorber Assembly	13	Rear Stabilizer Bar Bushing
4	Rear Upper Control Arm Welding Assembly	14	Rear Stabilizer Bar
5	Left Pull Rod Body	15	Rear Sub Frame Welding Assembly
6	Rear Left Trailing Arm Welding Assembly	16	Rear Lower Control Arm Welding Assembly
7	Left Trailing Arm Mounting Bracket Dust Boot	17	Rear Coil Spring Lower Cushion
8	Trailing Arm Bracket Assembly	18	Rear Coil Spring Assembly

9	Trailing Arm Bushing Assembly	19	Rear Coil Spring Upper Cushion
10	Rear Connecting Rod Assembly		

Rear suspension of this model uses multi-link independent suspension (height is non-adjustable), which is equipped with lateral stabilizer, cylindrical coil spring and double action telescopic shock absorber.

Component Operation Description

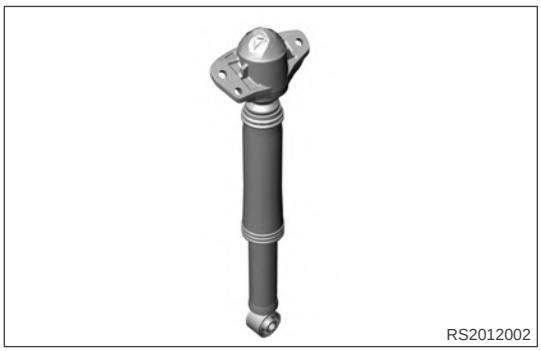
Rear Control Arm Welding Assembly

As a guide and power transmission element for suspension system of vehicle, control arm transmits various power acting on wheels to vehicle body and keeps wheels moving in a certain trail. Control arm elastically connects wheels and vehicle body together with ball joint or bushing.


RS2011002

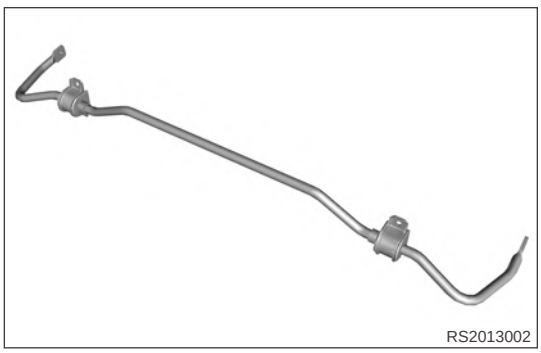
Rear Shock Absorber Assembly

It filters and eliminates vibration from roads to improve driving stability and bring people a sense of comfort and stability.


RS2012002

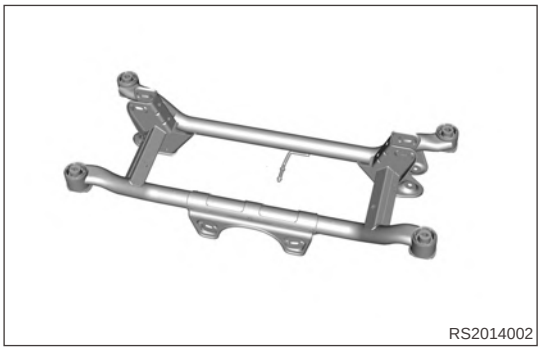
Rear Stabilizer Bar

Lateral stabilizer bar functions to prevent excessive lateral incline while vehicle is turning and keeps vehicle body in balance as much as possible. It aims to reduce lateral incline level of vehicle and improve smoothness. When vehicle is turning, vehicle body inclines and suspension on both sides have inconsistent bounce. The outer suspension will press against stabilizer bar to twist it, then elastic force from bar body will prevent wheel from lifting, so that vehicle body can be kept in balance as much as possible, thus realizing the lateral stability function.


RS2013002

Rear Sub Frame Assembly

Sub frame can reduce impact on vehicle body due to road shock and enhance connection rigid of suspension system and improve driving comfort and stability, making a strong and compact chassis during driving. It bears the deformation conditions such as loaded bend, longitudinal torsion, lateral bend and horizontal lozenging, etc. in place of vehicle body, which improves torsion resistance ability of vehicle body. Also, the force will be directly applied on it in a collision to improve vehicle safety performance.



On-vehicle Service

Problem Symptoms Table

Hint:

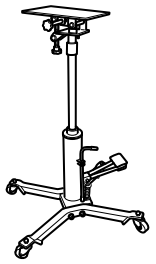
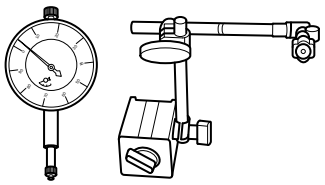
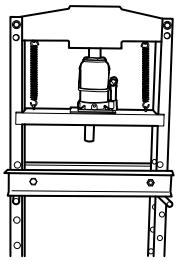
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Vehicle pulls	Rear tire (worn or improperly inflated)
	Rear wheel alignment (incorrect)
	Rear hub bearing (excessively worn)
	Rear suspension components (worn or deformed)
	Steering gear (misaligned or damaged)
	Suspension component (worn)
Rear wheel shimmy	Rear tire (worn or improperly inflated)
	Rear wheel (out of balance)
	Rear shock absorber assembly (worn or damaged)
	Rear wheel alignment (incorrect)
	Rear hub bearing (worn)
Droop	Vehicle (overloaded)
	Rear coil spring (too soft)
	Rear shock absorber assembly (worn or damaged)
	Rear suspension components (excessively worn or deformed)
	Rear wheel alignment (incorrect)
	Rear tire (improperly inflated)
Sways/pitches	Rear tire (worn or improperly inflated)
	Rear stabilizer bar assembly (bent or broken)

Symptom	Suspected Area
	Rear shock absorber assembly (worn or deformed)

Tools

General Tools

Tool Name	Tool Drawing
Transmission Carrier	 S00014
Dial Indicator and Magnetic Holder	 S00028
Hydraulic Press	 S00020

Torque

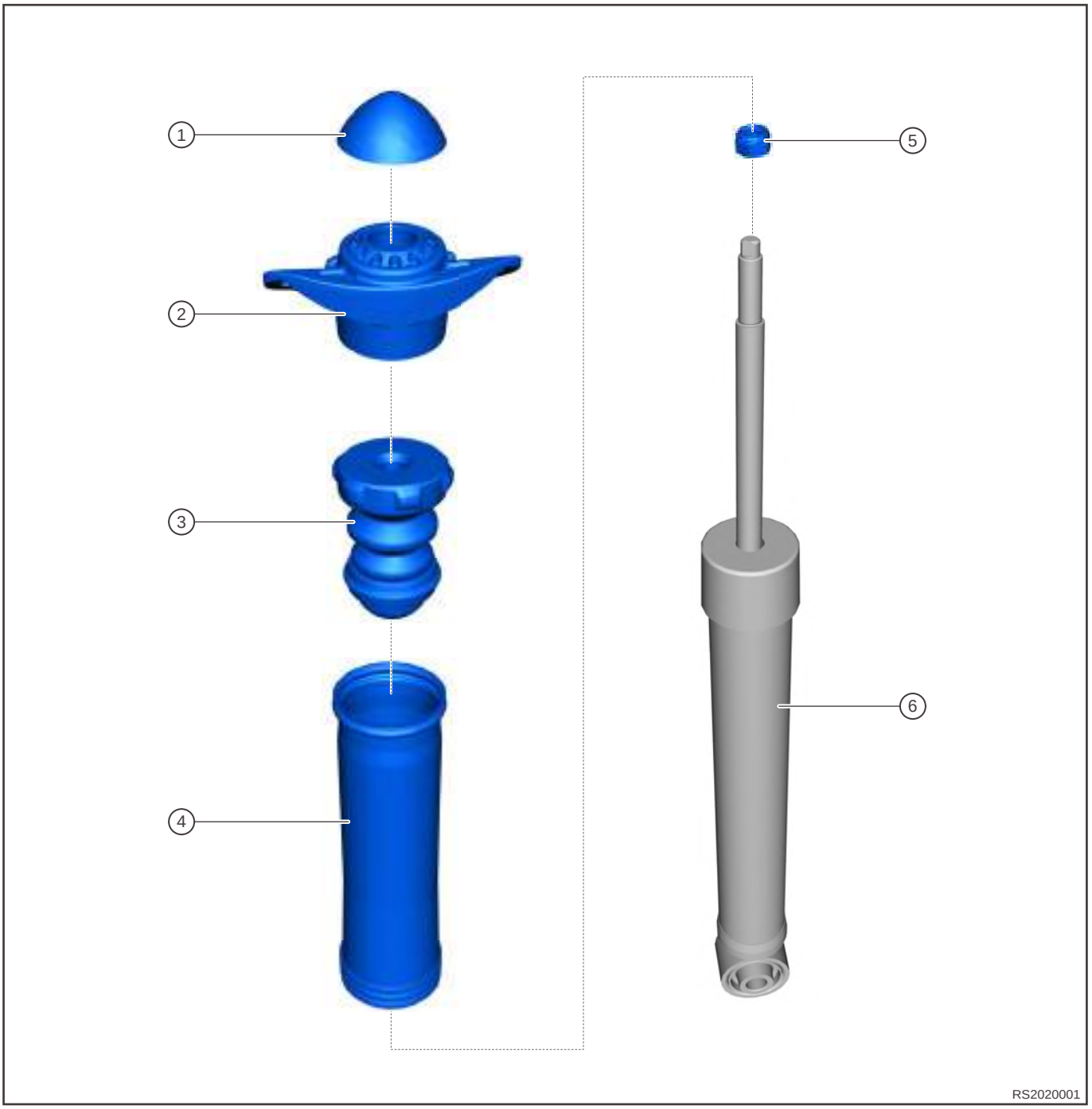
Torque Specifications

Item	Tightening Torque
Coupling Bolt Between Upper Part of Rear Shock Absorber Assembly and Body	60 ± 6 N·m
Coupling Bolt Between Lower Part of Rear Shock Absorber Assembly and Rear Steering Knuckle Assembly	160 ± 16 N·m
Rear Shock Absorber Assembly Fixing Nut	33 ± 3 N·m

Item	Tightening Torque
Coupling Bolt and Nut Between Rear Lower Control Arm Assembly and Rear Steering Knuckle Assembly	110 ± 11 N·m
Coupling Bolt and Nut Between Rear Upper Control Arm Assembly and Rear Steering Knuckle Assembly	160 ± 16 N·m
Coupling Bolt and Nut Between Rear Upper Control Arm Assembly and Rear Sub Frame Welding Assembly	115 ± 23 N·m
Coupling Bolt and Nut Between Rear Lower Control Arm Assembly and Rear Sub Frame Welding Assembly	110 ± 11 N·m
Coupling Bolt and Nut Between Rear Trailing Arm Assembly and Mounting Bracket	120 ± 12 N·m
Coupling Bolt Between Rear Trailing Arm Assembly Mounting Bracket and Body	60 ± 6 N·m
Coupling Bolt Between Rear Steering Knuckle Assembly and Rear Trailing Arm Assembly	110 ± 11 N·m
Coupling Nut Between Rear Connecting Rod Assembly and Rear Trailing Arm Assembly	60 ± 6 N·m
Coupling Bolt and Nut Between Rear Pull Rod Assembly and Rear Sub Frame Welding Assembly	110 ± 11 N·m
Coupling Bolt and Nut Between Rear Pull Rod Assembly and Rear Steering Knuckle Assembly	160 ± 16 N·m
Coupling Bolt Between Rear Stabilizer Bar Assembly and Rear Sub Frame Welding Assembly	25 ± 4 N·m
Coupling Nut Between Rear Connecting Rod Assembly and Rear Stabilizer Bar Assembly	60 ± 6 N·m
Fixing Bolt Between Rear Hub Bearing and Rear Left Steering Knuckle	80 - 91 N·m
Fixing Bolt Between Rear Wheel Speed Sensor and Rear Hub Bearing Unit	9 ± 1.5 N·m
Fixing Bolt Between Rear Dust Guard and Rear Left Steering Knuckle	8 ~ 13 N·m
Coupling Bolt Between Rear Sub Frame Assembly and Body	120 ± 12 N·m

Rear Shock Absorber Assembly

Description



1	Rear Shock Absorber Cover Cap	4	Rear Dust Boot
2	Rear Shock Absorber Upper Connecting Plate Assembly (w/ Insulator)	5	Shock Absorber Locking Nut
3	Rear Buffer Block	6	Rear Shock Absorber Assembly

On-vehicle Inspection

1. Check the rear shock absorber assembly.
   a. Park vehicle on level ground, and bounce vehicle up and down, then check if vehicle shakes up and down when body bounds. If vehicle shakes up and down consecutively, shock absorber assembly may be damaged and should be replaced.
2. Check rear shock absorber assembly for leakage
   a. As shock absorber assembly operates frequently while driving vehicle, shock absorber fluid temperature rises and oil gas is formed and adheres to dust boot. This is a normal phenomenon, and it is not necessary to replace the shock absorber assembly.
   b. If following conditions occur:
      - Oil traces in circumferential direction are uneven;
      - Oil traces reach lower connecting positions.

      Above conditions indicate that there may be leakage in shock absorber assembly, and it is necessary to replace the shock absorber assembly.
   c. If it is difficult to accurately judge shock absorber assembly for leakage from appearance. Perform road test after wiping off oil on the surface of malfunctioning shock absorber. Under normal road conditions, drive vehicle for 5 to 10 minutes and perform inspection. If there are oil traces at the shock absorber assembly surface, it indicates that oil leakage exists, and it is necessary to replace the shock absorber assembly.

Removal

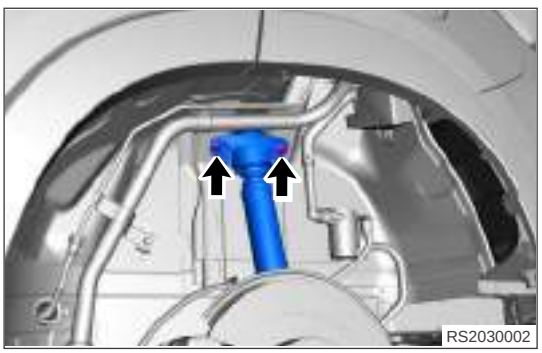
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

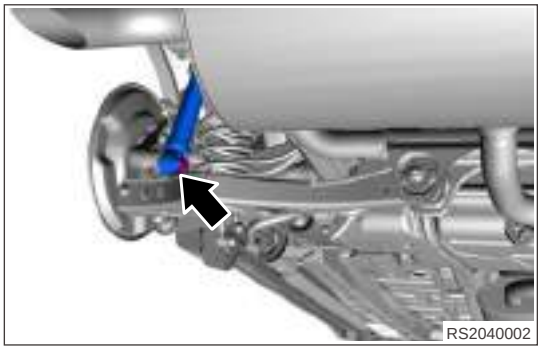
⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left wheel.
4. Remove the rear left wheel house protector.
5. Remove 2 coupling bolts between upper part of rear left shock absorber assembly and body.



6. Remove coupling bolt between lower part of rear left shock absorber assembly and rear left steering knuckle assembly.


RS2040002

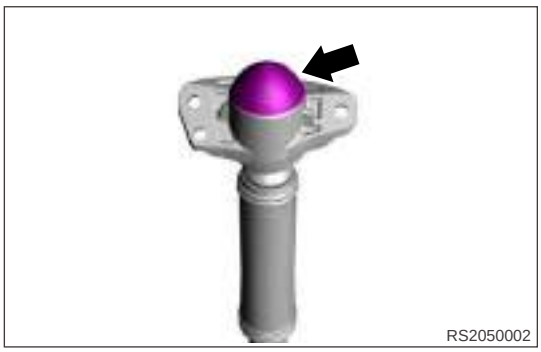
7. Remove the rear left shock absorber assembly.

Disassembly

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Remove the rear left shock absorber cover cap.


RS2050002

2. Remove fixing nut from rear left shock absorber assembly.

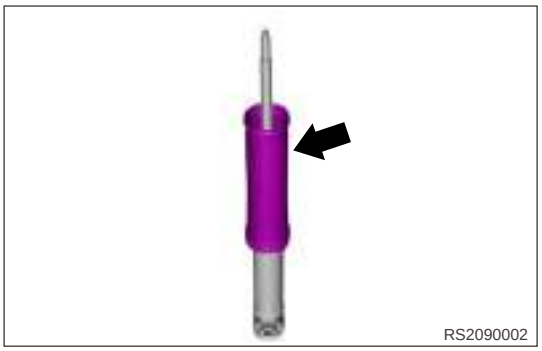

RS2060002

3. Remove the rear left shock absorber upper connecting plate assembly (w/ insulator).


RS2070002

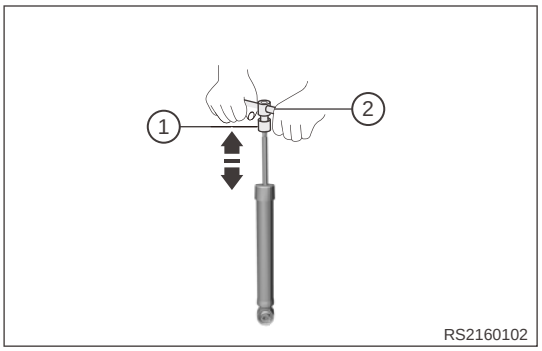
4. Remove the rear buffer block.

5. Remove the rear dust boot.



Inspection

1. Check the rear shock absorber assembly.
   Manual inspection:
   a. Install the nut (1) to the upper end of rear shock absorber assembly strut, and then install the T-wrench (2) or equivalent.



   b. Compress and extend the rear shock absorber assembly strut several times by hands in direction of arrow as shown in illustration. Check that there is no abnormal resistance or unusual sound during operation. If there is any abnormality, replace the rear shock absorber assembly with a new one.
2. Check the other components of rear shock absorber assembly.
   a. Check rear dust boot, rear buffer block and rear shock absorber cover cap for cracks, wear or deformation. Replace it as necessary.
   b. Check rear coil spring for wear, cracks or deformation. Replace it as necessary.

Reassembly

1. Install the rear dust cover.
2. Install the rear buffer block.
3. Install the rear left shock absorber upper connecting plate assembly (w/ insulator).
4. Install fixing nut to rear left shock absorber assembly.

   Torque: 33 ± 3 N·m

5. Install the rear left shock absorber cover cap.

Installation

⚠ Caution

- Be sure to tighten coupling bolts and nuts to specified torques.
- Bounce vehicle up and down several times to stabilize rear suspension after installation.

1. Install coupling bolt between lower part of rear left shock absorber assembly and rear left steering knuckle assembly.

   Torque: 160 ± 16 N·m

⚠ Caution

- When rear shock absorber device is connected with rear left steering knuckle, ensure that angle is 5.7° ± 1°, and bar code is outward near the brake side.

2. Install 2 coupling bolts between upper part of rear left shock absorber assembly and body.

   Torque: 60 ± 6 N·m

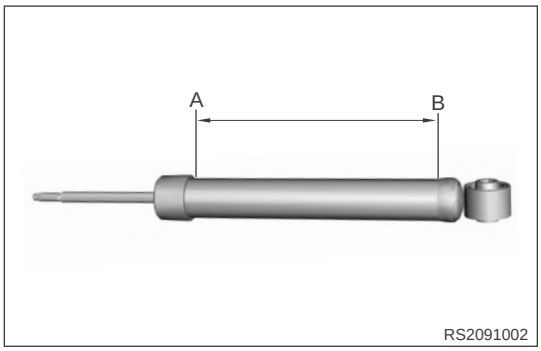
3. Install the rear left wheel house protector.
4. Install the rear left wheel.
5. Connect the negative battery cable.

Disposal

⚠ Warning

- Do not drill at high temperature and heat, and be sure to pay attention to safety!
- Shock absorber assembly contains nitrogen and oil, which are under high pressure. As hydraulic oil is explosive easily when exposed to heat, the surface is wet with water first before drilling or cutting.
- Be careful when drilling or cutting, because mental chips may fly about. Always perform operations with proper safety equipment to avoid personal injury.
- Before handling, be sure to wear goggles and release pressure inside shock absorber assembly to avoid personal injury.

1. Extend the rear shock absorber assembly strut fully.
2. Using a drill, make a hole between A and B in the strut as shown in the illustration, to discharge gas from rear shock absorber assembly and hydraulic oil.



3. After discharging gas and hydraulic oil from rear shock absorber assembly, handle the rear shock absorber assembly properly.

Hint:
Recycle disposed rear shock absorber assembly according to local environmental regulations.

Rear Coil Spring

Removal

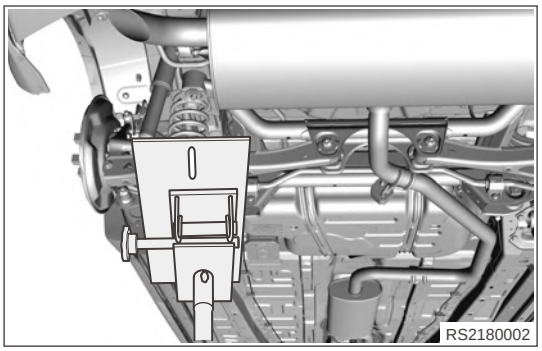
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

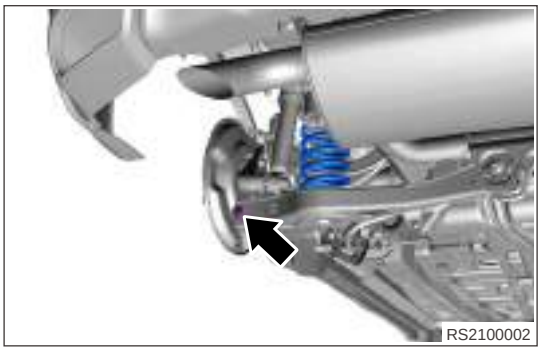
⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

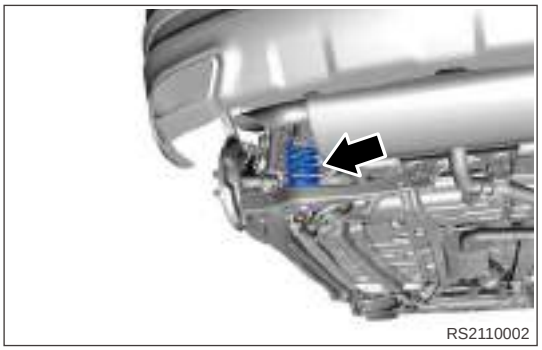
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left wheel.
4. Support the rear lower control arm assembly with a transmission carrier securely.


RS2180002

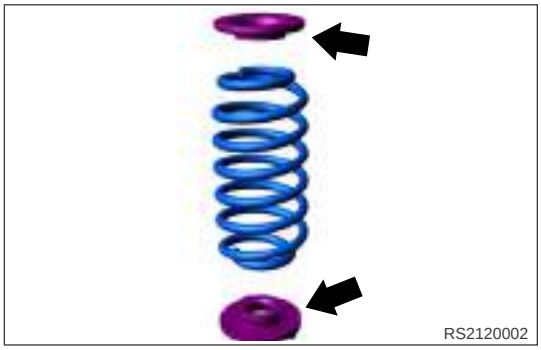
5. Remove coupling bolt and nut between rear lower control arm assembly and rear steering knuckle assembly.


RS2100002

6. Lower the transmission carrier slowly to an appropriate height and remove the rear coil spring carefully.


RS2110002

7. Remove the rear coil spring upper and lower cushions.



Inspection

1. Check rear coil spring for wear, cracks or permanent deformation due to excessive use. Replace it as necessary.
2. Check rear coil spring upper cushion and lower cushion for dirty, wear, cracks, deformation or damage. Replace it as necessary.
3. Check the free length of rear coil spring.

Installation

⚠ Caution

- Be sure to tighten coupling bolts and nuts to specified torques.
- Align the protrusion of rear coil spring lower cushion with the positioning hole of rear lower control arm during installation.
- After installation, lower vehicle and bounce vehicle up and down several times to stabilize rear suspension.
- Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

1. Install the rear coil spring upper and lower cushions.
2. Use transmission carrier to lift rear lower control arm to a proper height.
3. Install coupling bolt and nut between rear lower control arm assembly and rear steering knuckle assembly.

   Torque: 110 ± 11 N·m

4. Slowly lower the transmission carrier.
5. Install the rear left wheel.
6. Connect the negative battery cable.

Rear Upper Control Arm Assembly

Removal

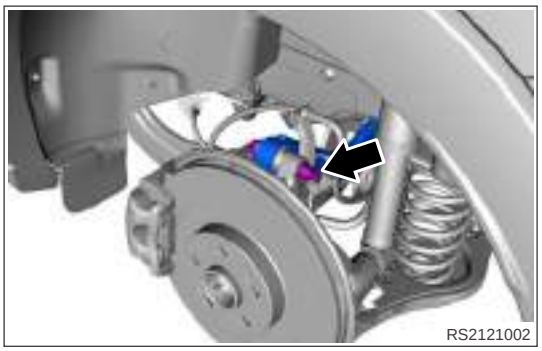
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

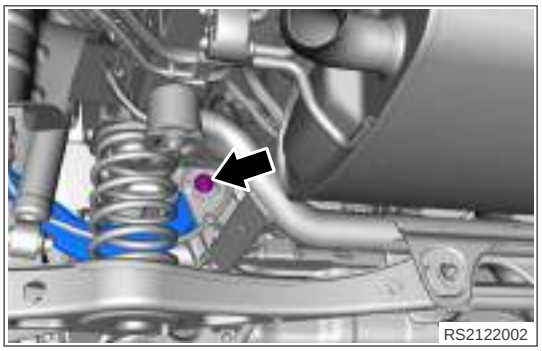
⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

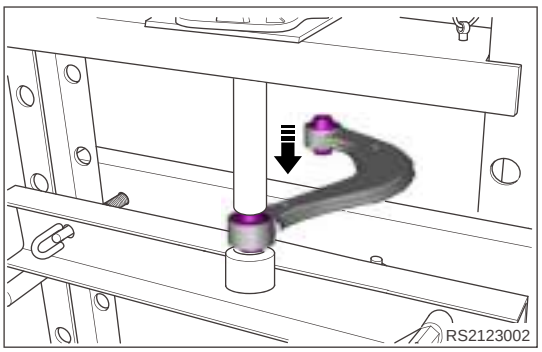
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left wheel.
4. Remove coupling bolt and nut between rear left upper control arm assembly and rear left steering knuckle assembly.


RS2121002

5. Remove coupling bolt between rear left upper control arm assembly and rear left sub frame welding assembly.


RS2122002

6. Remove the rear left upper control arm assembly.
7. Place the rear upper control arm assembly on a hydraulic press, cooperate with tools, and press out rear upper control arm assembly rubber bushing with hydraulic press.


RS2123002

Installation

⚠ Caution

- Be sure to tighten coupling bolts and nuts to specified torques.
- Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

1. Place the rear upper control arm assembly on a hydraulic press, cooperate with tools, and press control arm assembly rubber bushing into rear upper control arm with hydraulic press.

⚠ Caution

- Before pressing in, apply grease on the outside of control arm assembly rubber bushing to prevent control arm assembly rubber bushing from being damaged.

2. Install coupling bolt between rear left upper control arm assembly and rear sub frame welding assembly.

   Torque: 115 ± 23 N·m

3. Install coupling bolt and nut between rear left upper control arm assembly and rear left steering knuckle assembly.

   Torque: 160 ± 16 N·m

4. Install the rear left wheel.
5. Connect the negative battery cable.

Rear Lower Control Arm Assembly

Removal

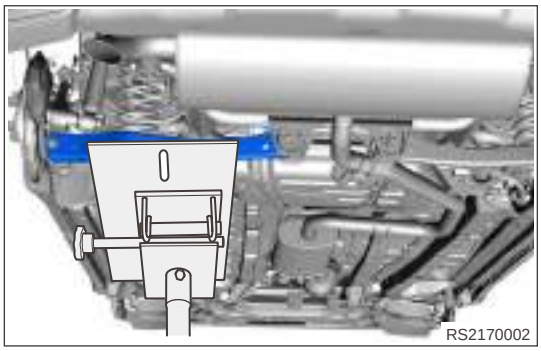
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

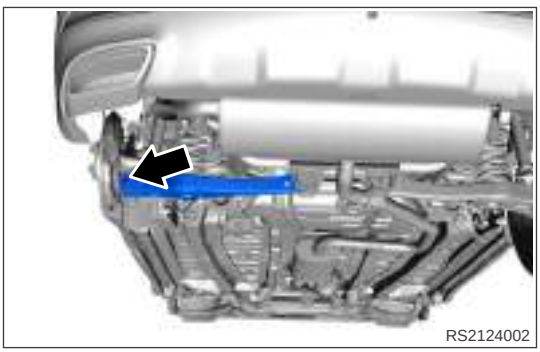
⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left wheel.
4. Support the rear left lower control arm assembly with a transmission carrier securely.

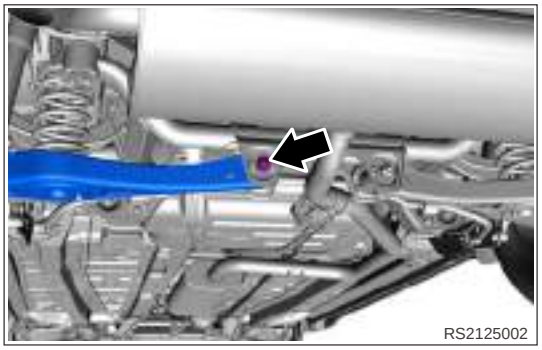

RS2170002

5. Remove coupling bolt and nut between rear left lower control arm assembly and rear left steering knuckle assembly.


RS2124002

6. Lower the transmission carrier slowly to a proper height and remove rear coil spring, rear coil spring upper cushion and rear coil spring lower cushion carefully.

7. Remove coupling bolt, nut and adjusting shim between rear left lower control arm assembly and rear sub frame welding assembly.



8. Remove the rear left lower control arm assembly.

Installation

⚠ Caution

- Be sure to tighten coupling bolts and nuts to specified torques.
- Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

1. Install coupling bolt, nut and adjusting shim between rear left lower control arm assembly and rear sub frame welding assembly.

   Torque: 110 ± 11 N·m

2. Install rear coil spring, rear coil spring upper and lower cushions and use transmission carrier to lift rear lower control arm to a proper height.
3. Install coupling bolt and nut between rear left lower control arm assembly and rear left steering knuckle assembly.

   Torque: 110 ± 11 N·m

4. Slowly lower the transmission carrier.
5. Install the rear left wheel.
6. Connect the negative battery cable.

Rear Trailing Arm Assembly

Removal

Hint:

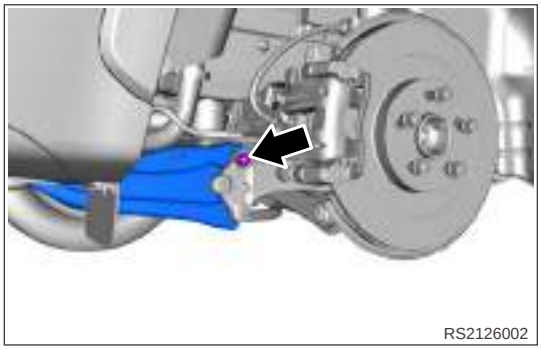
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Warning

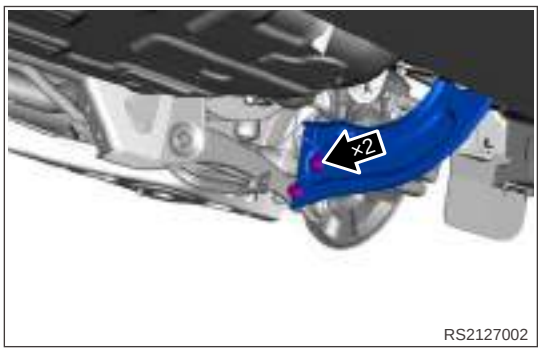
- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left wheel.

4. Remove coupling nut between rear left connecting rod assembly and rear left trailing arm assembly, and disengage rear left connecting rod assembly.

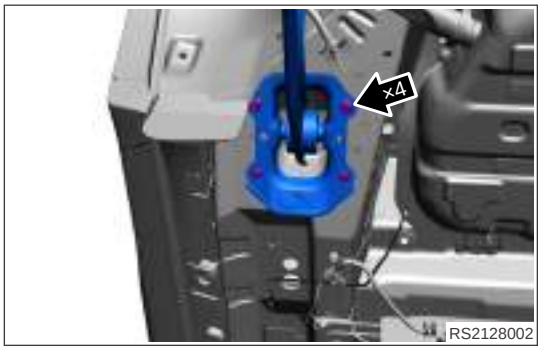

RS2126002

5. Remove 2 coupling bolts between rear left steering knuckle assembly and rear left trailing arm assembly.



RS2127002

6. Remove 4 coupling bolts between rear left trailing arm assembly mounting bracket and body.



RS2128002

7. Remove the rear left trailing arm assembly (w/ mounting bracket).

Disassembly

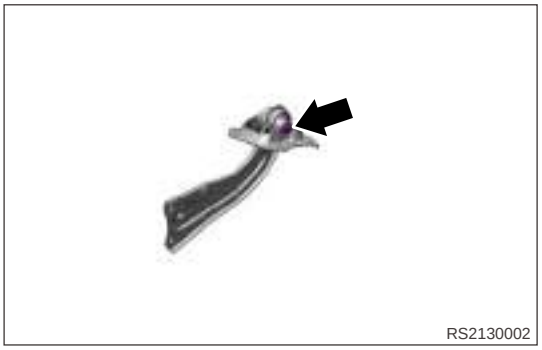
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

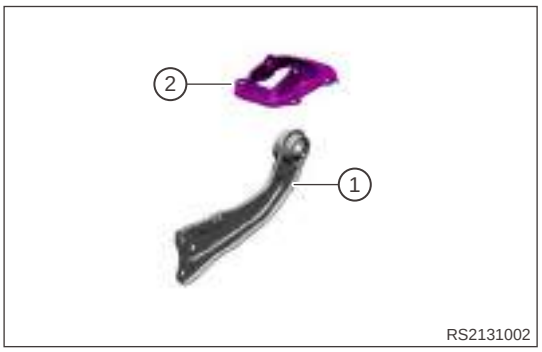
1. Remove the rear trailing arm mounting bracket dust boot.


RS2129002

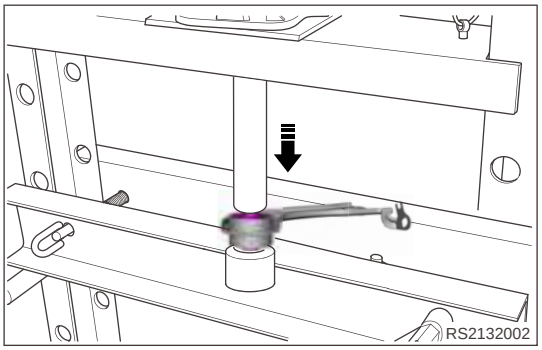
2. Remove coupling bolt and nut between rear trailing arm assembly and mounting bracket.



3. Separate rear trailing arm assembly (1) from mounting bracket (2).



4. Place the rear trailing arm assembly on a hydraulic press, and press out rear trailing arm assembly rubber boot with hydraulic press.



Reassembly

1. Place the rear trailing arm assembly on a hydraulic press, cooperate with tools, and press rear trailing arm assembly rubber sleeve into rear trailing arm assembly with hydraulic press.

⚠ Caution

- Before pressing in, apply grease on the outside of trailing arm assembly rubber boot to prevent it from damage.

2. Install coupling bolt and nut between rear trailing arm assembly and mounting bracket.

   Torque: 120 ± 12 N·m

3. Install the rear trailing arm mounting bracket dust boot.

Installation

⚠ Caution

- Be sure to tighten coupling bolts and nuts to specified torques.
- Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

1. Install 4 coupling bolts between rear left trailing arm assembly mounting bracket and body.
   Torque: 60 ± 6 N·m
2. Install 2 coupling bolts between rear left steering knuckle assembly and rear left trailing arm assembly.
   Torque: 110 ± 11 N·m
3. Install coupling nut between rear left connecting rod assembly and rear left trailing arm assembly.
   Torque: 60 ± 6 N·m
4. Install the rear left wheel.
5. Connect the negative battery cable.

Rear Pull Rod Assembly

Removal

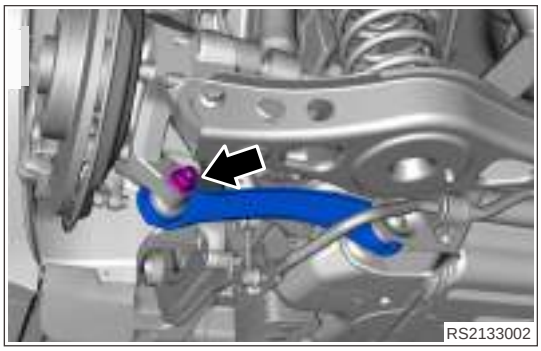
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

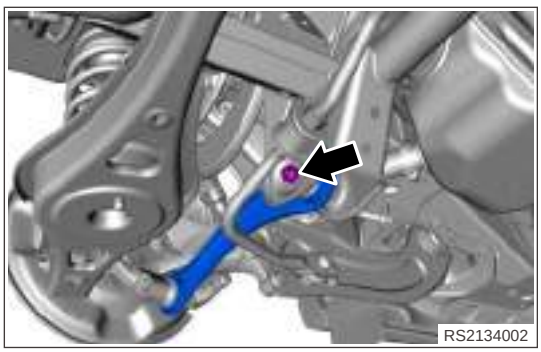
⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left wheel.
4. Remove coupling bolt and nut between rear left pull rod assembly and rear left steering knuckle assembly.

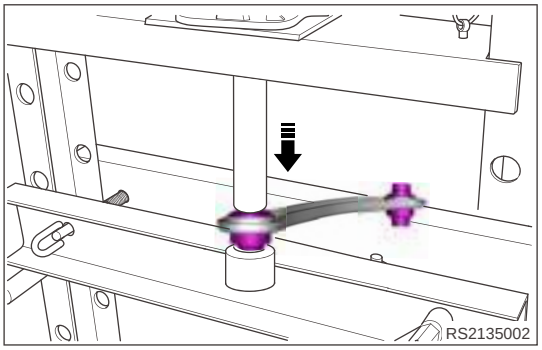

RS2133002

5. Remove coupling bolt and nut between rear left pull rod assembly and rear sub frame welding assembly.


RS2134002

6. Remove the rear left pull rod assembly.

7. Place the rear pull rod assembly on a hydraulic press, and press out rear pull rod assembly rubber boot with hydraulic press.



Installation

⚠ Caution
• Be sure to tighten coupling bolts and nuts to specified torques.

1. Place the rear pull rod assembly on a hydraulic press, cooperate with tools, and press rear pull rod assembly rubber boot into rear pull rod assembly with hydraulic press.

⚠ Caution
• Before pressing in, apply grease on the outside of rear pull rod assembly rubber boot to prevent it from damage.

2. Install coupling bolt and nut between rear left pull rod assembly and rear sub frame welding assembly.

   Torque: 110 ± 11 N·m

3. Install coupling bolt and nut between rear left pull rod assembly and rear left steering knuckle assembly.

   Torque: 160 ± 16 N·m

4. Install the rear left wheel.
5. Connect the negative battery cable.

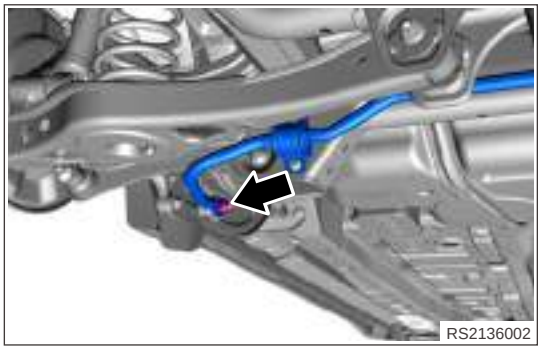
Rear Stabilizer Bar Assembly

Removal

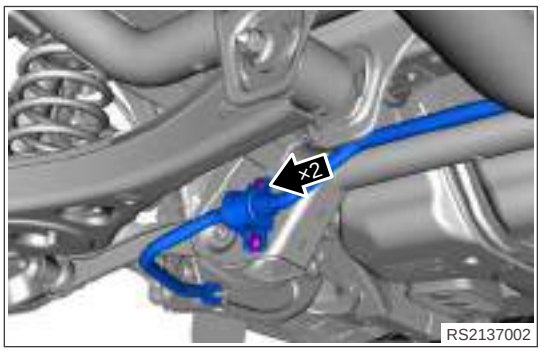
⚠ Warning
• Be sure to wear necessary safety equipment to prevent accidents. • Check if safety lock of lift is locked when repairing chassis parts. • It is not allowed to weld or modify suspension loading parts and guide parts. • When removing and installing chassis parts, replace self-locking nuts and rusted nuts for safety.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.

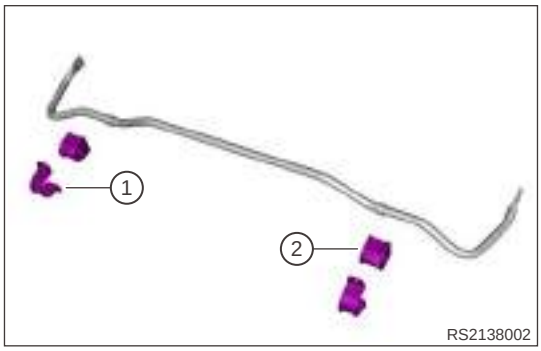
3. Remove coupling nut between rear left connecting rod assembly and rear stabilizer bar assembly, and remove rear connecting rod shield. Use same removal procedure for right side.



4. Remove 2 coupling bolts between rear stabilizer bar assembly and rear sub frame welding assembly (take left side as an example). Use same removal procedure for right side.



5. Remove the rear stabilizer bar assembly.
6. Remove rear stabilizer bar fixing clamp (1) and rear stabilizer bar rubber support (2) from rear stabilizer bar assembly.



Inspection

1. Check rear stabilizer bar assembly fixing clamps for wear, cracks, deformation or damage. Replace it as necessary.
2. Check rear stabilizer bar assembly rubber supports for dirt, wear, cracks, deformation or damage. Replace it as necessary.

Installation

⚠ Caution
• Be sure to tighten coupling bolts and nuts to specified torques.

1. Install rear stabilizer bar fixing clamp (1) and rear stabilizer bar rubber support (2).
2. Install 2 coupling bolts between rear stabilizer bar assembly and rear sub frame welding assembly (-Take left side as an example). Use same installation procedure for right side.

   Torque: 25 ± 4 N·m

⚠ Caution

- Due to rubber bushing deformation, tightened bolt will exit false torque, so it is necessary to retighten the tightened bolt.

3. Place rear connecting rod shield on rear connecting rod, install coupling nut between rear left connecting rod assembly and rear stabilizer bar assembly. Use same installation procedure for right side.

   Torque: 60 ± 6 N·m

4. Connect the negative battery cable.

Rear Connecting Rod Assembly

Removal

Hint:

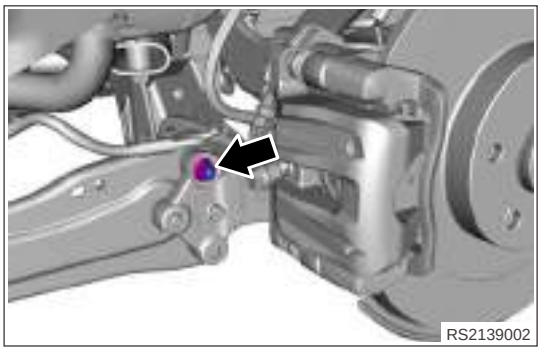
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify suspension loading parts and guide parts.
- When removing and installing chassis parts, replace self-locking nuts and rusted nuts for safety.

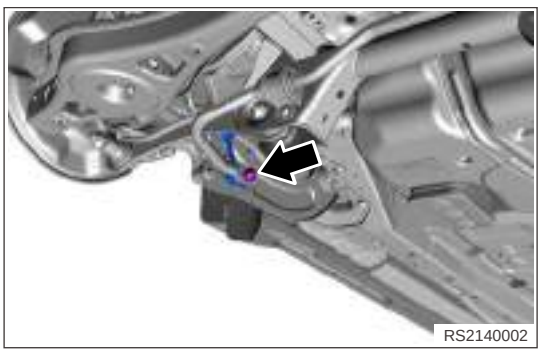
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove coupling nut between rear left connecting rod assembly and rear left trailing arm assembly, and disengage rear connecting rod assembly.

   Torque: 60 ± 6.0 N·m


RS2139002

4. Remove coupling nut between rear left connecting rod assembly and rear stabilizer bar assembly, and remove rear connecting rod assembly.

   Torque: 60 ± 6.0 N·m


RS2140002

Inspection

1. Check rear connecting rod assembly bush for wear, cracks, deformation, damage or grease leakage. Replace it as necessary.
2. Check if end of rear connecting rod assembly rotates smoothly. Replace it as necessary.

Installation

⚠ Caution

- Be sure to tighten coupling bolts and nuts to specified torques.
- Make sure that end of rear connecting rod assembly rotates smoothly without any sticking after installation.

1. Installation is in the reverse order of removal.

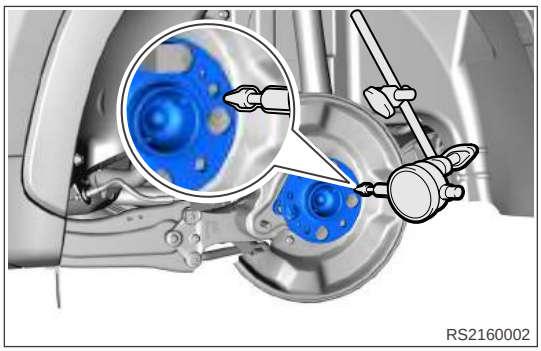
Rear Hub Bearing Assembly

On-vehicle inspection

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

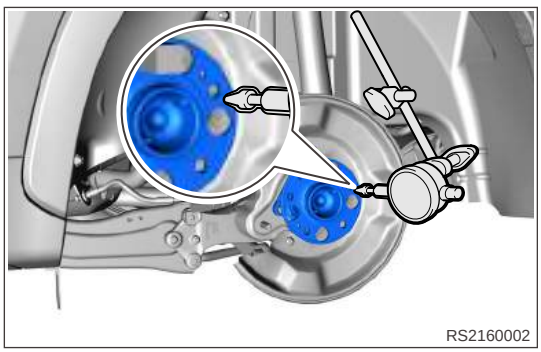
1. Remove the rear left wheel.
2. Remove the rear left brake caliper assembly.
3. Remove the rear left brake disc.
4. Check looseness of rear hub bearing.
   a. Check looseness near center of the rear hub bearing with a dial indicator.



⚠ Caution

- Ensure that dial indicator is perpendicular to measurement surface.
- If looseness exceeds maximum value, replace the rear hub bearing assembly.

5. Check the rear hub bearing runout.
   a. Check runout of the rear hub bearing assembly surface with a dial indicator.



⚠ Caution

- Ensure that dial indicator is perpendicular to measurement surface.
- If runout exceeds maximum value, replace the rear hub bearing assembly.

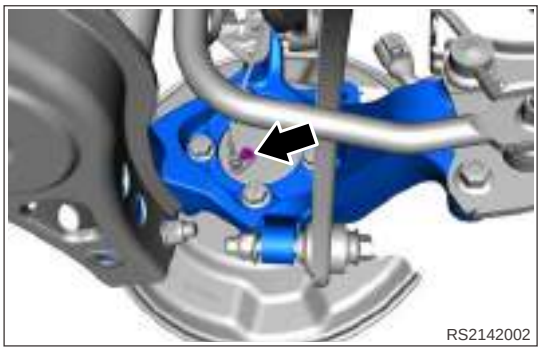
Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

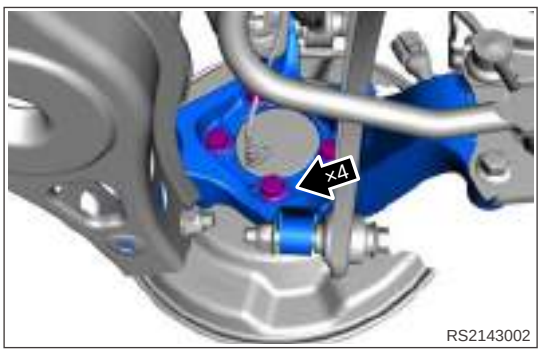
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left wheel.
4. Remove the rear left brake caliper assembly.
5. Remove the rear left brake disc.
6. Remove fixing bolt between rear left wheel speed sensor and rear hub bearing unit, and remove rear left wheel speed sensor carefully.

   Torque: 9 ± 1.5 N·m



7. Remove 4 fixing bolts between rear hub bearing and rear left steering knuckle.

   Torque: 80 ~ 91 N·m



8. Remove the rear hub bearing.

Installation

⚠ Caution
• Be sure to tighten bolt to specified torque. • Check wheel alignment after installation. Adjust wheel alignment to the standard range as necessary.

1. Installation is in the reverse order of removal.

Rear Steering Knuckle Assembly

Removal

Hint:

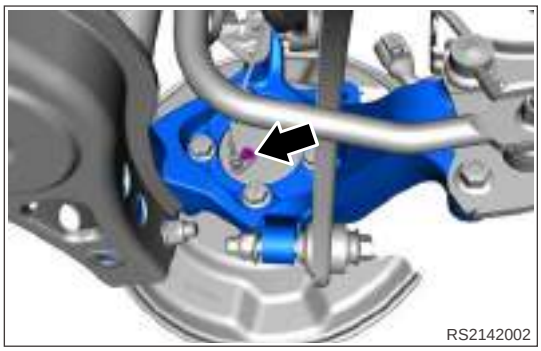
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not allowed to weld or modify bearing parts of wheel suspension and guide parts of wheel.
- When removing chassis parts, be sure to replace self-locking nuts and rusted nuts for safety.

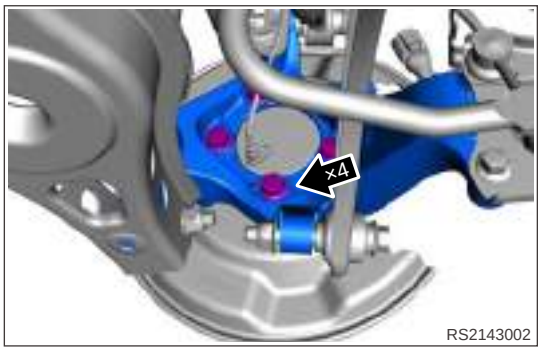
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left wheel.
4. Remove the rear left brake caliper assembly.
5. Remove the rear left brake disc.
6. Remove fixing bolt between rear left wheel speed sensor and left rear hub bearing unit, and remove rear left wheel speed sensor carefully.

   Torque: 9 ± 1.5 N·m


RS2142002

7. Remove 4 fixing bolts between rear left hub bearing and rear left steering knuckle.

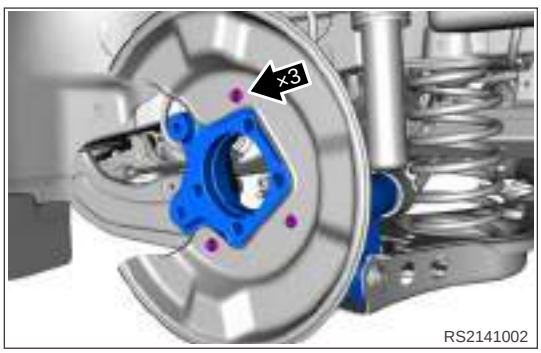
   Torque: 80 ~ 91 N·m



RS2143002

8. Remove the rear left hub bearing.
9. Remove 3 fixing bolts between rear dust guard and rear left steering knuckle and remove the rear dust guard.

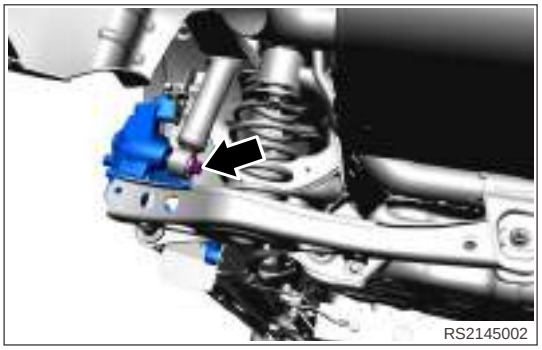
   Torque: 8 ~ 13 N·m



RS2141002

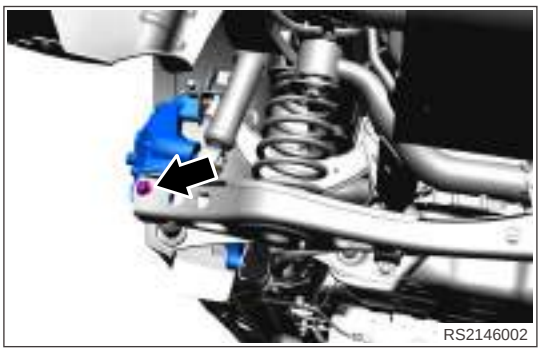
10. Remove coupling bolt between rear left shock absorber assembly and rear left steering knuckle assembly.

    Torque: 160 ± 16 N·m



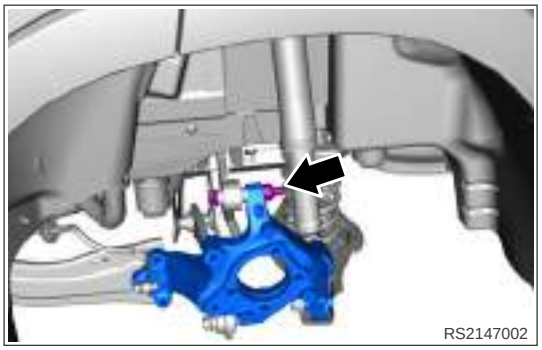
11. Remove coupling bolt and nut between rear left lower control arm assembly and rear left steering knuckle assembly.

    Torque: 110 ± 11 N·m



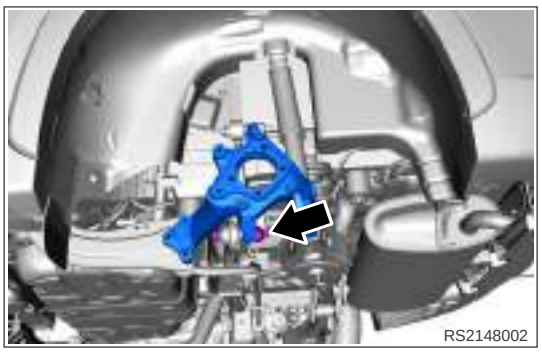
12. Remove coupling bolt and nut between rear left upper control arm assembly and rear left steering knuckle assembly.

    Torque: 160 ± 16 N·m



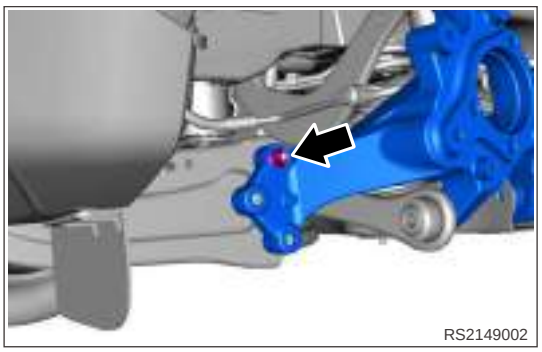
13. Remove coupling bolt and nut between rear left pull rod assembly and rear left steering knuckle assembly.

    Torque: 160 ± 16 N·m



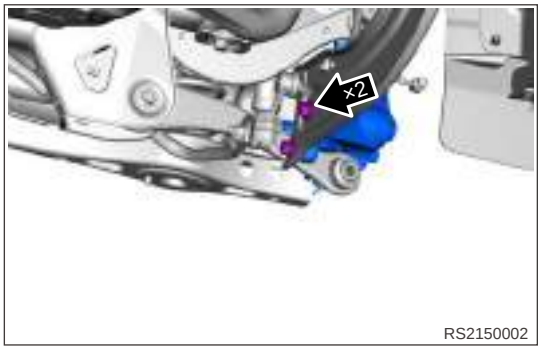
14. Remove fixing nut between rear left connecting rod and rear left steering knuckle assembly.

    Torque: 60 ± 6.0 N·m



15. Remove 2 coupling bolts between rear steering knuckle assembly and rear trailing arm assembly.

    Torque: 110 ± 11 N·m



16. Remove the rear left steering knuckle assembly.

Installation

> **⚠ Caution**
>
> - Be sure to tighten bolt to specified torque.
> - Check wheel alignment after installation. Adjust wheel alignment to the standard range as necessary.

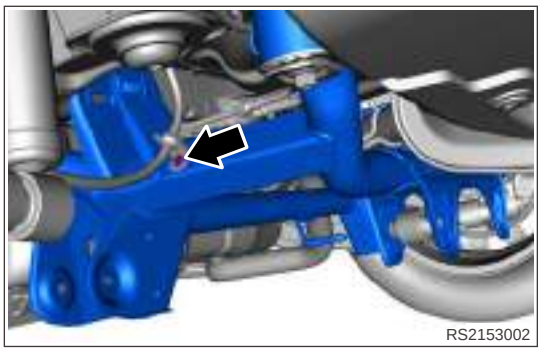
1. Installation is in the reverse order of removal.

Rear Sub Frame Assembly

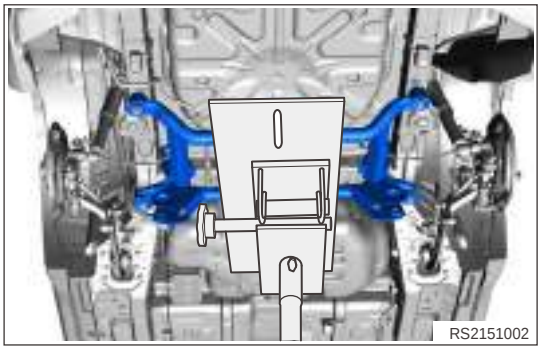
Removal

> **⚠ Warning**
>
> - Be sure to wear necessary safety equipment to prevent accidents.
> - Check if safety lock of lift is locked when repairing chassis.
> - It is not allowed to weld or modify bearing parts of wheel suspension and guide parts of wheel.
> - When removing chassis parts, replace self-locking nuts and rusted nuts for safety.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove 2 rear wheels.
4. Remove the rear muffler assembly.
5. Remove 2 rear lower control arm assemblies.
6. Remove 2 rear pull rod assemblies.
7. Remove 2 rear upper control arm assemblies.
8. Remove the rear stabilizer bar assembly.
9. Remove rear left wheel ABS sensor fixing bracket (use same procedures to remove rear right wheel ABS sensor fixing bracket).

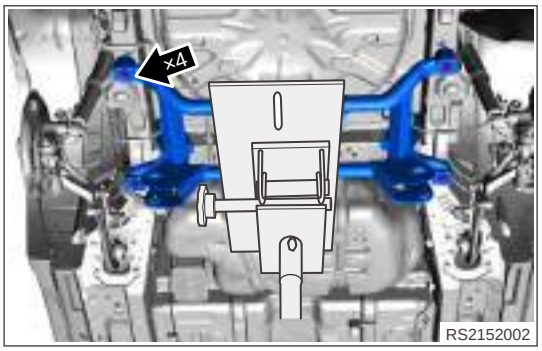


10. Install transmission carrier to support rear sub frame assembly.



11. Remove 4 coupling bolts between rear sub frame assembly and body.

    Torque: 120 ± 12 N·m



12. Remove the rear sub frame assembly.

Installation

⚠ Caution

- Be sure to tighten bolt to specified torque.
- Bounce vehicle up and down several times to stabilize rear suspension after installation.
- Check wheel alignment after installation. Adjust wheel alignment to the standard range as necessary.

1. Installation is in the reverse order of removal.

TIRE AND WHEEL

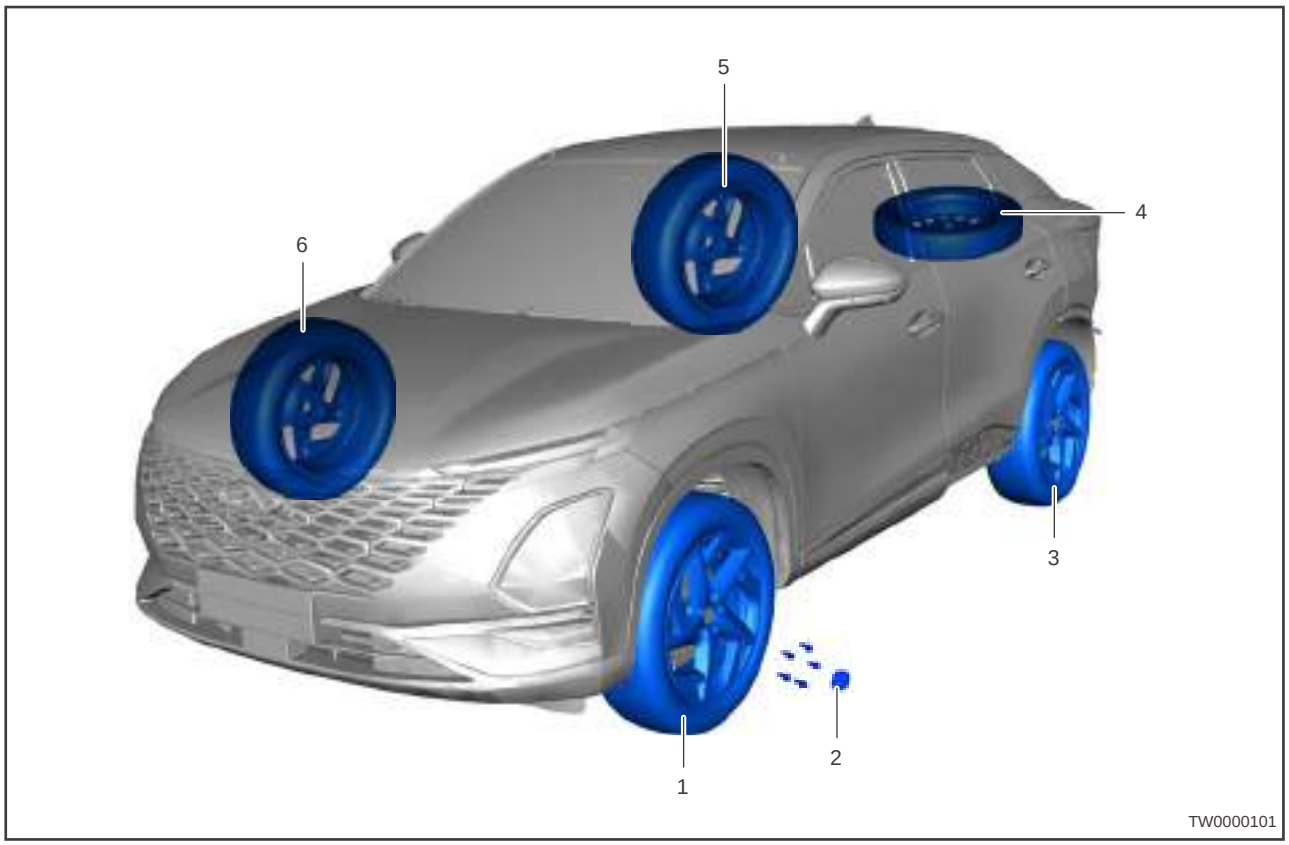
Warnings and Precautions

Precautions

1. Use tires only with the standard specification and type, because they have excellent reliability and skid resistance. Using a non-standard tire may lead to vehicle malfunction, which may cause an accident, resulting in serious injury or even death.
2. Contact surface between rim and tire should be cleaned before installing a new tire.
3. When installing wheel bolts, firstly, pre-tighten the bolts by hand, and then tighten them to the specified torque with a torque wrench.
4. Do not apply grease to the wheel bolts.
5. Some bad driving habits may shorten the tire life:
   a. Rapid acceleration;
   b. Depressing brake pedal suddenly and firmly;
   c. High-speed driving;
   d. Turning at excessive speed;
   e. Striking curbs or other obstacles;
   f. Tire pressure is too high or too low when driving vehicle;

System Overview

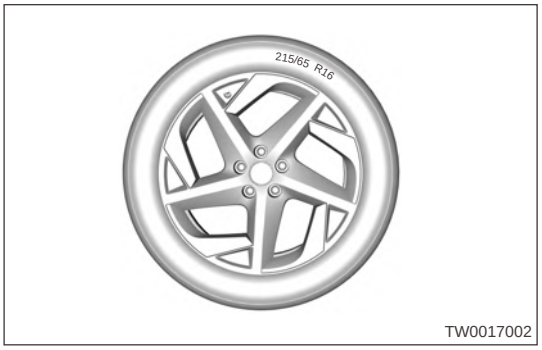
Description



1	Front Left Wheel	4	Spare Tire Assembly
2	Aluminum Rim Trim Cover	5	Rear Right Wheel
3	Rear Left Wheel	6	Front Right Wheel

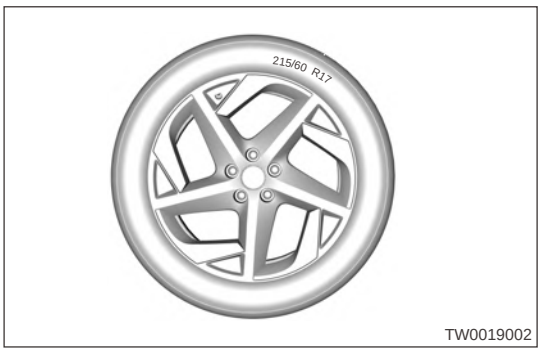
Tire Identification

2. Letter and number code of tire type, size, load index and speed level are stamped on the side wall of tire as shown in the illustration.
   a. 16-inch full-coated aluminum rim: 215/65 R16.



   b. 17-inch glossy aluminum rim: 215/60 R17.

   c. 18-inch full-coated aluminum rim: 215/55 R18.



Specifications

Torque Specifications

Description	Torque (N·m)
Wheel Mounting Bolt	130 ± 10 N m

Basic Parameters

Tire Type

Description	Type
Tire Type	215/65 R16 215/60 R17 215/55 R18

Hub Type

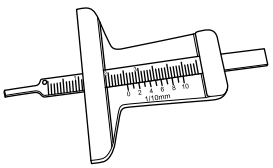
Description	Type
Rim Type	16×6 1/2J, 17×6 1/2J, 18×7J

Cold Tire Pressure (kPa) (Unloaded)

Description	Tire Pressure (kPa)
Front Tire	220
Rear Tire	220
T-type Tire (Rated Inflation Pressure)	420

Tool

General Tool

Tool Name	Tool Drawing
Tire Depth Gauge	 RCH0094006

Diagnosis & Testing

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Wear on one side of tire	Wheel alignment (incorrect)
Wear on both sides of tire	Tire pressure (insufficient)
Tire center wear	Tire pressure (excessive)

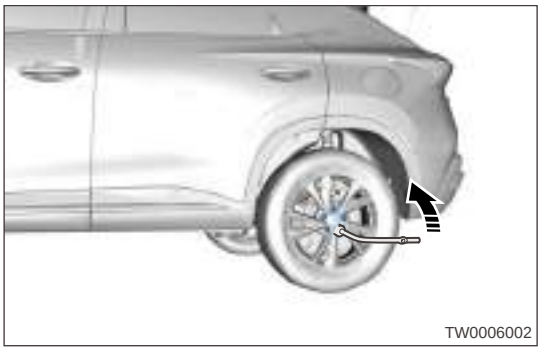
Symptom	Suspected Area
Serrated wear	Wheel alignment (incorrect)
Severe wear on partial area of tire	Braking (too hard)
Scratches on side wall of tire	Sharp objects on road (scratched)
Excessive tire noise	Tire pressure (incorrect)
	Tire (worn)

On-vehicle Service

Wheel

Removal

1. Remove the wheel.
   a. Stop vehicle at a level surface and apply parking brake.
   b. Using a tire wrench, loosen the wheel mounting bolts.
   c. Firmly support and raise the vehicle to a proper height.
   d. Using a tire wrench, remove 5 wheel mounting bolts.


TW0006002

   e. Remove the wheel.

⚠ Warning

- When removing and installing the wheel with tire pressure sensor, the tire pressure monitoring section must be strictly referred to.

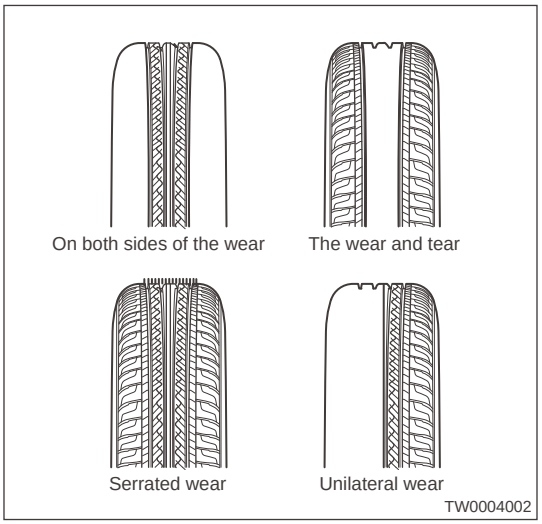
Inspection

⚠ Caution

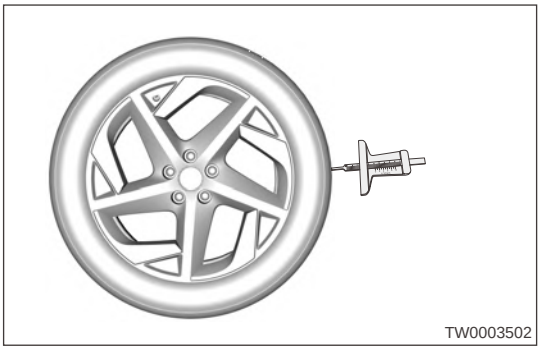
- Be sure to refer to the instruction when installing non-standard tires and rims.
- Use tires with standard specification and type.

1. Check if tires are scratched or damaged as shown in the illustration.
2. Check if rims are scratched or damaged as shown in the illustration.

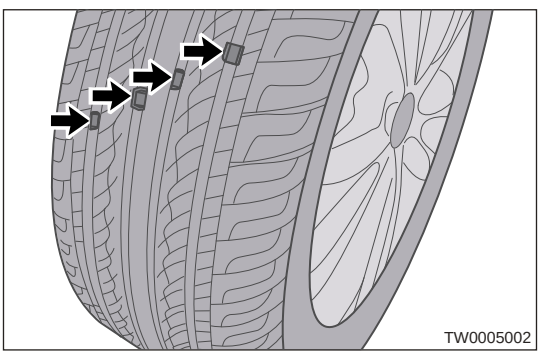
3. Check if tires are worn abnormally as shown in the illustration.



4. Measure the tread pattern depth with a tire depth gauge. When the depth is less than 1.6mm, the tire should be replaced.



5. Check the tread wear indicators (arrow). When tires are worn to the indicating mark, replace them.

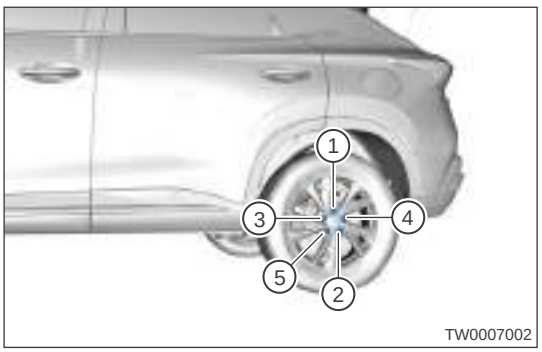


6. Use tire pressure gauge to check if pressures of all tires (including spare tire) are normal. Inflate tires to specified tire pressure as necessary.
7. Check air valve for leakage.

Installation

1. Install the wheel.
   a. Anti-corrosion and anti-rust treatment is conducted on the contact surface between wheel and brake disc.
   b. Install the wheel and pre-tighten the wheel mounting bolts by hand.
   c. Using a torque wrench, tighten the wheel mounting bolts evenly to the specified torque in the order shown in the illustration.

      Tightening torque: 130 ± 10 N · m

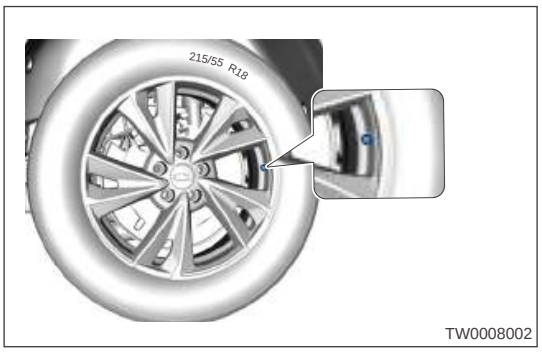


Tire Replacement

Removal

⚠ Warning
Speed level of new replaced tire must meet the specified values for safe operation; otherwise the tire may blow out.

1. Remove the wheel.
2. Use a tire remover to remove tires according to the instructions.



⚠ Caution

- When removing and installing tire with tire pressure sensor, be sure to strictly refer to the Tire Pressure Monitoring section.
- Before installing air valve, check if air valve hole of wheel is smooth without any burrs, and apply glycerin to air valve rubber surface or soak air valve into glycerin fluid, and then pull or press the locating ring of air valve by force to pass it through the air valve hole and install it into place (it is possible to use soapy water instead of glycerin).
- The four driving tires mounted on the same vehicle must be from the same manufacturer and are not allowed to be mixed.
- Before assembling the tire, apply glycerin or soapy water to the rim area of tire.
- When installing wheel assembly with TPMS, align dynamic balance testing mark (light point) on tire with valve core (TPMS) position on rim.
- When there is "dark point" mark on rim, align the dynamic balance testing mark on tire with "dark point" mark on rim.
- When there is no "dark point" mark on rim, align the dynamic balance testing mark on tire with the air valve.

Installation

1. Adjust tire pressure to specified value.

⚠ Caution

- Before performing four-wheel alignment work, check the four tires pressure and adjust the pressure: Front wheel: (220 ± 10) kPa, rear wheel: (220 ± 10) kPa.
- The rated inflation pressure of T-type spare tire assembly: (420 ± 20) kPa, isolated from the four wheels on the vehicle
- Please replace the tires only with standard specification and type.

2. Check contact surface among air valve, tire and rim for leakage.
3. Using a dynamic balancer, adjust the wheel balance.
4. Install the wheel.

   Tightening torque: 130 ± 10 N · m

⚠ Caution

- Avoid scratching tires and rims when removing tires.
- Contact surface between tire and rim should be cleaned when installing tires.

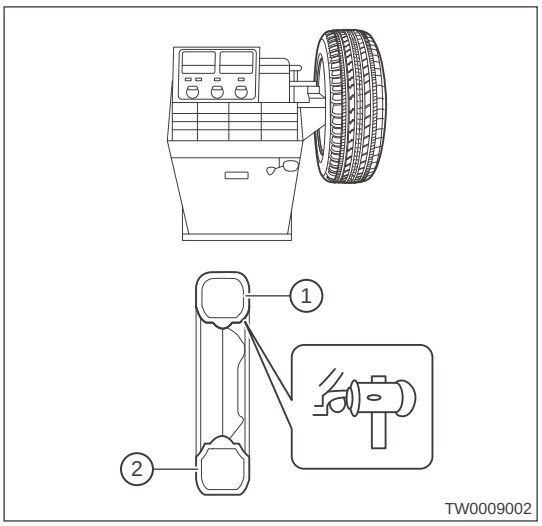
Wheel Balance

Operation Step

⚠ Caution

- Dynamic balancer must be calibrated before adjusting wheel balance.
- Remove impurities inside tread pattern and original balance blocks to ensure wheel balance.

1. Remove the wheel.
2. Adjust tire pressure to specified value.
3. Install wheel with balance block removed to balancer. Install the balance shaft with mounting surface of wheel facing inward, choose a suitable taper body, and firmly lock the wheels using a locking device (- align the taper body with center hole, otherwise data may be incorrect).
4. Turn on the power source of balancer, and input parameters such as the measured distance from rim to balancer, rim width and rim diameter.
5. Put down the wheel protector, and proceed to balance test procedure automatically (start button should be pushed for some balancers). When measurement is completed, the unbalanced weight for both sides of tire will be displayed on the balancer automatically, and the wheel brakes automatically until it stops. Do not open the protector before stopping. Failure to do this may lead to an accident.
6. According to the measurement result, corresponding balance blocks should be installed on the outside (1) and inside (2) of rim edge as shown in the illustration.



7. Perform test again after assembly is completed, until the balancer displays 0.
8. After dynamic balance is completed, remove the wheel.

⚠ Caution

- When installing balance blocks, wheel dynamic balance requirements for vehicles with a maximum design speed greater than 100 Km/h, allowing residual dynamic unbalanced mass: clamp type balance block side is 8 g or less, and paste type balance block side is 10 g or less.
- Clamp type balance block installation: Either side of each wheel is permitted to use only one clamp type balance block at most. DO NOT tap balance blocks forcibly during installation. If so, the balance block needs to be replaced in time. The replaced balance block is not allowed to be used again.
- Paste type balance block installation: Before pasting, wipe the adhesive part of aluminum rim with alcohol cotton to ensure that there is no oil, dust, etc. Tear off the plastic tape behind the adhesive balance block, and align it with step reference surface of pasting position, and apply force evenly with both hands. When the room temperature is lower than 25° C, the paste type balance block should be heated with oven temperature at 25 - 38° C.
- The T-type spare tire does not require dynamic balance test and the installation of balance block.

Tire Rotation

Operation Step

Description

1. Front and rear tires operate at different loads and perform different steering, driving and braking functions. For these reasons, different wear rate is formed, causing irregular wear patterns. These effects can be reduced by rotating tires at regular time.
2. Advantages of tire rotation:

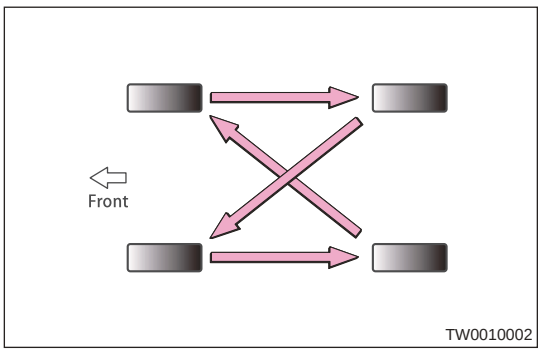
- Improving tread life;
- Maintaining traction levels;
- Maintaining a smooth and quiet driveability;

⚠ Caution

- Chery recommends that you should rotate tires every 10000 km. However, the best suitable time for tire rotation differs depending on driver’ s driving habits and road conditions.

Rotation Method

1. Perform tire rotation as shown in the illustration.



BRAKE SYSTEM

BRAKE SYSTEM

BRAKE SYSTEM

BRAKE CONTROL SYSTEM

Warnings and precautions

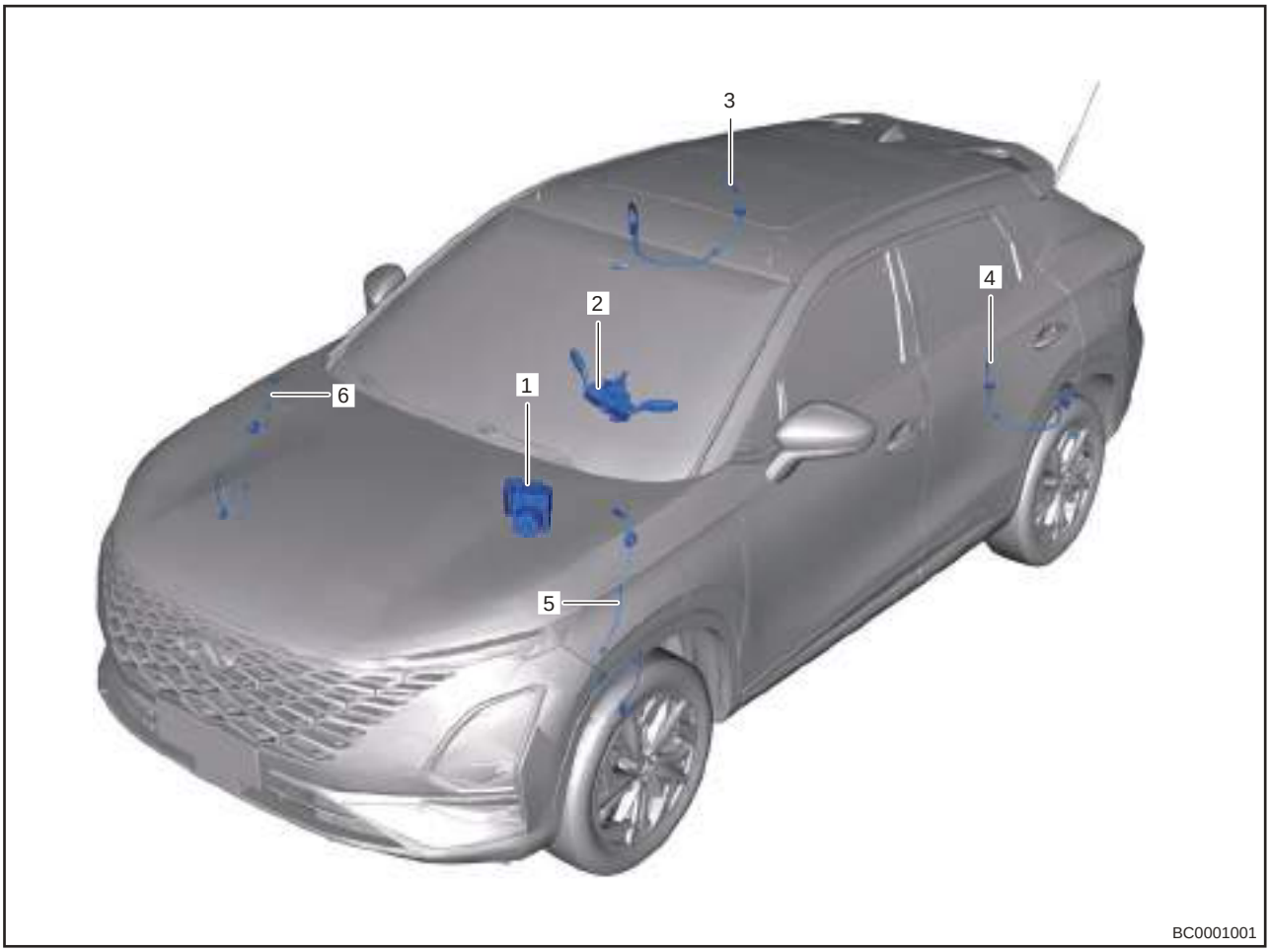
Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair:

1. When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.
2. Brake control system must be repaired by professional technicians who have trained and mastered maintenance skills and only use original parts for replacement.
3. DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose assembly, as brake fluid is corrosive.
4. After removing brake line, perform sealing treatment to prevent foreign matter from entering.
5. DO NOT allow any foreign matter such as dirt and dust to enter brake line from joint parts.
6. When connecting ESP module brake line, it must be connected properly. Incorrect connection may cause serious accidents.
7. After removing brake caliper assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.

System Overview

System Components Diagram



1	EPB/ESP Control Module Assembly	4	Rear Left Wheel Speed Sensor with Caliper Wire Harness Assembly
2	Steering Angle Sensor	5	Front Left Wheel Speed Sensor
3	Rear Right Wheel Speed Sensor with Caliper Wire Harness Assembly	6	Front Right Wheel Speed Sensor

Brake control system equipped on this model is ABS (Anti-lock Brake System) + EBD (Electronic Brake Force Distribution), ESP (Body Electronic Stability Program). With HDC (Hill Descent Control). It mainly consist of following components and functions:

- EPB/ESP control module assembly (hydraulic control module and electronic control module).
- Wheel speed sensors (each wheel has one sensor).
- Steering angle sensor (ESP).
- Yaw rate sensor (built in ESP control module assembly).
- BAS is English abbreviation of brake assist system, which functions as extension of ESP system. In emergency situation, drivers always apply braking timely, but not apply maximum braking force generally, thus extending brake distance. When this occurs, brake assist system will operate: when driver depresses brake pedal quickly in emergency with insufficient depressing force, BAS will increase brake pressure to maximum quickly, thus brake distance will be shortened by anti-lock brake system quickly and effectively.

- HHC is English abbreviation of Hill-start Assist Control System. When vehicle is static, HHC will determine if vehicle is on slope via longitudinal acceleration sensor. When vehicle starts to up from resting state (uphill forward or reversing), HHC will enter operating state automatically. When starting off, system will keep previous brake pressure for 1 to 2 seconds after driver releases brake pedal, make sure vehicle is still stopped. Brake pressure will decrease when drive torque increases, thus avoiding an accident caused by vehicle sliding rearward during starting off on a slope.

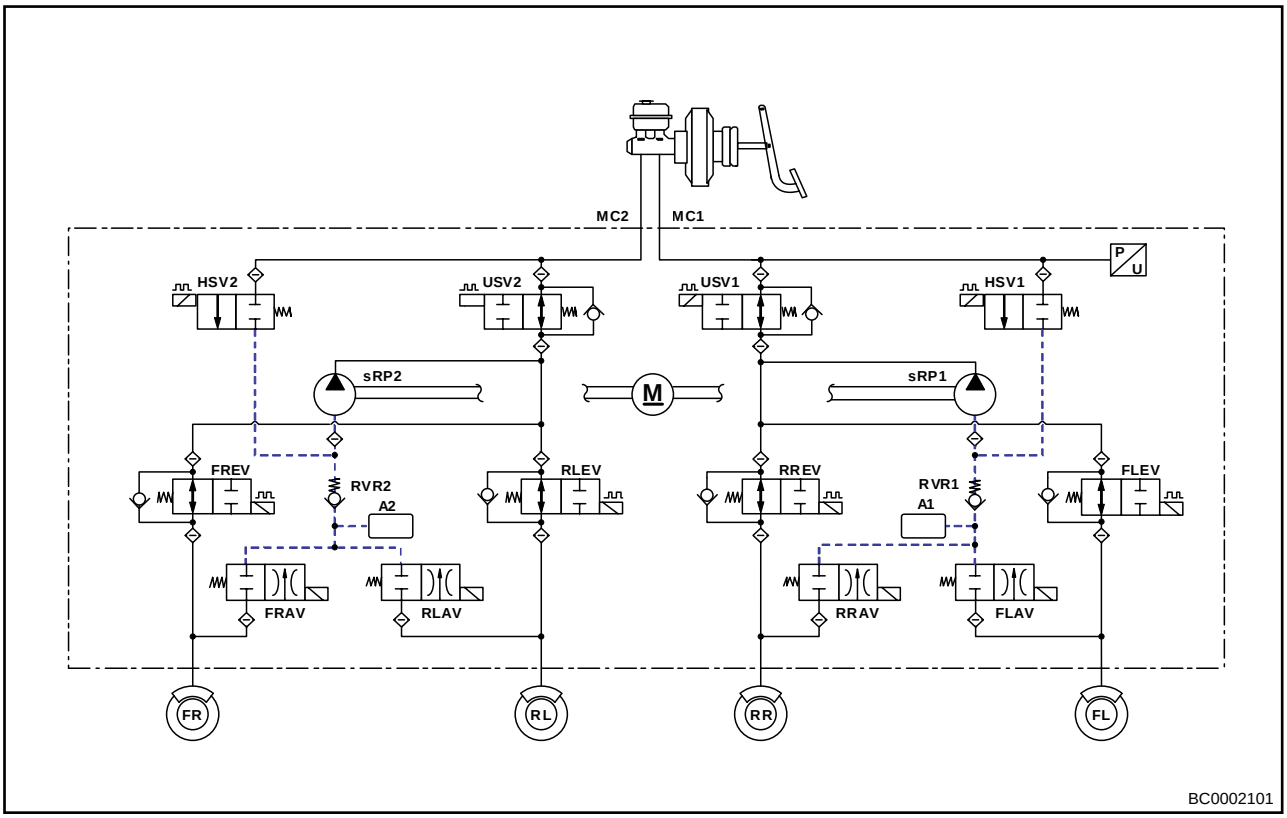
Primary purpose of ABS is to prevent wheels from being locked during sudden braking. It has following effects:

- Improving vehicle driving stability.
- Improving vehicle steering ability.
- Maintaining optimal brake pressure.
- Shortening brake distance efficiently.

EPB/ESP Operation

1. ABS Braking
   a. If ABS system detects that wheels may be locked when applying brake, brake system will enter ABS braking mode. During braking, EPB/ESP control module outputs signal from each wheel speed sensor to each solenoid valve after analysis in order to adjust fluid pressure in each line, to prevent wheels from being locked.
   b. There are some operating symptoms of EPB/ESP, but in fact they are normal.
      - If electronic control module is malfunctioning, fail-safe function will be activated, EPB/ESP system will not operate and EPB/ESP warning light will come on.
      - After vehicle is powered on or engine is started, short “buzz” sound can be heard. This is normal sound from EPB/ESP self-check.
      - Motor, solenoid valve, and return pump movement in hydraulic unit will cause noise when EPB/ESP is operating normally, but this is normal.
      - Brake pedal may vibrate slightly and mechanical noise can be heard during EPB/ESP operation, but this is normal.
      - Bumping sound between suspension and vehicle body can be caused by sudden brake.

2. EPB/ESP Control Mode



Description	Definition	Description	Definition
MC1	Brake Master Cylinder Circuit 1	FLEV	Front Left Wheel Inlet Valve
MC2	Brake Master Cylinder Circuit 2	FLAV	Front Left Wheel Outlet Valve
M	Motor	FREV	Front Right Wheel Inlet Valve
RP1	Return Pump 1	FRAV	Front Right Wheel Outlet Valve
RP2	Return Pump 2	FLEV	Rear Left Wheel Inlet Valve
A1	Accumulator 1	RLAV	Rear Left Wheel Outlet Valve
A2	Accumulator 2	RREV	Rear Right Wheel Inlet Valve
FL	Front Left Wheel	RRAV	Rear Right Wheel Outlet Valve
FR	Front Right Wheel	HSV1	High Pressure Switch Valve 1
RL	Rear Left Wheel	HSV2	High Pressure Switch Valve 2
RR	Rear Right Wheel	USV1	Circuit Control Valve 1
UP	Pressure Sensor	USV2	Circuit Control Valve 2

Pressure regulation is achieved by ESP/EPB module assembly mainly through four input valves (EV) (-normal open valve), four output valves (AV) (normal close valve), two high pressure valves (HSV), two circuit control valves (USV), return pump motor, return pump (sRP), pressure sensor and low pressure accumulator, etc.

3. Conventional Brake Operating Condition

   - For vehicles equipped with ABS, if brake pressure applied to wheels is not enough to lock wheels, oil pressure generated by master cylinder will be transmitted to each wheel cylinder through normal open valve, producing regular braking effect. When it is not necessary to continue braking, and if driver reduces pressure to brake pedal, brake fluid of each wheel returns to master cylinder and brake pressure decreases.

Solenoid Valve	Powered Condition	Solenoid Valve Condition
Input Valve (EV)	OFF	ON
Output Valve (AV)	OFF	OFF

4. EPB/ESP Operating (Relief) Condition

   - For vehicles equipped with EPB/ESP, if brake pressure is applied excessively, friction coefficient between wheels and road will decrease, and wheels will be decelerated earlier than vehicle, which could cause wheels to lock. In this case, EPB/ESP control module transmits the command that reduces wheel pressure to hydraulic control module. In other words, normal open valve cuts off oil passage and the oil passage of normal close valve is open, in order to reduce wheel cylinder pressure. At this time, brake fluid drained from wheel cylinder is temporarily stored in low pressure accumulator. Then, the brake fluid stored in low pressure accumulator returns to master cylinder with rotation of motor.

Solenoid Valve	Powered Condition	Solenoid Valve Condition
Input Valve (EV)	ON	OFF
Output Valve (AV)	ON	ON

5. EPB/ESP Operating (Maintaining) Condition

   - When appropriate pressure is applied to wheel cylinder by boosting or relieving pressure, ABS system enters maintaining pressure state. In other words, normal open valve cuts off oil passage and normal close valve also cuts off oil passage, the wheel cylinder pressure is maintained.

Solenoid Valve	Powered Condition	Solenoid Valve Condition
Input Valve (EV)	OFF	OFF
Output Valve (AV)	OFF	OFF

6. EPB/ESP Operating (Boost) Condition

   - When relieving pressure condition, if brake fluid is drained excessively or friction coefficient between wheels and road increases, it needs to increase each wheel pressure. In this case, EPB/ESP control module transmits the command that increases wheel pressure to hydraulic control module. Normal open valve opens oil circuit and normal close valve cuts off oil circuit. Brake fluid stored in low pressure accumulator is supplied to each wheel cylinder through master cylinder and normal open valve to boost pressure of each wheel cylinder.

Solenoid Valve	Powered Condition	Solenoid Valve Condition
Input Valve (EV)	OFF	ON
Output Valve (AV)	OFF	OFF

   ABS system operates circularly under relief, maintaining and boost pressure conditions until vehicle is completely stopped, so vehicle braking and steering performance will be guaranteed. ESP adjustment procedure is similar to ABS adjustment procedure. Brake fluid is supplied to wheel cylinders that need to increase pressure by pump, when stability control are realized and HSV valve opens and USV valve closes.

System Function Description

Hill Descent Control (HDC)
HDC system is a hill descent control system, which can help driver downhill in low speed and without brake intervention by driver actively.

No.	Function	Operation Method	Precautions
1	Function ON	Press HDC switch button on auxiliary fascia console manually, functional indicator of meter and operation indicator of button turn on. (Green car icon light on meter turns on, switch indicator turns on).	Speed range of function on is within 0 to 60 Km/h; HDC function is invalid when ESP system is malfunctioning.
2	Function off	Manually off: Press HDC switch button on auxiliary fascia console manually again, functional indicator of meter and operation indicator of button turn off. (Green car icon light on meter turns off, switch indicator turns off) Automatically off: When vehicle speed is higher than 60 Km/h or system has a fault, function turns off automatically.	
3	Functional roles	After function turns on, automatic gear vehicle can perform vehicle speed control within 8 to 60 Km/h, manual gear vehicle can perform vehicle speed control within 14 to 60 Km/h; If initial speed is lower than minimum or higher than maximum controlling speed, vehicle will perform control with minimum or maximum controlling speed acquiescently; Current controlling speed can be increased or decreased in given speed interval by depressing accelerator pedal or brake pedal.	This function applies brake actively via ESP increases pressure actively, at this time there is hydraulic operating sound, and it is normal.

Indicators and Warning Lights

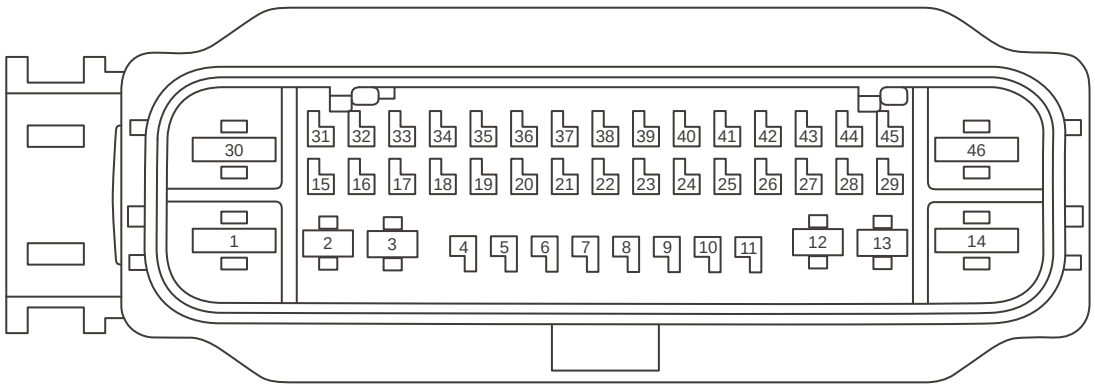
No.	Function	Operation Method	Precautions
1	Green HDC indicator remains on	Function turns on normally	Function turns on normally
2	Green HDC indicator intermittently on	HDC function works	Function turns on normally
3	Yellow ESP light remains on	ESP is malfunctioning, HDC function can not turn on	It is suggested to check and repair by Chery dealer

Hint:

- When HDC system is operating, ABS will be activated automatically if wheel is locked.
- When HDC system is operating, brake force will be distributed to wheel with higher attachment coefficient if any wheel loses contact with ground.
- When HDC system is operating, for safety, driver must make preparations to control vehicle any time. Because system may be overheating or ESP system malfunction will occur except it is locked by button. At this time system will exit control automatically, driver needs to control speed timely instead of HDC.

System Circuit Diagram

EPB/ESP Control Module Assembly Terminal Definition



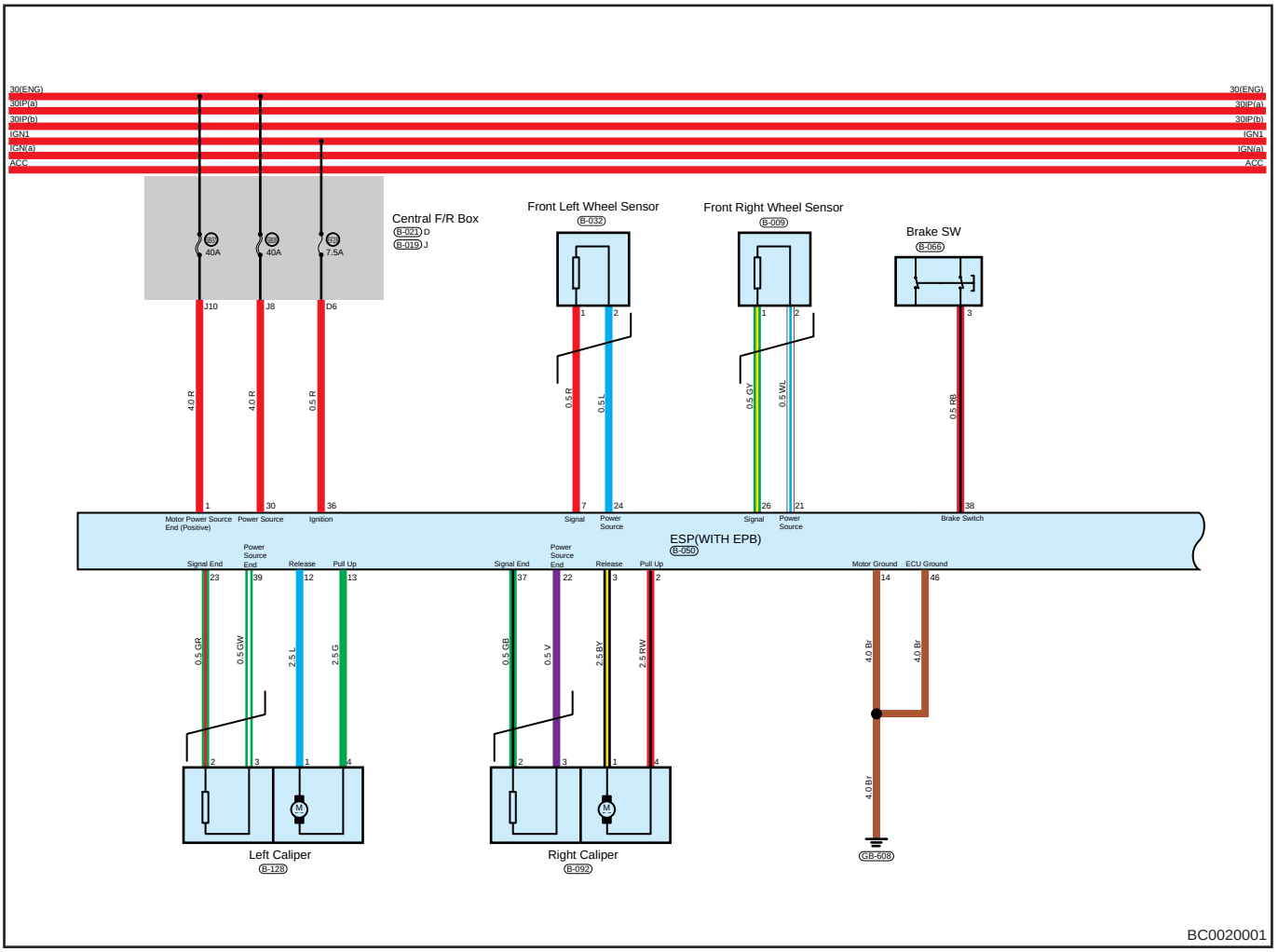
ESP(WITH EPB)

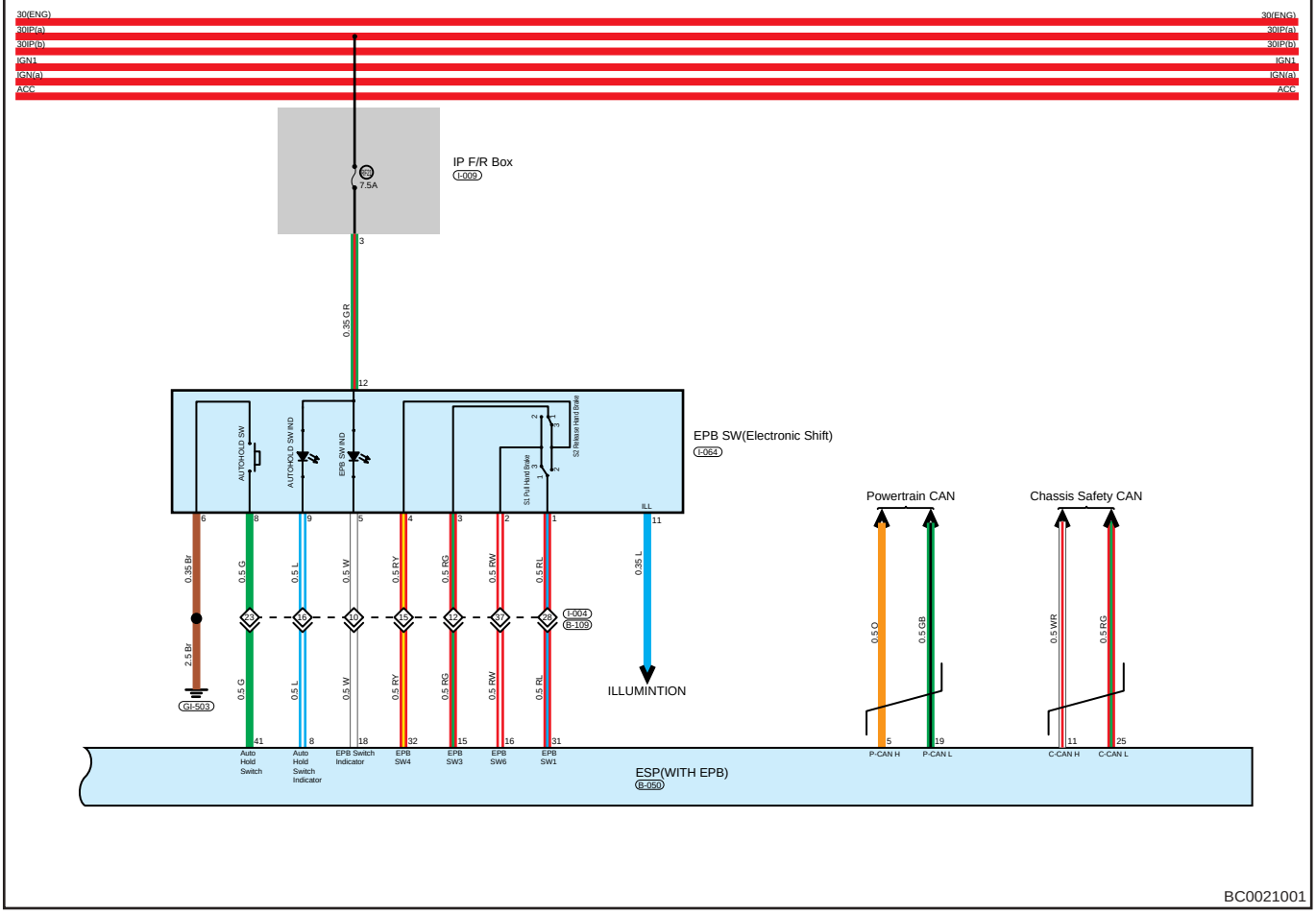
BC0069001

Pin	Definition	Pin	Definition
1	Motor Power Supply End (Positive)	2	Right Caliper Motor
3	Right Caliper Motor	4	-
5	P-CAN H	6	-
7	Wheel Speed Sensor Signal End (- Front Left)	8	AUTO HOLD Switch Indicator
9	-	10	-
11	C-CAN H	12	Left Caliper Motor
13	Left Caliper Motor	14	Motor Ground End
15	EPB Switch 3	16	EPB Switch 6

Pin	Definition	Pin	Definition
17	-	18	EPB Switch Indicator
19	P-CAN L	20	-
21	Wheel Speed Sensor Supply End (-Front Right)	22	Front Right Wheel Speed Sensor Power Source End
23	Front Left Wheel Speed Sensor Power Source End	24	Wheel Speed Sensor Supply End (-Front Left)
25	C-CAN L	26	Wheel Speed Sensor Signal End (-Front Right)
27	-	28	-
29	-	30	Valve Relay Power Source End
31	EPB Switch 1	32	EPB Switch 4
33	-	34	-
35	-	36	Ignition Coil
37	Right Wheel Speed Sensor Signal End	38	Brake SW
39	Left Wheel Speed Sensor Power Supply End	40	-
41	AUTO HOLD Switch	42	-
43	-	44	-
45	-	46	ECU Ground End

Circuit Diagram





Diagnosis & Testing

Problem Symptoms Table

Hint:

Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
When turning ENGINE START STOP switch ON, EPB/ESP warning light does not come on	Fuse
	Wire harness or connector
	EPB/ESP Control Module Assembly
	Instrument cluster
EPB/ESP warning light remains on	Fuse
	Wire harness or connector
	EPB/ESP Control Module Assembly
	Instrument cluster
EPB/ESP operation is abnormal	Wheel speed sensor (damaged, improperly installed, foreign matter attached)

Symptom	Suspected Area
	Hub ring gear (damaged, improperly installed, foreign matter attached)
	Brake line (blocked or leaked)
	Wire harness or connector
	EPB/ESP Control Module Assembly
Communication with EPB/ESP control module assembly cannot be performed	Fuse
	Wire harness or connector
	EPB/ESP Control Module Assembly
	Diagnostic tester

Problem Repair (No DTC)

If there is a problem in brake system, but no DTC is stored in EPB/ESP control module assembly, this problem is called a problem without DTC. A problem without DTC is caused by basic brake system malfunction. For example:

1. Brake fluid leakage (it may result in weak braking, brake pedal over-travel or even ineffective braking).
2. Using inferior brake fluid (it can result in corrosion of brake line and EPB/ESP hydraulic regulating module internal elements, or even ineffective braking).
3. Air in brake line (it may result in weak braking or even ineffective braking).
4. Brake line blockage (it may result in hard braking or even ineffective braking).
5. Excessive wear of brake disc (it may result in weak braking, brake pedal over-travel).
6. Brake booster malfunction (it may result in weak or hard braking, brake pedal over-travel or even ineffective braking).
7. Wrong brake line connection (it may result in EPB/ESP braking performance decreasing, drift, long braking distance etc.).

   Hint:
   - Note: No power supply to EPB/ESP or abnormally interrupted power supply will cause EPB/ESP warning light remaining on without storing DTC.
   - Troubleshooting method: check corresponding component according to the malfunction, repair or replace as necessary.

Diagnostic Help

1. Connect diagnostic tester (the latest software) to diagnostic connector, and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of brake control system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all ESP wire harness system grounds related to the latest DTC.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent Troubleshooting

If malfunction is intermittent, perform the followings:

1. Check if connector is loose.
2. Check if wire harness is worn, pierced, pinched or partially broken.
3. Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
4. If possible, try to duplicate the conditions under which DTC was set.
5. Look for data that has changed or DTC to reset during wiggling test.
6. Look for broken, bent, protruded or corroded terminals.
7. Inspect the mounting areas of brake control system, wire harness or wire harness connector and so on for damage, foreign matter, etc. that will cause incorrect signals.
8. Check and clean all wire harness connectors and ground parts related to DTC.
9. Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to normal work of circuit, and they are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnosis Procedure

Hint:

- Use following procedures to troubleshoot the ESP.

1	**Vehicle brought to workshop**

Next

2	**Check battery voltage**

Check if battery voltage is normal.

OK

Standard voltage: Not less than 12 V.

NG → **Replace battery**

OK

3	**Customer problem analysis**

Next

4	**Read DTCs**

No DTC → **Perform repair according to problem symptoms table**

DTC occurs

5	**Read DTCs (current DTC and history DTC)**

No DTC → **Troubleshoot according to Intermittent DTC malfunction procedures**

DTC occurs

6	**Repair according to Diagnostic Trouble Code (DTC) Chart**

Next

7	**Adjust, repair or replace**

Next

8	**Conduct test and confirm malfunction has been repaired**

Next → **End**

DTC Confirmation Procedure

Confirm that battery voltage is over 12V before performing following procedures

- Turn ENGINE START STOP switch to OFF.
- Connect diagnostic tester (the latest software) to diagnostic connector, and make it communicate with vehicle electronic module through data network.
- Turn ENGINE START STOP switch to ON.
- Use diagnostic tester to record and clear DTCs stored in ESP system.
- Turn ENGINE START STOP switch to OFF and wait for several seconds.
- Turn ENGINE START STOP switch to ON, select “Read DTC”.
- If DTC is not detected, malfunction indicated by DTC is intermittent.

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C1802-16	Supply Voltage - Low Voltage-Circuit Voltage Below Threshold	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C1802-17	Supply Voltage	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C1802-17	Supply Voltage	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C0010-04	Left Front Inlet Control-System Internal Failure	/	• Valve set relay malfunction. • Poor connection of EPB control module assembly ground wire • Fuse malfunction • Solenoid valve short or open circuit itself • Overheat protection triggered • EPB control module assembly is damaged	/
C0011-04	Left Front Outlet Control-System Internal Failure	/		/
C0014-04	Right Front Inlet Control-System Internal Failure	/		/
C0015-04	Right Front Outlet Control-System Internal Failure	/		/
C0018-04	Left Rear Inlet Control-System Internal Failure	/		/
C0019-04	Left Rear Outlet Control-System Internal Failure	/		/
C001C-04	Right Rear Inlet Control-System Internal Failure	/		/
C001D-04	Right Rear Outlet Control-System Internal Failure	/		/
C0001-04	TCS Control Channel Changeover Valve1 (ESP Only)	/		/

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C0002-04	TCS Control Channel Changeover Valve2 (ESP Only)	/		/
C0003-04	TCS Control Channel High Pressure Switch Valve 1 (ESP Only)	/		/
C0004-04	TCS Control Channel High Pressure Switch Valve 2 (ESP Only)	/		/
C1003-04	Valve Relay Failure-System Internal Failure	/		/
C1004-00	General Valve	/		/
C0020-04	ABS Pump Motor Control-System Internal Failure	/	• Fuse malfunction • Pump motor has poor ground connection • System overheat protection • System overheat protection • Abnormal pump motor power supply • Pump motor malfunction	/
C0031-00	Front Left Wheel Speed Sensor Failure	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C0031-09	Front Left Wheel Speed Sensor Component Fault	/		/
C0031-11	Front Left Wheel Speed Sensor Short to Ground	/		/
C0031-12	Front Left Wheel Speed Sensor Short to Power Supply	/		/

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C0031-13	Front Left Wheel Speed Sensor Signal Invalid	/		/
C0031-29	Front Left Wheel Speed Sensor Signal Invalid	/		/
C0031-37	Front Left Wheel Speed Sensor Signal Out of Range	/		/
C0032-00	WSS FL Undervoltage	/		/
C0032-08	Wrong Direction of Left Front Wheel Speed Sensor	/		/
C0034-00	Front Right Wheel Speed Sensor Fault	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C0034-09	Front Right Wheel Speed Sensor Component Fault	/		/
C0034-11	Front Right Wheel Speed Sensor Short to Ground	/		/
C0034-12	Front Right Wheel Speed Sensor Short to Battery	/		/
C0034-13	Front Right Wheel Speed Sensor Open	/		/
C0034-29	Front Right Wheel Speed Sensor Signal Invalid	/		/
C0034-37	Front Right Wheel Speed Sensor Signal Out of Range	/		/
C0035-00	WSS FR Undervoltage	/		/

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C0035-08	Wrong Direction of Right Front Wheel Speed Sensor	/		/
C0037-00	Rear Left Wheel Speed Sensor Fault	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C0037-09	Rear Left Wheel Speed Sensor Component Fault	/		/
C0037-11	Rear Left Wheel Speed Sensor Short to Ground	/		/
C0037-12	Rear Left Wheel Speed Sensor Short to Power Supply	/		/
C0037-13	Rear Left Wheel Speed Sensor Signal Invalid	/		/
C0037-29	Rear Left Wheel Speed Sensor Signal Invalid	/		/
C0037-37	Rear Left Wheel Speed Sensor Signal Out of Range	/		/
C0038-00	WSS RL Undervoltage	/		/
C0038-08	Wrong Direction of Left Rear Wheel Speed Sensor	/		/
C003A-00	Rear Right Wheel Speed Sensor Fault	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C003A-09	Rear Right Wheel Speed Sensor Component Fault	/		/
C003A-11	Rear Right Wheel Speed Sensor Short to Ground	/		/

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C003A-12	Rear Right Wheel Speed Sensor Short to Power Supply	/		/
C003A-13	Rear Right Wheel Speed Sensor Signal Invalid	/		/
C003A-29	Rear Right Wheel Speed Sensor Signal Invalid	/		/
C003A-37	Rear Right Wheel Speed Sensor Signal Out of Range	/		/
C003B-00	WSS RR Undervoltage	/		/
C003B-08	Wrong Direction of Right Rear Wheel Speed Sensor	/		/
C0040-64	Brake Pedal Switch Failure (ESP Only)	/	/	/
C0044-01	Brake Pressure Sensor Failure (ESP Only)- General Electrical Failure	/	/	/
C0044-28	Pressure Sensor Temperature Error	/	/	/
C0051-29	Steering Wheel Angle Sensor Signal Invalid (ESP Only)	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C0051-54	Steering Wheel Angle Sensor Uncalibrated (ESP Only)	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C0051-64	Steering Wheel Angle Sensor Signal Abnormal (ESP Only)	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C0061-64	Lateral Acceleration Sensor Signal Abnormal (ESP Only)	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C0062-64	Longitudinal Acceleration Sensor Signal Abnormal (ESP Only)	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C0063-64	Yaw Rate Sensor Signal Abnormal (ESP Only)	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C0063-01	Yaw Rate Sensor General Electrical Fault	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C0063-54	Yaw Rate Sensor Uncalibrated	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C006B-00	Stability System Active Too Long	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C0072-FC	DHP Valve Overheat Protection	/	/	/
C0089-04	TCS Disable Switch(ESP Only)	/	/	/
C0500-00	WSS Test FL Failure	/	/	/
C0506-00	WSS Test FR Failure	/	/	/
C050C-00	WSS Test RL Failure	/	/	/
C0512-00	WSS Test RR Failure	/	/	/
C053B-00	Valve Path Supply Line Open	/	/	/

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C053CFC	Wheel-speed Sensor Generic Error	/	/	/
C053D-00	Pressure Sensor 1 Range Error or Defective Plunger Pressure Sensor	/	/	/
C0563-00	ABS Implausible Long Control	/	/	/
C056B-00	Pressure Sensor 1 Noise or Internal Failure	/	/	/
C1000-16	ECU Voltage Too Low	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C1000-17	ECU Voltage Too High	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C1000-FC	System ASIC GPIO Error or APB Asic Voltage Error or PBC SW Failure	/	/	/
C1001-04	Internal fault in ECU system	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C1002-49	CAN Hardware Internal Electronic Failure	/	/	/
C1003-04	Valve Relay Failure-System Internal Failure	/	/	/
C1004-00	General Valve	/	/	/
C1007-29	Reverse Gear Switch Failure (ESP Only)-Signal Invalid	/	/	/
C1008-00	General WSS	/	/	/

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C1009-00	ECU Hardware Related Fault	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C104D-04	AVH Button Switch Failure	/	/	/
C1099-08	Wrong Direction of Wheel Speed Sensor	/	/	/
C1546-04	EPB_ SupplyFault-System Internal Failure	/	/	/
C156B-00	EPBASIC_ GenericError-No Sub Type Information	/	/	/
C1803-95	Assembly Test	/	• Assembly test is not performed • Power is not turned off normally after performing assembly test	/
C1804-53	EPB Maintenance Mode	/	• Enter service mode and not exit	/
C1826-01	EPB (Electronic Parking Brake) Actuator Driver Gen Electrical Failure	/	• Electronic control execution unit • ECU internal fault	/
C1807-98	Disc Over Heat	/	• Electronic control execution unit • ECU internal fault	/
C1823-00	APB Motor Enable Line Violation	/	• Electronic control execution unit • ECU internal fault	/
C1806-01	EPB Button Line Failure-General Electrical Failure	/	• EPB switch failure • ECU internal fault	/
C1806-16	EPB Button Under Voltage	/		/
C1830-00	EPB (Electronic Parking Brake)	/	• Electronic control execution unit	/

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
	Left Actuator CAT		• ECU internal fault	
C1831-00	EPB (Electronic Parking Brake) Right Actuator CAT	/		/
C1800-97	Left Actuator - Action Limited	/	• Electronic control execution unit failure • Dynamic park	/
C1801-97	Right Actuator - Action Limited	/		/
C1832-00	EPB Left Actuator Unintended Run-No Sub Type Information	/	• ECU internal fault	/
C1833-00	EPB Right Actuator Unintended Run-No Sub Type Information	/		/
C1800-73	Left Actuator - Apply Failed-Actuator Stuck Closed	/	• Vehicle Power Supply Voltage - Voltage Below Threshold • Electronic control execution unit internal resistance is too big	/
C1800-74	Left Actuator - Actuator Slipping (Apply Time Out)	/		/
C1801-73	Right Actuator - Apply Failed-Actuator Stuck Closed	/		/
C1801-74	Right Actuator - Actuator Slipping (Apply TimeOut)-Actuator Slipping	/		/
C1800-72	Left Actuator - Release Failed-Actuator Stuck Open	/	• Electronic control execution unit internal mechanical malfunction	/
C1801-72	Right Actuator -- Release Failed-Actuator Stuck Open	/		/
C1800-93	Left Actuator - No Motor Start	/	• Electronic control execution unit	/

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
	Detected-No Operation		internal resistance is too big	
C1801-93	Right Actuator - No Motor Start Detected-No Operation	/		/
C1800-19	Left Actuator - Circuit Current Above Threshold-Circuit Current Above Threshold	/	• Short circuit in electronic control execution unit	/
C1801-19	Right Actuator - Circuit Current Above Threshold-Circuit Current Above Threshold	/		/
C1800-92	Left Actuator - High Mechanical Resistance-Performance or Incorrect Operation	/	• Electronic control execution unit mechanical malfunction	/
C1801-92	Right Actuator - High Mechanical Resistance-Performance or Incorrect Operation	/		/
C1800-91	Left Actuator - Wrong Operating Characteristics Detect-Parametric	/	• Electronic control execution unit internal resistance is too big	/
C1801-91	Right Actuator - Wrong Operating Characteristics Detect-Parametric	/		/
C1824-01	EPB Left Actuator Electrical Failure-General Electrical Failure	/	• Electronic control execution unit • ECU internal fault	/
C1822-00	EPB Left Actuator Failure	/		/

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C1824-1E	EPB Left Actuator Shunt On Line or ECU-Circuit Resistance Out of Range	/		/
C1825-01	EPB Right Actuator Electrical Failure-General Electrical Failure	/		/
C1821-00	EPB Right Actuator Failure	/		/
C1825-1E	EPB Right Actuator Shunt On Line or ECU-Circuit Resistance Out of Range	/		/
C1802-44	PBC EEPROM Fault	/	/	/
C1805-94	Hydric Support Failed	/	/	/
C1806-04	EPB Button Always Pushed or Pulled-System Internal Failure	/	/	/
C1808-11	Circuit Short To Ground of Left Rear Caliper	/	/	/
C1808-12	Circuit Short To Battery of Left Rear Caliper	/	/	/
C1808-13	Circuit Open of Left Rear Caliper - Circuit Open	/	/	/
C1810-01	Short in Left Rear Caliper Positive and Negative	/	/	/
C1815-11	Circuit Short To Ground of Right Rear Caliper-Circuit Short To Ground	/	/	/
C1815-12	Circuit Short To Battery of Right	/	/	/

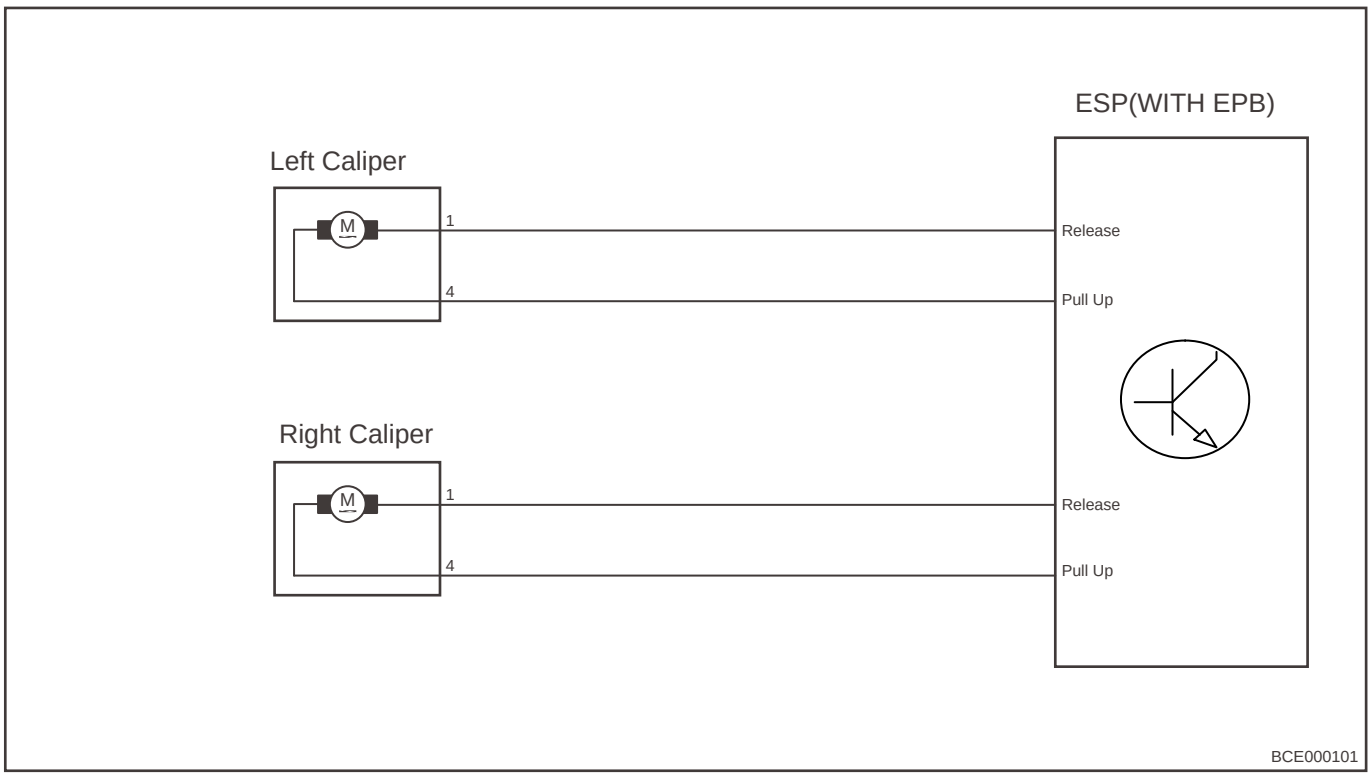
DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
	Rear Caliper-Circuit Short To Battery			
C1815-13	Circuit Open of Right Rear caliper-Circuit Open	/	/	/
C1817-01	Short in Right Rear Caliper Positive and Negative	/	/	/
C1821FC	EPB Right Motor Line Failure	/	/	/
C1822FC	EPB Left Motor Line Failure	/	/	/
C182496	EPB Intern Left HW Failure	/	/	/
C182596	EPB Intern Right HW Failure	/	/	/
C182B1E	EPB Motor Electrical Coupling Failure	/	/	/
C18341D	Short in Left Rear Caliper Positive and Negative	/	/	/
C1834FC	EPB Left Motor Transistors Error	/	/	/
C18351D	Short in Right Rear Caliper Positive and Negative	/	/	/
C1835FC	EPB Right Motor Transistors Error	/	/	/
C1836FC	EPB Motor GPIO Overcurrent Failure	/	/	/
C183700	APB_GPIO_ OverTemperatur-e	/	/	/
C186D-44	SupervisionFail-Data Memory Failure	/	/	/

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C186E-FC	ABS Pump Motor Control Othercycle	/	/	/
C186F-28	Brake Pressure Sensor Signal Bias Level Out Of Range Failure (ESP Only)	/	/	/

DTC Diagnosis Procedure

DTC	C1802-16	Supply Voltage - Low Voltage-Circuit Voltage Below Threshold

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check battery voltage. Standard voltage: 9 - 16 V.

NG → **Check or replace charging system or battery.**

OK ↓

2	**Check wire harness and connector (brake caliper - ESP (integrated EPB))**

(a) Check if related wire harness connection and installation are in good condition.

(b) Disconnect the negative battery cable.

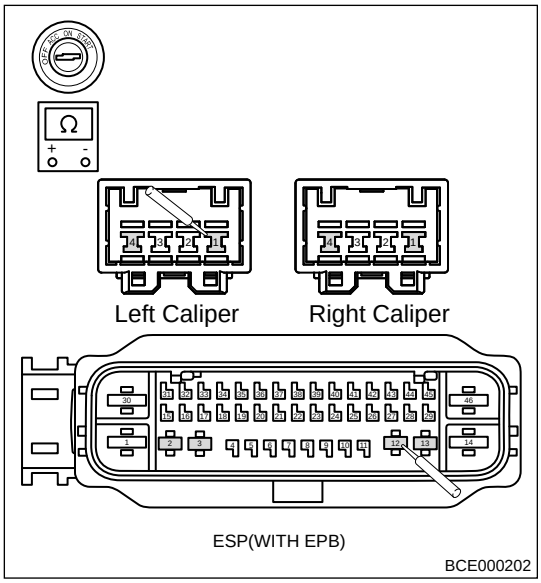
(c) Disconnect the ESP (integrated EPB) connector.

(d) Disconnect the rear left brake caliper connector.

(e) Disconnect the rear right brake caliper connector.

(f) Check for continuity between EPB and brake caliper.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear left brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



NG → **Repair or replace wire harness or connector.**

OK ↓

3	**Check brake caliper power supply circuit**

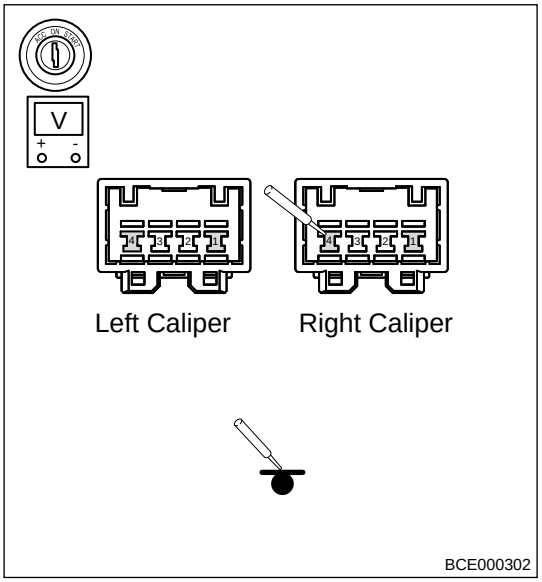
(a) Disconnect the rear left brake caliper connector.

(b) Disconnect the rear right brake caliper connector.

(c) Turn ignition switch to ON.

(d) Perform the voltage inspection.

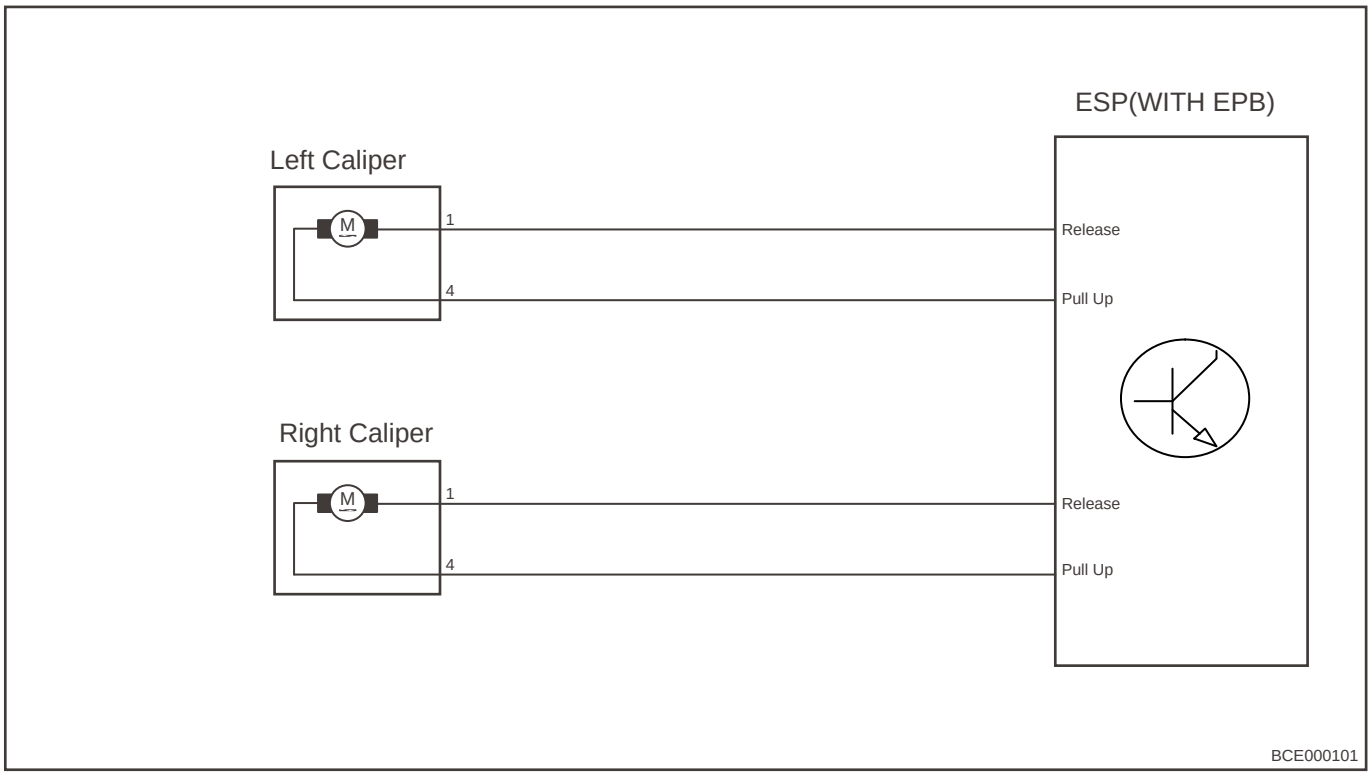
Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (4) - Body ground	Ignition switch ON	5 V
Rear right brake caliper (4) - Body ground	Ignition switch ON	5 V



OK	**Replace brake caliper**
NG	**Replace ESP (integrated EPB)**

DTC	C1802-17	Supply Voltage

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check battery voltage. Standard voltage: 9 - 16 V.

NG → **Check or replace charging system or battery.**

OK ↓

2	**Check wire harness and connector (brake caliper - ESP (integrated EPB))**

(a) Check if related wire harness connection and installation are in good condition.

(b) Disconnect the negative battery cable.

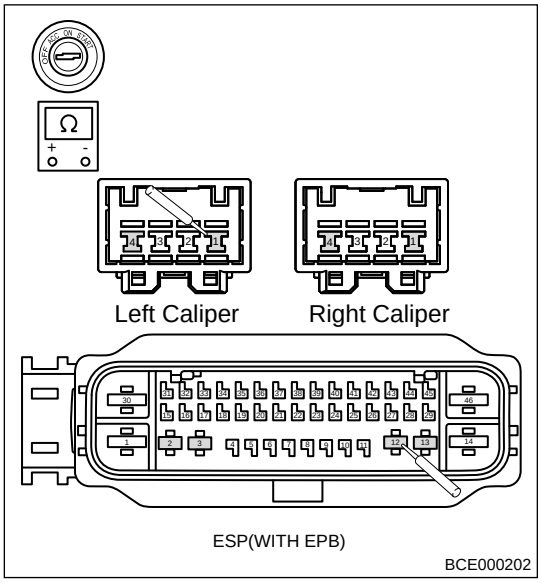
(c) Disconnect the ESP (integrated EPB) connector.

(d) Disconnect the rear left brake caliper connector.

(e) Disconnect the rear right brake caliper connector.

(f) Check for continuity between ESP (integrated EPB) and brake caliper.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear left brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



NG → **Repair or replace wire harness or connector.**

OK

3	Check brake caliper power supply circuit

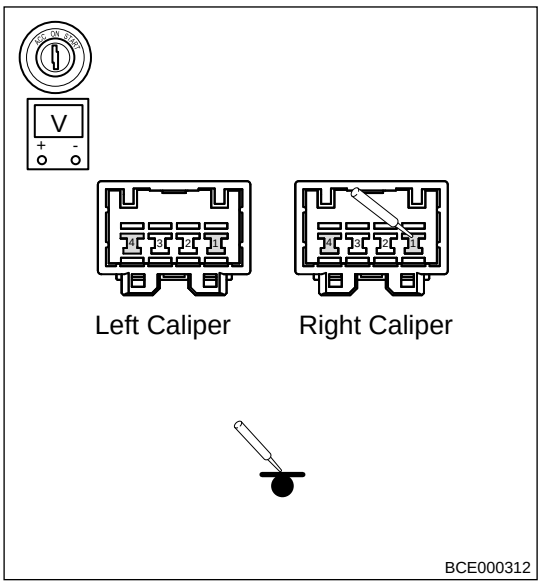
(a) Disconnect the rear left brake caliper connector.

(b) Disconnect the rear right brake caliper connector.

(c) Turn ignition switch to ON.

(d) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - Body ground	Ignition switch ON	5 V
Rear right brake caliper (1) - Body ground	Ignition switch ON	5 V

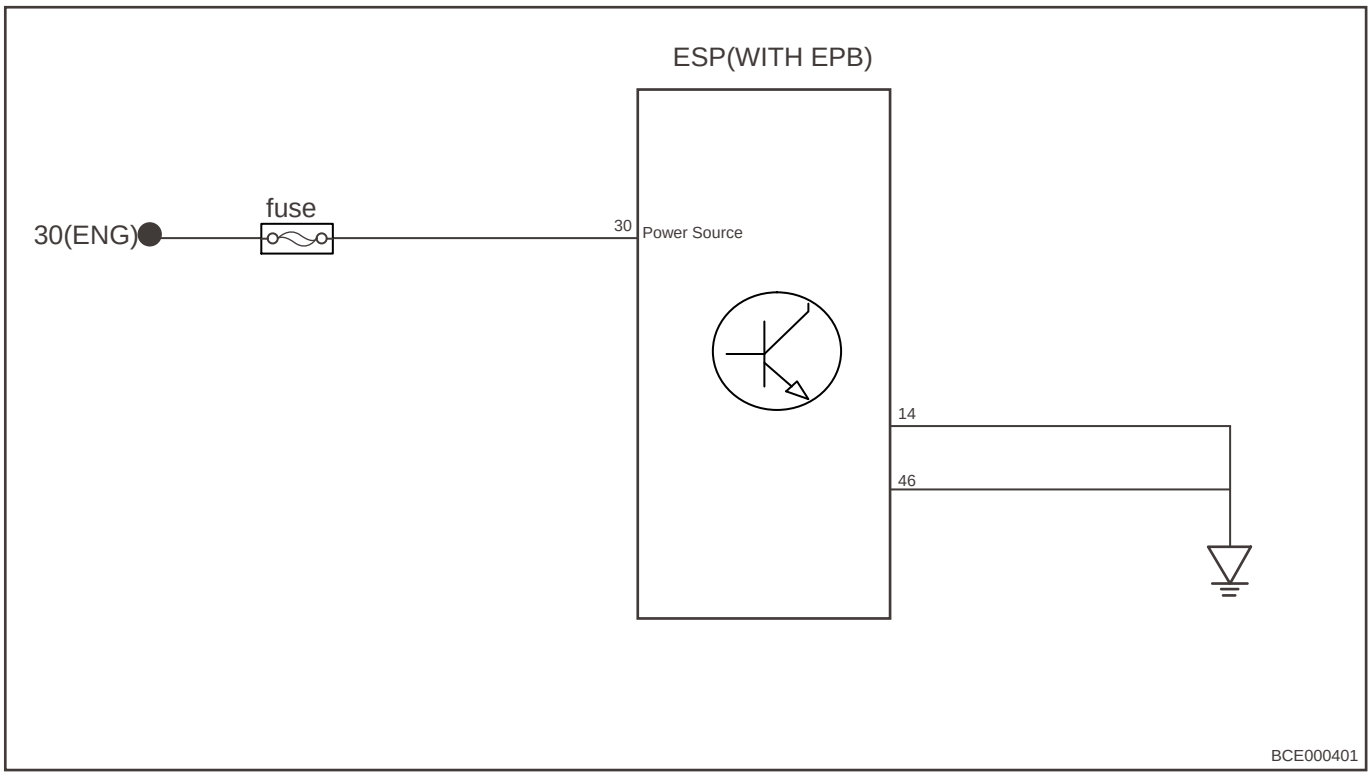


OK → **Replace brake caliper**

NG → **Replace ESP (integrated EPB)**

DTC	C0010-04	Left Front Inlet Control-System Internal Failure
DTC	C0011-04	Left Front Outlet Control-System Internal Failure
DTC	C0014-04	Right Front Inlet Control-System Internal Failure
DTC	C0015-04	Right Front Outlet Control-System Internal Failure
DTC	C0018-04	Left Rear Inlet Control-System Internal Failure
DTC	C0019-04	Left Rear Outlet Control-System Internal Failure
DTC	C001C-04	Right Rear Inlet Control-System Internal Failure
DTC	C001D-04	Right Rear Outlet Control-System Internal Failure
DTC	C0001-04	TCS Control Channel Changeover Valve1 (ESP Only)
DTC	C0002-04	TCS Control Channel Changeover Valve2 (ESP Only)
DTC	C0003-04	TCS Control Channel High Pressure Switch Valve 1 (ESP Only)
DTC	C0004-04	TCS Control Channel High Pressure Switch Valve 2 (ESP Only)
DTC	C1003-04	Valve Relay Failure-System Internal Failure
DTC	C1004-00	General Valve
DTC	C1008-00	General WSS
DTC	C0044-01	Brake Pressure Sensor Failure (ESP Only)-General Electrical Failure
DTC	C0044-28	Pressure Sensor Temperature Error
DTC	C053B-00	Valve Path Supply Line Open
DTC	C053D-00	Pressure Sensor 1 Range Error or Defective Plunger Pressure Sensor
DTC	C056B-00	Pressure Sensor 1 Noise or Internal Failure
DTC	C186F-28	Brake Pressure Sensor Signal Bias Level Out Of Range Failure (ESP Only)

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Check the fuse.

NG → **Replace the related fuse.**

OK

2	**Check ESP (integrated EPB) power supply circuit**

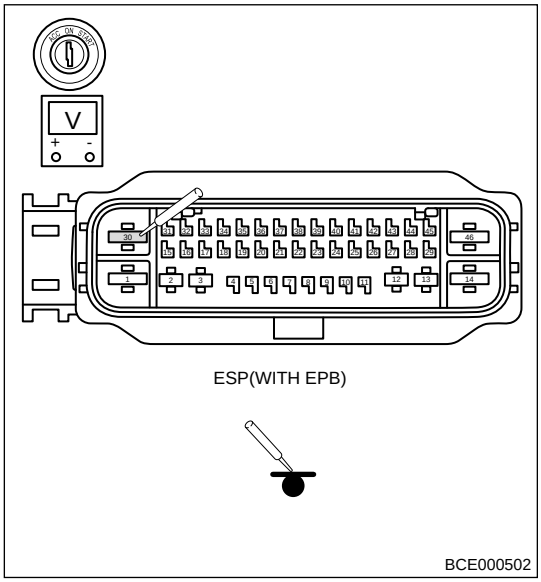
(a) Disconnect the ESP (integrated EPB) connector.

(b) Check if related wire harnesses are worn, pinched or broken.

(c) Check if related connector terminals are loose, broken, bent or corrosive.

(d) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (power supply circuit) - Body ground	Always	9-16V



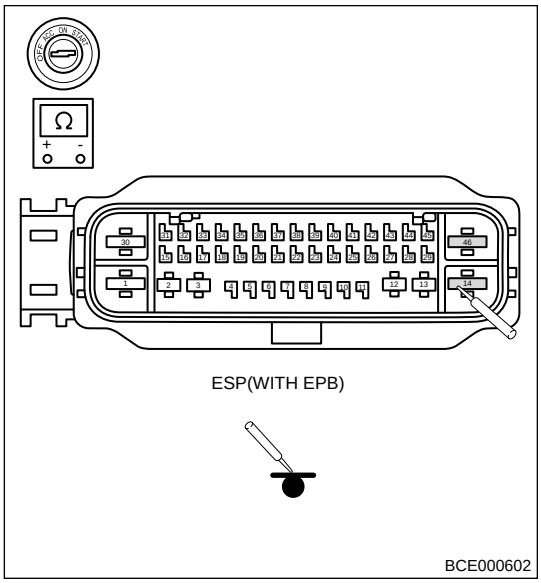
NG → **Repair or replace wire harness or connector.**

OK

3	**Check ESP (integrated EPB) ground circuit**

(a) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (ground circuit) - Body ground	Always	Less than 1 Ω
ESP (integrated EPB) (ground circuit) - Body ground	Always	Less than 1 Ω



NG → **Repair or replace wire harness or connector.**

OK

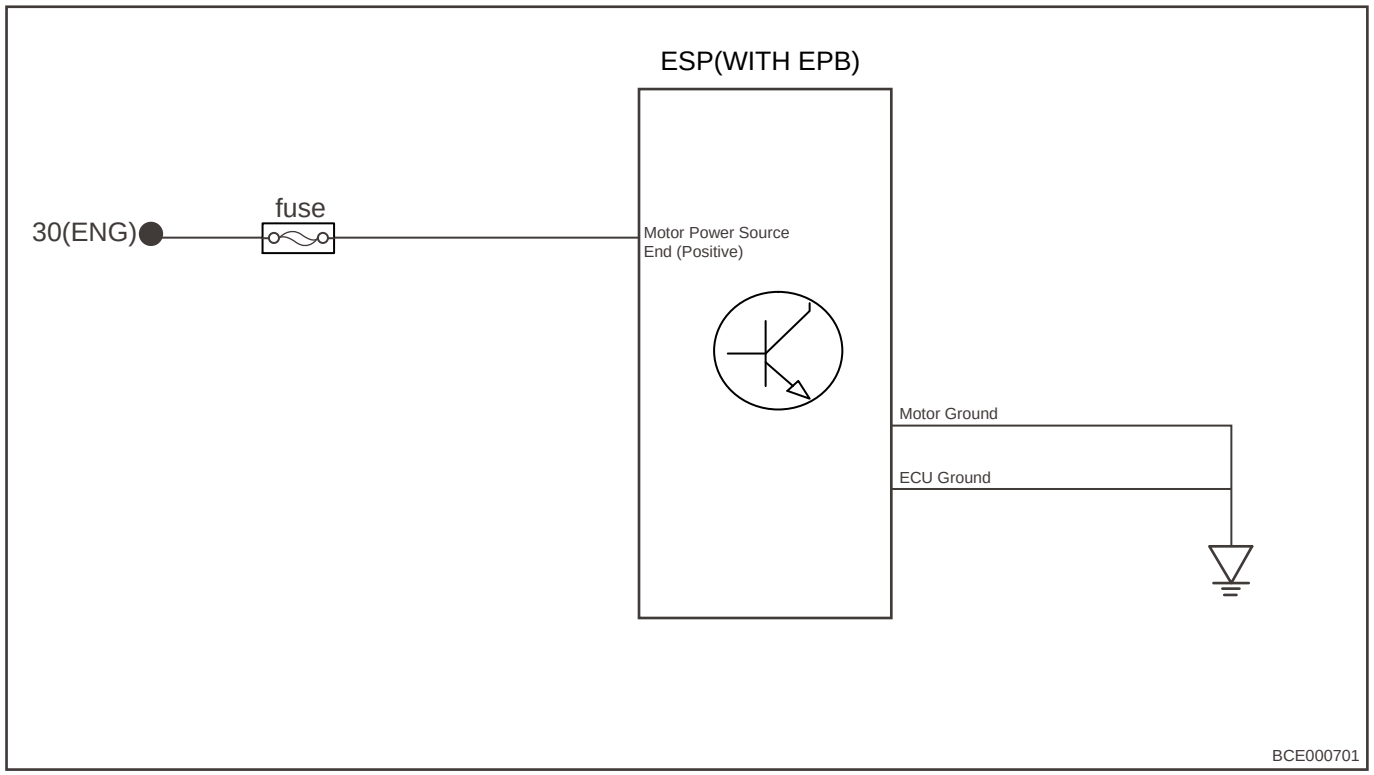
4	**Confirm DTCs again**

(a) Reconnect the ESP (integrated EPB) connector.
(b) Clear DTCs.
(c) Start the vehicle.
(d) Read DTCs again.
(e) Check if the same DTCs occur.

OK	**Check if intermittent fault occurs**
NG	**Replace ESP (integrated EPB)**

DTC	**C0020-04**	**ABS Pump Motor Control-System Internal Failure**
DTC	**C186E-FC**	**ABS Pump Motor Control Othercycle**

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Check the fuse.

NG → **Replace the related fuse.**

OK

2	**Check ESP (integrated EPB) power supply circuit**

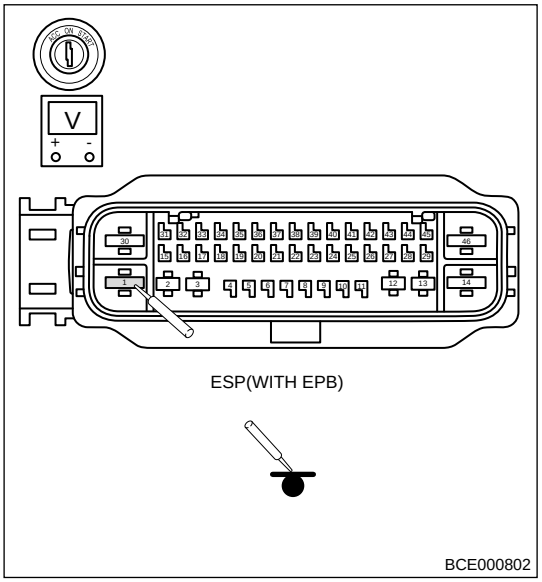
(a) Check if related wire harnesses are worn, pinched or broken.

(b) Check if related connector terminals are loose, broken, bent or corrosive.

(c) Disconnect the ESP (integrated EPB) connector.

(d) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (power supply terminal) - Body ground	Always	9-16V



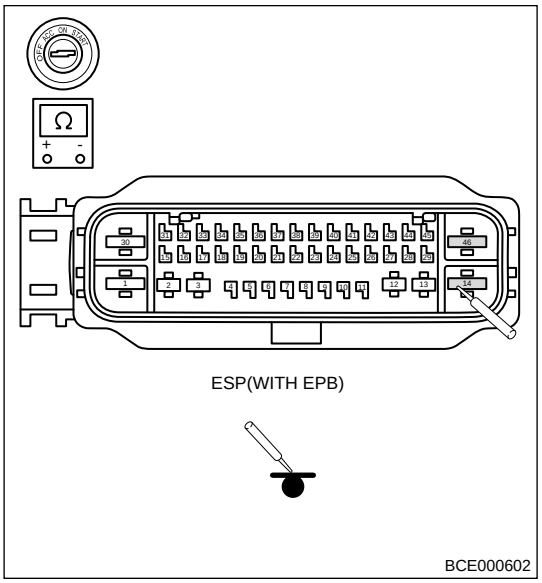
NG → **Repair or replace wire harness or connector.**

OK

3	**Check ESP (integrated EPB) ground circuit**

(a) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (ground terminal) - Body ground	Always	Less than 1 Ω
ESP (integrated EPB) (ground terminal) - Body ground	Always	Less than 1 Ω



NG → **Repair or replace wire harness or connector.**

OK

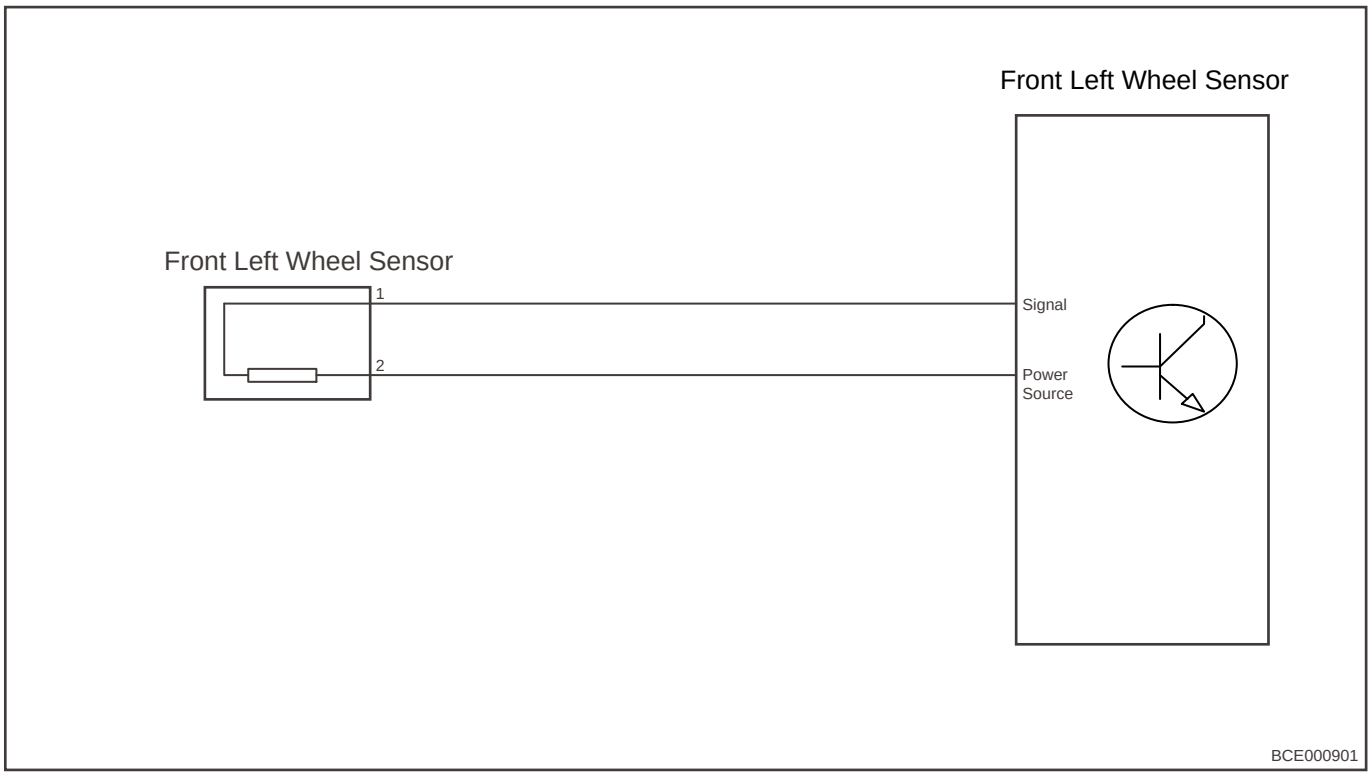
4	**Confirm DTCs again**

(a) Reconnect the ESP (integrated EPB) connector.
(b) Clear DTCs.
(c) Start the vehicle.
(d) Read DTCs again.
(e) Check if the same DTCs occur.

OK	**Check if intermittent fault occurs**
NG	**Replace ESP (integrated EPB)**

DTC	**C0031-00**	**Front Left Wheel Speed Sensor Failure**
DTC	**C0031-09**	**Front Left Wheel Speed Sensor Component Fault**
DTC	**C0031-11**	**Front Left Wheel Speed Sensor Short to Ground**
DTC	**C0031-12**	**Front Left Wheel Speed Sensor Short to Power Supply**
DTC	**C0031-13**	**Front Left Wheel Speed Sensor Open**
DTC	**C0031-29**	**Front Left Wheel Speed Sensor Signal Invalid**
DTC	**C0031-37**	**Front Left Wheel Speed Sensor Signal Out of Range**
DTC	**C0032-00**	**WSS FL Undervoltage**
DTC	**C0032-08**	**Wrong Direction of Left Front Wheel Speed Sensor**
DTC	**C0500-00**	**WSS Test FL Failure**

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check front left wheel speed sensor**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ignition switch to OFF.

(b) Disconnect the negative battery cable.

(c) Check front left wheel speed sensor.

(d) Check if related wire harness connector installation is in good condition and check for dirty.

NG → **Clean or replace the front left wheel speed sensor.**

OK

2	**Check wire harness and connector (front left wheel speed sensor - ESP (integrated EPB))**

(a) Turn ignition switch to OFF.

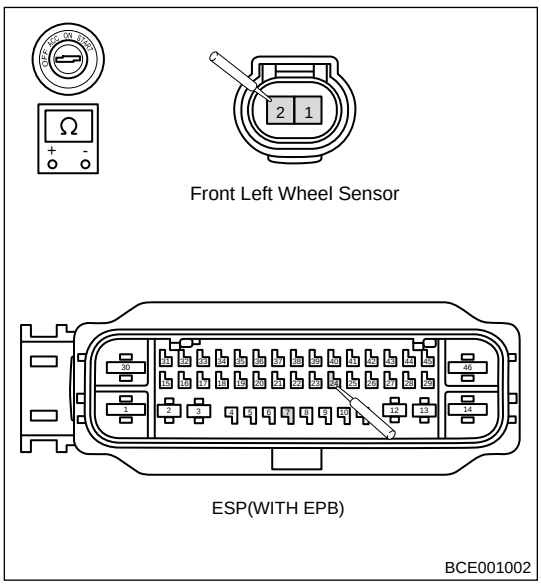
(b) Disconnect the negative battery cable.

(c) Check the front left wheel speed sensor connector.

(d) Check ESP (integrated EPB) connector.

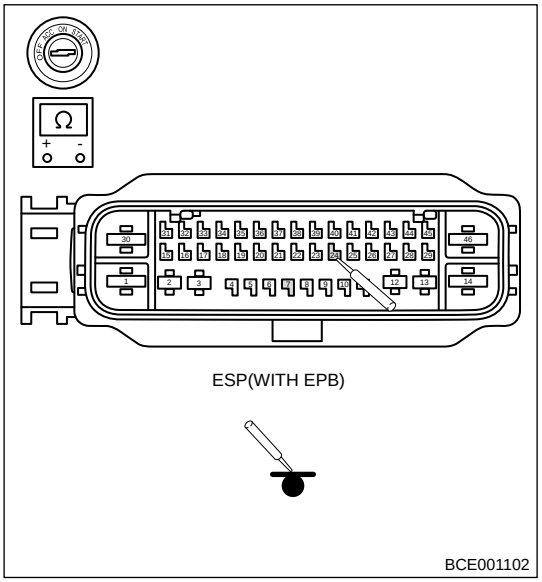
(e) Check for continuity between front left wheel speed sensor and ESP (integrated EPB) according to the table below.

Multimeter Connection	Condition	Specified Condition
Front left wheel speed sensor (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Front left wheel speed sensor (2) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



(f) Check if the resistance between sensor to ESP (-integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ

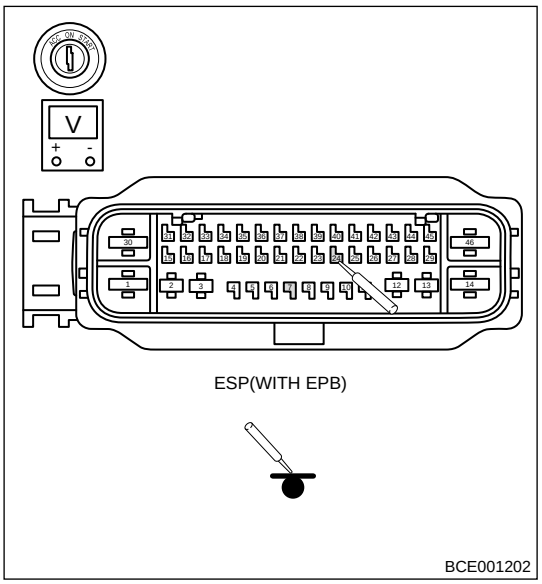


(g) Connect the negative battery cable.

(h) Turn ENGINE START STOP switch to ON.

(i) Check if the voltage between sensor to ESP (integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V



NG → **Repair or replace wire harness or connector.**

OK

3	**Confirm DTCs again**

(a) Reconnect the ESP (integrated EPB) connector.

(b) Clear DTCs.

(c) Start the vehicle.

(d) Read DTCs again.

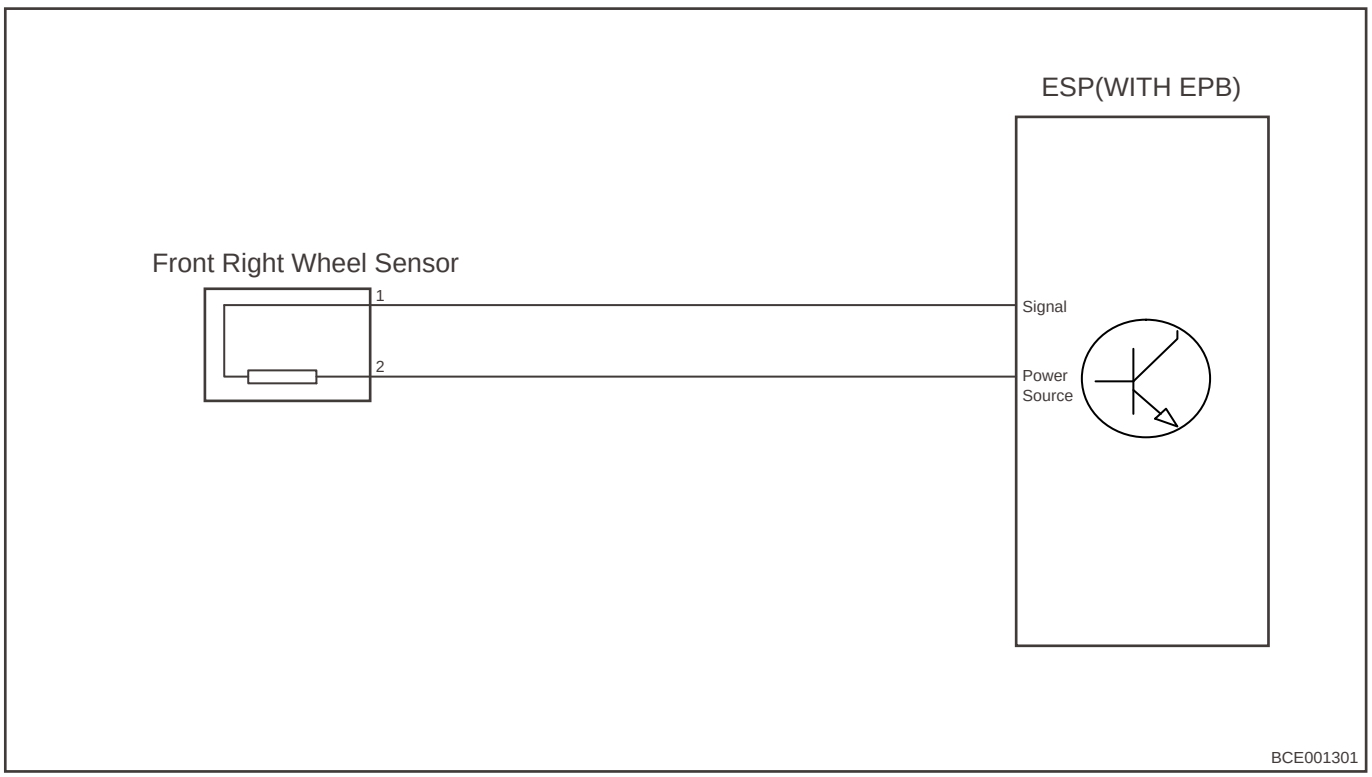
(e) Check if the same DTCs occur.

OK → **Check if intermittent fault occurs**

NG → **Replace ESP (integrated EPB)**

DTC	**C0034-00**	**Front Right Wheel Speed Sensor Fault**
DTC	**C0034-09**	**Front Right Wheel Speed Sensor Component Fault**
DTC	**C0034-11**	**Front Right Wheel Speed Sensor Short to Ground**
DTC	**C0034-12**	**Front Right Wheel Speed Sensor Short to Power Supply**
DTC	**C0034-13**	**Front Right Wheel Speed Sensor Open**
DTC	**C0034-29**	**Front Right Wheel Speed Sensor Signal Invalid**
DTC	**C0034-37**	**Front Right Wheel Speed Sensor Signal Out of Range**
DTC	**C0035-00**	**WSS FR Undervoltage**
DTC	**C0035-08**	**Wrong Direction of Right Front Wheel Speed Sensor**
DTC	**C0506-00**	**WSS Test FR Failure**

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check front right wheel speed sensor**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ignition switch to OFF.

(b) Disconnect the negative battery cable.

(c) Check front right wheel speed sensor.

(d) Check if related wire harness connector installation is in good condition and check for dirty.

NG → **Clean or replace front right wheel speed sensor.**

OK

2	**Check wire harness and connector (front right wheel speed sensor - ESP (integrated EPB))**

(a) Turn ignition switch to OFF.

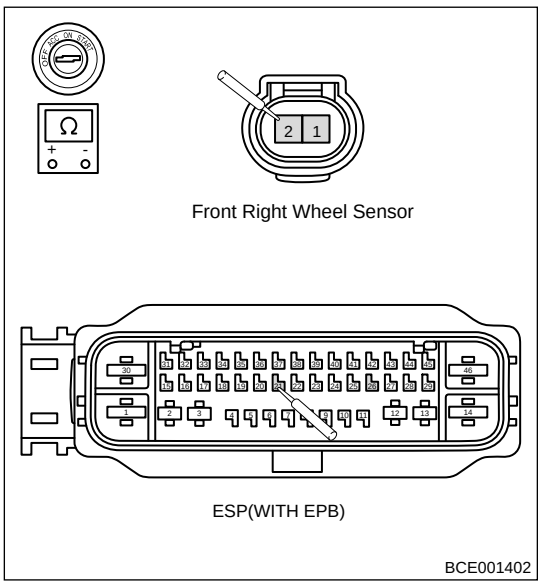
(b) Disconnect the negative battery cable.

(c) Check the front right wheel speed sensor connector.

(d) Check ESP (integrated EPB) connector.

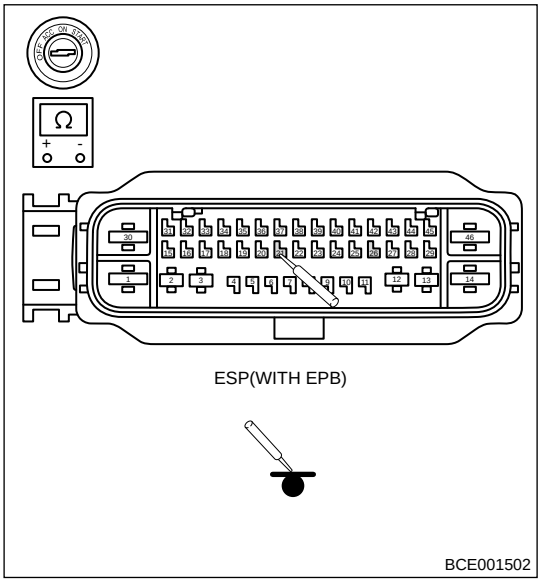
(e) Check for continuity between front right wheel speed sensor and ESP (integrated EPB) according to the table below.

Multimeter Connection	Condition	Specified Condition
Front right wheel speed sensor (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Front right wheel speed sensor (2) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



(f) Check if the resistance between sensor to ESP (-integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ

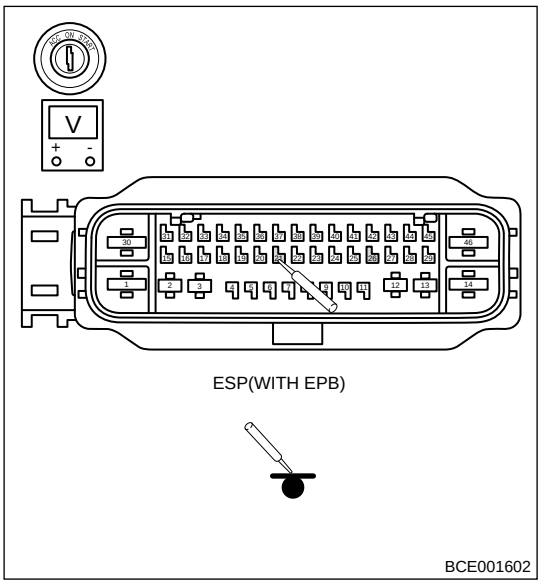


(g) Connect the negative battery cable.

(h) Turn ENGINE START STOP switch to ON.

(i) Check if the voltage between sensor to ESP (integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V



NG → **Repair or replace wire harness or connector.**

OK

3	**Confirm DTCs again**

(a) Reconnect the ESP (integrated EPB) connector.

(b) Clear DTCs.

(c) Start the vehicle.

(d) Read DTCs again.

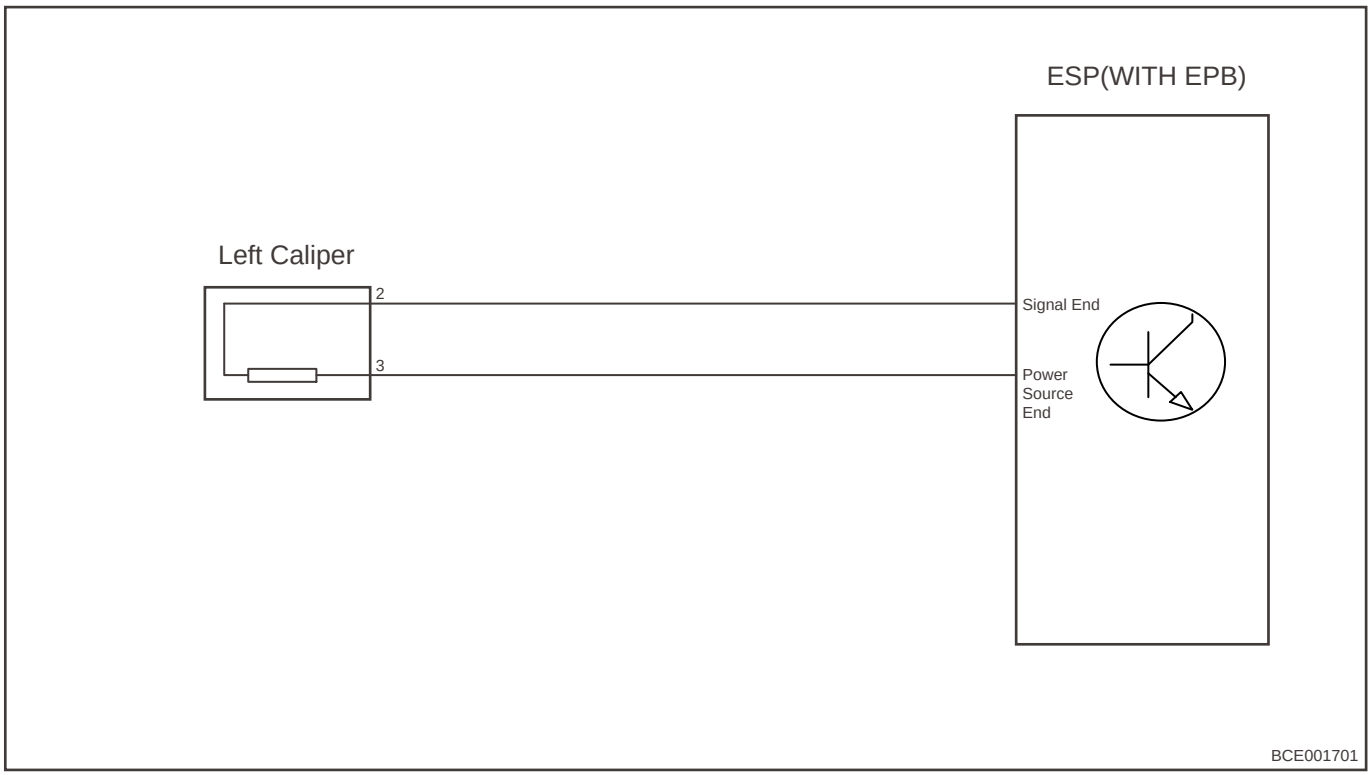
(e) Check if the same DTCs occur.

OK → **Check if intermittent fault occurs**

NG → **Replace ESP (integrated EPB)**

DTC	**C0037-00**	**Rear Left Wheel Speed Sensor Fault**
DTC	**C0037-09**	**Rear Left Wheel Speed Sensor Component Fault**
DTC	**C0037-11**	**Rear Left Wheel Speed Sensor Short to Ground**
DTC	**C0037-12**	**Rear Left Wheel Speed Sensor Short to Power Supply**
DTC	**C0037-13**	**Rear Left Wheel Speed Sensor Open**
DTC	**C0037-29**	**Rear Left Wheel Speed Sensor Signal Invalid**
DTC	**C0037-37**	**Rear Left Wheel Speed Sensor Signal Out of Range**
DTC	**C0038-00**	**WSS RL Undervoltage**
DTC	**C0038-08**	**Wrong Direction of Left Rear Wheel Speed Sensor**
DTC	**C050C-00**	**WSS Test RL Failure**

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check rear left wheel speed sensor**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ignition switch to OFF.

(b) Disconnect the negative battery cable.

(c) Check rear left wheel speed sensor.

(d) Check if related wire harness connector installation is in good condition and check for dirty.

NG → **Clean or replace rear left wheel speed sensor.**

OK

2	**Check wire harness and connector (rear left wheel speed sensor - ESP (integrated EPB))**

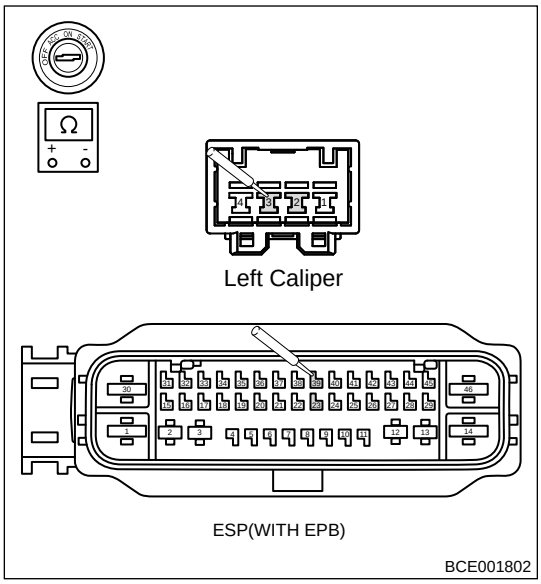
(a) Turn ignition switch to OFF.

(b) Disconnect the negative battery cable.

(c) Check the rear left wheel speed sensor connector.

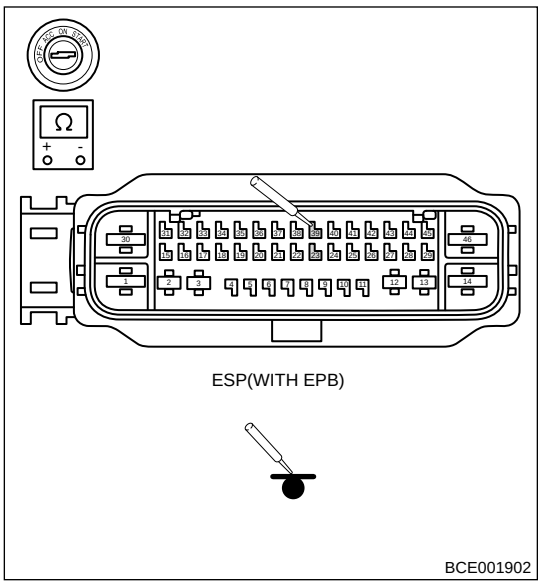
(d) Check for continuity between rear left wheel speed sensor and ESP (integrated EPB) according to the table below.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (2) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear left brake caliper (3) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



(e) Check if the resistance between sensor to ESP (- integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ

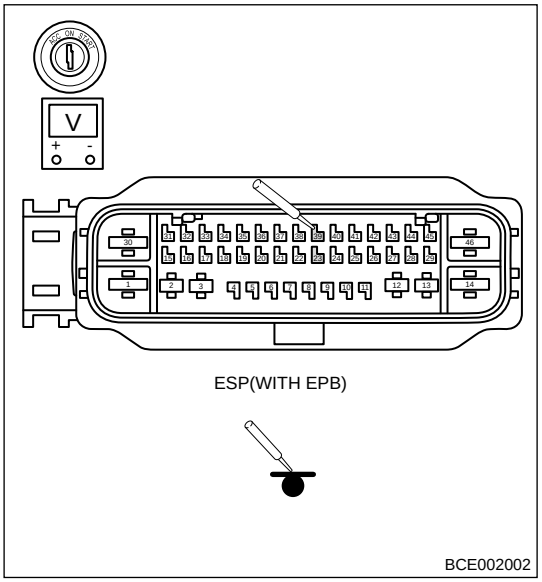


(f) Connect the negative battery cable.

(g) Turn ENGINE START STOP switch to ON.

(h) Check if the voltage between sensor to ESP (integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V



NG → **Repair or replace wire harness or connector.**

OK

3	**Confirm DTCs again**

(a) Reconnect the ESP (integrated EPB) connector.

(b) Clear DTCs.

(c) Start the vehicle.

(d) Read DTCs again.

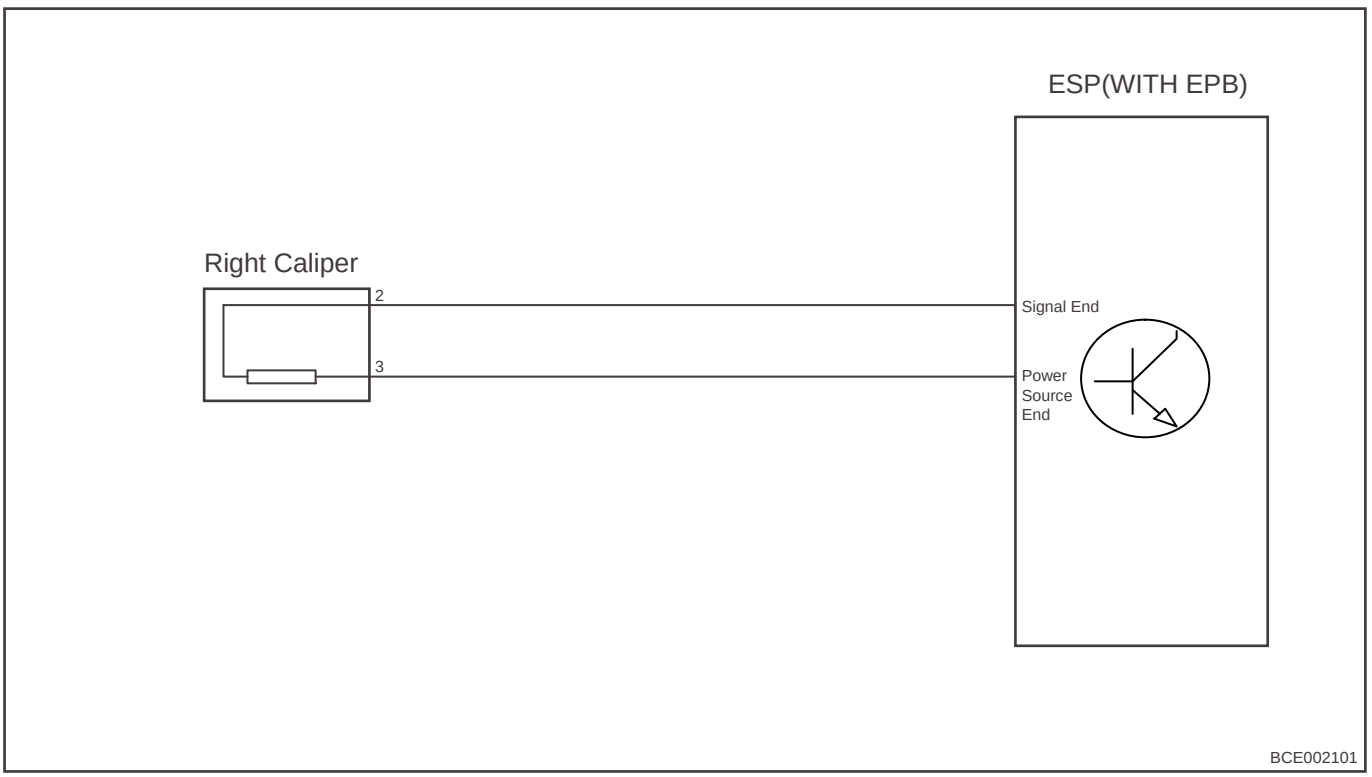
(e) Check if the same DTCs occur.

OK → **Check if intermittent fault occurs**

NG → **Replace ESP (integrated EPB)**

DTC	**C003A-00**	**Rear Right Wheel Speed Sensor Fault**
DTC	**C003A-09**	**Rear Right Wheel Speed Sensor Component Fault**
DTC	**C003A-11**	**Rear Right Wheel Speed Sensor Short to Ground**
DTC	**C003A-12**	**Rear Right Wheel Speed Sensor Short to Power Supply**
DTC	**C003A-13**	**Rear Right Wheel Speed Sensor Open**
DTC	**C003A-29**	**Rear Right Wheel Speed Sensor Signal Invalid**
DTC	**C003A-37**	**Rear Right Wheel Speed Sensor Signal Out of Range**
DTC	**C003B-00**	**WSS RR Undervoltage**
DTC	**C003B-08**	**Wrong Direction of Right Rear Wheel Speed Sensor**
DTC	**C0512-00**	**WSS Test RR Failure**

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check rear right wheel speed sensor**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ignition switch to OFF.

(b) Disconnect the negative battery cable.

(c) Check rear right wheel speed sensor.

(d) Check if related wire harness connector installation is in good condition and check for dirty.

NG → **Clean or replace rear right wheel speed sensor.**

OK

2	**Check wire harness and connector (rear right wheel speed sensor - ESP (integrated EPB))**

(a) Turn ignition switch to OFF.

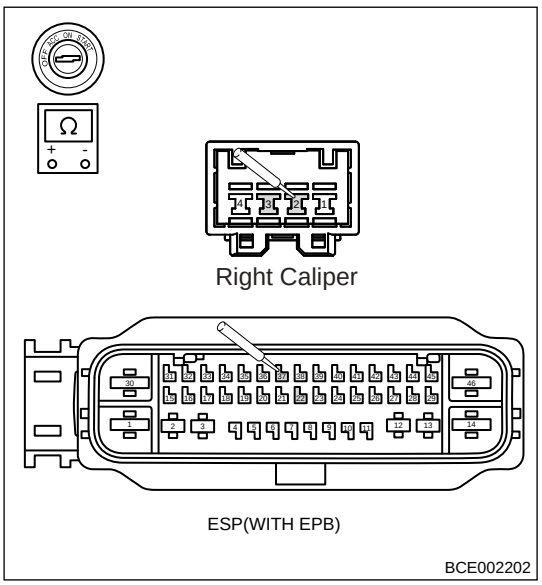
(b) Disconnect the negative battery cable.

(c) Check the rear right wheel speed sensor connector.

(d) Check ESP (integrated EPB) connector.

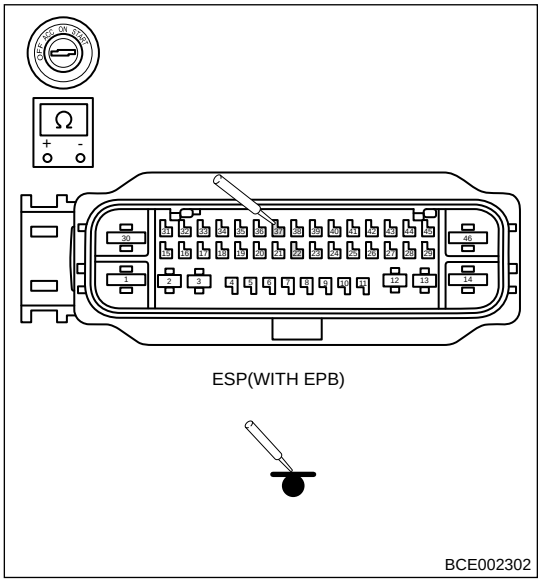
(e) Check for continuity between rear right wheel speed sensor and ESP (integrated EPB) according to the table below.

Multimeter Connection	Condition	Specified Condition
Rear right brake caliper (2) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear right brake caliper (3) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



(f) Check if the resistance between sensor to ESP (-integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ

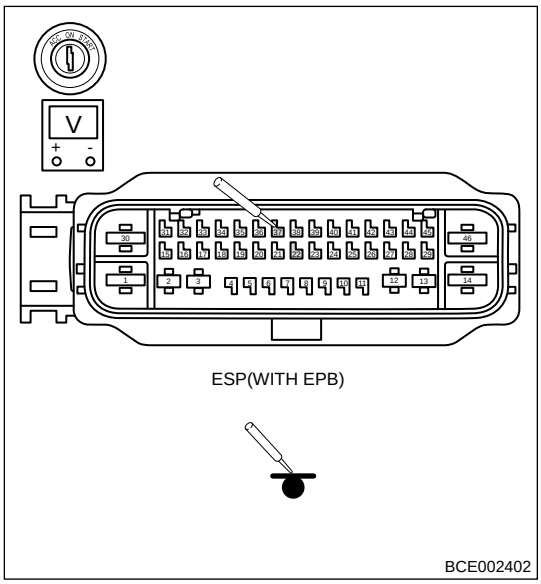


(g) Connect the negative battery cable.

(h) Turn ENGINE START STOP switch to ON.

(i) Check if the voltage between sensor to ESP (integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V



NG → **Repair or replace wire harness or connector.**

OK

3	**Confirm DTCs again**

(a) Reconnect the ESP (integrated EPB) connector.

(b) Clear DTCs.

(c) Start the vehicle.

(d) Read DTCs again.

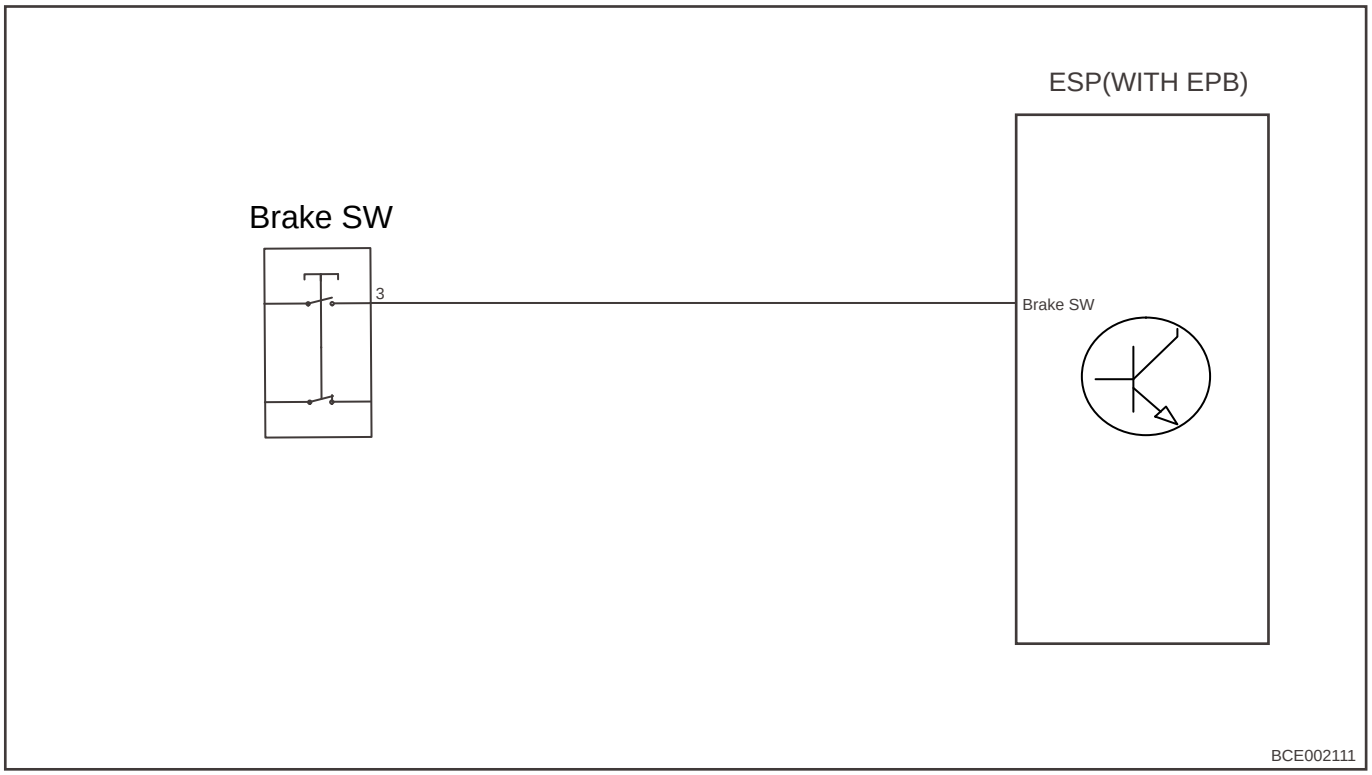
(e) Check if the same DTCs occur.

OK → **Check if intermittent fault occurs**

NG → **Replace ESP (integrated EPB)**

DTC	**C0040-64**	**Brake Pedal Switch Failure (ESP Only)**
DTC	**C1007-29**	**Reverse Gear Switch Failure (ESP Only)-Signal Invalid**

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check brake switch**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ignition switch to OFF.

(b) Disconnect the negative battery cable.

(c) Check brake switch.

(d) Check if related wire harness connector installation is in good condition.

NG → **Replace brake switch.**

OK

2	**Check wire harness and connector (brake switch - ESP (integrated EPB))**

(a) Turn ignition switch to OFF.

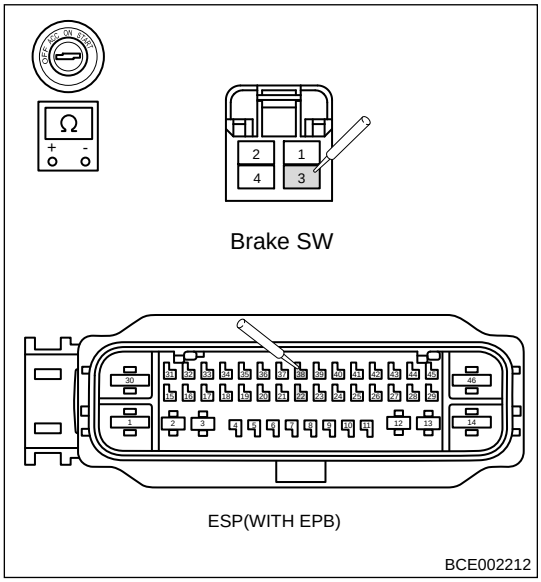
(b) Disconnect the negative battery cable.

(c) Check brake switch connector.

(d) Check ESP (integrated EPB) connector.

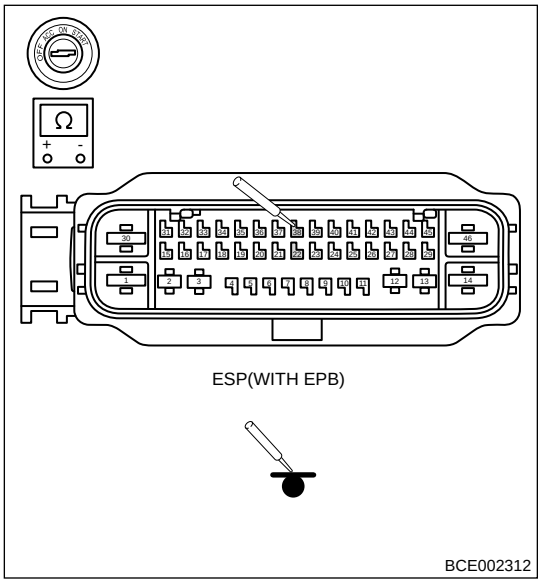
(e) Check for continuity between brake switch and ESP (-integrated EPB) according to the table below.

Multimeter Connection	Condition	Specified Condition
Brake switch (3) - ESP (integrated EPB (connect terminals))	Always	Less than 1 Ω



(f) Check if the resistance between brake switch sensor to ESP (integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ

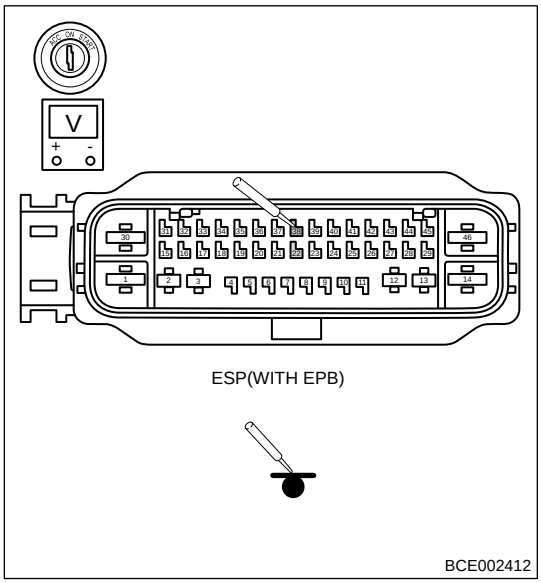


(g) Connect the negative battery cable.

(h) Turn ENGINE START STOP switch to ON.

(i) Check if the voltage between brake switch to ESP (-integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V



NG → **Repair or replace wire harness or connector.**

OK

3	**Confirm DTCs again**

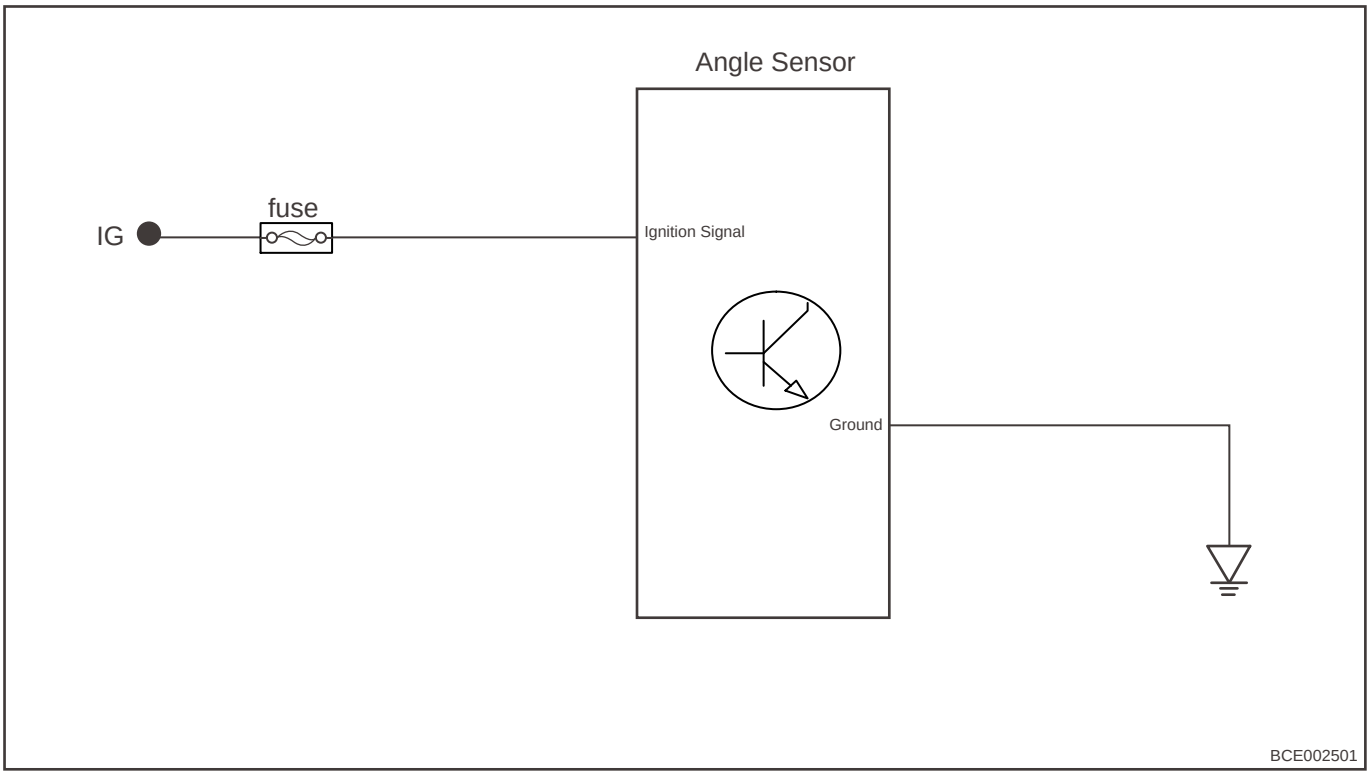
(a) Reconnect the ESP (integrated EPB) connector.
(b) Clear DTCs.
(c) Start the vehicle.
(d) Read DTCs again.
(e) Check if the same DTCs occur.

OK → **Check if intermittent fault occurs**

NG → **Replace ESP (integrated EPB)**

DTC	**C0051-29**	**Steering Wheel Angle Sensor Signal Invalid (ESP Only)**
DTC	**C0051-54**	**Steering Wheel Angle Sensor Uncalibrated (ESP Only)**
DTC	**C0051-64**	**Steering Wheel Angle Sensor Signal Abnormal (ESP Only)**

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check angle sensor calibration**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ignition switch to ON.

(b) Use diagnostic tester to recalibrate angle sensor.

(c) Use diagnostic tester to clear DTCs.

(d) Start the engine.

(e) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.

(f) Check if the same DTCs are still output.

NG	**Calibrate steering angle sensor**

OK

2	Check fuse

(a) Turn ignition switch to OFF.
(b) Disconnect the negative battery cable.
(c) Check if fuse is blown.

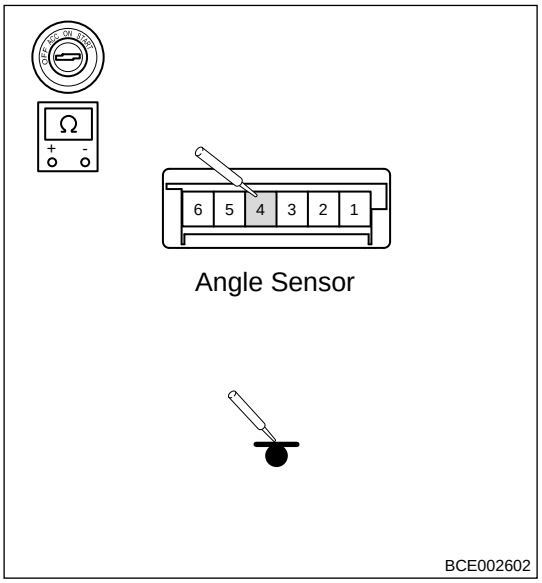
NG → **Replace fuse.**

OK

3	Check related wire harness and connector of steering angle sensor

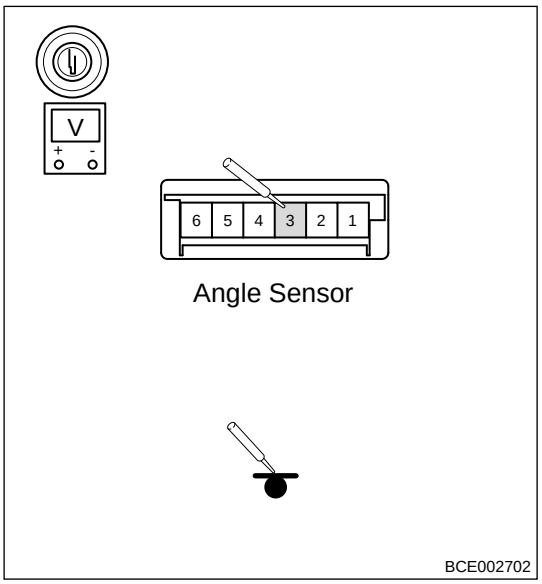
(a) Turn ignition switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the angle sensor connector.
(d) Check if related wire harnesses are worn, pinched or broken.
(e) Check if related connector terminals are loose, broken, bent or corrosive.
(f) Check for continuity between steering angle sensor and body ground.

Multimeter Connection	Condition	Specified Condition
Angel sensor (-connect terminal) - Body ground	Always	Less than 1 Ω



(g) Connect the negative battery cable.
(h) Turn ignition switch to ON.
(i) Check if voltage between steering angle sensor and body ground is normal.

Multimeter Connection	Condition	Specified Condition
Steering angle sensor (connect terminal) - Body ground	Always	More than 12 V



NG → **Repair or replace related wire harness or connector.**

OK

4	Confirm DTCs again

(a) Clear DTCs.

(b) Start the vehicle.

(c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.

(d) Check if the same DTCs occur.

OK	**Confirm that system operates normally**
NG	**Replace ESP (integrated EPB)**

DTC	**C0061-64**	**Lateral Acceleration Sensor Signal Abnormal (ESP Only)**
DTC	**C0062-64**	**Longitudinal Acceleration Sensor Signal Abnormal (ESP Only)**
DTC	**C0063-64**	**Yaw Rate Sensor Signal Abnormal (ESP Only)**
DTC	**C0063-01**	**Yaw Rate Sensor General Electrical Fault**
DTC	**C0063-54**	**Yaw Rate Sensor Uncalibrated**

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check lateral acceleration/yaw rate sensor calibration**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ignition switch to ON.

(b) Use diagnostic tester to recalibrate lateral acceleration/ yaw rate sensor.

(c) Use diagnostic tester to clear DTCs.

(d) Start the engine.

(e) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.

(f) Check if the same DTCs are still output.

NG → **Lateral acceleration/yaw rate sensor is not calibrated**

OK

2	**Check ESP (integrated EPB)**

(a) Check ESP control module assembly fixing bolt for looseness.

(b) Check ESP control module assembly fixing bracket bolt for looseness.

NG → **Tighten fixing bolt and fixing bracket bolt of ESP (integrated EPB) properly**

OK

3	**Confirm DTCs again**

(a) Clear DTCs.

(b) Start the vehicle.

(c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.

(d) Check if the same DTCs occur.

OK	**Confirm that system operates normally**
NG	**Replace ESP (integrated EPB)**

DTC	**C006B-00**	**Stability System Active Too Long**
DTC	**C053C-FC**	**Wheel-speed Sensor Generic Error**
DTC	**C1099-08**	**Wrong Direction of Wheel Speed Sensor**

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check related wire harness and connector**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ignition switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect all wheel speed sensor and angle sensor connectors.

(d) Check if related wire harnesses are worn, pinched or broken.

NG → **Repair or replace related wire harness and connector**

OK

2	**Check installation of wheel speed sensor**

(a) Turn ignition switch to OFF.

(b) Disconnect the negative battery cable.

(c) Check wheel speed sensor fixing bolt for looseness.

(d) Check for excessive clearance between installation position of wheel speed sensor and front steering knuckle.

(e) Check installation position of rear right wheel speed sensor for dirt.

NG → **Tighten fixing bolt properly, clean or replace wheel speed sensor**

OK

3	**Check hub gear ring and drive shaft upper gear ring**

(a) Check hub gear ring and drive shaft upper gear ring for foreign matter, missing teeth or damage.

NG → **Replace hub bearing assembly or outer ball cage assembly**

OK ↓

4	Check wheel speed sensor

(a) Drive vehicle straight ahead, and read datastream of wheel speed sensor with diagnostic tester.
(b) Check if data change of wheel speed sensor matches that of other wheel speed sensors.

NG → **Replace corresponding wheel speed sensor assembly**

OK ↓

5	Check installation of angle sensor

(a) Turn ignition switch to OFF.
(b) Disconnect the negative battery cable.
(c) Check if angle sensor connector is connected securely.
(d) Check if angle sensor is installed in place.
(e) Check if angle sensor connector position is dirty.

NG → **Clean or replace spiral cable**

OK ↓

6	Confirm DTCs again

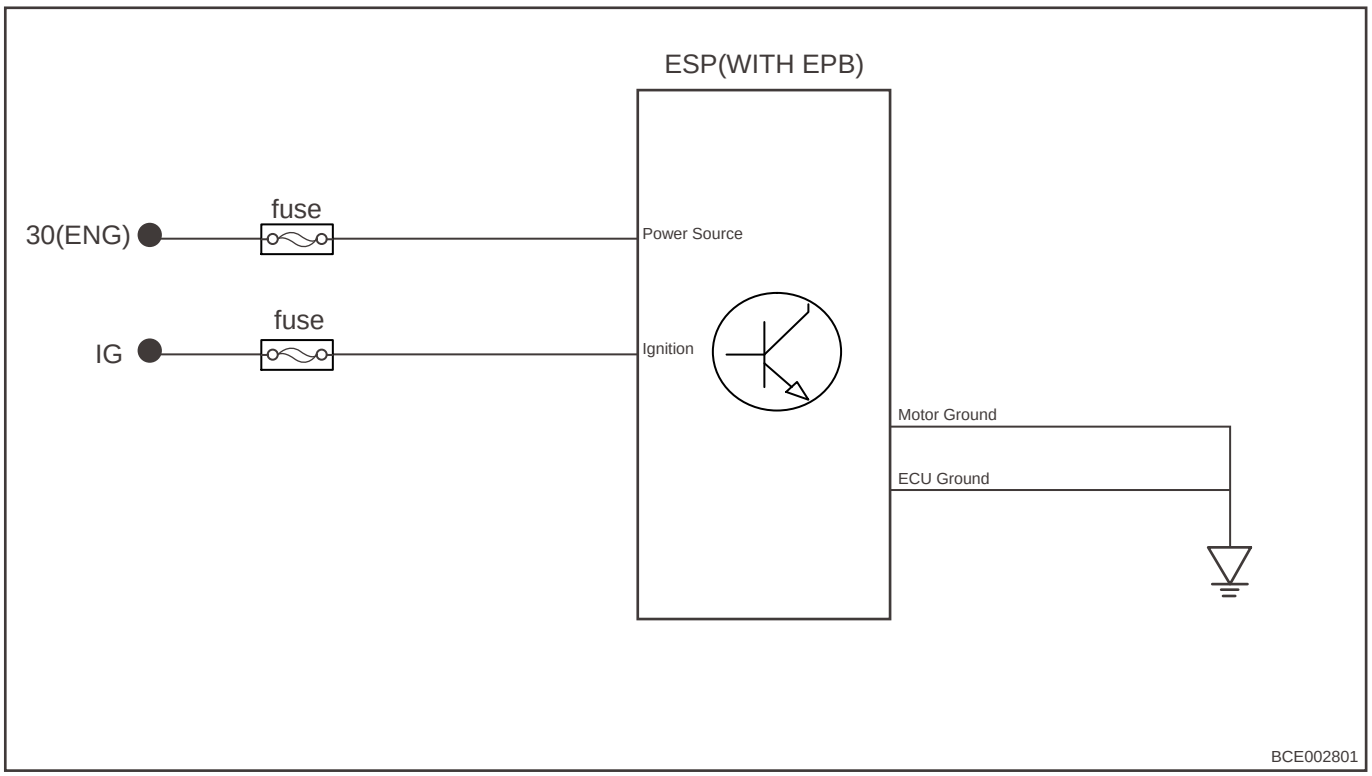
(a) Clear DTCs.
(b) Start the vehicle.
(c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.
(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

NG → **Replace ESP (integrated EPB)**

DTC	**C1000-16**	**ECU Voltage Too Low**
DTC	**C1000-17**	**ECU Voltage Too High**
DTC	**C1001-04**	**Internal fault in ECU system**
DTC	**C1009-00**	**ECU Hardware Related Fault**
DTC	**C1002-49**	**CAN Hardware Internal Electronic Failure**
DTC	**C1002-49**	**System ASIC GPIO Error or APB Asic Voltage Error or PBC SW Failure**
DTC	**C156B-00**	**EPBASIC_GenericError-No Sub Type Information**

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ignition switch to OFF.

(b) Disconnect the negative battery cable.

(c) Check if related wire harness or connector is well installed and check for looseness.

(d) Check the fuse.

(e) Check if fuse is blown.

NG → **Replace related fuse**

OK

2	**Check battery voltage**

(a) Standard voltage: Not less than 12V.

NG → **Replace battery or check charging system**

OK

3	**Check wire harness and connector**

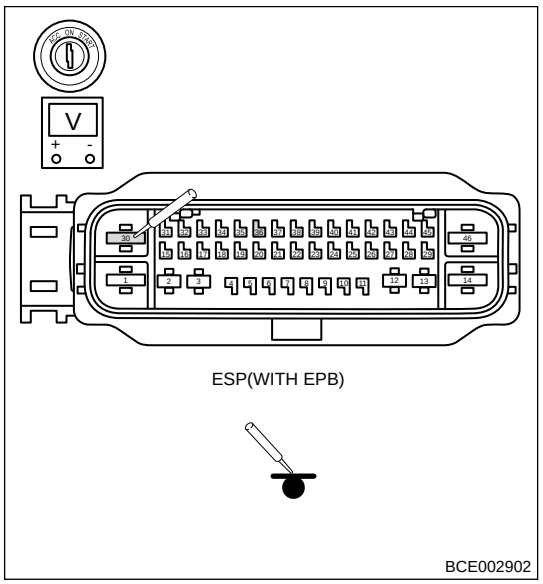
(a) Disconnect ESP (integrated EPB) connector.

(b) Turn ignition switch to ON.

(c) Check if the voltage between ESP (integrated EPB) and body ground is normal.

Voltage Measurement

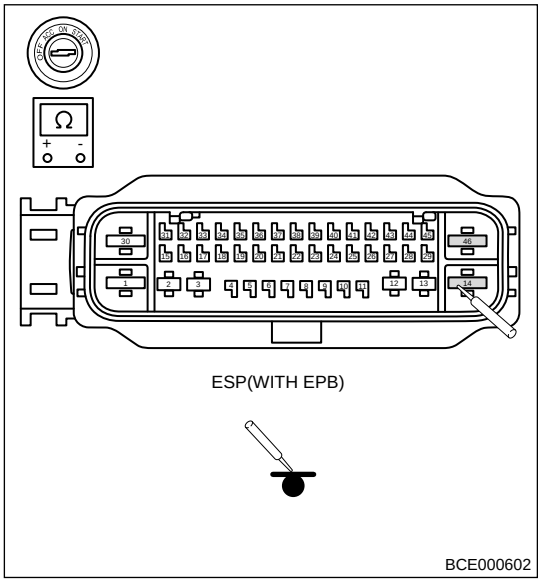
Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (power supply terminal) - Body ground	Always	More than 12 V
ESP (integrated EPB) (power supply terminal) - Body ground	Always	More than 12 V



(d) Check if the resistance between ESP (integrated EPB) and body ground is normal.

Resistance Measurement

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (ground terminal) - Body ground	Always	Less than 1 Ω
ESP (integrated EPB) (ground terminal) - Body ground	Always	Less than 1 Ω



NG → **Repair or replace related wire harness and connector**

OK

4	Confirm DTCs again

(a) Clear DTCs.

(b) Start the vehicle.

(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.

(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

NG → **Replace ESP (integrated EPB)**

DTC	C1803-95	Assembly Test

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Perform assembly test

(a) Turn off power normally after performing assembly test using diagnostic tester.

Next

2	**Confirm DTCs again**

(a) Clear DTCs.

(b) Start the vehicle.

(c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.

(d) Check if the same DTCs occur.

OK	**Confirm that system operates normally**
NG	**Replace ESP (integrated EPB)**

DTC	C1804-53	EPB Maintenance Mode

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Perform assembly test

(a) Turn off power normally after performing assembly test using diagnostic tester.

Next

2	Confirm DTCs again

(a) Clear DTCs.
(b) Start the vehicle.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs occur.

OK	Confirm that system operates normally
NG	Replace ESP (integrated EPB)

DTC	C0072-FC	DHP Valve Overheat Protection
DTC	C1802-44	PBC EEPROM Fault
DTC	C186D-44	SupervisionFail-Data Memory Failure

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Turn the power supply off

(a) Disconnect the negative battery.

Next

2	**Confirm DTCs again**

(a) Clear DTCs.
(b) Start the vehicle.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs occur.

OK	**Confirm that system operates normally**
NG	**Replace ESP (integrated EPB)**

DTC	**C0563-00**	**ABS Implausible Long Control**
DTC	**C1805-94**	**Hydric Support Failed**

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Turn the power supply off**

(a) Disconnect the negative battery.

Next

2	**Confirm DTCs again**

(a) Clear DTCs.
(b) Start the vehicle.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs occur.

OK	**Confirm that system operates normally**
NG	**Replace ESP (integrated EPB)**

DTC	**C1826-01**	**EPB (Electronic Parking Brake) Actuator Driver Gen Electrical Failure**
DTC	**C182B-1E**	**EPB Motor Electrical Coupling Failure**
DTC	**C1836-FC**	**EPB Motor GPIO Overcurrent Failure**

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check related wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the electronic control execution unit connector.
(d) Check if related wire harnesses are worn, pinched or broken.
(e) Check if related connector terminals are loose, broken, bent or corrosive.

NG → **Repair/replace related wire harness and connector**

OK

2	**Perform left/right brake caliper active test**

(a) Perform rear left/right brake caliper active tester.

NG → **Replace left/right brake caliper**

OK

3	**Confirm DTCs again**

(a) Clear DTCs.
(b) Start the vehicle.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

NG → **Replace ESP (integrated EPB)**

DTC	C1807-98	Disc Over Heat

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Perform left/right brake caliper active test

(a) Perform rear left/right brake caliper active tester.

NG → **Replace left/right brake caliper**

OK

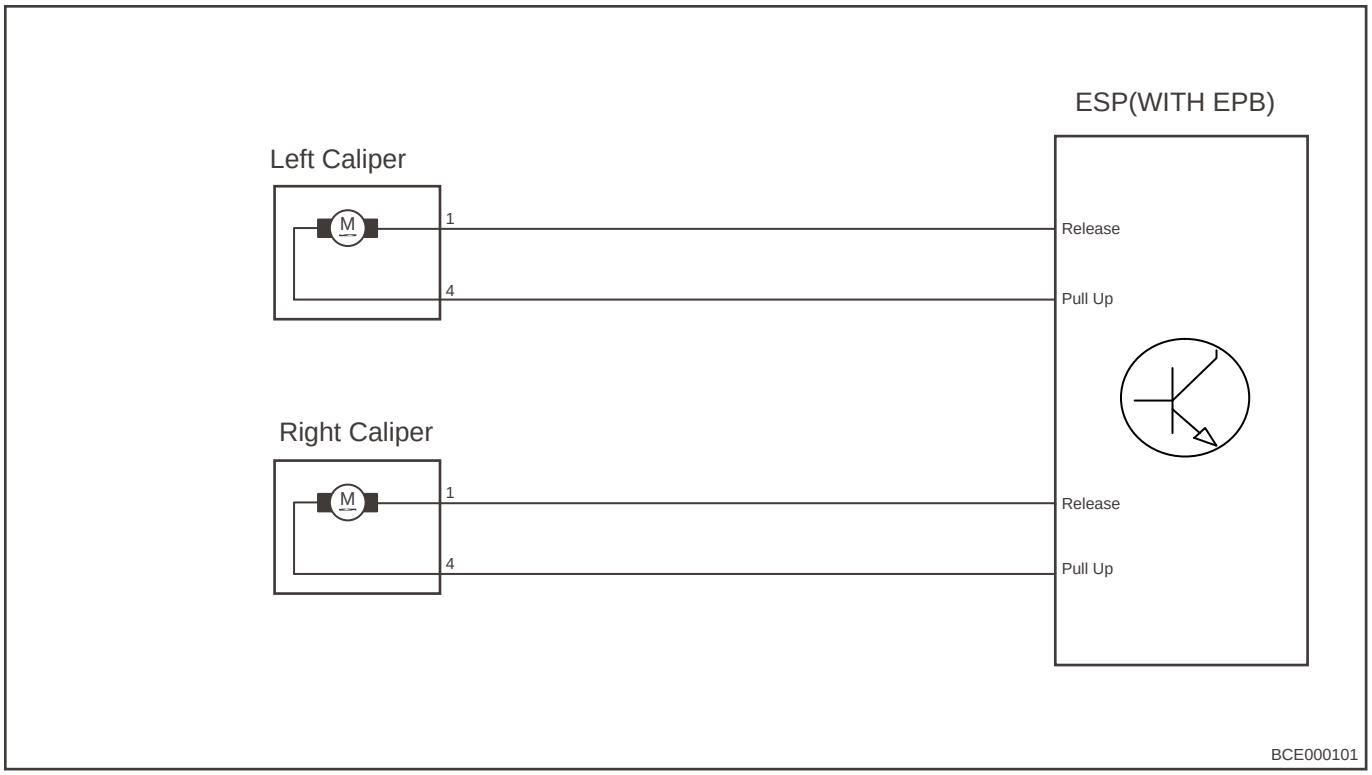
2	Confirm DTCs again

(a) Clear DTCs.
(b) Start the vehicle.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

NG → **Replace ESP (integrated EPB)**

DTC	C1823-00	APB Motor Enable Line Violation
DTC	C1837-00	APB_GPIO_OverTemperature



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

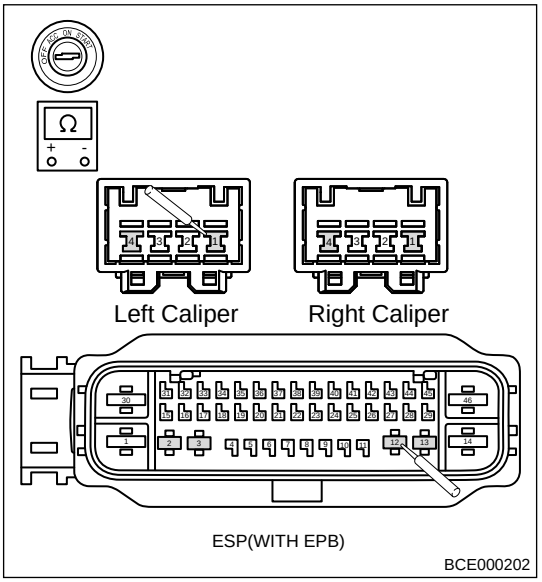
Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check related wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the left/right brake caliper connector.
(d) Disconnect the EPB control module assembly connector.
(e) Check if related wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loose, broken, bent or corrosive.

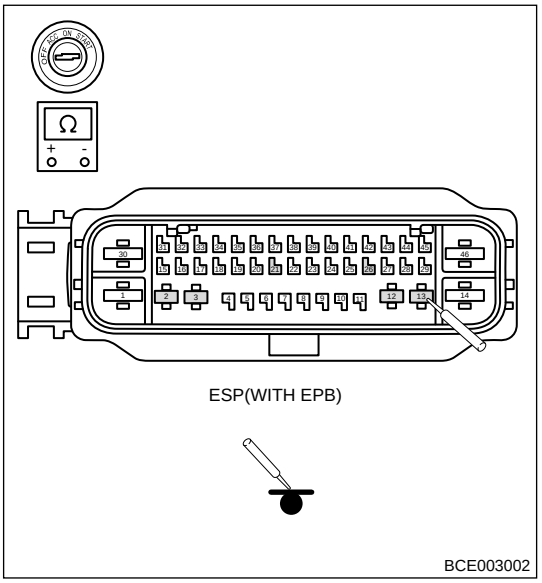
(g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



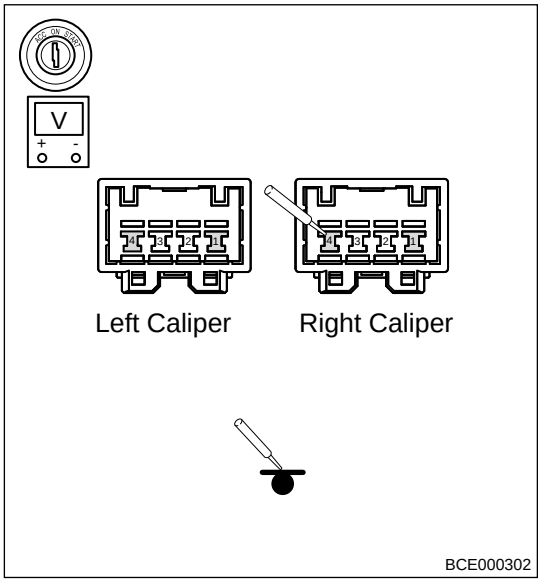
(h) Check if the resistance between left/right brake caliper to ESP (integrated EPB) wire harness and body ground is normal.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ



(i) Connect the negative battery cable.
(j) Turn ENGINE START STOP switch to ON.
(k) Check the voltage between ESP (integrated EPB) and body ground.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - Body ground	Always	0 V
Rear left brake caliper (4) - Body ground	Always	0 V
Rear right brake caliper (1) - Body ground	Always	0 V
Rear right brake caliper (4) - Body ground	Always	0 V



NG → **Repair or replace related wire harness and connector**

OK

2	**Perform left/right brake caliper active test**

(a) Perform rear left/right brake caliper active tester.

NG → **Replace left/right brake caliper**

OK

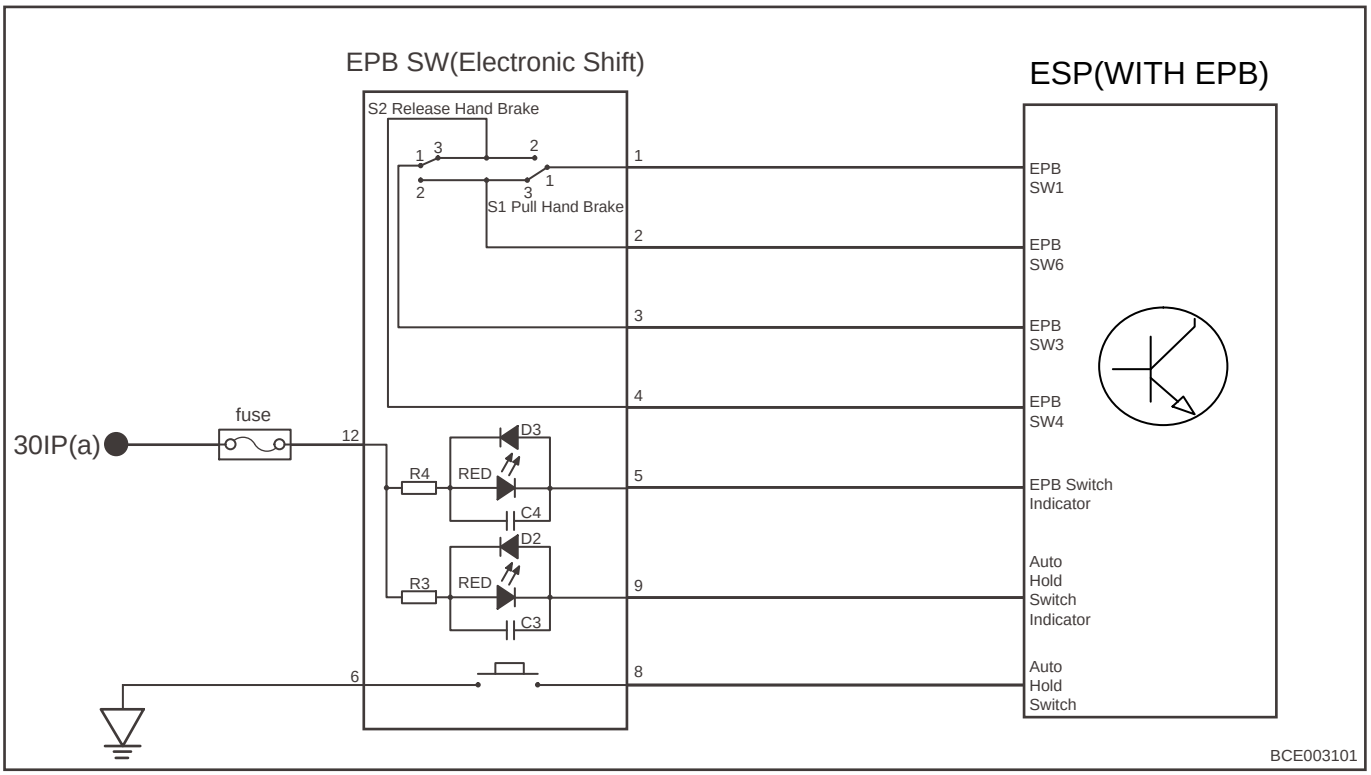
3	**Confirm DTCs again**

(a) Clear DTCs.
(b) Start the vehicle.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

NG → **Replace ESP (integrated EPB)**

DTC	**C1806-01**	**EPB Button Line Failure-General Electrical Failure**
DTC	**C1806-16**	**EPB Button Under Voltage**
DTC	**C1806-04**	**EPB Button Always Pushed or Pulled-System Internal Failure**
DTC	**C156B-00**	**EPB_SupplyFault-System Internal Failure**
DTC	**C0089-04**	**TCS Disable Switch(ESP Only)**
DTC	**C104D-04**	**AVH Button Switch Failure**



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

(a) Standard voltage: Not less than 12V.

NG → **Repair charging system/replace battery**

OK

2	**Check EPB switch**

(a) Turn ENGINE START STOP switch to OFF.

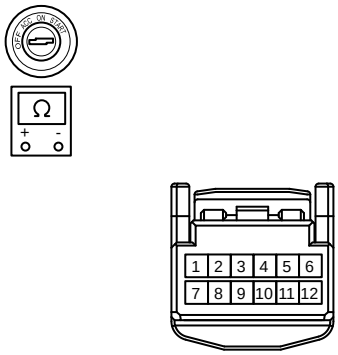
(b) Disconnect the negative battery cable.

(c) Disconnect the EPB switch connector.

(d) Check if EPB switch is stuck or pushed in by other objects.

(e) Check for switch continuity when EPB switch is not pressed.

Multimeter Connection	Condition	Specified Condition
EPB switch (1) - EPB switch (2)	Always	Less than 1 Ω
EPB switch (3) - EPB switch (4)	Always	Less than 1 Ω

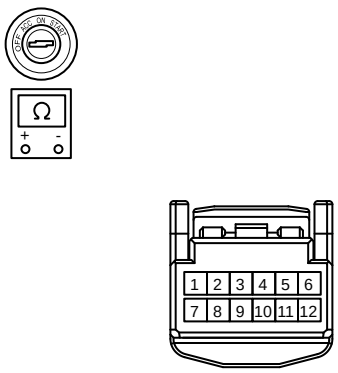


EPB SW(Electronic Shift)

BCE003202

(f) Check for switch continuity when EPB switch is pressed.

Multimeter Connection	Condition	Specified Condition
EPB switch (1) - EPB switch (3)	Always	Less than 1 Ω

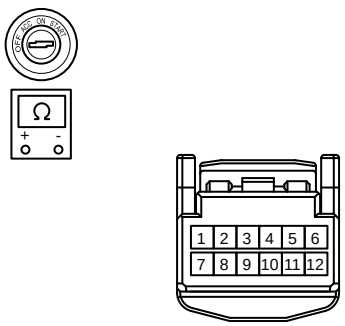


EPB SW(Electronic Shift)

BCE003302

(g) Check for switch continuity when EPB switch is pulled.

Multimeter Connection	Condition	Specified Condition
EPB switch (2) - EPB switch (4)	Always	Less than 1 Ω



EPB SW(Electronic Shift)

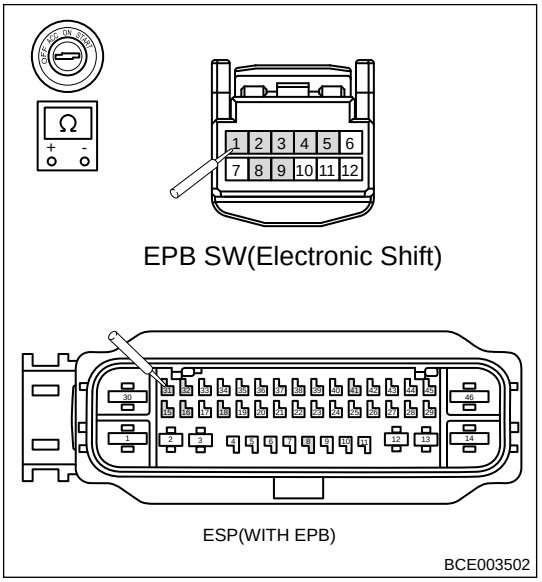
BCE003402

NG → **Replace EPB switch**

OK

3	**Check related wire harness and connector**

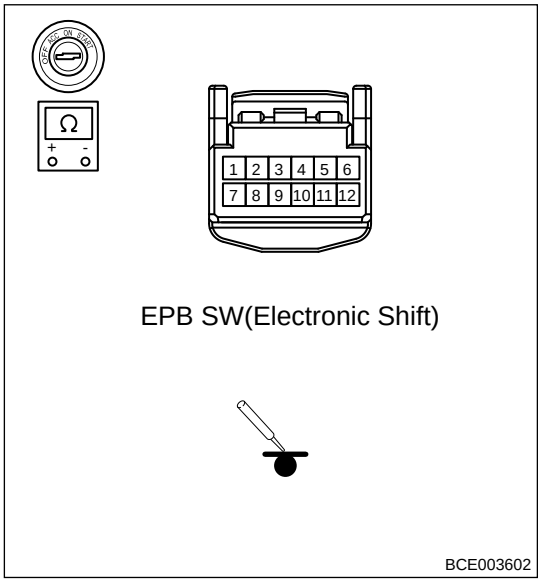
(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the EPB switch connector.
(d) Disconnect the EPB control module assembly.
(e) Check if related wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loose, broken, bent or corrosive.
(g) Check for continuity between wire harness of EPB switch and ESP (integrated EPB).



Multimeter Connection	Condition	Specified Condition
EPB switch (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
EPB switch (2) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
EPB switch (3) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
EPB switch (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
EPB switch (5) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
EPB switch (9) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
EPB switch (8) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω

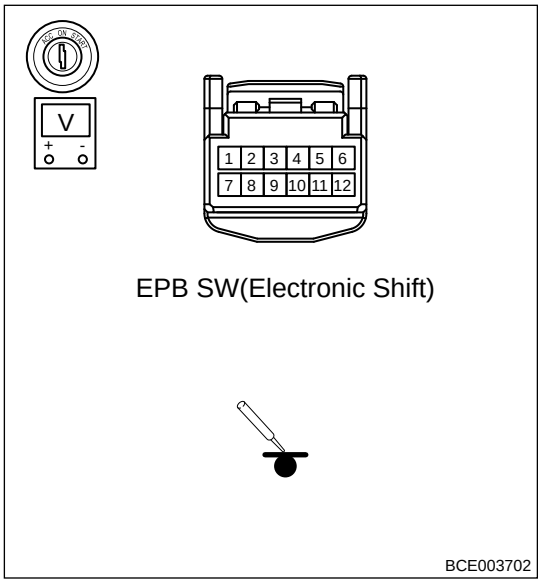
(h) Check the resistance between EPB switch and body ground.

Multimeter Connection	Condition	Specified Condition
EPB switch (6) - Body ground	Always	Less than 1 Ω



(i) Check the voltage between EPB switch and body ground.

Multimeter Connection	Condition	Specified Condition
EPB switch (12) - Body ground	Always	5 V



NG → **Repair/replace related wire harness and connector**

OK

4	**Confirm DTCs again**

(a) Clear DTCs.

(b) Start the vehicle.

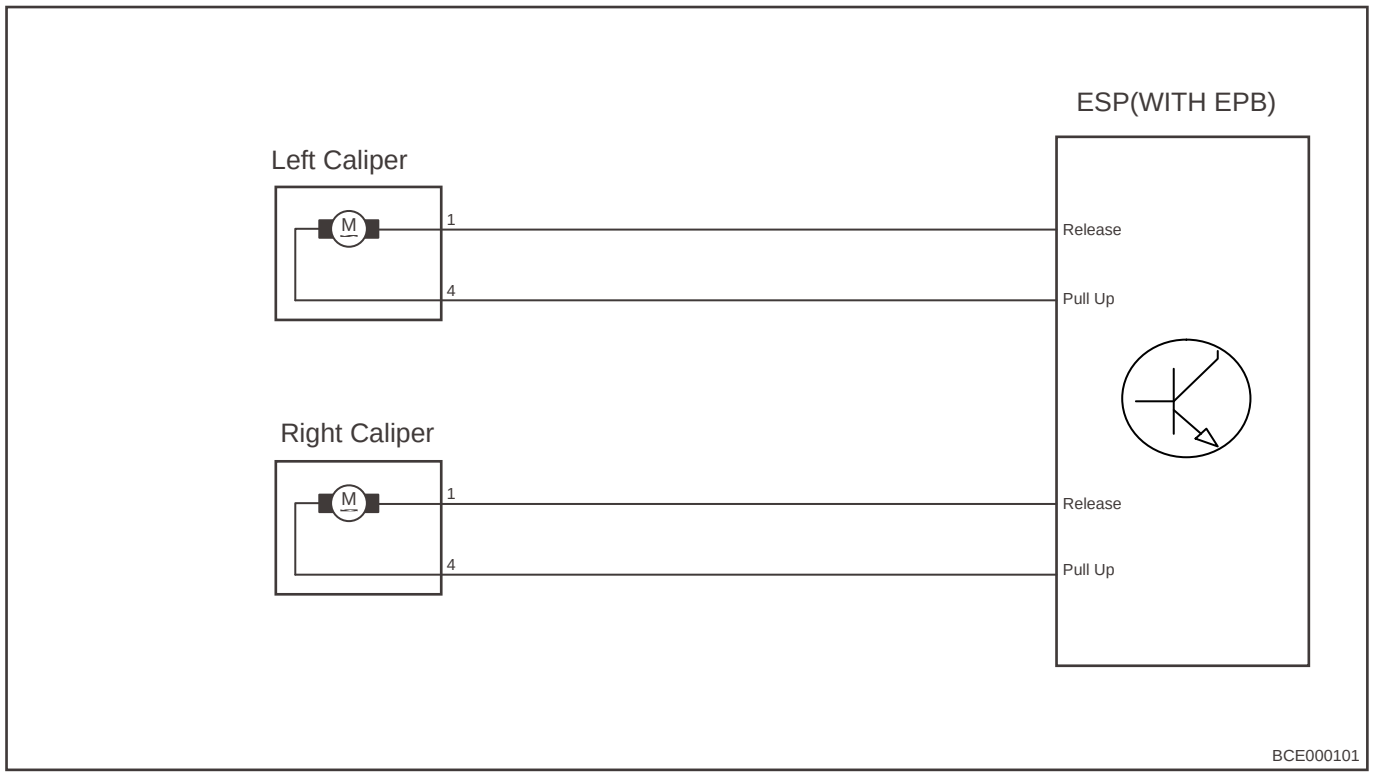
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.

(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

NG	**Replace ESP (integrated EPB)**

DTC	**C1830-00**	**EPB (Electronic Parking Brake) Left Actuator CAT**
DTC	**C1831-00**	**EPB (Electronic Parking Brake) Right Actuator CAT**



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

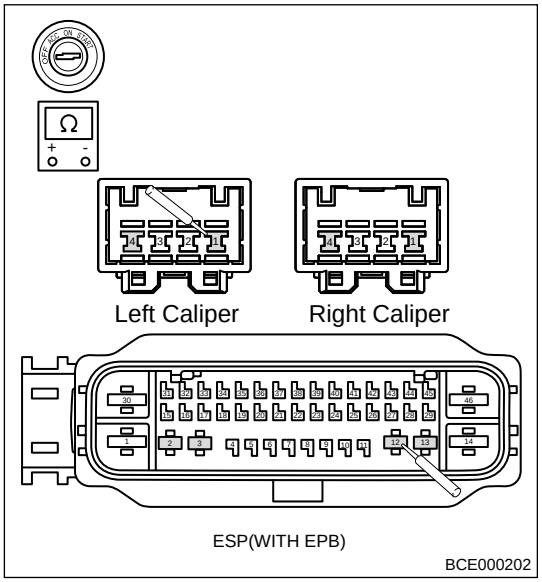
Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check related wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the left/right brake caliper connector.
(d) Disconnect the EPB control module assembly connector.
(e) Check if related wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loose, broken, bent or corrosive.

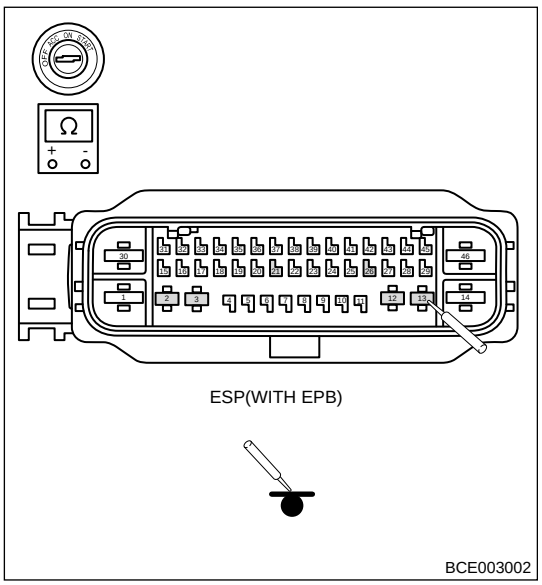
(g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



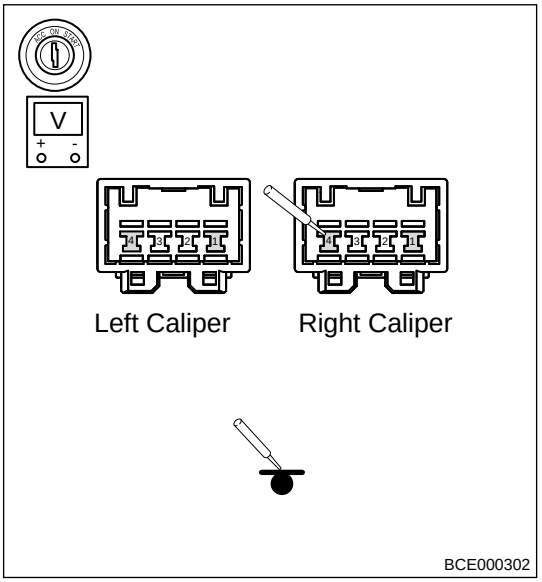
(h) Check the resistance between left/right brake caliper to ESP (integrated EPB) wire harness and body ground.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ



(i) Connect the negative battery cable.
(j) Turn ENGINE START STOP switch to ON.
(k) Check the voltage between ESP (integrated EPB) to ESP (integrated EPB) wire harness and body ground.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - Body ground	Always	0 V
Rear left brake caliper (4) - Body ground	Always	0 V
Rear right brake caliper (1) - Body ground	Always	0 V
Rear right brake caliper (4) - Body ground	Always	0 V



NG → **Repair or replace related wire harness and connector**

OK

2	**Perform left/right brake caliper active test**

(a) Perform rear left/right brake caliper active tester.

NG → **Replace left/right brake caliper**

OK

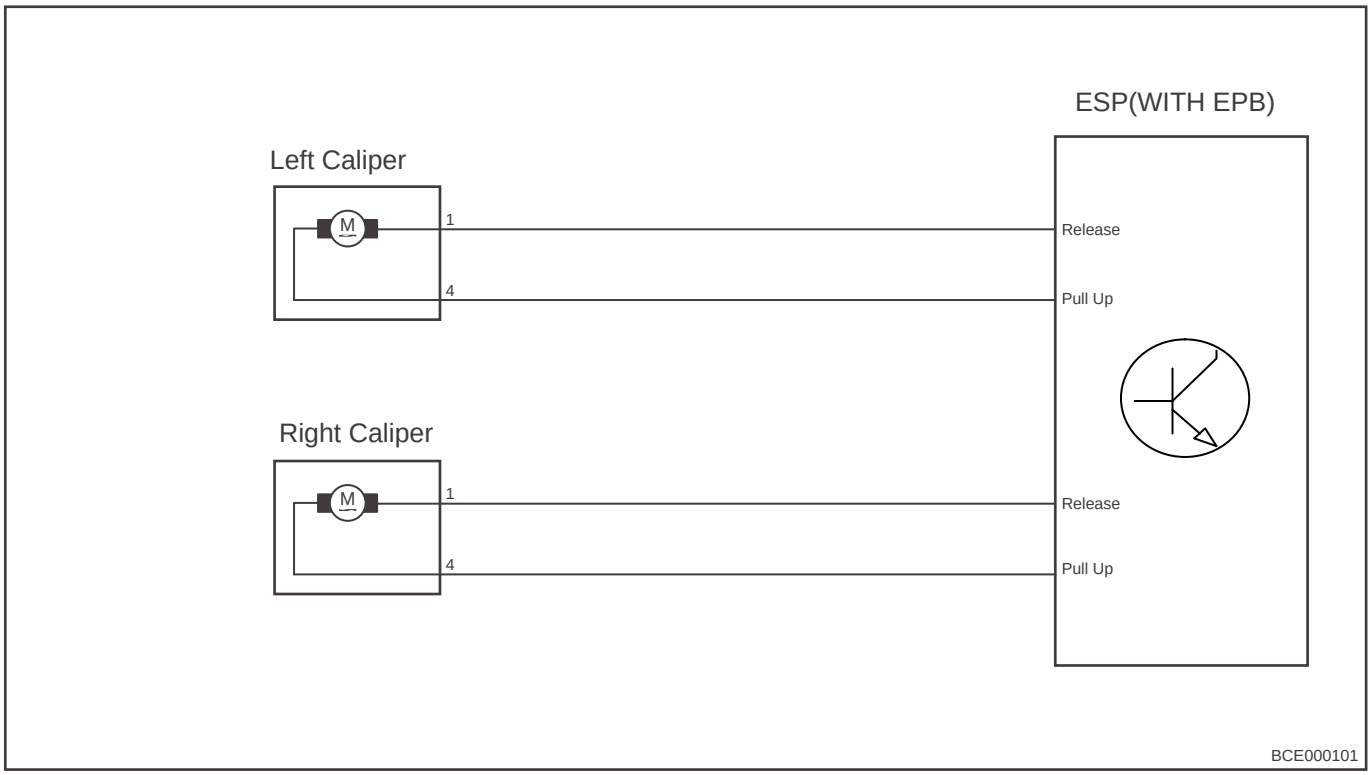
3	**Confirm DTCs again**

(a) Clear DTCs.
(b) Start the vehicle.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

NG → **Replace ESP (integrated EPB)**

DTC	**C1800-97**	**Left Actuator - Action Limited**
DTC	**C1801-97**	**Right Actuator - Action Limited**



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

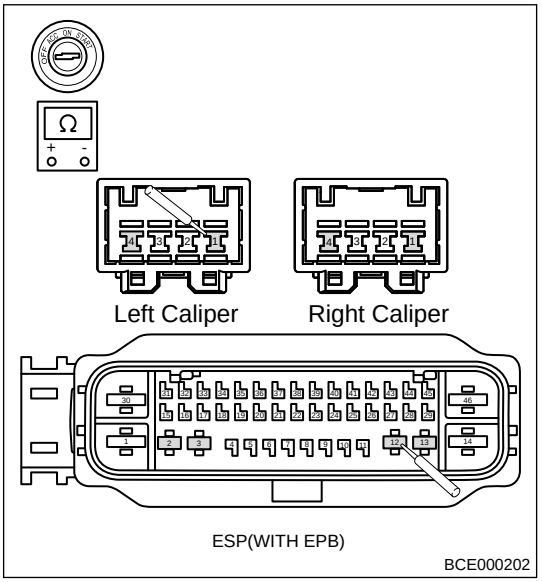
Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check related wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the left/right brake caliper connector.
(d) Disconnect the EPB control module assembly connector.
(e) Check if related wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loose, broken, bent or corrosive.

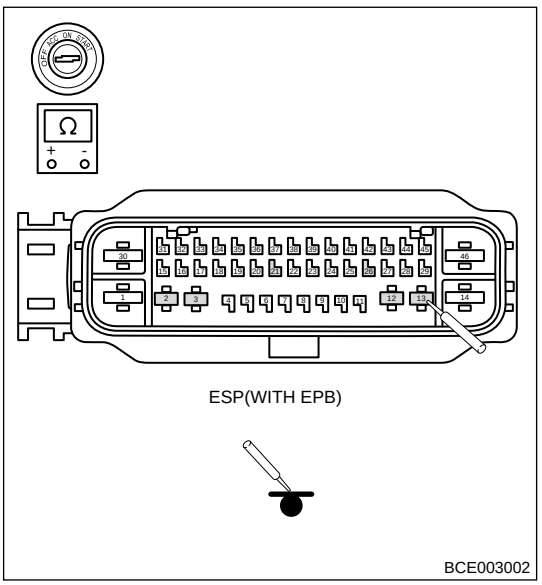
(g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



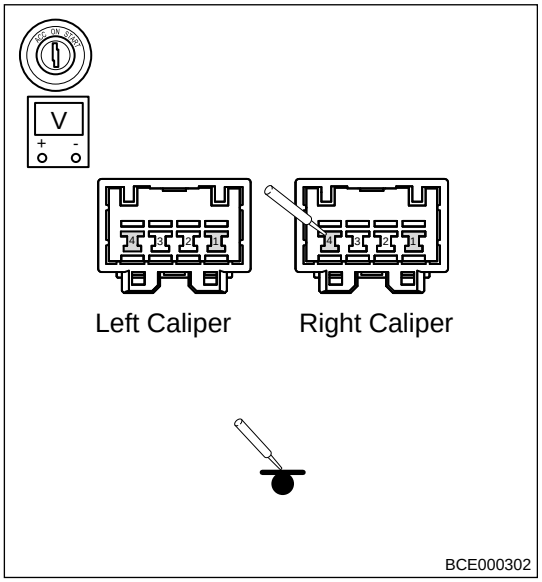
(h) Check the resistance between left/right brake caliper to ESP (integrated EPB) wire harness and body ground.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ



(i) Connect the negative battery cable.
(j) Turn ENGINE START STOP switch to ON.
(k) Check the voltage between ESP (integrated EPB) to ESP (integrated EPB) wire harness and body ground.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - Body ground	Always	0 V
Rear left brake caliper (4) - Body ground	Always	0 V
Rear right brake caliper (1) - Body ground	Always	0 V
Rear right brake caliper (4) - Body ground	Always	0 V



NG → **Repair or replace related wire harness and connector**

OK

2	**Perform left/right brake caliper active test**

(a) Perform rear left/right brake caliper active tester.

NG → **Replace left/right brake caliper**

OK

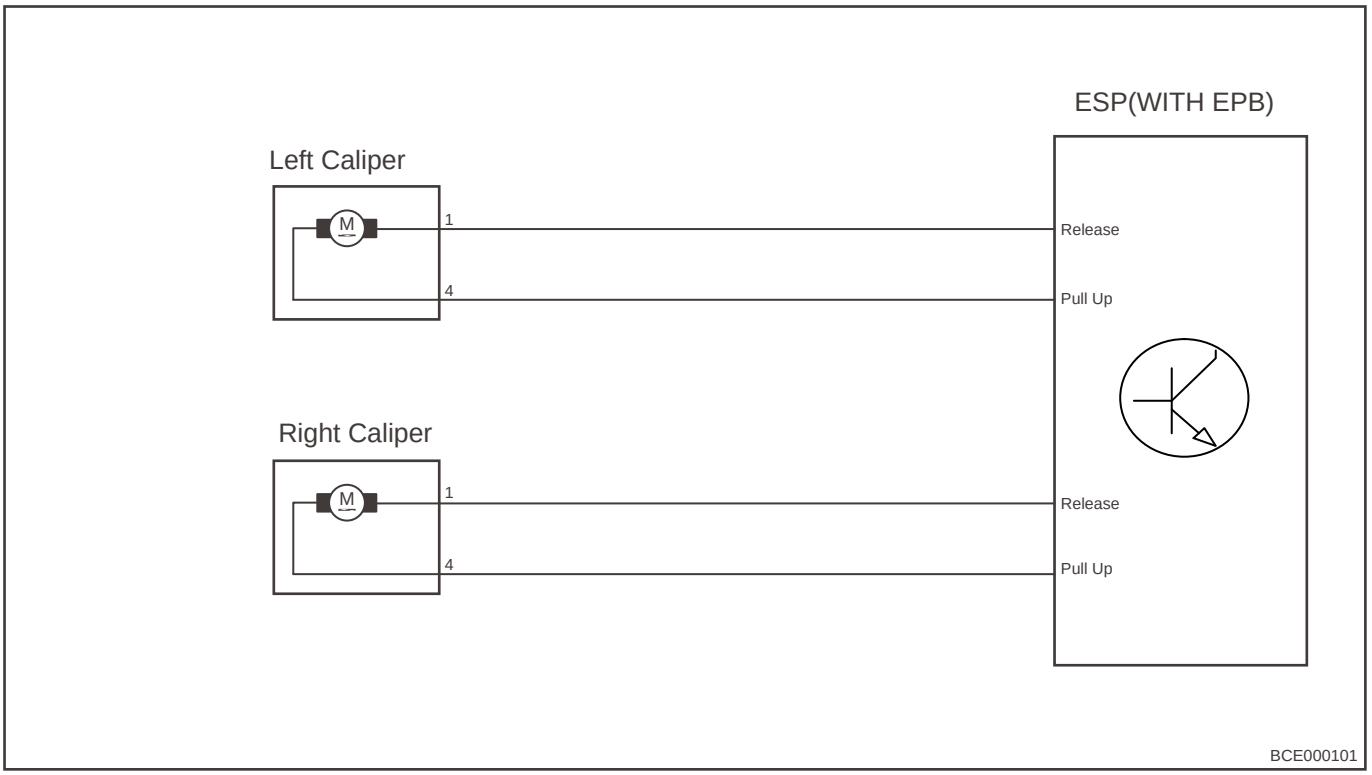
3	**Confirm DTCs again**

(a) Clear DTCs.
(b) Start the vehicle.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

NG → **Replace ESP (integrated EPB)**

DTC	**C1832-00**	**EPB Left Actuator Unintended Run-No Sub Type Information**
DTC	**C1833-00**	**EPB Right Actuator Unintended Run-No Sub Type Information**



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check related wire harness and connector**

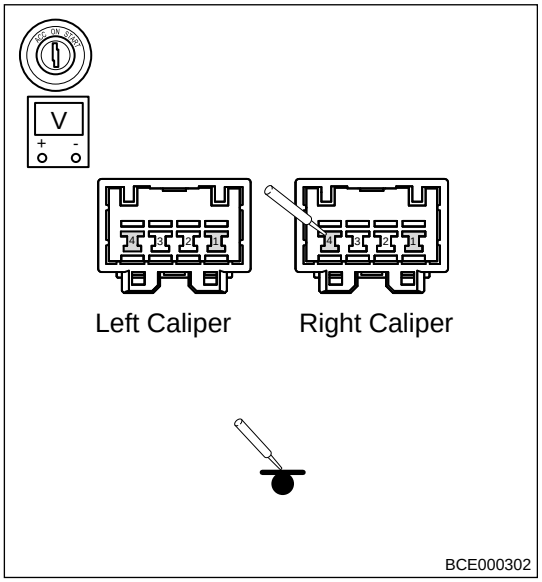
(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the left/right brake caliper connector.
(d) Disconnect the EPB control module assembly connector.
(e) Check if related wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loose, broken, bent or corrosive.

(g) Connect the negative battery cable.

(h) Turn ENGINE START STOP switch to ON.

(i) Check the voltage between ESP (integrated EPB) and body ground.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - Body ground	Always	0 V
Rear left brake caliper (4) - Body ground	Always	0 V
Rear right brake caliper (1) - Body ground	Always	0 V
Rear right brake caliper (4) - Body ground	Always	0 V



NG → **Repair or replace related wire harness and connector**

OK

2	**Confirm DTCs again**

(a) Clear DTCs.

(b) Start the vehicle.

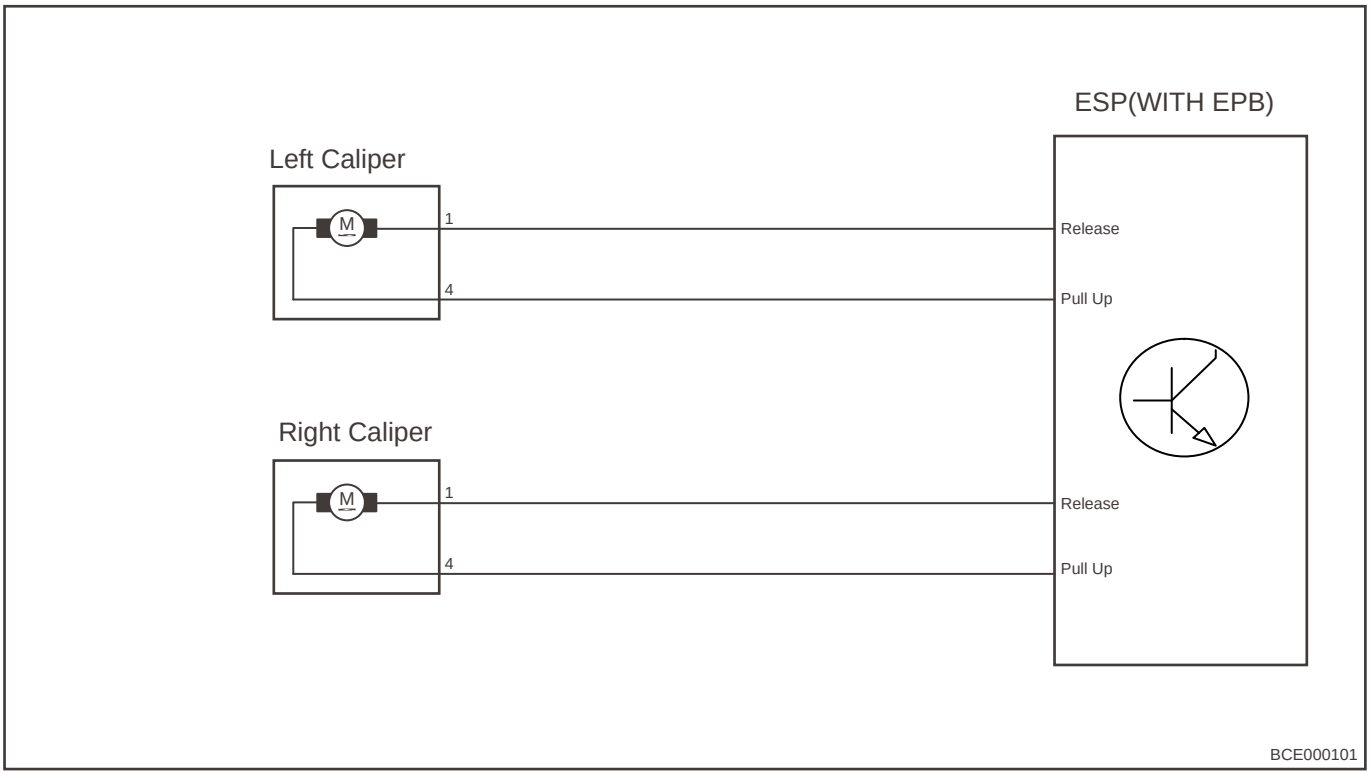
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.

(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

NG → **Replace ESP (integrated EPB)**

DTC	**C1800-73**	**Left Actuator - Apply Failed-Actuator Stuck Closed**
DTC	**C1800-74**	**Left Actuator - Actuator Slipping (Apply Time Out)**
DTC	**C1801-73**	**Right Actuator - Apply Failed-Actuator Stuck Closed**
DTC	**C1801-74**	**Right Actuator - Actuator Slipping (Apply TimeOut)-Actuator Slipping**



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

(a) Standard voltage: Not less than 12V.

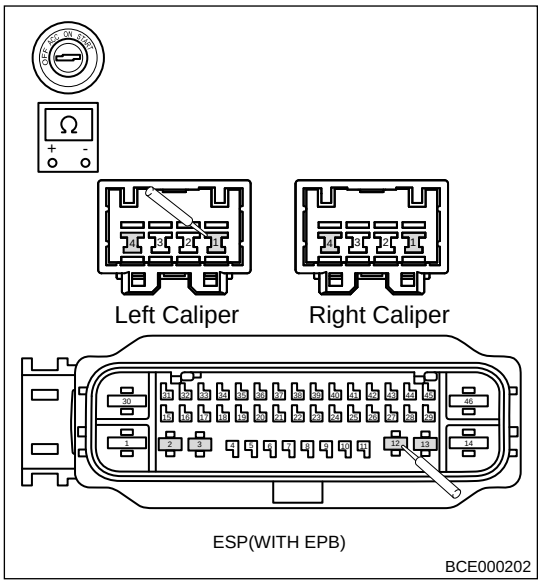
NG → **Repair charging system/replace battery**

OK ↓

2	**Check related wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the left/right brake caliper connector.
(d) Disconnect the EPB control module assembly connector.
(e) Check if related wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loose, broken, bent or corrosive.
(g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



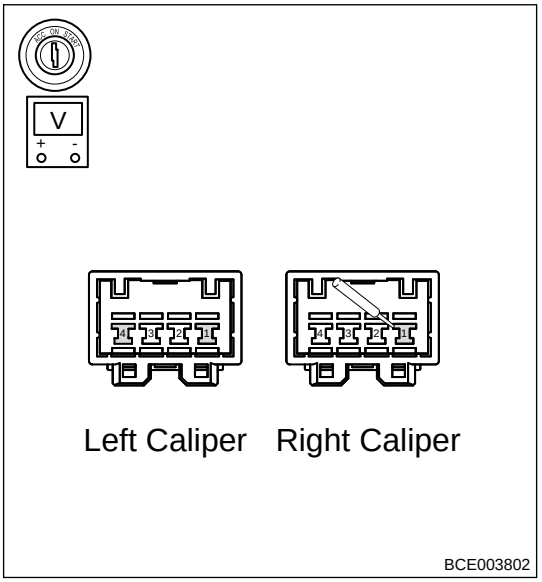
NG → **Repair or replace related wire harness and connector**

OK

3	**Check left/right brake caliper**

(a) Check internal resistance of left/right brake caliper motor.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - Left brake caliper (4)	Always	1.1 - 1.6 Ω
Right brake caliper (1) - right brake caliper (4)	Always	1.1 - 1.6 Ω



NG → **Replace left/right brake caliper**

OK →

4	**Confirm DTCs again**

(a) Clear DTCs.

(b) Start the vehicle.

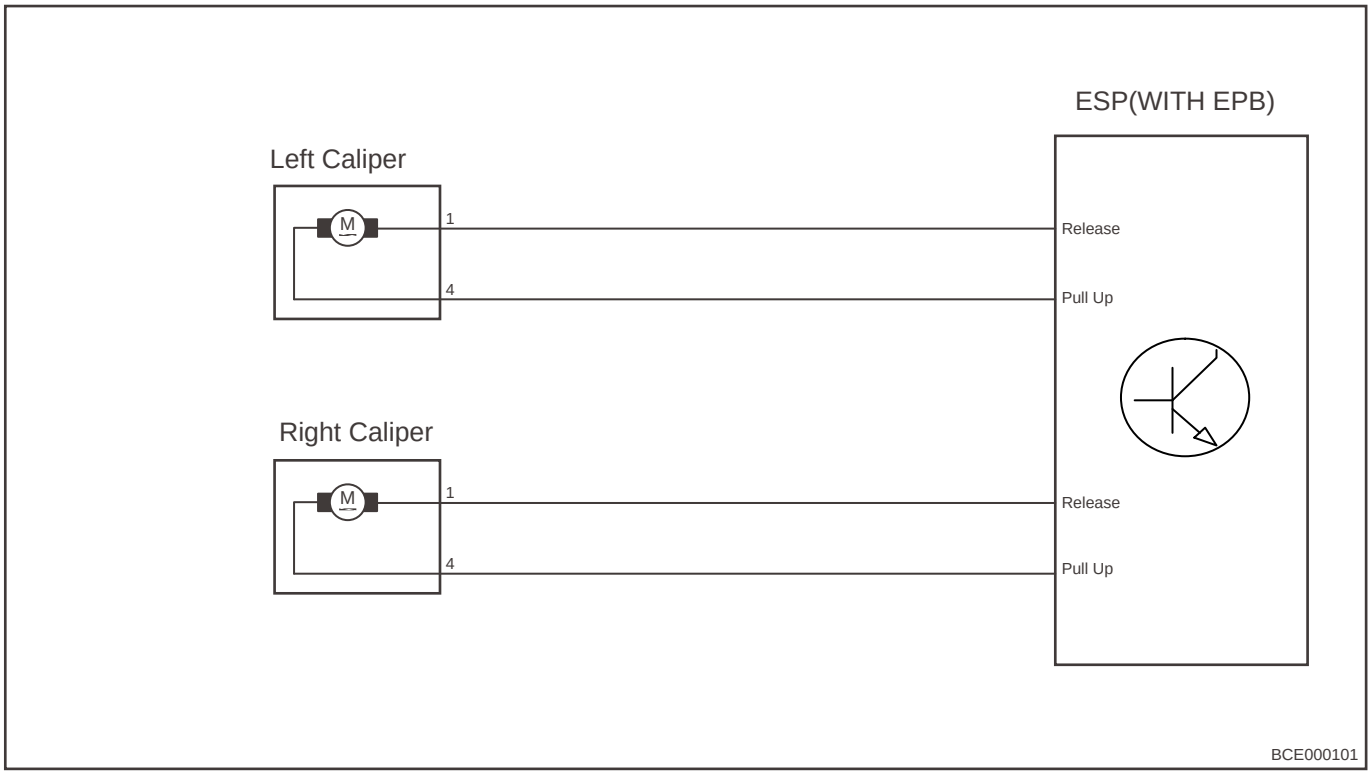
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.

(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

NG → **Replace ESP (integrated EPB)**

DTC	**C1800-72**	**Left Actuator - Release Failed-Actuator Stuck Open**
DTC	**C1801-72**	**Right Actuator -Release Failed-Actuator Stuck Open**



DTC Confirmation Procedure

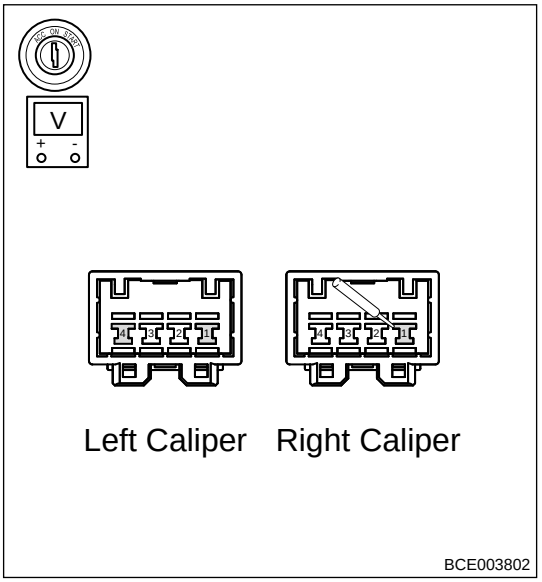
- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check left/right brake caliper**

(a) Check internal resistance of left/right brake caliper motor.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - Left brake caliper (4)	Always	1.1 - 1.6 Ω
Right brake caliper (1) - right brake caliper (4)	Always	1.1 - 1.6 Ω



NG → **Replace left/right brake caliper**

OK

2	**Confirm DTCs again**

(a) Clear DTCs.

(b) Start the vehicle.

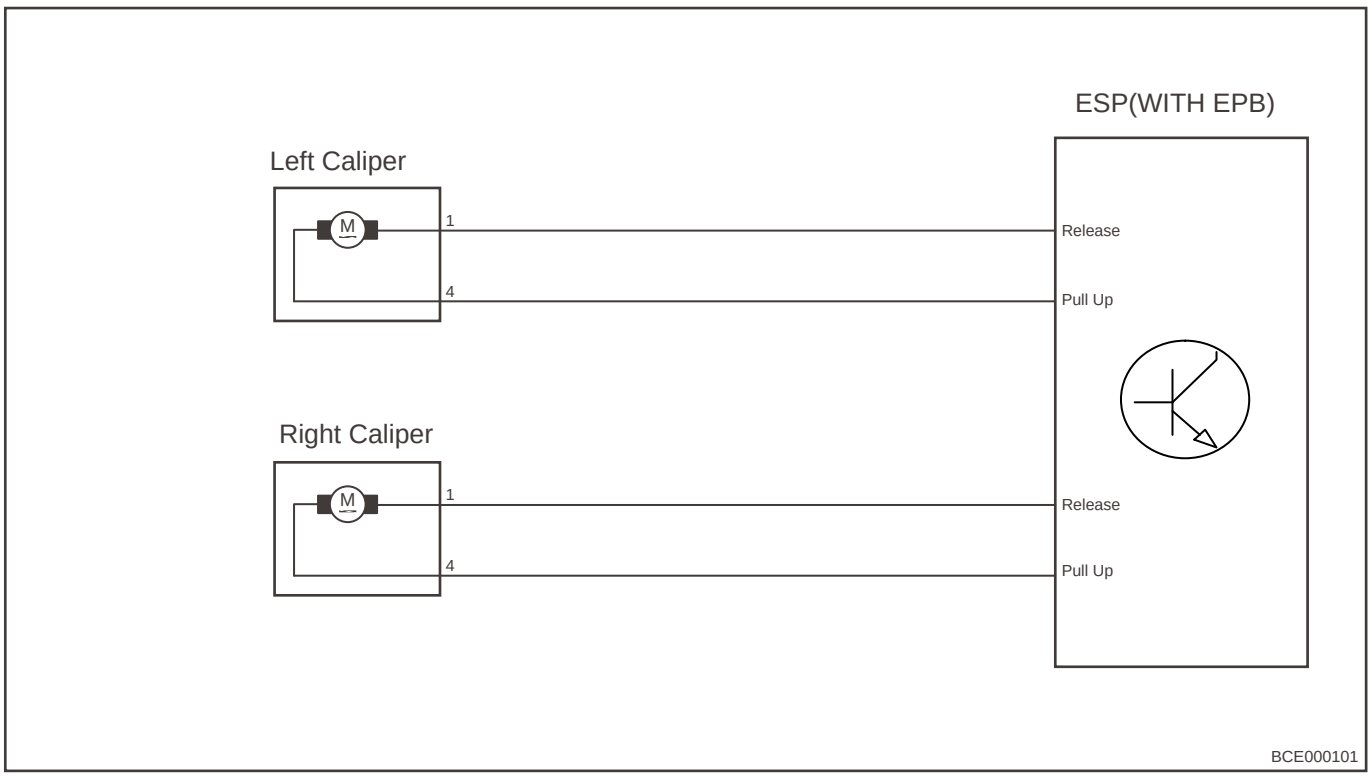
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.

(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

NG → **Replace ESP (integrated EPB)**

DTC	**C1800-93**	**Left Actuator - No Motor Start Detected-No Operation**
DTC	**C1801-93**	**Right Actuator - No Motor Start Detected-No Operation**



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

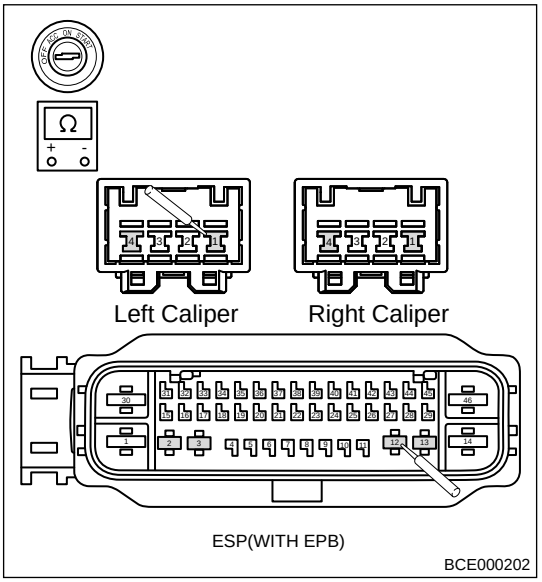
Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check related wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the left/right brake caliper connector.
(d) Disconnect the EPB control module assembly connector.
(e) Check if related wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loose, broken, bent or corrosive.

(g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



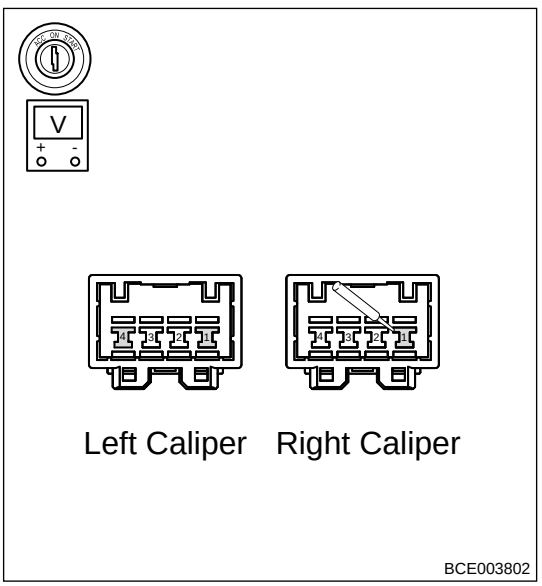
NG → **Repair or replace related wire harness and connector**

OK →

2	**Check left/right brake caliper**

(a) Check internal resistance of left/right brake caliper motor.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - Left brake caliper (4)	Always	1.1 - 1.6 Ω
Right brake caliper (1) - right brake caliper (4)	Always	1.1 - 1.6 Ω



NG → **Replace left/right brake caliper**

OK

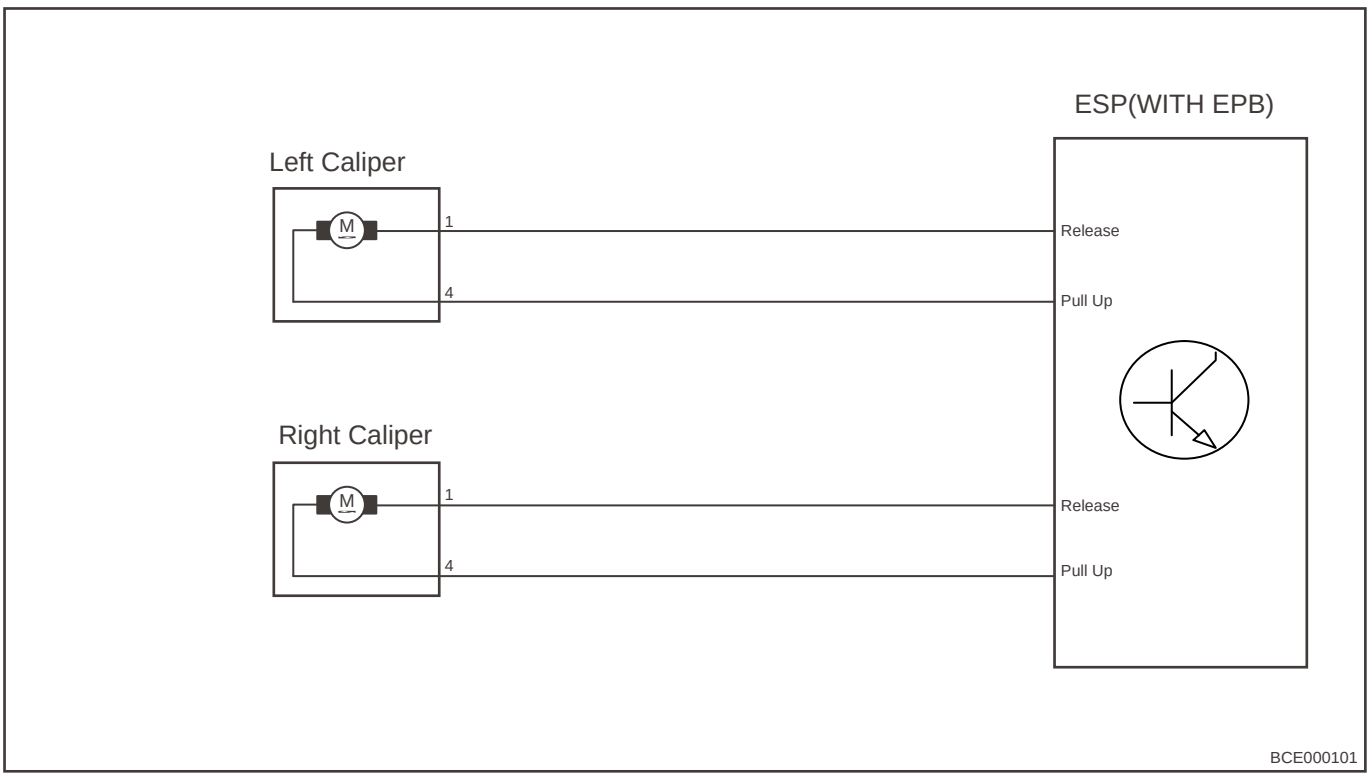
3	**Confirm DTCs again**

(a) Clear DTCs.
(b) Start the vehicle.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

NG → **Replace ESP (integrated EPB)**

DTC	**C1800-19**	**Left Actuator - Circuit Current Above Threshold-Circuit Current Above Threshold**
DTC	**C1808-11**	**Circuit Short To Ground of Left Rear Caliper**
DTC	**C1808-12**	**Circuit Short To Battery of Left Rear Caliper**
DTC	**C1808-13**	**Circuit Open of Left Rear Caliper - Circuit Open**
DTC	**C1810-01**	**Short in Left Rear Caliper Positive and Negative**
DTC	**C1801-19**	**Right Actuator - Circuit Current Above Threshold-Circuit Current Above Threshold**
DTC	**C1815-11**	**Circuit Short To Ground of Right Rear Caliper-Circuit Short To Ground**
DTC	**C1815-12**	**Circuit Short To Battery of Right Rear Caliper-Circuit Short To Battery**
DTC	**C1815-13**	**Circuit Open of Right Rear caliper-Circuit Open**
DTC	**C1817-01**	**Short in Right Rear Caliper Positive and Negative**



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check related wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect the left/right brake caliper connector.

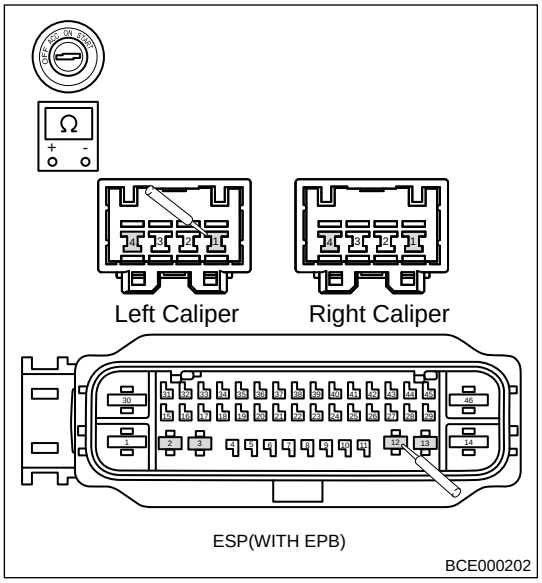
(d) Disconnect the EPB control module assembly connector.

(e) Check if related wire harnesses are worn, pinched or broken.

(f) Check if related connector terminals are loose, broken, bent or corrosive.

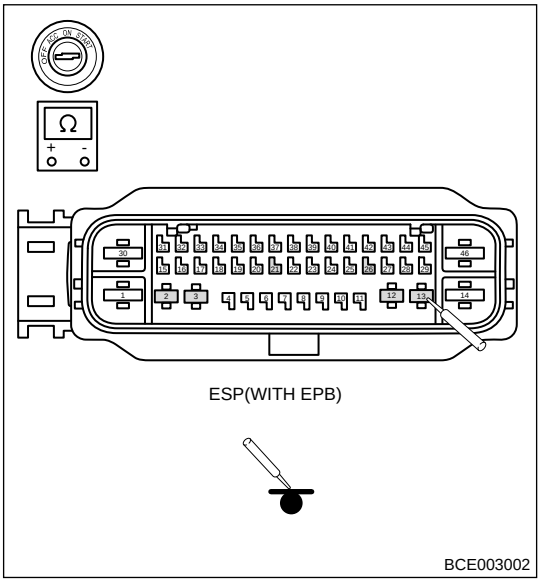
(g) Check for continuity between left/right brake caliper to ESP (integrated EPB) wire harness and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



(h) Check the resistance between left/right brake caliper to ESP (integrated EPB) wire harness and body ground.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ



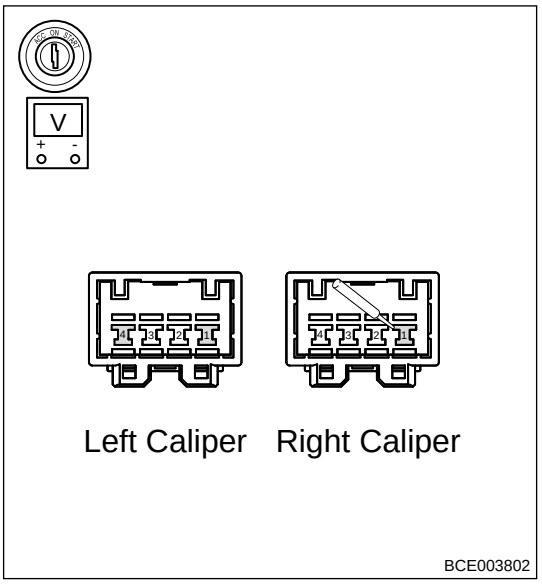
NG → **Repair or replace related wire harness and connector**

OK

2	**Check left/right brake caliper**

(a) Check internal resistance of left/right brake caliper motor.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - Left brake caliper (4)	Always	1.1 - 1.6 Ω
Right brake caliper (1) - right brake caliper (4)	Always	1.1 - 1.6 Ω



NG → **Replace left/right brake caliper**

OK

3	**Confirm DTCs again**

(a) Clear DTCs.

(b) Start the vehicle.

(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.

(d) Check if the same DTCs occur.

OK	**Confirm that system operates normally**
NG	**Replace ESP (integrated EPB)**

DTC	**C1800-92**	**Left Actuator - High Mechanical Resistance-Performance or Incorrect Operation**
DTC	**C1801-92**	**Right Actuator - High Mechanical Resistance-Performance or Incorrect Operation**

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Perform left/right brake caliper active test**

(a) Perform rear left/right brake caliper active tester.

NG → **Replace left/right brake caliper**

OK ↓

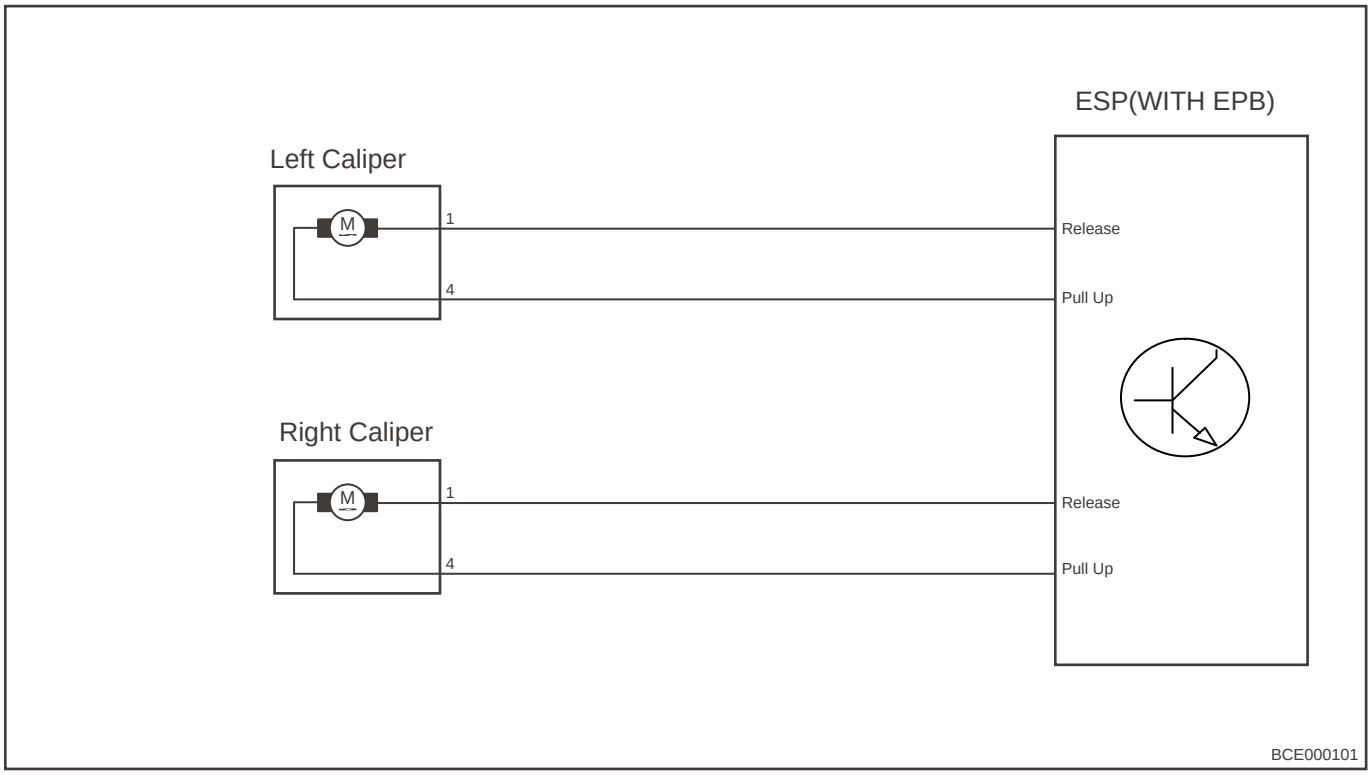
2	**Confirm DTCs again**

(a) Clear DTCs.
(b) Start the vehicle.
(c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.
(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

OK ↓

DTC	**C1800-91**	**Left Actuator - Wrong Operating Characteristics Detect-Parametric**
DTC	**C1801-91**	**Right Actuator - Wrong Operating Characteristics Detect-Parametric**



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

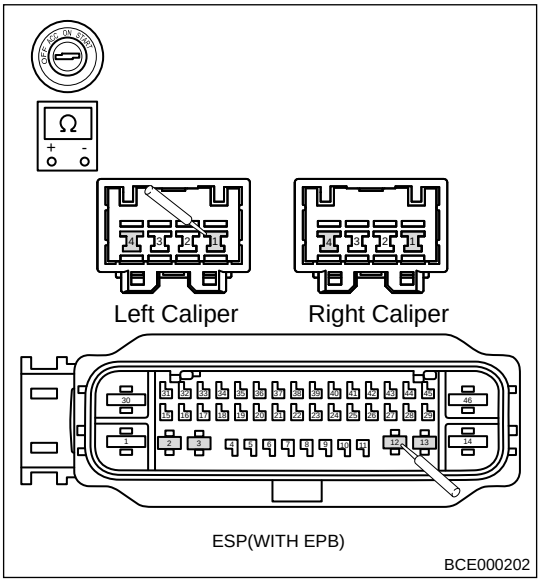
Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check related wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the left/right brake caliper connector.
(d) Disconnect the EPB control module assembly connector.
(e) Check if related wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loose, broken, bent or corrosive.

(g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



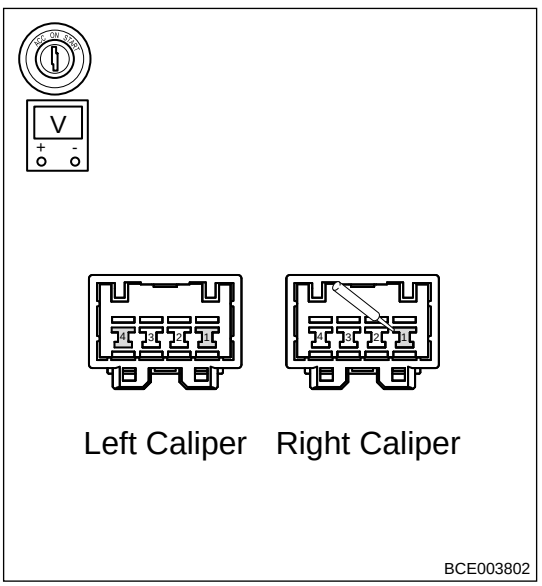
NG → **Repair or replace related wire harness and connector**

OK →

2	**Check left/right brake caliper**

(a) Check internal resistance of left/right brake caliper motor.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - Left brake caliper (4)	Always	1.1 - 1.6 Ω
Right brake caliper (1) - right brake caliper (4)	Always	1.1 - 1.6 Ω



NG → **Replace left/right brake caliper**

OK

3	**Confirm DTCs again**

(a) Clear DTCs.

(b) Start the vehicle.

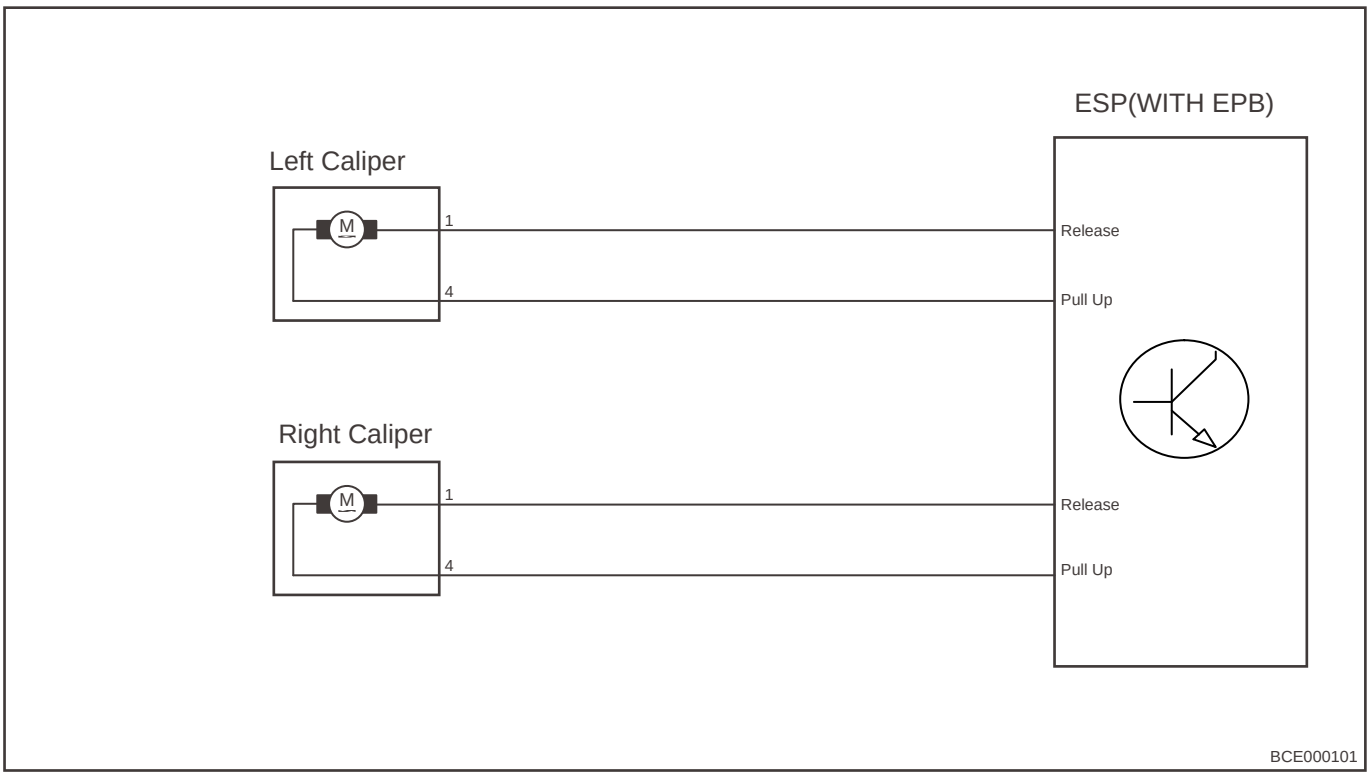
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.

(d) Check if the same DTCs occur.

OK → **Confirm that system operates normally**

NG → **Replace ESP (integrated EPB)**

DTC	**C1824-01**	**EPB Left Actuator Electrical Failure-General Electrical Failure**
DTC	**C1822-00**	**EPB Left Actuator Failure**
DTC	**C1824-1E**	**EPB Left Actuator Shunt On Line or ECU-Circuit Resistance Out of Range**
DTC	**C1822-FC**	**EPB Left Motor Line Failure**
DTC	**C1824-96**	**EPB Intern Left HW Failure**
DTC	**C1825-01**	**EPB Right Actuator Electrical Failure-General Electrical Failure**
DTC	**C1821-00**	**EPB Right Actuator Failure**
DTC	**C1825-1E**	**EPB Right Actuator Shunt On Line or ECU-Circuit Resistance Out of Range**
DTC	**C1821-FC**	**EPB Right Motor Line Failure**
DTC	**C1825-96**	**EPB Intern Right HW Failure**
DTC	**C1834-1D**	**Short in Left Rear Caliper Positive and Negative**
DTC	**C1834-FC**	**EPB Left Motor Transistors Error**
DTC	**C1835-1D**	**Short in Right Rear Caliper Positive and Negative**
DTC	**C1835-FC**	**EPB Right Motor Transistors Error**



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Perform left/right brake caliper active test**

(a) Perform rear left/right brake caliper active tester.

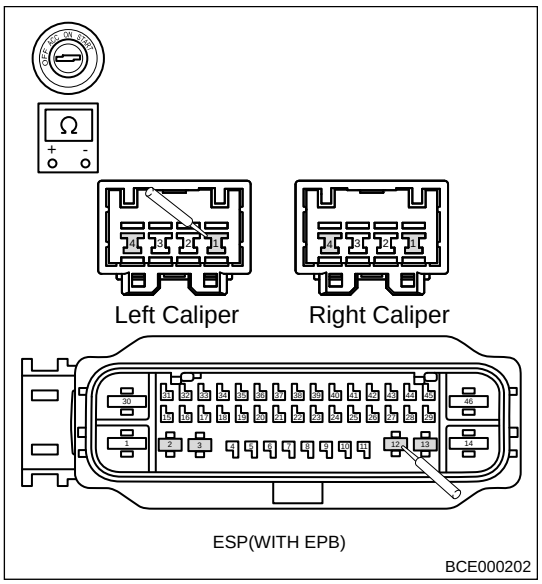
NG → **Replace left/right brake caliper**

OK ↓

2	**Check related wire harness and connector**

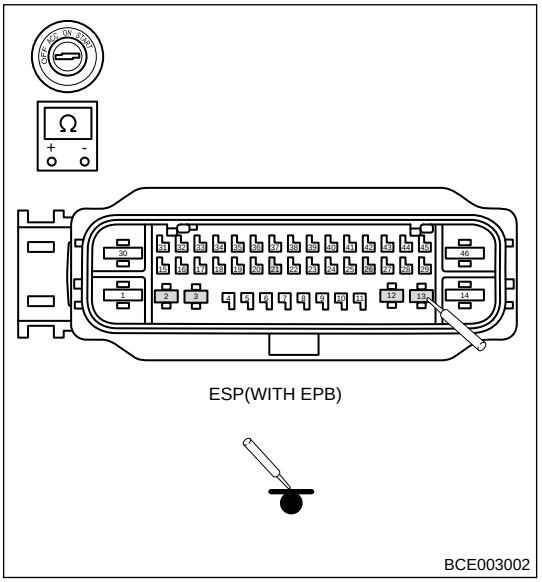
(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the left/right brake caliper connector.
(d) Disconnect the EPB control module assembly connector.
(e) Check if related wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loose, broken, bent or corrosive.
(g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



(h) Check the resistance between left/right brake caliper to ESP (integrated EPB) wire harness and body ground.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ

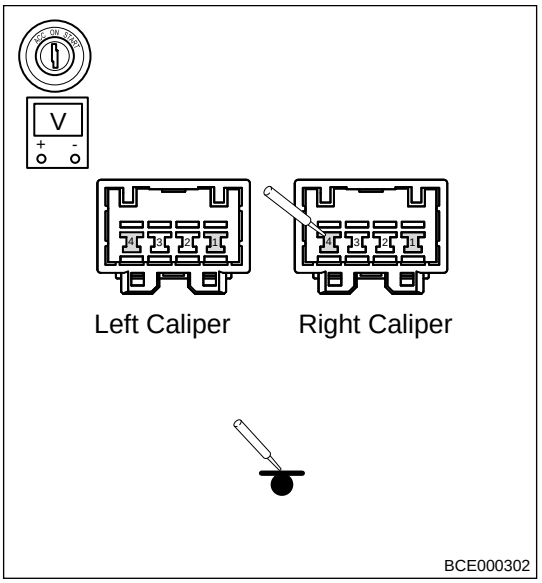


(i) Connect the negative battery cable.

(j) Turn ENGINE START STOP switch to ON.

(k) Check the voltage between ESP (integrated EPB) to ESP (integrated EPB) wire harness between and body ground.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - Body ground	Always	0 V
Rear left brake caliper (4) - Body ground	Always	0 V
Rear right brake caliper (1) - Body ground	Always	0 V
Rear right brake caliper (4) - Body ground	Always	0 V



NG → **Repair or replace related wire harness and connector**

OK

3	**Confirm DTCs again**

(a) Clear DTCs.

(b) Start the vehicle.

(c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.

(d) Check if the same DTCs occur.

OK	**Confirm that system operates normally**
NG	**Replace ESP (integrated EPB)**

DTC	U0005-00	High Speed CAN Communication Bus (+) High
DTC	U0007-00	High Speed CAN Communication Bus (-) Low
DTC	U0073-88	Control Module Communication Bus Off
DTC	U0100-87	Lost Communication With ECM (ESP Only)
DTC	U0101-87	Lost Communication With TCM (ESP Only)
DTC	U0126-87	Lost Communication with Steering Angle Sensor Module (ESP Only)
DTC	U0140-87	Lost Communication With BCM (ESP Only)
DTC	U0401-81	Invalid Data Received From ECM (ESP Only)-Invalid Serial Date Received
DTC	U0402-81	Invalid Data Received From TCM (ESP Only)-Invalid Serial Date Received
DTC	U0422-81	Invalid Data Received From Body Control Module (ESP Only)
DTC	U0428-81	Invalid Data Received From Steering Angle Sensor Module (ESP Only)
DTC	U1300-55	Software Configuration Error
DTC	U1163-87	Lost Communication With ACC (ESP Only)-Miss Message
DTC	U0433-81	Invalid Data Received From ACC (ESP Only)
DTC	U1410-81	HAS_InvalidValue-Invalid Serial Date Received
DTC	U1411-81	APBSystemState_InvalidValue APB-Invalid Serial Date Received
DTC	U1412-81	ABANet_InvalidValue-Invalid Serial Date Received
DTC	U1413-81	ABPNet_InvalidValue-Invalid Serial Date Received
DTC	U1414-81	ACCNet_InvalidValue-Invalid Serial Date Received
DTC	U1415-81	AEBNet_InvalidValue-Invalid Serial Date Received
DTC	U1416-81	AWBNet_InvalidValue-Invalid Serial Date Received
DTC	U1417-81	AccPedalNet_InvalidValue
DTC	U1418-81	BTMNet_InvalidValue-Invalid Serial Date Received
DTC	U1419-81	CDDNet_InvalidValue-Invalid Serial Date Received
DTC	U1421-81	SClutch_InvalidValue
DTC	U1422-81	EngineNet_InvalidValue
DTC	U1423-81	StartStopNet_InvalidValue StartStop-Invalid Serial Date Received
DTC	U1424-81	TCUNet_InvalidValue-Invalid Serial Date Received
DTC	U1425-81	VLCNet_InvalidValue-Invalid Serial Date Received

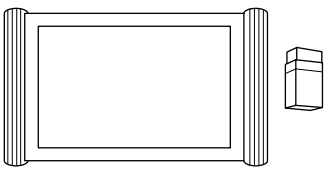
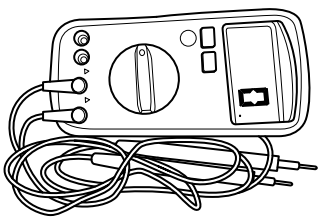
DTC	**U1426-81**	**VacuumNet_InvalidValue-Invalid Serial Date Received**
DTC	**U0146-87**	**Lost Communication With CGW**
DTC	**U0447-81**	**Invalid Data Received From CGW-Invalid Serial Date Received**
DTC	**U0155-87**	**Lost Communication With ICM-Miss Message**
DTC	**U0423-81**	**Invalid Data Received From ICM-Invalid Serial Date Received**
DTC	**U0142-87**	**Lost Communication With AVM-Miss Message**
DTC	**U0433-81**	**Invalid Data Received from AVM-Invalid Serial Date Received**
DTC	**U0100-00**	**Lost Communication with YAS**
DTC	**U0170-04**	**Lost Communication With SCM**
DTC	**U0170-08**	**Invalid Data Received From SCM**
DTC	**U0170-81**	**SCM Invalid Value**
DTC	**U0404-04**	**Invalid Data Received from YAS**

Refer to CAN Data Communication.

On-vehicle Service

Tools

General Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH000106
Digital Multimeter	 RCH000206

Specifications

Torque Specifications

Description	Torque (N·m)
Wheel Mounting Bolt	130 ± 10
Fixing Nut Between EPB/ESP Control Module Assembly and Mounting Bracket	8 ± 2
Fixing Bolt Between EPB/ESP Control Module Assembly Mounting Bracket and Body	23 ± 3.5
Front Wheel Speed Sensor Fixing Bolt	9 ± 1.5
Rear Wheel Speed Sensor Fixing Bolt	9 ± 1.5
Coupling Bolt Between Brake Pipe and EPB/ESP Control Module Assembly	18 ± 2

Brake Fluid Type

Name	Type
Brake Fluid Type	DOT4

Brake System Bleeding

Operation Step

⚠ Warning

- When bleeding brake system, wear safety glasses. If brake fluid gets on your eyes or skin, wash off with water completely.
- Brake fluid has a corrosive on body paint surface. Do not drop brake fluid on body paint surface.

⚠ Caution

- Brake fluid should meet Chery specified type (D0T4). DO NOT mix brake fluid with other types of brake fluid.
- Brake fluid has strong water absorbability, be sure to place it in the original sealed container.
- To prevent dust and other foreign matter from entering reservoir, wipe it off before removing reservoir cap.

1. Bleeding procedures for brake system with diagnostic tester are as follows:

a. Make sure all brake lines are installed and tightened properly.
b. Check that battery voltage is normal.
c. Turn ENGINE START STOP switch to OFF.
d. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
e. Turn ENGINE START STOP switch to ON.
f. Using diagnostic tester, read and clear DTCs stored in EPB/ESP control module assembly.
g. Using diagnostic tester, enter Brake Control System, select manual bleeding, and then perform operation according to information and procedures displayed on diagnostic tester.

Hint:
- If bleeder plug is open, never depress brake pedal repeatedly. Doing so will increase the amount of air in system.
- Do not drain brake fluid from brake fluid reservoir while bleeding the system. Otherwise, low fluid level in brake reservoir will cause additional air to enter the brake system.
- Always check brake fluid level at all times to ensure that brake fluid level in brake reservoir is always close to MAX level.

h. For X type brake circuit, the bleeding order is: rear left wheel, front left wheel, front right wheel, rear right wheel.
i. After bleeding is completed, fill brake reservoir with brake fluid to MAX level.
j. Drive vehicle to perform a road test, and confirm that EPB/ESP system operates normally and brake pedal feel is good.

Matching Learning

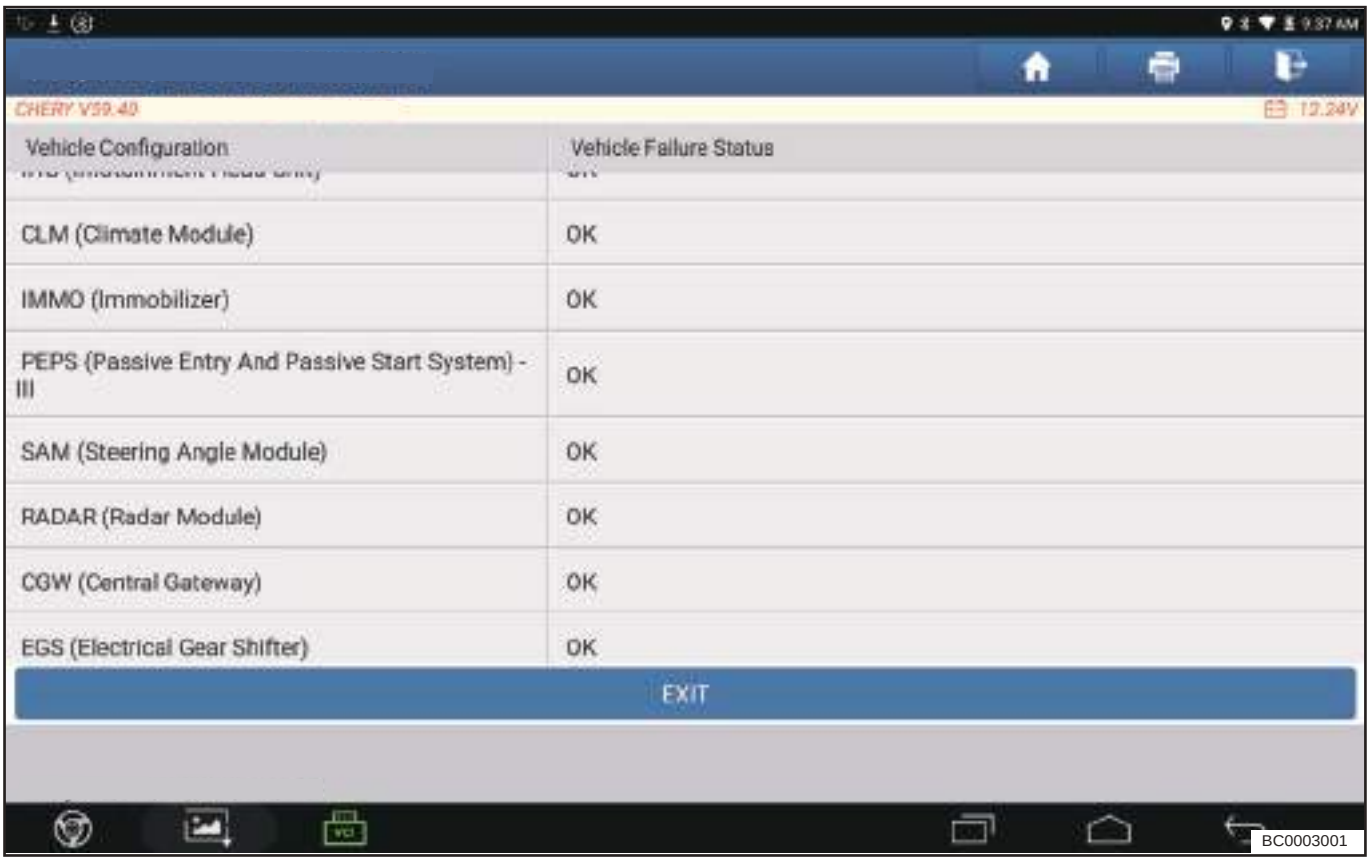
Steering Angle Sensor Calibration
Prerequisites for sensor calibration:

- Perform zero point calibration after steering angle sensor is installed.
- Calibration should be performed at front (four) wheel alignment station (make sure that the four-wheel alignment parameters are correct).
- Before calibrating, straighten up the vehicle and wheels must be in straight lines along proceeding direction. Difference between the two angles should meet toe-in of four-wheel alignment parameters value. Steering wheel must be adjusted to center.
- Before calibrate a calibrated sensor again, always calibrate it again to make it return uncalibrated state.

⚠ Caution

- Steering wheel must be centered in the actual calibration. If not, even the data is correct, it can cause wrong calibration when performing four-wheel alignment. This problem may not be detected at factory. Long-term cumulative errors may be caused or overrange phenomenon and ESP light illumination problem may occur when turning steering wheel to limit position during actual driving. Therefore, when performing four-wheel alignment, the steering wheel must be centered.
- Power should not be cut during calibration.

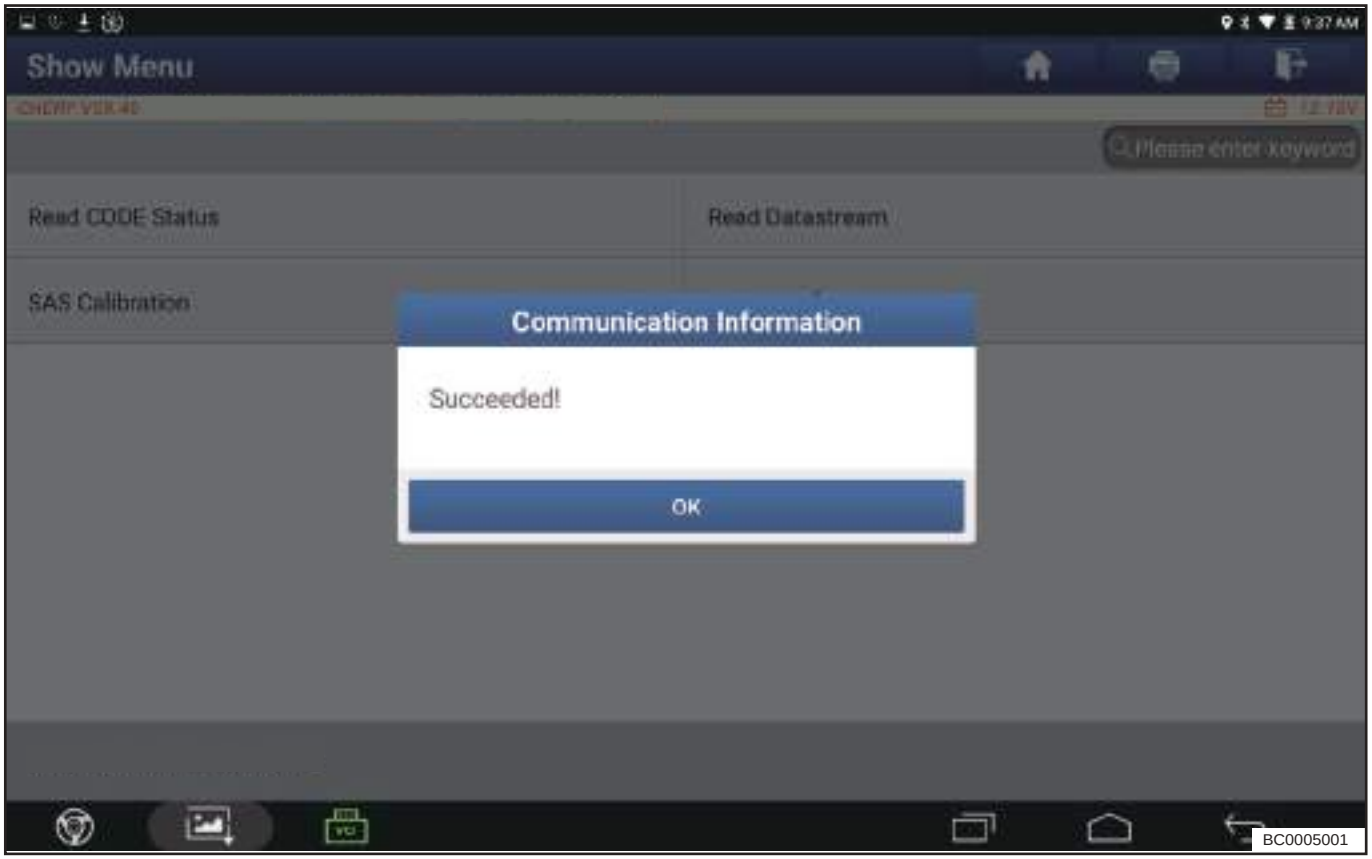
1. Connect the diagnostic tester.
2. Turn ENGINE START STOP switch to ON.
3. Place the steering wheel to center position (straighten up the vehicle, wheels must be in straight lines along proceeding direction, and center steering wheel).
4. Using diagnostic tester, enter “SAM (Steering Angle Module)”.



5. Click “SAS Calibration”.

6. Diagnostic tester will detect sensor malfunction and calibration automatically; if sensor has malfunction, it will exit calibration.

7. If sensor has been calibrated, “Recalibration” will be prompted. In this case, click “Recalibration” according to prompt on diagnostic tester and then click “Initial Calibration”. If there is no response, it will exit calibration.
8. Diagnostic tester will prompt whether calibration is succeed or not.



Warning

- Never cut off the power during calibration. (Power applied to equipment and steering angle sensor must not be cut off during calibration. Also, diagnostic tester and sensor must be connected properly. Otherwise, calibration cannot be performed properly. If any of them are connected poorly, electrical overload of the products can be caused worst of all.)

Caution

- The steering angle sensor should to be calibrated again after four-wheel alignment is performed.

Calibrating Yaw Rate Sensor

Prerequisites for sensor calibration:

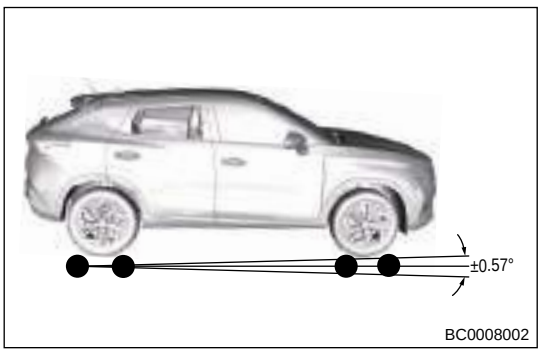
- Calibration can be performed on rotary hub tester or a flat area.
- Maximum tilting angle of tester must be within allowable range, that both are met ± 0.57° (± 1%) in two positive directions.
- The tester must be stationary.
- Turn steering wheel to straight ahead position.
- Tire pressure is proper.
- Vehicle load is normal.
- Less remaining fuel in fuel tank is allowable.
- Vehicle stands on its own wheels.

- Only driver sits in vehicle.
- Additional interference is prohibited, such as vibration due to opening or closing hood etc.

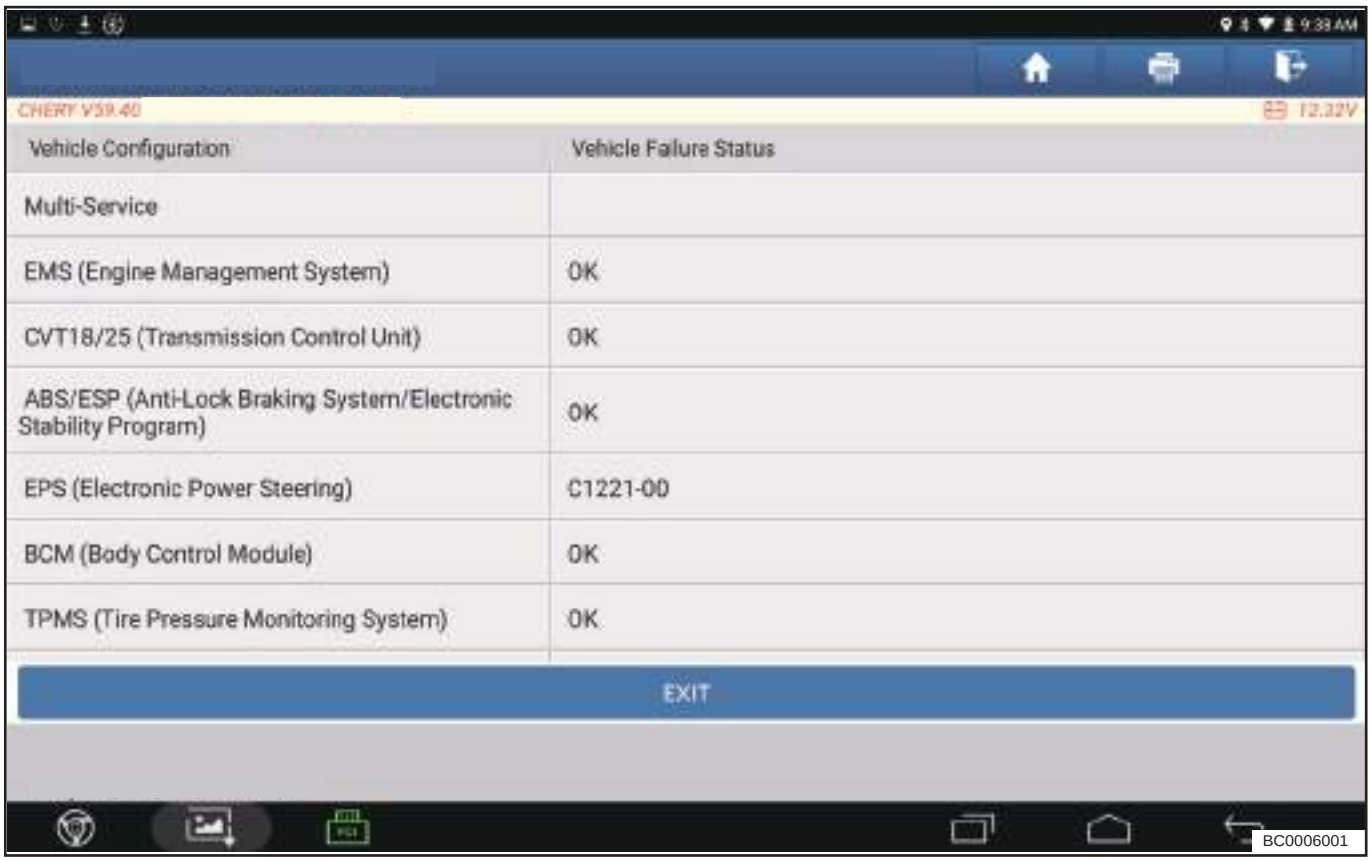
⚠ Caution

- When replacing EPB/ESP module, integrated sensor must be calibrated. During calibration, ECU will write the measured new data into the EEPROM for use by ESP. Ensure the above calibration conditions are right, because ESP cannot determine whether the above mentioned preconditions are proper or not. If offset is too large, system will reject the calibration. In the case, it is necessary to repair the vehicle.

1. Connect the diagnostic tester.
2. Turn ENGINE START STOP switch to ON.
3. Make sure vehicle tilt angle is in range of ± 0.57° (± 1%).



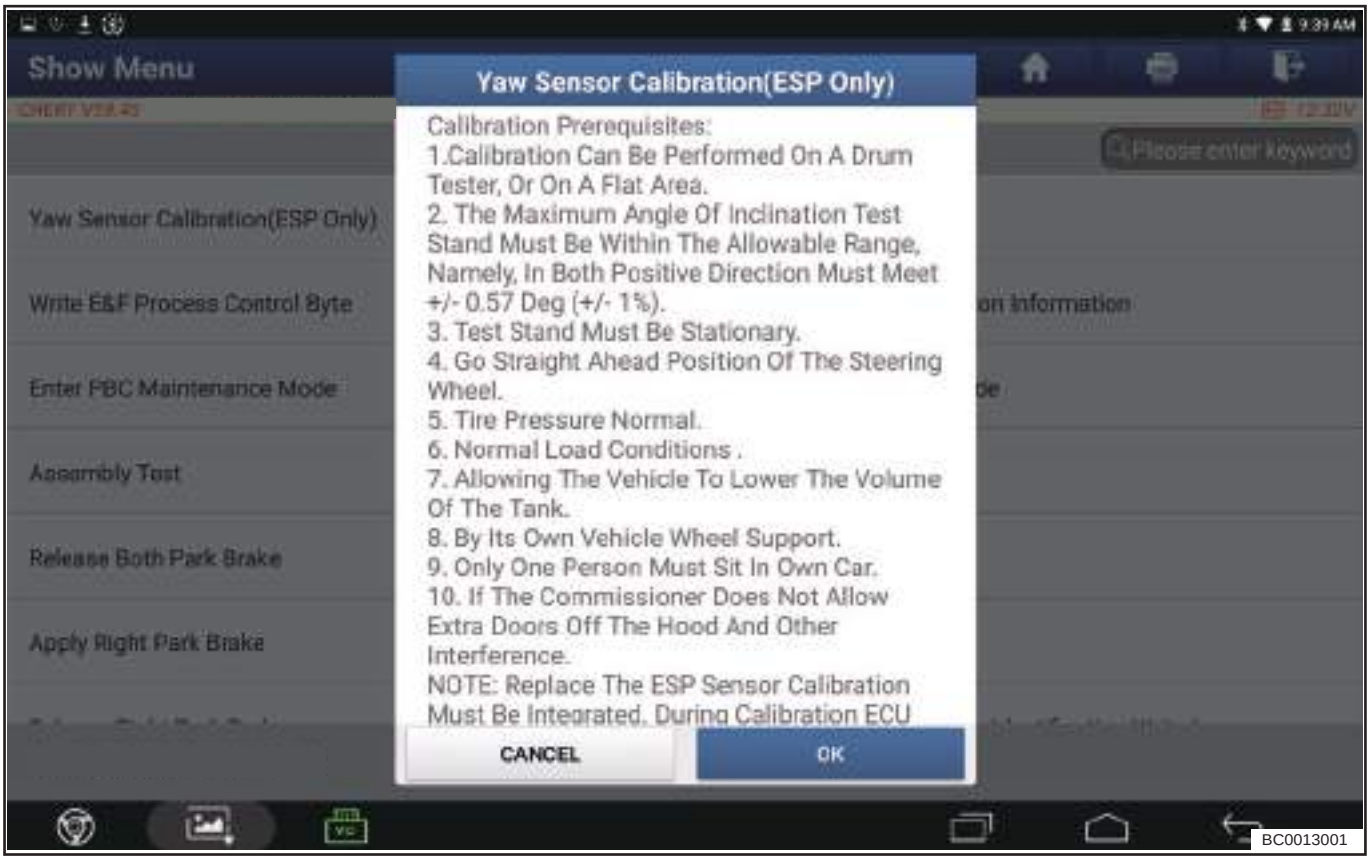
4. Enter menu “ABS/ESP (Anti-lock Braking System/Electronic Stability Program)”.



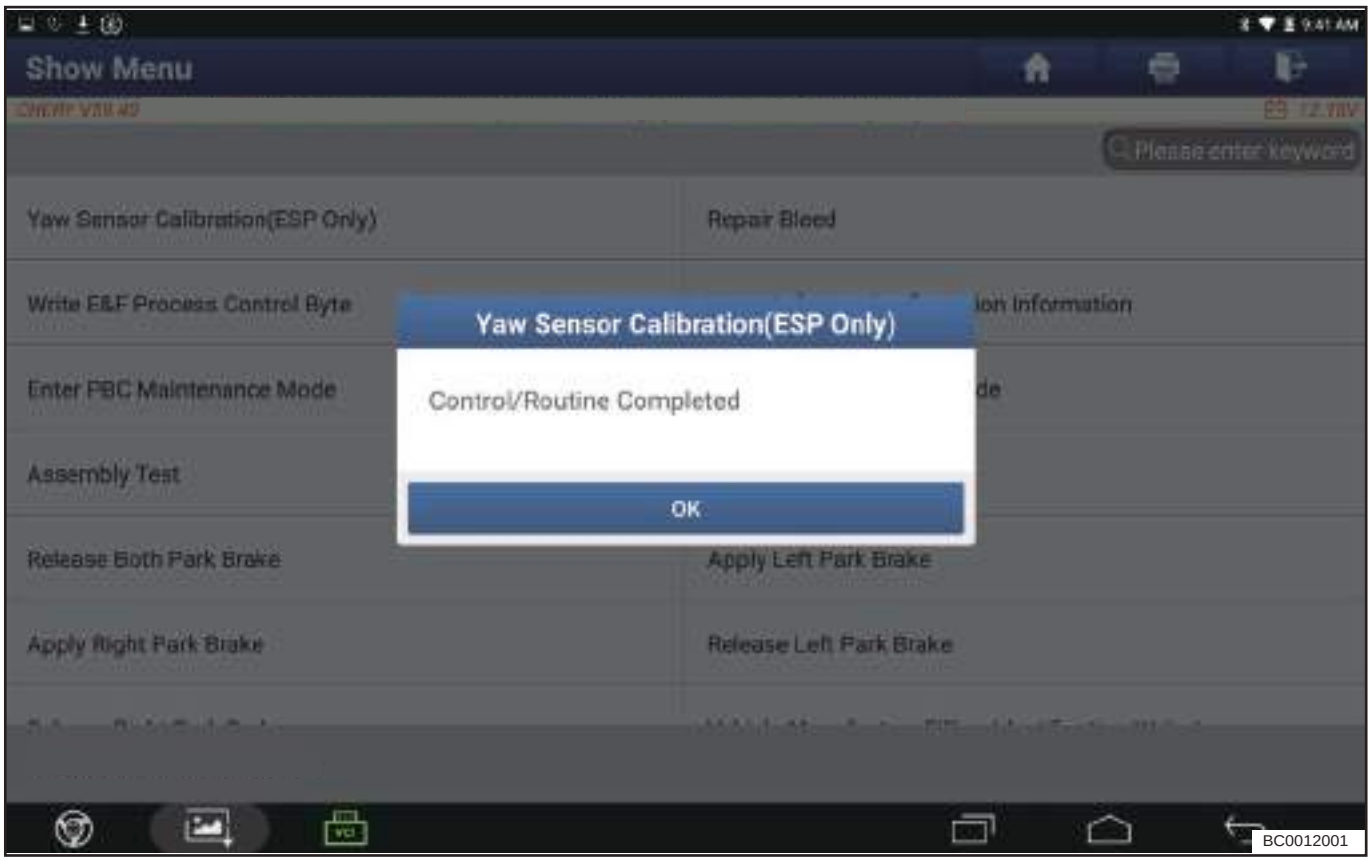
5. Click “Special Function”.

6. Click “Yaw Sensor Calibration (ESP Only)”.

7. Sensor calibration conditions.



8. Diagnostic tester will prompt whether calibration is succeed or not.

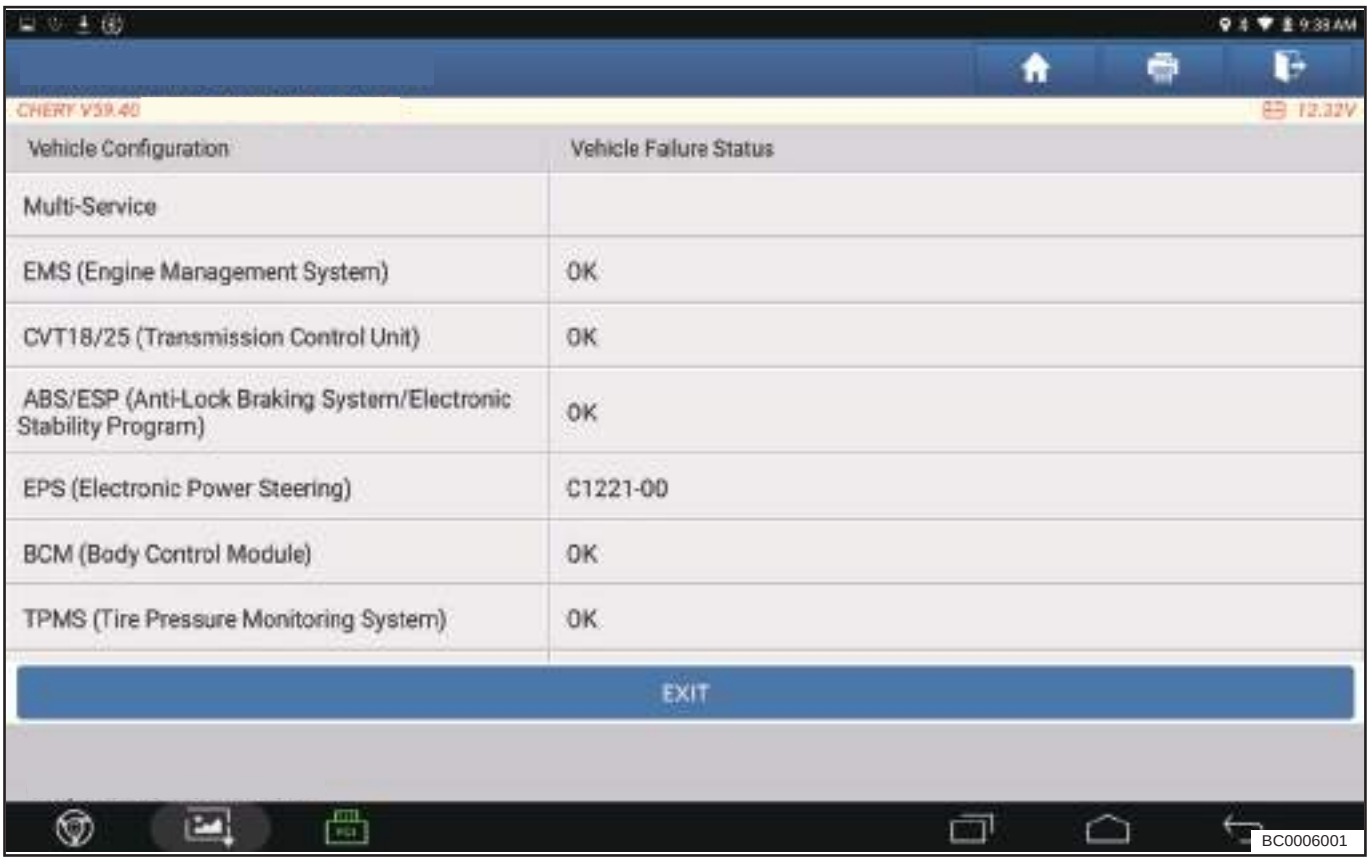


⚠ Warning

- Never cut off the power during calibration. (Power applied to equipment and steering angle sensor must not be cut off during calibration. Also, diagnostic tester and sensor must be connected properly. Otherwise, calibration cannot be performed properly. If any of them are connected poorly, electrical overload of the products can be caused worst of all.)

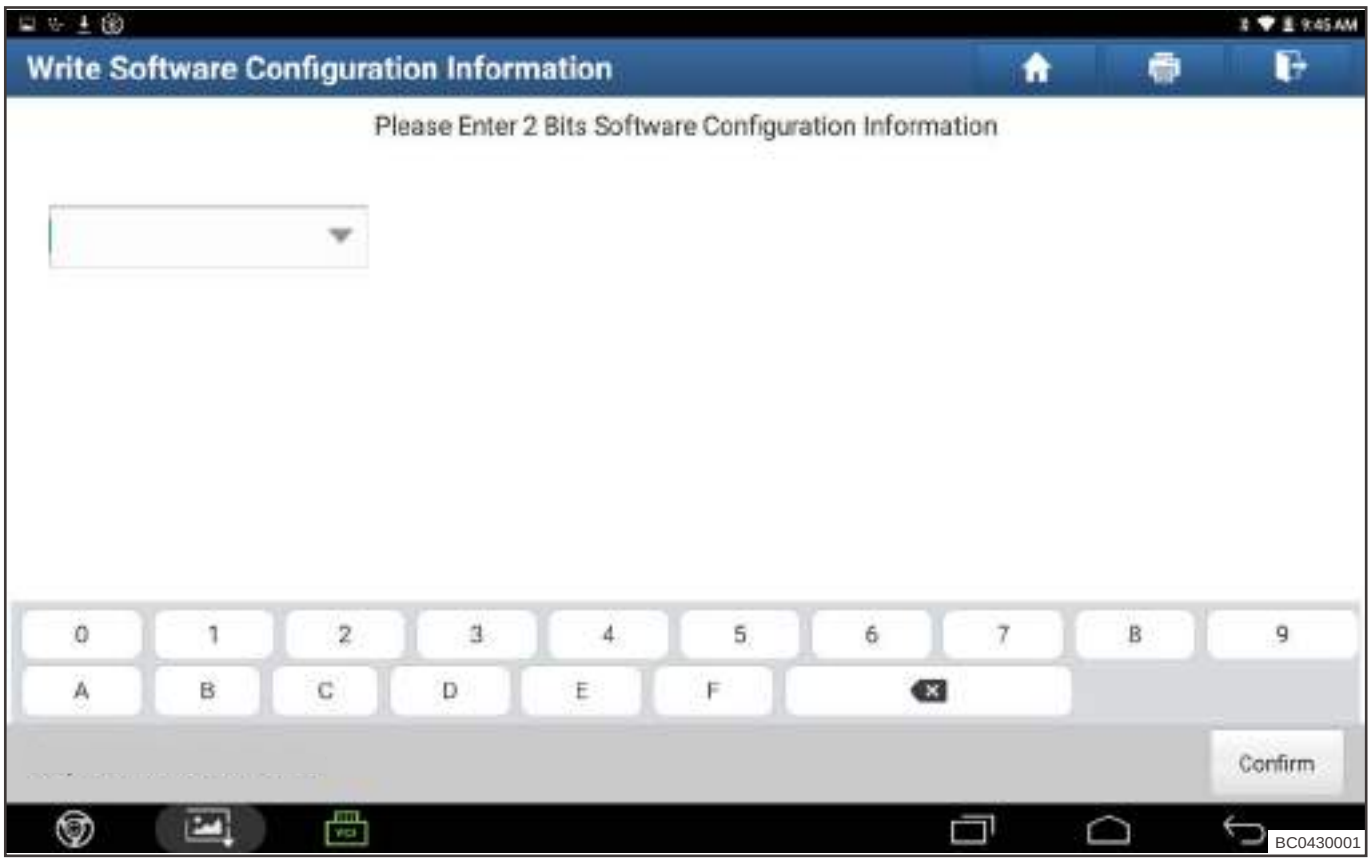
Software Configuration Information Writing

1. Connect the diagnostic tester.
2. Turn ENGINE START STOP switch to ON.
3. Enter menu “ABS/ESP (Anti-lock Braking System/Electronic Stability Program)”.



4. Click “Special Function”.

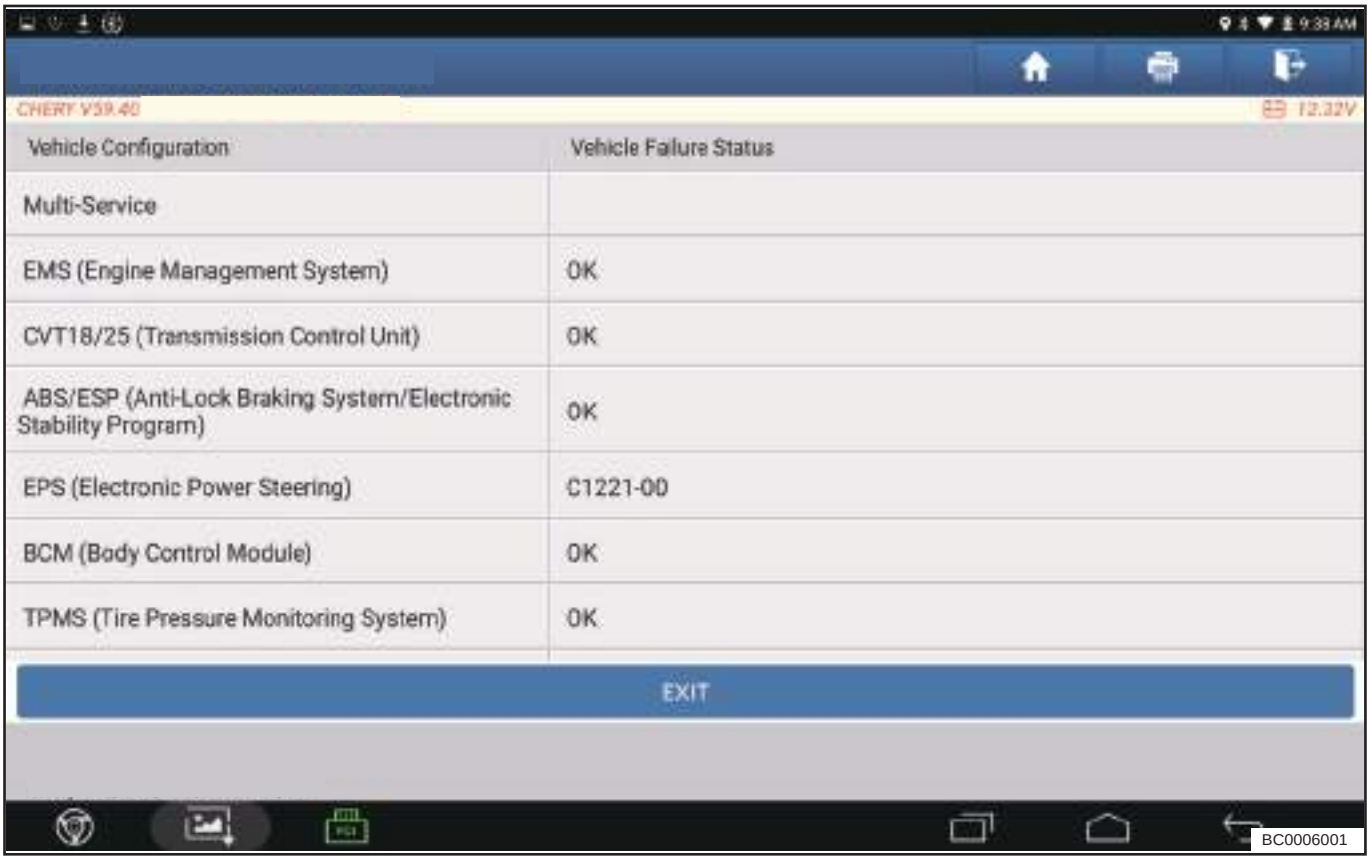
5. Click “Write Software Configuration Information” (Configuration code can be read by reading data stream).



Vehicle Manufacture Filling-Identification Write-in

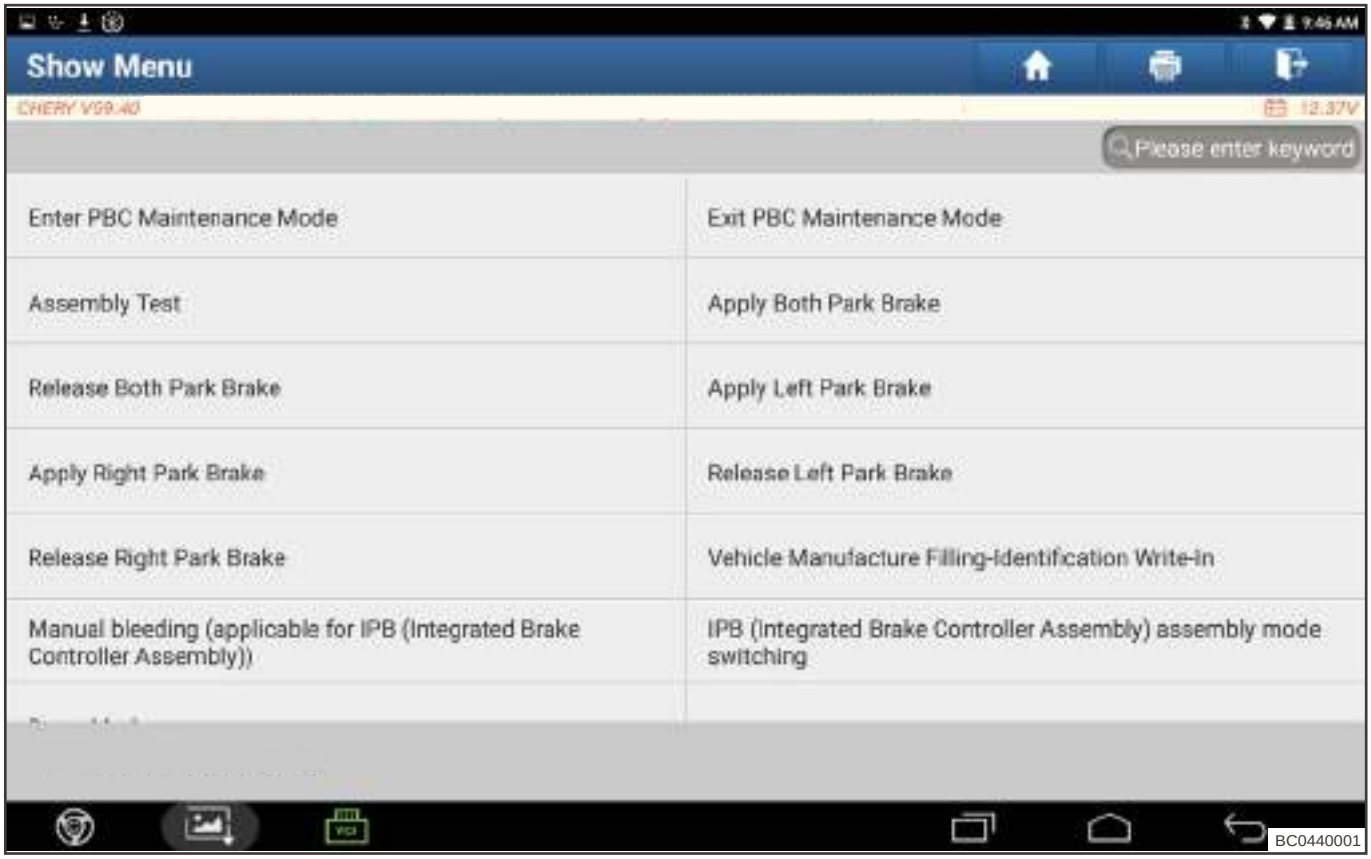
1. Connect the diagnostic tester.
2. Turn ENGINE START STOP switch to ON.

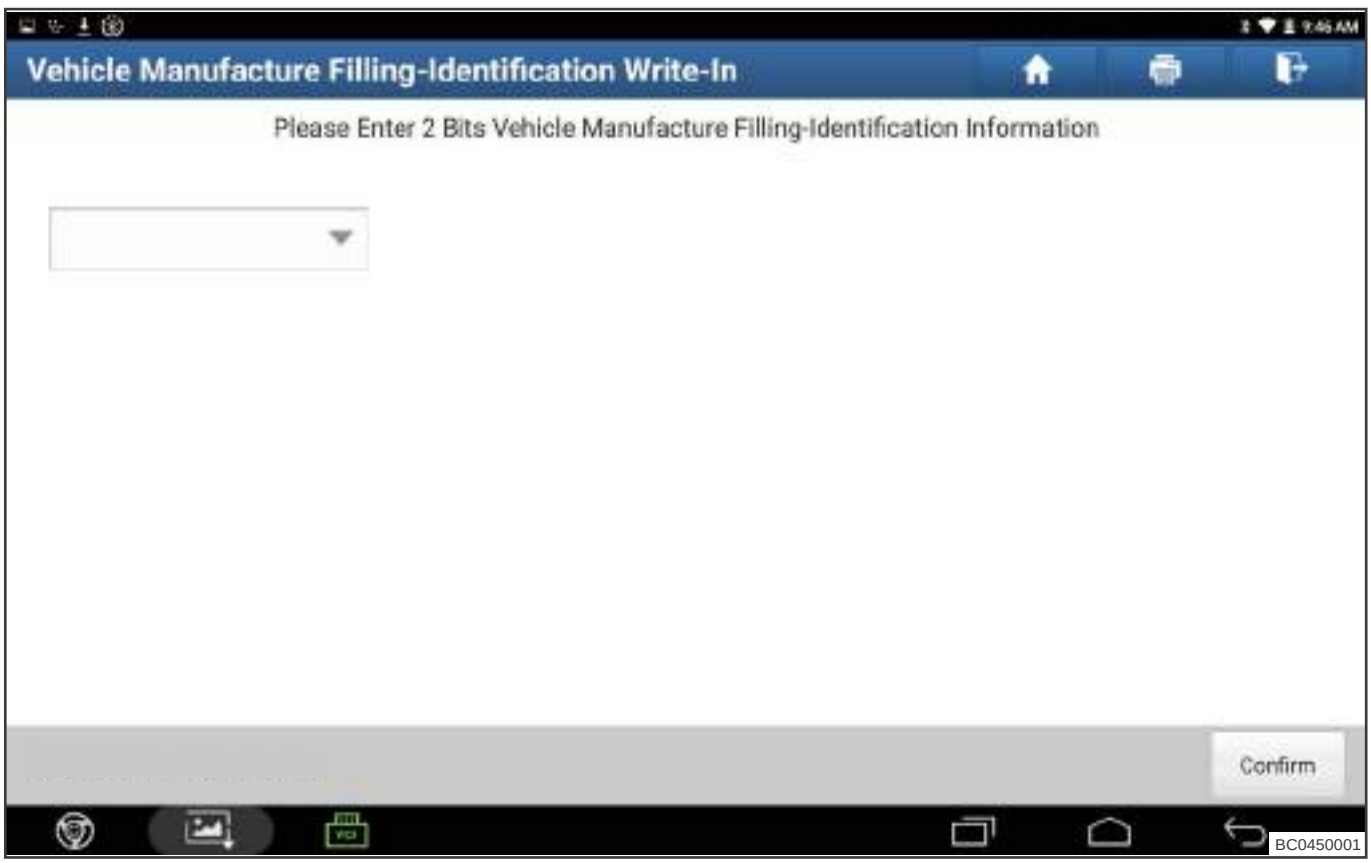
3. Enter menu “ABS/ESP (Anti-lock Braking System/Electronic Stability Program)”.



4. Click “Special Function”.

5. Vehicle manufacture filling-identification write-in (configuration code can be read by reading data stream).





EPB/ESP Control Module Assembly

Removal

⚠ Caution

- When repairing EPB/ESP system, first release the pressure of high pressure brake fluid in accumulator, to prevent high pressure brake fluid from spraying out and causing injury.
- Operation step: First turn ENGINE START STOP switch off, then depress and release brake pedal repeatedly, until brake pedal becomes hard.
- In addition, never turn on ENGINE START STOP switch before EPB/ESP system is installed completely to prevent hydraulic pump from energizing and running.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Remove the battery assembly.
3. Drain the brake fluid.

   Hint:
   Drained brake fluid should be well kept in a container. Never discard it at will.

⚠ Caution

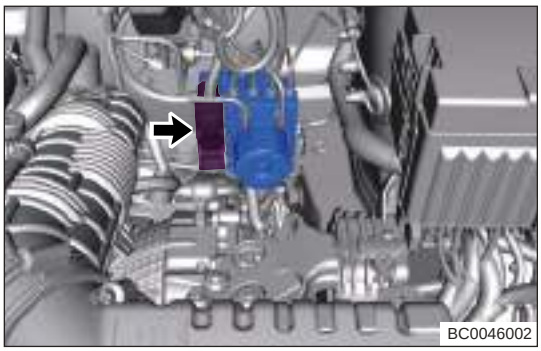
- Wash off brake fluid immediately if it comes in contact with any paint surface.

4. Remove the brake pipe assembly.

⚠ Caution

- When removing brake line, prevent foreign matter form entering EPB/ESP control module assembly threaded holes.
- After disconnecting brake line, sealing measure should be taken to prevent foreign matter form entering.

5. Remove the EPB/ESP control module assembly.
   a. Press the lock area of EPB/ESP control module assembly connector, toggle the connector lock bracket downward and disconnect the EPB/ESP control module assembly connector (arrow).

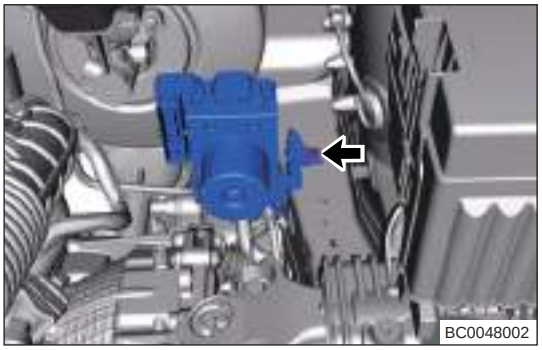


⚠ Caution

- When removing brake line, prevent foreign matter form entering EPB/ESP control module assembly threaded holes.
- After disconnecting brake line, sealing measure should be taken to prevent foreign matter form entering.

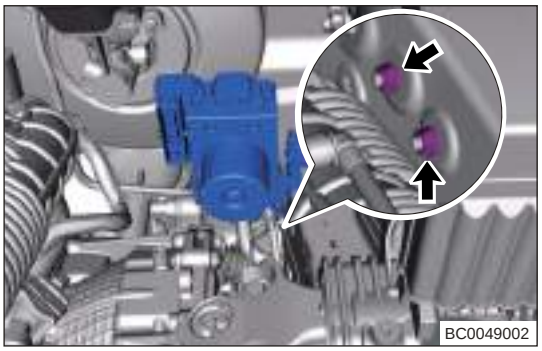
b. Remove fixing bolt (arrow) between EPB/ESP control module assembly mounting bracket and body.

Tightening torque: 23 ± 3.5 N·m



c. Remove 2 coupling nuts (arrow) between EPB/ESP control module assembly mounting bracket and body.

Tightening torque: 23 ± 3.5 N·m

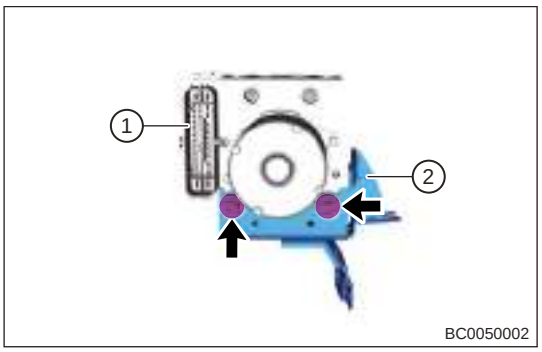


d. Remove the EPB/ESP control module assembly with mounting bracket.

Disassembly

1. Remove the EPB/ESP control module assembly.

a. Remove 2 fixing nuts (arrow) between EPB/ESP control module assembly (1) and mounting bracket (2).



b. Remove the EPB/ESP control module assembly with mounting bracket.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- EPB/ESP control module assembly contains hydraulic control module and electronic control module. As a unit, they cannot be repaired or replaced individually.
- Check insulator for aging or damage. Replace if necessary.
- When installing fixing bolts and screws, be sure to tighten them to specified torque.
- Perform ABS bleeding procedures for brake system after completing installation.
- Using diagnostic tester, enter brake control system, record and clear trouble code, then drive vehicle to perform a road test, confirming that EPB/ESP system operates normally and brake pedal feel is good.
- It is necessary to perform yaw rate sensor calibration after replacing ESP assembly.
- After replacing ESP assembly, perform “Assembly Inspection” with diagnostic tester, otherwise, malfunction may be lit.

Front Wheel Speed Sensor (Front Left Wheel as Example)

Removal

⚠ Caution

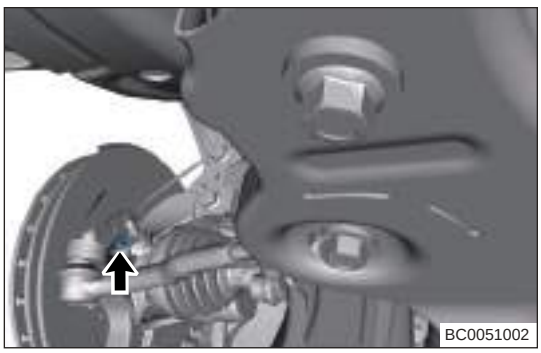
- Keep wheel speed sensor away from oil or other foreign matter. Otherwise speed signal generated by wheel speed sensor may be inaccurate, and system may even fail to operate normally.

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left wheel.
4. Remove the front left wheel speed sensor.
   a. Remove the fixing bolt (arrow) between front left wheel speed sensor and front left steering knuckle assembly, and disengage the front left wheel speed sensor carefully.

      Tightening torque: 9 ± 1.5 N·m

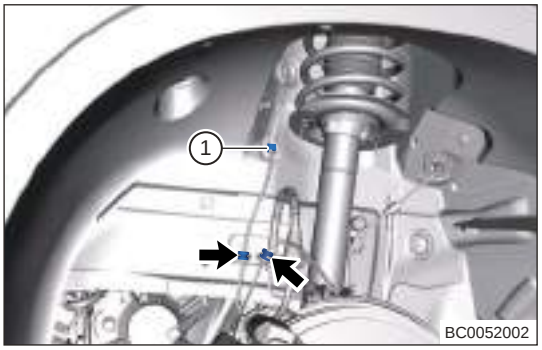


⚠ Caution

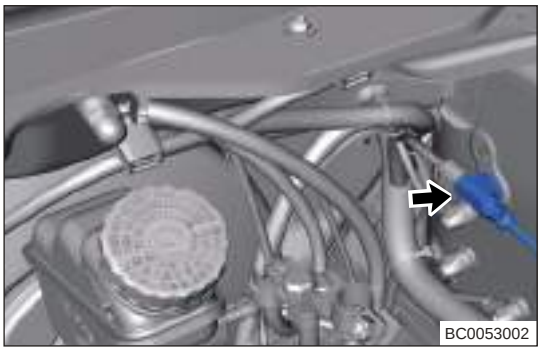
- Keep head and installation hole of sensor free of foreign matter.

b. Disengage the attachment part (arrow) of front left wheel speed sensor wire harness from front left shock absorber assembly and fixing bracket, disengage fixing clip (1) from front left wheel speed sensor wire harness.

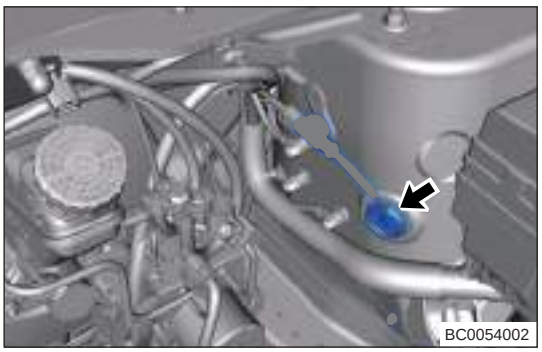
Hint:
Observe winding direction of sensor wire harness to prevent incorrect installation.



c. Disconnect the front left wheel speed sensor wire harness connector (arrow).



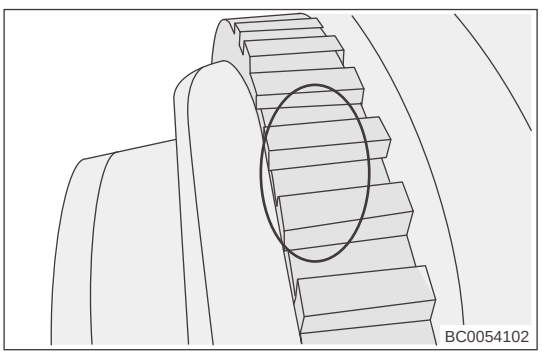
d. Detach the front left wheel speed sensor wire harness cover (arrow) from body.



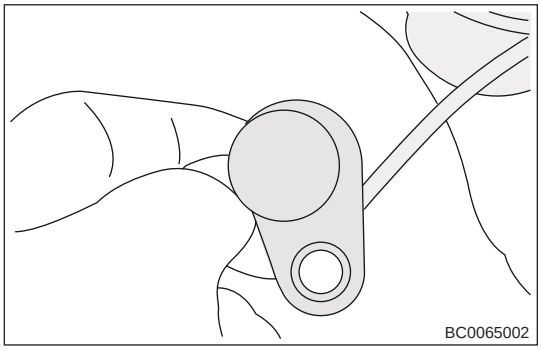
e. Remove the front left wheel speed sensor.

Inspection

1. Check the front wheel speed sensor.
   a. Check front wheel speed sensor surface for breakage, dents or notch.
   b. Check front wheel speed sensor connector or wire harness for scratches, breakage or damage.
   c. If any of above conditions occurs, replace the front wheel speed sensor with a new one.
   d. Check wheel speed sensor for proper installation.
   e. Using a diagnostic tester, read datastream of wheel speed sensor, record if each wheel speed is consistent with acceleration display, and if vehicle speed display is accurate.

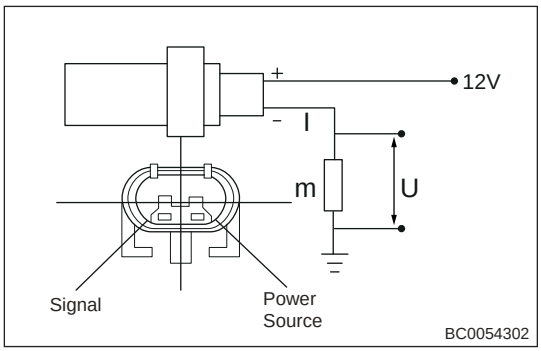


f. If wheel speed display is inconsistent, check the corresponding wheel speed sensor signal ring gear for missing teeth, dirt, demagnetization, off center.



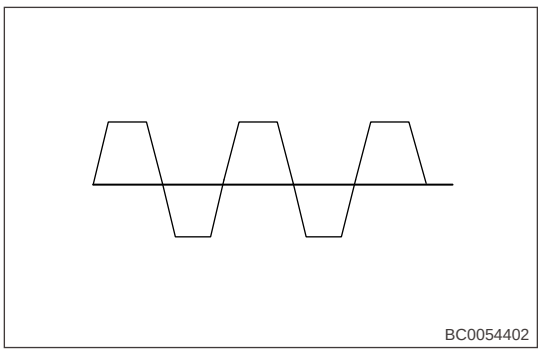
2. Simple test for wheel speed sensor.

a. Connect power supply terminal of sensor to 12 V power supply, connect sensor signal terminal and 75 Ω resistor in series and make it grounded, then rotate wheels and test voltage signal of resistor with an oscilloscope.



b. U is switched between high and low levels without any obvious teeth missing as ring gear rotates.

- U low ≈ 0.54 V
- U high ≈ 1.07 V



⚠ Caution

- Poles cannot be connected inversely during test, otherwise, damage may be caused.
- Above mentioned is a simple method and cannot replace the complete function test.
- Causes that affect test may include: Ring gear quality, installation error, etc.

c. After any repair actions on wheel speed sensor, it is necessary to accelerate vehicle to 40 Km/h or more to perform dynamic self-test of EPB/ESP system.

d. If malfunction still cannot be eliminated after completing dynamic self-test, replace wheel speed sensor.

e. After repair is finished, perform completion inspection.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- When installing coupling bolts, be sure to tighten them to specified torque.

Rear Wheel Speed Sensor (Rear Left Wheel as Example)

Removal

⚠ Caution

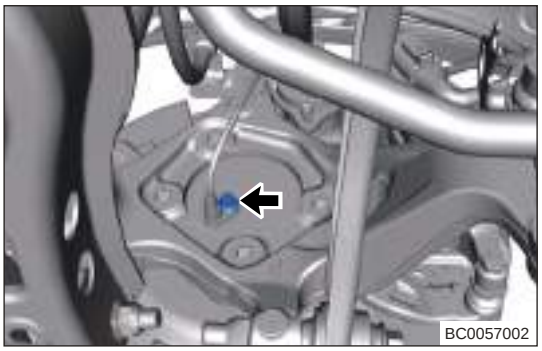
- Keep wheel speed sensor away from oil or other foreign matter. Otherwise speed signal generated by wheel speed sensor may be inaccurate, and system may even fail to operate normally.

Hint:

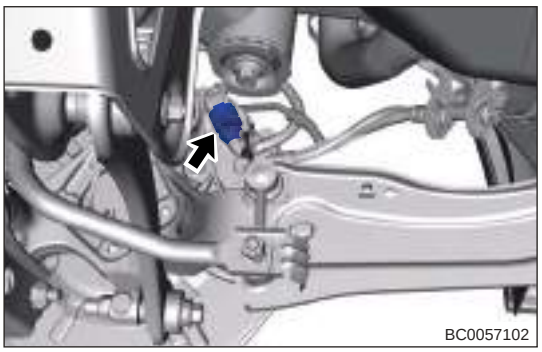
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left wheel.
4. Remove the rear left wheel speed sensor.
   a. Remove fixing bolt (arrow) from rear left wheel speed sensor.

      Tightening torque: 9 ± 1.5 N·m



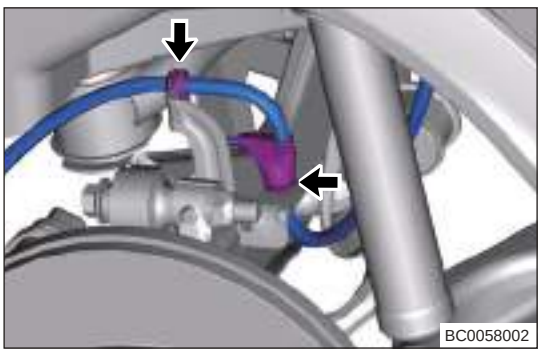
   b. Remove the rear left brake caliper motor connector (arrow).



⚠ Caution

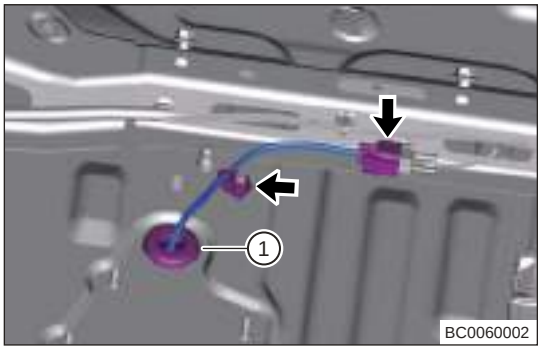
- Keep head and installation hole of sensor free of foreign matter.

   c. Detach attachment parts (arrow) of rear wheel speed sensor wire harness from fixing bolt.



   d. Remove the rear seat cushion assembly.

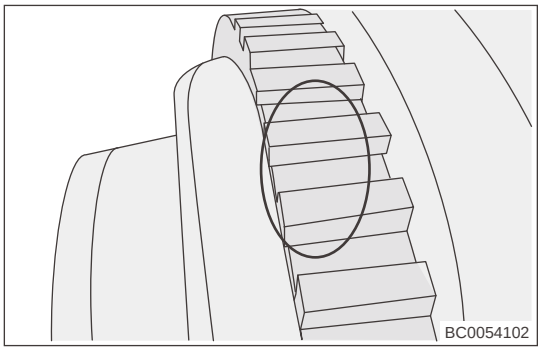
e. Disconnect rear wheel speed sensor with caliper wire harness assembly connector (arrow) and fixing clip (-arrow), and detach rear left wheel speed sensor wire harness plug (1) from vehicle body.



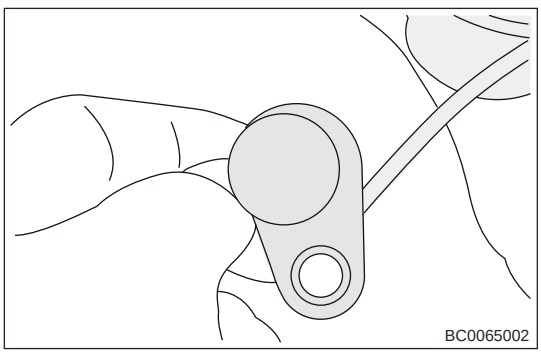
f. Remove the rear left wheel speed sensor.

Inspection

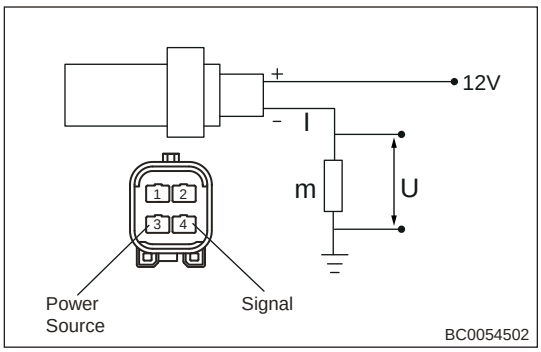
1. Check the rear left wheel speed sensor.
   a. Check rear wheel speed sensor surface for breakage, dents or notch.
   b. Check rear wheel speed sensor connector or wire harness for scratches, breakage or damage.
   c. If any of above conditions occurs, replace rear wheel speed sensor with a new one.
   d. Check wheel speed sensor for proper installation.
   e. Using a diagnostic tester, read datastream of wheel speed sensor, record if each wheel speed is consistent with acceleration display, and if vehicle speed display is accurate.



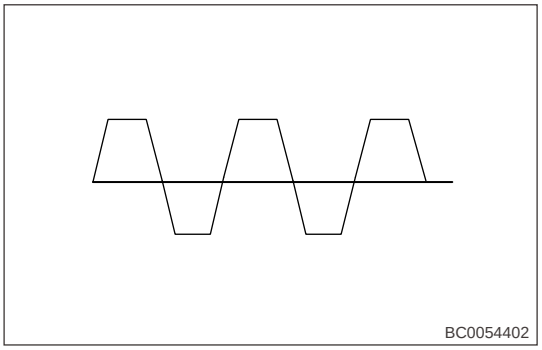
   f. If wheel speed display is inconsistent, check the corresponding wheel speed sensor signal ring gear for missing teeth, dirt, demagnetization, off center.



2. Simple test for wheel speed sensor.
   a. Connect power supply terminal of sensor to 12 V power supply, connect sensor signal terminal and 75 Ω resistor in series and make it grounded, then rotate wheels and test voltage signal of resistor with an oscilloscope.



b. U is switched between high and low levels without any obvious teeth missing as ring gear rotates.
   - U low ≈ 0.54 V
   - U high ≈ 1.07 V



⚠ Caution

- Poles cannot be connected inversely during test, otherwise, damage may be caused.
- Above mentioned is a simple method and cannot replace the complete function test.
- Causes that affect test may include: Ring gear quality, installation error, etc.

c. After any repair actions on wheel speed sensor, it is necessary to accelerate vehicle to 40 Km/h or more to perform dynamic self-test of EPB/ESP system.
d. If malfunction still cannot be eliminated after completing dynamic self-test, replace wheel speed sensor.
e. After repair is finished, perform completion inspection.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- When installing coupling bolts, be sure to tighten them to specified torque.

Steering Angle Sensor

Removal

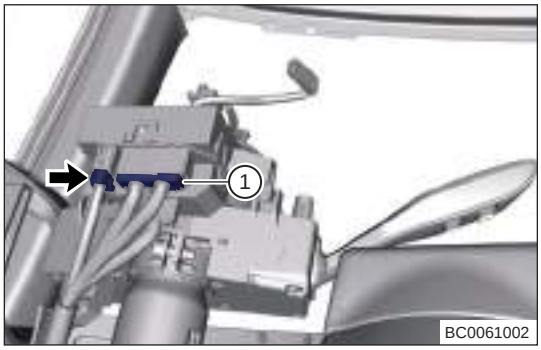
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.

⚠ Caution

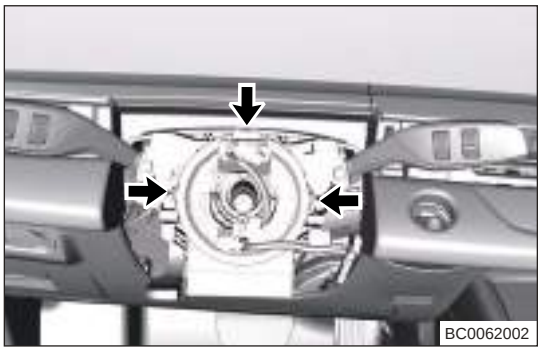
- Wait at least 90 seconds after disconnecting the negative battery cable to disable supplementary restraint system.

3. Position the front wheels straight ahead.
4. Remove the steering wheel assembly.
5. Remove the combination switch cover assembly.
6. Remove the steering angle sensor.

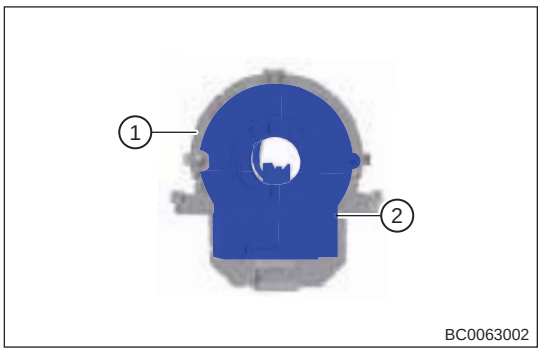
a. Disconnect the spiral cable wire harness connector (-arrow) and angle sensor connector (1).



b. Detach the fixing claws (arrow) between spiral cable and steering column, and remove the spiral cable.



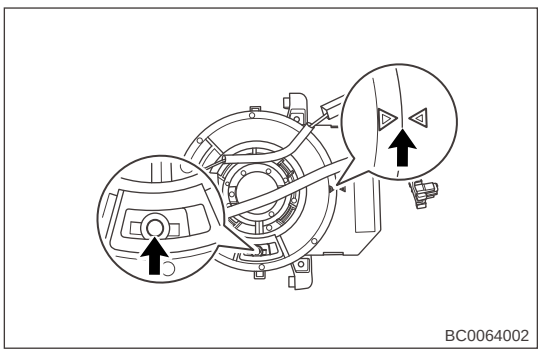
c. Detach the steering angle sensor fixing claws and separate the angle sensor (1) and spiral cable (2).



Installation

1. Installation is in the reverse order of removal.

- Always install spiral cable correctly according to matchmarks on spiral cable and steering column (fully turn spiral cable clockwise slowly, then turn it counterclockwise until yellow ball appears in transparent neutral window and arrow marks are aligned with each other), otherwise the spiral cable may be damaged.



⚠ Caution

- Always install spiral cable correctly according to specified operating instructions.
- DO NOT rotate the spiral cable over specified turns to prevent it from breaking.
- Be sure to install fixing claws in place when installing spiral cable.
- Check that horn operates normally after installation.
- Check SRS warning light after installation, and make sure that supplemental restraint system operates normally.
- It is necessary to adjust front wheel alignment.

FRONT BRAKE ASSEMBLY

Warnings and Precautions

Precautions

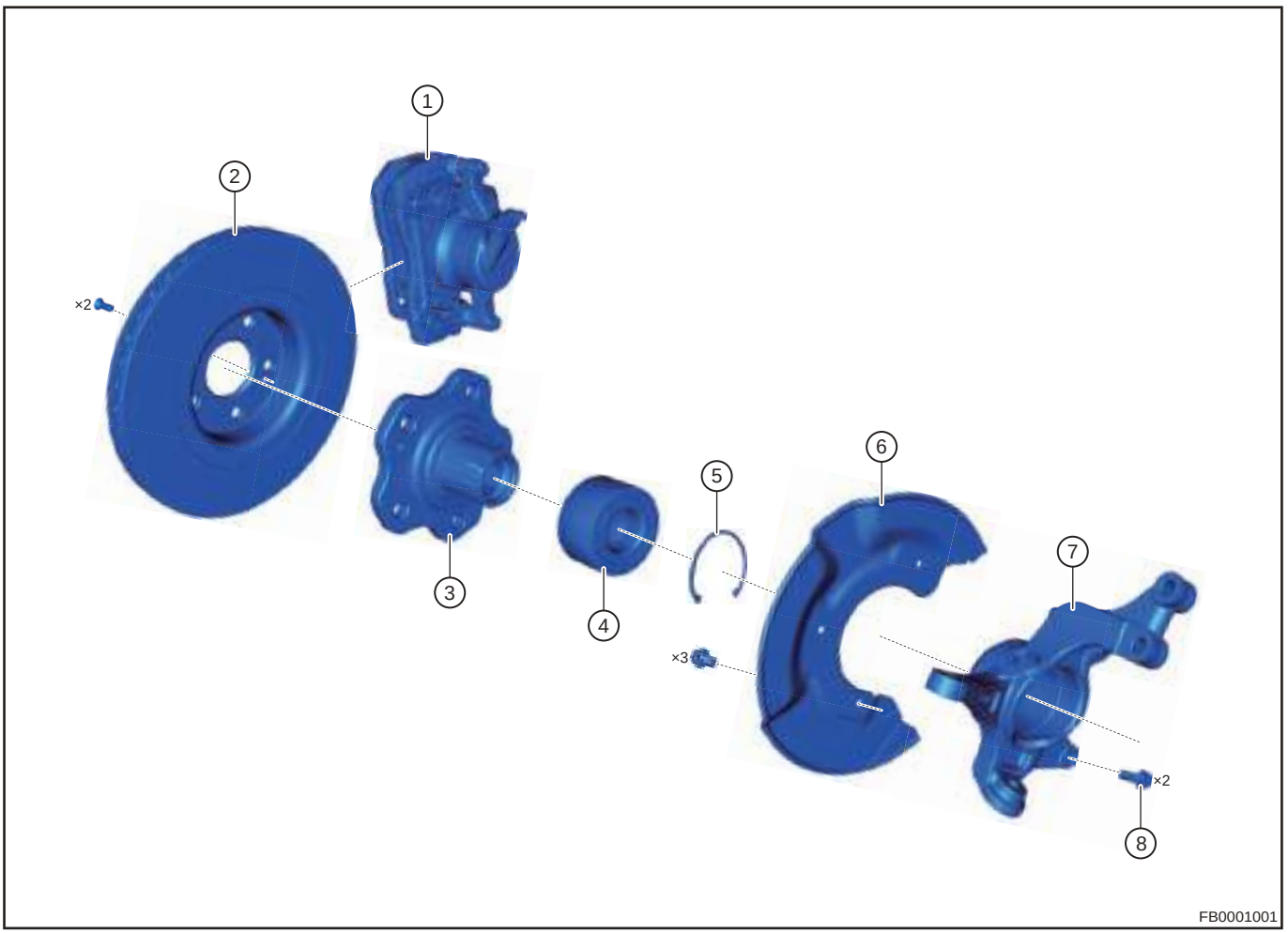
In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

1. DO NOT machine the brake disc, because it may make brake disc thickness less than the minimum thickness.
2. After removing front/rear brake caliper assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.
3. When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

System Overview

System Component Diagram

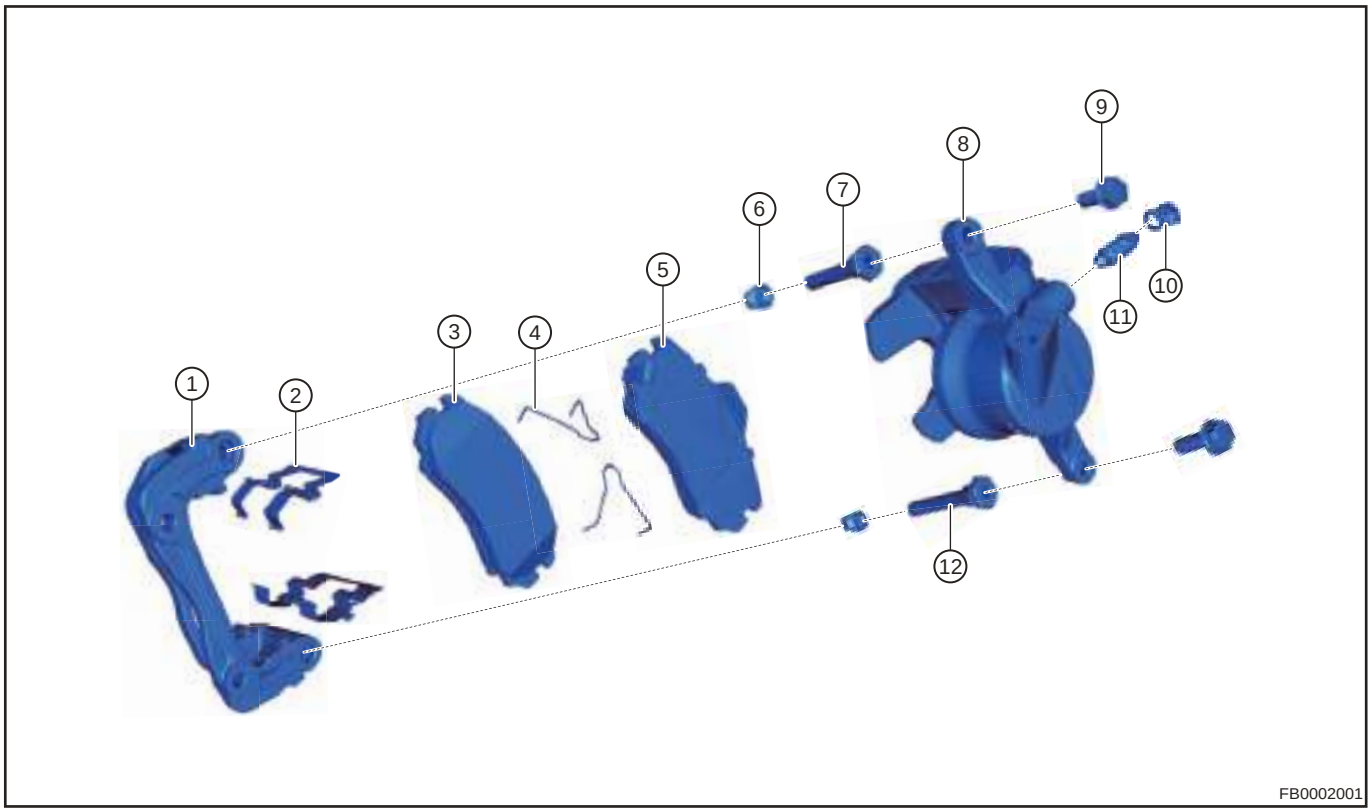
Front Left Steering Knuckle with Disc Brake Assembly



1	Front Left Brake Caliper Assembly	5	Snap Ring
2	Front Brake Disc	6	Front Left Dust Guard
3	Front Hub	7	Front Left Steering Knuckle
4	Front Hub Bearing	8	Front Brake Caliper Fixing Bolt

Front left steering knuckle with disc brake assembly is mainly composed of front left brake caliper assembly, front brake disc, front hub, front hub bearing, snap ring, etc.
Front brake disc is fixed on front hub, clamped in the middle of rear outer lining assembly/rear inner lining assembly, and rotates with wheel. Front brake caliper body assembly is connected with front brake caliper bracket (bracket is fixed on steering knuckle) through guide pin tightening bolt.

Front Left Brake Caliper Assembly



1	Front Brake Caliper Bracket	7	Main Guide Pin (without Bushing)
2	Front Spring Plate	8	Front Left Brake Caliper Body Assembly
3	Front Outer Lining Assembly	9	Guide Pin Tightening Bolt
4	Lining Return Spring	10	Bleeder Plug Cover
5	Front Inner Lining Assembly	11	Bleeder Plug
6	Guide Pin Dust Boot	12	Sub Guide Pin (with Bushing)

⚠ Caution

- Main guide pin is installed on the side close to bleeder plug, and sub guide pin is installed on the side far away from bleeder plug. Incorrect installation method will lead to abnormal sound on bumpy road.

Front left steering knuckle with disc brake assembly is mainly composed of front left brake caliper assembly, front brake disc, front hub, front hub bearing, snap ring, etc.
Front brake disc is fixed on front hub, clamped in the middle of rear outer lining assembly/rear inner lining assembly, and rotates with wheel. Front brake caliper body assembly is connected with front brake caliper bracket (bracket is fixed on steering knuckle) through guide pin tightening bolt.

Diagnosis & Testing

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Possible Cause
Braking deviation	Oily lining assembly
	Uneven brake disc wear
	Brake caliper body assembly failure (piston stuck)
Brake shakes	Hub bearing is damaged
	Uneven brake disc wear
	Steering/suspension part is loose
	Uneven lining assembly wear
	Brake caliper assembly fixing bolt is loose
Abnormal noise occurs during braking	Spring plate is damaged
	Hub bearing is damaged
	Abnormal brake disc wear
	Oily lining assembly
	Steering/suspension part is loose
	Abnormal lining assembly wear
	Brake caliper assembly fixing bolt is loose
Brake stuck	Minimum brake pedal free play
	Poor returning of guide pin (deformed or damaged)
	Brake caliper body assembly failure (piston stuck)

On-vehicle Service

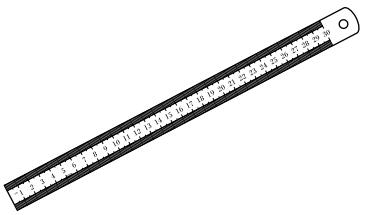
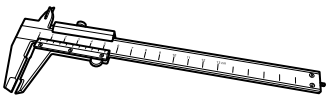
Specifications

Torque Specifications

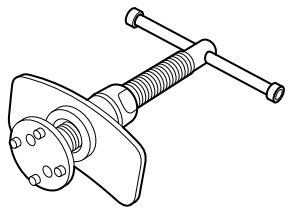
Description	Torque (N·m)
2 Front Brake Disc Fixing Screws	7 - 9
2 Coupling Bolts Between Front Left Brake Caliper Assembly and Front Left Steering Knuckle	90 - 110
Coupling Bolt Between Front Left Brake Hose Assembly and Front Left Brake Caliper Assembly	18 ± 2
1 Guide Pin Tightening Bolt Between Front Left Brake Caliper Body Assembly and Front Brake Caliper Bracket	22 - 32

Tools

General Tools

Tool Name	Tool Drawing
Caliper	 RCH0063006
Thickness Measurement Caliper	 RCH0019006

Special Tool

Tool Name	Part No.	Tool Drawing
Brake Cylinder Release Tool	ECH-0005	 S00076

Front Disc Brake Assembly

Removal

Hint:

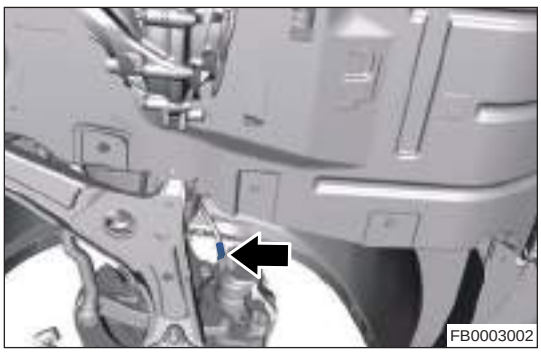
- Use same procedures for right and left sides.
- Procedures listed below are for left side.
- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

⚠ Caution

- After removing disc brake assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.

1. Remove the front left wheel.
2. Loosen coupling bolt between front left brake hose assembly and front left brake caliper assembly.

   Tightening torque: 18 ± 2 N·m

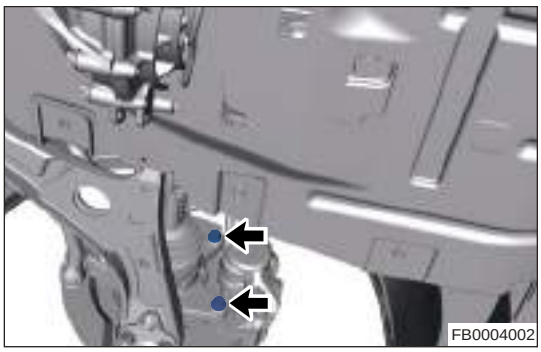

FB0003002

⚠ Caution

- After removing brake hose, perform sealing treatment to prevent foreign matter from entering.
- DO NOT allow any foreign matter such as dirt and dust to enter brake hose from joint parts.

3. Remove 2 coupling bolts between front left brake caliper assembly and front left steering knuckle.

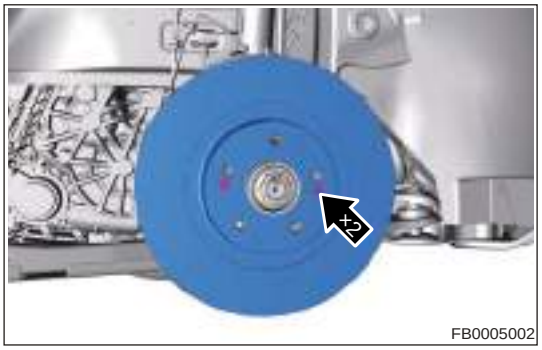
   Tightening torque: 90 - 110 N·m


FB0004002

4. Remove the front left brake caliper assembly.

5. Remove 2 fixing screws from front brake disc.

   Tightening torque: 7 - 9 N·m


FB0005002

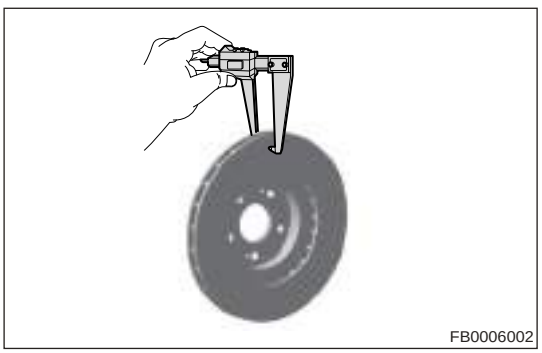
6. Remove the front brake disc.

Inspection

1. Check brake caliper fixing bracket and brake caliper guide pin set.
   a. Clean the contact surfaces of brake caliper fixing bracket and brake lining support shims with brake cleaner. Check for deformation, cracks, rust and foreign matter which is difficult to remove.
   b. Check brake caliper guide pin rubber dust boot for deformation, cracks, wear and foreign matter which is difficult to remove.
   c. Install the brake caliper guide pin and its rubber dust boot to brake caliper fixing bracket. Brake caliper guide pin set should move smoothly without sticking when pushing it with hand; otherwise replace it.
   d. After installing the brake lining, check if it is easy to drop (due to insufficient elasticity of support shim). Replace as necessary.
2. Check the brake disc.
   a. Minor scratch or wear on brake disc surface is acceptable. If severe scratch or deformation exists, the brake disc must be replaced.
   b. Excessive wear of brake disc may cause poor contact between brake lining and surface of brake disc. If protrusion on the brake disc is not removed before installing new brake lining, it will cause abnormal wear of brake disc.
   c. It is normal that the surface of brake disc is worn when replacing brake lining. If cracks or burned spots exist, the brake disc must be replaced.
3. Check the brake disc thickness.
   a. Using a vernier caliper, measure brake disc thickness at center of brake lining contact surface as shown in illustration.

      Standard thickness: 25 mm

      Minimum thickness: 23 mm


FB0006002

   b. If it is less than the minimum thickness due to wear, replace brake disc.

⚠ Caution
• DO NOT machine the brake disc, because it may make brake disc thickness less than the minimum thickness.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Make sure contact surface of lining and brake disc is free of oil and grease.
- Before installing brake linings, completely retract brake caliper piston back into bore of brake caliper.
- Depress brake pedal several times to secure brake linings to brake disc in order to ensure safety after installing brake linings and before moving vehicle.
- Replace the brake linings in pairs. DO NOT replace one alone.
- DO NOT install inner brake lining and outer brake lining reversely.
- Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
- Be sure to perform bleeding procedures for brake system after installation.
- Be sure to add brake fluid to a proper level after installation.

Replacement of Lining Assembly

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- After removing front brake caliper assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.

1. Remove the front left wheel.
2. Remove 1 guide pin tightening bolt between front left brake caliper body assembly and front brake caliper bracket.

   Tightening torque: 22 - 32 N·m


FB0007002

3. Slowly lift up front left brake caliper body assembly and remove 2 lining return springs.

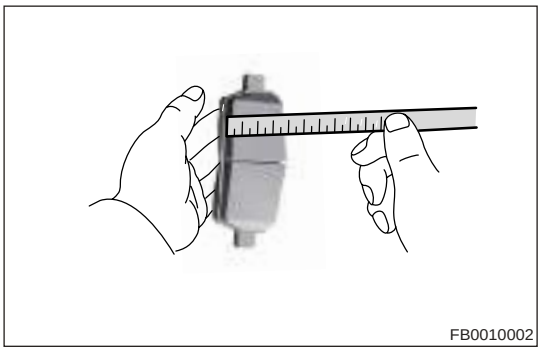
FB0008002

4. Remove the front outer/inner lining assembly.

5. Remove 2 front spring plates.

Inspection

1. Check the brake lining.
   a. Visually check the brake lining for flatness, and also check for excessive wear. If the condition of lining cannot be confirmed accurately only by visual inspection, perform physical inspection as necessary.
   b. Measure the minimum brake lining thickness. When the minimum thickness of brake lining is 2 mm or less, replace the brake linings.



   c. When replacing the excessively worn brake linings (inner and outer), it is also necessary to replace the linings on opposite side of vehicle as well as unchecked linings to maintain proper braking performance.
   d. If it is unnecessary to replace brake linings, be sure to reinstall brake linings to original positions.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to tighten fixing bolts to specified torques during installation.
- Be sure to add brake fluid to a proper level after installation.
- Be sure to perform bleeding procedures for brake system after installation.
- Replace the brake linings in pairs. DO NOT replace one alone.
- Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
- Depress brake pedal several times to secure brake linings to brake disc in order to ensure safety after installing brake linings and before moving vehicle.
- DO NOT install inner and outer linings in reverse.

REAR BRAKE ASSEMBLY

Warnings and Precautions

Precautions

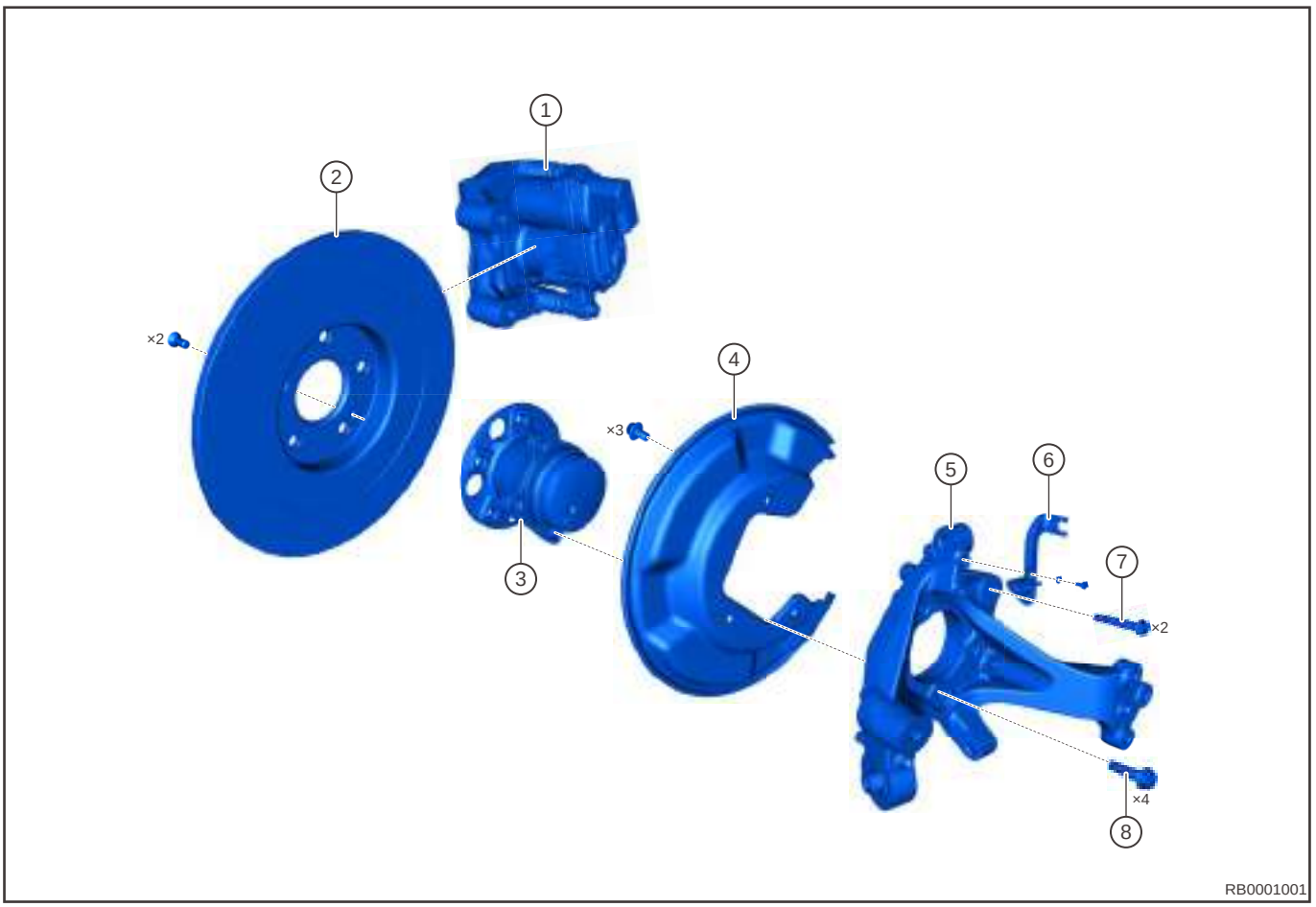
In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

1. DO NOT machine the brake disc, because it may make brake disc thickness less than the minimum thickness.
2. After removing front/rear brake caliper assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.
3. When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

System Overview

System Component Diagram

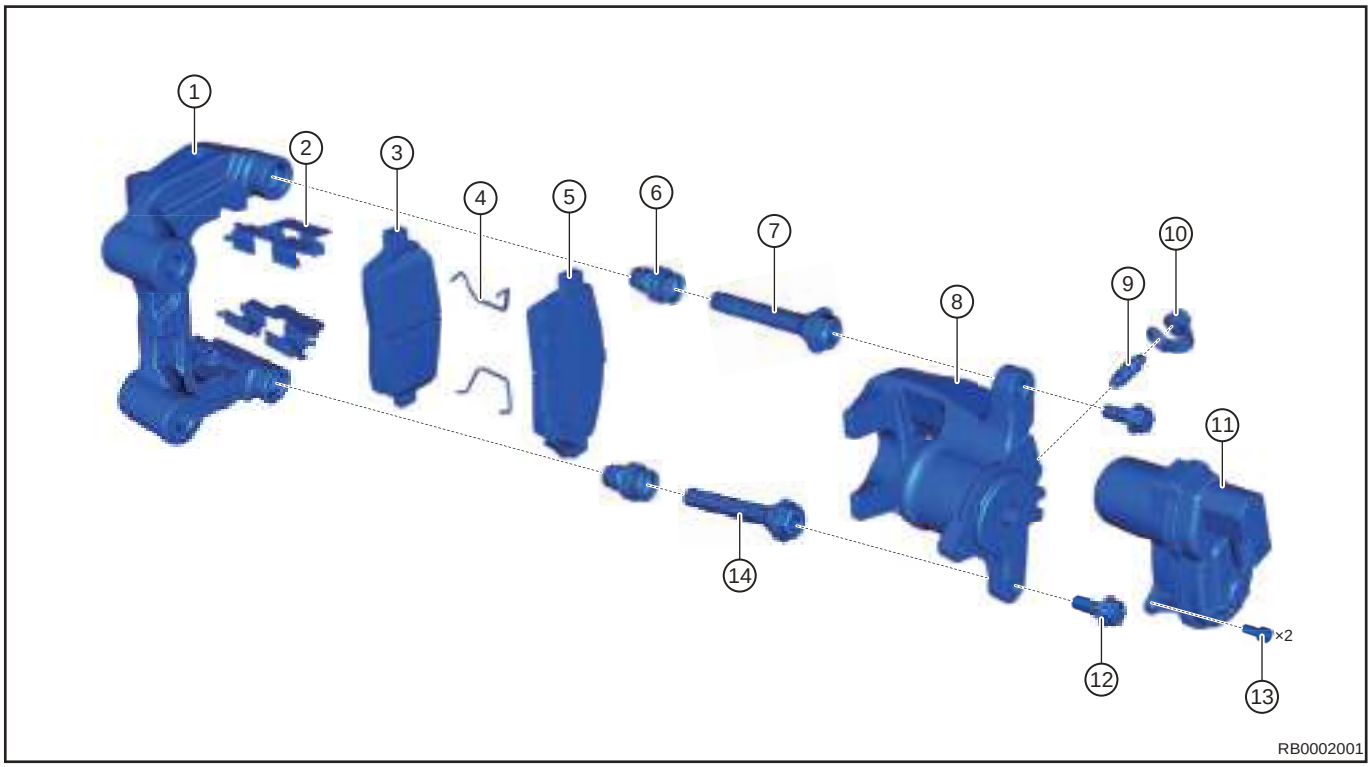
Rear Left Brake Assembly



1	Rear Left Brake Caliper Assembly	5	Rear Left Steering Knuckle
2	Rear Brake Disc	6	Rear Left Wheel Electrical Caliper Wire Harness Bracket
3	Rear Hub Bearing Unit	7	Brake Caliper Mounting Bolt x 2
4	Rear Left Dust Guard	8	Hub Bearing Fixing Bolt x 4

Rear left brake assembly is mainly composed of rear left brake caliper assembly, rear brake disc, front hub, rear hub bearing unit, etc.
Rear brake disc is fixed on rear hub bearing unit, clamped in the middle of rear outer lining assembly/rear inner lining assembly, and rotates with wheel. Rear brake caliper body assembly is connected with rear brake caliper bracket (bracket is fixed on steering knuckle) through guide pin tightening bolt.

Rear Left Brake Caliper Assembly



1	Rear Brake Caliper Bracket	8	Rear Left Brake Caliper Body Assembly
2	Rear Spring Plate x 2	9	Drain Plug
3	Rear Outer Lining Assembly	10	Drain Plug Cover
4	Lining Return Spring x 2	11	Electronic Control Execution Unit
5	Rear Inner Lining Assembly	12	Guide Pin Tightening Bolt
6	Guide Pin Dust Boot	13	Electronic Control Execution Unit Mounting Bolt x 2
7	Main Guide Pin	14	Sub Guide Pin

⚠ Caution

- Main guide pin is installed on the side close to bleeder plug, and sub guide pin is installed on the side far away from bleeder plug. Incorrect installation method will lead to abnormal sound on bumpy road.

Rear left brake caliper assembly is mainly composed of rear brake caliper bracket, rear left brake caliper body assembly, electronic control execution unit, guide pin, guide pin dust boot, etc.
When braking, brake fluid of brake master cylinder enters brake caliper assembly of each wheel through hydraulic line. A force acting on brake caliper assembly piston pushes brake caliper assembly piston and it’s inner lining assembly to move to the left and press it onto brake disc, so brake disc applies a rightward reaction force to brake caliper assembly piston, making brake caliper assembly piston and brake caliper body assembly move to the right along guide pin until outer lining assembly is also pressed onto brake disc. At this time, lining assemblies on both sides are pressed on brake disc, and brake disc is clamped to make it brake.

Diagnosis & Testing

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Possible Cause
Braking deviation	Oily lining assembly
	Uneven brake disc wear
	Brake caliper body assembly failure (piston stuck)
Brake shakes	Hub bearing is damaged
	Uneven brake disc wear
	Steering/suspension part is loose
	Uneven lining assembly wear
	Brake caliper assembly fixing bolt is loose
Abnormal noise occurs during braking	Spring plate is damaged
	Hub bearing is damaged
	Abnormal brake disc wear
	Oily lining assembly
	Steering/suspension part is loose
	Abnormal lining assembly wear
	Brake caliper assembly fixing bolt is loose
Brake stuck	Minimum brake pedal free play
	Poor returning of guide pin (deformed or damaged)
	Brake caliper body assembly failure (piston stuck)

On-vehicle Service

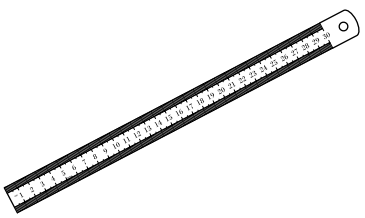
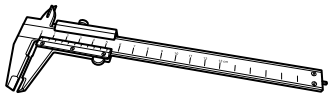
Specifications

Torque Specifications

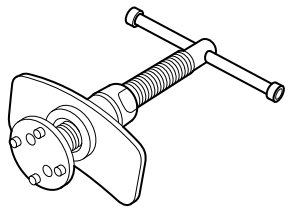
Description	Torque (N·m)
2 Mounting Bolts Between Electronic Control Execution Unit and Rear Left Brake Caliper Assembly	9 - 11
Rear Brake Disc Fixing Screw	4.5 ± 0.5
2 Brake Caliper Mounting Bolts Between Rear Left Brake Caliper Assembly and Rear Left Steering Knuckle	85 - 90
Coupling Bolt Between Rear Left Brake Hose Assembly and Rear Left Brake Caliper Assembly	27 ± 2
2 Guide Pin Tightening Bolts Between Rear Left Brake Caliper Body Assembly and Rear Brake Caliper Bracket	22 - 32
Coupling Bolt Between Rear Bearing and Rear Steering Knuckle	70 - 75

Tools

General Tools

Tool Name	Tool Drawing
Caliper	 RCH0063006
Thickness Measurement Caliper	 RCH0019006

Special Tool

Tool Name	Part No.	Tool Drawing
Brake Cylinder Release Tool	ECH-0005	 S00076

Rear Left Brake Assembly

Removal

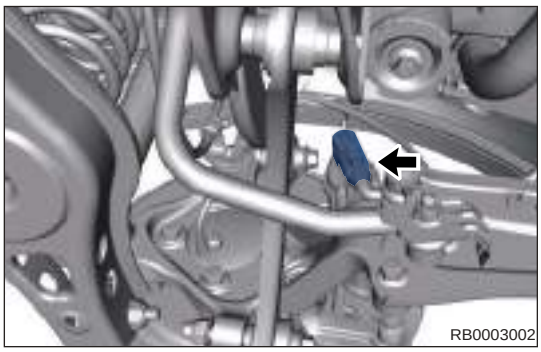
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.
- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

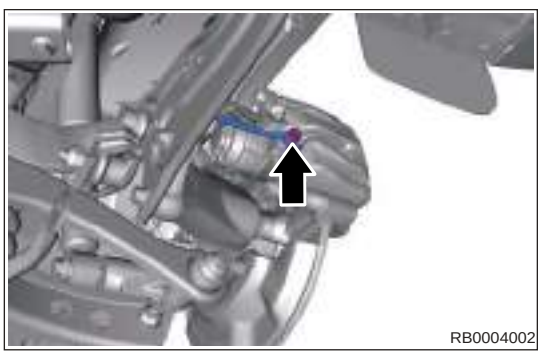
⚠ Caution

- After removing disc brake assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.

1. Disconnect the negative battery cable.
2. Remove the rear left wheel.
3. Disconnect the electronic control execution unit wire harness connector.


RB0003002

4. Remove coupling bolt between rear left brake hose assembly and rear left brake caliper assembly.
   Tightening torque: 27 ± 2 N·m

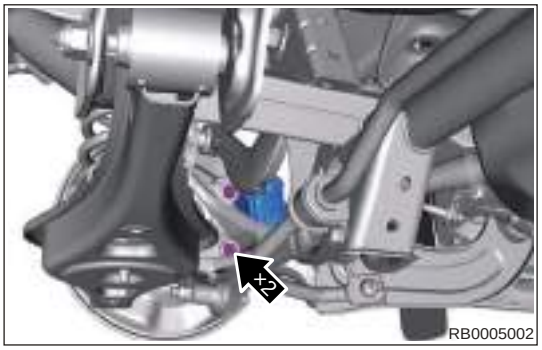

RB0004002

⚠ Caution

- When removing coupling bolt, be careful not to drop 2 gaskets.
- After removing brake hose, perform sealing treatment to prevent foreign matter from entering.
- DO NOT allow any foreign matter such as dirt and dust to enter brake hose from joint parts.

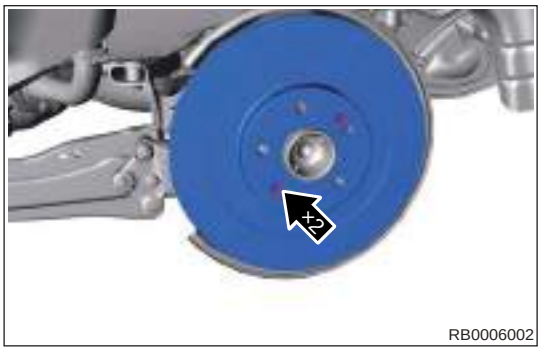
5. Remove 2 brake caliper mounting bolts between rear left brake caliper assembly and rear left steering knuckle.

   Tightening torque: 85 - 90 N·m



6. Remove the rear left brake caliper assembly.
7. Remove fixing screw from rear brake disc

   Tightening torque: 4.5 ± 0.5N·m



8. Remove the rear brake disc.

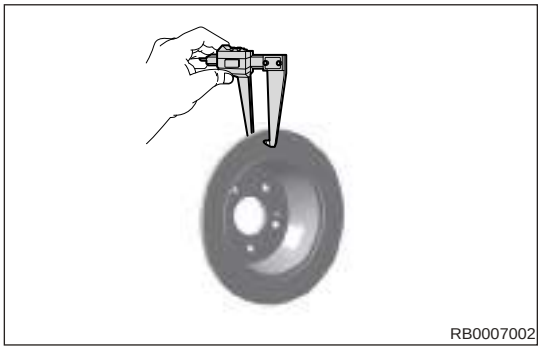
Inspection

1. Check brake caliper fixing bracket and brake caliper guide pin set.
   a. Clean the contact surfaces of brake caliper fixing bracket and brake lining support shims with brake cleaner. Check for deformation, cracks, rust and foreign matter which is difficult to remove.
   b. Check brake caliper guide pin rubber dust boot for deformation, cracks, wear and foreign matter which is difficult to remove.
   c. Install the brake caliper guide pin and its rubber dust boot to brake caliper fixing bracket. Brake caliper guide pin set should move smoothly without sticking when pushing it with hand; otherwise replace it.
   d. After installing the brake lining, check if it is easy to drop (due to insufficient elasticity of support shim). Replace as necessary.
2. Check the brake disc.
   a. Minor scratch or wear on brake disc surface is acceptable. If severe scratch or deformation exists, the brake disc must be replaced.
   b. Excessive wear of brake disc may cause poor contact between brake lining and surface of brake disc. If protrusion on the brake disc is not removed before installing new brake lining, it will cause abnormal wear of brake disc.
   c. It is normal that the surface of brake disc is worn when replacing brake lining. If cracks or burned spots exist, the brake disc must be replaced.
3. Check the brake disc thickness.

a. Using a vernier caliper, measure brake disc thickness at center of brake lining contact surface as shown in illustration.

Standard thickness: 10 mm

Minimum thickness: 8 mm



b. If it is less than the minimum thickness due to wear, replace brake disc.

⚠ Caution

- DO NOT machine the brake disc, because it may make brake disc thickness less than the minimum thickness.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Make sure contact surface of lining and brake disc is free of oil and grease.
- Before installing brake linings, completely retract brake caliper piston back into bore of brake caliper.
- Depress brake pedal several times to secure brake linings to brake disc in order to ensure safety after installing brake linings and before moving vehicle.
- Replace the brake linings in pairs. DO NOT replace one alone.
- DO NOT install inner brake lining and outer brake lining reversely.
- Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
- Be sure to perform bleeding procedures for brake system after installation.
- Be sure to add brake fluid to a proper level after installation.

Replacement of Lining Assembly

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- After removing rear brake caliper assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.

1. Remove the rear left wheel.

2. Remove 2 guide pin tightening bolts between rear left brake caliper body assembly and rear brake caliper bracket.

   Tightening torque: 22 - 32 N·m

RB0008002

3. Remove the rear left brake caliper body assembly.
4. Remove 2 lining return springs.

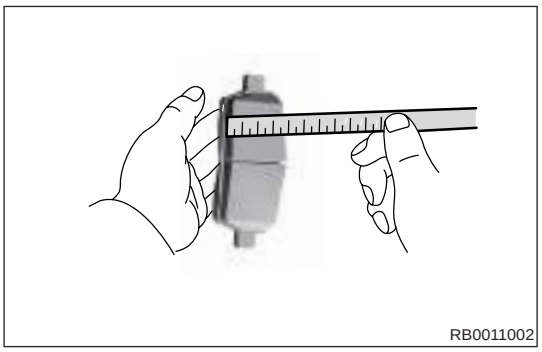
RB0009002

5. Remove rear outer/inner lining assembly.
6. Remove 2 rear spring plates.

RB0010002

Inspection

1. Check the brake lining.
   a. Visually check the brake lining for flatness, and also check for excessive wear. If the condition of lining cannot be confirmed accurately only by visual inspection, perform physical inspection as necessary.
   b. Measure the minimum brake lining thickness. When the minimum thickness of brake lining is 2 mm or less, replace the brake linings.


RB0011002

   c. When replacing the excessively worn brake linings (inner and outer), it is also necessary to replace the linings on opposite side of vehicle as well as unchecked linings to maintain proper braking performance.

d. If it is unnecessary to replace brake linings, be sure to reinstall brake linings to original positions.

Installation

1. Installation is in the reverse order of removal.

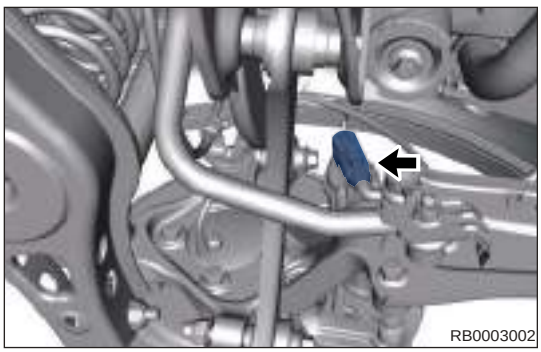
⚠ Caution

- Be sure to tighten fixing bolts to specified torques during installation.
- Be sure to add brake fluid to a proper level after installation.
- Be sure to perform bleeding procedures for brake system after installation.
- Replace the brake linings in pairs. DO NOT replace one alone.
- Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
- Depress brake pedal several times to secure brake linings to brake disc in order to ensure safety after installing brake linings and before moving vehicle.
- DO NOT install inner and outer linings in reverse.

Electronic Control Execution Unit

Removal

1. Disconnect the negative battery cable.
2. Remove the rear left wheel.
3. Disconnect the electronic control execution unit wire harness connector.


RB0003002

4. Remove 2 mounting bolts between electronic control execution unit and rear left brake caliper assembly.

   Tightening torque: 9 - 11 N·m


RB0012002

5. Remove the electronic control execution unit.

   Hint:
   Remove electronic control execution unit and be careful not to damage motor seal ring.

Installation

1. Installation is in the reverse order of removal.

HYDRAULIC BRAKE

Precautions

Precautions

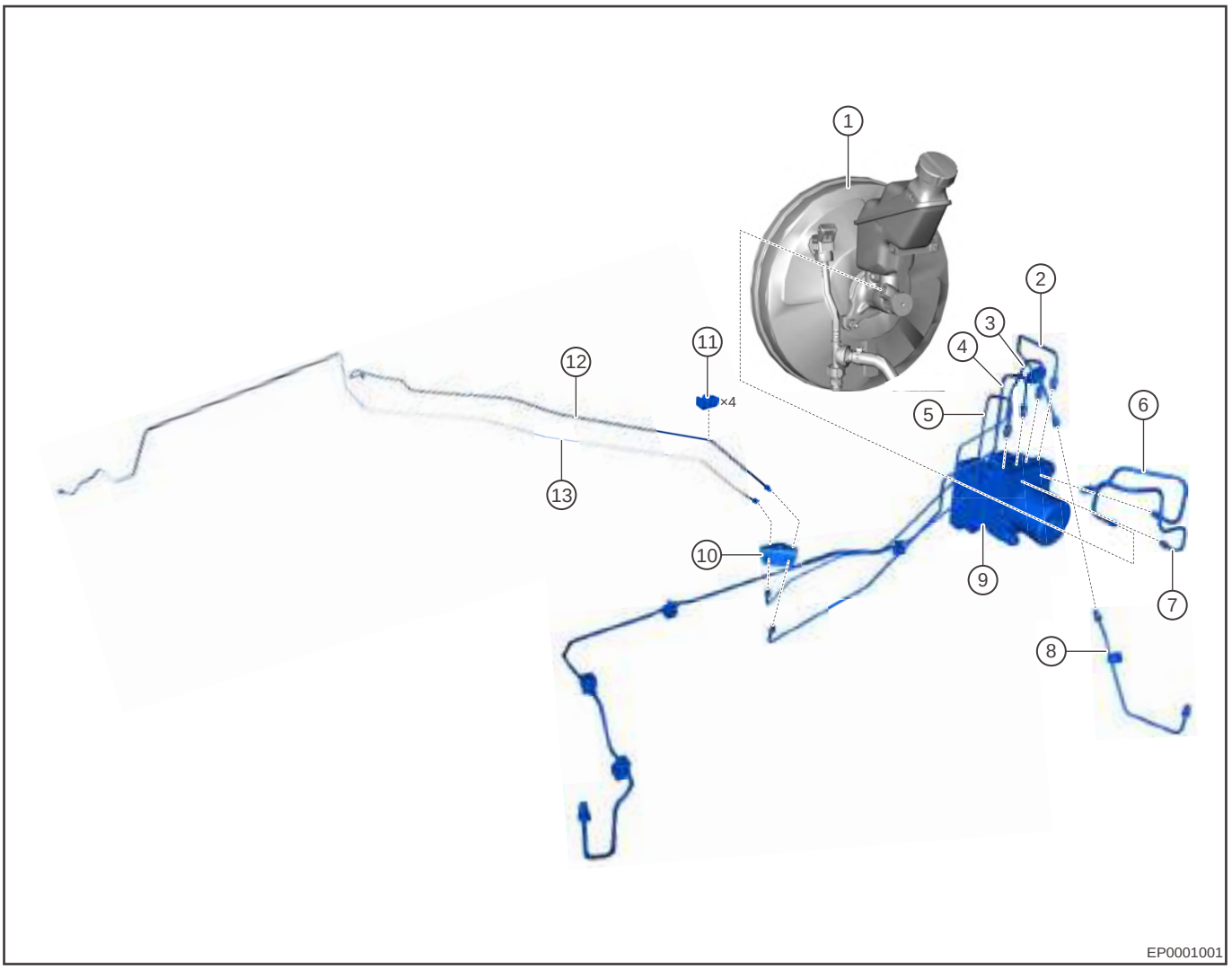
In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

- After removing brake line, perform sealing treatment to prevent foreign matter from entering.
- DO NOT allow any foreign matter such as dirt and dust to enter brake line from joint parts.
- DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose assembly, as brake fluid is corrosive.
- When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of ESP (vehicle power supply is turned off), so as to avoid reverse impact, resulting in ESP internal protection circuit breakdown.

System Overview

System Component Diagram

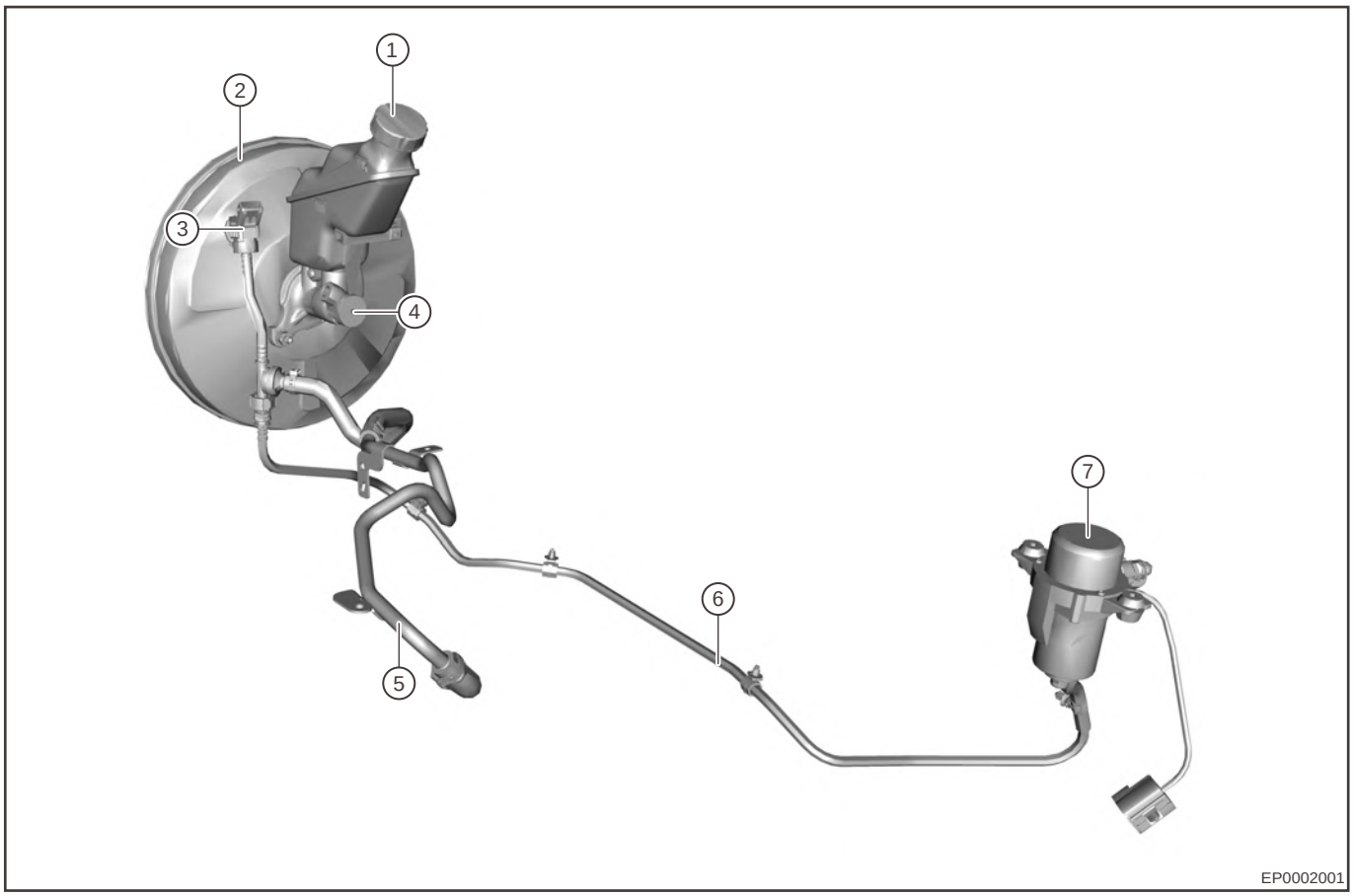
Hydraulic Brake



1	Vacuum Booster with Brake Master Cylinder Assembly	8	Front Left Brake Pipe II Assembly
2	Front Left Brake Pipe I Assembly	9	ESP Module Assembly
3	Rear Right Brake Pipe I Assembly	10	Two-way
4	Rear Left Brake Pipe I Assembly	11	Pipe Clamp with 2 Grooves
5	Front Right Brake Pipe Assembly	12	Rear Left Brake Pipe II Assembly
6	Master Cylinder 1st Chamber Pipe Assembly	13	Rear Right Brake Pipe II Assembly
7	Master Cylinder 2nd Chamber Pipe Assembly		

Hydraulic brake adopts hydraulic transmission device, mainly consists of ESP module assembly, vacuum booster with master cylinder assembly, brake master cylinder assembly, brake reservoir assembly, hydraulic line (brake hose, brake pipe), brake caliper assembly, vacuum pump assembly, etc.
When brake pedal assembly is depressed, brake master cylinder assembly piston is pushed forward, and brake fluid pressure in brake master cylinder assembly is increased. Brake fluid enters brake caliper assembly of each wheel through hydraulic line, and brake caliper assembly piston is pushed outward to allow the force of depressing brake pedal to be transmitted to wheel brake caliper assembly, and push wheel brake caliper assembly to brake.
When brake pedal assembly is released, brake master cylinder assembly piston will return under the action of oil pressure and return spring, brake caliper assembly piston and wheel brake caliper assembly will return to release the brake on wheel.

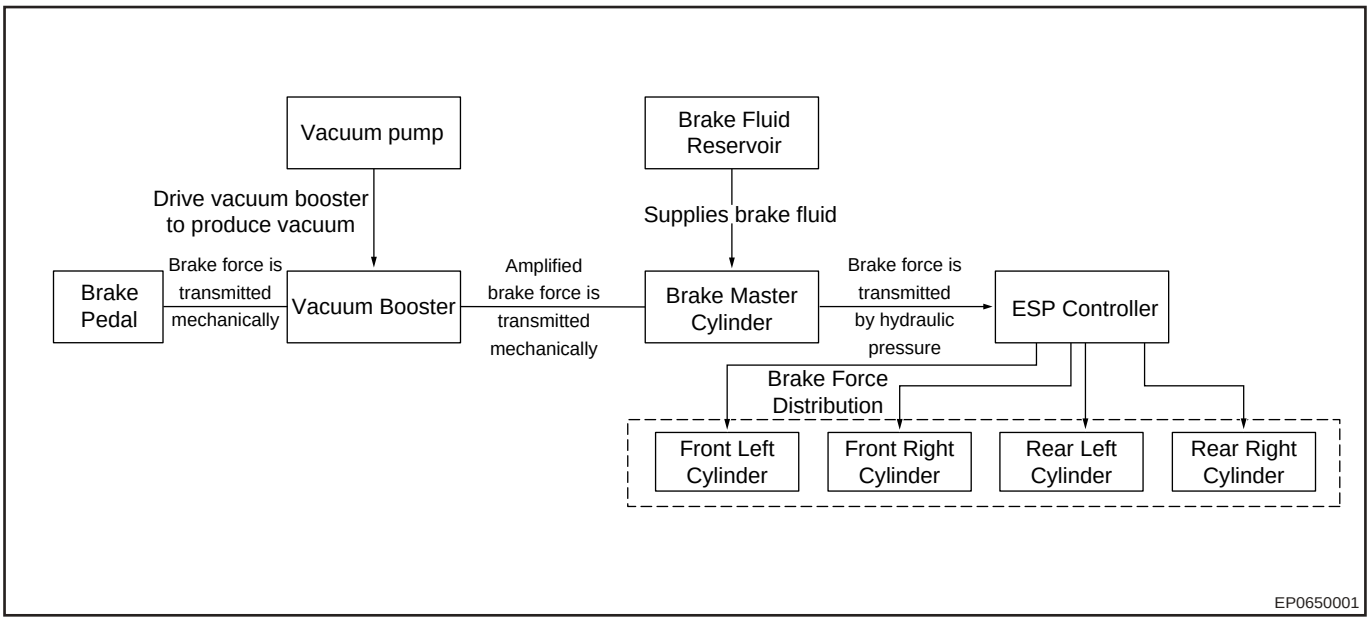
Vacuum Booster with Brake Master Cylinder Assembly



1	Brake Reservoir Assembly	5	Vacuum Tube Assembly
2	Vacuum Booster Assembly	6	Vacuum Pump Connecting Pipe Assembly
3	Atmospheric Pressure Sensor Assembly	7	Vacuum Pump Assembly
4	Brake Master Cylinder Assembly		

Vacuum booster system is mainly composed of vacuum booster assembly, brake master cylinder assembly, brake fluid reservoir assembly, vacuum pump assembly, atmospheric pressure sensor, etc.
Vacuum booster is a component that uses vacuum (negative pressure) to increase force applied by driver to brake pedal assembly.
Vacuum booster is generally located between brake pedal assembly and brake master cylinder assembly. For easy installation, it is usually combined with master cylinder as a set, and part of master cylinder is penetrated into vacuum booster housing.

System Schematic Diagram



When vacuum booster can not obtain vacuum or obtained vacuum is insufficient (at high altitude, low temperature, etc.), it will lead to poor assistance of brake system. Vacuum booster system monitors vacuum changes in vacuum booster through atmospheric pressure sensor, judges operating time of vacuum pump through logic and provides appropriate auxiliary power for brake system. Thereby ensuring that it can provide driver with sufficient braking assistance effect under various working conditions.

Component Operation Description

Brake Fluid Level Sensor
The float in brake fluid reservoir rises/falls according to brake fluid level.
When brake fluid level is on "MAX (maximum)" mark on brake fluid reservoir, the float in brake fluid reservoir rises.
When brake fluid level is on "MIN (minimum)" mark on brake fluid reservoir, the float in brake fluid reservoir falls.
When brake fluid level is below "MIN (minimum)" mark on brake fluid reservoir, brake system malfunction indicator on instrument cluster will come on.

Diagnostic Information and Steps

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.
Brake System:

Symptom	Possible Cause
Poor braking effect	Brake fluid quality
	Air in brake system
	Uneven brake disc wear
	Uneven lining assembly wear
	Minimum brake pedal free play

Symptom	Possible Cause
	Brake system leakage (fluid or pressure)

On-vehicle Service

Specifications

Torque Specifications

Item	Tightening Torque (N·m)
2 Fixing Nuts Between Brake Pedal Assembly and Vehicle Body	23 ± 2
4 Fixing Nuts Between Vacuum Booster Assembly and Brake Pedal Assembly	23 ± 2
Fixing Screw Between Brake Reservoir Assembly and Brake Master Cylinder Assembly	2 - 5
Coupling Bolt Between Front Left Brake Hose Assembly and Front Left Brake Caliper Assembly	27 ± 2
Coupling Nut Between Front Left Brake Hose Assembly and Front Left Brake Pipe II Assembly	18 ± 2
Coupling Bolt Between Rear Left Brake Hose Assembly and Rear Left Brake Caliper Assembly	27 ± 2
Coupling Nut Between Rear Left Brake Hose Assembly and Rear Left Brake Pipe II Assembly	18 ± 2
Coupling Nut Between Rear Left Brake Pipe I Assembly and Two-way	18 ± 2
Coupling Nut Between Rear Left Brake Pipe I Assembly and ESP Module Assembly	18 ± 2
Coupling Bolt Between Front Right Brake Hose Assembly and Front Right Brake Caliper Assembly	27 ± 2
Coupling Nut Between Front Right Brake Pipe Assembly and Front Right Brake Hose Assembly	18 ± 2
Coupling Nut Between Front Right Brake Pipe Assembly and ESP Controller Assembly	18 ± 2
Coupling Bolt Between Rear Right Brake Hose Assembly and Rear Right Brake Caliper Assembly	27 ± 2
Coupling Nut Between Rear Right Brake Pipe II Assembly and Rear Right Brake Hose Assembly	18 ± 2
Coupling Nut Between Rear Right Brake Pipe II Assembly and Two-way	18 ± 2

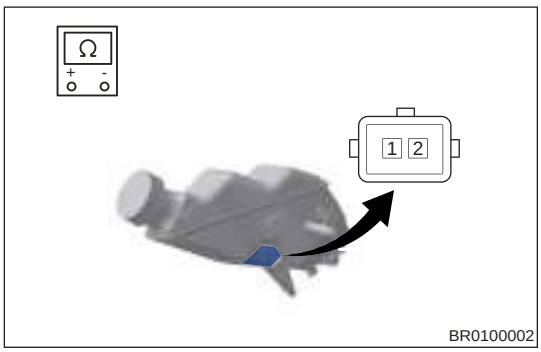
Item	Tightening Torque (N·m)
Coupling Nut Between Rear Right Brake Pipe I Assembly and Two-way	18 ± 2
Coupling Nut Between Rear Right Brake Pipe I Assembly and ESP Controller Assembly	18 ± 2

Inspection and Adjustment

Brake Fluid Level Sensor

1. Disconnect the brake fluid level sensor connector.

2. Using ohm band of digital multimeter, measure brake fluid level sensor terminal.

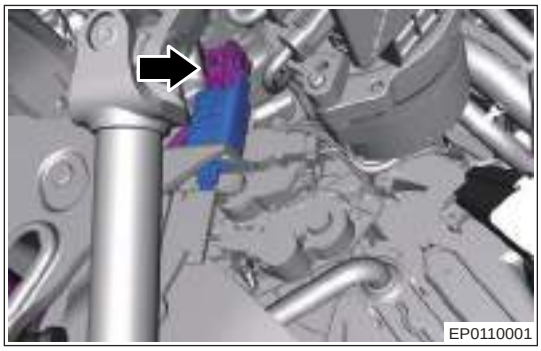


Multimeter Connection	Brake Fluid Level	Specified Condition
Terminal 1 - Terminal 2	MAX	∞
Terminal 1 - Terminal 2	MIN	⩽ 1 Ω

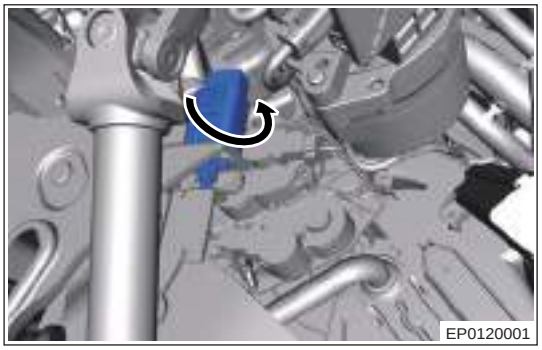
   If measurement result is not as specified, replace brake reservoir assembly.
3. When brake system malfunction indicator on instrument cluster comes on, unplug brake fluid level sensor connector, if brake system malfunction indicator remains on, check wire harness and instrument cluster.
4. When brake system malfunction indicator on instrument cluster comes on, unplug brake fluid level sensor connector, if brake system malfunction indicator goes off immediately, the level sensor is malfunctioning (precondition: brake fluid is within scale range).

Brake Switch Assembly

1. Disconnect the brake light switch assembly connector.

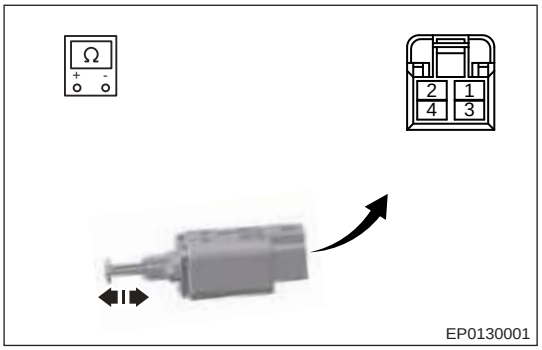


2. Press switch with hand and turn it by 90° counterclockwise to remove brake switch assembly.



3. Using ohm band of digital multimeter, measure brake switch assembly terminal.

Multimeter Connection	Switch Condition	Specified Condition
Terminal 1 - Terminal 3	Brake pedal depressed	∞
Terminal 2 - Terminal 4	Brake pedal depressed	⩽ 1 Ω
Terminal 1 - Terminal 3	Brake pedal released	⩽ 1 Ω
Terminal 2 - Terminal 4	Brake pedal released	∞



If measurement result is not as specified, replace brake switch assembly.

Brake Pedal Assembly

1. Brake pedal free play inspection:
   - Stop engine. Depress brake pedal several times until there is no vacuum in vacuum booster (- depress brake pedal until resistance is felt), then release brake pedal.
   - Reasonable range of brake pedal free play: 0 - 65 mm.
2. Brake pedal height inspection:
   - Turn over carpet and measure the distance between brake pedal center and dash panel.
   - Loosen the vacuum booster push rod locking nut and rotate the vacuum booster push rod clockwise or counterclockwise to adjust brake pedal height to specified value.

Vacuum Booster Assembly

1. Air tightness inspection:
   - Start engine and stop it after 1 or 2 minutes, disconnect the negative battery cable, and then slowly depress brake pedal several times. Check that every pedal depression amount becomes less than the previous one.
   - Start engine, depress and hold pedal, and then stop engine. Depress and hold pedal for 30 seconds, and check that pedal reserve distance does not change.
2. Operation inspection:
   - Stop engine and disconnect negative battery cable.
   - Depress the pedal several times and check that pedal reserve distance does not change.
   - Depress and hold pedal, and then start engine. Check that pedal can only be depressed slightly.

Brake System Bleeding

⚠ Caution

- When performing bleeding procedures for brake system, wear safety glasses.
- Be careful when bleeding air, as brake fluid at high pressure may spray out from bleeder screw.

⚠ Warning

- Before removing brake fluid reservoir, wipe off any dust and other foreign matters on brake fluid reservoir to prevent them from entering.
- Use fresh, clear and well-sealed brake fluid with specified type or equivalent.
- DO NOT allow the brake fluid to adhere to any paint surface, such as vehicle body. If brake fluid leaks onto any paint surface, immediately wash it off.
- During bleeding, do not depress brake pedal repeatedly at any time with bleeder screw opened. Otherwise, air amount in the system will increase to make an extra bleeding.
- DO NOT drain the brake fluid in brake fluid reservoir while bleeding brake system.

Hint:

- An assistant will be required to assist when bleeding brake system.

1. Remove cap from brake fluid reservoir assembly and ensure that brake fluid level is between the “MIN (Minimum)” and “MAX (Maximum)” mark on brake fluid reservoir.
2. Raise vehicle and remove drain plug cover.
3. Loosen brake bleeder screw cap and connect a clear plastic hose to bleeder screw. Submerge the end of hose into container.
4. Have an assistant depress brake pedal 3 to 4 times repeatedly; and depress and hold it at a lower position, then loosen the bleeder screw.
5. Tighten bleeder screw every time the brake pedal goes down quickly, then release the brake pedal.
6. Ensure that brake fluid level is not lower than "MIN (minimum)" mark on brake fluid reservoir assembly.
7. Repeat above steps, and use the same procedures to bleed brake line of each wheel in order of rear left wheel, front left wheel, front right wheel and rear right wheel, until no air exists in brake system.

   Empty sign: A stream of fresh brake fluid flows into clear container without bubbles.

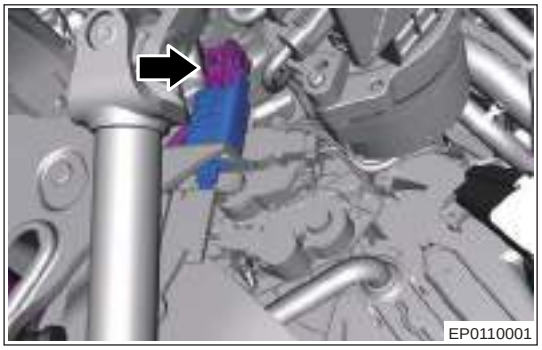
   Hint:
   During bleeding of brake system, make sure brake fluid level in brake fluid reservoir is always near “MAX” mark. Check brake fluid level at all times during bleeding. Add brake fluid as necessary.
8. Check that brake fluid level is between the “MIN (Minimum)” and “MAX (Maximum)” mark on brake fluid reservoir.
9. Check the brake pedal braking effect. If braking effect is poor or pedal is spongy, air may still exist in system. Perform bleeding procedures for brake system again as necessary.
10. Test vehicle to confirm that brakes operate properly with good depressing feel.

Brake Pedal Assembly

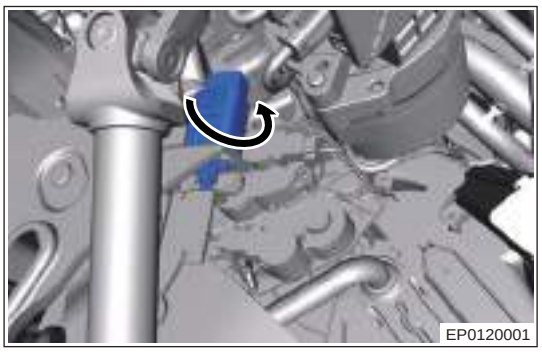
Removal

1. Disconnect the negative battery cable.
2. Remove the instrument panel lower left protector assembly.
3. Remove the electronic accelerator pedal assembly.

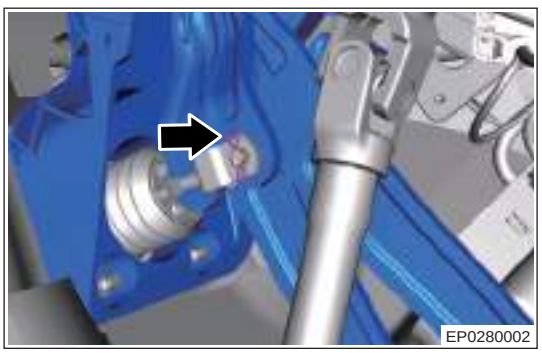
4. Disconnect the brake light switch assembly connector.



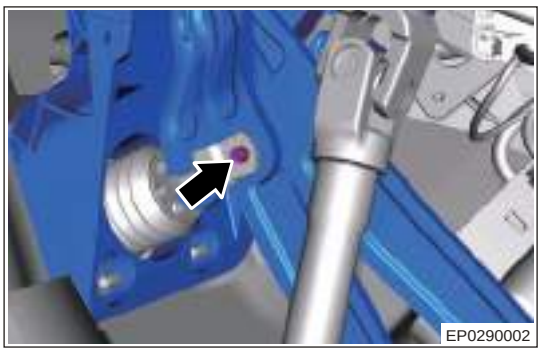
5. Press switch with hand and turn it by 90° counterclockwise to remove brake switch assembly.



6. Remove lock pin between vacuum booster assembly and brake pedal.

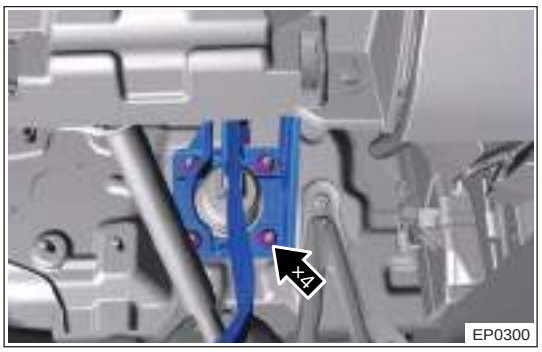


7. Remove lock shaft between vacuum booster assembly and brake pedal.



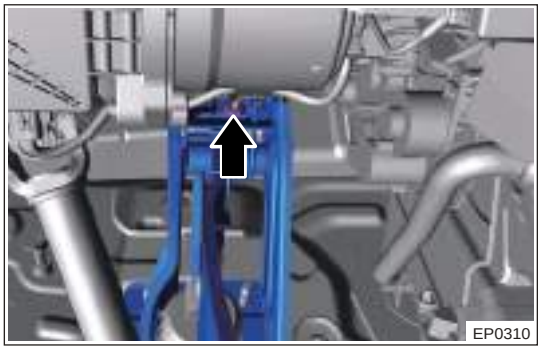
8. Remove 4 fixing nuts between vacuum booster assembly and brake pedal assembly.

   Tightening torque: 23 ± 2 N·m



9. Remove 1 fixing nut between brake pedal assembly and vehicle body.

   Tightening torque: 23 ± 2 N·m



10. Remove the brake pedal assembly.

Installation

1. Installation is in the reverse order of removal.

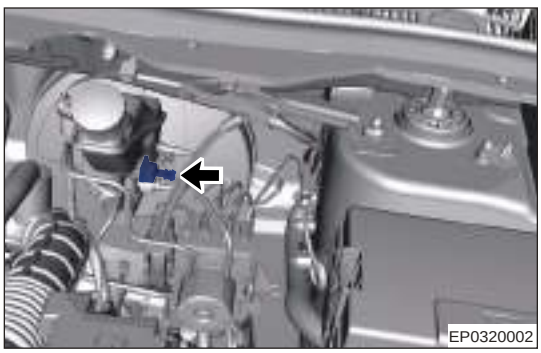
Brake Reservoir Assembly

Removal

Hint:

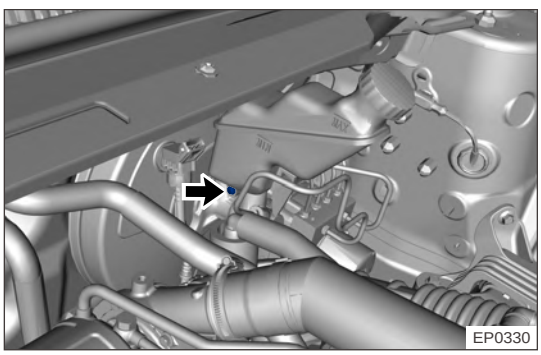
- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

1. Drain the brake fluid in brake reservoir assembly.
2. Disconnect the brake fluid level sensor connector (arrow).



3. Remove fixing screw (arrow) between brake reservoir assembly and brake master cylinder assembly.

   Tightening torque: 5 ± 1 N·m



4. Remove the brake reservoir assembly.

Installation

1. Installation is in the reverse order of removal.

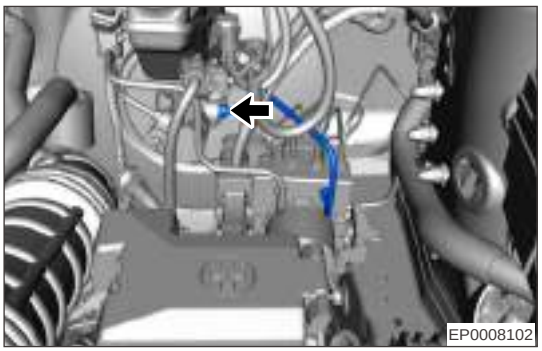
Brake Master Cylinder Assembly

Hint:

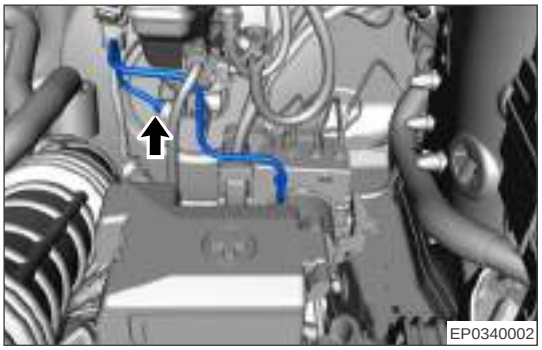
- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

Removal

1. Remove the brake reservoir assembly.
2. Loosen fixing nut (arrow) between master cylinder front chamber pipe assembly and brake master cylinder assembly.

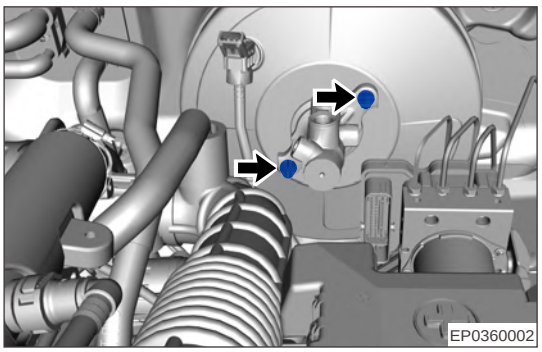


3. Loosen fixing nut between master cylinder rear chamber pipe assembly and brake master cylinder assembly.



4. Remove 2 fixing bolts between brake master cylinder assembly and vacuum booster assembly.

   Tightening torque: 25 ± 4 N·m



5. Remove the brake master cylinder assembly.

Installation

1. Installation is in the reverse order of removal.

Vacuum Booster Assembly

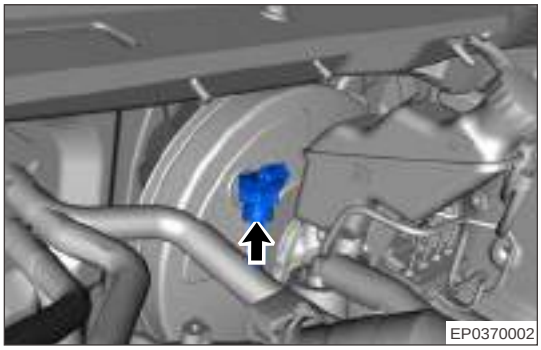
Hint:

- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

Removal

1. Disconnect the negative battery cable.
2. Remove the brake master cylinder assembly.
3. Remove the brake pedal assembly.

4. Disconnect connection between vacuum tube assembly and vacuum booster assembly.



5. Remove the vacuum booster with brake master cylinder assembly.

Installation

1. Install the vacuum booster with brake master cylinder assembly.
2. Install 4 fixing nuts between brake pedal assembly and vacuum booster assembly.

   Tightening torque: 23 ± 2 N·m

3. Install lock shaft and lock pin between vacuum booster assembly and brake pedal.
4. Install coupling nuts between master cylinder 1st, 2nd brake pipe and brake cylinder.

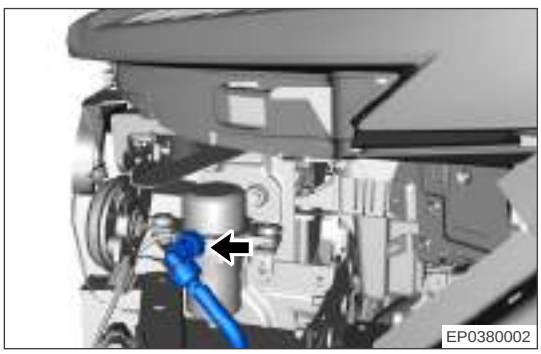
   Tightening torque: 18 ± 2 N·m

5. Connect vacuum pipe assembly and vacuum booster assembly.
6. Install brake fluid reservoir assembly to master cylinder connecting pipe and reservoir adapter, and install clamp.
7. Fill brake fluid and drain the air in brake system.

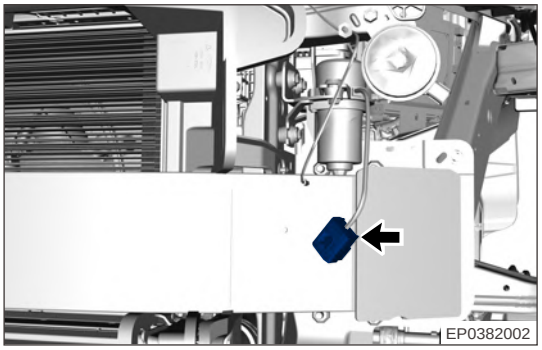
Vacuum Pump Assembly

Removal

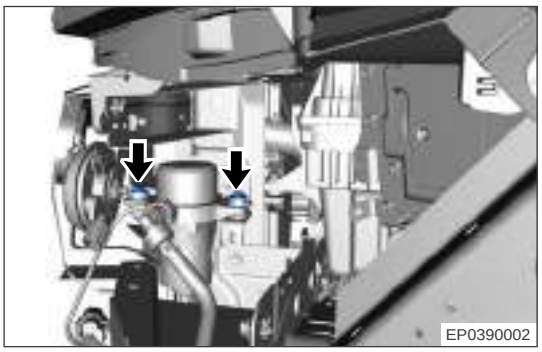
1. Disconnect the negative battery cable.
2. Remove the front left wheel.
3. Remove the front left wheel house protector.
4. Disconnect connection between vacuum pump connecting pipe assembly and vacuum pump assembly.



5. Disconnect the vacuum pump assembly connector.



6. Remove 2 fixing bolts from vacuum pump assembly.
   Tightening torque: 9 ± 1.5 N·m



7. Remove the vacuum pump assembly.

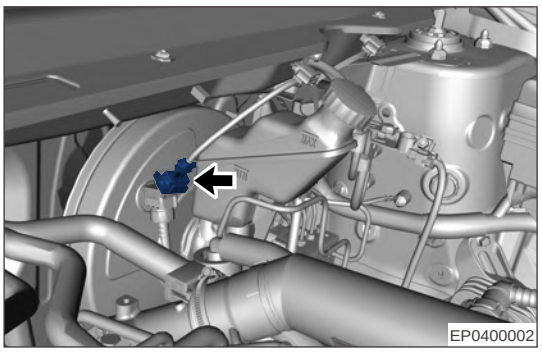
Installation

1. Installation is in the reverse order of removal.

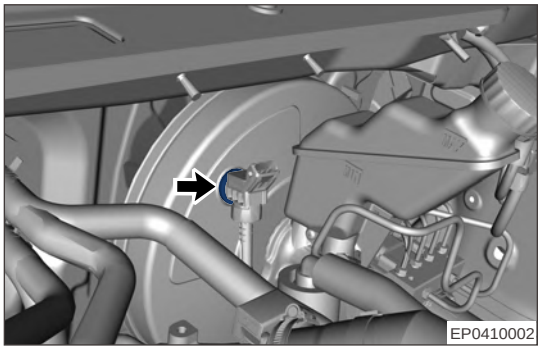
Vacuum Tube Assembly

Removal

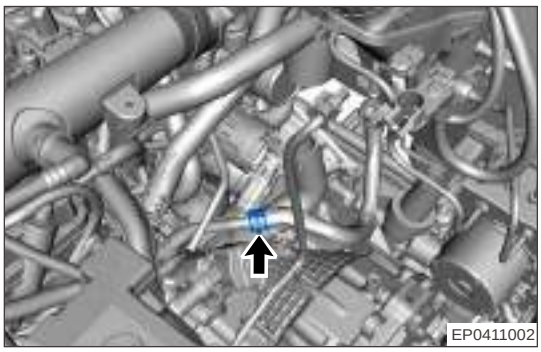
1. Remove battery and tray.
2. Remove the air filter assembly.
3. Remove the front left wheel.
4. Remove the front left wheel house protector.
5. Disconnect the atmospheric pressure sensor assembly connector.



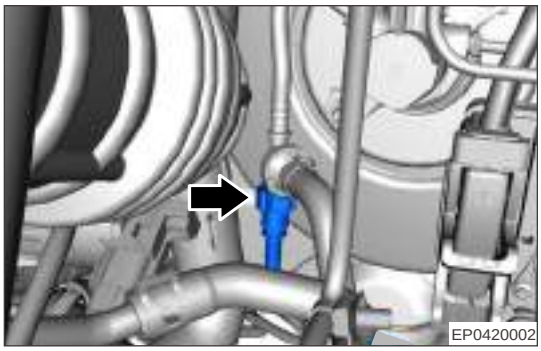
6. Disconnect connection between vacuum tube assembly and vacuum booster assembly.



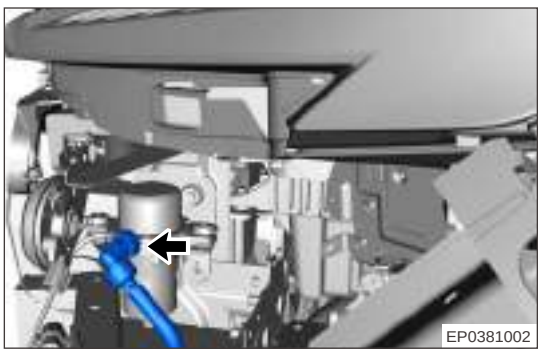
7. Loosen elastic hose clamp between vacuum tube assembly and metal vacuum tube.



8. Remove the vacuum tube assembly.
9. Loosen elastic hose clamp between vacuum pump connecting pipe assembly and vacuum tube assembly.



10. Remove the vacuum tube assembly.
11. Disconnect connection between vacuum pump connecting pipe assembly and vacuum pump assembly.



12. Remove the vacuum pump connecting pipe assembly.

Installation

1. Installation is in the reverse order of removal.

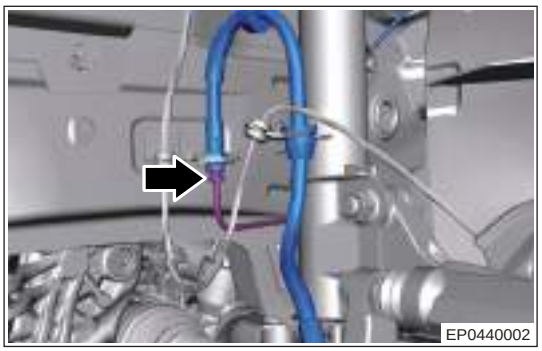
Brake Hose Assembly (Take left side as an example)

Removal

Hint:

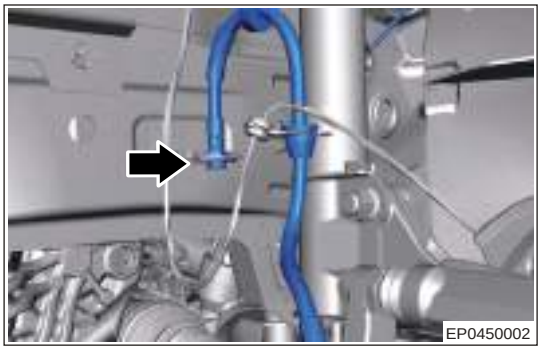
- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

1. Remove the front left wheel.
2. Remove coupling nut (arrow) between front left brake hose assembly and front left brake pipe II assembly.

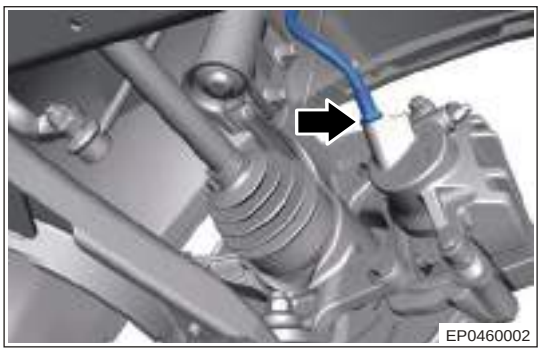


> **⚠ Caution**
>
> - After removing brake line, perform sealing treatment to prevent foreign matter from entering.
> - DO NOT allow any foreign matter such as dirt and dust to enter brake line from joint parts.

3. Remove holding reed (arrow) between front left brake hose assembly and front left brake pipe II assembly.



4. Remove holding reed (arrow) between front left brake hose assembly and front left brake pipe II assembly.

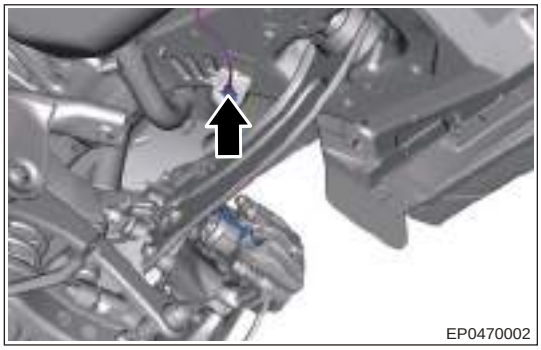


5. Remove the front left brake hose assembly.

> **⚠ Caution**
>
> - DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose assembly, as brake fluid is corrosive.

6. Remove the rear left wheel.

7. Remove coupling nut (arrow) between rear left brake hose assembly and rear left brake pipe II assembly.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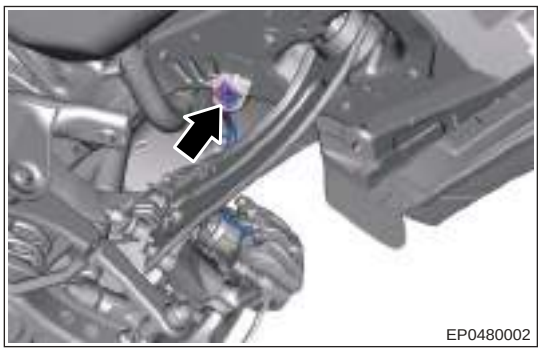
⚠ Caution

- After removing brake line, perform sealing treatment to prevent foreign matter from entering.
- DO NOT allow any foreign matter such as dirt and dust to enter brake line from joint parts.

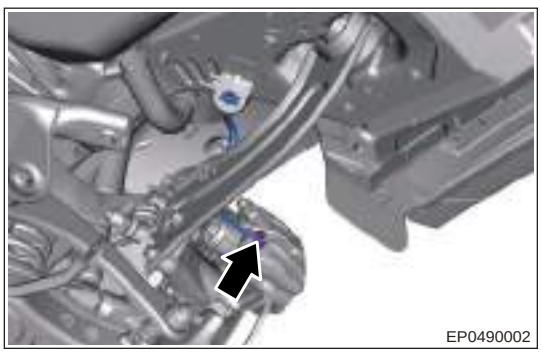
8. Remove holding reed (arrow) between rear left brake hose assembly and rear left brake pipe II assembly.


EP0480002

9. Remove coupling bolt (arrow) between rear left brake hose assembly and rear left brake caliper assembly.

   Hint:

   - When removing coupling bolt, be careful not to drop 2 gaskets.


EP0490002

10. Remove the rear left brake hose assembly.

⚠ Caution

- DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose, as brake fluid is corrosive.

Installation

1. Install the front left brake hose assembly.
2. Install and tighten coupling bolt between front left brake hose assembly and front left brake caliper assembly.

   Tightening torque: 27 ± 2 N·m

3. Install and tighten coupling nut between front left brake hose assembly and front left brake pipe II assembly.

   Tightening torque: 18 ± 2 N·m

4. Install holding reed between front left brake hose assembly and front left brake pipe assembly.
5. Install the rear left brake hose assembly.

6. Install and tighten coupling bolt between rear left brake hose assembly and rear left brake caliper assembly.

   Tightening torque: 27 ± 2 N·m

Hint:

- When installing coupling bolt, be careful not to drop the 2 gaskets.

7. Install and tighten coupling nut between rear left brake hose assembly and rear left brake pipe II assembly.

   Tightening torque: 18 ± 2 N·m

8. Install holding reed between rear left brake hose assembly and rear left brake pipe II assembly.
9. Fill brake fluid and drain the air in brake system.
10. Install front left wheel and rear left wheel.

Brake Pipe Assembly

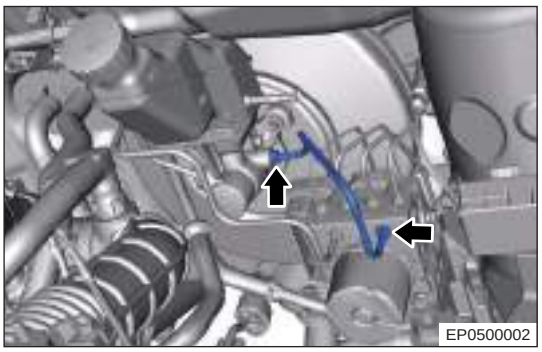
Removal

Hint:

- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

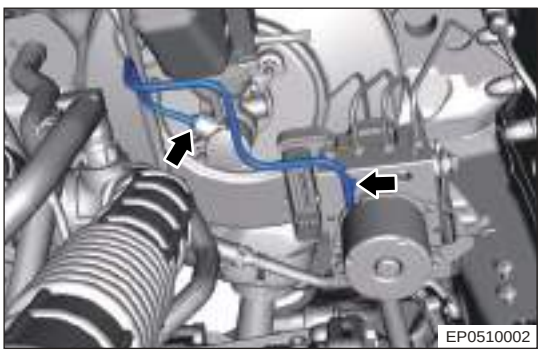
1. Drain the brake fluid in reservoir.
2. Remove battery and tray.
3. Loosen coupling nuts (arrow) between master cylinder front chamber pipe assembly and brake master cylinder assembly and EPB module assembly.

   Tightening torque: 18 ± 2 N·m


EP0500002

4. Loosen coupling nuts (arrow) between master cylinder rear chamber pipe assembly and brake master cylinder assembly and EPB module assembly.

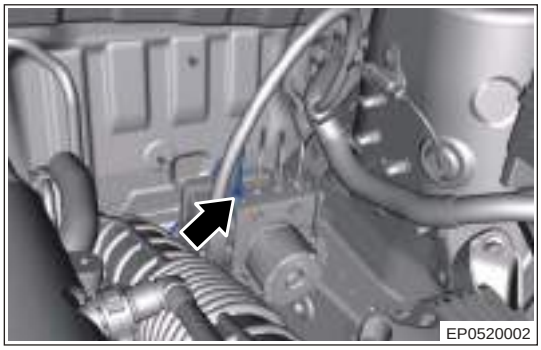
   Tightening torque: 18 ± 2 N·m


EP0510002

5. Remove the front right wheel.

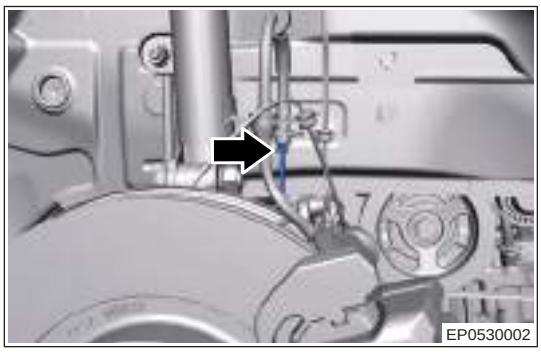
6. Remove coupling nut (arrow) between front right brake pipe assembly and ESP module assembly.

   Tightening torque: 18 ± 2 N·m



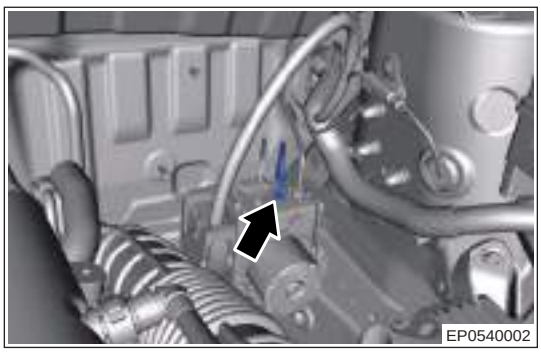
7. Remove coupling nut (arrow) between front right brake pipe assembly and front right brake hose assembly

   Tightening torque: 18 ± 2 N·m



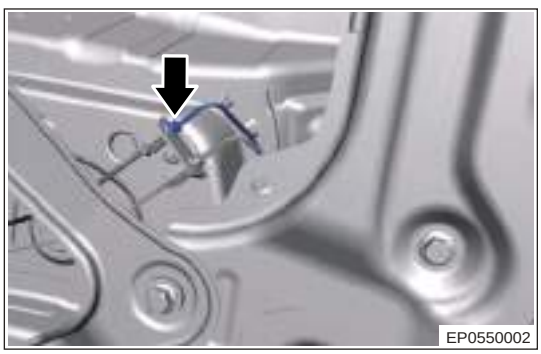
8. Remove the front right brake pipe assembly.
9. Remove the rear right wheel.
10. Remove the fuel tank assembly.
11. Remove the left fuel tank spoiler.
12. Remove coupling nut (arrow) between rear right brake pipe I assembly and ESP module assembly.

    Tightening torque: 18 ± 2 N·m



13. Remove coupling nut (arrow) between rear right brake pipe I assembly and two-way.

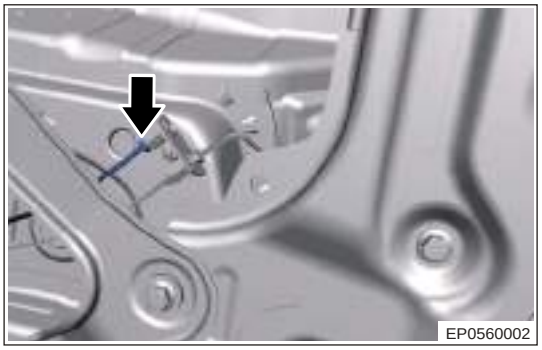
    Tightening torque: 18 ± 2 N·m



14. Remove the rear right brake pipe I assembly.

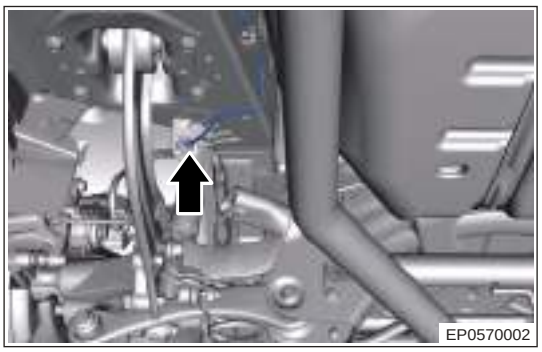
15. Remove coupling nut (arrow) between rear right brake pipe II assembly and two-way.

    Tightening torque: 18 ± 2 N·m



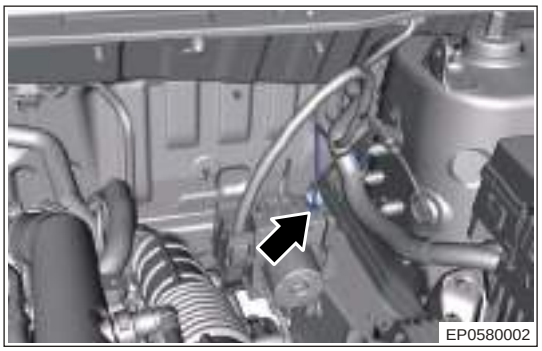
16. Remove coupling nut (arrow) between rear right brake pipe II assembly and rear right brake hose assembly

    Tightening torque: 18 ± 2 N·m



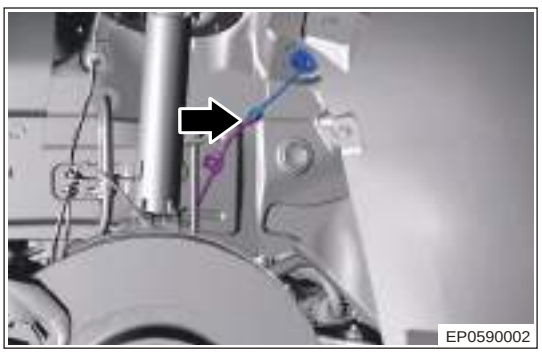
17. Remove the rear right brake pipe II assembly.
18. Remove the front left wheel.
19. Remove coupling nut (arrow) between front left brake pipe I assembly and ESP module assembly.

    Tightening torque: 18 ± 2 N·m



20. Remove coupling nut (arrow) between front left brake pipe I assembly and front left brake pipe II assembly.

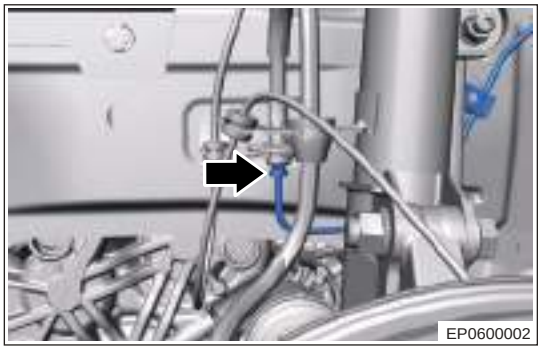
    Tightening torque: 18 ± 2 N·m



21. Remove the front left brake pipe I assembly.

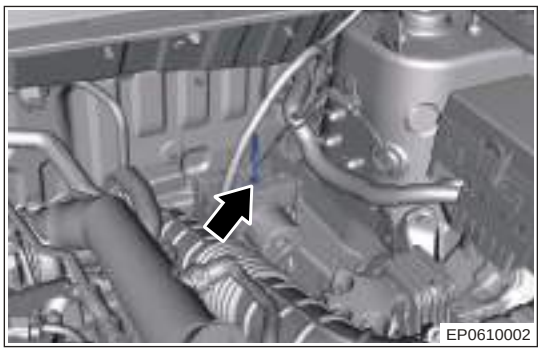
22. Remove coupling nut (arrow) between front left brake pipe II assembly and front left brake hose assembly.

    Tightening torque: 18 ± 2 N·m



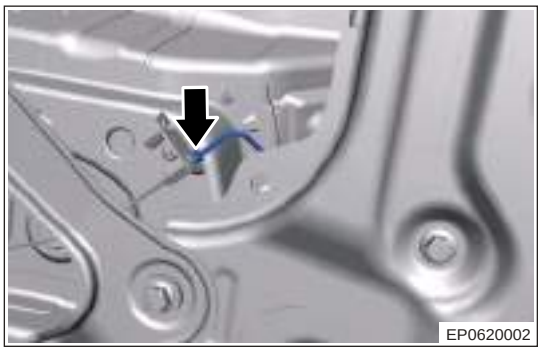
23. Remove the front left brake pipe II assembly.
24. Remove the rear left wheel.
25. Remove coupling nut (arrow) between rear left brake pipe I assembly and ESP module assembly.

    Tightening torque: 18 ± 2 N·m



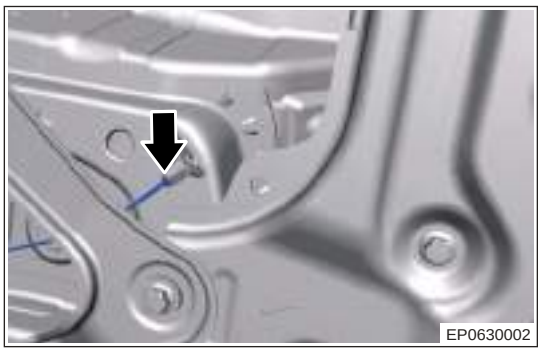
26. Remove coupling nut (arrow) between rear left brake pipe I assembly and two-way.

    Tightening torque: 18 ± 2 N·m



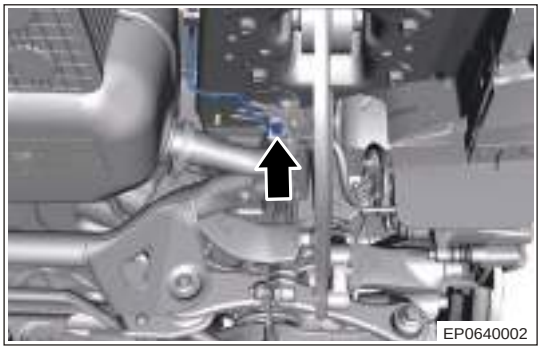
27. Remove the rear left brake pipe I assembly.
28. Remove coupling nut (arrow) between rear left brake pipe II assembly and two-way.

    Tightening torque: 18 ± 2 N·m



29. Remove coupling nut (arrow) between rear left brake pipe II assembly and rear left brake hose assembly.

    Tightening torque: 18 ± 2 N·m



30. Remove the rear left brake pipe II assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution
• When connecting brake pipe to ESP module assembly, the pipes of 4 wheels cannot be interchanged.

ELECTRONIC PARKING BRAKE SYSTEM

Warnings and Precautions

Warning

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. To prevent vehicle from moving accidentally, after Electronic Parking Brake System (EPB) operates when vehicle is stopped or leaving vehicle, both red indicator and electronic parking switch indicator come on for a while and then go off. At the moment, observe if the indicators come on to make sure that electronic parking brake is applied successfully.
2. To prevent vehicle from moving accidentally, when vehicle is in automatic parking status, it is necessary to confirm the gear position before starting vehicle by depressing accelerator pedal.
3. Turn on sudden braking function only when the foot brake is faulty or brake pedal is stuck.
4. Because ESP and its component can not exceed the physical limit of road adhesion. Turning on emergency braking function when driving on a curve, dangerous road area, heavy traffic road or in bad weather may lead to drift, sideslip or pull. Beware of accident.
5. Use this function with caution during normal driving. Prevent other passengers from touching this switch by mistake while driving. Otherwise it may lead to an accident.
6. When sudden braking function is triggered, a “drone” sound will be heard, it is normal.
7. During sudden braking, electronic parking performs braking operation in a constant deceleration, which may be different from driver's expected deceleration and the braking distance may be different as well.

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair:

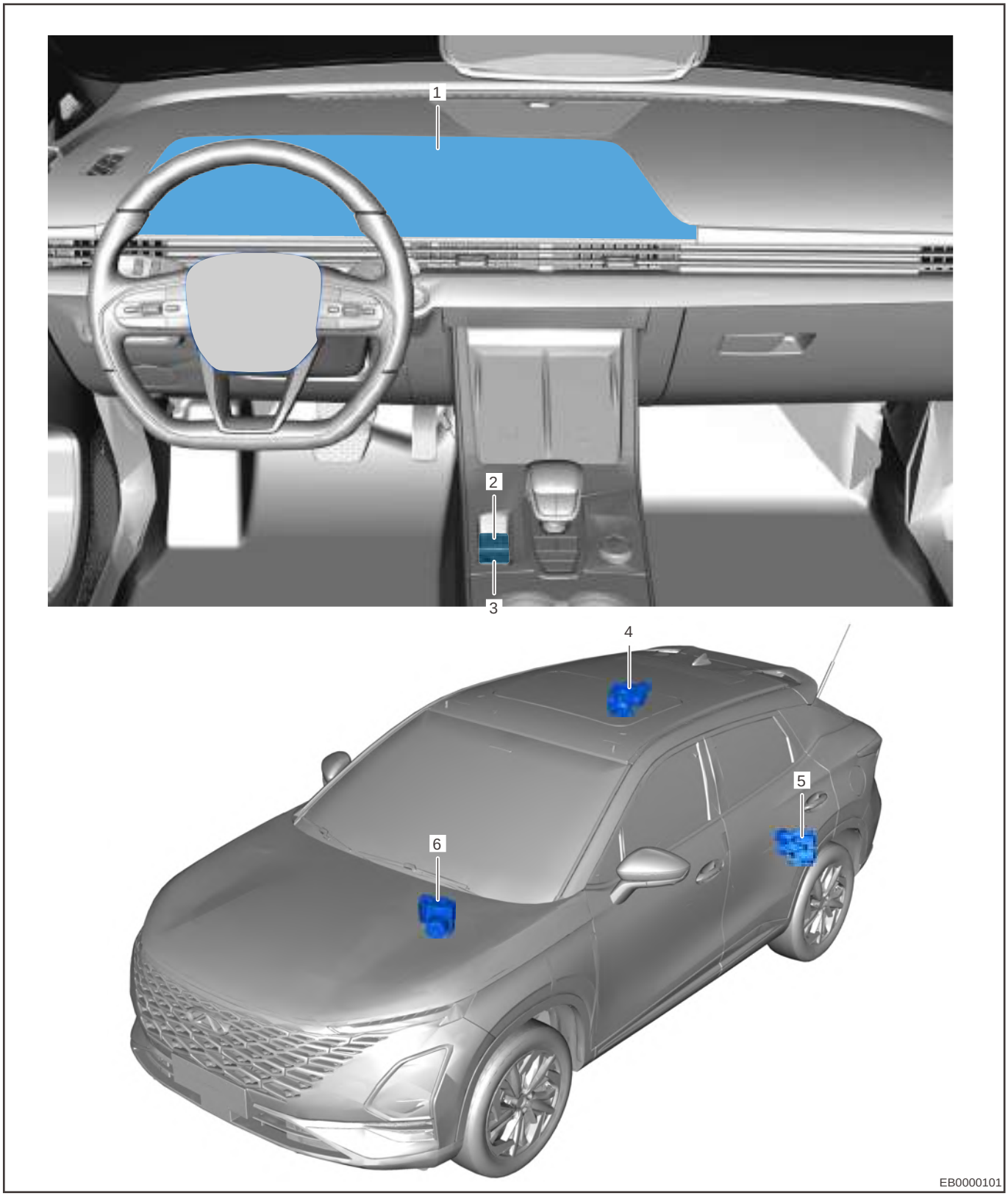
1. When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.
2. If parking brake cannot be released by parking brake switch manually or automatically on a slope, please try to tow vehicle to a level road or place obstacles such as stoppers in front of or rear of front wheels respectively to prevent wheel rolling, avoiding coasting accident after releasing parking brake.

General Information

Description

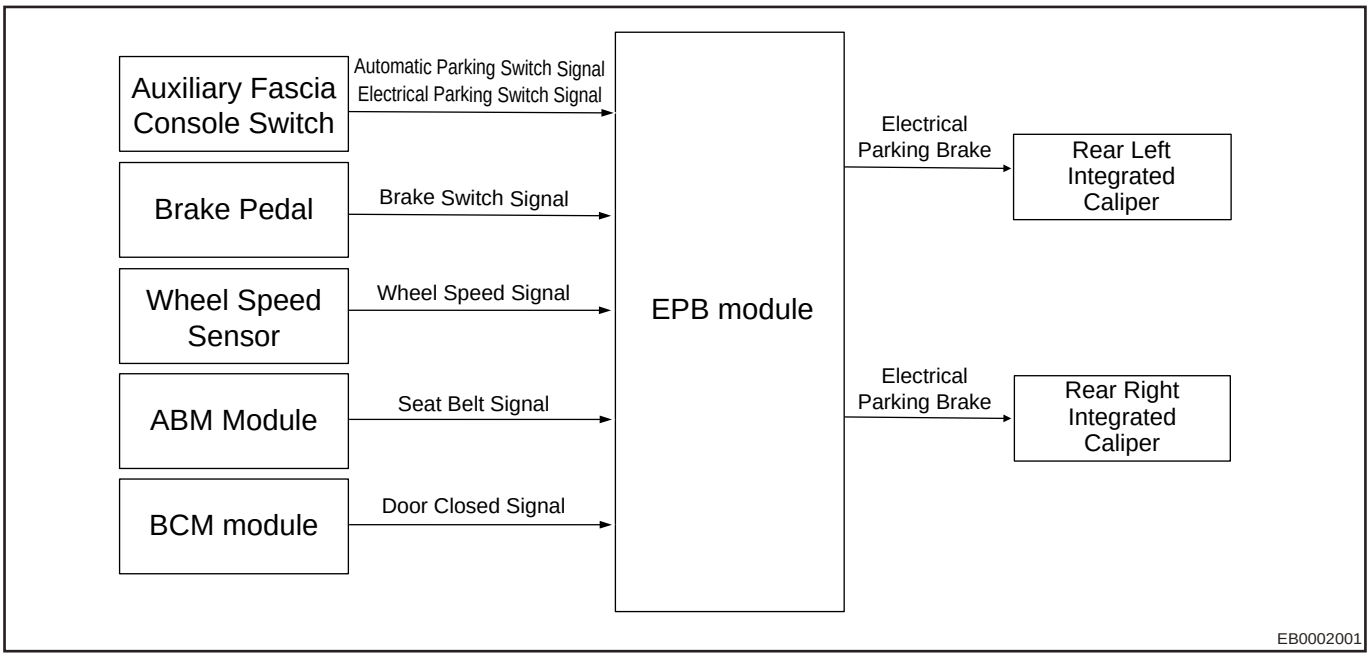
Electronic Parking Brake System (EPB) integrates temporary braking while driving with long-term braking after stopping. Therefore, vehicle can be stopped through electronic parking brake operation. Electronic parking brake stops vehicle through electronic parking brake operation. Its operation principle is the same as mechanical parking brake operation, which is to control vehicle stopping by friction generated from brake disc and brake lining, but control changes to electronic button from mechanical parking brake lever. Electronic parking brake has extended basic parking function to AUTO HOLD. With AUTO HOLD enabled, driver does not have to depress brake pedal for long time when stopping vehicle, and avoid unnecessary moving, that is vehicle will not slide rearward.

System Component Diagram



1	Instrument Cluster	4	Rear Right Integrated Caliper Assembly
2	Electrical Parking Brake Switch	5	Rear Left Integrated Caliper Assembly
3	Automatic Parking Switch	6	EPB Module Assembly

System Schematic Diagram



ESP controller assembly collects seat belt signal and door closed signal via CAN line, and collects electric parking switch signal, automatic parking switch signal, brake switch signal and wheel speed signal via hard-wire connection. Then, integrated caliper assembly operates according to data requirements analysis.

System Function Introduction

Electronic Parking Brake System (EPB)

Electronic Parking Brake System (EPB) integrates temporary braking while driving with long-term parking braking after stopping. Therefore, vehicle can be stopped through electronic parking brake operation instead of traditional manual operation.

- Manual parking brake application

  When engine starts or ENGINE START STOP switch is in ON mode while vehicle is stationary, pull up the electronic parking switch, the red electronic parking brake system indicator on instrument cluster and indicator on electronic parking switch come on, which indicates parking brake function is operating.

  Turn ENGINE START STOP switch to OFF, and Electronic Parking Brake (EPB) achieves parking brake automatic application function.

- Manual parking brake releasing

  When engine starts or ENGINE START STOP switch is in ON mode while depressing brake pedal, press the electronic parking switch manually, the red electronic parking brake system indicator on instrument cluster and indicator on electronic parking switch go off, which indicates parking brake function is released.

- Automatic releasing

Fasten driver side seat belt, close driver side door. Depress accelerator pedal when vehicle is in D or R position on a level ground. Then electronic parking brake will be released automatically and red electronic parking brake system indicator on instrument cluster goes off.

If shift to D or R position when vehicle is stooped on a slope, it is necessary to depress accelerator pedal deeply and automatic parking brake is released only when drive force is greater than the force in coasting direction.

⚠ Caution

- Electronic parking brake system (EPB) and automatic parking system (AUTO HOLD) are unavailable when battery is depleted.
- If parking brake is applied or released while depressing the brake pedal, brake pedal may move up or down slightly, just depress brake pedal firmly.
- Fasten driver side seat belt and close driver side door when electronic parking brake is released automatically. Otherwise, automatic parking brake releasing conditions are not met.
- While electronic parking brake is applied or released, a “fizz” sound may be heard from rear of vehicle, which is generated during parking brake operation. This is normal, please rest assured use.
- If vehicle coasts after stopping for a while, for safety, system will increase parking brake force automatically, to make vehicle stationary; during the process of increasing parking brake force, system will produce a certain operating sound, which is normal.
- With engine starting or ENGINE START STOP switch turned to ON, if parking brake can not be released manually by depressing brake pedal, depress accelerator pedal and press electronic parking brake switch to release parking brake. Use this method only when parking brake can not be released manually by depressing brake pedal. Please take care when using this method.

⚠ Warning

- To prevent vehicle from moving accidentally, after EPB operates when vehicle is stopped or leaving vehicle, both red electronic parking brake system indicator on instrument cluster and electronic parking switch indicator come on for a while and then go off. At the moment, observe if the indicators come on to make sure that electronic parking brake is applied successfully.

Automatic Parking Function (AUTO HOLD)

Electronic parking brake system (EPB) has extended basic parking function to automatic parking function (AUTO HOLD). With AUTO HOLD enabled, driver does not have to depress brake pedal for long time when stopping vehicle, automatic parking can be used to avoid unnecessary moving (such as coasting).

- Automatic parking operating condition

  Start the engine, close driver side door and fasten driver side seat belt.

- Turn on automatic parking

  When automatic parking conditions are met, press automatic parking button and indicator on automatic parking button comes on, which indicates automatic parking function is turned on.

- Activate automatic parking

  With automatic parking function turned on, vehicle stops from moving status after depressing brake pedal, automatic parking function is activated and green automatic parking system indicator on instrument cluster comes on.

  When vehicle is stationary and depressing brake pedal, while automatic parking function is turned on and automatic parking conditions are met, automatic parking function is enabled and green automatic parking system indicator on instrument cluster comes on.

- Turn off automatic parking

With automatic parking function turned on, press automatic parking button to turn off automatic parking function and indicator on automatic parking button goes off, which indicates vehicle has exited automatic parking function.

With automatic parking function activated, press automatic parking button to turn off automatic parking function. Both green automatic parking system indicator on instrument cluster and indicator on automatic parking button go off, which indicates vehicle has exited automatic parking function and turned to parking brake function.

- Release automatic parking

  Automatic parking releasing method is the same as that of electronic parking, including manual and automatic releasing operations.

⚠ Caution

- Be sure to turn automatic parking function off before driving into car washing room.
- Be sure to observe safety regulations to park the vehicle properly, avoid hurting yourself and pedestrian.
- Slowly depress the accelerator pedal, as it is normal that there is delay for the automatic releasing of automatic parking.
- After engine starts, automatic parking system can not be entered if driver side seat belt is unfastened or driver side door is not closed.
- When automatic parking function is activated, open driver side door or unfasten driver side seat belt, then automatic parking turns to electronic parking.
- For MT model, fully depress the clutch pedal and shift to D/R position and then depress accelerator pedal to release automatic parking. If vehicle is driving on an uphill slope, it is suggested to depress accelerator pedal under half-linkage state to perform hill starting.
- With automatic parking turned on, when vehicle is stopped moving by brake and kept in stationary state, automatic parking system will apply parking brake automatically while transmission is in D or R position. It is suggested to shift to N in short time parking, and shift to P in long time parking.
- With automatic parking function turned on, when opening driver side door or unfastening driver side seat belt, it will exit automatic parking function. When driver side door is closed or driver side seat belt is fastened again, automatic parking function is turned on again.

⚠ Warning

- To prevent vehicle from moving accidentally, when vehicle is in automatic parking status, it is necessary to confirm the gear position before starting vehicle by depressing accelerator pedal.

Emergency Braking Function

If foot brake is faulty, pull up and hold the electronic parking switch to forcibly apply brake through parking brake. The red electronic parking system indicator on instrument cluster flashes during sudden braking. To exit sudden braking, release the electronic parking switch.

⚠ Warning

- When sudden braking function is triggered, a “drone” sound will be heard, it is normal.
- During sudden braking, electronic parking performs braking operation in a constant deceleration, which may be different from driver's expected deceleration and the braking distance may be different as well.
- Use this function with caution during normal driving. Prevent other passengers from touching this switch by mistake while driving. Otherwise it may lead to an accident.
- Turn on sudden braking function only when the foot brake is faulty or brake pedal is stuck. Because Electronic Stability Program (ESP) system and its component can not exceed the physical limit of road adhesion. Turn on emergency braking function when driving on a curve, dangerous road area, heavy traffic road or in bad weather may lead to drift, sideslip or pull. Beware of accident.

Service Mode

1. This mode is used when checking and repairing EPB system.
2. When entering service mode, EPB caliper will be released in place automatically.
3. Never perform “Exit Maintenance Mode” if inspection and repair of vehicle are not finished, to prevent serious accident.
4. Diagnostic tester must be used to perform “Exit Maintenance Mode” after inspection and repair of vehicle are finished (such as replacing brake linings with new ones), failure to do so may cause vehicle to lose EPB function, however, conventional braking will not be affected.
5. When service mode function is triggered, a “drone” sound will be heard, it is normal.
6. Operation methods for entering and exiting service mode are as shown in table below:

Function	Vehicle Status	Engine Status	Key Status	Operation Method	HMI Status	
					Instrument Cluster	Switch
Service Mode	Stationary	Ignited/Stall	ON	Entering or exiting is performed using diagnostic tester or by professional technicians at 4S shop	Red P and yellow P lights flash when entering service mode, and reflect EPB status of real-vehicle after exiting service mode	Reflect EPB status of real vehicle

Emergency Brake

1. This function is used when service brake becomes unavailable. Never use electric parking brake on this vehicle in emergency case other than service brake failure.
2. Emergency brake refers to the ESP system brake, and the brake force is constant during emergency brake.
3. Brake light comes on normally during emergency brake.
4. When emergency brake function is triggered, a “drone” sound will be heard, it is normal.
5. Operation methods for entering and exiting emergency brake are as shown in table below:

Function	Vehicle Status	Engine Status	Key Status	Operation Method	HMI Status	
					Instrument Cluster	Switch
Entering Emergency Brake	Stationary	Ignited/stall	ON	Pull up EPB switch and hold it when vehicle speed is more than 3 km/h	Red P light flashes	EPB switch indicator flashes
Exiting Emergency Brake	Driving	Ignited/Stall	ON	Release EPB switch/ depress accelerator pedal	No P light comes on	No indicator comes on
	Driving → Stationary			Stop vehicle		

Meter Indicator Light and Prompt Information

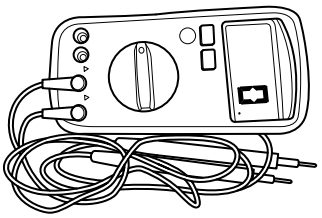
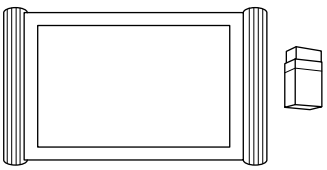
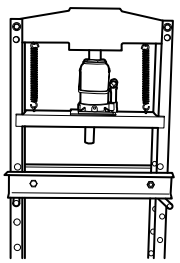
No.	Indicator Light Condition or Prompt Information	Indicator Light Description	Treatment
1	Yellow P light - remains ON	EPB system malfunction	Check and repair
2	Red P light - flashes	Switch always pulled while driving, which belongs to emergency brake mode	Normal, don’t need to repair
		Switch is not operated, caliper status is unknown	Try to press or pull up the switch. It needs to be checked and repaired if the operation above is invalid
3	Red P light - remains ON	EPB parking function is operative	Normal, don’t need to repair
4	Green A light - remains ON	Automatic parking function is operative	Normal, don’t need to repair
5	Please depress brake pedal when releasing parking brake	Press EPB release button when parking brake is applied and brake pedal is not depressed	Depress brake pedal and press EPB button simultaneously
6	Please fasten seat belt	Seat belt is not fastened when driving away after parking	Fasten seat belt and depress accelerator pedal

7	Please close door and fasten seat belt	Press automatic parking switch when seat belt is not fastened or a door is not closed	Close driver door and fasten seat belt, then press automatic parking switch
8	Parking slope is too large, please pay attention to safety	Static parking on a slope is larger than 30%	It is recommended to park vehicle on a small slope

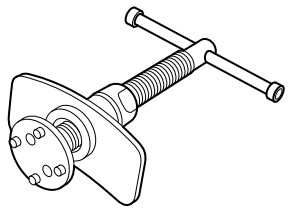
On-vehicle Service

Tools

General Tools

Tool Name	Part No.	Tool Drawing
Digital Multimeter	-	 RCH000206
Diagnostic Tester	-	 RCH000106
Interior Crow Plate	-	 S00020

Special Tool

Tool Name	Part No.	Tool Drawing
Rear Brake Cylinder Release Tool	ECH-0005	 RCH0000053

Specifications

Torque Specifications

Description	Torque (N·m)
Left Integrated Caliper Motor Fixing Bolt	10 ± 1.0
Right Integrated Caliper Motor Fixing Bolt	10 ± 1.0
Left Integrated Caliper Guide Pin Bolt	30 ± 2.0
Right Integrated Caliper Guide Pin Bolt	30 ± 2.0

On-vehicle inspection

⚠ Caution

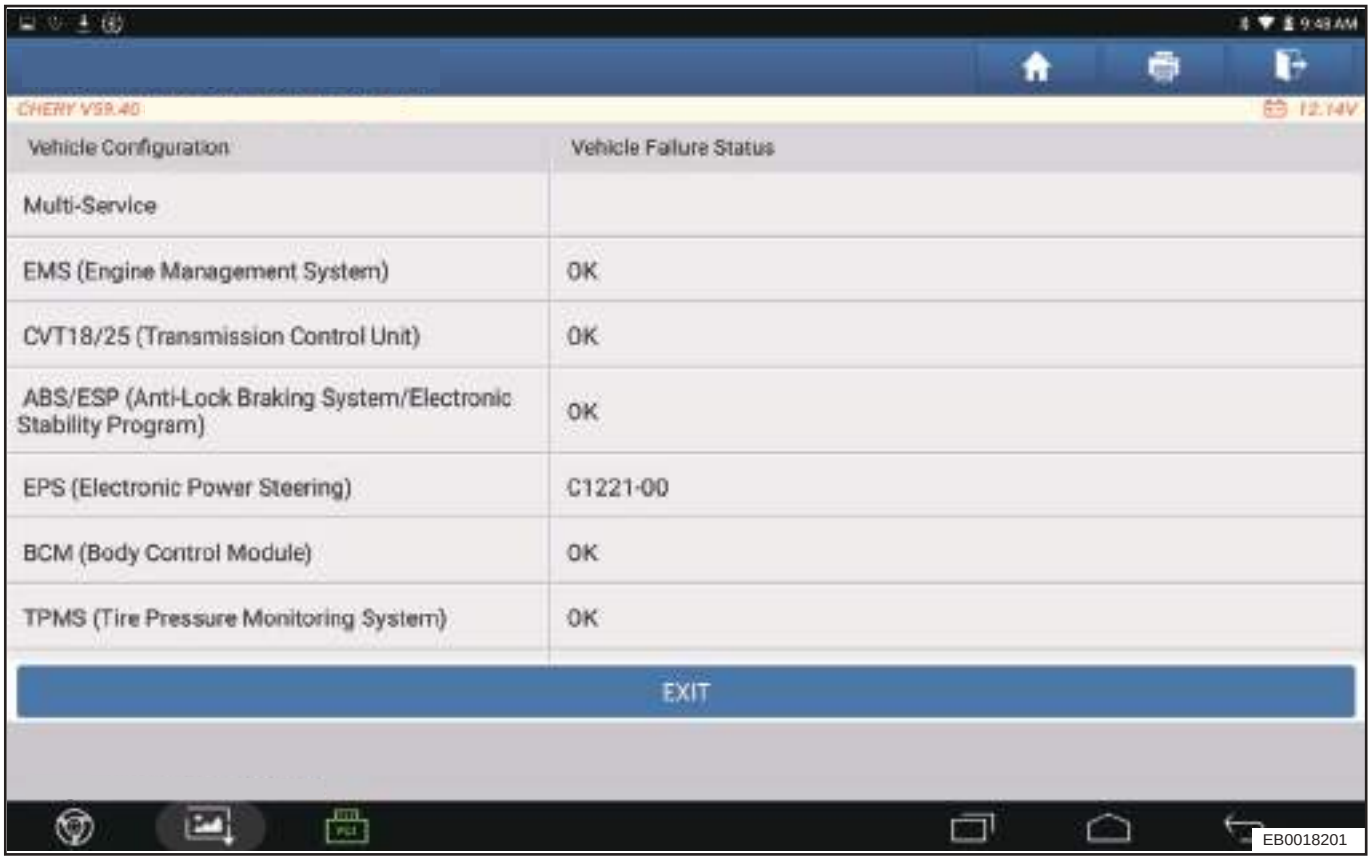
- EPB system must be repaired by professional technicians who have trained and mastered maintenance skills and only use original parts for replacement.
- Before perform a fault diagnosis of EPB system, it is necessary to confirm that vehicle CAN interface can be connected properly.
- Note following when connecting EPB wire harness: Turn ENGINE START STOP switch off before disconnecting wire harness connector, make sure that connector is dry and clean and avoid any foreign material entering; Wire harness must be installed in place horizontally and vertically in order to avoid damaging connector.
- If EPB motor fuse need to be replaced, make sure that it is exactly the same with original model, including shape and parameters, and ensure that connection is fully in place.

1. Inspect friction material thickness of brake linings on both sides visually, replace it when minimum value is less than 2 mm.
2. When brake lining is worn to limit state, there will be mechanical alarm, and the brake lining should be replaced.
3. It is necessary to replace 4 brake linings of left and right brake calipers when replacing brake linings.
4. If removed brake lining can be reused, it must be installed at original position when it is reinstalled.
5. During warranty period of brake lining, it is not possible to replace brake lining with different wear thickness. If friction material thickness is less than 2mm in warranty period, brake lining should be replaced, and check brake caliper for dragging at the same time.
6. Check EPB wire harness for aging or damage, replace as necessary.

Diagnosis Tester Test

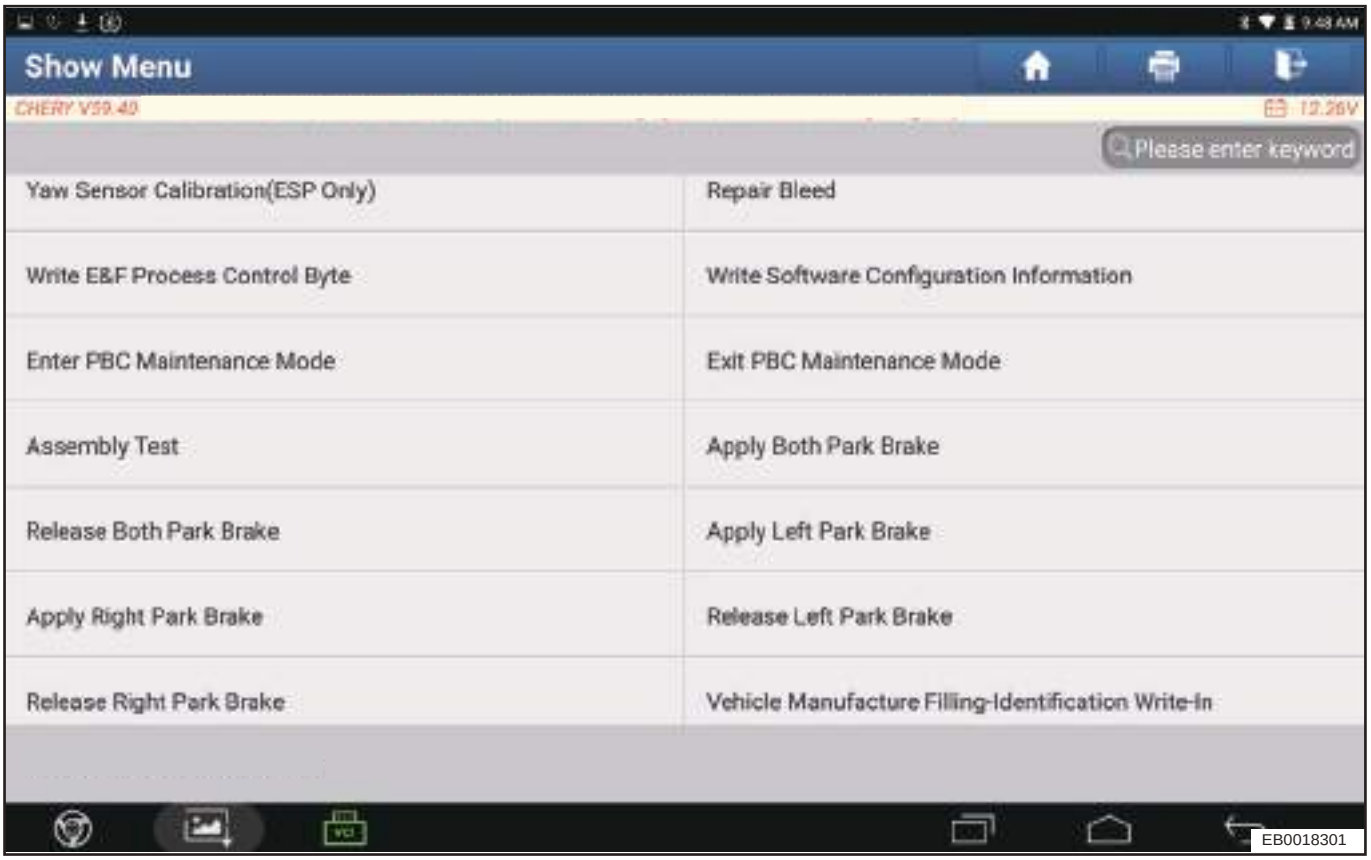
Brake System Service Mode

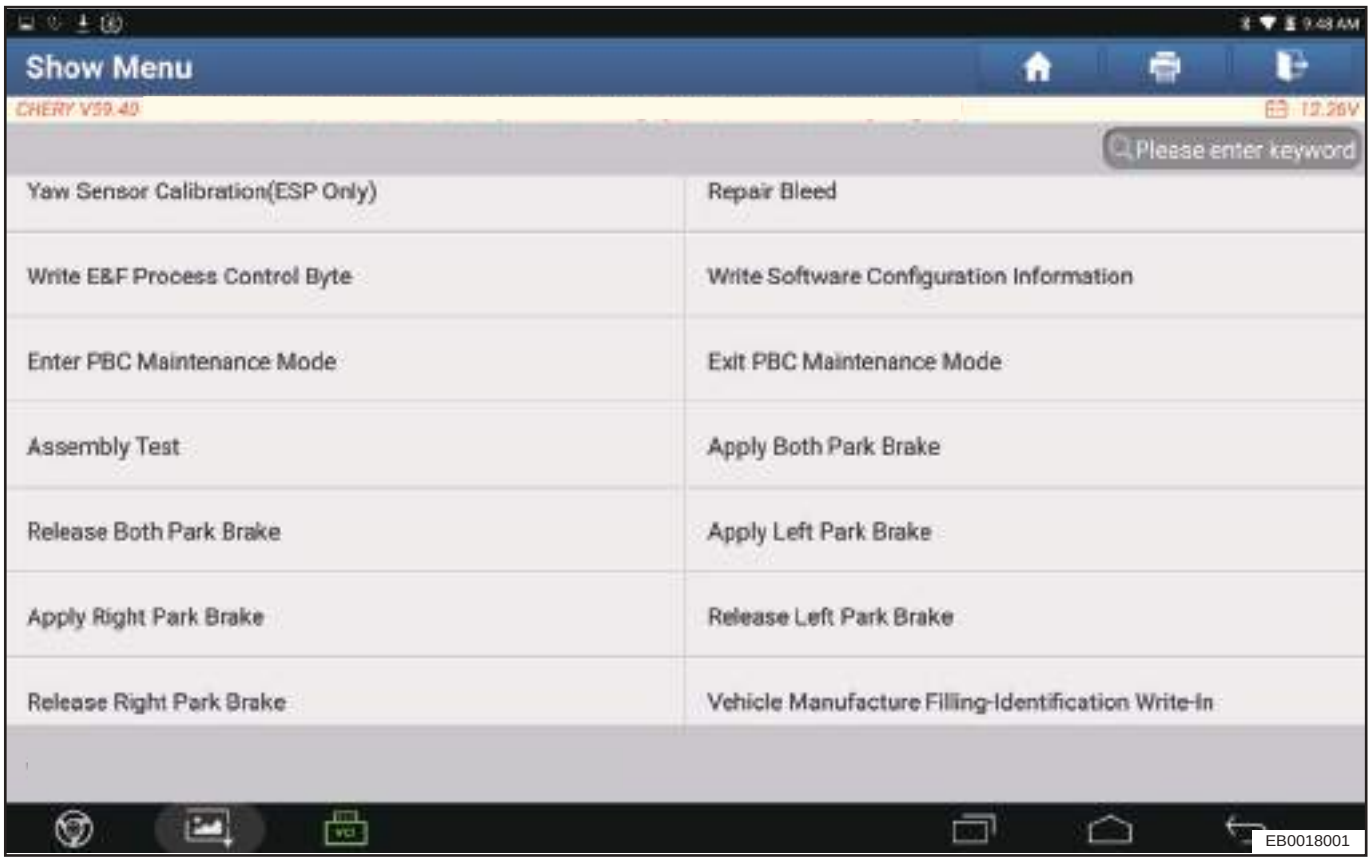
1. Turn ENGINE START STOP switch to ON.
2. Connect the diagnostic tester.
3. Select and enter “ABS/ESP (Anti-lock Braking System/Electronic Stability Program)”.



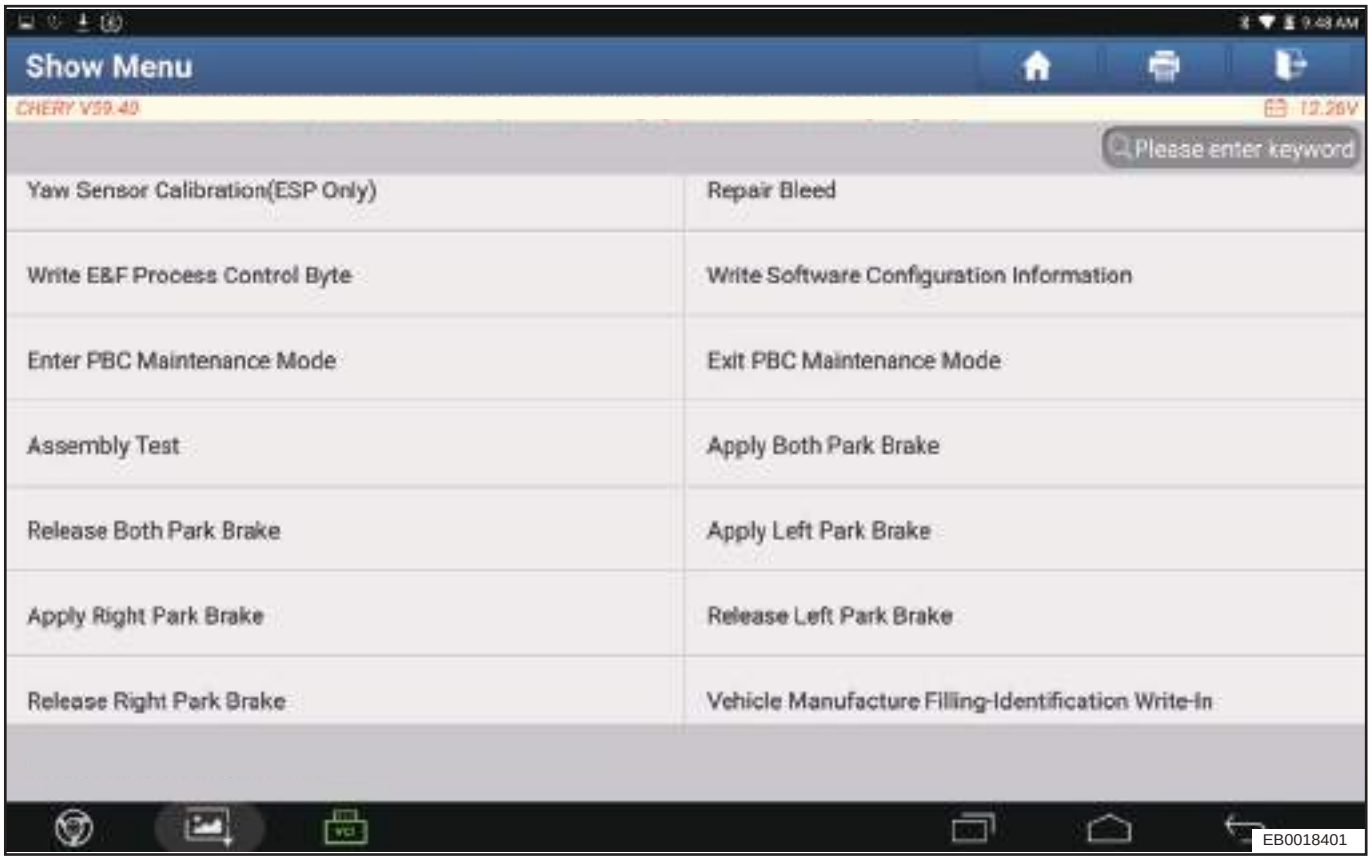
4. Click diagnostic tester to enter “Special Function”.

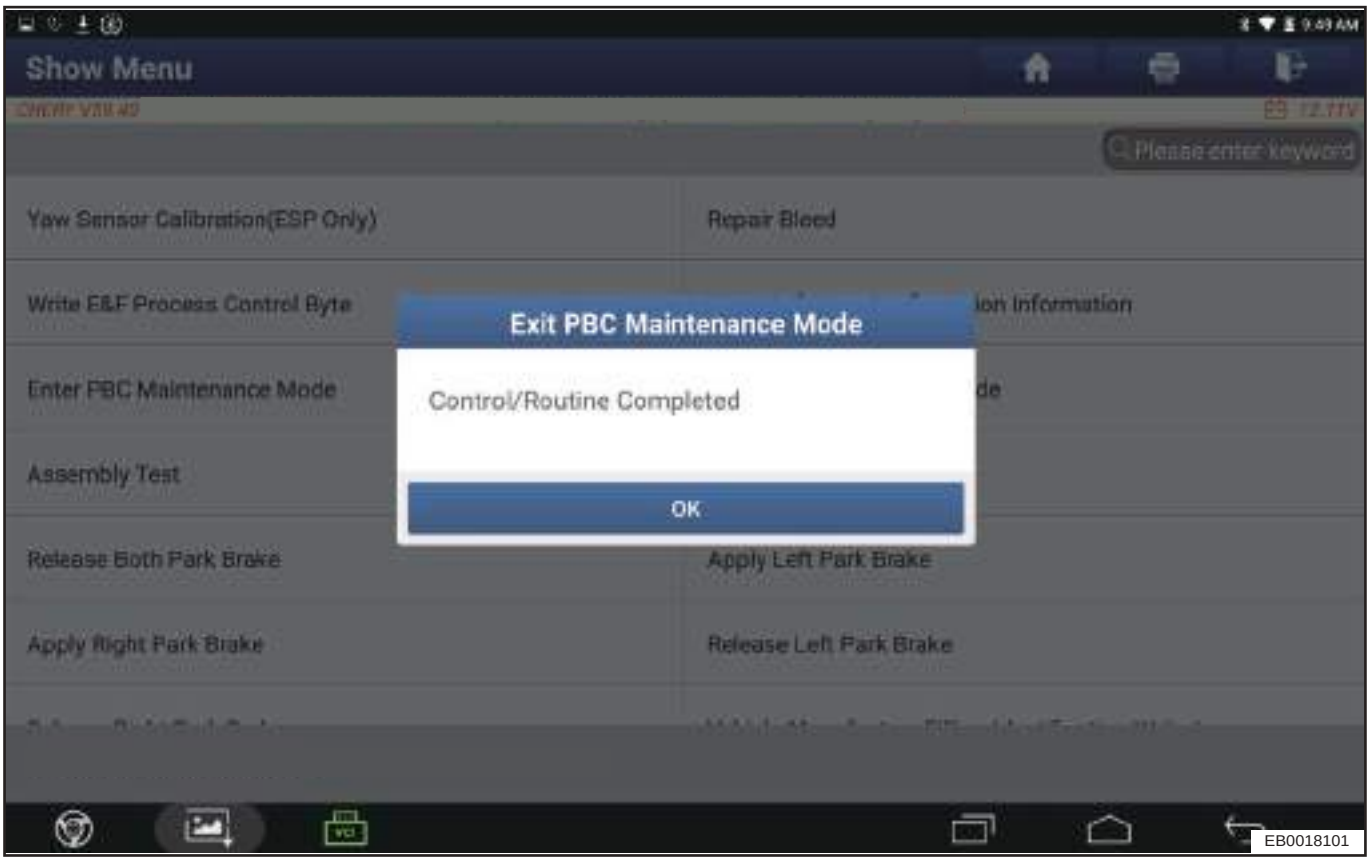
5. Click “Enter PBC Maintenance Mode”.





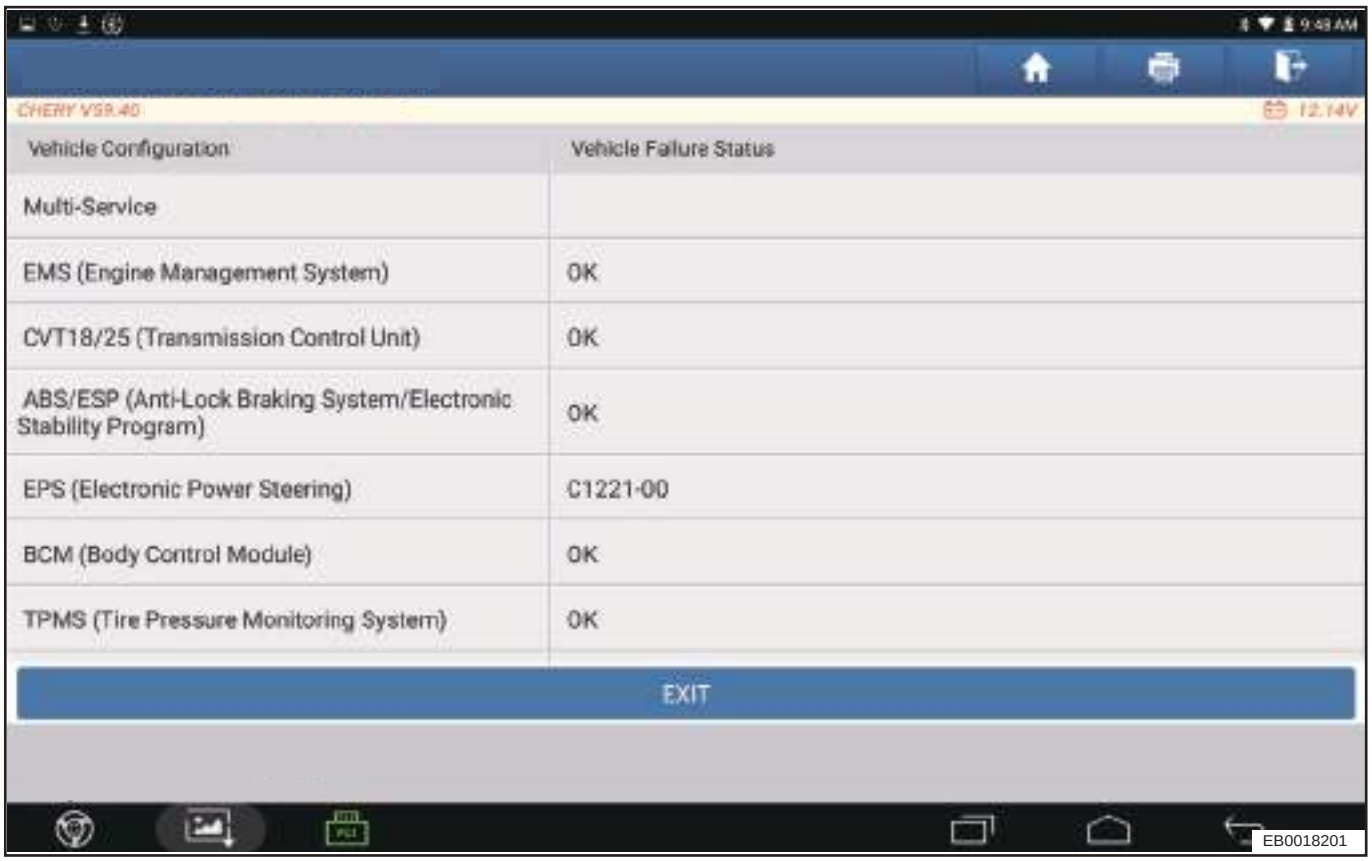
6. Click “Exit PBC Maintenance Mode”.





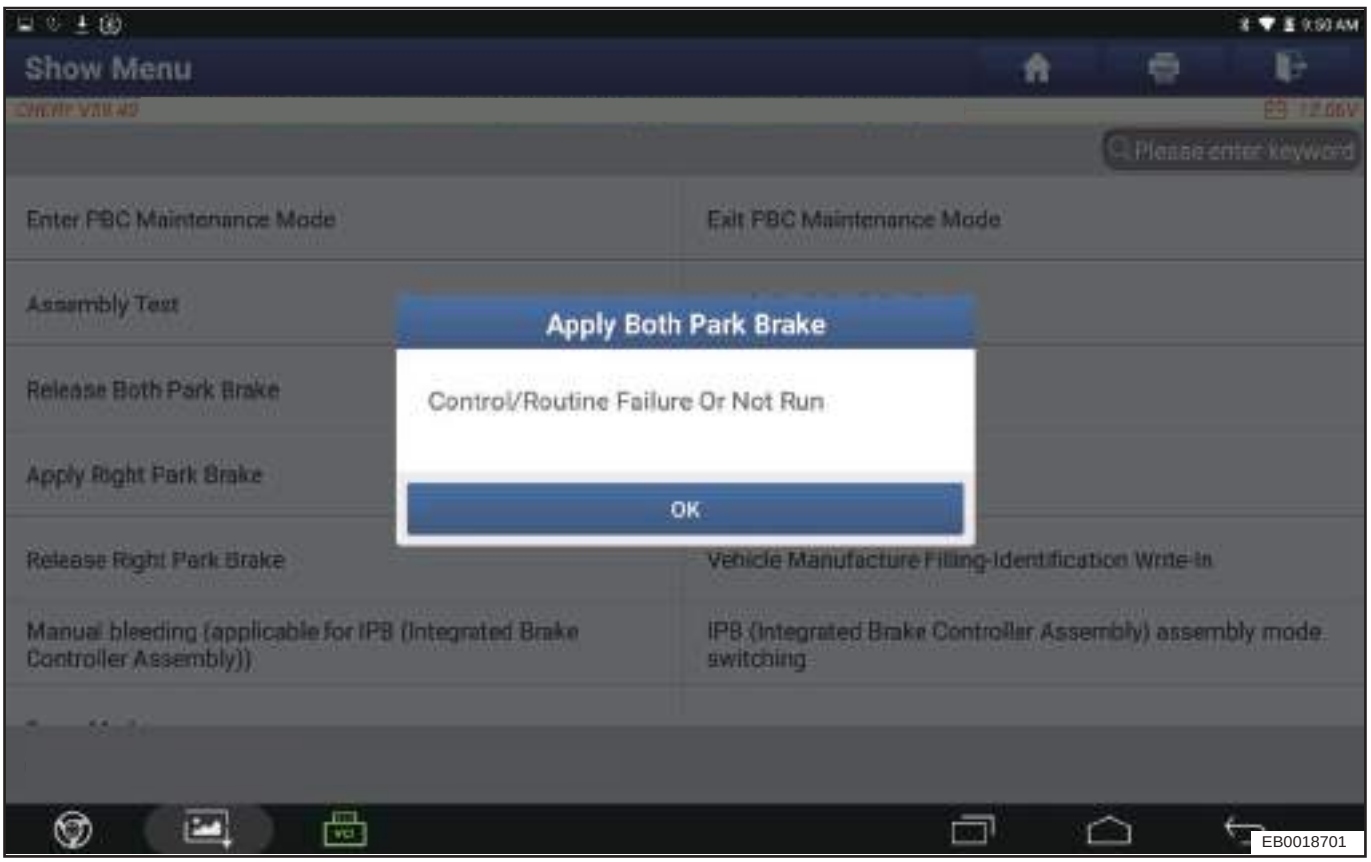
Simultaneously Apply and Release Rear Brake Caliper Test

1. Turn ENGINE START STOP switch to ON.
2. Connect the diagnostic tester.
3. Select and enter “ABS/ESP (Anti-lock Braking System/Electronic Stability Program)”.

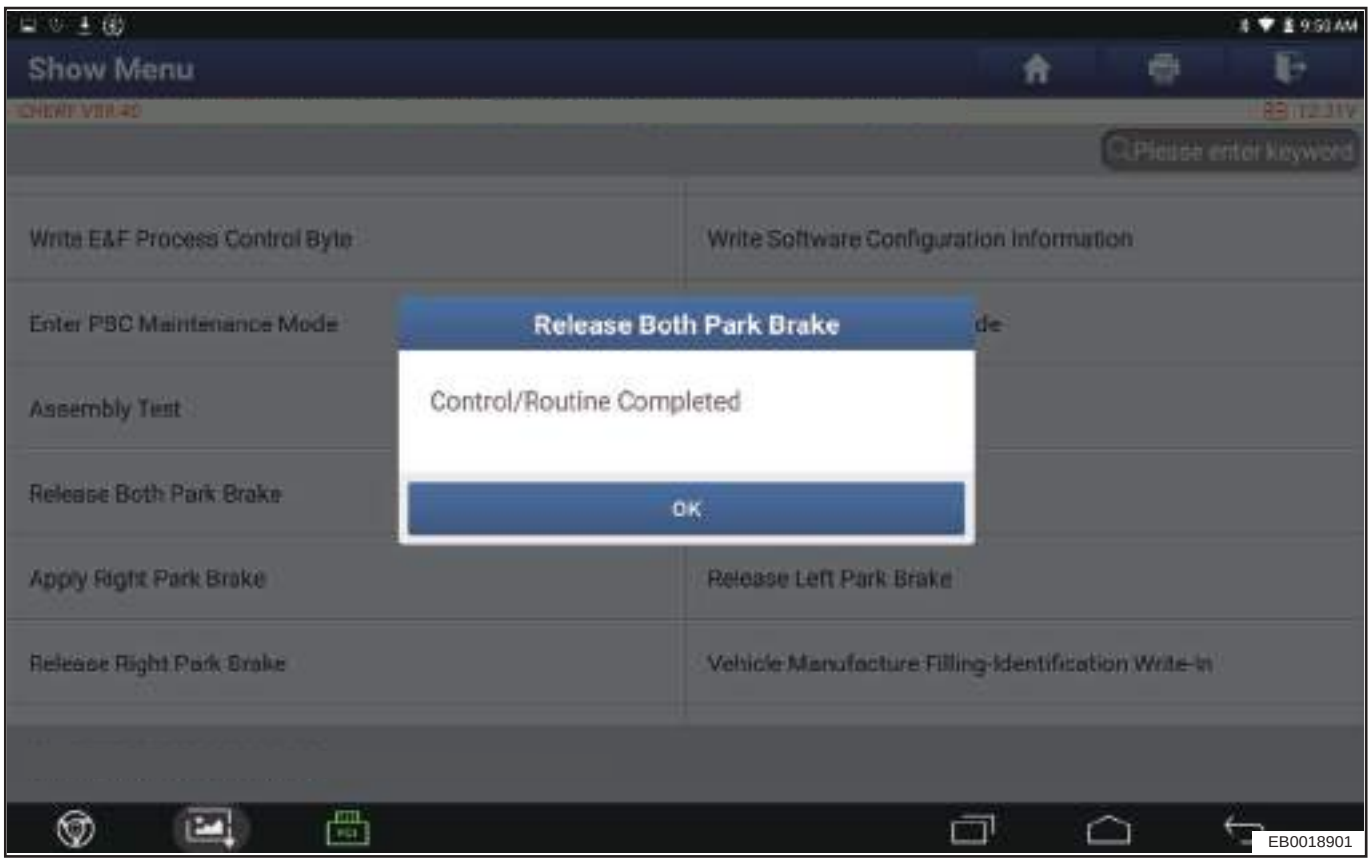


4. Click diagnostic tester to enter “Special Function”.

5. Click “Apply Both Rear Brake Caliper”.



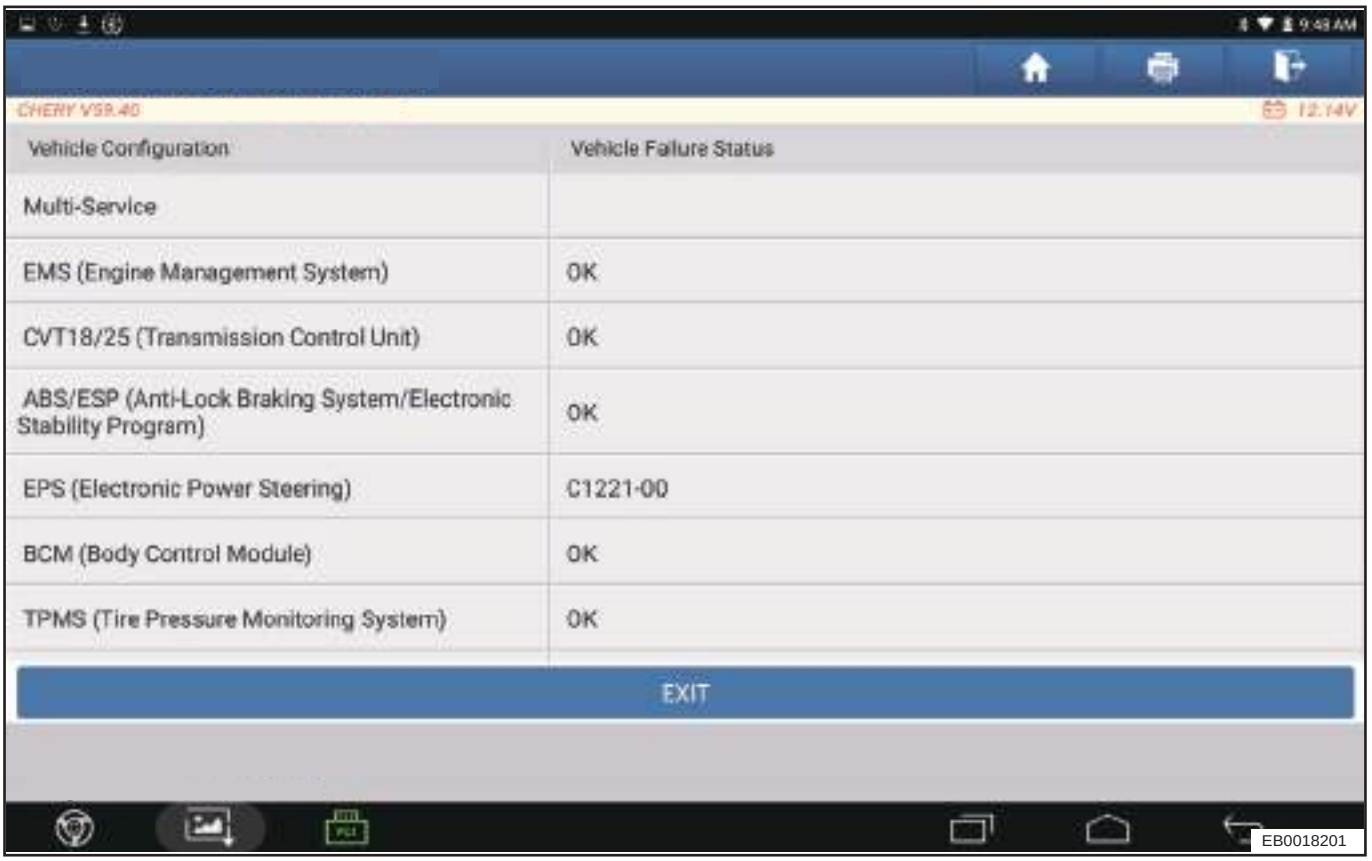
6. Click “Release Both Rear Brake Caliper”.



Separately Apply and Release Rear Brake Caliper Test

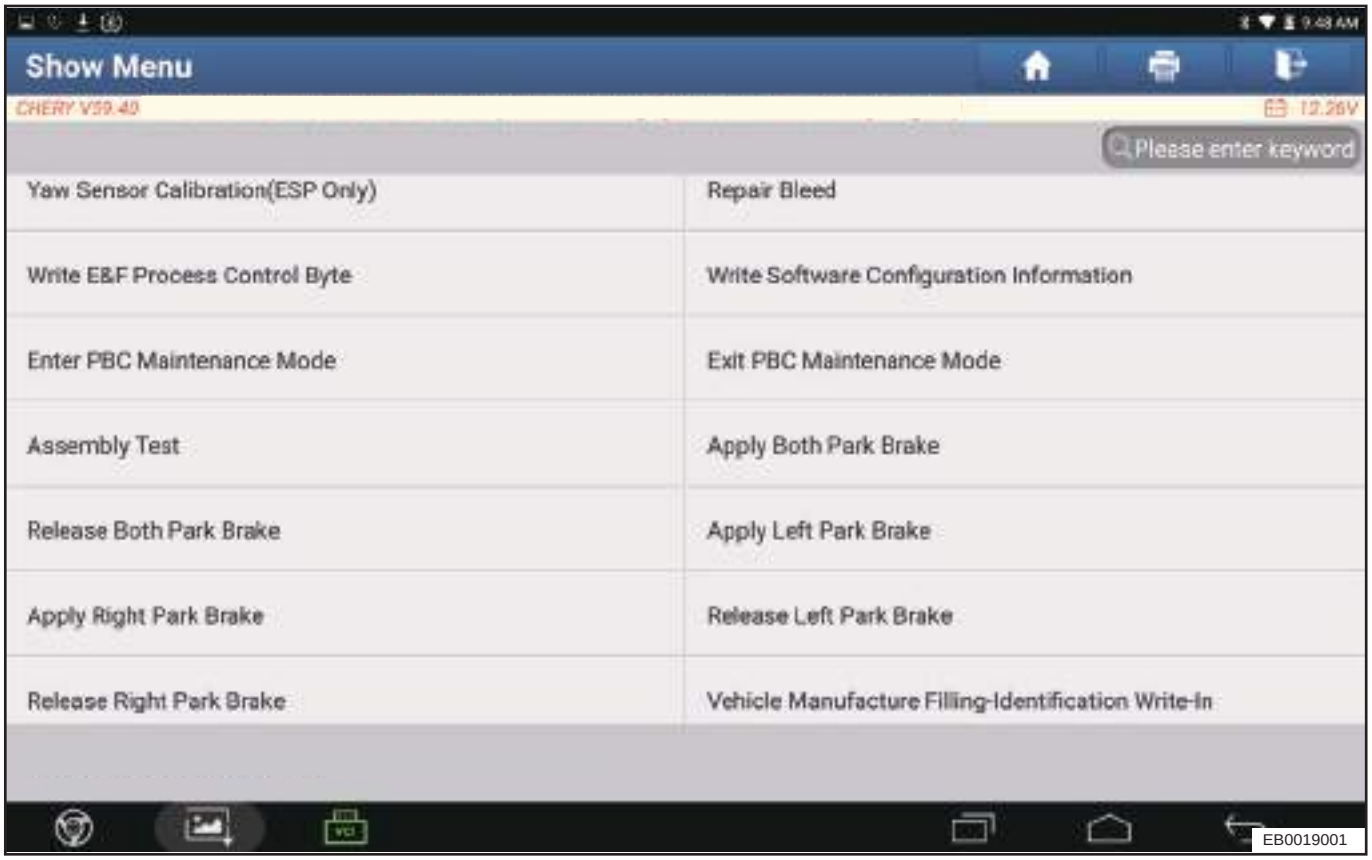
1. Turn ENGINE START STOP switch to ON.

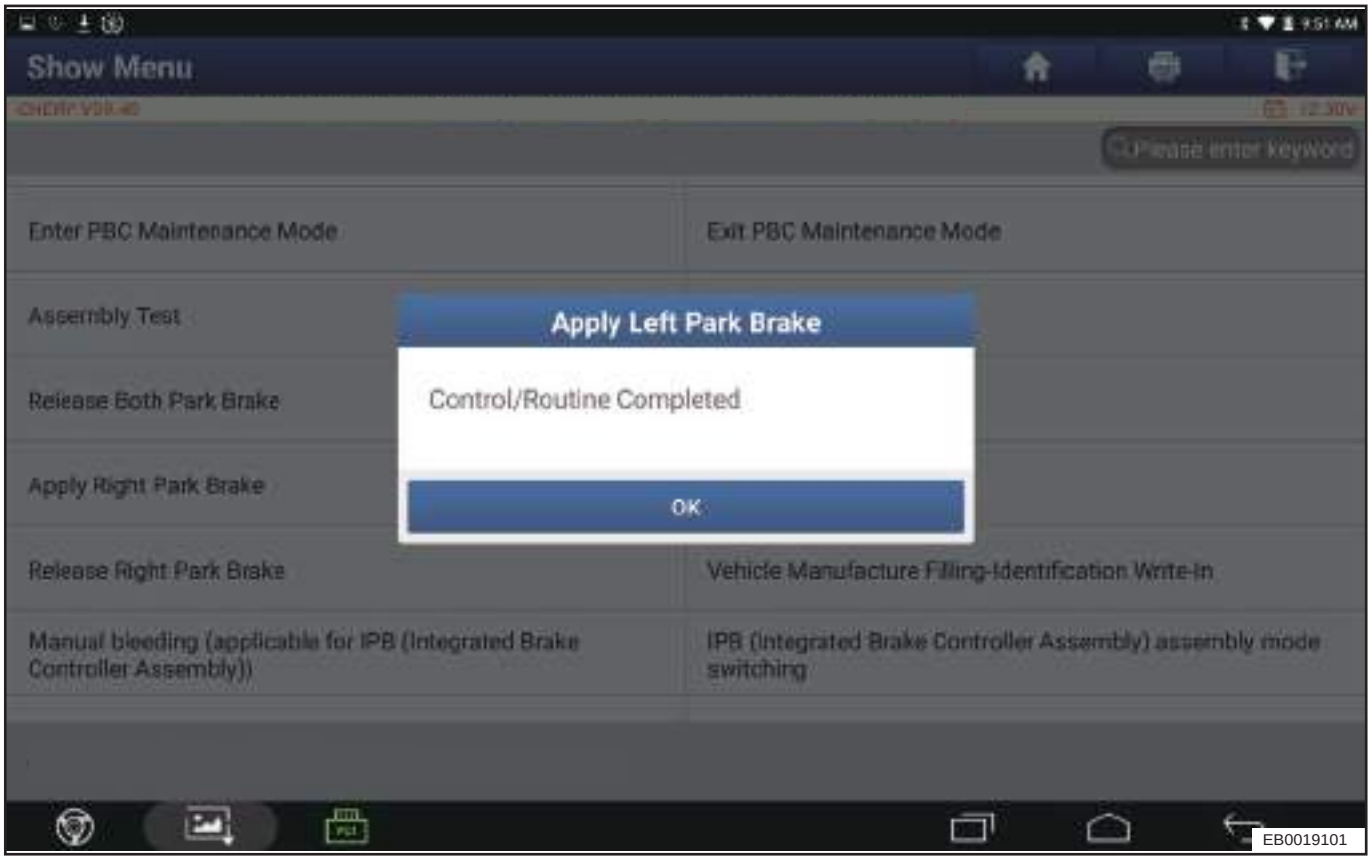
2. Connect the diagnostic tester.
3. Select and enter “ABS/ESP (Anti-lock Braking System/Electronic Stability Program)”.



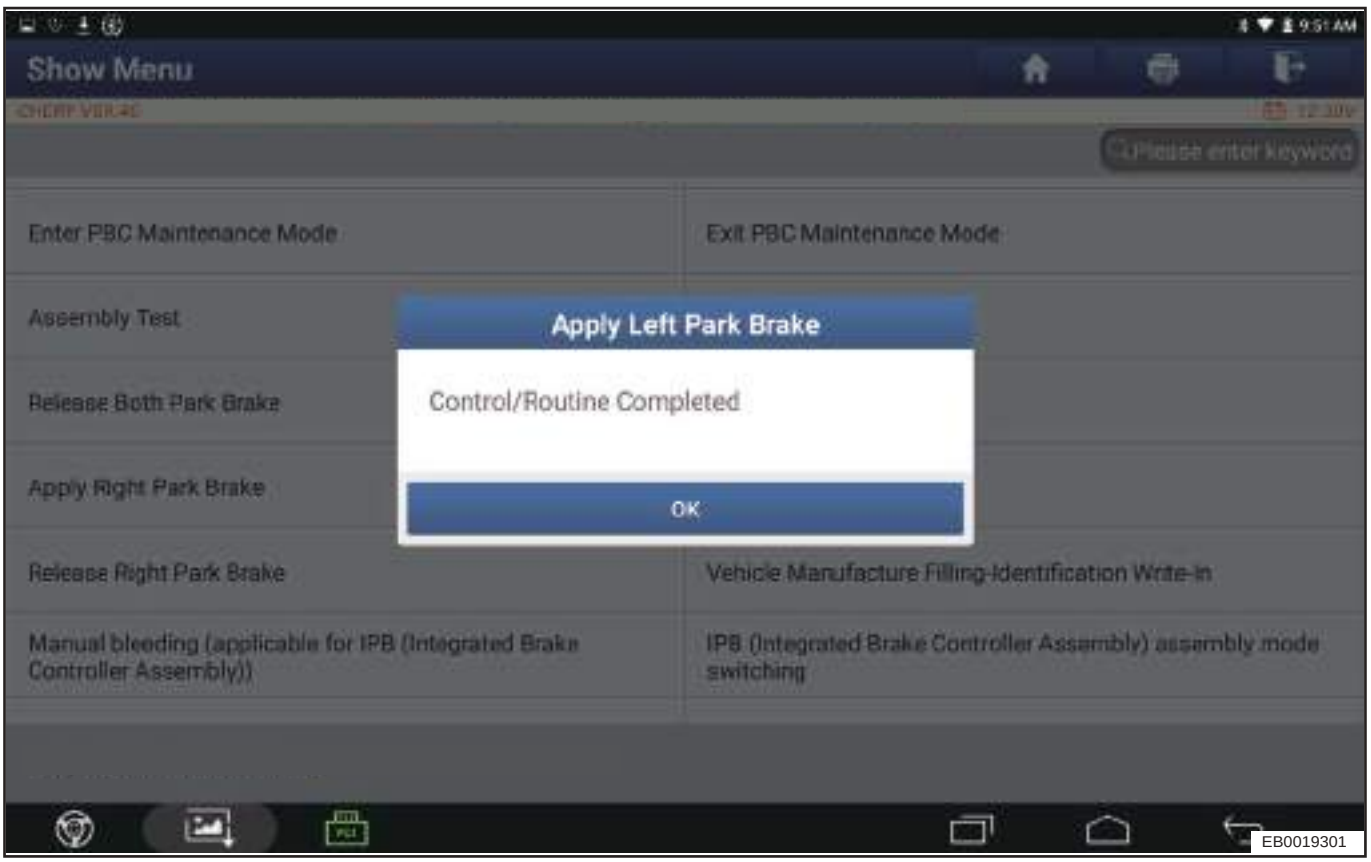
4. Click diagnostic tester to enter “Special Function”.

5. Click “Apply Rear Left Brake Caliper”.

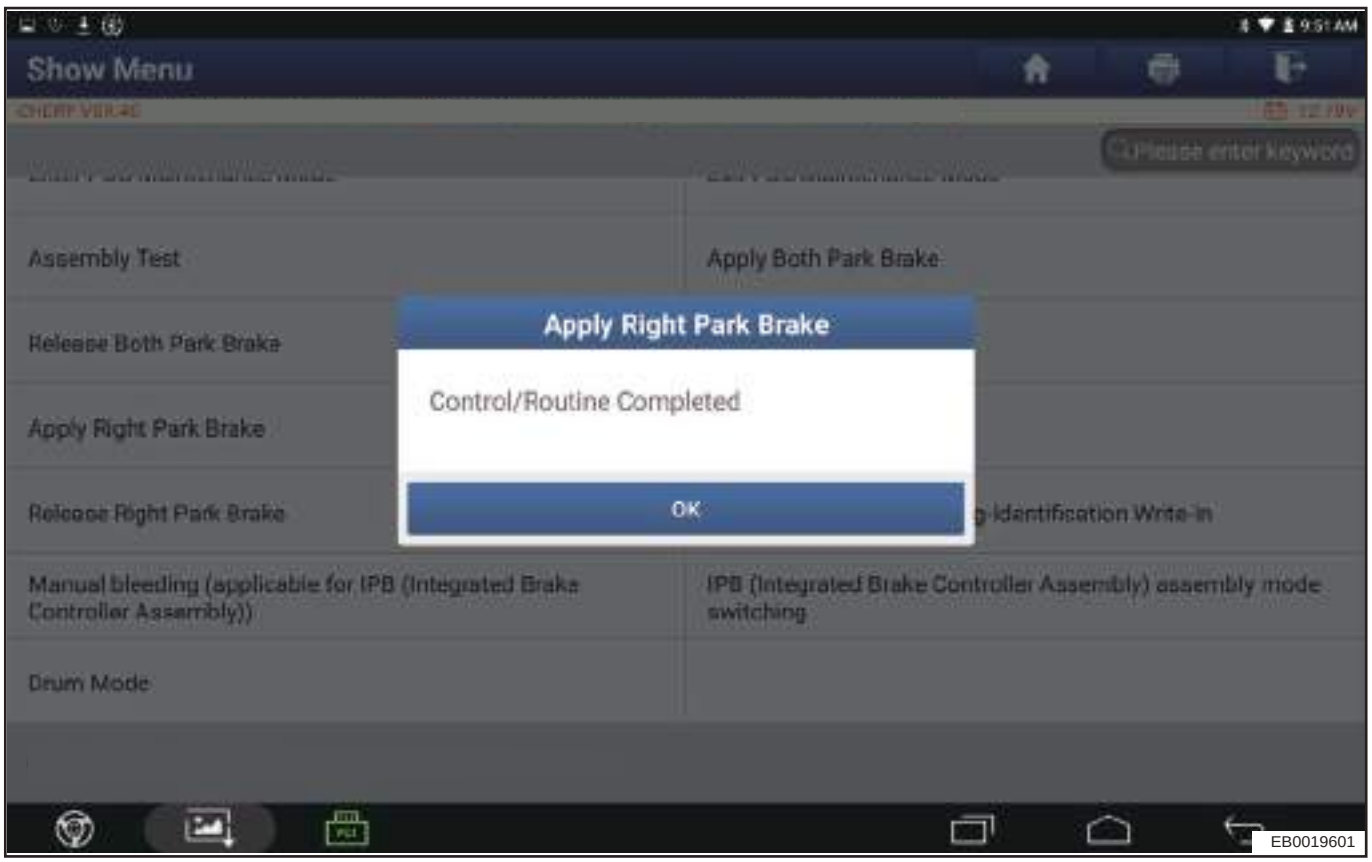




6. Click “Release Rear Left Brake Caliper”.

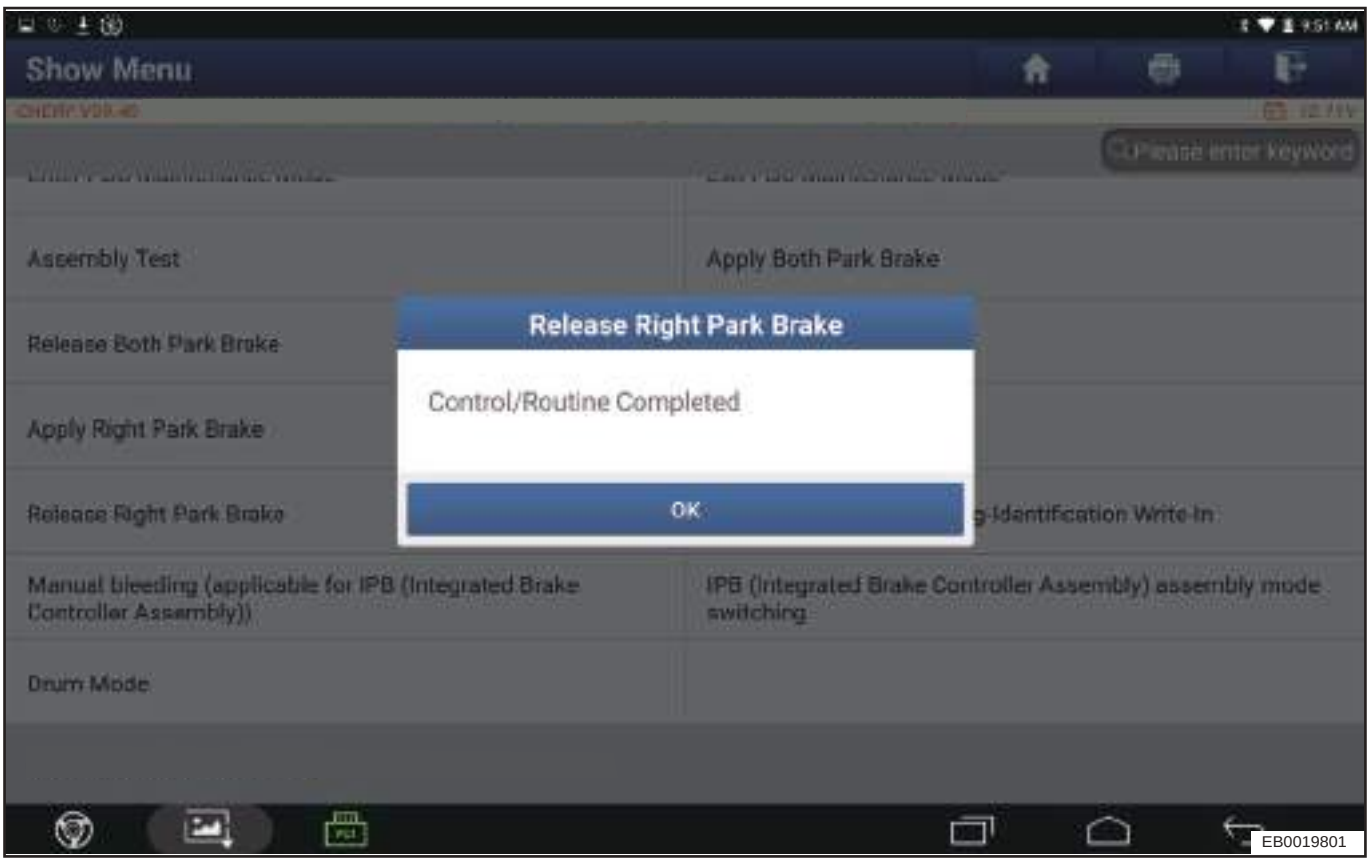


7. Click “Apply Rear Right Brake Caliper”.



8. Click “Release Rear Right Brake Caliper”.


Show Menu
Please enter keyword
Yaw Sensor Calibration(ESP Only)
Repair Bleed
Write E&F Process Control Byte
Write Software Configuration Information
Enter PBC Maintenance Mode
Exit PBC Maintenance Mode
Assembly Test
Apply Both Park Brake
Release Both Park Brake
Apply Left Park Brake
Apply Right Park Brake
Release Left Park Brake
Release Right Park Brake
Vehicle Manufacture Filling-Identification Write-In
EB0019701


Show Menu
Please enter keyword
Assembly Test
Apply Both Park Brake
Release Both Park Brake
Release Right Park Brake
Control/Routine Completed
OK
Apply Right Park Brake
Release Right Park Brake
Manual bleeding (applicable for IPB (Integrated Brake Controller Assembly))
IPB (Integrated Brake Controller Assembly) assembly mode switching
Drum Mode
EB0019801

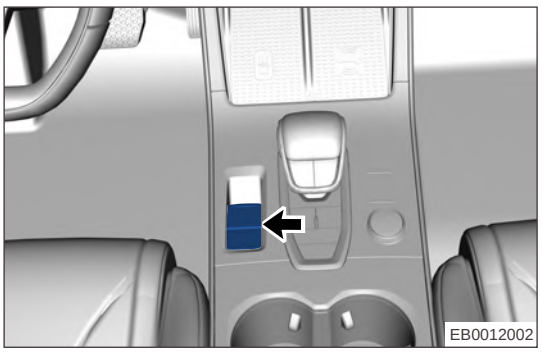
⚠ Caution

- All actions of the EPB action test should be in line with the actual operation, otherwise the EPB system should be overhauled.

EPB Switch

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the shift lever assembly.
4. Remove the A/C control panel assembly.
5. Using an interior crow plate, remove the auxiliary fascia console control panel assembly (arrow).



6. Disconnect electronic parking switch connector and remove electronic parking switch.

Inspection

1. According to circuit diagram, internal resistance of EPB switch is measured using digital multimeter ohm gear. If it does not match with measured value of following table, replace the EPB switch.

Multimeter Connection	Manual Parking Switch State	Specified Condition
Terminal 1 - Terminal 2	No action	⩽ 1 Ω
Terminal 3 - Terminal 4	No action	⩽ 1 Ω
Terminal 1 - Terminal 3 - Terminal 4	Parking brake pulled up	⩽ 1 Ω
Terminal 3 - Terminal 2 - Terminal 1	Parking brake released	⩽ 1 Ω

Multimeter Connection	Automatic Parking Switch State	Specified Condition
Terminal 6 - Terminal 8	Not pressed	∞
Terminal 6 - Terminal 8	Pressed	⩽ 1 Ω

Multimeter Connection	Manual Parking Switch State	Specified Condition
Terminal 12 - Terminal 5	Manual parking switch indicator	2.2 kΩ
Terminal 12 - Terminal 9	Automatic parking switch indicator	2.2 kΩ

Installation

1. Install the electric parking switch.
2. Connect the electric parking switch connector.
3. Install the auxiliary fascia console control panel assembly.
4. Install the A/C control panel assembly.
5. Install the shift knob assembly.
6. Connect the negative battery cable.

Integrated Caliper Motor

Removal

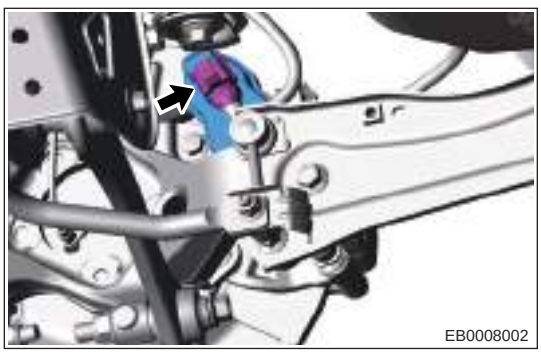
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

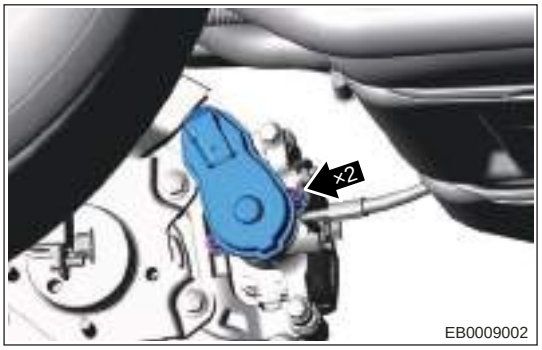
- Be sure to wear safety equipment to prevent accidents, when removing integrated caliper motor.
- Remove integrated caliper motor without damaging motor seal ring and replace it when necessary.
- When removing integrated caliper motor, do not allow foreign matter enter into motor.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left tire.
4. Remove the rear left integrated caliper motor.
   a. Disconnect the rear left integrated caliper motor wire harness connector (arrow).

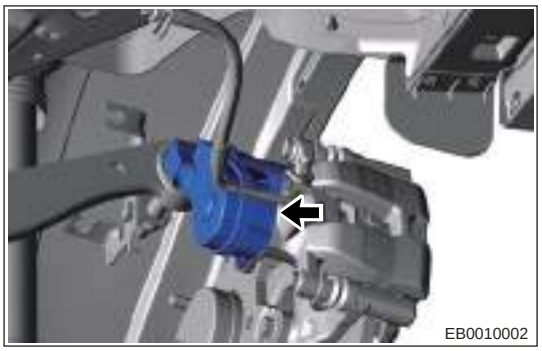


b. Remove 2 fixing bolts (arrows) from rear left integrated caliper motor.

Tightening torque: 10 ± 1.0 N·m



c. Remove the integrated caliper motor (arrow).



⚠ Caution

- Save the removed parking actuator properly to avoid dust or water polluting grease and seal rings.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when installing integrated caliper motor.
- When installing integrated caliper motor, remove sediment, dust and other foreign objects that are on matching surface of parking actuator and on head of parking caliper.
- When installing integrated caliper motor, check whether the O-ring of parking caliper head is invalid or abnormal. Please replace it in time.
- When installing integrated caliper motor, parking caliper head and actuator motor must be tightly coupled, tighten fixing bolts to specified torque.
- When installing integrated caliper motor, check whether the o-ring seal is extruded between parking actuator and parking caliper, if it is extruded, should be reinstalled.
- When installing integrated caliper motor, manual parking clamp and release must be performed to confirm if parking function is normal.

EPB Brake Caliper Emergency Release

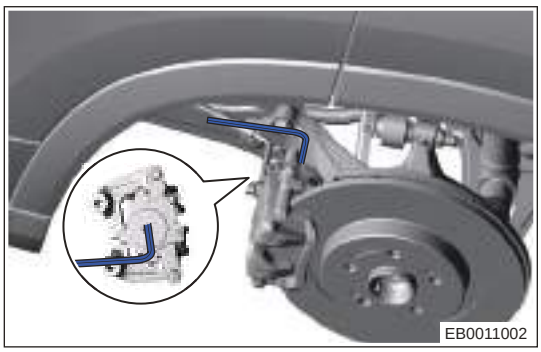
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- If parking brake cannot be released by parking brake switch manually or automatically due to unexpected circumstances (such as battery does not output voltage, parking brake system failure, etc.) during using EPB system, you need to enable parking emergency releasing function to release parking brake, please follow the following steps for specific methods.
- If this malfunction occurs on a slope, please try to tow vehicle to a level road or place obstacles such as rocks in front of or rear of front wheels respectively to prevent wheel rolling, avoiding coasting accident after releasing rear wheel brake urgently.
- Be sure to wear safety equipment to prevent accidents, when EPB brake caliper emergency releasing.

1. Remove the rear left tire.
2. Remove the rear left integrated caliper motor.
3. Align inner hexagon 6# with spline in EPB caliper, rotate 2-3 cycles clockwise (when operator faces spline) or stop until brake disc can rotate freely (it is normal that a large rotation force is needed due to vehicle parking brake condition).



4. The vehicle only loses parking function and does not affect normal braking function after releasing parking brake.

⚠ Caution

- Emergency release is highly specialized, it is recommended to perform by Chery 4S shop professionals.

STEERING SYSTEM

STEERING SYSTEM

ELECTRONIC POWER STEERING CONTROL SYSTEM

Warnings and precautions

Precautions

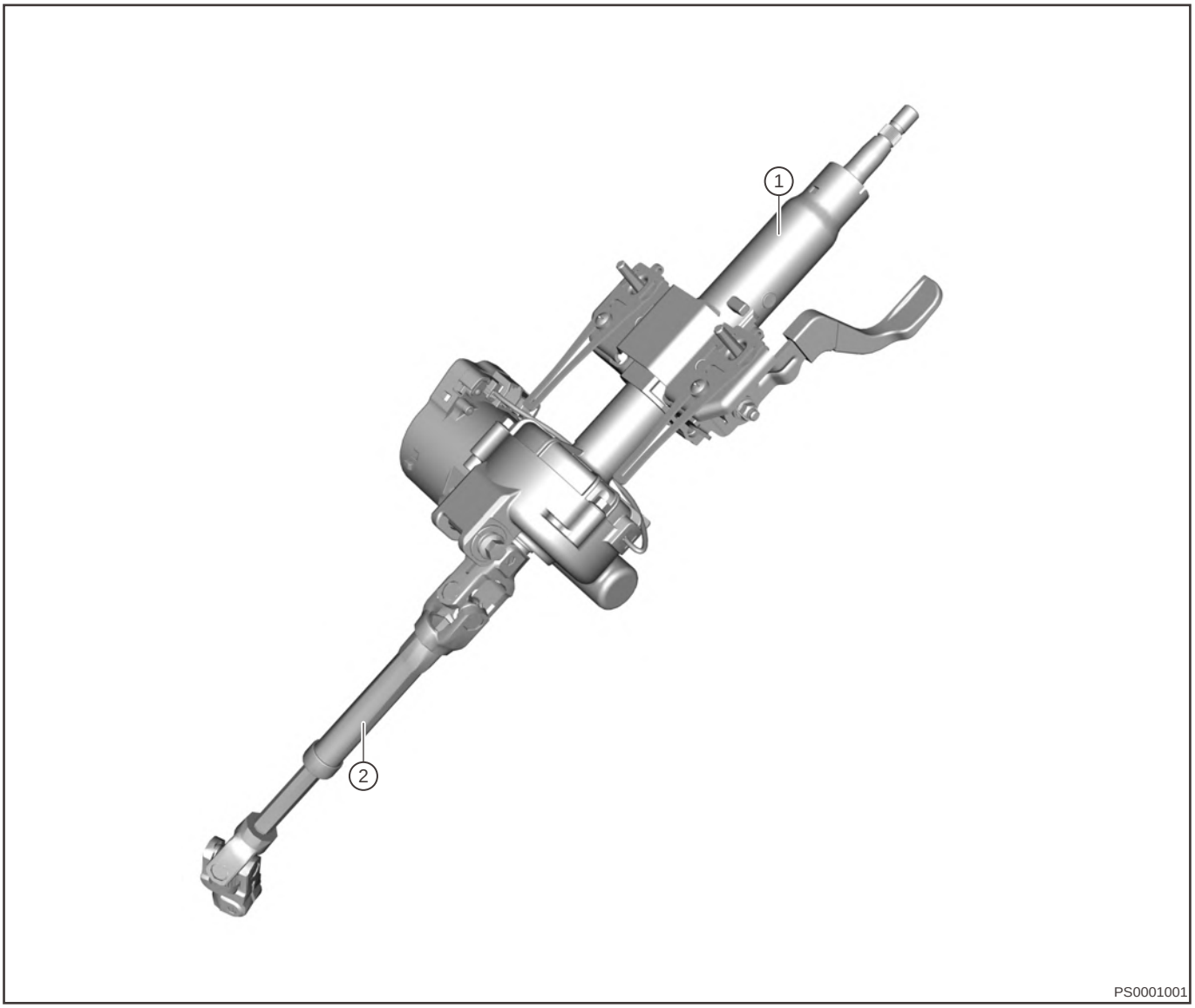
1. Calibration requirements: Keep vehicle stationary and steering wheel centered to ensure that the left and right errors are within 10°.
2. Battery voltage is higher than 10 V and lower than 16 V.
3. When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.
4. It is necessary to perform steering angle calibration after replacing electronic power steering column assembly, steering gear, four-wheel alignment etc.
5. When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

System Overview

System Description

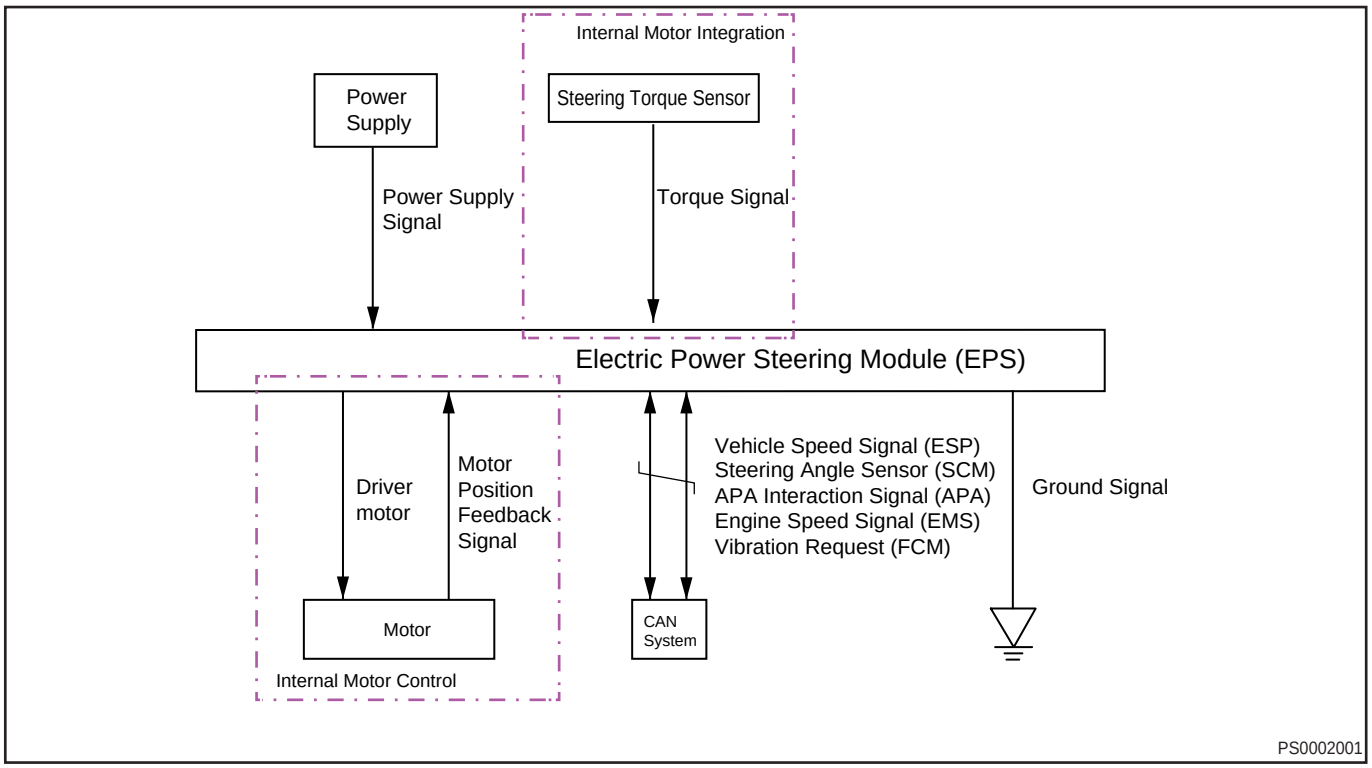
The steering column is the component of the steering system that connects the steering wheel and the steering gear. Through the steering column, the driver transfers torque to the steering gear, which drives the steering gear to achieve steering.

System Components Diagram



1	Electric Steering Column	2	Steering Intermediate Shaft Assembly

System Schematic Diagram



Electronic power steering module is integrated into steering column.

Operation

When driver rotates the steering wheel, torque sensor installed on steering column sends detected torque acting on steering wheel to steering assist control unit. Based on information such as steering torque, vehicle speed (provided by vehicle CAN line), steering wheel rotation angle, steering wheel rotation speed and characteristic curve stored in control unit, control unit calculates required steering torque based on specified algorithm, and controls motor operation. The steering assist is provided by motor drive column, thus steering rack operates.

Component Operation Description

Steering angle sensor

The steering angle sensor of vehicle is used to detect rotation angle and direction of steering wheel. Turning steering wheel to left and right will be detected by steering angle sensor, so as to make electronic control unit of vehicle send correct steering command. Rotation angle of steering wheel provides basis for steering extent of vehicle, so that the vehicle drives according to driver’s steering intention.

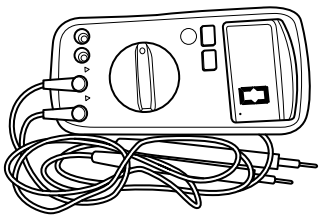
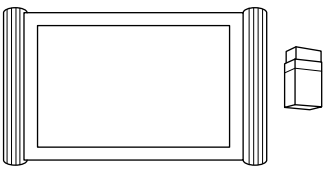
EPS Corner Calibration and Soft Stop Learning (for Offline Calibration of Four-wheel Alignment Station Electrical Inspection Equipment)

1. Start vehicle;
2. Turn steering wheel to left and right more than ± 45° at a speed of < 200°/s;
3. Perform four-wheel alignment on vehicle;
4. The ignition switch is turned off and turned on within 3 seconds (+15 on);
5. Fix the steering wheel horizontally;
6. Connect the electrical inspection equipment, enter corner calibration interface, and confirm directly until the calibration is completed according to the prompt of electrical inspection equipment;
7. Calibration is completed;

8. (After the four-wheel alignment is completed), drive out the four-wheel alignment station, turn the steering wheel left and right to the limit position, and keep the hand force not less than 10 N·m for more than 1 second, and ensure that the steering wheel hits the limit position and then returns to the center position;
9. The software completes soft stop position learning.

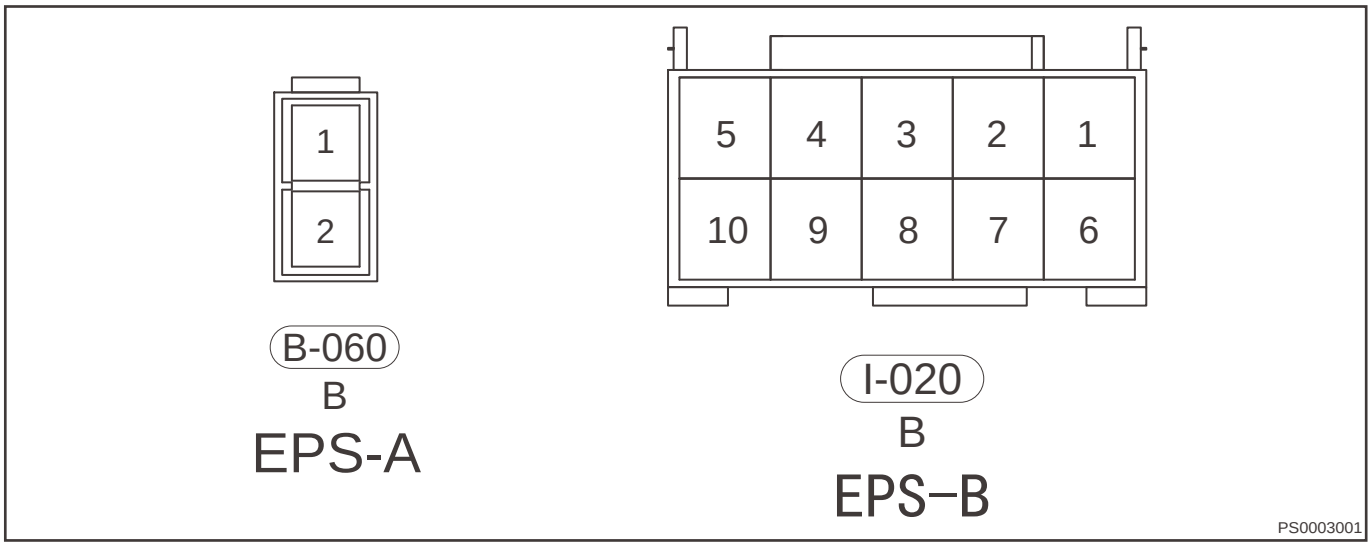
⚠ Caution
In step 2, if the steering speed is too fast or the steering angle is insufficient, it cannot be calibrated. In step 4, if the vehicle is not powered on in 3 seconds, it cannot be calibrated. In step 8, if the steering wheel limit position (turned to strike position) has not reached, it will cause soft stop position learning to be advanced for the first time, resulting in an power assist loss prior to the limit position.

Tools

Tool Name	Tool Drawing
Digital Multimeter	 S00002
Diagnostic tester	 S00001

System Circuit Diagram

Module Terminal Definition



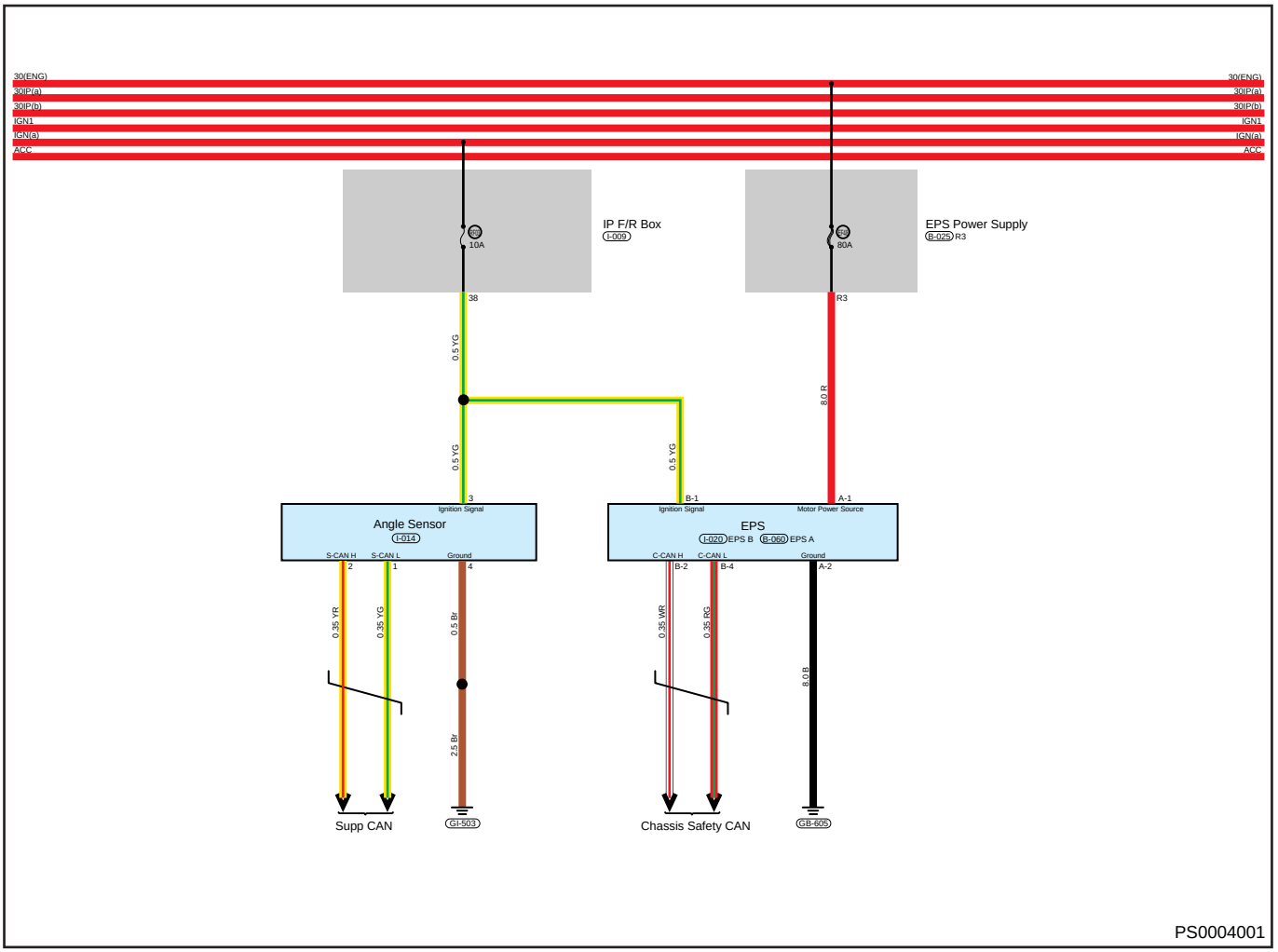
Vehicle power supply: Controller power supply connector (connector A)

Pin	Definition	Pin	Definition
1	Motor Power Source	2	Ground

Vehicle signal: Controller signal connector (connector B)

Pin	Definition	Pin	Definition
1	Ignition Signal	2	C-CAN H
3	-	4	C-CAN L
5	-	6	-
7	-	8	-
9	-	10	-

Circuit Diagram



Diagnostic Information and Steps

Diagnostic Help

- Connect diagnostic tester and make it communicate with vehicle electronic module through data network.
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be deleted, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that applied to the malfunction.
- Visually check the related wire harness.
- Check and clean Electronic Power Steering controller (EPS controller) ground related to latest DTC.
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the following:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.

- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect sensors and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

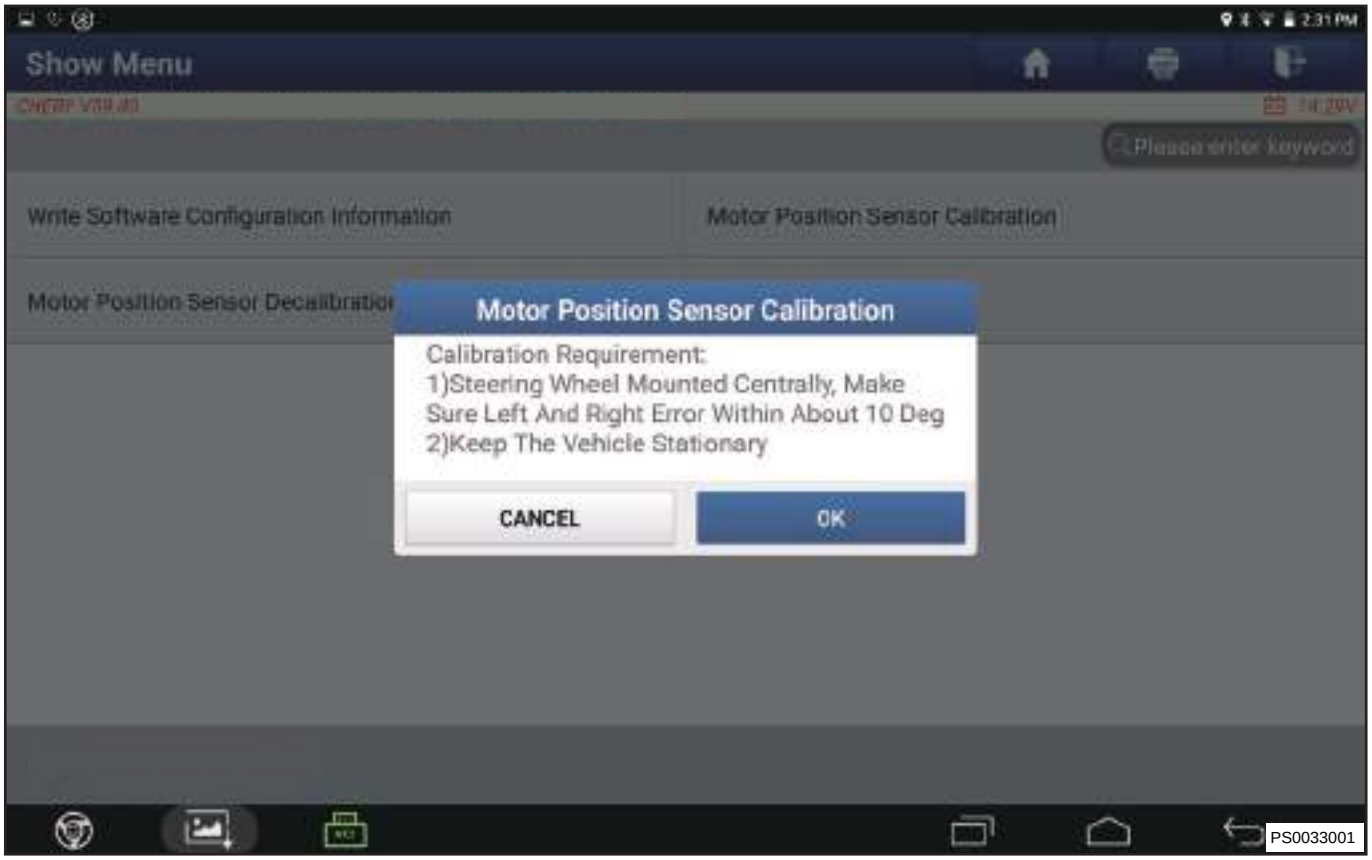
Motor Position Sensor Calibration

1. Connect diagnostic tester, turn ignition switch ON.
2. Select the "OMODA" model.
3. Select “EPS (Electronic Power Steering)”.

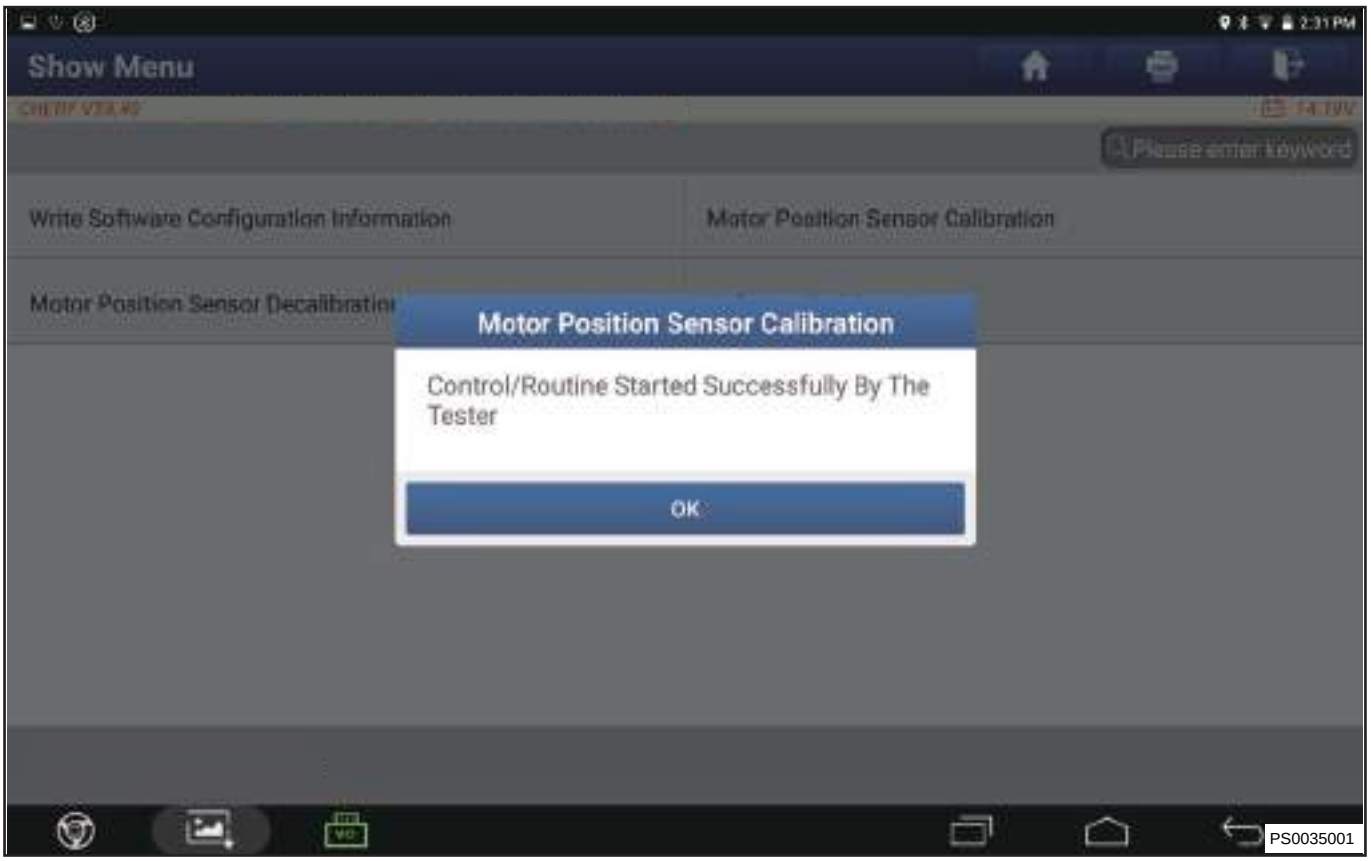
4. Click “Special Function”.

5. Go to next interface, click “Motor Position Sensor Calibration”

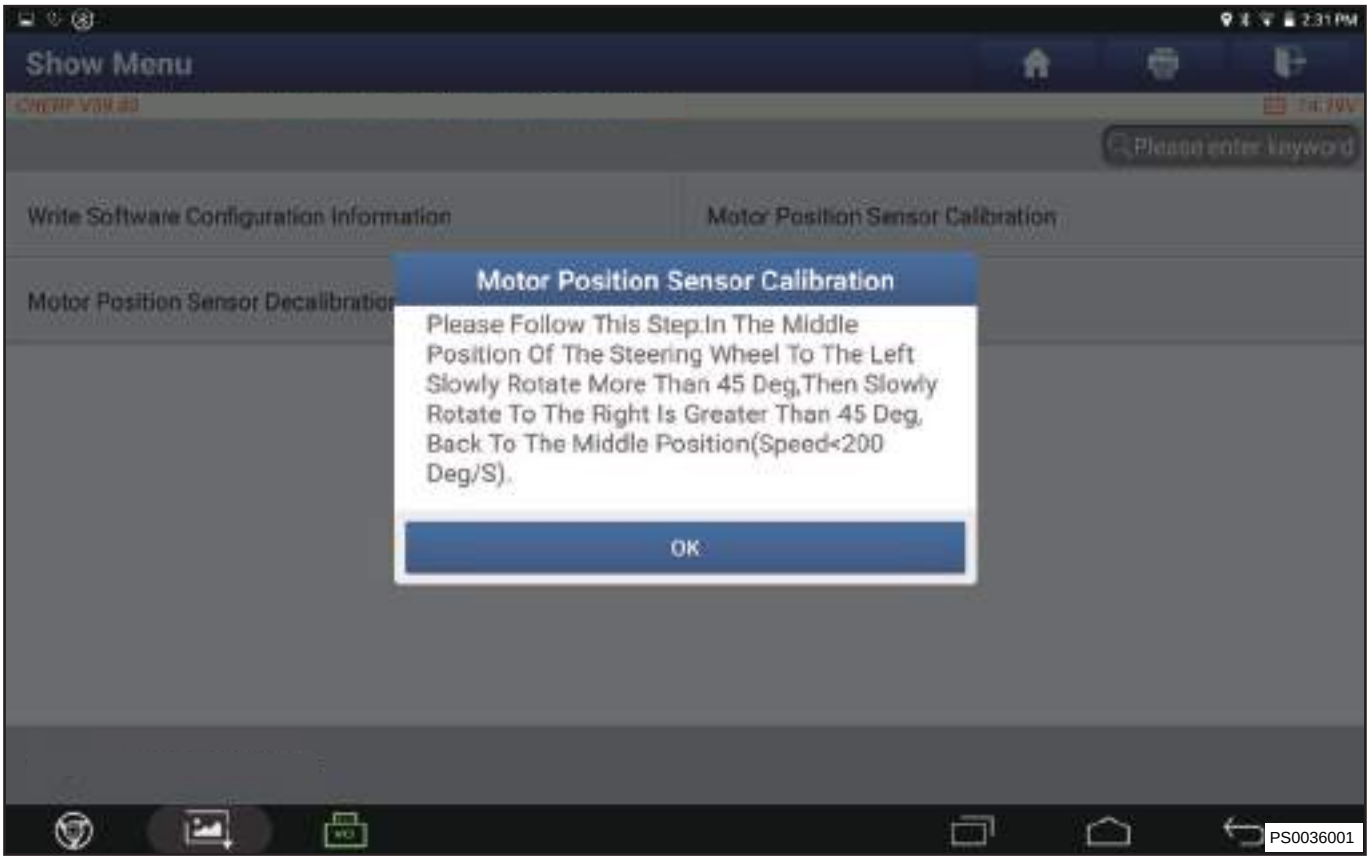
6. Hint: “Calibration requirement: (1) Steering wheel mounted centrally. Make sure left and right error within about 10 deg (2) Keep the vehicle stationary” Then click “OK”.



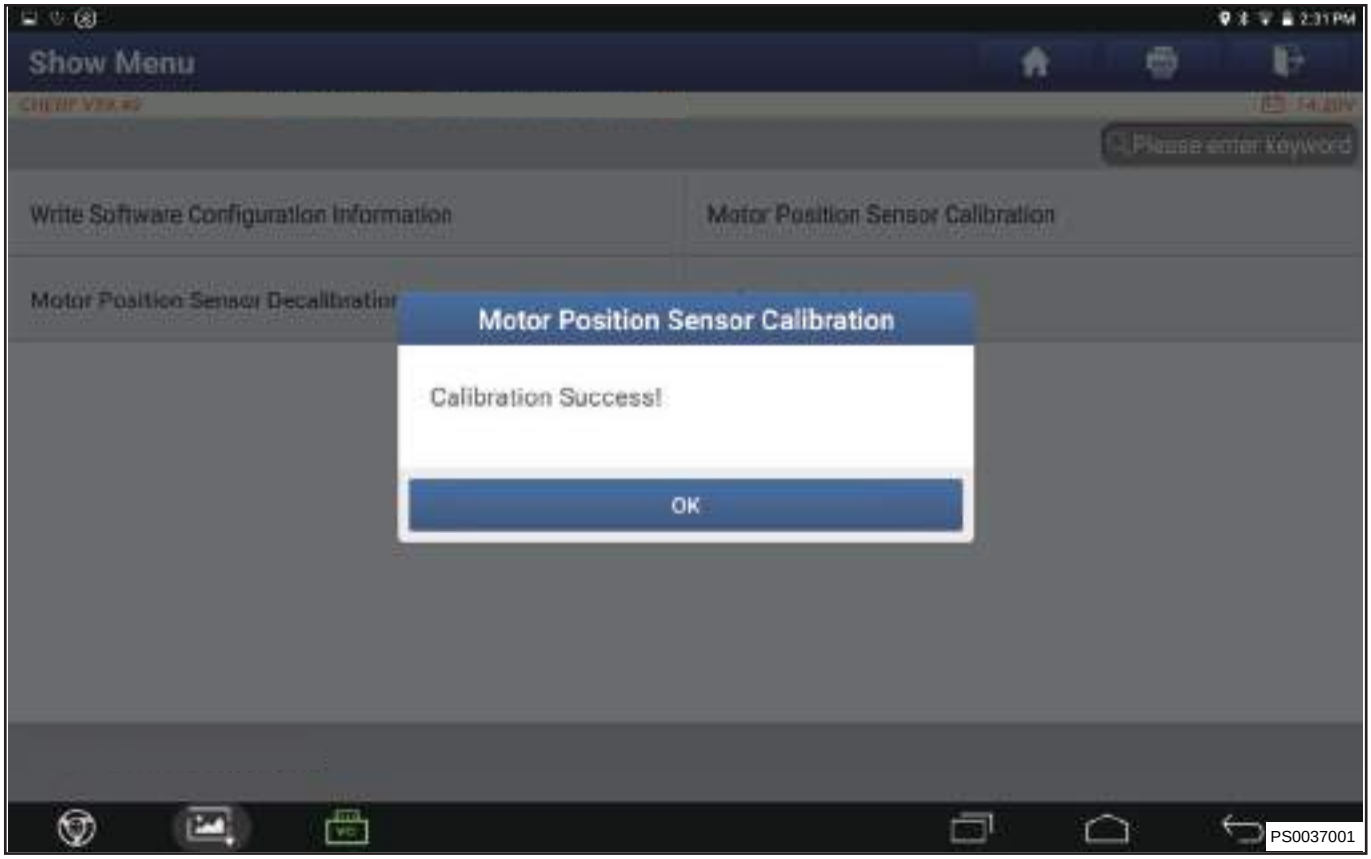
7. Hint: “Control/Routine Started successfully by the tester” Then click “OK”.



8. Hint: “Please follow this step: In the middle position of the steering wheel to the left slowly rotate more than 45 deg, then slowly rotate to the right is greater than 45 deg, back to the middle position (Speed < 200 deg/s)” and click “OK”.



9. Hint: “Calibration success!” Then click “OK”.



⚠ Caution

- Calibration requirements: Keep vehicle stationary and steering wheel centered to ensure that the left and right errors are within 10°.
- Battery voltage is higher than 9 V and lower than 16 V.

VIN Code Configuration Code Writing

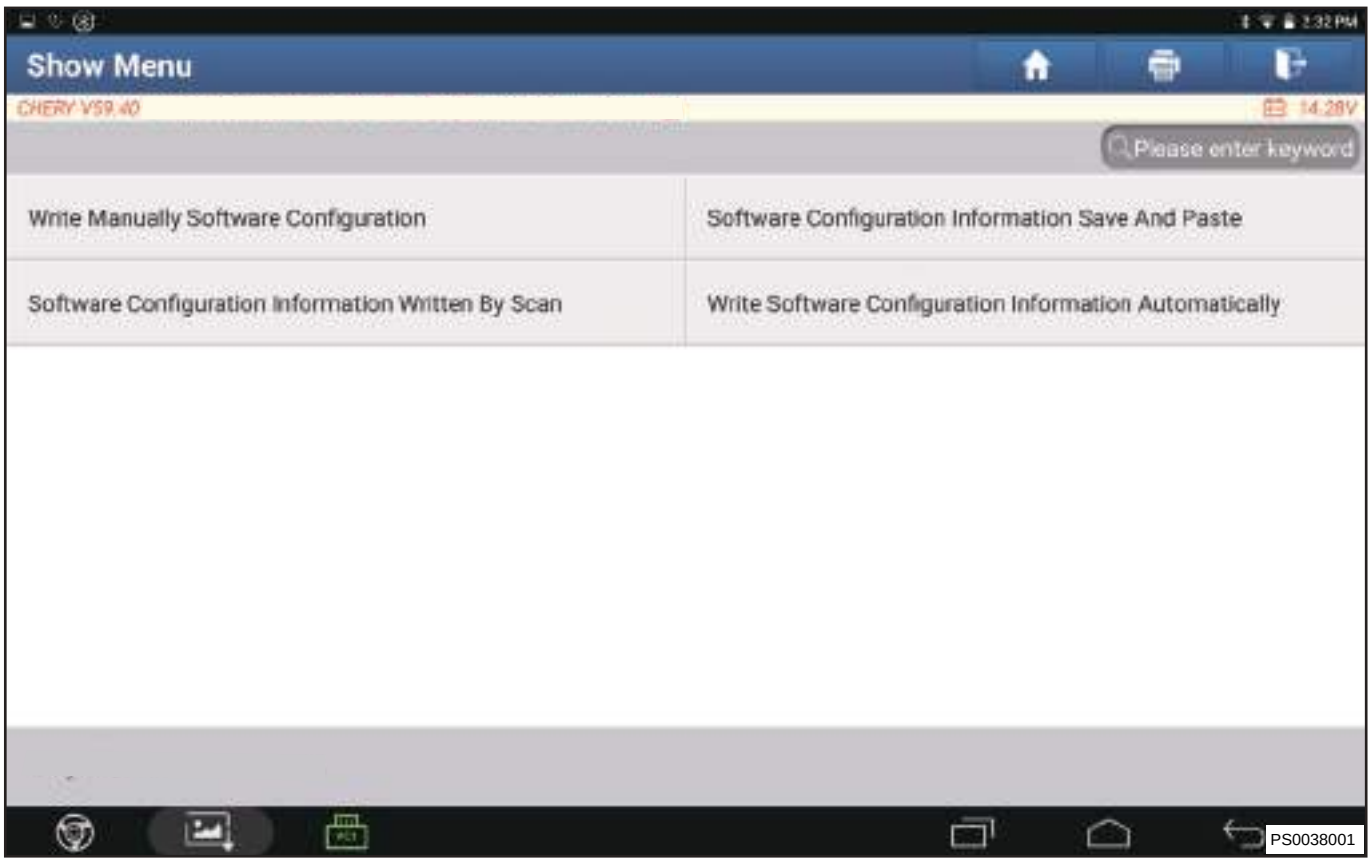
Automatic Writing

1. Connect diagnostic tester, turn ignition switch ON.
2. Select the "OMODA" model.
3. Select “EPS (Electronic Power Steering)”.

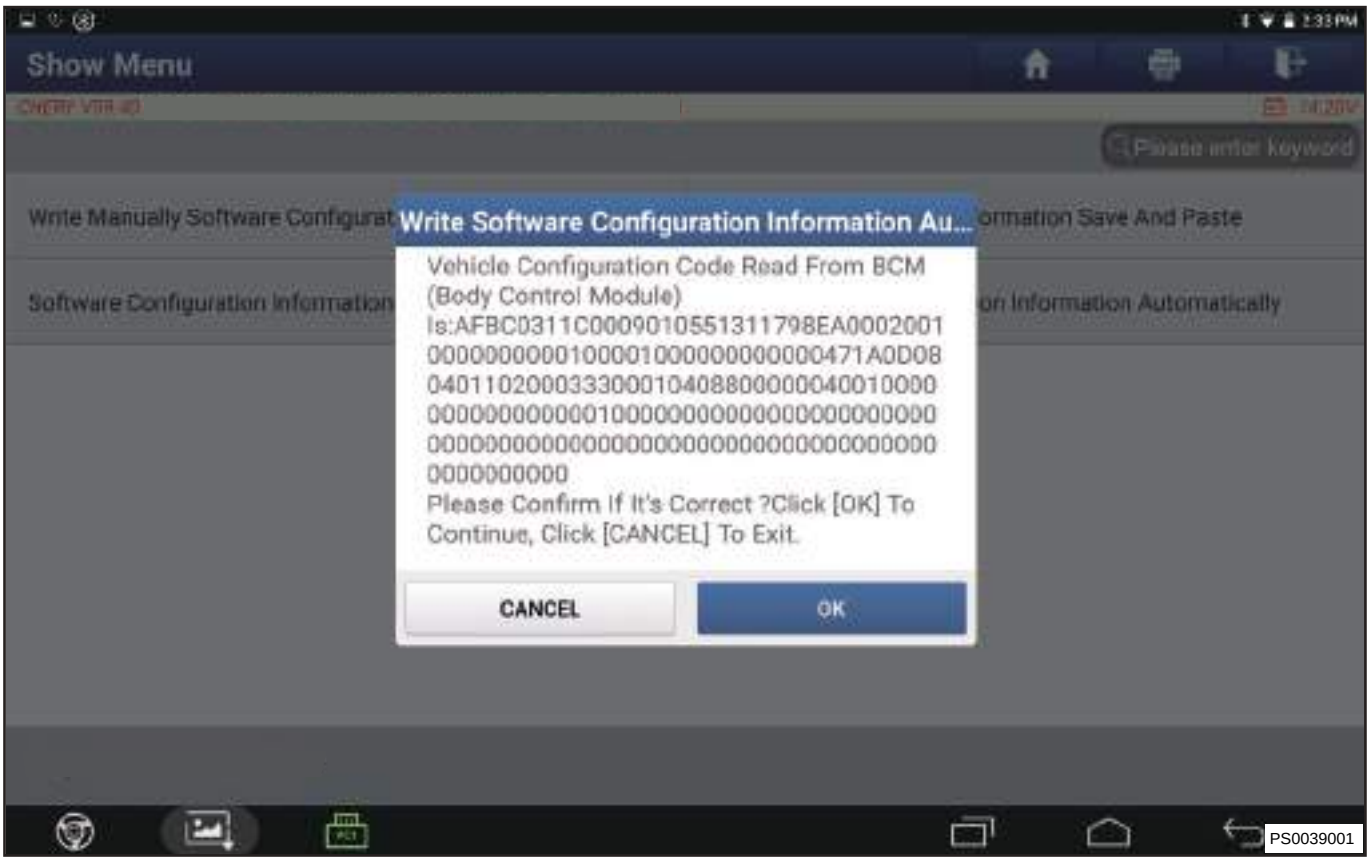
4. Click “Special Function”.

5. Enter next screen and click “Write Software Configuration Information”

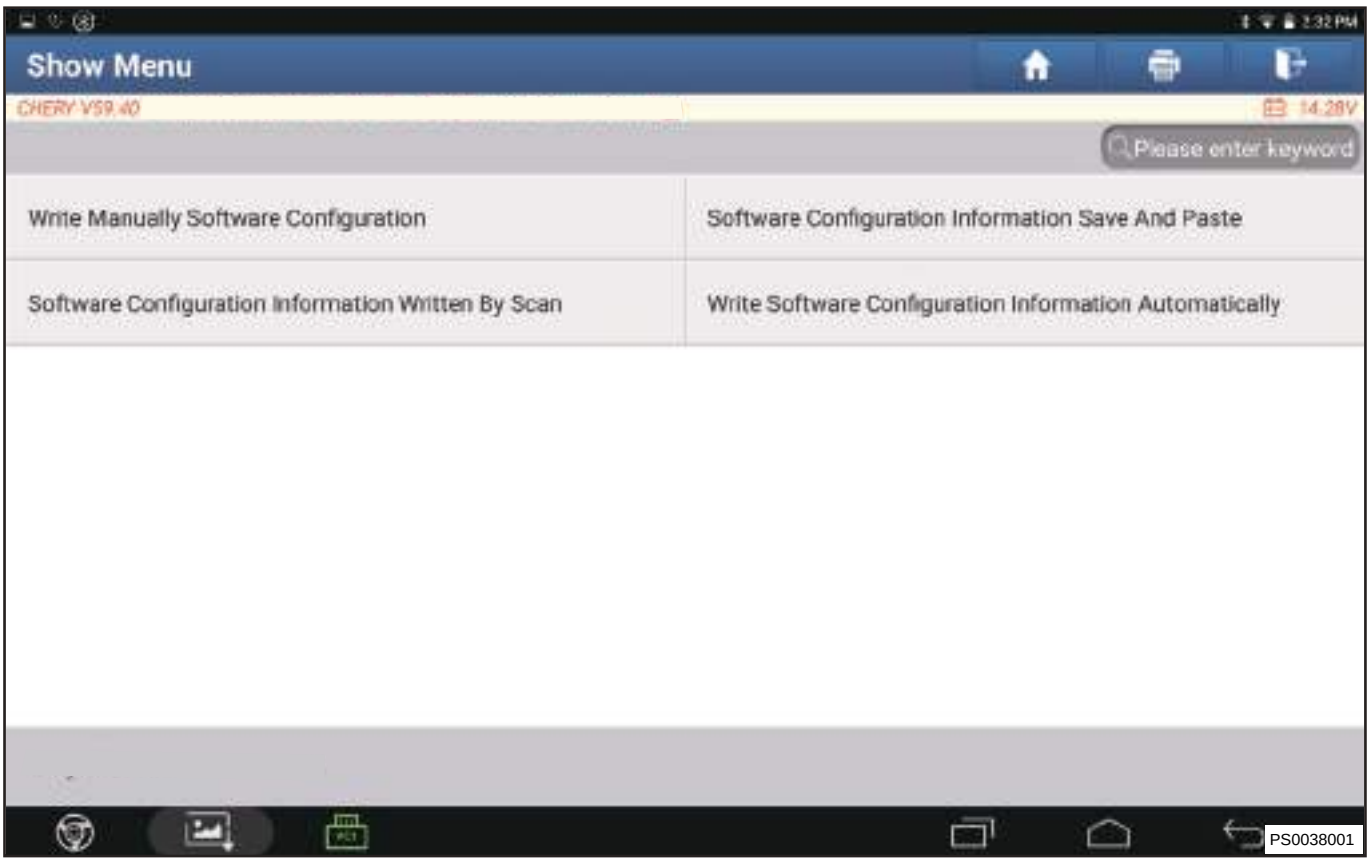
6. Enter next screen and click “Software Configuration Information Save And Paste”



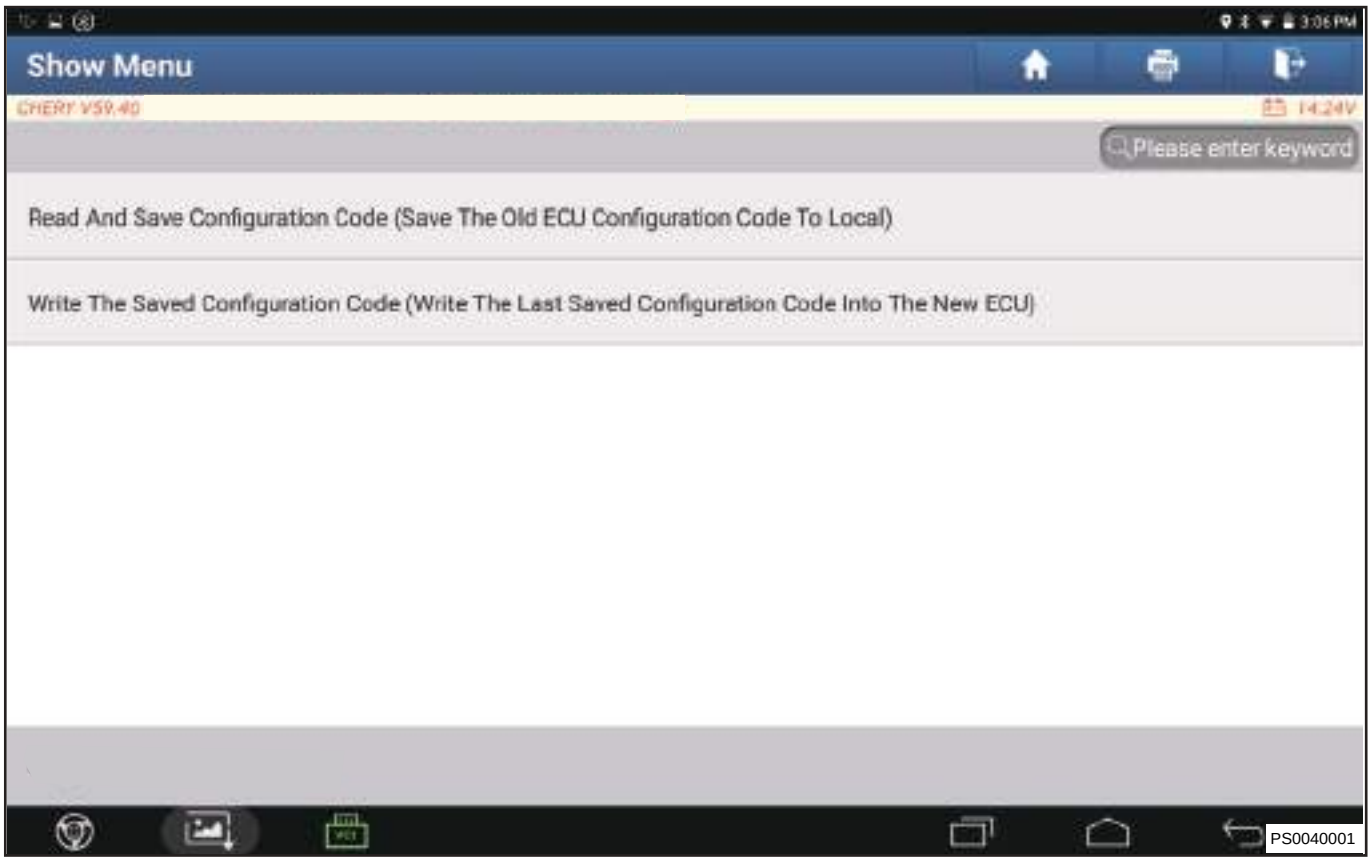
7. Hint: “Vehicle Configuration Code Read From BCM (Body Control Module)”. Then click “OK”.



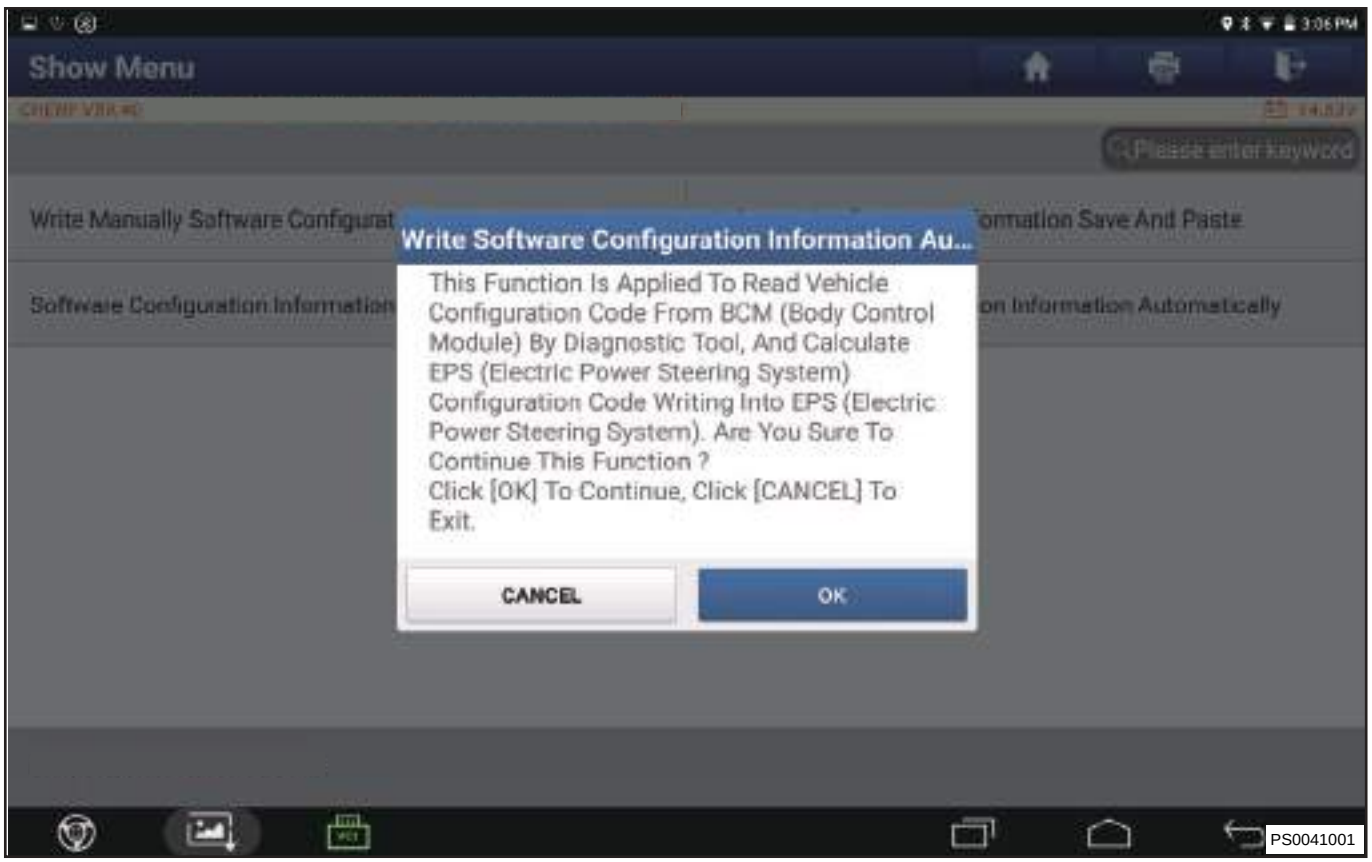
8. Go back to previous screen and click “Write Software Configuration Information Automatically”.



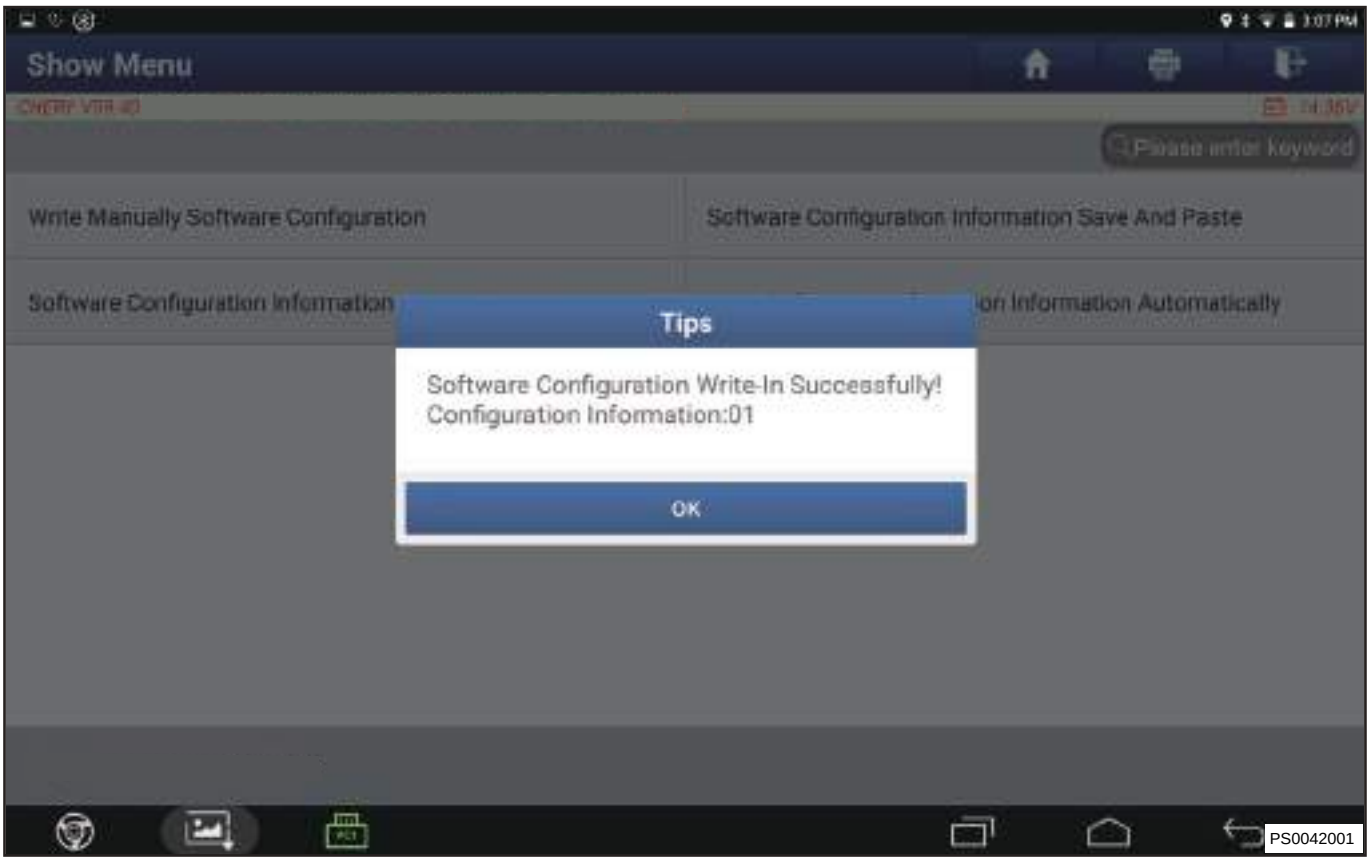
9. Enter next screen and click “Read And Save Configuration Code (Save The Old ECU Configuration Code To Local)”.



10. Hint: “Configuration Code Writing Into EPS (Electronic Power Steering System).” Then click “OK”.



11. Hint: “Software Configuration Write-In Successfully!”.



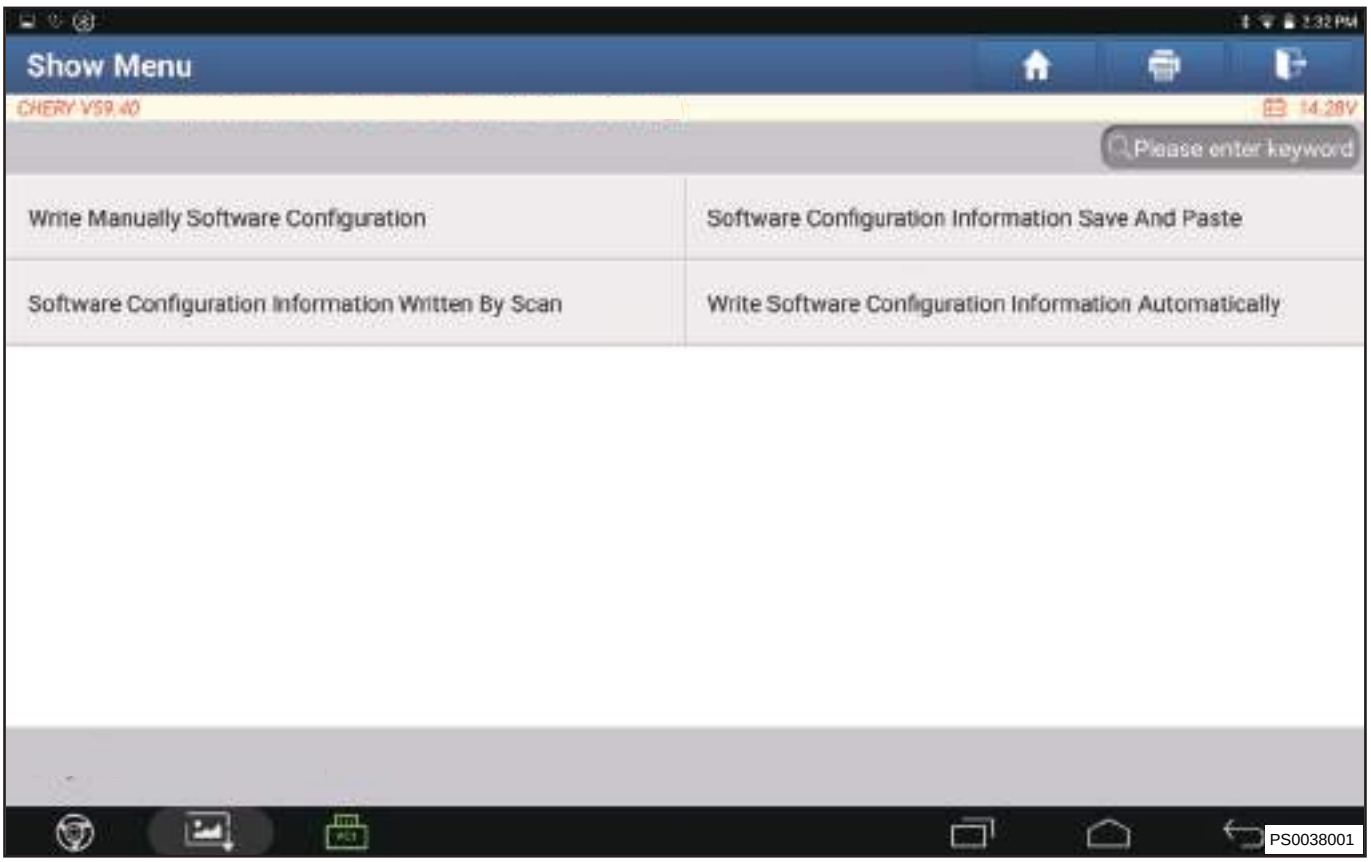
Write Manually

1. Connect diagnostic tester, turn ignition switch ON.
2. Select the "OMODA" model.
3. Select “EPS (Electronic Power Steering)”.

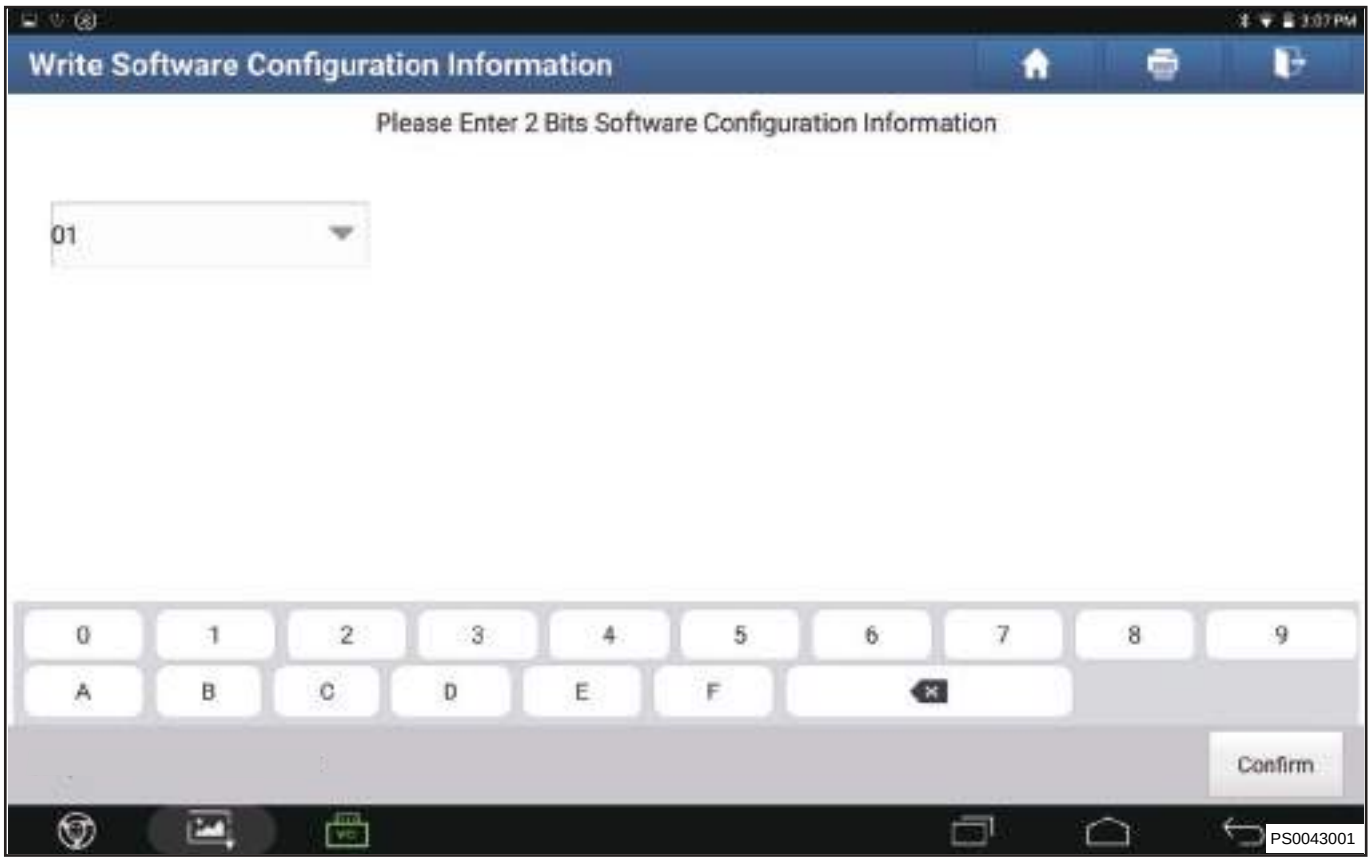
4. Click “Special Function”.

5. Enter next screen and click “Write Software Configuration Information”.

6. Enter next screen and click “Write Manually Software Configuration”.



7. Click and enter vehicle VIN code.



8. Hint: “Software Configuration Write-In Successfully!”.

Diagnostic Trouble Code (DTC) Chart

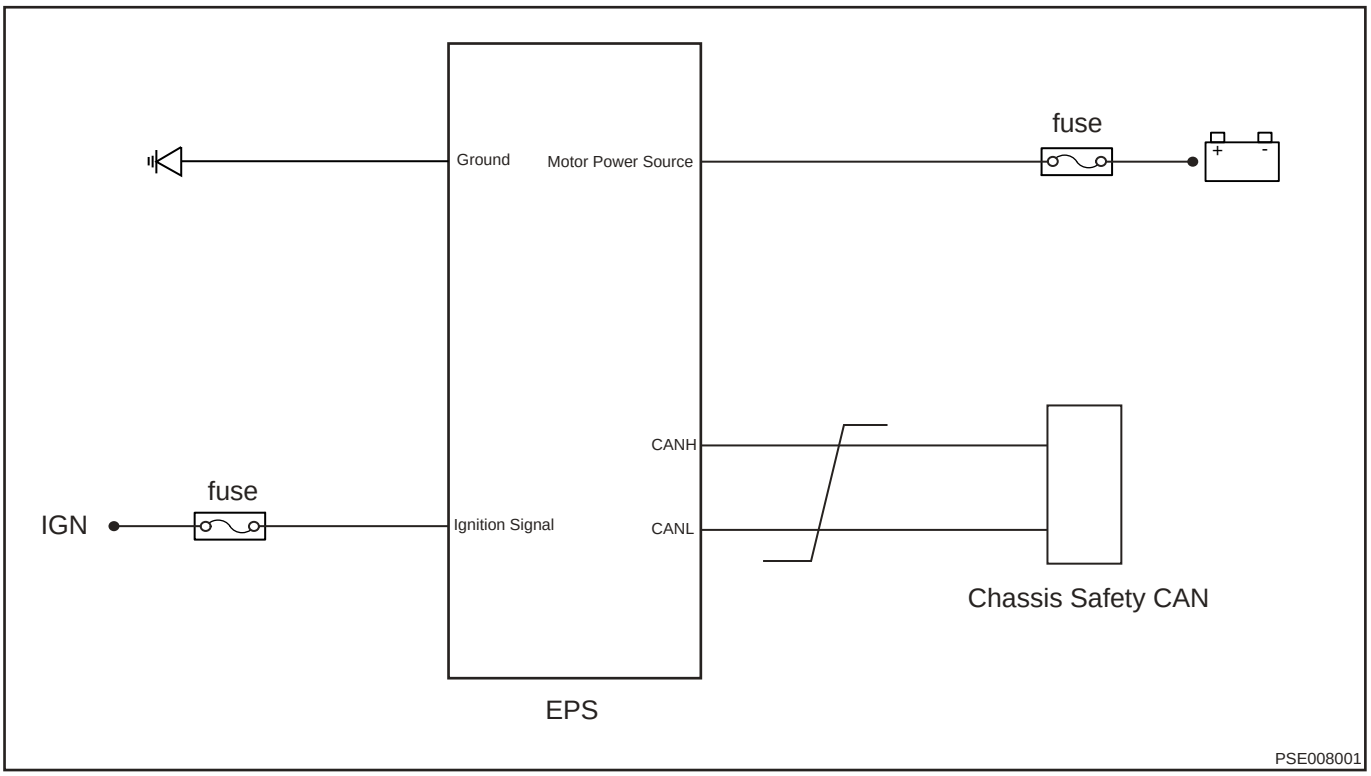
DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C1201-44	Data Flash Verify Error-Data Memory Failure	Related error register flag is set	• ECU defected	/
C1202-49	ECU Hardware Error-Internal Electronic Failure	Related error register flag is set		/
C1204-00	ECU Reset Error	Unexpected reset source is detected		/
C1204-48	ECU Sw Monitoring Error	Algorithm error is detected		/
C1206-45	Flash Code Verify Error	Checksum is wrong		/
C1208-49	Output Stage Error	Motor short to Vbat or ground, phase open, or motor current out of range is detected.		/
C1209-49	Phase Current Error	Phase current is out of range		/

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C120A-49	Rotor Position Sensor Error	Resolver signal is out of range		/
C120F-00	Steering Angle Sensor Not Calibrated-No Sub Type Information	Related flag is not set	• ECU or HELLA sensor defected	/
C1214-1C	High Power Supply Voltage	Supply voltage is beyond 16V and below 24	• Battery failure	/
C1214-17	Supply Voltage Too High	Supply voltage is below 24		/
C1217-1C	Low Power Supply Voltage	Supply voltage is below 9V and beyond 6V		/
C1217-16	Supply Voltage Too Low	Supply voltage is beyond 6V		/
C1218-4B	Over Temperature Reduction-Over Temperature	PCB and Output stage(MOSFET) Temperature difference is too high	• Too long time strong steering	/
C121A-4B	Temperature Out Of Range-Over Temperature	System temperature is beyond 100℃	• Environment temperature too high	/
C121A-49	Torque Sensor Error-Internal Electronic Failure	T1 or T2 signal is out of range	• ECU or HELLA sensor defected	/
C121E-44	RAM Check Error	Related error register flag is set	• ECU defected	/
C121F-49	SBC Error	Related error register flag is set		/
C1220-49	Gate Driver Fault	Related error register flag is set		/
C1221-00	Soft End Stop Function no Calibration or Calibration Error	Related flag is not set	• ECU or HELLA sensor defected	/
C1222-49	Switch Power MOSFET Error	Switch Power MOSFET circuit error is detected	• ECU defected	/
C1223-49	Vbat Voltage Detection Circuit Error	Vbat voltage detection circuit error is detected		/

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C1224-49	EEPROM SPI Communication Timeout	EEPROM SPI communication timeout is detected		/
C1225-46	EEPROM Error	Checksum is wrong		/
C1219-4B	Temperature Sensor Signal Out of Range	Temperature signal is out of range		/
C1210-49	Steering Angle Implausible	Steering Angle Sensor diagnostic and communication fault or hardware error	• Internal steering angle sensor defected • Hardware error	/
U0073-88	CAN Bus Off	/	/	/
U0100-87	Lost Communication with EMS	/	/	/
U0129-87	Lost Communication with BSM	/	/	/
U1300-55	Software Configuration Error	/	/	/
U3000-51	Control Module Not Programmed	/	/	/
U0418-81	Invalid Data Received from BSM	/	/	/

DTC Diagnosis Procedure

DTC	**C1201-44**	**Data Flash Verify Error-Data Memory Failure**
DTC	**C1202-49**	**ECU Hardware Error-Internal Electronic Failure**
DTC	**C1204-00**	**ECU Reset Error**
DTC	**C1204-48**	**ECU Sw Monitoring Error**
DTC	**C1206-45**	**Flash Code Verify Error**
DTC	**C121A-49**	**Torque Sensor Error-Internal Electronic Failure**



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

(a) Connect negative battery terminal cable, and turn ENGINE START STOP switch to ON to make engine run normally.
(b) Check battery voltage with voltage band of multimeter.
Specified Condition

Multimeter Connection	Condition	Specified Condition
Battery (+) - Battery (-)	ENGINE START STOP switch ON	Not less than 12 V

NG	**Check and repair battery**

OK

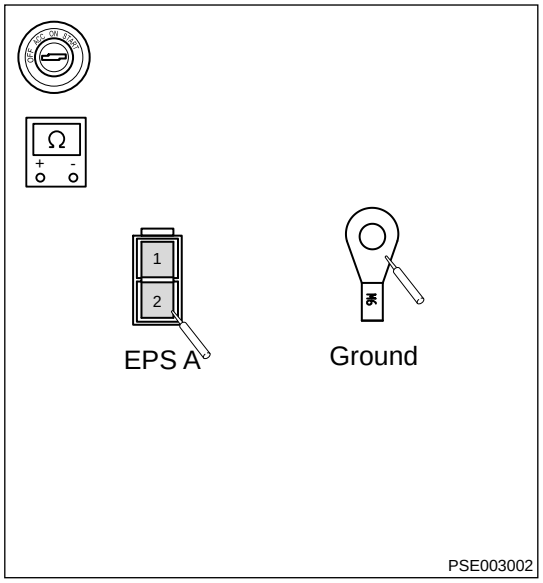
2	**Inspect ground and power supply circuit**

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the EPS connector.

(c) Check for continuity between EPS (ground terminal) terminal and ground.

(d) Check for continuity between EPS (power supply terminal) and power supply.

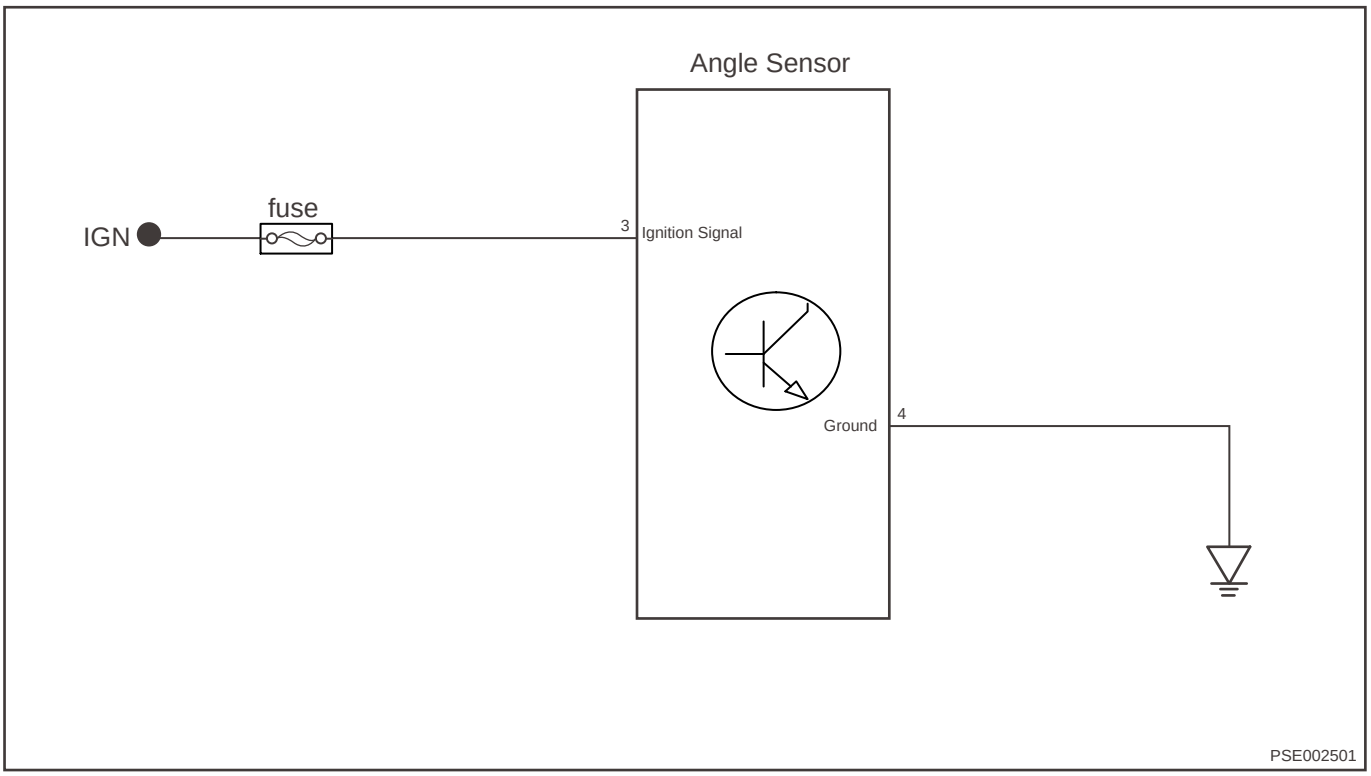


OK → **Replace EPS**

NG → **Replace or repair wire harness**

DTC	**C120F-00**	**Steering Angle Sensor Not Calibrated-No Sub Type Information**
DTC	**C1221-00**	**Soft End Stop Function no Calibration or Calibration Error**
DTC	**C1201-49**	**Steering Angle Implausible**

Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check steering angle calibration**

(a) Turn ENGINE START STOP switch to ON.
(b) Connect the diagnostic tester, read data streams of steering angle sensor.
(c) Check if steering angle sensor angle is normal and calibration is successful.

NG → **Recalibrate steering angle sensor**

OK →

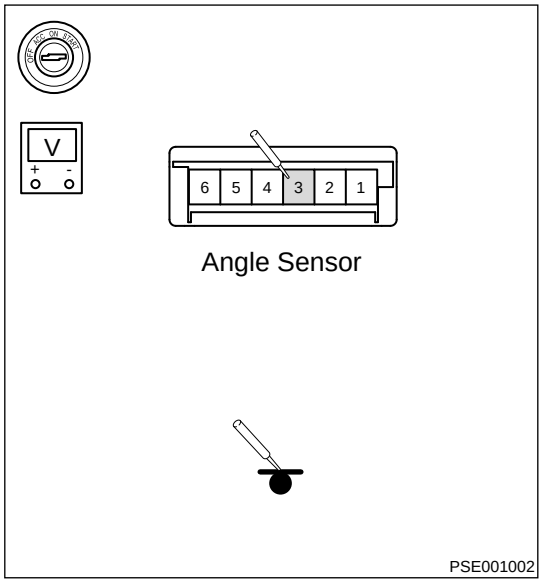
2	**Check angle sensor power supply**

(d) Turn ENGINE START STOP switch to OFF.

(e) Disconnect angel sensor.

(f) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Angle sensor (3) - body ground	ENGINE START STOP switch ON	12-14V



NG → **Repair or replace power supply wire harness**

OK →

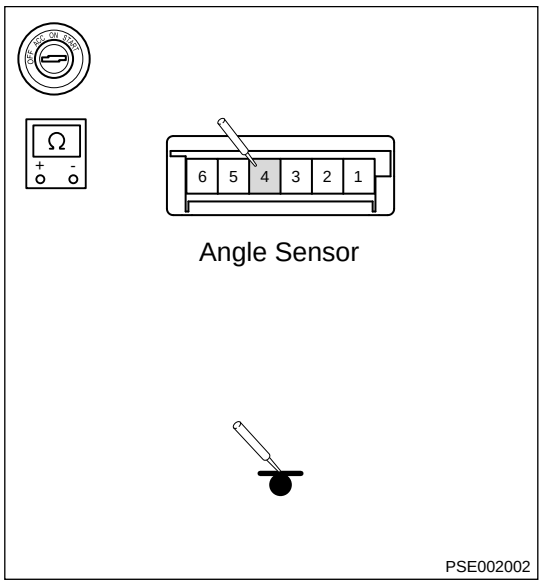
3	**Check angle sensor ground**

(g) Turn ENGINE START STOP switch to OFF.

(h) Disconnect angel sensor.

(i) Check continuity between angle sensor (4) and body ground with multimeter ohm band.

Multimeter Connection	Condition	Specified Condition
Angle sensor (4) - body ground	ENGINE START STOP switch “OFF”	⩽ 1 Ω



NG → **Repair or replace ground point**

OK → **Replace EPS**

DTC	**C1208-49**	**Output Stage Error**
DTC	**C1209-49**	**Phase Current Error**
DTC	**C120A-49**	**Rotor Position Sensor Error**
DTC	**C1222-49**	**Switch Power MOSFET Error**
DTC	**C1223-49**	**Vbat Voltage Detection Circuit Error**
DTC	**C1224-49**	**EEPROM SPI Communication Timeout**
DTC	**C1225-46**	**EEPROM Error**
DTC	**C121E-44**	**RAM Check Error**
DTC	**C121F-49**	**SBC Error**
DTC	**C1220-00**	**Drive Motor Fault**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

1	**Replace EPS**

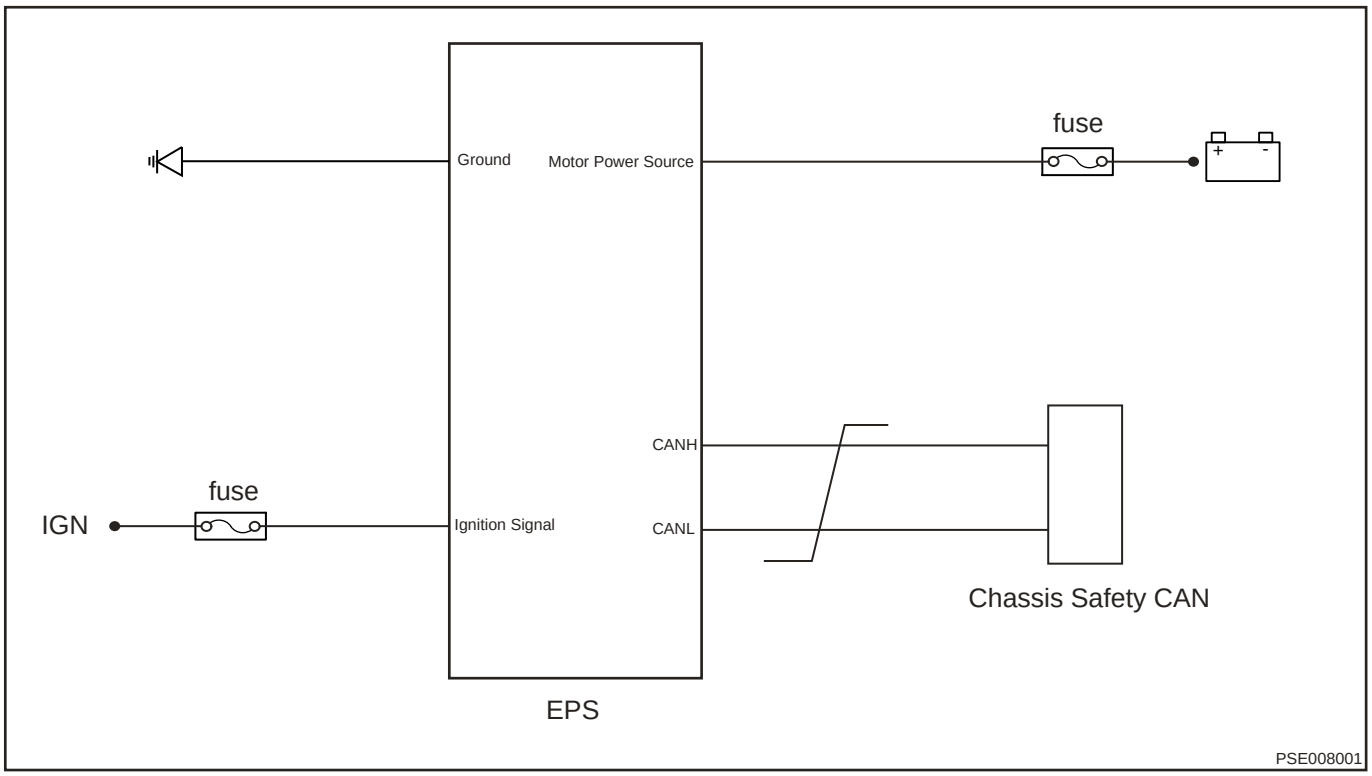
(a) Replace EPS.
(b) Connect diagnostic tester and clear DTCs.
(c) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(d) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**C1214-1C**	**High Power Supply Voltage**
DTC	**C1214-17**	**Supply Voltage Too High**
DTC	**C1217-1C**	**Low Power Supply Voltage**
DTC	**C1217-16**	**Supply Voltage Too Low**

Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

(a) Check if battery voltage is normal.
(b) Check battery voltage with voltage band of multimeter.

NG → **Check and repair battery**

OK

2	**Check fuse**

(a) Turn ENGINE START STOP switch to OFF.
(b) Remove fuse from engine compartment fuse and relay.
(c) Check if fuse is blown.

NG → **Replace fuse**

OK

3	Check power supply voltage

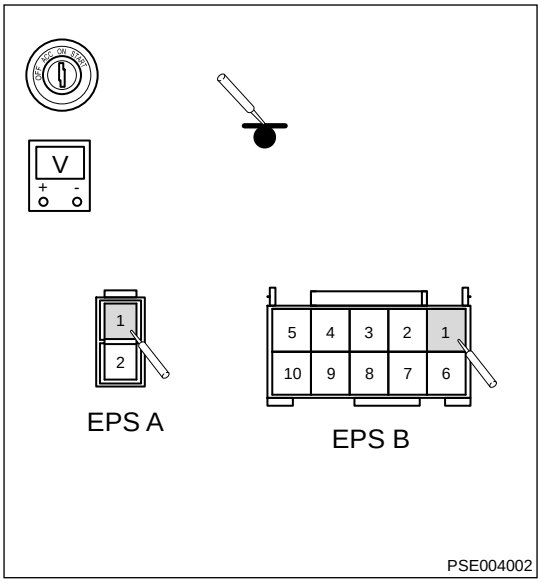
(a) Turn ignition switch to OFF.

(b) Disconnect the EPS signal connector and power supply connector.

(c) Turn ENGINE START STOP switch to ON.

(d) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
EPS signal connector (B1) - body ground	ENGINE START STOP switch ON	12-14V
EPS signal connector (A1) - body ground	ENGINE START STOP switch ON	12-14V



NG → **Repair or replace power supply wire harness**

OK

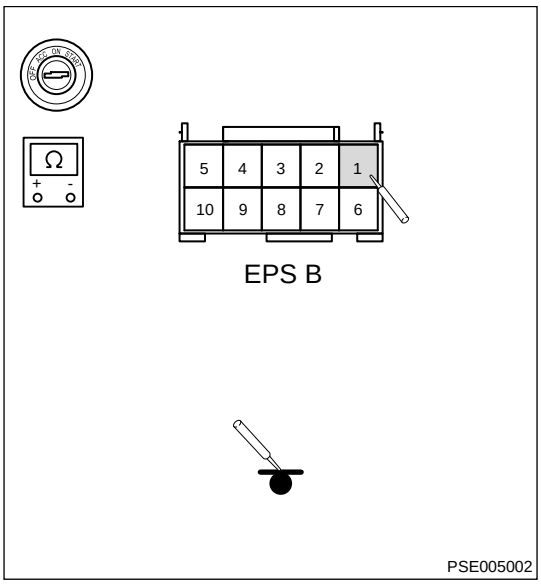
4	Check ground

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect electronic power steering signal connector.

(c) Perform the resistance inspection

Multimeter Connection	Condition	Specified Condition
EPS signal connector (B1) - body ground	ENGINE START STOP switch “OFF”	⩽ 1 Ω



NG → **Repair or replace ground point**

OK

5	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the EPS signal connector and EPS power supply connector.

(c) Using ohm band of multimeter, check for continuity between EPS signal connector and instrument panel fuse and relay box fuse.

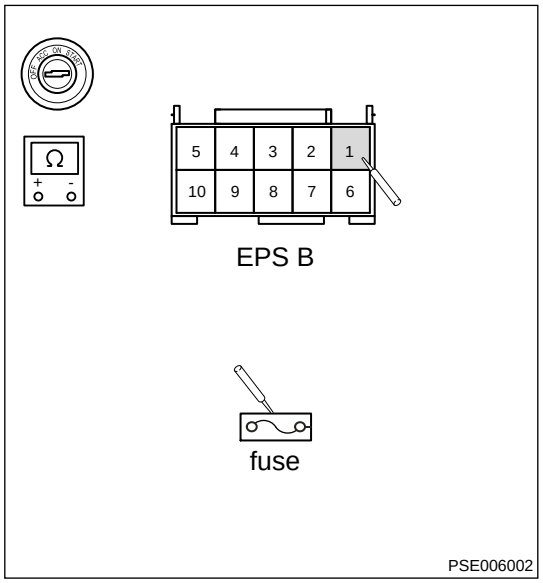
(d) Using ohm band of multimeter, check for continuity between EPS signal connector and engine compartment fuse and relay box fuse.

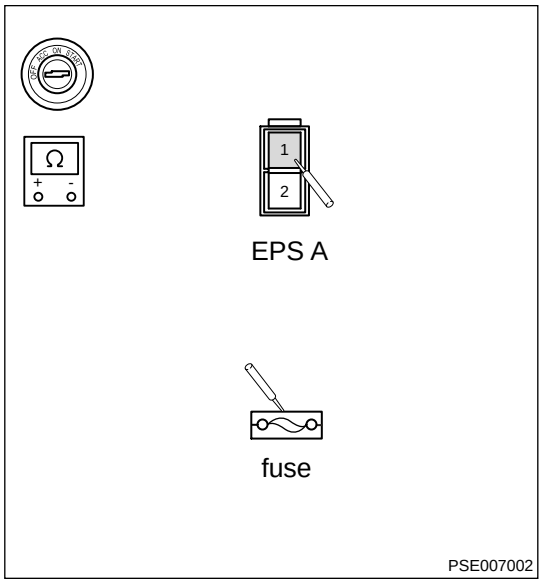
Multimeter Connection	Condition	Specified Condition
EPS signal connector (B1) - fuse	ENGINE START STOP switch “OFF”	⩽ 1 Ω
EPS signal connector (A1) - fuse	ENGINE START STOP switch “OFF”	⩽ 1 Ω

(e) Using ohm band of multimeter, check for continuity between EPS signal connector (B1) and body ground; and check for continuity between EPS power supply connector (A1) and body ground.

Check for short

Multimeter Connection	Condition	Specified Condition
EPS signal connector (B1) - ground	ENGINE START STOP switch “OFF”	∞
EPS power supply connector (A1) - ground	ENGINE START STOP switch “OFF”	∞





NG → **System operates normally**

OK → **Repair or replace control circuit wire harness and connector**

DTC	**C1218-4B**	**Over Temperature Reduction-Over Temperature**
DTC	**C121A-4B**	**Temperature Out Of Range-Over Temperature**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Parked in the shade to dissipate heat**

(a) Parked in the shade to dissipate heat.

NG → **Replace EPS**

OK

2	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**U0073-88**	**CAN Bus Off**
DTC	**U0100-87**	**Lost Communication with EMS**
DTC	**U0129-87**	**Lost Communication with BSM**
DTC	**U1300-55**	**Software Configuration Error**
DTC	**U3000-51**	**Control Module Not Programmed**
DTC	**U0418-81**	**Invalid Data Received from BSM**

DTC Confirmation Procedure
Refer to CAN Network Malfunction Diagnosis.

STEERING WHEEL

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. Be sure to read precautions for SRS airbag before removing steering wheel.
2. Be sure to read precautions for SRS airbag before removing multi-function switch.
3. Be sure to read precautions for SRS airbag before removing shift fork.

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

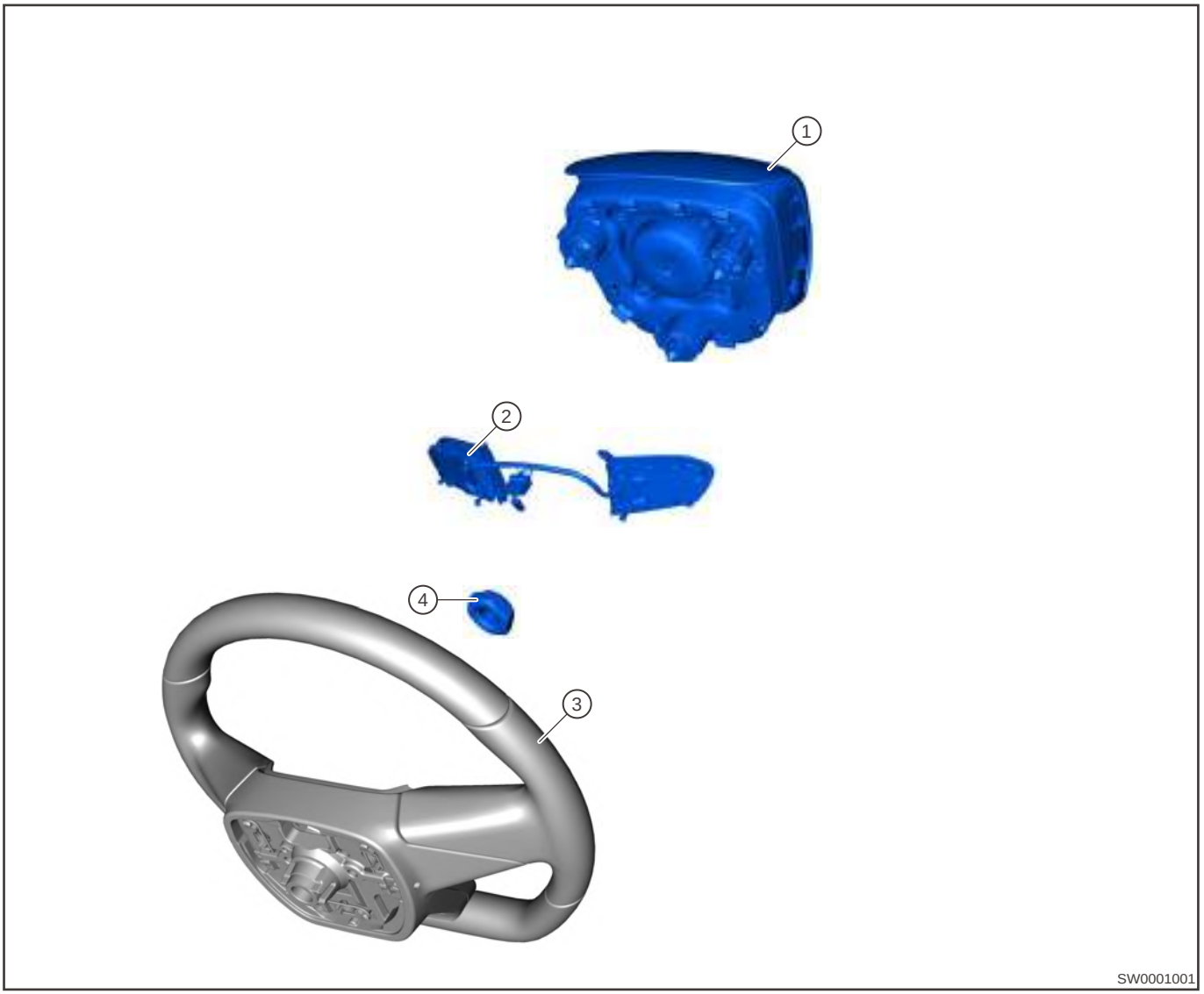
1. Wait at least 90 seconds after disconnecting the negative battery cable to prevent airbag and belt pretensioner from being activated.
2. Vehicle SAM angle sensor provides angle signal to ESP and other related controllers; Motor position sensor in EPS module provides steering angle signal for EPS; Therefore, after replacing electric steering column assembly, steering gear and performing four-wheel alignment, it is necessary to calibrate zero point of SAM steering angle and motor position sensor in EPS module.
3. When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

System Overview

System Description

Steering wheel is the device that driver controls the driving direction. Through the steering mechanism, steering wheel controls wheels to left and right to change driving direction or keep vehicle driving straight.

System Components Diagram

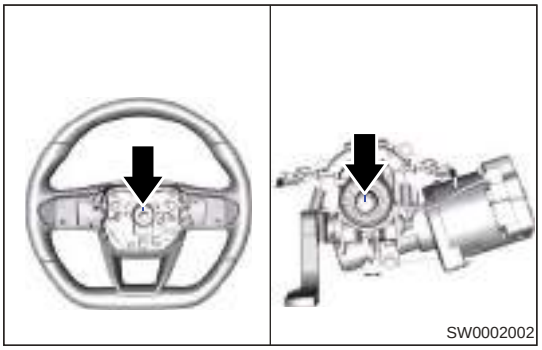


1	Driver Airbag	3	Steering Wheel Body
2	Steering Wheel Multi-function Switch	4	Steering Wheel Locking Nut

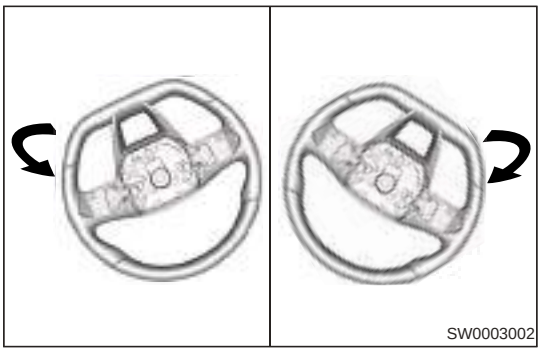
Assembly of Steering Wheel and Electric Steering Column

1. Align steering wheel scale mark with column scale mark, then turn steering wheel to extreme position, check steering wheel angle, and ensure the deviation of both rotation corners is ⩽10°. If the deviation is >10°, check them after checking one side.

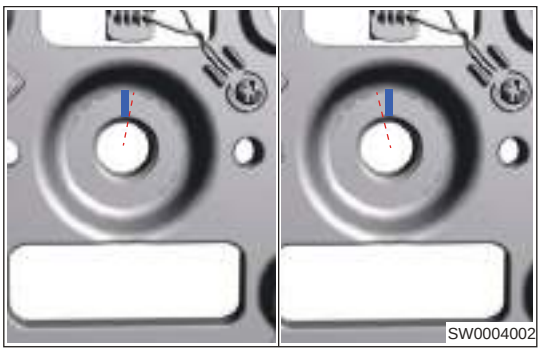
2. Align steering wheel scale mark with column scale mark.



3. Turn steering wheel to limit position, comparing the difference between rotation angles.



4. If visually measure that deviation is between 10° and 20°, pull the steering wheel and turn scale mark to other side of steering wheel.



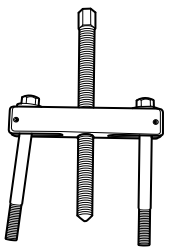
⚠ Caution

The scales of steering wheel and column can only assist in assembly, but it cannot be finally positioned, and check left and right strokes as acceptance standard for final position.

On-vehicle Service

Tool

Special Tool

Tool Name	Part No.	Tool Drawing
Steering Wheel Remover	ECH-0008	 RCH001406

Steering Wheel Assembly

Removal

⚠ Caution

After removing steering wheel, install spiral cable stopper pin fixing combination switch.

1. Adjust steering wheel to the centered position (visually check tire is straight-ahead).
2. Turn ENGINE START STOP switch to OFF.
3. Disconnect the negative battery cable.

⚠ Caution

Wait at least 90 seconds after disconnecting the negative battery cable to prevent airbag and belt pretensioner from being activated.

4. Remove the driver airbag assembly.
5. Remove the steering wheel assembly.
   a. Disconnect the steering wheel quick button connector (arrow) and steering wheel heating connector (arrow).


SW0005002

b. Remove the steering wheel locking nut.

Tightening torque: 30 ± 3 N·m

c. Use steering wheel remover to remove steering wheel.

d. Install spiral cable stopper pin fixing combination switch.

Inspection

Hint:
Steering wheel centering or steering performance are affected by manufacturing error, requirements for four wheels alignment toe-in and steering wheel centering are as following:

1. Confirm the left and right strokes of steering wheel after it is assembled.
2. Before performing four-wheel alignment, first rotate steering wheel to left and right to determine rotation angle of one side is not less than 45°, then returns to horizontal position.
3. Fix the steering wheel horizontally.
4. Use calibration device to complete center position calibration of steering wheel rotation angle (for calibration methods, refer to EPS steering angle calibration).
5. When adjusting front wheel toe-in, it is necessary to adjust steering gear left and right tie rods. Loosen locking nut of steering gear tie rod when adjusting, use wrench to rotate inner lever at hexagonal position of outer lever, until toe-in value reaches specified value, then tighten locking nut. If threads exposed outside on left and right levers are greatly not equal (difference between threads exposed outside on left and right levers are more than 3 threads), please recheck if steering wheel is centered. It is necessary to hold the flat and square position of outer lever with wrench while tightening. Tightening torque for nut is 55 ± 5 N·m.
6. After the four wheels alignment is completed and exiting the four wheels alignment station, turn the steering wheel to the limit position (make sure the steering wheel has hit the limit position) and return to the middle position, and the vehicle is turned off.

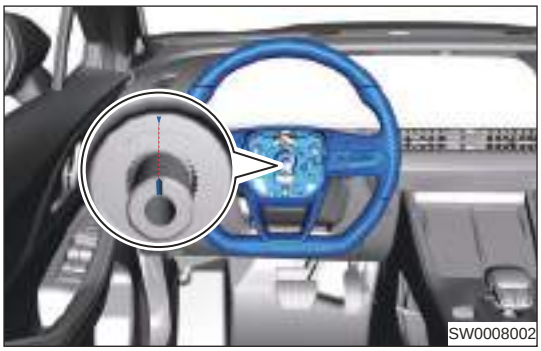
Installation

⚠ Caution

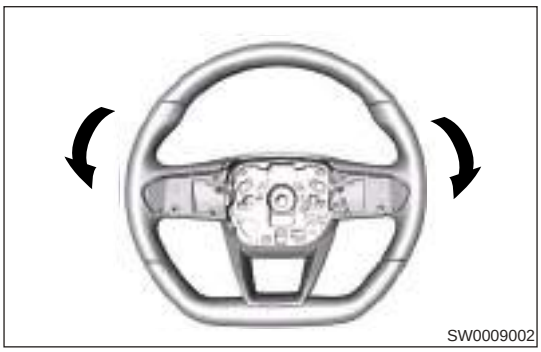
- During the assembly, the wiring harness of coil spring shall not be pressed by steering wheel or other components. After installation is finished, the wiring harness shall remain free;
- During the assembly, if steering wheel is not assembled and coil spring limit pin is pulled out, the coil spring must be adjusted to its original position before assembling the steering wheel (refer to the switch system assembly specification), otherwise the steering wheel cannot be assembled.
- After the installation is finished, it is necessary to check that all connectors have been inserted in place again and the switch harness is pressed into the slot;
- Multi-function switch function is normal.

1. Pull out the spiral cable stopper pin.
2. Visually check tire is straight-ahead (adjust steering wheel to the centered position).
3. Install the steering wheel.

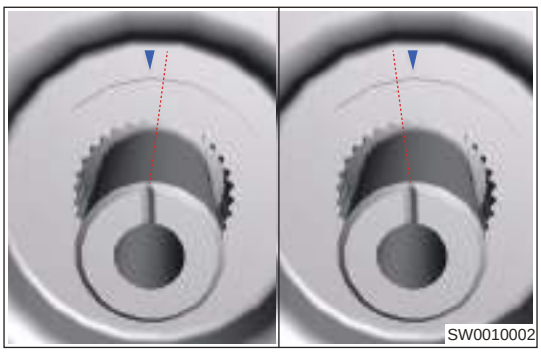
   a. Align scale marks on steering wheel and steering column to assemble.



   b. Turn steering wheel left and right to the limit position, and check steering wheel rotation angle.



   c. Visually check steering wheel rotation angle, and ensure the angle deviation on both sides is no more than 10°. If the deviation is more than 10°, check after adjusting one gear tooth.



4. Install the steering wheel locking nut.
   Tightening torque: 30 ± 3 N·m
5. Connect the steering wheel multi-function switch connector.
6. Install the driver airbag.

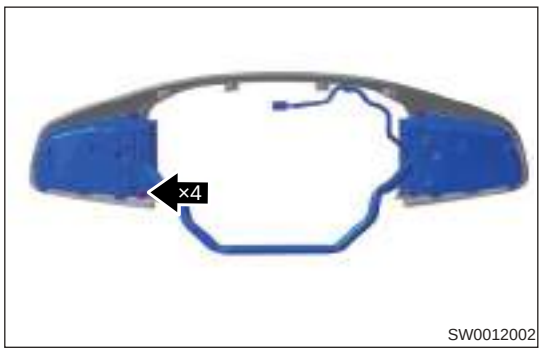
Steering Wheel Multi-function Switch

Removal

1. Remove the driver airbag.
2. Squeeze mounting board clips and steering wheel multi-function switch to push it out.


SW0011002

3. Remove 4 fixing screws between steering wheel multi-function switch and mounting board.



SW0012002

4. Remove the steering wheel multi-function switch.

Installation

1. Installation is in the reverse order of removal.

STEERING COLUMN

Warnings and Precautions

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

1. Wear glove during assembling steering column with intermediate shaft assembly, prevent hands are contacted with steering column, which may cause rust.
2. DO NOT hold steering column handle position, but steering column position; do not bump, strike steering column when taking, carrying or assembling it, prevent steering column from collapse.
3. Adjustment handle is in locking state after steering column is assembled, do not transfer to next station, prevent handle is knocked during operation, which may cause person damage or handle breakage.
4. DO NOT touch interior ornaments when removing steering column with intermediate shaft assembly to avoid scratching interior ornaments.
5. The zero point calibration of steering angle sensor must be carried out on four-wheel alignment station, otherwise the zero point calibration of steering angle sensor is not accurate, which will bring the risk of ESP alarm.
6. After installing steering column, perform software configuration and center calibration.
7. When removing and installing steering column, it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.
8. It is necessary to perform steering angle sensor zero point calibration after replacing steering column.

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

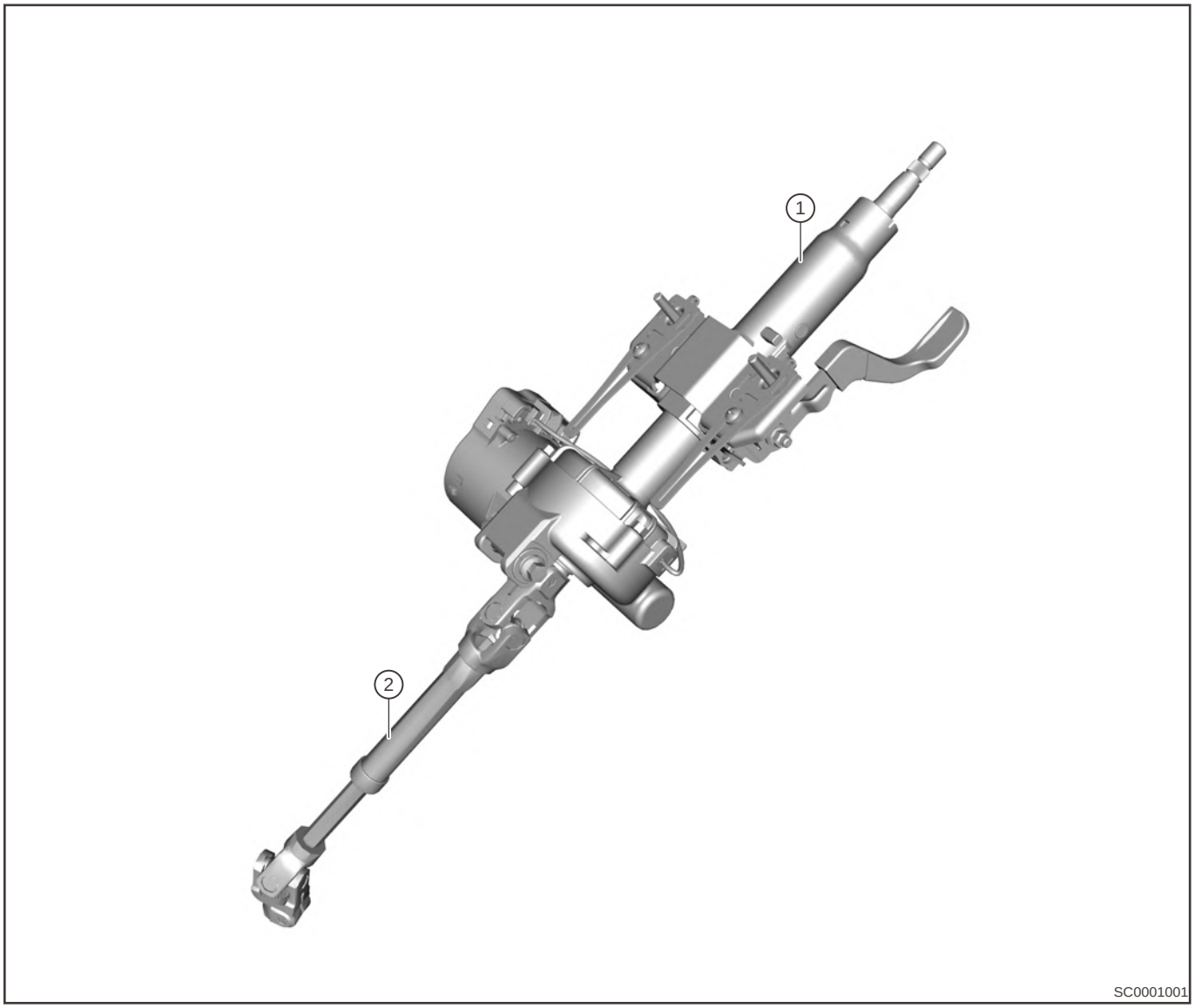
1. Wait at least 90 seconds after disconnecting the negative battery cable to prevent airbag and belt pretensioner from being activated.
2. Vehicle SAM angle sensor provides angle signal to ESP and other related controllers; Motor position sensor in EPS module provides steering angle signal for EPS; Therefore, after replacing electric steering column assembly, steering gear and performing four-wheel alignment, it is necessary to calibrate zero point of SAM steering angle and motor position sensor in EPS module.
3. When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

System Overview

System Description

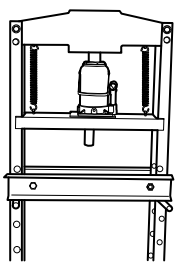
The steering column is the component of the steering system that connects the steering wheel and the steering gear. Through the steering column, the driver transfers torque to the steering gear, which drives the steering gear to achieve steering.

System Components Diagram



1	Electric Steering Column	2	Steering Intermediate Shaft

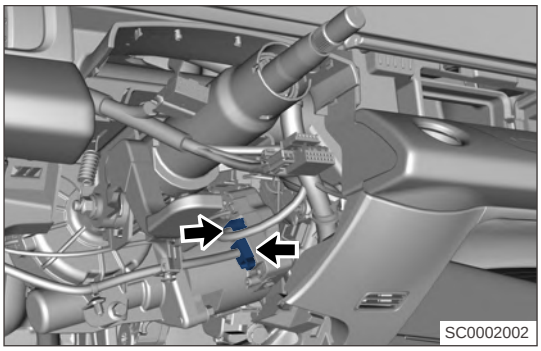
Tool

Tool Name	Tool Drawing
Interior Crow Plate	 S00020

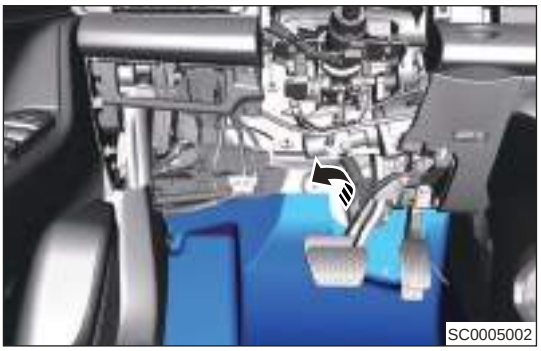
Replacement of Steering Column with Intermediate Shaft Assembly

Removal

1. Set the steering wheel to straight-ahead position.
2. Turn off all electrical equipment and ENGINE START STOP switch.
3. Disconnect the negative battery cable.
4. Remove the driver airbag assembly.
5. Remove the steering wheel assembly.
6. Remove the combination switch cover.
7. Remove the spiral cable.
8. Remove the light combination switch assembly.
9. Disconnect 2 connectors from EPS controller.

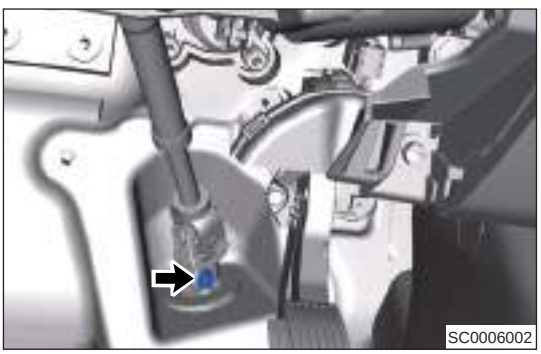


10. Turn over carpet under driver seat in the direction of arrow.



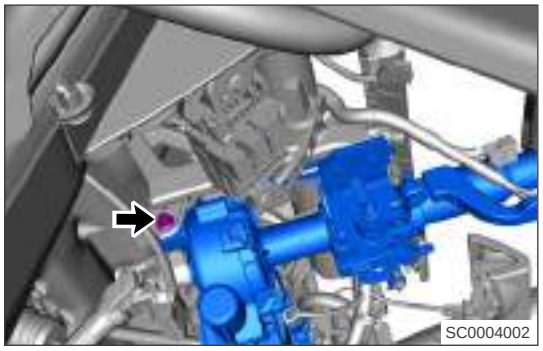
11. Remove coupling bolt between steering column with intermediate shaft assembly and steering gear input shaft.

    Tightening torque: 49 ± 3N·m



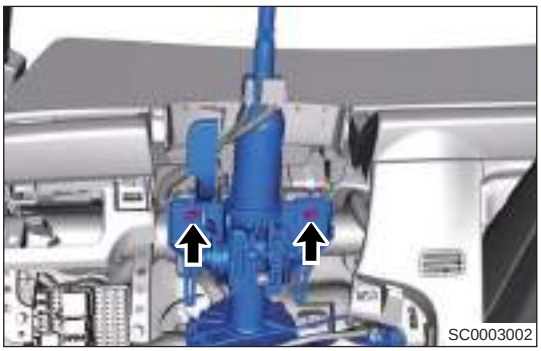
12. Remove fixing bolt from steering column lower bracket.

    Tightening torque: 50 ± 5N·m



13. Remove 2 fixing bolts from steering column upper bracket.

    Tightening torque: 25 ± 3N·m



14. Remove the steering column with intermediate shaft assembly.

Hint:

- Check steering column assembly for wear, crack or deformation. As welding or correction is not allowed, replace steering column assembly if necessary.
- Check steering column bearing for looseness, wear or sticking. Replace steering column assembly if necessary.

Installation

1. Installation is in the reverse order of removal.

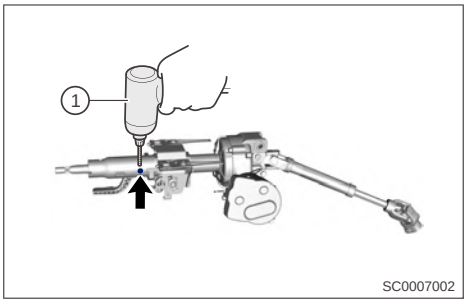
⚠ Caution

- Wear glove during assembling, prevent hands are contacted with steering column, which may cause rust.
- DO NOT hold steering column handle position, but steering column position; do not bump, strike steering column when taking, carrying or assembling it, prevent steering column from collapse.
- Do not loosen the steering column adjusting handle before tightening the upper support bolt to prevent the support from tipping over and not in place.
- Adjustment handle is in locking state after steering column is assembled, do not transfer to next station, prevent handle is knocked during operation, which may cause person damage or handle breakage.
- DO NOT touch interior ornaments when installing steering column with intermediate shaft assembly to avoid scratching interior ornaments.
- It is necessary to perform motor position sensor calibration after assembling.

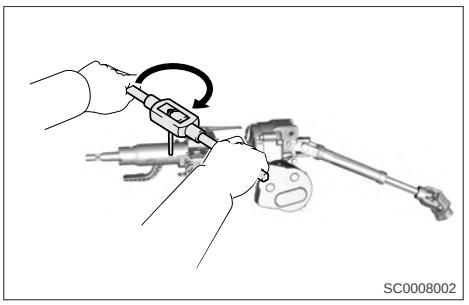
Disassembly

1. Remove the electronic steering column lock.

a. Using an electric drill (1), drill a hole on anti-theft bolt of electronic steering column lock.



b. Using a screw remover, remove anti-theft bolt of electronic steering column lock.



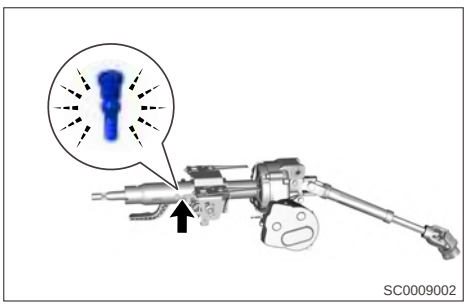
Inspection

1. Check steering column assembly for wear, crack or deformation. As welding or correction is not allowed, replace steering column assembly if necessary.
2. Check steering column bearing for looseness, wear or sticking. Replace steering column assembly if necessary.

Reassembly

1. Install the electronic steering column lock.

a. Install electronic steering column lock to steering column assembly with a new anti-theft bolt of electronic steering column lock and tighten anti-theft bolt until its head falls off.



STEERING GEAR

Warnings and Precautions

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

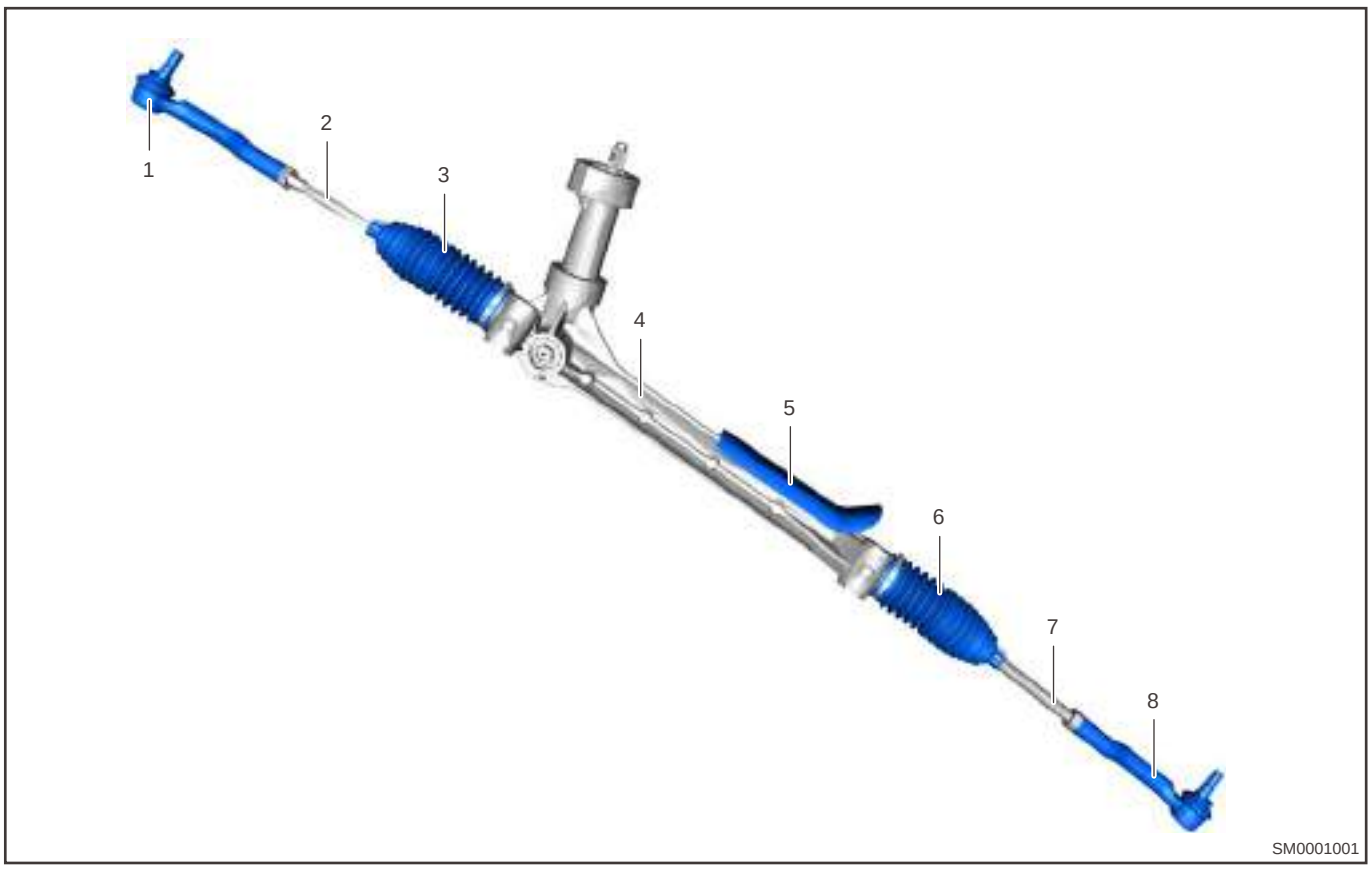
1. To replace steering gear, it is necessary to perform four-wheel alignment and center calibration.
2. After four-wheel alignment, it is necessary to recalibrate center calibration.
3. When removing and installing steering gear, it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.
4. It is necessary to perform steering angle sensor zero point calibration after replacing steering gear.
5. When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

System Overview

System Description

This vehicle adopts the electronic power steering system, which can reduce the workload when driver operates the steering wheel, thus improving operation convenience and driving safety.

System Components Diagram



1	Left Steering Tie Rod Ball Pin	5	Steering Gear Heat Insulator
2	Left Steering Tie Rod Assembly	6	Right Steering Tie Rod Boot
3	Left Steering Tie Rod Boot	7	Right Steering Tie Rod Assembly
4	Steering Gear Assembly	8	Right Steering Tie Rod Ball Pin

Adjustment of Toe-in and Steering Wheel Angle

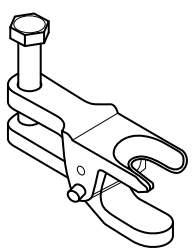
Hint:
Steering wheel centering or steering performance are affected by manufacturing error, requirements for four wheels alignment toe-in and steering wheel centering are as following:

1. Confirm the left and right strokes of steering wheel after it is assembled (Assembly method: Visually align steering column scale with steering wheel scale, then turn left and right to the limit position and check the corner. If the deviation is >10°, move it back by one gear tooth and control the steering deviation angle within the range of 10°. For details, see the assembly of steering wheel and electric steering column);
2. Before performing four-wheel alignment, first rotate steering wheel to left and right to determine rotation angle of one side is not less than 45°, then returns to horizontal position;
3. Fix the steering wheel horizontally;
4. Use calibration device to complete center position calibration of steering wheel rotation angle (for calibration methods, refer to EPS corner calibration);
5. When adjusting front wheel toe-in, it is necessary to adjust steering gear left and right tie rods. Loosen locking nut of steering gear tie rod when adjusting, use wrench to rotate inner lever in hexagonal position of outer lever, until toe-in value reaches specified value, then tighten locking nut. If threads exposed outside on left and right levers are greatly not equal (difference between left and right levers threads exposed outside are more than 3 threads), please recheck if steering wheel is centered. It is necessary to set outer lever flat square position with wrench while tightening, tighten torque of nut is 55 ± 5 Nm.
6. After the four wheels alignment is completed and exiting the four wheels alignment station, turn the steering wheel to the limit position (make sure the steering wheel has hit the limit position) and return to the middle position, and the vehicle is turned off.

On-vehicle Service

Tool

Special Tool

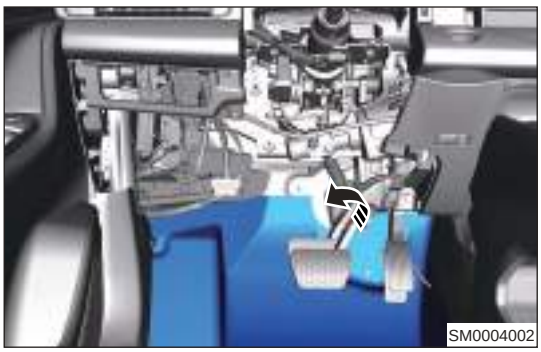
Tool Name	Part No.	Tool Drawing
Ball Separator	ECH-0003	 S00019

Replacement of Steering Gear Assembly

Removal

1. Set the front wheels to straight-ahead position.
2. Turn off all electrical equipment and ENGINE START STOP switch.
3. Disconnect the negative battery cable.
4. Remove front left and front right wheels.
5. Remove the engine lower protector.
6. Remove front left and front right control arm assemblies.
7. Remove the front left and front right side rail assembly.
8. Remove coupling bolt between steering column with intermediate shaft assembly and steering gear input shaft.

   a. Turn over carpet under driver seat in the direction of arrow.



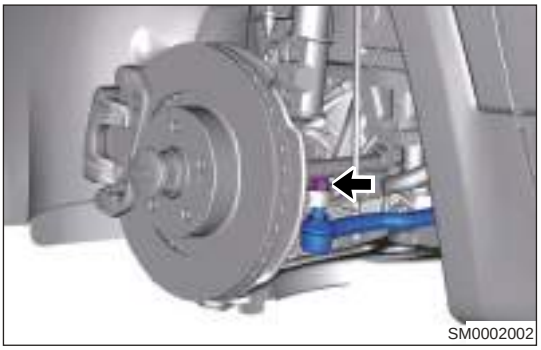
   b. Remove coupling bolt (arrow) between steering column with intermediate shaft assembly and steering gear input shaft.

      Tightening torque: 49 ± 3 N·m

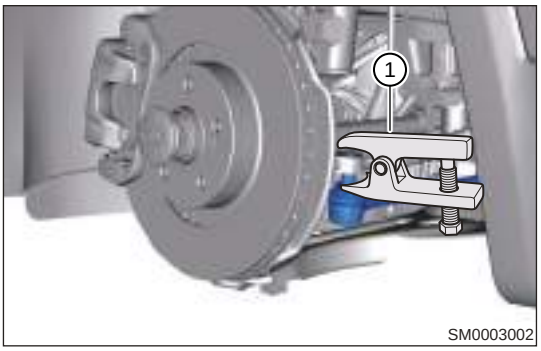
9. Remove the tie rod ball pin.

a. Remove coupling nut (arrow) between left steering tie rod ball pin assembly and front left steering knuckle assembly.

Tightening torque: 45 ± 5 N·m


SM0002002

b. Install ball pin separator (1), and separate steering tie rod ball pin from steering knuckle assembly.



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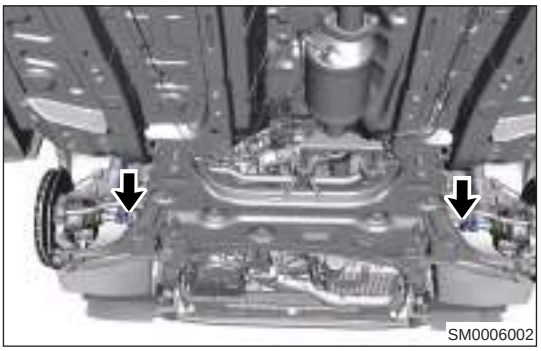
10. Remove 2 locking nuts (arrow) between connecting rod and front stabilizer bar.

Tightening torque: 60 ± 6 N·m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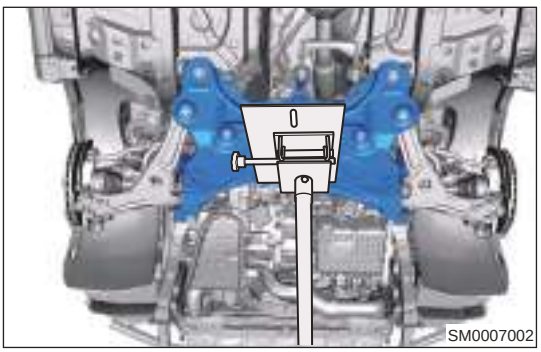
11. Using a transmission carrier, support front sub frame welding assembly.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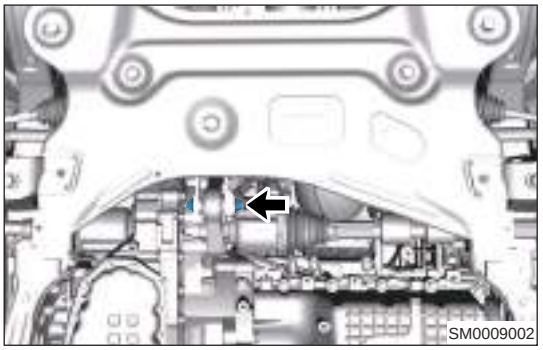
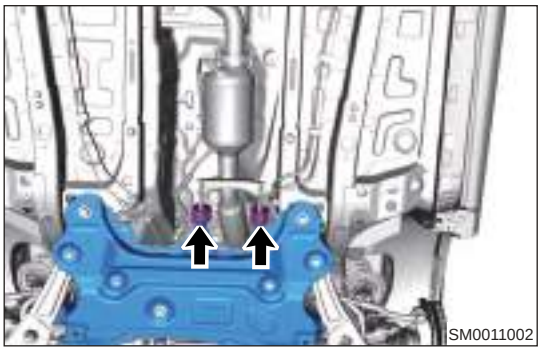
12. Remove the coupling bolt and nut (arrow) between rear mounting cushion assembly upper body and rear mounting cushion assembly lower body.

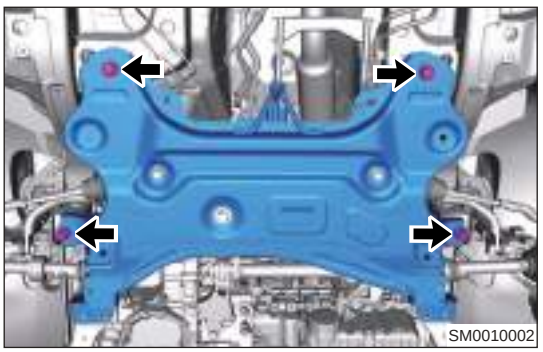


13. Detach exhaust pipe fixing rubber lugs (arrow) from front sub frame welding assembly.



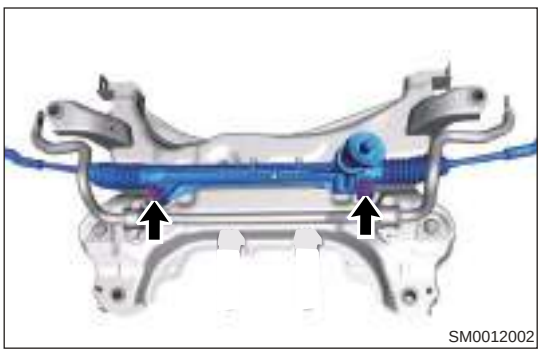
14. Remove 4 fixing bolts (arrow) between sub frame and vehicle body, and lower sub frame slowly.

    Tightening torque: 180 ± 18 N·m



15. Remove 2 fixing bolts of steering gear assembly from sub frame, and remove steering gear assembly.

    Tightening torque: (110 ±8) Nm+ (240 ±5) °



Inspection

1. Check if steering gear dust boot is damaged, clamp is loose. Replace them if necessary to prevent water and micro dust from entering and causing parts failure prematurely.
2. Check if steering gear is damaged. Replace the steering gear assembly if necessary.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Install coupling bolt between steering column lower joint and steering gear input shaft securely.
- After installing steering gear assembly, perform front wheel alignment procedure.

FOUR-WHEEL ALIGNMENT

Warnings and Precautions

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

1. Be sure to perform wheel alignment procedures according to operating instructions of four-wheel alignment device.
2. Periodic maintenance and service for four-wheel alignment device should be performed.
3. After four-wheel alignment, it is necessary to recalibrate center calibration.
4. After four-wheel alignment, it is necessary to calibrate the zero point of SAM steering angle and the motor position sensor inside EPS module.

System Overview

System Description

Installation of four wheels, steering mechanism, front and rear axles should have a certain relative position, and this relative position is a standard value set by manufacturer. This mounting position is adjusted and restored by wheel alignment.
In general, wheel alignment has the following 6 parameters:

1. Check front wheel camber.
2. Check front wheel toe-in.
3. Check kingpin caster.
4. Check kingpin inclination.
5. Check rear wheel camber.
6. Check rear wheel toe-in.

Parameter Operation Description

System Function Introduction

Front wheel alignment includes kingpin caster, kingpin inclination, front wheel camber and front wheel toe-in. Rear wheel alignment includes wheel camber and each rear wheel toe-in. In this way, front wheel alignment and rear wheel alignment are called wheel alignment, which is often called four-wheel alignment. Wheel alignment functions to keep vehicle driving in stable straight line and light steering, and reduce wear of tires and steering gear parts during driving.

Kingpin Caster

Looking at wheel from side, steering kingpin (the center of rotation when the wheel turns) tilts backward, which is called kingpin caster. After setting kingpin caster, there is a distance (called kingpin caster distance, which has the same principle with that of front wheel cross beam of bicycle tilting backward) between ground point of kingpin center line and ground projection point of wheel center. The ground point of wheel is located at rear end of extension line of steering kingpin, and wheel is pulled backward by rolling resistance during driving, so that the direction of wheel is naturally toward driving direction. Setting a large kingpin caster can improve straight line driving performance, and kingpin caster distance is also increased. If kingpin caster distance is too large, steering wheel will be heavy and wheel bumps will be increased due to road interference.

Kingpin Inclination

When looking at the tire from front and rear direction of vehicle, kingpin is inclined toward the inside of vehicle body. This angle is called kingpin inclination. When wheel turns around kingpin, the lowest point of wheel will fall below road surface, but in fact, the lower edge of wheel cannot fall below road surface. Instead, the steering vehicle wheel and entire front of vehicle are lifted up to a corresponding height. The gravity of vehicle has effect of returning steering vehicle wheels to original middle position, so steering wheel is easy to reset.
In addition, kingpin inclination also reduces the distance between intersection of kingpin and road to intersection of wheel center plane and ground, thereby reducing driver's force on steering wheel during steering, making steering easier and reducing the impact force transmitted from steering vehicle wheel to steering wheel. However, kingpin inclination should not be too large, otherwise it will accelerate tire wear.

Front Wheel Camber

When looking at wheel from front and rear direction, tires are not installed vertically, but slightly tilted to show an "八" shape, which is called negative camber, and when it is tilted in opposite direction, it is called positive camber. In heyday of using bias tires, camber was set to be relatively large because it made it easier to operate the steering wheel by tilting the tires to the ground. Vehicle generally sets camber to be very small, close to vertical. The use of flat radial tires for automobiles continues to grow in popularity. Due to characteristics of radial tires (large rigid tire tread pattern and wide outer tread), setting a large camber will cause tire to wear out and reduce tire friction. Also, due to continuous use of power steering mechanism, camber has been continuously reduced. Nevertheless, setting a small camber can apply appropriate lateral thrust to wheel bearings on axle.

Front Wheel Toe-in

Four-wheel alignment toe value
Toe-in, the so-called "pigeon toe", refers to the front left and front right wheels being pointed inward respectively. The purpose of adopting this structure is to correct outward rotation of wheel caused by front wheel camber. As mentioned above, due to camber, the steering wheel operation becomes more easy. On the other hand, due to the tilt of wheels, front left and front right wheels rotate to outside respectively. To correct this problem, the left and right wheels have an inward angle, thus left and right wheels can keep moving in a straight line and reducing tire wear.

Specifications (Parameters Standard for Four-wheel Alignment)

Multi-link Independent Suspension Four-wheel Alignment Parameters

Item		Specified Value
Front Wheel	Front Wheel Camber	-25′ ± 45′
	Kingpin Caster	4°14′ ± 60′
	Kingpin Inclination	11°30′ ± 60′
	Front Wheel Toe-in	5′ ± 5′ (one side)
Rear Wheel	Rear Wheel Camber	-42′ ± 30′
	Rear Wheel Toe-in	5′ ± 10′ (one side)
Sideways Sliding		≤ 3 m/km

Torsion Beam Semi-independent Suspension Four-wheel Alignment Parameters

Item		Specified Value
Front Wheel	Front Wheel Camber	-25′ ± 45′

	Kingpin Caster	4°14′ ± 60′
	Kingpin Inclination	11°30′ ± 60′
	Front Wheel Toe-in	5′ ± 5′ (one side)
Rear Wheel	Rear Wheel Camber	-1°20′ ± 30′
	Rear Wheel Toe-in	10′ ± 20′ (one side)
Sideways Sliding		⩽ 3 m/km

Diagnostic Information and Steps

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair or adjust faulty components, or replace it as necessary.

Symptom	Suspected Area
Vehicle pulls	Front wheel alignment (incorrect)
	Rear wheel alignment (incorrect)
Wheel shimmy	Front wheel alignment (incorrect)
	Rear wheel alignment (incorrect)
Abnormal tire wear	Tire (worn or improperly inflated)
	Front wheel alignment (incorrect)
	Rear wheel alignment (incorrect)

On-vehicle Inspection

Four-wheel Alignment

Inspection before Wheel Alignment
If following components have been removed, installed or replaced, check and perform wheel alignment procedures:

- Front control arm assembly
- Front control arm ball pin assembly
- Front steering knuckle
- Front shock absorber assembly
- Steering gear and steering tie rod
- Drive shaft
- Front sub frame welding assembly
- Rear torsion beam welding assembly

1. Vehicle is in unloaded state.
2. Use a lift to support and raise vehicle to a proper height.
3. Check hub bearing for excessive clearance, and replace hub bearing as necessary.

4. Check suspension components, steering tie rod and ball pin for wear, deformation or damage. Replace malfunctioning parts as necessary.
5. Check shock absorber assembly for proper operation.
6. Check if tire pressure is within specified range and adjust it to specified pressure as necessary.

Item	Front Wheel	Rear Wheel	Spare Tire
Tire Pressure (kPa) (Unloaded)	220	220	420

7. Check the rim and tire.
   a.Visually check rim and tire for scratches, wear or damage.
   b.Perform wheel dynamic balance procedures.

Front Wheel Camber

1. Incorrect front wheel camber will cause abnormal tire wear. Check and adjust front wheel camber as necessary.
   In normal conditions, it is not necessary to adjust camber after assembling the independent suspension and wheel steering knuckle. If wheel camber is not within the tolerance due to other reasons, adjust through the coupling bolt between independent suspension and steering knuckle.
   Specified Value for Front Wheel Camber:

Item	Parameter
Front Wheel Camber	-25′ ±45′

Inspection

1. Visually check driving system components for deformation and damage before adjustment. Replace deformed or damaged components as necessary.
2. Install wheel alignment device onto front wheel, and perform inspection procedures according to operating instructions for wheel alignment device.

Front Wheel Toe-in

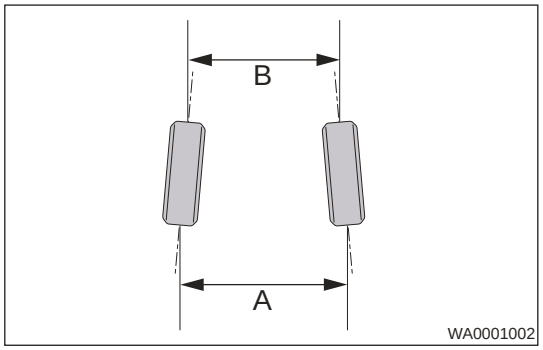
1. Incorrect front wheel toe-in will cause wheel pull and abnormal tire wear. Check and adjust front wheel toe-in as necessary.
   If front wheel toe-in is not within the tolerance due to other reasons, adjust the length of steering tie rod to return the toe-in to specified value.
   Specified Value for Front Wheel Toe-in:

Item	Parameter
Front Wheel Toe-in	5′ ±5′ (one side)

Inspection

1. Perform inspection with four-wheel alignment device (perform inspection procedures referring to operating instructions for four-wheel alignment device).
2. Manual check:
   a. Park vehicle on level ground, check if front tire pressure is within the specified range and adjust it to specified value as necessary.
   b. Place marks on center position in front of front wheels, and measure distance A between marks with a tape measure.
   c. Push vehicle to rotate wheels 180°, and measure distance B between marks with a tape measure when marks are turned to rear of wheels.

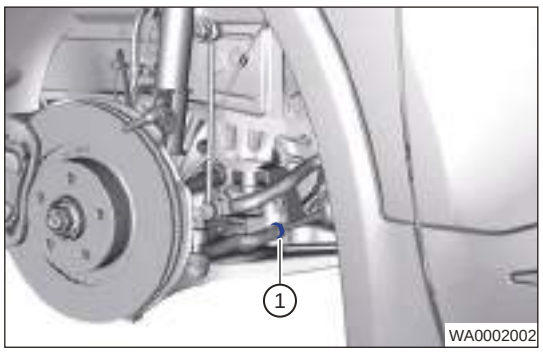
d. Calculation method: Front wheel toe-in = A - B ⩽ 1 mm.



Adjustment

1. Make adjusting preparation for wheel alignment according to requirement of tester.

2. Loosen the locking nut (1) of steering tie rod, and turn the tie rod to adjust the length as required until front wheel toe-in reaches the specified value.



3. Tighten the steering tie rod locking nut and reinstall the elastic jacket snap ring. Check if locking nut is tightened in place and if jacket position is correct.
   Tightening torque: 55 ± 5 N·m

⚠ **Caution**
• If elasticity of elastic jacket snap ring is not enough, replace it.

4. After adjusting front wheel toe-in, check steering wheel for eccentricity. If necessary, loosen the steering wheel locking nut and adjust the steering wheel to horizontal position, and then tighten the steering wheel locking nut to specified torque.
   Tightening torque: 48 ± 4 N·m

Kingpin Caster & Kingpin Inclination

1. Kingpin caster and kingpin inclination can only be checked by using four-wheel alignment device.

   Kingpin caster and kingpin inclination are assured by design structure and cannot be adjusted.

   If measured value is not within the specified range, check if other components connected to steering knuckle are deformed or damaged. In addition, check the connecting part of steering knuckle for deformation or damage.

   If so, replace corresponding components.

   Specified Value for Kingpin Caster & Kingpin Inclination:

Item	Parameter
Kingpin Caster	4°14′ ± 60′
Kingpin Inclination	11°30′ ±60′

Rear Wheel Camber (Rear Independent Suspension)

1. Incorrect rear wheel camber will cause wheel pull and abnormal tire wear. Check and adjust rear wheel camber as necessary.

   If rear wheel camber is not within the tolerance due to other reasons, adjust eccentric adjusting bolt and eccentric adjusting shim between rear lower control arm assembly and rear sub frame welding assembly to return the camber to specified value.

   If rear wheel camber is not as specified, check rear suspension and wheels for damage or deformation. Replace damaged or deformed components as necessary.

   Specified Value for Rear Wheel Camber:

Item	Parameter
Rear Wheel Camber	-42′ ± 30′

Adjustment

1. Make adjusting preparation for wheel alignment according to requirement of tester.

2. Loosen the coupling bolts between rear lower control arm assembly and rear sub frame welding assembly, be careful that eccentric adjusting shim does not detach from groove.

3. Rotate the eccentric adjusting shim and eccentric adjusting bolt to adjust rear wheel camber to specified value.

4. Tighten the coupling bolts between rear lower control arm assembly and rear sub frame welding assembly to specified torque after adjustment (adjusting method of left and right wheels is the same).

   Tightening torque: 115 ± 23N·m

Rear Wheel Camber (Rear Torsion Suspension)

1. Rear wheel camber and rear wheel toe-in are assured by design structure and cannot be adjusted. If measured value is not within the specified range, check if rear suspension components are deformed or damaged. Replace it as necessary. If the rear shaft assembly is deformed due to a very large impact force and the rear wheel positioning parameters change and are beyond the specified range, the rear shaft assembly must be replaced.

Item	Parameter
Rear Wheel Camber	-1°20′ ± 30′

Rear Wheel Toe-in

1. Incorrect rear wheel toe-in will cause wheel pull and abnormal tire wear. Check and adjust rear wheel toe-in as necessary.

   If rear wheel toe-in is not within the tolerance due to other reasons, adjust eccentric adjusting bolt and eccentric adjusting shim between tie rod assembly and rear sub frame welding assembly to return the toe-in to specified value.

   If rear wheel toe-in is not as specified, check rear suspension and wheels for damage or deformation. Replace damaged or deformed components as necessary.

   Specified Value for Rear Wheel Toe-in:

Item	Parameter
Rear Wheel Toe-in	5′ ± 10′ (one side)

Adjustment

1. Make adjusting preparation for wheel alignment according to requirement of tester.

2. Loosen the coupling bolts between tie rod assembly and rear sub frame welding assembly, be careful that eccentric adjusting shim does not detach from groove.

3. Rotate the eccentric adjusting bolt and eccentric adjusting sleeve to adjust rear wheel toe-in to specified value.

4. Tighten the coupling bolts between tie rod assembly and rear sub frame welding assembly to specified torque after adjustment (adjusting method of left and right wheels is the same).

   Tightening torque: 115 ± 23N·m

⚠ Caution

- It is mainly ensured by the design that the torsion beam semi-independent suspension does not need to be adjusted during use.

AIR CONDITIONING CONTROL SYSTEM

AIR CONDITIONING CONTROL SYSTEM

AIR CONDITIONING CONTROL SYSTEM

Warnings and precautions

Precautions

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

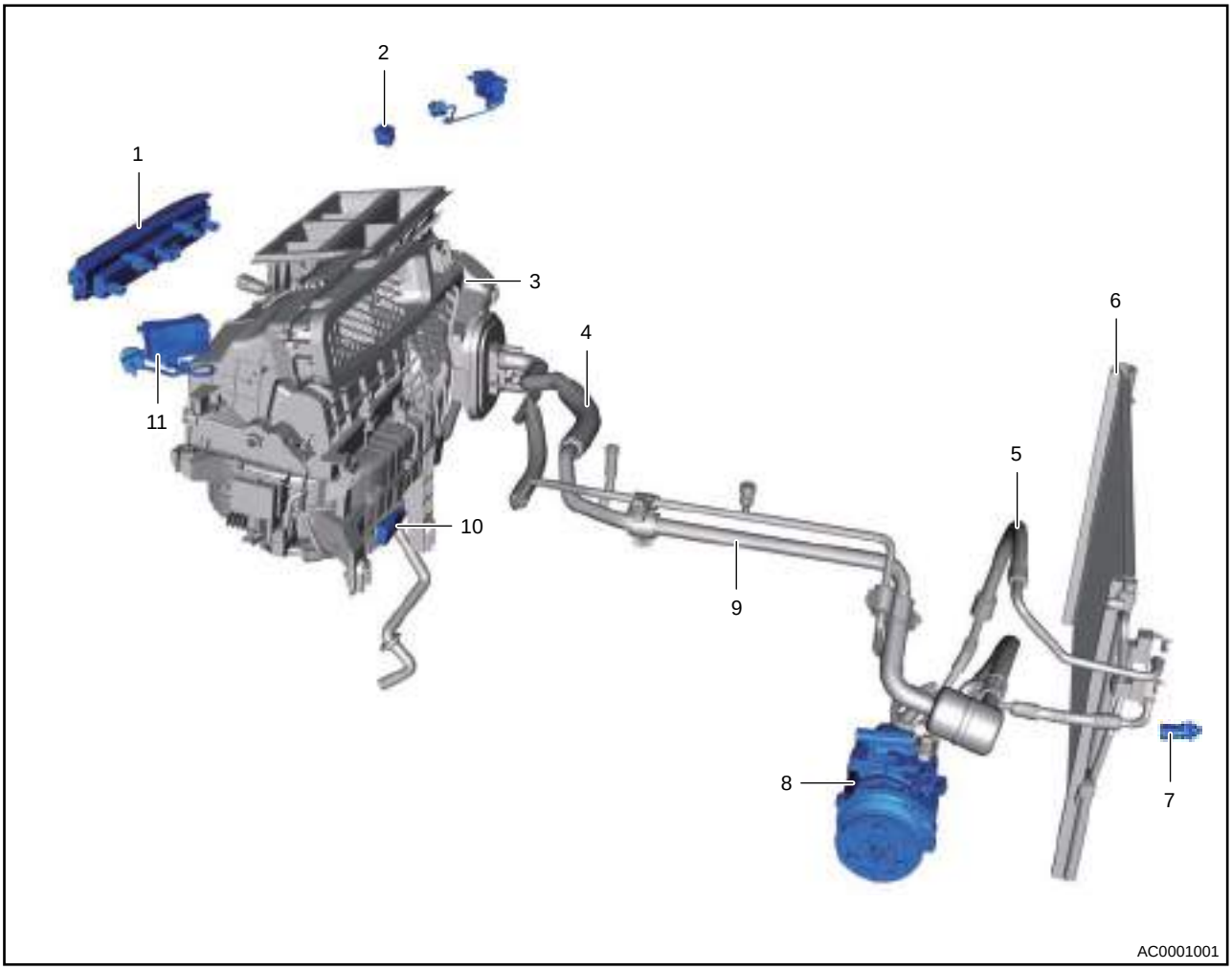
1. Take extra care when servicing A/C system under high pressure.
2. Because there is refrigerant under high pressure in A/C system. It must be serviced by professional technician. Otherwise, a wrong service procedure may cause a serious danger or fatal injury.
3. If A/C system pressure is released unexpectedly, ventilate work area before servicing. In a closed work place, if a large amount of refrigerant is discharged, it may cause oxygen reduction and result in smothering, causing a serious or fatal injury.

System Overview

System Description

Air conditioning and distribution system: Air mixing and distributor part of HVAC, rear evaporator (not equipped on single-evaporator air conditioning), inner/outer circulation inlet, outlet and air filter. Control system: Automatic A/C control module, electric/automatic A/C control panel assembly, left/right mix damper motor, mode damper motor, inner/outer circulation motor, blower, blower speed regulation module, A/C pressure switch and evaporator temperature sensor as well as inside and outside PM2.5 sensors and air quality sensor for high-configuration automatic air conditioning.
Heating system: Heater core assembly, heating inlet hose, heating outlet hose and engine cooling circulation system.
Refrigerating system: Compressor assembly, condenser assembly, expansion valve, evaporator core assembly and A/C high and low pressure lines.

System Components Diagram



1	A/C Control Panel	7	Outside Temperature Sensor
2	Solar Sensor	8	A/C Compressor Assembly
3	HVAC Assembly	9	Condenser - Evaporator Line Assembly
4	Evaporator - Compressor Line Assembly	10	Automatic A/C Control Module
5	Compressor - Condenser Line Assembly	11	Anion Generator
6	Condenser Assembly (w/ Receiver Drier)		

A/C System Function Description

Blower Advanced ON Function

Conditions for blower advanced ON for 30 seconds:

1. Outside temperature is higher than 20°C
2. Battery voltage is higher than 12.5 V
3. Vehicle fortifying is released

Stopping conditions for blower advanced ON function:

1. Blower advanced ON operates for more than 30 seconds
2. Open any door
3. Vehicle is in fortifying mode

Blower Delay OFF Function
Enabling conditions for blower delay OFF function:

1. A/C was turned on during the last driving
2. Battery voltage is higher than 12.5 V
3. Blower starts to operate for 1 minute and then stops after vehicle enters fortifying mode for more than 5 minutes

PM2.5 Function
Inside air is repeatedly purified by an efficient A/C element. If the interior environment quality is poor, system will give corresponding prompts. Operate according to the prompts, press PM2.5 button, and the air purification function will be turned on.
Disabled conditions for purification function:

1. Outside temperature is lower than 2°C, room temperature is lower than 15°C, and engine coolant temperature is lower than 70°C
2. Front defroster is turned on
3. Wiper is turned on for more than 30 seconds

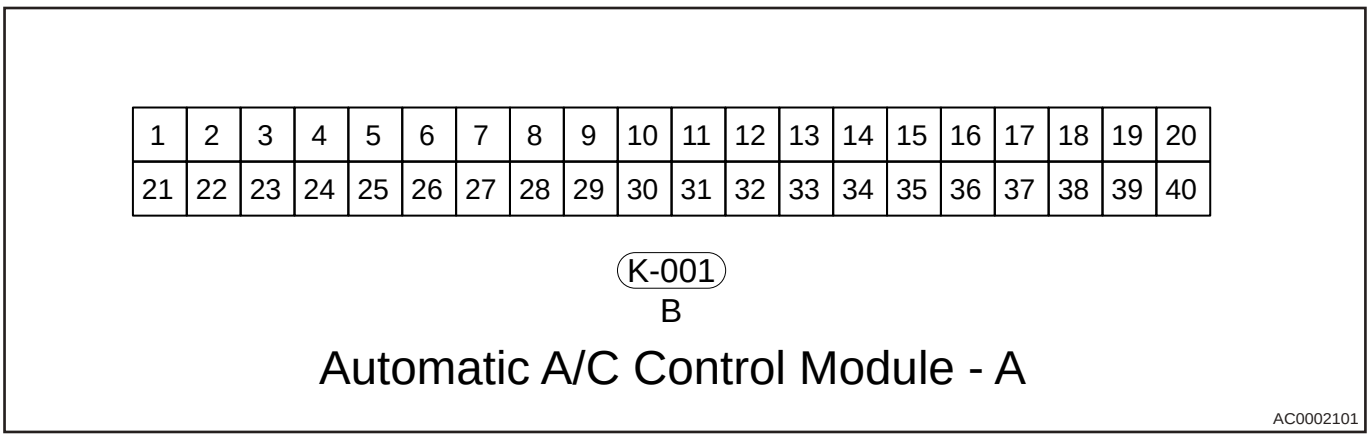
Anion Function (If Equipped)
Anion function and one-button purification function are turned on at the same time.
Purification process of anion: The activated charged anion has a strong adsorption and decomposition effect, which makes PM2.5 and other particles fall and settle down. At the same time, it decomposes harmful viruses and bacteria to make them lose vitality and become nourishing water molecules, so as to achieve the purpose of air purification.

Automatic Defogging Function
After the automatic defogging function is turned on, the air conditioning will automatically remove the fog from front windshield when a fogging risk is collected on front windshield to ensure the driving safety.

System Schematic Diagram

Module Terminal Definition

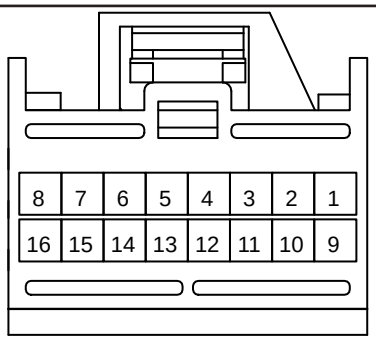
Automatic A/C module A



Pin	Definition	Pin	Definition
1	Left Mix Damper Motor P1	2	Left Mix Damper Motor P4
3	Left Mix Damper Motor P3	4	Right Mix Damper Motor P2

Pin	Definition	Pin	Definition
5	Right Mix Damper Motor P1	6	Right Mix Damper Motor P4
7	Right Mix Damper Motor P3	8	Blower Relay
9	-	10	CAN-H
11	CAN-L	12	KL15
13	Mode Damper Motor P2	14	Mode Damper Motor P1
15	Mode Damper Motor P4	16	Mode Damper Motor P3
17	Inner/Outer Circulation Motor P4	18	Inner/Outer Circulation Motor P3
19	Inner/Outer Circulation Motor P2	20	Inner/Outer Circulation Motor P1
21	Ground	22	Sensor Ground
23	-	24	Right Solar Sensor
25	Left Solar Sensor	26	-
27	Outlet Temperature Sensor	28	Evaporator Temp Sensor +
29	Outer Temp Sensor +	30	-
31	Left Foot Outlet	32	Feedback Signal
33	Blower Speed Control	34	Right Foot Outlet
35	Sensor Power Supply	36	-
37	KL30	38	ECV+
39	ECV-	40	Left Mix Damper Motor P2

Automatic A/C Control Panel



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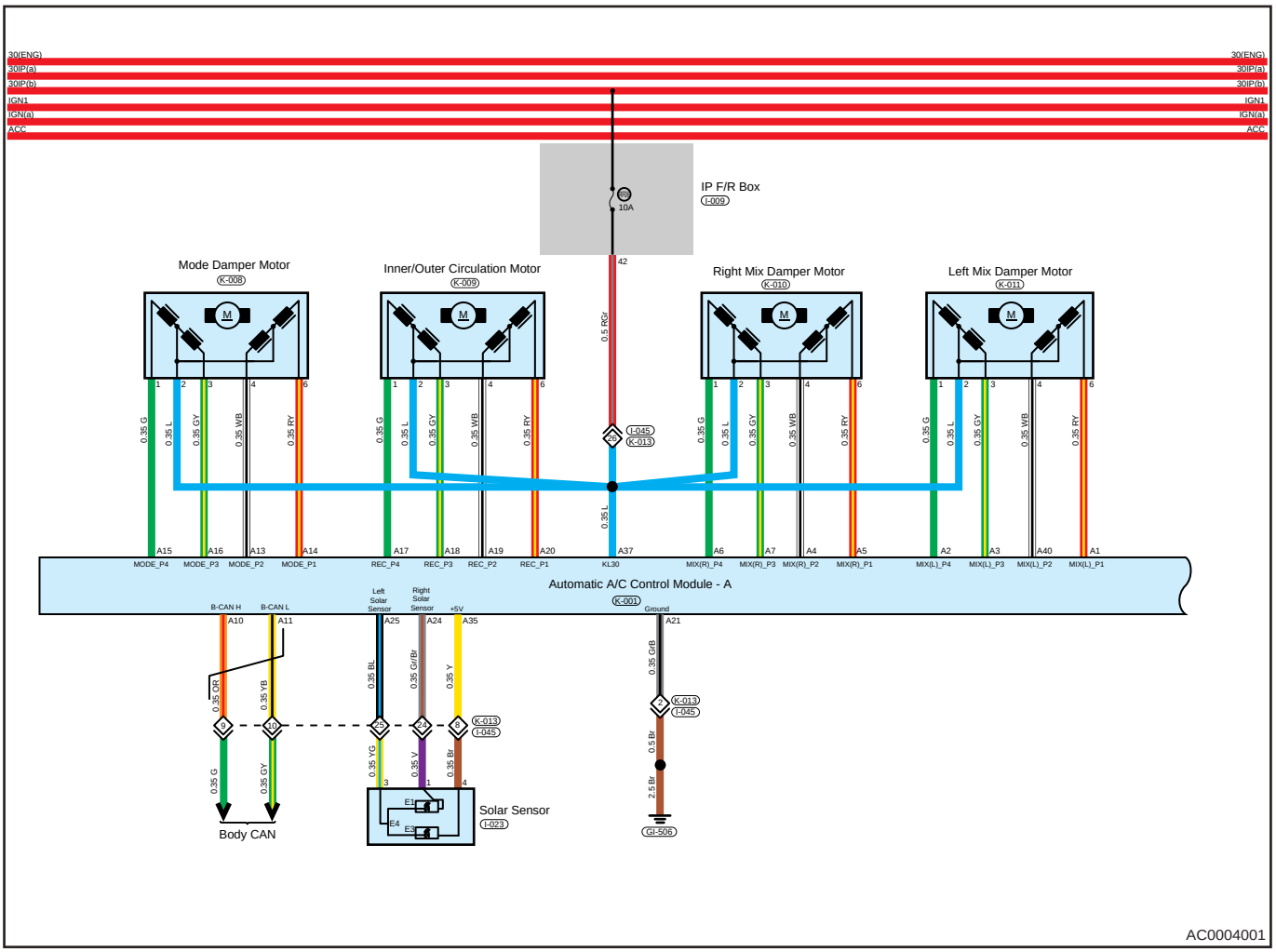
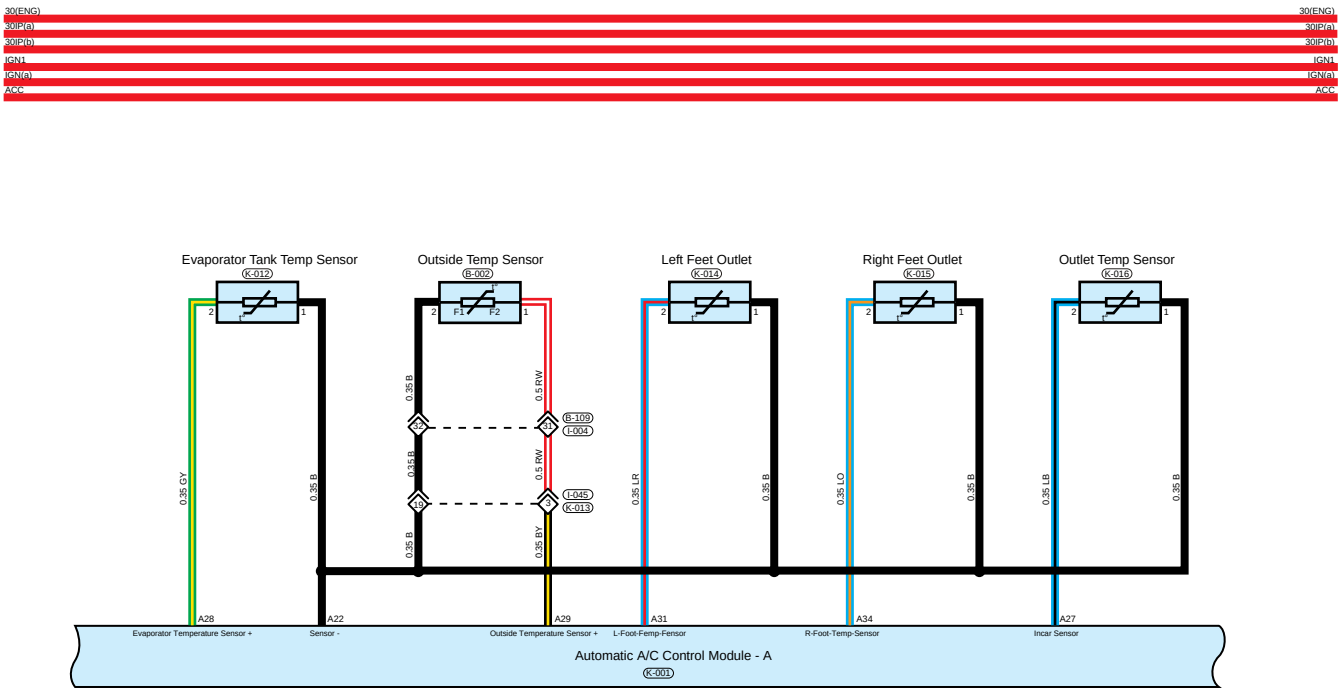
Pin	Definition	Pin	Definition
1	-	2	-
3	Rear Defroster Output	4	B-CAN H
5	B-CAN L	6	-
7	Ground	8	KL15
9	-	10	-

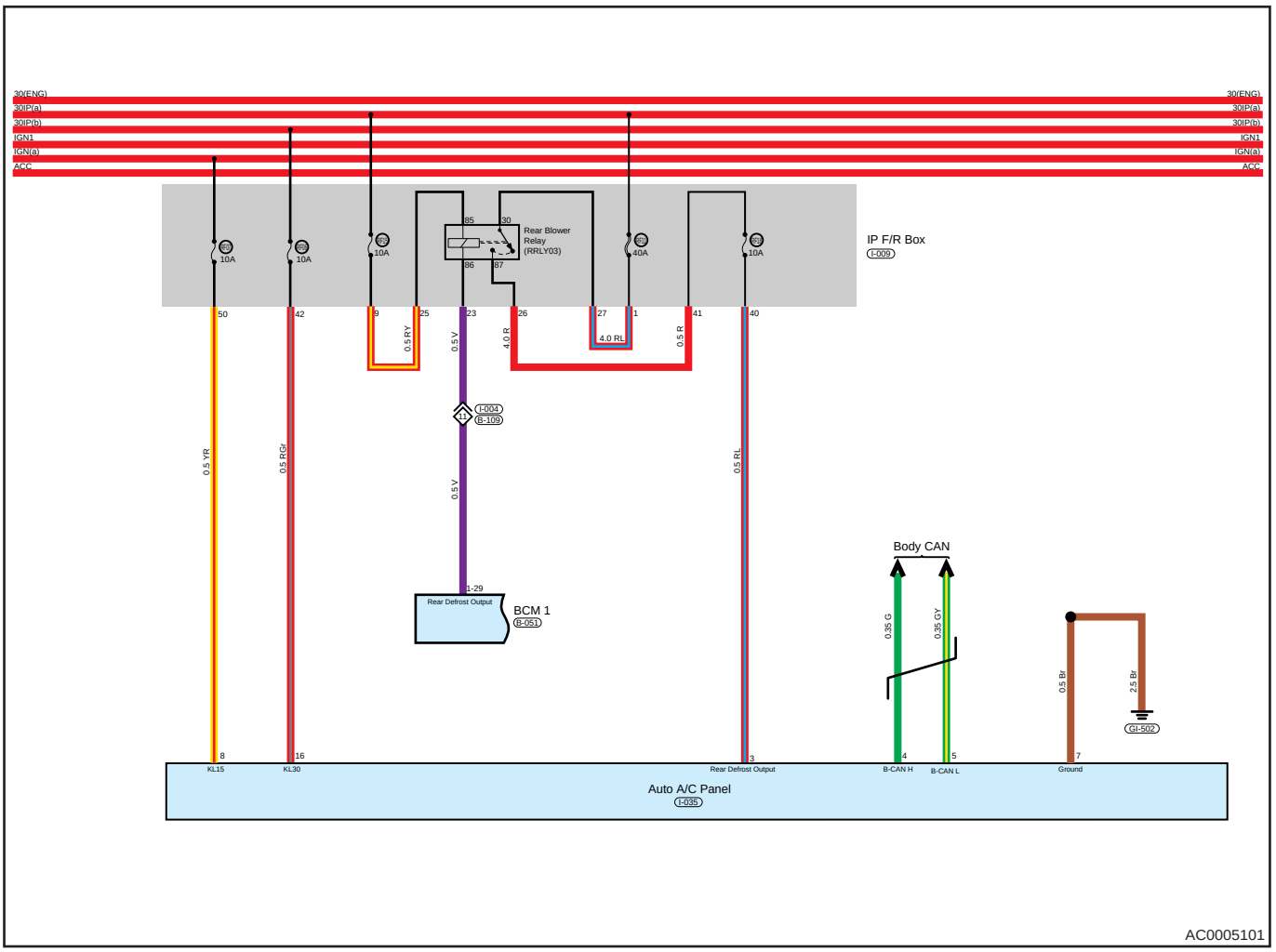
Pin	Definition	Pin	Definition
11	-	12	-
13	-	14	-
15	-	16	KL30

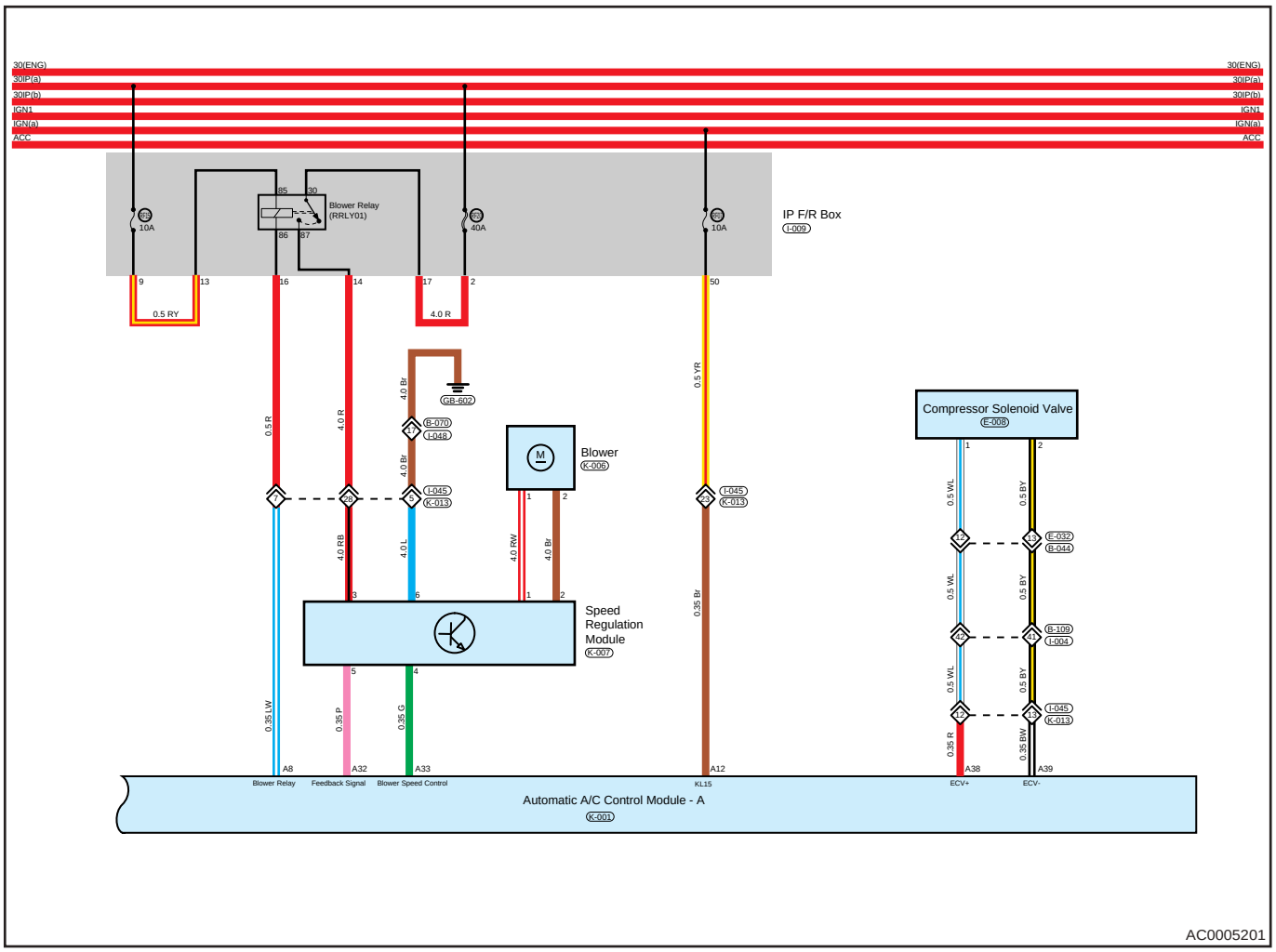
Circuit Diagram




30(ENG)
30IP(a)
30IP(b)
IGN1
IGN(a)
ACC
Evaporator Tank Temp Sensor
K-012
Outside Temp Sensor
B-002
Left Feet Outlet
K-014
Right Feet Outlet
K-015
Outlet Temp Sensor
K-016
0.35 GV
0.35 B
0.35 B
0.5 RW
0.35 B
0.5 RW
0.35 B
0.35 BY
0.35 LR
0.35 B
0.35 LO
0.35 B
0.35 LB
0.35 B
B-109
I-004
I-045
K-013
A28
A22
A29
A31
A34
A27
Evaporator Temperature Sensor +
Sensor -
Outside Temperature Sensor +
L-Foot-Femp-Fensor
R-Foot-Temp-Sensor
Incar Sensor
Automatic A/C Control Module - A
K-001

AC0005001


30(ENG)
30IP(a)
30IP(b)
IGN1
IGN(a)
ACC
IP F/R Box
I-009
Rear Blower Relay (RRLY03)
10A
10A
10A
40A
10A
85
30
86
87
50
42
9
25
23
26
27
1
41
40
0.5 RY
0.5 V
4.0 R
4.0 RL
0.5 R
0.5 YR
0.5 RG
0.5 RL
0.5 V
I-004
B-109
1-29
Rear Defrost Output
BCM 1
B-051
Body CAN
0.35 G
0.35 GY
0.5 Br
2.5 Br
GI-502
8
16
3
4
5
7
KL15
KL30
Rear Defrost Output
B-CAN H
B-CAN L
Ground
Auto A/C Panel
I-035
AC0005101



Diagnostic Information and Steps

Problem Symptoms Table

Hint:

Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Possible Cause
A/C no heating	Blower fuse (damaged)
	Blower relay (damaged)
	Blower speed regulation switch (damaged)
	Blower motor (damaged)
	Mix damper control mechanism (stuck or damaged)
	Heating pipe (blocked or damaged)
	Heater core assembly (blocked or damaged)
	Wire harness or connector (open or short)

Symptom	Possible Cause
A/C no cooling	Leak in system
	Refrigerant (overcharged)
	A/C pressure switch (damaged)
	Evaporator temperature sensor (damaged)
	A/C switch (damaged)
	Compressor assembly fuse (damaged)
	Compressor assembly relay (damaged)
	Compressor assembly belt (loose)
	Compressor assembly (damaged)
	Condenser assembly (blocked or damaged)
	Expansion valve (blocked or frosted)
	Evaporator core assembly (blocked or damaged)
	Wire harness or connector (open or short)
A/C intermittent cooling	Moisture in system
	Refrigerant (overcharged)
A/C insufficient cooling	Leak in system
	Refrigerant (insufficient)
	Refrigerant (overcharged)
	Air in refrigerant
	Moisture in refrigerant
	Condenser (dirty or blocked)
	Expansion valve (dirty or blocked)
	Condenser core (dirty or blocked)
	A/C high/low pressure line (dirty or blocked)
	Blower speed regulation switch (damaged)
	Blower motor (damaged)
	Compressor assembly belt (loose)
Too much noise in system	Compressor assembly belt (slip)
	Compressor assembly clutch bearing (worn or excessive clearance)
	Compressor assembly solenoid coil (faulty or loose connector)

Symptom	Possible Cause
	Compressor assembly belt (over tightened)
	Compressor assembly mounting bolt (loose)
	Cooling fan blade (distorted)
	Refrigerant oil (insufficient)
During operation, pressure on low pressure side switches between normal and vacuum	Moisture in refrigerant (excessive)
Pressure is too low for low pressure side and high pressure side, cooling performance is insufficient	A/C system (leaked)
	Refrigerant (insufficient)
Pressures at low pressure side and high pressure side are low, frost exists on line from condenser to A/C unit	Condenser (dirty or blocked)
Vacuum occurs at low pressure side, and pressure at high pressure side is too low, frost exists on lines on both sides of condenser or expansion valve	Moisture in refrigerant (excessive)
	Expansion valve (dirty or blocked)
	A/C line (leaked)
	Condenser (dirty or blocked)
Pressure at low pressure side and pressure at high pressure side is too high	Expansion valve (faulty)
	Refrigerant oil (excessive)
Pressure at low pressure side is normal or slightly low, and pressure at high pressure side is too high	Condenser surface (dirty)
	Cooling fan (not operating)
	Refrigerant (overcharged)
	Air in refrigerant
	Engine (overheating)
Pressure at low pressure side is too high, and pressure at high pressure side is too low	Compressor assembly belt (slip)
	Compressor assembly (faulty)
Pressure at low pressure side is too low, and pressure at high pressure side is too high	A/C high pressure line (blocked)
	Expansion valve (faulty)

Diagnosis Tools

Digital Multimeter
When using digital multimeter:

- Troubleshoot electrical malfunctions and wire harness system.
- Look for basic malfunction.
- Measure voltage, current and resistance.

Diagnostic Help

- Connect diagnostic tester (the latest software) to diagnostic interface, and make it communicate with vehicle electronic module through data network.
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If Diagnostic Trouble Code (DTC) cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all system grounds related to the latest DTCs.
- If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Turn ENGINE START STOP switch to ON.
- Use the diagnostic tester to record and clear DTCs stored in the system.
- Turn ENGINE START STOP switch to OFF and wait several seconds.
- Turn ENGINE START STOP switch to ON and check DTCs in the system again.
- If DTC is detected, it indicates current malfunction.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate the conditions under which DTC was reset.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect the mounting areas of instrument cluster, wire harness or wire harness connector and so on for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- Remove instrument cluster from malfunctioning vehicle, then install it to a new vehicle and perform a test. If this DTC cannot be cleared, instrument cluster is malfunctioning. If DTC can be cleared, reinstall instrument cluster to original vehicle.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Groundings are very important to entire circuit system, which are normal or not can seriously affect the entire circuit system. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) and oxidation may increase load resistance. This case will seriously affect normal operation of circuit. Check the ground points as follows:

- Remove ground bolt or nut.

- Check all contact surfaces for tarnish, dirt and rust, etc.
- Clean as necessary to ensure that contact is in good condition.
- Reinstall ground bolt or nut securely.
- Check if any additional accessories interfere with ground circuit.
- If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnosis Procedure

Hint:
Use following procedures to troubleshoot the air conditioning system.

1	**Vehicle brought to workshop**

Next

2	**Examine vehicle and check basic items**

Check system power supply voltage, and check that fuse, wire harness and connector are connected normally.

OK

Standard voltage: Not less than 12 V.

Result

NG → **Check and replace malfunctioning parts**

OK

3	**Using a diagnostic tester, read related DTC and data stream information**

Result

Result	Proceed to
No DTC	A
DTC occurs	B

A → **Perform troubleshooting procedure without DTCs according to malfunction symptom**

B

4	**Troubleshoot according to DTCs troubleshooting procedure**

Result

Result	Proceed to
Problem is not resolved	A
Problem is resolved	B

A → **Return to procedure 1 and troubleshoot the process again**

B

5	**According to air conditioning system malfunction repair completion inspection and delivery, confirm if malfunction is repaired**

Result

Result	Proceed to
Delivery inspection is failed	A
Delivery inspection is qualified	B

A → **Return to procedure 1 and troubleshoot the process again**

B

6	**Finished**

Diagnostic Trouble Code (DTC) Chart

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
B1404_11	Filtered Evaporator Temperature Circuit Short to Ground	CLM detects that sensor output voltage is equal to 0 V continually	CLM detects that normal function can be restored only after temperature sensor side voltage returns to a stable normal value.	• Short in temperature sensor itself • Short in connecting wire between CLM and temperature sensor • Internal fault in CLM	Sensor uses a pull-up resistor of 6.8K for 5 V power supply. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B1404_15	Filtered Evaporator Temperature Circuit Short to Battery or Open	CLM detects that sensor output voltage is equal to 5V continually		• Short in temperature sensor itself • Short in connecting wire between CLM and temperature sensor • Internal fault in CLM	Sensor uses a pull-up resistor of 6.8K for 5 V power supply. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B1409_11	Mode Motor Step Circuit Short to Ground	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and the returned data is not all 0.	SPI data of each step motor driver IC sent by MCU is the same as the returned data of step motor driver IC, which indicates that step motor connection is normal,	• Short to power supply in connecting wire • Short to power supply in step motor internal circuit • Short to power supply in CLM internal circuit	Integrated chip overcurrent protection

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
B1409_12	Mode Motor Step Circuit Short to Battery	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and all the returned data are 0.	and then the normal function can be restored.	• Open or short to ground in connecting wire • Open or short to ground in step motor internal circuit • Open or short to ground in CLM internal circuit	Integrated chip overcurrent protection
B1410_11	Rec Motor Step Circuit Short to Ground	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and all the returned data are 0.	SPI data of each step motor drive IC sent by MCU is the same as return data of step motor drive IC, which indicates the step motor connection is normal, and normal function can be restored.	• Open or short to ground in connecting wire • Open or short to ground in step motor internal circuit • Open or short to ground in CLM internal circuit	Integrated chip overcurrent protection
B1410_12	Rec Motor Step Circuit Short to Battery	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and all the returned data are 0.		• Short to power supply in connecting wire • Short to power supply in step motor internal circuit • Short to power supply in CLM internal circuit	Integrated chip overcurrent protection
B1414_11	Mix Flap Motor Step (-Right Side) Circuit	SPI data of each step motor driver IC sent by MCU is different	SPI data of each step motor drive IC sent by MCU is the same as return data	• Open or short to ground in connecting wire • Open or short to ground in step motor internal circuit	Integrated chip overcurrent protection

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
	Short to Ground	from the returned data of step motor driver IC, and all the returned data are 0.	of step motor drive IC, which indicates the step motor connection is normal, and normal function can be restored.	• Open or short to ground in CLM internal circuit	
B1414_12	Mix Flap Motor Step (-Right side) Circuit Short to Battery	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and all the returned data are 0.		• Short to power supply in connecting wire • Short to power supply in step motor internal circuit • Short to power supply in CLM internal circuit	Integrated chip overcurrent protection
B1412_11	Mix Flap Motor Step (-Left Side) Circuit Short to Ground	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and all the returned data are 0.	SPI data of each step motor drive IC sent by MCU is the same as return data of step motor drive IC, which indicates the step motor connection is normal, and normal function can be restored.	• Open or short to ground in connecting wire • Open or short to ground in step motor internal circuit • Open or short to ground in CLM internal circuit	Integrated chip overcurrent protection
B1412_12	Mix Flap Motor Step (-Left Side) Circuit Short to Battery	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and all the		• Short to power supply in connecting wire • Short to power supply in step motor internal circuit • Short to power supply in CLM internal circuit	Integrated chip overcurrent protection

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
		returned data are 0.			
B1408_29	Blower Voltage Gear Not Adjustable	The blower feedback voltage is 0 when CLM detects that the blower is in 1st gear, however, it will not generate corresponding feedback voltage as the change of blower gear.	When CLM detects that blower feedback voltage changes with band (-tolerance of ±10% is allowable), the normal function can be restored only when blower operates normally.	• CCP button invalid • CLM output PWM signal fault • VLCL blower driver circuit fault	Integrated chip overcurrent protection
B1408_31	Blower Voltage Not Output	Blower voltage outputs low level continuously when CLM detects that blower is in 1st gear.		• CCP button invalid • CLM output PWM signal fault • VLCL blower driver circuit fault	Integrated chip overcurrent protection
B1403_11	Ambient Temperature Sensor	CLM detects that sensor output voltage is equal to 0 V continually	CLM detects that normal function can be restored only after temperature sensor side voltage returns to a stable normal value.	• Short in temperature sensor itself • Short in connecting wire between CLM and temperature sensor • Internal fault in CLM	Sensor uses a pull-up resistor of 10K for 5 V power supply. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
B1403_15	External Ambient Temperature Sensor Open	CLM detects that sensor output voltage is equal to 5V continually	CLM returns to normal function until it detects that voltage at solar sensor end returns to stable normal value.	• Short in temperature sensor itself • Short in connecting wire between CLM and temperature sensor • Internal fault in CLM	Sensor uses a pull-up resistor of 10K for 5 V power supply. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B1406_14	Solar Sensor (-Left) Circuit Short to Ground or Open	CLM detects that sensor output voltage is equal to 0 V continually		• Short in sensor itself • Short in connecting wire between CLM and sensor • Internal fault in CLM	Sensor connects a pull-down resistor of 7.68K to ground. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B1406_12	Solar Sensor (-Left) Short to Power Supply	CLM detects that sensor output voltage is equal to 5V continually		• Open in sensor itself • Open in connecting wire between CLM and sensor • Internal fault in CLM	Sensor connects a pull-down resistor of 7.68K to ground. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
B1407_14	Solar Sensor (Right)	CLM detects that sensor output voltage is equal to 0 V continually	CLM returns to normal function until it detects that voltage at solar sensor end returns to stable normal value.	• Short in sensor itself • Short in connecting wire between CLM and sensor • Internal fault in CLM	Sensor connects a pull-down resistor of 7.68K to ground. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B1407_12	Solar Sensor (-Right) Short to Power Supply	CLM detects that sensor output voltage is equal to 5V continually		• Open in sensor itself • Open in connecting wire between CLM and sensor • Internal fault in CLM	Sensor connects a pull-down resistor of 7.68K to ground. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B1418_11	Incar PM2.5 Sensor Circuit Short to Ground	When sensor output is continuously low level	Duty ratio of sensor output is within normal range	Short to ground in sensor output	Sensor acquisition circuit collects high and low level signals by itself, it will not cause any adverse effects on the hardware circuit no matter port is short to ground or power supply.
B1418_15	Incar PM2.5 Sensor Circuit Short to Battery or Open	When sensor output is continuously high level		Short to power supply or open in sensor output circuit	Sensor acquisition circuit collects high and low level signals by itself, it will not cause any adverse effects on the hardware circuit no

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
					matter port is short to ground or power supply.
B141B_11	Incar Temperature Sensor Circuit Short to Ground	CLM detects that sensor output voltage is equal to 0 V continually	CLM detects that normal function can be restored only after temperature sensor side voltage returns to a stable normal value.	• Short to ground in sensor output • Short in connecting wire between CLM and temperature sensor • Internal fault in CLM	Sensor connects a pull-down resistor of 10K to ground. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B141B_12	Incar Temperature Sensor Circuit Short to Battery	CLM detects that sensor output voltage is equal to 5V continually		• Short in temperature sensor itself • Short in connecting wire between CLM and temperature sensor • Internal fault in CLM	Sensor connects a pull-down resistor of 10K to ground. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B141A_11	Outcar PM2.5 Sensor Circuit Short to Ground	When sensor output is continuously low level	Duty ratio of sensor output is within normal range	Short to ground in sensor output	Sensor acquisition circuit collects high and low level signals by itself, it will not cause any adverse effects on the hardware circuit no matter port is short to ground or power supply.
B141A_15	Outcar PM2.5 Sensor Circuit	When sensor output is		Short to power supply or open in sensor output circuit	Sensor acquisition circuit collects high and low level signals

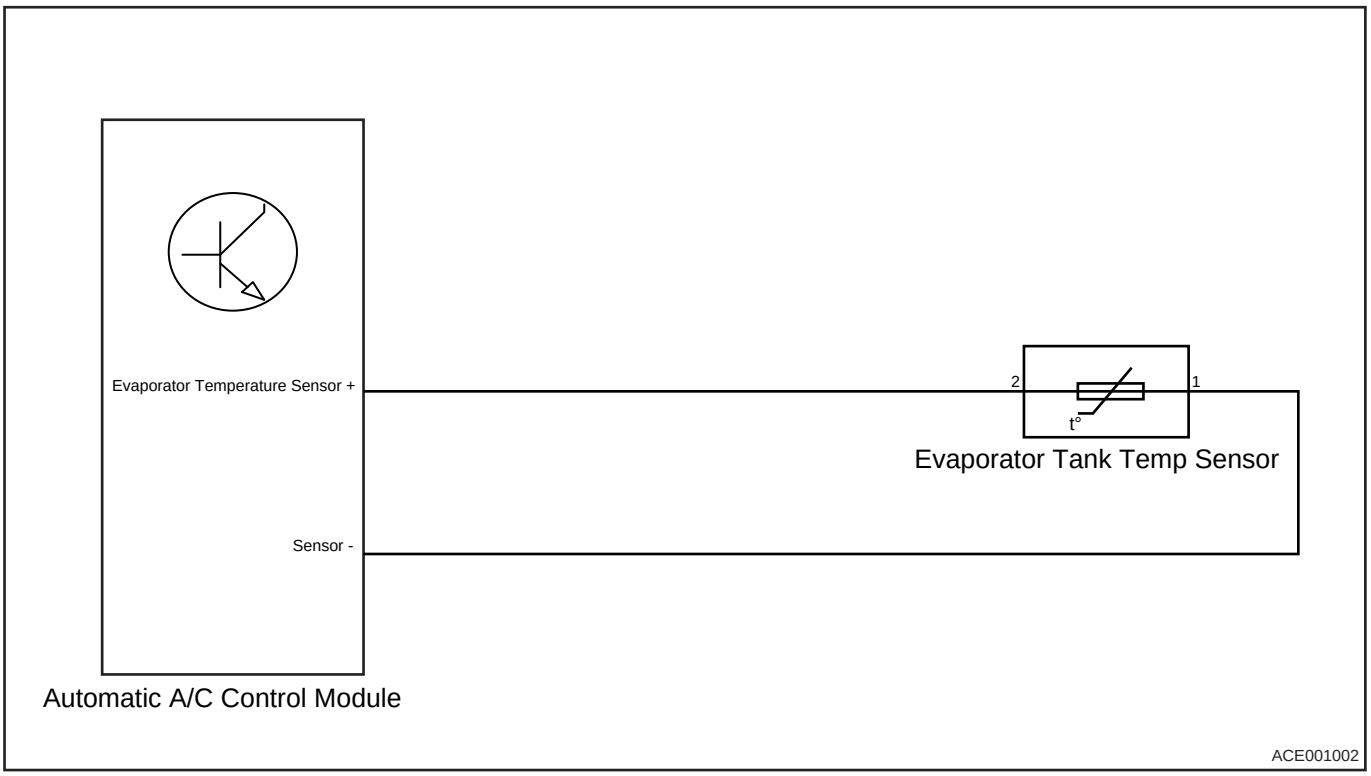
DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
	Short to Battery or Open	continuously high level			by itself, it will not cause any adverse effects on the hardware circuit no matter port is short to ground or power supply.
B1419_11	AQS Sensor Circuit Short to Ground	When sensor output is continuously low level	Duty ratio of sensor output is within normal range	Short to ground in sensor output	Sensor acquisition circuit collects high and low level signals by itself, it will not cause any adverse effects on the hardware circuit no matter port is short to ground or power supply.
B1419_15	AQS Sensor Circuit Short to Battery or Open	When sensor output is continuously high level		Short to power supply or open in sensor output circuit	Sensor acquisition circuit collects high and low level signals by itself, it will not cause any adverse effects on the hardware circuit no matter port is short to ground or power supply.
B1419_09	AQS Sensor Component Failure	The feedback pwm of component is 97±1%		Air quality sensor self-diagnosis error	Sensor acquisition circuit collects high and low level signals by itself, it will not cause any adverse effects on the hardware circuit no matter port is short to ground or power supply.
B1416_1C	Left Anion Generator	CLM detects that anion feedback voltage is out of normal range of 0.1 to 4.9 V	CLM returns to normal function until it detects that anion feedback voltage returns to stable normal value.	1: Anion generator itself fault 2: Short in connecting wire between CLM and anion 3: Internal fault in CLM	After anion feedback circuit divides the voltage signal via resistors of 51K and 36K, it will be connected to sampling point through 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through
B1417_1C	Right Anion	CLM detects that anion			

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
	Generator	feedback voltage is out of normal range of 0.1 to 4.9 V			a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B141C_01	Fragrance Controller Step Motor	LIN bus receives 0x2B message that indicates a step motor fault	LIN bus receives 0x2B message that does not indicate a step motor fault	1: Short to power supply in connecting wire2: Short to power supply in step motor internal circuit3: Short to power supply in fragrance internal circuit	Integrated chip overcurrent protection
B141D_01	Fragrance Controller Fan	LIN bus receives 0x2B message that indicates a fan fault	LIN bus receives 0x2B message that does not indicate a fan fault	Fan driver circuit fault	Integrated chip overcurrent protection
B1BE0_16	Power Supply Undervoltage	Less than 9 V	Returns to normal function until the voltage returns to stable normal value.	1: Battery2: Wire harness or connector	/
B1BE0_17	Power Supply Overvoltage	More than 16 V			/

DTC Diagnosis Procedure

DTC	B1404_11	Filtered Evaporator Temperature Circuit Short to Ground
DTC	B1404_15	Filtered Evaporator Temperature Circuit Open

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check the evaporator temperature sensor connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace evaporator temperature sensor**

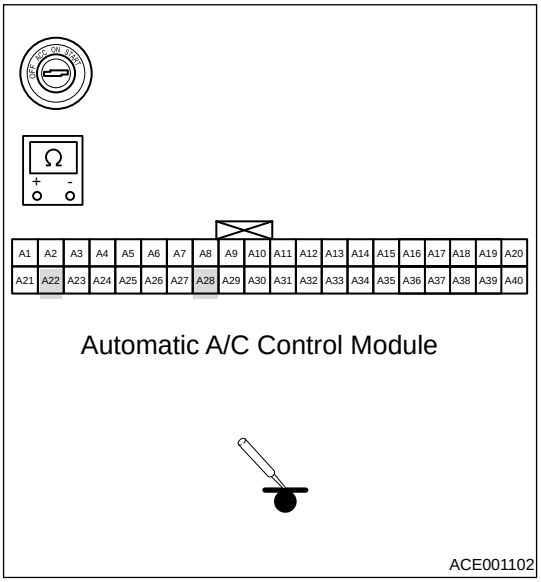
OK

2	**Check resistance between evaporator temperature sensor and ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to evaporator + terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to evaporator - terminal) - Body ground	Ignition switch OFF	∞



NG → **Repair or replace evaporator temperature sensor ground wire harness**

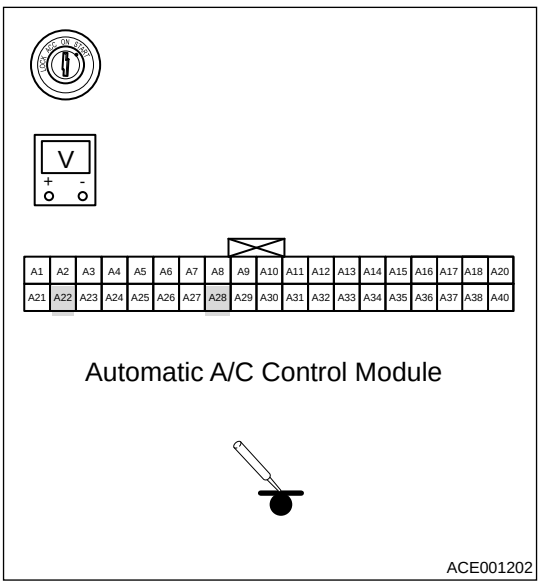
OK

3	Check voltage between evaporator temperature sensor and power supply

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to evaporator + terminal) - Body ground	Ignition switch ON	0 V
A/C control module (to evaporator - terminal) - Body ground	Ignition switch ON	0 V



NG → **Repair or replace evaporator temperature sensor power supply wire harness**

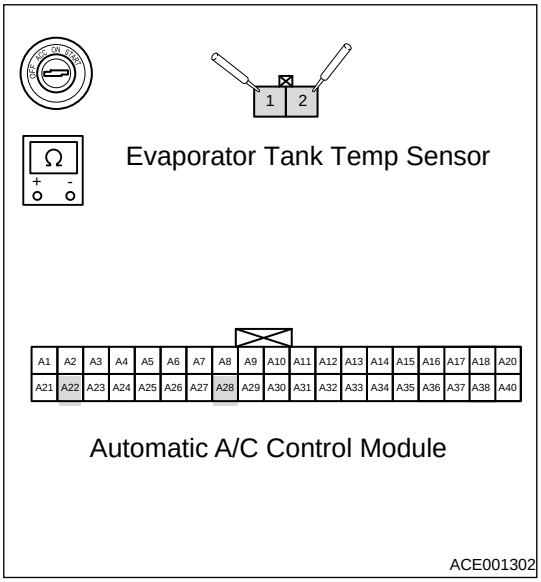
OK

4	Check resistance between evaporator temperature sensor and A/C control module

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to evaporator + terminal) - Evaporator temperature sensor (2)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to evaporator - terminal) - Evaporator temperature sensor (1)	Ignition switch OFF	⩽ 1 Ω



NG → **Repair or replace evaporator temperature sensor and A/C control module wire harness**

OK →

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

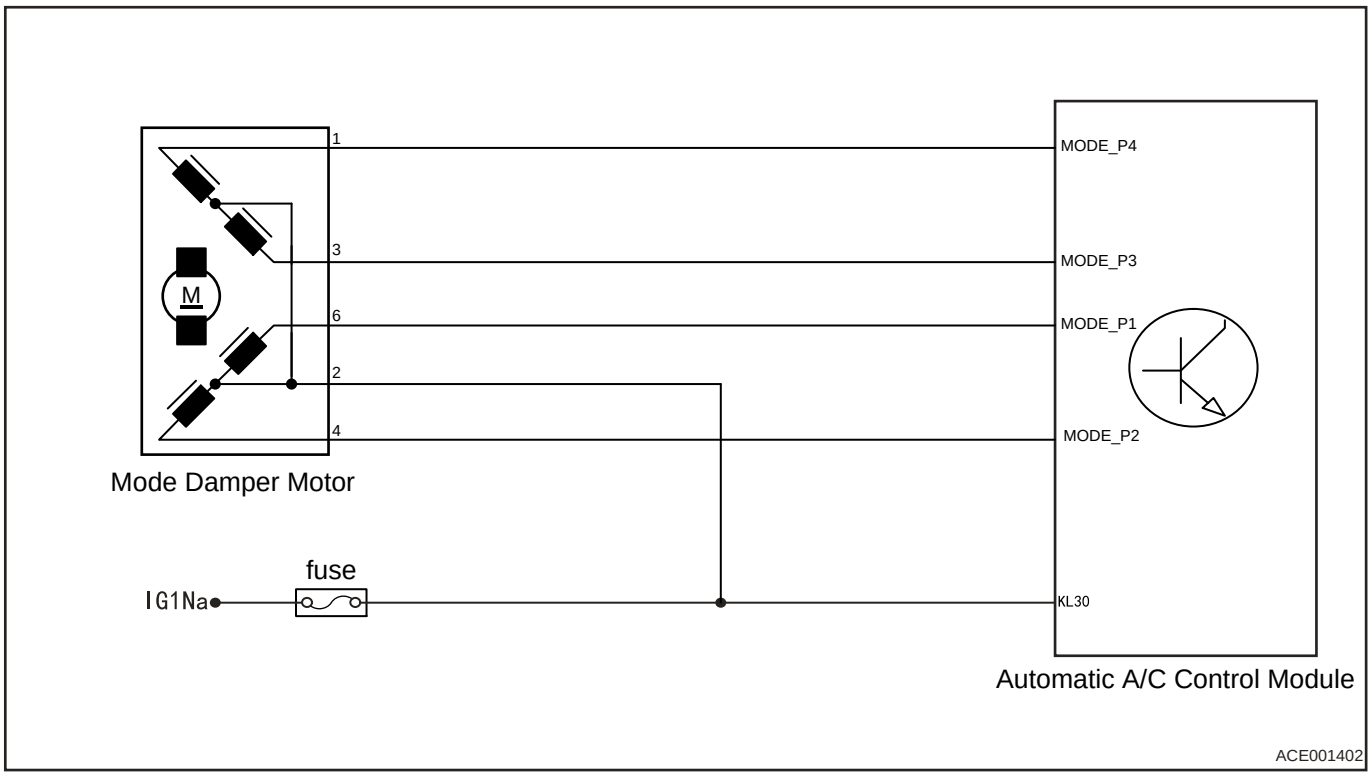
NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1409_11**	**Mode Motor Step Circuit Short to Ground**
DTC	**B1409_12**	**Mode Motor Step Circuit Short to Battery**

Description

Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check mode motor connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace mode motor connector**

OK ↓

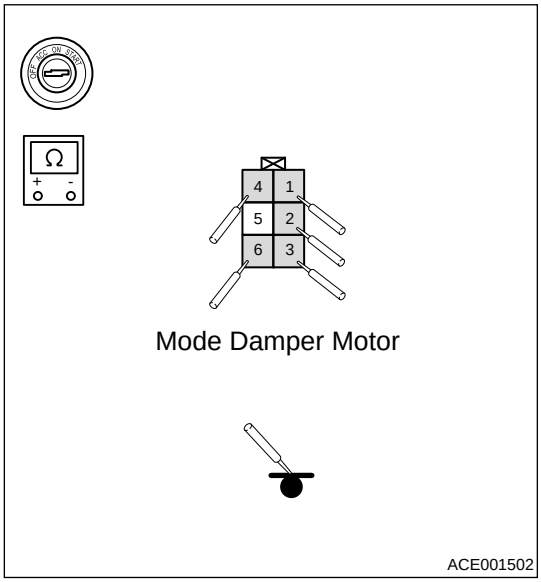
2	**Check resistance between mode motor and ground**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Mode damper motor (1) - Body ground	Ignition switch OFF	∞
Mode damper motor (3) - Body ground	Ignition switch OFF	∞
Mode damper motor (6) - Body ground	Ignition switch OFF	∞
Mode damper motor (2) - Body ground	Ignition switch OFF	∞
Mode damper motor (4) - Body ground	Ignition switch OFF	∞



NG → **Repair or replace mode motor ground wire harness**

OK

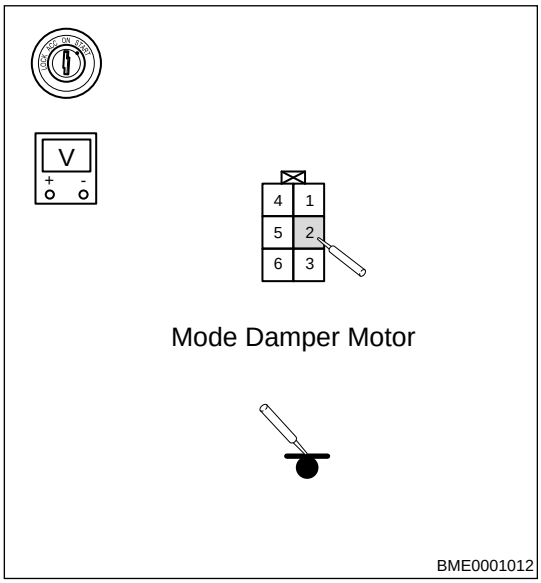
3	**Check mode motor power supply voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Mode damper motor (2) - Body ground	Ignition switch ON	12 V



NG → **Repair or replace mode motor power supply wire harness**

OK

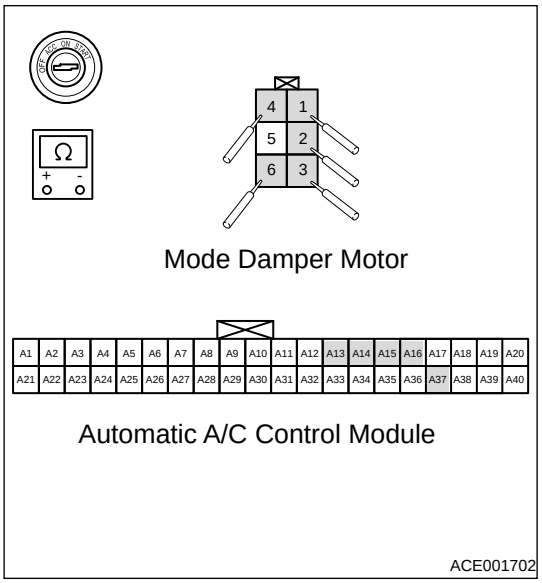
4	Check resistance between mode motor and A/C control module

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Mode damper motor (1) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mode damper motor (3) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mode damper motor (6) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mode damper motor (2) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mode damper motor (4) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω



NG → **Repair or replace mode motor power supply wire harness**

OK

5	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

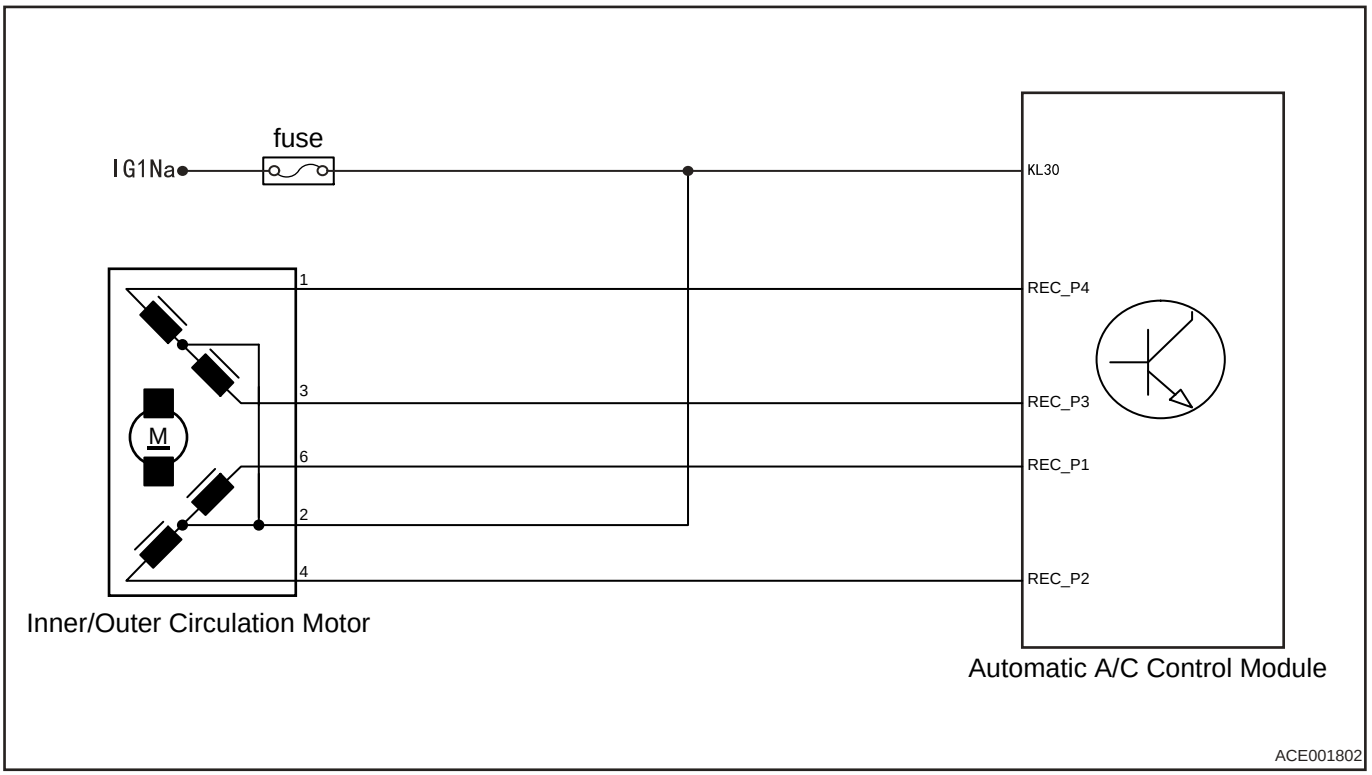
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1410_11**	**Rec Motor Step Circuit Short to Ground**
DTC	**B1410_12**	**Rec Motor Step Circuit Short to Battery**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check inner/outer circulation motor connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace inner/outer circulation motor connector**

OK

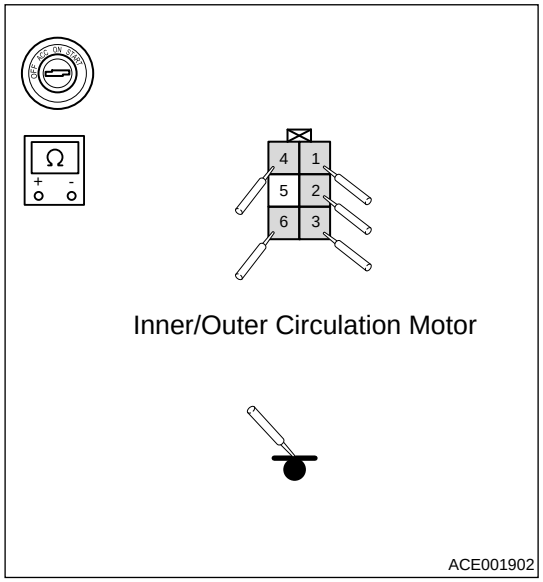
2	**Check resistance between inner/outer circulation motor and ground**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Inner/outer circulation motor (1) - Body ground	Ignition switch OFF	∞
Inner/outer circulation motor (2) - Body ground	Ignition switch OFF	∞
Inner/outer circulation motor (3) - Body ground	Ignition switch OFF	∞
Inner/outer circulation motor (4) - Body ground	Ignition switch OFF	∞
Inner/outer circulation motor (6) - Body ground	Ignition switch OFF	∞



NG → **Repair or replace inner/outer circulation motor ground wire harness**

OK →

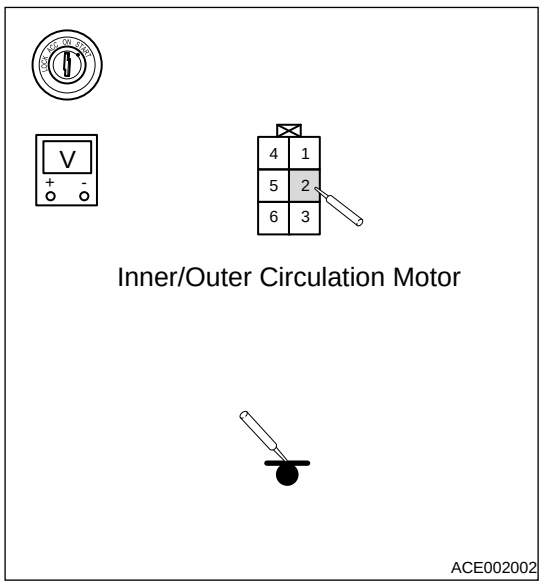
3	**Check inner/outer circulation motor power supply voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Inner/outer circulation motor (2) - Body ground	Ignition switch ON	12 V



NG → **Repair or replace inner/outer circulation motor power supply wire harness**

OK

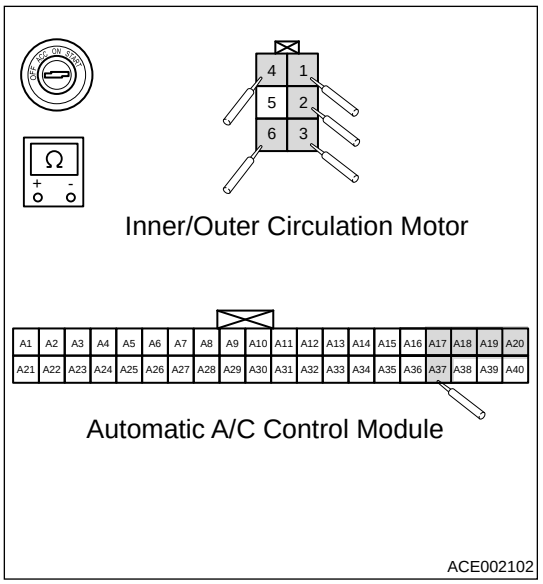
4	Check resistance between inner/outer circulation motor and A/C control module

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Inner/outer circulation motor (1) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Inner/outer circulation motor (3) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Inner/outer circulation motor (6) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Inner/outer circulation motor (2) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Inner/outer circulation motor (4) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness between inner/outer circulation motor and A/C control module**

OK

5	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

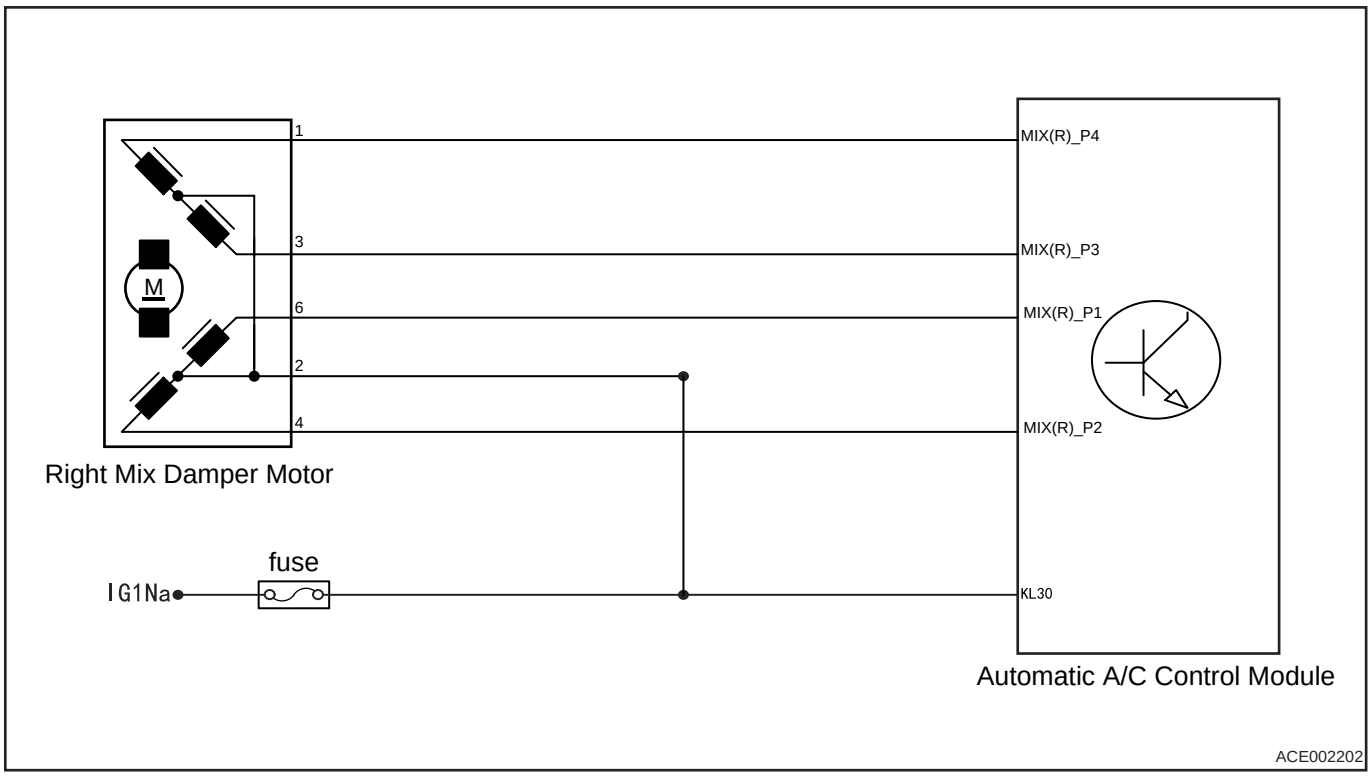
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG	**Replace with a new ECU to check if fault reoccurs.**
OK	**Conduct test and confirm malfunction has been repaired.**

DTC	**B1414_11**	**Mix Flap Motor Step (Right Side) Circuit Short to Ground**
DTC	**B1414_12**	**Mix Flap Motor Step (Right side) Circuit Short to Battery**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check mix damper motor connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG	**Repair or replace mix damper motor connector**

OK

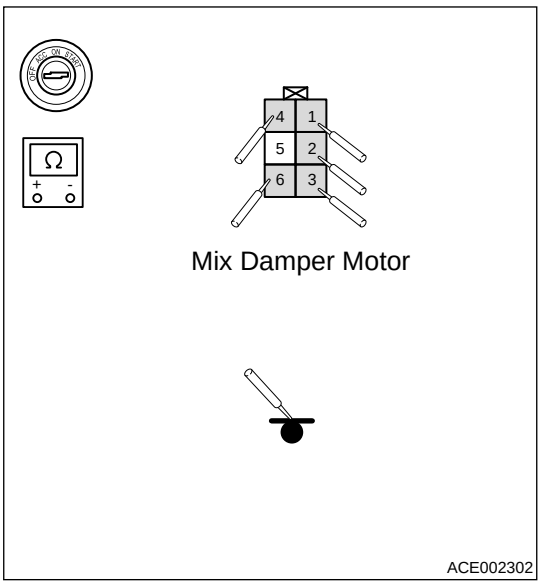
2	Check resistance between mix damper motor and ground

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Mix damper motor (1) - Body ground	Ignition switch OFF	∞
Mix damper motor (3) - Body ground	Ignition switch OFF	∞
Mix damper motor (6) - Body ground	Ignition switch OFF	∞
Mix damper motor (2) - Body ground	Ignition switch OFF	∞
Mix damper motor (4) - Body ground	Ignition switch OFF	∞



NG → **Repair or replace mix damper motor ground wire harness**

OK

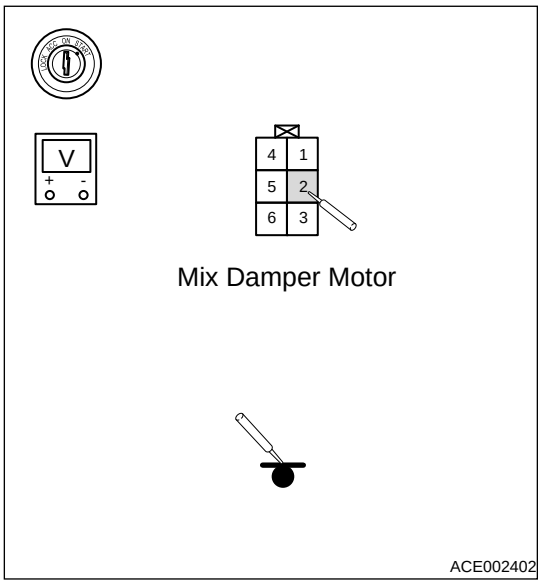
3	Check mix damper motor power supply voltage

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Mix damper motor (2) - Body ground	Ignition switch ON	12 V



NG → **Repair or replace mix damper motor power supply wire harness**

OK

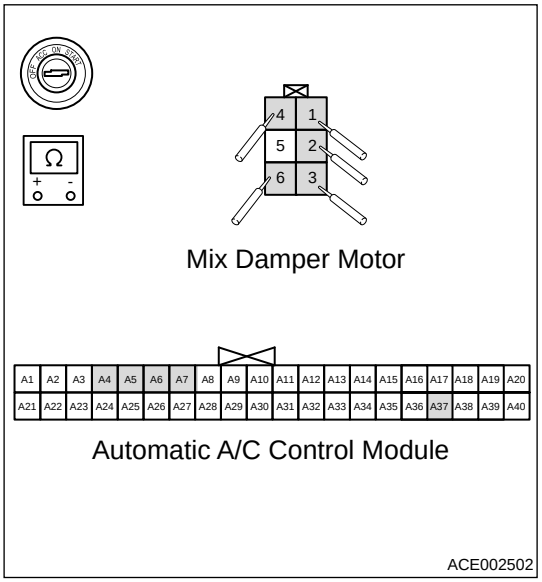
4	Check resistance between mix damper motor and A/C control module

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Mix damper motor (1) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mix damper motor (3) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mix damper motor (6) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mix damper motor (2) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mix damper motor (4) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness between inner/outer circulation motor and A/C control module**

OK

5	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

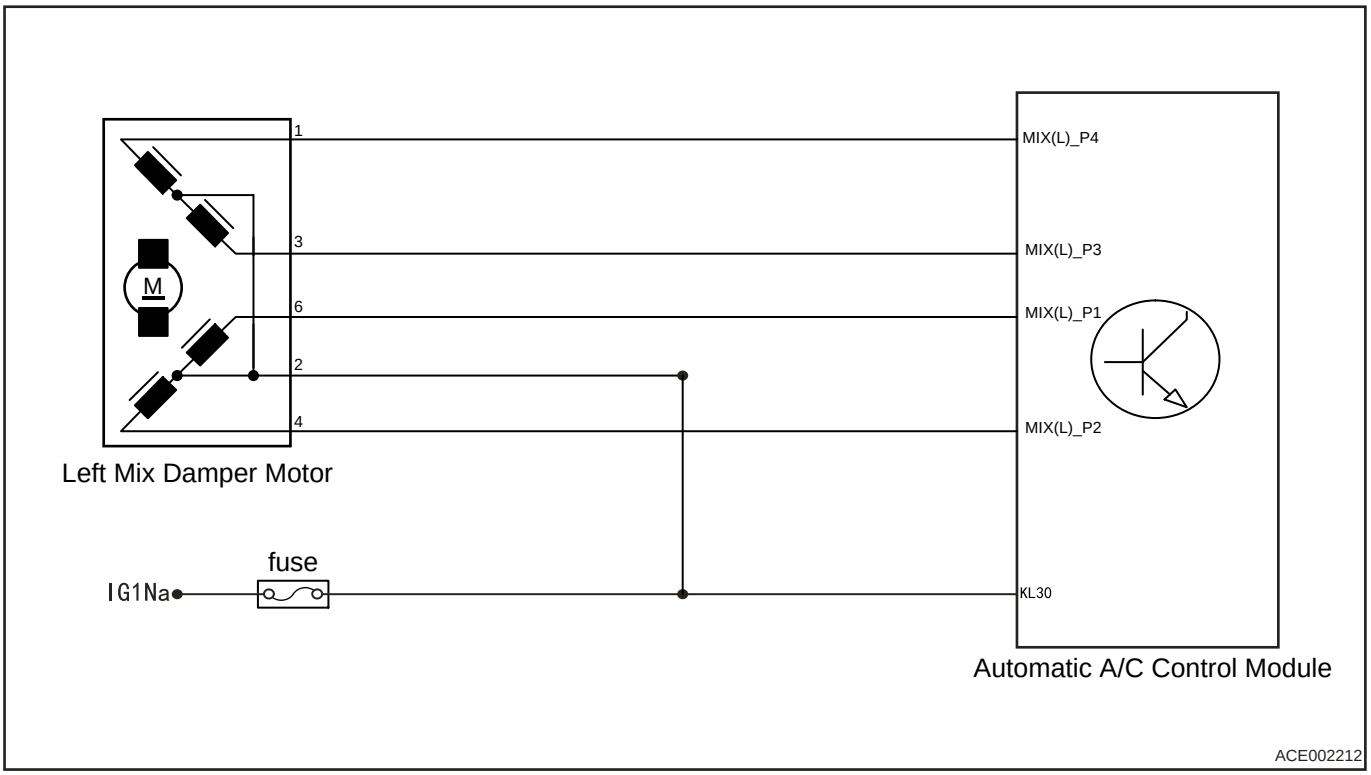
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK	**Conduct test and confirm malfunction has been repaired.**

DTC	**B1412_11**	**Mix Flap Motor Step (Left Side) Circuit Short to Ground**
DTC	**B1412_12**	**Mix Flap Motor Step (Left Side) Circuit Short to Battery**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check mix damper motor connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG	**Repair or replace mix damper motor connector**

OK

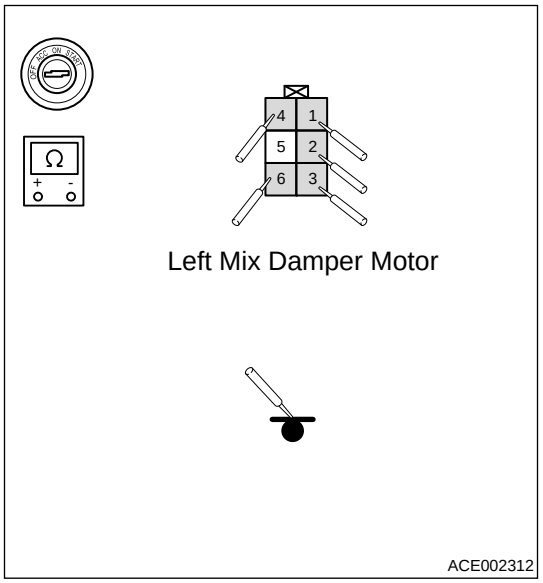
2	Check resistance between mix damper motor and ground

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Left mix damper motor (1) - Body ground	Ignition switch OFF	∞
Left mix damper motor (3) - Body ground	Ignition switch OFF	∞
Left mix damper motor (6) - Body ground	Ignition switch OFF	∞
Left mix damper motor (2) - Body ground	Ignition switch OFF	∞
Left mix damper motor (4) - Body ground	Ignition switch OFF	∞



NG → **Repair or replace mix damper motor ground wire harness**

OK

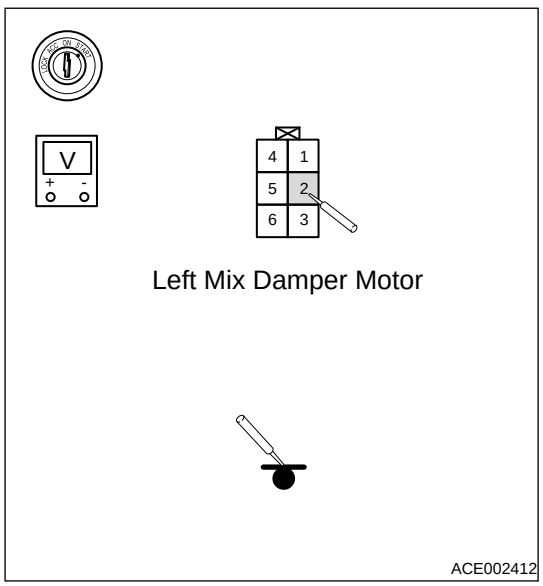
3	Check mix damper motor power supply voltage

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Left mix damper motor (2) - Body ground	Ignition switch ON	12 V



NG → **Repair or replace mix damper motor power supply wire harness**

OK ↓

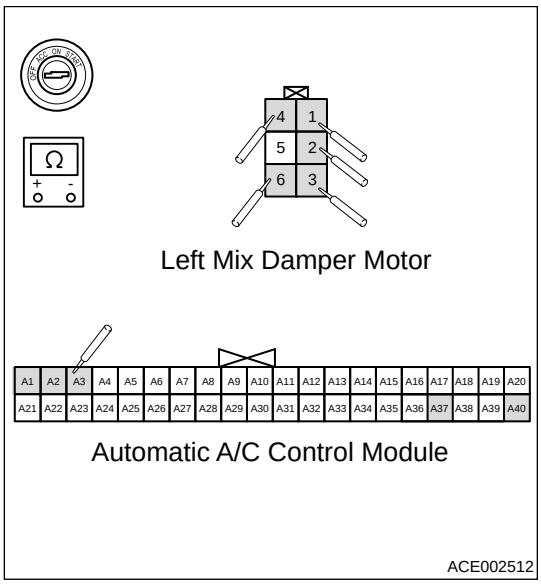
4	Check resistance between mix damper motor and A/C control module

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Left mix damper motor (1) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Left mix damper motor (3) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Left mix damper motor (6) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Left mix damper motor (2) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Left mix damper motor (4) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness between inner/outer circulation motor and A/C control module**

OK ↓

5	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

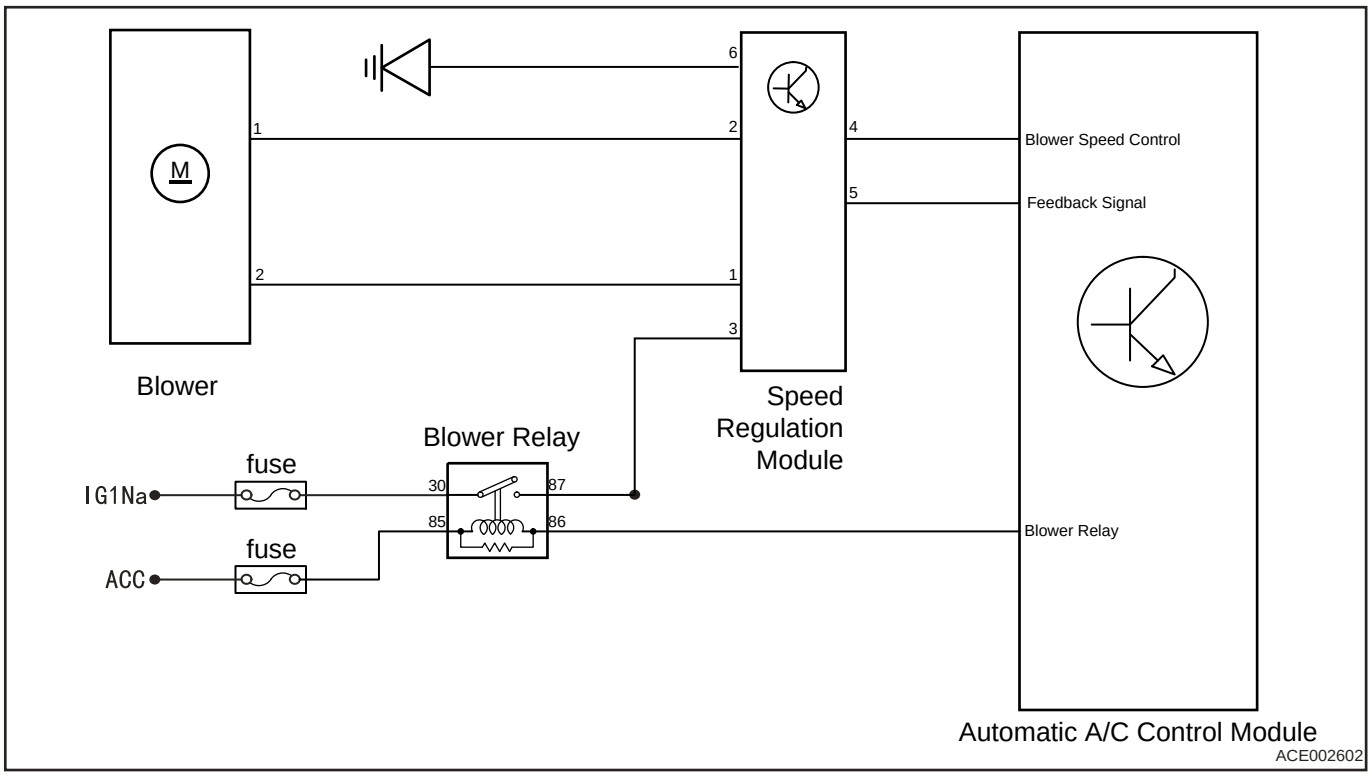
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG	**Replace with a new ECU to check if fault reoccurs.**
OK	**Conduct test and confirm malfunction has been repaired.**

DTC	**B1408_29**	**Blower Voltage Gear Not Adjustable**
DTC	**B1408_31**	**Blower Voltage Not Output**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

(a) Use circuit diagram as a guide to perform the following inspection procedures:
(b) Check if fuse RF20/RF15 is blown or no power.

NG	**Replace fuse or check the cause for no power**

OK

2	Check blower connector

(a) Use circuit diagram as a guide to perform the following inspection procedures:

(b) Turn ENGINE START STOP switch to OFF.

(c) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace blower connector**

OK

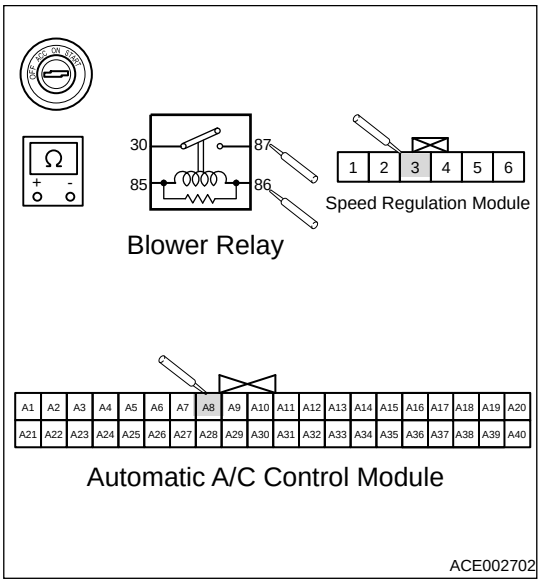
3	Check resistance between blower relay and A/C control module

(a) Use circuit diagram as a guide to perform the following inspection procedures:

(i) Turn ENGINE START STOP switch to OFF.

(ii) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Relay (87) - Speed regulation module (3)	Ignition switch OFF	Less than 1 Ω
Relay (86) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω



NG → **Repair or replace blower relay and A/C control module wire harness**

OK

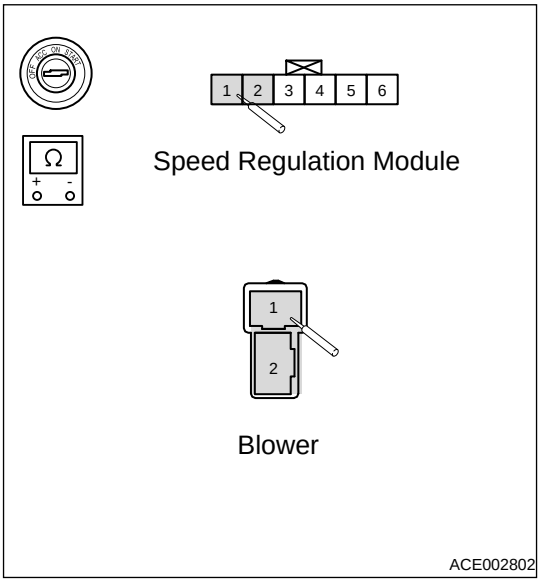
4	Check resistance between speed regulation module and blower

(a) Use circuit diagram as a guide to perform the following inspection procedures:

(i) Turn ENGINE START STOP switch to OFF.

(ii) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Blower (1) - Speed regulation module (2)	Ignition switch OFF	Less than 1 Ω
Blower (2) - Speed regulation module (1)	Ignition switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness between speed regulation module and blower**

OK →

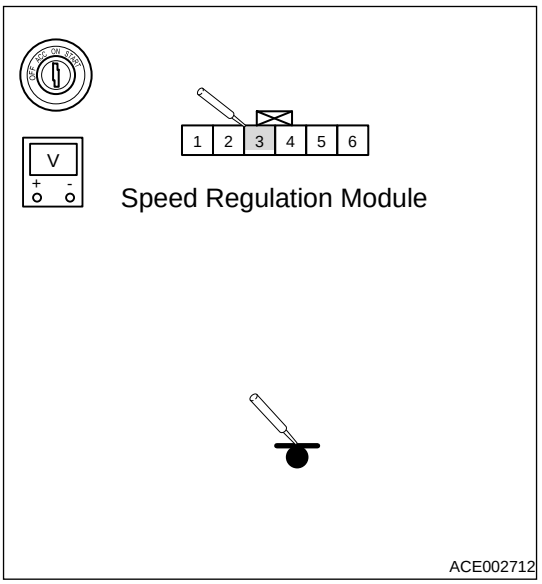
5	Check voltage between speed regulation module and power supply

(a) Use circuit diagram as a guide to perform the following inspection procedures:

(i) Turn ENGINE START STOP switch to ON.

(ii) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Speed regulation module (3) - Body ground	Ignition switch ON	12 V



NG → **Repair or replace speed regulation module power supply wire harness**

OK →

6	Check resistance between speed regulation module and ground

(a) Use circuit diagram as a guide to perform the following inspection procedures:
  (i) Turn ENGINE START STOP switch to OFF.
  (ii) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Speed regulation module (6) - Body ground	Ignition switch OFF	Less than 1 Ω

NG → **Repair or replace speed regulation module ground wire harness**

OK →

7	Check blower

(a) Using 12 V battery, test the blower with power on.
(b) Check if blower is operating normally.

NG → **Repair or replace blower**

OK →

8	Reconfirm DTCs

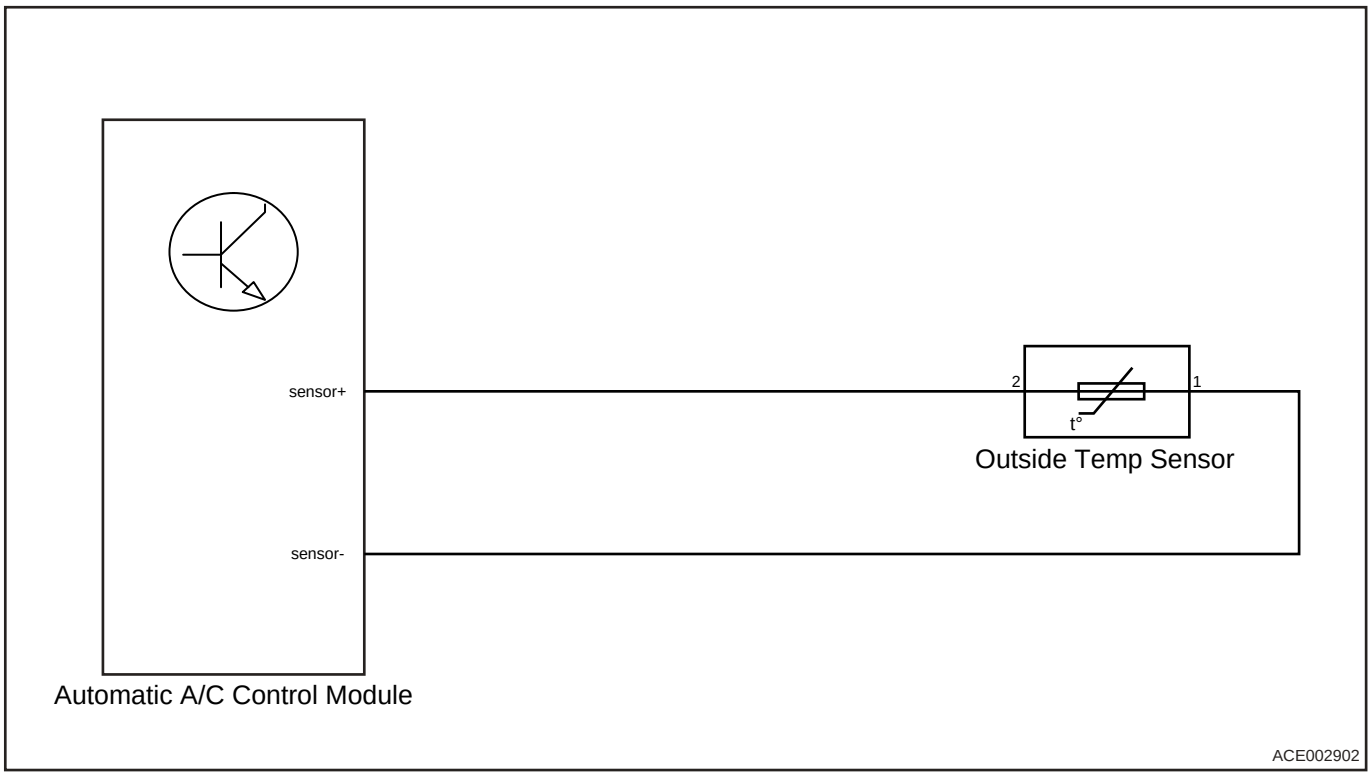
Use circuit diagram as a guide to perform the following inspection procedures:
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1403_11	External Ambient Temperature Sensor Short to Ground
DTC	B1403_15	External Ambient Temperature Sensor Open

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check outside temperature sensor connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

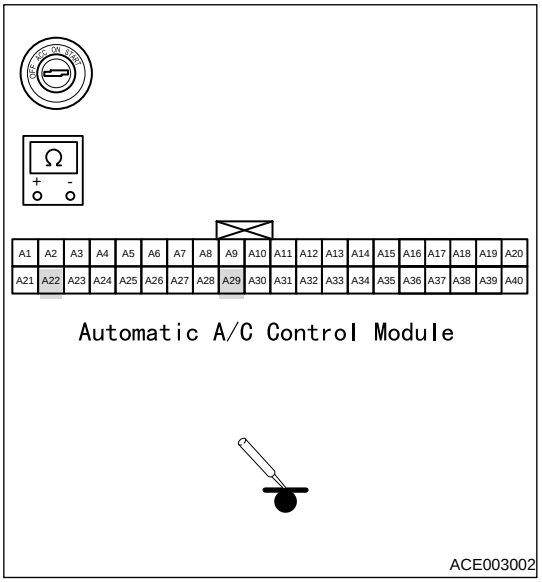
NG → **Repair or replace outside temperature sensor**

OK

2	**Check resistance between outside temperature sensor and ground**

(a) Turn ENGINE START STOP switch to OFF.
(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to outside temperature sensor terminal +) - Body ground	Ignition switch OFF	∞
A/C control module (to outside temperature sensor terminal -) - Body ground	Ignition switch OFF	∞



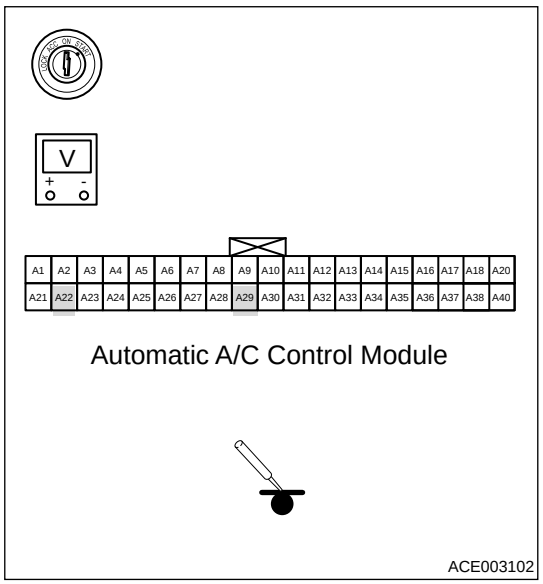
NG → **Repair or replace outside temperature sensor ground wire harness**

OK

3	**Check voltage between outside temperature sensor and power supply**

(a) Turn ENGINE START STOP switch to ON.
(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to outside temperature sensor terminal +) - body ground	Ignition switch ON	0 V
A/C control module (to outside temperature sensor terminal -) - Body ground	Ignition switch ON	0 V



NG → **Repair or replace outside temperature sensor power supply wire harness**

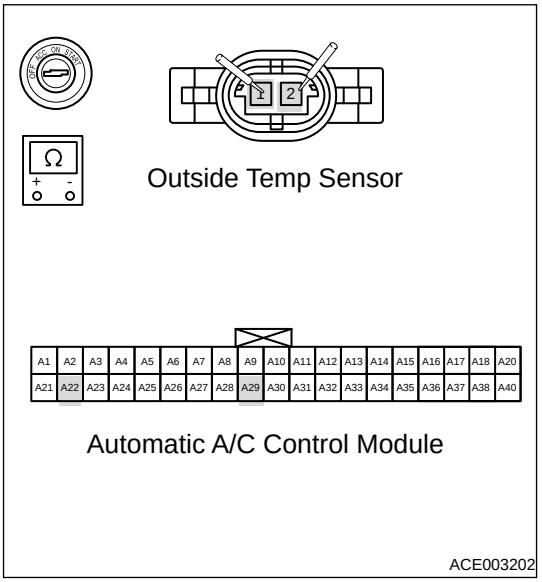
OK

4	**Check resistance between outside temperature sensor and A/C control module**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to terminal) - Outside temperature sensor (2)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - Outside temperature sensor (1)	Ignition switch OFF	⩽ 1 Ω



NG → **Repair or replace outside temperature sensor and A/C control module wire harness**

OK →

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

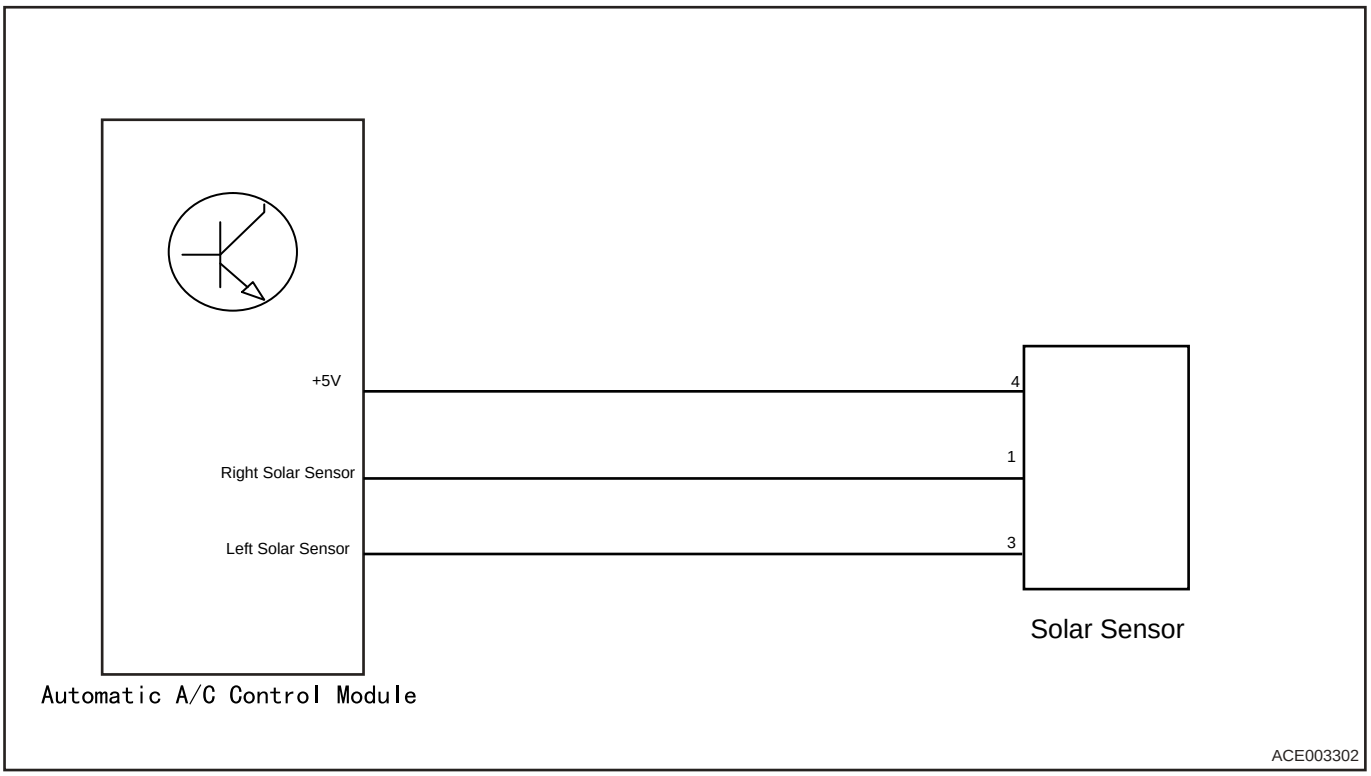
NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1406_14**	**Solar Radiation (Left Side)-Circuit Short to Ground or Open**
DTC	**B1406_12**	**Solar Radiation (Left side) Circuit Short to Battery**
DTC	**B1407_14**	**Solar Radiation (Right Side)-Circuit Short to Ground or Open**
DTC	**B1407_12**	**Solar Radiation (Right Side) Circuit Short to Battery**

Description

Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check solar sensor connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace solar sensor connector**

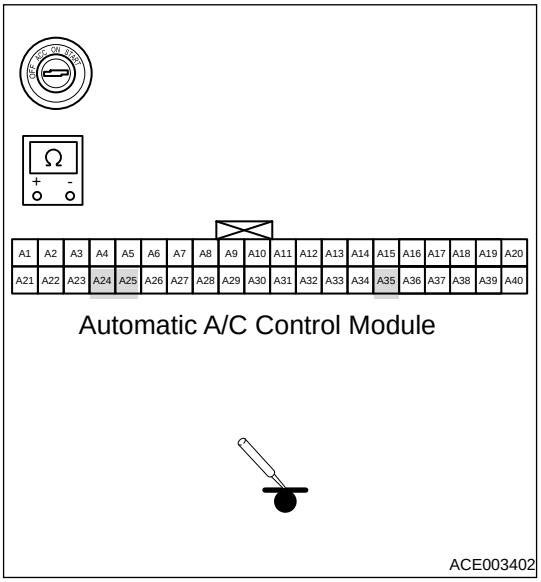
OK

2	**Check resistance between solar sensor and ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to solar sensor terminal - left) - Body ground	Ignition switch OFF	∞
A/C control module (to solar sensor terminal - right) - Body ground	Ignition switch OFF	∞
A/C control module (to solar sensor terminal - power supply) - Body ground	Ignition switch OFF	∞



NG → **Repair or replace solar sensor ground wire harness**

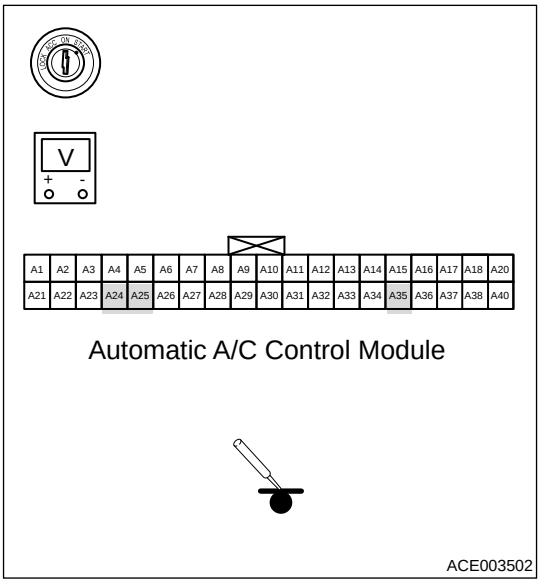
OK

3	**Check voltage between solar sensor and power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to solar sensor terminal - left) - Body ground	Ignition switch ON	0 V
A/C control module (to solar sensor terminal - right) - Body ground	Ignition switch ON	0 V
A/C control module (to solar sensor terminal - power supply) - Body ground	Ignition switch ON	0 V



NG → **Repair or replace solar sensor power supply wire harness**

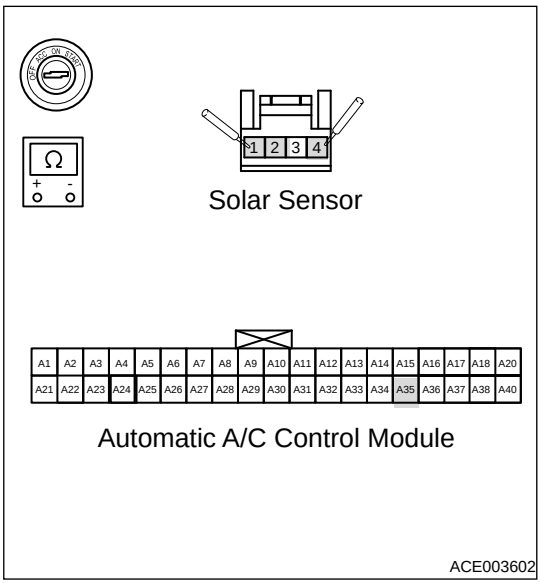
OK

4	Check resistance between solar sensor and A/C control module

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to terminal) - solar sensor (4)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - solar sensor (2)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - solar sensor (1)	Ignition switch OFF	⩽ 1 Ω



NG → **Repair or replace solar sensor and A/C control module wire harness**

OK

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

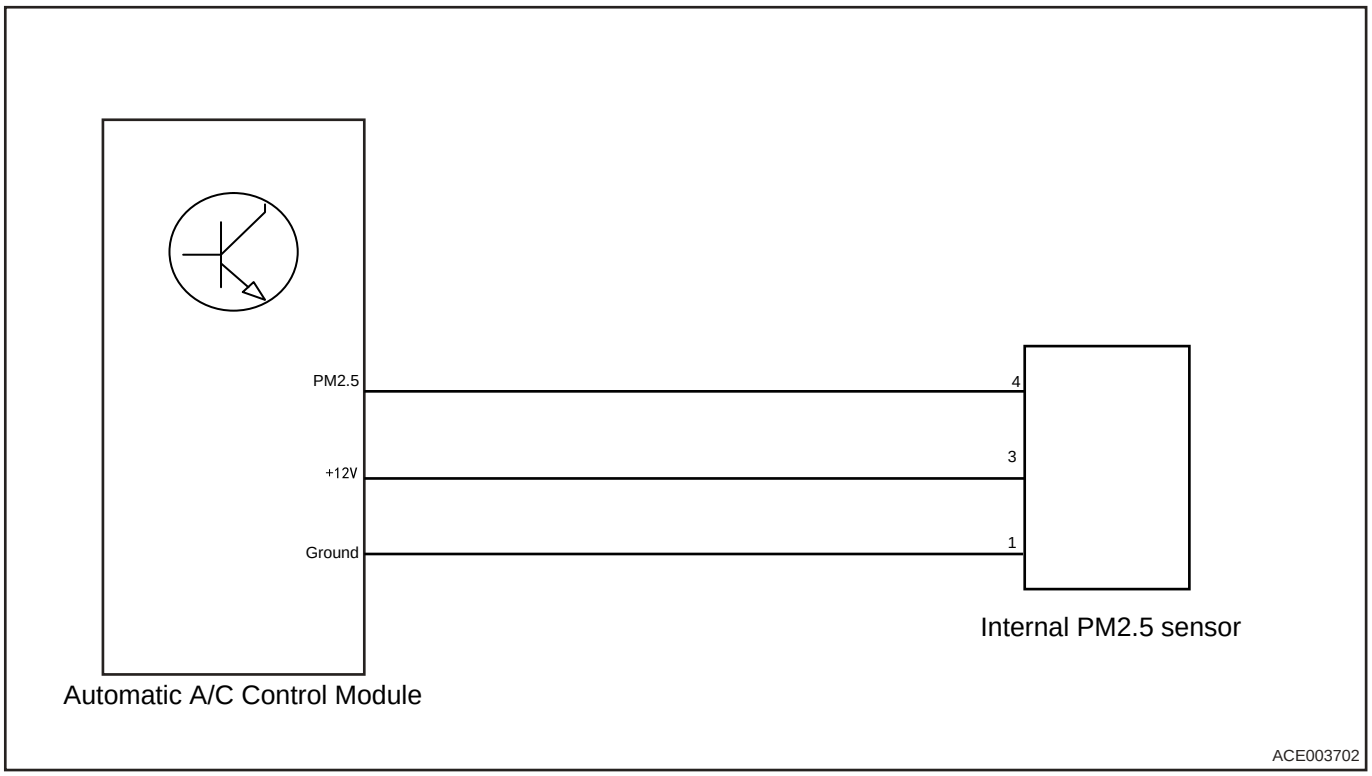
NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1418_11**	**Incar PM2.5 Sensor Malfunction-Sensor Output to Ground**
DTC	**B1418_15**	**Incar PM2.5 Sensor Malfunction-Sensor Power Supply is Shut Off or Open**

Description

Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check incar PM2.5 sensor connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace incar PM2.5 sensor connector**

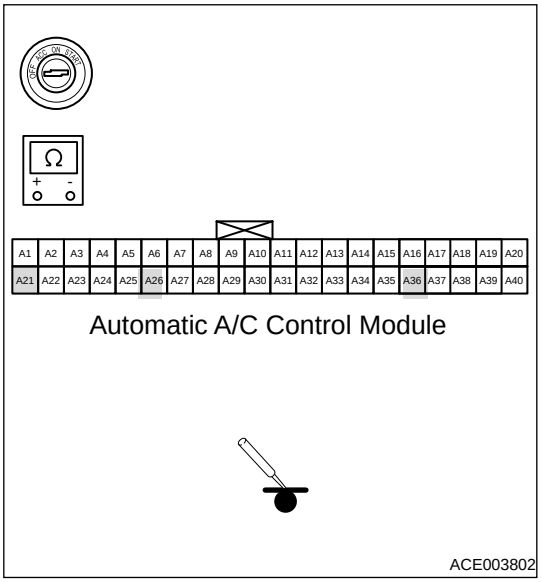
OK

2	**Check resistance between incar PM2.5 sensor and ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to incar PM2.5 sensor-signal) - Body ground	Ignition switch OFF	∞
A/C control module (to incar PM2.5 sensor - power supply) - Body ground	Ignition switch OFF	∞
A/C control module (to incar PM2.5 sensor - ground) - Body ground	Ignition switch OFF	0



NG → **Repair or replace incar PM2.5 sensor ground wire harness**

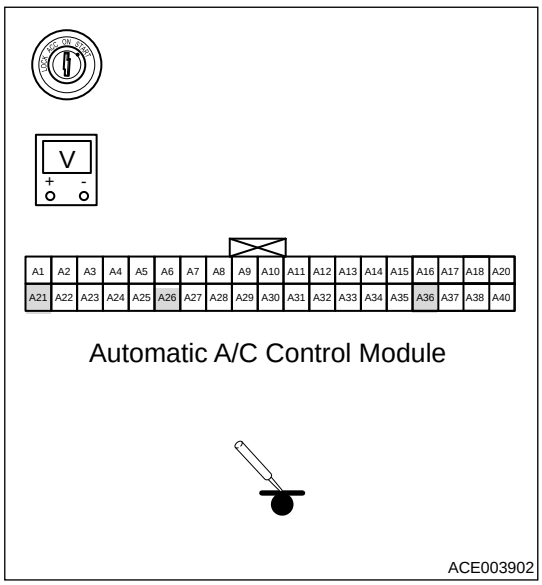
OK →

3	**Check voltage between incar PM2.5 sensor and power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to incar PM2.5 sensor-signal) - Body ground	Ignition switch ON	0 V
A/C control module (to incar PM2.5 sensor - power supply) - Body ground	Ignition switch ON	0 V
A/C control module (to incar PM2.5 sensor - ground) - Body ground	Ignition switch ON	0 V



NG → **Repair or replace incar PM2.5 sensor power supply wire harness**

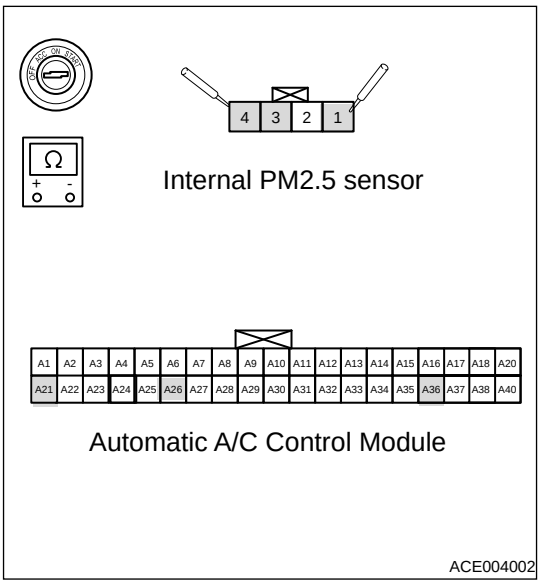
OK

4	Check resistance between incar PM2.5 sensor and A/C control module

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to terminal) - Incar PM2.5 sensor (4)	Ignition switch OFF	⩽ 1 Ω
A/C control module (36) - Incar PM2.5 sensor (1)	Ignition switch OFF	⩽ 1 Ω
A/C control module (21) - Incar PM2.5 sensor (3)	Ignition switch OFF	⩽ 1 Ω



NG → **Repair or replace incar PM2.5 sensor and A/C control module wire harness**

OK

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

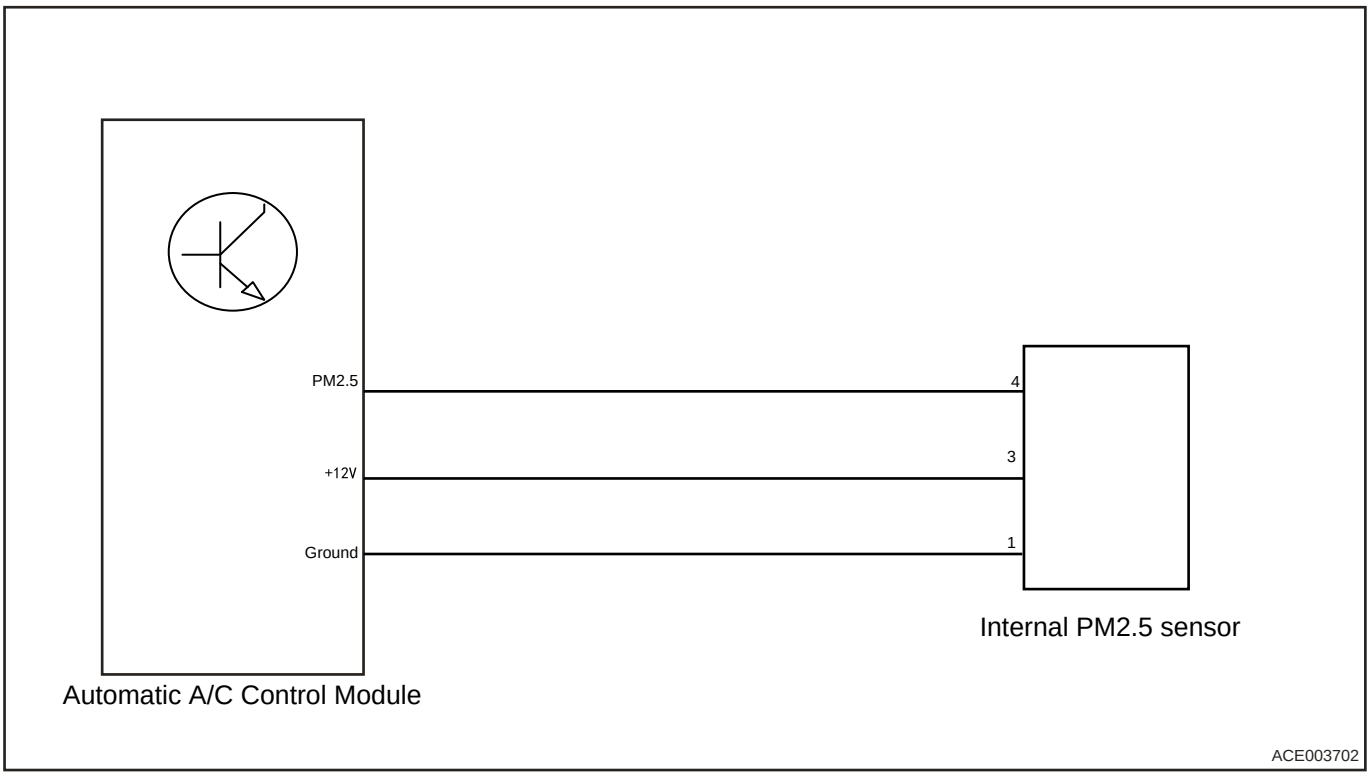
NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B141A_11**	**Outcar PM2.5 Sensor-Circuit Short to Ground**
DTC	**B141A_15**	**Outcar PM2.5 Sensor-Circuit Power Supply is Shut Off or Open**

Description

Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check outcar PM2.5 sensor connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace outcar PM2.5 sensor connector**

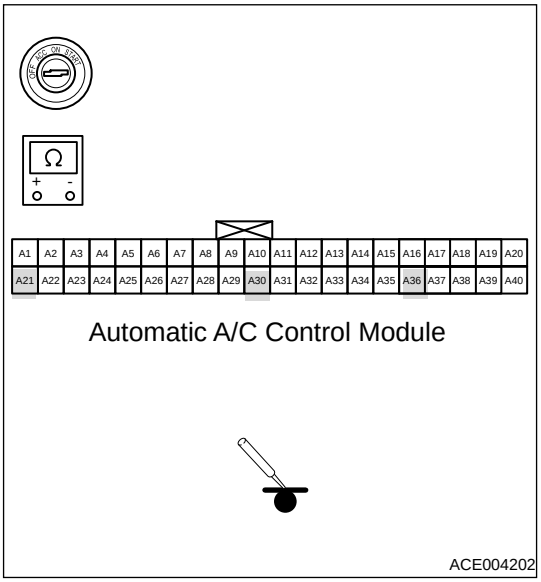
OK

2	**Check resistance between outcar PM2.5 sensor and ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to outcar PM2.5 sensor- signal terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to outcar PM2.5 sensor - power supply terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to outcar PM2.5 sensor - ground terminal) - Body ground	Ignition switch OFF	0



NG → **Repair or replace outcar PM2.5 sensor ground wire harness**

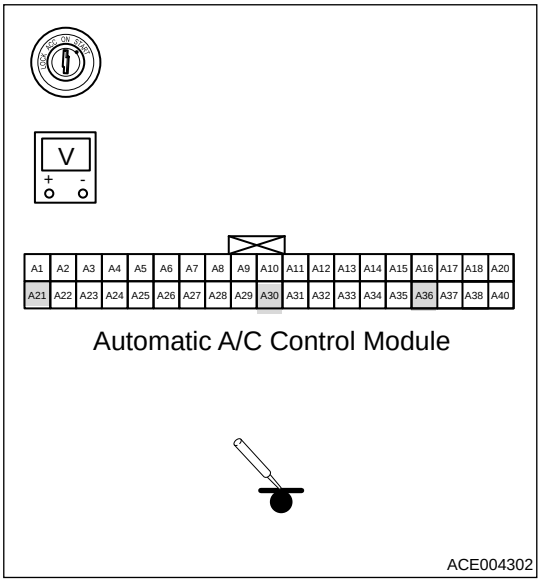
OK →

3	**Check voltage between outcar PM2.5 sensor and power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to outcar PM2.5 sensor- signal terminal) - Body ground	Ignition switch ON	0 V
A/C control module (to outcar PM2.5 sensor - power supply terminal) - Body ground	Ignition switch ON	0 V
A/C control module (to outcar PM2.5 sensor - ground terminal) - Body ground	Ignition switch ON	0 V



NG → **Repair or replace outcar PM2.5 sensor power supply wire harness**

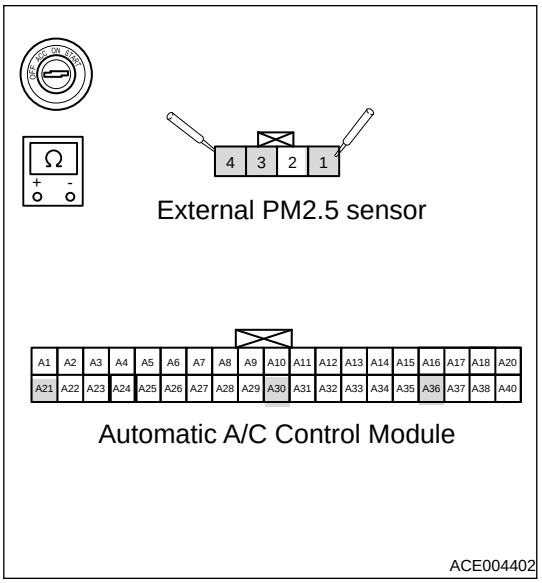
OK →

4	**Check resistance between outcar PM2.5 sensor and A/C control module**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to terminal) - Outcar PM2.5 sensor (4)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - Outcar PM2.5 sensor (1)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - Outcar PM2.5 sensor (3)	Ignition switch OFF	⩽ 1 Ω



NG → **Repair or replace incar PM2.5 sensor and A/C control module wire harness**

OK

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

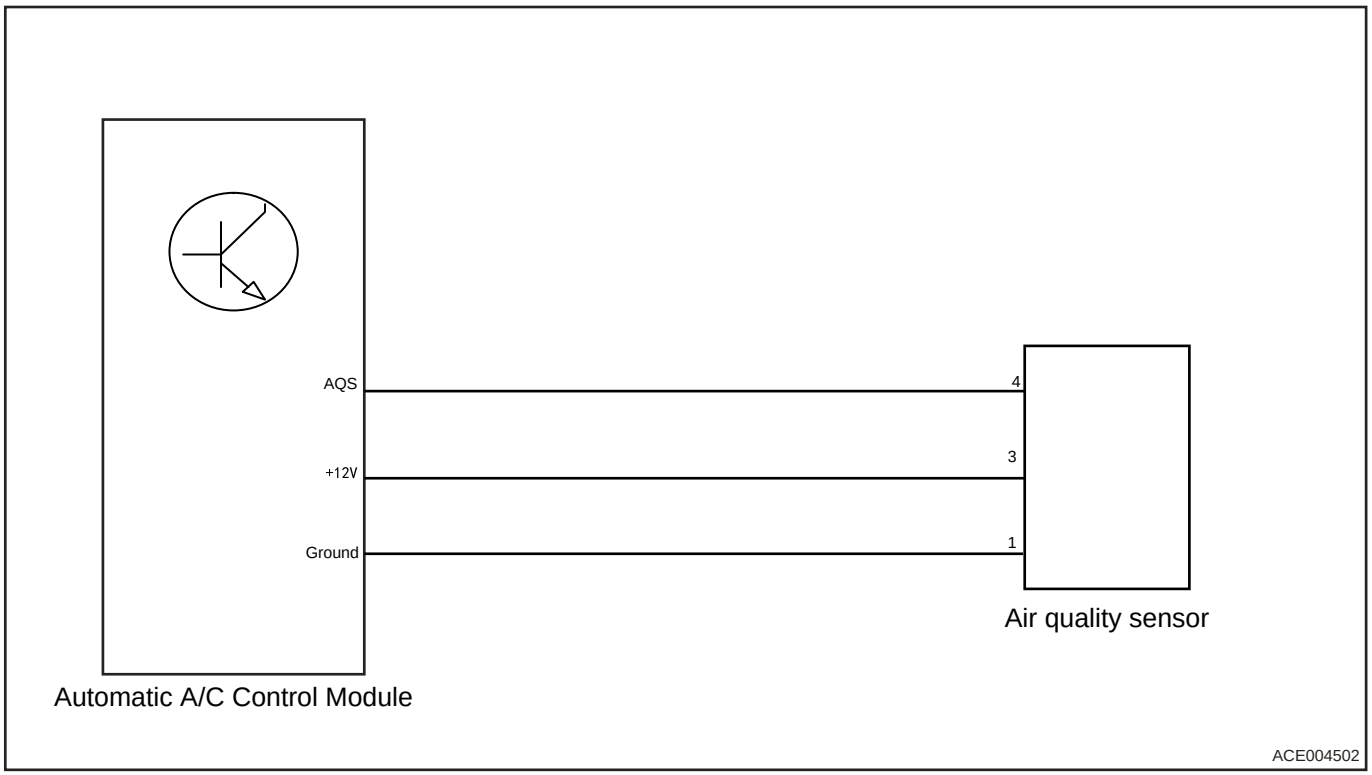
NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1419_11**	**AQS Sensor Circuit Short to Ground**
DTC	**B1419_15**	**AQS Sensor Circuit Short to Battery or Open**
DTC	**B1419_09**	**AQS Sensor Component Failure**

Description

Control Schematic Diagram



DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).

- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check air quality sensor connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

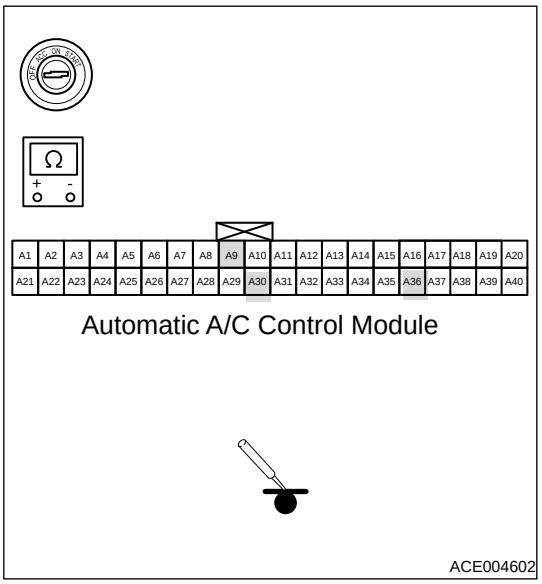
NG → **Repair or replace air quality sensor connector**

OK

2	**Check resistance between air quality sensor and ground**

(a) Turn ENGINE START STOP switch to OFF.
(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to air quality sensor - signal terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to air quality sensor - power supply terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to air quality sensor - ground terminal) - Body ground	Ignition switch OFF	0



NG → **Repair or replace air quality sensor ground wire harness**

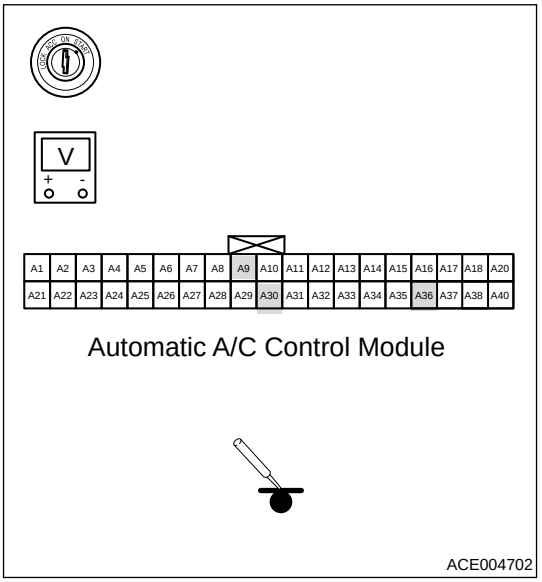
OK

3	**Check voltage between air quality sensor and power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to air quality sensor - signal terminal) - Body ground	Ignition switch ON	0 V
A/C control module (to air quality sensor - power supply terminal) - Body ground	Ignition switch ON	0 V
A/C control module (to air quality sensor - ground terminal) - Body ground	Ignition switch ON	0 V



NG → **Repair or replace air quality sensor power supply wire harness**

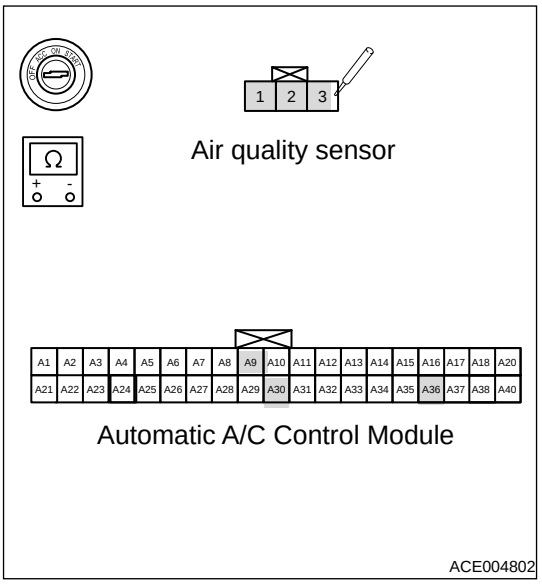
OK →

4	**Check resistance between air quality sensor and A/C control module**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to terminal) - Air quality sensor (3)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - Air quality sensor (1)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - Air quality sensor (2)	Ignition switch OFF	⩽ 1 Ω



NG → **Repair or replace incar PM2.5 sensor and A/C control module wire harness**

OK

5	Reconfirm DTCs

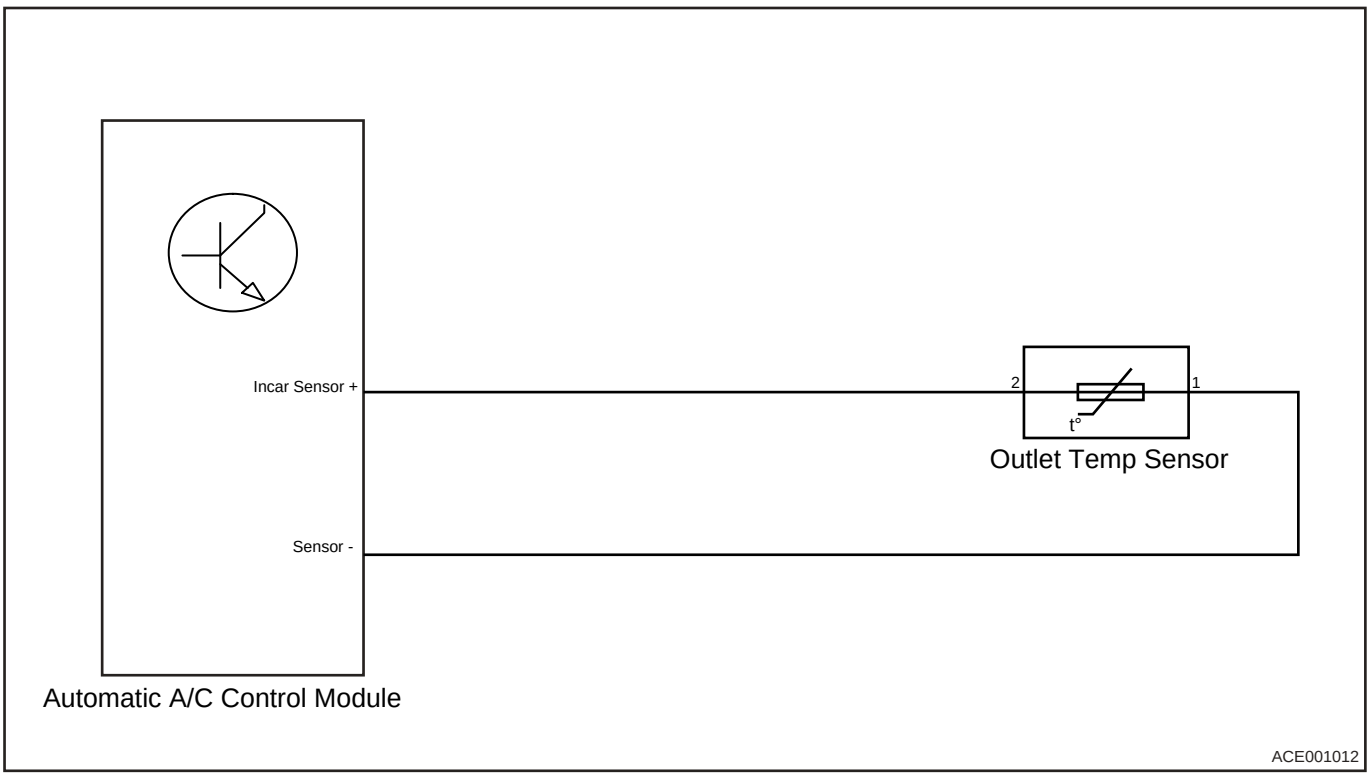
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B141B_11**	**Incar Temperature Sensor Circuit Short to Ground**
DTC	**B141B_12**	**Incar Temperature Sensor Circuit Short to Battery**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check the room temperature sensor connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

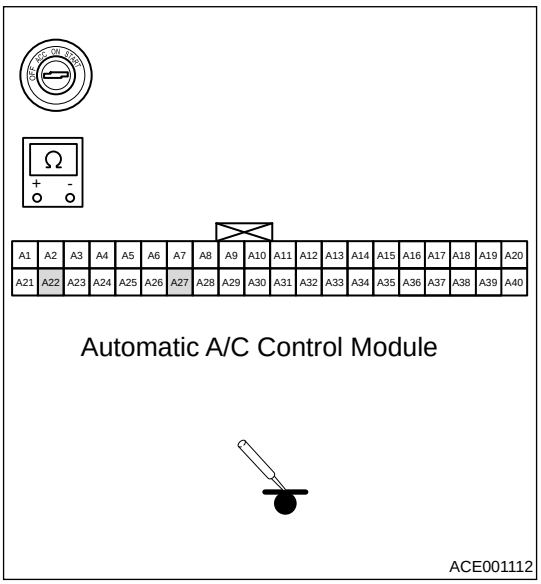
NG → **Repair or replace room temperature sensor connector.**

OK

2	**Check resistance between room temperature sensor and ground**

(a) Turn ENGINE START STOP switch to OFF.
(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to room temperature sensor + terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to room temperature sensor - terminal) - Body ground	Ignition switch OFF	∞



NG → **Repair or replace room temperature sensor ground wire harness.**

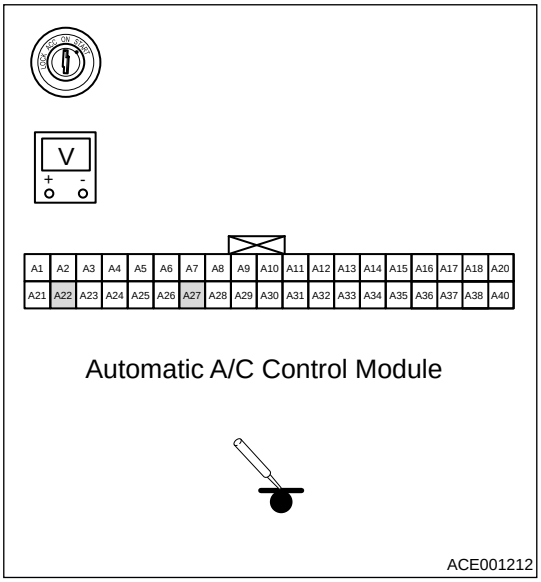
OK

3	**Check voltage between room temperature sensor and power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to room temperature sensor + terminal) - body ground	Ignition switch ON	0 V
A/C control module (to room temperature sensor - terminal) - Body ground	Ignition switch ON	0 V



NG → **Repair or replace room temperature sensor power supply wire harness.**

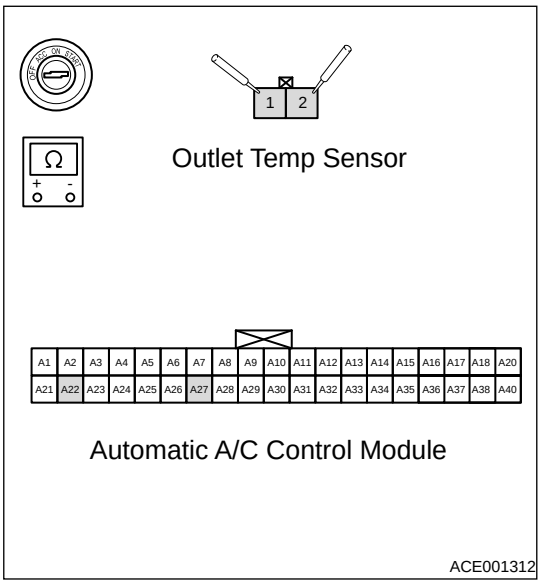
OK

4 Check resistance between room temperature sensor and A/C control module

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to room temperature sensor + terminal) - room temperature sensor (2)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to room temperature sensor - terminal) - room temperature sensor (1)	Ignition switch OFF	⩽ 1 Ω



NG → **Repair or replace room temperature sensor and A/C control module wire harness.**

OK

5	**Reconfirm DTCs**

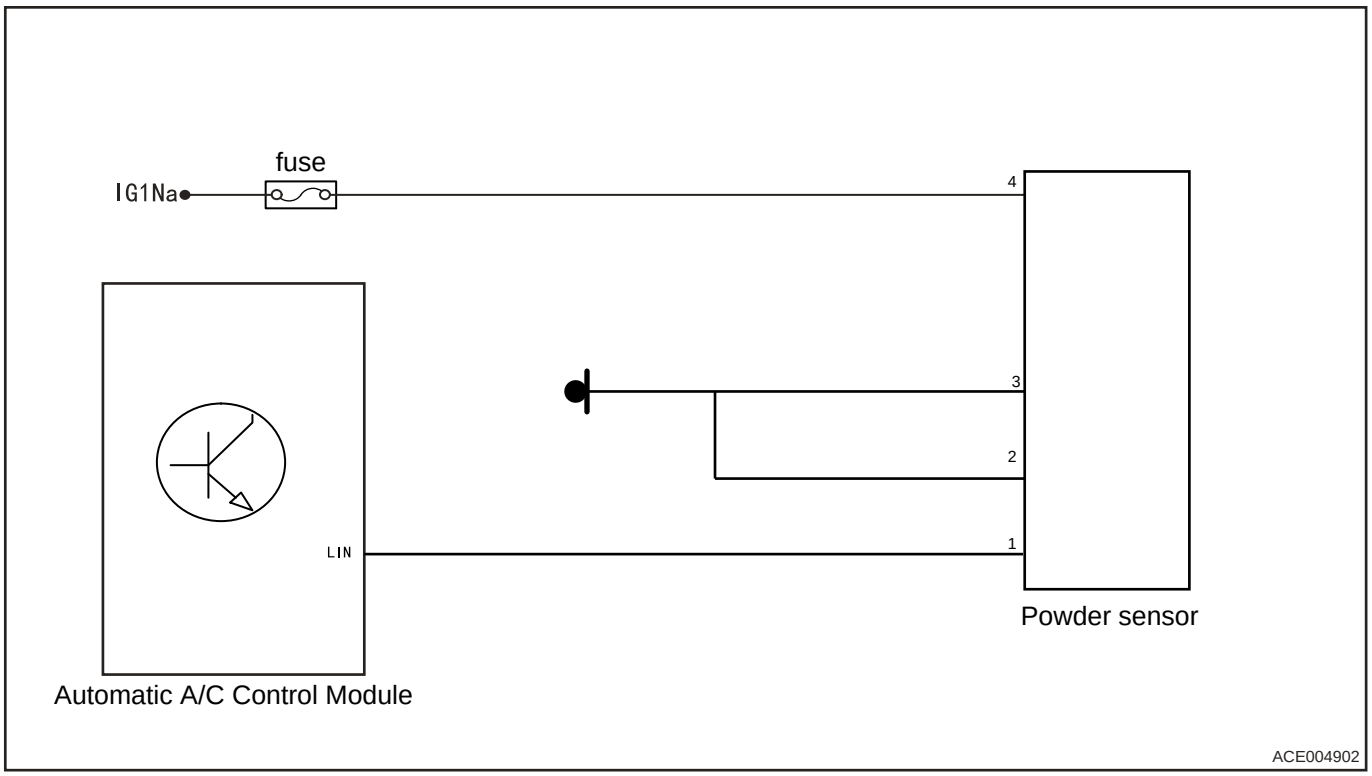
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B141C_01**	**Fragrance Controller Step Motor**
DTC	**B1419_15**	**Fragrance Controller Fan**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fragrance sensor fuse**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check fragrance sensor fuse for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace corresponding fuse**

OK

2	**Check fragrance sensor connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

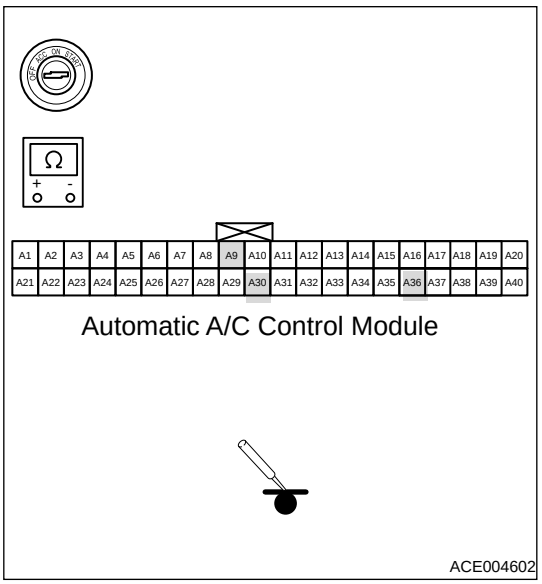
NG → **Repair or replace fragrance sensor connector**

OK

3	**Check resistance between fragrance sensor wire harness and ground**

(a) Turn ENGINE START STOP switch to OFF.
(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to fragrance sensor - signal terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to fragrance sensor - power supply terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to fragrance sensor - ground terminal) - Body ground	Ignition switch OFF	0



NG → **Repair or replace fragrance sensor ground wire harness**

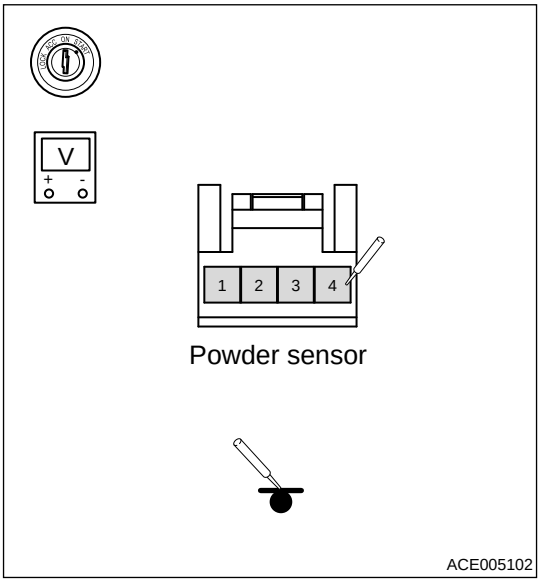
OK

4	**Check voltage between fragrance sensor and power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to fragrance sensor - signal terminal) - Body ground	Ignition switch ON	0 - 11 V
A/C control module (to fragrance sensor - power supply terminal) - Body ground	Ignition switch ON	12 V
A/C control module (to fragrance sensor - ground terminal) - Body ground	Ignition switch ON	0 V



NG → **Repair or replace fragrance sensor power supply wire harness**

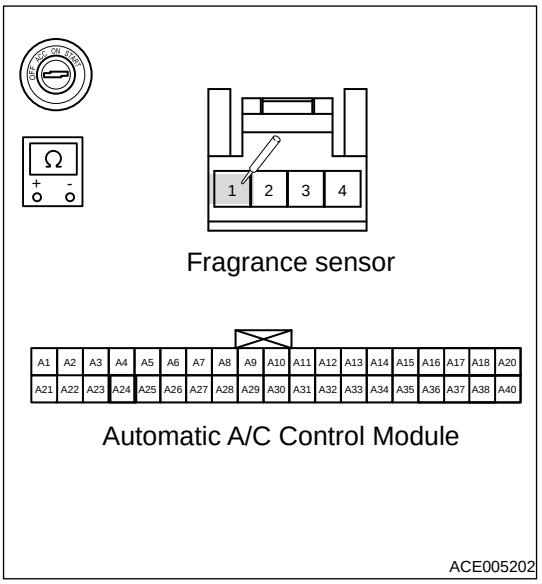
OK →

5	Check resistance between fragrance sensor and A/C control module wire harness

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to terminal) - Fragrance sensor (1)	Ignition switch OFF	⩽ 1 Ω



NG → **Repair or replace fragrance sensor and A/C control module wire harness**

OK

6	Reconfirm DTCs

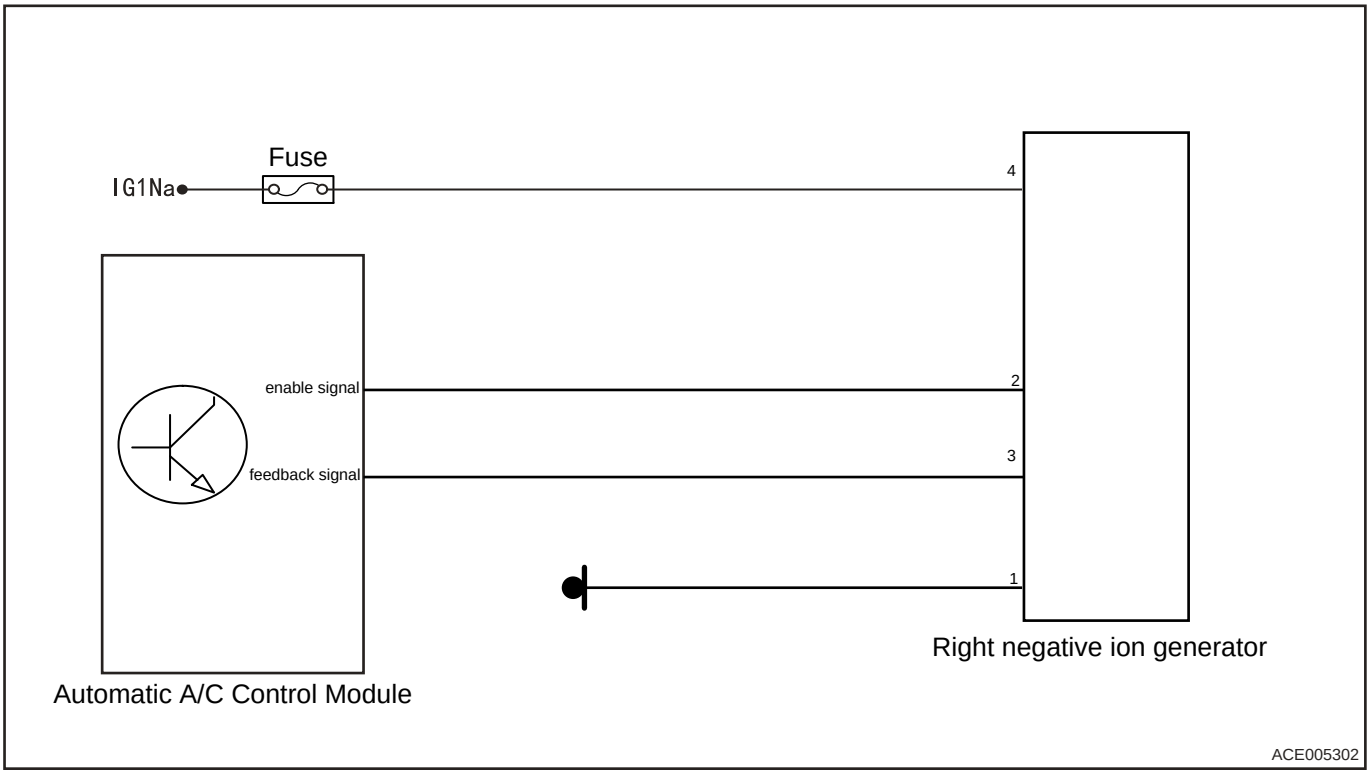
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1417_1C	Right Anion Generator

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check right anion generator fuse**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check right anion generator fuse for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace corresponding fuse**

OK

2	**Check right anion generator connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

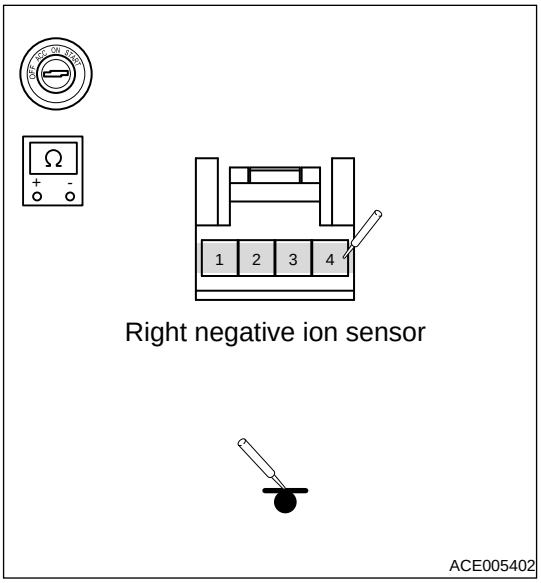
NG → **Repair or replace right anion generator connector**

OK

3	**Check resistance between right anion generator wire harness and ground**

(a) Turn ENGINE START STOP switch to OFF.
(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to right anion generator - signal terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to right anion generator - power supply terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to right anion generator - ground terminal) - Body ground	Ignition switch OFF	0



NG → **Repair or replace right anion generator ground wire harness**

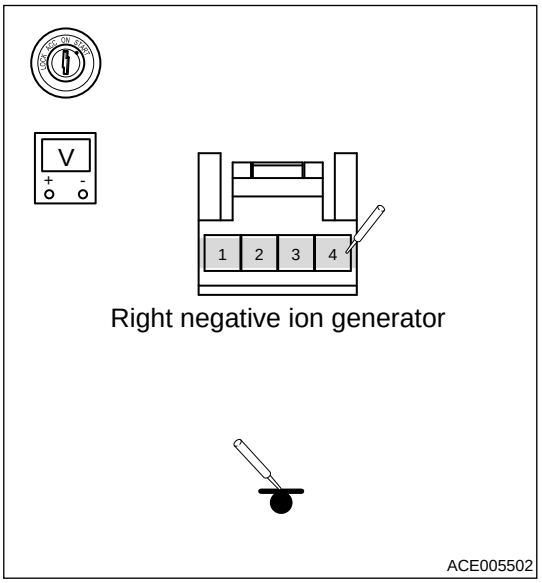
OK

4	Check voltage between right anion generator and power supply

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to right anion generator - signal terminal) - Body ground	Ignition switch ON	0.1 ~ 4.9V
A/C control module (to right anion generator - power supply terminal) - Body ground	Ignition switch ON	12 V
A/C control module (to right anion generator - ground terminal) - Body ground	Ignition switch ON	0 V



NG → **Repair or replace right anion generator power supply wire harness**

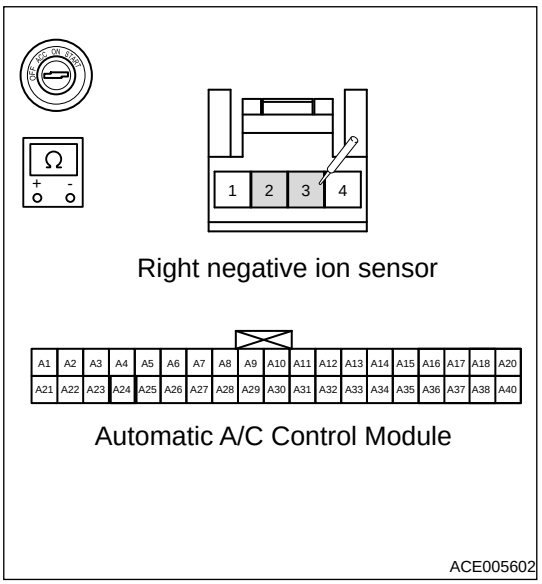
OK →

5	Check resistance between right anion generator and A/C control module wire harness

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to terminal) - Right anion generator (2)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - Right anion generator (3)	Ignition switch OFF	⩽ 1 Ω



NG → **Repair or replace right anion generator and A/C control module wire harness**

OK

6	Reconfirm DTCs

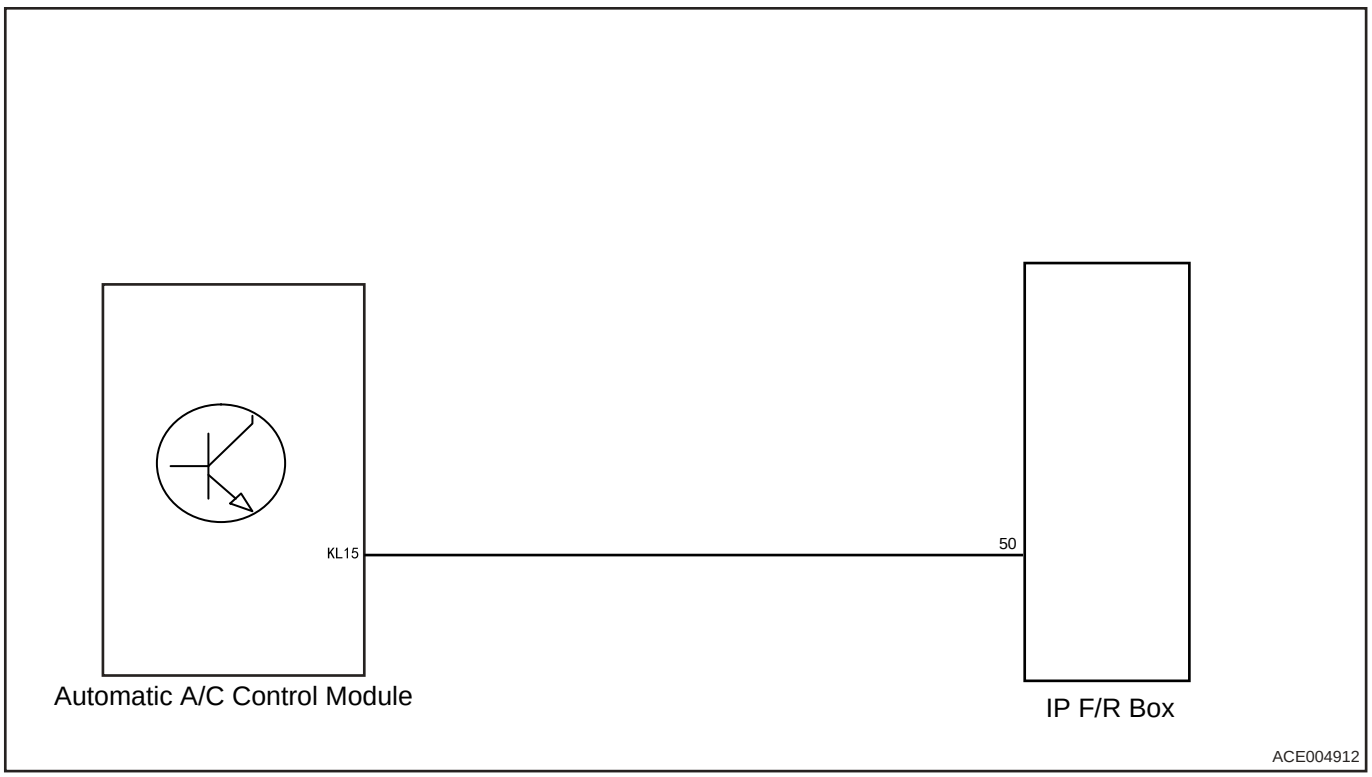
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1BE0_16	Power Supply Undervoltage
DTC	B1BE0_17	Power Supply Overvoltage

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check battery voltage. Standard voltage: 9 - 16 V.

NG → **Check or replace charging system or battery.**

OK ↓

2	**Check the fuse in instrument panel fuse and relay box**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check the fuse in instrument panel fuse and relay box for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace corresponding fuse**

OK ↓

3	**Check A/C controller connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace A/C controller connector.**

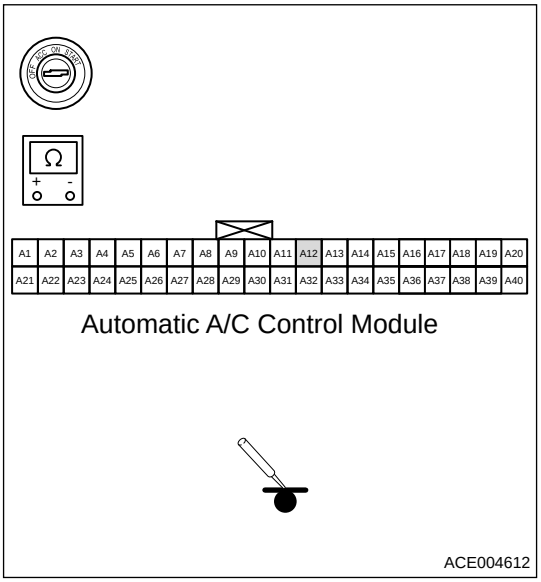
OK ↓

4	**Check resistance between A/C controller wire harness and ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to terminal) - Body ground	Ignition switch OFF	∞



NG → **Repair or replace A/C control module ground wire harness.**

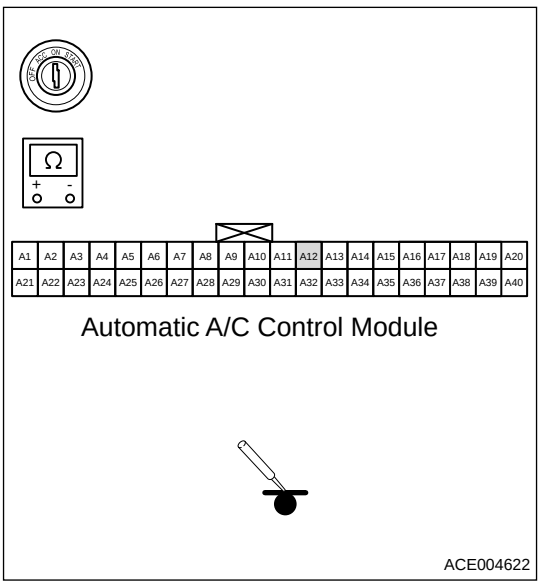
OK ↓

5	**Check voltage between A/C controller and power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to power supply terminal) - Body ground	Ignition switch ON	12 V



NG → **Repair or replace A/C controller power supply wire harness.**

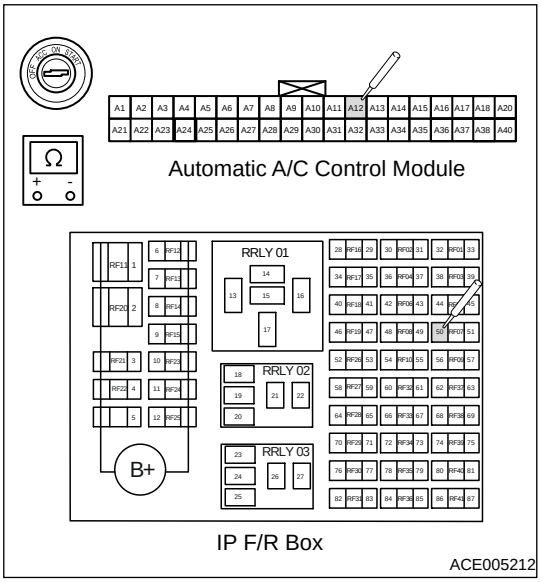
OK ↓

6	**Check resistance between A/C controller and instrument panel fuse and relay box wire harness**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to terminal) - Instrument panel fuse and relay box (50)	Ignition switch OFF	⩽ 1 Ω



NG → **Repair or replace instrument panel fuse and relay box and A/C control module wire harness.**

OK →

7	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

Network fault

1	**Refer to "CAN network system" for troubleshooting.**

A/C COOLING

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. Take extra care when servicing A/C system under high pressure.
2. Because there is refrigerant under high pressure in A/C system. It must be serviced by professional technician. Otherwise, a wrong service procedure may cause a serious danger or fatal injury.
3. If A/C system pressure is released unexpectedly, ventilate work area before servicing. In a closed work place, if a large amount of refrigerant is discharged, it may cause oxygen reduction and result in smothering, causing a serious or fatal injury.
4. Never drain refrigerant in A/C system into the atmosphere directly, and avoid environmental contamination.

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

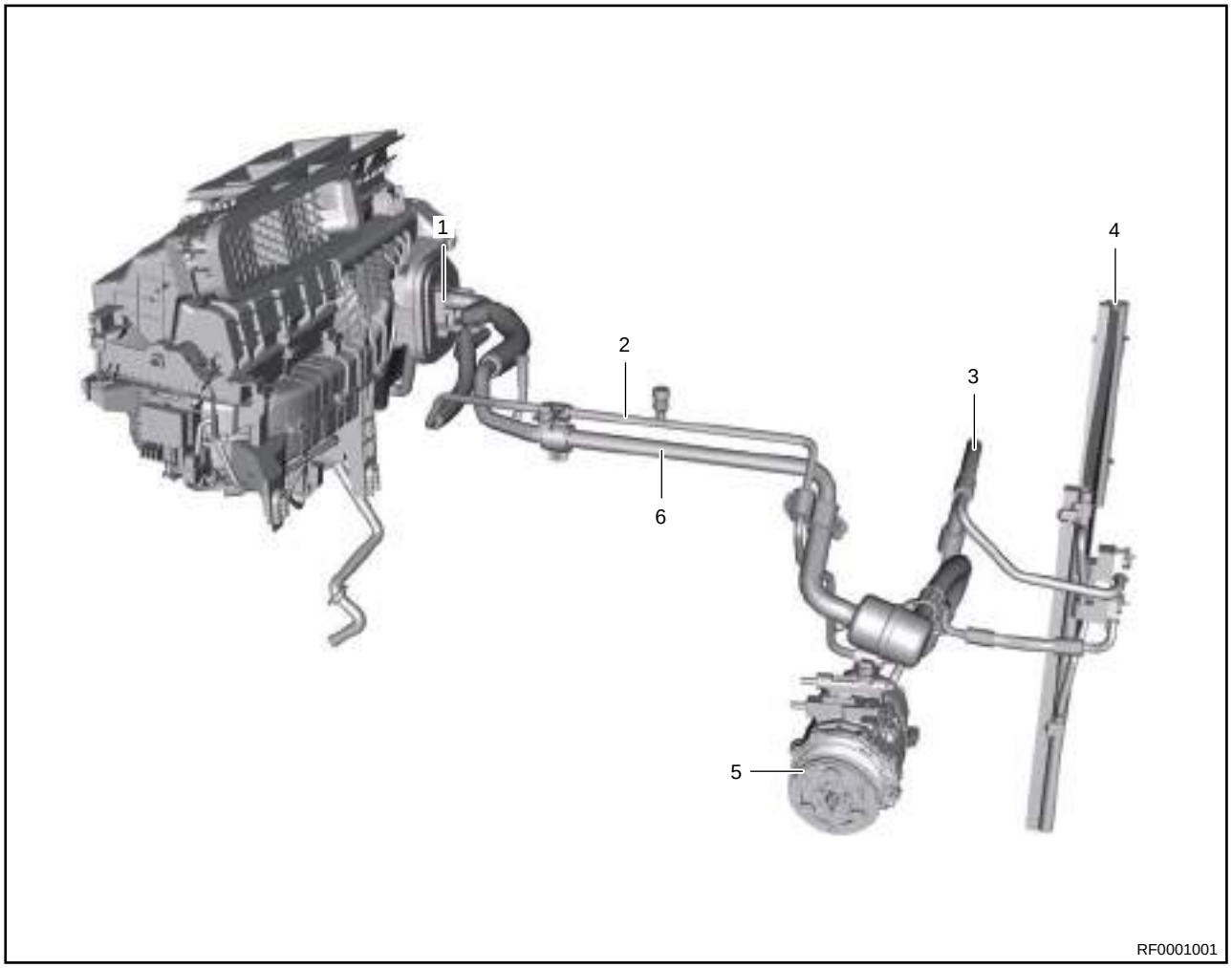
1. Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant.
2. Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

System Overview

System Description

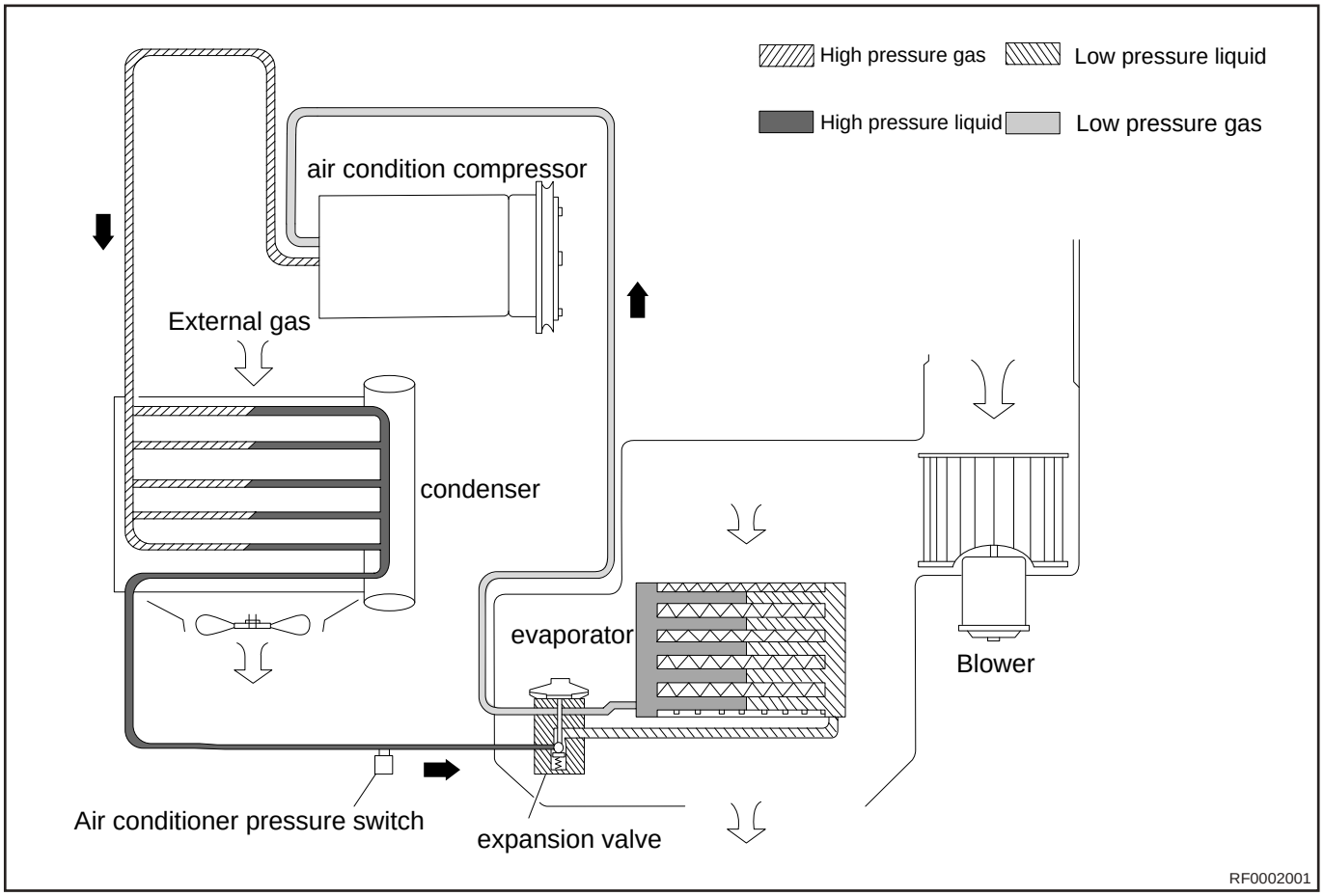
A/C system of this model is integrated cold and warm air conditioning, which adopts external control variable displacement compressor and expansion valve control method, and uses environment-friendly refrigerant R134a Refrigerant / R1234yf (European Union). This system consists of compressor, condenser, HVAC, line, AIPM (front A/C control panel), CLM (A/C control module) and other accessories including pressure switch, O-ring, etc.

System Components Diagram



1	Evaporator Assembly	4	Condenser Assembly (w/ Receiver Drier)
2	Evaporator - Condenser Line Assembly	5	A/C Compressor Assembly
3	Compressor - Condenser Line Assembly	6	Evaporator - Compressor Line Assembly

System Schematic Diagram



A/C cooling system of vehicle is mainly composed of compressor, expansion valve, condenser, evaporator and blower. The various components are connected by high pressure rubber pipes and steel pipes to form a closed system. When the refrigeration system is operating, the refrigerant circulates in this space in different states. And this cycle is divided into four processes:

1. Compression process: The compressor sucks the low temperature/pressure refrigerant gas at the outlet of evaporator, then compresses it to high temperature/pressure gas and discharges it from compressor.
2. Cooling process: High temperature/pressure superheated refrigerant gas enters the condenser. Due to the decrease in pressure and temperature, the refrigerant gas condenses into liquid and discharges a large amount of heat.
3. Throttling process: The refrigerant liquid with higher temperature and pressure becomes larger after passing through the expansion device, the pressure and temperature drop sharply, and it is discharged from expansion device with mist (small droplets).
4. Heat absorption process: The mist refrigerant liquid enters the evaporator. At this time, the boiling point of the refrigerant is much lower than the temperature in the evaporator, so the refrigerant liquid evaporates into gas. In the evaporation process, a large amount of surrounding heat is absorbed, and then the low temperature/pressure refrigerant vapor enters the compressor again. The above process is operated cyclically, so as to achieve the purpose of reducing the air temperature around the evaporator.

Component Operation Description

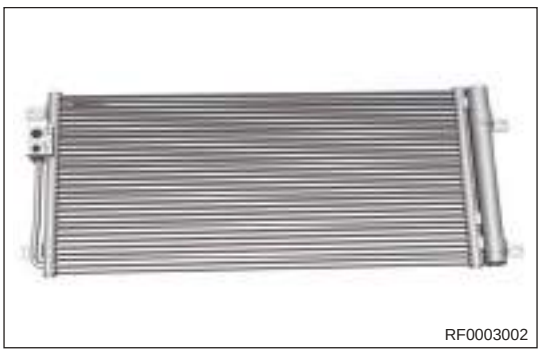
A/C Compressor

Compressor is an important element of refrigeration system. It compresses the low temperature/pressure refrigerant vapor from evaporator and makes it become high temperature/pressure refrigerant vapor. This model uses a variable capacity compressor. When refrigeration system is operating, the electromagnetic clutch of variable capacity compressor is always in the engaged status. It can change the piston displacement continuously and steadily within a certain range by external control valve according to the change of refrigeration load and engine speed, so as to realize the regulation of system flow.


RF0002002

Condenser

Condenser contains desiccant that is used to remove water from the refrigerant in line. Compressor compresses the refrigerant into high temperature/pressure refrigerant gas, which is then discharged into the condenser, in which heat is released to the cooling medium air and condensed into high pressure liquid.


RF0003002

A/C Pressure Sensor

A/C pressure sensor is installed on high pressure pipe and used to monitor the refrigerant pressure and output the refrigerant pressure signal to ECM. ECM controls compressor based on the signal transmitted from A/C pressure sensor.


RF0004002

Solar Sensor

Solar sensor is installed on instrument panel and used to detect light intensity in the area where the vehicle is located and control the automatic mode of air conditioning.


RF0005002

Outside Temperature Sensor

Outside temperature sensor is installed at lower left of front impact beam and used to detect the outside temperature and control the automatic mode of air conditioning. The sensor sends signal to automatic A/C module. The resistance of outside temperature sensor changes with the change of ambient temperature. Resistance increases as temperature decreases. Resistance decreases as temperature increases.


RF0006002

Anion Generator (If Equipped)

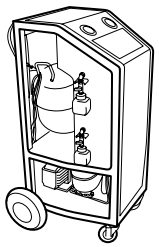
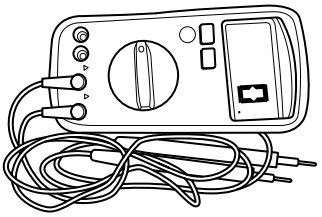
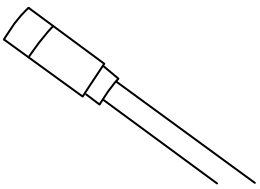
Anion generator is installed on blower air duct. The anion generator boosts the low voltage into positive high voltage and negative high voltage by booster circuit, and ionizes the air under the action of positive high voltage electric field and negative high voltage electric field to generate a large number of positive and negative ions.

Hint:
The connector of negative ion generator must be disconnected when cleaning the air conditioning line after sale to avoid fire.


RF0006102

On-vehicle Service

Tools

Tool Name	Tool Drawing
Refrigerant Recycling Machine	 RCH004606
Digital Multimeter	 RCH000206
Gas Leak Detector	 RCH009206

Specifications

Torque Specifications

Description	Torque (N · m)
A/C High/Low Pressure Line Clamp Fixing Bolt	9 ± 1
Expansion Valve Fixing Bolt	9 ± 1
Evaporator - Compressor Line Fixing Bolt	9 ± 1
Compressor Line Fixing Bolt	25 ± 3
Condenser - Evaporator Line Fixing Nut	9 ± 1
A/C High Pressure Line Clamp Fixing Bolt	9 ± 1
Compressor - Condenser Line Fixing Nut	9 ± 1

Description	Torque (N · m)
Compressor Fixing Bolt	22.5 ± 2.5
Condenser Assembly Fixing Bolt	5 ± 1

Refrigerant Charging Specification

Type	Charging Capacity
R134a Refrigerant/R1234yf (European Union)	550 ± 15g

Refrigerant Oil Charging Specifications

Description	Charging Capacity
Evaporator Replacement	30ml
Compressor Assembly Replacement	Supplement according to actual pouring amount
Condenser Replacement	30ml
A/C Line Replacement	10ml

Newly installed air conditioning system does not need to be recharged. Recharge when repairing a part or after driving a certain distance. The reference quantity is: Evaporator: TBDg, Condenser: TBDg, Pipe: TBDg, compressor oil is refilled according to the actual amount of oil poured out.

On-vehicle Inspection

Hint:
A/C refrigerant lines and hoses are used to transfer refrigerant among A/C system components. Any twist or bend in refrigerant lines and hoses will reduce performance of A/C system and refrigerant flow in system.
There remains high pressure in refrigerant when A/C compressor assembly is operating. It is necessary to ensure that each connecting part in A/C system is sealed well. Check all system lines at least once a year to ensure that they are in good condition and properly routed. Refrigerant lines and hoses cannot be repaired and must be replaced if leakage or damage exists.

1. General inspection
    a. Check if there exists any oil or dust in each joint of A/C line. If this occurs, there may exist leak.
    b. Check if condenser surface is dirty and if fins are deformed.
    c. Check if there are harsh noises while compressor assembly is operating normally.
    d. Temperature difference should be noticeable by touching intake line and exhaust line of compressor assembly with hand. Normally, temperature of low pressure line is relatively low and that of high pressure line is relatively hot. Feel the temperature difference between condenser inlet pipe and outlet pipe, under normal conditions, temperature of inlet pipe is higher than that of outlet pipe. If you feel the temperature difference between expansion valve inlet and outlet line with hand, under normal conditions, temperature of expansion valve inlet line is relatively hot and that of outlet line is relatively cool, and the temperature difference between them is noticeable.
2. Using pressure gauge set, check the refrigerant pressure.
    Connect the manifold pressure gauge set. After following conditions are met, read pressure values on pressure gauge. Measurement Condition:
    - Inner/outer circulation switch is in outer circulation position.
    - Engine runs at approximately 2,000 rpm.
    - Adjust temperature knob to Max. Cool.
    - Set blower speed control switch to highest band.
    - Turn on A/C switch.

Observe the pressure value on the pressure gauge.

Compressor Assembly Noise Inspection

When checking noise related to A/C system, you must first know the conditions under which the noise occurs. These conditions include: weather, vehicle speed, engine speed, engine temperature and any other special conditions. Loud noises during A/C operation can often mislead someone. For example, some sounds, like a failed bearing, may be caused by loose bolts, mounting brackets or a loose compressor assembly.

⚠ Warning

- A/C compressor assembly must be replaced if any abnormal noise is heard from compressor assembly.
- Noise may occur from drive belt at different engine speeds, and you may mistake it for a noise from A/C compressor assembly.

1. Select a quiet place for testing.
2. Duplicate customer's feedback information as much as possible.
3. Turn on and off A/C several times to identify compressor assembly noise clearly.
4. Check the condition of compressor assembly belt.
5. Check the hub, pulley, bearing assembly of compressor assembly. Make sure that hub and pulley are aligned correctly, and pulley bearing is securely installed to A/C compressor assembly.
6. Check if refrigerant line routes incorrectly, and if it is damaged or has an interference that could result in an abnormal noise. Also, check the refrigerant line for twist or bend, otherwise the refrigerant will be limited to flow, which will cause a noise.
7. Loosen all compressor assembly tightening bolts and retighten them.
8. If noise occurs when liquid refrigerant in A/C suction line is under a slugging condition, replace the condenser and check refrigerant oil level and charging condition for refrigerant.
9. If the slugging condition still exists after replacing condenser, replace the A/C compressor assembly.

⚠ Caution

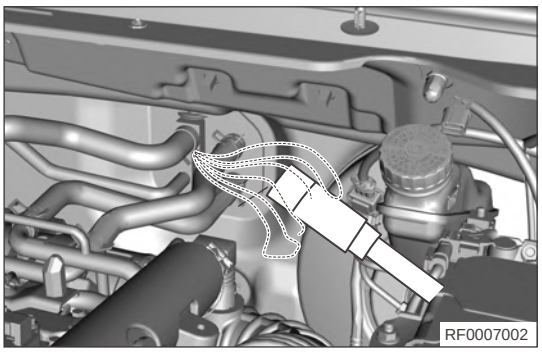
DO NOT race engine when vacuum pump operates or vacuum exists in A/C system. Otherwise, A/C compressor assembly will be damaged seriously.

Refrigerant Leakage Inspection

⚠ Warning

- DO NOT perform pressure test or leakage test to R134a Refrigerant/R1234yf (European Union) service device or vehicle A/C system with compressed air. Mixture of air and R134a Refrigerant/ R1234yf (European Union) is inflammable under high pressure. This mixture has potential danger, and it may cause a fire or explosion, resulting in vehicle damage, personal injury or death.
- Avoid inhaling vapor or moisture from the A/C refrigerant and refrigerant oil.
- Only use special service device to discharge R134a Refrigerant/R1234yf (European Union) system. If system discharges unexpectedly, ventilate work place before servicing.
- If A/C refrigerant filling amount is empty or low, A/C system may have leak. Check all A/C lines, joints and parts for remaining oil. The remaining oil is indication mark of A/C system leaking position.

1. Check refrigerant for leakage
   a. After recharging refrigerant, use gas leak detector to check refrigerant gas for leakage.
   b. Perform operations under following conditions:
      - Stop the engine.
      - Ensure the ventilation is well (gas leak detector may react to volatile gases which are not from refrigerant, such as gasoline vapor or exhaust gas).
      - Repeat the test for 2 or 3 times.
      - Make sure that there is some refrigerant remaining in the refrigeration system.



   c. Place gas leak detector near the joint of A/C line, and check the A/C line for leakage. If gas leak detector makes a sound, it indicates that a leakage exists. Repair or replace the leakage A/C line as necessary.
   d. Disconnect A/C pressure switch connector, and use same procedures to check A/C pressure switch for leakage. Replace the A/C pressure switch as necessary.
   e. Insert gas leak detector into evaporator tank assembly, and use same procedures to check evaporator for leakage. Clean or replace the evaporator core assembly as necessary.
   f. Use same procedures to check condenser for leakage. Clean or replace the condenser assembly as necessary.

Refrigerant Recovering, Vacuum Pumping and Recharging

Refrigerant Recovering/Draining

⚠ Warning

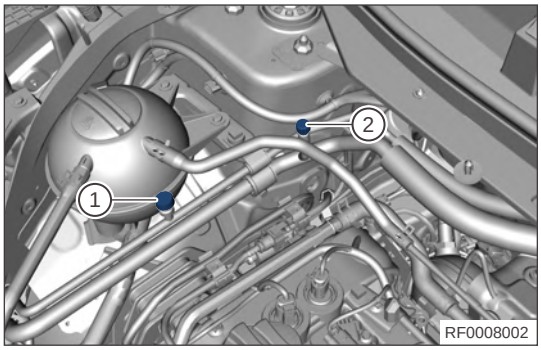
- Take extra care when servicing A/C system under high pressure.
- Because there is refrigerant under high pressure in A/C system. It must be serviced by professional technician. Otherwise, a wrong service procedure may cause a serious danger or fatal injury.
- If A/C system pressure is released unexpectedly, ventilate work area before servicing. In a closed work place, if a large amount of refrigerant is discharged, it may cause oxygen reduction and result in smothering, causing a serious or fatal injury.
- Never drain refrigerant in A/C system into the atmosphere directly, and avoid environmental contamination.

⚠ Caution

- R134a Refrigerant/R1234yf (European Union) special recycling device must be used to recover refrigerant.
- DO NOT work near open flames.
- Always dispose of recovered refrigerant as specified.
- Never charge R-12 to refrigerant system which is designed to use R134a Refrigerant/R1234yf (-European Union). This refrigerant is incompatible, which could damage the A/C system.
- DO NOT race engine when vacuum pump operates or vacuum exists in A/C system. Otherwise, A/C compressor assembly will be damaged seriously.

1. Open the engine hood and loosen the joint cover of A/C high/low pressure line.

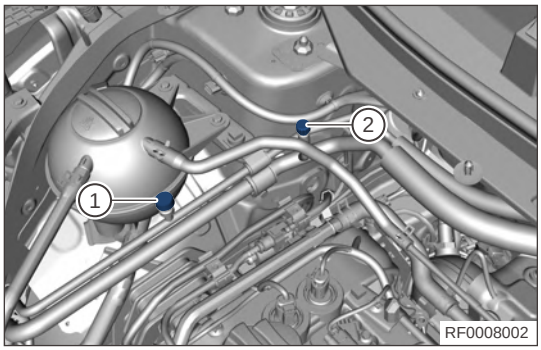
2. Connect the refrigerant recycling machine to A/C high/low pressure line joint.
   a. Connect the blue connector to A/C low pressure line joint (1).
   b. Connect the red connector to A/C high pressure line joint (2).



3. Open the high pressure valve and low pressure valve of refrigerant recycling machine.
4. Choose "recovering" item on machine and make it start to operate.
5. Check the low pressure value on pressure gauge to ensure that recycling is completed, and then turn off machine.
6. Disconnect the connection between refrigerant recycling machine and A/C line joint.
7. Reinstall the cover onto refrigerant line joint.

Vacuum Pumping

1. Open the engine hood and loosen the joint cover of A/C high/low pressure line.
2. Connect the refrigerant recycling machine to A/C high/low pressure line joint.
   a. Connect the blue connector to A/C low pressure line joint (1).
   b. Connect the red connector to A/C high pressure line joint (2).



3. Open the high pressure valve and low pressure valve of refrigerant recycling machine.
4. Choose "vacuum pumping" item on machine and the time setting is 15 minutes, then choose OK and make it start to operate.
5. Wait for 10 minutes after completing operation, check if there is any change in A/C system vacuum. If there is any change, the A/C system leakage may exist, you should check and repair the A/C system. If there is no change, proceed to perform refrigerant charging procedures.

Refrigerant Recharging

⚠ Caution

- A small amount of refrigerant oil in A/C system will be discharged when recovering and draining refrigerant. When filling A/C system, be sure to supplement refrigerant oil, as some amount of refrigerant oil are lost during recovering.
- DO NOT fill excessive refrigerant. Otherwise, it will cause excessive pressure to compressor assembly, resulting in compressor assembly noise and A/C system failure.
- Always perform vacuum pumping before recharging refrigerant.

1. Perform vacuum pumping with a vacuum pump.
2. Add refrigerant oil after checking that there is no leakage in A/C system.
3. Perform vacuum pumping for 3 minutes again after adding refrigerant oil, then charge refrigerant.

4. Choose "charging" item on machine and set the amount of charging to specified value, then choose "OK" and make it start to operate.
5. Open the suction valve and close the discharging valve, and then open the charging valve to allow refrigerant to flow into the system.
6. When the delivery of refrigerant has stopped, close the charging valve.
7. If charged refrigerant is not delivered to specified position, start the engine to operate the A/C compressor assembly.
8. Open the charging valve to deliver the remaining refrigerant to A/C system.

⚠ Warning

At this time, do not open exhaust (high pressure) valve. Failure to do so may result in personal injury or even death.

9. Perform A/C system pressure test after charging.
10. Remove the connecting pipe for refrigerant charging after the test is completed.
11. Reinstall the cover onto A/C line joint.

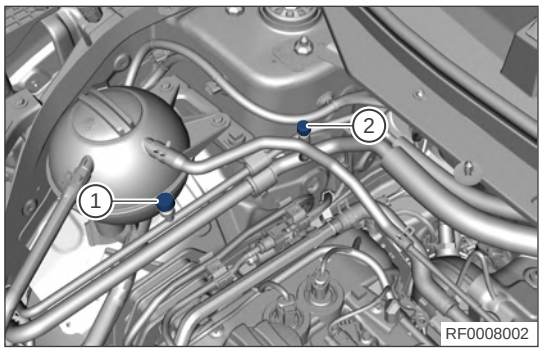
Refrigerant Oil Recovering and Charging

Refrigerant Oil Recovering

⚠ Caution

- Special service device for R134a Refrigerant/R1234yf (European Union) must be used.
- Always keep work area in good ventilation, because A/C system is easy to leak.
- Always dispose of recovered refrigerant as specified.
- Refrigerant oil must be charged after replacing A/C system components or recovering refrigerant.

1. Open the engine hood and loosen the joint cover of A/C high/low pressure line.
2. Connect the refrigerant recycling machine to A/C high/low pressure line joint.
   a. Connect the blue connector to A/C low pressure line joint (1).
   b. Connect the red connector to A/C high pressure line joint (2).



3. Open the high pressure valve and low pressure valve of refrigerant recycling machine.
4. Recover refrigerant oil according to instructions on the machine.
5. Record amount of recovered refrigerant oil.
6. Disconnect the connection between refrigerant recycling machine and A/C line joint.
7. Reinstall the joint cover onto refrigerant line joint.

Refrigerant Oil Charging

1. Perform vacuum pumping with a vacuum pump. Wait for 10 minutes after completing operation, check if there is any change in A/C system pressure. If there is any change, the A/C system leakage may exist, you should check and repair the A/C system. If there is no change, proceed to perform refrigerant oil charging procedures.
2. Open the suction valve and close the exhaust valve, and then open the charging valve to allow refrigerant oil to flow into the system.
3. Close the charging valve after refrigerant oil charging is completed.
4. Perform vacuum pumping again for 3 minutes.
5. Continue to perform refrigerant charging procedures after operation is completed.

Item	A/C Compressor Assembly Replacement	Condenser Replacement	Evaporator Tank Replacement	Line Replacement
Refrigerant Oil Charging Amount	Supplement according to actual pouring amount	30ml	30ml	10ml

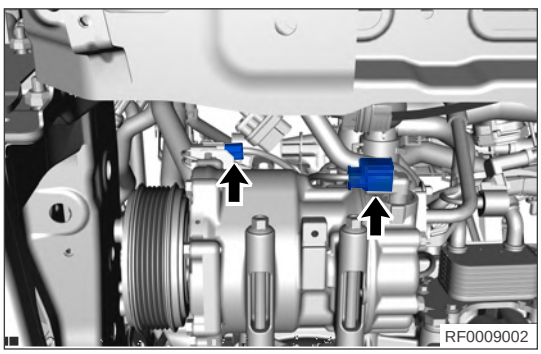
Compressor Assembly

Removal

⚠ Caution

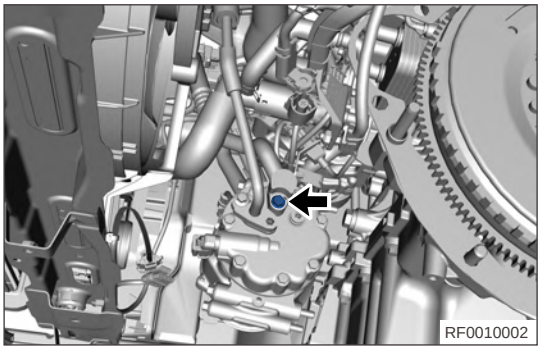
- Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant.
- Always keep work area in good ventilation.
- Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.
- If A/C compressor assembly has an internal malfunction, it is necessary to replace the A/C fluid line. Failure to do so may result in serious damage to A/C compressor assembly after replacing.
- When replacing compressor assembly, it is necessary to measure the refrigerant oil amount removed from new A/C compressor assembly.

1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and the ignition switch.
3. Disconnect the negative battery cable.
4. Remove the accessory drive belt.
5. Remove the engine lower protector assembly.
6. Remove the compressor assembly.
   a. Disconnect 2 connectors (arrow) from compressor assembly wire harness.



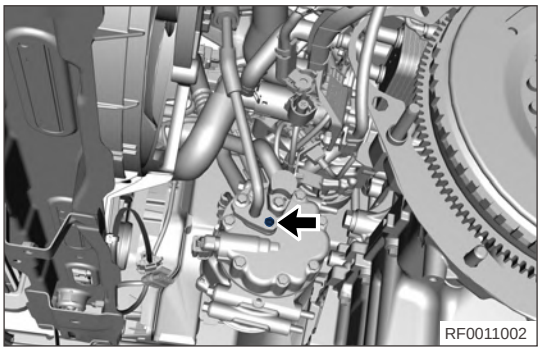
b. Remove compressor low pressure line fixing bolt, and disconnect compressor low pressure line.

Tightening torque: 25 ± 3 N • m



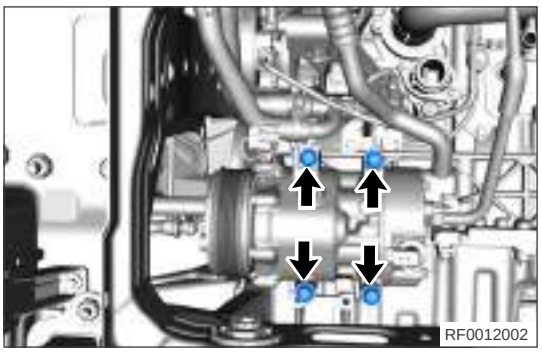
c. Remove compressor high pressure line fixing bolt, and disconnect compressor high pressure line.

Tightening torque: 25 ± 3 N • m



d. Remove 4 fixing bolts (arrow) between compressor assembly and mounting bracket.

Tightening torque: 22.5 ± 2.5 N • m



e. Remove A/C compressor assembly.

Installation

⚠ Caution

- Tighten fixing bolts and nuts to specified torques.
- It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks.
- Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint.
- Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system.
- Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle.
- Perform recharging for A/C system and check for refrigerant leakage.

1. Installation is in the reverse order of removal.

Replacement of Condenser Assembly

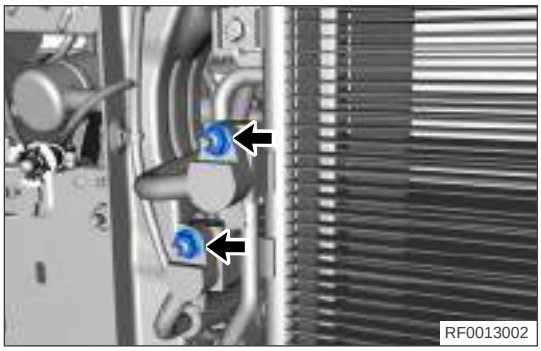
Removal

⚠ Caution

- Be sure to follow safety precautions before performing this procedure. Failure to do so may result in serious personal injury or even death.
- Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant.
- Always keep work area in good ventilation.
- Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and the ignition switch.
3. Disconnect the negative battery cable.
4. Remove the front bumper assembly.
5. Remove the front impact beam assembly.
6. Remove the left/right air deflector assembly.
7. Remove the condenser assembly.
   a. Remove 2 fixing nuts (arrow) of condenser A/C line (- arrow), and disconnect A/C line.

      Tightening torque: 9 ± 1 N • m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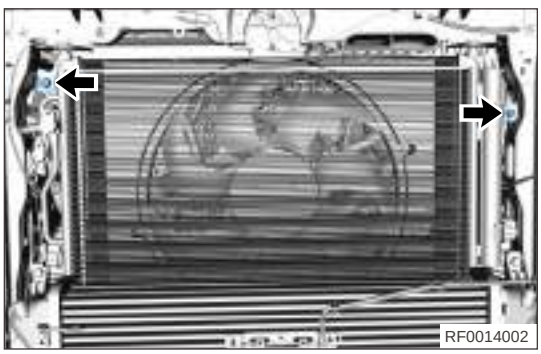
   b. Remove 2 fixing bolts (arrow) between radiator assembly and condenser assembly.

      Tightening torque: 5 ± 1 N • m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   c. Remove the condenser assembly.

Installation

⚠ Caution

- Tighten fixing bolts and nuts to specified torques.
- It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks.
- Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint.
- Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system.
- Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle.
- Perform recharging for A/C system and check for refrigerant leakage.

1. Installation is in the reverse order of removal.

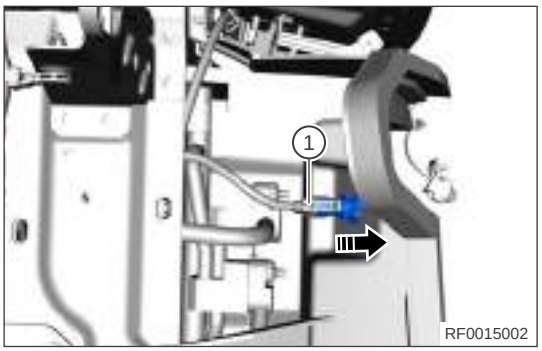
Replacement of Outside Temperature Sensor

Removal

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing front bumper assembly.
- Appropriate force should be applied, when removing front bumper assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing front bumper assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front grille assembly.
4. Remove the outside temperature sensor.
   a. Pinch clip of outside temperature sensor and push it outward in direction of arrow to remove outside temperature sensor from front impact beam.
   b. Remove the wire harness connector (1).
   c. Remove the outside temperature sensor.



Installation

1. Installation is in the reverse order of removal.

Replacement of Pressure Sensor

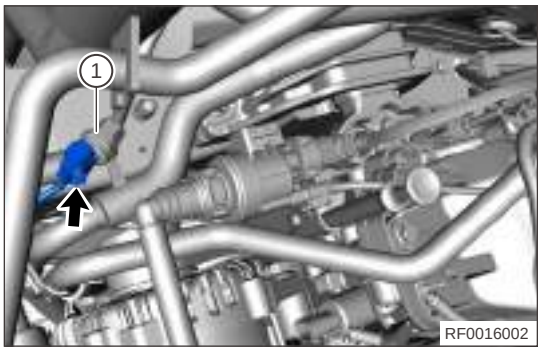
Removal

⚠ Caution

- Appropriate force should be applied when removing pressure sensor. Be careful not to operate roughly.

1. Recover the refrigerant from A/C system assembly.

2. Turn off all electrical equipment and ENGINE START STOP switch.
3. Disconnect the negative battery cable.
4. Turn off all electrical equipment and the ignition switch.
5. Disconnect the pressure sensor connector.
6. Use wrench to remove the pressure sensor (1).



Installation

1. Installation is in the reverse order of removal.

Solar Sensor

Removal

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the solar sensor.
   a. The solar sensor adopts clip assembly. Use a flat tip screwdriver to carefully insert about 3 mm from the gap between solar sensor and instrument cluster (put a soft object under it to avoid damage to the surface of instrument cluster). Use a little force to pry solar sensor out from instrument cluster.
   b. Remove the wire harness connector.
   c. Remove the solar sensor.

Installation

1. Installation is in the reverse order of removal.

   Hint:
   Install solar sensor into the corresponding fixing hole, and a "click" sound is heard, indicating that it is installed in place.

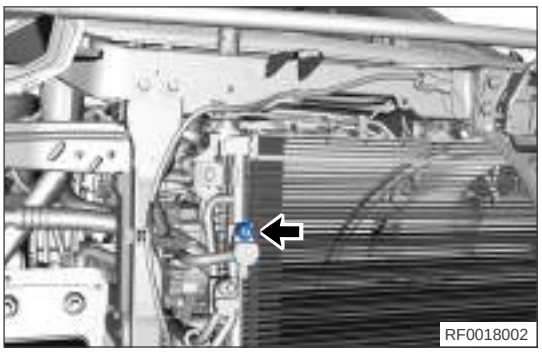
Compressor - Condenser Line

Removal

⚠ Warning
• Special service device for R134a Refrigerant/R1234yf (European Union) must be used to recover/ charge refrigerant. • Always keep work area in good ventilation. • Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

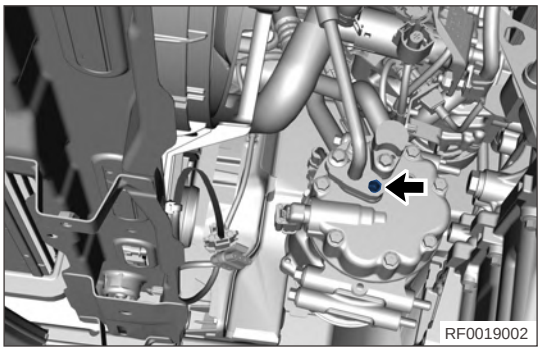
1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and the ignition switch.
3. Disconnect the negative battery cable.
4. Remove the front bumper assembly.
5. Remove the compressor to condenser line assembly.
   a. Remove the fixing nut (arrow) from compressor to condenser line assembly.

      Tightening torque: 9 ± 1 N • m



   b. Remove the fixing bolt (arrow) between compressor to condenser line assembly and compressor assembly, and disengage the compressor to condenser line assembly from compressor assembly.

Tightening torque: 25 ± 3 N•m



Installation

⚠ Caution

- Tighten fixing bolts and nuts to specified torques.
- It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks.
- Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint.
- Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system.
- Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle.
- Perform recharging for A/C system and check for refrigerant leakage.

1. Installation is in the reverse order of removal.

Compressor - Evaporator Line and Evaporator - Condenser Line

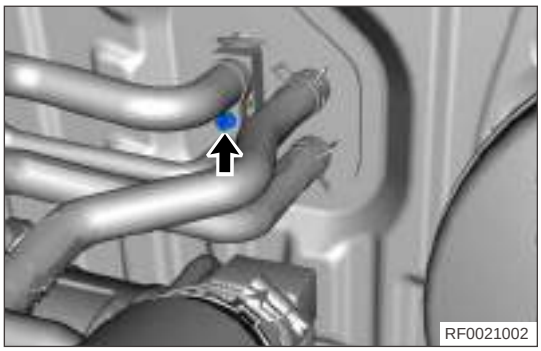
Removal

⚠ Warning

- Special service device for R134a Refrigerant/R1234yf (European Union) must be used to recover/charge refrigerant.
- Always keep work area in good ventilation.
- Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

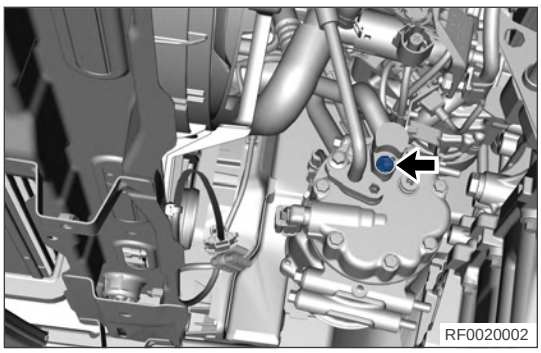
1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and the ignition switch.
3. Disconnect the negative battery cable.
4. Remove the engine lower protector.
5. Remove the A/C pressure sensor.
6. Remove the front bumper.
7. Remove the right air deflector.
8. Remove the compressor - evaporator line and evaporator - condenser line.
   a. Remove the evaporator - compressor line fixing bolt (- arrow) at expansion valve.

      Tightening torque: 9 ± 1 N·m



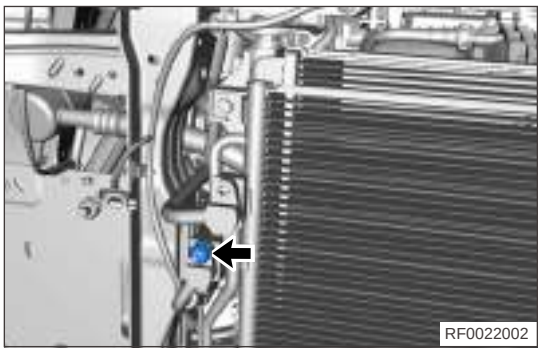
   b. Remove evaporator - compressor line assembly fixing bolt (arrow), and detach line.

      Tightening torque: 25 ± 3 N·m



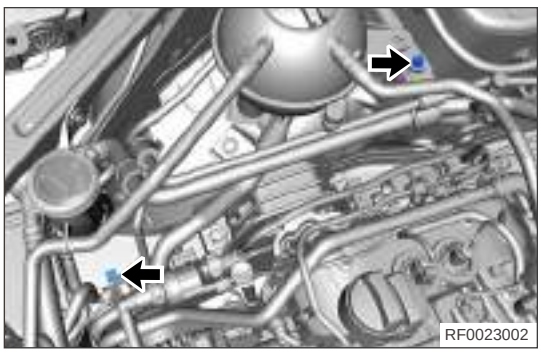
   c. Remove A/C condenser - evaporator line assembly fixing nut (arrow), and detach line.

Tightening torque: 9 ± 1 N•m



   d. Remove 2 fixing bolts (arrow) from A/C line clamp.

Tightening torque: 9 ± 1 N•m



9. Remove the compressor - evaporator line and evaporator - condenser line assembly.

Installation

⚠ Caution

- Tighten fixing bolts and nuts to specified torques.
- It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks.
- Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint.
- Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system.
- Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle.
- Perform recharging for A/C system and check for refrigerant leakage.

1. Installation is in the reverse order of removal.

AC FAN BODY AND AIR DUCT

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. Take extra care when servicing A/C system under high pressure.
2. Because there is refrigerant under high pressure in A/C system. It must be serviced by professional technician. Otherwise, a wrong service procedure may cause a serious danger or fatal injury.
3. If A/C system pressure is released unexpectedly, ventilate work area before servicing. In a closed work place, if a large amount of refrigerant is discharged, it may cause oxygen reduction and result in smothering, causing a serious or fatal injury.
4. Never drain refrigerant in A/C system into the atmosphere directly, and avoid environmental contamination.

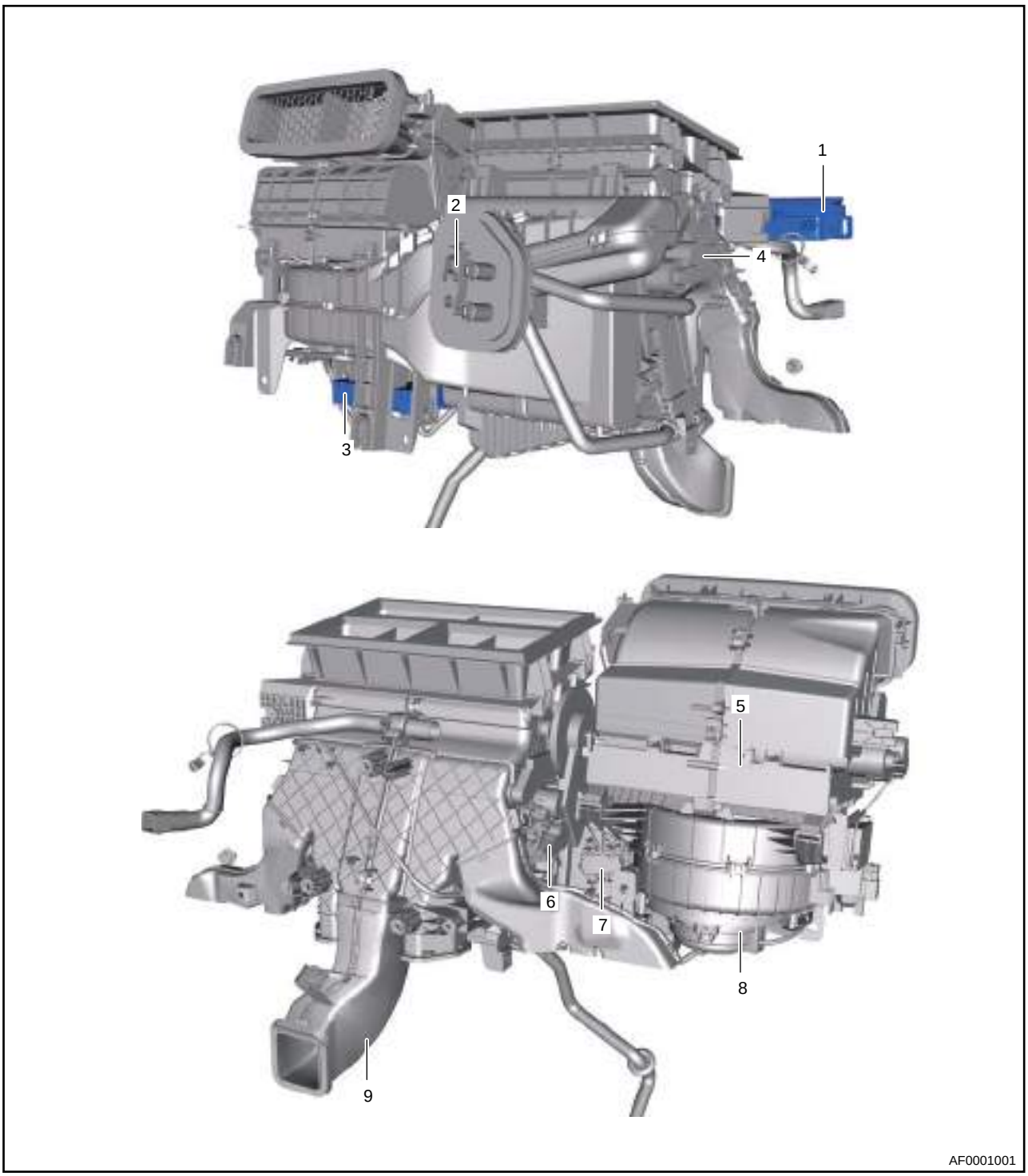
Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

1. Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant.
2. Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

System Overview

HVAC Assembly

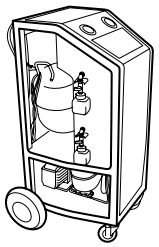
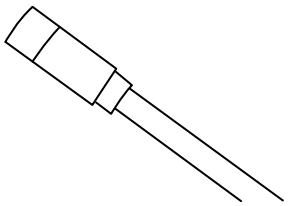
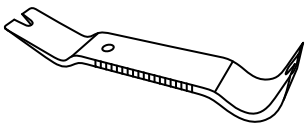


1	A/C Control Panel	6	Mode Damper Motor
2	Evaporator	7	Blower Speed Regulation Module
3	A/C Control Module	8	Blower Assembly

4	Mix Damper Motor	9	HVAC Transition Duct
5	A/C Element		

On-vehicle Service

Tools

Tool Name	Tool Drawing
Refrigerant Recycling Machine	 S00034
Gas Leak Detector	 S00100
Interior & Exterior Remover	 RCH002506

Specifications

Torque Specifications

Description	Torque (N · m)
HVAC Fixing Nut	7 ± 1
HVAC Fixing Bolt	7 ± 1
Inlet Air Duct Fixing Screw	1.2 ± 0.2
Inlet Air Duct Fixing Bolt	1.2 ± 0.2
Inner/Outer Damper Set Fixing Bolt	1.2 ± 0.2

Description	Torque (N · m)
Heater Core Fixing Screw	1.2 ± 0.2
Heater Core Plate Fixing Screw	1.2 ± 0.2
Damper Set Fixing screw	1.2 ± 0.2
Damper Drive Set Fixing Screw	1.2 ± 0.2
Damper Drive Set Fixing Bolt	1.2 ± 0.2
Fixing Screw Between Evaporator Housing and Evaporator Case	1.2 ± 0.2
Rear Right Outlet Fixing Screw	1.2 ± 0.2
Rear Left Outlet Fixing Screw	1.2 ± 0.2
Evaporator Case Fixing Screw	1.2 ± 0.2
Damper Set Housing Fixing Screw	1.2 ± 0.2
Anion Generator Fixing Screw	1.5 ± 0.5

A/C Control Panel Assembly

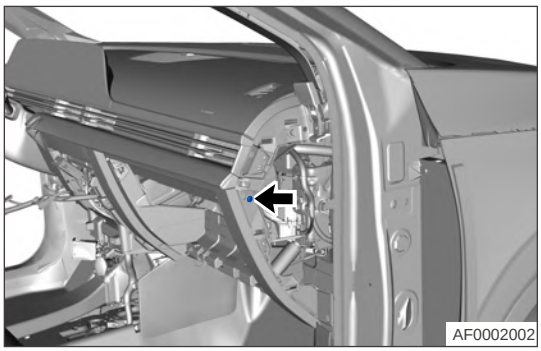
Removal

⚠ Caution

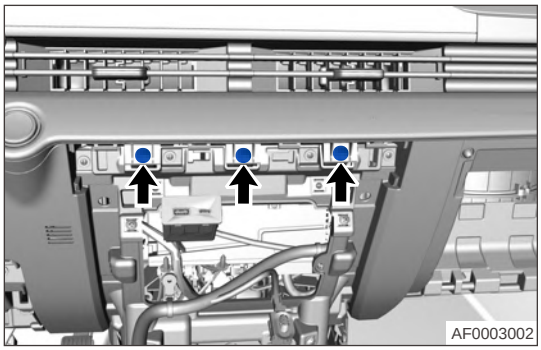
- Be careful not to scratch instrument cluster surface when removing central control panel cover and A/C panel.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Remove the instrument panel right end plate assembly.
3. Remove the auxiliary fascia console control panel.
4. Remove the A/C control panel assembly.

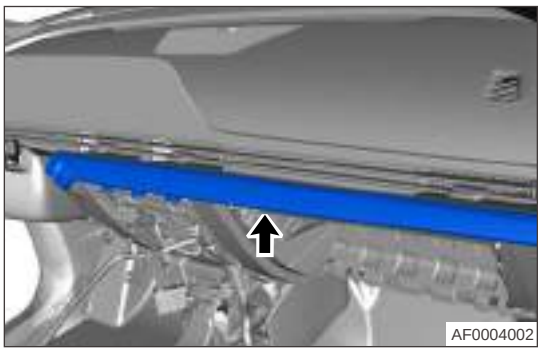
e. Remove A/C control panel right fixing screw (arrow).



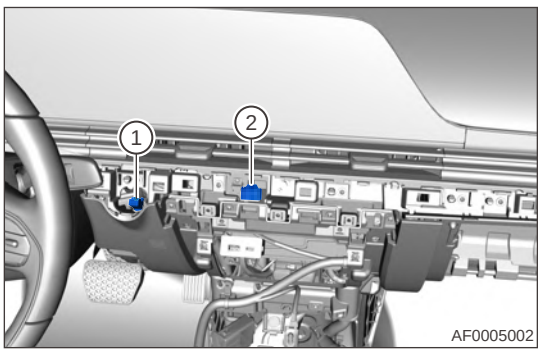
f. Remove 3 A/C control panel middle fixing screws (arrow).



g. Using an interior crow plate, carefully pry off the A/C control panel assembly (arrow).



h. Disconnect the ENGINE START STOP switch connector (1) and A/C control panel connector (2).



i. Remove the A/C control panel.

Installation

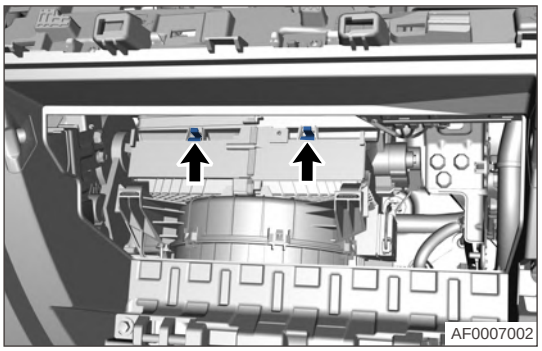
⚠ Caution
• Be careful not to scratch the panel and instrument panel parts during installation.

1. Installation is in the reverse order of removal.

Replacement of A/C Element

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the glove box assembly.
4. Remove the A/C element.
   a. Detach 2 clips (arrow) from A/C element protector cover, and remove A/C element protector cover.
   b. Remove the A/C element assembly.



Installation

⚠ Caution

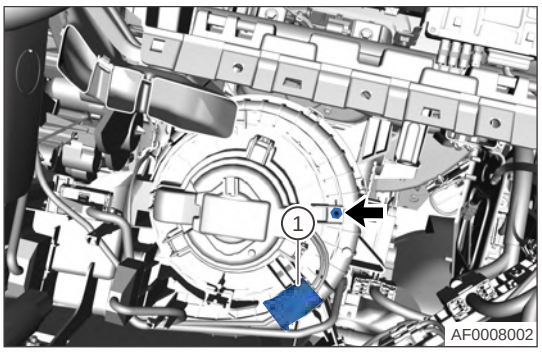
- If A/C element is too dirty or damaged, replace it with a new one.
- When installing A/C element, make arrow mark on the element face downward.

1. Installation is in the reverse order of removal.

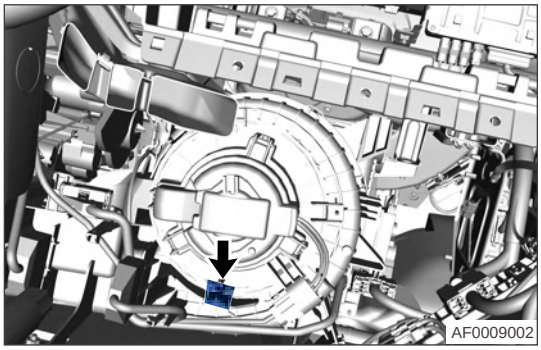
Replacement of Front Blower Assembly

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel left soundproof board assembly.
4. Remove the blower assembly.
   a. Disconnect blower assembly connector (1), and remove 1 fixing bolt (arrow) from blower.

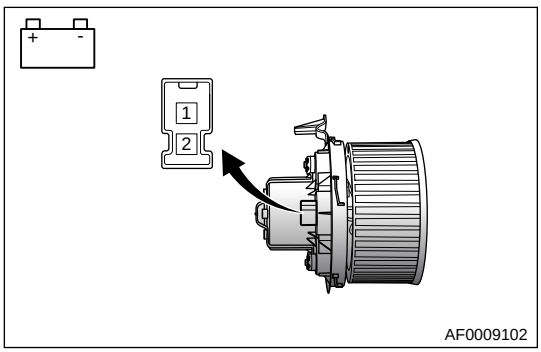


b. Detach blower fixing claw (arrow), and rotate blower counterclockwise to remove blower.



Inspection

1. Remove the blower assembly.
   a. Connect the positive (+) battery lead to terminal 1 and negative (-) battery lead to terminal 2. Check that the blower motor operates smoothly.



Installation

1. Installation is in the reverse order of removal.

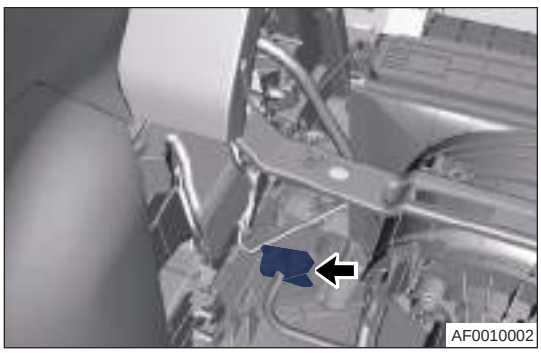
Blower Speed Regulation Module

Removal

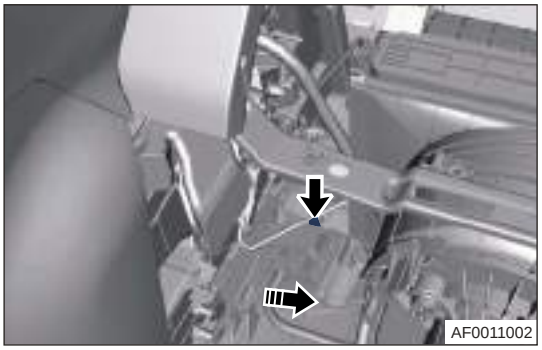
⚠ Warning

- During normal operation, blower speed regulation module may be very hot. Turn off blower and wait for a few minutes to cool it before diagnosing or servicing, in order to avoid burns.
- DO NOT operate blower assembly when removing the blower speed regulation module from vehicle. Failure to do so may result in damage to the blower assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the glove box assembly.
4. Remove the blower speed regulation module.
   a. Disconnect the blower speed regulation module connector (1).



b. Detach blower speed regulation module fixing claw (-arrow), and move blower speed regulation module to right side.



c. Remove the blower speed regulation module.

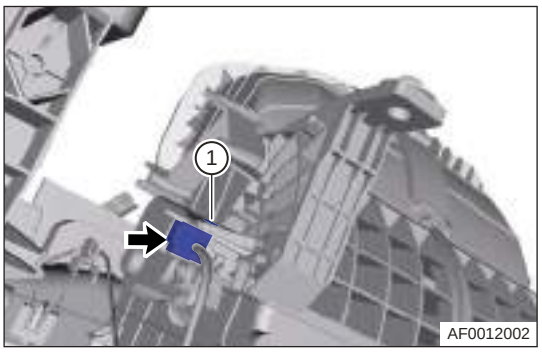
Installation

1. Installation is in the reverse order of removal.

Inner/Outer Circulation Damper Servo Motor

Removal

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the glove box assembly.
4. Remove the inner/outer circulation damper servo motor.
   a. Disconnect the inner/outer circulation damper servo motor connector (arrow).
   b. Detach the fixing clip (1) from inner/outer circulation motor.
   c. Rotate counterclockwise to remove the inner/outer circulation damper motor.



Installation

1. Installation is in the reverse order of removal.

Mode Damper Motor

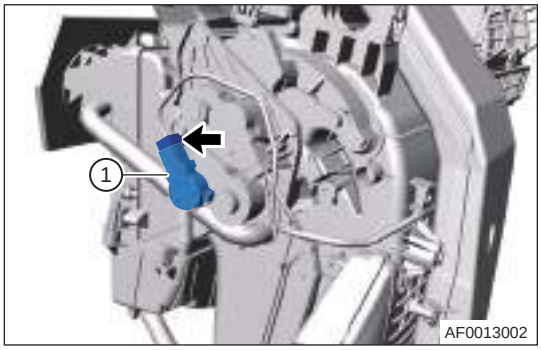
Removal

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel lower left protector assembly.
4. Remove the mode damper motor.

a. Disconnect the mode damper motor connector (arrow).

b. Detach the fixing clip (1) from mode damper motor.

c. Rotate counterclockwise to remove the mode damper motor.



Installation

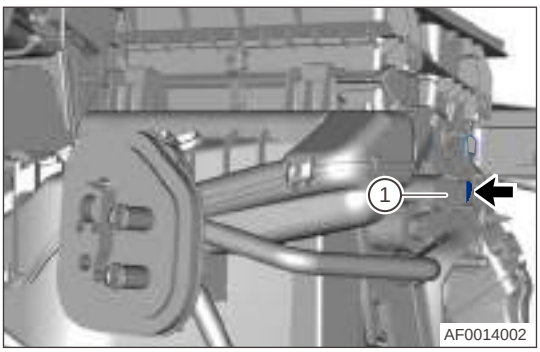
1. Installation is in the reverse order of removal.

> ⚠ **Caution**
>
> • When installing, apply a small amount of grease to contact surface of the mode damper motor lever and the mode damper set to ensure the motor operates smoothly.

Right Mix Damper Motor

Removal

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel right lower protector assembly.
4. Remove the right mix damper motor.
   a. Disconnect the right mix damper motor connector (arrow).
   b. Detach the mix damper motor fixing clip.
   c. Rotate counterclockwise to remove right mix damper motor (1).



Installation

1. Installation is in the reverse order of removal.

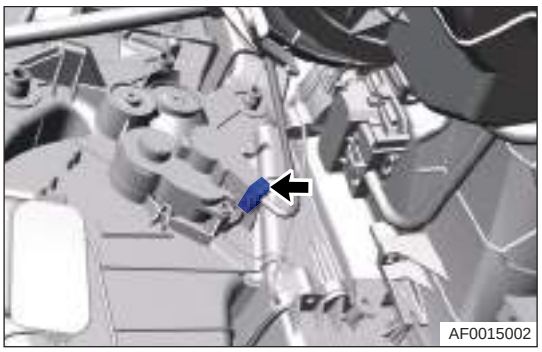
> ⚠ **Caution**
>
> • When installing, apply a small amount of grease to contact surface of the right mix damper motor lever and the mix damper set to ensure the motor operates smoothly.

Left Mix Damper Motor

Removal

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the glove box assembly.

4. Remove the left mix damper motor.
   a. Disconnect the left mix damper motor connector (arrow).
   b. Detach the mix damper motor fixing clip.
   c. Rotate counterclockwise to remove left mix damper motor.


AF0015002

Installation

1. Installation is in the reverse order of removal.

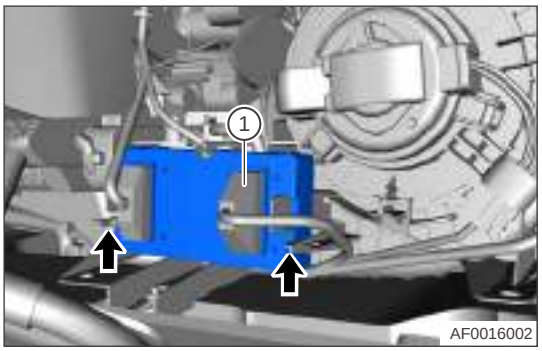
⚠ Caution

- When installing, apply a small amount of grease to contact surface of the left mix damper motor lever and the mix damper set to ensure the motor operates smoothly.

Automatic A/C Control Module

Removal

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the automatic A/C control module.
   a. Disconnect the automatic A/C control module connector (1).
   b. Loosen 2 fixing clips (arrow) and remove automatic A/C control module.



AF0016002

Installation

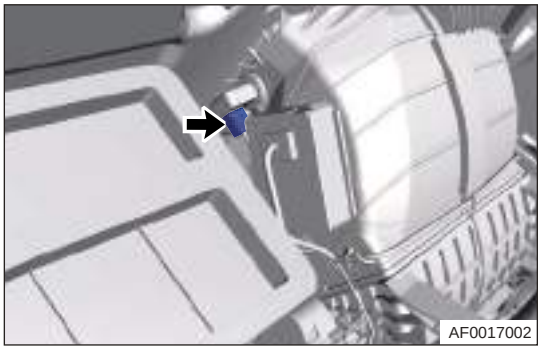
1. Installation is in the reverse order of removal.

Air Quality Sensor

Removal

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel assembly.
4. Remove the air quality sensor.

a. Disconnect air quality sensor connector (arrow), and rotate counterclockwise to remove air quality sensor.



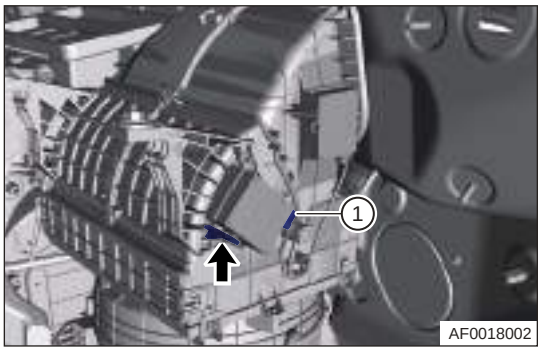
Installation

1. Installation is in the reverse order of removal.

Inside PM2.5 Sensor (If Equipped)

Removal

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel assembly.
4. Remove the inside PM2.5 sensor.
   a. Disconnect the inside PM2.5 sensor (1).
   b. Detach inside PM2.5 sensor fixing claw (arrow) and move inside PM2.5 sensor upward.
   c. Remove the inside PM2.5 sensor.



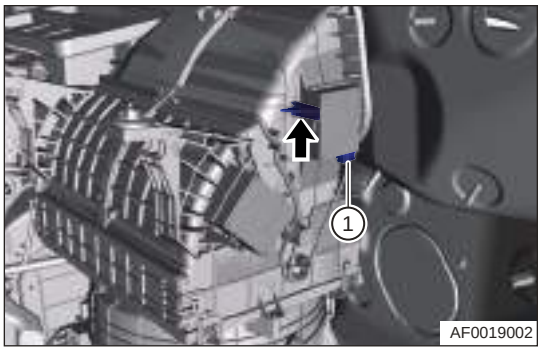
Installation

1. Installation is in the reverse order of removal.

Outside PM2.5 Sensor (If Equipped)

Removal

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel assembly.
4. Remove the outside PM2.5 sensor.
   a. Disconnect the outside PM2.5 sensor (1).
   b. Detach outside PM2.5 sensor fixing claw (arrow) and move outside PM2.5 sensor upward.
   c. Remove the outside PM2.5 sensor.



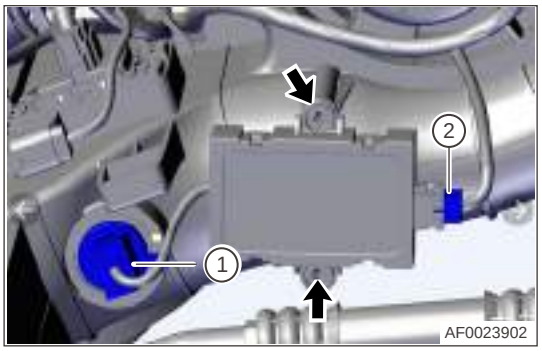
Installation

1. Installation is in the reverse order of removal.

Anion Generator (If Equipped)

Removal

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel assembly.
4. Remove the anion generator.
   a. Rotate and remove anion emitter (1).
   b. Disconnect the negative ion generator connector (2).
   c. Remove 2 fixing screws (arrow) and anion generator.



Installation

1. Installation is in the reverse order of removal.

HVAC Assembly

Removal

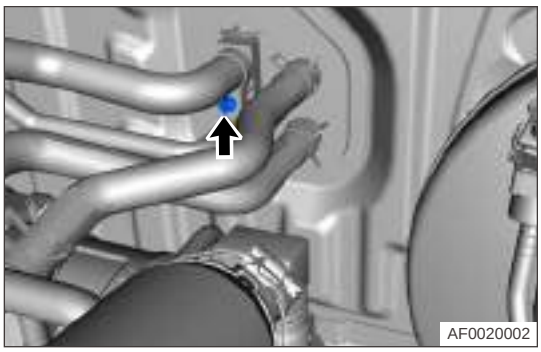
⚠ Caution

- Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant.
- Be careful not to damage hoses during removal and installation.
- Always keep work area in good ventilation.
- Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and the ignition switch.
3. Disconnect the negative battery cable.
4. Remove the driver airbag. (For details, refer to removal and installation of driver airbag).
5. Remove the steering wheel assembly (For details, refer to removal and installation of steering wheel assembly).
6. Remove the auxiliary fascia console assembly (For details, refer to removal and installation of auxiliary fascia console body assembly).
7. Remove the instrument panel body assembly (For details, refer to removal and installation of instrument panel body assembly).
8. Remove the instrument panel crossmember assembly (For details, refer to removal and installation of instrument panel crossmember).

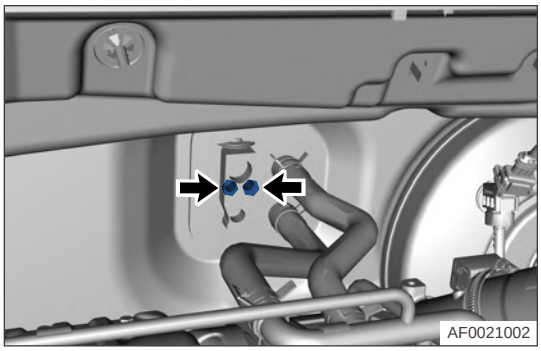
9. Remove the HVAC assembly.
   a. Remove the A/C high/low pressure line fixing bolt (arrow).

      Tightening torque: 9 ± 1.5 N • m

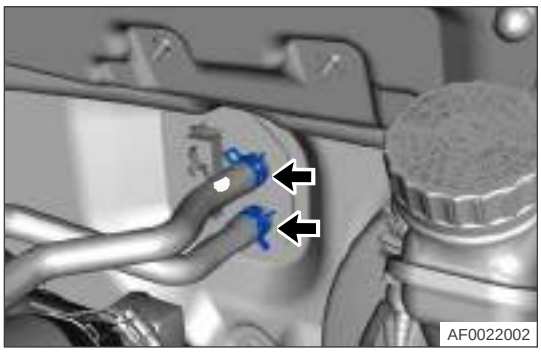


   b. Remove 2 fixing bolts (arrow) from expansion valve and remove expansion valve assembly.

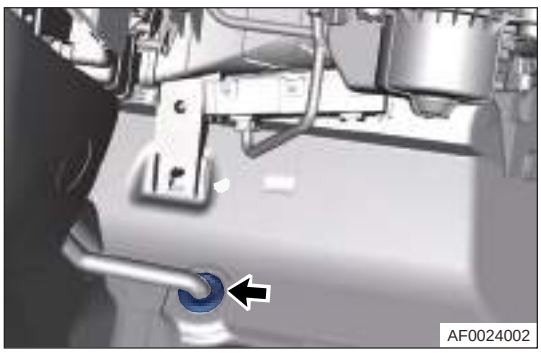
      Tightening torque: 9 ± 1.5 N • m



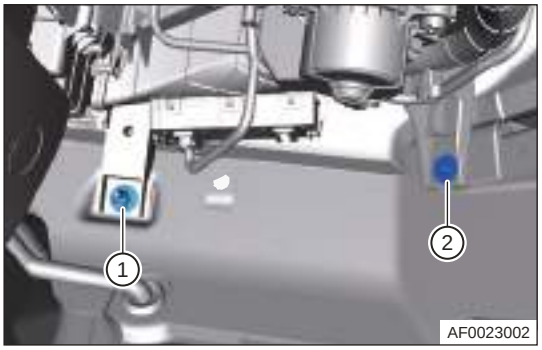
   c. Using snap spring pliers, disengage fixing clamps (-arrow) from heating inlet and outlet hoses to detach the inlet and outlet hoses.



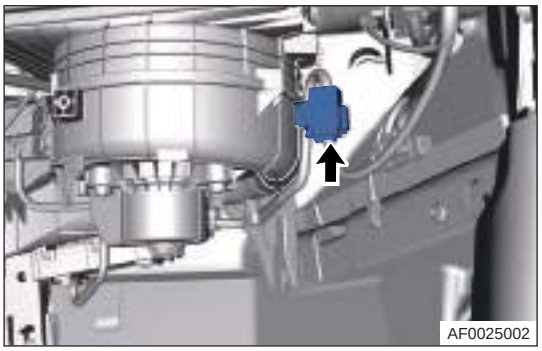
   d. Disengage the outlet hose of HVAC and fixing bush rubber (arrow) of body.



e. Remove HVAC fixing nut (1) and fixing bolt (2).
Tightening torque: 7 ± 1.5 N • m



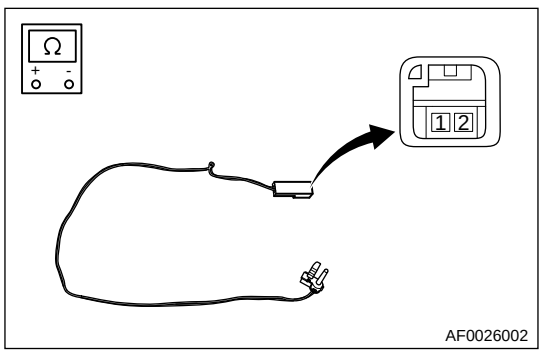
f. Disconnect HVAC assembly and interior wire harness (arrow).



g. Carefully remove HVAC assembly from cabin.

Inspection

1. Check the evaporator temperature sensor.
   a. Using ohm band of digital multimeter, measure the resistance of evaporator temperature sensor according to the table below.



Multimeter Connection	Temperature (℃)	Standard Resistance (Ω)
Terminal 1 - Terminal 2	-5	7790
Terminal 1 - Terminal 2	0	6194
Terminal 1 - Terminal 2	5	4963
Terminal 1 - Terminal 2	10	4001
Terminal 1 - Terminal 2	15	3245
Terminal 1 - Terminal 2	20	2648

Hint:

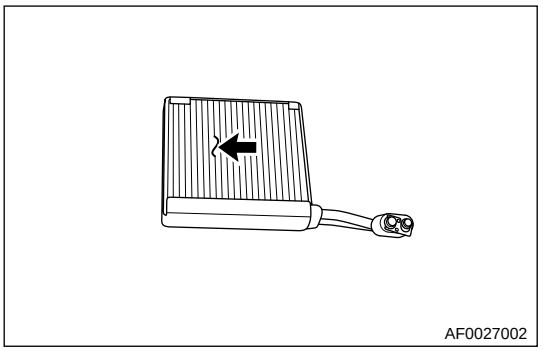
- Resistance decreases as temperature increases.
- If result is not as specified, replace evaporator temperature sensor.

⚠ Caution

- Resistance value may change even if sensor is touched slightly. Make sure that connector of sensor is held firmly.
- During measurement, sensor temperature must be almost the same as the ambient temperature.

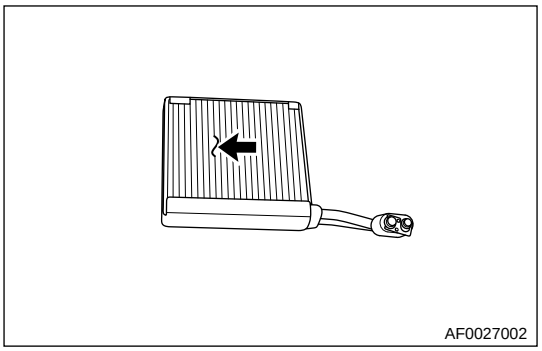
2. Check the evaporator core assembly.
   a. Check if evaporator core assembly is cracked, damaged and leaked. If any problem is found, replace evaporator core assembly.
   b. Check fin for bends.

Hint:
If any fin is bent, carefully straighten it with a screwdriver or pliers.



3. Check the heater core assembly.
   a. Check if heater core assembly is cracked, damaged or leaked. Check if heater core assembly is cracked, damaged or leaked.
   b. Check fin for bends.

Hint:
If any fin is bent, carefully straighten it with a screwdriver or pliers.



4. Check the damper control mechanism assembly.
   a.Check if inner/outer circulation damper adjustment mechanism is stuck, deformed, damaged or if it has fallen out. Replace as necessary.
   b.Check if mode damper adjustment mechanism is stuck, deformed, damaged or if it has fallen out. Replace as necessary.
   c.Check if face/defrost damper set is stuck, deformed, damaged or if it has fallen out. Replace as necessary.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

1. If evaporator core is reused, do not insert evaporator temperature sensor into its original position. Insert it to a location that is 1 fin to the right or left of its previous location.
2. During installation, apply a small amount of grease to contact surface of the inner/outer circulation damper adjustment mechanism to ensure that it can operate smoothly.
3. During installation, apply a small amount of grease to contact surface of the mix damper adjustment mechanism set to ensure that it can operate smoothly.
4. During installation, apply a small amount of grease to contact surface of the face damper adjustment mechanism to ensure that it can operate smoothly.
5. During installation, apply a small amount of grease to contact surface of the defrost damper adjustment mechanism to ensure that it can operate smoothly.
6. Always check that inner/outer circulation damper mechanism assembly operates normally after installation.
7. Always check that mix damper mechanism assembly operates normally after installation.
8. Always check that face damper mechanism assembly operates normally after installation.
9. Always check that defrost damper mechanism assembly operates normally after installation.
10. Tighten fixing bolts and nuts to specified torques.
11. It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks.
12. Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system.
13. Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle.
14. Be sure to recharge refrigerant and check for refrigerant leakage after installation.
15. Be sure to recharge engine cooling system and check for coolant leakage after installation.

AIRBAG CONTROL SYSTEM

AIRBAG CONTROL SYSTEM

AIRBAG CONTROL SYSTEM

Warnings and Precautions

Warnings

1. Before removing airbag system components, disconnect the negative battery cable and wait for at least 90 seconds. Before servicing steering system, remove the driver airbag and spiral cable for safekeeping.
2. If vehicle has been involved in a minor collision but the airbags do not deploy, always inspect airbag components.
3. If airbags may be touched during servicing, remove the airbags as necessary and keep it properly before servicing.
4. Never use airbag components from another vehicle. When replacing the airbag components, parts of the same model should be selected for replacement.
5. If an airbag component is dropped or if there are any cracks, dents or other defects in the case, bracket or connector, it must be replaced with an airbag component with same model.
6. Information labels are attached to the periphery of airbag components. Always follow the cautions and instructions on labels.
7. Do not use a common multimeter to measure the resistance of airbag. Only use a multimeter with high impedance for measurement. Otherwise, the airbag may be deployed.

Precautions

1. Never expose airbag components directly to hot air or open flame.
2. Never attempt to disassemble or repair airbag components.
3. Removed airbags should be kept properly. Never put other objects on them. If triggered accidentally, it may cause personal injury.
4. As a disposable component, the airbag must be replaced after deployment and never reuse.
5. Always dispose of vehicle together with airbags, or the airbags may be triggered accidentally to cause personal injury.

Precautions During Usage

Airbag is passive safety system component. In order to actually protect the passengers in collision with airbag, users should follow the precautions related to airbag usage:

- Driver and passengers should use belt correctly. Correct belt usage can protect human body and reduce the personal injury in accidents.
- DO NOT add any additional units without permission that may interfere or damage belt pretensioner or airbag.
- DO NOT place any objects on steering wheel and front passenger side instrument panel, or these objects may cut into the inflated airbag or become trajectile to injure human body.
- DO NOT add or reversely place seat cover for seats with side airbag.
- Children that are under twelve are not allowed to sit in front seat. For vehicles equipped with passenger airbag, backward facing child seat is not allowed to use on front passenger seat.
- It’s only allowed to install genuine spare parts.
- Only authorized personnel can remove the controller, wire harness and connector from airbag.
- If airbag and belt pretensioner are deployed in accident, airbag controller and all wire harness with airbag connectors must be replaced together with airbag and belt.
- Airbag controller in all vehicles have been matched and verified and it’s forbidden to change vehicle structure and airbag controller. Random addition and modification of airbag controller and wire harness will make airbag controller operate abnormally, leading to airbag fault deployment and undeployment, which results in personal injury.

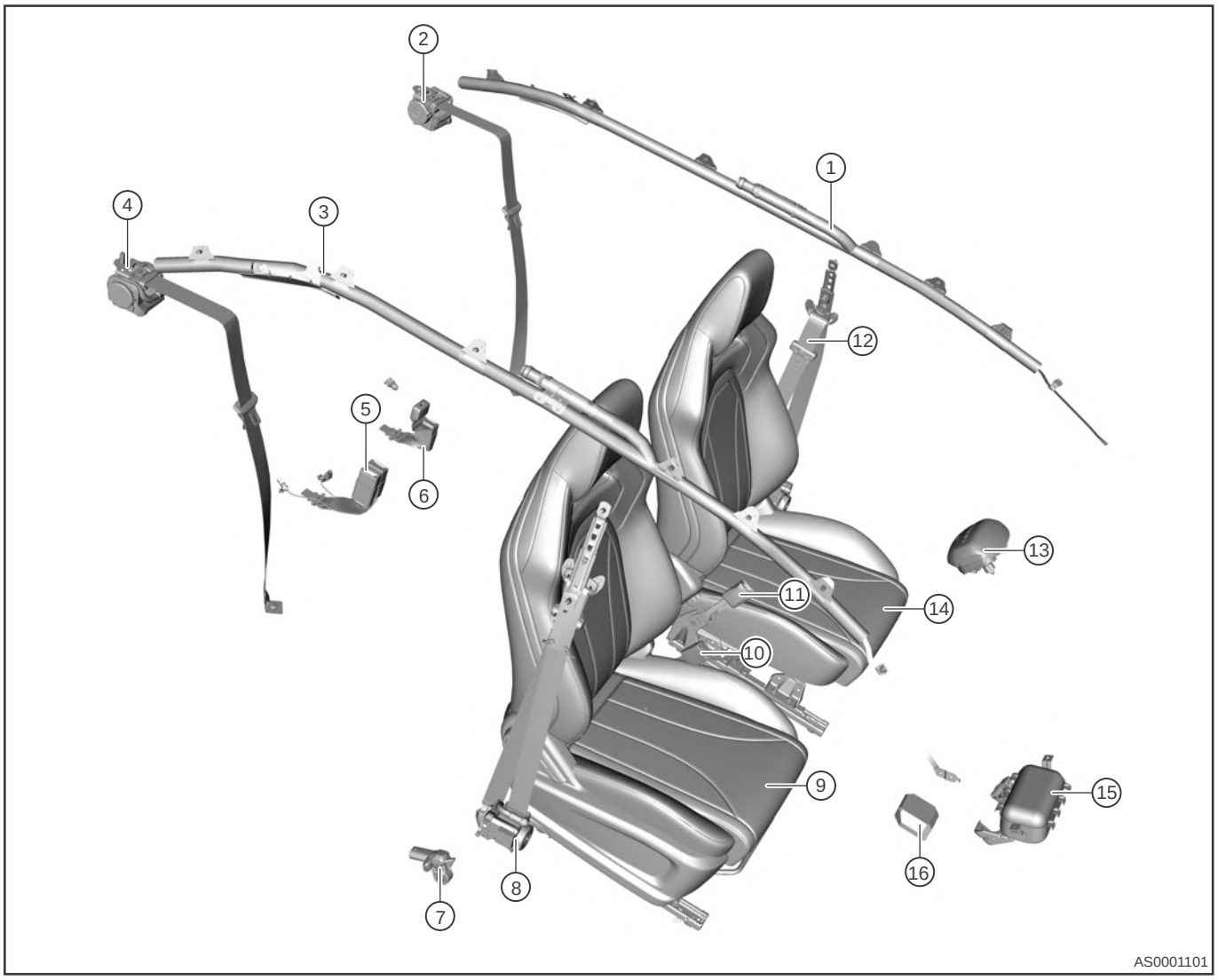
- Airbag manufacturer suggests that the airbag should be replaced after 10 years.

System Overview

System Description

Supplemental restraint system (SRS) consists of Airbag Control Module (ACM), driver airbag/front passenger airbag, front side airbag, curtain airbag, seat belt and other components. Circuit is continuously monitored and controlled by the airbag controller assembly. Airbag indicator on instrument cluster illuminates for approximately 6 seconds for a test each time ENGINE START STOP switch is turned to “ON”. Airbag indicator goes off after the test is completed. If indicator comes on at any time other than test time, it indicates that there is a problem in supplemental restraint system circuit.

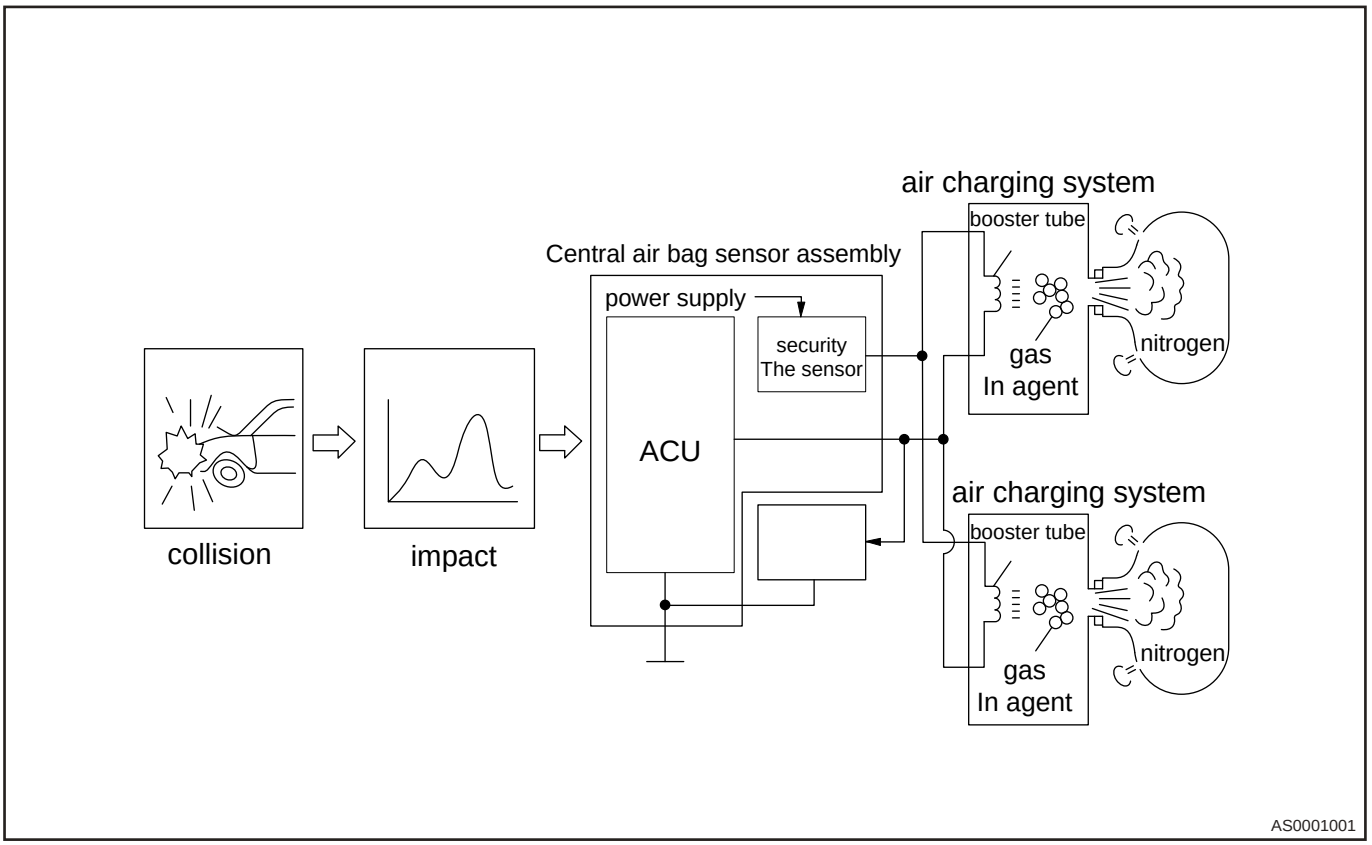
System Components Diagram



1	Left Curtain Shield Airbag Assembly	9	Front Passenger Side Seat Airbag Assembly
2	Rear Left Seat Belt Assembly	10	Front Right Seat Belt Buckle Assembly
3	Right Curtain Shield Airbag Assembly	11	Front Left Seat Belt Buckle Assembly

4	Rear Right Seat Belt Assembly	12	Front Left Seat Belt Assembly
5	Double Buckle Assembly	13	Driver Airbag Assembly
6	Small Buckle Lock Assembly	14	Driver Side Seat Airbag Assembly
7	Right Side Collision Sensor	15	Front Passenger Airbag Assembly
8	Front Right Seat Belt Assembly	16	Airbag Controller Assembly

System Schematic Diagram



- Whether the airbag is deployed depends on the deceleration signal of the vehicle during the collision. When the deceleration signal reaches the set actviation conditions; The microprocessor in the airbag controller of the supplemental restraint system sends signal to inflator unit of the corresponding airbag to rapidly deploy the airbag, thus protecting the occupant.

1. The airbag controller controls the airbag and seat belt.
   - Seat belt signals of front passenger and rear seat belt are directly transmitted to the airbag controller through hard wire connection.
   - The airbag controller directly controls whether the airbags and curtain shield actuators are activated. When a collision occurs, the airbag controller will determine whether to issue the ignition command according to the detailed ignition condition strategy.
2. This vehicle adopts the occupant restraint system, which includes active and supplemental types. Active restraint system requires occupants to take some actions, such as fastening seat belt; while supplemental restraint system requires no actions from occupants.

   Airbag controller is a real-time embedded electronic control unit designed for passenger protection in cabin.

The main function of airbag controller is to trigger passive safety related devices such as airbags and pretensioner in the event of a crash.

a. Active restraint system

   i. Driver seat belt and front passenger seat belt.

   ii. Rear seat belt.

b. Supplemental restraint system

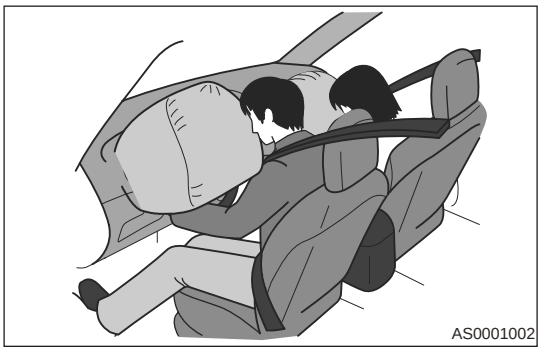
   i. Airbag system.

Collision Operating Condition

Hint:
When the collision reaches the set ignition threshold.

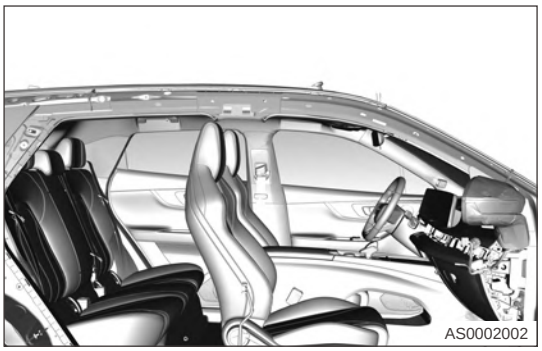
1. Front collision

   - Front collision is detected by the sensor in controller;
   - Front collision ignition deployment circuit: driver and passenger front airbags, all seat belt with pretensioners.



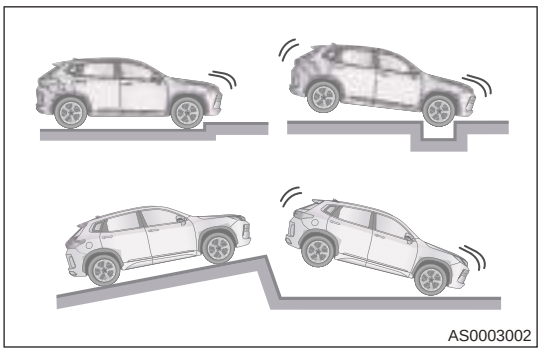
2. Side collision

   - Side collision is detected by the side collision sensor in B-pillar and the Sensor in controller.

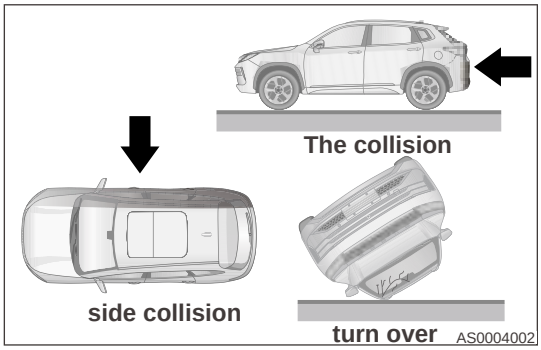


3. Other collisions

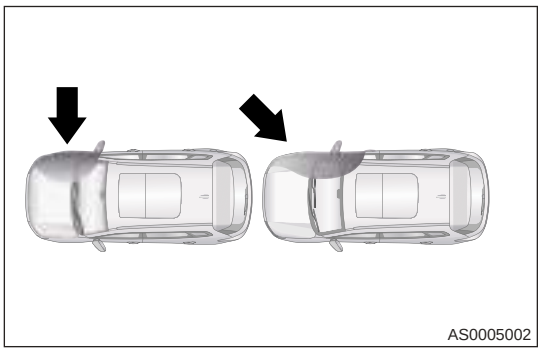
   - If the bottom of vehicle is subjected to a severe impact, the driver airbag and front passenger airbag may also deploy as shown in illustration.



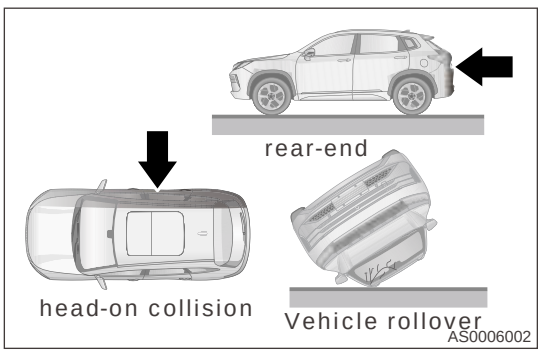
- When vehicle is involved in side collision, rear collision, roll over or frontal collision at low speed as shown in illustration, the driver airbag and front passenger airbag will not generally deploy.



- As shown in illustration, if a collision to the side of the vehicle body other than the passenger compartment, or the vehicle is subjected to a collision from the side at certain angles, the front side airbag and curtain shield airbag may not deploy.



- The side airbag and curtain shield airbag will not generally deploy if the vehicle is involved in a front collision, rear collision or roll over.



System Components Description

Airbag Control Module
The controller controls ignition circuit and activates airbag (and belt pretensioner) according to set activation threshold to keep occupants at proper position in the cabin when accident occurs, thus protecting occupants.

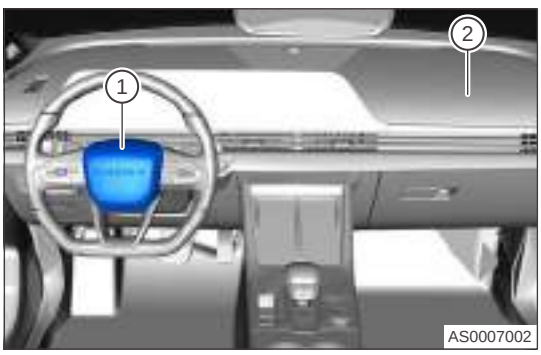
Driver Front Airbag and Passenger Front Airbag
Driver front airbag is located on the steering wheel and integrated with the horn switch. Passenger front airbag is located above the glove box and inside the instrument panel upper body. As shown in illustration:

1. Position of driver front airbag.

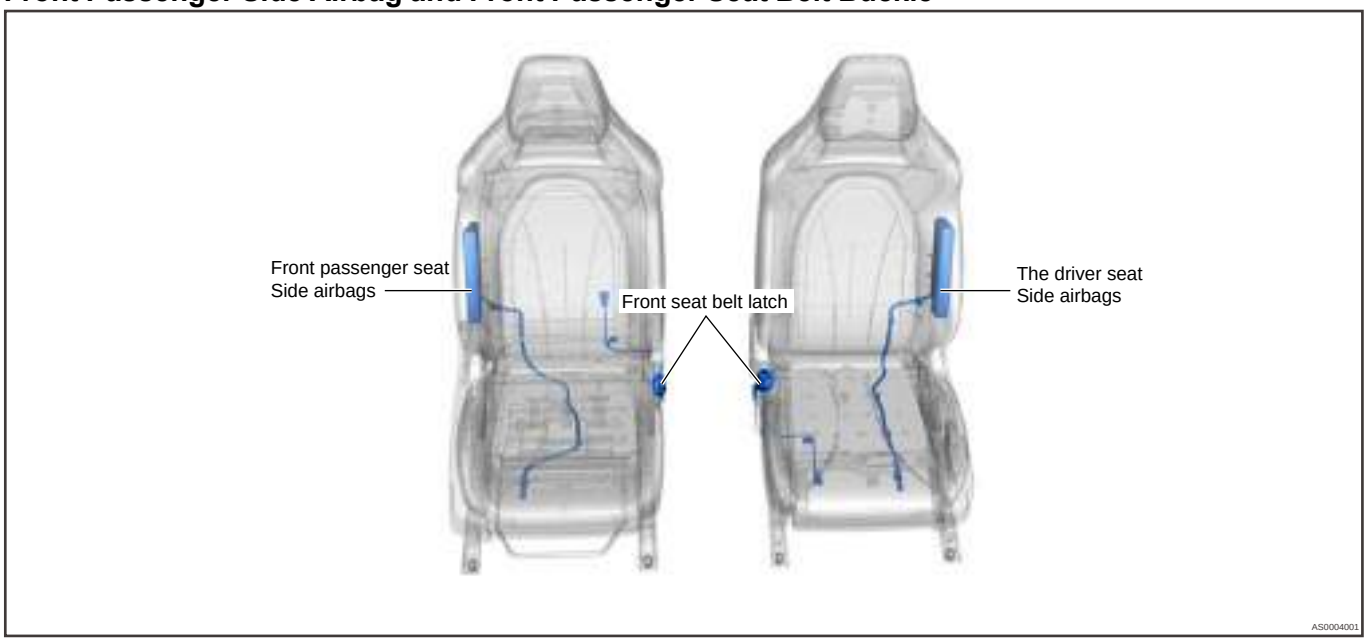
   Resistance: 2.0 ± 0.3 Ω

2. Position of front passenger front airbag.

   Resistance: 2.0 ± 0.3 Ω

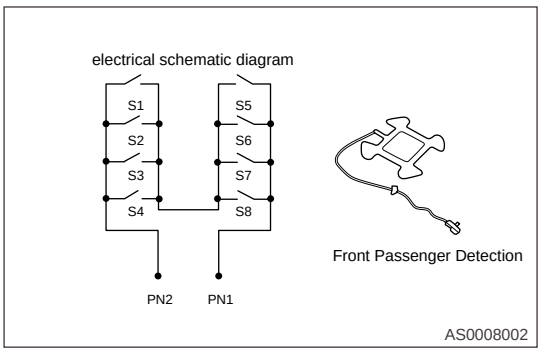


Front Passenger Side Airbag and Front Passenger Seat Belt Buckle

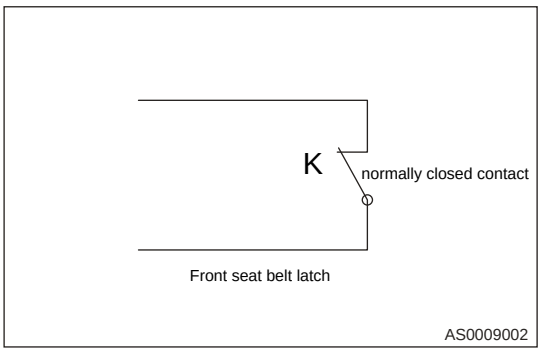


Airbag resistance on seat: 2.0 + 0.5 / -0.3Ω, it’ s strictly forbidden to measure resistance with multimeter!

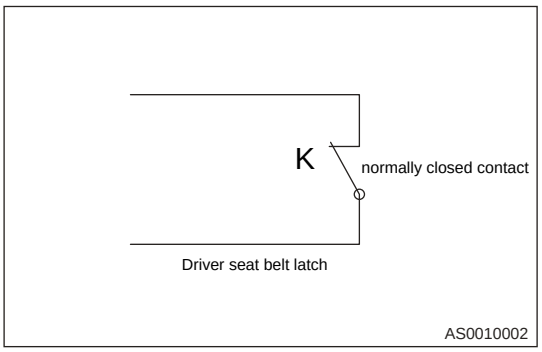
- Front passenger detection device schematic diagram as shown in illustration: Passenger loading status: When detected external resistance is lower than 100 Ω, it’ s judged that there is passenger. When resistance is higher than 400 Ω, it’ s judged that there is no passenger.



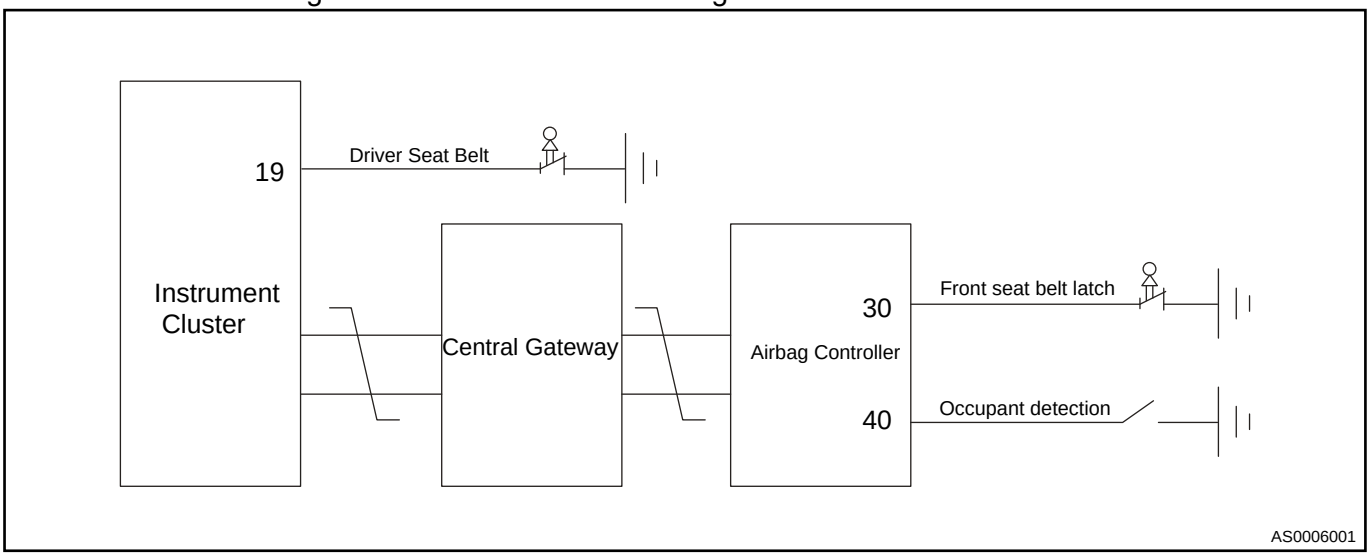
- Front passenger seat belt buckle schematic diagram is as shown in illustration. Front passenger seat belt buckle status: When detected external resistance is lower than 400 Ω, it’ s judged that the seat belt is not fastened. When resistance is higher than 900 Ω, it’ s judged that the seat belt is fastened.



- Driver seat belt buckle schematic diagram is as shown in illustration. The buckle is connected to the 19# terminal of instrument cluster. When ENGINE START STOP switch is ON, if the 19# terminal is high level / suspending, the driver seat belt warning in instrument cluster does not alarm; if the 19# terminal is low level, it will alarm.



Electrical schematic diagram related to seat belt warning is as follows:



Warning strategy is as follows
When ENGINE START STOP switch is in ON position:
If the driver wears the seat belt, the driver seat belt warning light goes off; If the seat belt is not fastened, the driver seat belt warning symbol flashes, and the buzzer will sound when vehicle speed is ⩾25 km/h, to remind the driver to wear the seat belt;
When ENGINE START STOP switch is in ON position:
The passenger seat belt buckle switch detection and passenger detection device operate together to confirm the logic of front passenger seat belt reminder warning light.If there is an adult on the seat (signal of the detection device), and the seat belt is not fastened, the passenger seat belt warning symbol flashes, and the buzzer will sound when vehicle speed is 25 km/h or more, to remind the passenger to wear the seat belt. If the seat belt is fastened, the alarm will stop.
When seat belt warning is operating:
If the seat belt is fastened, the alarm will stop.
Shift to R position or warning for 100 seconds has finished, the buzzer stops sounding and indication warning continues.

Curtain Shield Airbag
Curtain shield airbag is mainly used to protect the head of passengers during side collision. The curtain shield airbag is installed in the inner side of roof and body quarter sheet metal, usually run through the front and rear, and it is controlled by the lateral acceleration sensor in the body. It will deploy when the lateral acceleration is greater than the calibrated threshold.

Resistance: 2.0 ± 0.3 Ω

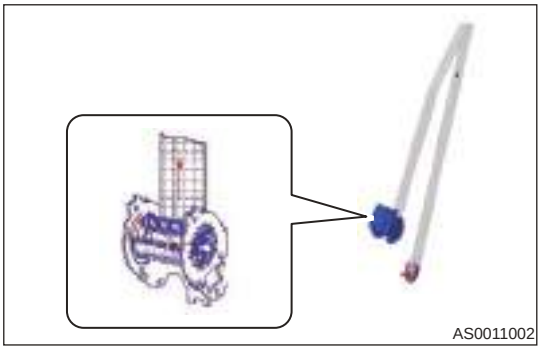
Seat Belt
Following types of belts are equipped together with common emergency lock type seat belt:

1. Emergency lock type belt

   Reduce the pressure of belt on passengers, protect the occupants and prevent second collision.

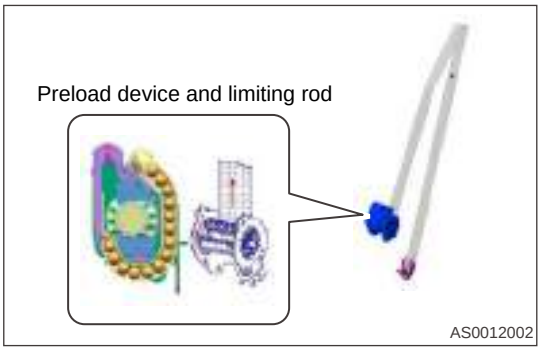
2. Limiting type belt

   Besides common emergency lock type belt, limiter lever is added. Reduce the pressure of belt on passengers, protect the occupants and prevent second collision.



3. Limiting type belt with pretensioner

   Besides common emergency lock type belt, pretensioner and limiter lever are added, which tightens the belt, reduces the pressure of belt on passengers, protects the occupants and prevents second collision during deployment.



Post-accident Repair and Inspection

1. Post-accident components replacement of deployed airbag.
   a. Airbag controller components should be replaced immediately in accordance with the provisions in this manual after the airbag is deployed in an accident.
2. Post-accident components replacement of seat belt.

   Hint:
   After the collision, the seat belt replacement can be divided into the following two situations:
   - The seat belt with pretensioner is determined to be activated or not depending on the form of the collision.
   - Restraint and emergency locking are based on the presence or absence of an occupant.

   a. Some seat belts need to be replaced or recommended to be replaced if airbag is deployed in an accident.

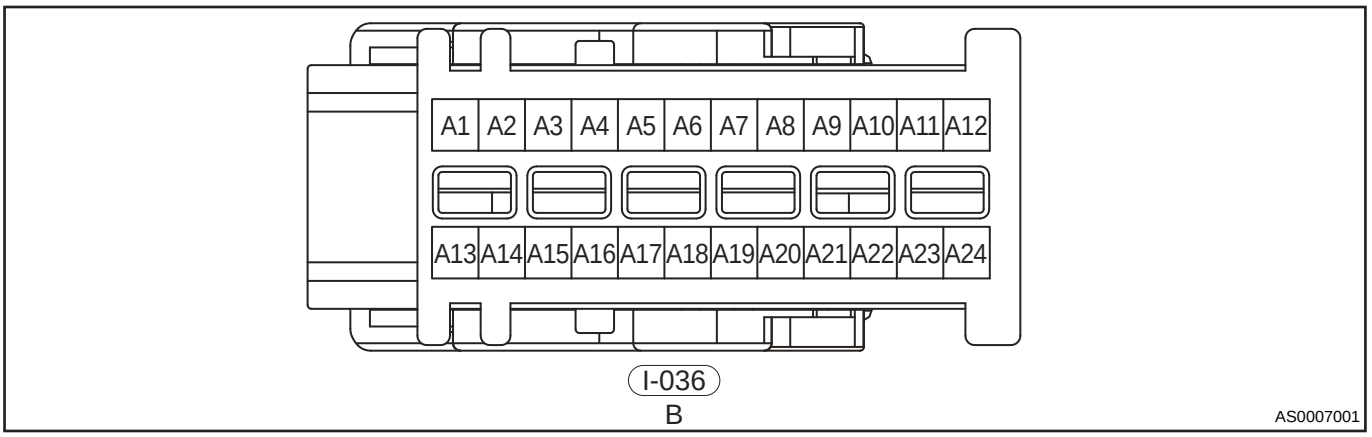
Seat Belt	Replace or Not
Used limiting type belt in the event of an accident	It is necessary to replace it
Seat belt with pretensioner that must be exploded or has been exploded	It is necessary to replace it
Used common emergency lock type belt in the event of an accident	It is necessary to replace it
Height adjuster (the seat belt had been used in the event of an accident)	It is necessary to replace it

3. Post-accident inspection of other components
   a. No matter whether the airbag is deployed or not, specific inspection must be carried out after any collision. The steering column must be measured for dimension. Check the instrument panel and steering column cover for cracks or other damage, check the instrument panel support for deformation, bending, cracks or other damage and check the seat belt and installation fixing point.

System Circuit Diagram

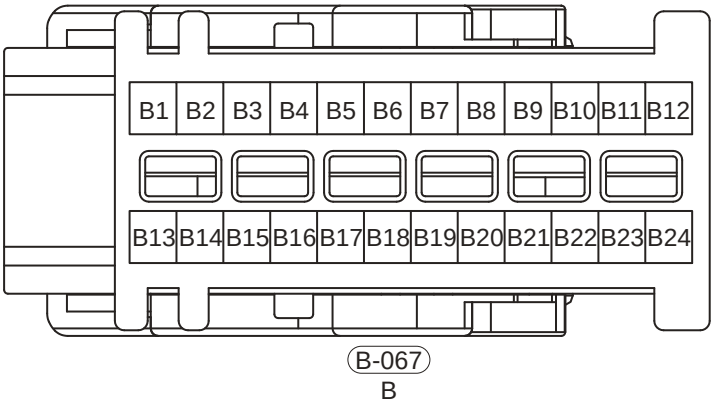
Module Terminal Definition

Airbag Module A



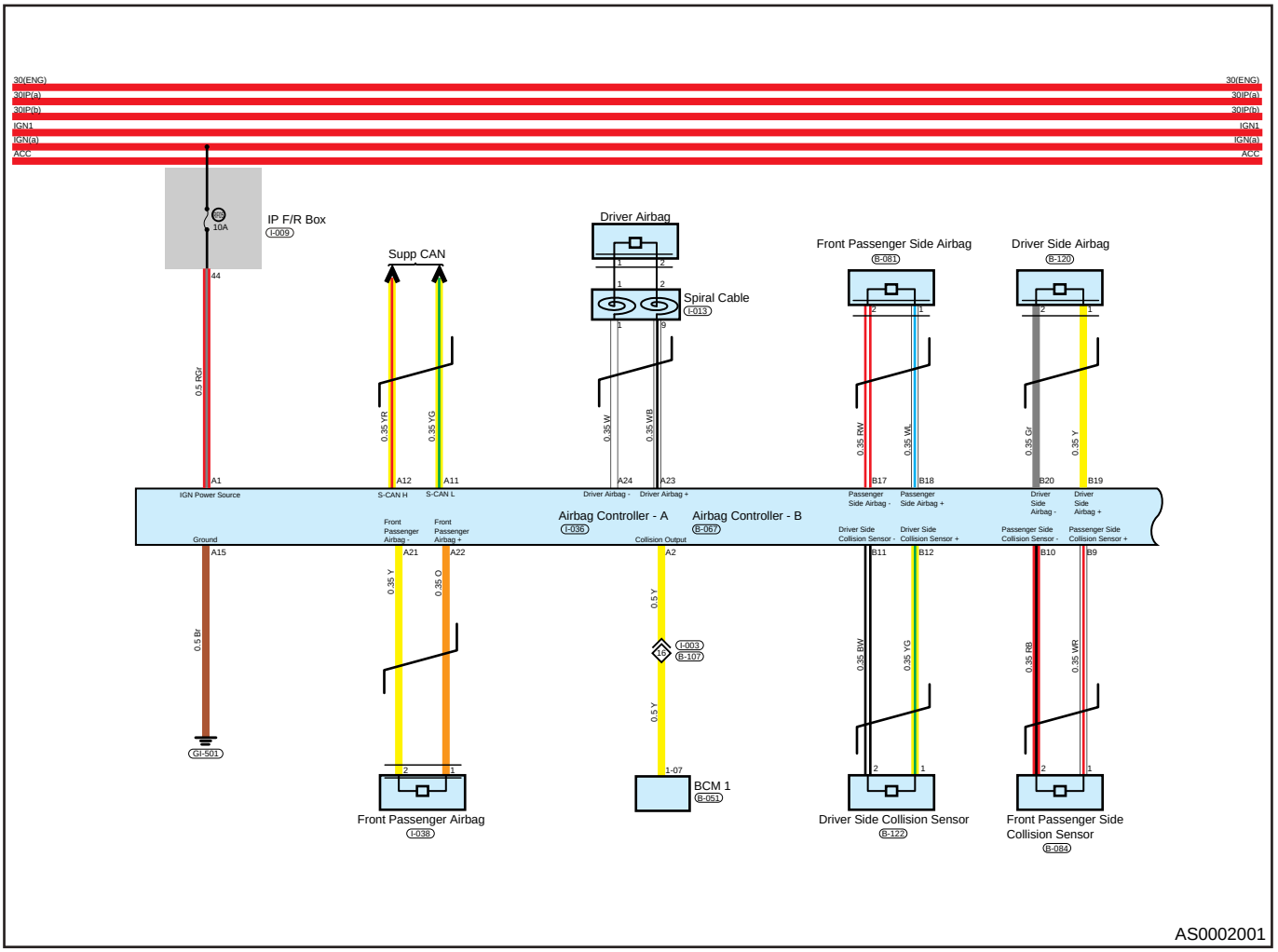
Pin	Definition	Pin	Definition
1	Power Source Positive	2	Collision Output
3	Second Row Left Belt Buckle Switch	4	Second Row Middle Belt Buckle Switch
5	Passenger Airbag SW	6	Second Row Right Belt Buckle Switch
7	-	8	-
9	-	10	-
11	CAN Low	12	CAN High
13	Passenger Seat Belt Buckle Switch	14	Front Passenger Detection
15	Power Source Ground	16	-
17	Seat Belt Pretensioner FR -	18	Seat Belt Pretensioner FR +
19	Seat Belt Pretensioner RL +	20	Seat Belt Pretensioner RL -
21	Front Passenger Airbag -	22	Front Passenger Airbag +
23	Driver Airbag +	24	Driver Airbag -

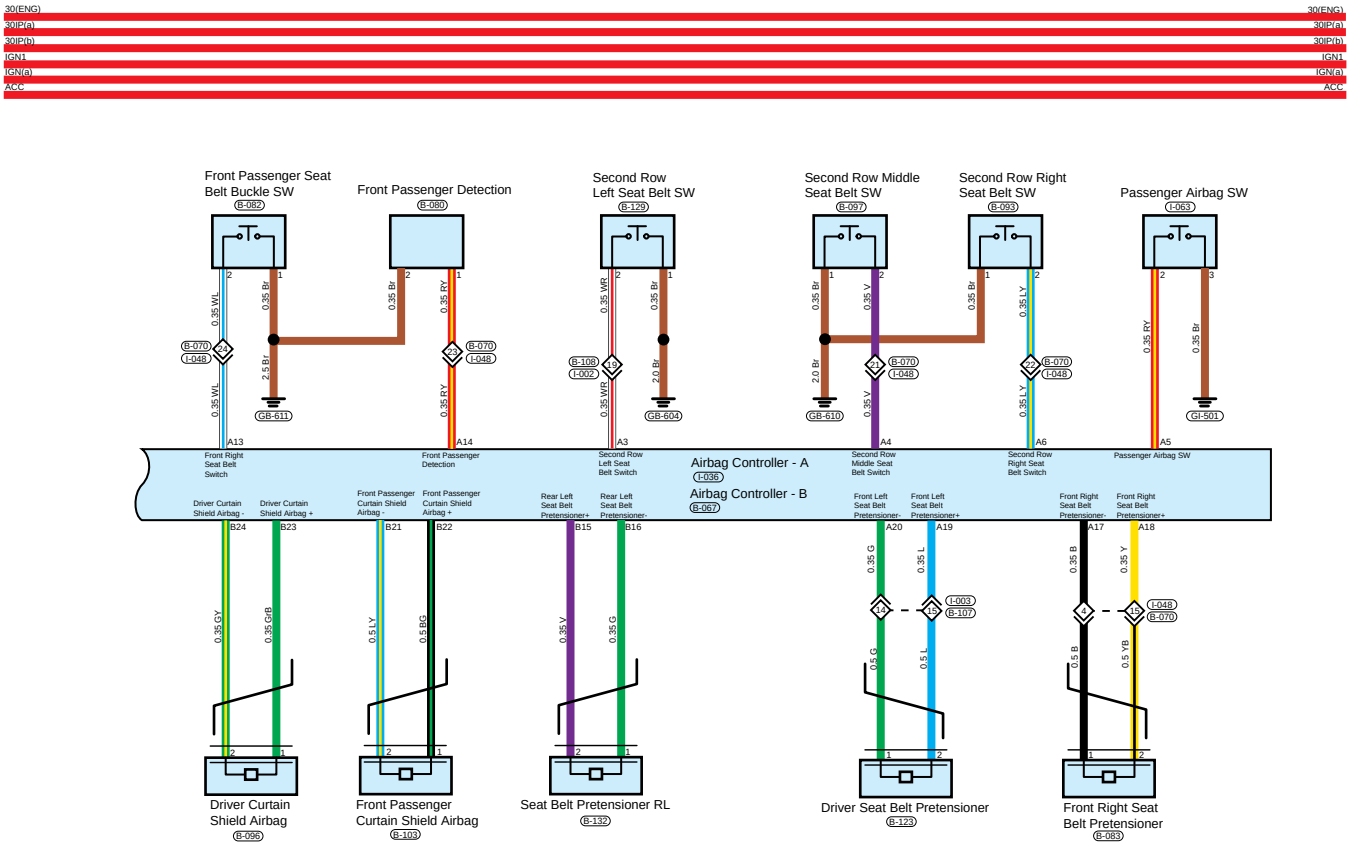
Airbag Module B



Pin	Definition	Pin	Definition
1	-	2	-
3	-	4	-
5	-	6	-
7	-	8	-
9	Right Side Collision Sensor +	10	Right Side Collision Sensor -
11	Left Side Collision Sensor -	12	Left Side Collision Sensor +
13	-	14	-
15	Rear Left Seat Belt Pretensioner +	16	Rear Left Seat Belt Pretensioner -
17	Front Right Side Airbag -	18	Front Right Side Airbag +
19	Front Left Side Airbag +	20	Front Left Side Airbag -
21	Front Right Side Curtain Shield Airbag -	22	Front Right Side Curtain Shield Airbag +
23	Front Left Side Curtain Shield Airbag +	24	Front Left Side Curtain Shield Airbag -

Circuit Diagram





Matching Learning

Module Matching Learning

Items	Applicable Situations	Actions Required by Diagnostic Tester	Note
Module replacement	· Module damaged, needs replacement	VIN data write-inWrite software configuration1 (information)	

1. Connect diagnostic tester, turn ENGINE START STOP switch to ON.
2. Select the model.
3. Proceed to next interface and click “SRS (Supplemental Restrain System)” to select.
4. Enter next screen and click “Special Function”.
5. Select “VIN Data Write-In” / “Write software configuration1 (information)”.

- When all conditions are satisfied, ACU starts to write the configuration word. After writing, ACU automatically restarts and detects if there is a current fault. The time for determining and writing the configuration word is about 10 s;
- Case 1: No fault, ACU directly locks the configuration;
- Case 2: There is a fault, all associated DTC faults are solved in ACU before the configuration can be locked.
- If ACU configuration needs to be changed after locking, activate it again through the diagnostic tester and turn on ACU reconfiguration function.
- State description for airbag light:
  a.When the vehicle is powered on and initialized, airbag light will be on for 6 seconds and off for 1 second;
  b.The airbag light flashes during the initial configuration of ACU factory or activating configuration again using the diagnostic tester;
  c.After ACU configuration is completed, if there is a fault, the airbag light will remain on; if there is no fault, the airbag light will turn off.

⚠ Caution

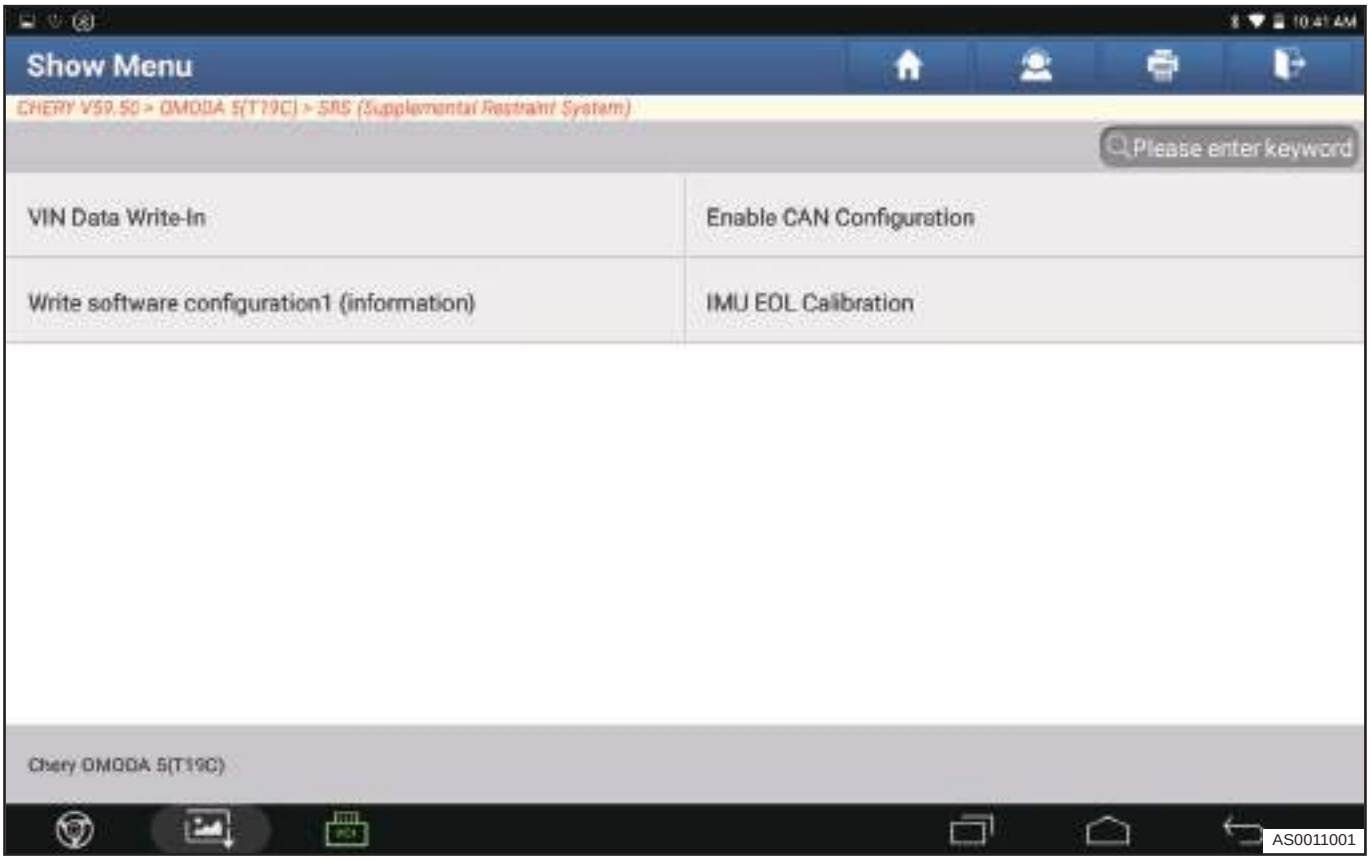
- ACU is divided into high configuration and low configuration (179AA is low configuration, 180AA is high configuration). Confirm the vehicle configuration information during installation firstly.
- Handle ACU carefully and it’ s strictly forbidden to tap and crash it fiercely.
- There should be no other objects between ACU installation plane and ACU module, and ACU must be installed directly on body panel.
- Make sure that the ignition key cylinder is in OFF state during installation and removal of ACU, and never install or remove it with power on.
- Reconfirm the installation direction of ACU after installation and make sure that label arrow direction is facing vehicle head. If fitted reversely, airbag controller assembly will not operate normally.
- ACU is not configured or during in configuration (when airbag light is flashing), ACU does not have the function of deployment, vehicle can not operate normally.

IMU (Inertial Sensor) Calibration

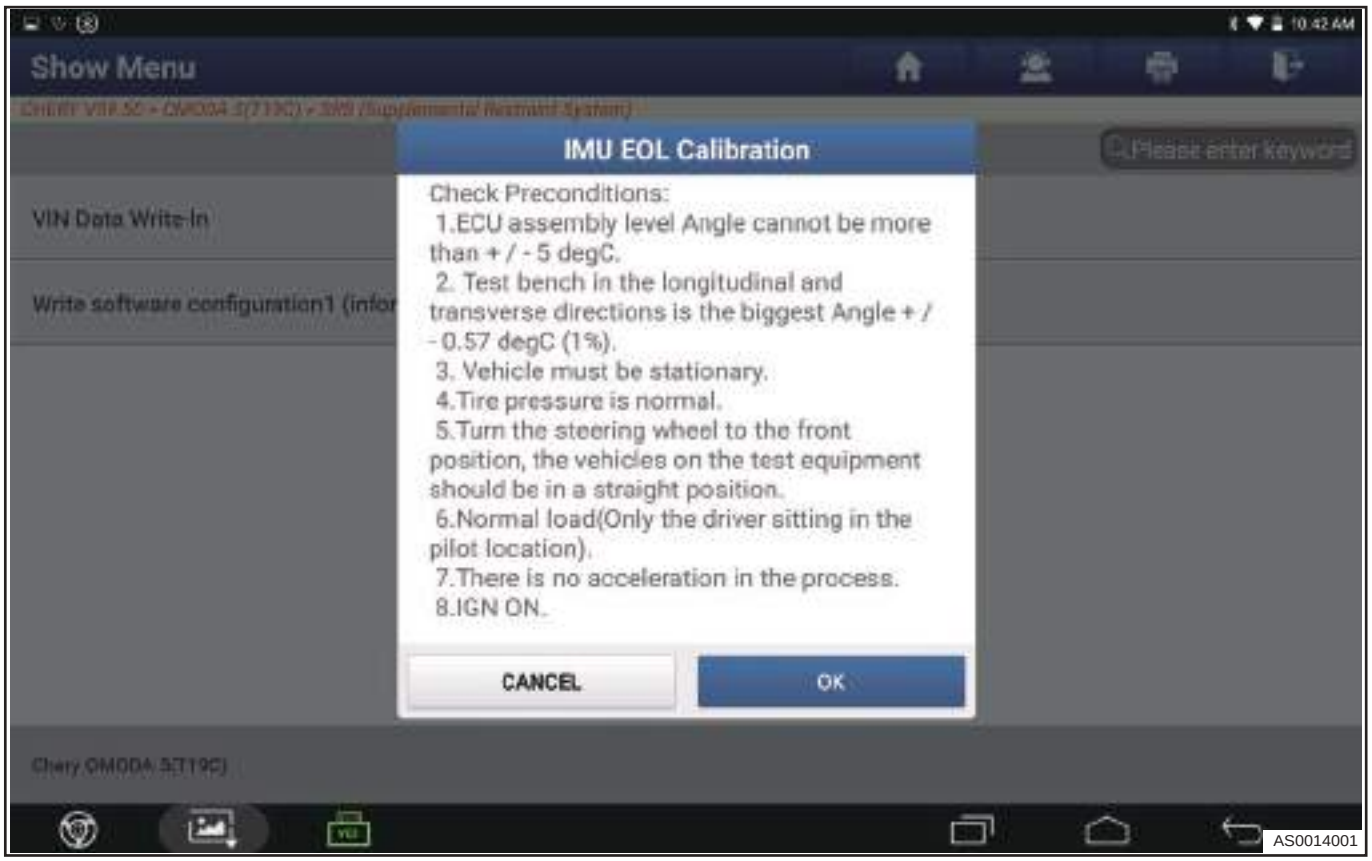
1. Connect diagnostic tester, turn ENGINE START STOP switch to ON.
2. Select the model.
3. Proceed to next interface and click “SRS (Supplemental Restrain System)” to select.

4. Enter next screen and click “Special Function”.

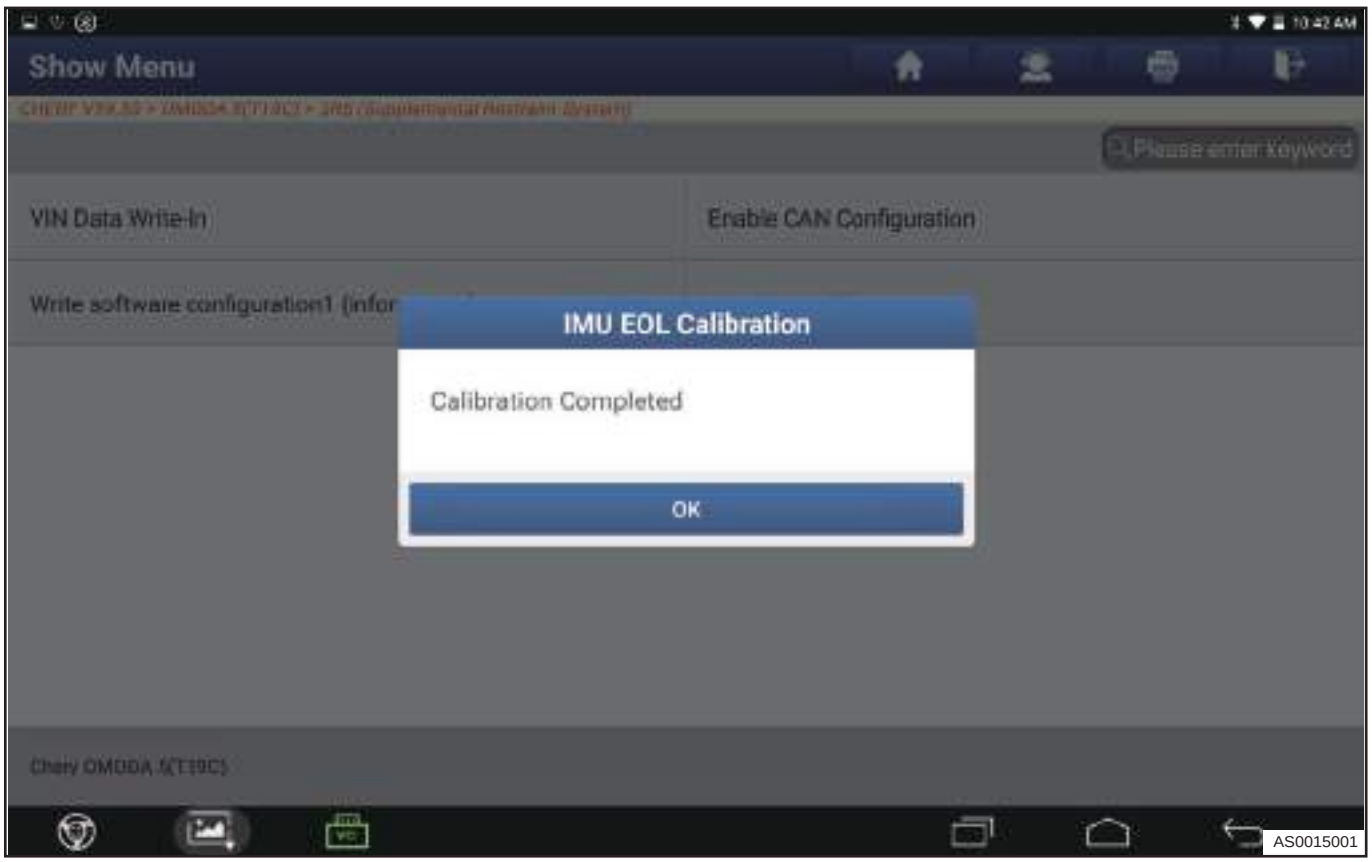
5. Select “IMU EOL Calibration”.



6. Sensor calibration conditions.



7. Diagnostic tester will prompt whether calibration is success or not.



⚠ Caution
• Replace airbag module and recalibrate the inertial sensor.

Diagnosis & Test

Diagnosis Contents

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Airbag system indicator remains on	Battery voltage is too low or too high
	Airbag module internal fault
	Instrument cluster airbag indicator fault
	Poor contact in instrument cluster connector
	Airbag module power supply fuse open or poor contact
	Poor contact in airbag module connector
	Airbag circuit fault
Airbag assembly (resistance is too high or too low)	Airbag itself fault
	Connection fault between airbag and airbag module
	Airbag module fault

DTC Confirmation Procedure
Confirm that battery voltage is normal before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn ENGINE START STOP switch to ON.
- Use diagnostic tester to record and clear DTCs stored in supplemental restraint system.
- Turn the ENGINE START STOP switch to OFF and wait for several seconds.
- Turn ENGINE START STOP switch to “ON”, and then select read DTC.
- If DTC is detected, it indicates current malfunction.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

Intermittent DTC Troubleshooting
If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.

- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect airbag components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Preparations before Dealing with Airbag System Wire Harness Malfunction

1. Read and record the system DTC.
2. Turn ENGINE START STOP switch to OFF, disconnect the negative battery cable for at least 1 minute so that the airbag controller has enough time to discharge.
3. Prevent electric static discharge, such as static-proof wrist strap.
4. To prevent the ignition element from igniting accidentally during wire harness measurement, it is necessary to disengage all elements connected to wire harness, such as airbag, module, sensor etc. before measuring.

Airbag System Malfunction Repair Completion Inspection

1. Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable (if is the connected);
2. Connect each wire harness connector of airbag system;
3. Connect negative battery cable;
4. Start the vehicle, operate the electrical system, turn on the electrical equipment as much as possible (-blower, rear defroster, headlight, audio, etc.). If all the following requirements are met, the airbag system is normal, otherwise it should be checked and repaired again:
   a. ENGINE START STOP switch is ON, system performs self-check, airbag warning light comes on. Warning light goes off when self-check is completed.
   b. Connect the diagnostic tester, read the DTC and observe the datastream. Use the simulation method if necessary. Test the vehicle in the malfunction conditions described by customer, check if the malfunction is no longer duplicate and no other DTCs are produced.
   c. If equipped with front passenger detection device, the front passenger seat belt warning light should operate normally; (Check method: A person sits on the front passenger seat and does not wear the seat belt, the light comes on and goes off after the seat belt is fastened.)
   d. Clear history DTC (if exists)

Disposal of Airbag

Airbag deploys (in vehicle).

1. It is necessary to deploy the airbag before disposing. If the vehicle is scrapped and disassembled, the airbag may deploy in vehicle.
   a. Preventive procedure of airbag deployment

⚠ Caution

To prevent injury when deploying the airbag in vehicle, please refer to following prevention methods:

- Remove all movable objects or loose parts within airbag deployment range before the airbag is deployed.
- The airbag is deployed only in the reserved airbag deployment area with door closed and side window opened.
- The airbag is deployed only in the reserved airbag deployment area (site), the technicians must stand at least 10 meters in front of the vehicle.
- Do not load voltage before all preparations have been completed.
- Cool down the airbag at least 30 minutes before handling the deployed airbag.
- Please wear gloves and safety glasses during disposal process.
- If airbag deployment is failed, wait at least 5 minutes after disconnecting the voltage, and then you can approach the vehicle.

   b. Prevention methods of deployment procedure
      i. Inside deployment prevention methods
         - Disconnect the negative and positive battery cables and move the battery 10 meters away from the vehicle.
         - Prepare two additional wire harnesses at least 10 meters long for each one and special connector for connecting the spiral cable (clock spring). Peel off the 13 mm insulation coat at the end of wire harness. Connect the connector at one end and another end to twist as shown in illustration.
         - Place the twisted end next to the battery for airbag deployment, but do not connect it to battery at this time.
         - Remove driver side lower instrument panel from steering column. When connecting the lower part of steering column to SRS wire harness connector of spiral cable, connect the connector in figure 10.
         - Clean the site.
         - Disengage the twisted end of the wire harness next to the battery for airbag deployment.
         - One wire harness contacts with negative battery and another one contacts with positive battery, the airbag will deploy at this time.
         - Deploy the passenger side airbag module using the same procedure.
         - Handle the deployed airbag with correct prevention methods. Refer to “Handling Procedure for Deployed Airbag” in this manual.
      ii. Outside deployment prevention methods
         - Install the airbag set to the tire with rim with airbag front surface faced up, and the space for wire and connector is reserved to prevent the deployment from being destroyed.
         - Prepare two additional wire harnesses at least 10 meters long for each one and special connector for connecting airbag set. Peel off the 13 mm insulation coat at the end of wire harness. Connect the connector at one end as shown in illustration.
         - Place the twisted end next to the battery for airbag deployment, but do not connect it to battery at this time.
         - Stack 4 old tires without rims on the wheel installed with airbag set, and secure all the tires in 4 different positions with rope.
         - Clean the site.
         - Disengage the twisted end of the wire harness next to the battery for airbag deployment.

- One wire harness contacts with negative battery and another one contacts with positive battery, the airbag will deploy at this time.
- Deploy the passenger side airbag module using the same procedure.
- Handle the deployed airbag with correct prevention methods. Refer to “Handling Procedure for Deployed Airbag Set” in this manual.

Handling procedure for deployed airbag set

2. Place the deployed airbag in a solid plastic bag.
3. Be sure to seal the plastic bag tightly.
4. Wash both hands carefully after handling the deployed airbag.
5. Although above protection measures are taken, if the irritant substance attaches to the eyes or skin, flush it with a large amount of water immediately.

⚠ Caution

- There may be powder particles on airbag surface, which is primarily composed of chemical reaction product (used to lubricate bag when inflating).
- There may be substance which can irritate eyes or skin attached to the deployed airbag, so please wear gloves and safety glasses during disposal process.
- After the airbag deploys, the temperature on airbag module metal surface is very high. To avoid any injury or fire, please keep the deployed airbag module far away from any combustible materials,
- Do not pour water or oil on the airbag after the airbag deploys and handle it after cooling for 30 minutes.

Diagnosis Procedure

Hint:
Use following procedures to troubleshoot the airbag control system.

1	**Vehicle brought to workshop**

Next

2	**Check battery voltage**

Check if battery voltage is normal.
OK
Standard voltage: Not less than 12V.
Result

Result	Go to
OK	A
NG	B

B → **Replace battery**

A

3	**Check ACU warning light**

Next

4	Check for DTCs (current DTC and history DTC)

Result

Result	Go to
DTC occurs	A
No DTC	B

B → **Perform repair according to problem symptoms table**

A

5	Read DTCs (current DTC and history DTC)

Result

Result	Go to
Current DTC	A
History DTC	B

B → **Troubleshoot according to Intermittent DTC malfunction procedures**

A

6	Repair according to Diagnostic Trouble Code (DTC) Chart

Next

7	Adjust, repair or replace

Next

8	Conduct test and confirm malfunction has been repaired

Next → **End**

Diagnostic Trouble Code (DTC) Chart

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1-250-16	Power Supply-Circuit Voltage Below Threshold	Circuit voltage below threshold;	External	• When voltage is less than 7.2 V, the malfunction is detected; • When voltage is less than 8.5 V, the malfunction may is detected;	When voltage is 9 V, the malfunction disappears When voltage is 7.7 V, the malfunction may disappear	• Excessive low vehicle power supply voltage	The vehicle power supply voltage control is within normal range	Warning light comes on
B1-250-17	Power Supply-Circuit Voltage Above Threshold	Circuit voltage above threshold;	External	• When voltage is 19.5 V, the malfunction is detected; • When voltage is 16.5 V, the malfunction may is detected;	When voltage is less than 16 V, the malfunction disappears When voltage is less than 19 V, the malfunction may disappear	• Excessive high vehicle power supply voltage	The vehicle power supply voltage control is within normal range	Warning light comes on
B0-001-11	Driver Frontal Airbag Deployment Control-Circuit Short To Ground	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of	• Driver front airbag initiation circuit is short to ground, and short-circuit current is detected by controller (pin 4 and 5)	Protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
					driver front airbag ignition circuit and ground.			
B0-001-12	Driver Frontal Airbag Deployment Circuit Short To Battery	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction can be stored as history DTC, troubleshoot driver front airbag ignition circuit;	• Driver front airbag initiation circuit is short to power supply, short-circuit current is detected by controller	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on
B0-001-1A	Driver Frontal Airbag Deployment Control Circuit Resistance Below Threshold	Circuit resistance below threshold	External	• When airbag is less than 1.4 Ω, the malfunction is detected; • When airbag resistance value is 1.4~1.7 Ω, the malfunction may be detected;	• When airbag resistance value is more than 1.4 Ω, the malfunction may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit;	• Driver frontal airbag initiation circuit resistance is below set threshold	Correctly define resistance range/ system operation	Warning light comes on
B0-001-1B	Driver Frontal Airbag	Circuit resistance above threshold	External	• When airbag resistance value is more than	• When airbag resistance value is less than 4.4 Ω, the	• Driver frontal airbag initiation circuit	Correctly define resistance range/ system operation	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Deployment Control Circuit Resistance Above Threshold			4.4 Ω, the malfunction is detected; • When airbag resistance value is 3.8~4.4 Ω, the malfunction may be detected;	malfunction may disappear; • When airbag resistance value is less than 3.8 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit;	resistance is above set threshold		
B0-010-11	Passenger Frontal Airbag Deployment Control	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver front airbag ignition circuit and ground.	• Front passenger front airbag initiation circuit is short to ground, short-circuit current is detected by controller	Protect the wire harness integrity	Warning light comes on
B0-010-12	Passenger Frontal Airbag Depl-	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected;	• When leakage resistance value is more than 1 kΩ, the malfunction	• Front passenger front airbag initiation circuit is short to	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	oyment Control			• When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot driver knee airbag ignition circuit;	power supply, short-circuit current is detected by controller		
B0-010-1A	Passenger Frontal Airbag Deployment Control	Circuit resistance below threshold	External	• When airbag is less than 1.1 Ω, the malfunction is detected; • When airbag resistance value is 1.1~1.7 Ω, the malfunction may be detected;	• When airbag resistance value is more than 1.4 Ω, the malfunction may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit.	• Front passenger airbag ignition circuit resistance below set threshold	Correctly define resistance range/ system operation	Warning light comes on
B0-010-1B	Passenger Frontal Airbag Deployment Control	Circuit resistance above threshold	External	• When airbag resistance value is more than 5.0 Ω, the malfunction is detected; • When airbag	• When airbag resistance value is less than 4.4 Ω, the malfunction may disappear; • When airbag resistance value is less	• Front passenger frontal initiation circuit resistance above set threshold	Correctly define resistance range/ system operation	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
				resistance value is 3.8~5.0 Ω, the malfunction may be detected;	than 3.8 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit.			
B0-004-11	Driver Knee Airbag Deployment Control Circuit Short To Ground	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver front airbag ignition circuit and ground.	• Airbag ignition circuit short to ground, short-circuit current detected by controller;	Protect the wire harness integrity	Warning light comes on
B0-004-12	Driver Knee Airbag Deployment Control Circuit Short To	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ,	• Airbag ignition circuit short to power supply, short circuit current detected by controller;	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Power Supply			malfunction may be detected;	the malfunction disappear, troubleshoot resistance value of driver knee airbag ignition circuit;			
B0-004-1A	Driver Knee Airbag Deployment Control-Circuit Resistance Below Threshold	Circuit resistance below threshold	External	• When airbag is less than 1.4 Ω, the malfunction is detected; • When airbag resistance value is 1.4~1.7 Ω, the malfunction may be detected;	• When airbag resistance value is more than 1.4 Ω, the malfunction may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit.	• Airbag ignition circuit resistance value is below set threshold.	Correctly define resistance range/ system operation	Warning light comes on
B0-004-1B	Driver Knee Airbag Deployment Control-Circuit Resistance Above Upper	Circuit resistance above threshold	External	• When airbag resistance value is more than 4.4 Ω, the malfunction is detected; • When airbag resistance value is 3.8~4.4 Ω, the	• When airbag resistance value is less than 4.4 Ω, the malfunction may disappear; • When airbag resistance value is less than 3.8 Ω, the malfunction disappear, test resistance	• Airbag ignition circuit resistance value is more than set threshold	Correctly define resistance range/ system operation	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Threshold			malfunction may be detected;	value of driver front airbag ignition circuit.			
B0-020-11	Left Side Airbag Deployment Control-Circuit Short To Ground	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver front airbag ignition circuit and ground.	• Airbag ignition circuit short to ground, short-circuit current detected by controller;	Protect the wire harness integrity	Warning light comes on
B0-020-12	Left Side Airbag Deployment Control-Circuit Short To Battery	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of	• Airbag ignition circuit short to power supply, short circuit current detected by controller	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
					driver knee airbag ignition circuit;			
B0-020-1A	Left Side Airbag Deployment Control-Circuit Resistance Below Threshold	Circuit resistance below threshold	External	• When airbag is less than 1.1 Ω, the malfunction is detected; • When airbag resistance value is 1.1~1.7 Ω, the malfunction may be detected;	• When airbag resistance value is more than 1.1 Ω, the malfunction may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit.	• Airbag ignition circuit resistance below set threshold	Correctly define resistance range/ system operation	Warning light comes on
B0-020-1B	Left Side Airbag Deployment Control-Circuit Resistance Above Threshold	Circuit resistance above threshold	External	• When airbag resistance value is more than 5.0 Ω, the malfunction is detected; • When airbag resistance value is 3.8~5.0, the malfunction may be detected;	• When airbag resistance value is less than 5.0, the malfunction may disappear; • When airbag resistance value is less than 3.8 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit;	• Airbag ignition circuit resistance value is more than set threshold	Correctly define resistance range/ system operation	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B0-028-11	Right Side Airbag Deployment Control Circuit Short To Ground	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver front airbag ignition circuit and ground.	• Airbag ignition circuit short to ground, short-circuit current detected by controller;	Protect the wire harness integrity	Warning light comes on
B0-028-12	Right Side Airbag Deployment Control Circuit Short To Battery	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver knee airbag ignition circuit;	• Airbag ignition circuit short to power supply, short circuit current detected by controller	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B0-028-1A	Right Side Airbag Deployment Control Circuit Resistance Below Threshold	Circuit resistance below threshold	External	• When airbag is less than 1.1, the malfunction is detected; • When airbag resistance value is 1.11~7 Ω, the malfunction may be detected;	• When airbag resistance value is more than 1.1, the malfunction may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit.	• Airbag ignition circuit resistance below set threshold	Correctly define resistance range/ system operation	Warning light comes on
B0-028-1B	Right Side Airbag Deployment Control Circuit Resistance Above Threshold	Circuit resistance above threshold	External	• When airbag resistance value is more than 5.0, the malfunction is detected; • When airbag resistance value is 3.8~5.0, the malfunction may be detected;	• When airbag resistance value is less than 4.4 Ω, the malfunction may disappear; • When airbag resistance value is less than 3.8 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit;	• Airbag ignition circuit resistance value is more than set threshold	Correctly define resistance range/ system operation	Warning light comes on
B0-021-11	Left Curtain Airbag	Circuit short to ground	External	• When leakage is less than 1 kΩ, the	• When leakage resistance value is more than 1 kΩ,	• Airbag ignition circuit short to ground,	Protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Deployment Control Circuit Short To Ground			malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver front airbag ignition circuit and ground.	short-circuit current detected by controller;		
B0-021-12	Left Curtain Airbag Deployment Control Circuit Short To Battery	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver knee airbag ignition circuit;	• Airbag ignition circuit short to power supply, short circuit current detected by controller	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on
B0-021-1A	Left Curtain Airbag	Circuit resistance below threshold	External	• When airbag is less than 1.4 Ω, the	• When airbag resistance value is more than 1.4 Ω, the malfunction	• Ignition circuit resistance value is below set threshold.	Correctly define resistance range/ system operation	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Deployment Control Circuit Resistance Below Threshold			malfunction is detected; • When airbag resistance value is 1.4~1.7 Ω, the malfunction may be detected;	may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit.			
B0-021-1B	Left Curtain Airbag Deployment Control Circuit Resistance Above Threshold	Circuit resistance above threshold	External	• When airbag is more than 5.0, the malfunction is detected; • When airbag resistance value is 3.8~5.0, the malfunction may be detected;	• When airbag resistance value is less than 4.4 Ω, the malfunction may disappear; • When airbag resistance value is less than 3.8 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit;	• Ignition circuit resistance above set threshold	Correctly define resistance range/ system operation	Warning light comes on
B0-029-11	Right Side Airbag Deployment Control Circuit	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear;	• Airbag ignition circuit short to ground, short-circuit current detected by controller;	Protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Short To Ground			value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver front airbag ignition circuit and ground.			
B0-029-12	Right Side Airbag Deployment Control-Circuit Short To Battery	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver knee airbag ignition circuit;	• Airbag ignition circuit short to power supply, short circuit current detected by controller	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on
B0-029-1A	Right Side Airbag Deployment Control-	Circuit resistance below threshold	External	• When airbag is less than 1.4 Ω, the malfunction is detected; • When airbag resistance	• When airbag resistance value is more than 1.4 Ω, the malfunction may disappear; • When airbag resistance	• Airbag ignition circuit resistance below set threshold	Correctly define resistance range/ system operation	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Circuit Resistance Below Threshold			value is 1.4~1.7 Ω, the malfunction may be detected;	value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit.			
B0-029-1B	Right Side Airbag Deployment Control-Circuit Resistance Above Threshold	Circuit resistance above threshold	External	• When airbag is more than 5.0, the malfunction is detected; • When airbag resistance value is 3.8~5.0, the malfunction may be detected;	• When airbag resistance value is less than 4.4 Ω, the malfunction may disappear; • When airbag resistance value is less than 3.8 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit;	• Ignition circuit resistance above set threshold	Correctly define resistance range/ system operation	Warning light comes on
B1-285-11	Front Row Left Seatbelt Retractor Pretensioner Deployment Control-	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the	• Airbag ignition circuit short to ground, short-circuit current detected by controller;	Protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Circuit Short To Ground			malfunction may be detected;	malfunction disappear, troubleshoot resistance value of driver front airbag ignition circuit and ground.			
B1-285-12	Front Row Left Seatbelt Retractor Pretensioner Deployment Control-Circuit Short To Battery	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver knee airbag ignition circuit;	• Airbag ignition circuit short to power supply, short circuit current detected by controller	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on
B1-285-1A	Front Row Left Seatbelt Retractor Pretensioner Deployment Control-	Circuit resistance below threshold	External	• When airbag is less than 1.4 Ω, the malfunction is detected; • When airbag resistance value is 1.4~1.7 Ω, the	• When airbag resistance value is more than 1.4 Ω, the malfunction may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test	• Ignition circuit resistance is less than set threshold	Correctly define resistance range/ system operation	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Circuit Resistance Below Threshold			malfunction may be detected;	resistance value of driver front airbag ignition circuit.			
B1-285-1B	Front Row Left Seatbelt Retractor Pretensioner Deployment Control-Circuit Resistance Above Threshold	Circuit resistance above threshold	External	• When airbag is more than 5.0, the malfunction is detected; • When airbag resistance value is 3.8~5.0, the malfunction may be detected;	• When airbag resistance value is less than 4.4 Ω, the malfunction may disappear; • When airbag resistance value is less than 3.8 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit;	• Ignition circuit resistance above set threshold	Correctly define resistance range/ system operation	Warning light comes on
B1-286-11	Front Row Right Seatbelt Retractor Pretensioner Deployment Control-Circuit Short	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot	• Airbag ignition circuit short to ground, short-circuit current detected by controller;	Protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	To Ground				resistance value of driver front airbag ignition circuit and ground.			
B1-286-12	Front Row Right Seatbelt Retractor Pretensioner Deployment Control Circuit Short To Battery	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver knee airbag ignition circuit;	• Airbag ignition circuit short to power supply, short circuit current detected by controller	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on
B1-286-1A	Front Row Right Seatbelt Retractor Pretensioner Deployment Control Circuit Resi-	Circuit resistance below threshold	External	• When airbag is less than 1.4 Ω, the malfunction is detected; • When airbag resistance value is 1.4~1.7 Ω, the malfunction may be detected;	• When airbag resistance value is more than 1.4 Ω, the malfunction may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front	• Ignition circuit resistance is less than set threshold	Correctly define resistance range/ system operation	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	stance Below Threshold				airbag ignition circuit.			
B1-286-1B	Front Row Right Seatbelt Retractor Pretensioner Deployment Control-Circuit Resistance Above Threshold	Circuit resistance above threshold	External	• When airbag is more than 5.0, the malfunction is detected; • When airbag resistance value is 3.8~5.0, the malfunction may be detected;	• When airbag resistance value is less than 4.4 Ω, the malfunction may disappear; • When airbag resistance value is less than 3.8 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit;	• Ignition circuit resistance above set threshold	Correctly define resistance range/ system operation	Warning light comes on
B1-204-11	Belt Pretensioner Driver Deployment Control-Circuit Short To Ground	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver front	• Airbag ignition circuit short to ground, short-circuit current detected by controller;	Protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
					airbag ignition circuit and ground.			
B1-204-12	Belt Pretensioner Driver Deployment Control Circuit Short To Battery	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver knee airbag ignition circuit;	• Airbag ignition circuit short to power supply, short circuit current detected by controller	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on
B1-204-1A	Belt Pretensioner Driver Deployment Control Circuit Resistance Below Threshold	Circuit resistance below threshold	External	• When airbag is less than 1.4 Ω, the malfunction is detected; • When airbag resistance value is 1.4~1.7 Ω, the malfunction may be detected;	• When airbag resistance value is more than 1.4 Ω, the malfunction may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit.	• Ignition circuit resistance is less than set threshold	Correctly define resistance range/ system operation	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1-204-1B	Belt Pretensioner Driver Deployment Control Circuit Resistance Above Threshold	Circuit resistance above threshold	External	• When airbag is more than 5.0, the malfunction is detected; • When airbag resistance value is 3.8~5.0, the malfunction may be detected;	• When airbag resistance value is less than 4.4 Ω, the malfunction may disappear; • When airbag resistance value is less than 3.8 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit;	• Ignition circuit resistance above set threshold	Correctly define resistance range/ system operation	Warning light comes on
B1-205-11	Belt Pretensioner Passenger Deployment Control Circuit Short To Ground	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver front airbag ignition circuit and ground.	• Airbag ignition circuit short to ground, short-circuit current detected by controller;	Protect the wire harness integrity	Warning light comes on
B1-205-12	Belt Prete-	Circuit short to	External	• When leakage is	• When leakage	• Airbag ignition	Connect the wire harness	Warning

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	nsioner Passenger Deployment Control Circuit Short To Battery	power supply		less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver knee airbag ignition circuit;	circuit short to power supply, short circuit current detected by controller	firmly or protect the wire harness integrity	light comes on
B1-205-1A	Belt Pretensioner Passenger Deployment Control Circuit Resistance Below Threshold	Circuit resistance below threshold	External	• When airbag is less than 1.4 Ω, the malfunction is detected; • When airbag resistance value is 1.4~1.7 Ω, the malfunction may be detected;	• When airbag resistance value is more than 1.4 Ω, the malfunction may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit.	• Ignition circuit resistance is less than set threshold	Correctly define resistance range/ system operation	Warning light comes on
B1-205-1B	Belt Pretensioner	Circuit resistance above	External	• When airbag is more than 5.0, the	• When airbag resistance value is less than 4.4 Ω, the	• Ignition circuit resistance above	Correctly define resistance range/	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Passenger Deployment Control Circuit Resistance Above Threshold	threshold		malfunction is detected; • When airbag resistance value is 3.8~5.0, the malfunction may be detected;	malfunction may disappear; • When airbag resistance value is less than 3.8 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit;	set threshold	system operation	
B0-073-11	Second Row Left Seatbelt Pretensioner Deployment Control Circuit Short To Ground	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver front airbag ignition circuit and ground.	• Airbag ignition circuit short to ground, short-circuit current detected by controller;	Protect the wire harness integrity	Warning light comes on
B0-073-12	Second Row Left Seatbelt Prete-	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected;	• When leakage resistance value is more than 1 kΩ, the malfunction	• Airbag ignition circuit short to power supply, short circuit	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	nsioner Deployment Control Circuit Short To Battery			• When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver knee airbag ignition circuit;	current detected by controller		
B0-073-1A	Second Row Left Seatbelt Pretensioner Deployment Control Circuit Resistance Below Threshold	Circuit resistance below threshold	External	• When airbag is less than 1.4 Ω, the malfunction is detected; • When airbag resistance value is 1.4~1.7 Ω, the malfunction may be detected;	• When airbag resistance value is more than 1.4 Ω, the malfunction may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit.	• Ignition circuit resistance is less than set threshold	Correctly define resistance range/ system operation	Warning light comes on
B0-073-1B	Second Row Left Seatbelt Pretensioner	Circuit resistance above threshold	External	• When airbag is more than 5.0, the malfunction is detected; • When airbag	• When airbag resistance value is less than 4.4 Ω, the malfunction may disappear;	• Ignition circuit resistance above set threshold	Correctly define resistance range/ system operation	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Deployment Control Circuit Resistance Above Threshold			resistance value is 3.8~5.0, the malfunction may be detected;	• When airbag resistance value is less than 3.8 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit;			
B0-075-11	Second Row Right Seatbelt Pretensioner Deployment Control Circuit Short To Ground	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver front airbag ignition circuit and ground.	• Airbag ignition circuit short to ground, short-circuit current detected by controller;	Protect the wire harness integrity	Warning light comes on
B0-075-12	Second Row Right Seatbelt Pretensioner Depl-	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear;	• Airbag ignition circuit short to power supply, short circuit current detected	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	oyment Control Circuit Short To Battery			(1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver knee airbag ignition circuit;	by controller		
B0-075-1A	Second Row Right Seatbelt Pretensioner Deployment Control Circuit Resistance Below Threshold	Circuit resistance below threshold	External	• When airbag is less than 1.4 Ω, the malfunction is detected; • When airbag resistance value is 1.4~1.7 Ω, the malfunction may be detected;	• When airbag resistance value is more than 1.4 Ω, the malfunction may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit.	• Ignition circuit resistance is less than set threshold	Correctly define resistance range/ system operation	Warning light comes on
B0-075-1B	Second Row Right Seatbelt Pretensioner Deployment	Circuit resistance above threshold	External	• When airbag is more than 5.0, the malfunction is detected; • When airbag resistance value is 3.8~5.0,	• When airbag resistance value is less than 4.4 Ω, the malfunction may disappear; • When airbag resistance value is less than 3.8 Ω,	• Ignition circuit resistance above set threshold	Correctly define resistance range/ system operation	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Control-Circuit Resistance Above Threshold			the malfunction may be detected;	the malfunction disappear, test resistance value of driver front airbag ignition circuit;			
B0-030-11	Second Row Left Side Airbag Deployment Control-Circuit Short To Ground	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver front airbag ignition circuit and ground.	• Airbag ignition circuit short to ground, short-circuit current detected by controller;	Protect the wire harness integrity	Warning light comes on
B0-030-12	Second Row Left Side Airbag Deployment Control-Circuit	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ,	• Airbag ignition circuit short to power supply, short circuit current detected by controller	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Short To Battery			malfunction may be detected;	the malfunction disappear, troubleshoot resistance value of driver knee airbag ignition circuit;			
B0-030-1A	Second Row Left Side Airbag Deployment Control Circuit Resistance Below Threshold	Circuit resistance below threshold	External	• When airbag is less than 1.4 Ω, the malfunction is detected; • When airbag resistance value is 1.4~1.7 Ω, the malfunction may be detected;	• When airbag resistance value is more than 1.4 Ω, the malfunction may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit.	• Ignition circuit resistance is less than set threshold	Correctly define resistance range/ system operation	Warning light comes on
B0-030-1B	Second Row Left Side Airbag Deployment Control Circuit Resistance	Circuit resistance above threshold	External	• When airbag is more than 5.0, the malfunction is detected; • When airbag resistance value is 3.8~5.0, the malfunction may be detected;	• When airbag resistance value is less than 4.4 Ω, the malfunction may disappear; • When airbag resistance value is less than 3.8 Ω, the malfunction disappear, test resistance	• Ignition circuit resistance above set threshold	Correctly define resistance range/ system operation	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Above Threshold				value of driver front airbag ignition circuit;			
B0-038-11	Second Row Right Side Seat Side Airbag Deployment Control-Circuit Short To Ground	Circuit short to ground	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of driver front airbag ignition circuit and ground.	• Airbag ignition circuit short to ground, short-circuit current detected by controller;	Protect the wire harness integrity	Warning light comes on
B0-038-12	Second Row Right Side Seat Side Airbag Deployment Control-Circuit Short To Battery	Circuit short to power supply	External	• When leakage is less than 1 kΩ, the malfunction is detected; • When leakage resistance value is (1~10) kΩ, the malfunction may be detected;	• When leakage resistance value is more than 1 kΩ, the malfunction may disappear; • When leakage resistance value is more than 10 kΩ, the malfunction disappear, troubleshoot resistance value of	• Airbag ignition circuit short to power supply, short circuit current detected by controller	Connect the wire harness firmly or protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
					driver knee airbag ignition circuit;			
B0-038-1A	Second Row Right Side Seat Side Airbag Deployment Control Circuit Resistance Below Threshold	Circuit resistance below threshold	External	• When airbag is less than 1.4 Ω, the malfunction is detected; • When airbag resistance value is 1.4~1.7 Ω, the malfunction may be detected;	• When airbag resistance value is more than 1.4 Ω, the malfunction may disappear; • When airbag resistance value is more than 1.7 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit.	• Ignition circuit resistance is less than set threshold	Correctly define resistance range/ system operation	Warning light comes on
B0-038-1B	Second Row Right Side Seat Side Airbag Deployment Control Circuit Resistance Above Threshold	Circuit resistance above threshold	External	• When airbag is more than 5.0, the malfunction is detected; • When airbag resistance value is 3.8~5.0, the malfunction may be detected;	• When airbag resistance value is less than 4.4 Ω, the malfunction may disappear; • When airbag resistance value is less than 3.8 Ω, the malfunction disappear, test resistance value of driver front airbag ignition circuit;	• Ignition circuit resistance above set threshold	Correctly define resistance range/ system operation	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B0-0C-7-12	Passenger Presence Detection Switch Circuit Short To Battery	Switch pin is connected to power supply	External	• Switch pin is connected to power supply;	• Move out wire harness overlap part;	• System short circuit appears;	Protect the wire harness integrity	Warning light comes on
B1-233-12	Passenger Buckle Switch Circuit Short To Battery	Switch pin is connected to power supply	External	• Switch pin is connected to power supply;	• Move out wire harness overlap part;	• System short circuit appears;	Protect the wire harness integrity	Warning light comes on
B1-234-12	Second Row Left Buckle Switch Circuit Short To Battery	Switch pin is connected to power supply	External	• Switch pin is connected to power supply;	• Move out wire harness overlap part;	• System short circuit appears;	Protect the wire harness integrity	Warning light comes on
B1-235-12	Second Row Middle Buckle Switch-	Switch pin is connected to power supply	External	• Switch pin is connected to power supply;	• Move out wire harness overlap part;	• System short circuit appears;	Protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Circuit Short To Battery							
B1-236-12	Second Row Right Buckle Switch Circuit Short To Battery	Switch pin is connected to power supply	External	• Switch pin is connected to power supply;	• Move out wire harness overlap part;	• System short circuit appears;	Protect the wire harness integrity	Warning light comes on
B0-090-11	Left Front Restraints Sensor Circuit Short To Ground	Circuit short to ground	External	Sensor pin is connected to ground	Move out wire harness overlap part	System short circuit appears	Protect the wire harness integrity	Warning light comes on
B0-090-12	Left Front Restraints Sensor Circuit Short To Battery	Circuit short to power supply	External	Sensor pin is connected to power supply	Move out wire harness overlap part	System short circuit appears	Protect the wire harness integrity	Warning light comes on
B0-090-13	Left Front Restraints	Circuit open	External	Sensor is not connected	Connect the sensor	Sensor that needs to be connected is	Check wire harness between	Warning light

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Sensor Circuit Open					not connected	ACU and sensor for community	comes on
B0090-96	Left Front Restraints Sensor Component Internal Failure	Sensor internal failure	External	Sensor has self-check function: Once malfunction is detected, sensor will report this malfunction	Replace sensor	Sensor is damaged	Use qualified sensor	Warning light comes on
B0090-91	Left Front Restraints Sensor Configured Fault	Sensor parameter failure	External	Sensor has self-check function: Once malfunction is detected, sensor will report this malfunction	Replace sensor	/	Use qualified sensor	Warning light comes on
B0090-00	Left Front Restraints Sensor-No Sub Type Information	Communication Error	External	Two identical sensors are connected to one communication interface	Use corrected sensor	Use the identical sensor to connect to the same communication interface	Use correct sensor	Warning light comes on
B0095-11	Right Front Restraints Sensor Circuit Short To	Circuit short to ground	External	Sensor pin is connected to ground	Move out wire harness overlap part	System short circuit appears	Protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Ground							
B0-095-12	Right Front Restraints Sensor-Circuit Short To Battery	Circuit short to power supply	External	Sensor pin is connected to power supply	Move out wire harness overlap part	System short circuit appears	Protect the wire harness integrity	Warning light comes on
B0-095-13	Right Front Restraints Sensor-Circuit Open	Circuit open	External	Sensor is not connected	Connect the sensor	Sensor that needs to be connected is not connected	Check wire harness between ACU and sensor for community	Warning light comes on
B0-095-96	Right Front Restraints Sensor-Component Internal Failure	Sensor internal failure	External	Sensor has self-check function: Once malfunction is detected, sensor will report this malfunction	Replace sensor	Sensor is damaged	Use qualified sensor	Warning light comes on
B0-095-91	Right Front Restraints Sensor Configured Fault	Sensor parameter failure	External	Sensor has self-check function: Once malfunction is detected, sensor will report this malfunction	Replace sensor	/	Use qualified sensor	Warning light comes on
B0-095-00	Right Front	Comm-	External	Two identical sensors are connected to	Use correct sensor	Use the identical sensor to	Use correct sensor	Warning light

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Restraints Sensor-No Sub Type Information	unication Error		one communication interface		connect to the same communication interface		comes on
B0-091-11	Left Side Restraints Sensor-Circuit Short To Ground	Circuit short to ground	External	Sensor pin is connected to ground	Move out wire harness overlap part	System short circuit appears	Protect the wire harness integrity	Warning light comes on
B0-091-12	Left Side Restraints Sensor-Circuit Short To Battery	Circuit short to power supply	External	Sensor pin is connected to power supply	Move out wire harness overlap part	System short circuit appears	Protect the wire harness integrity	Warning light comes on
B0-091-13	Left Side Restraints Sensor-Circuit Open	Circuit open	External	Sensor is not connected	Connect the sensor	Sensor that needs to be connected is not connected	Check wire harness between ACU and sensor for community	Warning light comes on
B0-091-96	Left Side Restraints Sensor-	Sensor internal failure	External	Sensor has self-check function: Once malfunction is detected, sensor will	Replace sensor	Sensor is damaged	Use qualified sensor	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Component Internal Failure			report this malfunction				
B0-091-95	Left Side Restraints Sensor-Configuration Error	Sensor parameter failure	External	Sensor has self-check function: Once malfunction is detected, sensor will report this malfunction	Replace sensor	/	Use qualified sensor	Warning light comes on
B0-091-00	Left Side Restraints Sensor-No Sub Type Information	Communication error	External	Two identical sensors are connected to one communication interface	Use correct sensor	Use the identical sensor to connect to the same communication interface	Use correct sensor	Warning light comes on
B0-096-11	Right Side Restraints Sensor-Circuit Short To Ground	Circuit short to ground	External	Sensor pin is connected to ground	Move out wire harness overlap part	System short circuit appears	Protect the wire harness integrity	Warning light comes on
B0-096-12	Right Side Restraints Sensor-Circuit Short	Circuit short to power supply	External	Sensor pin is connected to power supply	Move out wire harness overlap part	System short circuit appears	Protect the wire harness integrity	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	To Battery							
B0-096-13	Right Side Restraints Sensor-Circuit Open	Circuit open	External	Sensor is not connected	Connect the sensor	Sensor that needs to be connected is not connected	Check wire harness between ACU and sensor for community	Warning light comes on
B0-096-96	Right Side Restraints Sensor-Component Internal Failure	Sensor internal failure	External	Sensor has self-check function: Once malfunction is detected, sensor will report this malfunction	Replace sensor	Sensor is damaged	Use qualified sensor	Warning light comes on
B0-096-95	Right Side Restraints Sensor - Configuration Error	Sensor parameter failure	External	Sensor has self-check function: Once malfunction is detected, sensor will report this malfunction	Replace sensor	/	Use qualified sensor	Warning light comes on
B0-096-00	Right Side Restraints Sensor-No Sub Type Information	Communication error	External	Two identical sensors are connected to one communication interface	Use correct sensor	Use the identical sensor to connect to the same communication interface	Use correct sensor	Warning light comes on

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1-251-00	ACU Internal Error-No Sub Type Information	No subtype information	External	CAN active, CAN self diagnosis active	Replace controller	Hardware is damaged	Use the controller according to the specification	Warning light comes on
B1-22-C-00	ACU Has Been Scrapped-No Sub Type Information	Controller has been scrapped	External	NA	NA	ACU has been scrapped	NA	Warning light comes on
B1-216-47	Crash Front	Crash	External	Front crash	Replace controller	Front crash occurs	Prevent live operation of the controller	Warning light comes on
B1-217-47	Crash Side	Crash	External	Crash side	Replace controller	Side collision occurs	Prevent live operation of the controller	Warning light comes on
B1-218-47	Crash Row-Watchdog / Safety µC Failure	Crash	External	Crash side	Replace controller	Side collision occurs	Prevent live operation of the controller	Warning light comes on
B1-27-F-47	Crash Recording Locked	Crash	External	EDR locked	Replace controller	EDR locked	Prevent live operation of the controller	Warning light comes on
B1-215-00	Squib Cross Coupling	No subtype	External	Airbag circuit is coupled	Airbag circuit is not coupled	Wire harnesses in different ignition	Strengthen initiation circuit	Warning light

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Error-No Sub Type Information	information				circuits overlap	wire harness protection	comes on
B1-240-00	ICM Airbag Lamp Failed-No Sub Type Information	No subtype information	External	Airbag indicator signal value error of instrument panel cluster	Repair BCM or instrument cluster	BCM or instrument cluster fault	Use qualified meter and BCM	Warning light comes on
B1-22-D-95	Driver Airbag Unexpected Config-Incorrect Assembly	EOL ignition circuit configuration is wrong and ACU pins are connected with additional initiation circuit	External	PIN4 and PIN5 are empty set originally, but they are connected with external circuit.	Check PIN4 and PIN5 of controller for external connection and measure the resistance between pins.	ACU software configuration or actual vehicle configuration error	Compare with car configuration table (Confirm whether it is ACU software configuration error or actual vehicle configuration error). Airbag does not match with ACU, 1. ACU circuit inadequate configuration error; 2. Vehicle actual excessive configuration error.	Warning light comes on
B1-	Passenger	EOL ignition circuit	External	PIN34 and PIN16 are	Check PIN34 and PIN16 of controller for	ACU software	Compare with car	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
22-E-95	Airbag Unexpected Config-Incorrect Assembly	configuration is wrong and ACU pins are connected with additional initiation circuit		empty set originally, but they are connected with external circuit.	external connection and measure the resistance between pins.	configuration or actual vehicle configuration error	configuration table (Confirm whether it is ACU software configuration error or actual vehicle configuration error). Airbag does not match with ACU, 1. ACU circuit inadequate configuration error; 2. Vehicle actual excessive configuration error.	
B1-21-F-95	Left Side Airbag Unexpected Config-Incorrect Assembly	EOL ignition circuit configuration is wrong and ACU pins are connected with additional initiation circuit	External	PIN23 and PIN22 are empty set originally, but they are connected with external circuit.	Check PIN23 and PIN22 of controller for external connection and measure the resistance between pins.	ACU software configuration or actual vehicle configuration error	Compare with car configuration table (Confirm whether it is ACU software configuration error or actual vehicle configuration error). Airbag does not match with ACU, 1. ACU circuit inadequate configuration error;	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
							2. Vehicle actual excessive configuration error.	
B1-220-95	Right Side Airbag Unexpected Config-Incorrect Assembly	EOL ignition circuit configuration is wrong and ACU pins are connected with additional initiation circuit	External	PIN52 and PIN51 are empty set originally, but they are connected with external circuit;	Check PIN52 and PIN51 of controller for external connection and measure the resistance between pins.	ACU software configuration or actual vehicle configuration error	Compare with car configuration table (Confirm whether it is ACU software configuration error or actual vehicle configuration error). Airbag does not match with ACU, 1. ACU circuit inadequate configuration error; 2. Vehicle actual excessive configuration error.	
B1-221-95	Left Curtain Unexpected Config-Incorrect Assembly	EOL ignition circuit configuration is wrong and ACU pins are connected with additional	External	PIN20 and PIN21 are empty set originally, but they are connected with external circuit.	Check PIN20 and PIN21 of controller for external connection and measure the resistance between pins.	ACU software configuration or actual vehicle configuration error	Compare with car configuration table (Confirm whether it is ACU software configuration error or actual vehicle configuration error). Airbag does not	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
		initiation circuit					match with ACU, 1. ACU circuit inadequate configuration error; 2. Vehicle actual excessive configuration error.	
B1-222-95	Right Curtain Unexpected Config-Incorrect Assembly	EOL ignition circuit configuration is wrong and ACU pins are connected with additional initiation circuit	External	PIN53 and PIN54 are empty set originally, but they are connected with external circuit;	Check PIN53 and PIN54 of controller for external connection and measure the resistance between pins.	ACU software configuration or actual vehicle configuration error	Compare with car configuration table (Confirm whether it is ACU software configuration error or actual vehicle configuration error). Airbag does not match with ACU, 1. ACU circuit inadequate configuration error; 2. Vehicle actual excessive configuration error.	
B1-223-95	Front Row Left Seatbelt Retractor	EOL ignition circuit configuration is wrong and	External	PIN19 and PIN1 are empty set originally, but they are connected with external circuit.	Check PIN19 and PIN1 of controller for external connection and measure the resistance between pins.	ACU software configuration or actual vehicle configuration error	Compare with car configuration table (Confirm whether it is ACU software	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Pretensioner Unexpected Config-Incorrect Assembly	ACU pins are connected with additional initiation circuit					configuration error or actual vehicle configuration error). Airbag does not match with ACU, 1. ACU circuit inadequate configuration error; 2. Vehicle actual excessive configuration error.	
B1-224-95	Front Row Right Seatbelt Retractor Pretensioner Unexpected Config-Incorrect Assembly	EOL ignition circuit configuration is wrong and ACU pins are connected with additional initiation circuit	External	PIN35 and PIN17 are empty set originally, but they are connected with external circuit;	Check PIN35 and PIN17 of controller for external connection and measure the resistance between pins.	ACU software configuration or actual vehicle configuration error	Compare with car configuration table (Confirm whether it is ACU software configuration error or actual vehicle configuration error). Airbag does not match with ACU, 1. ACU circuit inadequate configuration error; 2. Vehicle actual excessive configuration error.	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1-225-95	Belt Pretensioner Driver Unexpected Config-Incorrect Assembly	EOL ignition circuit configuration is wrong and ACU pins are connected with additional initiation circuit	External	PIN49 and PIN50 are empty set originally, but they are connected with external circuit;	Check PIN49 and PIN50 of controller for external connection and measure the resistance between pins.	ACU software configuration or actual vehicle configuration error	Compare with car configuration table (Confirm whether it is ACU software configuration error or actual vehicle configuration error). Airbag does not match with ACU, 1. ACU circuit inadequate configuration error; 2. Vehicle actual excessive configuration error.	
B1-226-95	Belt Pretensioner Pass Unexpected Config-Incorrect Assembly	EOL ignition circuit configuration is wrong and ACU pins are connected with additional initiation circuit	External	PIN47 and PIN48 are empty set originally, but they are connected with external circuit;	Check PIN47 and PIN48 of controller for external connection and measure the resistance between pins.	ACU software configuration or actual vehicle configuration error	Compare with car configuration table (Confirm whether it is ACU software configuration error or actual vehicle configuration error). Airbag does not match with ACU, 1. ACU circuit inadequate	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
							configuration error; 2. Vehicle actual excessive configuration error.	
B1-227-95	Second Row Left Seatbelt Pretensioner Unexpected Config-Incorrect Assembly	EOL ignition circuit configuration is wrong and ACU pins are connected with additional initiation circuit	External	PIN40 and PIN39 are empty set originally, but they are connected with external circuit;	Check PIN40 and PIN39 of controller for external connection and measure the resistance between pins.	ACU software configuration or actual vehicle configuration error	Compare with car configuration table (Confirm whether it is ACU software configuration error or actual vehicle configuration error). Airbag does not match with ACU, 1. ACU circuit inadequate configuration error; 2. Vehicle actual excessive configuration error.	
B1-229-95	Second Row Right Seatbelt Pretensioner Unexpected Config-	EOL ignition circuit configuration is wrong and ACU pins are connected with	External	PIN41 and PIN42 are empty set originally, but they are connected with external circuit;	Check PIN41 and PIN42 of controller for external connection and measure the resistance between pins.	ACU software configuration or actual vehicle configuration error	Compare with car configuration table (Confirm whether it is ACU software configuration error or actual vehicle configuration error).	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Incorrect Assembly	additional initiation circuit					Airbag does not match with ACU, 1. ACU circuit inadequate configuration error; 2. Vehicle actual excessive configuration error.	
B0-004-95	Driver Knee Airbag Ignition Circuit Config-Incorrect Assembly	EOL ignition circuit configuration is wrong and ACU pins are connected with additional initiation circuit				ACU software configuration or actual vehicle configuration error	Compare with car configuration table (Confirm whether it is ACU software configuration error or actual vehicle configuration error). Airbag does not match with ACU, 1. ACU circuit inadequate configuration error; 2. Vehicle actual excessive configuration error.	
B0-030-95	Second Row Left Side Seat	EOL ignition circuit configuration is	External	Pins are empty set originally, but they are connected	Check controller for external connection and measure the resistance between pins.	ACU software configuration or actual vehicle	Compare with car configuration table (Confirm whether it	

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	Side Airbag Unexpected Config-Incorrect Assembly	wrong and ACU pins are connected with additional initiation circuit		with external circuit.		configuration error	is ACU software configuration error or actual vehicle configuration error). Airbag does not match with ACU, 1. ACU circuit inadequate configuration error; 2. Vehicle actual excessive configuration error.	
B0-038-95	Second Row Right Side Seat Side Airbag Unexpected Config-Incorrect Assembly	EOL ignition circuit configuration is wrong and ACU pins are connected with additional initiation circuit	External	Pins are empty set originally, but they are connected with external circuit.	Check controller for external connection and measure the resistance between pins.	ACU software configuration or actual vehicle configuration error	Compare with car configuration table (Confirm whether it is ACU software configuration error or actual vehicle configuration error). Airbag does not match with ACU, 1. ACU circuit inadequate configuration error; 2. Vehicle actual excessive	

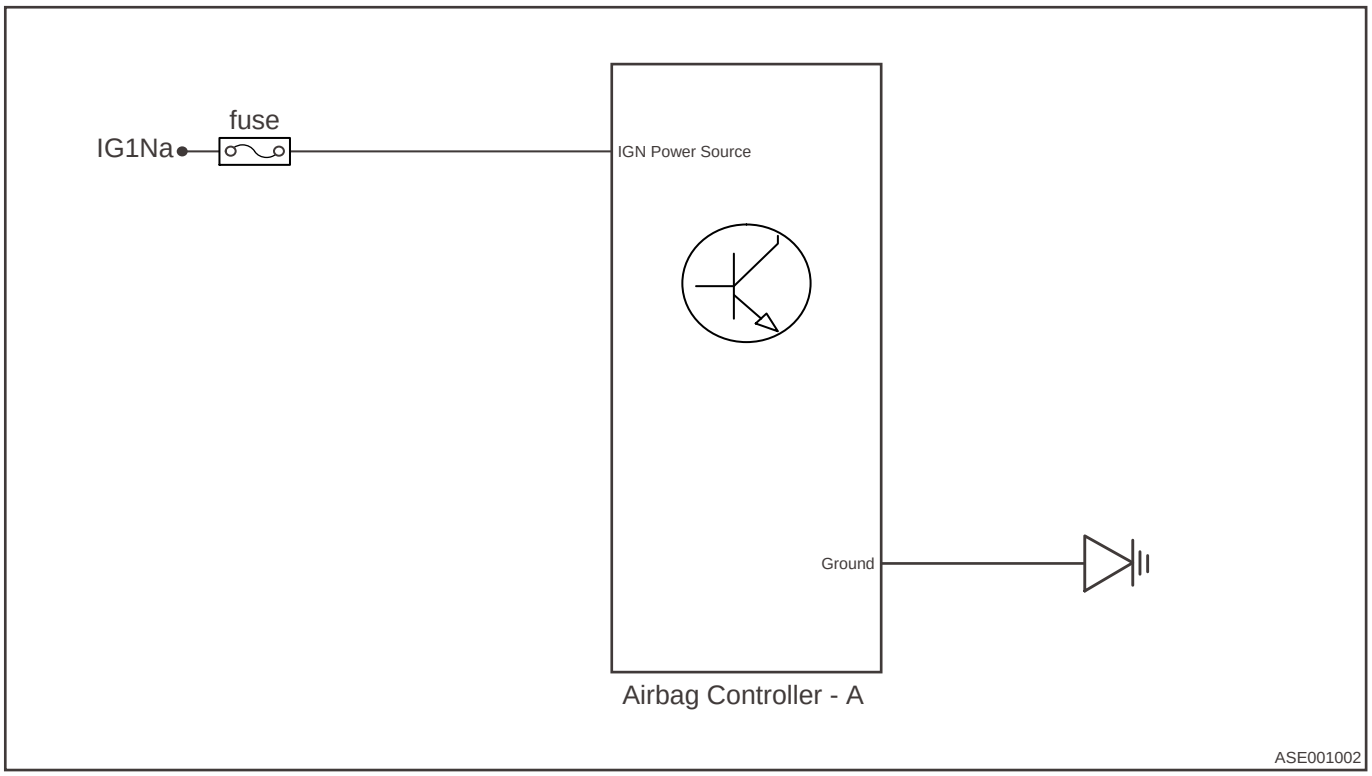
DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
							configuration error.	
B1-284-12	Crash Output Fault-Circuit Short To Battery	PIN10 output malfunction.	External	Move out wire harness overlap part	PIN10 overlaps with power supply	Crash event notification circuit is short to power supply		Warning light comes on
B1-284-11	Crash Output Fault-Circuit Short To Ground	PIN10 output malfunction.	External	Move out wire harness overlap part	PIN10 overlaps with ground	Crash event notification circuit is short to ground		
B1-284-13	Crash Output Fault-Circuit Open	PIN10 output malfunction.	External	PIN10 output malfunction.	Check controller P10;	Crash event notification circuit is open		

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1-22-D-95	Driver Airbag Unexpected Config-Incorrect Assembly	Initiation circuit configuration is wrong and controller terminals are connected with additional initiation circuit	External	• Terminals 10 and 11 are empty set originally, but they are connected with external circuit;	/	• The actual connecting condition of terminals 10 and 11 on vehicle doesn't match with controller configuration	Check if terminals 10 and 11 need to be connected with initiation circuit according to actual item require	Warning light comes on
B1-22-E-95	Passenger Airbag Unexpected Config-Incorrect Assembly	Initiation circuit configuration is wrong and controller terminals are connected with additional initiation circuit	External	• Terminals 13 and 14 are empty set originally, but they are connected with external circuit;	/	• The actual connecting condition of terminals 13 and 14 on vehicle doesn't match with controller configuration	Check if terminals 13 and 14 need to be connected with initiation circuit according to actual item require	Warning light comes on

DTC Diagnosis Procedure

DTC	**B1250-16**	**Power Supply-Circuit Voltage Below Threshold**
DTC	**B1250-17**	**Power Supply-Circuit Voltage Above Threshold**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check system voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Start engine, and use voltage band of multimeter to check if battery voltage is normal. (Rated voltage: Not less than 12 V)

Perform the voltage inspection

Multimeter Connection	Detection Condition	Specified Condition
Battery (+) - Battery (-)	ENGINE START STOP switch ON	Not less than 12 V

NG → **Repair or replace battery**

OK

2	Check fuse

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check if fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

OK ↓

3	Check airbag controller connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace airbag controller connector.**

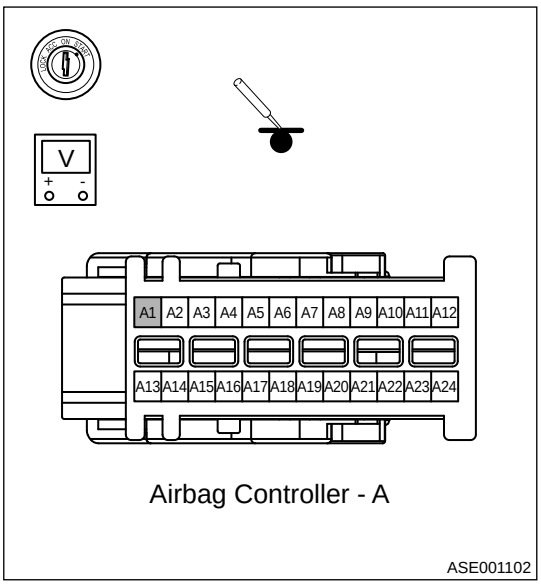
OK ↓

4	Check airbag controller power supply circuit

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (- power supply terminal) - Body ground	ENGINE START STOP switch ON	12 V



Airbag Controller - A

ASE001102

NG → **Repair the airbag system controller power supply wire harness.**

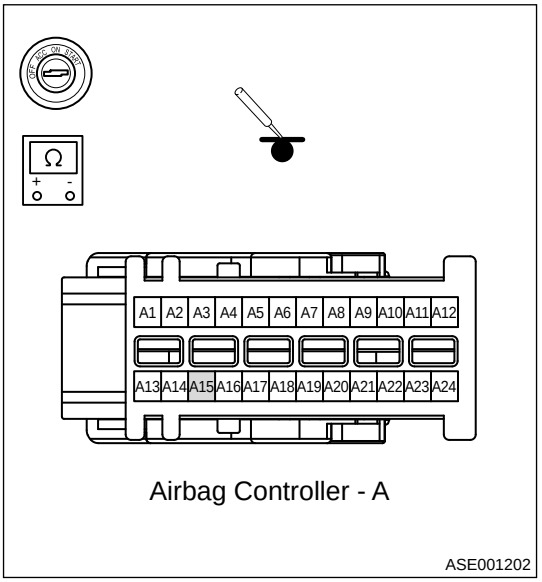
OK ↓

5	Check airbag controller ground circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (-ground terminal) - Body ground	ENGINE START STOP switch OFF	⩽ 1 Ω



Airbag Controller - A

ASE001202

NG → **Repair airbag system controller ground wire harness.**

OK →

6	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

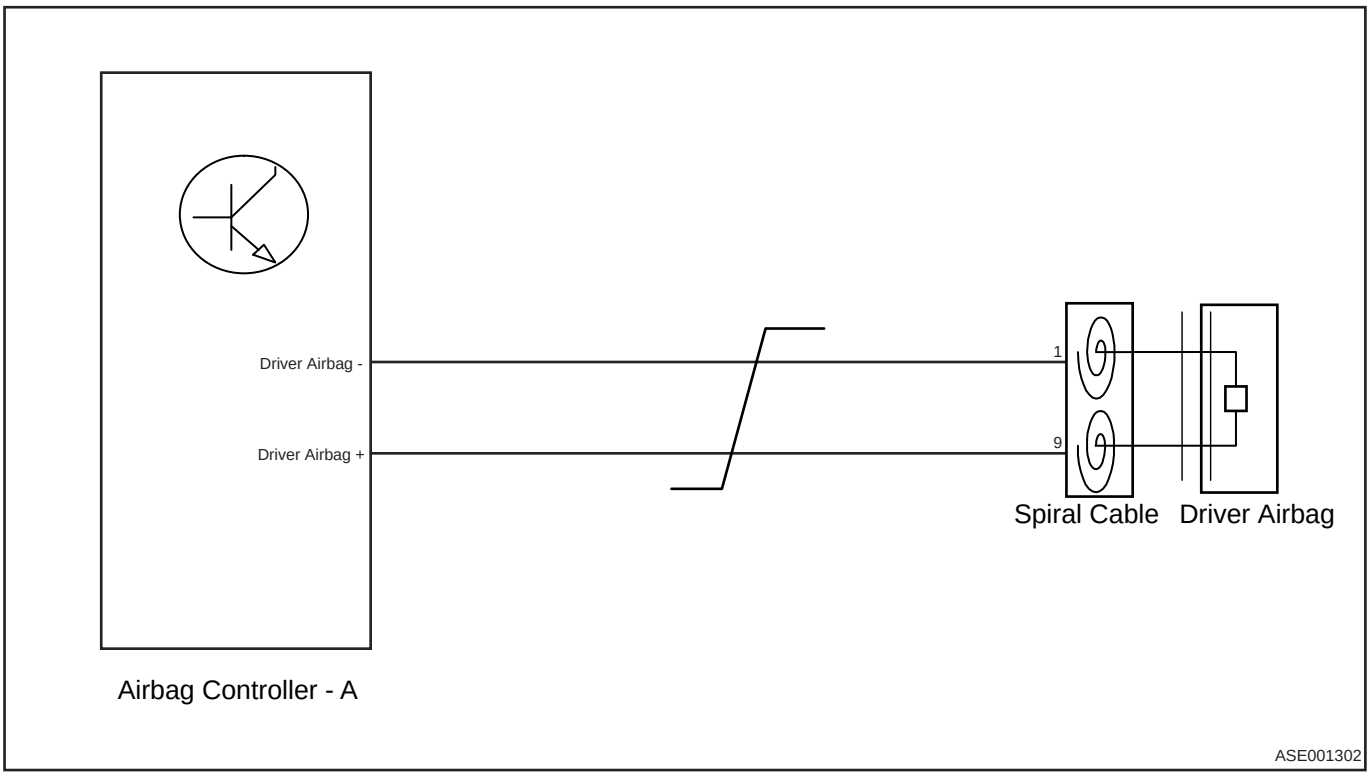
NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B0001-11**	**Driver Frontal Airbag Deployment Control-Circuit Short To Ground**
DTC	**B0001-12**	**Driver Frontal Airbag Deployment-Circuit Short To Battery**
DTC	**B0001-1A**	**Driver Frontal Airbag Deployment Control-Circuit Resistance Below Threshold**
DTC	**B0001-1B**	**Driver Frontal Airbag Deployment Control-Circuit Resistance Above Threshold**

Description

Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

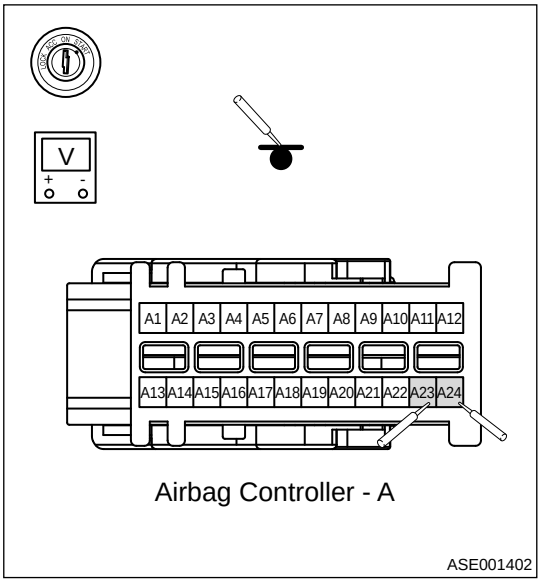
- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Inspect the driver frontal airbag voltage to power supply**

(a) Disconnect the driver frontal airbag connector.
(b) Disconnect the airbag connector.
(c) Turn ENGINE START STOP switch to ON.
(d) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (- corresponding driver airbag terminal+) - Body ground	ENGINE START STOP switch ON	0 V
Airbag module (- corresponding driver airbag terminal-) - body ground	ENGINE START STOP switch ON	0 V



NG

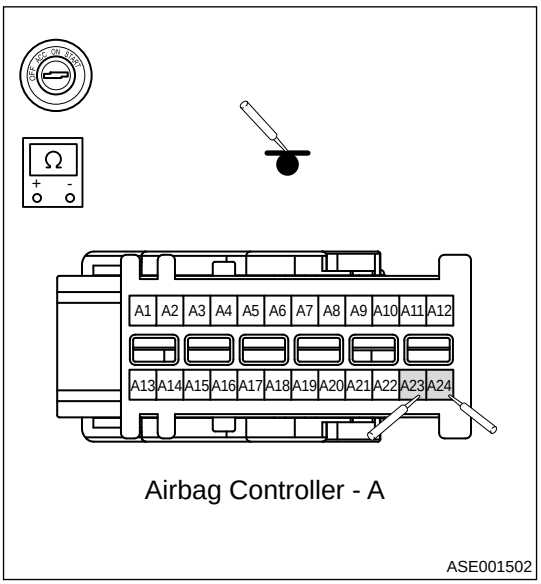
Repair or replace driver frontal airbag power supply wire harness.

OK

2	**Inspect the resistance between driver frontal airbag wire harness and ground**

(a) Disconnect the driver frontal airbag connector.
(b) Disconnect the airbag connector.
(c) Turn ENGINE START STOP switch to OFF.
(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (-corresponding driver airbag terminal+) - Body ground	ENGINE START STOP switch OFF	∞
Airbag module (-corresponding driver airbag terminal-) - body ground	ENGINE START STOP switch OFF	∞



NG

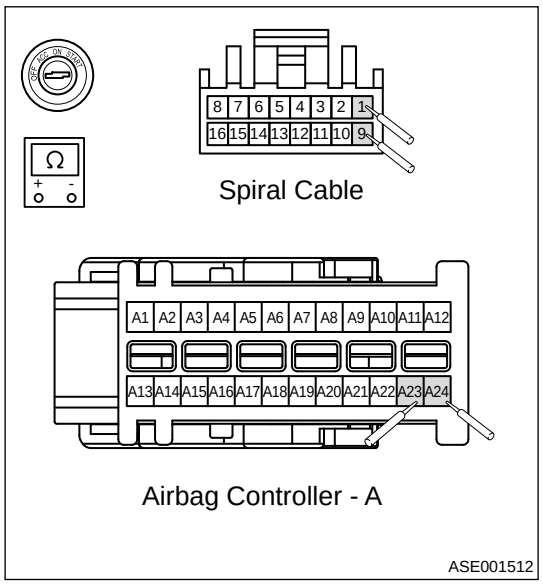
Repair or replace driver frontal airbag ground wire harness.

OK

3	**Check circuit between airbag controller and driver frontal airbag**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Disconnect the driver frontal airbag connector.
(b) Disconnect the airbag connector.
(c) Turn ENGINE START STOP switch to OFF.
(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag Module (-corresponding terminal) - Spiral cable (1)	ENGINE START STOP switch OFF	Less than 1 Ω
Airbag Module (-corresponding terminal) - Spiral cable (9)	ENGINE START STOP switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness between airbag controller and driver frontal airbag.**

OK ↓

4	Check the driver frontal airbag

(a) Substitute one 2.5 Ω resistance for airbag.
(b) Check if DTC exists.

NG → **Repair or replace driver frontal airbag.**

OK ↓

5	Check spiral cable

(a) Check if spiral cable has any damage, stuck or other symptoms.
(b) Check if spiral cable is normal.

NG → **Repair or replace spiral cable.**

OK ↓

6	Reconfirm DTCs

For preparations, refer to "Preparations before dealing with airbag system wire harness malfunction". Use circuit diagram as a guide to perform the following inspection procedures:

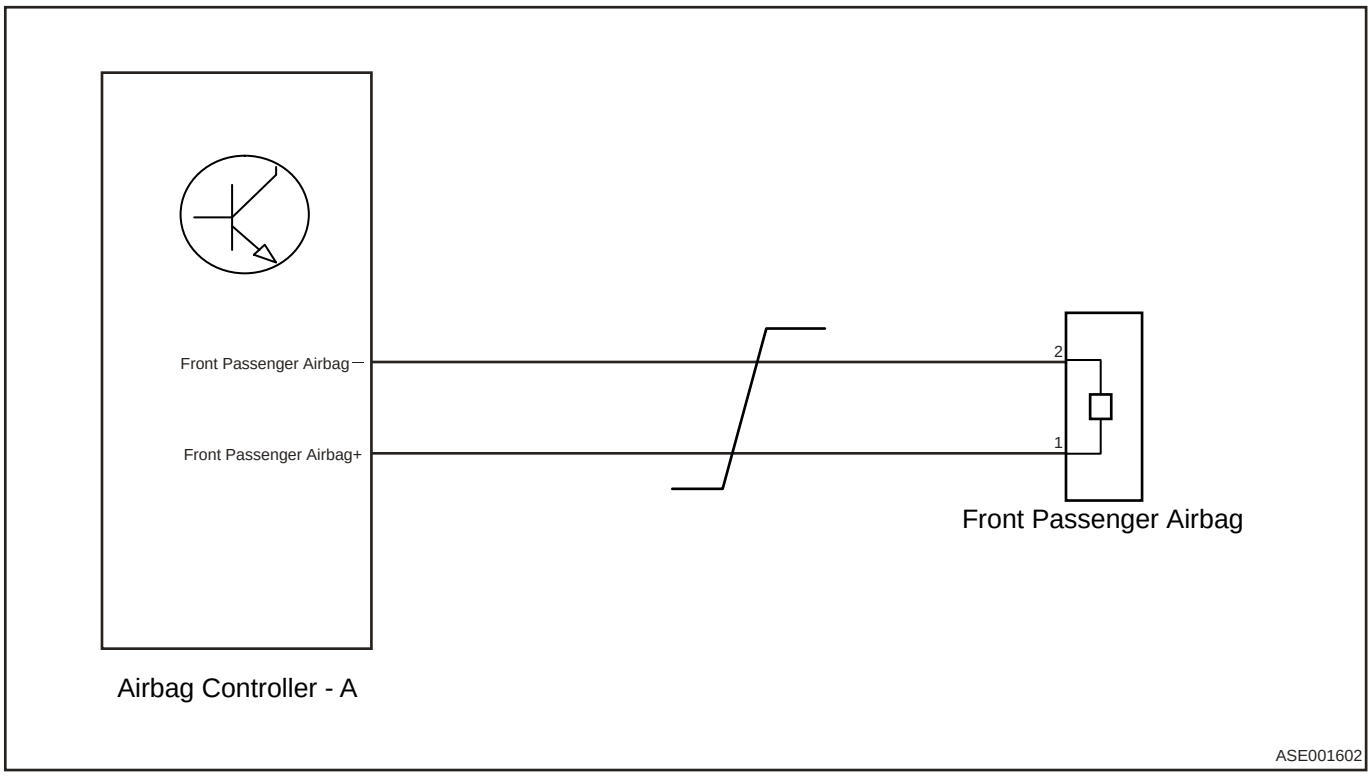
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the malfunction information and confirm that the malfunction has been solved.

NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B0010-11**	**Passenger Frontal Airbag Deployment Control-Circuit Short To Ground**
DTC	**B0010-12**	**Passenger Frontal Airbag Deployment Control-Circuit Short To Battery**
DTC	**B0010-1A**	**Passenger Frontal Airbag Deployment Control-Circuit Resistance Below Threshold**
DTC	**B0010-1B**	**Passenger Frontal Airbag Deployment Control-Circuit Resistance Above Threshold**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check front passenger front airbag voltage to power supply**

Use circuit diagram as a guide to perform the following inspection procedures:

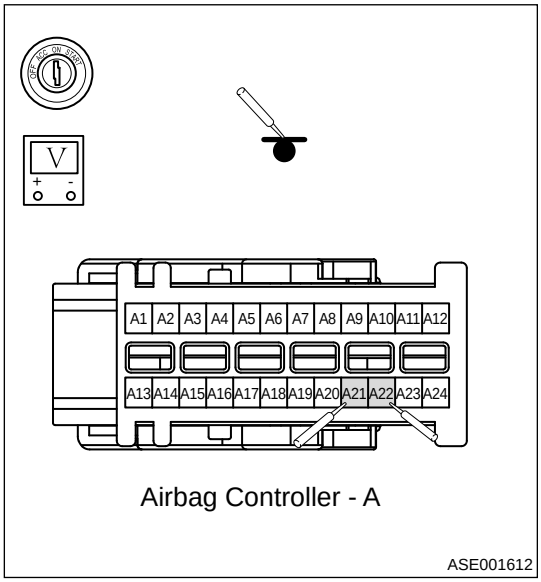
(a) Disconnect the front passenger frontal airbag connector.

(b) Disconnect the airbag connector.

(c) Turn ENGINE START STOP switch to ON.

(d) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (-corresponding front passenger airbag+) - Body ground	ENGINE START STOP switch ON	0 V
Airbag module (-corresponding front passenger airbag-) - Body ground	ENGINE START STOP switch ON	0 V



Airbag Controller - A

ASE001612

NG → **Repair or replace wire harness between front passenger front airbag and power supply**

OK →

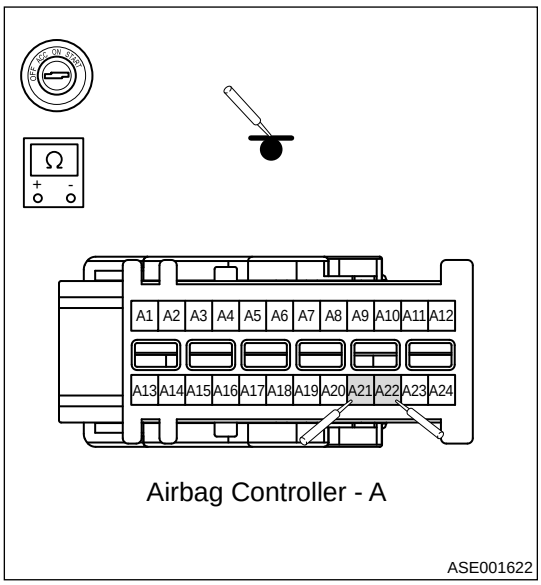
2	Check front passenger front airbag resistance to power supply

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (-corresponding front passenger airbag+) - Body ground	ENGINE START STOP switch OFF	∞
Airbag module (-corresponding front passenger airbag-) - Body ground	ENGINE START STOP switch OFF	∞



Airbag Controller - A

ASE001622

NG → **Repair or replace wire harness and connectors of front passenger frontal airbag wire harness to ground**

OK

3	Check circuit between airbag controller and front passenger frontal airbag

Use circuit diagram as a guide to perform the following inspection procedures:

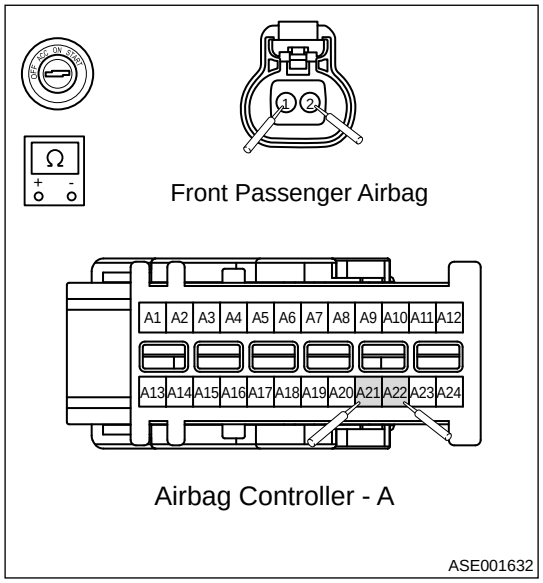
(a) Disconnect the front passenger frontal airbag connector.

(b) Disconnect the airbag connector.

(c) Turn ENGINE START STOP switch to OFF.

(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (-corresponding terminal) - Front passenger airbag (2)	ENGINE START STOP switch OFF	Less than 1 Ω
Airbag module (-corresponding terminal) - Front passenger airbag (1)	ENGINE START STOP switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness between airbag controller and front passenger frontal airbag.**

OK

4	Reconfirm DTCs

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

(c) Read the malfunction information and confirm that the malfunction has been solved.

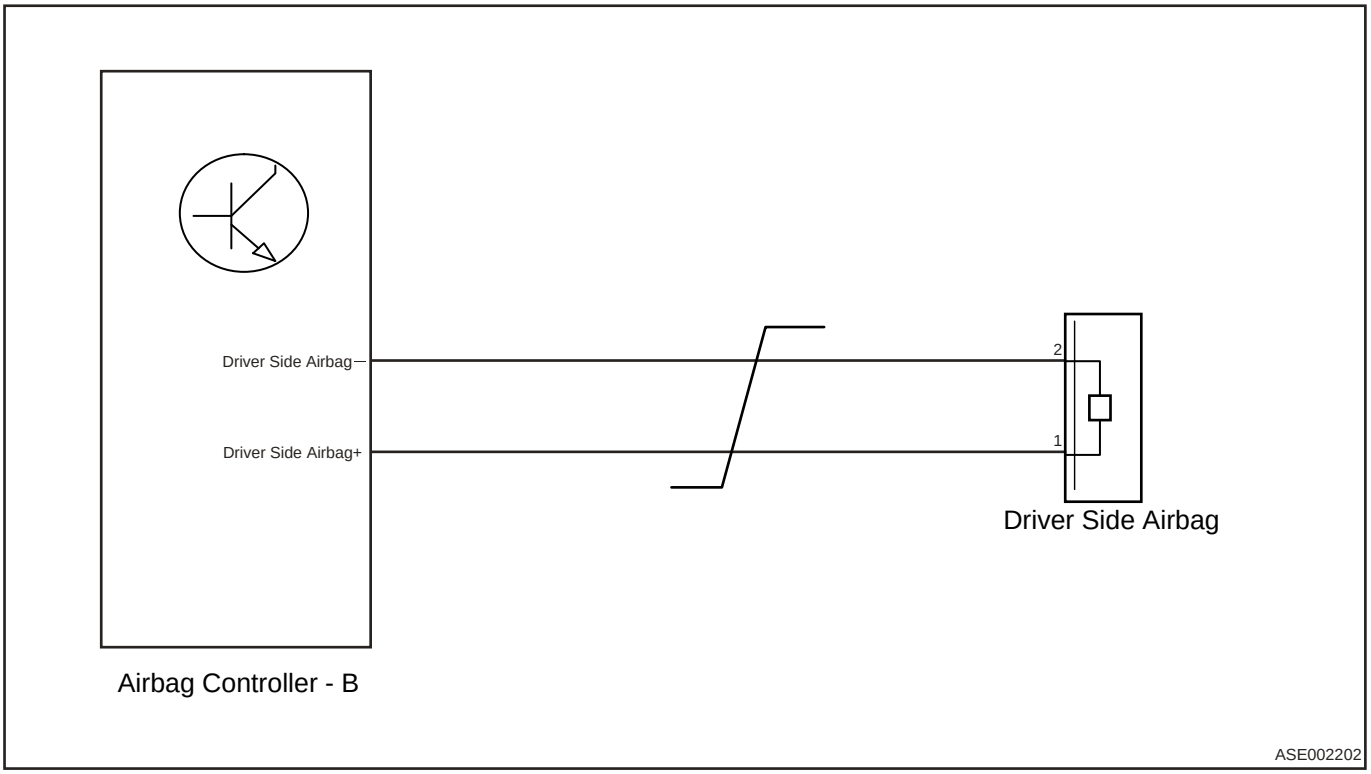
NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B0020-11**	**Left Side Airbag Deployment Control-Circuit Short To Ground**
DTC	**B0020-12**	**Left Side Airbag Deployment Control-Circuit Short To Battery**

DTC	**B0020-1A**	**Left Side Airbag Deployment Control-Circuit Resistance Below Threshold**
DTC	**B0020-1B**	**Left Side Airbag Deployment Control-Circuit Resistance Above Threshold**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

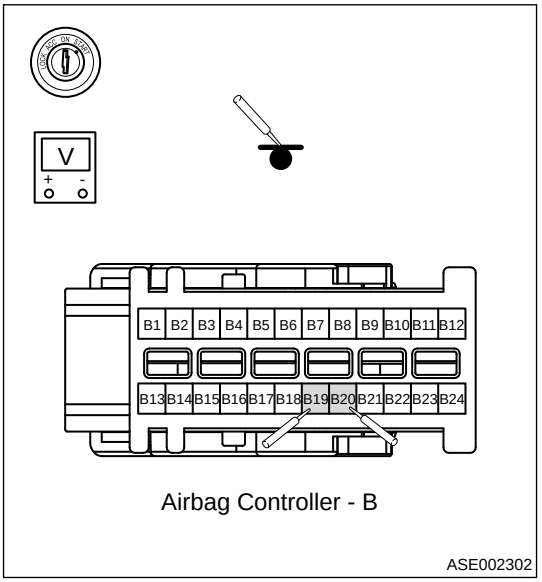
- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Inspect the voltage between driver seat side airbag and power supply**

(a) Disconnect the driver seat side airbag connector.
(b) Remove the airbag module connector.
(c)
(d) Turn ENGINE START STOP switch to ON.
(e) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (- corresponding driver seat side+) - Body ground	ENGINE START STOP switch ON	0 V
Airbag module (- corresponding driver seat side-) - Body ground	ENGINE START STOP switch ON	0 V



Airbag Controller - B
ASE002302

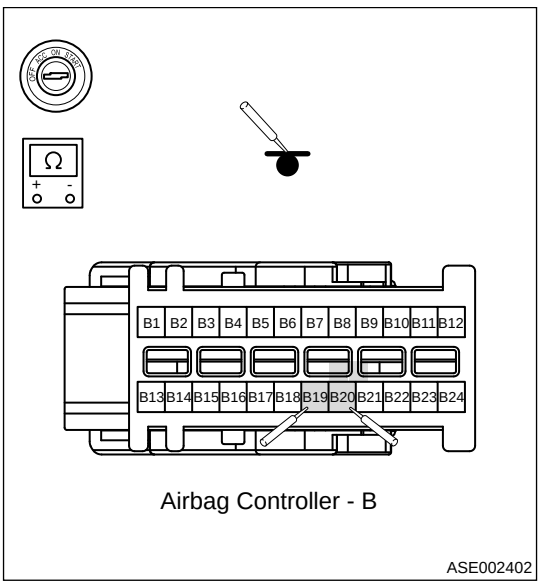
NG → **Repair or replace driver seat side airbag power supply wire harness.**

OK

2	**Inspect the resistance between driver seat side airbag and ground**

(a) Disconnect the driver seat side airbag connector.
(b) Remove the airbag module connector.
(c) Turn ENGINE START STOP switch to OFF.
(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (- corresponding driver seat side+) - Body ground	ENGINE START STOP switch OFF	∞
Airbag module (- corresponding driver seat side-) - Body ground	ENGINE START STOP switch OFF	∞



Airbag Controller - B
ASE002402

NG → **Repair or replace driver seat side airbag ground wire harness.**

OK

3	**Check circuit between airbag controller and driver seat side airbag**

Use circuit diagram as a guide to perform the following inspection procedures:

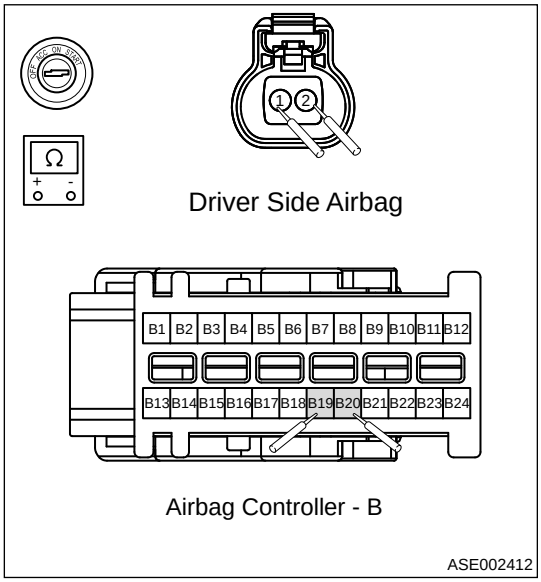
(a) Disconnect the driver seat side airbag connector.

(b) Disconnect the airbag connector.

(c) Turn ENGINE START STOP switch to OFF.

(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (- corresponding terminal) - Driver seat side airbag (2)	ENGINE START STOP switch OFF	Less than 1 Ω
Airbag module (- corresponding terminal) - Driver seat side airbag (1)	ENGINE START STOP switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness between airbag controller and driver seat side airbag.**

OK

4	Check the driver seat side airbag

(a) Substitute one 2.5 Ω resistance for airbag.

(b) Check if DTC exists.

NG → **Repair or replace driver seat side airbag.**

OK

5	Reconfirm DTCs

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

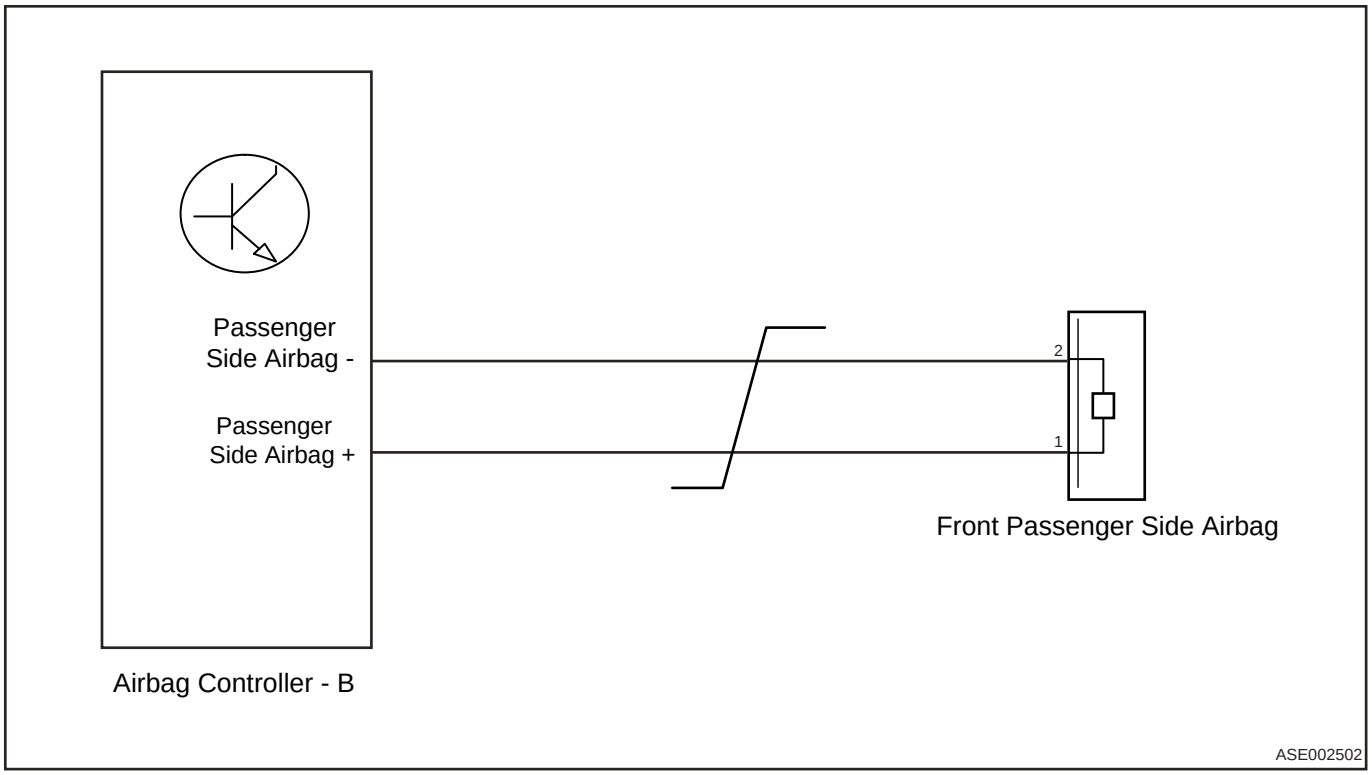
(c) Read the malfunction information and confirm that the malfunction has been solved.

NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B0028-11**	**Right Side Airbag Deployment Control-Circuit Short To Ground**
DTC	**B0028-12**	**Right Side Airbag Deployment Control-Circuit Short To Battery**
DTC	**B0028-1A**	**Right Side Airbag Deployment Control-Circuit Resistance Below Threshold**
DTC	**B0028-1B**	**Right Side Airbag Deployment Control-Circuit Resistance Above Threshold**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

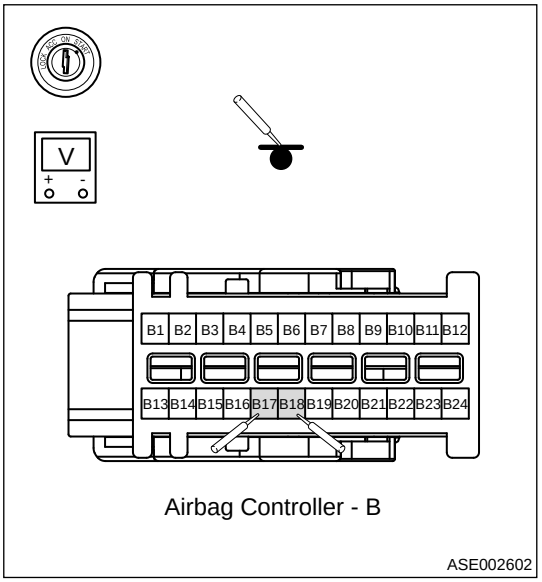
- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Inspect the voltage between front passenger seat side airbag and power supply**

(a) Disconnect the front passenger seat side airbag connector.
(b) Remove the airbag module connector.
(c) Turn ENGINE START STOP switch to ON.
(d) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (- front passenger seat side airbag +) - Body ground	ENGINE START STOP switch ON	0 V
Airbag module (- front passenger seat side airbag-) - Body ground	ENGINE START STOP switch ON	0 V



Airbag Controller - B
ASE002602

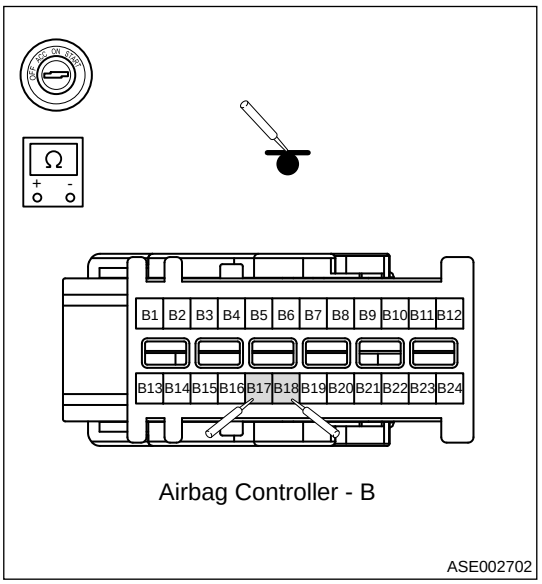
NG → **Repair or replace front passenger seat side airbag power supply wire harness.**

OK →

2	**Inspect the resistance between front passenger seat side airbag and ground**

(a) Disconnect the front passenger seat side airbag connector.
(b) Remove the airbag module connector.
(c) Turn ENGINE START STOP switch to OFF.
(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (- front passenger seat side airbag +) - Body ground	ENGINE START STOP switch OFF	∞
Airbag module (- front passenger seat side airbag-) - Body ground	ENGINE START STOP switch OFF	∞



Airbag Controller - B
ASE002702

NG → **Repair or replace front passenger seat side airbag ground wire harness.**

OK →

3	**Check circuit between airbag controller and front passenger seat side airbag**

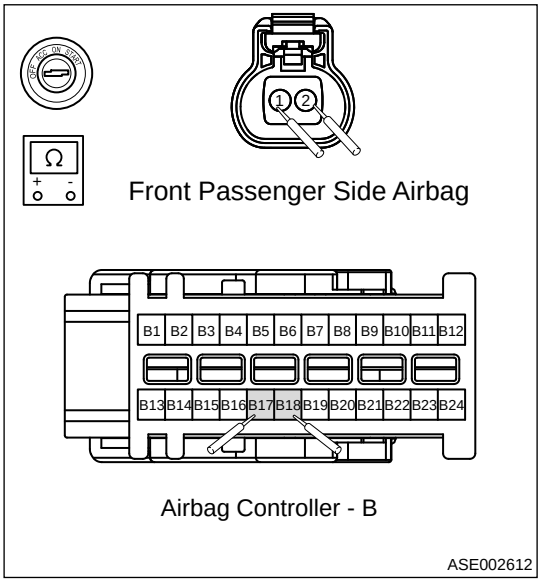
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Disconnect the front passenger seat side airbag connector.

(b) Disconnect the airbag connector.

(c) Turn ENGINE START STOP switch to OFF.

(d) Perform the resistance inspection.



Multimeter Connection	Condition	Specified Condition
Airbag module (- corresponding terminal) - Front passenger seat side airbag (2)	ENGINE START STOP switch OFF	Less than 1 Ω
Airbag module (- corresponding terminal) - Front passenger seat side airbag (1)	ENGINE START STOP switch OFF	Less than 1 Ω

NG → **Repair or replace wire harness between airbag controller and front passenger seat side airbag.**

OK

4	Check the front passenger seat side airbag

(a) Substitute one 2.5 Ω resistance for airbag.

(b) Check if DTC exists.

NG → **Repair or replace front passenger seat side airbag.**

OK

5	Reconfirm DTCs

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

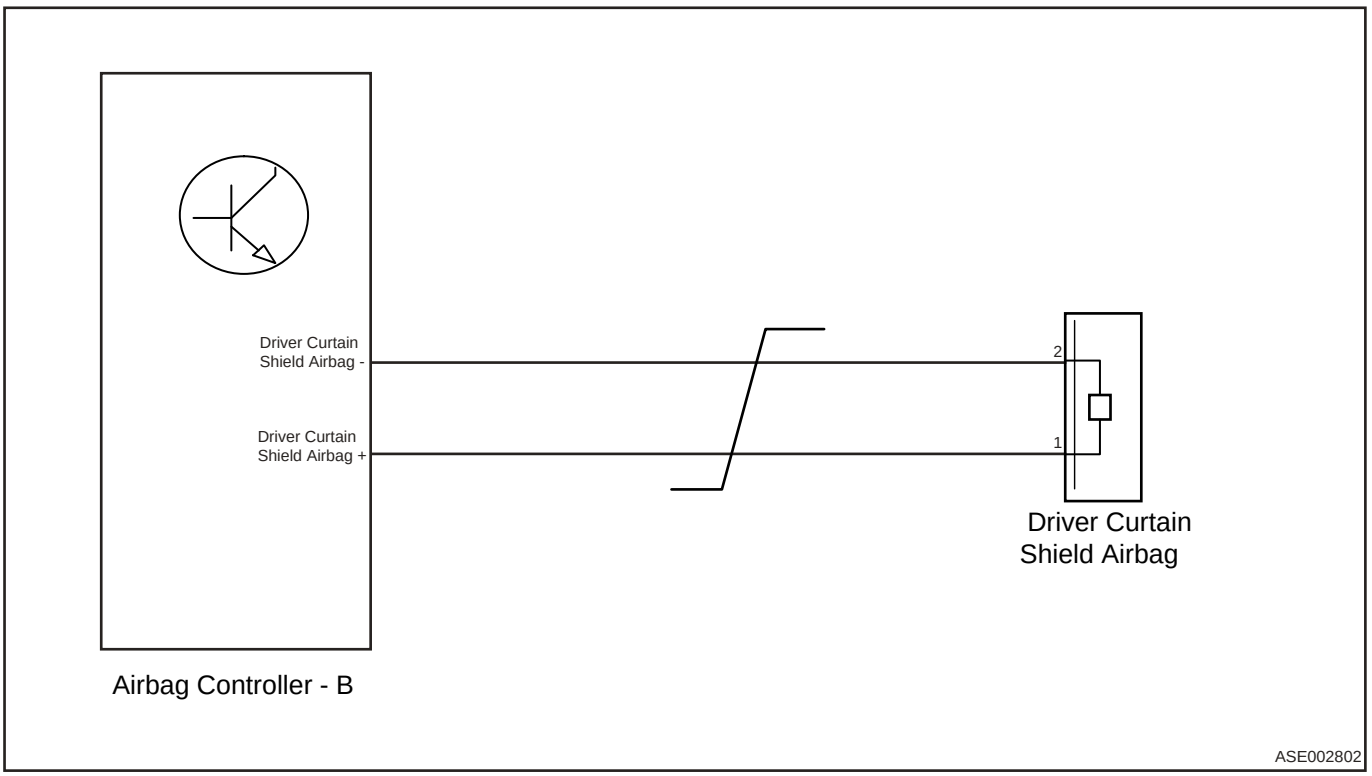
(c) Read the malfunction information and confirm that the malfunction has been solved.

NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B0021-11**	**Left Curtain Airbag Deployment Control-Circuit Short To Ground**
DTC	**B0021-12**	**Left Curtain Airbag Deployment Control-Circuit Short To Battery**
DTC	**B0021-1A**	**Left Curtain Airbag Deployment Control-Circuit Resistance Below Threshold**
DTC	**B0021-1B**	**Left Curtain Airbag Deployment Control-Circuit Resistance Above Threshold**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Inspect the voltage between driver curtain airbag and power supply**

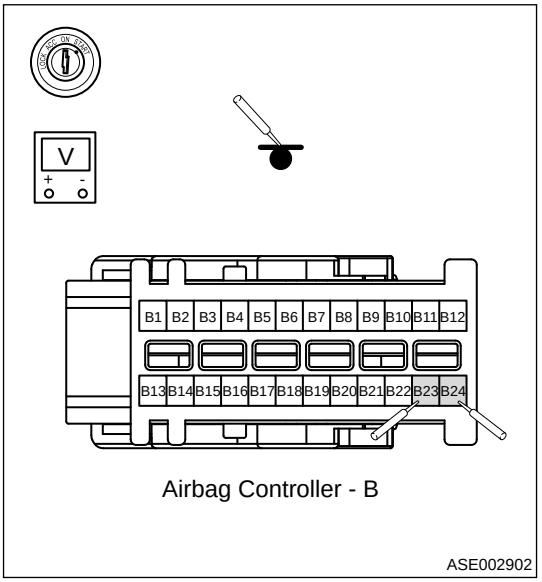
(a) Disconnect the driver curtain airbag connector.

(b) Remove the airbag module connector.

(c) Turn ENGINE START STOP switch to ON.

(d) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (-driver curtain airbag+) - Body ground	ENGINE START STOP switch ON	0 V
Airbag module (-driver curtain airbag-) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace driver curtain airbag power supply wire harness.**

OK

2	**Inspect the resistance between driver curtain airbag and ground**

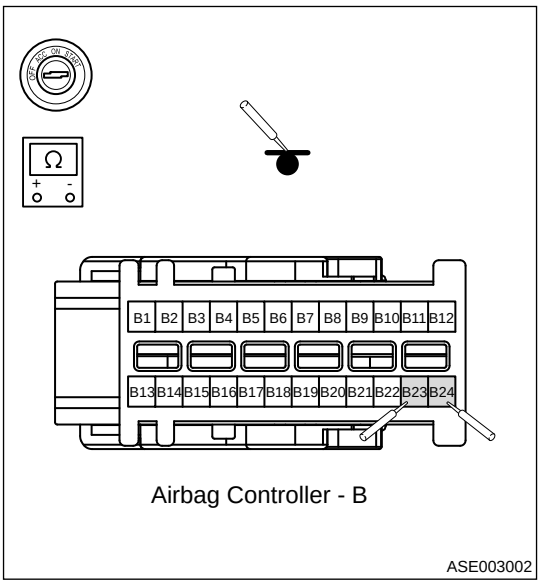
(a) Disconnect the driver curtain airbag connector.

(b) Remove the airbag module connector.

(c) Turn ENGINE START STOP switch to OFF.

(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (-driver curtain airbag+) - Body ground	ENGINE START STOP switch OFF	∞
Airbag module (-driver curtain airbag-) - Body ground	ENGINE START STOP switch OFF	∞



NG → **Repair or replace driver curtain airbag ground wire harness.**

OK

3	**Check circuit between airbag controller and driver curtain airbag**

Use circuit diagram as a guide to perform the following inspection procedures:

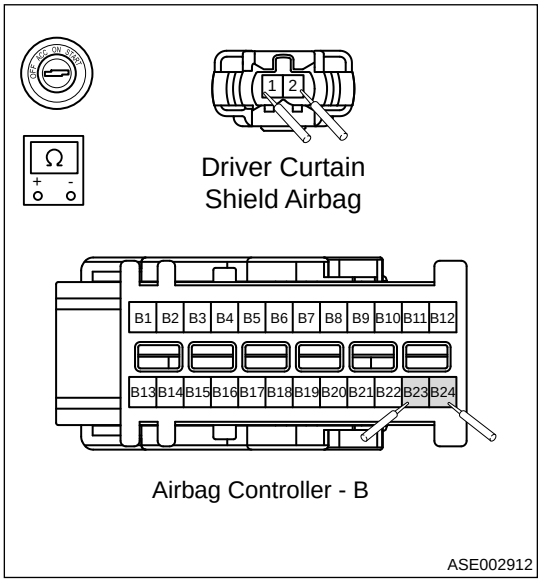
(a) Disconnect the driver curtain airbag connector.

(b) Disconnect the airbag connector.

(c) Turn ENGINE START STOP switch to OFF.

(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (- corresponding terminal) - Driver curtain airbag (2)	ENGINE START STOP switch OFF	Less than 1 Ω
Airbag module (- corresponding terminal) - Driver curtain airbag (1)	ENGINE START STOP switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness between airbag controller and driver curtain airbag.**

OK

4	Inspect the driver curtain airbag

(a) Substitute one 2.5 Ω resistance for airbag.

(b) Check if DTC exists.

NG → **Repair or replace driver frontal airbag.**

OK

5	Reconfirm DTCs

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

(c) Read the malfunction information and confirm that the malfunction has been solved.

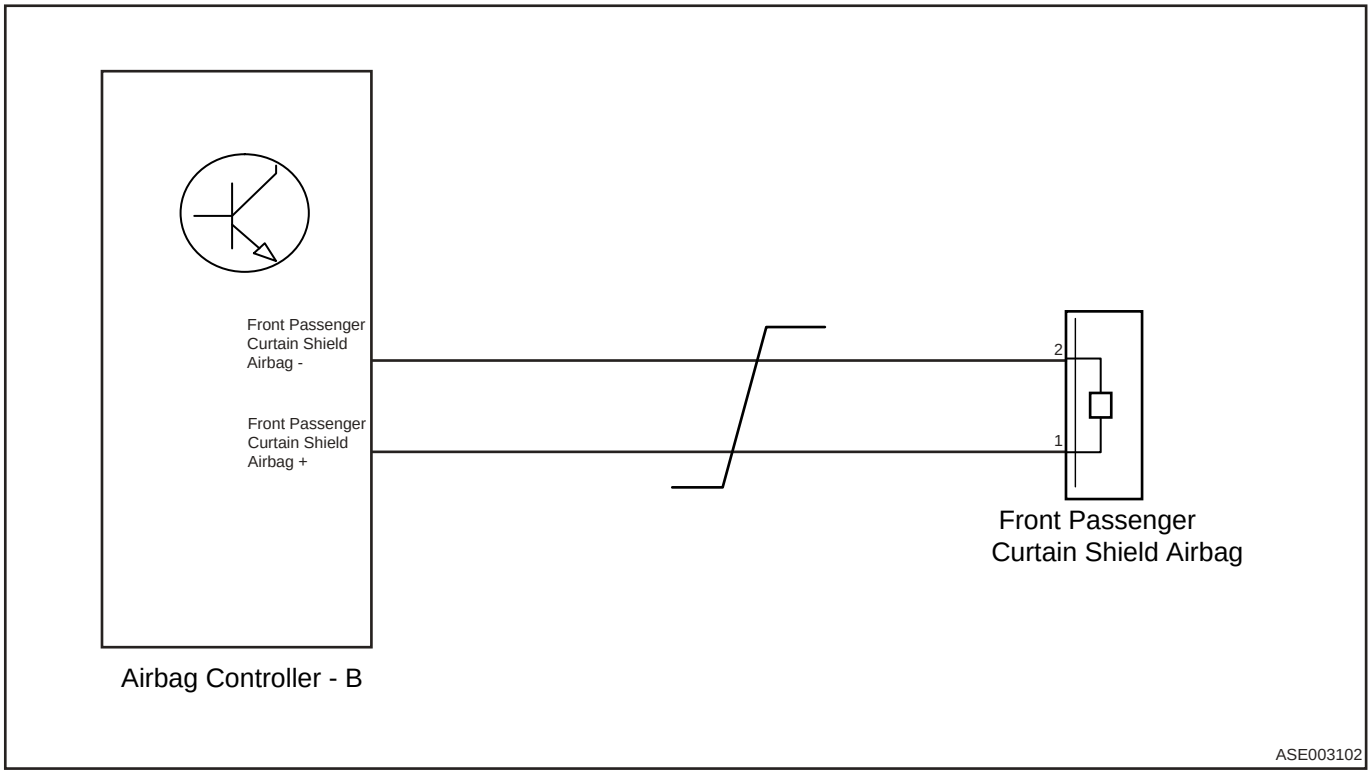
NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B0029-11	Right Side Airbag Deployment Control-Circuit Short To Ground
DTC	B0029-12	Right Side Airbag Deployment Control-Circuit Short To Battery

DTC	**B0029-1A**	**Right Side Airbag Deployment Control-Circuit Resistance Below Threshold**
DTC	**B0029-1B**	**Right Side Airbag Deployment Control-Circuit Resistance Above Threshold**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Inspect the voltage between right side curtain shield airbag and power supply**

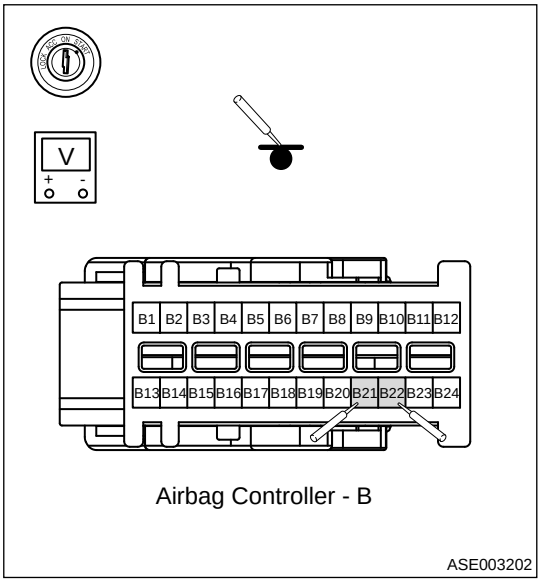
(a) Disconnect the right side curtain shield airbag connector.

(b) Disconnect the airbag module connector.

(c) Turn ENGINE START STOP switch to ON.

(d) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (-right side curtain shield airbag+) - Body ground	ENGINE START STOP switch ON	0 V
Airbag module (-right side curtain shield airbag-) - Body ground	ENGINE START STOP switch ON	0 V



Airbag Controller - B

ASE003202

NG → **Repair or replace right side curtain shield airbag power supply wire harness.**

OK

2	**Inspect the resistance between right side curtain shield airbag and ground**

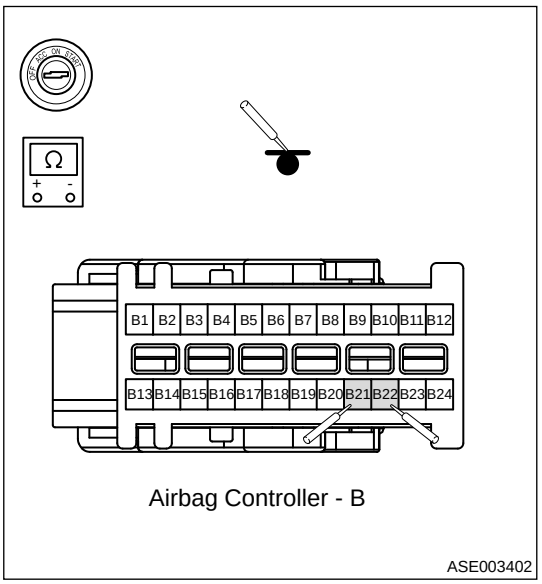
(a) Disconnect the right side curtain shield airbag connector.

(b) Disconnect the airbag module connector.

(c) Turn ENGINE START STOP switch to OFF.

(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (-right side curtain shield airbag+) - Body ground	ENGINE START STOP switch OFF	∞
Airbag module (-right side curtain shield airbag-) - Body ground	ENGINE START STOP switch OFF	∞



Airbag Controller - B

ASE003402

NG → **Repair or replace right side curtain shield airbag ground wire harness.**

OK

3	**Check circuit between airbag controller and right side curtain shield airbag**

Use circuit diagram as a guide to perform the following inspection procedures:

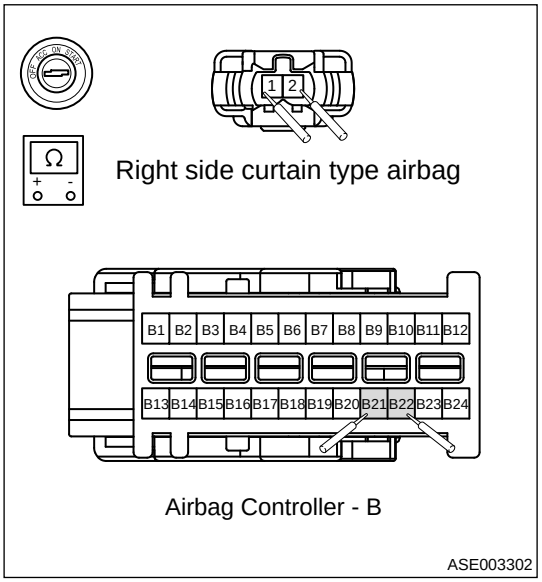
(a) Disconnect the right side curtain shield airbag connector.

(b) Disconnect the airbag module connector.

(c) Turn ENGINE START STOP switch to OFF.

(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (- corresponding terminal) - Right side curtain shield airbag (2)	ENGINE START STOP switch OFF	Less than 1 Ω
Airbag module (- corresponding terminal) - Right side curtain shield airbag (1)	ENGINE START STOP switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness between airbag controller and right side curtain shield airbag.**

OK

4	**Inspect the right side curtain shield airbag**

(a) Substitute one 2.5 Ω resistance for airbag.

(b) Check if DTC exists.

NG → **Repair or replace right side curtain shield airbag.**

OK

5	**Reconfirm DTCs**

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

(c) Read the malfunction information and confirm that the malfunction has been solved.

NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1285-11**	**Front Row Left Seatbelt Retractor Pretensioner Deployment Control-Circuit Short To Ground**
DTC	**B1285-12**	**Front Row Left Seatbelt Retractor Pretensioner Deployment Control-Circuit Short To Battery**
DTC	**B1285-1A**	**Front Row Left Seatbelt Retractor Pretensioner Deployment Control-Circuit Resistance Below Threshold**
DTC	**B1285-1B**	**Front Row Left Seatbelt Retractor Pretensioner Deployment Control-Circuit Resistance Above Threshold**

For repair methods, refer to “Driver Frontal Airbag Malfunction Troubleshooting Procedure” to perform troubleshooting and repair according to Circuit Diagram Manual.

DTC	**B1286-11**	**Front Row Right Seatbelt Retractor Pretensioner Deployment Control-Circuit Short To Ground**
DTC	**B1286-12**	**Front Row Right Seatbelt Retractor Pretensioner Deployment Control-Circuit Short To Battery**
DTC	**B1286-1A**	**Front Row Right Seatbelt Retractor Pretensioner Deployment Control-Circuit Resistance Below Threshold**
DTC	**B1286-1B**	**Front Row Right Seatbelt Retractor Pretensioner Deployment Control-Circuit Resistance Above Threshold**

For repair methods, refer to “Driver Frontal Airbag Malfunction Troubleshooting Procedure” to perform troubleshooting and repair according to Circuit Diagram Manual.

DTC	**B1204-11**	**Belt Pretensioner Driver Deployment Control-Circuit Short To Ground**
DTC	**B1204-12**	**Belt Pretensioner Driver Deployment Control-Circuit Short To Battery**
DTC	**B1204-1A**	**Belt Pretensioner Driver Deployment Control-Circuit Resistance Below Threshold**
DTC	**B1204-1B**	**Belt Pretensioner Driver Deployment Control-Circuit Resistance Above Threshold**

For repair methods, refer to “Driver Frontal Airbag Malfunction Troubleshooting Procedure” to perform troubleshooting and repair according to Circuit Diagram Manual.

DTC	**B1205-11**	**Belt Pretensioner Passenger Deployment Control-Circuit Short To Ground**
DTC	**B1205-12**	**Belt Pretensioner Passenger Deployment Control-Circuit Short To Battery**
DTC	**B1205-1A**	**Belt Pretensioner Passenger Deployment Control-Circuit Resistance Below Threshold**
DTC	**B1205-1B**	**Belt Pretensioner Passenger Deployment Control-Circuit Resistance Above Threshold**

For repair methods, refer to “Driver Frontal Airbag Malfunction Troubleshooting Procedure” to perform troubleshooting and repair according to Circuit Diagram Manual.

DTC	**B0073-11**	**Second Row Left Seatbelt Pretensioner Deployment Control-Circuit Short To Ground**
DTC	**B0073-12**	**Second Row Left Seatbelt Pretensioner Deployment Control-Circuit Short To Battery**

DTC	**B0073-1A**	**Second Row Left Seatbelt Pretensioner Deployment Control-Circuit Resistance Below Threshold**
DTC	**B0073-1B**	**Second Row Left Seatbelt Pretensioner Deployment Control-Circuit Resistance Above Threshold**

For repair methods, refer to “Driver Frontal Airbag Malfunction Troubleshooting Procedure” to perform troubleshooting and repair according to Circuit Diagram Manual.

DTC	**B0075-11**	**Second Row Right Seatbelt Pretensioner Deployment Control-Circuit Short To Ground**
DTC	**B0075-12**	**Second Row Right Seatbelt Pretensioner Deployment Control-Circuit Short To Battery**
DTC	**B0075-1A**	**Second Row Right Seatbelt Pretensioner Deployment Control-Circuit Resistance Below Threshold**
DTC	**B0075-1B**	**Second Row Right Seatbelt Pretensioner Deployment Control-Circuit Resistance Above Threshold**

For repair methods, refer to “Driver Frontal Airbag Malfunction Troubleshooting Procedure” to perform troubleshooting and repair according to Circuit Diagram Manual.

DTC	**B0030-11**	**Second Row Left Side Airbag Deployment Control-Circuit Short To Ground**
DTC	**B0030-12**	**Second Row Left Side Airbag Deployment Control Circuit Short to Power Supply**
DTC	**B0030-1A**	**Second Row Left Side Airbag Deployment Control-Circuit Resistance Below Threshold**
DTC	**B0030-1B**	**Second Row Left Side Airbag Deployment Control-Circuit Resistance Above Threshold**

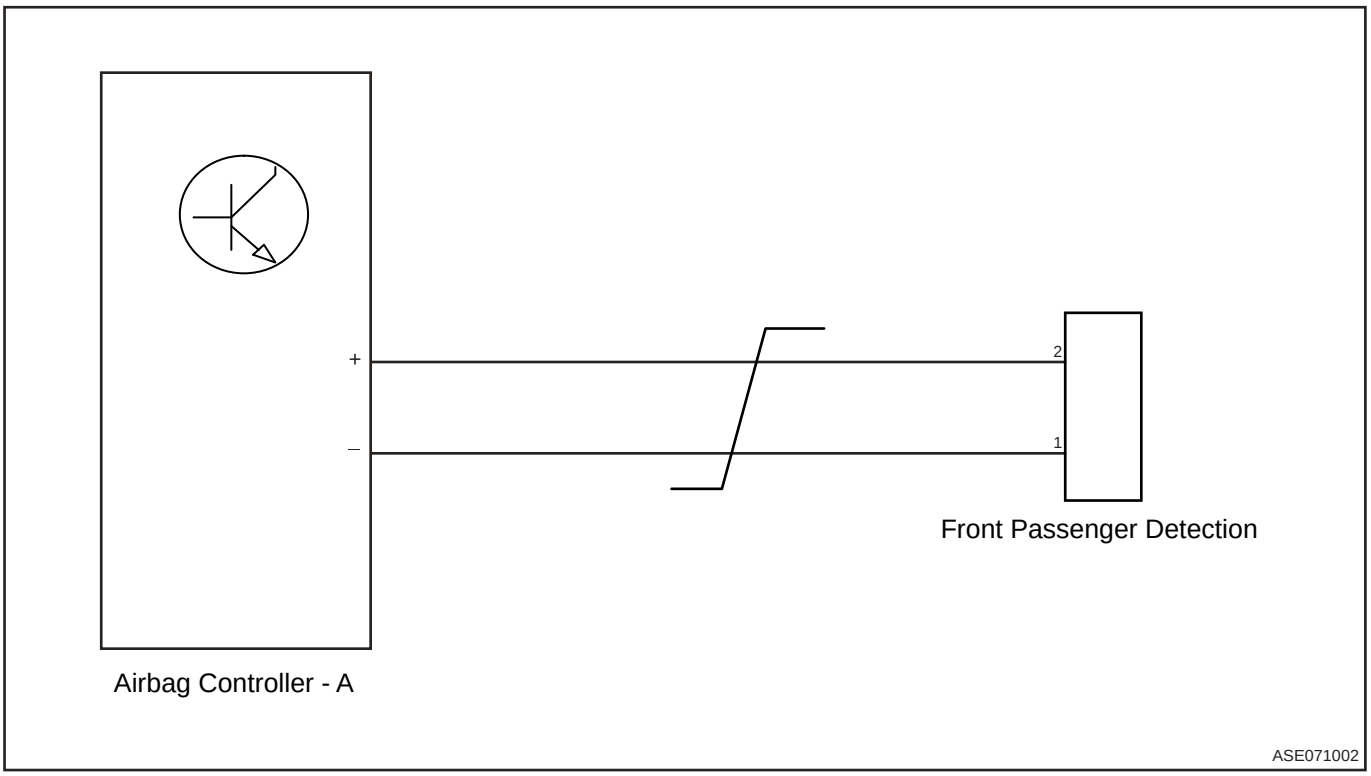
For repair methods, refer to “Driver Frontal Airbag Malfunction Troubleshooting Procedure” to perform troubleshooting and repair according to Circuit Diagram Manual.

DTC	**B0038-11**	**Second Row Right Side Seat Side Airbag Deployment Control-Circuit Short To Ground**
DTC	**B0038-12**	**Second Row Right Side Seat Side Airbag Deployment Control-Circuit Short To Power Supply**
DTC	**B0038-1A**	**Second Row Right Seat Side Airbag Deployment Control-Circuit Resistance Below Threshold**
DTC	**B0038-1B**	**Second Row Right Seat Side Airbag Deployment Control-Circuit Resistance Above Threshold**

For repair methods, refer to “Driver Frontal Airbag Malfunction Troubleshooting Procedure” to perform troubleshooting and repair according to Circuit Diagram Manual.

DTC	**B00C7-12**	**Passenger Presence Detection Switch-Circuit Short To Battery**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

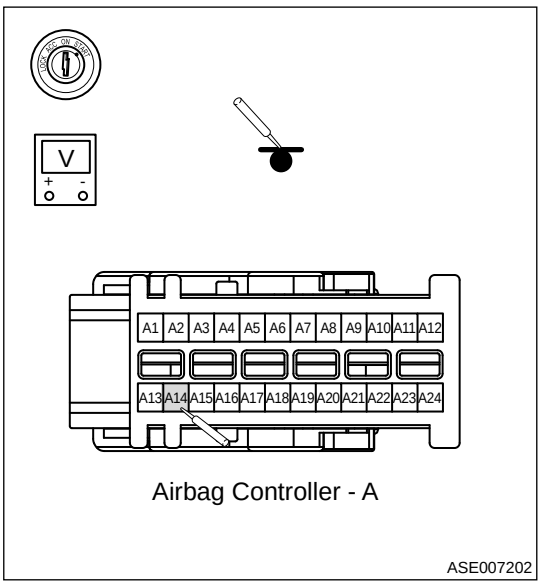
1	**Check voltage between front passenger load detection switch and power supply**

(a) Disconnect the airbag connector.

(b) Turn ENGINE START STOP switch to ON.

(c) Check voltage between connector terminal line and ground.

Multimeter Connection	Condition	Specified Condition
Airbag module (-front passenger load detection+) - Body ground	ENGINE START STOP switch ON	0 V
Airbag module (-front passenger load detection-) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace front passenger load detection switch wire harness.**

OK

2	Reconfirm DTCs

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

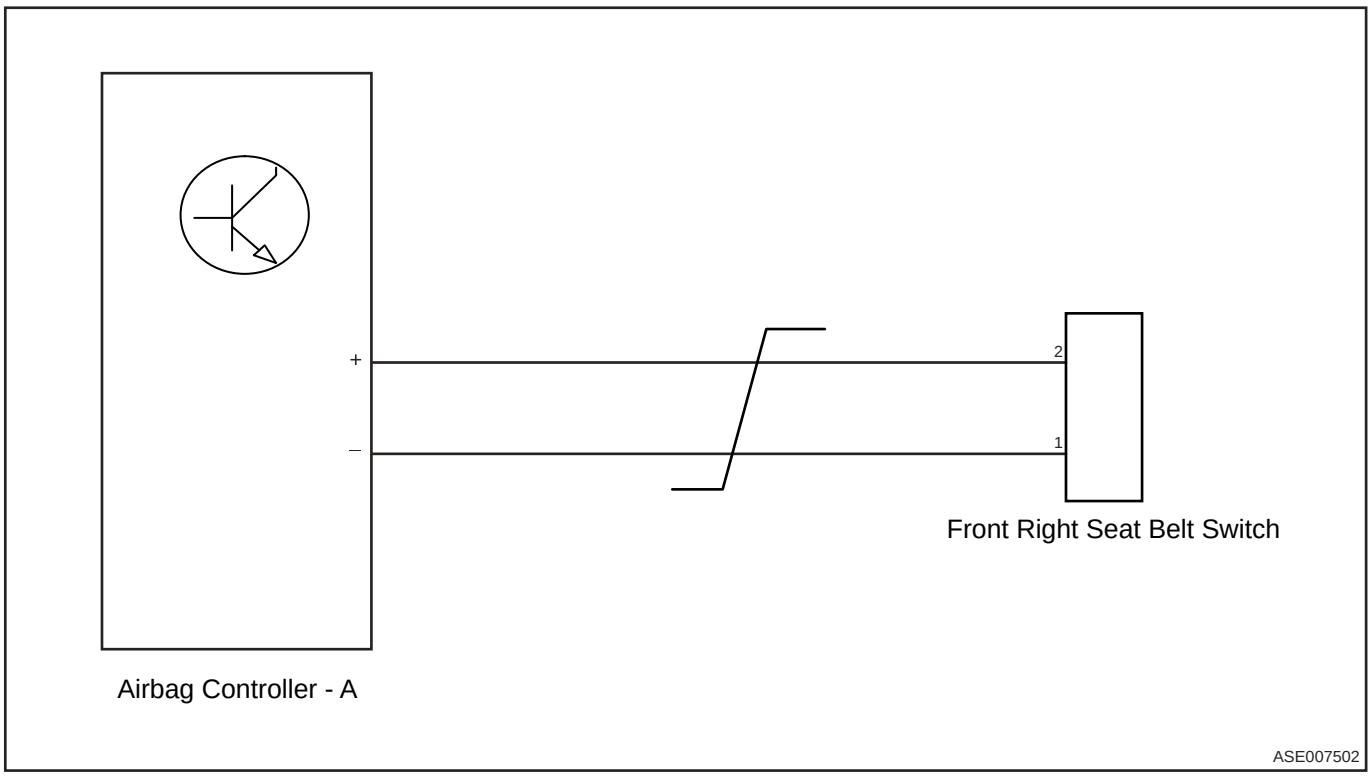
(c) Read the malfunction information and confirm that the malfunction has been solved.

NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1233-12	Passenger Buckle Switch-Circuit Short To Battery

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.

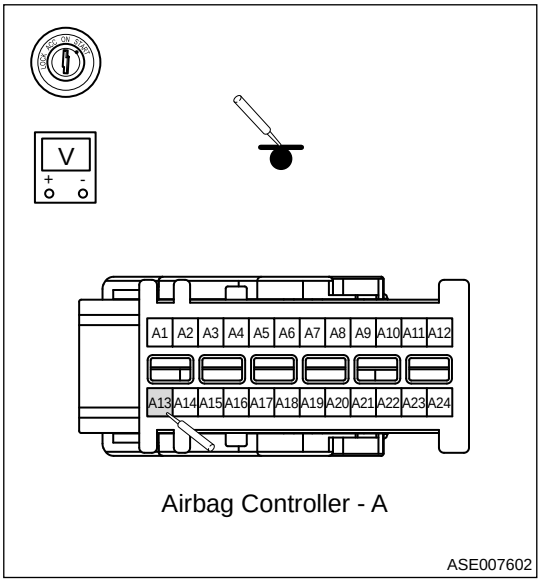
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check voltage between front passenger seat belt buckle switch and power supply**

(a) Disconnect the airbag connector.
(b) Turn ENGINE START STOP switch to ON.
(c) Check voltage between connector terminal line and ground.

Multimeter Connection	Condition	Specified Condition
Airbag module (-front passenger seat belt buckle switch+) - Body ground	ENGINE START STOP switch ON	0 V
Airbag module (-front passenger seat belt buckle switch-) - Body ground	ENGINE START STOP switch ON	0 V



Airbag Controller - A
ASE007602

NG → **Repair or replace front passenger seat belt buckle switch wire harness.**

OK →

2	**Reconfirm DTCs**

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the malfunction information and confirm that the malfunction has been solved.

NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1234-12	Second Row Left Buckle Switch-Circuit Short To Battery

For diagnostic methods, refer to “Passenger Buckle Switch-Circuit Short To Battery” inspection procedure according to Circuit Diagram Manual.

DTC	B1235-12	Second Row Middle Buckle Switch-Circuit Short To Battery

For diagnostic methods, refer to “Passenger Buckle Switch-Circuit Short To Battery” inspection procedure according to Circuit Diagram Manual.

DTC	B1236-12	Second Row Right Buckle Switch-Circuit Short To Battery

For diagnostic methods, refer to “Passenger Buckle Switch-Circuit Short To Battery” inspection procedure according to Circuit Diagram Manual.

DTC	B0090-11	Left Front Restraints Sensor-Circuit Short To Ground
DTC	B0090-12	Left Front Restraints Sensor-Circuit Short To Battery
DTC	B0090-13	Left Front Restraints Sensor-Circuit Open
DTC	B0090-96	Left Front Restraints Sensor-Component Internal Failure
DTC	B0090-91	Left Front Restraints Sensor Configured Fault
DTC	B0090-00	Left Front Restraints Sensor-No Sub Type Information

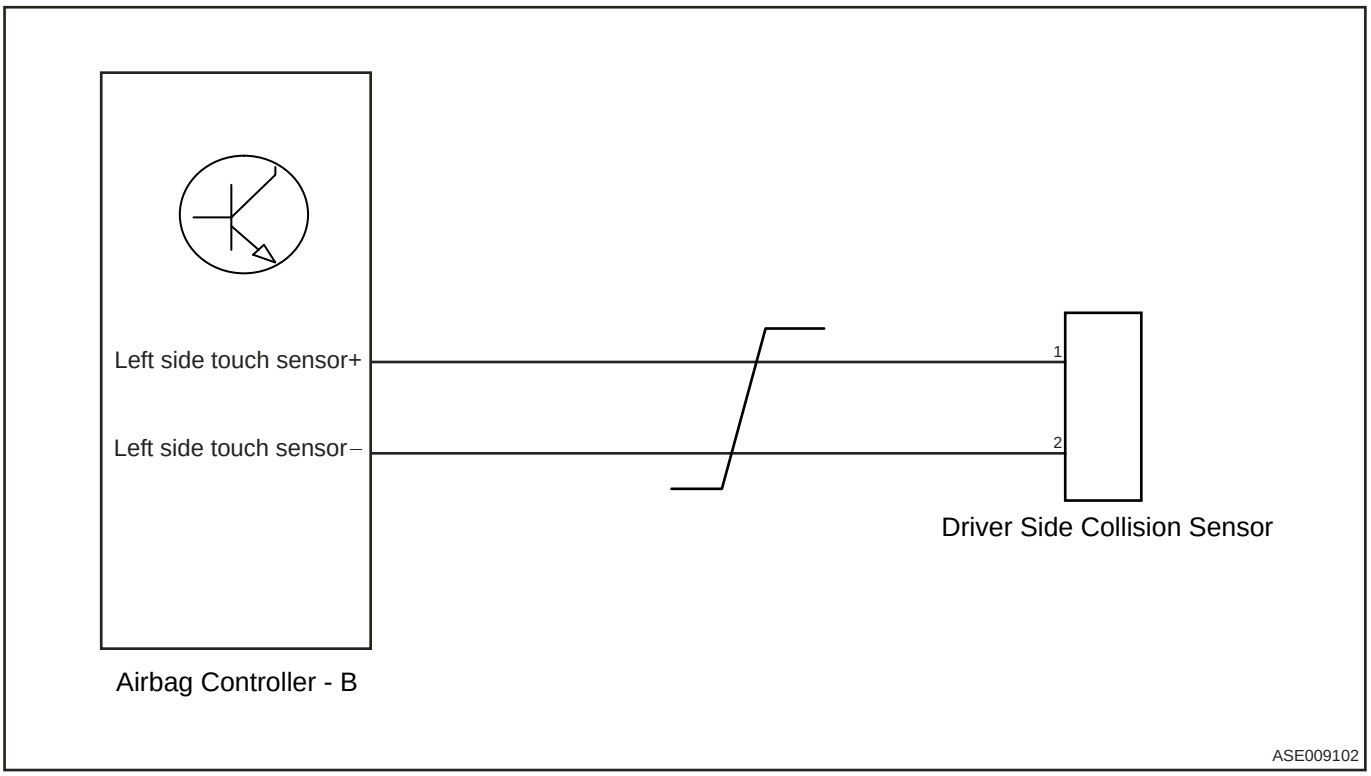
For reserve/detection methods, refer to “Left Side Sensor Malfunction Diagnosis Procedure” to perform inspect and repair according to Circuit Diagram Manual.

DTC	B0095-11	Right Front Restraints Sensor-Circuit Short To Ground
DTC	B0095-12	Right Front Restraints Sensor-Circuit Short To Battery
DTC	B0095-13	Right Front Restraints Sensor-Circuit Open
DTC	B0095-96	Right Front Restraints Sensor-Component Internal Failure
DTC	B0095-91	Right Front Restraints Sensor Configured Fault
DTC	B0095-00	Right Front Restraints Sensor-No Sub Type Information

For reserve/detection methods, refer to “Left Side Sensor Malfunction Diagnosis Procedure” to perform inspect and repair according to Circuit Diagram Manual.

DTC	B0091-11	Left Side Sensor-Circuit Short To Ground
DTC	B0091-12	Left Side Restraints Sensor-Circuit Short To Battery
DTC	B0091-13	Left Side Restraints Sensor-Circuit Open
DTC	B0091-96	Left Side Restraints Sensor-Component Internal Failure
DTC	B0091-95	Left Side Restraints Sensor- Configuration Error
DTC	B0091-00	Left Side Restraints Sensor-No Sub Type Information

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

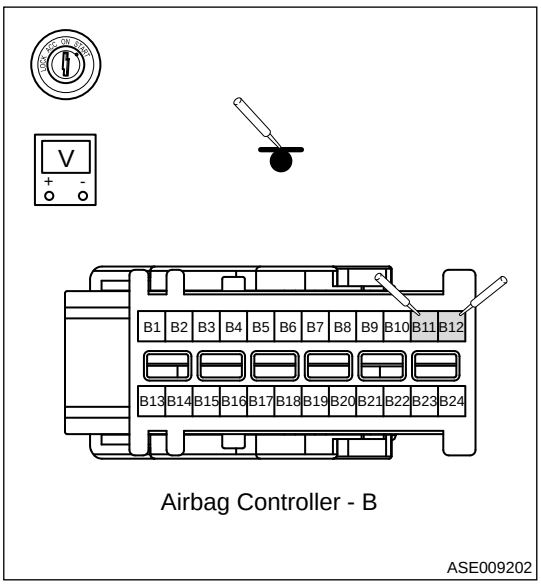
- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check voltage between left front restraints sensor and power supply**

(a) Disconnect the airbag connector.
(b) Turn ENGINE START STOP switch to ON.
(c) Check voltage between connector terminal line and ground.

Multimeter Connection	Condition	Specified Condition
Airbag module (- left front restraints sensor +) - Body ground	ENGINE START STOP switch ON	0 V
Airbag module (- left front restraints sensor-) - Body ground	ENGINE START STOP switch ON	0 V



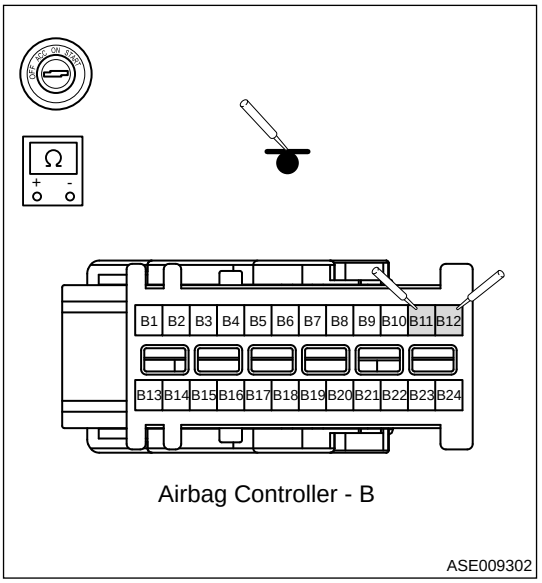
NG → **Repair or replace left front restraints sensor wire harness.**

OK

2	**Check resistance between left front restraints sensor and ground**

(a) Disconnect the left front restraints sensor connector.
(b) Disconnect the airbag connector.
(c) Turn ENGINE START STOP switch to OFF.
(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (- left front restraints sensor +) - Body ground	ENGINE START STOP switch OFF	∞
Airbag module (- left front restraints sensor-) - Body ground	ENGINE START STOP switch OFF	∞



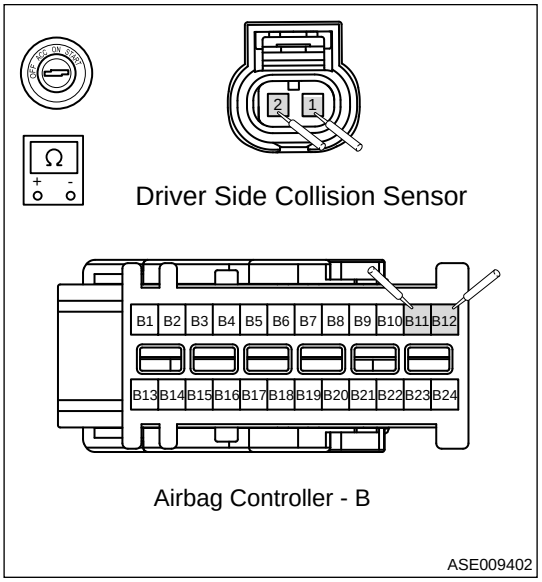
NG → **Repair or replace left front restraints sensor wire harness.**

OK

3	**Check circuit between airbag controller and left front restraints sensor wire harness**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Disconnect the left front restraints sensor.
(b) Disconnect the airbag connector.
(c) Turn ENGINE START STOP switch to OFF.
(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (- corresponding terminal) - Left front restraints sensor (2)	ENGINE START STOP switch OFF	Less than 1 Ω
Airbag module (- corresponding terminal) - Left front restraints sensor (1)	ENGINE START STOP switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness between airbag controller and left front restraints sensor.**

OK

4	Check the collision sensor

(a) Replace the collision sensor.
(b) Check if DTC exists.

OK → **Replace the collision sensor.**

NG

5	Reconfirm DTCs

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the malfunction information and confirm that the malfunction has been solved.

NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B0096-11**	**Right Side Restraints Sensor-Circuit Short To Ground**
DTC	**B0096-12**	**Right Side Restraints Sensor-Circuit Short To Battery**
DTC	**B0096-13**	**Right Side Restraints Sensor-Circuit Open**
DTC	**B0096-96**	**Right Side Restraints Sensor-Component Internal Failure**
DTC	**B0096-95**	**Right Side Restraints Sensor - Configuration Error**
DTC	**B0096-00**	**Right Side Restraints Sensor-No Sub Type Information**

For detection methods, refer to “Left Side Sensor Malfunction Diagnosis Procedure” to perform inspect and repair according to Circuit Diagram Manual.

DTC	**B1251-00**	**ACU Internal Error-No Sub Type Information**
DTC	**B122C-00**	**ACU Has Been Scrapped-No Sub Type Information**
DTC	**B1216-47**	**Crash Front**
DTC	**B1217-47**	**Crash Side-Watchdog / Safety µC Failure**
DTC	**B1218-47**	**Crash Row-Watchdog / Safety µC Failure**
DTC	**B127F-47**	**Crash Recording Locked**

Description

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Reconfirm DTCs**

For preparations, refer to "Preparations before dealing with airbag system wire harness malfunction".
Use circuit diagram as a guide to perform the following inspection procedures:
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1215-00**	**Squib Cross Coupling Error-No Sub Type Information**

Description

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTC occurs again.

NG → **Check and repair related failure circuit for coupling error.**

OK

2	**Reconfirm DTCs**

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG	**Replace with a new ECM to check if fault reoccurs**
OK	**Conduct test and confirm malfunction has been repaired.**

DTC	B1240-00	ICM Airbag Lamp Failed-No Sub Type Information

Description

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check for DTCs

(a) Using diagnostic tester, clear DTC and read DTC again.

(b) Check if DTC occurs again.

NG	**Replace BCM or instrument cluster module.**

OK

2	Reconfirm DTCs

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG	**Replace with a new ECM to check if fault reoccurs**
OK	**Conduct test and confirm malfunction has been repaired.**

DTC	**B122D-95**	**Driver Airbag Unexpected Config-Incorrect Assembly**
DTC	**B122E-95**	**Passenger Airbag Unexpected Config-Incorrect Assembly**
DTC	**B122F-95**	**Left Side Airbag Unexpected Config-Incorrect Assembly**
DTC	**B1220-95**	**Right Side Airbag Unexpected Config-Incorrect Assembly**
DTC	**B1221-95**	**Left Curtain Unexpected Config-Incorrect Assembly**
DTC	**B1222-95**	**Right Curtain Unexpected Config-Incorrect Assembly**
DTC	**B1223-95**	**Front Row Left Seatbelt Retractor Pretensioner Unexpected Config-Incorrect Assembly**
DTC	**B1224-95**	**Front Row Right Seatbelt Retractor Pretensioner Unexpected Config-Incorrect Assembly**
DTC	**B1225-95**	**Belt Pretensioner Driver Unexpected Config-Incorrect Assembly**
DTC	**B1226-95**	**Belt Pretensioner Pass Unexpected Config-Incorrect Assembly**
DTC	**B1227-95**	**Second Row Left Seatbelt Pretensioner Unexpected Config-Incorrect Assembly**
DTC	**B1229-95**	**Second Row Right Seatbelt Pretensioner Unexpected Config-Incorrect Assembly**
DTC	**B0004-95**	**Driver Knee Airbag Ignition Circuit Config-Incorrect Assembly**
DTC	**B0030-95**	**Second Row Left Side Seat Side Airbag Unexpected Config-Incorrect Assembly**
DTC	**B0038-95**	**Second Row Right Side Seat Side Airbag Unexpected Config-Incorrect Assembly**

Description

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTC occurs again.

NG → **Compare with configuration table to confirm if actual vehicle has corresponding malfunction configuration.**

OK

2	Rewrite the correct configuration code with diagnostic tester

(a) Using diagnostic tester, clear DTC and read DTC again.

(b) Rewrite the correct configuration code with diagnostic tester.

NG → **Confirm if configuration code is met with actual vehicle configuration, if not, please get the correct configuration code.**

OK

3	Reconfirm DTCs

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

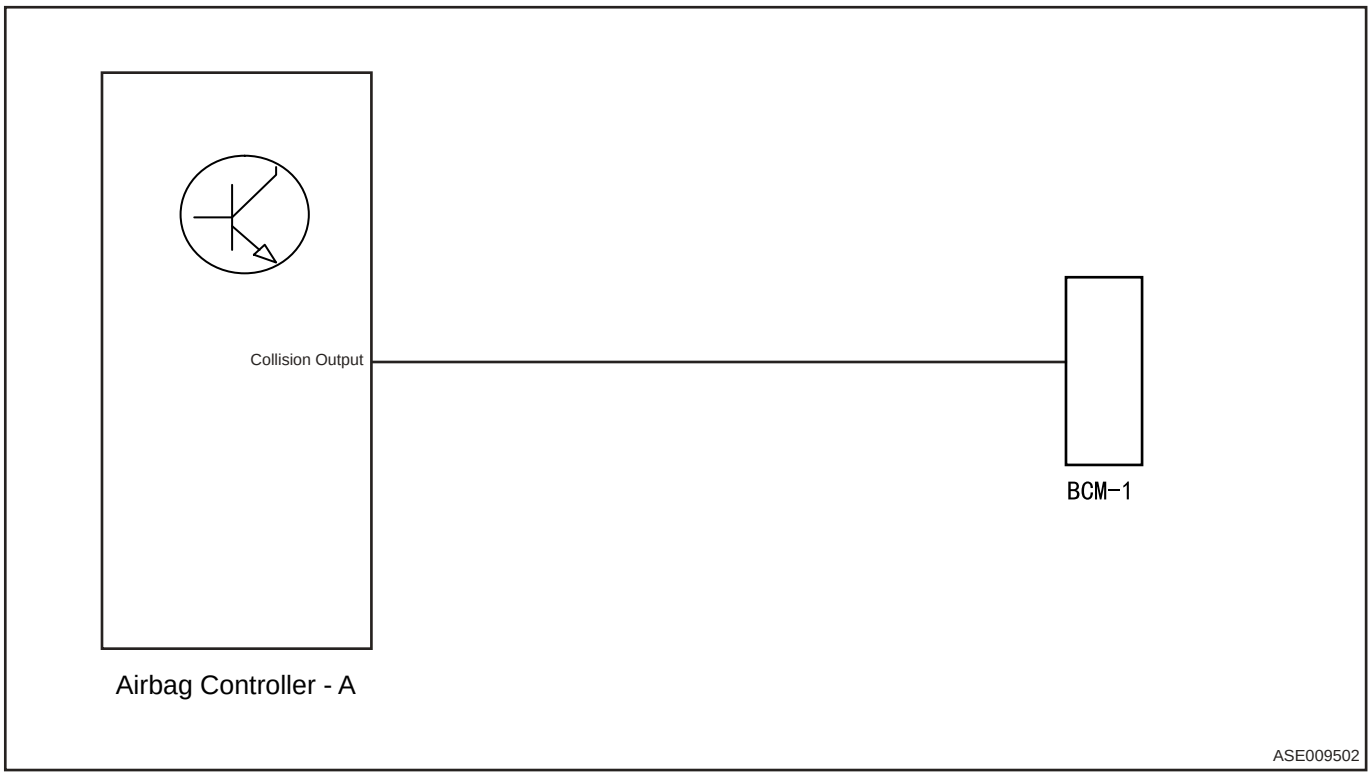
(c) Read the malfunction information and confirm that the malfunction has been solved.

NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1284-12**	**Crash Output Fault-Circuit Short To Power Supply**
DTC	**B1284-11**	**Crash Output Fault-Circuit Short To Ground**
DTC	**B1284-13**	**Crash Output Fault-Circuit Open**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTC occurs again.

NG → **Check and repair circuit between airbag module and BCM according to diagram manual.**

OK

2	**Reconfirm DTCs**

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG	**Replace with a new ECM to check if fault reoccurs**
OK	**Conduct test and confirm malfunction has been repaired.**

DTC	B122D-95	Driver Airbag Unexpected Config-Incorrect Assembly

Description

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Confirm if airbag controller are applicable to this model.**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Confirm that the airbag controller configuration.
(b) Correct the controller spare part number.

NG	**Replace or repair the airbag controller.**

OK

2	**Reconfirm DTCs**

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG	**Replace with a new ECM to check if fault reoccurs**
OK	**Conduct test and confirm malfunction has been repaired.**

DTC	B122E-95	Passenger Airbag Unexpected Config-Incorrect Assembly

Description

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.

- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Confirm if airbag controller are applicable to this model.**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Confirm that the airbag controller configuration.

(b) Correct the controller spare part number.

NG → **Replace or repair the airbag controller.**

OK

2	**Reconfirm DTCs**

For preparations, refer to “Preparations before dealing with airbag system wire harness malfunction”.
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

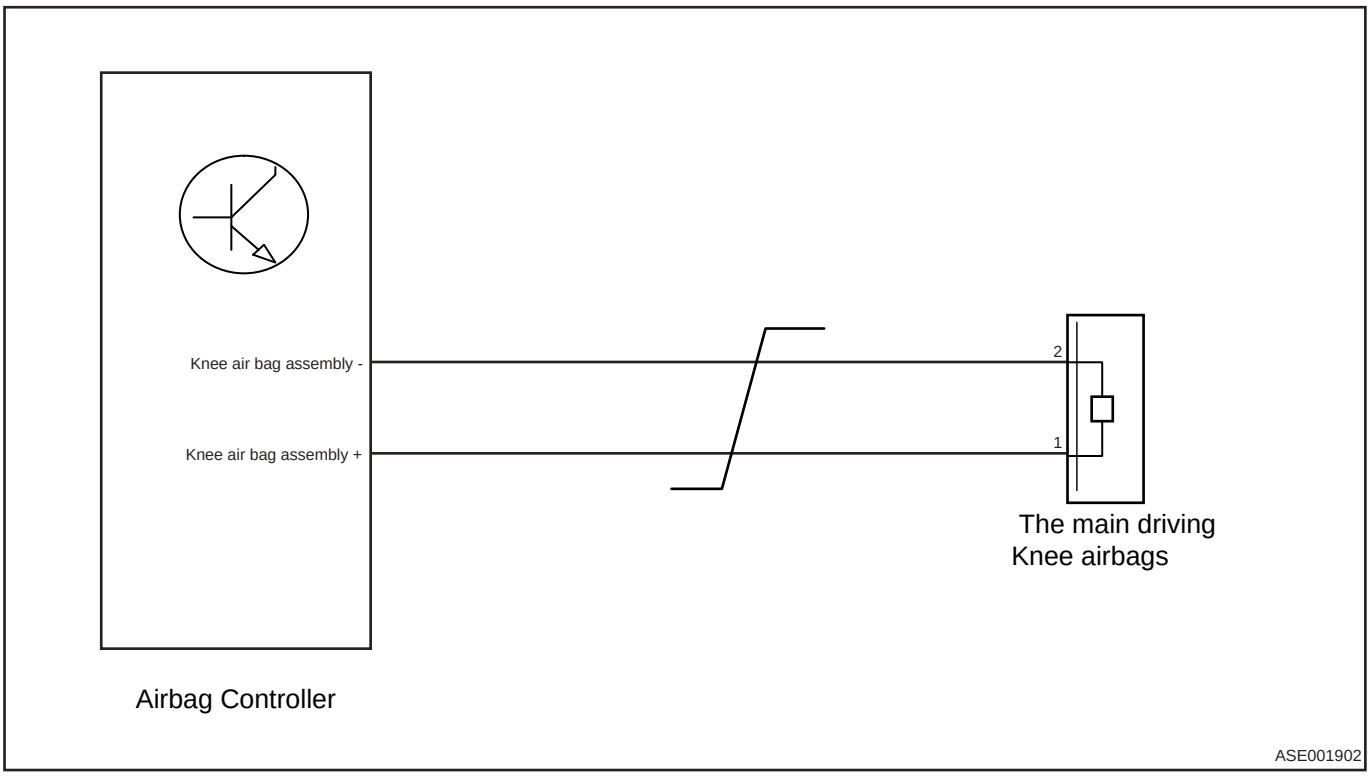
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B0004-11**	**Driver Knee Airbag Deployment Control-Circuit Short To Ground**
DTC	**B0004-12**	**Driver Knee Airbag Deployment Control-Circuit Short To Power Supply**
DTC	**B0004-1A**	**Driver Knee Airbag Deployment Control-Circuit Resistance Below Threshold**
DTC	**B0004-1B**	**Driver Knee Airbag Deployment Control-Circuit Resistance Above Threshold**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Inspect the voltage between driver knee airbag and power supply**

Use circuit diagram as a guide to perform the following inspection procedures:

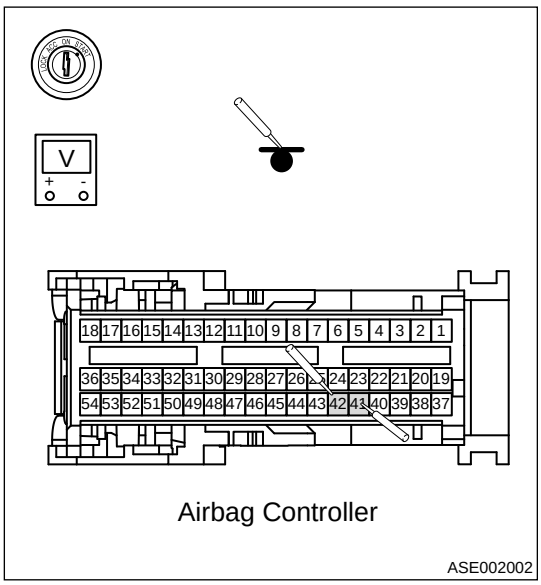
(a) Disconnect the driver knee airbag connector.

(b) Disconnect the airbag connector.

(c) Turn ENGINE START STOP switch to ON.

(d) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (-knee airbag+) - Body ground	ENGINE START STOP switch ON	0 V
Airbag module (-knee airbag-) - Body ground	ENGINE START STOP switch ON	0 V



NG

Repair or replace driver knee airbag power supply wire harness.

OK

2	**Inspect the resistance between driver knee airbag and ground**

Use circuit diagram as a guide to perform the following inspection procedures:

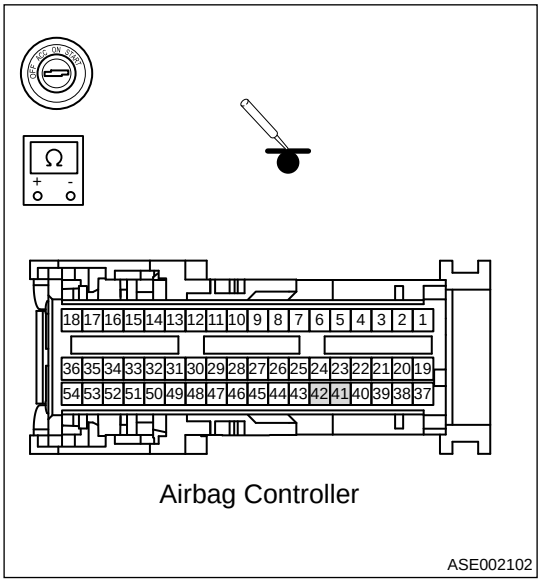
(a) Disconnect the driver knee airbag connector.

(b) Disconnect the airbag connector.

(c) Turn ENGINE START STOP switch to OFF.

(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (-knee airbag+) - Body ground	ENGINE START STOP switch OFF	∞
Airbag module (-knee airbag-) - Body ground	ENGINE START STOP switch OFF	∞



NG

Repair or replace driver knee airbag ground wire harness.

OK

3	**Check circuit between airbag controller and driver knee airbag**

Use circuit diagram as a guide to perform the following inspection procedures:

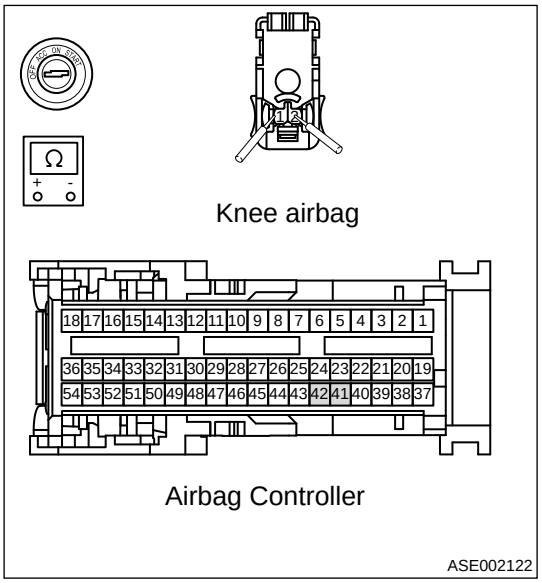
(a) Disconnect the driver knee airbag connector.

(b) Disconnect the airbag connector.

(c) Turn ENGINE START STOP switch to OFF.

(d) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
Airbag module (-corresponding terminal) - Driver knee airbag (2)	ENGINE START STOP switch OFF	Less than 1 Ω
Airbag module (-corresponding terminal) - Driver knee airbag (1)	ENGINE START STOP switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness between airbag controller and front passenger frontal airbag.**

OK ↓

4	**Inspect the driver knee airbag**

(a) Substitute one 2.5 Ω resistance for airbag.
(b) Check if DTC exists.

NG → **Repair or replace driver knee airbag.**

OK ↓

5	**Reconfirm DTCs**

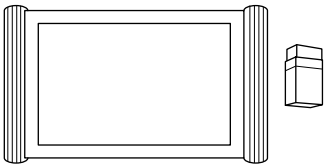
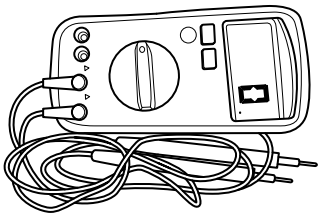
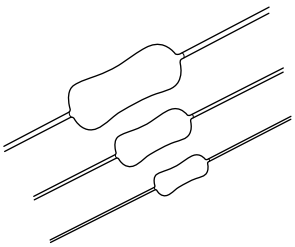
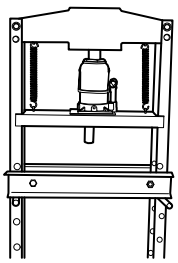
For preparations, refer to "Preparations before dealing with airbag system wire harness malfunction".
Use circuit diagram as a guide to perform the following inspection procedures:
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the malfunction information and confirm that the malfunction has been solved.

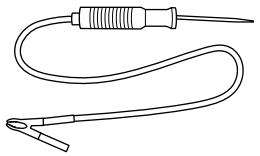
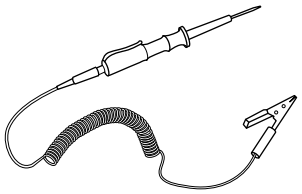
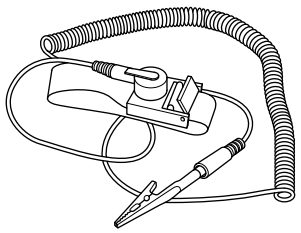
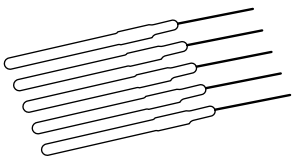
NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

On-vehicle Service

Tools

Tool Name	Tool Drawing
Diagnostic Tester	 S00001
Digital Multimeter	 S00002
Resistor (2 Ω)	 S00070
Interior & Exterior Remover	 S00020

Tool Name	Tool Drawing
Bulb Test Light	 S00071
Diode Test Light	 S00072
Static-proof Wrist Strap	 S00073
Wire Harness Terminal Service Tool	 S00074

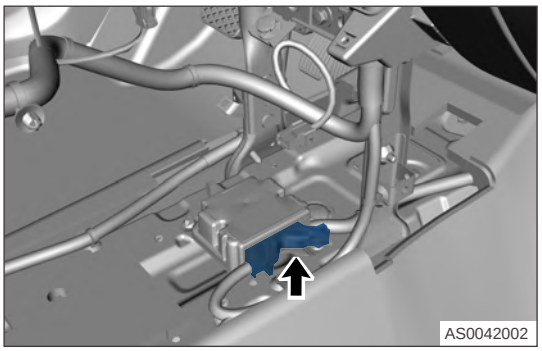
Replacement of Airbag System Controller (ACU)

Removal

⚠ Warning

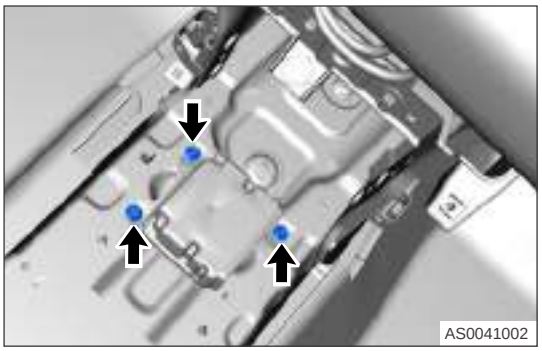
- Be sure to follow correct procedures to remove and install airbag system controller.
- Inspect and confirm that part number in airbag control module label matches with configuration card part number in vehicle; parts surface should be free of chips and labels and bar codes should be intact and clear before assembly; Peel off one bar code after inspection and attach it to record card in vehicle;
- Handle airbag control module carefully and it’ s strictly forbidden to tap and crash it fiercely.
- There should be no other objects between airbag control module installation plane and ACU module, and ACU must be installed directly on body panel.
- Make sure that the ENGINE START STOP Switch in OFF state during installation and removal of ACU, and never install or remove it with power on.
- Reconfirm the installation direction of ACU after installation and make sure that label arrow direction is facing vehicle head. If fitted reversely, airbag controller assembly will not operate normally.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Wait at least 90 seconds after disconnecting the negative battery cable to disable supplementary restraint system.
3. Remove the auxiliary fascia console assembly. (See page).
4. Press lower limit clamp to separate it from wire harness connector and remove airbag controller assembly.



5. Remove 3 fixing bolts (10# socket wrench) from airbag controller.

   Torque: 9 ± 1 N·m



Inspection

1. Check whether pins of airbag system controller are exposed and bent before assembly.
2. Check whether there are cracks, burrs and other phenomena on airbag system controller.

Installation

⚠ Caution
• Before installing tightening bolts, always make sure that airbag wire harness is not held down or stuck. Adjust if necessary and install it in place. • Make sure to tighten fixing bolts to specified torque during installation. • Always keep vehicle power off during installation. It is forbidden to install the airbag controller assembly with vehicle power on. • Check SRS warning light after installation, and make sure that supplemental restraint system operates normally.

1. Installation is in the reverse order of removal.

AIRBAG

Warnings and Precautions

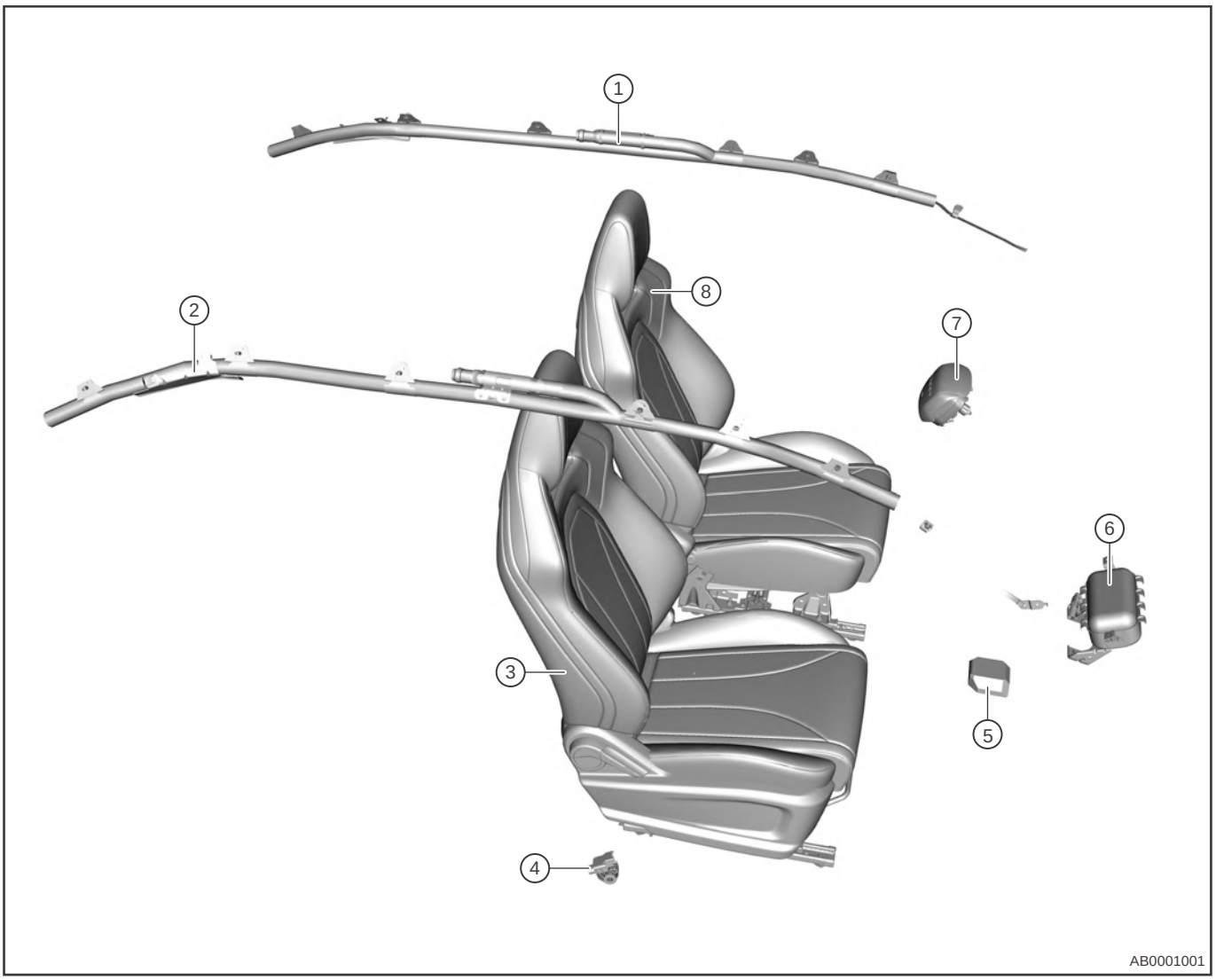
Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair:

1. Wire harness assembly: Arrange the wire harness without any torsion and wrinkles, etc. Never make it with metal or non-metal sharp edge. It should be connected with ACU (Airbag Module), SIS and each airbag module firmly without any looseness.
2. System power-on detection:
   a. After powering-on, ACU sends airbag indicator light on signal via CAN, the lighting time should last for 3 seconds (When the controller has an Squib fault or undervoltage/overvoltage error, initialization time of malfunction indicator is extended to a maximum of 10 seconds). After self-check is completed, ACU sends airbag indicator off signal via CAN, the warning light goes off for (1 ±0.1) seconds, and then it will enter normal operation state;
   b. After completion of (remains on for 3 seconds) and (goes off for 1±0.1 seconds) states, if there is no DTC in system that requires the indicator light to be turned on, the indicator light will go off. If the indicator light remains on, it indicates that there is a malfunction in ACU, it is necessary to clear the fault with a diagnostic tester. Check corresponding components and wire harness connection according to the fault display of diagnostic tester. If the malfunction is still not eliminated, you must complete the corresponding adjustment operation under the guidance of the quality department, design department and suppliers until the indicator goes off.
   c. Diagnosis of airbag system should be completed at the follow-up station of four-wheel alignment. It is required to perform diagnosis when the vehicle is powered-on and airbag modules, etc. are fully fastened.
3. The installation and repairing of all airbag parts must be performed with power off, and it’ s strictly forbidden to install, remove and rework on production line with power on. If the replacement or repairing of airbag parts is involved, you must cut off power supply. Because within 30 seconds of vehicle stalling or fuse removed (refer to Technology Instruction for Wire Harness System Assembly and Adjustment), sufficient power to deploy airbag is still remained inside airbag controller, so perform the repairing operation after 30 seconds of airbag controller and battery cut off.
4. Be sure to clear all DTCs from ACU after vehicle assembly is complete.
5. Store the airbag in a place with enough spare space to prevent accidental airbag deployment. If there is no airbag deployment space, accidental airbag deployment may injure human body or damage the vehicle.
6. In order to avoid DTC, never energize airbag system before connecting all airbag system components and performing diagnostic inspection.
7. If airbag and ACU had fallen down from a position higher than 1 m, please do not reuse it and insulate it.
8. Handle airbag and ACU carefully, and never tap or strike it fiercely.
9. Assembly, detection and removal of airbag system must meet relevant requirements and specifications, and never perform operation casually.

System Overview

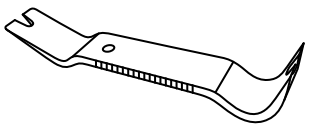
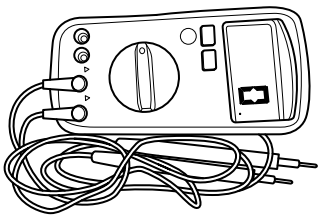
System Components Diagram



1	Left Curtain Shield Airbag Assembly	5	Airbag Controller Assembly
2	Right Curtain Shield Airbag Assembly	6	Front Passenger Airbag Assembly
3	Front Passenger Side Seat Airbag Assembly	7	Driver Airbag Assembly
4	Right Side Collision Sensor	8	Driver Side Seat Airbag Assembly

On-vehicle Service

Tools

Tool Name	Tool Drawing
Interior Crow Plate	 S00020
Digital Multimeter	 S00002

Driver Airbag Assembly (DAB)

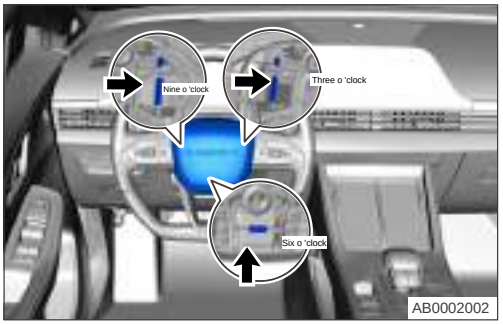
Removal

⚠ Warning

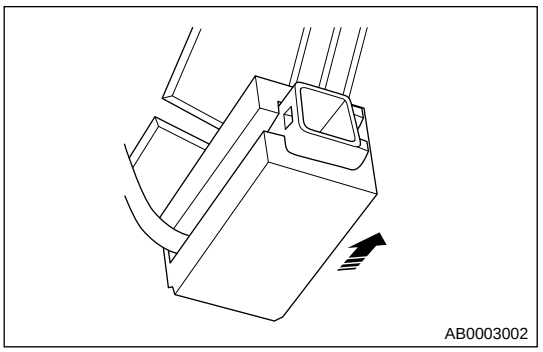
- Wait at least 90 seconds after disconnecting the negative battery cable to disable supplementary restraint system.
- DO NOT damage the airbag wire harness when handling airbag assembly wire harness connector.
- DO NOT pull the airbag wire harness when removing driver airbag assembly.
- DAB installation and repairing must be performed with power off, and it’s strictly forbidden to install, remove and rework DAB on any production line with power on. DAB replacement and repairing must be performed with power off. Within 30s of vehicle stalling or fused removed (refer to Technology Instruction for Wire Harness System Assembly), sufficient power to deploy airbag is still remained inside airbag controller, so it’s necessary to perform repairing after 30s since the power of airbag controller is cut off.
- In order to avoid DTC, never energize airbag system before connecting all airbag system components (including DAB) and performing diagnostic inspection;
- Keep space in area for storing DAB to prevent accidental deployment of DAB. If there is no deployment space, accidental deployment of DAB may injure human body or damage the vehicle.
- If DAB falls down from a position higher than 1 m, please do not reuse it and insulate it.
- Handle DAB carefully, and never tap or strike it fiercely.
- Assembly, detection and removal of DAB must meet relevant requirements and specifications, and never perform operation casually.

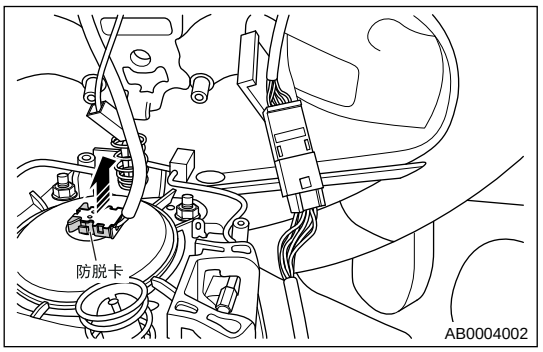
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.

3. Remove the driver airbag assembly.
   a. Position the front wheels straight ahead.
   b. Using a slotted screwdriver, remove DAB in sequence through 3 removal holes in locations of 3 o’ clock, 9 o’ clock and 6 o’ clock on steering wheel. Insert the screwdriver into removal hole of 3 o’ clock position on steering wheel in removal direction and push it further lightly when reaching to snap spring until a “click” sound is heard, which means that the clip is detached, and the corresponding side of airbag will be bounced up. Then perform removal in 9 o’ clock direction with the same method as above. Finally perform removal in 6 o’ clock direction, and then take up the whole DAB module from steering wheel lightly with both hands.

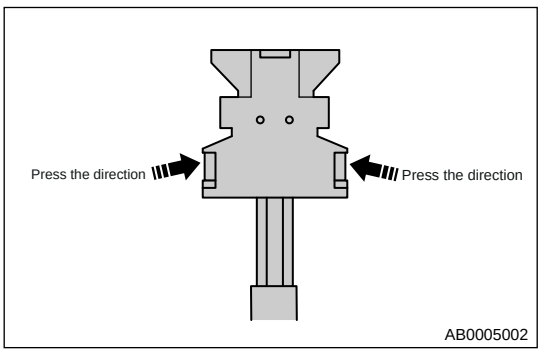


   c. Removal of multi-function switch wire harness connector: Remove switch wire harness connector in direction as indicated in illustration.

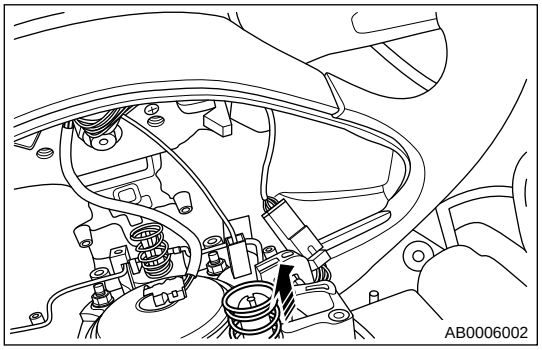




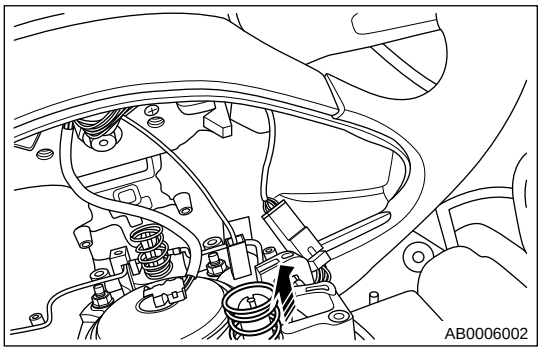
   d. Removal of clock spring DAB connector: While taking up DAB with one hand, use 2 fingers of the other hand to press and hold lock clips of both sides in “pressing direction” as indicated in illustration and then remove DAB connector in removal direction.



e. Removal of horn connector: Remove horn connector in direction as indicated in illustration.



f. Removal of steering wheel heating connector.



Inspection

1. Before assembly, confirm that label part number in driver airbag assembly and configuration card part number in vehicle matches;
2. Then check driver airbag assembly cover plate surface for trimming, residual, air vent, scratches, galling etc.; it’ s also forbidden for defects such as inclusion and dents etc. Peel off a bar code after inspection and attach it to record card in vehicle.

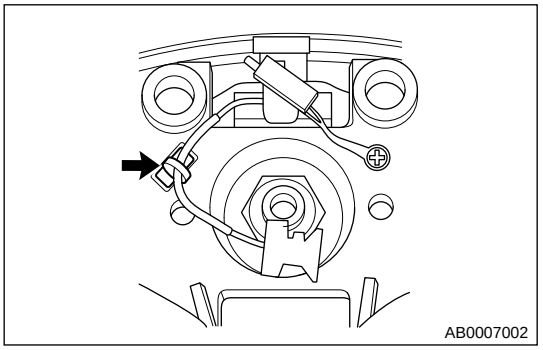
Installation

⚠ Caution

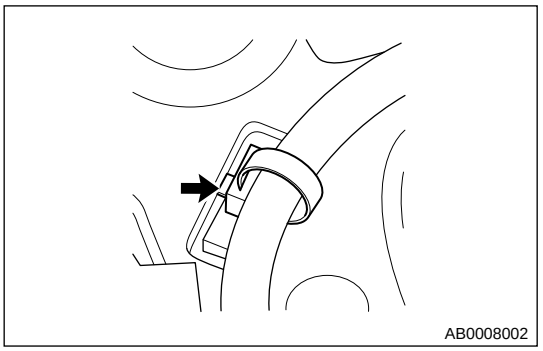
- Confirm that label part number in DAB and configuration card part number in vehicle matches before assembly.
- Then check DAB cover plate surface for trimming, residual, air vent, scratches, galling etc.; it’ s also forbidden for defects such as inclusion and dents etc. Peel off a bar code after inspection and attach it to record card in vehicle.
- Install the DAB after completing the steering wheel;
- Make sure that the ignition key cylinder is in OFF state during installation and never install it with power on;
- Make sure that all connectors are securely connected and the wire harness is fixed in the set slot before pressing DAB into steering wheel;
- After installing the DAB, airbag light is normal after the power is turned on, ensure that the horn pressing function is normal;
- Press periphery and center part of DAB cover with palms to make sure that the pressing operation is smooth without sluggish.

1. Pass airbag connector on clock spring side through the ribbon hole and zip up the ribbon and cut out the unnecessary ribbon tail part with a scissor. Connect airbag connector on clock spring to generator in DAB in pressing direction as indicated in illustration until a “click” sound is heard. The connector plane and generator port fitted flatly indicates that the connector is installed in place.

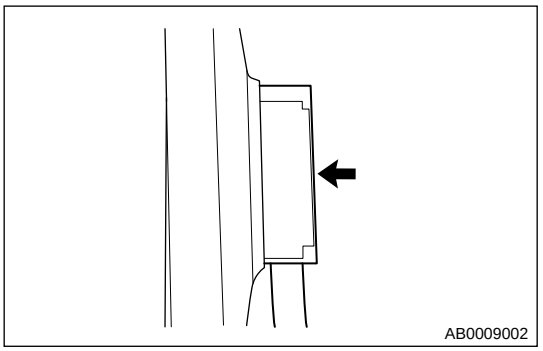
a. Install the airbag connector and ribbon on clock spring side.



b. Tighten the ribbon firmly and cut out the unnecessary part.

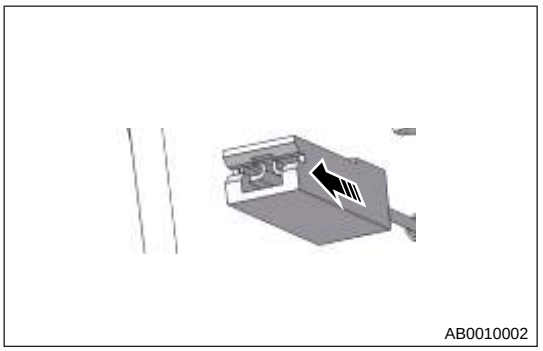


c. Press the airbag connector on clock spring side to the connector on generator in direction of arrow to flatten them.



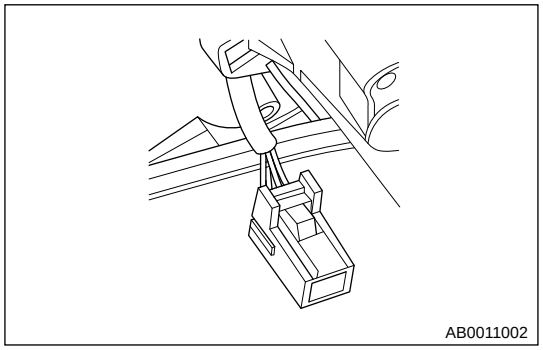
2. Connect horn connector on clock spring to horn metal plate on DAB side in direction as required.

a. Insert the horn connector into horn metal plate on DAB side in direction of arrow.



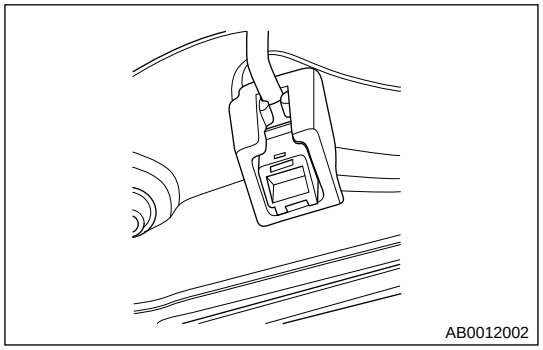
3. Connect DAB multi-function switch connector to the corresponding port on steering wheel until a “click” sound is heard, which means that the connector is connected in place. Then press the oppositely connected connector to the bottom of steering wheel fixing hole for fixing.

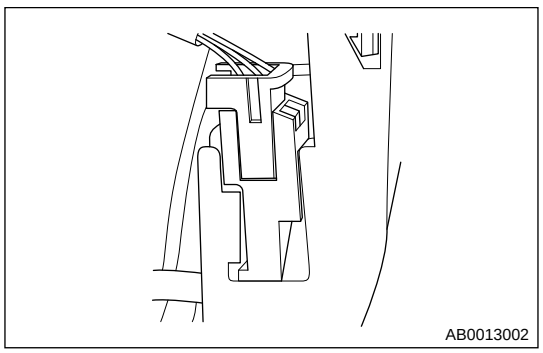
a. Insert the horn connector into horn metal plate on DAB side in direction of arrow.



4. Place DAB on steering wheel and toggle horn wire harness to the center of steering wheel in direction as indicated in illustration. After confirming that locating pillar aligns with steering wheel, press center part of airbag trim cover with palms of both hands until a “click” sound is heard, which means that the airbag and steering wheel have been fixed and installation is completed.

a. Insert the horn connector into horn metal plate on DAB side in direction of arrow.





Front Passenger Airbag Assembly

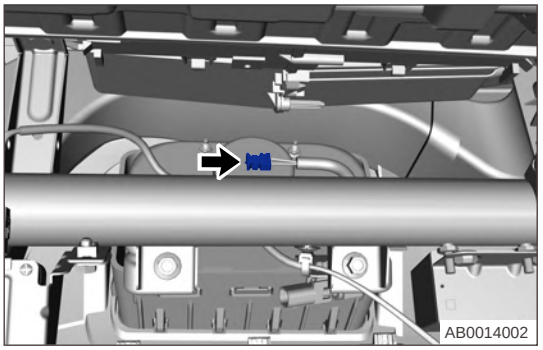
Removal

⚠ Caution

- Handle airbag assembly and airbag control module assembly carefully, and never tap or strike them fiercely.
- Removal, inspection and installation of airbag system must meet relevant requirements and specifications, and never perform operation casually.
- Removed airbag should be kept properly with face up. Store the airbag in a place with enough spare space to prevent accidental airbag deployment.
- Wait at least 90 seconds after disconnecting the negative battery cable to disable supplementary restraint system.

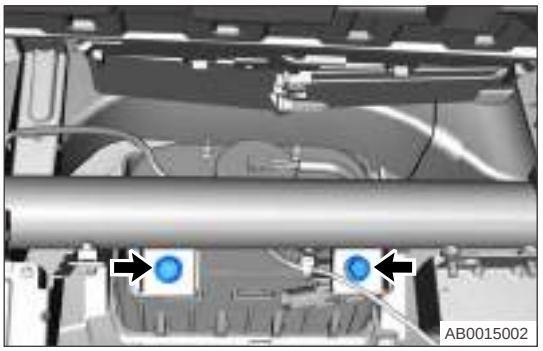
1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.

3. Remove the glove box assembly.
   a. Remove the front passenger airbag assembly wire harness connector assembly (arrow).



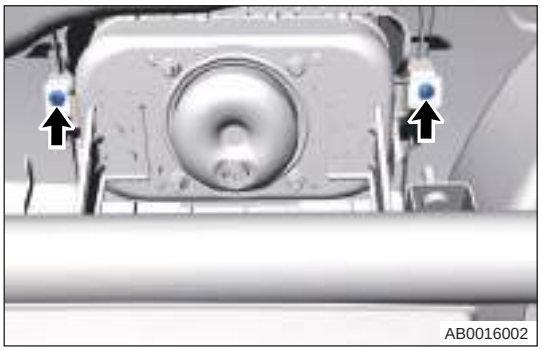
   b. Remove 2 coupling bolts (arrow) between front passenger airbag assembly and instrument panel crossmember assembly.

      Tightening torque: 23 ± 2 N · m

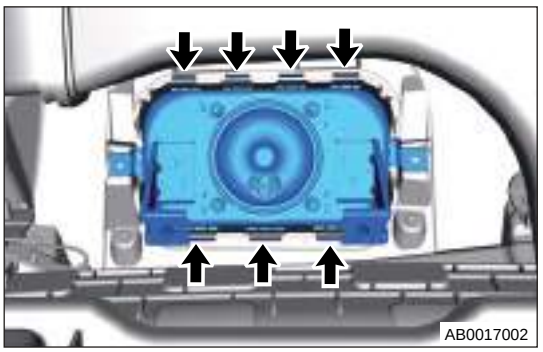


4. Remove the instrument panel upper body assembly.
5. Remove the front passenger airbag assembly.
   a. Remove 2 fixing screws (arrow) between front passenger airbag and instrument panel.

      Tightening torque: 2.5 ± 0.5 N · m



   b. Using a flat tip screwdriver wrapped with protective tape, slightly pry fixing claws (arrow) around front passenger airbag assembly mounting bracket to separate it from instrument panel body assembly.



   c. Remove the front passenger airbag assembly.

Inspection

1. Confirm that part number in front passenger airbag assembly label and part number in vehicle configuration card matches before assembly;
2. Then check front passenger airbag assembly cover plate surface for trimming, residual, air vent, scratches, galling etc.; it’ s also forbidden for defects such as inclusion and dents etc. Peel off a bar code after inspection and attach it to record card in vehicle.

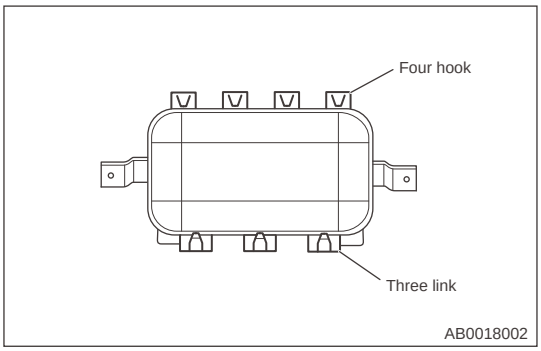
Installation

⚠ Caution

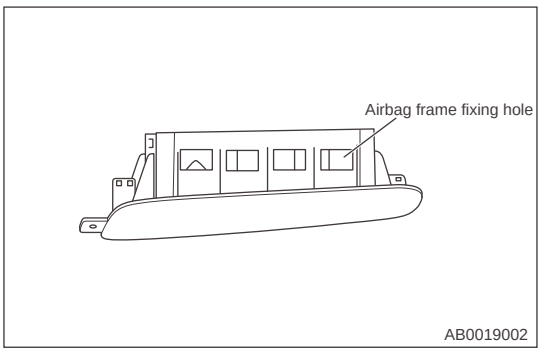
- Before installing tightening bolts, always make sure that airbag wire harness is not held down or stuck. Adjust if necessary and install it in place.
- Make sure to tighten fixing bolts to specified torque during installation.
- When installing front passenger airbag assembly, first slide the hook on one side into locating hole in airbag box, and then press in hook on the other side firmly, making sure that hooks on both sides enter the corresponding locating holes correctly.
- Always keep vehicle power off during installation. It is forbidden to install the front passenger airbag assembly with vehicle power on.
- Check ACU warning light after installation, and make sure that supplemental restraint system operates normally.

1. Detailed description and technology requirements during assembly

   a. Inspect and confirm that parts surface should be free of chips and damages and labels and bar codes should be intact and clear before assembly; Peel off one bar code after inspection and attach it to record card in vehicle;

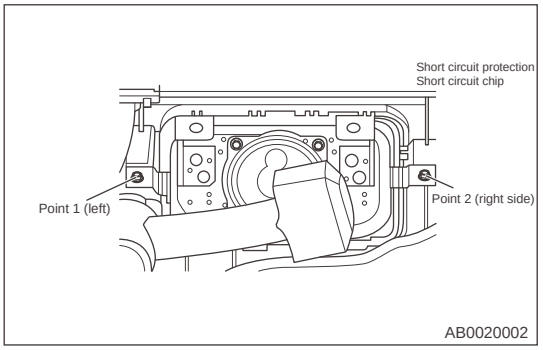


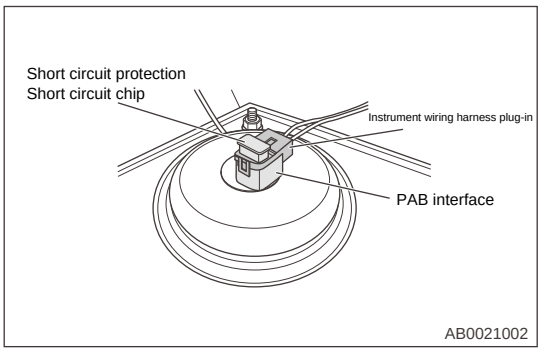
   b. PAB should be installed firstly to instrument panel upper body. Place PAB entirely into airbag bracket on back side of instrument panel upper body. First hang 3 hooks into fixing holes in airbag frame, then press 4 hooks on the other side firmly into bracket holes and make sure that hooks on both sides have been put into the corresponding fixing holes.



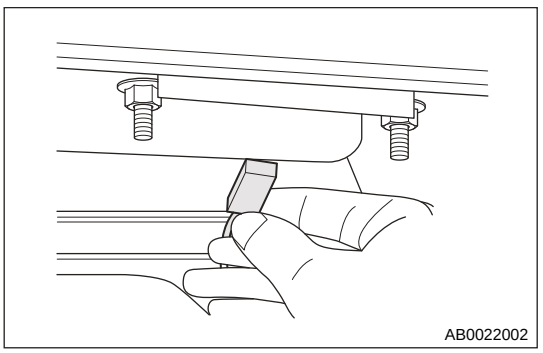
c. Using 2 cross-recessed button head self-tapping screws, tighten front passenger airbag assembly to instrument panel airbag frame. First tighten point 2 on right side, then tighten point 1 on left side and finally tighten fixing bolts with installing tools according to set torque value.

Tightening torque: 2.5 ± 0.5 N·m



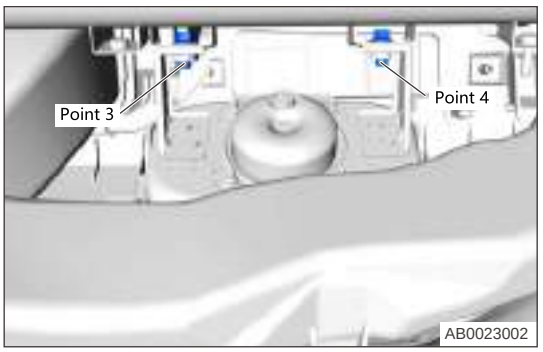


d. After putting instrument panel body into packing machine, insert instrument cluster wire harness connector into PAB generator port while keeping the connector fitting flatly with the generator. And press down short-circuit plate to keep its upper surface be flush with connector surface on wire harness end, which indicates that it is installed in place. PAB port has failure-proof function and it’ s forbidden to connect forcibly;



e. After installing instrument panel body, pre-tighten 2 bolts of PAB to CCB bracket in glove box port. Tighten point 3 on left side, then tighten point 4 on right side and finally tightens bolts with installing tools according to set torque value.

Tightening torque: 23 ± 2 N·m



Removal and Installation of Side Curtain Shield Airbag (CAB)

Removal

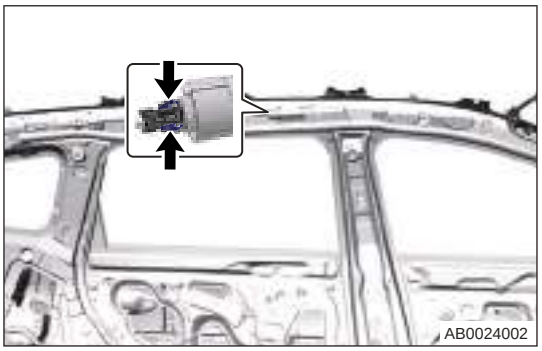
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

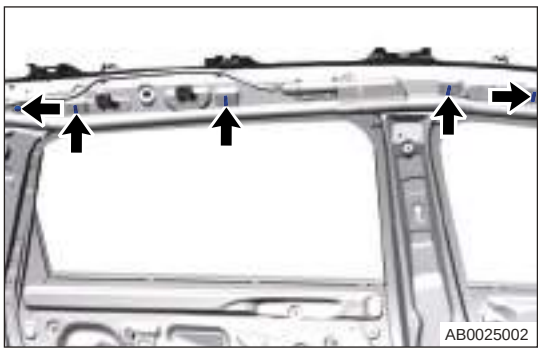
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing.
- Handle side curtain shield airbag assembly carefully, and never tap or strike it fiercely.
- Removal, inspection and installation of side curtain shield airbag must meet relevant requirements and specifications, and never perform operation casually.
- Removed side curtain shield airbag should be kept properly with face up. Store the side curtain shield airbag in a place with enough spare space to prevent accidental airbag deployment.

1. Turn off all electrical equipment and the ignition switch.
2. Wait at least 90 seconds after disconnecting the negative battery cable to disable supplementary restraint system.
3. Remove protector and roof.
4. Remove the seat belt retractor.
5. Remove the right curtain shield airbag.
   a. Unplug the curtain shield airbag connector (arrow).

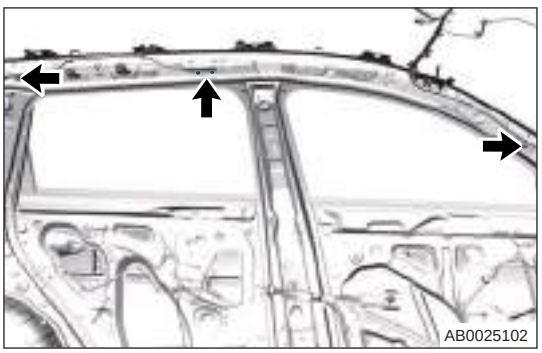


   b. Use needle nose pliers to remove the airbag clips (-arrow) that fix CAB in turn.



   c. Remove 4 fixing bolts (arrow) from metal end plate of A-pillar airbag strap.

      Tightening torque: 10 ± 1 N · m

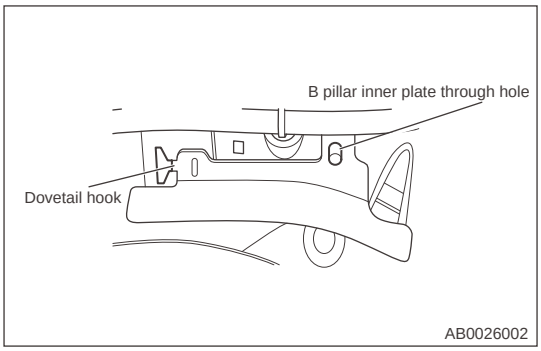


Installation

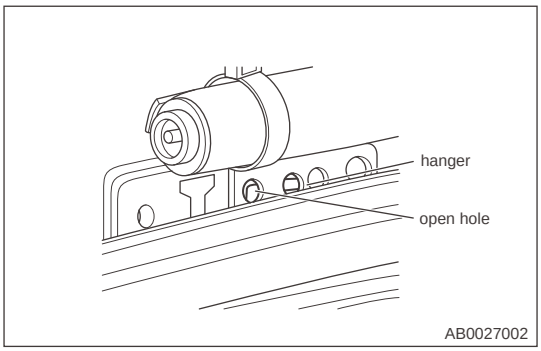
Hint:

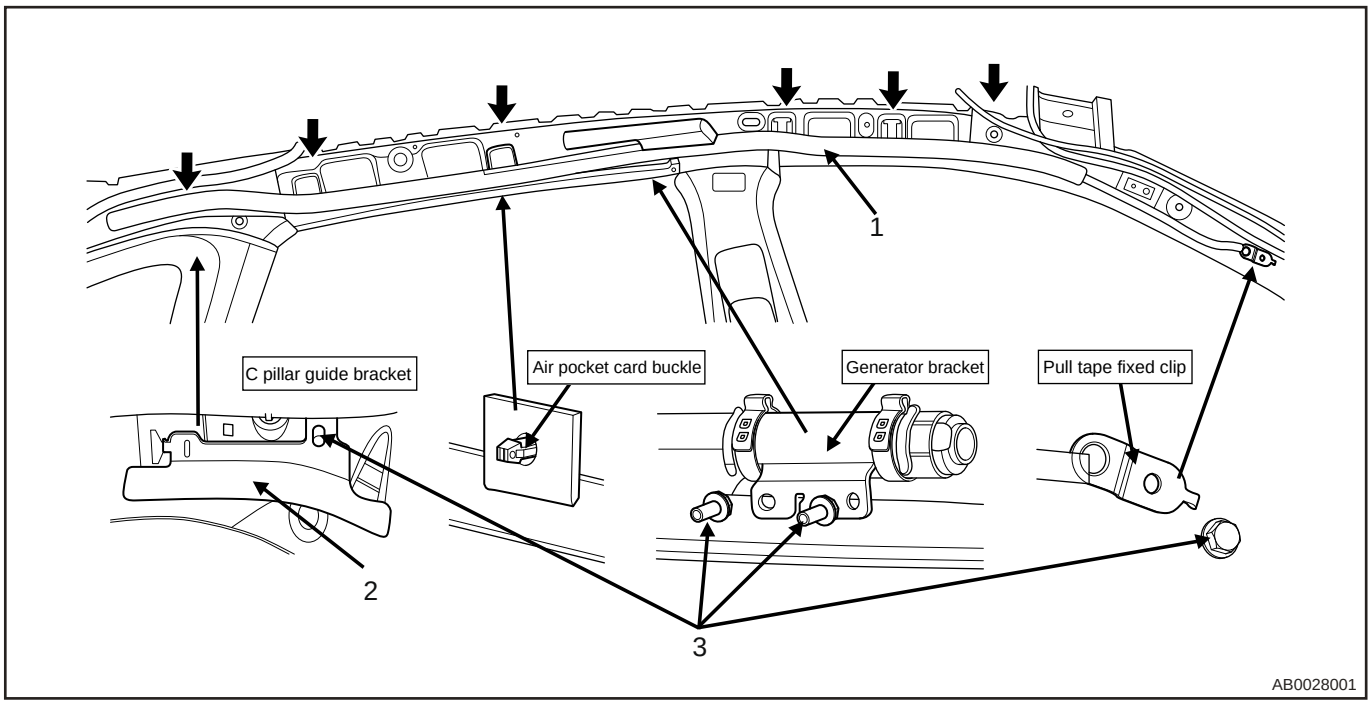
- It is essential to check if protecting bag stitching of air bag is in lower part of air bag during assembly.
- Air bag on each armrest installation bracket should be in lower part of armrest bracket. If air bag covers armrest installation bracket, it's necessary to adjust air bag to lower part of the bracket with hands.
- Always keep vehicle power off during installation. It is forbidden to install the airbag controller assembly with vehicle power on.
- Always keep vehicle power off during installation. It is forbidden to install the airbag controller assembly with vehicle power on.
- Air bag on C pillar guide bracket should be in upper part of guide bracket. After assembling air bag clip, it's necessary to adjust air bag to upper part of C pillar guide bracket with hands.
- During assembly, insert locating pin of the sensor into waist-shaped locating hole.
- Check that airbag components surface should be free of damages before assembly and labels and bar codes should be intact and clear; it's also necessary to check that CAB installation area on vehicle body should be free of rags, sharp corners, welding spatters etc.
- Be sure to follow correct procedures to remove and install side curtain shield airbag.
- Check that airbag components surface should be free of damages before assembly and labels and bar codes should be intact and clear; it's also necessary to check that CAB installation area on vehicle body should be free of rags, sharp corners, welding spatters etc.; peel off one bar code after the checking and attach it to record card in vehicle.

- Temporary install C pillar guide bracket to vehicle body with hooks (hang swallow tail hook into vehicle body swallow tail groove and then hang the hook beside bolt hole into vehicle body hole) and then tighten it to vehicle body with bolt through bolt hole.



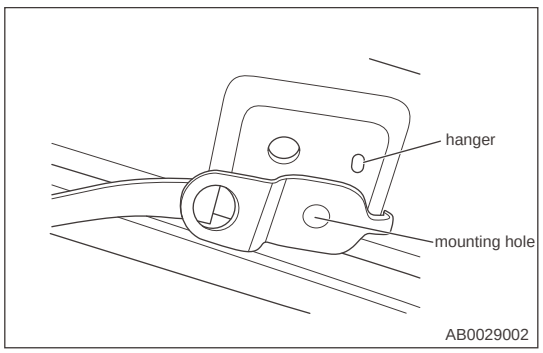
- Hang the hook on CAB generator bracket into vehicle body swallow tail groove and then press clip into the corresponding installation hole in vehicle body; lightly hold the air bag with one hand and use tools to pre-tighten round hole and then waist-shaped hole on CAB generator bracket with the other hand and finally tighten the bolt to vehicle body according to torque requirements.

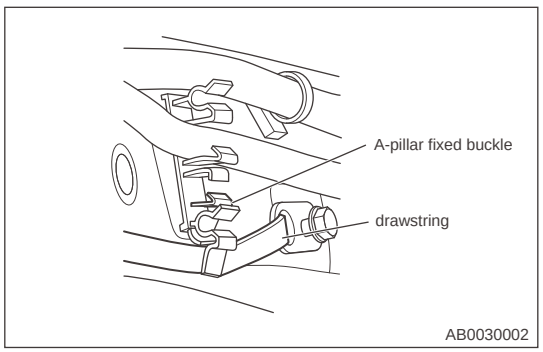




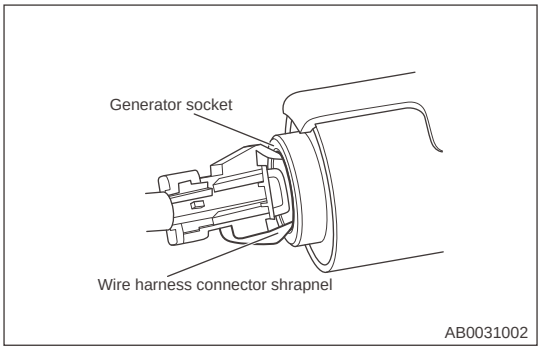
- Press 6 air bag clips (equipped with the generator) on front and rear part of generator into the corresponding installation holes in vehicle body in sequence; protecting bag stitching of air bag must be in lower part of air bag during assembly, the last 6# clip hole in vehicle body is on C pillar metal, it's necessary to perform the installation strictly as indicated in illustration and it's forbidden to clip into peripheral hole forcibly; Check if all clips are firmly secured by pulling lightly. (See illustration above)

- First hang the hook on strip fixing end plate into hook hole in vehicle body and now strip should operate normally and then tighten the bolt to vehicle body; then clip strip into A pillar fixing clip.

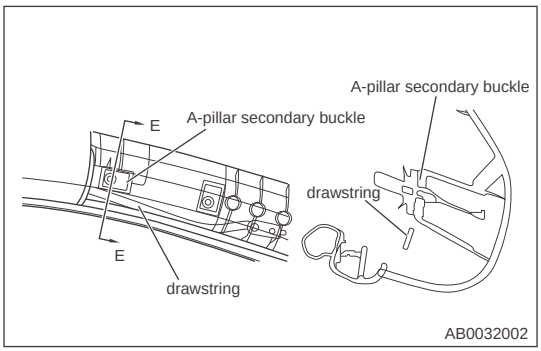




- Insert the connector on wire harness end into generator end and make sure that the connector is assembled into place. Insert wire harness end connector directly into generator end and a "click" sound indicates that it is installed in place; the port has failure-proof function and do not insert it forcibly.



- When assembling A pillar protector, perform fine adjustment of strip with hand. After controlling strip under A pillar secondary clip, fix A pillar protector according to assembly instruction manual of pillar protector system.

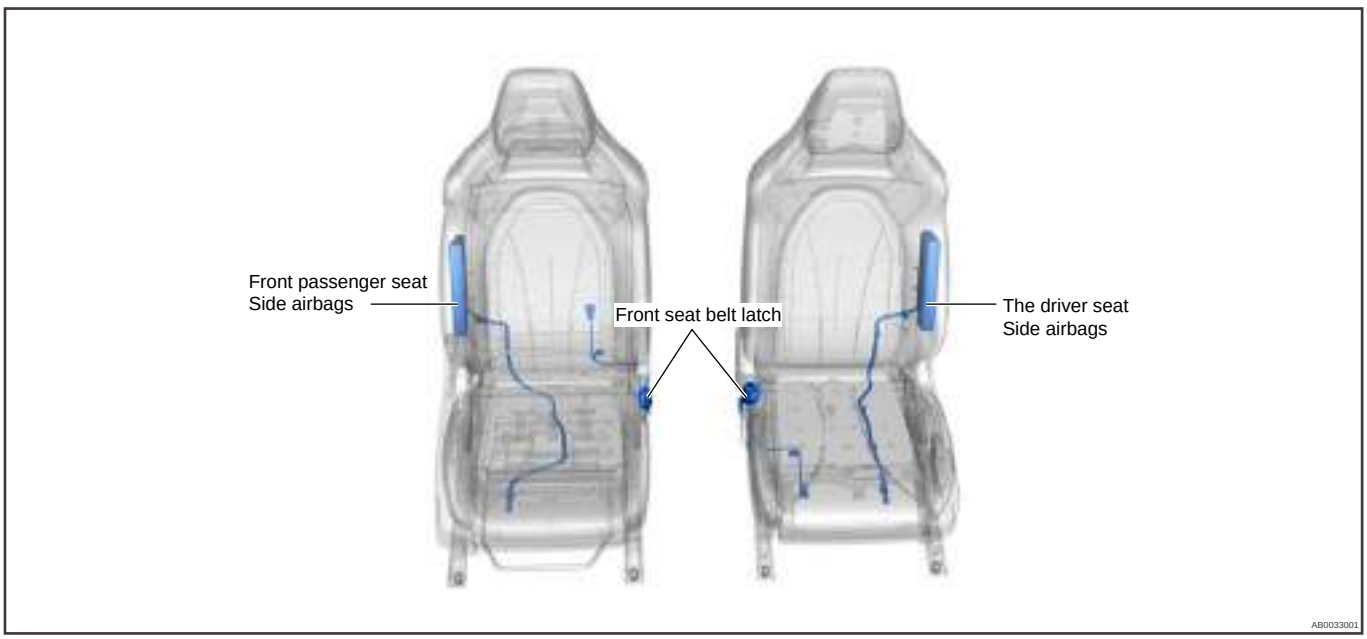


1. Installation is in the reverse order of removal.

Front Seat Side Airbag

Description

Installation positions of front passenger side airbag, front passenger seat belt buckle and front passenger detection device.



⚠ Caution

- Airbag resistance on seat: 2.0 + 0.5 / -0.3Ω, it’ s strictly forbidden to measure resistance with multimeter.
- Front passenger side airbag is non-removable and must be removed together with seat assembly.
- Passenger loading status: When detected external resistance is lower than 100 Ω, it’ s judged that there is passenger. When resistance is higher than 400 Ω, it’ s judged that there is no passenger.

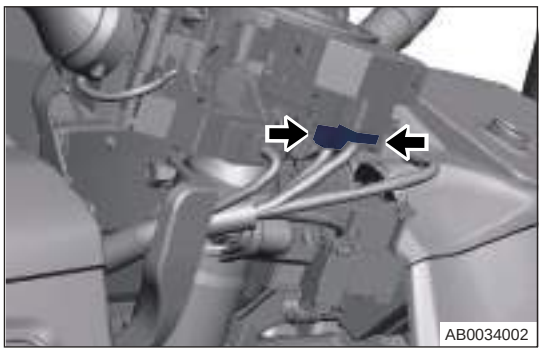
Spiral Cable

Removal

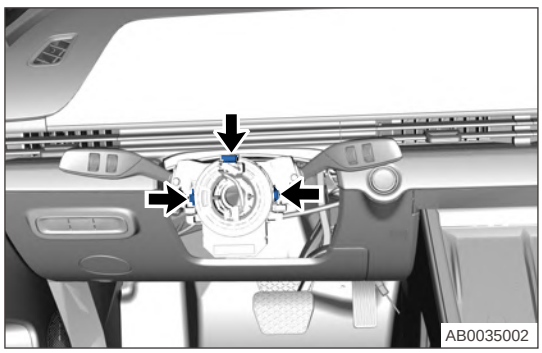
Hint:

- Wait at least 90 seconds after disconnecting the negative battery cable to disable supplementary restraint system.

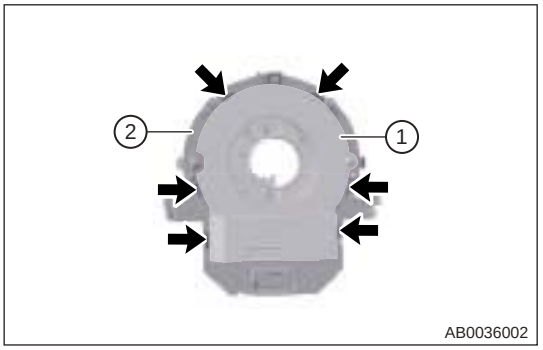
1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Position the front wheels straight ahead.
4. Remove the steering wheel assembly.
5. Remove the combination switch cover assembly.
6. Remove the spiral cable.
   a. Disconnect the spiral cable wire harness connector (-arrow) and angle sensor connector (arrow).



   b. Detach the fixing claws (arrow) between spiral cable and combination switch assembly.



c. Detach the angle sensor fixing claws and separate the angle sensor (1) and spiral cable (2).

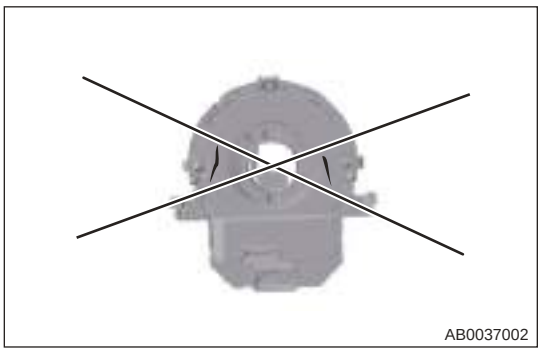


Inspection

Hint:

- An activation prevention mechanism is built in airbag system connector. When connector is disconnected, this mechanism cuts off circuit by bringing short spring plate into contact with terminals, thus insulating the circuit from external power sources to prevent accidental airbag activation.
- To release activation prevention mechanism, insert a piece of paper with the same thickness as male terminal between terminals and short spring plate to disconnect the connection.

1. Check the spiral cable.
   a. Check that there are no scratches or cracks on connectors, or no cracks, dents or chipping on the cable.



   b. If there are scratches, cracks, dents or cuts on connectors or spiral cable, replace the spiral cable with a new one.
2. Remove spiral cable and measure pin 1 and pin 2

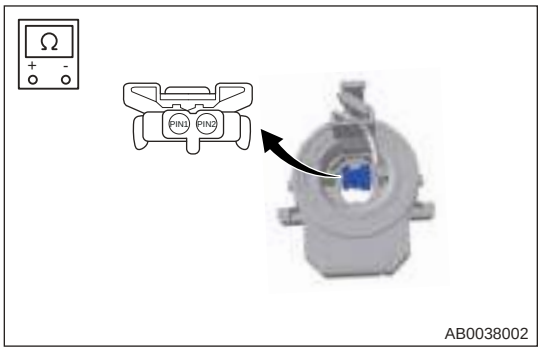
Use circuit diagram as a guide to perform the following inspection procedures:

   a. Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable and wait for at least 90 seconds.
   b. Remove the single piece of spiral cable.
   c. Using ohm band of multimeter, measure resistance between 2 pins of spiral cable.

Specified Condition

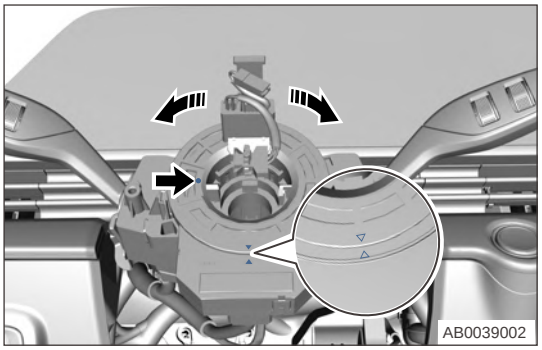
Multimeter Connection	Condition	Specified Condition
PIN1 - PIN2	ENGINE START STOP switch “OFF”	⩽ 1 Ω

If result is not as specified, replace spiral cable assembly.



Installation

Hint:
Always install spiral cable correctly according to matchmarks on spiral cable and steering column (fully turn spiral cable in a direction slowly, then turn it in the opposite direction until yellow ball appears in transparent neutral window and arrow marks align with each other), otherwise the spiral cable may be damaged.



⚠ Caution

- Always install spiral cable correctly according to specified operating instructions.
- DO NOT rotate the spiral cable over specified turns to prevent it from breaking.
- Be sure to install fixing claws in place when installing spiral cable.
- Check that horn operates normally after installation.
- Check ACU warning light after installation, and make sure that supplemental restraint system operates normally.

1. Installation is in the reverse order of removal.

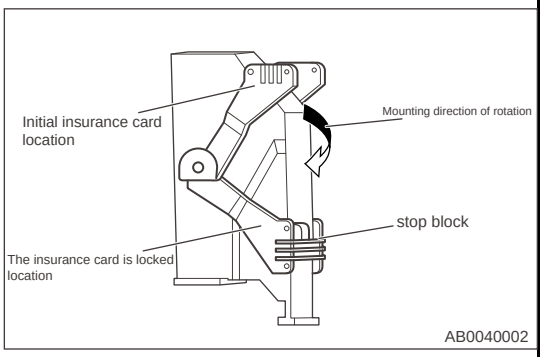
Airbag System Controller

Removal

⚠ Caution

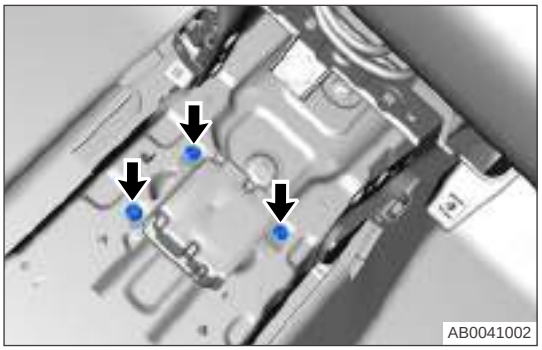
- Be sure to follow correct procedures to remove and install airbag system controller.
- Inspect and confirm that part number in ACU label matches with configuration card part number in vehicle; parts surface should be free of chips and labels and bar codes should be intact and clear before assembly; Peel off one bar code after inspection and attach it to record card in vehicle;
- Place ACU module on passage bottom panel in body with arrow direction in label facing vehicle head while aligning 3 installation holes of ACU with vehicle body projection welding nut hole. Pre-tighten the bolts and tighten 3 bolts to specified torque with a tool;

- Insert wire harness connector into ACU port: Rotate fuse clip from initial position to final lock position following installation rotation direction and make sure that fuse clip goes over stop block. Generally a “click” sound will be heard, which indicates that fuse clip has been clamped into place. Make sure that fuse clip is in initial position before installation. ACU port has failure-proof function, which causes impossible inserting with incorrect configuration, so never assemble it forcibly.

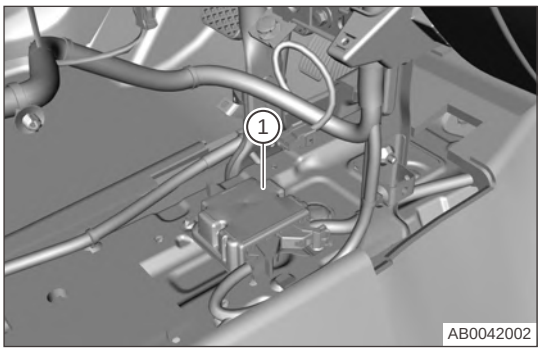


- Peel off the entire bar code and attach it to record card in vehicle for relevant information tracing.
- ACU ignition circuits are divided into 2 circuits and 4 circuits separately and first confirm the vehicle configuration information during installation.
- Handle ACU carefully and it’s strictly forbidden to tap and crash it fiercely.
- There should be no other objects between ACU installation plane and ACU and ACU must be installed directly on body panel.
- When installing and tightening bolts of ACU, make sure that start button is in OFF and it’s forbidden to install it with power on.
- Reconfirm the installation direction of airbag controller assembly after installation and make sure that label arrow direction is facing vehicle head. If fitted reversely, airbag controller assembly will not operate normally.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable and wait for 90 seconds.
3. Remove the auxiliary fascia console assembly.
4. Remove the airbag controller assembly.
   a. Remove 3 fixing bolts (arrow) from airbag controller.
      Tightening torque: 9 ± 1 N · m



   b. Press lower limit clamp to separate it from wire harness connector and remove airbag controller assembly (1).



Installation

Hint:

- Before installing tightening bolts, always make sure that airbag wire harness is not held down or stuck. Adjust if necessary and install it in place.
- Make sure to tighten fixing bolts to specified torque during installation.
- Always keep vehicle power off during installation. It is forbidden to install the airbag controller assembly with vehicle power on.
- Check ACU warning light after installation, and make sure that supplemental restraint system operates normally.

1. Installation is in the reverse order of removal.

Removal and Installation of Side Collision Sensor

Removal

Hint:

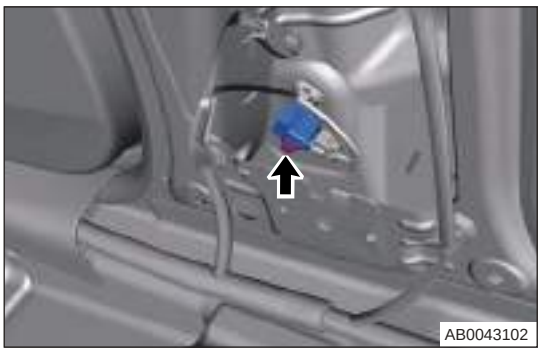
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution
• Be sure to wear necessary safety equipment to prevent accidents, when removing rear right seat belt buckle assembly. • Try to prevent interior from being scratched, when removing rear right seat belt buckle assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable and wait for 90 seconds.

3. Remove front right doorsill pressure plate, rear right doorsill pressure plate and right B-pillar lower protector.
4. Remove the seat belt retractor.
5. Remove the side collision sensor.
   a. Loosen and remove fixing bolts (arrow).

   Tightening torque: 9 ± 1 N·m



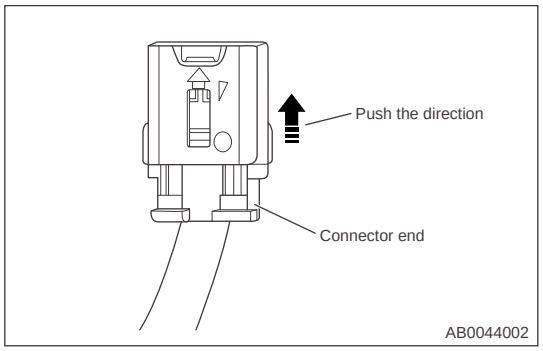
   b. Unplug connector (arrow) and remove sensor assembly.

Installation

Hint:

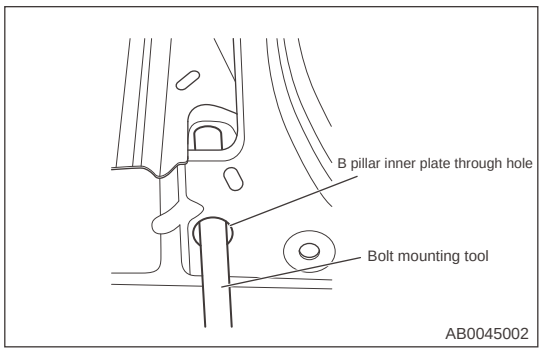
- Before installing tightening bolts, always make sure that airbag wire harness is not held down or stuck. Adjust if necessary and install it in place.
- Make sure to tighten fixing bolts to specified torque during installation.
- Always keep vehicle power off during installation. It is forbidden to install the airbag controller assembly with vehicle power on.
- Check ACU warning light after installation, and make sure that supplemental restraint system operates normally.
- During assembly, insert locating pin of the sensor into waist-shaped locating hole.
- Be sure to follow correct procedures to remove and install side collision sensor.

- Insert wire harness connector into side collision sensor port and generally a “click” sound will be heard after pushing into connector end to lock, which indicates that it is clamped into place; connector port has failure-proof function. If it cannot be inserted, adjust and insert it again and do not insert it forcibly.



- Install SIS waist-shaped pin into waist-shaped hole of B pillar reinforcing plate and bolt installation hole of SIS and bolt installation hole on B pillar reinforcing plate are aligned basically.

- Pass bolt installation tool through B pillar inner plate through hole and tighten SIS to B pillar reinforcing plate metal sheet according to torque requirements with bolt.



1. Installation is in the reverse order of removal.

SEAT BELT

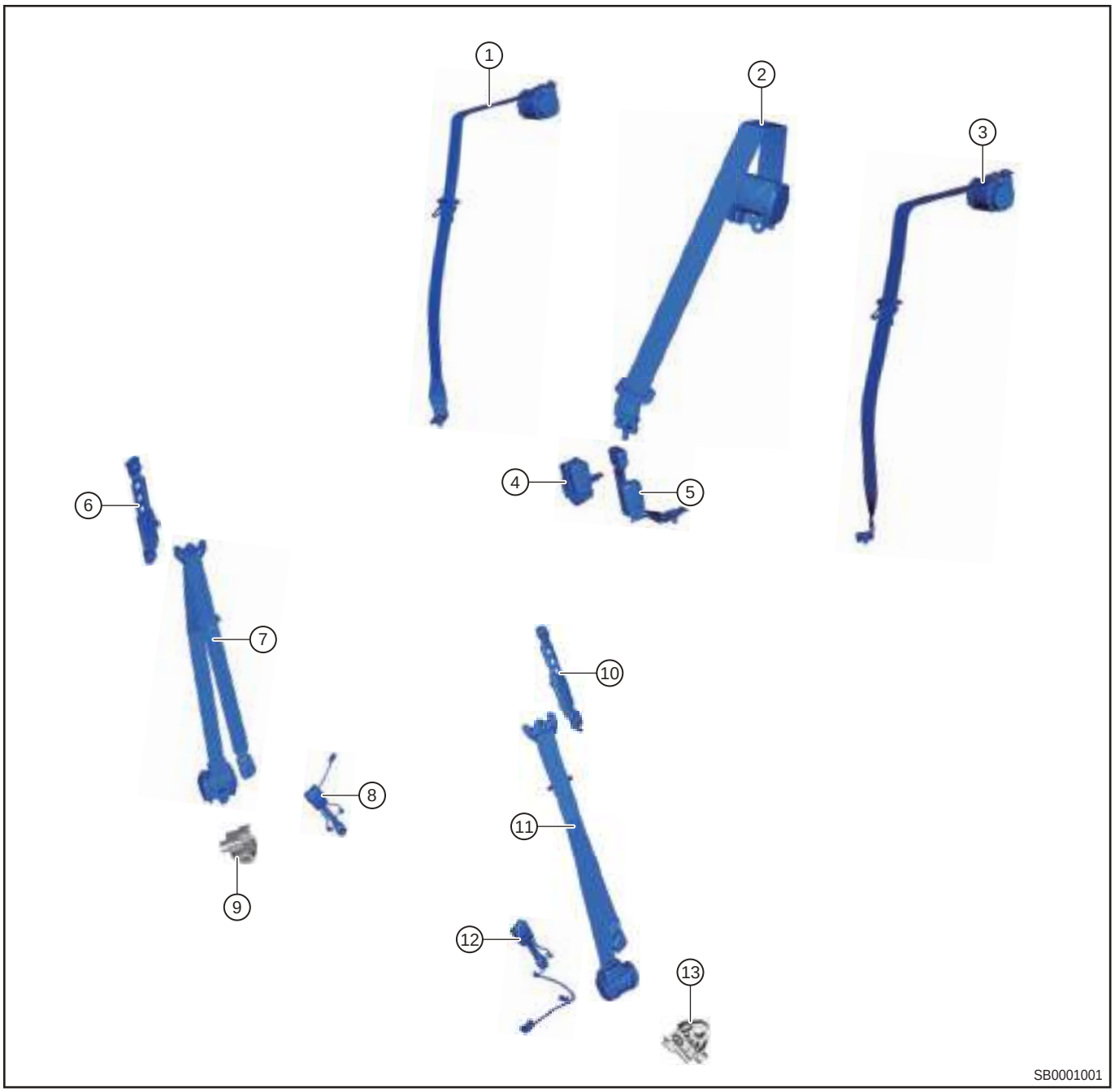
Warnings and Precautions

Precautions

1. Be sure to perform assembly of vehicle in accordance with BOM strictly. It is not allowed to replace the parts assembly without permission;
2. During assembly of vehicle, tighten parts with specified torque in list strictly;
3. It is not allowed to replace the components of parts assembly without permission, such as bolt, washer etc;
4. If the parts assembly is accidentally dropped during handling and installation, please check the plastic parts of parts assembly (such as retractor) for cracks. If there is crack, insulate and dispose it after packaging and marking to prevent accidental injury;
5. It is necessary to check whether the seat belt is in good condition before installing it; Pull the webbing and lock the buckle after assembling to ensure that the webbing can be extended and retracted smoothly, the buckle can be locked and unlocked normally. Make sure that there are no objects (such as tools, etc) can scratch the webbing during assembly of seat belt;
6. During overturn inspection of rear seat, never insert locking tab of rear center seat belt into big buckle;
7. Never check the retracted function of the rear center seat belt when small buckle (rear seat small buckle lock assembly) is unlocked.

System Overview

System Components Diagram

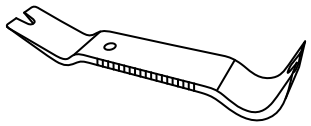


1	Rear Right Seat Belt Assembly	8	Front Right Seat Belt Buckle
2	Rear Center Seat Belt Assembly	9	Right Side Collision Sensor
3	Rear Left Seat Belt Assembly	10	Left Height Adjuster Assembly
4	Double Buckle Lock Assembly	11	Front Left Seat Belt Assembly
5	Rear Left Seat Belt Buckle	12	Front Left Seat Belt Buckle

6	Right Height Adjuster Assembly	13	Left Side Collision Sensor
7	Front Right Seat Belt Assembly		

On-vehicle Service

Tools

Tool Name	Tool Drawing
Interior Crow Plate	 RCH002506

Replacement of Front Left Seat Belt Assembly

Removal

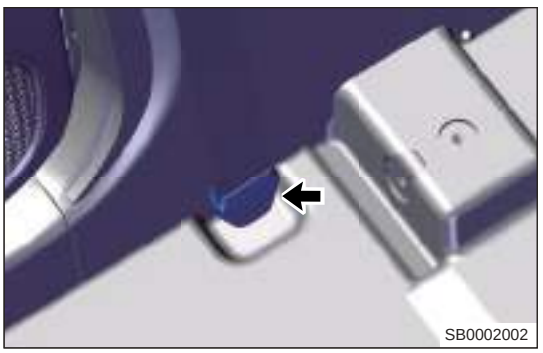
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents when removing front seat belt assembly.
- Appropriate force should be applied when removing front seat belt assembly. Be careful not to operate roughly.
- DO NOT scratch interior when removing front seat belt assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front doorsill pressure plate assembly.
4. Remove the front left door opening weatherstrip.
5. Remove the left doorsill pressure plate assembly.
6. Remove the rear left door opening weatherstrip.
7. Remove the front left seat belt assembly.
   a. Using special tool, pry off left B-pillar protector seat belt lower bolt cover (arrow).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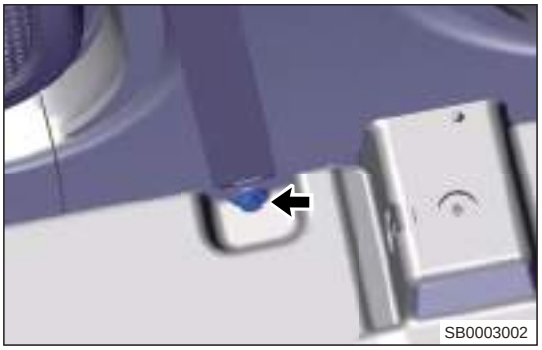
b. Remove the front seat belt assembly lower fixing bolt (arrow).

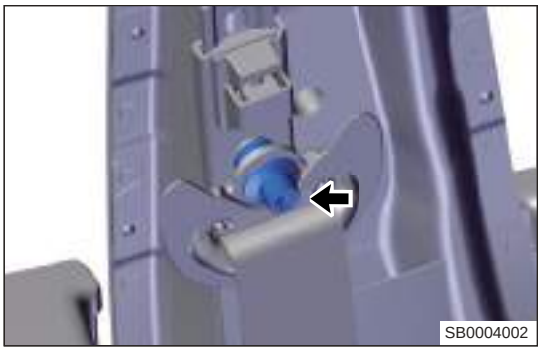


c. Remove the left B-pillar lower protector.

d. Remove the left B-pillar upper protector.

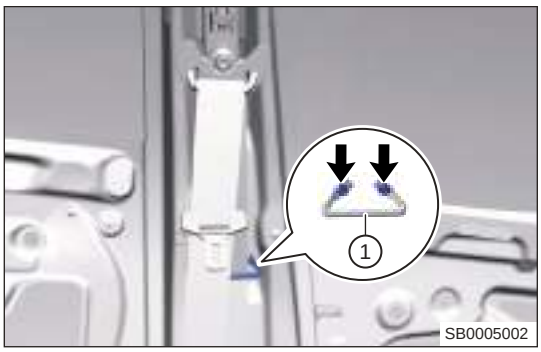
e. Remover 1 fixing bolt (arrow) from upper part of front seat belt assembly.

Tightening torque: 50 ± 5N·m



f. Remove 2 fixing screws (arrow) from fork bracket.

Tightening torque: 2.5 ± 0.5N·m

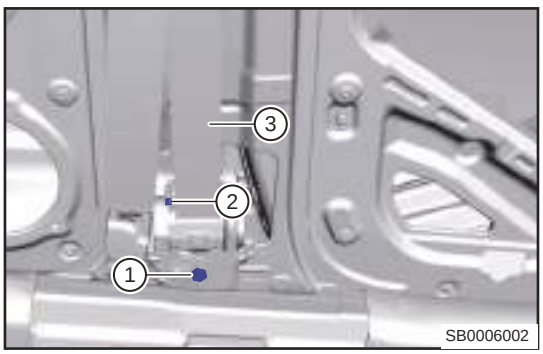


g. Remove fixing bolt (1) from tensioner assembly.

Tightening torque: 50 ± 5N·m

h. Remove fixing bolt (2) from tensioner assembly.

i. Remove the front left seat belt assembly (3).



Installation

⚠ Caution
• If the connector wire harness is too long or interferes with the webbing, it is necessary to insert the wire harness into B-pillar to increase the gap between wire harness and webbing.

⚠ Warning

- When connecting gas generator connector, if the pin inside of gas generator is deflective, please pack it properly and dispose it.

1. Installation is in the reverse order of removal.

Rear Seat Belt Assembly

Removal

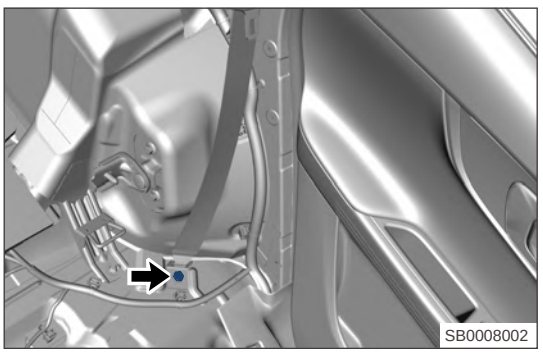
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

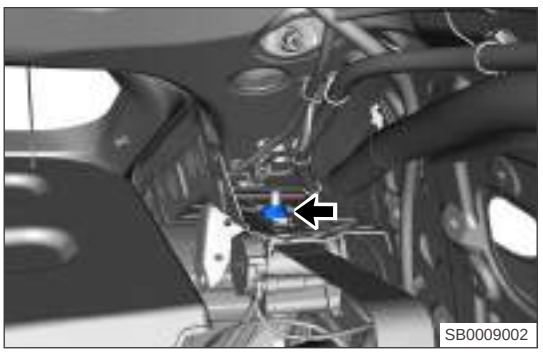
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing rear seat belt assembly.
- Appropriate force should be applied, when removing the rear seat belt assembly. Be careful not to operate roughly.
- Try to prevent interior from being scratched, when removing rear seat belt assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the rear seat belt assembly.
   a. Remove the rear seat belt lower end plate protective cover
   b. Remove the rear seat belt lower fixing bolt (arrow).



   c. Remove the C-pillar upper and lower protector assembly.
   d. Remove 1 fixing bolt (arrow) from retractor assembly and remove T-type hook of retractor assembly from mounting board.



   e. Remove the rear left seat belt assembly.

Installation

⚠ Caution

- Keep seat belt assembly clean without oil attached and check seat belt assembly for damage, when installing rear seat belt assembly.
- Be sure to tighten all fixing bolts and fixing screws according to specified torque, when installing rear seat belt assembly.
- Be sure to perform assembly of vehicle in accordance with BOM strictly. It is not allowed to replace the parts assembly without permission.
- During assembly of vehicle, tighten parts with specified torque in list strictly.
- It is not allowed to replace the components of parts assembly without permission, such as bolt, washer etc.
- If the parts assembly is accidentally dropped during handling and installation, please check the plastic parts of parts assembly (such as retractor) for cracks. If there is crack, insulate and dispose it after packaging and marking to prevent accidental injury.
- It is necessary to check whether the seat belt is in good condition before installing it; Pull the webbing and lock the buckle after assembling to ensure that the webbing can be extended and retracted smoothly, the buckle can be locked and unlocked normally. Make sure that there are no objects (such as tools, etc.) can scratch the webbing during assembly of seat belt.

1. Install the rear seat belt assembly.
   a. Install the rear seat belt upper end plate bolt (arrow).
      Tightening torque: 50 ± 5N·m
   b. Insert the seat belt pretensioner connector of interior wire harness into the gas generator connector of retractor and press the lock button, ensure that the connector is connected properly and clamped in place (connecting angle is 45).
   c. Install the T-type hook of retractor to the retractor mounting board slot of C-pillar sheet metal, then install and tighten the retractor fixing bolt.
      Tightening torque: 50 ± 5N·m
   d. Install C-pillar lower protector assembly, and pass the locking tab and webbing through the hole of C-pillar lower protector.

e. Install and tighten 1 fixing bolt of rear left seat belt assembly lower end plate.

Tightening torque: 50 ± 5N·m

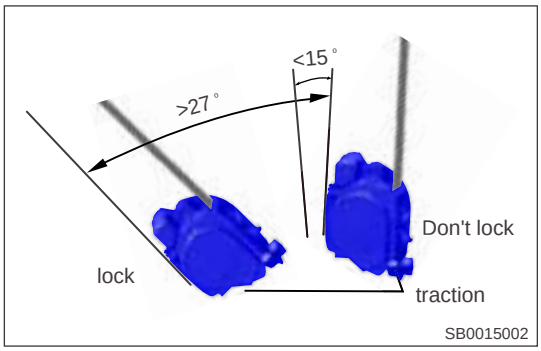
Hint:

- The webbing between lower end plate and retractor should be smooth without any breakage and twist.
- If the rear left seat belt assembly is limiting type belt with pretensioner, the resistance value is 2.15 ± 0.35 Ω, it' s strictly forbidden to measure resistance with multimeter.
- If the webbings on both sides of rear seat cannot be pulled out, it is necessary to make a preliminary judgment on the seat belt. If the seat belt is locked due to the sensitivity function of seat belt.
- Judgment method: Slowly contract the webbing for 10-15 mm, and then pull out it slowly. If the seat belt can be pulled out normally and there are no other problems, the seat belt is normal. If the webbing can not be pulled out, further testing of seat belt is required.

Inspection

Hint:

- DO NOT disassemble the rear seat belt retractor.
- The retractor should be extended and retracted freely within 15° to each side. When the angle is more than 15° or less than 27°, either locking or unlocking is OK, but when the angle is more than 27°, it must be locked.
- If result is not as specified, replace rear seat belt assembly.



Rear Center Seat Belt Assembly

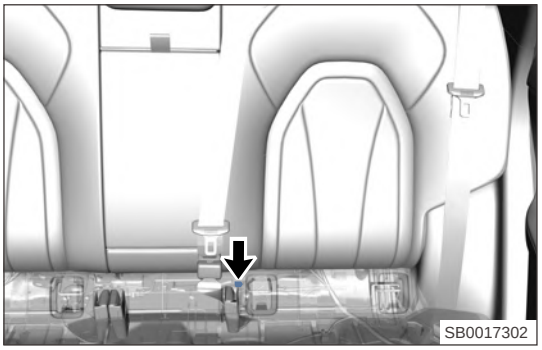
Removal

⚠ Caution

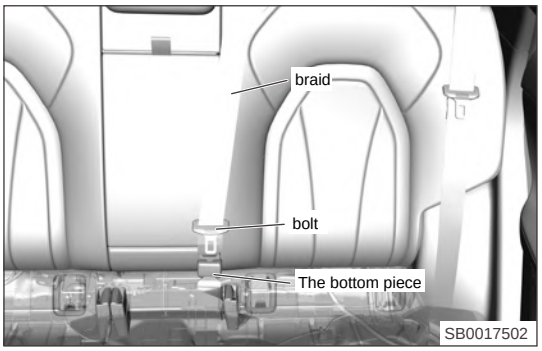
- Be sure to wear safety equipment to prevent accidents, when removing rear seat belt assembly.
- Appropriate force should be applied, when removing the rear seat belt assembly. Be careful not to operate roughly.
- Try to prevent interior from being scratched, when removing rear seat belt assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the rear seat.
4. Remove the center seat belt assembly.

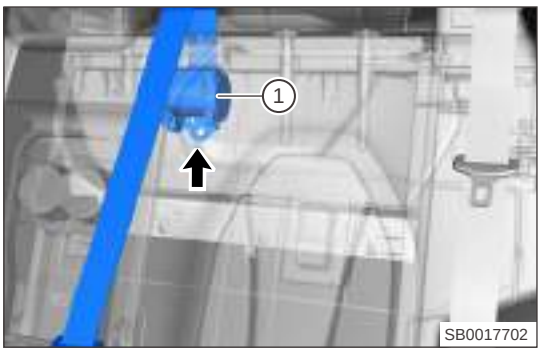
a. Remove the center seat belt installation bolt (arrow).



b. Insert the webbing, locking tab and lower end plate of the center seat belt assembly.



c. Remove bolt (arrow) between retractor and seat frame, and take retractor (1) out of limit hook of seat frame and move it away.



Installation

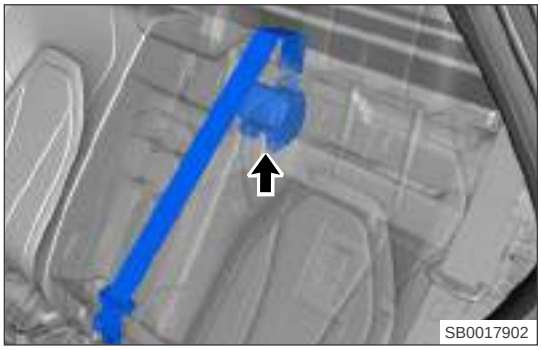
⚠ Caution

- Pass the webbing, locking tab and lower end plate through the seat frame hole and prevent scratches.
- The above assembling operation should be carried out in seat factory. The bar code on second row center seat belt assembly should be peeled off after installing the second row left seat and attach it to the corresponding position on vehicle.
- The seat factory should test the above installation torque by a ratio of 100%.

1. Install the second row center seat belt assembly.

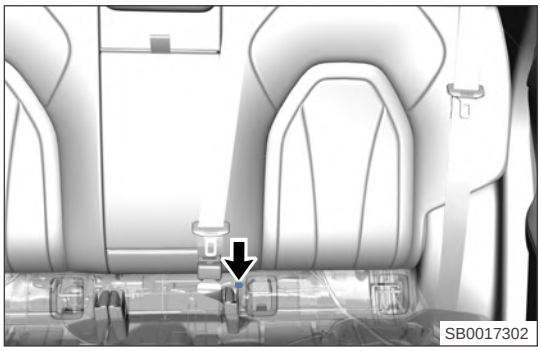
a. First take out the second row center seat belt assembly that is in good condition, hook the retractor mounting hole onto the seat frame mounting bolt, and align the retractor limit hook with seat frame limit hook, then pre-tighten the mounting nut (arrow) and tighten it (supplied by the seat supplier).

Tightening torque: 50 ± 5 N • m



b. After above procedures are completed, pass the webbing, locking tab and lower end plate of second row center seat belt assembly through the seat hole. Tighten the mounting bolt (arrow) of lower end plate 1 to the bolt frame after passing through the webbing.

Tightening torque: 50 ± 5 N • m



2. Connect the negative battery cable.

Inspection

Hint:

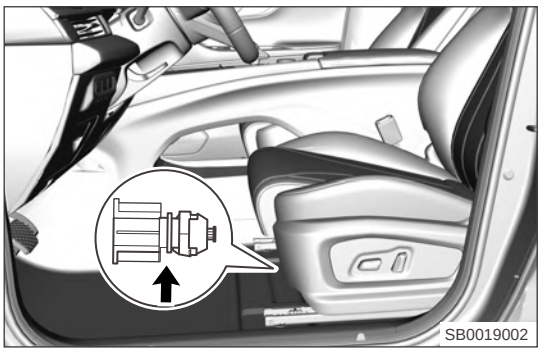
- DO NOT disassemble the rear seat belt retractor.
- Center seat belt is adaptive type and the angle is 45° backward and 35° forward, which is not locked.

Front Seat Belt Buckle Assembly

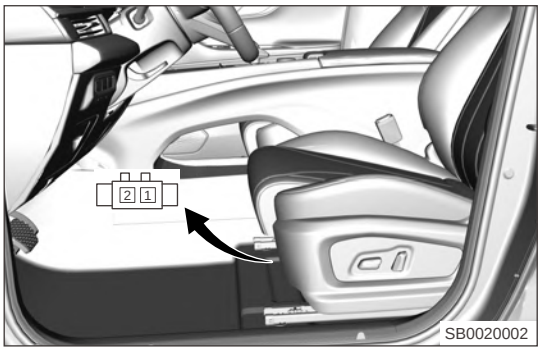
On-vehicle Inspection

1. Inspect the front seat belt buckle assembly.

c. Disconnect the front seat belt buckle connector (arrow).



d. Using a digital multimeter, measure resistance between terminals 1 and 2 of front seat belt buckle assembly connector.
Under normal condition, the measured resistance should be ∞ Ω (no continuity) when front seat belt assembly is fastened; The measured resistance should be less than 1 Ω (continuity) when front seat belt assembly is unfastened.
If result is not as specified, replace front seat belt buckle assembly.



Removal

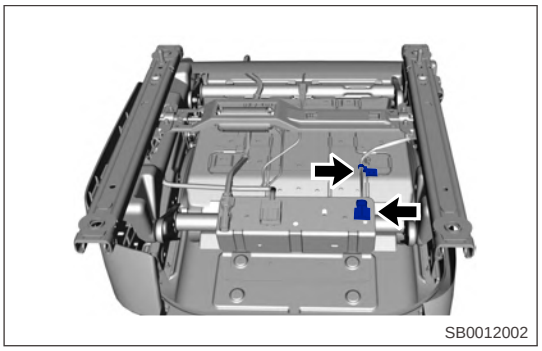
Hint:

- Use same procedures for front passenger seat belt buckle assembly and driver seat belt buckle assembly.
- Procedures listed below are for driver seat belt buckle assembly.

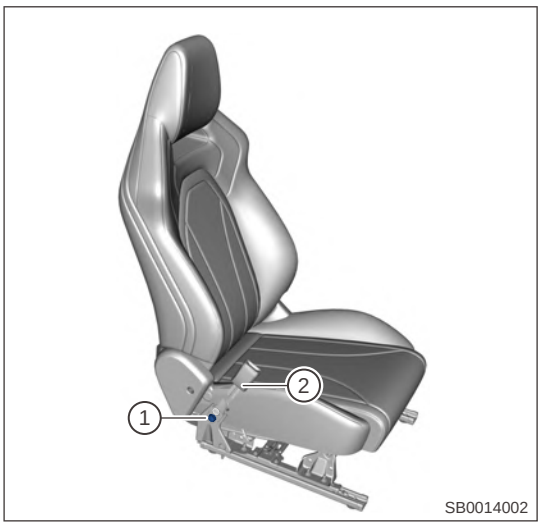
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing front seat belt buckle assembly.
- Try to prevent interior from being scratched, when removing front seat belt buckle assembly.
- Try to prevent wire harness and connector from being damaged, when removing front seat belt buckle assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front seat assembly.
4. Remove the driver seat belt buckle assembly.
   a. Disengage the seat belt buckle wire harness connector (arrow) from bottom part of seat.
   b. Disengage the seat belt wire harness clips (arrow) from bottom part of seat.


SB0012002

   c. Remove fixing bolt (1) from seat belt buckle, and remove driver seat belt buckle assembly (2).
      Tightening torque: 50 ± 5N·m



SB0014002

Installation

⚠ Warning

1. Be sure to tighten all fixing bolts according to specified torque, when installing front seat belt buckle assembly.
2. Install connectors in place, when installing front seat belt buckle assembly.

1. Installation is in the reverse order of removal.

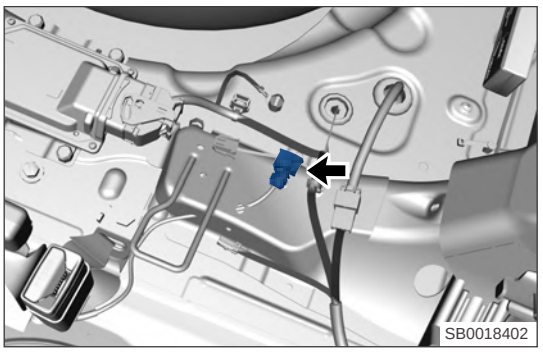
Rear Left Seat Belt Buckle Assembly

Removal

Hint:

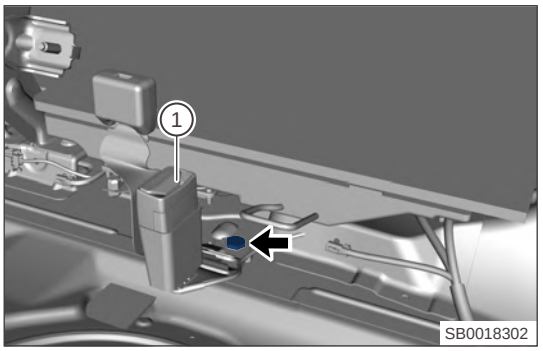
- Be sure to wear safety equipment to prevent accidents, when removing rear left seat belt buckle assembly.
- Try to prevent interior from being scratched, when removing rear left seat belt buckle assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the rear left seat belt buckle assembly.
   a. Remove connector (arrow) of rear left seat belt buckle assembly on the seat.



   b. Remove mounting bolt (arrow) and rear left seat belt buckle assembly (1).

   Tightening torque: 50 ± 5N·m



Installation

Hint:

- Be sure to tighten the fixing nut to specified torque when installing rear left seat belt buckle assembly.
- The assembly should be carried out in the seat factory and supplied with the seat assembly.
- The seat factory should test the above installation torque by a ratio of 100%.

1. Installation is in the reverse order of removal.

Rear Double-lock Buckle Assembly

Removal

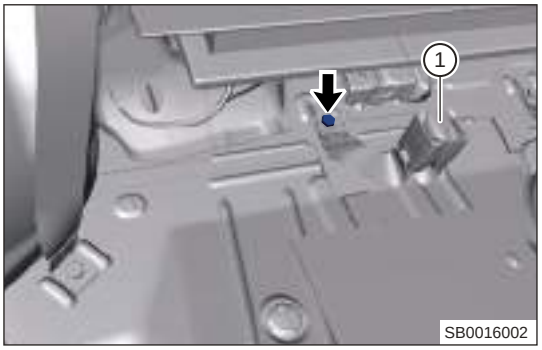
Hint:

- Be sure to wear safety equipment to prevent accidents, when removing rear seat belt buckle assembly.
- Try to prevent interior from being scratched, when removing rear seat belt buckle assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the rear seat belt buckle assembly.

a. Remove mounting bolt (arrow) and rear seat belt buckle assembly (1).

Tightening torque: 50 ± 5N·m



Installation

Hint:

- Be sure to tighten the fixing nut to specified torque when installing rear left seat belt buckle assembly.
- The assembly should be carried out in the seat factory and supplied with the seat assembly.
- The seat factory should test the above installation torque by a ratio of 100%.

1. Installation is in the reverse order of removal.

Height Adjuster Assembly

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

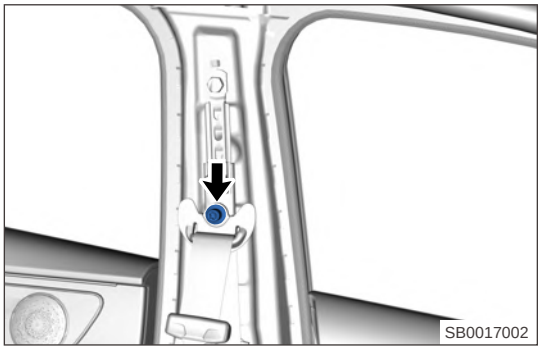
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing height adjuster assembly.
- Appropriate force should be applied, when removing the height adjuster assembly. Be careful not to operate roughly.
- Try to prevent interior from being scratched, when removing height adjuster assembly.
- Take the height adjuster assembly that is in good condition, first align the mounting bolts of height adjuster assembly with the upper and lower mounting nuts at fixing points of height adjuster for body B-pillar respectively and pre-tighten them. After that, the limit hook of height adjuster assembly should be engaged with the body limit hook; Finally tighten the mounting bolts.
- It is necessary to press the unlock button all the time when the height adjuster assembly of T18 seat belt is adjusted up and down. DO NOT push up directly or forcefully or quickly downward to unlock. Adjust the height adjuster to highest position after assembling.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the left B-pillar lower protector assembly.
4. Remove the left B-pillar upper protector assembly.
5. Remove the height adjuster assembly.

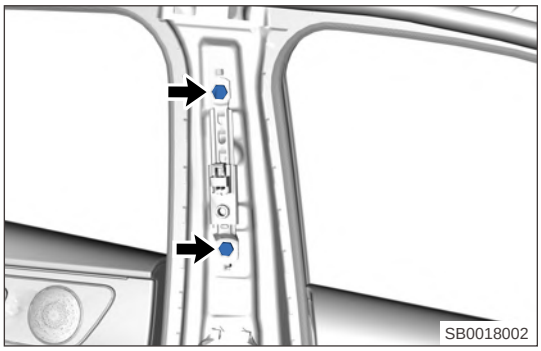
a. Remove the front seat belt assembly upper fixing bolt (arrow).

Tightening torque: 50 ± 5N·m



b. Remove 2 fixing bolts (arrow) from height adjuster assembly.

Tightening torque: 50 ± 5N·m



c. Remove height adjuster assembly from dowel pin.

Installation

Hint:

- Be sure to tighten the fixing bolts to specified torque when installing height adjuster assembly.

1. Installation is in the reverse order of removal.

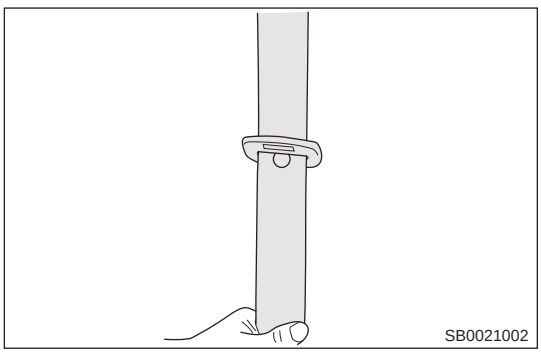
Locking Tab Reversing

Operation Method

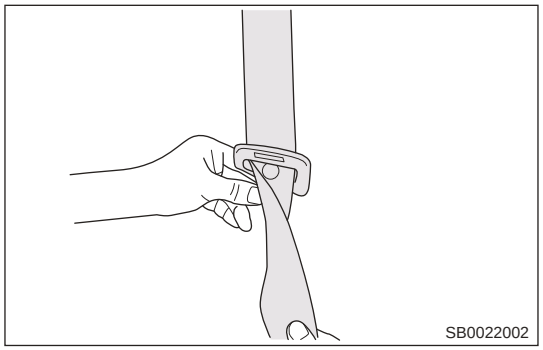
Hint:

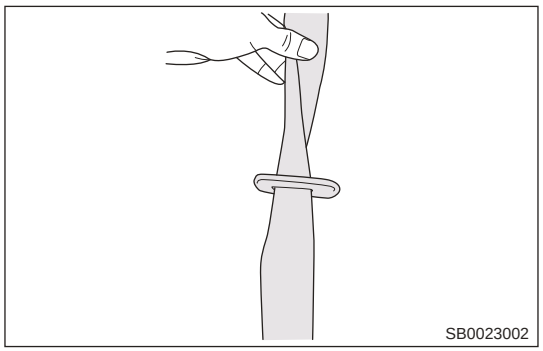
- When the seat belt is recycled, safety webbing contacts with the seat side shoulder, which may cause the safety webbing to be reversed by 180 degrees with the locking tab. When pulling the locking tab (-inside opening clearance is larger than the thickness of webbing) at the next time of usage, the locking tab may be reversed occasionally. In this case, recover it according to the instructions (without removing seat belt), and the webbing is not damaged and without replacing.

1. Figure after the locking tab is reversed.

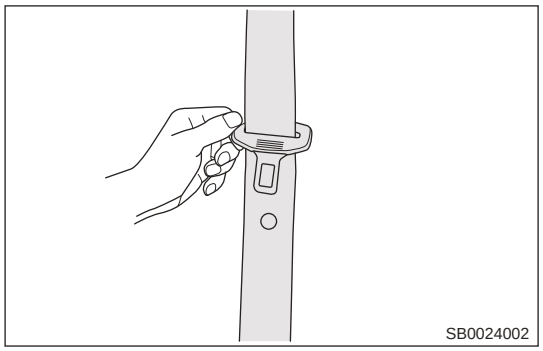


2. Fold the webbing in any direction and pull it downward forcefully to make the reversed webbing be pulled into the locking tab.





3. Complete the lock tab reversing.



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INSTRUMENT CLUSTER SYSTEM

Warnings and precautions

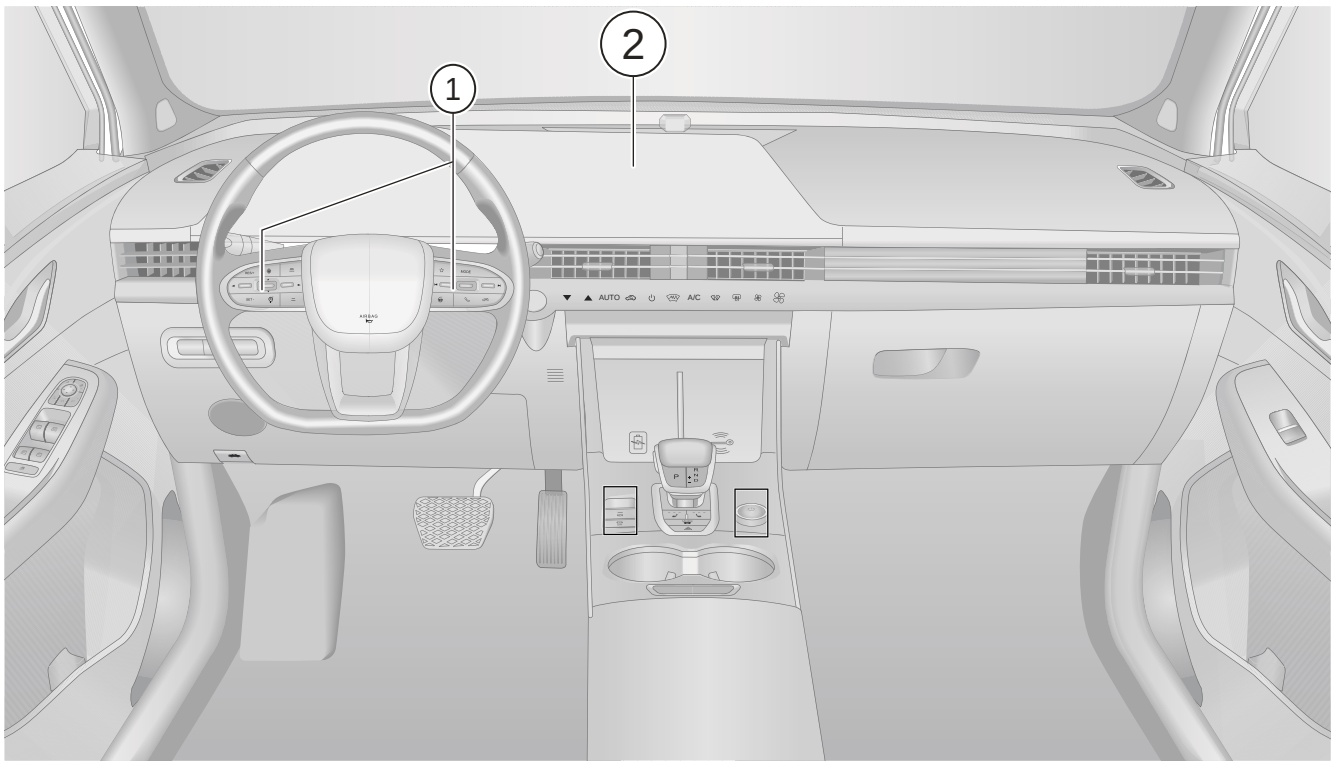
Precautions

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. Try to prevent interior and body paint from being scratched, when removing instrument cluster.
2. Be sure to wear necessary safety equipment to prevent accidents, when removing instrument cluster.
3. Appropriate force should be applied, when removing instrument cluster. Be careful not to operate roughly.
4. When removing instrument cluster, handle it with care, so as to avoid meter needle and dial from deviating from initial position or becoming looseness caused by collisions.

System Overview

System Components Diagram



ME0030001

1	Steering Wheel Quick Button	2	Hyperscreen

System Principle

Instrument cluster is located above the upper left of instrument panel assembly, which is used to monitor and display the operation status of each system and component in vehicle. Instrument cluster receives signals from each sensor and switch, and displays the operation status of each system through instrument

cluster, operation/malfunction indicator. As a result, it will be helpful for driver to eliminate possible troubles in time, thus avoiding malfunctions or accidents efficiently.

Operation/Malfunction Indicator

Operation indicator is used to prompt the driver that some system on vehicle is operating and corresponding operation indicator will come on.Malfunction indicator is used to warn the driver that some system on vehicle is malfunctioning and corresponding malfunction indicator will come on or flash.

Name	Indicator	Description
Daytime Running Indicator		Start the engine and daytime running indicator remains on.
Position Indicator		Turn on the position light and it remains on.
Turn Signal Light Indicator		While turning on left turn signal light or right turn signal light, the corresponding turn signal light also flashes. When hazard warning light switch is turned on, left and right turn signal indicators flash at the same time.
High Beam Indicator		Turn on high beam light, it remains on.
Front Fog Indicator		Turn on front fog light, it remains on.
Rear Fog Indicator		Turn on rear fog light, it remains on.
Intelligent Headlight Assist System (IHC) Indicator		This indicator is used to show that Intelligent Headlight Assist System (IHC) is in operation.
Intelligent Headlight Assist System (IHC) Malfunction Indicator		This indicator is used to remind the driver that Intelligent Headlight Assist System (IHC) is faulty. Please go to Chery service station for inspection and repair as soon as possible.
Front Seat Belt Indicator		The indicator is used to remind that the front seat belt is unfastened or improperly fastened, fasten the seat belt before driving. Note: Passenger seat belt alarm function is not a standard configuration, which should be subject to actual vehicle configuration.

Name	Indicator	Description
Second Row Seat Belt Indicator (If Equipped)		The indicator is used to remind that the second row seat belt is unfastened or improperly fastened, fasten the seat belt before driving. Note: Second row seat belt unfastened red indicator remains on, seat belt fastened green indicator remains on, all seat belts fastened indicator turns off.
Electronic Parking Brake System		This indicator is used to show that Electronic Parking Brake System (EPB) is in operation.
Electronic Parking Brake System (EPB) Malfunction Indicator		This indicator is used to remind the driver that Electronic Parking Brake System (EPB) is faulty. Please go to Chery service station for inspection and repair as soon as possible.
Automatic Parking System (-AUTO HOLD) Indicator		This indicator is used to show that Automatic Parking System (-AUTO HOLD) is in operation.
Brake System Malfunction Indicator		The indicator is used to remind the driver that brake fluid level is low or brake system is faulty, please contact Chery dealer for inspection and repair immediately.
Anti-lock Brake System (ABS) Malfunction Indicator		The indicator is used to remind the driver that Anti-Lock Brake System (ABS) is faulty, please go to Chery dealer for inspection and repair as soon as possible.
Hill Descent Control System (HDC) Indicator		This indicator is used to show that Hill Descent Control System (HDC) is in operation.
Hill Descent Control System (HDC) Malfunction Indicator		This indicator is used to remind the driver that Hill Descent Control System (HDC) is faulty. Please go to Chery service station for inspection and repair as soon as possible.
Electronic Stability Program System (ESP) Indicator		If the indicator flashes, it means the Electronic Stability Program System (ESP) is in operation status. If the indicator remains on, it is used to remind the driver that Electronic Stability Program System (ESP) is faulty, please

Name	Indicator	Description
		go to Chery dealer for inspection and repair as soon as possible.
ESP OFF Indicator		After turning off ESP function, ESP OFF indicator remains on, which means that Electronic Stability Program System (ESP) is in shielded status.
Lane Keeping Assist System (LKA) Indicator		This indicator is used to show that Lane Keeping Assist System (LKA) is in operation.
Lane Keeping Assist System (LKA) Malfunction Indicator		This indicator is used to remind the driver that Lane Keeping Assist System (LKA) is faulty. Please go to Chery service station for inspection and repair as soon as possible.
Lane Departure Warning System (LDW) Indicator		This indicator flashes to show that the Lane Departure Warning System (LDW) is in operation. This indicator remains on, it is used to remind the driver that Lane Departure Warning System (LDW) is faulty. Please go to Chery service station for inspection and repair as soon as possible.
Auto Emergency Brake System (AEB) Indicator		This indicator remains on, it is used to show that Auto Emergency Brake System (AEB) is in operation.
Auto Emergency Brake System (AEB) Malfunction Indicator		This indicator remains on, it is used to remind the driver that Auto Emergency Brake System (AEB) is faulty. Please go to Chery service station for inspection and repair as soon as possible.
Traffic Congestion Assistance System (TJA) / Integrated Cruise Assist System (ICA) Malfunction Indicator		This indicator remains on, it is used to remind the driver that Traffic Congestion Assistance System (TJA) / Integrated Cruise Assist System (ICA) is faulty. Please go to Chery service station for inspection and repair as soon as possible.
Idle Start and Stop System Indicator		This indicator remains on, it is used to show that idle start and stop system meets the operating conditions.

Name	Indicator	Description
Idle Start and Stop System Malfunction Indicator		This indicator flashes, it is used to remind the driver that idle start and stop system is in fault status. Please go to Chery service station for inspection and repair as soon as possible. This indicator remains on, it is used to show idle start and stop system does not meet the safety start condition or is turned off.
Gasoline Particulate Filter (GPF) Indicator		If the indicator remains on, it is used to remind the driver that Gasoline Particulate Filter (GPF) is full, please increase vehicle speed to clean.
Gasoline Particulate Filter (GPF) Malfunction Indicator		This indicator remains on, it is used to remind the driver that Gasoline Particulate Filter (GPF) is faulty. Please go to Chery service station for inspection and repair as soon as possible.
4WD System Malfunction Indicator		This indicator remains on, it is used to remind the driver that 4WD system is faulty. Please go to Chery service station for inspection and repair as soon as possible.
Airbag Malfunction Indicator		This indicator remains on, it is used to remind the driver that airbag is faulty. Please go to Chery service station for inspection and repair as soon as possible.
Tire Pressure Monitoring System (TPMS) Malfunction Indicator		This indicator remains on, it is used to remind the driver that tire pressure is faulty. Check whether the tire pressure is too low or the temperature is too high. If the tire pressure is normal, please contact Chery service station for inspection and repair as soon as possible.
Electronic Power Steering System (EPS) Malfunction Indicator		This indicator remains on, it is used to remind the driver that Electronic Power Steering System (EPS) is faulty. Please contact Chery service station for inspection and repair immediately.

Name	Indicator	Description
EPC Malfunction Indicator	EPC	This indicator remains on, it is used to remind the driver that engine system is faulty. Please contact Chery service station for inspection and repair immediately.
Engine Malfunction Indicator		This indicator remains on to remind the driver that the engine is malfunctioning. Please contact Chery dealer for check and repair immediately.
Transmission Malfunction Indicator		This indicator remains on to remind the driver that the driver that the transmission system is malfunctioning. Please contact Chery dealer for check and repair immediately.
Engine Warm-up Indicator		This indicator remains on, it is used to show that the engine is warming up. When the water temperature rises, the indicator turns off, indicating that the engine is warmed up.
Hight Coolant Temperature Warning Light		This indicator remains on, it is used to remind the driver that engine coolant temperature is too high. Drive the vehicle to a safe area and stop, idle for several minutes then turn vehicle power supply to OFF mode. Please contact Chery service station for inspection and repair immediately.
Maintenance Indicator		This indicator remains on, it is used to remind the driver that it is necessary to perform vehicle maintenance. Please go to Chery service station for inspection and repair as soon as possible.
Warning Indicator		This indicator remains on, it is used to remind the driver that there is fault or abnormal information in the vehicle. Relevant warning information can be queried in fault inquiry screen. If it cannot be solved, please contact Chery service station immediately.

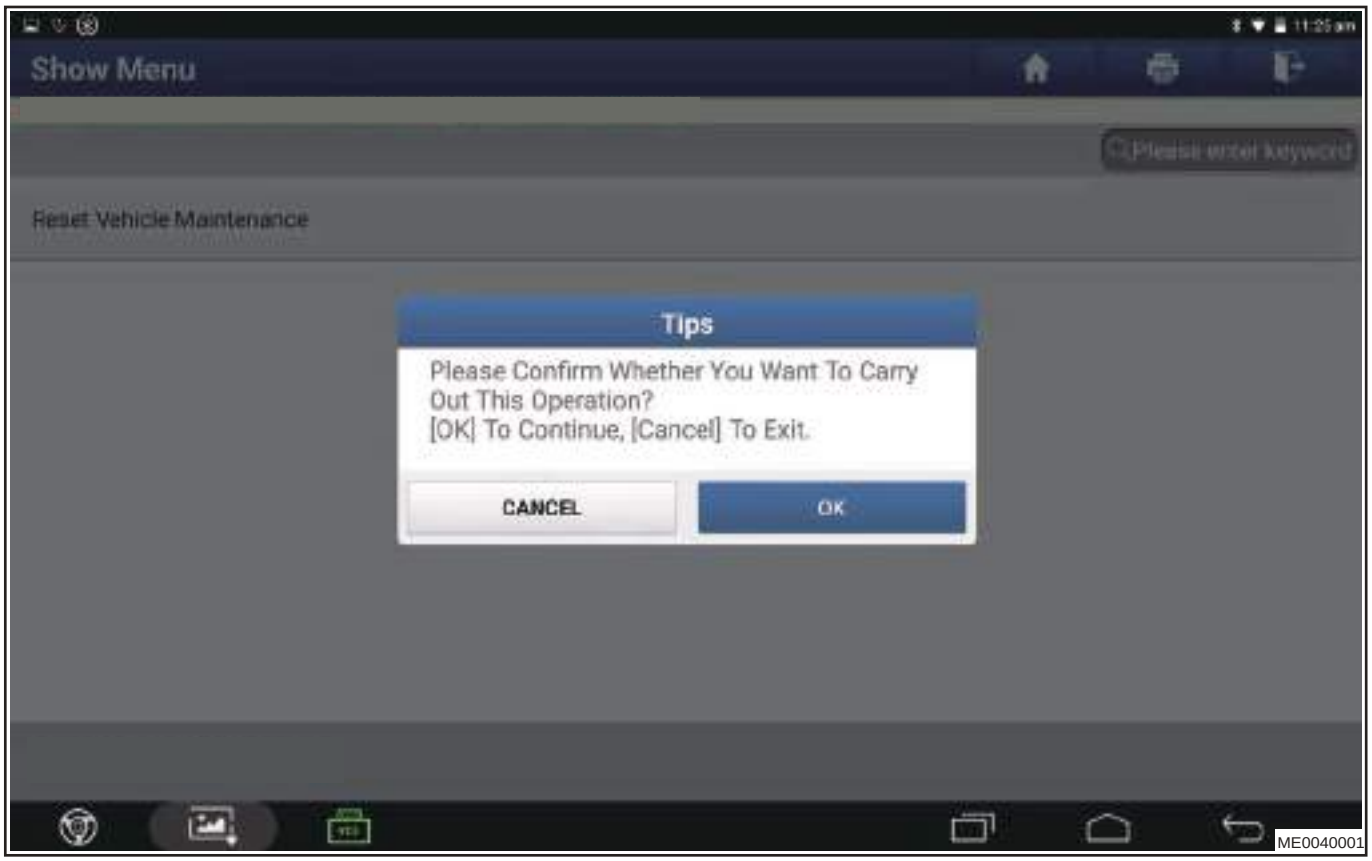
Name	Indicator	Description
Fatigue Driving Indicator		This indicator remains on, it is used to remind the driver that the driving time has exceeded the set time and pay attention to rest.
Overspeed Warning Indicator		This indicator remains on, it is used to remind the driver that the vehicle speed has exceeded the set limit value and pay attention to vehicle speed.
Low Oil Pressure Warning Indicator		This indicator remains on to remind the driver that the engine oil pressure is low, drive the vehicle to a safe area and stop. Please contact Chery dealer for check and repair immediately.
Charging System Indicator		This indicator remains on, it is used to show charging system status. If indicator does not remain on when switching power supply to ON mode, or this indicator remains on after starting engine, please go to Chery service station for inspection and repair as soon as possible.
Low Fuel Level Warning Light		This indicator remains on, it is used to remind the driver that the vehicle fuel is insufficient, please add fuel as soon as possible.

Maintenance Indicator Clearing

Diagnostic tester clearing

1. Connect diagnostic tester, enter the system, select model and click “Special Function”.
2. Enter next screen and click “Reset Vehicle Maintenance”.

3. Click “OK”.



4. Finished

Manual clearing
Press the multi-function steering wheel “OK” button to select “Maintenance Mileage Reset”, select “Yes” and press the “OK” button to eliminate it manually.

Diagnosis & Testing

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Entire instrument cluster does not operate	Fuse
	Instrument Cluster
	Wire harness or connector
Vehicle speed displays abnormally	Wheel speed sensor
	Wire harness or connector
	Instrument Cluster
Tachometer is abnormal	Engine speed sensor
	Instrument Cluster
	Wire harness or connector
	Engine Control Module (ECM)
Fuel gauge is abnormal	Fuel level sensor
	Instrument Cluster
	Wire harness or connector
Position indicator is abnormal	Position light switch (combination light switch assembly)
	Wire harness or connector
	Instrument Cluster
	Body Control Module (BCM)
Turn signal indicator is abnormal	Turn signal light switch (combination light switch assembly)
	Body Control Module (BCM)
	Instrument Cluster
	Wire harness or connector
High beam indicator is abnormal	High beam switch (combination light switch assembly)
	Body Control Module (BCM)
	Instrument Cluster

Symptom	Suspected Area
	Wire harness or connector
Rear fog indicator is abnormal	Rear fog light switch (combination light switch assembly)
	Body Control Module (BCM)
	Instrument Cluster
	Wire harness or connector
Charging system warning light is abnormal	Generator
	Instrument Cluster
	Wire harness or connector
Low engine oil pressure warning light is abnormal	Engine oil level
	Engine oil pressure switch
	Wire harness or connector
	Instrument Cluster
ABS warning light is abnormal	ABS control unit assembly
	CAN line or connector
	Domain controller
Coolant temperature warning light is abnormal	Coolant level
	Extremely high engine coolant temperature
	Coolant temperature sensor
	Wire harness or connector
	Instrument Cluster
	Body Control Module (BCM)
Engine malfunction warning light is abnormal	CAN line or connector
	Engine Control Module (ECM)
	Instrument Cluster
SRS warning light is abnormal	CAN line or connector
	Airbag control module (SRS)
	Instrument Cluster
Driver seat belt reminder light is abnormal	Driver seat belt buckle switch
	Wire harness or connector
	Instrument Cluster
Front passenger seat belt reminder light is abnormal (If equipped)	Front passenger seat belt buckle switch
	Wire harness or connector
	Instrument Cluster

Symptom	Suspected Area
Brake system warning light is abnormal	Low brake fluid level
	Parking brake switch
	Instrument Cluster
Cruise indicator is abnormal	Cruise switch (multi-function switch)
	Wire harness or connector
	Instrument Cluster
Transmission malfunction warning light is abnormal	Transmission Control Unit (TCU)
	CAN line or connector
	Instrument Cluster
Low tire pressure warning light is abnormal	Low or high tire pressure (tire pressure is not within specified range)
	Instrument Cluster

Diagnostic Help

1. Connect diagnostic tester X-431 3G (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all CD system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Check modules and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1100-13	Power Supply Voltage	/	• Instrument cluster fault • Battery fuse fault • Wire harness fault	Check corresponding wire harness, if the fault still occurs, replace the instrument cluster
B1100-16	Power Supply Voltage			
B1100-17	Power Supply Voltage			
B1101-11	Fuel System Short Circuit	/	• Instrument cluster fault • Fuel pump malfunction • Fuel pump wire harness fault	Check corresponding wire harness, if the fault still occurs, replace the instrument cluster
B1101-15	ICM Fuel System Fault			
B110C-11	Fuel PIN21 Short to Ground			
B110C-13	Fuel PIN21 Open			
B110D-11	Fuel PIN22 Short to Ground			
B1104-41	Instrument Cluster EEPROM Data Checksum Error	/	• Instrument panel internal fault	Perform power off test, if the fault still occurs, replace the instrument cluster
B110E-04	Display Overall Function Failure (-Including but Not Limited to Display and Touch)	/		
B110F-04	Display Module Function Failure	/		
B1110-04	Display Backlight Module Function Failure	/		

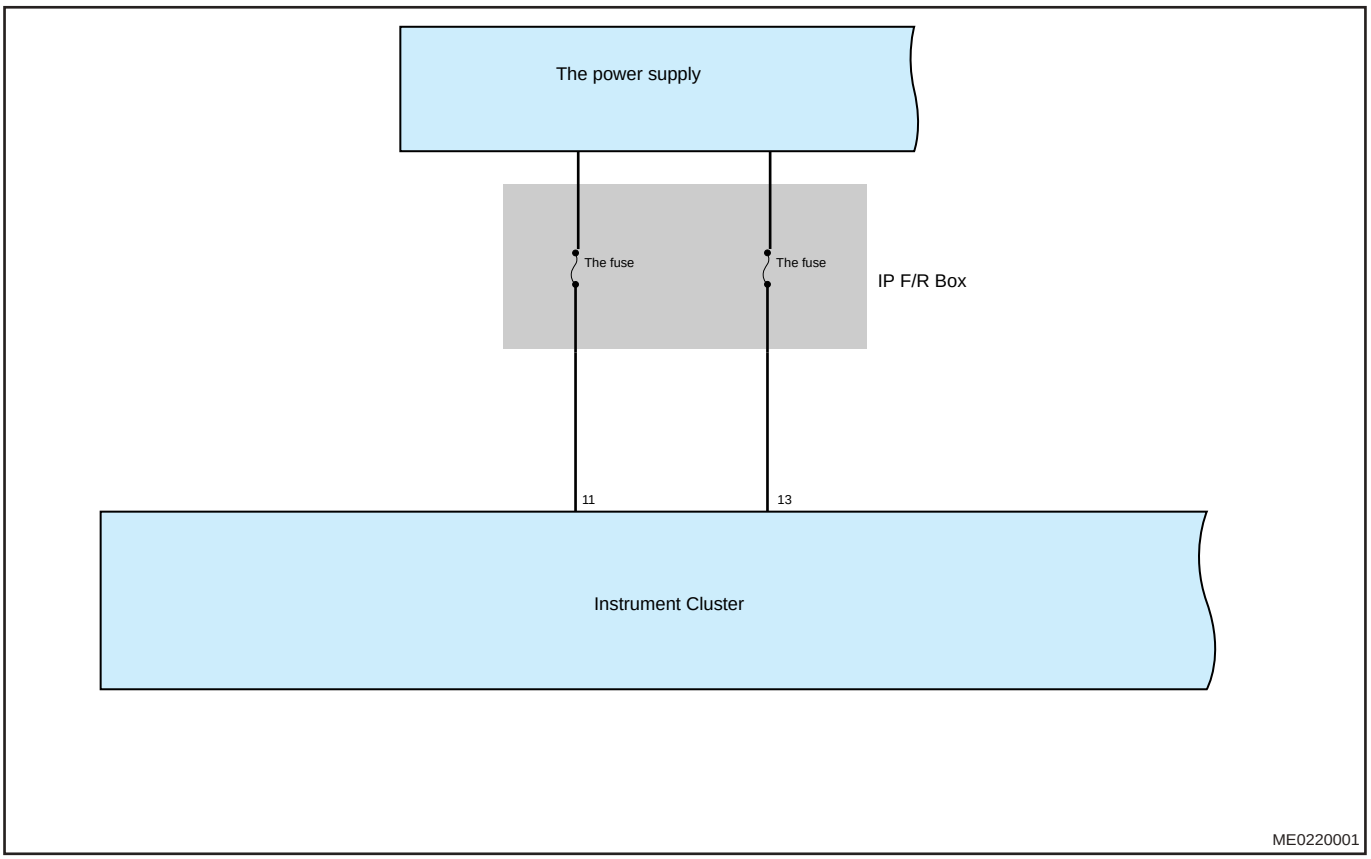
DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1111-04	Display Video Signal Failure	/		
B1112-04	Display Backlight Level Missing	/		
B1113-04	Communication Failure between Display and IHU	/		
U0073-88	BD CAN Busoff	/	• Instrument panel internal fault • Wire harness connector fault • Each module malfunction	Refer to "CAN Network System" for inspection and repair
U1010-88	IFT CAN Busoff	/		
U0140-87	Lost Communication with BCM	/		
U0214-87	Lost Communication with Passive Entry Passive Start (PEPS)	/		
U0164-87	Lost Communication With CLM	/		
U0141-87	Lost Communication with Reversing Radar	/		
U0142-87	Lost Communication with Around View Monitor Module	/		
U0230-87	Lost Communication with PLG	/		
U0100-87	Lost Communication with EMS	/		
U0129-87	Lost Communication With Brake System Control Module	/		
U0101-87	Lost Communication with TCU	/		
U0151-87	Lost Communication With ABM	/		

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U1157-87	Lost Communication with Blind Spot Detection	/		
U0131-87	Lost Communication with Electronic Power Steering Module	/		
U1162-87	Lost Communication with Front Camera Module	/		
U1163-87	Lost Communication with FRM	/		
U1193-87	Lost Communication with Electric Shifting Controller	/		
U1189-87	Lost Communication with MFS	/		
U0126-87	Lost Communication with SAM	/		
U1300-55	Software Configuration Error	/	• Software information not configured	Reconfiguration

DTC Diagnosis Procedure

DTC	**B1100-13**	**Power Supply Voltage**
DTC	**B1100-16**	**Power Supply Voltage**
DTC	**B1100-17**	**Power Supply Voltage**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

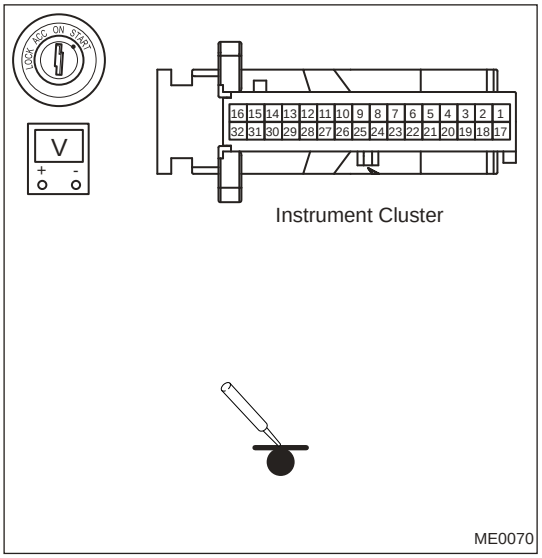
Use circuit diagram as a guide to perform the following inspection procedures:
(a) Check if fuse is normal.

NG → **Replace faulty fuse.**

OK

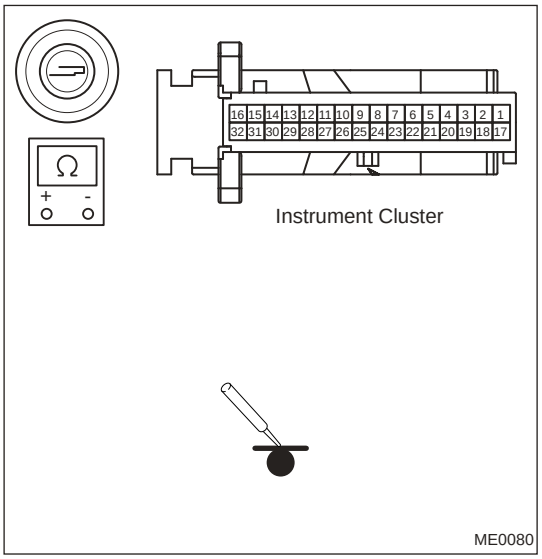
2	**Check related wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.
(b) Disconnect the instrument cluster connector.
(c) Check if related wire harnesses are worn, pinched or broken.
(d) Check if related connector terminals are loose, broken, bent or corrosive.
(e) Check if related connector pins are in good condition.
(f) Turn ENGINE START STOP switch to ON.
(g) Using a digital multimeter, check if the voltage between instrument cluster connector and body ground is normal according to table below.



Multimeter Connection	Specified Condition
Instrument cluster (11) - Body ground	Not less than 12 V
Instrument cluster (13) - Body ground	Not less than 12 V

(h) Using a digital multimeter, check if the continuity between connector I-016 (3) and body ground is normal.



Multimeter Connection	Specified Condition
I-016 (3) - Body ground	$< 1\ \Omega$

NG → **Repair or replace wire harness and connector.**

OK →

3	**Reconfirm DTCs**

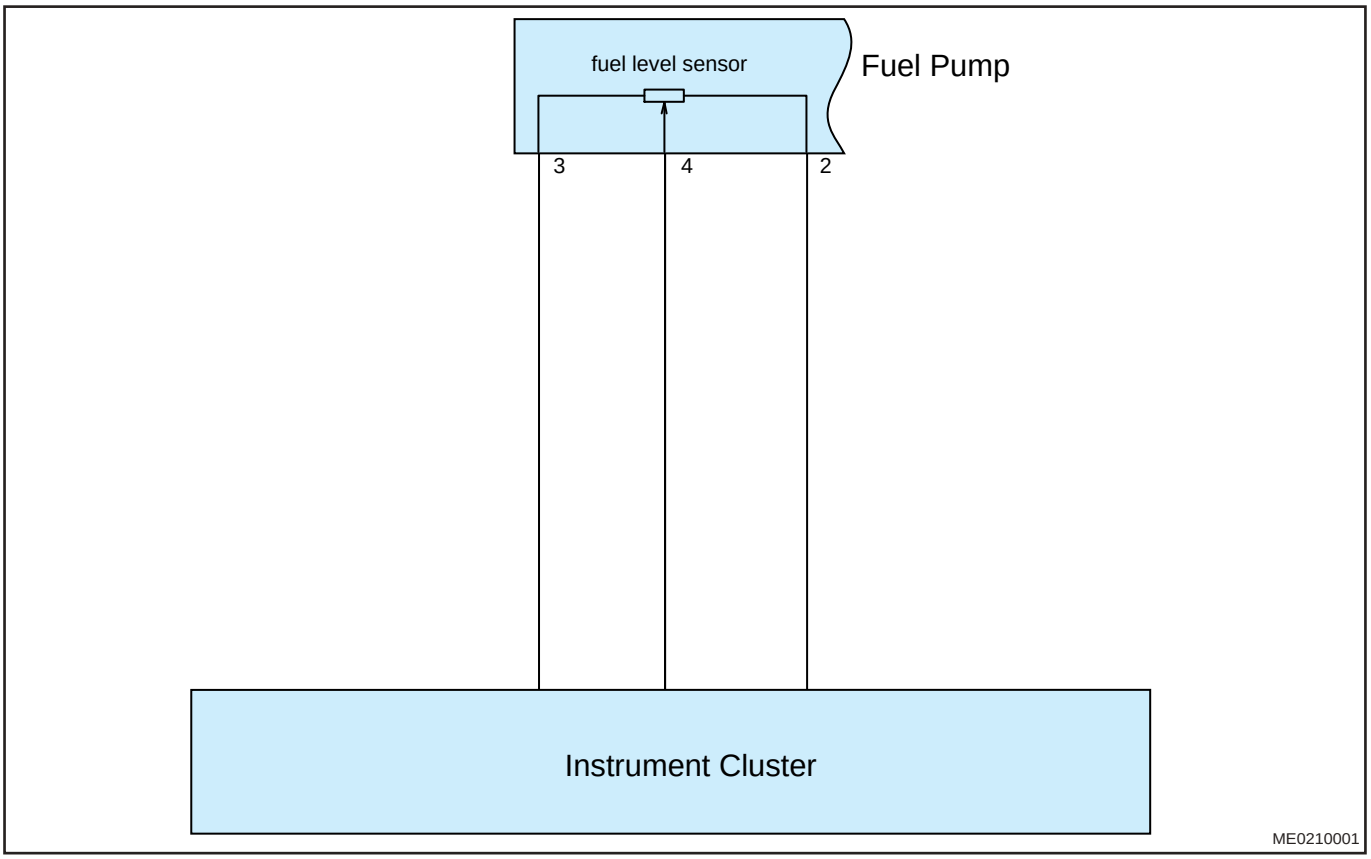
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace instrument cluster.**

OK → **System operates normally.**

DTC	**B1101-11**	**Fuel System Short Circuit**
DTC	**B1101-15**	**ICM Fuel System Fault**
DTC	**B110C-11**	**Fuel PIN21 Short to Ground**
DTC	**B110C-13**	**Fuel PIN21 Open**
DTC	**B110D-11**	**Fuel PIN22 Short to Ground**

Description
Control Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Confirm DTCs**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect fuel pump wire harness connector and instrument panel wire harness connector.

(c) Check if wire harnesses are worn, pierced, pinched or partially broken.

(d) Check for broken, bent, protruded or corroded terminals.

(e) Check if related connector pins are in good condition.

NG → **Repair or replace wire harness and connector.**

OK

2	**Check fuel pump level sensor resistance**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect the fuel pump wire harness connector.

(c) Turn fuel float multimeter from low to high to check if resistances between terminal 2 and terminal 4, and terminal 3 and terminal 4 of fuel pump change continuously.

NG → **Replace fuel pump assembly**

OK

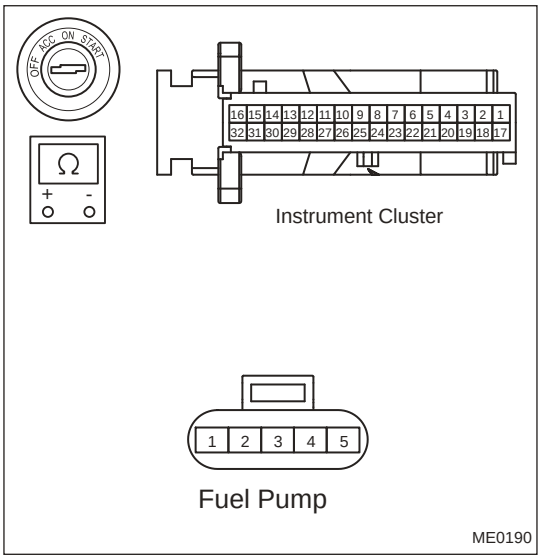
3	**Check fuel pump wire harness**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect the fuel pump wire harness connector.

(c) Using a digital multimeter, check resistance between fuel pump wire harness connector and terminals of instrument panel wire harness connector to check if there is an open circuit in fuel pump wire harness according to the table below.

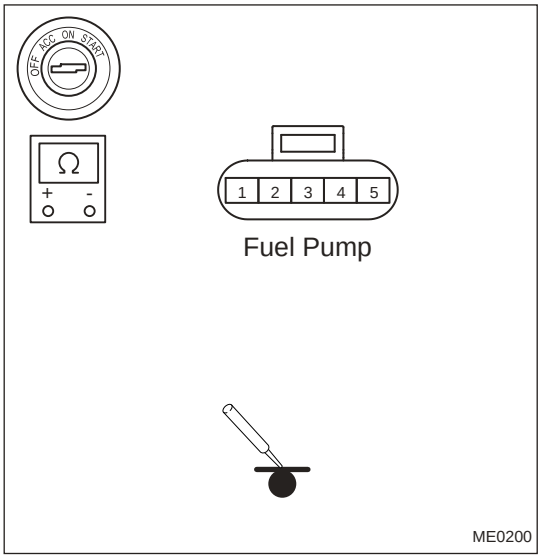
Multimeter Connection	Condition	Specified Condition
Fuel pump (2) - Instrument cluster (- connected terminal)	ENGINE START STOP switch “OFF”	＜ 1 Ω



Multimeter Connection	Condition	Specified Condition
Fuel pump (3) - Instrument cluster (- connected terminal)		< 1 Ω
Fuel pump (4) - Instrument cluster (- connected terminal)		< 1 Ω

(d) Using a digital multimeter, measure ground resistance between fuel pump wire harness connector and body according to table below.

Multimeter Connection	Condition	Specified Condition
Fuel pump (2) - Body ground	ENGINE START STOP switch "OFF"	∞
Fuel pump (3) - Body ground		∞
Fuel pump (4) - Body ground		∞



NG → **Repair or replace instrument panel wire harness**

OK

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace instrument cluster assembly.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1104-41	Instrument Cluster EEPROM Data Checksum Error

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.

- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Power off test**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable and wait for 3 minutes to connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

NG → **Replace instrument cluster.**

OK → **System operates normally.**

DTC	**B1104-41**	**Instrument Cluster EEPROM Data Checksum Error**
DTC	**B110E**	**Display Overall Function Failure (Including but Not Limited to Display and Touch)**
DTC	**B110F**	**Display Module Function Failure**
DTC	**B1110**	**Display Backlight Module Function Failure**
DTC	**B1111**	**Display Video Signal Failure**
DTC	**B1112**	**Display Backlight Level Missing**
DTC	**B1113**	**Communication Failure between Display and IHU**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Power off test**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable and wait for 3 minutes to check if it recovers.

NG → **Clear DTCs**

OK

2	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace instrument cluster assembly.**

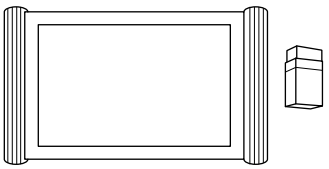
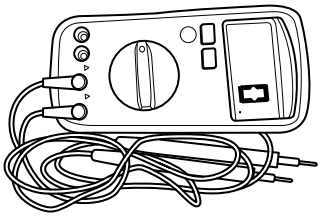
OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**U0073-88**	**BD CAN Busoff**
DTC	**U1010-88**	**IFT CAN Busoff**
DTC	**U0140-87**	**Lost Communication with BCM**
DTC	**U0214-87**	**Lost Communication with Passive Entry Passive Start (PEPS)**
DTC	**U0164-87**	**Lost Communication With CLM**
DTC	**U0141-87**	**Lost Communication with Reversing Radar**
DTC	**U0142-87**	**Lost Communication with Around View Monitor Module**
DTC	**U0230-87**	**Lost Communication with PLG**
DTC	**U0100-87**	**Lost Communication with EMS**
DTC	**U0129-87**	**Lost Communication With Brake System Control Module**
DTC	**U0101-87**	**Lost Communication with TCU**
DTC	**U0151-87**	**Lost Communication With ABM**
DTC	**U1157-87**	**Lost Communication with Blind Spot Detection**
DTC	**U0131-87**	**Lost Communication with Electronic Power Steering Module**
DTC	**U1162-87**	**Lost Communication with Front Camera Module**
DTC	**U1163-87**	**Lost Communication with FRM**
DTC	**U1193-87**	**Lost Communication with Electric Shifting Controller**
DTC	**U1189-87**	**Lost Communication with MFS**
DTC	**U0126-87**	**Lost Communication with SAM**
DTC	**U1300-55**	**Software Configuration Error**

DTC Confirmation Procedure
Refer to CAN communication system

On-vehicle Service

Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Digital Multimeter	 RCH0002006

Torque Specifications

Description	Torque (N·m)
Hyperscreen Fixing Bolt	5 ± 1 N·m

Instrument cluster

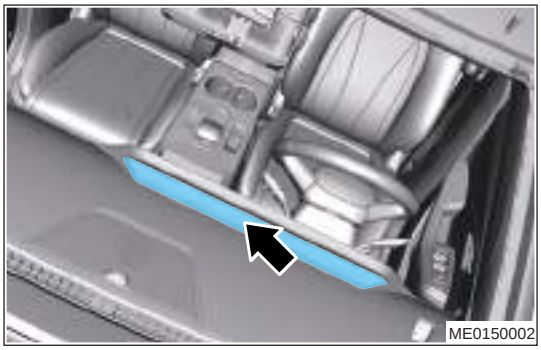
Removal

⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents, when removing instrument cluster.
- Appropriate force should be applied, when removing instrument cluster. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.

3. Using an interior crow plate, pry off screw block cover.



4. Remove 5 fixing bolts from dual LCD.

5. Disconnect instrument cluster connector from dual LCD, and remove dual LCD.

Installation

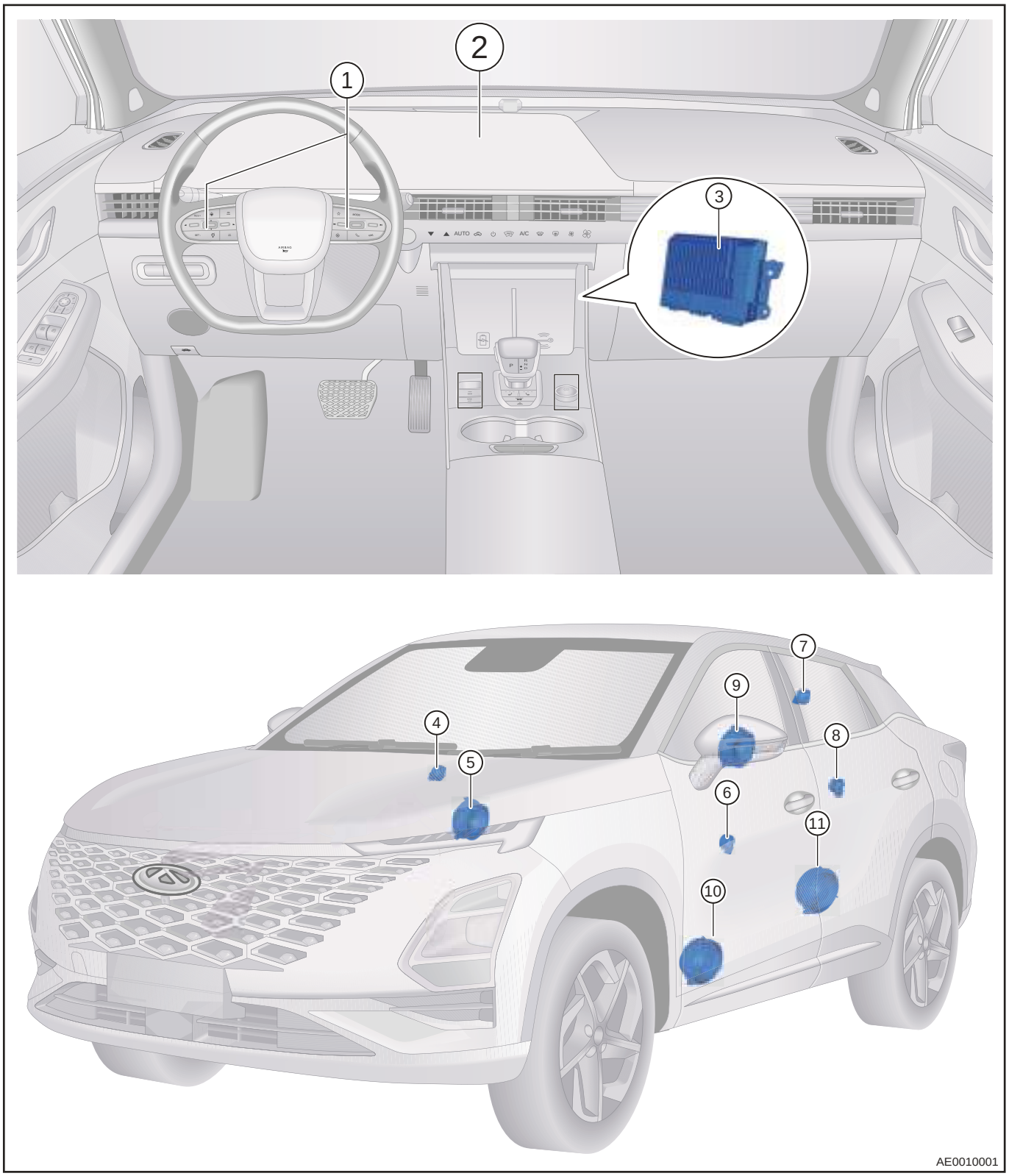
⚠ Caution
• Tighten fixing nut to specified torque, when installing dual LCD. • Install connector into place when installing dual LCD. • Check audio system for proper operation, after installing dual LCD.

1. Installation is in the reverse order of removal.

AUDIO/VISUAL SYSTEM

System Overview

System Components Diagram



1	Steering Wheel Quick Button	2	Hyperscreen
3	Domain controller	4	Front Right Tweeter
5	Front Right Woofer	6	Front Left Tweeter
7	Rear Right Tweeter	8	Rear Left Tweeter
9	Rear Right Woofer	10	Front Left Woofer
11	Rear Left Woofer		

System Principle

- A domain controller indicates that at least one server is responsible for the verification of each computer and user connected to the network in "domain" mode, which is equivalent to the guard of a unit, called "Domain Controller (abbreviated for DCM)". In this vehicle, domain controller integrates audio head unit module (RRM) and panoramic view monitor system into one module, but modules still operate independently by their independent ECU.
- Domain controller (audio head unit) part still maintains the traditional audio head unit function.
- Audio control panel controls domain controller (audio head unit) by transmitting information via CAN line network.
- Multi-function steering wheel controls the domain controller (audio head unit) by transmitting signal to the central gateway module (CGW) via LIN line, and then transmitting information via CAN line network.
- Multi-function steering wheel (standard) controls domain controller (audio head unit) by transmitting information directly via ordinary dedicated line.
- Radio/AVM video/face recognition camera/AR navigation is transmitted to domain controller (audio head unit) via digital signal.
- Data from domain controller (audio head unit) and USB1/USB2/TBOX is transmitted via universal serial bus (USB).
- Data from domain controller (audio head unit) and instrument cluster display is transmitted to instrument cluster display via low voltage differential signal (LDVS).
- Microphone 1 voice signal is transmitted to domain controller (audio head unit) through TBOX, microphone 2 voice signal is directly transmitted to domain controller (audio head unit).
- The standard reversing view monitor transmits signal to domain controller (audio head unit) via a dedicated line by using a common camera.

Diagnosis & Testing

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Current Status	Symptom	Possible Cause and Solution
General condition	Head unit operates, but has no sound or sound is very low	Turn up the volume. Check setting of front and rear, left and right balance for horn
	Navigation volume cannot be adjusted	Stop vehicle, and adjust navigation volume on navigation screen or volume setting screen

Current Status	Symptom	Possible Cause and Solution
	Head unit screen cannot be operated	In some states, operations on screen are not available. End current state, long press the Power button for 10S to restart the system and try to operate the screen again. Or click [SET] button to restore factory setting in the system setting
	Some functions in air conditioning setting are not available	Some functions related to the vehicle are available only when ENGINE START STOP switch is in ON
Radio playback	Poor reception	Check if antenna is fully deployed, connection is correct (-whether negative is grounded). The required radio signal is too weak, please use manual search
	Available station cannot be searched by automatic station searching	When there are several available stations in current range and favorite station is 0, only 40 stations with the strongest signal can be searched. If you have other favorite ones, please manually search and store them
USB file playback	There are unplayable files	The system can not support all formats files. There are many audio and video formats nowadays. Even file formats supported by audio video descriptions may not be supported due to the different encoding formats. Please refer to audio and video descriptions, download supported formats and try
	Volume fluctuates up and down during playback	Volume fluctuates up and down during playback, as there is no uniform standard, the volume cannot be handled uniformly, please adjust the volume knob by yourself.
	Knocking / noise	It may be caused when the original file is being recorded or caused by noise. Please confirm if it is a native problem with other players
	USB audio, video, pictures can not be played normally and no prompt is given	Due to large number of USB manufacturers, the file system, supported protocols, etc. are very different, the system can not

Current Status	Symptom	Possible Cause and Solution
		support all of them. Please try another USB.
Music playback	Bluetooth music name is showed as unknown	The model shows name in accordance with Bluetooth standard, if phone does not comply with the standard, it will be shown as unknown. Please change your phone and try again
Speech recognition	Inaccurate speech recognition	Say out voice command words provided by voice recognition system as much as possible and use Mandarin; Try to keep the vehicle quiet, and use voice recognition function in low noise surroundings; Microphone is in dome light position, so if noise is unavoidable, say command out as close to the microphone as possible

Hint:
If malfunction still cannot be eliminated, please drive vehicle to Chery Automobile authorized after-sales service center or 4S shop for inspection and repair. Do not remove head unit without authorization and repair it by yourself.

Diagnostic Help

1. Connect diagnostic tester X-431 3G (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all CD system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Check modules and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.

- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnosis Procedure

Hint:
Use following procedures to troubleshoot the control system.

1	**Vehicle brought to workshop**

Next

2	**Examine vehicle and check basic items**

Check system power supply voltage, and check that fuse, wire harness and connector are connected normally.

OK

Standard voltage: Not less than 12 V.

Result

NG → **Check and replace malfunctioning parts**

OK

3	**Using a diagnostic tester, read related DTC and data stream information**

Result

Result	Proceed to
No DTC	A
DTC occurs	B

A → **Perform troubleshooting procedure without DTCs according to malfunction symptom**

B

4	**Troubleshoot according to DTCs troubleshooting procedure**

Result

Result	Proceed to
Problem is not resolved	A
Problem is resolved	B

A → **Return to procedure 1 and troubleshoot the process again**

B

5	**According to malfunction repair completion inspection and delivery, confirm if malfunction is resolved**

Result

Result	Proceed to
Delivery inspection is failed	A
Delivery inspection is qualified	B

A → **Return to procedure 1 and troubleshoot the process again**

B

6	**Finished**

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1800-16	Power Supply Voltage Failure	/	• Fuse • Charging system • Wire harness connector • Domain controller	Check for short or open in battery, fuse and each wire harness terminal
B1800-17	Power Supply Voltage Failure	/		

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1813-00	Speakers Connected to Amplifier Failure	/	• Speaker • Wire harness connector • Domain controller	Check for short or open in speaker and each wire harness terminal
B1830-04	Amplifier R/W Failure	/		
B1814-00	Tuner Antenna Abnormal	/	• Wire harness connector • Domain controller	Check for short or open in each wire harness terminal
B1832-04	Tuner IC R/W Failure	/		
B1835-04	Communication Failure Between MCU and Main Processor	/	• Domain controller	Perform power off test, replace domain controller if the fault still exists
B1840-4B	MMI Over Temperature	/		
B1847-04	Connecting Fault with Audio Display	/	• Hyperscreen • Wire harness connector • Domain controller	Check for short or open in each wire harness terminal
B1848-04	Connecting Fault with Instrument Cluster Display	/		
B184D-04	Connection Fault With Touchpad	/		
B1834-04	Voice Recognition IC R/W Failure	/	• Domain controller	Perform power off test, replace domain controller if the fault still exists
B1831-04	EEPROM R/W Failure	/		
B181F-04	Display Backlight Level Missing	/	• Hyperscreen • Domain controller	Perform power off test, replace domain controller if the fault still exists
B181E-04	Display Video Signal Failure	/		
B181A-04	Display Overall Function Failure (-Including but Not Limited to Display and Touch)	/		
B184C-04	Microphone Fault	/	• Microphone • Wire harness connector • Domain controller	Check for short or open in microphone and each wire harness terminal
U1007-88	Control Module BD CAN Communication	/	• Wire harness connector failure	Refer to “CAN network system”

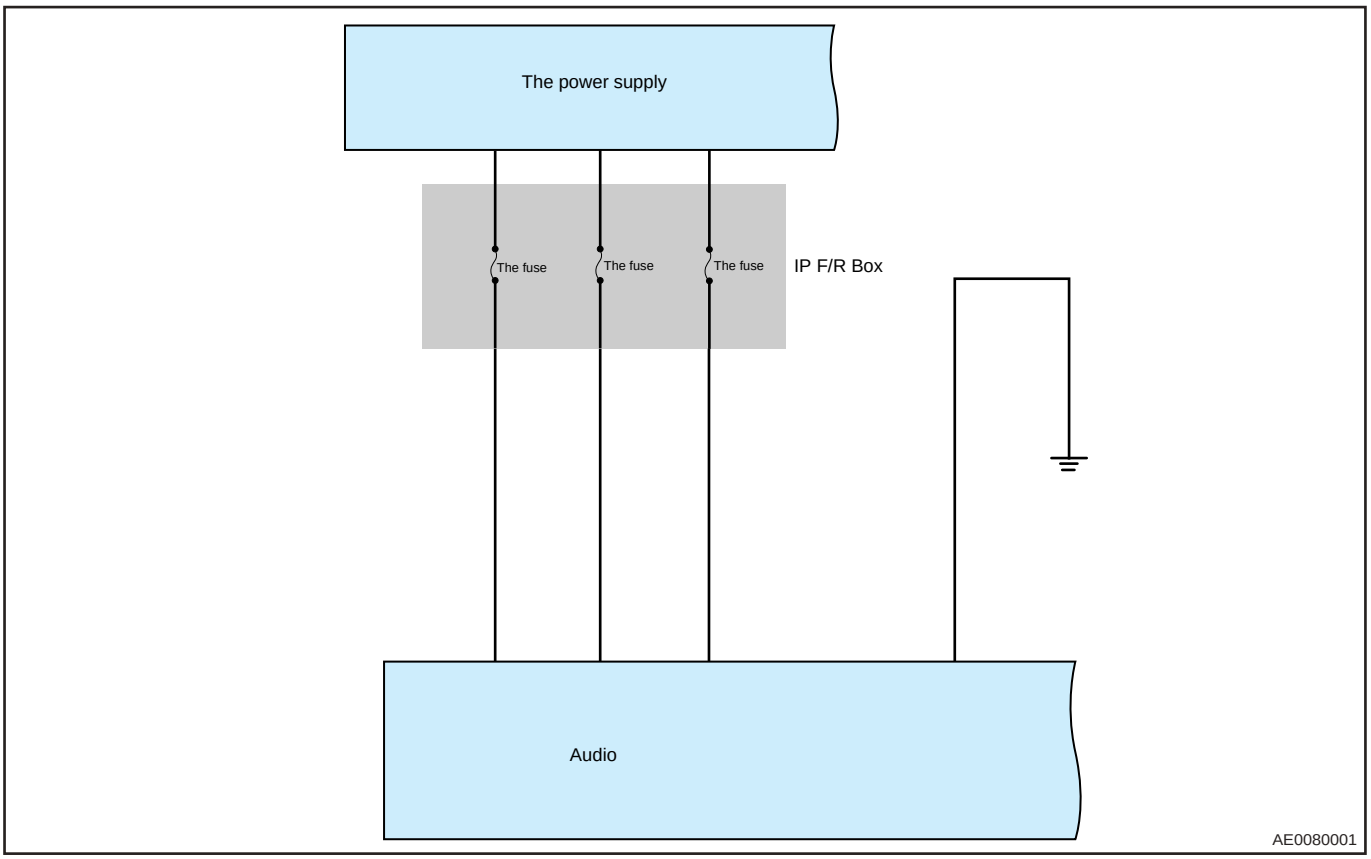
DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
	Bus Off BD CAN Busoff		• Each module malfunction • Domain controller malfunction	for inspection and repair
U0073-88	Control Module IFT CAN Communication Bus Off IFT CAN Busoff	/		
U0140-87	Lost Communication with BCM	/		
U0214-87	Lost Communication with Passive Entry Passive Start (PEPS)	/		
U0164-87	Lost Communication With CLM	/		
U0141-87	Lost Communication with Reversing Radar	/		
U0142-87	Lost Communication with Around View Monitor Module	/		
U0230-87	Lost Communication with PLG	/		
U0100-87	Lost Communication with EMS	/		
U0129-87	Lost Communication With Brake System Control Module	/		
U0101-87	Lost Communication with TCU	/		
U0151-87	Lost Communication With ABM	/		
U1157-87	Lost Communication with Blind Spot Detection	/		

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U0131-87	Lost Communication with Electronic Power Steering Module	/		
U1162-87	Lost Communication with Front Camera Module	/		
U1163-87	Lost Communicate with Front Radar	/		
U1193-87	Lost Communication with Electric Shifting Controller	/		
U1189-87	Lost Communication with MFS	/		
U0126-87	Lost Communication with SAM	/		
U1194-87	Lost Communication with Wireless Charging Module	/		
U1160－87	Lost Communication with Auto A/C Panel	/		
U0208-87	Lost Communication with Seat Module Controller	/		
U0193-87	Lost Communication with Audio Control Panel Controller	/		
U1300-55	Software Configuration Error	/	• Software information configuration error	Reconfiguration

DTC Diagnosis Procedure

DTC	B1800-16	Power Supply Voltage Failure
DTC	B1800-17	Power Supply Voltage Failure

Description
System Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Start engine, and use voltage band of multimeter to check if battery voltage is normal. (Rated voltage: Not less than 12 V)

NG → **Check or replace charging system or battery.**

OK

2	**Check fuse**

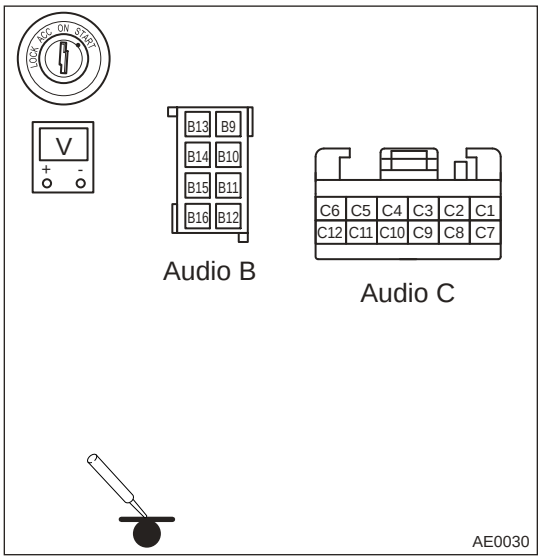
(a) Turn off all electrical equipment and ENGINE START STOP switch.
(b) Disconnect the negative battery cable.
(c) Check if pow supply fuse is normal.

NG → **Replace fuse.**

OK

3	**Check wire harness and connector**

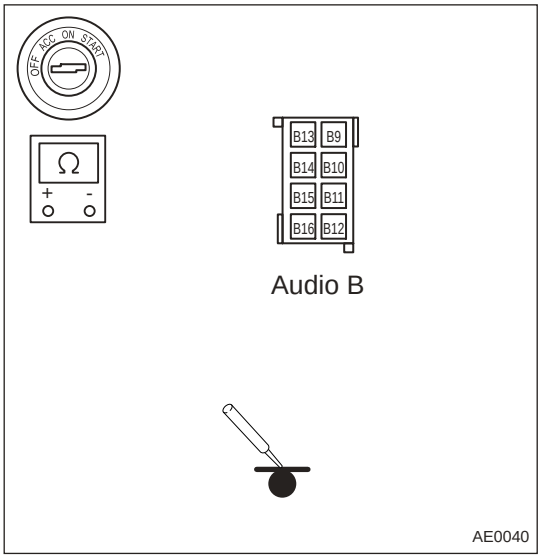
(a) Turn off all electrical equipment and ENGINE START STOP switch.
(b) Disconnect the negative battery cable.
(c) Disconnect the domain controller audio connector.
(d) Connect the negative battery cable.
(e) Turn ENGINE START STOP switch to ON.
(f) Using a digital multimeter, measure voltage between domain controller audio power supply terminal and body, and detect it with a 21 W test lamp according to table below.



Multimeter Connection	Condition	Specified Condition
Domain controller audio power supply terminal (1) - Body ground	ENGINE START STOP switch “ON”	Not less than 12 V
Domain controller audio power supply terminal (2) - Body ground		Not less than 12 V
Domain controller audio power supply terminal (3) - Body ground		Not less than 12 V

(g) Using a digital multimeter, measure resistance between domain controller audio connector ground terminal and body according to table below.

Multimeter Connection	Condition	Specified Condition
Domain controller audio connector ground terminal - Body ground	Ignition switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness or connector.**

OK →

4	Confirm DTCs again

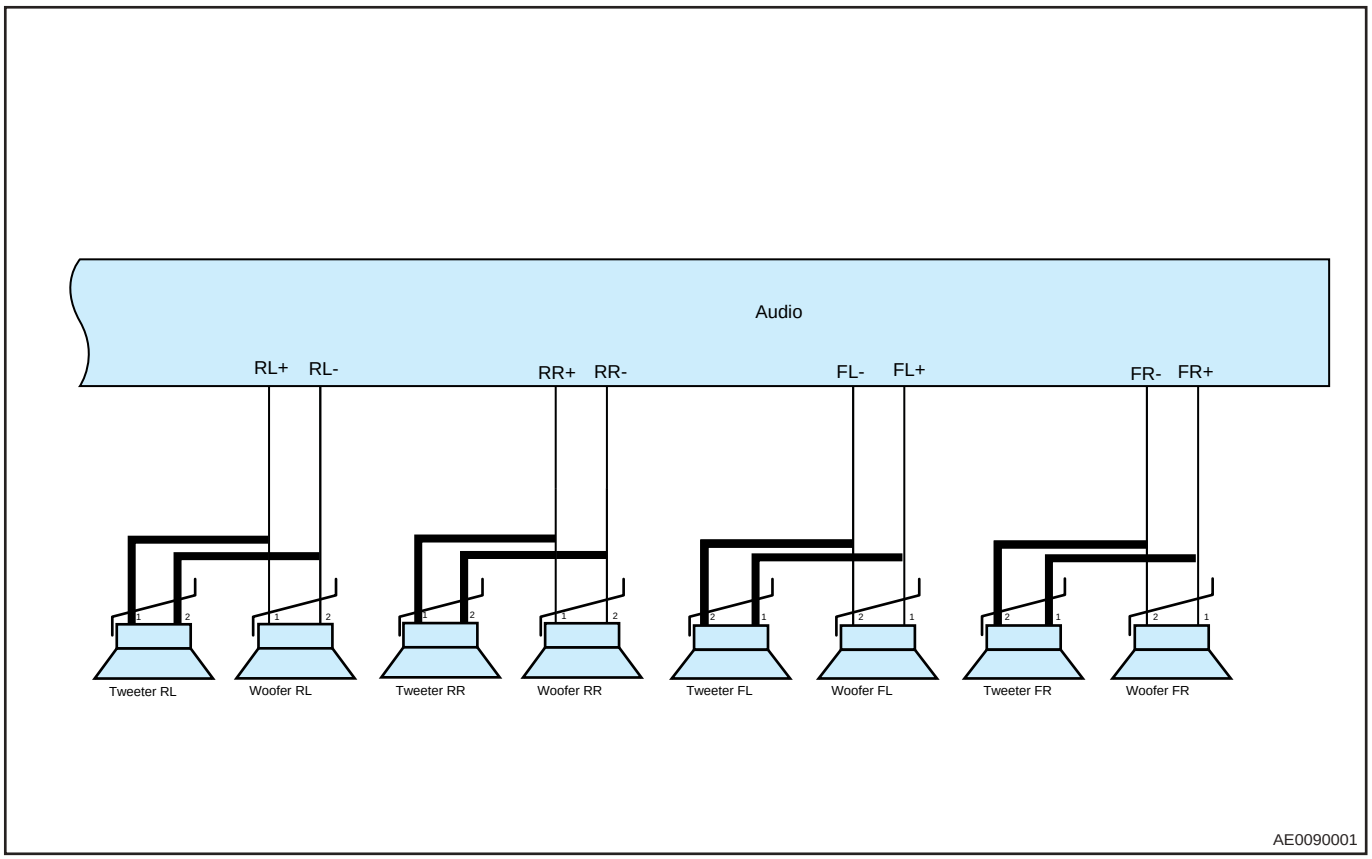
(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace domain controller**

DTC	B1813-00	Speakers Connected to Amplifier Failure
DTC	B1830-04	Amplifier R/W Failure

Description
System Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check horn of vehicle**

(a) Play music to check for speakers failing to operate on vehicle.

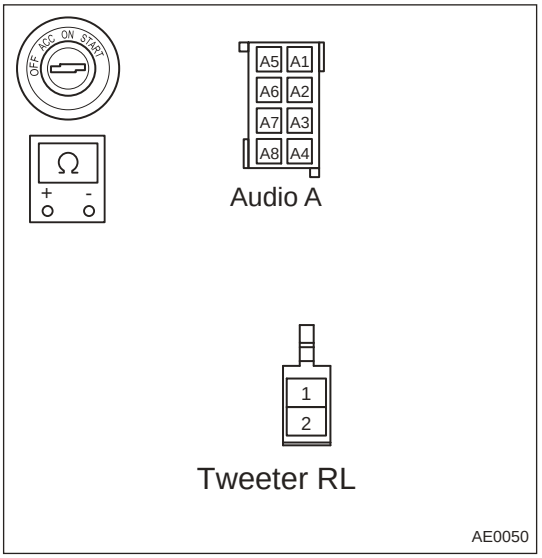
(b) Take the front right tweeter failing to operate as an example.

(c) Turn ignition switch to OFF and disconnect the negative battery cable.

(d) Disconnect front right tweeter connector and domain controller audio connector.

(e) Check for continuity between front right tweeter connector and domain controller audio connector.

Multimeter Connection	Condition	Specified Condition
Front right tweeter (1) - Domain controller audio (corresponding terminal)	Ignition switch OFF	Less than 1 Ω
Front right tweeter (2) - Domain controller audio (corresponding terminal)		

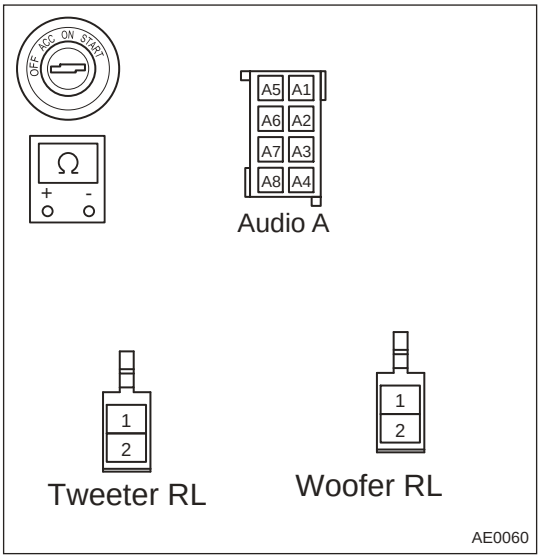


(f) Take front right tweeter and front right woofer failing to operate as an example.

(g) Disconnect front right tweeter connector, front right woofer connector and domain controller audio connector.

(h) Check for continuity between front right tweeter connector, front right woofer connector and domain controller audio connector.

Multimeter Connection	Condition	Specified Condition
Front right tweeter (1) - Domain controller audio (corresponding terminal)	Ignition switch OFF	Less than 1 Ω
Front right tweeter (2) - Domain controller audio (corresponding terminal)		



Multimeter Connection	Condition	Specified Condition
Front right woofer (1) - Domain controller audio (corresponding terminal)		
Front right woofer (2) - Domain controller audio (corresponding terminal)		

NG → **Repair or replace wire harness**

OK

2	**Check front right tweeter and woofer.**

(a) Using a replacement method, remove front left tweeter and woofer and install them to the front right position.

(b) Check if front right tweeter and woofer operate properly.

OK → **Replace tweeter and woofer**

NG → **Replace domain controller**

DTC	**B1847-04**	**Connecting Fault with Audio Display**
DTC	**B1848-04**	**Connecting Fault with Instrument Cluster Display**
DTC	**B184D-04**	**Connection Fault With Touchpad**

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Power off test**

(a) Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.

(b) Wait for 2 minutes, and then connect the negative battery cable, turn ignition switch to ON to check if the fault occurs again.

OK → **System is normal**

NG

2	**Check hyperscreen and connecting wire harness between hyperscreen and domain controller**

(a) Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
(b) Remove hyperscreen and connecting wire harness between hyperscreen and domain controller from malfunctioning vehicle, then install it to a new vehicle and perform a test.

NG → **Repair or replace hyperscreen and connecting wire harness.**

OK

3	**Confirm DTCs again**

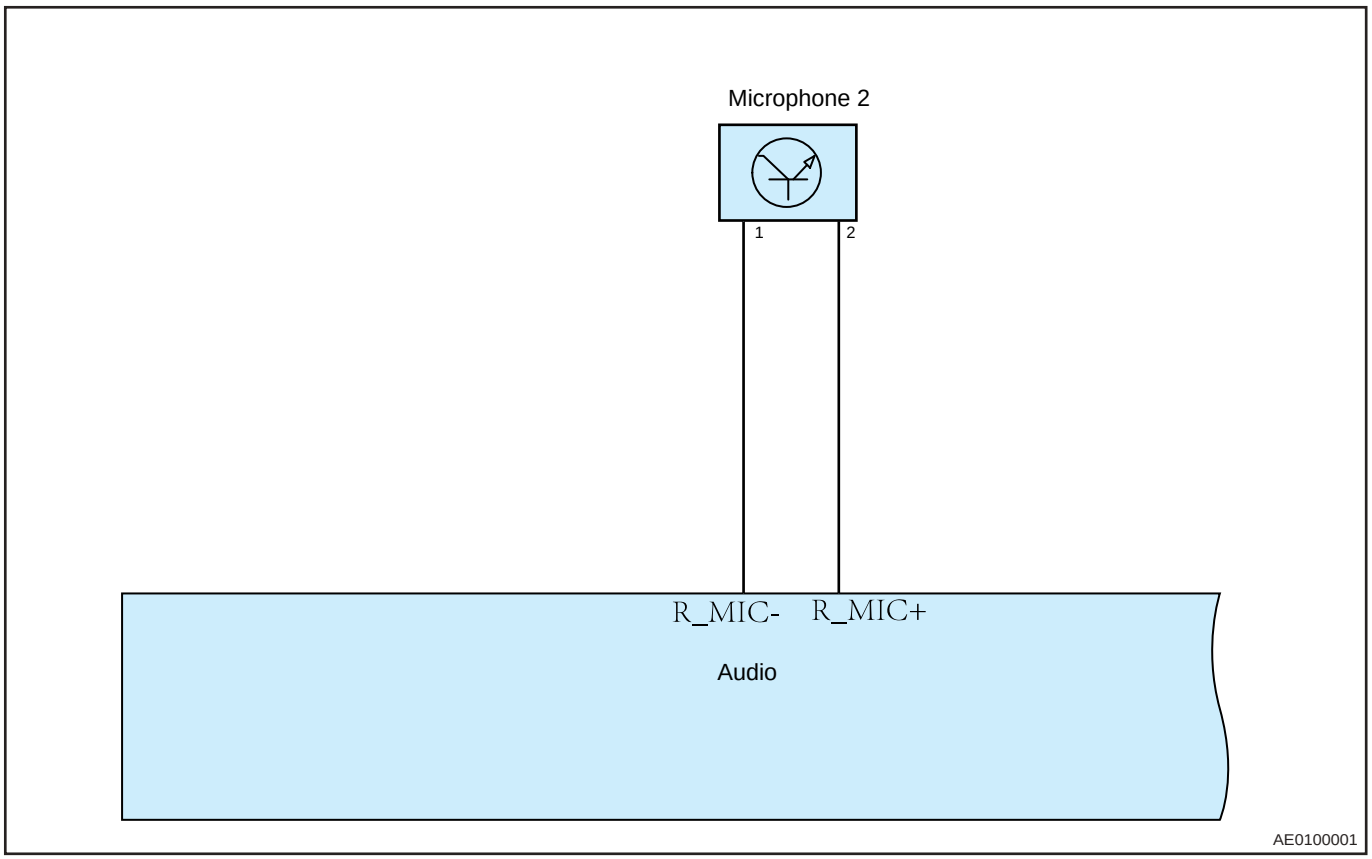
(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace domain controller**

DTC	**B184C-04**	**Microphone Fault**

Description
System Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check microphone**

(a) Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
(b) Remove microphone 2 from malfunctioning vehicle then install it to a new vehicle and perform a test.

NG → **Replace microphone 2**

OK

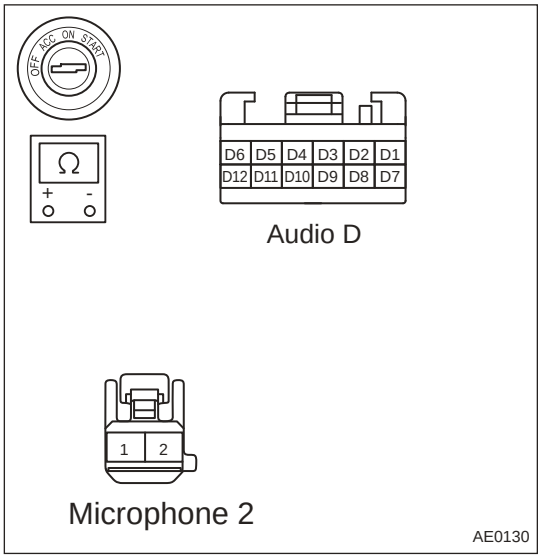
2	**Check wire harness connector between domain controller and microphone 2**

(a) Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.

(b) Disconnect microphone 2 connector and instrument cluster wire harness domain controller audio connector.

(c) Check for continuity between microphone 2 connector and domain controller audio connector.

Multimeter Connection	Condition	Resistance
Microphone 2 connector (1) - Domain controller audio (corresponding terminal)	ENGINE START STOP switch "OFF"	< 1 Ω
Microphone 2 connector (2) - Domain controller audio (corresponding terminal)		



NG → **Repair or replace wire harness or connector.**

OK →

3	Confirm DTCs again

(a) Connect all the connectors.

(b) Connect the negative battery cable.

(c) Use diagnostic tester to clear DTCs.

(d) Start the engine.

(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace domain controller**

DTC	B1835-04	Communication Failure Between MCU and Main Processor
DTC	B1840-4B	MMI Over Temperature
DTC	B1841-19	USB1 Current Above Threshold
DTC	B1842-19	USB2 Current Above Threshold

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Domain controller**

(a) Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
(b) Remove domain controller from malfunctioning vehicle, then install it to a new vehicle and perform a test.
(c) Check for system DTC.

OK	**System is normal**
NG	**Replace domain controller**

DTC	**B1834-04**	**Voice Recognition IC R/W Failure**
DTC	**B1831-04**	**EEPROM R/W Failure**

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Power off test**

(a) Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
(b) Wait for 2 minutes, and then connect the negative battery cable, turn ignition switch to ON to check if the fault occurs again.

OK	**System is normal**

NG

2	**Confirm DTCs again**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK	**Confirm that system is normal**
NG	**Replace domain controller**

DTC	**B181F-04**	**Display Backlight Level Missing**
DTC	**B181E-04**	**Display Video Signal Failure**
DTC	**B181A-04**	**Display Overall Function Failure (Including but Not Limited to Display and Touch)**

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Power off test**

(a) Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
(b) Wait for 2 minutes, and then connect the negative battery cable, turn ignition switch to ON to check if the fault occurs again.

OK → **System is normal**

NG

2	**Check display**

(a) Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
(b) Replace the original display with a new one for running test.

OK → **Replace display**

NG

3	**Confirm DTCs again**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace domain controller**

DTC	**U0140-87**	**Lost Communication with BCM**
DTC	**U0214-87**	**Lost Communication with Passive Entry Passive Start (PEPS)**
DTC	**U0164-87**	**Lost Communication With CLM**
DTC	**U0141-87**	**Lost Communication with Reversing Radar**
DTC	**U0142-87**	**Lost Communication with Around View Monitor Module**
DTC	**U0230-87**	**Lost Communication with PLG**
DTC	**U0100-87**	**Lost Communication with EMS**
DTC	**U0129-87**	**Lost Communication With Brake System Control Module**
DTC	**U0101-87**	**Lost Communication with TCU**
DTC	**U0151-87**	**Lost Communication With ABM**
DTC	**U1157-87**	**Lost Communication with Blind Spot Detection**
DTC	**U0131-87**	**Lost Communication with Electronic Power Steering Module**
DTC	**U1162-87**	**Lost Communication with Front Camera Module**
DTC	**U1163-87**	**Lost Communicate with Front Radar**
DTC	**U1193-87**	**Lost Communication with Electric Shifting Controller**
DTC	**U1189-87**	**Lost Communication with MFS**
DTC	**U0126-87**	**Lost Communication with SAM**
DTC	**U1194-87**	**Lost Communication with Wireless Charging Module**
DTC	**U1160 – 87**	**Lost Communication with Auto A/C Panel**
DTC	**U0208-87**	**Lost Communication with Seat Module Controller**
DTC	**U0193-87**	**Lost Communication with Audio Control Panel Controller**

DTC Confirmation Procedure
Refer to CAN communication system

On-vehicle Service

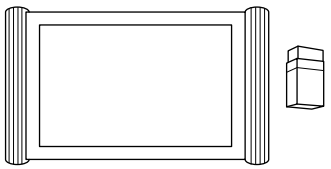
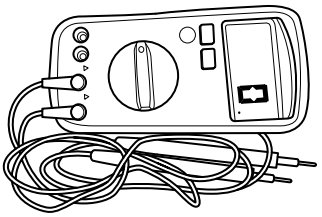
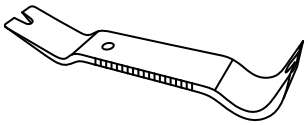
Torque

Torque Specifications

Description	Torque (N·m)
Combined Antenna Fixing Nut	5 ± 1
Woofer Fixing Screw	1.5 ± 0.5
Front Tweeter Fixing Screw	1.5 ± 0.5
Domain Controller Fixing Bolt	5 ± 1

Tools

General Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Digital Multimeter	 RCH0002006
Interior Crow Plate	 RCH002506

Domain controller

Removal

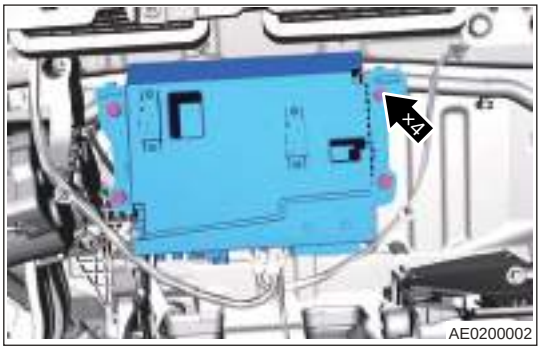
Hint:

- Be sure to wear safety equipment to prevent accidents, when removing domain controller.
- Appropriate force should be applied when removing domain controller. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel assembly.

4. Remove 4 fixing bolts from domain controller.

   Tightening Torque
   5 ± 1 N·m



5. Disconnect domain controller connector, and remove domain controller.

Installation

⚠ Caution

- Tighten fixing bolts to specified torque, when installing domain controller.
- Connect connectors in place, when installing domain controller.
- Check audio system for proper operation, after installing domain controller.

1. Installation is in the reverse order of removal.

Front Left Tweeter

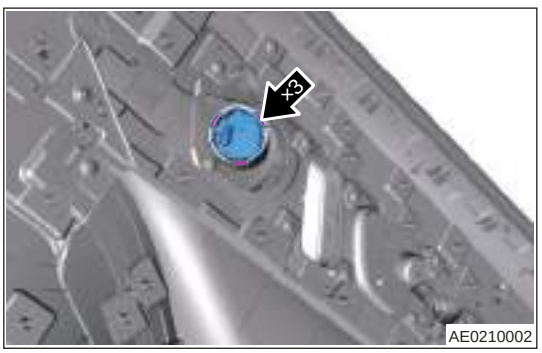
Removal

Hint:
Use same procedures for right and left sides (take left side as an example).

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing front left tweeter.
- Appropriate force should be applied when removing front left tweeter. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the left door protector assembly.
4. Pry up 3 fixing clips from front left tweeter and remove front left tweeter.



Installation

⚠ Caution
• Check front left tweeter for proper operation, after installing front left tweeter.

1. Installation is in the reverse order of removal.

Front Left Woofer

Removal

Hint:
Use same procedures for right and left sides (take left side as an example).

⚠ Caution
• Be sure to wear safety equipment to prevent accidents, when removing front left woofer. • Appropriate force should be applied when removing front left woofer. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door protector.
4. Disconnect the front left woofer connector.

5. Remove 3 fixing screws from front left woofer and remove front left woofer.

   Tightening Torque
   1.5 ± 0.5 N·m

Installation

⚠ Caution
• Be sure to tighten fixing bolts to specified torque, when installing front left woofer. • Check front left woofer for proper operation, after installing front left woofer.

1. Installation is in the reverse order of removal.

Rear Left Tweeter

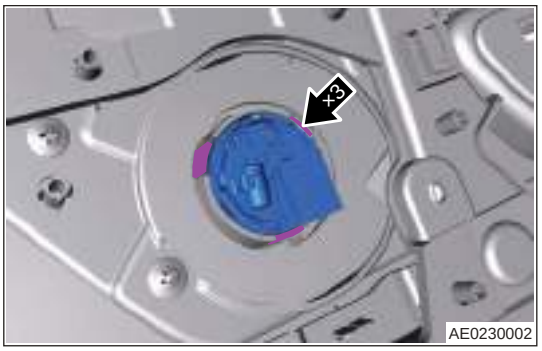
Removal

Hint:
Use same procedures for right and left sides (take left side as an example).

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing rear left tweeter.
- Appropriate force should be applied when removing rear left tweeter. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left door inner trim panel assembly.
4. Pry up 3 fixing clips from rear left tweeter and remove rear left tweeter.



Installation

⚠ Caution

- Check rear left tweeter for proper operation, after installing rear left tweeter.

1. Installation is in the reverse order of removal.

Rear Left Woofer

Removal

Hint:
Use same procedures for right and left sides (take left side as an example).

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing rear left woofer.
- Appropriate force should be applied when removing rear left woofer. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.

3. Remove the rear left door protector assembly.

4. Disconnect the rear left woofer connector.

5. Remove 3 fixing screws from rear left woofer and remove rear left woofer.

   Tightening Torque
   1.5 ± 0.5 N·m

Installation

⚠ Caution
• Be sure to tighten fixing bolts to specified torque, when installing rear left tweeter. • Check rear left tweeter for proper operation, after installing rear left tweeter.

1. Installation is in the reverse order of removal.

Combined Antenna

Removal

Hint:

- Be sure to wear safety equipment to prevent accidents, when removing combined antenna.
- Appropriate force should be applied when removing combined antenna. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear part of interior ceiling.

4. Disconnect combined antenna connector and remove fixing nut from combined antenna.

   Tightening Torque
   5 ± 1 N·m

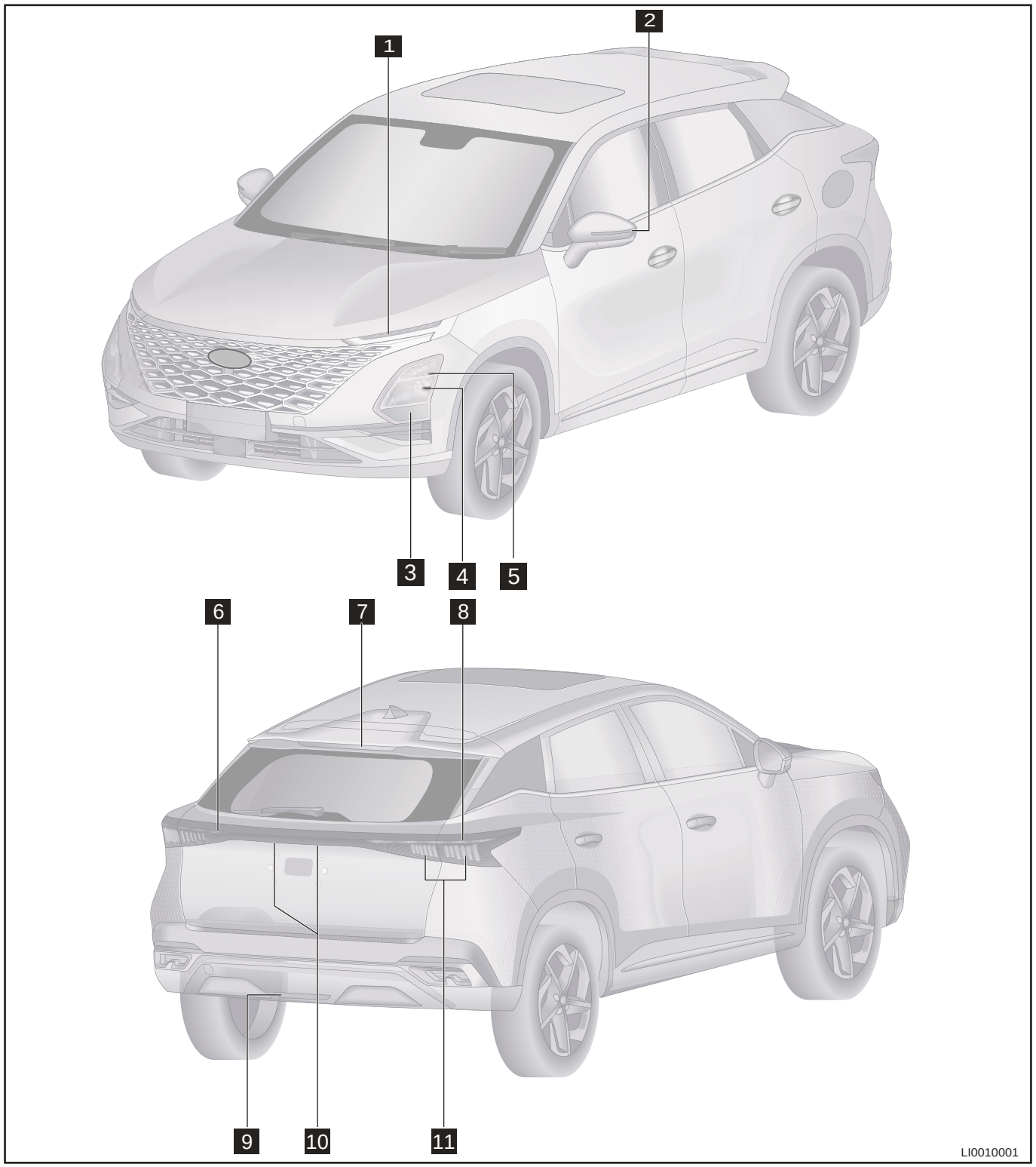
Installation

1. Installation is in the reverse order of removal.

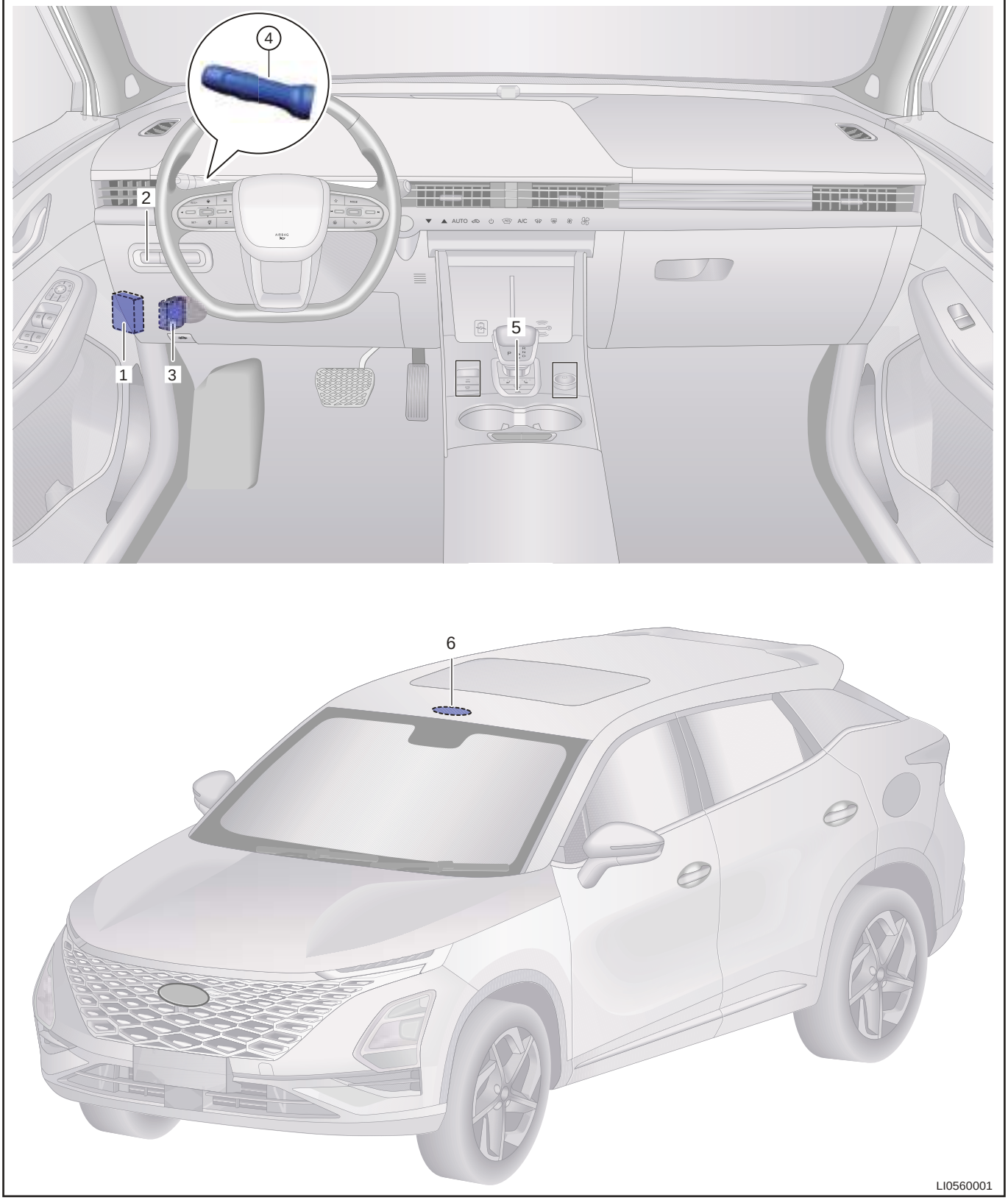
LIGHTING SYSTEM

System Overview

System Components Diagram



1	Position Light/Front Turn Signal Light/ Daytime Running Light	2	Side Turn Signal Light
3	Front Fog Light	4	Low Beam Light
5	High Beam Light	6	Back-up Light
7	High Mounted Stoplight	8	Rear Turn Signal Light
9	Rear Fog Light	10	License Plate Light
11	Stop Light/Rear Position Light		


4
2
1
3
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6
LI0560001

1	Body Control Module (BCM)	2	Headlight Leveling Switch
3	Instrument Panel Relay Box	4	Combination Switch
5	Hazard Warning Light Switch	6	Dome Light Switch

Lighting system on this model consists of vehicle lighting device and light signal device, which are used for normal operation of vehicle and ensuring safety when driving at night or in fog.Lighting system consists of headlight assembly (including headlight (high beam (auxiliary high beam)/low beam), front position light, turn signal light, daytime running light), side turn signal light, front dome light, foot light and door scuff plate light, instrument panel backlight, rear combination light assembly (including turn signal light, rear position light, brake light), rear fog light (rear fog light and reflector), back-up light, license plate light, high mounted stop light and luggage compartment light. Headlight assembly and rear combination light assembly use semi-closed structure for easy inspection and repair.

Lighting Control Principle

Turn Signal Light Function

1. Left turn signal light operating conditions: IGN ON; left turn signal light switch is activated.
2. When left turn signal light is operating: The flashing frequency of left turn signal light is 400 ms on and 400 ms off.
   - When left turn signal light is operating: Key is switched from ON to OFF, left turn signal light stops operating and meter stops flashing.
3. When left turn signal light is operating: The corresponding bulb is intact, BCM sends LHTurnLightSts (-Bcan) and the load operating frequency is the same as that of left turn signal light; If the corresponding 21W bulb is damaged, BCM will send LHTurnLightSts and the frequency will be 2 times of normal operating frequency of bulb. No matter whether the bulb is damaged or not, BCM will send DirectionIndLeft (Bcan) signal all the time.
4. Operating conditions for right turn signal light: IGN-ON; right turn signal light switch is activated.
5. When right turn signal light is operating: The load flashing frequency of right turn signal light is 400 ms on and 400 ms off.
   - When right turn signal light is operating: Key is switched from ON to OFF, right turn signal light stops operating and meter stops flashing.
6. When right turn signal light is operating: The corresponding bulb is intact, BCM sends RHTurnsignalSts and the load operating frequency is the same as that of right turn signal light; If the corresponding 21W bulb is damaged, BCM will send RHTurnsignalSts and the frequency will be 2 times of normal operating frequency of bulb. No matter whether the bulb is damaged or not, BCM will send DirectionIndRight signal all the time.
7. When left/right turn signal light is operating: Left/right turn signal light input is deactivated, left/right turn signal light should stop operating immediately.
8. When left/right turn signal light is operating: key is switched from IGN ON to ACC or OFF, and left/right turn signal light stops operating immediately.

Lane Change Function

1. Operating conditions for left lane change: IGN ON; left turn signal light switch activates shortly (50 ms ~ 1,000 ms).
2. When left lane change is operating: Left turn signal light flashes 3 times at frequency of 400 ms on and 400 ms off.
3. When left lane change is operating: The corresponding bulb is intact, BCM sends LHTurnsignalSts and load operating frequency is the same as that of left turn signal light; If the corresponding 21 W bulb is damaged, BCM will send LHTurnsignalSts and the frequency will be 2 times of that when bulb is intact. No matter whether the bulb is damaged or not, BCM will work and send DirectionIndLeft signals.

4. During left lane change operation: Left turn signal light switch is activated (50 ms ~ 1000 ms) shortly again, and left turn signal light flashes 3 times again.
5. When left lane change is operating: Left turn signal switch remains active (> 1000 ms) and automatically switches to left turn signal light operating logic.
6. When left lane change is operating: key is switched from IGN ON to ACC or OFF, and left turn signal light stops operating immediately.
7. When left lane change is operating: after flashing 3 times, left turn signal light should stop operating immediately.
8. Operating conditions for right lane change: IGN ON; right turn signal light switch activates shortly (50 ms ~ 1,000 ms).
9. When right lane change is operating: Right turn signal light flashes 3 times at frequency of 400 ms on and 400 ms off.
10. When right lane change is operating: The corresponding bulb is intact, BCM sends RHTurnsignalSts and load operating frequency is the same as that of right turn signal light; the corresponding bulb is damaged, BCM will send RHTurnsignalSts and the frequency will be 2 times as that when bulb is intact. No matter whether the bulb is damaged or not, BCM will send DirectionIndRight signal all the time.
11. During right lane change operation: Right turn signal light switch is activated (50 ms ~ 1,000 ms) shortly again, and right turn signal light flashes 3 times again.
12. When right lane change is operating: Right turn signal switch remains active (> 1,000 ms) and automatically switches to right turn signal light operating logic.
13. When right lane change is operating: key is switched from IGN ON to ACC or OFF, and right turn signal light stops operating immediately.
14. When right lane change is operating: after flashing 3 times, right turn signal light should stop operating immediately.

Hazard Warning Light Function

1. Hazard warning light function activation conditions: Hazard warning light switch is activated when hazard warning light is not activated.
2. When hazard warning light is activated: Flashing frequency of left/right turn signal light and hazard warning light indicator are 400 ms on and 400 ms off.
3. When hazard warning light is activated: The corresponding bulb is intact, BCM sends LHTurnsignalSts and RHTurnsignalSts and load operating frequency is the same as that of turn signal light; If any 21 W bulb is damaged, the flashing frequency of turn signal light CAN signal (LHTurnsignalSts and RHTurnsignalSts) and hazard warning light will be 2 times of that when bulb is intact.
4. When hazard warning light is activated: Hazard warning light switch is activated again and hazard warning light function is turned off; left/right turn signal light stops operating immediately.
5. When ABM sends a collision signal, hazard warning light function should be activated automatically (CAN signal of left/right turn signal light, indicator and turn signal light). Automatically activated hazard warning light function due to collision can be canceled as key is switched to OFF, then to ON or hazard warning light button is pressed.
6. When turn signal light function and hazard warning light function are both effective, BCM should perform the next action.

Hint:
In a ignition cycle, BCM responds to one collision signal only.

Position Light

1. Activation conditions for position light: IGN ON or ACC; position light input or low beam light input is activated.
2. When position light is operating: BCM should send ParkLightSts =1(Bcan).
3. When position light is operating: When position light input and low beam input are deactivated, position light stops operating.
4. When position light is operating: When key is switched to OFF, small light stops operating and sends ParkLightSts=0(Bcan).

Parking light

1. Activation conditions for parking light: Key is switched to OFF; position light switch is activated.
2. When parking light is activated: Position light comes on and BCM should send ParkLightSts = 1 (Bcan).
3. When parking light is activated: Position light switch is deactivated and position light is turned off, BCM should send ParkLightSts = 0 (Bcan).

Low Beam Light

1. Low beam light activation conditions: IGN ON; low beam light switch is activated.
2. When low beam light is activated: BCM sends LowBeamSts=1.
3. When low beam light is activated: When low beam light switch input is canceled, low beam light turns off immediately.
4. When low beam light is activated: When key is turned from IGN ON to ACC or OFF, low beam light turns off immediately.

Follow Me Home

1. Light is in manual mode
   a. FMH function activation condition: Flash switch is activated within 2 minutes after key is switched to OFF, and it can be activated again within 2 minutes regardless of whether FMH function is manually turned off or automatically turned off due to overtime.
   b. When FMH function is activated: Low beam light and small light are illuminated, and both LowBeamSts=1 and ParkTailLightSts=1(Bcan) and FMH time FollowMeTime are sent.
   c. When FMH function is activated: Default duration is 30 S. Activating Flash switch again for a short time will increase duration of FMH function by 30 S each time, but no more than 8 times.
   d. When FMH function is activated: Flash switch is activated for 2 seconds, FMH function will be manually turned off - low beam light and position light will turn off immediately and cumulative duration of FMH will be reset.
   e. When FMH function is activated: Key is switched to ACC or IGN ON, FMH function will be turned off - low beam light and position light will turn off immediately and cumulative duration of FMH will be reset.
   f. When FMH function is activated: FMH function will be automatically turned off after set FMH working time is reached: low beam light and position light will turn off immediately.
2. Light is in automatic mode
   a. The vehicle has fortification condition, light combination switch is in AUTO, remote controller lock button is pressed, and BCM receives valid signal sent from rain sensor, and low beam light and position light are automatically turned on for 30s.
   b. After 30 S or ignition key is switched to OFF/ON/ACC or light combination switch is switched from AUTO, low beam light and position light are turned off.

Lead me to the car

1. Light is in manual mode
   a. Activation condition for LMC function: IGN OFF; FMH is activated in this same ignition cycle (ON->ACC->OFF) and automatically turns off due to timeout; Remote control unlock signal is received; Four doors are closed.
   b. When LMC function is activated: Low beam light and small light are on and send ParkTailLightSts= 1(Bcan).
   c. When LMC function is activated: FMH function cannot be activated, low beam light and small light operate in LMC mode.
   d. When LMC function is activated: Remote control lock signal (four doors are closed) is received, LMC function is turned off - low beam light and position light are off.
   e. When LMC function is activated: Any door is opened, LMC function is turned off - low beam light and small light are off.
   f. When LMC function is activated: Any key is switched to ACC or IGN ON, LMC function is turned off - low beam light and position light are off.

g. When LMC function is activated: After receiving remote control unlock signal, LMC function delays 60 s (subject to remote control unlock time received)
h. When LMC function is activated: Longest duration is 60 s, LMC function will turn off automatically after overtime.

2. Light is in automatic mode
   a. The key is in OFF, light combination switch is in AUTO, remote controller unlock button is pressed, and BCM receives valid signal sent from rain sensor, and low beam light and position light turn on for 30 seconds.
   b. After 30 seconds or ignition key is switched to ACC, low beam light and position light are turned off.
   c. When "Lead me to the car" function is activated, if the activation conditions are met again or "Follow me home" function is activated, it counts for 30 seconds again and the light will not flash.

Automatic Lighting

1. Low beam light and position light turn on if the following conditions are met.
   a. IGN=ON
   b. Light switch is switched to AUTO
   c. LIN valid signal sent from rain sensor is received
2. After automatic lighting is activated, BCM sends low beam light and position light CAN signal to the instrument panel.
3. Low beam lights go out if any condition is met
   a. IGN≠ON
   b. Light switch is switched away from AUTO
   c. Rain sensor LIN signal is invalid
4. Position lights go out if any condition is met.
   a. IGN=ON
   b. After light switch is switched away from AUTO for 2 seconds
   c. After rain sensor LIN signal becomes invalid for 5 seconds

High Beam Light

1. High beam light operating conditions: IGN ON; low beam lights are in activating status, high beam light switch is activated.
2. When high beam light is operating: High beam lights come on and send HighBeamSts=1.
3. When high beam light is operating: When vehicle cranks, high beam lights temporarily stop operating but CAN data will be sent continuously and resume operation after cranking.
4. When high beam light is operating: When high beam light switch is deactivated, high beam light turns off.
5. When high beam light is operating: When low beam light switch is deactivated, high beam light turns off.
6. When high beam light is operating: When key is turned from IGN ON to ACC or OFF, high beam light turns off.

Flash Function

1. Flash operating conditions: IGN-ON; Flash switch is activated.
2. When Flash is operating: High beam lights come on and send HighBeamSts=1.
3. When Flash is operating: When vehicle cranks, high beam lights temporarily stop operating, but CAN data will be sent continuously, and resume operation after cranking.
4. When Flash is operating: When Flash switch is deactivated, high beam lights turn off.
5. When Flash is operating: key is switched from IGN ON to ACC or OFF, high beam lights turn off.

Rear Fog Light Control

1. Operating conditions for rear fog light: IGN-ON; Front fog light or low beam lights are activated; Rear fog light switch is activated.
2. When rear fog light is operating: Rear fog light comes on and send RearFogLightSts=1.

3. When rear fog light is operating: When rear fog light switch is activated again, rear fog light turns off.
4. When rear fog light is operating: key is switched from IGN ON to ACC or OFF, rear fog light is turned off.
5. When rear fog light is operating: When low beam light or front fog light load is turned off, rear fog lights turn off at the same time.

Daytime Running Light

1. Daytime running light operating conditions: Engine starts; low and high beam lights and front fog lights are not activated.
2. When daytime running light is operating: When engine is stopped, daytime running light function turns off.
3. When daytime running light is operating: The activation of position light, low beam light and front fog light will cause daytime running lights to be turned off.
4. When daytime running light is operating: Flash function does not affect daytime running light operation.

Battery Save

1. Battery save function remains active during IGN ON or IGN ACC.
2. Battery save function remains active without other wake-up sources within 15 minutes after IGN OFF.
3. Within 15 minutes of battery save timing after key is switched to OFF: Opening any door or luggage compartment door, receiving remote unlock signal, inserting and removing key will reset timing to 15 minutes.

   Hint:
   Battery save load includes: Key light, dome light and luggage compartment light.
4. BCM enters sleeping mode after 3 minutes when fortifying is successful.

   Hint:
   Battery Save can be woken up by central control unlock or mechanical unlock after Battery Save is turned off.

Dome Light

1. Key insertion and removal, dome light and key light control:
   a. When key is removed, BCM turns on dome light and key light for 3 minutes (fades in and fades out).
   b. Within 3 minutes of dome light operation: Key insertion does not affect the operation timing of dome light and key light.
   c. Within 3 minutes of dome light operation: When the key is turned to IGN ON, dome light and key light will fade out immediately.
   d. Within 3 minutes of dome light operation: If all doors are closed after any door is opened, dome light and key light continue to work for 8 seconds, and then fade out.
2. Door status, dome light and key light control:
   a. If any of doors is opened and remains open, dome light comes on for 3 minutes (fades in and fades out).
   b. Within 3 minutes of dome light operation: If another door is opened while one door remains open, dome light timing reset - continues to come on for 3 minutes, and then fades out.
   c. Within 3 minutes of dome light operation: When key is turned to ON, all doors are closed, dome light will fade out immediately.
   d. Within 3 minutes of dome light operation: When the key is turned to OFF or ACC and all doors are closed, dome light will fade out after 8 s; if the key is turned to IG ON within 8 s, dome light will fade out immediately.
3. Remote control key, dome light and key light control:
   a. When BCM receives unlock signal from remote controller: No matter what status the door is in, dome light comes on for 15 seconds (fades in and fades out).
   b. Within 15 seconds of dome light operation: When the key is turned to ING ON, the dome light will fade out immediately.

   c. Within 15 s of dome light operation: When RF is fortified successful, dome light will come off immediately.
   d. Within 15 s of dome light operation: When any door is opened, dome light enters into mode 2.
4. Collision signal, dome light and key light control:
   a. With IGN-ON, regardless of door status, if the received collision output is a valid CAN signal sent by airbag controller, BCM will illuminate dome light for 30 minutes. There is no fade-in process, including fade-out process.
   b. Within 30 minutes of dome light illumination: If key is switched to OFF, dome light will fade out immediately.
   c. Within 30 minutes of dome light illumination: If BCM receives RF key lock signal, dome light turns off immediately and there is no fade-out process.

⚠ Warning

- Please turn rear dome light switch to door control gear to test above function logic.
- In any of above conditions (key insertion and removal, door status, remote control key) triggers dome light to come on, another event is triggered again, and dome light illumination time is reset.

3rd Row Dome Light

1. 3rd row dome light operating conditions: Luggage compartment is opened and luggage compartment light continuously turns on for 15 minutes.
2. 3rd row dome light is operating: Luggage compartment is closed and luggage compartment light turns off immediately.

Back-up Light Control

1. Operating conditions for back-up light: IGN=ON.
2. When receiving reverse switch signal or CAN signal sent from TCU, BCM turns on backup light.
3. If there is no switch signal and CAN signal, it will turn off back-up light.

Sudden Braking Hazard Warning Light Alarm Function

1. If the following conditions are met, hazard warning light is activated (left/right turn signal light, indicator light and turn signal light flash):
   a. The key position is in ON position.
   b. CAN signal sent from ESP is received (a signal that requires the light to flash).
2. If any of following conditions is met, stop the hazard warning light (left/right turn signal light, indicator light and turn signal light CAN signal) flashes:
   a. CAN signal sent from ESP is received (a signal that requires the light to stop flashing);
   b. Key position is in OFF position.

⚠ Warning

- When hazard warning light of this function is operating, operate hazard warning light switch, this function stops immediately.
- During this operation, BCM receives collision signal and function stops immediately.

Assist Steering Illumination

1. When following conditions are met for starting of fog light auxiliary lighting function:
   a. IGN=ON
   b. Turn signal light turns on or steering column is turned by more than 45° (corresponding CAN signal is SteeringAngle)
   c. Low beam light is turned on
   d. Vehicle speed is lower than 40 km/h

2. Fog light auxiliary lighting function will be turned off when any of the following conditions is met:
   a. IGN=ACC or OFF
   b. Turn signal light turns off and steering column is turned by less than 10° (corresponding CAN signal is SteeringAngle)
   c. Low beam light is turned on
   d. Vehicle speed is more than 40km/h
3. When fog light auxiliary light is activated, meter indicator is not activated.
4. This function can be configured on line.

Brake Light Control

1. When any of following conditions is met, turn on the brake light function:
   a. When brake switch is pressed, brake switch is a high level self-locking switch.
   b. CAN signal sent from EPB is received (a signal that requires the light to turn on).
   c. CAN signal sent from ESP is received (a signal that required the light to turn on).
2. When brake light function is turned on, left and right brake lights and high mounted stop light turn on at the same time.
3. When all the above conditions are not met, left and right brake lights and high mounted stop light will turn off simultaneously.

LIN Ambient Light

1. Initial status
   a. After vehicle is off-line and powered on for the first time or battery is powered on again after battery is disconnected from vehicle, ambient light function is set to ON by default, after that, system turns on/off according to DVD settings
2. Ambient light turns on / off
   a. When all the following conditions are met, BCM sends LIN signal TheaterDimmingRequest=01 (ON) (Ambient light turns on). The position light output is in activated condition.
   b. DVD setting is turned on
   c. Position light output is deactivated or DVD setting is OFF, ambient light turns off.
3. Door control logic related to ambient light
   a. When all following conditions are met, BCM sends LIN signal TheaterDimmingRequest=01 (ON) (-ambient light ON)
   b. Position light output is deactivated
   c. Vehicle is in fortifying deactivation mode
   d. Any door is open
   e. DVD setting is turned on
4. Ambient light is opened and continues 3 minutes.
5. Close all doors within 3 minutes after ambient light comes on, and the light turns off after 8 seconds delay
6. Open any other door within 3 minutes after ambient light comes on, and then count again for 3 minutes after last door is opened.
7. With position light output is not activated, if one of following conditions is met, BCM sends LIN signal TheaterDimmingRequest=00 (OFF) immediately (ambient light turns off)
   a. Vehicle enters fortifying mode successfully
   b. DVD setting is turned off
8. Ambient light color
   a. Initial status
   b. After the vehicle is powered on first time after leaving production line or powered on after battery is disconnected and reconnected from vehicle, the related driving mode is OFF by default. Then turn on/off according to DVD settings.

c. When the related driving mode is OFF: Ambient light colour is blue by default, then choose different colour according to DVD settings.
d. When related driving mode is turned on
e. In ECO mode, ambient light is green
f. In Sport mode, ambient light is red
g. In normal mode, ambient light is blue

9. Ambient light brightness (musical rhythm)
   a. Initial status
   b. When vehicle rolls from the line and powered on for the first time or vehicle battery is powered on again after disconnection, musical rhythm mode default is off.
   c. When musical rhythm mode is off: Ambient light brightness is Level 3, and different levels can be selected according to DVD setting.
   d. When musical rhythm mode is on: According to different brightness level signals sent from IHU, it changes levels from zero with the musical rhythm

Intelligent Headlight

Function Description

1. The main function of intelligent headlight control system is the intelligent low/high beam switching. The system can request high beam ON/OFF according to the traffic and environmental factors. If there are no relevant traffic participants in front, the system will activate high beam; With system activated, if there is a meeting or following vehicle or street lighting, high beam will be turned off.

Control principle

1. After IGN ON, system switch is turned to ON, and headlight is in AUTO, camera will detect vehicle status, surrounding environment and road condition in front. If IHC opening conditions are met, system will request high beam to be turned ON; When followings, oncomings or vehicles related environment (including the existence of multiple street lights, if external environment brightness is higher than the threshold, etc.) do not meet the IHC open conditions, system will request high beam to be turned off, once the system ON conditions resume, system will follow a certain delay mechanism and send high beam request without interfering with other traffic participants (ECE48 defined vehicles driving in opposite or same directions, ECE50 defined motorbikes driving in opposite or same directions, electric motorcars with light as well as bicycles with light driving in same direction, light size must be more than 150*150 mm and light intensity is greater than 30 cd). The request of low/high beam switching is transmitted to BCM from multi-function front camera via CAN signal, and driver can change lighting state at any time using light rod.

System operating precondition

1. IGN ON
2. Headlight switch is in AUTO
3. Low beam light turns on automatically
4. BCM judges that all the above conditions are met, then BCM sends corresponding system switch requests according to functional logic. If any condition is not met, it will send HWASW = 0 continuously and system cancels activation requests

High Beam Light Request Condition

1. IHC function is activated
2. Vehicle speed $\geqslant$ 40 km/h
3. Ambient light $<$ 6 lux
4. There is no related light source ahead
5. If all the above high beam light ON conditions are met and related suppression conditions are not met, the system requests high beam light to be turned on

Minimum ON Time of High Beam Light

1. To avoid frequent switching between low beam and high beam, it is recommended to follow the following delay strategy when turning on high beam light

If following several traffic conditions are detected, the system will request to use high beam light. After the relevant traffic participants leave the corresponding conditions, there will be a delay in the corresponding light state switching, refer to table below for details.

Low Beam Light Operation Condition			High Beam Light Switching Request Condition	Delay Time
Operating Condition		Operation condition range		
Driving in same direction	Overtaking	< 50 m	The vehicle in front is detected within 50 m of your vehicle and overtook by your vehicle (regardless of left or right);	4 s
	Following	< 50 m	The vehicle in front is detected within 50 m of your vehicle and then disappears;	2 s
	Following	50 - 200 m	The vehicle in front is detected within 50 - 200 m of your vehicle and then disappears;	3 s
	There is a vehicle in front	> 200 m	The vehicle in front is detected within 200 m of your vehicle and then disappears;	2 s
Driving in opposite direction	Meeting	< 50 m	The vehicle in front is detected within 50 m of your vehicle and meets with your vehicle on the left;	0.5 s
	Driving in opposite direction	50 - 200 m	The vehicle in front is detected within 50 - 200 m of your vehicle and then disappears;	2 s
	There is a vehicle in front	> 200 m	The vehicle in front is detected within 200 m of your vehicle and then disappears;	2 s

High Beam OFF Request

1. With system turned off, system will send 0x0 signal by default and request high beam light to be turned off.
2. The system will request high beam light to be turned off if following faults occur in multi-function front camera:
   a. Permanent system hardware failure
   b. Temporary system hardware failure
   c. Permanent lighting failure (lighting failure time is more than 45 minutes)
   d. Temporary lighting failure
   e. Overheating protection
   f. Overvoltage
   g. Hot restart
   h. Communication fault
   i. Signal fault
3. The system will request high beam light to be turned off when multi-function front camera detects the following auto-glare status
   a. Heavy fog weather
   b. Fog light is activated
   c. Wiper running speed achieves second level (continue fast signal) or above
4. Road lighting
   a. If three or more street lights (including tunnels) are detected, the system will request high beam light to be turned off. Reflectors on the side of highway are not allowed to be misidentified as lighting sources
5. Ambient brightness
   a. If ambient brightness is too high (ambient light > 12 lux, which is directly obtained from the camera), the system will request high beam light to be turned off.
6. Vehicle speed
   a. The system will request high beam light to be turned off when vehicle speed is lower than 30 km/h (adjustable).
7. Traffic condition
   a. If a traffic participant is detected in front of your vehicle, the system will request high beam light to be turned off.
   b. Signs on the road are not allowed to be misidentified as vehicles driving in opposite or same direction.
8. Other descriptions
   a. Auto position: System status light is allowed to be turned on only when system is in Auto position and low beam light ON conditions are met
   b. Low beam light status: In Auto position, the system is allowed to be turned on after low beam light comes on automatically
   c. High beam OFF request: System can request high beam light to be turned off when any of high beam OFF request condition is met
   d. High priority light changing suppression: System does not change the light distribution request of the vehicle's current state under high priority light suppression conditions
   e. Low priority light changing suppression: System will maintain the light distribution request of the vehicle's current state under low priority light suppression condition. At this time, if the system is in low beam light state and the conditions of high beam light are met, it is not allowed to switch to the high beam light state; If the system is in high beam light state and the conditions of low beam light are met, it is allowed to switch to low beam light state.
   f. High beam request: Under the function activation condition, the system will request high beam to be turned on if all low beam requests and suppression conditions are not met.
   g. Priority mechanism: Driver can change light distribution using headlight lever at any time.

h. HC function switch: Multi-function front camera memorizes the IHC function audio setting items. After the next power on, the last memorized switch state will be sent.

Diagnosis & Testing

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.
Rear combination light fixed part consists of 2 brake light bulbs and 2 position light bulbs. If one damaged bulb and the other does not come on, you need to check the two bulbs simultaneously and contact CHERY service station to check and repair if necessary.

Symptom	Suspected Area
Low beam light does not come on (one side)	Fuse
	Headlight bulb
	Wire harness or connector
Low beam lights do not come on (both sides)	Fuse
	Headlight bulb
	Combination light switch assembly
	Low beam relay
	Wire harness or connector
	Body Control Module (BCM)
High beam light does not come on (one side)	Fuse
	Headlight bulb
	Wire harness or connector
High beam light does not come on (both sides)	Fuse
	Headlight bulb
	Combination light switch assembly
	High beam relay
	Wire harness and connector
	Body Control Module (BCM)
Position light does not come on (one side)	Position light bulb
	Wire harness or connector
Position lights do not come on (both sides)	Position light bulbs (all)
	Wire harness or connector
	Combination light switch assembly
	Body Control Module (BCM)

Daytime Running Light

Symptom	Suspected Area
Daytime running light does not come on	Daytime running light bulb
	Wire harness or connector
	Body Control Module (BCM)

Rear fog light

Symptom	Suspected Area
Rear fog light does not come on	Rear fog light bulb
	Combination light switch
	Wire harness or connector
	Body Control Module (BCM)

Turn Signal Light and Hazard Warning Light

Symptom	Suspected Area
Hazard warning light and turn signal light do not come on	Bulb
	Combination light switch
	Wire harness or connector
	Body Control Module (BCM)
	Hazard warning light switch
Hazard warning light does not come on (hazard warning light is normal)	Hazard warning light switch
	Wire harness or connector
	Body Control Module (BCM)
Turn signal light does not come on (hazard warning light is normal)	Combination light switch
	Wire harness or connector
	Body Control Module (BCM)

License Plate Light

Symptom	Suspected Area
License plate light does not come on	License plate light bulb
	Combination light switch assembly
	Wire harness or connector
	Body Control Module (BCM)

Luggage Compartment Light

Symptom	Suspected Area
Luggage compartment light does not come on	Luggage compartment light bulb
	Luggage compartment lock assembly
	Wire harness or connector
	Body Control Module (BCM)

Brake light

Symptom	Suspected Area
Brake lights do not come on (all)	Fuse
	Brake light bulbs (all)
	Brake light switch
	Wire harness connector
	Body Control Module (BCM)
Only one brake light does not come on	Brake light bulb
	Wire harness or connector

Front Dome Light

Symptom	Suspected Area
Front dome light does not come on	Front dome light bulb
	Wire harness or connector
	Front dome light assembly
	Body Control Module (BCM)

Back-up light

Symptom	Suspected Area
Back-up lights do not come on (all)	Transmission Control Unit (TCU)
	Back-up light bulb
	Back-up light switch (MT)
	Body Control Module (BCM)
	Wire harness or connector
	Gear switch

Diagnostic Help

1. Connect diagnostic tester X-431 3G (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.

3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all CD system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1001-11	Left Side Turn Lamp Control Circuit-Circuit Short to Ground	/	• Bulb damaged • Turn signal light switch • Wire harness or connector damaged • BCM	/
B1001-13	Left Side Turn Lamp Control Circuit-Circuit Open	/		/

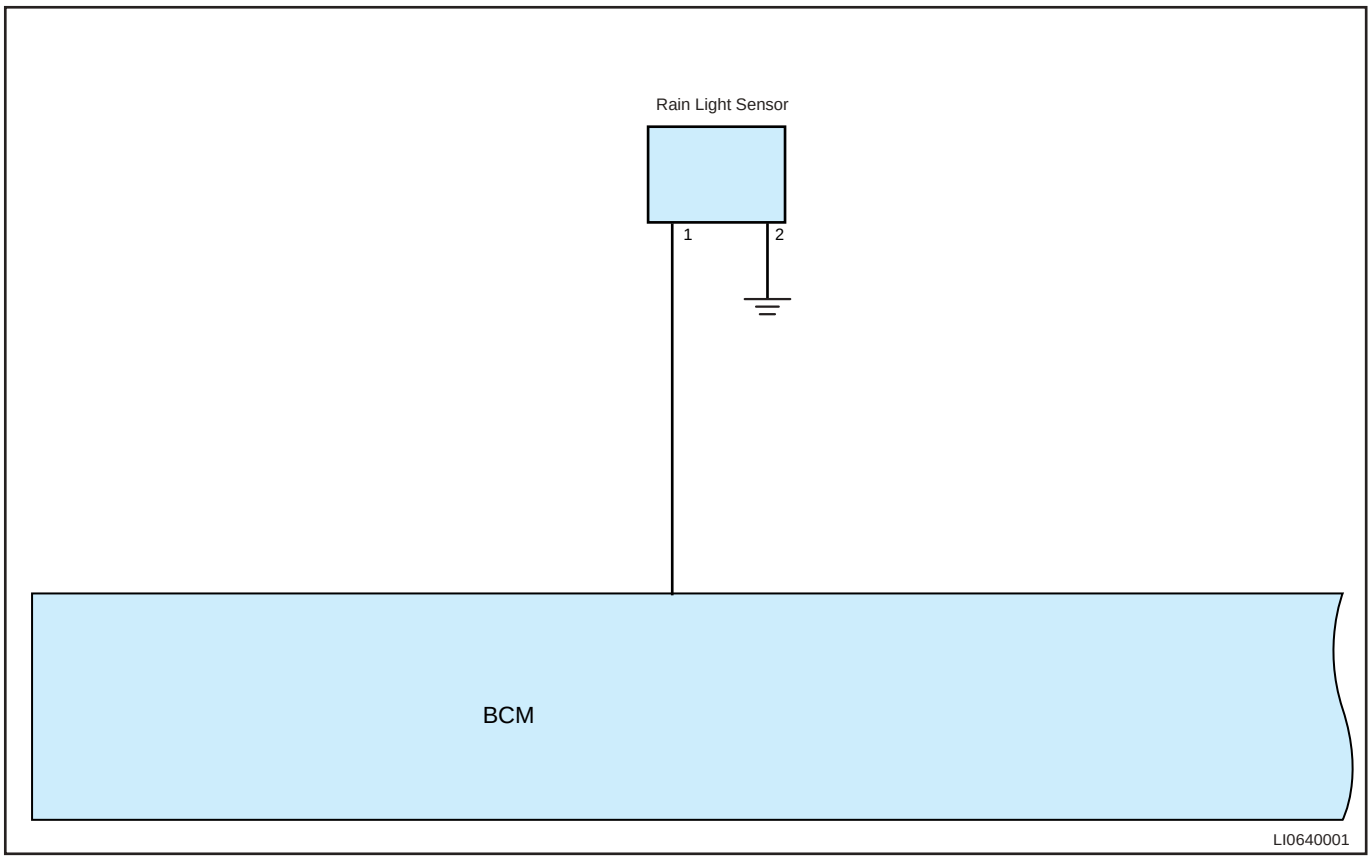
DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1002-11	Right Side Turn Lamp Control Circuit-Circuit Short to Ground	/	• Bulb damaged • Turn signal light switch • Wire harness or connector damaged • BCM	/
B1002-13	Right Side Turn Lamp Control Circuit-Circuit Open	/		/
B1005-11	Front Park Light Output Control Circuit-Circuit Short to Ground	/	• Wire harness or connector damaged • Bulb damaged • Position light switch • BCM	/
B1005-13	Front Park Light Output Control Circuit-Circuit Open	/		/
B1006-11	Rear Park Light Output Control Circuit-Circuit Short to Ground	/	• Wire harness or connector damaged • Bulb damaged • Position light switch • BCM	/
B1006-13	Rear Park Light Output Control Circuit-Circuit Open	/		/
B1008-11	Rear Fog Control Circuit-Circuit Short to Ground	/	• Wire harness or connector damaged • Damaged rear fog light • BCM	/
B1008-13	Rear Fog Control Circuit-Circuit Open	/		/
B1008-71	Rear Fog Control Circuit-Actuator Stuck	/		/
B101E-11	L-DRL Control Circuit-Circuit Short to Ground	/	• Wire harness or connector damaged • Daytime running light damaged • BCM	/
B101E-13	L-DRL Control Circuit-Circuit Open	/		/
B101F-11	R-DRL Control Circuit-Circuit Short to Ground	/		/
B101F-13	R-DRL Control Circuit-Circuit Open	/		/

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1035-11	Brake Light Control Circuit-Circuit Short to Ground	/	• Wire harness or connector damaged • Brake light damaged • Brake light switch damaged • Fuse • BCM	/
B1035-13	Brake Light Control Circuit-Circuit Open	/		/
B1036-11	H-Brake Light Control Circuit-Circuit Short to Ground	/		/
B1036-13	H-Brake Light Control Circuit-Circuit Open	/		/
B1039-11	NTC Output Circuit / Reversing Lamp Control Circuit-Circuit Short to Ground	/	• Wire harness or connector damaged • Back-up light damaged • BCM	/
B1039-13	NTC Output Circuit / Reversing Lamp Control Circuit-Circuit Open	/		/
B1047-62	Optical Rain Sensor Signal Compare Failure	/	• Module failure	/
B1027-11	Battery Save Control Circuit	/	• Module failure	/

DTC Diagnosis Procedure

DTC	B1047-62	Optical Rain Sensor Signal Compare Failure

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check optical rain sensor**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Replace the original optical rain sensor with a new one for running test.

OK → **Replace optical rain sensor**

NG

2	**Check for open or short in wire harness**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect optical rain sensor connector and body control module connector.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

(g) Using ohm band of digital multimeter, check for continuity between optical rain sensor (1) and BCM to check circuit for open.

Multimeter Connection	Condition	Specified Condition
Optical rain sensor (1) - Body control module (to terminal)	Always	⩽ 1 Ω

Use circuit diagram as a guide to perform the following inspection procedures:

(h) Using ohm band of digital multimeter, check for continuity between optical rain sensor (2) and body ground.

Multimeter Connection	Condition	Specified Condition
Optical rain sensor (2) - Body ground	Always	⩽ 1 Ω

NG → **Replace wire harness**

OK

3	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace body control module**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1027-11	Battery Save Control Circuit

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTCs occur again.

NG → **Turn off vehicle power supply (- disconnect the negative battery cable), then clear DTC**

OK

2	**Reconfirm DTCs**

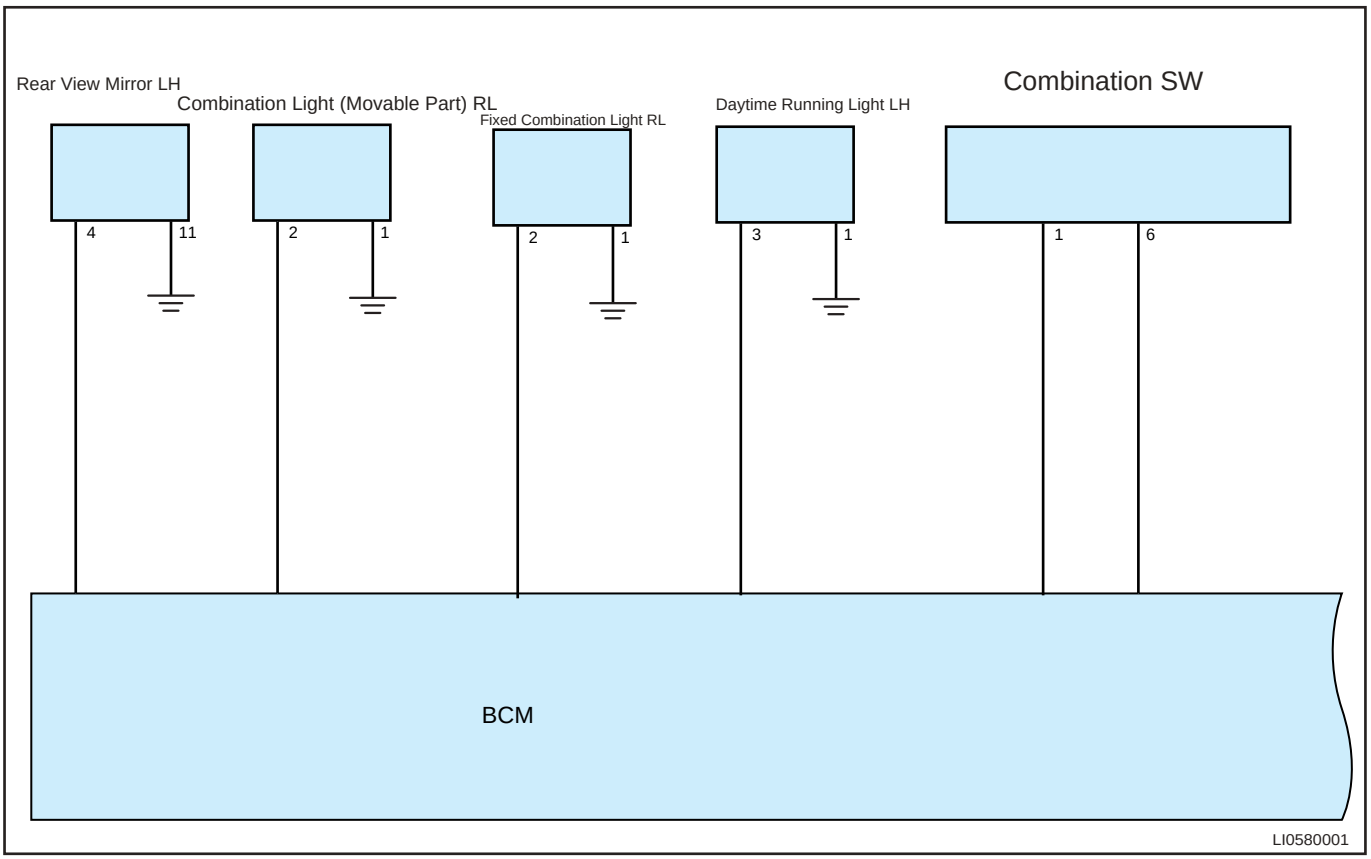
Use circuit diagram as a guide to perform the following inspection procedures:
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace body control module**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1001-11**	**Left Side Turn Lamp Control Circuit-Circuit Short to Ground**
DTC	**B1001-13**	**Left Side Turn Lamp Control Circuit-Circuit Open**

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check left turn signal light bulb**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn off all electrical equipment and ENGINE START STOP switch.

(b) Disconnect the negative battery cable.

(c) Remove the left turn signal light bulb, and check if left turn signal light bulb filament is blown.

NG → **Replace left turn signal light bulb**

-

OK

2	**Using diagnostic tester to perform active test**

(a) Turn ENGINE START STOP switch to ON.
(b) Connect the diagnostic tester, perform active test for left turn signal light.

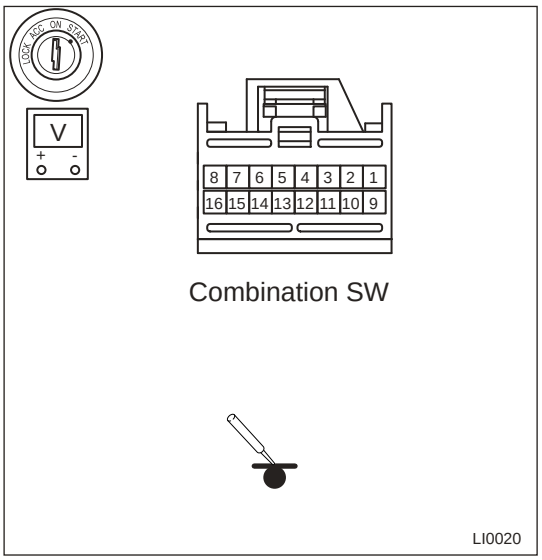
NG → **Check actuator circuit wire harness**

OK

3	**Check left turn signal light control circuit**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the light switch connector.
(d) Connect the negative battery cable.
(e) Turn ENGINE START STOP switch to ON.
(f) Using a digital multimeter, measure voltage between light switch connector and body ground according to table below.

Multimeter Connection	Condition	Specified Condition
Light switch (6) - Body ground	Always	Not less than 12 V



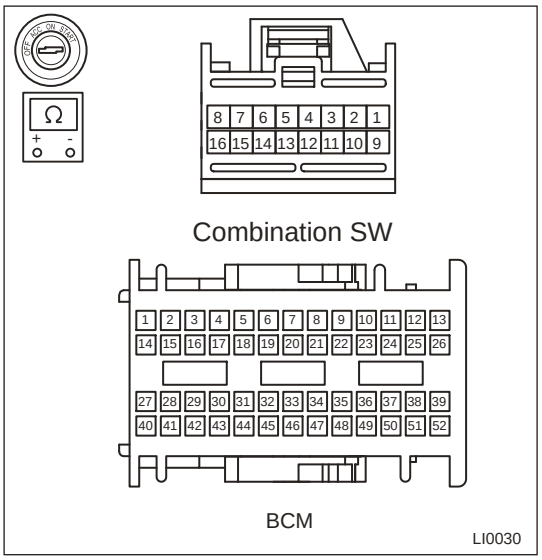
NG → **Repair or replace faulty wire harness**

OK

4	**Check combination switch control circuit**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the body control module connector.
(d) Disconnect the light switch connector.
(e) Using a digital multimeter, measure if resistance between light switch connector and BCM is normal according to table below.

Multimeter Connection	Condition	Specified Condition
Light switch (1) - BCM (- corresponding terminal)	Always	⩽ 1 Ω



NG → **Repair or replace faulty wire harness**

OK

5	Check combination switch

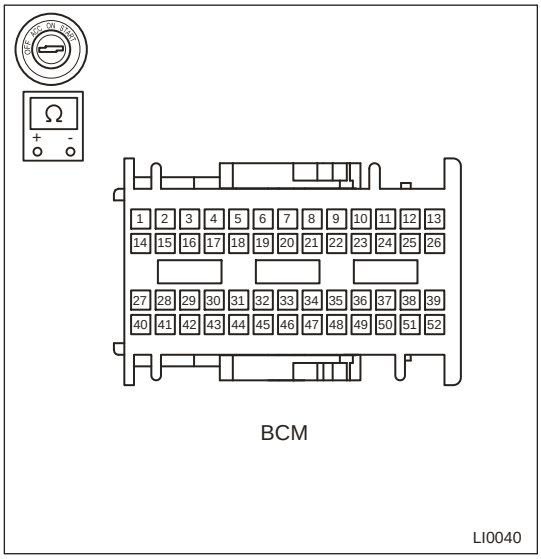
(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect the body control module connector.

(d) Using a digital multimeter, measure if resistance between BCM connectors is normal when turning on left turn signal light according to table below.

Multimeter Connection	Condition	Specified Condition
BCM (- combination light switch) - BCM (- analog ground)	Always	1000 Ω



NG → **Replace combination switch**

OK

6	Check left turn signal light output circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

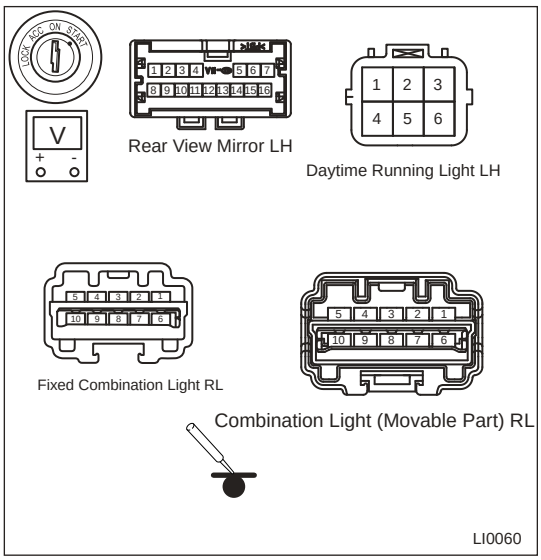
(c) Disconnect the left turn signal light connector.

(d) Connect the negative battery cable.

(e) Turn ENGINE START STOP switch to ON.

(f) Using a digital multimeter, measure voltage between left turn signal light connector and body ground according to table below.

Multimeter Connection	Condition	Specified Condition
Left rear view mirror (4) - Body ground	Always	Not less than 12 V
Movable part of rear left combination light (2) - Body ground		
Fixed part of rear left combination light (2) - Body ground		



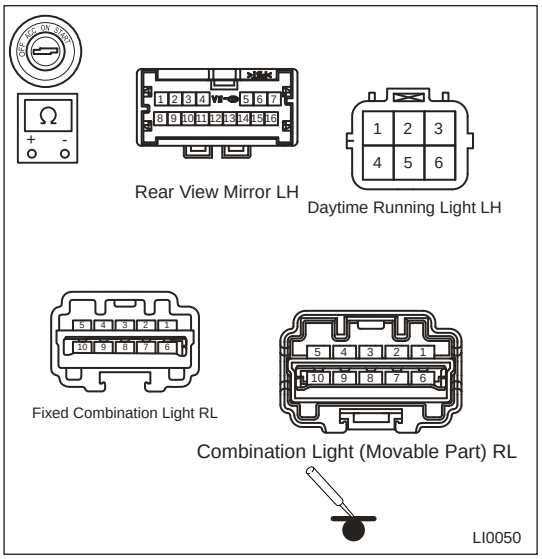
Multimeter Connection	Condition	Specified Condition
Left daytime running light (3) - Body ground		

NG → **Repair or replace faulty wire harness**

OK

7	Check output circuit ground for continuity

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the left turn signal light connector.
(d) Using a digital multimeter, check for continuity between left turn signal light connector and body ground according to table below.



Multimeter Connection	Condition	Specified Condition
Left rear view mirror (11) - Body ground	Always	⩽ 1 Ω
Movable part of rear left combination light (1) - Body ground		
Fixed part of rear left combination light (1) - Body ground		
Left daytime running light (1) - Body ground		

NG → **Repair or replace faulty wire harness**

OK

8	Reconfirm DTCs

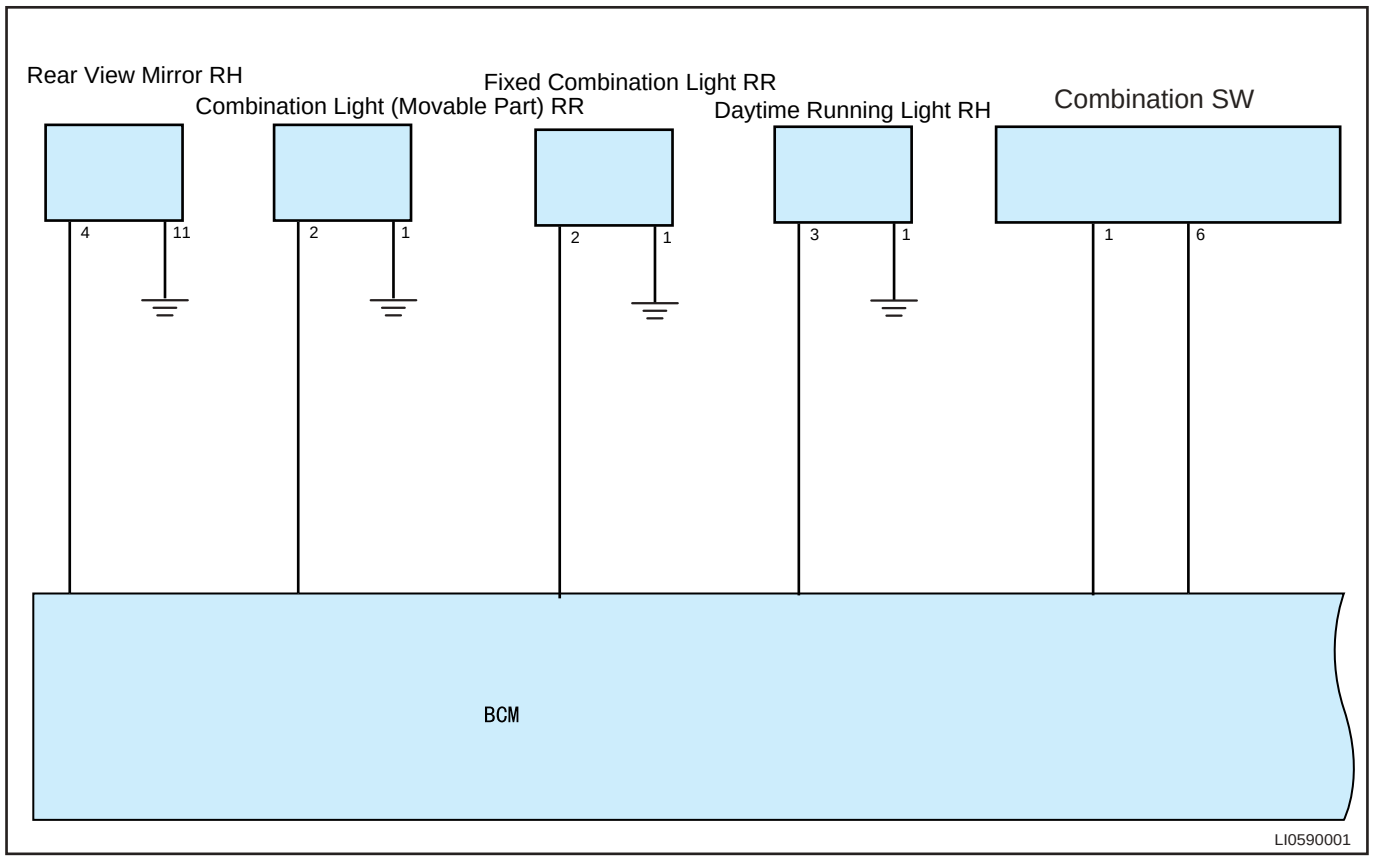
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace body control module**

OK	**Conduct test and confirm malfunction has been repaired.**

DTC	**B1002-11**	**Right Side Turn Lamp Control Circuit-Circuit Short to Ground**
DTC	**B1002-13**	**Right Side Turn Lamp Control Circuit-Circuit Open**

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check right turn signal light bulb**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn off all electrical equipment and ENGINE START STOP switch.

(b) Disconnect the negative battery cable.

(c) Remove right turn signal light bulb, and check if right turn signal light bulb filament is blown.

NG → **Replace right turn signal light bulb**

OK

2	**Using diagnostic tester to perform active test**

(a) Turn ENGINE START STOP switch to ON.

(b) Connect the diagnostic tester, perform active test for right turn signal light.

NG → **Check actuator circuit wire harness**

OK

3	**Check control circuit output voltage**

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

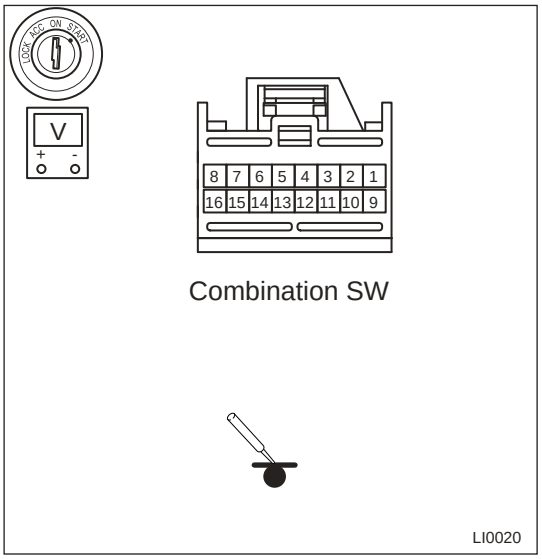
(c) Disconnect the light switch connector.

(d) Connect the negative battery cable.

(e) Turn ENGINE START STOP switch to ON.

(f) Using a digital multimeter, measure voltage between light switch connector and body ground according to table below.

Multimeter Connection	Condition	Specified Condition
Light switch (6) - Body ground	Always	Not less than 12 V



NG → **Repair or replace faulty wire harness**

OK

4	**Check combination switch control circuit**

(a) Turn ENGINE START STOP switch to OFF.

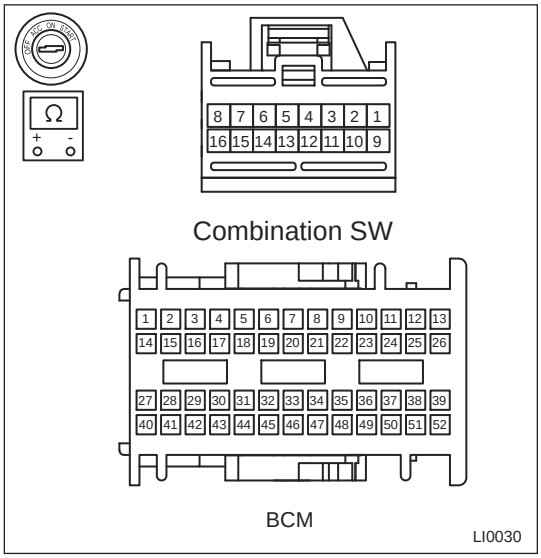
(b) Disconnect the negative battery cable.

(c) Disconnect the body control module connector.

(d) Disconnect the light switch connector.

(e) Using a digital multimeter, measure if resistance between light switch and BCM is normal according to table below.

Multimeter Connection	Condition	Specified Condition
Light switch (1) - BCM (- corresponding terminal)	Always	⩽ 1 Ω



NG → **Repair or replace faulty wire harness**

OK

5	Check combination switch

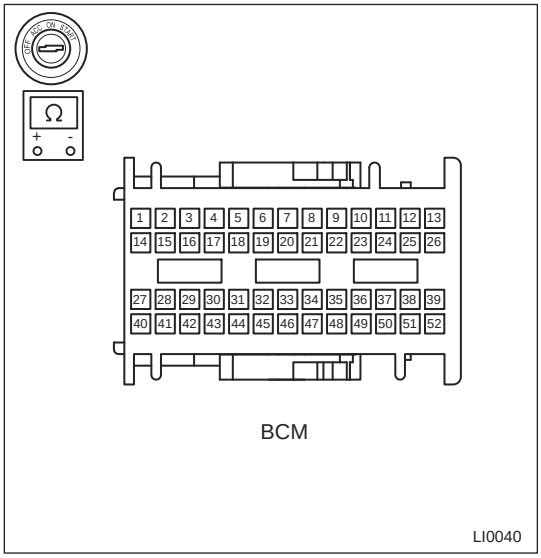
(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect the body control module connector.

(d) Using a digital multimeter, measure if resistance between connector BCM terminals is normal when turning on right turn signal light according to table below.

Multimeter Connection	Condition	Specified Condition
BCM (turn signal light switch) - BCM (analog ground)	Always	3000 Ω

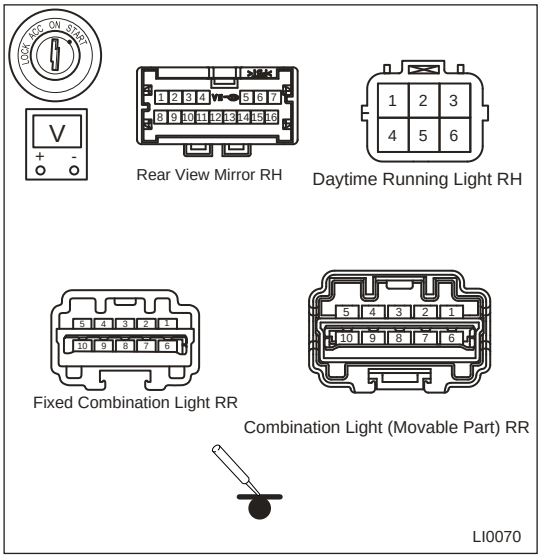


NG → **Replace combination switch**

OK

6	Check right turn signal light output circuit

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the right turn signal light connector.
(d) Connect the negative battery cable.
(e) Turn ENGINE START STOP switch to ON.
(f) Using a digital multimeter, measure voltage between right turn signal light connector and body ground according to table below.



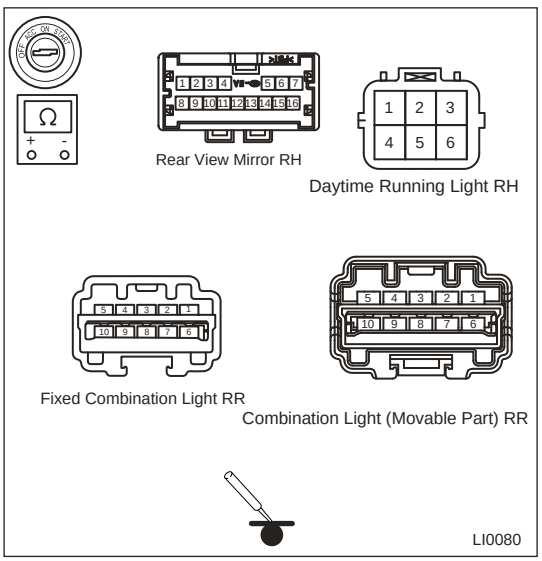
Multimeter Connection	Condition	Specified Condition
Right rear view mirror (4) - Body ground	Always	Not less than 12 V
Movable part of rear right combination light (2) - Body ground		
Fixed part of rear right combination light (2) - Body ground		
Right daytime running light (3) - Body ground		

NG → **Repair or replace faulty wire harness**

OK →

7	**Check output circuit ground for continuity**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the right turn signal light connector.
(d) Using a digital multimeter, check for continuity between right turn signal light connector and body ground according to table below.



Multimeter Connection	Condition	Specified Condition
Right rear view mirror (11) - Body ground	Always	⩽ 1 Ω
Movable part of rear right combination light (1) - Body ground		

Multimeter Connection	Condition	Specified Condition
Fixed part of rear right combination light (1) - Body ground		
Right daytime running light (1) - Body ground		

NG → **Repair or replace faulty wire harness**

OK

8	**Reconfirm DTCs**

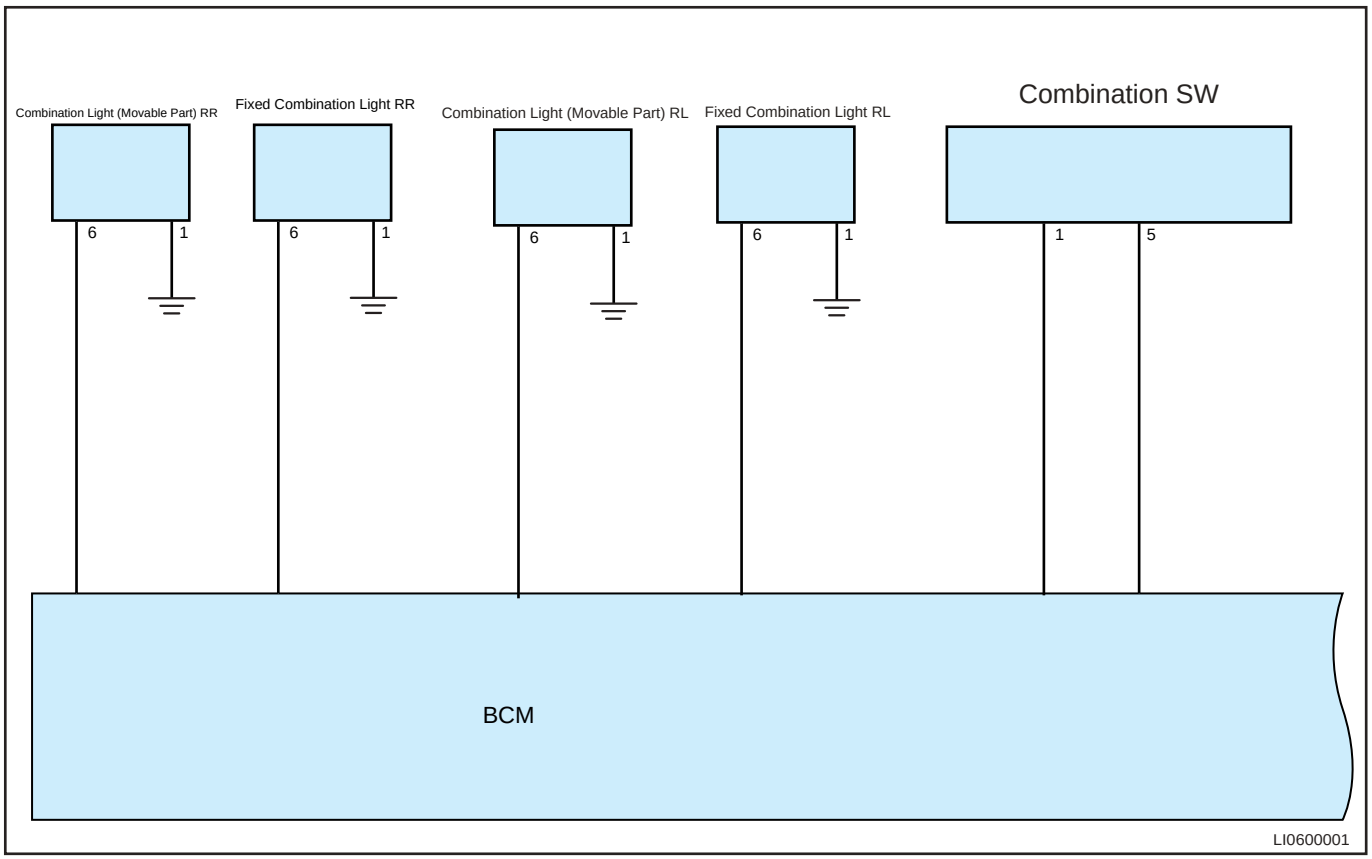
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace body control module**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1006-11	Rear Park Light Output Control Circuit-Circuit Short to Ground
DTC	B1006-13	Rear Park Light Output Control Circuit-Circuit Open

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check front position light bulb**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Turn off all electrical equipment and ENGINE START STOP switch.
(b) Disconnect the negative battery cable.
(c) Remove the rear position light bulb, and check if rear position light bulb is blown.

NG → **Replace rear position light bulb**

OK

2	**Using diagnostic tester to perform active test**

(a) Turn ENGINE START STOP switch to ON.
(b) Connect the diagnostic tester, perform active test for rear position light.

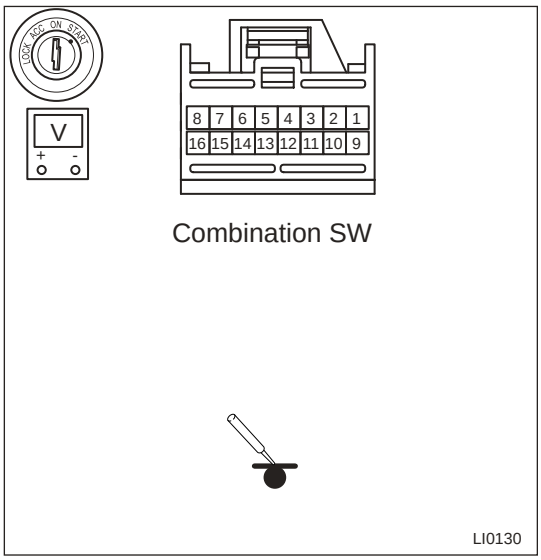
NG → **Check actuator circuit wire harness**

OK

3	**Check rear position light control circuit**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the combination switch connector.
(d) Connect the negative battery cable.
(e) Turn ENGINE START STOP switch to ON.
(f) Using a digital multimeter, measure voltage between combination switch connector and body ground according to table below.

Multimeter Connection	Condition	Specified Condition
Combination switch (5) - Body ground	Always	Not less than 12 V



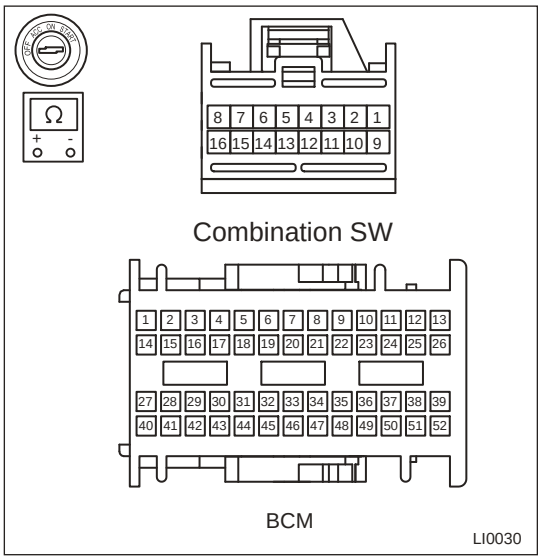
NG → **Repair or replace faulty wire harness**

OK

4	**Check combination switch control circuit**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the body control module connector.
(d) Disconnect the combination switch connector.
(e) Using a digital multimeter, measure if resistance between combination switch connector and BCM is normal according to table below.

Multimeter Connection	Condition	Specified Condition
Combination switch (1) - BCM (45)	Always	⩽ 1 Ω



NG → **Repair or replace faulty wire harness**

OK

5	Check combination switch

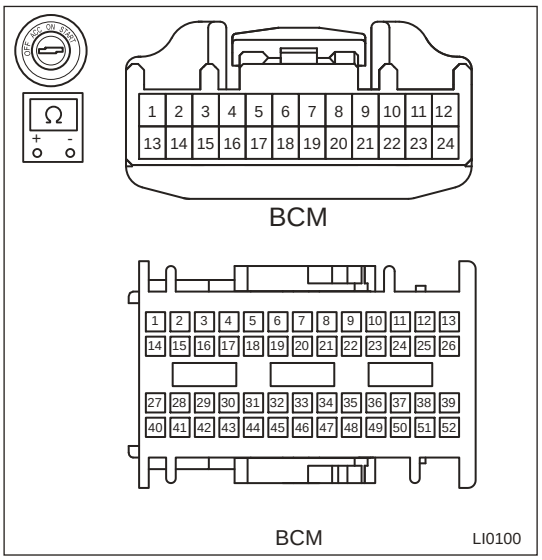
(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect the body control module connector.

(d) Using a digital multimeter, measure if resistance between connector BCM terminals is normal when turning on position light according to table below.

Multimeter Connection	Condition	Specified Condition
BCM (lighting input) - BCM (- analog ground)	Always	3000 Ω



NG → **Replace combination switch**

OK

6	Check rear position light output circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

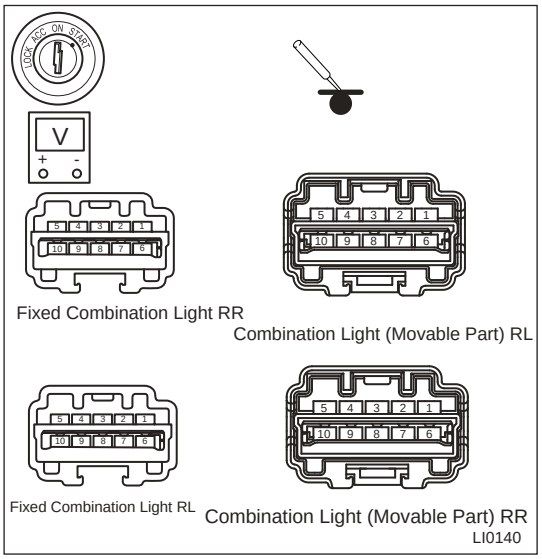
(c) Disconnect the rear position light connector.

(d) Connect the negative battery cable.

(e) Turn ENGINE START STOP switch to ON.

(f) Using a digital multimeter, measure voltage between rear position light connector and body ground according to table below.

Multimeter Connection	Condition	Specified Condition
Movable part of rear right combination light (6) - Body ground	Always	Not less than 12 V
Fixed part of rear right combination light (6) - Body ground		



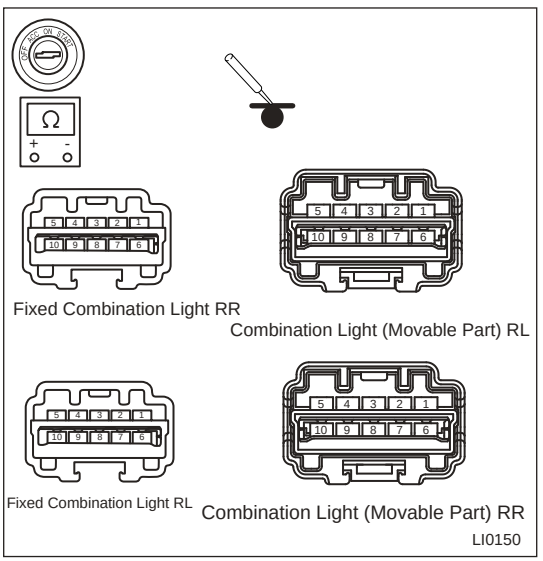
Multimeter Connection	Condition	Specified Condition
Movable part of rear left combination light (6) - Body ground		
Fixed part of rear left combination light (6) - Body ground		

NG → **Repair or replace faulty wire harness**

OK

7	**Check output circuit ground for continuity**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the rear position light connector.
(d) Using a digital multimeter, check for continuity between rear position light connector and body ground according to table below.



Multimeter Connection	Condition	Specified Condition
Movable part of rear right combination light (1) - Body ground	Always	⩽ 1 Ω
Fixed part of rear right combination light (1) - Body ground		
Movable part of rear left combination light (1) - Body ground		
Fixed part of rear left combination light (1) - Body ground		

NG → **Repair or replace faulty wire harness**

OK

8	Reconfirm DTCs

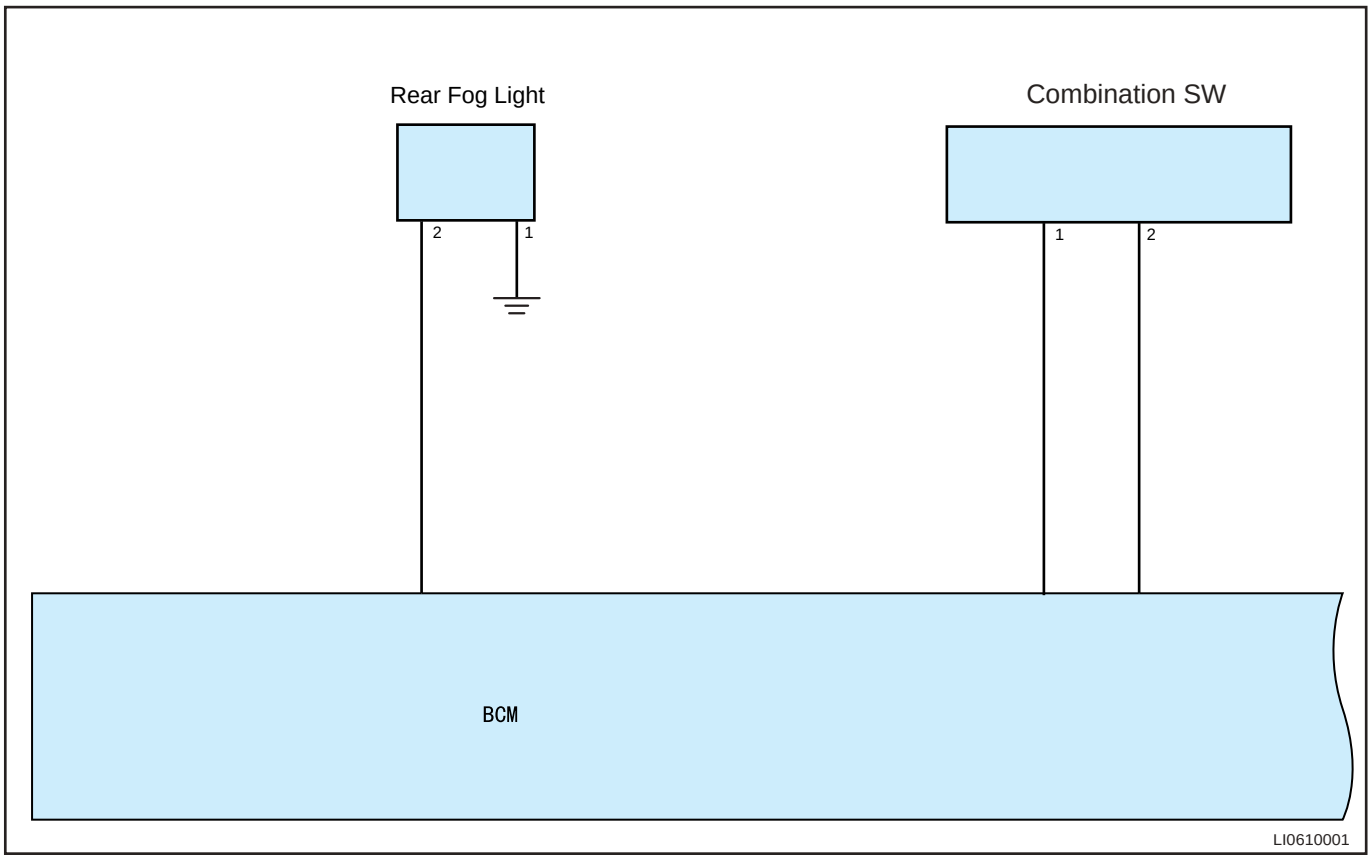
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace body control module**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1008-11**	**Rear Fog Control Circuit-Circuit Short to Ground**
DTC	**B1008-13**	**Rear Fog Control Circuit-Circuit Open**
DTC	**B1008-71**	**Rear Fog Control Circuit-Actuator Stuck**

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check rear fog light bulb**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn off all electrical equipment and ENGINE START STOP switch.

(b) Disconnect the negative battery cable.

(c) Remove the rear fog light bulb, and check if bulb filament is blown.

NG → **Replace rear fog light bulb**

OK

2	**Using diagnostic tester to perform active test**

(a) Turn ENGINE START STOP switch to ON.

(b) Connect the diagnostic tester, perform active test for rear position light.

NG → **Check actuator circuit wire harness**

OK

3	**Check rear fog light control circuit**

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

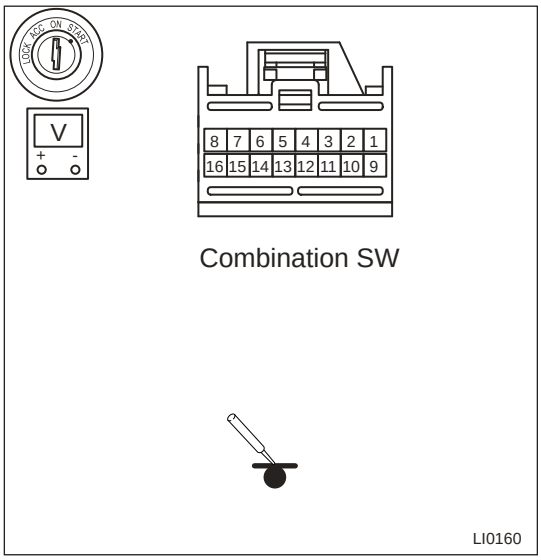
(c) Disconnect the combination switch connector.

(d) Connect the negative battery cable.

(e) Turn ENGINE START STOP switch to ON.

(f) Using a digital multimeter, measure voltage between combination switch connector and body ground according to table below.

Multimeter Connection	Condition	Specified Condition
Combination switch (2) - Body ground	Always	Not less than 12 V



NG → **Repair or replace faulty wire harness**

OK

4	Check combination switch control circuit

(a) Turn ENGINE START STOP switch to OFF.

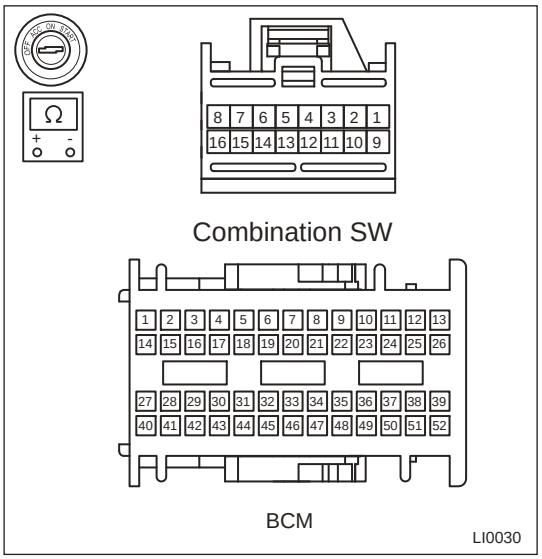
(b) Disconnect the negative battery cable.

(c) Disconnect the body control module connector.

(d) Disconnect the combination switch connector.

(e) Using a digital multimeter, measure if resistance between combination switch and BCM is normal according to table below.

Multimeter Connection	Condition	Specified Condition
Combination switch (1) - BCM (corresponding terminal)	Always	⩽ 1 Ω



NG → **Repair or replace faulty wire harness**

OK

5	Check combination switch

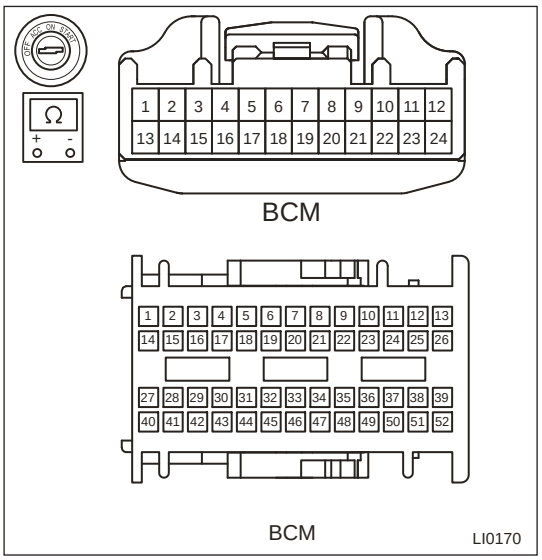
(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect the body control module connector.

(d) Using a digital multimeter, measure if resistance between connector BCM terminals is normal when turning on fog light according to table below.

Multimeter Connection	Condition	Specified Condition
BCM (rear fog light output) - BCM (analog ground)	Always	⩽ 1 Ω



NG → **Replace combination switch**

OK

6	Check rear fog light output circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

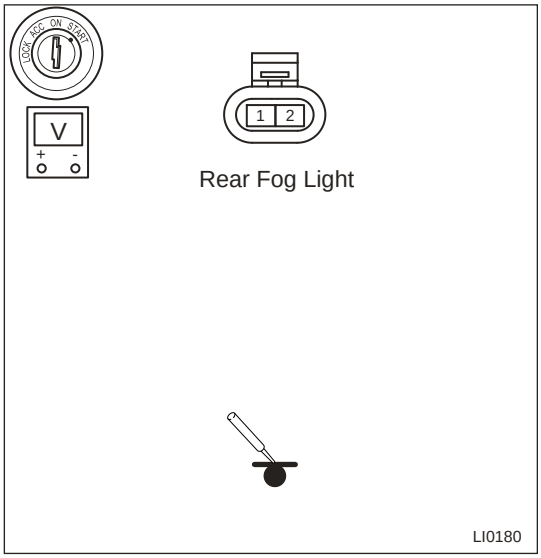
(c) Disconnect the rear fog light connector.

(d) Connect the negative battery cable.

(e) Turn ENGINE START STOP switch to ON.

(f) Using a digital multimeter, measure voltage between rear fog light connector and body ground according to table below.

Multimeter Connection	Condition	Specified Condition
Rear fog light (2) - Body ground	Always	Not less than 12 V



NG → **Repair or replace faulty wire harness**

OK

7	Check output circuit ground for continuity

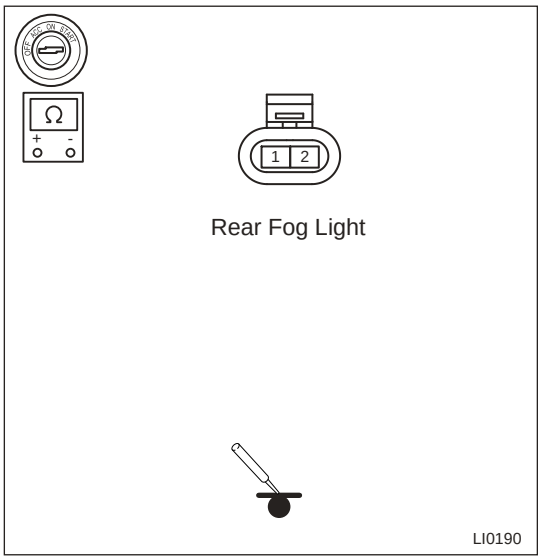
(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect the rear fog light connector.

(d) Using a digital multimeter, check for continuity between rear fog light connector and body ground according to table below.

Multimeter Connection	Condition	Specified Condition
Rear fog light (1) - Body ground	Always	⩽ 1 Ω



NG → **Repair or replace faulty wire harness**

OK

8	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

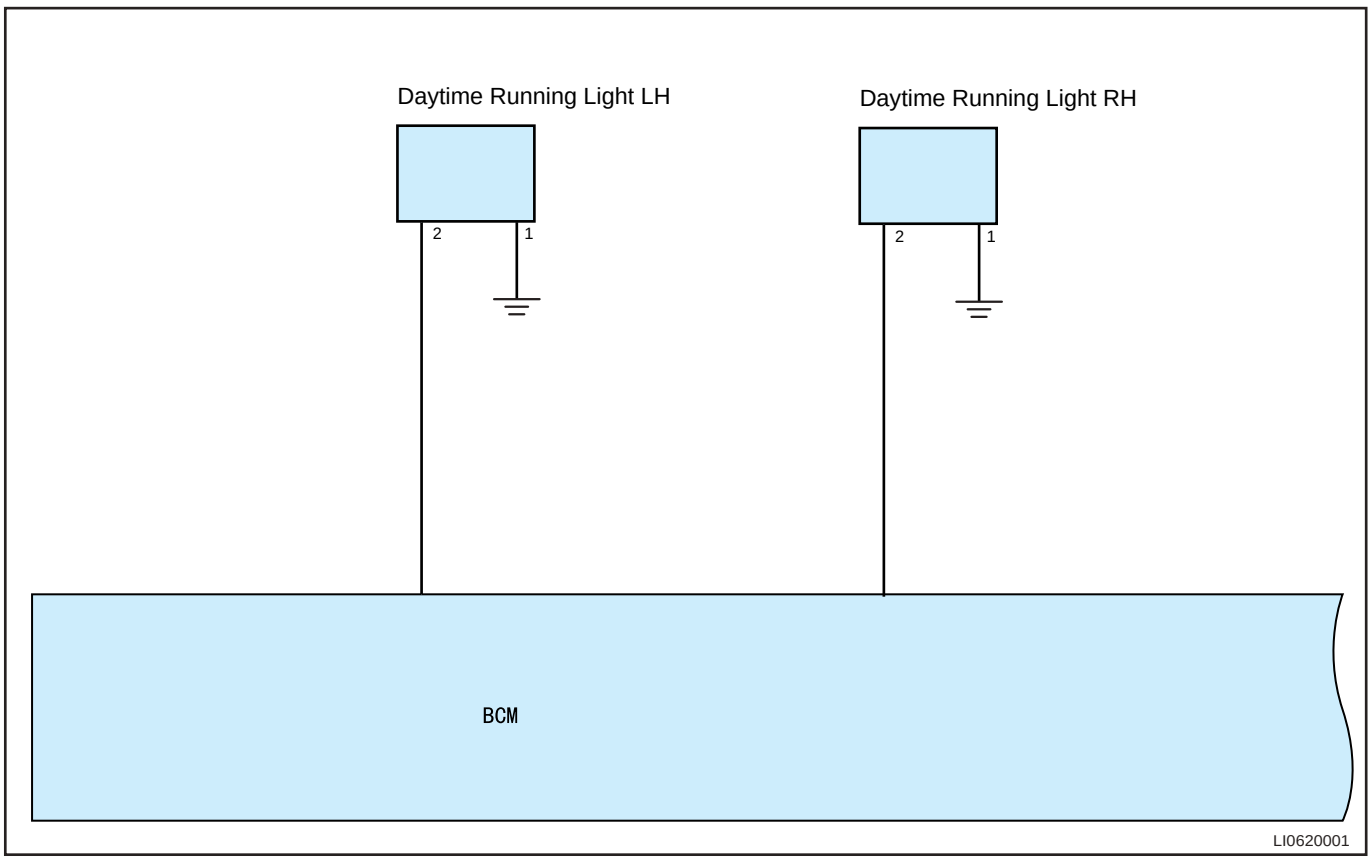
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG	**Replace body control module**
OK	**Conduct test and confirm malfunction has been repaired.**

DTC	**B101E-11**	**L-DRL Control Circuit-Circuit Short to Ground**
DTC	**B101E-13**	**L-DRL Control Circuit-Circuit Open**
DTC	**B101F-11**	**R-DRL Control Circuit-Circuit Short to Ground**
DTC	**B101F-13**	**R-DRL Control Circuit-Circuit Open**

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check for output voltage of daytime running light**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

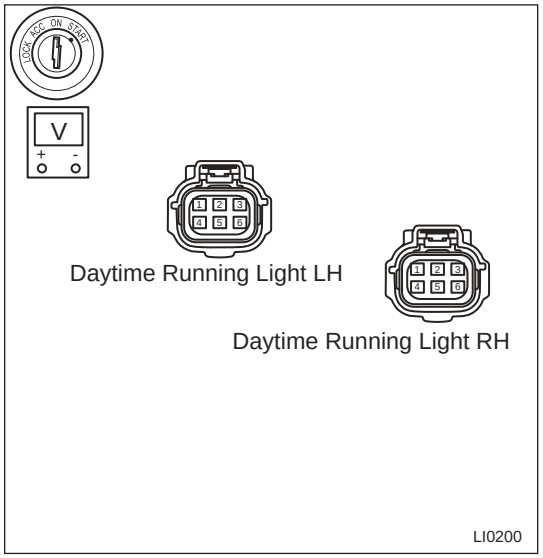
(b) Disconnect the negative battery cable.

(c) Disconnect the daytime running light connector.

(d) Connect the negative battery cable.

(e) Turn ENGINE START STOP switch to ON.

(f) Using a digital multimeter, measure daytime running light connector to check its output voltage and ground according to table below.



Multimeter Connection	Condition	Specified Condition
Left daytime running light (1) - Left daytime running light (2)	Always	Not less than 12 V
Right daytime running light (1) - Right daytime running light (2)		

NG → **Replace daytime running light**

OK ↓

2	**Check daytime running light wire harness**

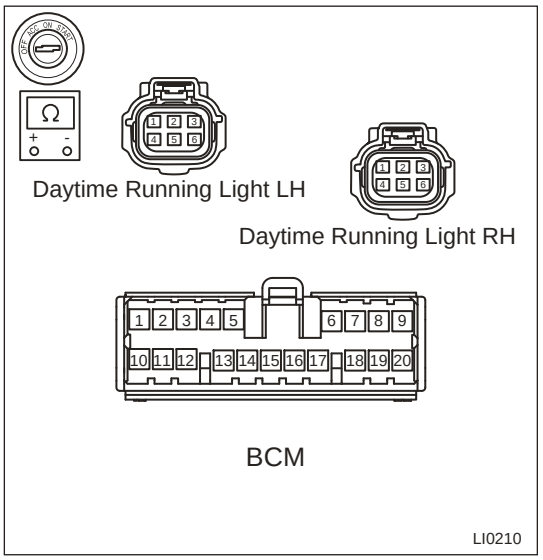
(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect the body control module.

(d) Disconnect the daytime running light connector.

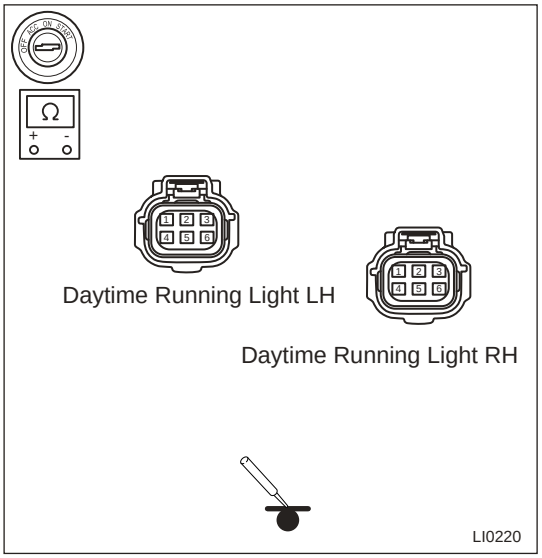
(e) Using a digital multimeter, measure if resistance between connector BCM and daytime running light connector is normal according to table below.



Multimeter Connection	Condition	Specified Condition
Left daytime running light (2) - BCM (- corresponding terminal)	Always	⩽ 1 Ω
Right daytime running light (2) - BCM (- corresponding terminal)		

(f) Using a digital multimeter, measure if resistance between daytime running light connector and body ground is normal according to table below.

Multimeter Connection	Condition	Specified Condition
Left daytime running light (1) - Body ground	Always	⩽ 1 Ω
Right daytime running light (1) - Body ground		



NG → **Repair or replace faulty wire harness**

OK

3	Reconfirm DTCs

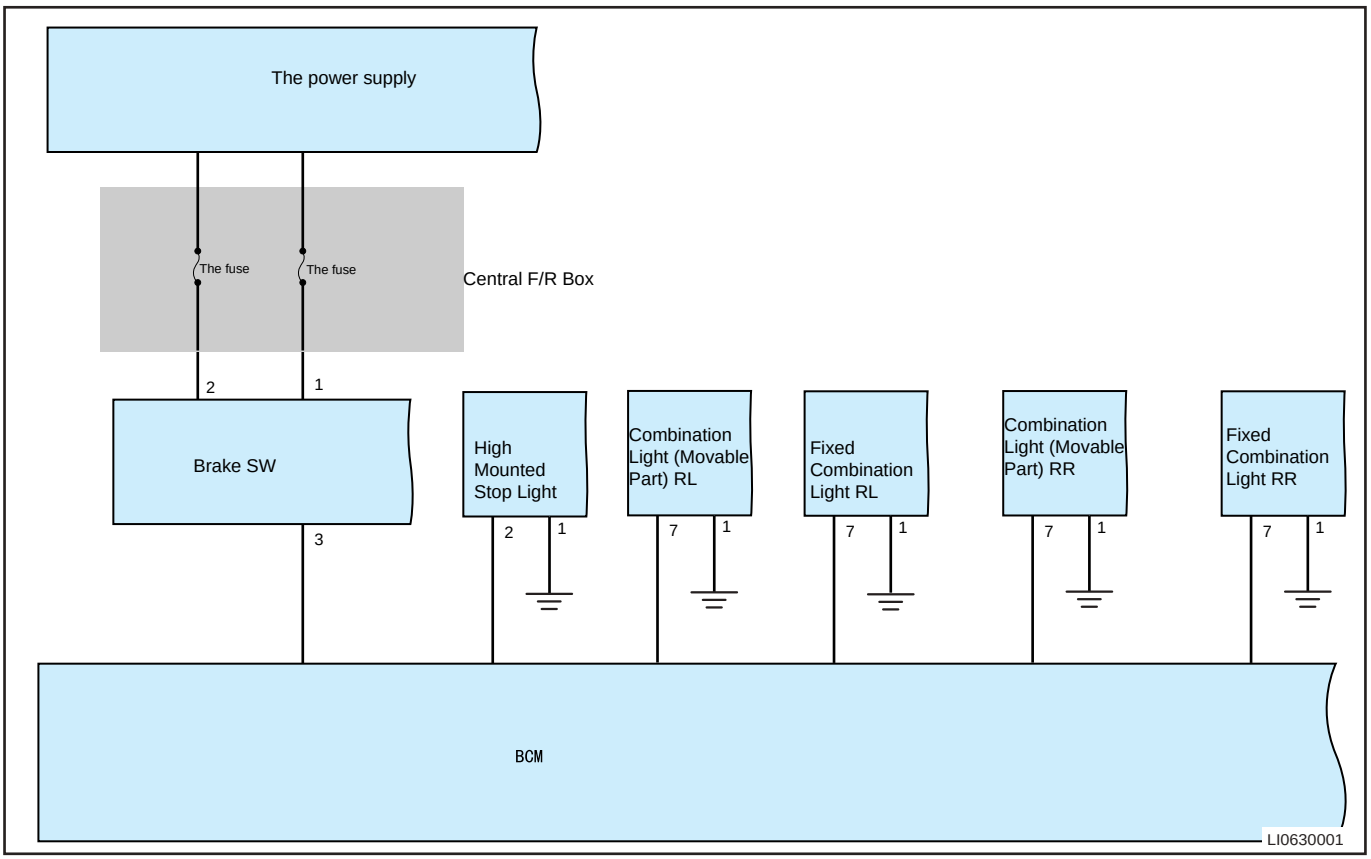
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace body control module**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1036-11**	**H-Brake Light Control Circuit-Circuit Short to Ground**
DTC	**B1036-13**	**H-Brake Light Control Circuit-Circuit Open**
DTC	**B1035-11**	**Brake Light Control Circuit-Circuit Short to Ground**
DTC	**B1035-13**	**Brake Light Control Circuit-Circuit Open**

Description
System Schematic Diagram



DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Remove the fuse from engine compartment fuse and relay box.

(d) Check if fuse is blown.

NG → **Replace fuse**

OK

2	**Check brake light bulb**

(a) Turn off all electrical equipment and ENGINE START STOP switch.
(b) Disconnect the negative battery cable.
(c) Remove the brake light bulb, and check if bulb filament is blown.

NG → **Replace brake light bulb**

OK

3	**Check brake switch**

(a) Replace the old switch with a new one.
(b) Check vehicle again.

OK → **Replace brake switch**

NG

4	**Using diagnostic tester to perform active test**

(a) Turn ENGINE START STOP switch to ON.
(b) Connect the diagnostic tester, perform active test for brake light.

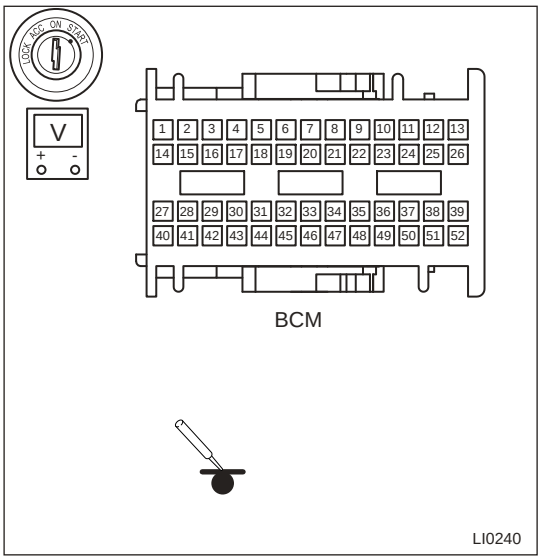
NG → **Check actuator circuit wire harness**

OK

5	**Check brake light control circuit**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the body control module connector.
(d) Connect the negative battery cable.
(e) Turn ENGINE START STOP switch to ON, depress brake pedal.
(f) Using a digital multimeter, measure the voltage between body control module connector and body ground according to table below.

Multimeter Connection	Condition	Specified Condition
BCM (Brake switch Input) - Body ground	Always	Not less than 12 V



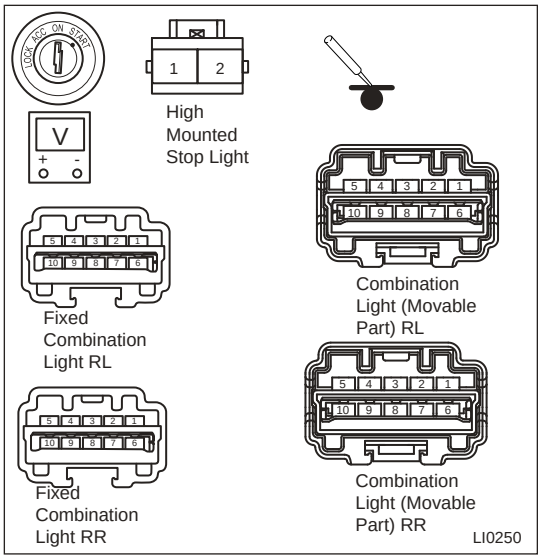
NG → **Repair or replace faulty wire harness**

OK

6	Check brake light output circuit

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the brake light connector.
(d) Connect the negative battery cable.
(e) Turn ENGINE START STOP switch to ON.
(f) Using a digital multimeter, measure voltage between brake light connector and body ground according to table below.

Multimeter Connection	Condition	Specified Condition
High mounted stop light (2) - Body ground	Always	Not less than 12 V
Movable part of rear left combination light (7) - Body ground		
Fixed part of rear left combination light (7) - Body ground		
Movable part of rear right combination light (7) - Body ground		
Fixed part of rear right combination light (7) - Body ground		

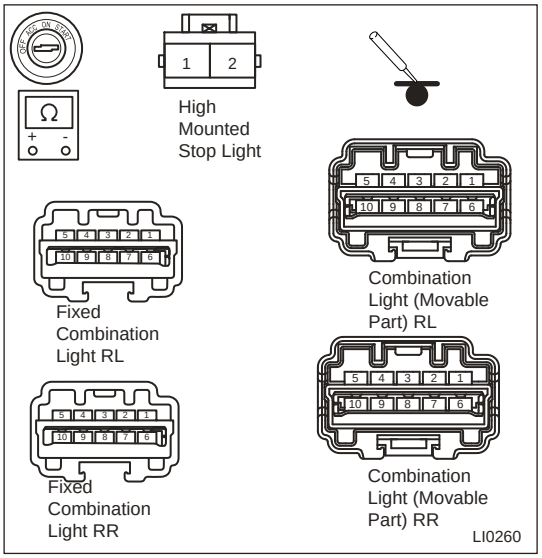


NG → **Repair or replace faulty wire harness**

OK

7	Check output circuit ground for continuity

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the brake light connector.
(d) Using a digital multimeter, check for continuity between brake light connector and body ground according to table below.



Multimeter Connection	Condition	Specified Condition
High mounted stop light (1) - Body ground	Always	⩽ 1 Ω
Movable part of rear left combination light (1) - Body ground		
Fixed part of rear left combination light (1) - Body ground		
Movable part of rear right combination light (1) - Body ground		
Fixed part of rear right combination light (1) - Body ground		

NG → **Repair or replace faulty wire harness**

OK

8	Reconfirm DTCs

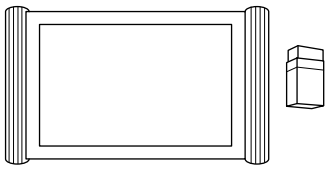
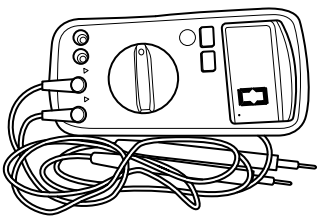
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace body control module**

OK → **Conduct test and confirm malfunction has been repaired.**

On-vehicle Service

Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Digital Multimeter	 RCH0002006

Torque Specifications

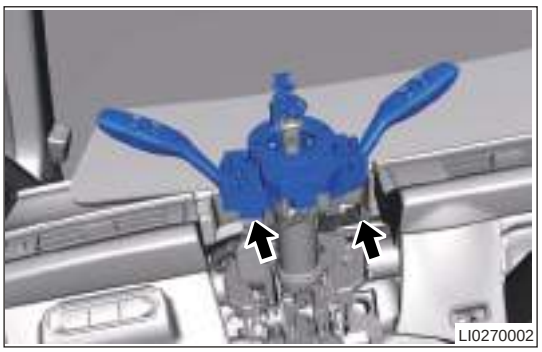
Description	Torque (N·m)
Headlight Assembly Fixing Bolt	3.5 ± 0.5
High Mounted Stop Light Fixing Nut	2.0 ± 0.5
Rear Fog Light Fixing Screw	1.5 ± 0.5
Interior Front Dome Light Fixing Screw	2.5 ± 0.5
Rear Combination Light Movable Part Nut	3.5 ± 0.5
Rear Tail Light Fixed Part Nut	1.5 ± 0.5
Back Door Ornament Light Fixing Nut	3.5 ± 0.5
License Plate Light Protector Fixing Screw	1.5 ± 0.5

Combination light switch assembly

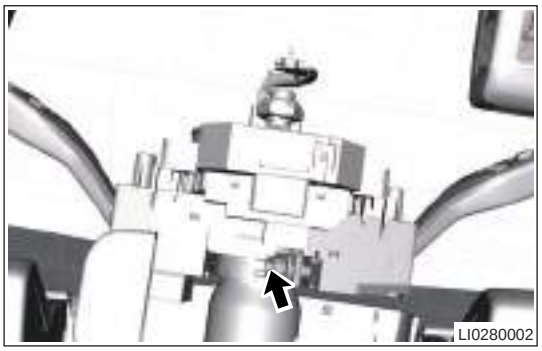
Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the driver airbag.
4. Remove the steering wheel.

5. Remove the combination switch cover.
6. Remove the spiral cable assembly.
7. Remove the combination switch assembly.
   a. Disconnect the combination switch connector.



   b. Remove the fixing bolt, and remove the combination switch assembly.



Installation

⚠ Caution

- Always install spiral cable correctly according to specified operating instructions.
- Check that horn operates normally after installation.
- Check SRS warning light after installation, and make sure that supplemental restraint system operates normally.

1. Installation is in the reverse order of removal.

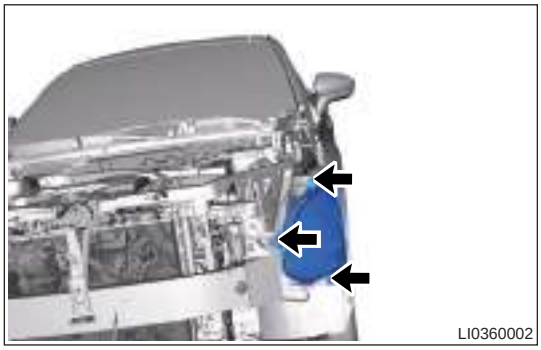
Headlight assembly

Removal

Hint:
Use same procedures for right headlight assembly and left headlight assembly. Operation procedures listed below are for left headlight assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the headlight assembly.

a. Remove 3 fixing bolts from upper part of headlight assembly.



b. Disconnect wire harness connector (arrow) from headlight assembly and remove headlight assembly.

Installation

⚠ Caution
• When installing headlight assembly, make sure headlight assembly is well fitted with hood, front wing and front bumper. Adjust it as necessary.

1. Installation is in the reverse order of removal.

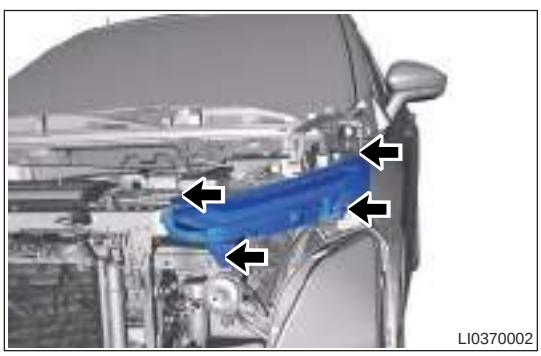
Front Signal Light Assembly

Removal

Hint:
Use same procedures for front right signal light assembly and front left signal light assembly. Operation procedures listed below are for front left signal light assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the front signal light assembly.

a. Remove 4 fixing bolts from upper part of front signal light assembly.



b. Disconnect wire harness connector (arrow) from front signal light assembly and remove front signal light assembly.

Installation

⚠ Caution

- When installing front signal light assembly, make sure front signal light assembly is well fitted with hood, front wing and front bumper. Adjust it as necessary.

1. Installation is in the reverse order of removal.

Rear Combination Light Assembly (Fixed Part)

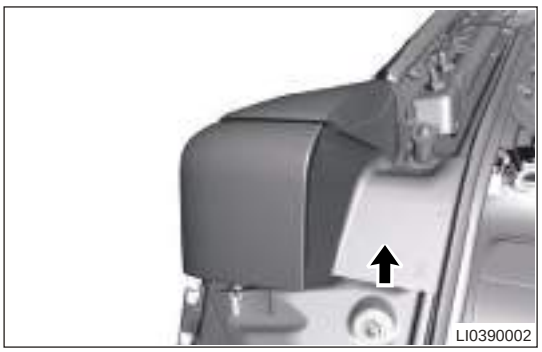
Removal

⚠ Caution

- Use same procedures for rear right combination light assembly (fixed part) and rear left combination light assembly (fixed part).
- Procedures listed below are for rear left combination light assembly (fixed part).

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear combination light assembly (fixed part).

a. Using a screwdriver wrapped with protective tape, pry off rear left combination light plugs (arrow).



b. Remove 2 fixing screws from rear left combination light assembly, and disconnect rear left combination light connector.

Tightening Torque
1.5 ± 0.5N·m

c. Remove the rear left combination light assembly (fixed part).

Installation

⚠ Caution
• When installing rear combination light assembly (fixed part), make sure rear combination light assembly is well fitted with luggage compartment and rear bumper. Adjust it as necessary.

1. Installation is in the reverse order of removal.

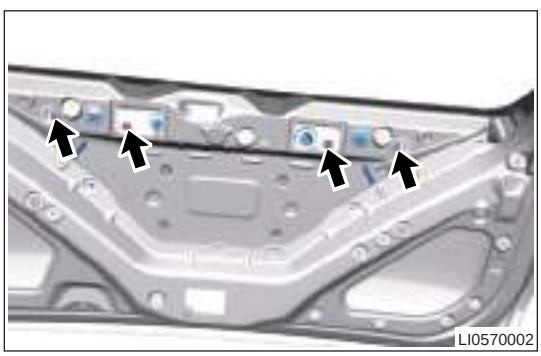
Rear Combination Light Assembly (Movable Part)

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear combination light assembly (movable part).
   a. Remove the back door trim board.
   b. Remove 3 fixing nuts (arrow) from left side of rear combination light assembly (movable part).
   c. Remove 3 fixing nuts (arrow) from right side of rear combination light assembly (movable part).

Tightening Torque
3.5 ± 0.5 N·m

   d. Disconnect wire harness connector from both sides of rear combination light assembly (movable part).
   e. Remove 4 fixing nuts (arrow) from middle part of rear combination light assembly (movable part).



Installation

⚠ Caution
• When installing rear combination light assembly (movable part), make sure rear combination light assembly is well fitted with luggage compartment and rear bumper. Adjust it as necessary.

1. Installation is in the reverse order of removal.

Front dome light assembly

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front dome light assembly.
   a. Pry off dome light with an interior crow plate, disconnect connector and remove dome light.

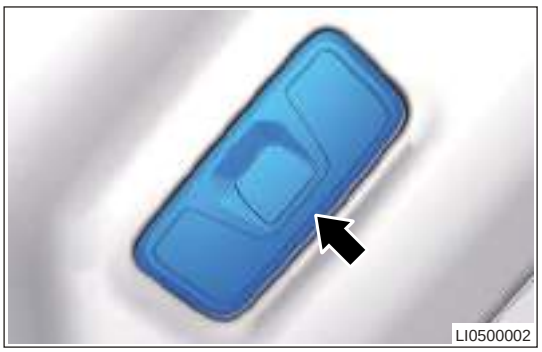
Installation

1. Installation is in the reverse order of removal.

Second Row Dome Light

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the second row dome light.
   a. Pry off dome light with an interior crow plate, disconnect connector and remove dome light.



Installation

1. Installation is in the reverse order of removal.

License Plate Light Assembly

Removal

Hint:

- Operation steps of right license plate light are same as that of left license plate light. Procedures listed below are for left side.

1. Open the back door.
2. Turn off all electrical equipment and ENGINE START STOP switch.
3. Disconnect the negative battery cable.
4. Remove the license plate light assembly.
   a. Using a screwdriver wrapped with protective tape to pry off left license plate light, disconnect left license plate light connector to remove left license plate light assembly.


LI0510002

   b. Remove the left license plate light assembly.

Installation

1. Installation is in the reverse order of removal.

High Mounted Stop Light Assembly

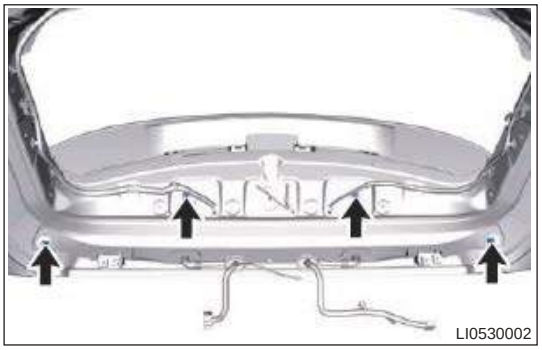
Removal

1. Open the back door.
2. Turn off all electrical equipment and ENGINE START STOP switch.
3. Disconnect the negative battery cable.
4. Remove back door upper protector assembly.
5. Remove the high mounted stop light assembly.
   a. Remove 2 rubber plugs (arrow) from back door.

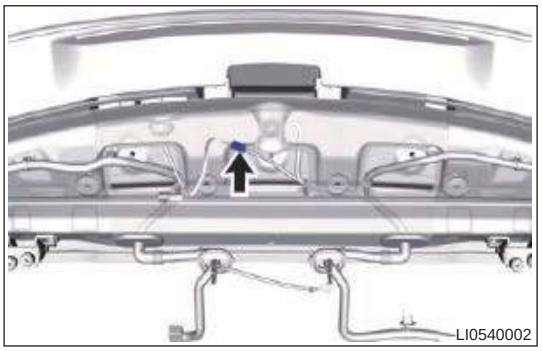

LI0520002

b. Remove 4 spoiler fixing nuts (arrow) from back door.

Tightening Torque
5 ± 1 N·m


LI0530002

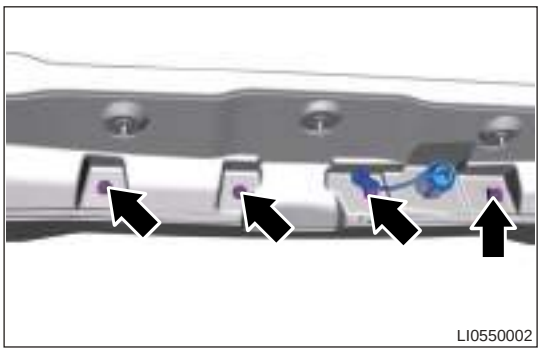
c. Disconnect the high mounted stop light connector (arrow).


LI0540002

d. Remove rear spoiler plate from back door.

e. Remove 4 fixing screws (arrow) of high mounted stop light from rear spoiler plate, and remove high mounted stop light.

Tightening Torque
2 ± 0.5 N·m


LI0550002

Installation

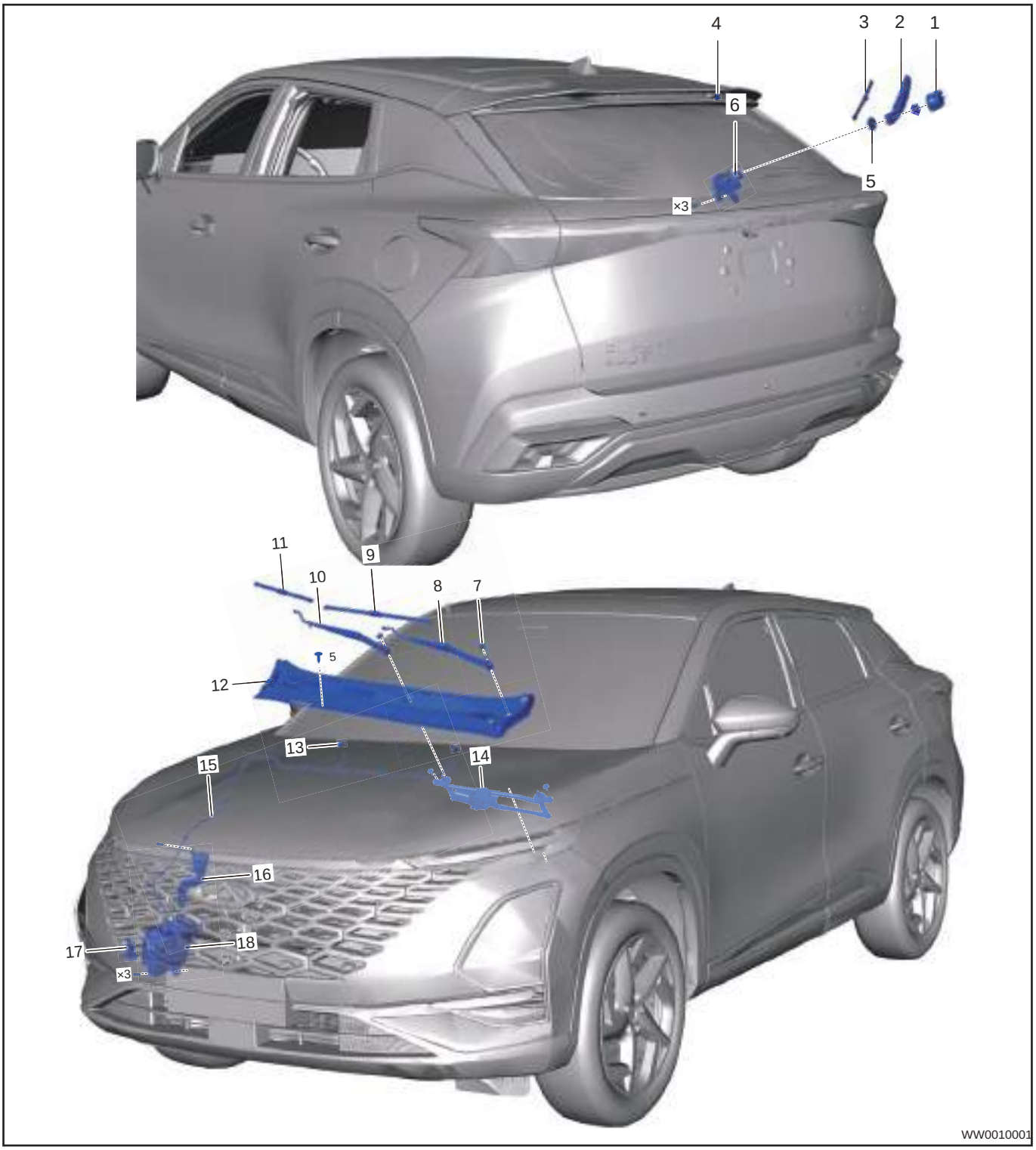
1. Installation is in the reverse order of removal.

WIPER AND WASHER

System Overview

Description

Wiper And Washer



1	Rear Wiper Arm Trim Cap	10	Sub Wiper Arm Assembly
2	Rear Wiper Arm Assembly	11	Sub Wiper Blade
3	Rear Wiper Blade	12	Front Windshield Lower Support Assembly
4	Rear Nozzle Assembly	13	Front Wiper Nozzle
5	Seal Ring	14	Front Wiper Motor Link Rod Assembly
6	Rear wiper motor assembly	15	Washer Line Assembly
7	Front Wiper Arm Trim Cap	16	Guide Pipe Assembly
8	Main Wiper Arm Assembly	17	Washer Pump
9	Main Wiper Blade	18	Washer Fluid Reservoir Assembly

Wiper and washer are important equipment for cleaning the front windshield assembly. which can operate only with ENGINE START STOP switch ON. Driver can control all operations of wiper and washer by moving switch control lever.

Wiper Service Mode

- With ignition ON, then turn ignition switch to OFF and turn wiper switch to MIST position to enter wiper service mode.

Diagnosis & Testing

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Both front wiper and washer systems do not operate	Fuse
	Wiper switch assembly
	Washer pump
	Wire harness or connector
	BCM
Front wiper system does not operate in LO or HI	Wiper switch assembly
	Front wiper motor assembly
	Wire harness or connector
	BCM

Symptom	Suspected Area
Front wiper system does not operate	Fuse
	Wiper switch assembly
	Front wiper motor assembly
	Wire harness or connector
	BCM
Front wiper arm and blade do not return to original position when front wiper switch is turned off	Front wiper motor assembly
	Wire harness or connector
	BCM
Both rear wiper and washer systems do not operate	Fuse
	Wiper switch assembly
	Rear wiper motor assembly
	Washer pump
	Wire harness or connector
	BCM
Washer system does not operate	Nozzle assembly
	Wiper switch assembly
	Washer pump
	Wire harness or connector
	BCM

Diagnostic Help

1. Connect diagnostic tester X-431 3G (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all CD system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.

- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1014-71	Front Wiper Low Speed Control Circuit	/	• Wire harness or connector damaged • Wiper Motor	/
B1015-71	Front Wiper High Speed Control Circuit	/		/
B1016-71	Rear Washer Control Circuit	/	• Wire harness or connector damaged • Washer Motor	/
B1017-71	Front Washer Control Circuit	/		/
B103A-11	Front Washer Heating Control Circuit	/	• Wire harness or connector damaged • Nozzle heating damaged • Body control module fault	/
B103A-13	Front Washer Heating Control Circuit			

DTC Diagnosis Procedure

DTC	B1014-71	Front Wiper Low Speed Control Circuit
DTC	B1015-71	Front Wiper High Speed Control Circuit

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Turn off all electrical equipment and ENGINE START STOP switch.
(b) Disconnect the negative battery cable.
(c) Remove fuse, check if fuse is blown.

NG → **Replace fuse**

-

OK

2	**Check relay**

(a) Replace the old relay with a new one.
(b) Perform running test.

OK → **Replace relay**

NG

3	**Check wire harness between central fuse and relay box and wiper motor**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the connector.
(d) Check for continuity in wire harness between central fuse and relay box and wiper motor

NG → **Repair or replace faulty wire harness**

OK

4	**Check wire harness between motor and BCM**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the connector.
(d) Check for continuity in wire harness between motor and BCM.

NG → **Repair or replace faulty wire harness**

OK ↓

5	Check motor

(a) Replace the old motor with a new one for running test.

OK → **Repair or replace motor**

NG ↓

6	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace body control module**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1016-71	Rear Washer Control Circuit
DTC	B1017-71	Front Washer Control Circuit

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check wire harness between washer motor and BCM

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the connector.
(d) Check for continuity in wire harness between washer motor and BCM.

NG → **Repair or replace faulty wire harness**

OK ↓

2	**Check motor**

(a) Replace the old motor with a new one for running test.

OK → **Repair or replace motor**

NG ↓

3	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace body control module**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B103A-11**	**Front Washer Heating Control Circuit**
DTC	**B103A-13**	**Front Washer Heating Control Circuit**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check wire harness between front washer heating and BCM**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the connector.
(d) Check for continuity in wire harness between front washer heating and BCM.

NG → **Repair or replace faulty wire harness**

OK ↓

2	Check the nozzle

(a) Replace the old nozzle with a new one for running test.

OK → **Repair or replace the nozzle**

NG

3	Reconfirm DTCs

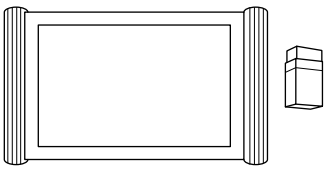
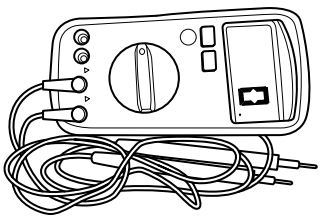
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace body control module**

OK → **Conduct test and confirm malfunction has been repaired.**

On-vehicle Service

Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Digital Multimeter	 RCH0002006

Torque Specifications

Description	Torque (N·m)
Front Wiper Arm Assembly Fixing Nut	18 ± 2
Wiper Motor and Link Rod Assembly Fixing Bolt	9.5 ± 1.5

Description	Torque (N·m)
Rear Wiper Arm Assembly Upper Fixing Nut	10 ± 1.5
Rear Wiper Motor Assembly Fixing Bolt	10 ± 1.5
Washer Fluid Reservoir Assembly Fixing Bolt	7 ± 1
Front Wiper Motor Fixing Bolt	10 ± 1.5
Guide Pipe Fixing Bolt	5 ± 1

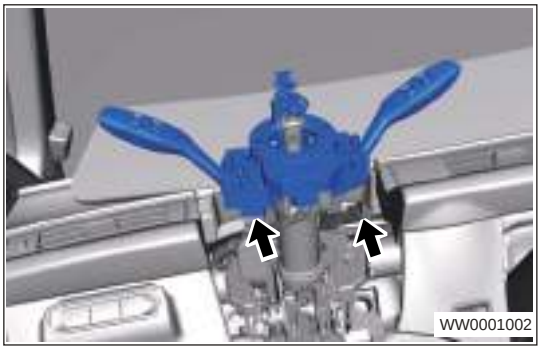
Wiper switch assembly

Removal

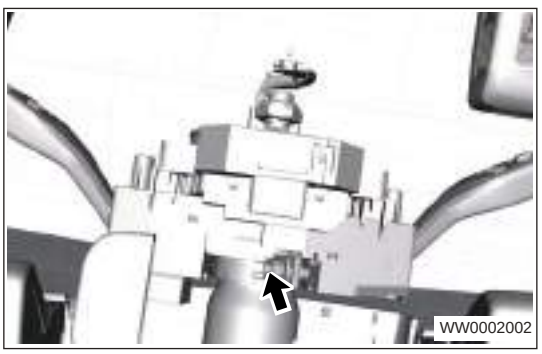
Hint:

- Be sure to wear safety equipment to prevent accidents, when removing wiper switch assembly.
- Appropriate force should be applied, when removing wiper switch assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing wiper switch assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the combination switch lower cover.
4. Remove the combination switch upper cover.
5. Remove the wiper switch assembly.
   a. Disconnect the combination switch connector.



   b. Remove the fixing bolt, and remove the combination switch assembly.



Installation

⚠ Caution
• Always operate carefully to prevent components from being damaged, when installing wiper switch assembly. • Install connectors in place, when installing wiper switch assembly. • Check wiper switch for proper operation, after installing wiper switch assembly.

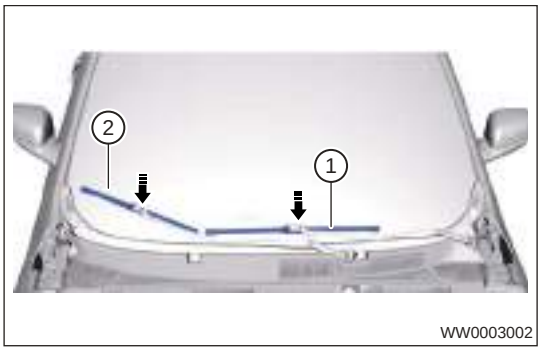
1. Installation is in the reverse order of removal.

Front Wiper Blade Assembly

Removal

⚠ Caution
• Be sure to wear safety equipment to prevent accidents, when removing front wiper blade assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front wiper blade assembly.
   a. Press the clip (arrow), remove wiper blade (1) as shown in illustration.



Installation

1. Installation is in the reverse order of removal.

Front Wiper Arm Assembly

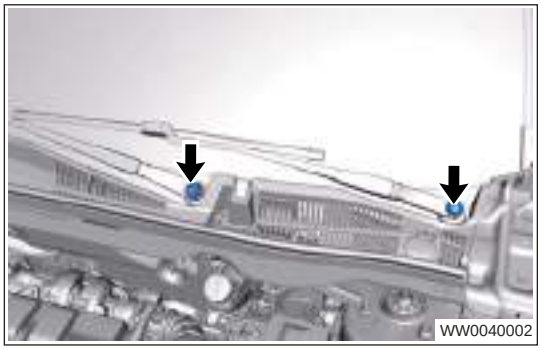
Removal

Hint:

- Be sure to wear safety equipment to prevent accidents, when removing front wiper arm assembly.
- Appropriate force should be applied, when removing front wiper arm assembly. Be careful not to operate roughly.
- Try to prevent front windshield assembly from being scratched, when removing front wiper arm assembly.

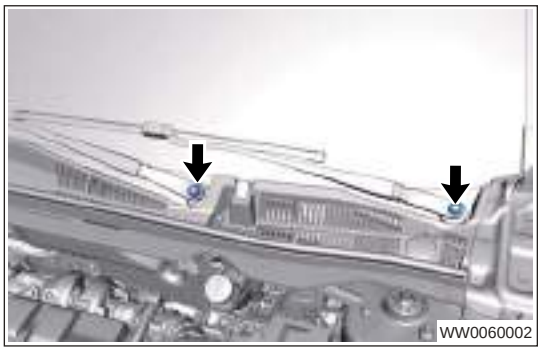
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Open the hood.
3. Disconnect the negative battery cable.
4. Remove the front wiper arm assembly.

a. Using a screwdriver wrapped with protective tape, remove front wiper arm trim caps (arrow).

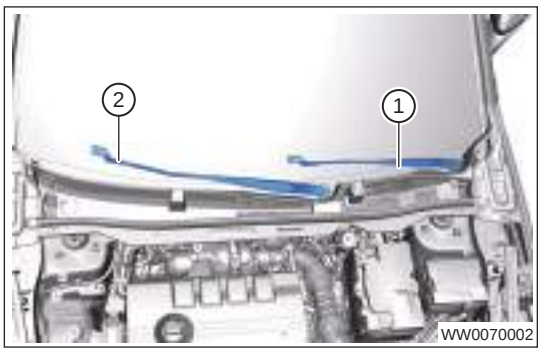


b. Remove 2 fixing nuts (arrow) from front wiper arm assembly.

Tightening Torque
18 ± 2 N • m



c. Remove the front main wiper arm (1) and front sub wiper arm (2).



Installation

⚠ Caution

- Always operate carefully to prevent other components from being damaged, when installing front wiper arm assembly.
- Be sure to tighten fixing nuts to specified torque, when installing front wiper arm assembly.
- Check front wiper arm assembly for proper operation after installation.

Hint:

- Adjust front wiper arm assembly to proper position when installing.
- Pay attention to locating points on front windshield assembly during installation. Wiper arm blade should be pressed against locating points.

1. Installation is in the reverse order of removal.

Front Wiper Motor and Link Rod Assembly

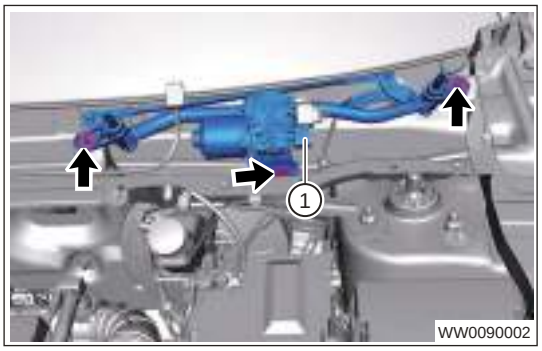
Removal

Hint:

- Be sure to wear safety equipment to prevent accidents, when removing front wiper motor assembly.
- Appropriate force should be applied, when removing front wiper motor assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing front wiper motor assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front right wing assembly.
4. Remove the front windshield lower support assembly.
5. Remove the wiper motor and link rod assembly.
   a. Disconnect the connector (1) from wiper motor and link rod assembly.
   b. Remove 3 fixing bolts (arrow) from wiper motor and link rod assembly.

      Tightening Torque
      9.5 ± 1.5 N·m



   c. Remove the wiper motor and link rod assembly.

Inspection

1. Check the front wiper motor assembly.
   a. Check the LO operation.

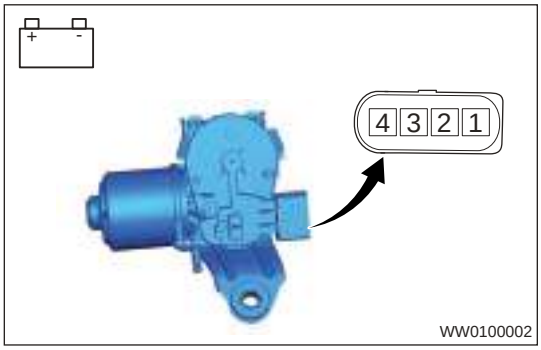
Measurement Condition	Specified Condition
Battery negative (-) - Terminal 4	Motor running at low speed (LO)
Battery positive (+) → Terminal 2	

   If result is not as specified, replace front wiper motor assembly.
   b. Check the HI operation.

Measurement Condition	Specified Condition
Battery negative (-) - Terminal 4	Motor running at low speed (HI)
Battery positive (+) → Terminal 1	

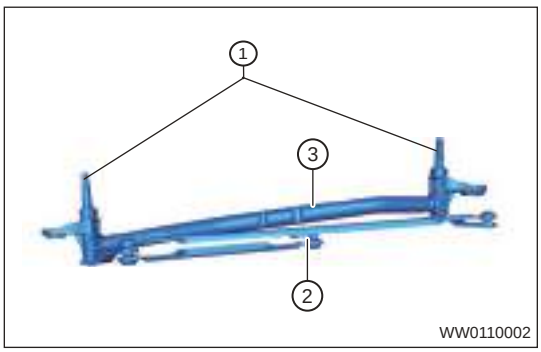
c. Check the auto reset function.

- Connect positive (+) battery lead to terminal 2 or 1, and connect negative (-) battery lead to terminal 4. When motor runs at low speed (LO) or high speed (HI), disconnect battery positive (+) to stop front wiper motor at any position other than the original position.
- Connect terminal 4 and terminal 3 with a lead and then connect another lead from middle to positive (+) battery, and connect negative (-) battery lead to terminal 2 to make motor operate to original position at low speed (LO) again.
- Check whether the front wiper motor assembly can stop automatically after it operates to original position. OK: Motor operates to original position and stops automatically, that is, motor can reset automatically. If result is not as specified, replace front wiper motor assembly.



2. Check the wiper link rod.

a. Check the pivot (1) for looseness or falling off, link rod (2) for deformation or break, and shaft sleeve (3) for catching. Replace the wiper link rod if necessary.



Installation

Hint:

- Always operate carefully to prevent other components from being damaged, when installing front wiper motor assembly.
- Adjust and make sure that wiper motor and link rod are at original position, before installing front wiper motor assembly, otherwise, wiper system cannot operate normally.
- Install connector in place and tighten fixing bolts and nuts to the specified torque when installing front wiper motor assembly.
- Check wiper system for proper operation after installing front wiper motor assembly.

1. Installation is in the reverse order of removal.

Front Nozzle Assembly

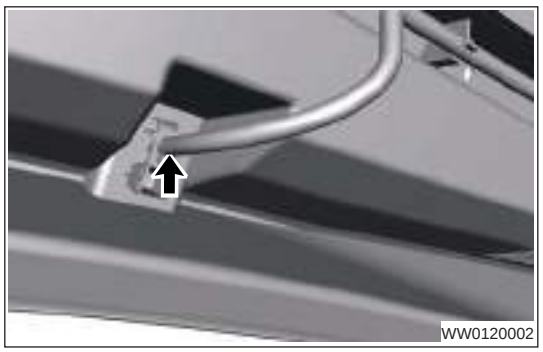
Removal

Hint:

- Be sure to wear safety equipment to prevent accidents, when removing front nozzle assembly.
- Appropriate force should be applied, when removing multi-function interface. Be careful not to operate roughly.

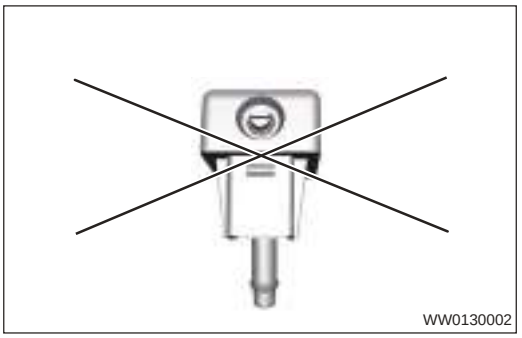
1. Turn off all electrical equipment and ENGINE START STOP switch.

2. Disconnect the negative battery cable.
3. Remove the front windshield lower support assembly.
4. Remove the front nozzle assembly.
   a. Loosen front nozzle assembly and disconnect water spray hose as shown in illustration.

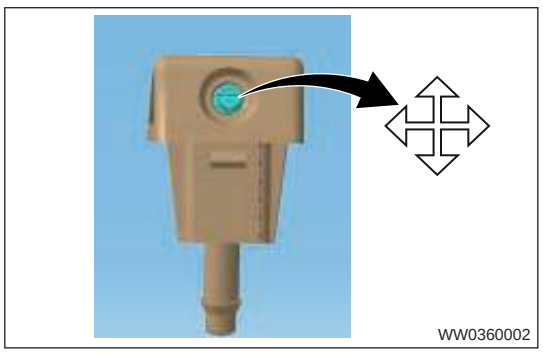


Inspection

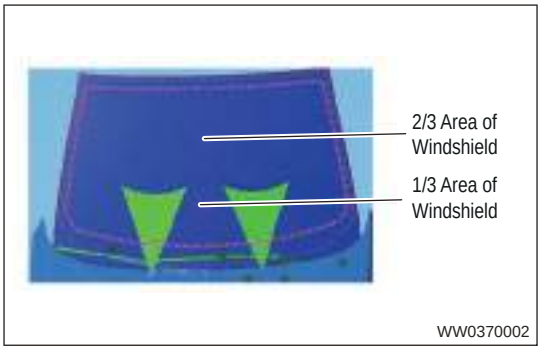
1. Check the front washer nozzle assembly.
   a. Check front nozzle for blockage, deformation or damage. Replace the front nozzle if necessary.



2. Adjust nozzle angle.
   a. Adjust the nozzle bead up and down to adjust the nozzle angle, so as to reach the ideal injection position.



b. Adjust the nozzle to spray the washer fluid at a position about 1/3 - 2/3 of the front windshield



c. Due to the high injection pressure, when the washer fluid is sprayed onto the front windshield, some of the washer fluid will be reflected on the roof cover through the windshield, which is a normal phenomenon, but the water column is not allowed to spray directly out of the front windshield.

Installation

⚠ Caution

- Always operate carefully to prevent components from being damaged, when installing front nozzle assembly.
- Install washer pipeline joints in place when installing front nozzle assembly.
- Check front nozzle for proper operation, after installing front nozzle assembly.

1. Installation is in the reverse order of removal.

Rear Wiper Arm Assembly

Removal

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing rear wiper arm assembly.
- Appropriate force should be applied when removing rear wiper arm assembly. Be careful not to operate roughly.
- Try to prevent rear windshield assembly from being scratched, when removing rear wiper arm assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the rear wiper blade.

a. Lift the rear wiper arm assembly in the direction of arrow as shown in illustration.

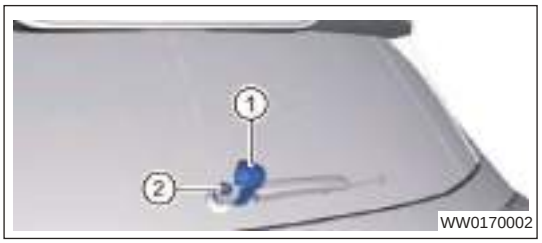
b. Pull the rear wiper arm blade from rear wiper arm assembly in the direction of arrow as shown in illustration.

4. Remove the rear wiper arm assembly.

a. Remove the rear wiper arm trim cap (1).

b. Remove fixing nut (2) from rear wiper arm assembly.

Tightening Torque
10 ± 1.5 N·m



c. Remove the rear wiper arm assembly.

Installation

⚠ Caution

- Operate carefully to prevent other components from being damaged when installing rear wiper arm assembly.
- Be sure to tighten fixing nuts to the specified torque, when installing rear wiper arm assembly.
- Check rear wiper arm assembly for proper operation after installation.

1. Installation is in the reverse order of removal.

Rear wiper motor assembly

Removal

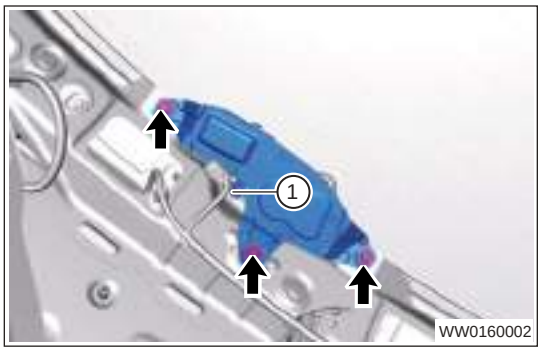
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing rear wiper motor assembly.
- Appropriate force should be applied when removing rear wiper motor assembly. Be careful not to operate roughly.
- Try to prevent rear windshield assembly from being scratched, when removing rear wiper motor assembly.

1. Turn off all electrical equipment and the ignition switch.

2. Disconnect the negative battery cable.
3. Remove the rear wiper arm assembly.
4. Remove the luggage compartment protector assembly.
5. Remove the rear wiper motor assembly.
   a. Disconnect the rear wiper motor assembly connector (1).
   b. Remove 3 fixing bolts (arrow) from rear wiper motor assembly.

      Tightening Torque
      10 ± 1.5 N·m



   c. Using a screwdriver wrapped with protective tape, pry off the gasket (arrow).

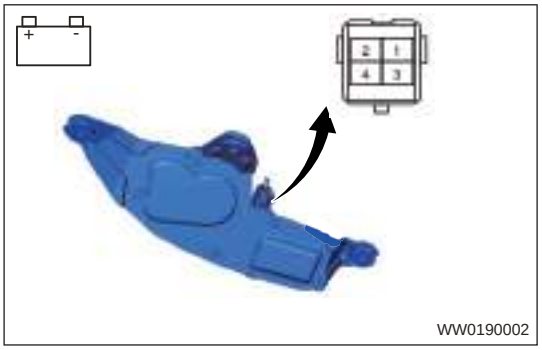
   d. Remove the rear wiper motor assembly.

Inspection

1. Check the rear wiper motor assembly.

a. Check the rear wiper motor assembly operation.

Pin	Function	Rated Current	Current		Signal Type	Optional Line Diameter
			Imin (A）	Imax (A)		
1	Positive (red)	1.5 A	⩽ 2 A	⩽ 11 A	DC	0.75
2	Reset (black)	1.5 A	⩽2 A	⩽ 11 A	DC	0.75
3	Negative (blue)	1.5 A	⩽ 2 A	⩽ 11 A	DC	0.75



If result is not as specified, replace rear wiper motor assembly.

Installation

⚠ Caution

- Always operate carefully to prevent other components from being damaged, when installing rear wiper motor assembly.
- Be sure to tighten fixing nuts to specified torque, when installing rear wiper motor assembly.
- Check wiper arm assembly for proper operation, after installing rear wiper motor assembly.

1. Installation is in the reverse order of removal.

Rear Nozzle Assembly

Removal

⚠ Caution

- Be sure to wear safety equipment to prevent accidents when removing rear nozzle assembly.
- Appropriate force should be applied when removing rear nozzle assembly. Be careful not to operate roughly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the rear spoiler assembly.
4. Remove the rear nozzle assembly.

a. Remove the rear nozzle assembly (arrow) with a interior crow plate and disconnect connecting water pipe.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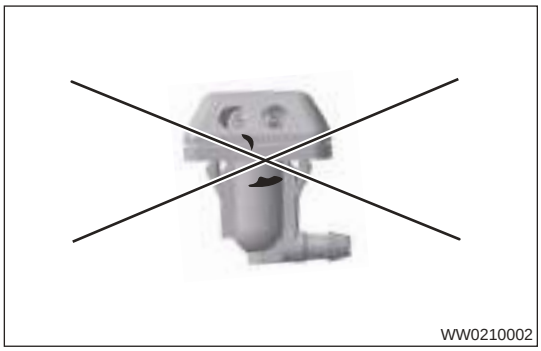
b. Remove the rear nozzle assembly.

Inspection

1. Check the rear nozzle assembly.

a. Check rear nozzle assembly for blockage, deformation or damage. Replace rear nozzle if necessary.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Installation

⚠ Caution

- Always operate carefully to prevent components from being damaged when installing rear nozzle assembly.
- Install washer line joints in place when installing rear nozzle assembly.
- Check rear nozzle for proper operation after installing rear nozzle assembly.

1. Installation is in the reverse order of removal.

Washer Pump Assembly

Removal

⚠ Caution

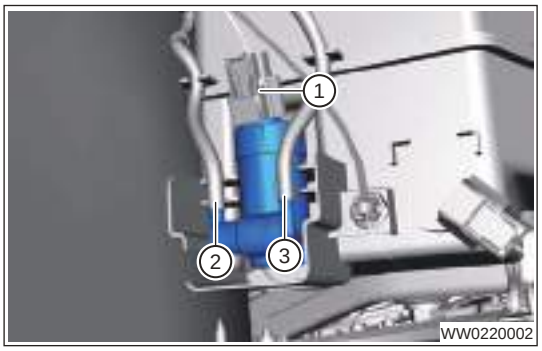
- Be sure to wear safety equipment to prevent accidents, when removing washer pump assembly.
- Appropriate force should be applied, when removing washer pump assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing washer pump assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.

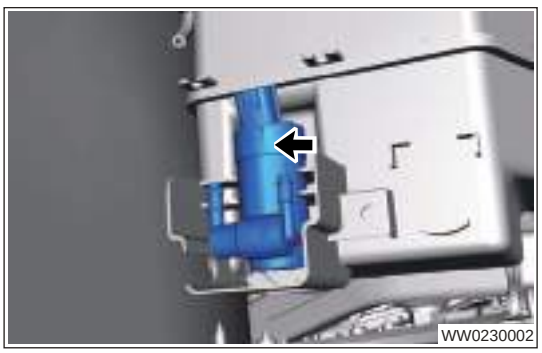
4. Remove the washer pump assembly.

a. Disconnect the front and rear washer pump connectors (1).

b. Disconnect joint (3) between rear washer line and washer pump and joint (2) between front washer line and washer pump.



c. Remove the washer pump assembly.



Inspection

1. Check the washer pump assembly.

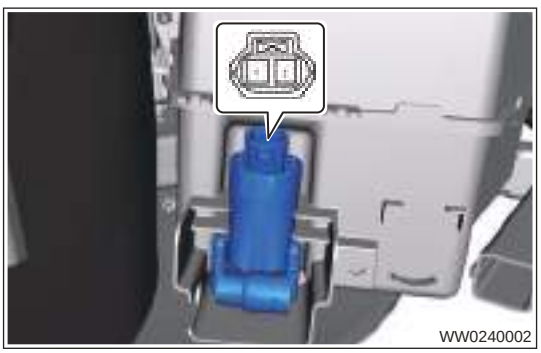
a. Fill washer fluid reservoir assembly with washer fluid.

b. Connect positive (+) battery lead to terminal 1 of washer pump, and connect negative (-) battery lead to terminal 2.

c. Check that washer fluid flows out of front washer pump. OK: Washer fluid flows out of front washer pump. If result is not as specified, replace the washer pump assembly.

d. Connect positive (+) battery lead to terminal 1 of washer pump, and connect negative (-) battery lead to terminal 2.

e. Check that washer fluid flows out of rear washer pump. OK: Washer fluid flows out of rear washer pump. If result is not as specified, replace the washer pump assembly.



Installation

⚠ Caution

- Always operate carefully to prevent components from being damaged, when installing washer pump assembly.
- Install washer pipeline joint in place, when installing washer pump assembly.
- Check washer system for proper operation, after installing washer pump assembly.

1. Installation is in the reverse order of removal.

Washer Fluid Reservoir Assembly

Removal

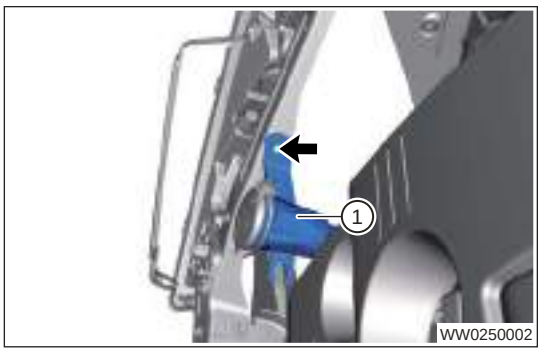
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing washer fluid reservoir assembly.
- Appropriate force should be applied, when removing washer fluid reservoir assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing washer fluid reservoir assembly.

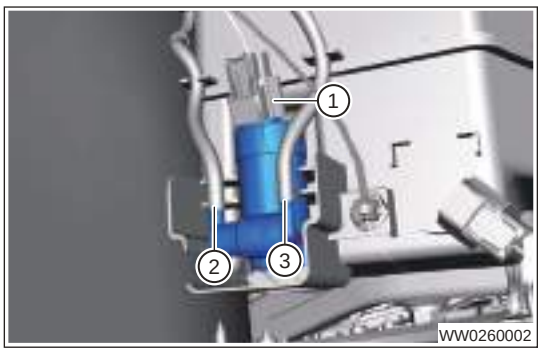
1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the guide pipe assembly.
   a. Remove the fixing bolt (arrow) from guide pipe assembly.

      Tightening Torque
      5 ± 1 N·m

   b. Remove guide pipe assembly (1) from washer fluid reservoir assembly.

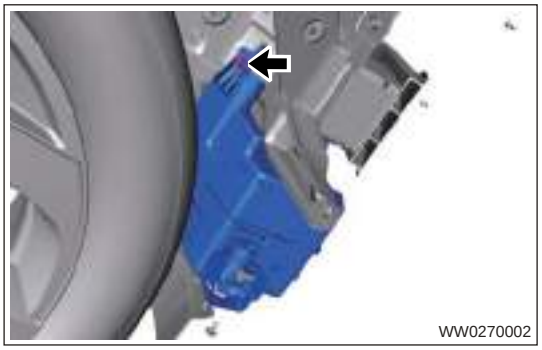


5. Remove the washer fluid reservoir assembly.
   a. Disconnect the front and rear washer pump connectors (1).
   b. Disconnect joint (3) between rear washer line and washer pump and joint (2) between front washer line and washer pump.



c. Remove 1 fixing nut (arrow) from side of washer fluid reservoir assembly.

Tightening Torque
7 ± 1 N·m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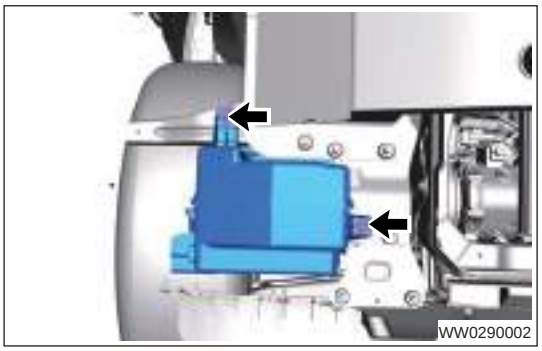
d. Remove 2 fixing nuts (arrow) from front of washer fluid reservoir assembly, and remove washer fluid reservoir assembly.

Tightening Torque
7 ± 1 N·m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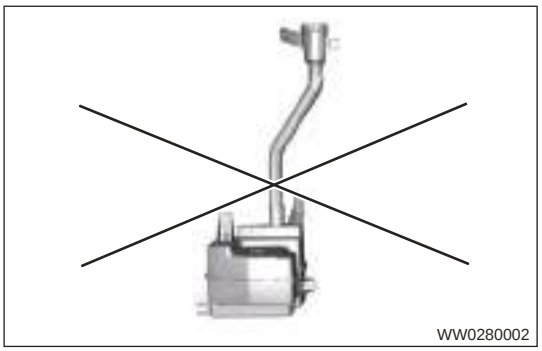
Inspection

1. Check the washer fluid reservoir assembly.
   a. Check washer fluid reservoir assembly for leakage, deformation or damage. Replace washer fluid reservoir assembly if necessary.
   b. Check internal and external sides of washer fluid reservoir for dirt. Remove dirt or replace washer fluid reservoir assembly if necessary.
   c. Check grommet for damage. Replace grommet if necessary.


WW0280002

Installation

⚠ Caution

- Always operate carefully to prevent components from being damaged, when installing washer fluid reservoir assembly.
- Tighten fixing bolts to specified torque, when installing washer fluid reservoir assembly.
- Install washer pipeline joint in place when installing washer fluid reservoir assembly.

1. Installation is in the reverse order of removal.

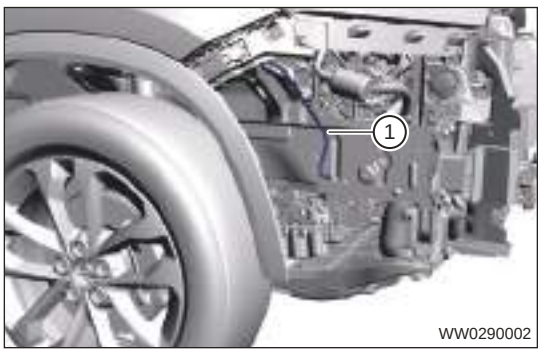
Front Washer Line Assembly

Removal

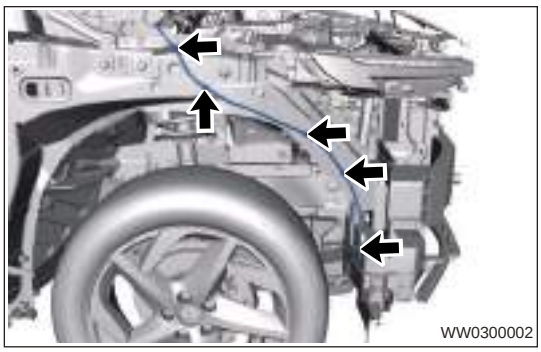
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing washer pipeline assembly.
- Appropriate force should be applied, when removing washer pipeline assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing washer pipeline assembly.

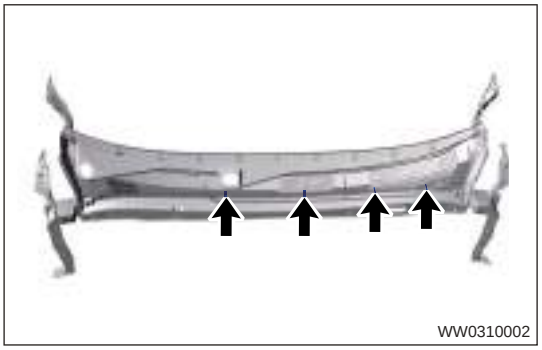
1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the front right wheel house protector assembly.
5. Remove the front windshield trim board assembly.
6. Remove the front nozzle assembly.
7. Remove the front washer line assembly.
   a. Disconnect the joint (1) between front washer line and front washer pump.



   b. Remove the clips (arrow) from washer line on the inner side of wing.



c. Remove 4 clips (arrow) from washer line on the front windshield trim board.



Installation

⚠ Caution

- Always operate carefully to prevent components from being damaged, when installing washer line assembly.
- Install washer pipeline joint in place, when installing washer pipeline assembly.
- Check washer system for proper operation, after installing washer pipeline assembly.

1. Installation is in the reverse order of removal.

Rear Washer Line Assembly

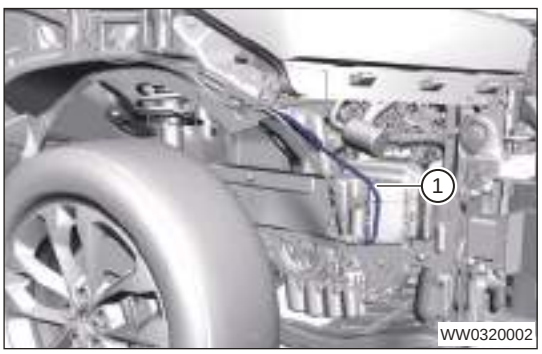
Removal

⚠ Caution

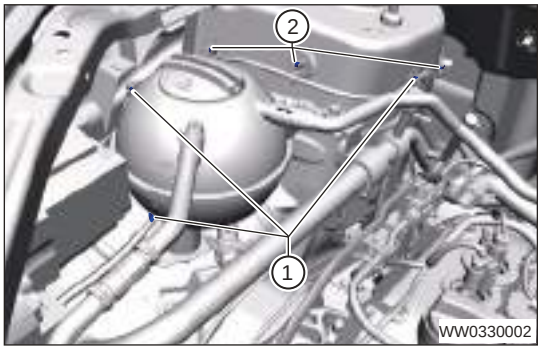
- Be sure to wear necessary safety equipment to prevent accidents when removing rear washer line assembly.
- Appropriate force should be applied when removing rear washer line assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched when removing rear washer line assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the rear washer line assembly.

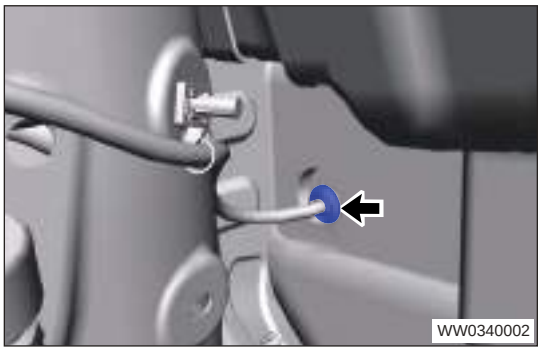
a. Disconnect the joint (1) between rear washer line and rear washer pump.



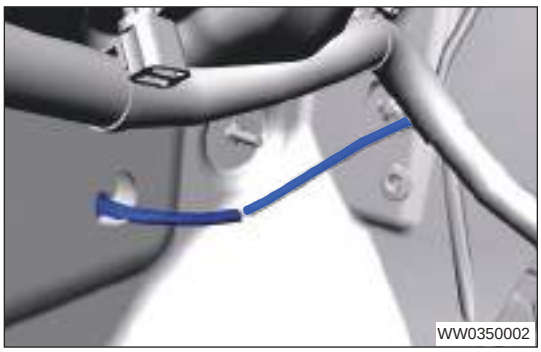
b. Remove 3 fixing clips (1) and 3 band clips (2) of pipe from projection welding stud along pipe.



c. Separate 2-way connector (arrow) of washer pipe and wire harness end pipe.



d. Remove grommet with pipe from front baffle plate.



Installation

⚠ Caution

- Always operate carefully to prevent components from being damaged, when installing washer line assembly.
- Install washer pipeline joint in place, when installing washer pipeline assembly.
- Check washer system for proper operation, after installing washer pipeline assembly.

1. Installation is in the reverse order of removal.

WINDOW/SLIDING ROOF

Warnings and precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. To protect window regulating system, window jam protection function will be canceled in some cases, and auto window UP function will also be canceled, to avoid possible potential risk, at this time window only has general regulating function, window regulating function of corresponding door will resume after jam protection learning.
2. When removing/installing sliding roof fixing bracket, an assistant is needed to hold it. During operation, prevent the sliding roof fixing bracket from dropping, which may cause an accident.

Precautions

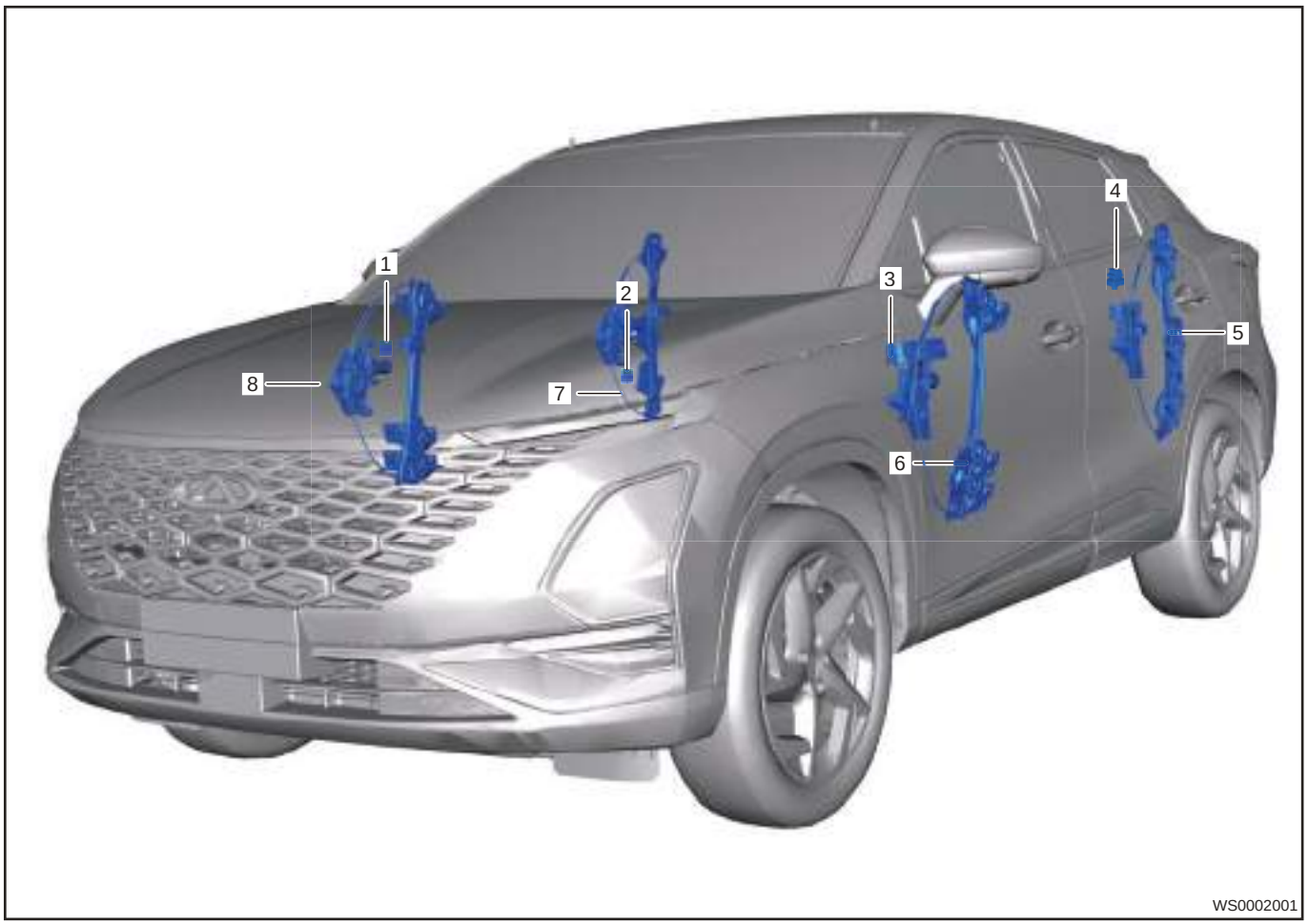
In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

1. Be sure to wear safety equipment to prevent accidents, when removing glass regulator switch.
2. Prevent window glass from dropping which will cause damage, when removing front and rear door glass assembly.
3. When removing front windshield assembly, two persons are required and prevent it from dropping.
4. When removing rear windshield assembly, two persons are required and prevent it from dropping.
5. Appropriate force should be applied, when removing sliding roof front and rear glass. Be careful not to operate roughly, to avoid damage to sliding roof glass.

System Overview

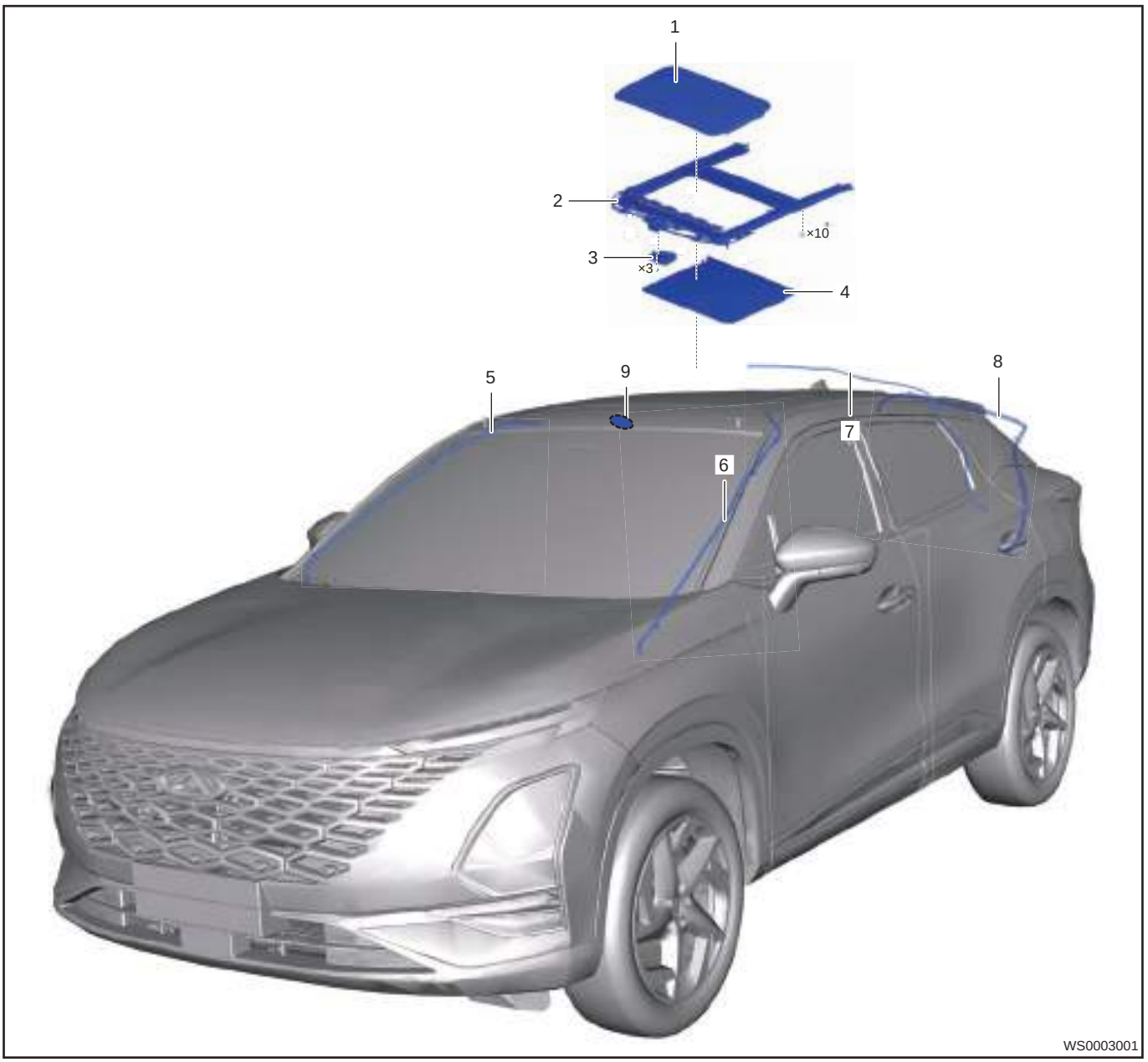
System Components Diagram

1	Front Windshield Assembly	5	Front Right Side Door Quarter Window Glass Assembly
2	Front Left Side Door Quarter Window Glass Assembly	6	Front Right Side Door Glass Assembly
3	Front Left Side Door Glass Assembly	7	Rear Right Side Door Glass Assembly
4	Rear Left Side Door Glass Assembly	8	Rear Windshield Assembly



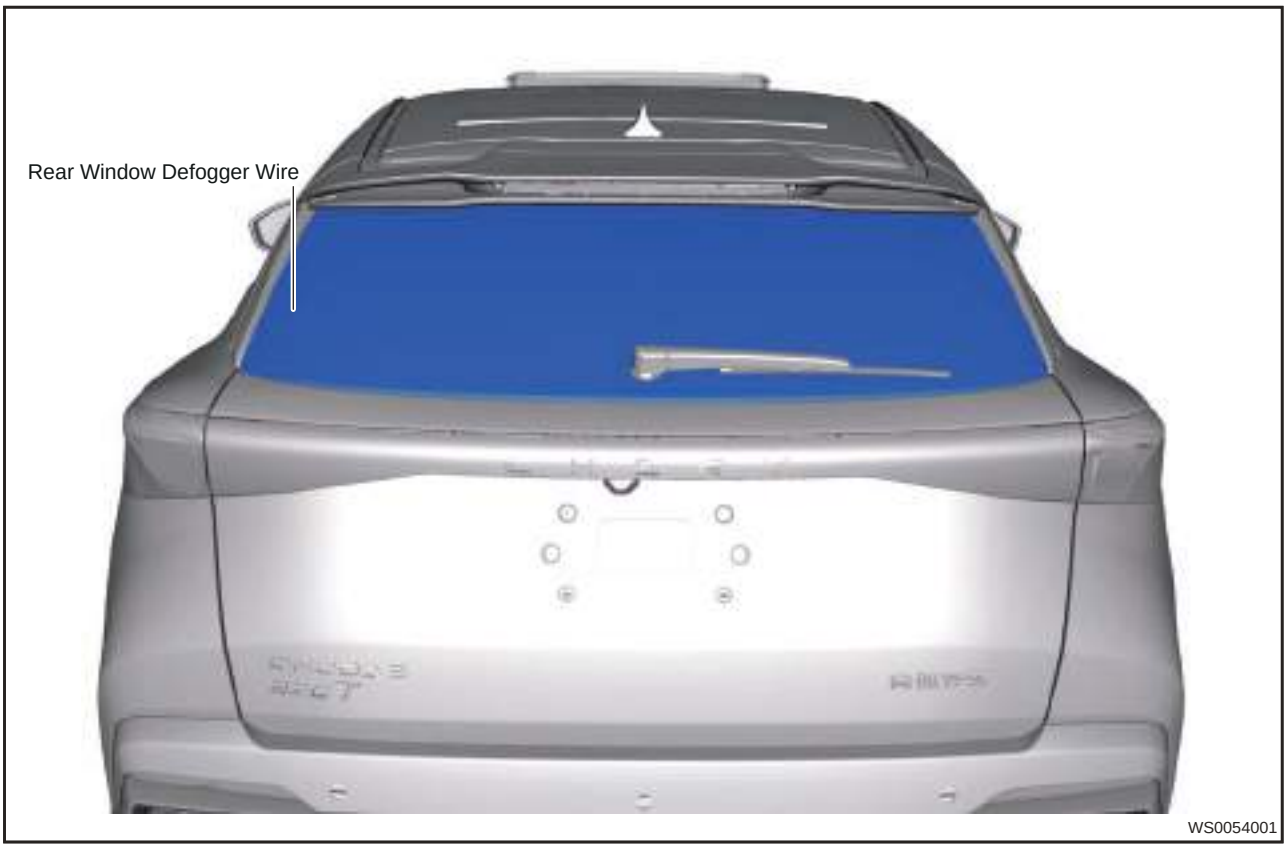
1	Front Right Door Glass Regulator Switch Assembly	5	Rear Left Door Glass Regulator
2	Rear Right Door Glass Regulator Switch Assembly	6	Front Left Door Glass Regulator
3	Front Left Door Glass Regulator Switch Assembly	7	Rear Right Door Glass Regulator
4	Rear Left Door Glass Regulator Switch Assembly	8	Front Right Door Glass Regulator

Power window control system controls each window glass UP/DOWN function by operating the glass regulator control switches on door inner protector assembly. Main control devices of this system include: Front left door glass regulator switch (built into driver side door) and glass regulator switches (built into front and rear passenger side doors). Press the front left door glass regulator switch or any switch on glass regulator switch, to transmit the UP/DOWN signal to corresponding power glass regulator motor, thus controlling UP/DOWN operation of corresponding power window glass.



1	Sliding Roof Glass Assembly	6	Sliding Roof Front Left Drain Hose Assembly
2	Sliding Roof Bracket Assembly	7	Sliding Roof Rear Right Drain Hose Assembly
3	Sliding Motor Assembly	8	Sliding Roof Rear Left Drain Hose Assembly
4	Sliding Roof Sun Visor	9	Sliding Roof Switch Assembly
5	Sliding Roof Front Right Drain Hose Assembly		

On this model, panoramic sliding roof consists of sliding roof switch, sliding roof glass, electronic sun visor, glass motor, sun visor motor, control module, wire harness and sliding roof drain hose.



Turn on the rear defroster switch, heat the rear defroster heat wire to remove fog, frost or water steam on the rear windshield, gaining clear view. To turn on the rear defroster, it is necessary to turn ENGINE START STOP switch to “ON” and press rear defroster switch. Rear defroster switch indicator comes on, while the indicator on rear defroster switch starts to work. Rear defroster stops operating and the indicator goes off after the rear defroster switch is pressed again.

System Principle

Main Component Function

Item	Description
Power window lock switch	• Located on front left door inner protector assembly. It controls the operation of front and rear passenger side glass regulator switches. • When power window lock switch is in lock position, only driver side glass regulator switch can control UP/DOWN operation of power window glass.
Power glass regulator switch	• Located on door inner protector assembly. • Each power glass regulator switch controls UP/DOWN operation of corresponding power window glass.
Power glass regulator	• It can change position of power window glass.

System Function

Function	Description
Manual UP function	• Power window glass goes up when glass regulator control switch is pulled up and held while it stops as the switch is released.
Manual DOWN function	• Power window glass goes down when glass regulator control switch is pushed down and held while it stops as the switch is released.
Auto DOWN	• Power window glass goes down automatically when glass regulator control switch is pressed shortly. To stop it partway, push or pull the switch again.
Power window lock function	• Operation of corresponding power window glass is impossible with all passenger side power glass regulator switches when power window lock switch is pressed. At this time, only operation of driver side power window glass is possible. This function can be canceled only when power window lock switch is pressed again.

Operation Inspection

1. Check the power window lock switch.
   a. Check that front and rear passenger side power window glasses cannot be operated with front and rear passenger side power glass regulator switches, when power window lock switch is pressed.
      • OK: Operation of front and rear passenger side power glass regulator switches is invalid.

   b. Check that front and rear passenger side power window glasses can be operated with front and rear passenger side power glass regulator switches, when power window lock switch is pressed again.
      • OK: Operation of front and rear passenger side power glass regulator switches is possible.
2. Check the manual UP/DOWN function.
   a. Check that driver side power window glass operates as follows:

OK

Condition	Front Left Door Glass Regulator Switch	Switch Operation	Power Window Glass
Turn ENGINE START STOP switch to “OFF”	Driver side	Pulled	UP (close)

Condition	Front Left Door Glass Regulator Switch	Switch Operation	Power Window Glass
		Pressed	DOWN (open)

b. Check that power window glass other than driver side power window glass operates as follows:

OK

Condition	Front Left Door Glass Regulator Switch	Switch Operation	Power Window Glass
Turn ENGINE START STOP switch to “OFF” and window lock switch to OFF position	Passenger side	Pulled	UP (close)
		Pressed	DOWN (open)
	Rear left side	Pulled	UP (close)
		Pressed	DOWN (open)
	Rear right side	Pulled	UP (close)
		Pressed	DOWN (open)

3. Check the remote manual UP/DOWN function.
   a. Check that driver side power window glass operates as follows:

OK

Condition	Front Left Door Glass Regulator Switch	Switch Operation	Power Window Glass
Turn ENGINE START STOP switch to “OFF”	Driver side	Fully pulled up	UP (close)
		Fully pushed	DOWN (open)

b. Check that power window glass other than driver side power window glass operates as follows:

OK

Condition	Front Left Door Glass Regulator Switch	Switch Operation	Power Window Glass
Turn ENGINE START STOP switch to “OFF” and window lock switch to “OFF” position	Passenger side	Pulled	UP (close)
		Pressed	DOWN (open)
	Rear left side	Pulled	UP (close)
		Pressed	DOWN (open)
	Rear right side	Pulled	UP (close)
		Pressed	DOWN (open)

Window Jam Protection System

Composition

It consists of 1 front left door glass regulator switch, 3 single glass regulator switches, 4 glass regulators and Body Control Module (BCM).

Function Introduction

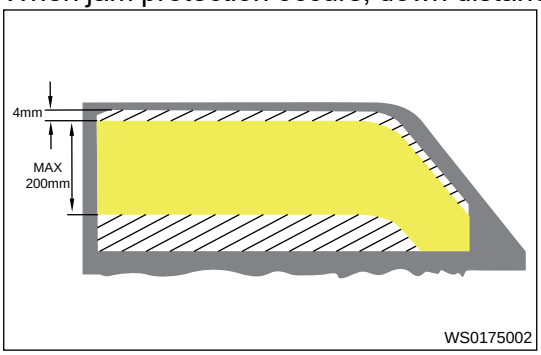
"Jam protection" is window regulating system with jam protection function, which mainly reflects on: When operating window auto UP or remote one-button UP, and passenger is caught carelessly by window which

raises automatically, jam protection control module will control glass regulator motor to reverse before motor reaches the set jam protection force, thus making window glass go down a certain distance, avoiding injury to passenger.

Jam Protection Requirement

Window regulating system with jam protection function must meet followings in performance requirements of jam protection system:

1. Jam protection area, which is within 4 mm - 200 mm range of yellow part in following illustration.
2. Jam protection force is less than 100 N.
3. When jam protection occurs, down distance of window reverse is 150 mm.



Operation

Jam protection system achieves jam protection function by controlling rotation of motor.
When window raises automatically, if one passenger is caught, according to motor characteristics, it can be known that current increases quickly and speed decreases, jam protection system collects relevant parameters and performs calculation, which will drive motor to reverse before jam protection force reaches 100 N, thus achieving "jam protection".

Basic Function

1. General function: UP/DOWN function of normal power glass;
2. Auto window UP: Turn window regulator switch to top. If there is no obstacle, window will go up automatically until reaching top and then stop;
3. Remote one-button window UP: Press remote key lock button once, door will lock automatically and window will go up automatically until reaching top and then stop;
4. Jam protection function:
5. Ignition pause function: As engine starts, window regulating operation will pause to provide large current for assist;
6. Window DOWN by long pressing remotely;
7. Canceling jam protection: When jam protection occurs twice continuously, auto window UP will be canceled (jam protection), ensuring raising window fully when it is necessary to raise window forcibly;
8. Overload heat protection: To avoid damage caused by motor overheating, abnormal operation of window regulating frequently is not allowed;
9. Soft pausing function: To avoid impact and noise due to going down to bottom of glass driven by motor, stop going down as glass nearly reaches bottom;
10. Manual learning function: Press window switch, raise glass manually to top and make it be locked for 2 s, then operate glass to bottom manually and make it be locked for 2 s.

General Function

Do not operate window regulator switch for power window regulating until ENGINE START STOP switch is turned to ON.
Window regulator switch has delay function, that is window regulator switch can operate if front door is not opened within 120 s after turning key to a position other than ON position; within this period, once any front door is opened, glass regulating function will be disabled immediately.

Remote One-button Window UP and Auto Window UP Function

- To protect window regulating system, window jam protection function will be canceled in some cases, and auto window UP function will also be canceled, to avoid possible potential risk, at this time window only has general regulating function, window regulating function of corresponding door will resume after jam protection learning.
- When window raises automatically or remotely, make sure that there is no obstacle within window raising range, or jam protection will be activated and the window operates in reverse direction, causing the condition that window cannot close normally.
- Jam protection function is a kind of window safety protection function. Do not use any object and informal method to verify jam protection frequently, or it will damage system mechanism (such as motor, glass, regulator and glass guide etc).

Remote window up

Turn off ENGINE START STOP switch, remove key, and close four doors, and vehicle enters armed state when remote lock button or door handle switch is pressed, and four window glasses will raise automatically. If lock button, unlock button or door handle switch is pressed again as window glass raises automatically, window glass will stop raising.

Jam Protection Function

If jam protection system operates normally, jam protection function will be activated when the window meets obstacle resistance within jam protection area as window raises automatically or by one-button remotely. Max. allowable jam protection force by system is 100 N while glass will stop automatically and go back a certain distance (150 mm). If you want to close window, move away the obstacle, and operate switch again.

When window is nearly closed (within 4 mm), jam protection function will stop sensing, so extremely thin obstacle will not be seen easily during window raising.

Remote Long-press Window DOWN Function

Turn ENGINE START STOP switch to OFF and remove key with four doors closed, press and hold unlock button on remote key for at least 1.5 seconds, window glass of four doors will go down automatically. Release unlock button on remote key during going down, window glass will stop operating.

Press and hold unlock button on remote key as window goes down remotely. If remote signal suspends due to shaking (including hands tremble, electromagnetic interference etc), remote window DOWN operation will end.

Jam Protection Canceling Conditions

System will cancel jam protection function in following conditions:

1. When jam protection occurs twice continuously (window does not raise to top);
2. Control module cuts off power supply connection during operation or non-operation;
3. Window position calculation judged by system exceeds limit value.
   a.If there is obstacle as window closes within 10 seconds for first jam protection rollback, jam protection function will be activated again, and window will reverse automatically. At this time, only manual window UP function operates. Window provides maximum closing force within 10 seconds, to make window be closed smoothly in some extreme cases. Please make sure there is no obstacle during closing, avoiding personal injury.
   b.When jam protection is canceled, use the remote one-button window UP function, window will go down to bottom and then raise to the top, thus jam protection learning is completed, so that system has multiple functions.

Overload Heat Protection Function

If the window is operated repeatedly within a short time, window regulator motor will be burnt due to overheating.

To protect the motor, if window regulating operation is performed about 10 times continuously, control function of corresponding window switch will be disabled actively. After motor temperature resumes to

normal, the switch will be able to operate, and this function will not affect the normal use of window regulating function.

Perform Jam Protection Module Self-learning in Following Conditions:

1. After locking occurs twice continuously.
2. After replacing body control module.
3. After replacing power glass regulator.
4. After vehicle powers off.

Learning Function (Jam Protection Module Initialization)

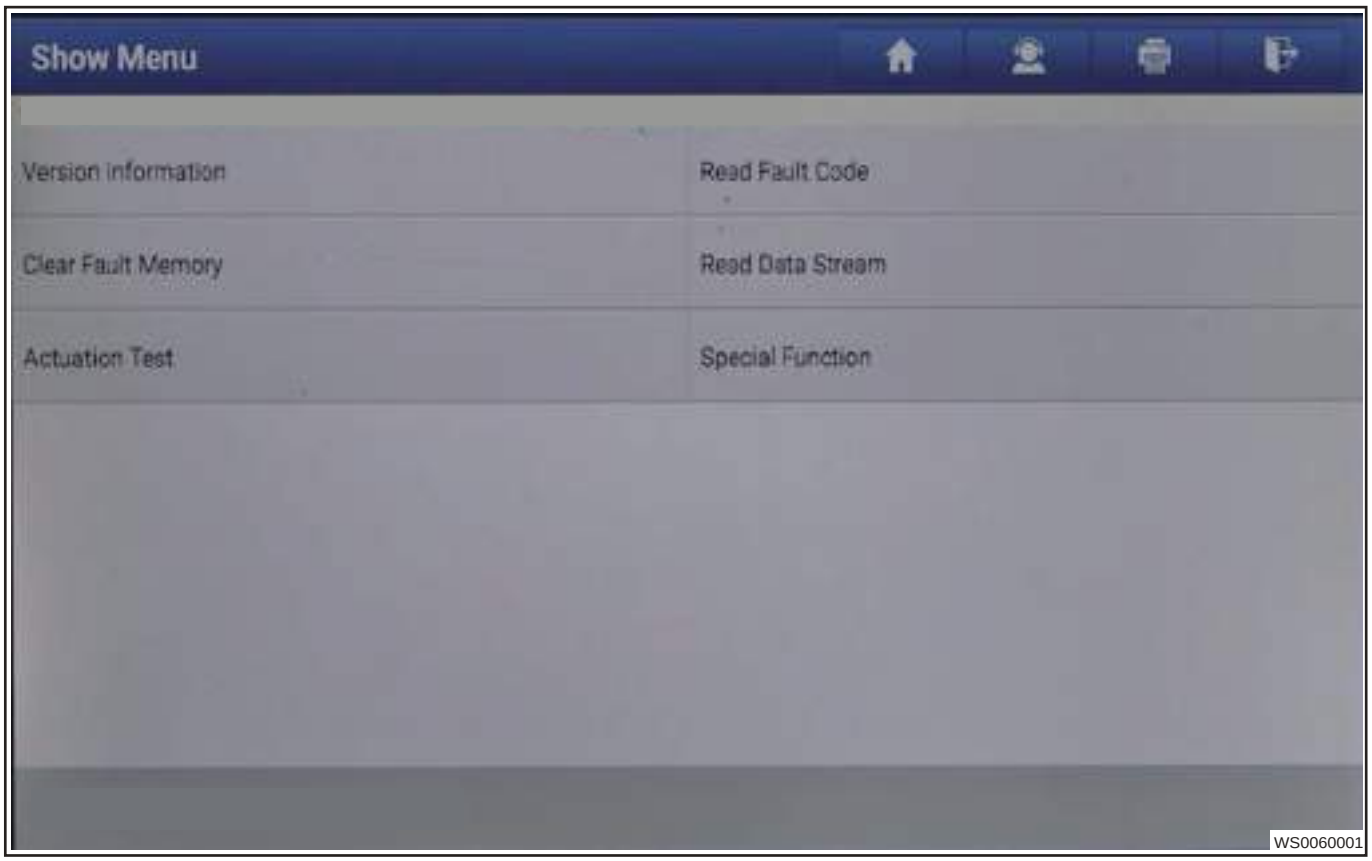
1. When vehicle passes through bumps, hollow road surface during driving, one-button window UP operation is interrupted and window may reverse and go down because door system suffers action of gravity suddenly. Probability of rollback occurrence by mistake is low, and it is normal.
2. Learning function includes manual learning and diagnostic tester learning.
   During normal use of window regulating system, such as entering "jam protection canceling" condition without auto window UP (jam protection function), jam protection window regulating system resumes to multiple functions by using manual learning.
   It is necessary to perform diagnostic tester learning when replacing door regulating system related mechanisms (such as glass regulator, glass run etc.), to make sure system parameters can be updated. After completing learning, clear the fault codes using diagnostic tester.
   Make sure there is no obstacle in window range during learning, manual learning steps are as follows:

   a.Turn ENGINE START STOP switch to ON.
   b.Operate window glass to raise until reaching top manually and lock it for 2 seconds.
   c.Release the switch.
   d.Operate window glass to go down until reaching bottom manually and keep it lock for 2 seconds.
   e.Release the switch.
   f.Try the auto window UP function.

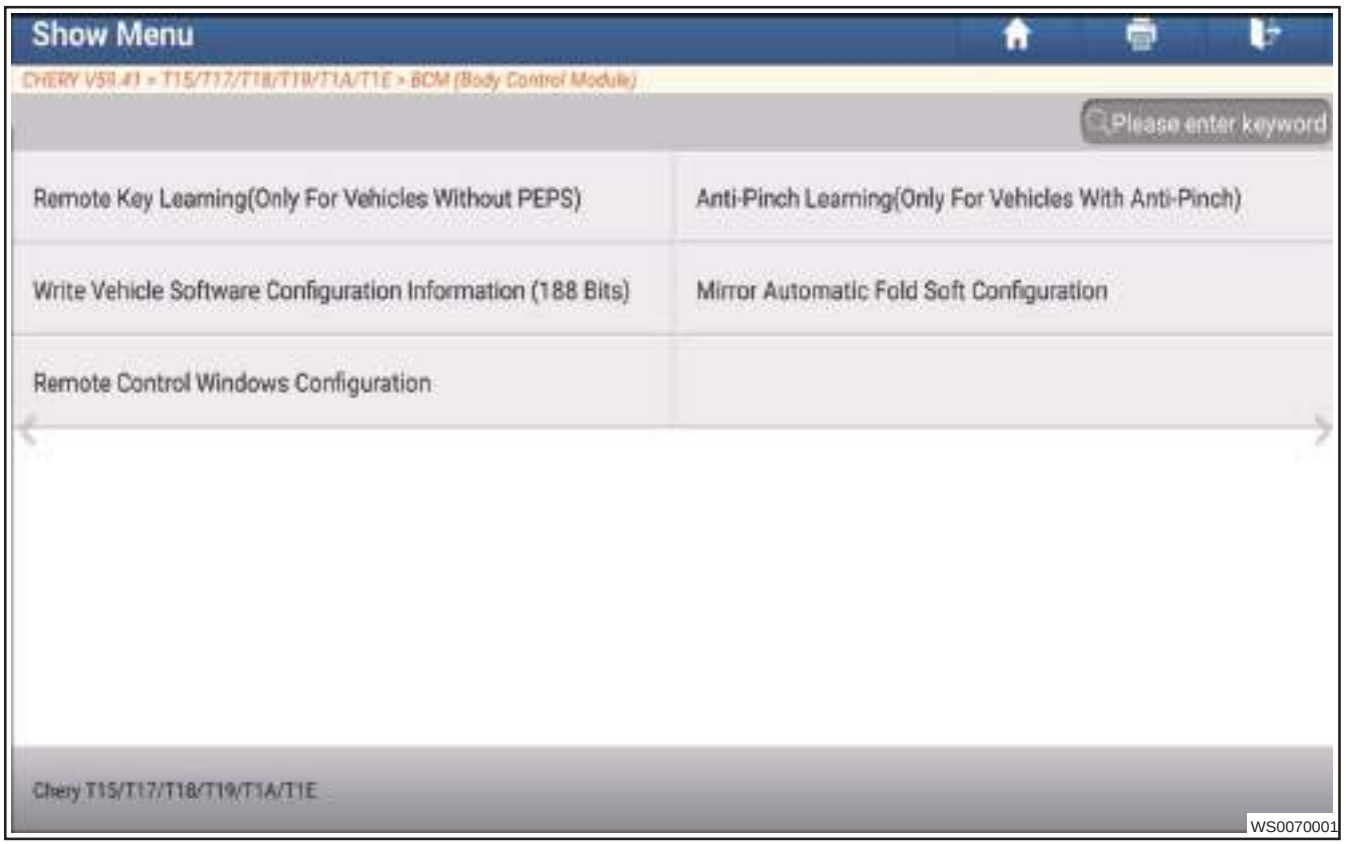
Matching Learning

Window Jam Protection Learning with Diagnostic Tester

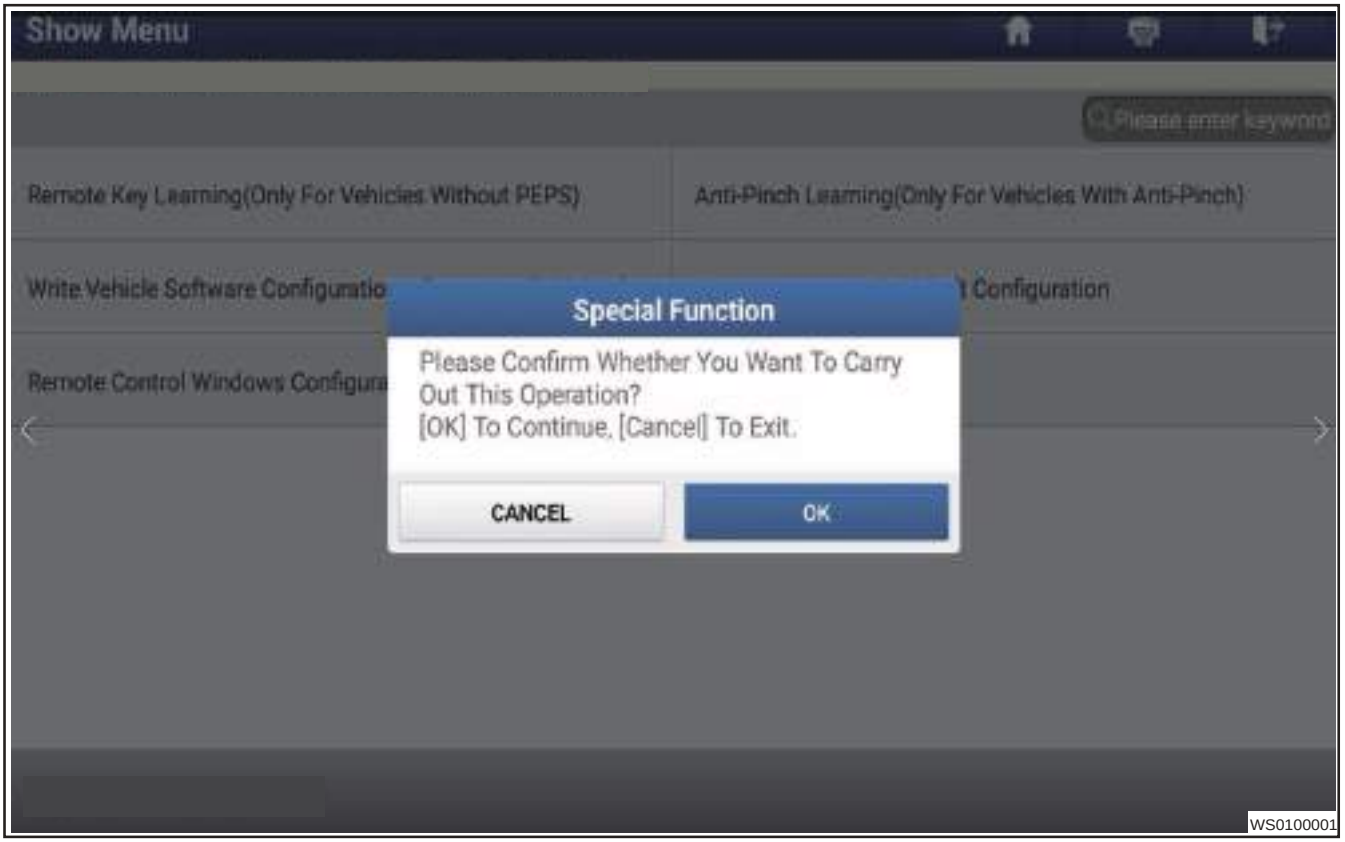
1. Enter diagnostic interface, select “BCM (Body Control Module)” on diagnostic tester interface to enter next interface.
2. Select "Special function" on diagnostic tester interface and click it to enter.



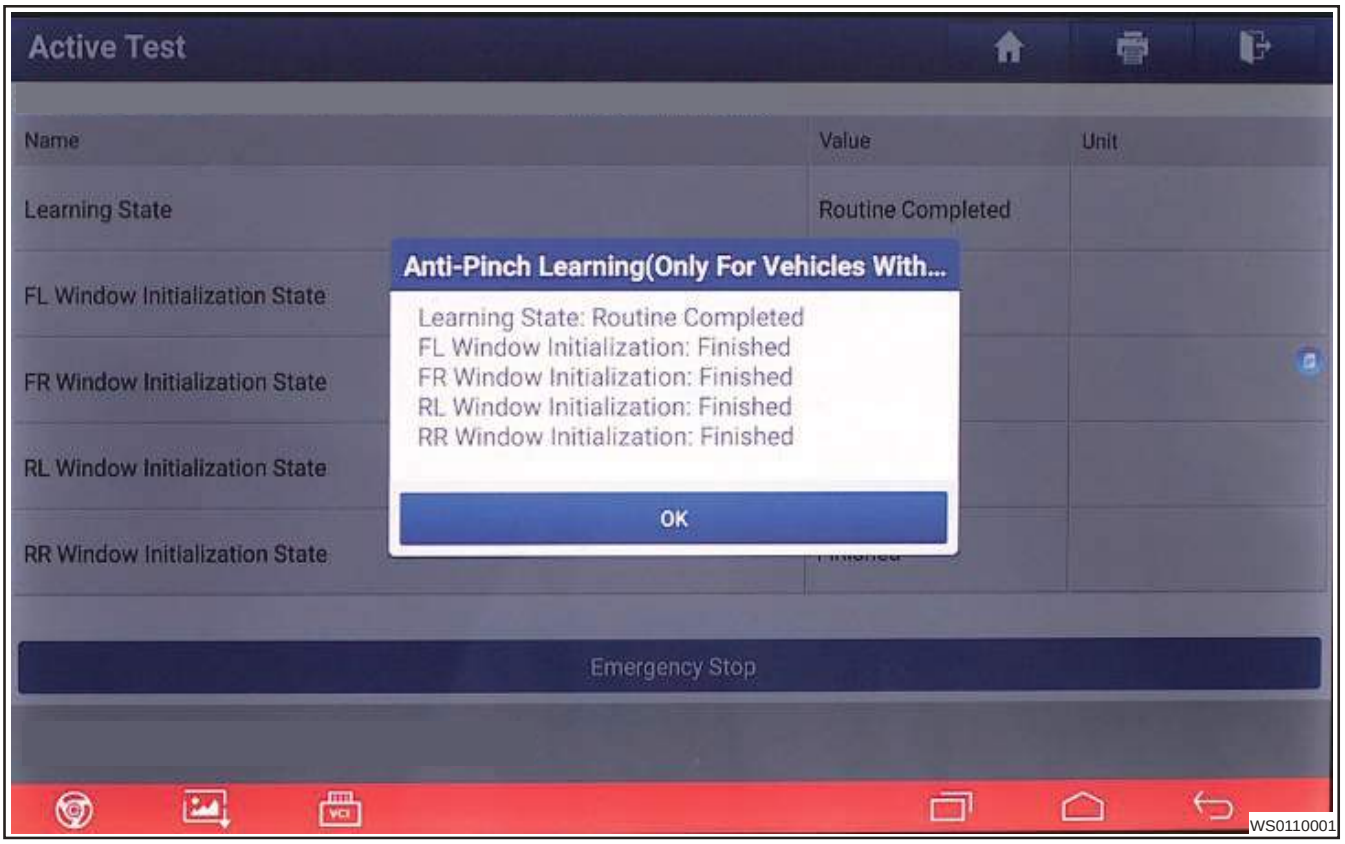
3. Select "Anti-Pinch Learning (Only For Vehicles With Anti-Pinch)" on diagnostic tester interface and click it to enter.



4. “Please Confirm Whether You Want To Carry Out This Operation? [OK] To Continue, [Cancel] To Exit.” is displayed on the diagnostic tester, click “OK”.



5. At this time, window jam protection learning will be performed.



6. Window glass self-learning is succeeded.

Sliding Roof Self-learning

To avoid the accidental failing to close sliding roof problem, perform self-learning of sliding roof once manually after vehicle rolls from the line. The specific learning method is: In fully closed position, long press the window closing button until the reset action occurs, use the automatic function to operate glass to the half open position, and long press the closing button until it reaches the fully closed position, then the whole self-learning is finished.

Check Sliding Roof Switch

⚠ Caution

- When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

a. Turn ENGINE START STOP switch to OFF.
b. Disconnect the sliding roof switch connector.
c. Using a digital multimeter, check for continuity between terminals of connector to check if sliding roof switch function is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
Sliding roof switch (2) - Sliding roof switch (5)	"Sliding Roof Glass Open" button pressed	⩽ 1 Ω
Sliding roof switch (1) - Sliding roof switch (6)	"Sliding Roof Glass Closed" button pressed	⩽ 1 Ω
Sliding roof switch (6) - Sliding roof switch (8)	"Sun Visor Open" button pressed	⩽ 1 Ω
Sliding roof switch (7) - Sliding roof switch (9)	"Sun Visor Closed" button pressed	⩽ 1 Ω

d. If result is not as specified, replace sliding roof switch.

Diagnosis & Test

Problem Symptoms Table

Sliding Roof Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Sliding roof water leakage	Sliding roof weatherstrip damaged
	Drain hose clogged or folded
	Distance between sliding roof glass and roof hole is extremely large or height of glass is poor
	Sliding roof drain is clogged by foreign matters
Wind noise from sliding roof	Poor fixation of sliding roof glass and roof

Symptom	Suspected Area
	Sliding roof wind screen damaged
Abnormal starting and operation	Poor connection in wire harness, fuse or ground wire
	Poor sliding roof control unit, sliding roof motor
	Sun visor control unit, sun visor fault
	Improper installation position between sun visor mounting
	Sun visor comes off from guide rail
	Foreign matters in guide rail
Incorrect starting	Sun visor switch fault
	Poor sliding roof motor
	Sun visor comes off from guide rail, guide rail is scratched with trim strip after it is damaged
	Sun visor module fault
	Sun visor motor fault
Operating noise of sun visor	Operation is resisted when sun visor comes off from guide rail or trim strip is damaged
	Lack of grease in guide rail of sun visor
	Impact between drain hose and vehicle body
	Distance between sliding roof glass and roof hole is extremely large or height of glass is poor
	Sun visor mounting bracket deformation or improper position

Rear Windshield Problem Symptoms Table

Symptom	Suspected Area
Rear defroster switch is turned on but does not operate	Fuse
	Rear defroster switch
	Rear defroster wire
	Wire harness or connector
	Ground

Power Glass Problem Symptoms Table

Hint:

- Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Driver side/passenger side power window glass cannot be operated with driver side glass regulator switch	Power supply, fuse
	Driver side glass regulator switch
	Driver side/passenger side power glass regulator
	Wire harness or connector
	Body Control Module (BCM)
Passenger side power window glass cannot be operated with passenger side glass regulator control switch	Power supply, fuse
	Passenger side power glass regulator switch
	Passenger side power glass regulator
	Wire harness or connector
	Body Control Module (BCM)
Power window glass has intermittent problem	Ground
	Wire harness or connector

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect the diagnostic tester (the latest software).
3. Turn ENGINE START STOP switch to ON.
4. Use the diagnostic tester to record and clear DTCs stored in the system.
5. Turn ENGINE START STOP switch to OFF and wait several seconds.
6. Turn ENGINE START STOP switch to ON and check DTCs in the system again.
7. If DTC is detected, it indicates current malfunction.
8. If no DTC is detected, malfunction indicated by the DTC is intermittent.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnosis Procedure

Hint:
Use following procedures to troubleshoot the control system.

1	**Vehicle brought to workshop**

Next

2	**Examine vehicle and check basic items**

Check system power supply voltage, and check that fuse, wire harness and connector are connected normally.

OK

Standard voltage: Not less than 12 V.

Result

NG → **Check and replace malfunctioning parts**

OK

3	**Using a diagnostic tester, read related DTC and data stream information**

Result

Result	Proceed to
No DTC	A
DTC occurs	B

A → **Perform troubleshooting procedure without DTCs according to malfunction symptom**

B

4	**Troubleshoot according to DTCs troubleshooting procedure**

Result

Result	Proceed to
Problem is not resolved	A
Problem is resolved	B

A → **Return to procedure 1 and troubleshoot the process again**

B

5	**According to system malfunction repair completion inspection and delivery, confirm if malfunction is resolved.**

Result

Result	Proceed to
Delivery inspection is failed	A
Delivery inspection is qualified	B

A → **Return to procedure 1 and troubleshoot the process again**

B

6	**Finished**

Diagnostic Trouble Code (DTC) Chart

DTC	DTC	Detection Condition	Possible Cause	Maintenance Advice
B100C-13	Front Left Window Up Control Circuit-Circuit Open	Input continuously for 20 s, the software collects once every 10 ms, detect continuously for 5 times after a delay of 20 s, and the circuit current is less than 1 A	• Ground • Line connector • Glass regulator switch • Glass regulator motor • BCM module • Jam protection learning is not performed	/
B100C-71	Front Left Window Up Control Circuit-Actuator Stuck	The error is less than 10%, the time of duration is more		/

DTC	DTC	Detection Condition	Possible Cause	Maintenance Advice
		than 100 MS, the software will detect once every 10MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will be output as long as operating conditions of load are met.		
B100D-13	Front Left Window Down Control Circuit-Circuit Open	Input continuously for 20 s, the software collects once every 10 ms, detect continuously for 5 times after a delay of 20 s, and the circuit current is less than 1 A		/
B100D-71	Front Left Window Down Control Circuit-Actuator Stuck	The error is less than 10%, the time of duration is more than 100 MS, the software will detect once every 10MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will be output as long as operating conditions of load are met.		/
B100E-13	Front Right Window Up	Input continuously for 20 s, the software collects		/

DTC	DTC	Detection Condition	Possible Cause	Maintenance Advice
	Control Circuit-Circuit Open	once every 10 ms, detect continuously for 5 times after a delay of 20 s, and the circuit current is less than 1 A		
B100E-71	Front Right Window Up Control Circuit-Actuator Stuck	The error is less than 10%, the time of duration is more than 100 MS, the software will detect once every 10MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will be output as long as operating conditions of load are met.		/
B100F-13	Front Right Window Down Control Circuit-Circuit Open	Input continuously for 20 s, the software collects once every 10 ms, detect continuously for 5 times after a delay of 20 s, and the circuit current is less than 1 A		/
B100F-71	Front Right Window Down Control Circuit-Actuator Stuck	The error is less than 10%, the time of duration is more than 100 MS, the software will detect once every 10MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power		/

DTC	DTC	Detection Condition	Possible Cause	Maintenance Advice
		supply is turned on. Regardless of key position, load will be output as long as operating conditions of load are met.		
B1010-13	Rear Left Window Up Control Circuit-Circuit Open	Input continuously for 20 s, the software collects once every 10 ms, detect continuously for 5 times after a delay of 20 s, and the circuit current is less than 1 A		/
B1010-71	Rear Left Window Up Control Circuit-Actuator Stuck	The error is less than 10%, the time of duration is more than 100 MS, the software will detect once every 10MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will be output as long as operating conditions of load are met.		/
B1011-13	Rear Left Window Down Control Circuit-Circuit Open	Input continuously for 20 s, the software collects once every 10 ms, detect continuously for 5 times after a delay of 20 s, and the circuit current is less than 1 A		/
B1011-71	Rear Left Window Down Control Circuit-Actuator Stuck	The error is less than 10%, the time of duration is more than 100 MS, the		/

DTC	DTC	Detection Condition	Possible Cause	Maintenance Advice
		software will detect once every 10MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will be output as long as operating conditions of load are met.		
B1012-13	Rear Right Window Up Control Circuit-Circuit Open	Input continuously for 20 s, the software collects once every 10 ms, detect continuously for 5 times after a delay of 20 s, and the circuit current is less than 1 A		/
B1012-71	Rear Right Window Up Control Circuit-Actuator Stuck	The error is less than 10%, the time of duration is more than 100 MS, the software will detect once every 10MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will be output as long as operating conditions of load are met.		/
B1013-13	Rear Right Window Down Control Circuit-Circuit Open	Input continuously for 20 s, the software collects once every 10 ms, detect		/

DTC	DTC	Detection Condition	Possible Cause	Maintenance Advice
		continuously for 5 times after a delay of 20 s, and the circuit current is less than 1 A		
B1013-71	Rear Right Window Down Control Circuit-Actuator Stuck	The error is less than 10%, the time of duration is more than 100 MS, the software will detect once every 10MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will be output as long as operating conditions of load are met.		/
B1022-71	FL Window Button-Actuator Stuck	It is detected that the switch input state has not changed for 20 s		/
B1023-71	FR Window Button-Actuator Stuck	It is detected that the switch input state has not changed for 20 s		/
B1033-71	RL Window Button-Actuator Stuck	It is detected that the switch input state has not changed for 20 s		/
B1025-71	RR Window Button-Actuator Stuck	It is detected that the switch input state has not changed for 20 s		/
B1026-71	Passenger FR Window Button-Actuator Stuck	It is detected that the switch input state has not changed for 20 s		/
B1034-71	Passenger RL Window Button-Actuator Stuck	It is detected that the switch input		/

DTC	DTC	Detection Condition	Possible Cause	Maintenance Advice
		state has not changed for 20 s		
B1028-71	Passenger RR Window Button Short-Actuator Stuck	It is detected that the switch input state has not changed for 20 s		/
B1029-71	FL Window Relay-Actuator Stuck	It is detected that the output valid state of glass up or down relay has not changed for 20 s		/
B102A-71	FR Window Relay-Actuator Stuck	It is detected that the output valid state of glass up or down relay has not changed for 20 s		/
B102B-71	RL Window Relay-Actuator Stuck	It is detected that the output valid state of glass up or down relay has not changed for 20 s		/
B102C-71	RR Window Relay-Actuator Stuck	It is detected that the output valid state of glass up or down relay has not changed for 20 s		/
B102E-86	FL Window Motor Position Signal-Signal Invalid	It is calculated that the window position exceeds the top position or bottom position by 25 mm		/
B102F-86	FR Window Motor Position Signal-Signal Invalid	It is calculated that the window position exceeds the top position or bottom position by 25 mm		/
B1030-86	RL Window Motor Position Signal-Signal Invalid	It is calculated that the window position exceeds the top position or bottom position by 25 mm		/
B1031-86	RR Window Motor Position Signal-Signal Invalid	It is calculated that the window position exceeds the top position or		/

DTC	DTC	Detection Condition	Possible Cause	Maintenance Advice
		bottom position by 25 mm		
B102D-96	Anti-pinch Module Controller	MCU Internal Failure	• Circuit voltage below threshold; • Circuit voltage above threshold; • Component internal fault	/
B1021-17	Anti-pinch Module Power Supply-Circuit Voltage Above Threshold	It is detected that the battery voltage is > 16.5 V for 1000 ms		/
B1021-16	Anti-pinch Module Power Supply-Circuit Voltage Below Threshold	It is detected that the battery voltage is < 8.5 V for 5000 ms		/
B1032-87	Lost Communication With Anti-pinch Module MCU-Missing Message	/	• BCM module	/

DTC Diagnosis Procedure

DTC	B1032-87	Lost Communication With Anti-pinch Module MCU-Missing Message

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check for DTCs

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTCs occur again.

NG → **Turn off vehicle power supply (-disconnect the negative battery cable), then clear DTC**

OK

2	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG	**Replace BCM**
OK	**Conduct test and confirm malfunction has been repaired.**

DTC	**B1021-17**	**Anti-pinch Module Power Supply-Circuit Voltage Above Threshold**
DTC	**B1021-16**	**Anti-pinch Module Power Supply-Circuit Voltage Below Threshold**
DTC	**B102D-96**	**Anti-pinch Module Controller**

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

(a) Connect negative battery cable, and turn ENGINE START STOP switch to ON to make engine run normally.

(b) Using voltage band of multimeter, check the power of battery.

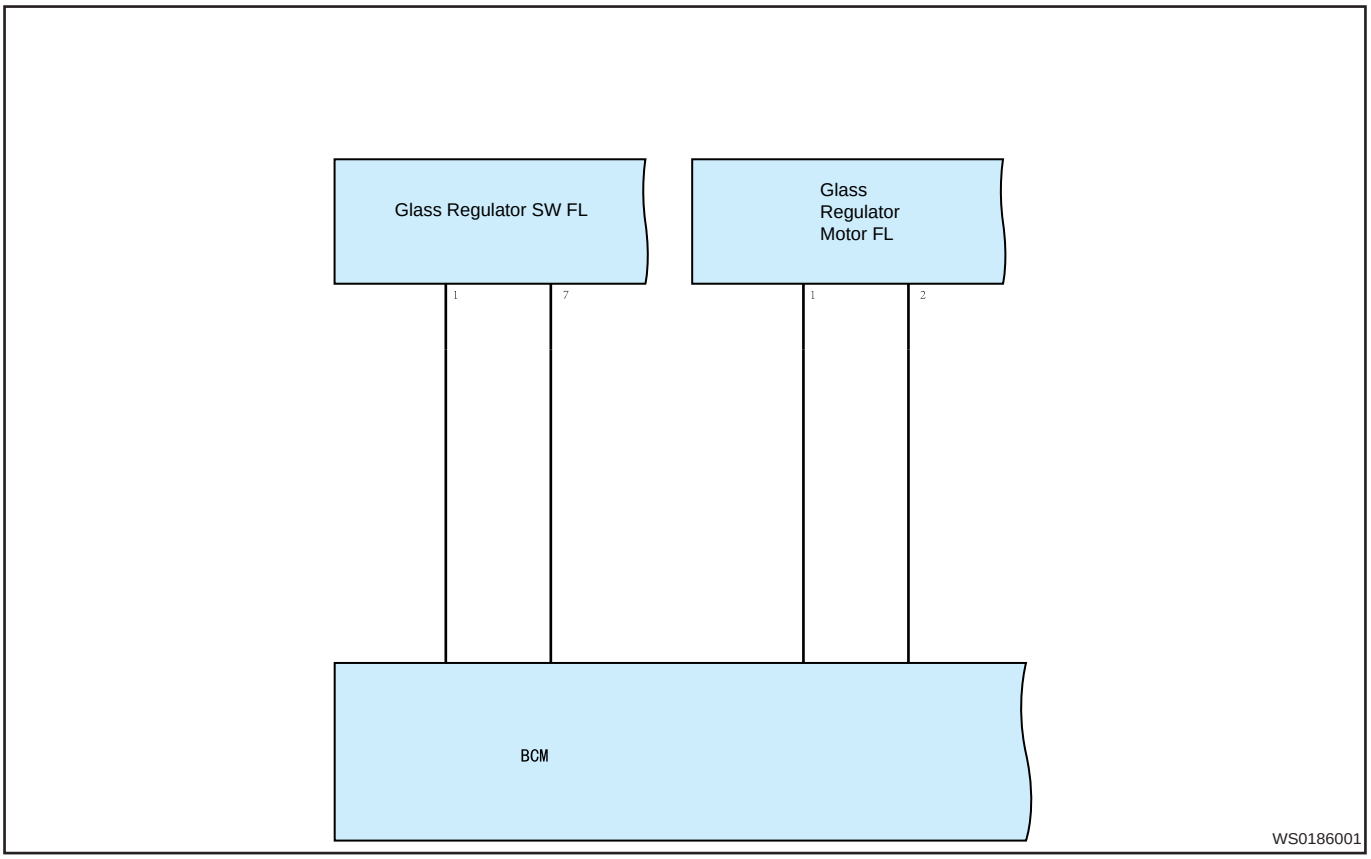
Multimeter Connection	Condition	Specified Condition
Battery (+) - Battery (-)	ENGINE START STOP switch “ON”	⩾ 12V

OK	**Replace BCM**
NG	**Replace and repair wire harness and connector**

DTC	**B100C-13**	**Front Left Window Up Control Circuit-Circuit Open**
DTC	**B100C-71**	**Front Left Window Up Control Circuit-Actuator Stuck**
DTC	**B100D-13**	**Front Left Window Down Control Circuit-Circuit Open**
DTC	**B100D-71**	**Front Left Window Down Control Circuit-Actuator Stuck**

DTC	**B1022-71**	**FL Window Button-Actuator Stuck**
DTC	**B1029-71**	**FL Window Relay-Actuator Stuck**
DTC	**B102E-86**	**FL Window Motor Position Signal-Signal Invalid**

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check ground point**

(a) Disconnect negative battery cable, and turn ENGINE START STOP switch to OFF.
(b) Check the BCM ground point.

NG → **Repair or replace ground wire harness or ground point**

OK

2	Use diagnostic tester to perform active test for window system

OK → Check front left door glass control circuit

NG

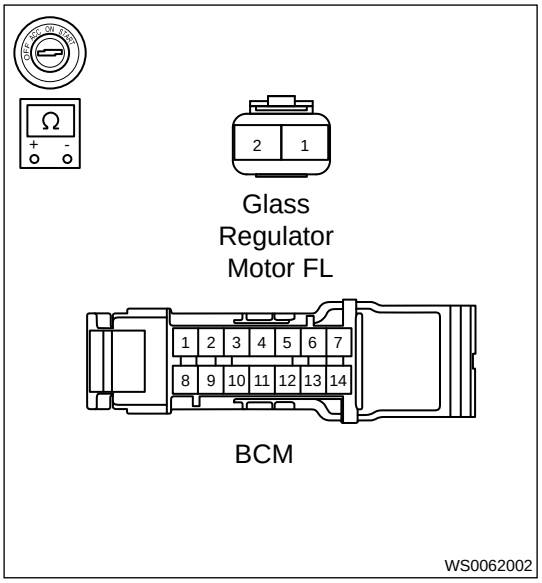
3	Check execution circuit of front left window system

(a) Disconnect negative battery cable, and turn ENGINE START STOP switch to “OFF”.

(b) Disconnect front left door glass regulator motor connector and BCM connector.

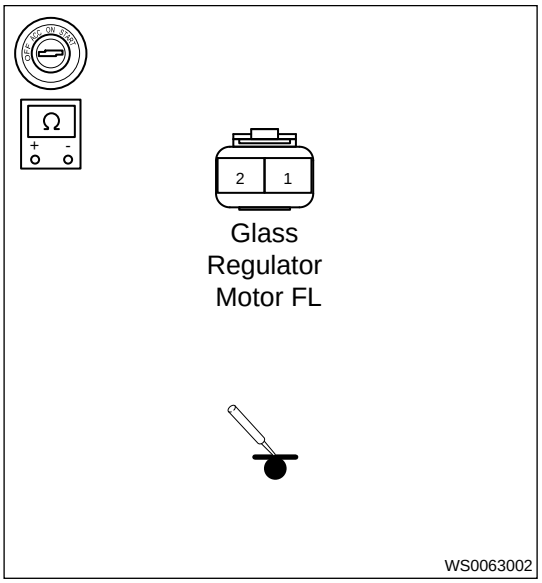
(c) Using ohm band of multimeter, check for continuity between front left door glass regulator motor and BCM.

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator motor (1) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
Front left door glass regulator motor (2) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω



(d) Using ohm band of multimeter, check for continuity between front left door glass regulator motor and ground.

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator motor (1) - Ground	ENGINE START STOP switch “OFF”	∞
Front left door glass regulator motor (2) - Ground	ENGINE START STOP switch “OFF”	∞



(e) Using ohm band of multimeter, check for continuity between front left door glass regulator motor (1) and battery (+), front left door glass regulator motor (2) and battery (+) respectively.

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator motor (1) - Battery (+)	ENGINE START STOP switch "OFF"	∞
Front left door glass regulator motor (2) - Battery (+)	ENGINE START STOP switch "OFF"	∞

NG → **Replace wire harness and connector**

OK

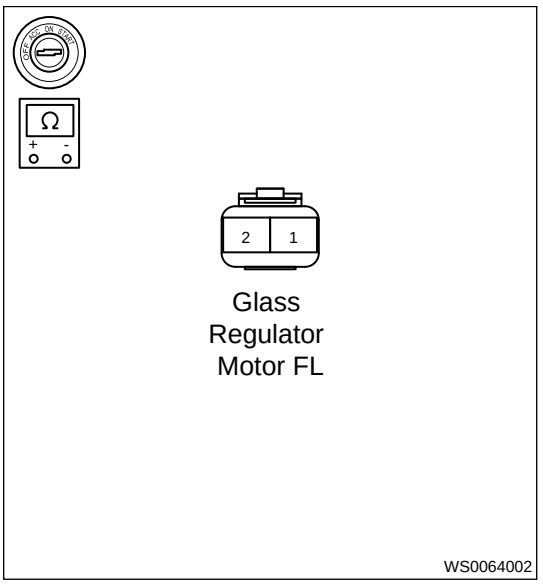
4	**Check front left window regulator motor**

(a) Disconnect negative battery cable, and turn ENGINE START STOP switch to "OFF".

(b) Disconnect the front left window regulator motor connector.

(c) Using ohm band of multimeter, check resistance between front left window regulator motor (1) and (2).

Multimeter Connection	Condition	Specified Condition
Front left window regulator motor (1) - Front left window regulator motor (2)	ENGINE START STOP switch "OFF"	< 1 Ω



(d) Apply 12 V voltage to both terminals of front left window regulator motor connector, and observe if operation of window regulator is faulty.

OK → **Replace BCM**

NG → **Replace front left window regulator motor**

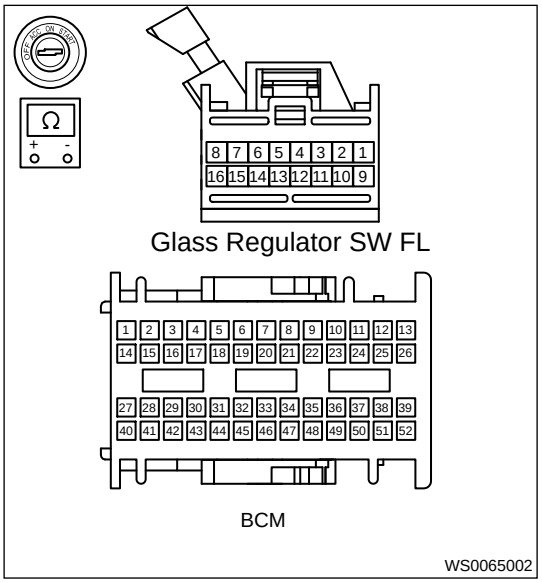
5	**Check front left door glass control circuit**

(a) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(b) Disconnect the front left door glass regulator switch and BCM connector.

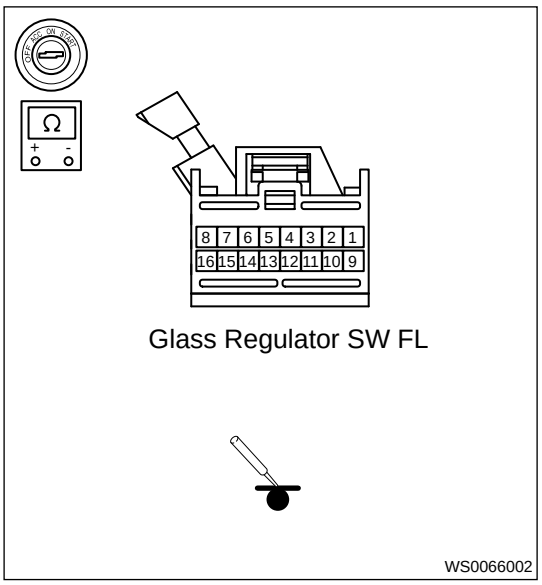
(c) Using ohm band of multimeter, check for continuity between front left door glass regulator switch and BCM.

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (1) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
Front left door glass regulator switch (7) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω



(d) Using ohm band of multimeter, check for continuity between front left door glass regulator switch and ground.

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (1) - Ground	ENGINE START STOP switch “OFF”	∞
Front left door glass regulator switch (7) - Ground	ENGINE START STOP switch “OFF”	∞



(e) Using ohm band of multimeter, check for continuity between front left door glass regulator switch (1) and battery (+), front left door glass regulator switch (7) and battery (+).

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (1) - Battery (+)	ENGINE START STOP switch “OFF”	∞
Front left door glass regulator switch (7) - Battery (+)	ENGINE START STOP switch “OFF”	∞

NG → **Replace wire harness and connector**

OK

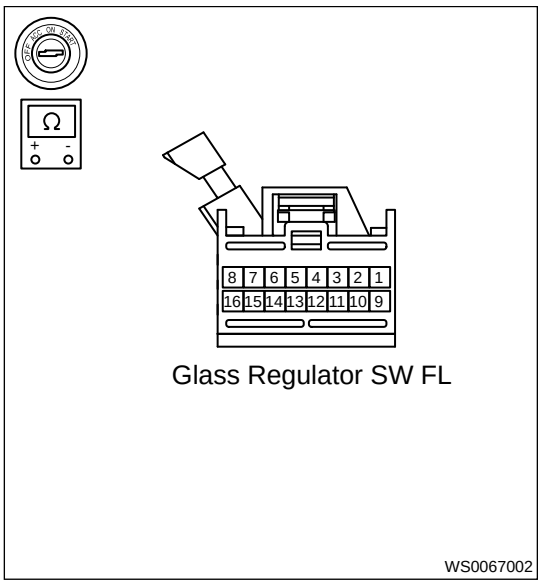
6	**Check front left door power glass regulator switch**

(a) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(b) Remove the front left door power glass regulator switch.

(c) Use ohm band of multimeter to measure resistance of front left door power glass regulator switch.

Multimeter Connection	Condition	Specified Condition
Front left door power glass regulator switch (1) - Front left door power glass regulator switch (7)	Auto DOWN	⩽ 5 Ω
	Manual DOWN	332 Ω
	Manual UP	3000 Ω
	Auto UP	1500 Ω



Glass Regulator SW FL

(d) Check glass regulator switch for stuck, damage.

NG → **Replace front left door glass regulator switch**

OK

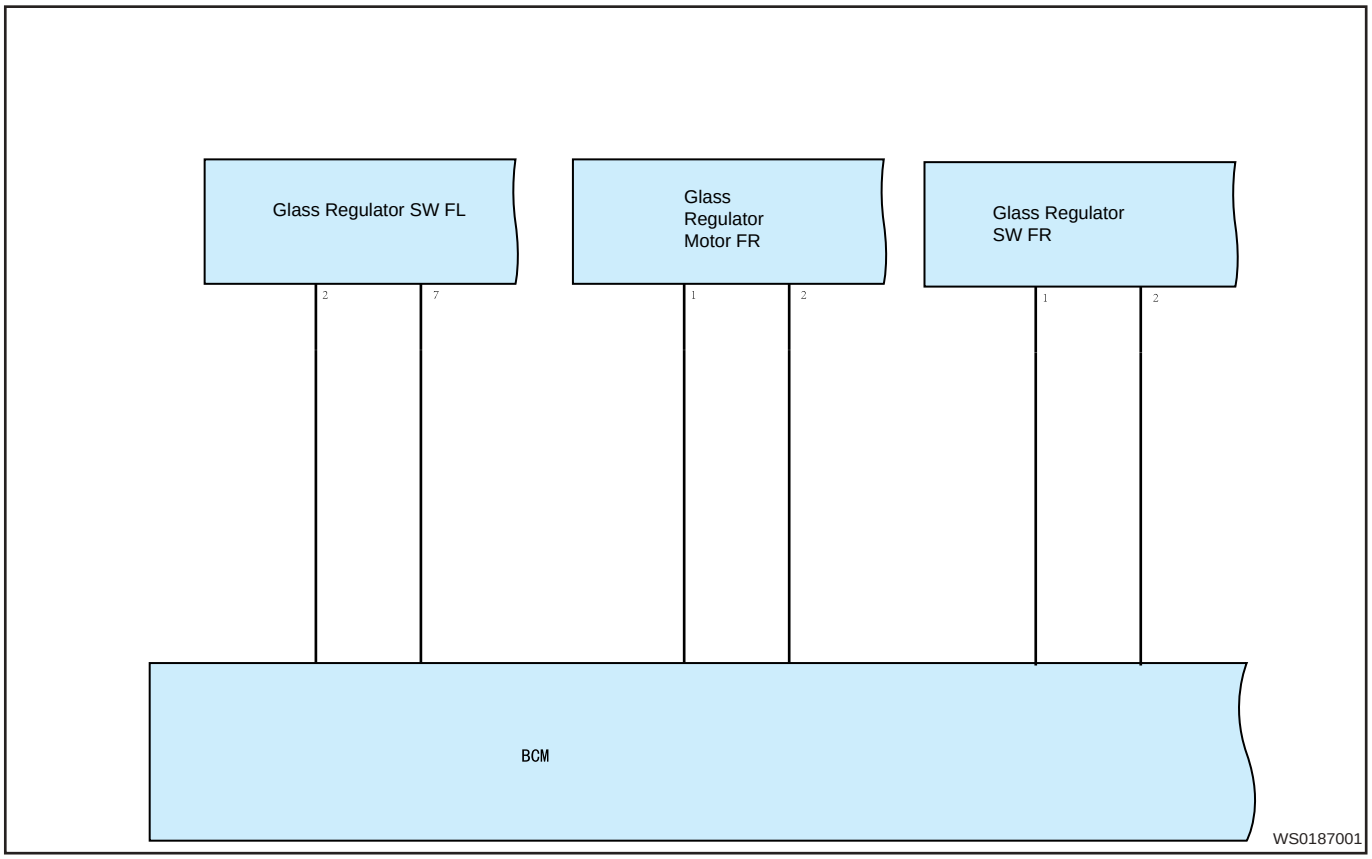
7	**Reconfirm DTCs**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to “OFF”.
(d) Use diagnostic tester (the latest software) to read the DTCs stored in body control system again.

OK	**System operates normally**
NG	**Replace Body Control Module (BCM)**

DTC	**B100E-13**	**Front Right Window Up Control Circuit-Circuit Open**
DTC	**B100E-71**	**Front Right Window Up Control Circuit-Actuator Stuck**
DTC	**B100F-13**	**Front Right Window Down Control Circuit-Circuit Open**
DTC	**B100F-71**	**Front Right Window Down Control Circuit-Actuator Stuck**
DTC	**B1023-71**	**FR Window Button-Actuator Stuck**
DTC	**B1026-71**	**Passenger FR Window Button-Actuator Stuck**
DTC	**B102A-71**	**FR Window Relay-Actuator Stuck**
DTC	**B102F-86**	**FR Window Motor Position Signal-Signal Invalid**

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.

- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check ground point**

(a) Disconnect negative battery cable, and turn ENGINE START STOP switch to “OFF”.

(b) Check the BCM ground point.

NG → **Repair or replace ground wire harness or ground point**

OK

2	**Use diagnostic tester to perform active test for window system**

OK → **Check control circuit of front right glass regulator**

NG

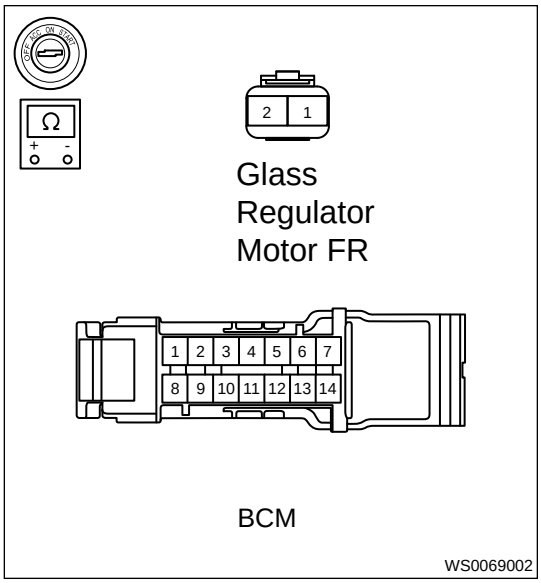
3	**Check executive circuit of front right window system.**

(a) Disconnect negative battery cable, and turn ENGINE START STOP switch to “OFF”.

(b) Disconnect front right door glass regulator motor connector and BCM connector.

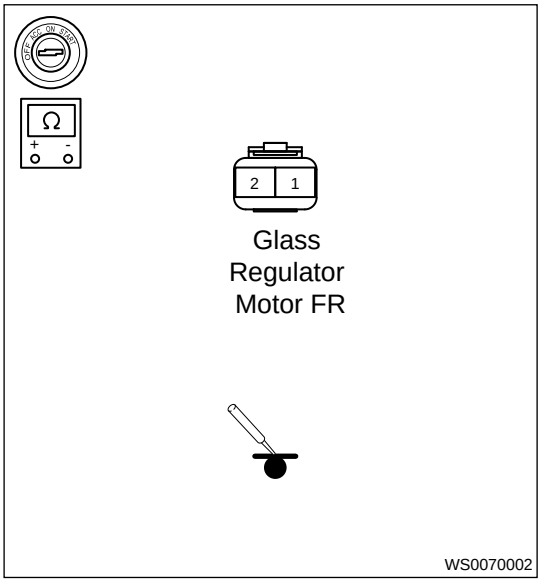
(c) Using ohm band of multimeter, check for continuity between front right door glass regulator motor and BCM.

Multimeter Connection	Condition	Specified Condition
Front right door glass regulator motor (1) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
Front right door glass regulator motor (2) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω



(d) Using ohm band of multimeter, check for continuity between front right door glass regulator motor and ground.

Multimeter Connection	Condition	Specified Condition
Front right door glass regulator motor (1) - Ground	ENGINE START STOP switch "OFF"	∞
Front right door glass regulator motor (2) - Ground	ENGINE START STOP switch "OFF"	∞



(e) Using ohm band of multimeter, check for continuity between front right door glass regulator motor (1) and battery (+), front right door glass regulator motor (2) and battery (+) respectively.

Multimeter Connection	Condition	Specified Condition
Front right door glass regulator motor (1) - Battery (+)	ENGINE START STOP switch "OFF"	∞
Front right door glass regulator motor (2) - Battery (+)	ENGINE START STOP switch "OFF"	∞

NG → **Replace wire harness and connector**

OK →

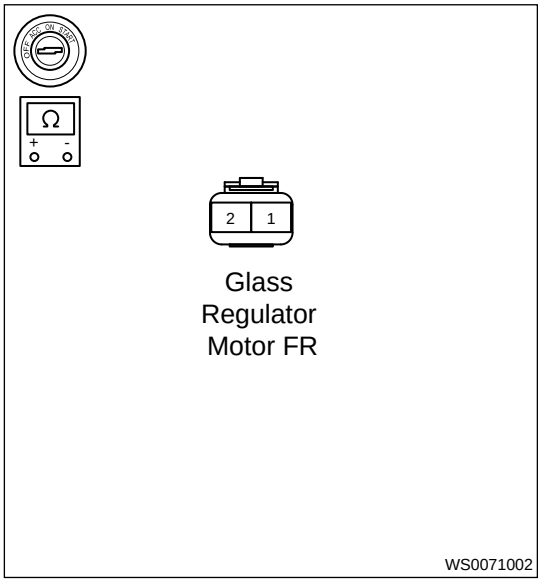
4	**Check front right window regulator motor**

(a) Disconnect negative battery cable, and turn ENGINE START STOP switch to "OFF".

(b) Disconnect the front right window regulator motor connector.

(c) Using ohm band of multimeter, check resistance between front right door glass regulator motor (1) and (2).

Multimeter Connection	Condition	Specified Condition
Front right door glass regulator motor (1) - Front right door glass regulator motor (2)	ENGINE START STOP switch "OFF"	＜ 1 Ω



(d) Apply 12 V voltage to both terminals of front right window regulator motor connector, and observe if operation of window regulator is faulty.

OK	**Replace BCM**
NG	**Replace rear right window regulator motor**

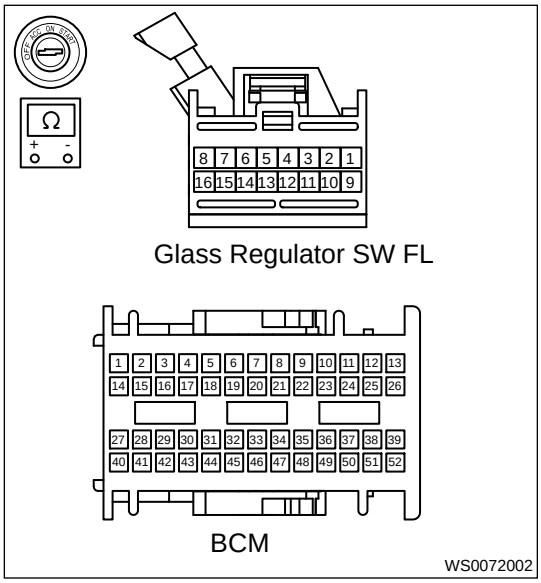
5	**Check front left glass regulator switch assembly (which controls front right regulator) wire harness connector**

(a) Turn ENGINE START STOP switch to "OFF", disconnect the negative battery cable.

(b) Disconnect the front left door glass regulator switch and BCM connector.

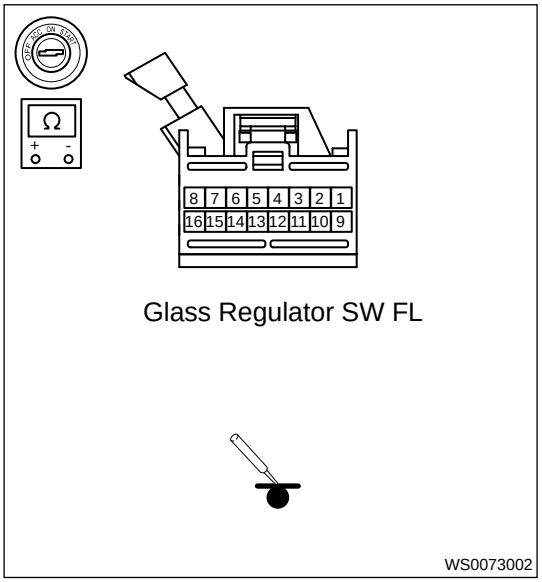
(c) Using ohm band of multimeter, check for continuity between front left door glass regulator switch and BCM.

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (2) - BCM (corresponding terminal)	ENGINE START STOP switch "OFF"	⩽ 1 Ω
Front left door glass regulator switch (7) - BCM (corresponding terminal)	ENGINE START STOP switch "OFF"	⩽ 1 Ω



(d) Using ohm band of multimeter, check for continuity between front left door glass regulator switch and ground.

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (2) - Ground	ENGINE START STOP switch "OFF"	∞
Front left door glass regulator switch (7) - Ground	ENGINE START STOP switch "OFF"	∞



(e) Using ohm band of multimeter, check for continuity between front left door glass regulator switch (2) and battery (+), front left door glass regulator switch (7) and battery (+).

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (2) - Battery (+)	ENGINE START STOP switch "OFF"	∞
Front left door glass regulator switch (7) - Battery (+)	ENGINE START STOP switch "OFF"	∞

NG → **Replace wire harness and connector**

OK →

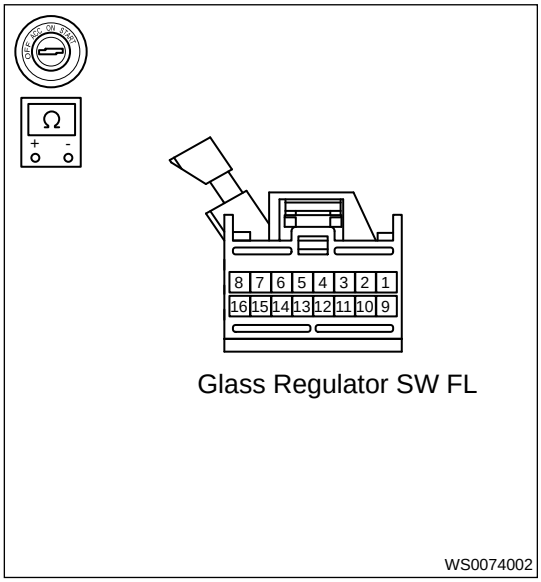
6	**Check front left glass regulator switch assembly (which controls front right glass regulator)**

(a) Turn ENGINE START STOP switch to "OFF", disconnect the negative battery cable.

(b) Remove the front left door power glass regulator switch.

(c) Use ohm band of multimeter to measure resistance of front left door glass regulator switch.

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (2) - Front left door glass regulator switch (7)	Auto DOWN	⩽ 5 Ω
	Manual DOWN	332 Ω
	Manual UP	3000 Ω
	Auto UP	1500 Ω



(d) Check glass regulator switch for stuck and damage.

NG → **Replace front left door glass regulator switch assembly**

OK →

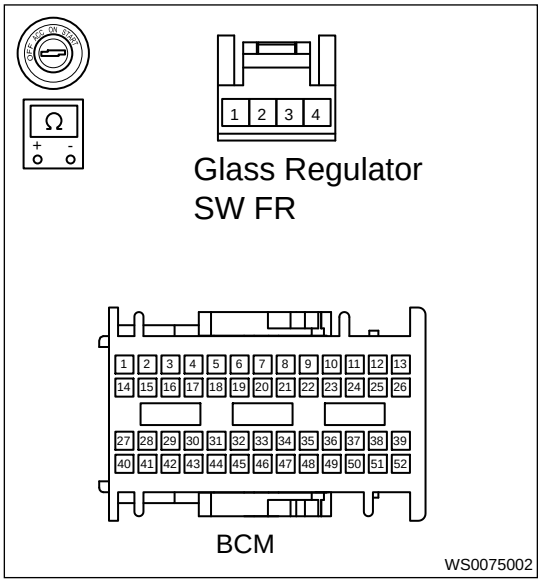
7	Check control circuit of front right door glass

(a) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(b) Disconnect the front right door glass regulator switch and BCM connector.

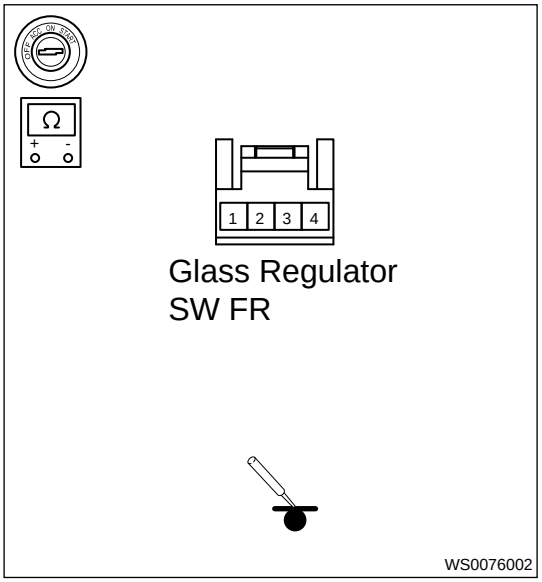
(c) Using ohm band of multimeter, check for continuity between front right door glass regulator switch and BCM.

Multimeter Connection	Condition	Specified Condition
Front right door glass regulator switch (2) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
Front right door glass regulator switch (1) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω



(d) Using ohm band of multimeter, check for continuity between front right door glass regulator switch and ground.

Multimeter Connection	Condition	Specified Condition
Front right door glass regulator switch (2) - Ground	ENGINE START STOP switch "OFF"	∞
Front right door glass regulator switch (1) - Ground	ENGINE START STOP switch "OFF"	∞



(e) Using ohm band of multimeter, check for continuity between front right door glass regulator switch (2) and battery (+), front right door glass regulator switch (1) and battery (+).

Multimeter Connection	Condition	Specified Condition
Front right door glass regulator switch (2) - Battery (+)	ENGINE START STOP switch "OFF"	∞
Front right door glass regulator switch (1) - Battery (+)	ENGINE START STOP switch "OFF"	∞

NG → **Replace wire harness and connector**

OK →

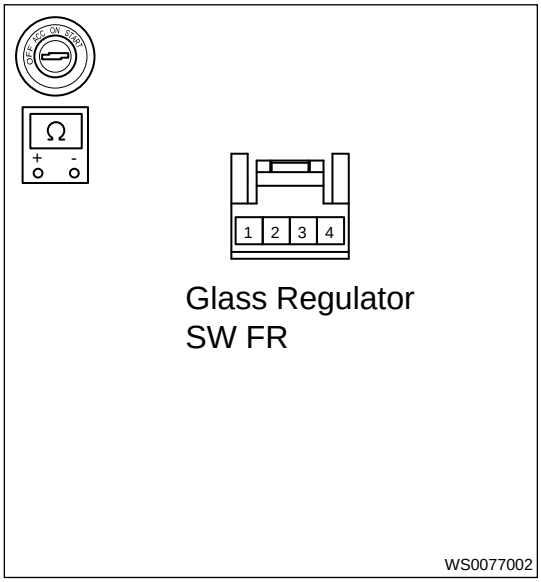
8	**Check front right door power glass regulator switch**

(a) Turn ENGINE START STOP switch to "OFF", disconnect the negative battery cable.

(b) Remove the front right door power glass regulator switch.

(c) Use ohm band of multimeter to measure resistance of front right door glass regulator switch.

Multimeter Connection	Condition	Specified Condition
Front right door glass regulator switch (1) - Front right door glass regulator switch (2)	Auto DOWN	⩽ 5 Ω
	Manual DOWN	332 Ω
	Manual UP	3000 Ω
	Auto UP	1500 Ω



(d) Check glass regulator switch for stuck and damage.

NG → **Replace front right door glass regulator switch**

OK

9	Reconfirm DTCs

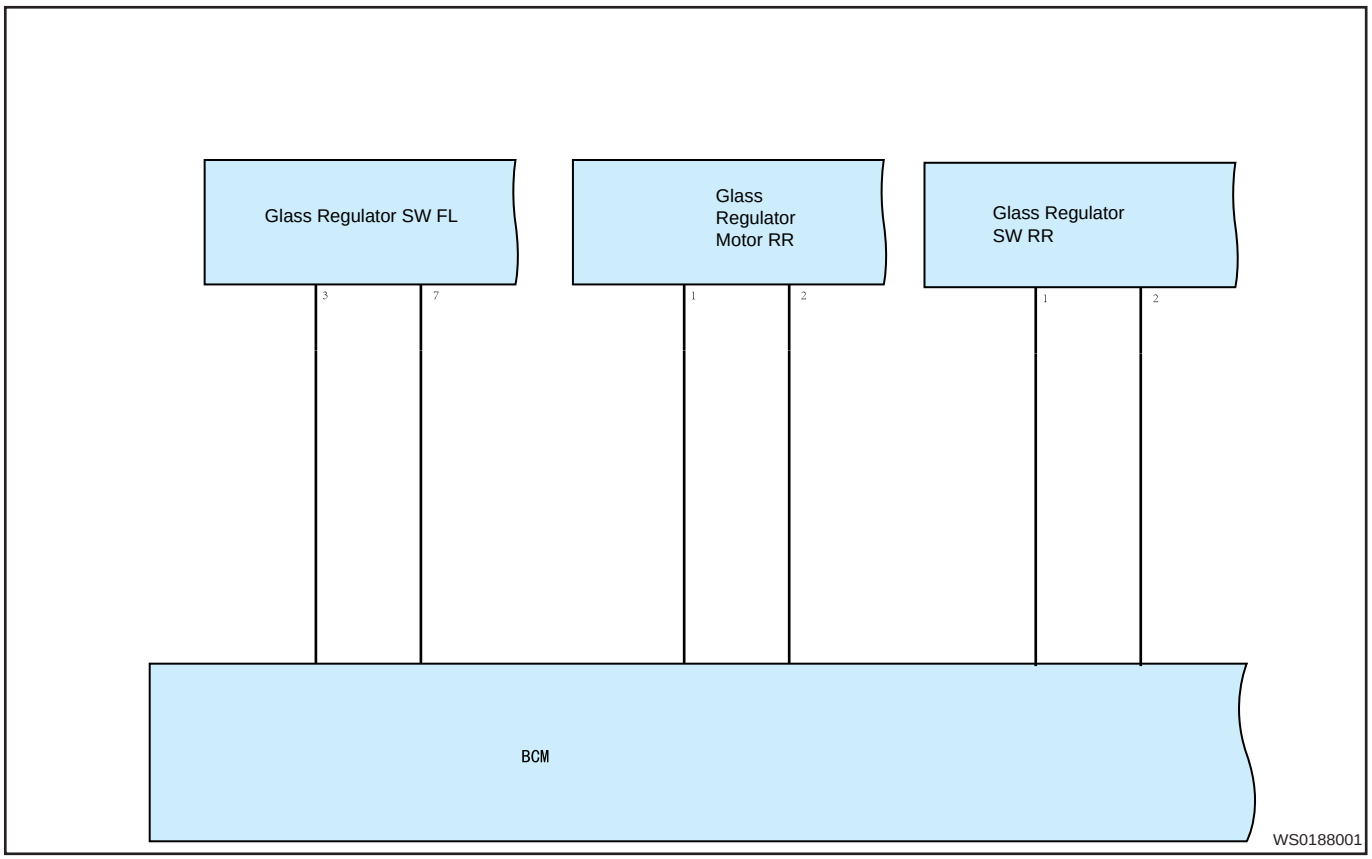
(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to “OFF”.
(d) Use diagnostic tester (the latest software) to read the DTCs stored in body control system again.

OK → **System is normal**

NG → **Replace Body Control Module (BCM)**

DTC	**B1010-13**	**Rear Left Window Up Control Circuit-Circuit Open**
DTC	**B1010-71**	**Rear Left Window Up Control Circuit-Actuator Stuck**
DTC	**B1011-13**	**Rear Left Window Down Control Circuit-Circuit Open**
DTC	**B1011-71**	**Rear Left Window Down Control Circuit-Actuator Stuck**
DTC	**B102B-71**	**RL Window Relay-Actuator Stuck**
DTC	**B1030-86**	**RL Window Motor Position Signal-Signal Invalid**

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check ground point**

(a) Disconnect negative battery cable, and turn ENGINE START STOP switch to “OFF”.

(b) Check BCM ground point

NG → **Repair or replace ground wire harness or ground point**

OK

2	**Use diagnostic tester to perform active test for window system**

OK → **Check control circuit of rear left glass regulator**

NG

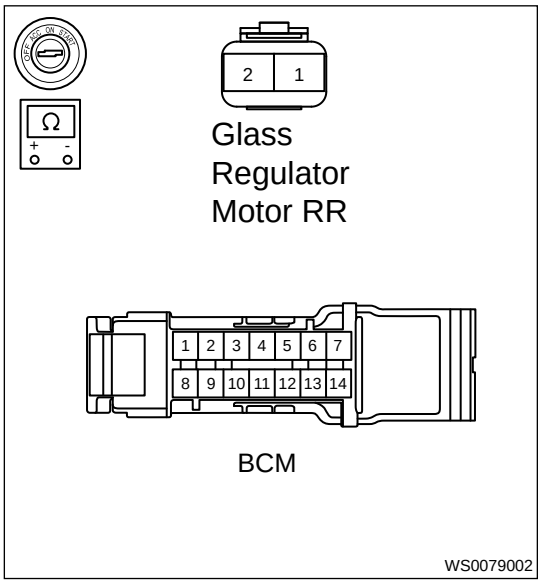
3	Check execution circuit of rear left window system

(a) Disconnect negative battery cable, and turn ENGINE START STOP switch to “OFF”.

(b) Disconnect rear left door glass regulator motor connector and BCM connector.

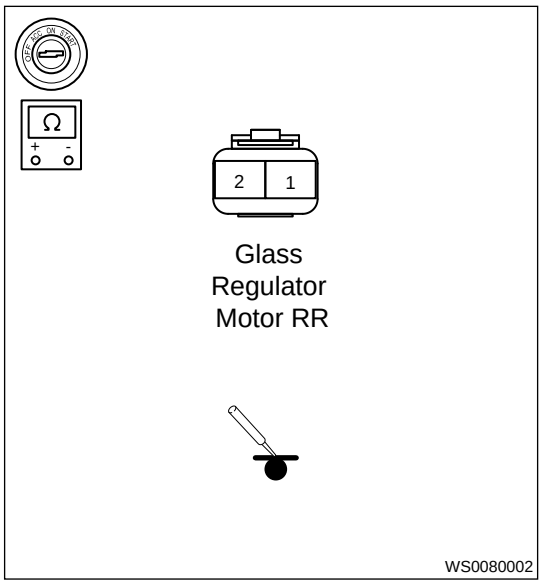
(c) Using ohm band of multimeter, check for continuity between rear left door glass regulator motor and BCM.

Multimeter Connection	Condition	Specified Condition
Rear left door glass regulator motor (1) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
Rear left door glass regulator motor (2) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω



(d) Using ohm band of multimeter, check for continuity between rear left door glass regulator motor and ground.

Multimeter Connection	Condition	Specified Condition
Rear left door glass regulator motor (1) - Ground	ENGINE START STOP switch “OFF”	∞
Rear left door glass regulator motor (2) - Ground	ENGINE START STOP switch “OFF”	∞



(e) Using ohm band of multimeter, check for continuity between rear left door glass regulator motor (1) and battery (+), rear left door glass regulator motor (2) and battery (+) respectively.

Multimeter Connection	Condition	Specified Condition
Rear left door glass regulator motor (1) - Battery (+)	ENGINE START STOP switch “OFF”	∞
Rear left door glass regulator motor (2) - Battery (+)	ENGINE START STOP switch “OFF”	∞

NG → **Replace wire harness and connector**

OK →

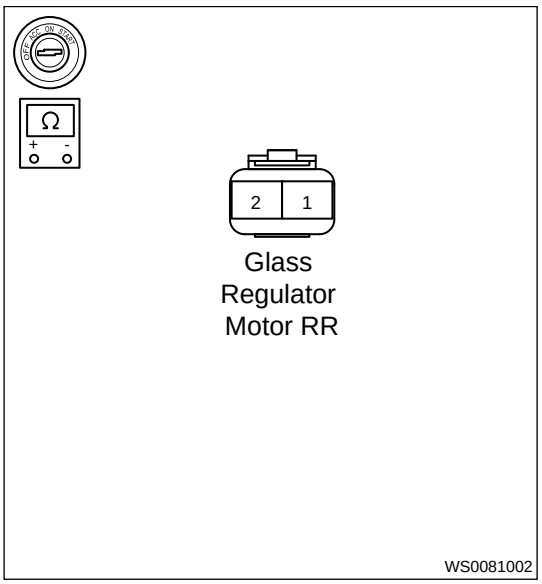
4	**Check rear left window regulator motor**

(a) Disconnect negative battery cable, and turn ENGINE START STOP switch to “OFF”.

(b) Disconnect the rear left window regulator motor connector.

(c) Using ohm band of multimeter, check resistance between rear left door glass regulator motor (1) and (2).

Multimeter Connection	Condition	Specified Condition
Rear left door glass regulator motor (1) - Rear left door glass regulator motor (2)	ENGINE START STOP switch “OFF”	＜ 1 Ω



(d) Apply 12 V voltage to both terminals of rear left window regulator motor connector, and observe if operation of window regulator is faulty.

OK → **Replace BCM**

NG → **Replace rear left window regulator motor**

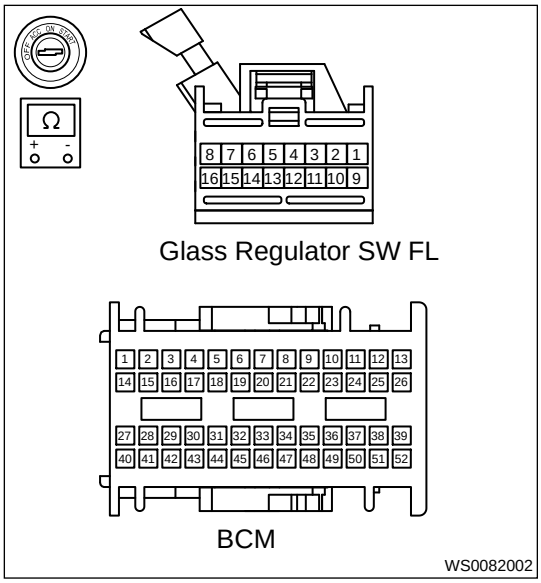
5	**Check control circuit of rear left glass regulator**

(a) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(b) Disconnect the front left door glass regulator switch and BCM connector.

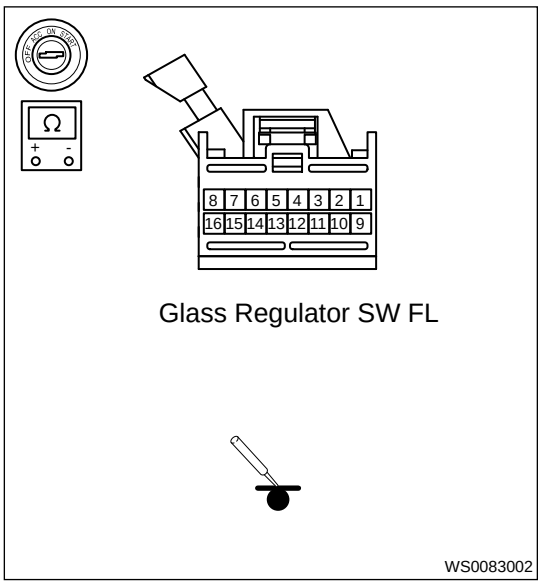
(c) Using ohm band of multimeter, check for continuity between front left door glass regulator switch and BCM.

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (3) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
Front left door glass regulator switch (7) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω



(d) Using ohm band of multimeter, check for continuity between front left door glass regulator switch and ground.

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (3) - Ground	ENGINE START STOP switch “OFF”	∞
Front left door glass regulator switch (7) - Ground	ENGINE START STOP switch “OFF”	∞



(e) Using ohm band of multimeter, check for continuity between front left door glass regulator switch (3) and battery (+), front left door glass regulator switch (7) and battery (+).

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (3) - Battery (+)	ENGINE START STOP switch “OFF”	∞
Front left door glass regulator switch (7) - Battery (+)	ENGINE START STOP switch “OFF”	∞

NG → **Replace wire harness and connector**

OK →

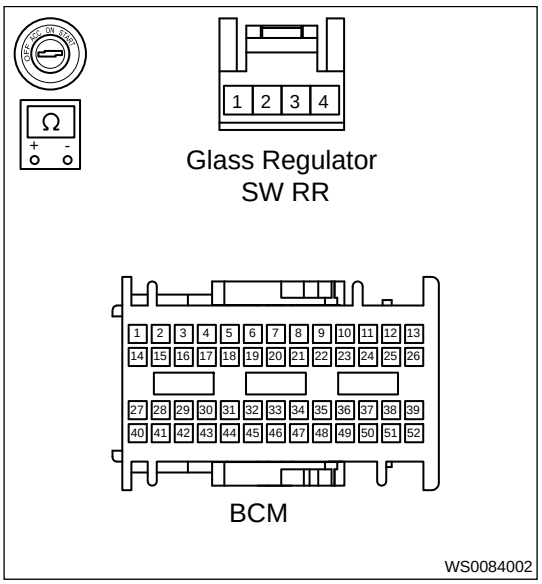
6	Check control circuit of rear left door glass

(a) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(b) Disconnect rear left door glass regulator switch and BCM connector.

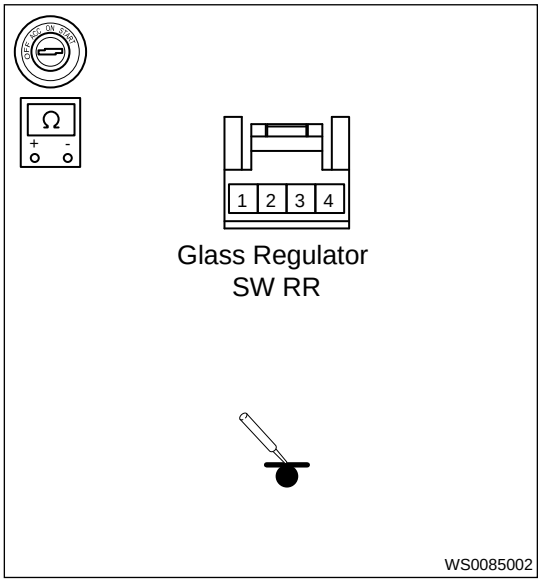
(c) Using ohm band of multimeter, check for continuity between rear left door glass regulator switch and BCM.

Multimeter Connection	Condition	Specified Condition
Rear left door glass regulator switch (2) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
Rear left door glass regulator switch (1) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω



(d) Using ohm band of multimeter, check for continuity between rear left door glass regulator switch and ground.

Multimeter Connection	Condition	Specified Condition
Rear left door glass regulator switch (2) - Ground	ENGINE START STOP switch "OFF"	∞
Rear left door glass regulator switch (1) - Ground	ENGINE START STOP switch "OFF"	∞



(e) Using ohm band of multimeter, check for continuity between rear left door glass regulator switch (2) and battery (+), rear left door glass regulator switch (1) and battery (+).

Multimeter Connection	Condition	Specified Condition
Rear left door glass regulator switch (2) - Battery (+)	ENGINE START STOP switch "OFF"	∞
Rear left door glass regulator switch (1) - Battery (+)	ENGINE START STOP switch "OFF"	∞

NG → **Replace wire harness and connector**

OK

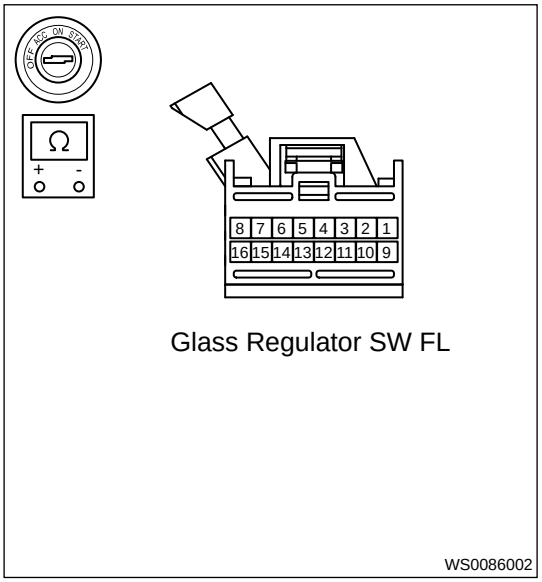
7	**Check front left door glass regulator switch assembly (which controls rear left glass regulator)**

(a) Turn ENGINE START STOP switch to "OFF", disconnect the negative battery cable.

(b) Remove the front left door power glass regulator switch.

(c) Use ohm band of multimeter to measure resistance of front left door glass regulator switch.

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (3) - Rear left door glass regulator switch (7)	Auto DOWN	⩽ 5 Ω
	Manual DOWN	332 Ω
	Manual UP	3000 Ω
	Auto UP	1500 Ω



(d) Check glass regulator switch for stuck and damage.

NG → **Replace front left door glass regulator switch assembly**

OK

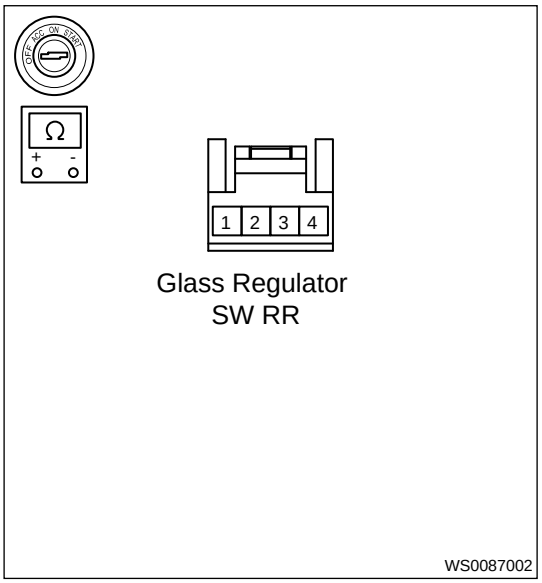
8	Check rear left door glass regulator switch

(a) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(b) Remove the rear left door power glass regulator switch.

(c) Use ohm band of multimeter to measure resistance of rear left door power glass regulator switch.

Multimeter Connection	Condition	Specified Condition
Rear left door power glass regulator switch (1) - Rear left door power glass regulator switch (2)	Auto DOWN	⩽ 5 Ω
	Manual DOWN	332 Ω
	Manual UP	3000 Ω
	Auto UP	1500 Ω



(d) Check glass regulator switch for stuck and damage.

NG → **Replace rear left door glass regulator switch**

OK

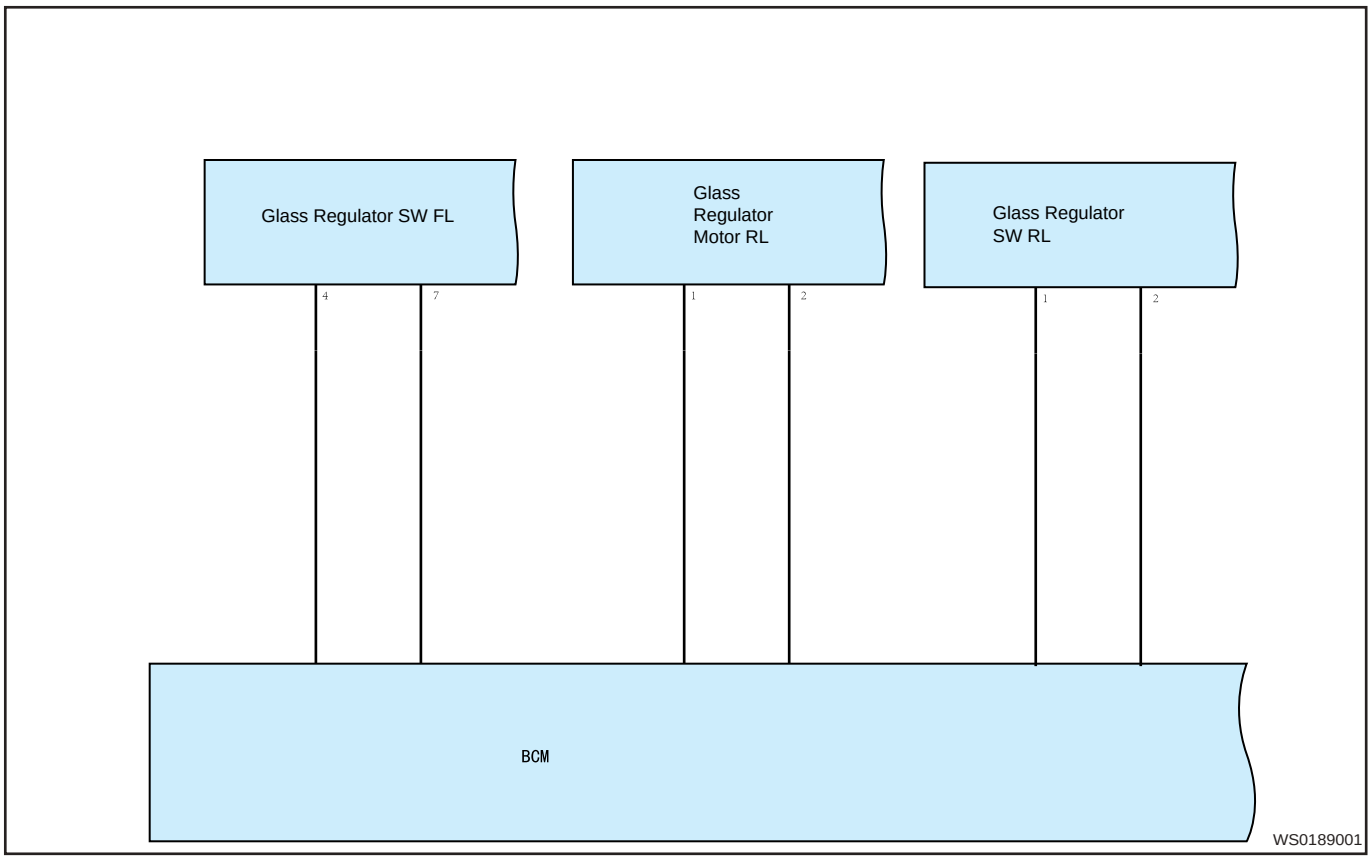
9	Reconfirm DTCs

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to “OFF”.
(d) Use diagnostic tester (the latest software) to read the DTCs stored in body control system again.

OK	**System is normal**
NG	**Replace Body Control Module (BCM)**

DTC	**B1012-13**	**Rear Right Window Up Control Circuit-Circuit Open**
DTC	**B1012-71**	**Rear Right Window Up Control Circuit-Actuator Stuck**
DTC	**B1013-13**	**Rear Right Window Down Control Circuit-Circuit Open**
DTC	**B1013-71**	**Rear Right Window Down Control Circuit-Actuator Stuck**
DTC	**B1025-71**	**RR Window Button-Actuator Stuck**
DTC	**B1028-71**	**Passenger RR Window Button Short-Actuator Stuck**
DTC	**B102C-71**	**RR Window Relay-Actuator Stuck**
DTC	**B1031-86**	**RR Window Motor Position Signal-Signal Invalid**

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check ground point**

(a) Disconnect negative battery cable, and turn ENGINE START STOP switch to “OFF”.

(b) Check the BCM ground point.

NG → **Repair or replace ground wire harness or ground point**

OK

2	**Use diagnostic tester to perform active test for window system**

OK → **Check control circuit of rear right door glass regulator**

NG

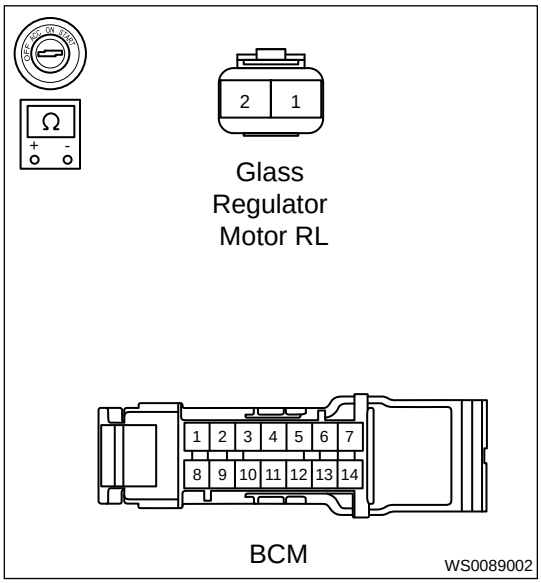
3	Check execution circuit of rear right window system

(a) Disconnect negative battery cable, and turn ENGINE START STOP switch to “OFF”.

(b) Disconnect rear right door glass regulator motor connector and BCM connector.

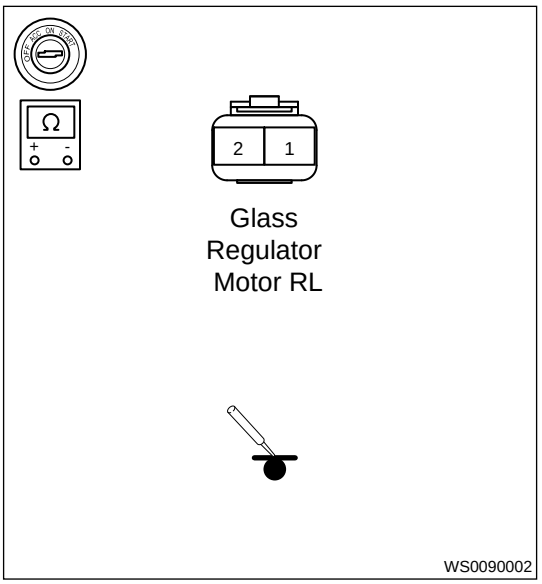
(c) Using ohm band of multimeter, check for continuity between rear right door glass regulator motor and BCM.

Multimeter Connection	Condition	Specified Condition
Rear right door glass regulator motor (1) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
Rear right door glass regulator motor (2) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω



(d) Using ohm band of multimeter, check for continuity between rear right door glass regulator motor and ground.

Multimeter Connection	Condition	Specified Condition
Rear right door glass regulator motor (1) - Ground	ENGINE START STOP switch “OFF”	∞
Rear right door glass regulator motor (2) - Ground	ENGINE START STOP switch “OFF”	∞



(e) Using ohm band of multimeter, check for continuity between rear right door glass regulator motor (1) and battery (+), rear right door glass regulator motor (2) and battery (+) respectively.

Multimeter Connection	Condition	Specified Condition
Rear right door glass regulator motor (1) - Battery (+)	ENGINE START STOP switch "OFF"	∞
Rear right door glass regulator motor (2) - Battery (+)	ENGINE START STOP switch "OFF"	∞

NG → **Replace wire harness and connector**

OK →

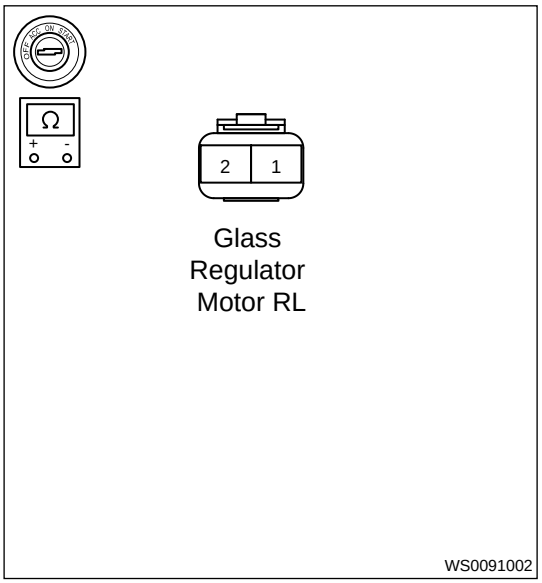
4	**Check rear right window regulator motor**

(a) Disconnect negative battery cable, and turn ENGINE START STOP switch to "OFF".

(b) Disconnect the rear right window regulator motor connector.

(c) Use ohm band of multimeter to check resistance of rear right window regulator motor.

Multimeter Connection	Condition	Specified Condition
Rear right window regulator motor (1) - Rear right window regulator motor (2)	ENGINE START STOP switch "OFF"	< 1 Ω



(d) Apply 12 V voltage to both terminals of rear right window regulator motor connector, and observe if operation of window regulator is faulty.

OK → **Replace BCM**

NG → **Replace rear right window regulator motor**

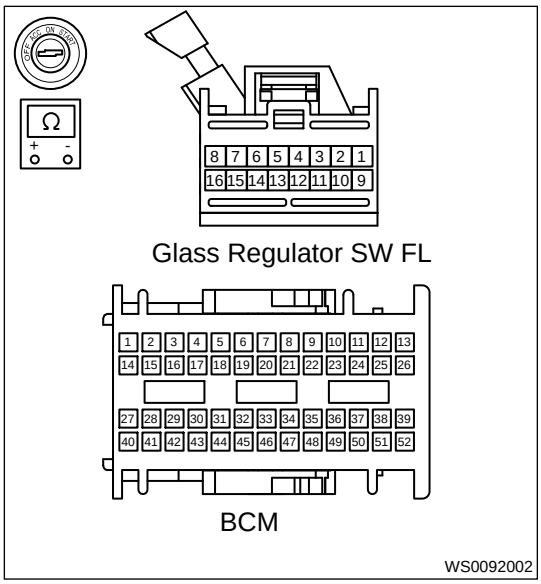
5	**Check control circuit of rear right door glass regulator**

(a) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(b) Disconnect the front left door glass regulator switch and BCM connector.

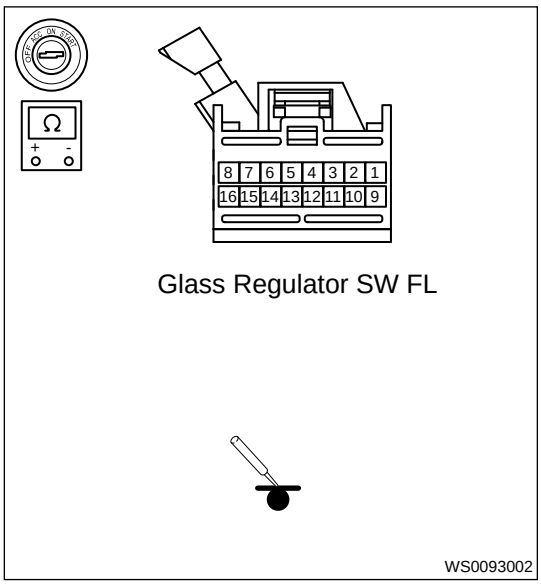
(c) Using ohm band of multimeter, check for continuity between front left door glass regulator switch and BCM.

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (4) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
Front left door glass regulator switch (7) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω



(d) Using ohm band of multimeter, check for continuity between front left door glass regulator switch and ground.

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (4) - Ground	ENGINE START STOP switch “OFF”	∞
Front left door glass regulator switch (7) - Ground	ENGINE START STOP switch “OFF”	∞



(e) Using ohm band of multimeter, check for continuity between front left door glass regulator switch (4) and battery (+), front left door glass regulator switch (7) and battery (+).

Multimeter Connection	Condition	Specified Condition
Front left door glass regulator switch (4) - Battery (+)	ENGINE START STOP switch “OFF”	∞
Front left door glass regulator switch (7) - Battery (+)	ENGINE START STOP switch “OFF”	∞

NG → **Replace wire harness and connector**

OK →

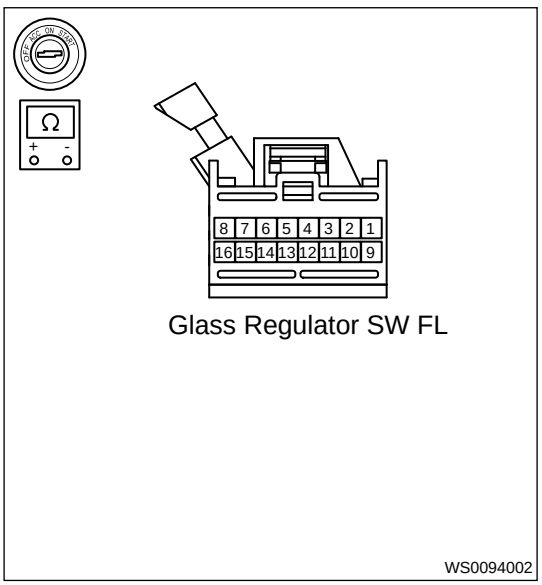
6	**Check front left door glass regulator switch assembly (which controls rear right glass regulator circuit)**

(a) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(b) Remove the front left door power glass regulator switch.

(c) Use ohm band of multimeter to measure resistance of front left door power glass regulator switch.

Multimeter Connection	Condition	Specified Condition
Front left door power glass regulator switch (4) - Front left door power glass regulator switch (7)	Auto DOWN	⩽ 5 Ω
	Manual DOWN	332 Ω
	Manual UP	3000 Ω
	Auto UP	1500 Ω



Glass Regulator SW FL

(d) Check glass regulator switch for stuck and damage.

NG → **Replace front left door glass regulator switch assembly**

OK →

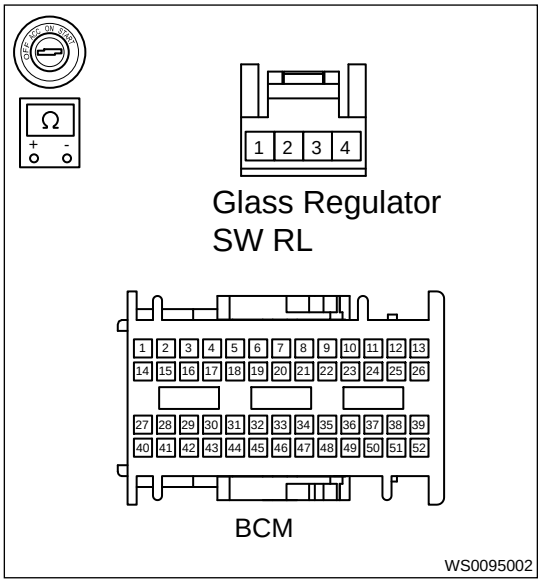
7	**Check control circuit of rear right door glass**

(a) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(b) Disconnect rear right door glass regulator switch and BCM connector.

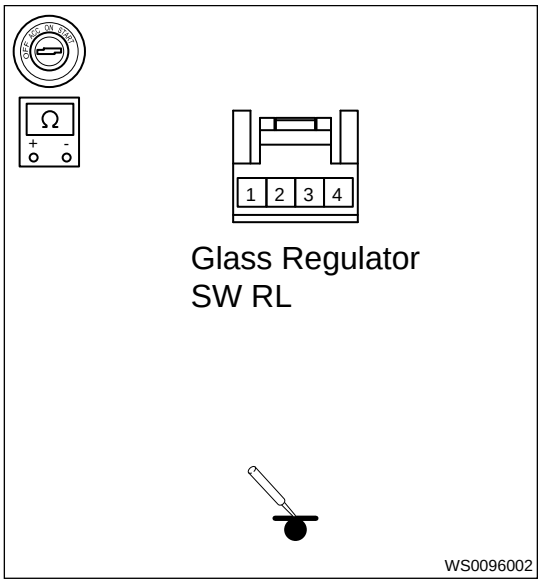
(c) Using ohm band of multimeter, check for continuity between rear right door glass regulator switch and BCM.

Multimeter Connection	Condition	Specified Condition
Rear right door glass regulator switch (2) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
Rear right door glass regulator switch (1) - BCM (corresponding terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω



(d) Using ohm band of multimeter, check for continuity between rear right door glass regulator switch and ground.

Multimeter Connection	Condition	Specified Condition
Rear right door glass regulator switch (2) - Ground	ENGINE START STOP switch “OFF”	∞
Rear right door glass regulator switch (1) - Ground	ENGINE START STOP switch “OFF”	∞



(e) Using ohm band of multimeter, check for continuity between rear right door glass regulator switch (2) and battery (+), rear right door glass regulator switch (1) and battery (+).

Multimeter Connection	Condition	Specified Condition
Rear right door glass regulator switch (2) - Battery (+)	ENGINE START STOP switch "OFF"	∞
Rear right door glass regulator switch (1) - Battery (+)	ENGINE START STOP switch "OFF"	∞

NG → **Replace wire harness and connector**

OK

8	**Check rear right door power glass regulator switch**

(a) Turn ENGINE START STOP switch to "OFF", disconnect the negative battery cable.

(b) Remove the rear right door power glass regulator switch.

(c) Use ohm band of multimeter to measure resistance of rear right door power glass regulator switch.

Multimeter Connection	Condition	Specified Condition
Rear right door power glass regulator switch (1) - Rear right door power glass regulator switch (2)	Auto DOWN	⩽ 5 Ω
	Manual DOWN	332 Ω
	Manual UP	3000 Ω
	Auto UP	1500 Ω

(d) Check glass regulator switch for stuck and damage.

NG → **Replace rear right door glass regulator switch**

OK

9	**Reconfirm DTCs**

(a) Connect all the connectors.

(b) Connect the negative battery cable.

(c) Turn ENGINE START STOP switch to "OFF".

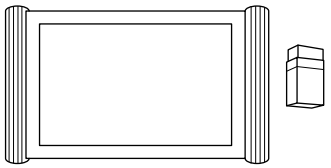
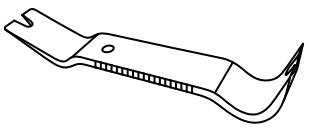
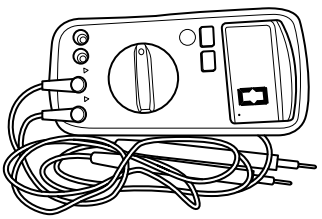
(d) Use diagnostic tester (the latest software) to read the DTCs stored in body control system again.

OK	**System is normal**
NG	**Replace Body Control Module (BCM)**

On-vehicle Service

Tools

General Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Interior Crow Plate	 RCH002506
Digital Multimeter	 RCH0002006

Torque Specifications

Description	Torque (N·m)
Sliding Roof Switch Assembly Fixing Screw	2.5 ± 0.5
Sliding Roof Mounting Bracket Fixing Bolt	9.0 ± 1.5
Motor Mounting Screw	4.0 ± 0.5
Glass Assembly Bracket Fixing Screw	5.5 ± 0.5
Outer Weather Bar Fixing Screw	1.0 ± 0.2

Description	Torque (N·m)
Front Door Glass Rear Guide Rail Fixing Bolt	7 ± 1.0
Power Glass Regulator Fixing Bolt	9 ± 1.5
Power Glass Regulator Fixing Nut	9 ± 1.5
Rear Door Glass Rear Guide Rail Fixing Screw	1.5 ± 0.5
Rear Door Glass Rear Guide Rail Fixing Bolt	7 ± 1.0

Front Left Door Power Glass Regulator Switch

Removal

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing front left door power glass regulator switch.
- Appropriate force should be applied when removing front left door glass regulator switch. Be careful not to operate roughly.
- Try to prevent front door inner protector assembly from being scratched, when removing front left door glass regulator switch.

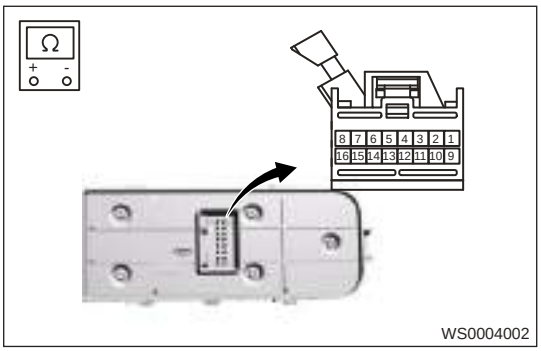
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door glass regulator switch.
   a. Remove the power glass regulator switch rubber pad.

   b. Remove the fixing bolt (arrow).

c. Using an interior crow plate, pry off power glass regulator switch and remove the power glass regulator switch.

Inspection

1. Check the front left door glass regulator switch.
   a. Using a digital multimeter, check for continuity between terminals of front left door glass regulator switch according to table below.



Compone-nt	Multimeter Connecti-on	Switch Condition	Specified Condition
Front left door glass regulator switch	1 - 7	Auto DOWN	⩽ 5 Ω
		Manual DOWN	332 Ω
		Manual UP	3000 Ω
		Auto UP	1500 Ω
Front right door glass regulator switch	2 - 7	Auto DOWN	⩽ 5 Ω
		Manual DOWN	332 Ω
		Manual UP	3000 Ω
		Auto UP	1500 Ω
Rear left door glass regulator switch	3 - 7	Auto DOWN	⩽ 5 Ω
		Manual DOWN	332 Ω
		Manual UP	3000 Ω
		Auto UP	1500 Ω
Rear right door glass regulator switch	4 - 7	Auto DOWN	⩽ 5 Ω
		Manual DOWN	332 Ω
		Manual UP	3000 Ω
		Auto UP	1500 Ω

b. If result is not as specified, replace front left door glass regulator switch.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Check if connector is correctly installed, when installing front left door glass regulator switch.
- Check if front left door glass regulator switch can be operated normally after installation.

Front Door Weather Bar

Removal

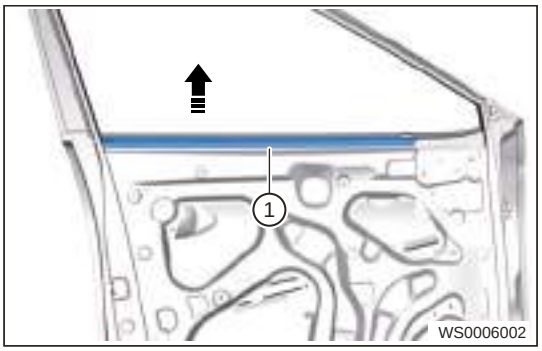
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

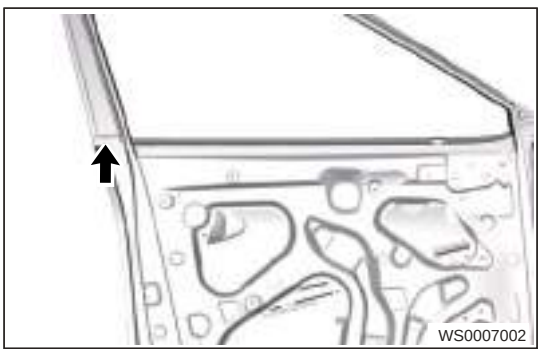
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing front door weather bars.
- Appropriate force should be applied when removing front door weather bars. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing front door weather bars.

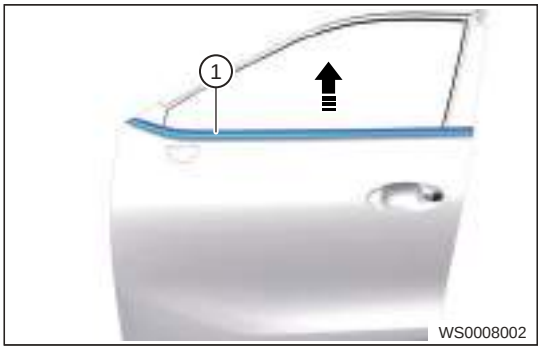
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door inner weather bar.
   a. Remove the front left door inner protector assembly.
   b. Using an interior crow plate, remove front door inner weather bar (1) in direction of arrow.



4. Remove the front left door outer weather bar.
   a. Remove the outside rear view mirror assembly.
   b. Remove 1 fixing screws (arrow).
      Tightening torque: 1.0 ± 0.2N • m



c. Using an interior crow plate, remove front door outer weather bar (1) from slot in direction of arrow.



Installation

1. Installation is in the reverse order of removal.

Front Door Upper Glass Run

Removal

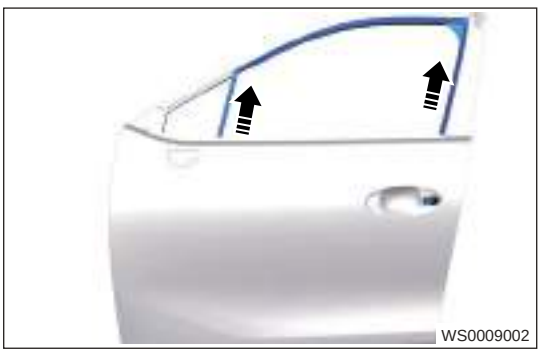
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

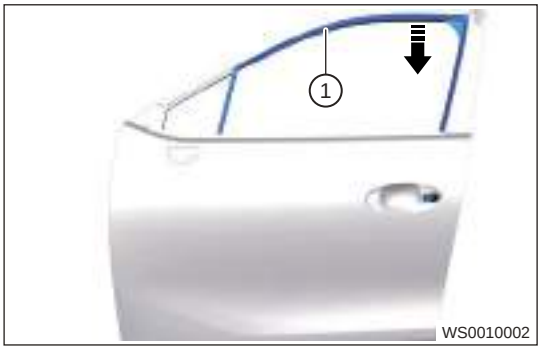
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing front door upper glass run.
- Appropriate force should be applied when removing front door upper glass run. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door inner protector assembly.
4. Remove the left outside rear view mirror assembly.
5. Remove the front left door weather bar.
6. Remove the front left door upper glass run.
   a. Lower the front door glass assembly and pull the lower part of front door upper glass run out from slot in direction of arrow.



b. Remove front left door glass upper run (1) from slot in direction of arrow as shown in illustration.



Installation

1. Installation is in the reverse order of removal.

Front Door Glass Assembly

Removal

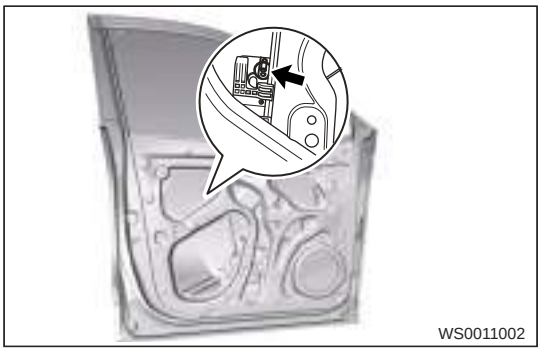
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing front door glass assembly.
- Appropriate force should be applied when removing front door glass assembly. Be careful not to operate roughly.
- Try to prevent window glass from dropping which will cause damage, when removing front door glass assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door inner protector assembly.
4. Remove the front left door protective film assembly.
5. Remove the front left door weather bar.
6. Remove the front left door glass assembly.
   a. Raise front door glass assembly to a proper position.
   b. Using a screwdriver wrapped with protective tape, detach the fixing clip (arrow) from front door glass assembly and remove the front left door glass assembly.



Installation

1. Installation is in the reverse order of removal.

Front Door Rear Glass Guide Rail Assembly

Removal

Hint:

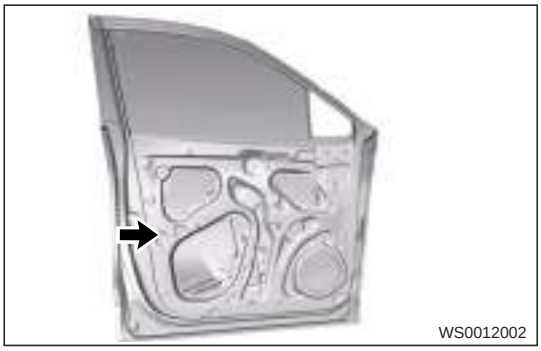
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing front door rear glass guide rail assembly.
- Appropriate force should be applied when removing front door rear glass guide rail assembly. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door inner protector assembly.
4. Remove the front left door protective film assembly.
5. Remove the front left door weather bar.
6. Remove the front left door rear glass assembly.
7. Remove the front door rear glass guide rail assembly.
   a. Remove fixing bolt (arrow) from front door rear glass guide rail assembly, and remove front left door rear glass guide rail assembly.

      Tightening torque: 7 ± 1.0N·m



Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- After installing front door rear glass guide rail assembly, make sure that window glass can go up and down smoothly and freely without any vibration, chattering or shock loading, etc.

Front Door Power Glass Regulator

Removal

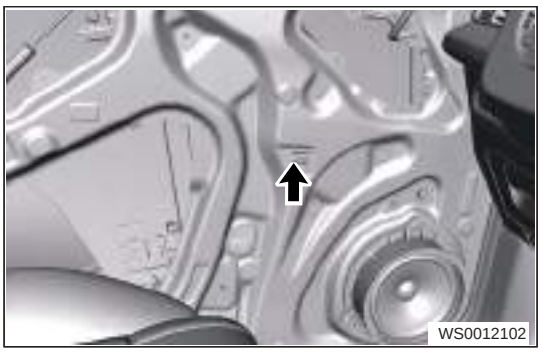
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

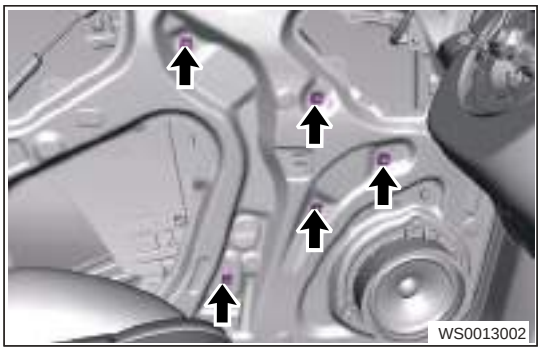
- Be sure to wear safety equipment to prevent accidents, when removing front door power glass regulator.
- Appropriate force should be applied when removing front door power glass regulator. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door inner protector assembly.
4. Remove the front left door protective film assembly.
5. Remove the front left door weather bar.
6. Remove the front left door glass assembly.
7. Remove the front left door power glass regulator.
   a. Disconnect the front power glass regulator connector (arrow).



   b. Remove 4 fixing nuts and 1 fixing bolts (arrow) from front door power glass regulator, and remove front left door power glass regulator assembly.

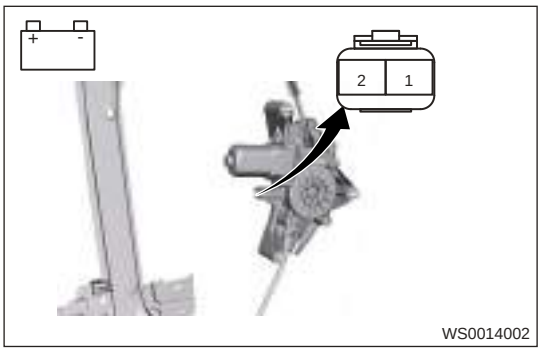
      Tightening torque: 9 ± 1.5N • m



Inspection

1. Check the front door power glass regulator.
   a. Apply battery voltage to the terminals of power glass regulator motor connector, and check the operation of front door power glass regulator motor according to table below.

Battery positive (+)	Battery negative (-)	Specified Condition
1	2	UP smoothly
2	1	DOWN smoothly



   b. If result is not as specified, replace front door power glass regulator.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- After installing front door power glass regulator is installed, make sure that window glass can go up and down smoothly and freely without any vibration, chattering or shocking, etc.

Rear Left Door Power Glass Regulator Switch

Removal

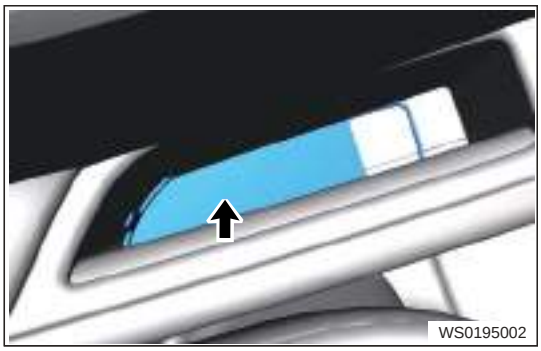
Hint:

- Use same procedures for front right, rear right and rear left sides.
- Procedures listed below are for rear left side.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing power glass regulator switch.
- Appropriate force should be applied when removing power glass regulator switch. Be careful not to operate roughly.
- Try to prevent door inner protector assembly from being scratched, when removing power glass regulator switch.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left door inner protector assembly.
4. Remove the rear left power glass regulator switch.
   a. Remove the power glass regulator switch rubber pad.



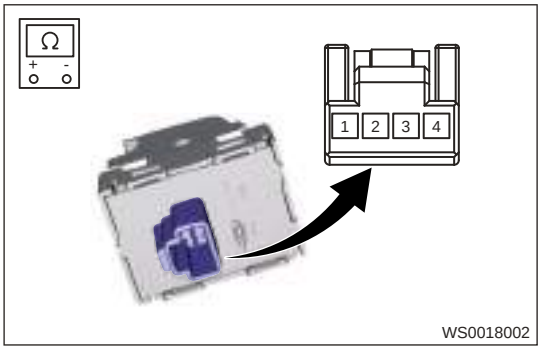
   b. Remove the fixing bolt (arrow).

   c. Using an interior crow plate, pry off power glass regulator switch and remove the power glass regulator switch.

Inspection

1. Check the power glass regulator switch.

a. Using a digital multimeter, check for continuity between terminals of other three power glass regulator switches according to table below.



Compone-nt	Multimeter Connecti-on	Switch Condition	Specified Condition
Front right door glass regulator switch	2 - 1	Auto DOWN	⩽ 5 Ω
		Manual DOWN	332 Ω
		Manual UP	3000 Ω
		Auto UP	1500 Ω
Rear left door glass regulator switch	2 - 1	Auto DOWN	⩽ 5 Ω
		Manual DOWN	332 Ω
		Manual UP	3000 Ω
		Auto UP	1500 Ω
Rear right door glass regulator switch	2 - 1	Auto DOWN	⩽ 5 Ω
		Manual DOWN	332 Ω
		Manual UP	3000 Ω
		Auto UP	1500 Ω

b. If result is not as specified, replace power glass regulator switch.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Check if connector is installed in place, when installing power glass regulator switch.
- Check if power glass regulator switch can be operated normally after installation.

Rear Door Weather Bar

Removal

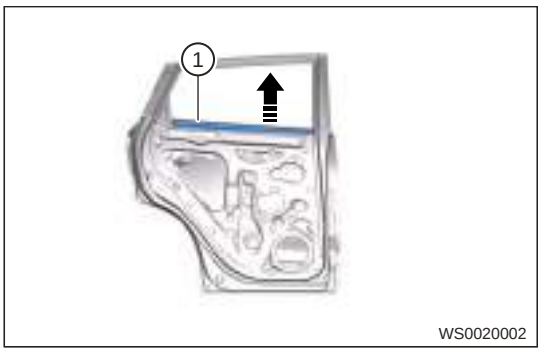
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing rear door weather bars.
- Appropriate force should be applied when removing rear door weather bars. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left inner weather bar.

a. Remove the rear left door inner protector assembly.

b. Using an interior crow plate, remove rear door inner weather bar (1) from slot in direction of arrow.

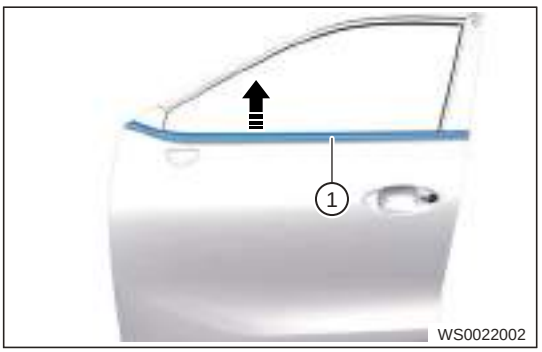


4. Remove the rear left door outer weather bar.

a. Remove 2 fixing screws (arrow).

Tightening torque: 1.0 ± 0.2N • m

b. Using an interior crow plate, remove rear door outer weather bar (1) from slot in direction of arrow.



Installation

1. Installation is in the reverse order of removal.

Rear Door Upper Glass Run

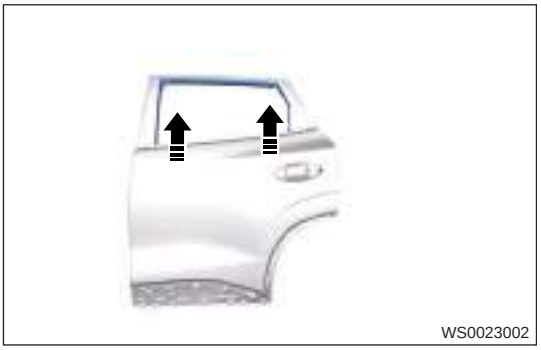
Removal

Hint:

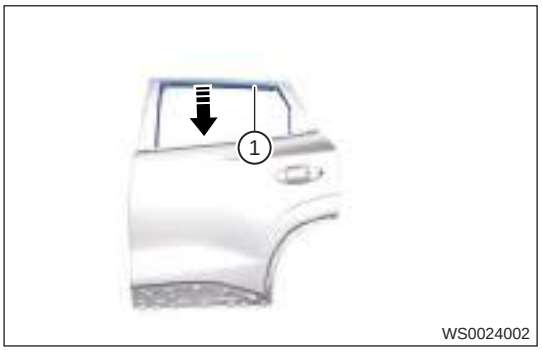
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left door weather bar.
4. Remove the rear left door upper glass run.

a. Lower rear door glass assembly and pull lower part of rear door upper glass run out from slot in direction of arrow.



b. Remove rear left door glass upper run (1) in direction of arrow as shown in illustration.



Installation

1. Installation is in the reverse order of removal.

Rear Door Glass Assembly

Removal

Hint:

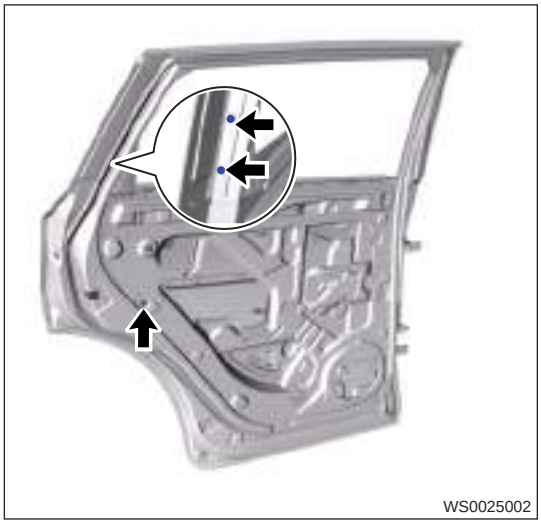
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left door inner protector assembly.
4. Remove the rear left door protective film assembly.
5. Remove the rear left door weather bar.
6. Remove the rear left door upper glass run.
7. Remove the rear left door glass rear guide rail assembly.

a. Remove 2 fixing screws and 1 fixing bolt (arrow) from rear left door guide rail, and remove rear left door glass guide rail.

Tightening torque: 1.5 ± 0.5 N • m

Tightening torque: 7 ± 1.0N • m



8. Remove the rear left door glass assembly.
   a. Raise front door glass assembly to a proper position.
   b. Detach snap pin from rear door glass assembly, and remove rear left door glass assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution
• Try to prevent window glass from dropping which will cause damage, when installing rear door glass assembly.

Rear Door Power Glass Regulator

Removal

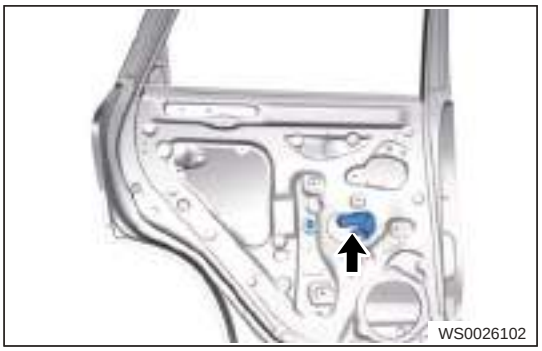
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

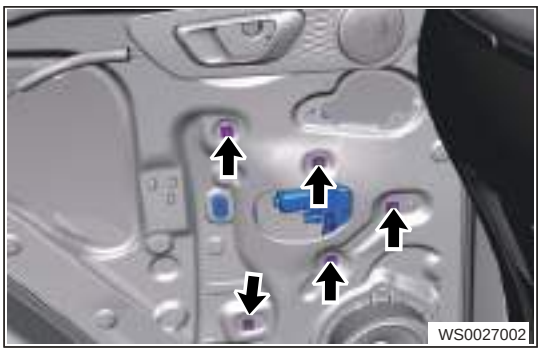
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing rear door power glass regulator.
- Appropriate force should be applied when removing rear door power glass regulator. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left door inner protector assembly.
4. Remove the rear left door protective film assembly.
5. Remove the rear left door weather bar.
6. Remove the rear left door glass assembly.
7. Remove the rear left door power glass regulator.
   a. Disconnect the rear door power glass regulator connector (arrow).



   b. Remove 5 fixing nuts (arrow) from rear door power glass regulator.
      Tightening torque: 9 ± 1.5N • m



Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- After installing rear door power glass regulator, make sure that window glass can go up and down smoothly and freely without any vibration, chattering or shocking, etc.

Front Windshield Assembly

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.

3. Remove the roof assembly.

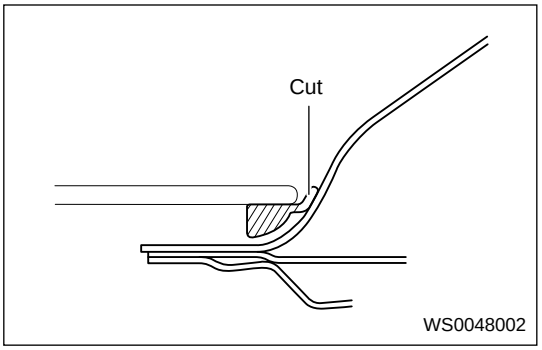
⚠ Caution

- It is not necessary to completely remove the roof assembly. Lower the front part of roof assembly, so that front windshield assembly can be removed.

4. Remove the inside rear view mirror assembly.
5. Remove the wiper arm assembly.
6. Remove the front windshield lower trim board assembly.
7. Remove the front windshield weatherstrip.
8. Remove the front windshield assembly
   a. Using a knife, cut off the adhesive.

⚠ Caution

- Try to prevent body paint surface from being scratched, when cutting off the adhesive.

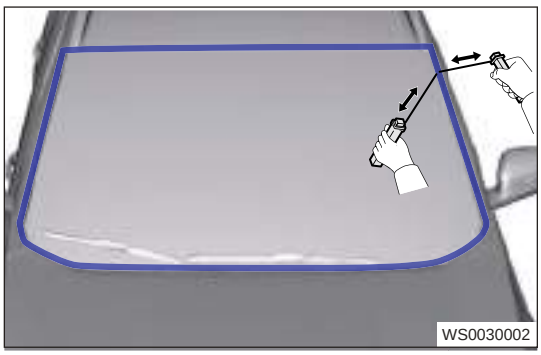


   b. Apply protective tape to the outer surface of body to prevent scratches.

⚠ Caution

- To prevent instrument panel upper body assembly from being scratched, place a plastic sheet between piano wire and instrument panel upper body assembly.

   c. Pass a piano wire through the seam between body and front windshield assembly.
   d. Tie wooden blocks or similar objects to both piano wire ends, cut off the adhesive by pulling the piano wire around front windshield assembly, and remove the front windshield assembly.

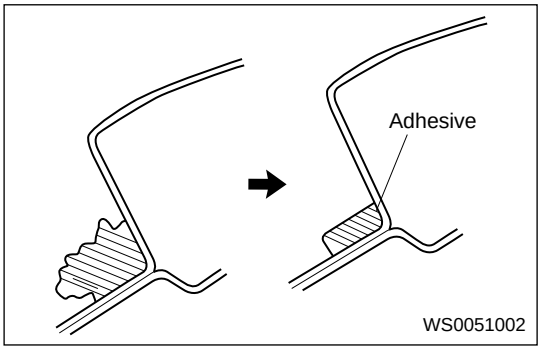


⚠ Caution

- When removing front windshield assembly, an assistant is needed.
- When removing front windshield assembly, prevent it from dropping.
- Leave as much adhesive on the body as possible when cutting off the adhesive.
- When separating front windshield assembly from vehicle, be careful not to damage body paint, interior and exterior ornaments.

9. Clean the vehicle body.

a. Using a knife, cut off any excess adhesive on the contact surface of vehicle body as shown in illustration.



⚠ Caution

- Try to prevent body paint surface from being scratched, when cutting off the adhesive.
- Leave as much adhesive on the body as possible, when cutting off the adhesive.

b. Clean the contact surface of vehicle body with cleaner.

⚠ Caution

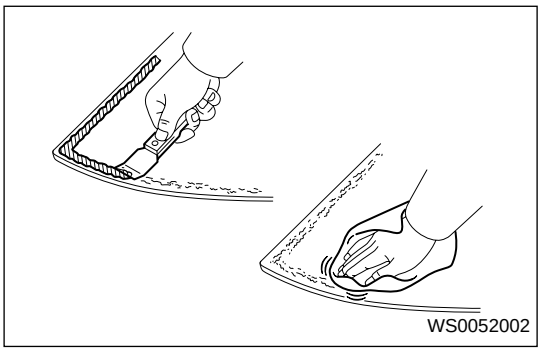
- Even if all adhesive has been removed, cleaning of vehicle body would be necessary.

10. Clean the removed glass.

⚠ Caution

- DO NOT touch the glass after cleaning it.
- Even if a new glass is used, it is necessary to clean it with glass cleaner.

a. Using a scraper, remove the adhesive sticking to glass.



b. Clean the outer edges of glass with cleaner.

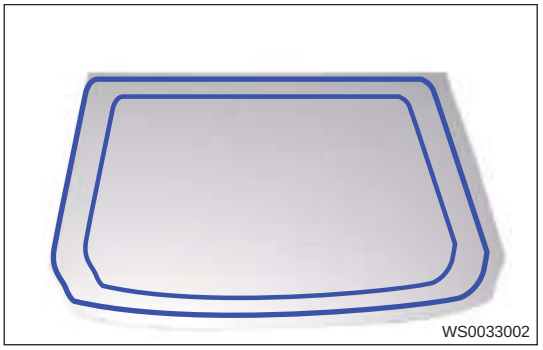
Installation
Installation condition

- Scan the code to confirm the part number and name before assembly before assembling, check the number of accessories and whether stopper is lost and whether small cracks or bubbles exist around windshield. Never install unqualified windshield to vehicle.
- Check if gum application surface on the sheet metal is flat before assembly.
- After glass is applied with gum, check if the glass gum is applied uniformly, especially at the corner of glass. Never load the glass of which gum is not applied uniformly.

1. Wipe the sheet metal primer area matched with the windshield with alcohol cloth and make sure width is 20 - 24 mm.
2. Apply sheet metal primer A11-4105013 and make sure application width is 19 - 21 mm; Do not expose it in the air before applying the sheet metal primer.
3. Using cleaner A11-4105017 (accelerant), clean the area around gum application and make sure cleaning width is 15 - 17 mm.
4. Apply A11-4105015 windshield primer (tolerance ± 1mm) along the glue line on the glass. Make sure application width is 13 - 15 mm. Apply gum A11-4105011 along the glue line in the center of the glue line at the lower part of the windshield. Make sure the gum width is 7 - 9 mm, height is 11 - 13 mm and

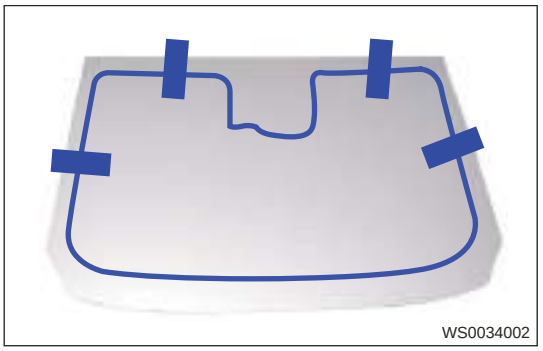
the height after being compressed is 5 - 7 mm. There should be no uneven gum and gum deviation from application line. There also no gum leakage or fluid overflowing; if gum overflowing from glass occurs, it is necessary to remove it.

5. Align dowel pins of front windshield with corresponding set holes for windshield installation on sheet metal of tonneau cover. Install the windshield, make sure to fix the upper end first and then make it contact the lower end (be careful to avoid impact to the glass and wrinkles to weatherstrips during assembly, and weatherstrips is matching with sheet metal well).
6. Fine tuning glass left and right to make sure clearance between glass edges and tonneau cover and quarter is uniform and meets the requirements of DTS (NOTE: Stand at the center of front left wheel to observe windshield VIN code).
   a. Slightly tap four sides of glass (within 100 - 200 mm from coil to outside edge of glass as shown in illustration) to install glass into place (height after being compressed is 5 - 7 mm).


WS0033002

   b. Apply tape (4 positions, length of tape is 150 - 200 mm) to prevent glass from sliding.

      Hint:
      In order to avoid blocking the wiper blade after tape is applied, it is required that the length of adhesive tape remaining on the glass shall not exceed 100 mm on the top of glass, and the length of quarter part shall be between 40 and 60.


WS0034002

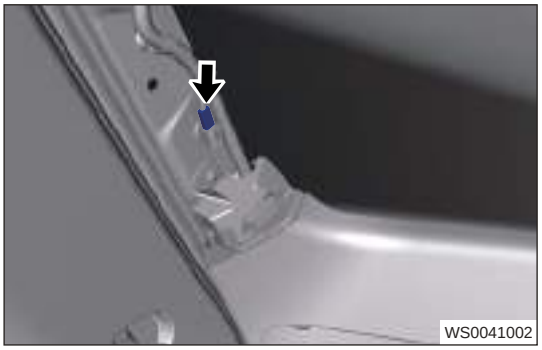
7. Install the front windshield lower trim board assembly.
8. Install the wiper arm assembly.
9. Install the inside rear view mirror assembly.
10. Install the roof assembly.
11. Connect the negative battery cable.

Rear Windshield Assembly

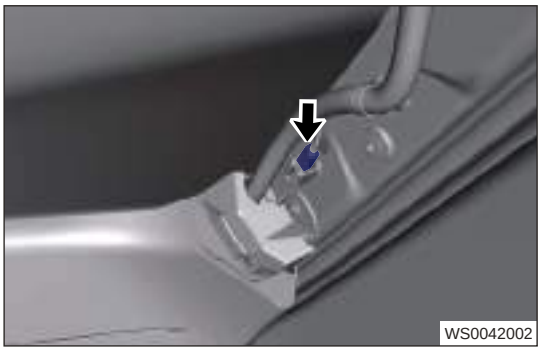
Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear door protector assembly.
4. Remove the rear wiper arm assembly.
5. Remove the rear wiper motor assembly.
6. Remove the rear spoiler assembly.
7. Remove the defroster wire harness assembly.

a. Remove the left defroster connector (arrow).



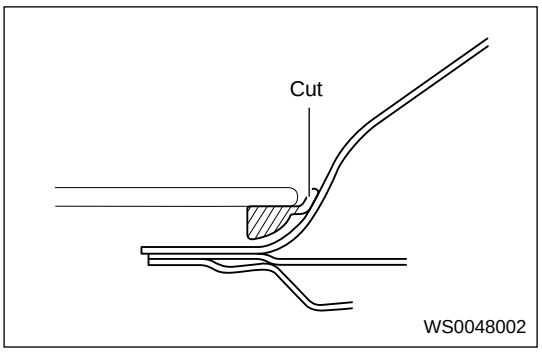
b. Remove the right defroster connector (arrow).



8. Remove the rear windshield weatherstrip.
9. Remove the rear windshield assembly.
   a. Using a knife, cut off the adhesive.

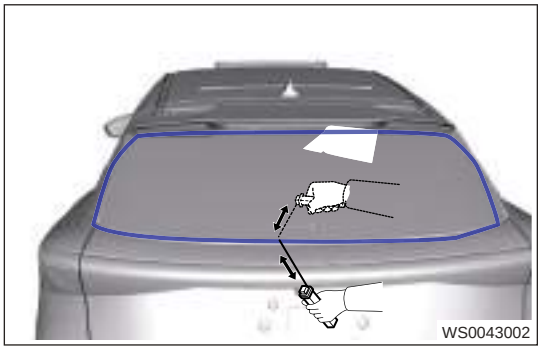
⚠ Caution

- Try to prevent body paint surface from being scratched, when cutting off the adhesive.



   b. Apply protective tape to the outer surface of body to prevent scratches.
   c. Pass a piano wire through the seam between body and rear windshield assembly.

d. Tie wooden blocks or similar objects to both piano wire ends, cut off the adhesive by pulling the piano wire around rear windshield assembly, and remove the rear windshield assembly.

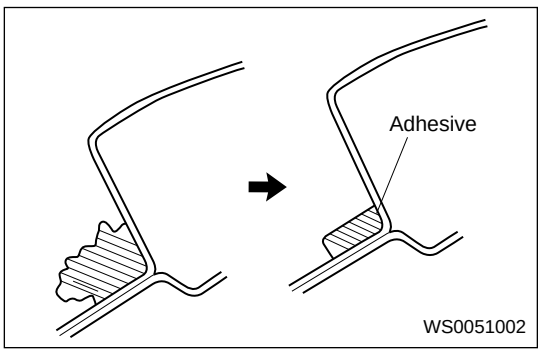


⚠ Caution

- When removing rear windshield assembly, two persons are required.
- When removing rear windshield assembly, prevent it from dropping.
- Leave as much adhesive on the body as possible when cutting off the adhesive.
- When separating rear windshield assembly from vehicle, be careful not to damage body paint, interior and exterior ornaments.

10. Clean the vehicle body.

a. Using a knife, cut off any excess adhesive on the contact surface of vehicle body as shown in illustration.



⚠ Caution

- Try to prevent body paint surface from being scratched, when cutting off the adhesive.
- Leave as much adhesive on the body as possible, when cutting off the adhesive.

b. Clean the contact surface of vehicle body with cleaner.

⚠ Caution

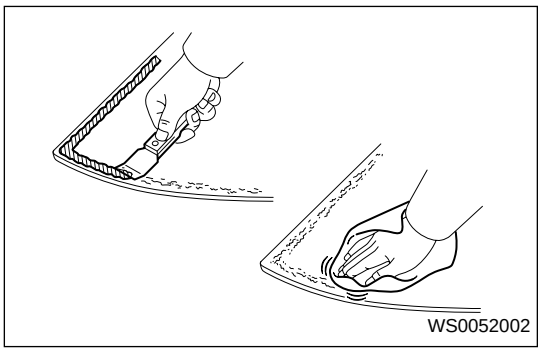
- Even if all adhesive has been removed, cleaning of vehicle body would be necessary.

11. Clean the removed glass.

⚠ Caution

- DO NOT touch the glass after cleaning it.

a. Using a scraper, remove the adhesive sticking to glass.



b. Clean the outer edges of glass with glass cleaner.

Installation

1. Detailed description and technology requirements during assembly.

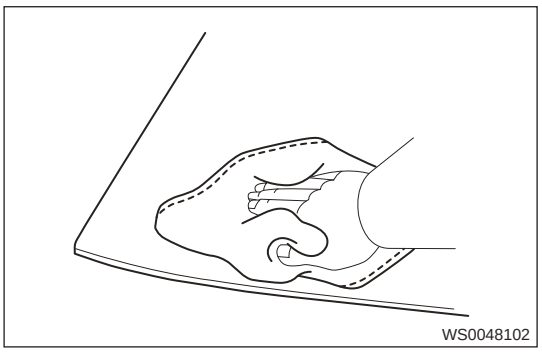
a. Before assembling, check the number of accessories and whether stopper is lost and whether small cracks or bubbles exist around windshield. Never install unqualified windshield to vehicle.
b. Check if gum application surface on the sheet metal is flat before assembly.
c. After glass is applied with gum, check if the glass gum is applied uniformly, especially at the corner of glass. Never load the glass of which gum is not applied uniformly.

2. Assembly order:
   a. Wipe the primer area with alcohol cloth and width is 20 - 24 mm;
   b. Apply sheet metal primer A11-4105013 to the center position of sheet metal installation area and make sure application width is 19 - 21 mm; Do not expose it in the air before applying the sheet metal primer.
   c. Using cleaner A11-4105017 (accelerant), clean the area around gum application and make sure cleaning width is 15 - 17 mm;
   d. Apply A11-4105015 windshield primer (tolerance ± 1 mm) on the application position around rear windshield. Make sure application width is 13 - 15 mm. Apply gum A11-4105011 from center lower position along application line. Make sure the gum width is 7 - 9 mm, height is 11 - 13 mm and the height after being compressed is 5 - 7 mm. There should be no uneven gum and gum deviation from application line before assembly and no gum leakage or fluid overflowing after assembly; if gum overflowing from glass occurs, it is necessary to remove it;
   e. Align dowel pins of rear back door with corresponding set holes for windshield mounting on metal sheet of back door outer panel to install the windshield (be careful to avoid impact to the glass during assembly);
   f. Fine tuning glass to make sure clearance between glass edges is uniformly. Slightly tap four sides of glass to install glass into place (height after being compressed is 5 - 7 mm) and apply tape (see 4 positions in the figure, length of tape is 150 - 200 mm) to prevent glass from shaking.
   g. After installation, connect wire harness connector and tongue on the glass, and confirm the installing condition.
3. Clean the contact surface of rear windshield.

⚠ Caution

- DO NOT touch the surface of rear windshield after cleaning it.

   a. Remove any residue on the contact surface of rear windshield with a clean, lint-free cloth soaked with cleaner.



4. Apply a coat of primer to the contact surface of rear windshield assembly.

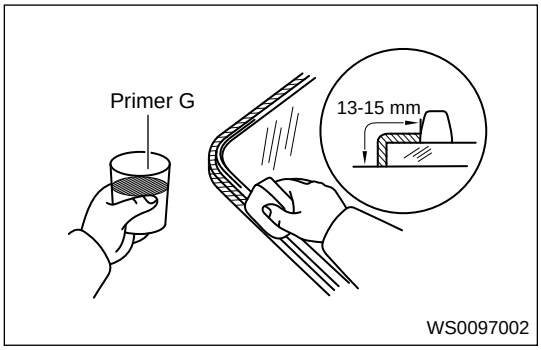
⚠ Caution

- Allow primer to dry for at least 3 minutes.
- DO NOT apply primer to the adhesive.
- DO NOT apply too much primer.
- DO NOT keep any opened primer for later use.

   a. Using a brush, apply a coat of primer to glass edge and contact surface.

b. Wipe off any excess primer with a clean cloth before drying.

c. Width of primer is 13 to 15 mm.



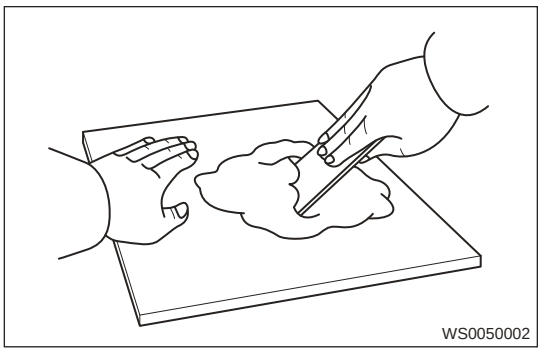
5. Mix the adhesive.

⚠ Caution

- Adhesive should be mixed thoroughly within 5 minutes.

a. Using a solvent, thoroughly clean the mixing board and scraper.

b. Using a scraper, thoroughly mix 500 g main adhesive and 75 g hardener on the mixing board.



6. Apply the adhesive.

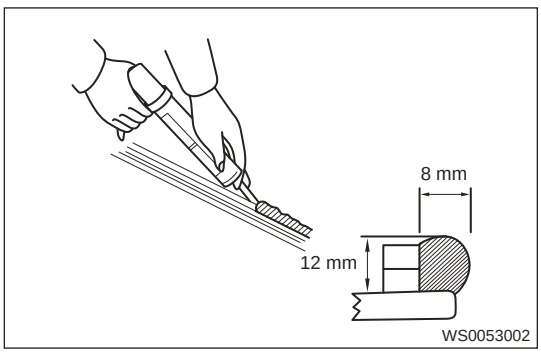
a. Cut off the tip of cartridge nozzle and add adhesive.

b. Install the cartridge to sealer gun.

c. Apply adhesive evenly to rear windshield assembly as shown in illustration.

Adhesive width: 8 mm

Adhesive height: 12 mm

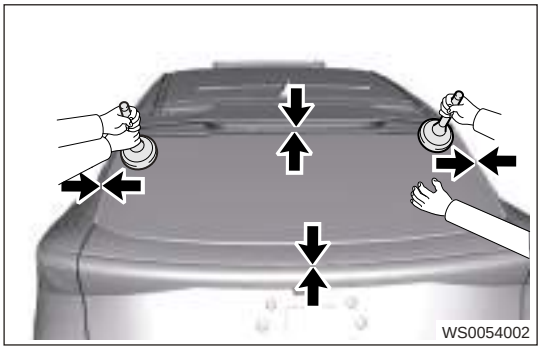


7. Install the rear windshield assembly.

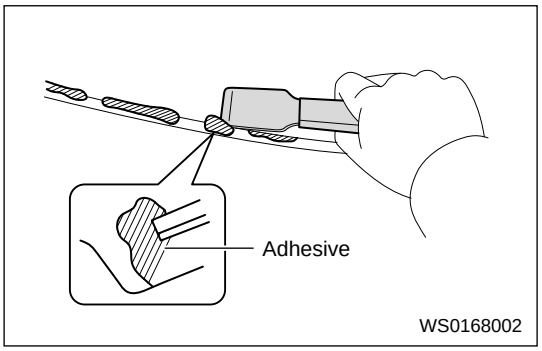
⚠ Caution

- Check that upper-and-lower clearance and right-and-left clearance of rear windshield assembly are uniform, to ensure good fitting with weatherstrips all around.

a. Align the matchmarks on glass and vehicle body, and gently press in glass along the edge.



b. Using a scraper, uniformly apply adhesive to the glass edge.



c. Remove any excess or spilled adhesive with the scraper.
d. Apply tape all the way around, and do not remove them until the adhesive hardens.

8. Check and repair the sealing of glass.
   a. Check the glass for leakage after adhesive has completely hardened.
   b. If it leaks, seal the leaks by adding adhesive.
9. Connect the negative battery cable.

Sliding Roof Switch Assembly

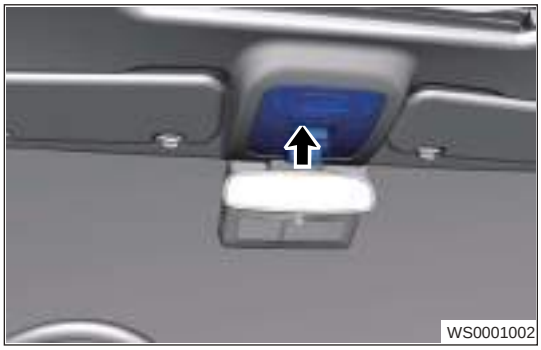
Removal

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing sliding roof switch assembly.
- Try to prevent interior from being scratched during operation, when removing sliding roof switch assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the sliding roof switch assembly.

a. Using an interior crow plate, remove sliding roof switch assembly and disconnect wire harness connector.



Installation

1. Installation is in the reverse order of removal.

⚠ Caution
• Make sure that sliding roof switch functions properly, after installing sliding roof switch assembly.

Sliding Roof Glass Motor

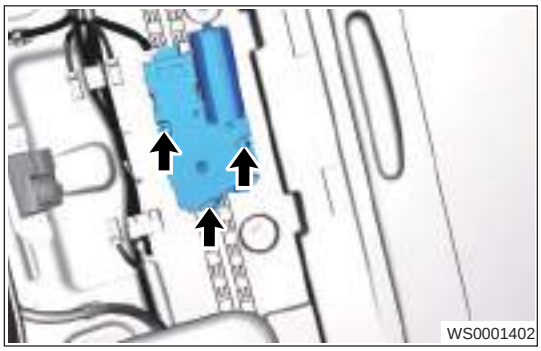
Removal

⚠ Caution
• Be sure to wear safety equipment to prevent accidents, when removing sliding roof glass motor. • Appropriate force should be applied, when removing sliding roof glass motor. Be careful not to operate roughly.

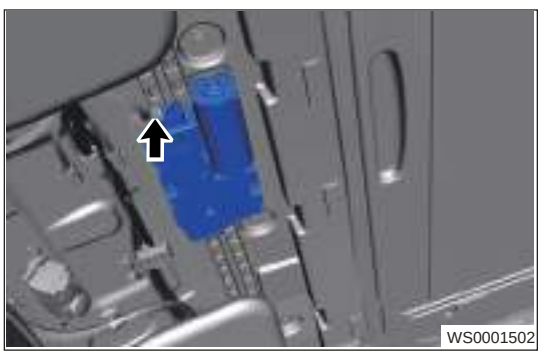
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the roof assembly.
4. Remove the sliding roof glass motor.

a. Remove 3 fixing screws (arrow) from sliding roof glass motor assembly.

Tightening torque: 5 ± 1.0 N • m



b. Disconnect wire harness connector (arrow) from sliding roof glass motor assembly.



c. Remove the sliding roof glass motor assembly.

Installation

1. Installation is in the reverse order of removal.

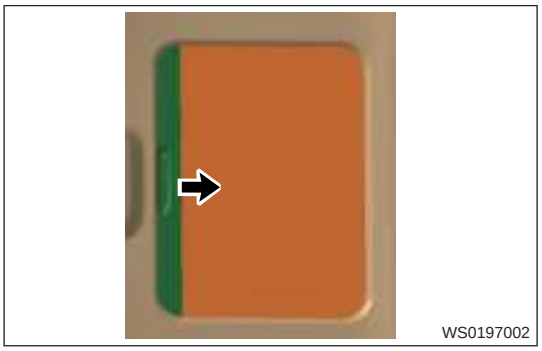
> **⚠ Caution**
>
> - Connect connector in place and tighten fixing screw to specified torque, when installing sliding roof glass motor assembly.
> - After sliding roof glass motor is installed, there should be no abnormal noise and resistance when opening and closing the sliding roof glass.

Sliding Roof Glass

Removal

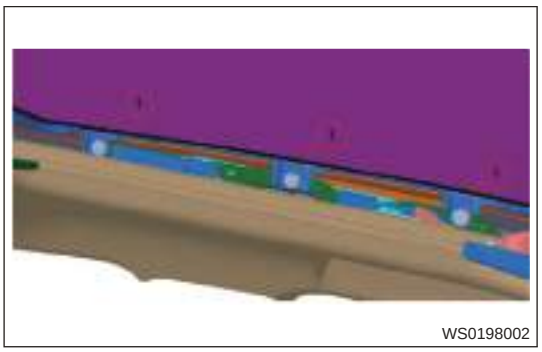
> **⚠ Caution**
>
> - Be sure to wear safety equipment to prevent accidents, when removing sliding roof glass.
> - Appropriate force should be applied when removing sunroof glass. Be careful not to operate roughly to prevent sunroof glass from being damage.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the sliding roof glass.
   a. Open the sun visor in direction of arrow



   b. Remove 3 fixing bolts from left side of sliding sunroof glass. (Use same method for right side)

      Tightening torque: 5 ± 0.5N·m



   c. Remove the sliding sunroof glass carefully from the roof.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- The matching levelness tolerance between sliding roof front glass and tonneau cover is -2 ~ 1 mm, the matching levelness tolerance between sliding roof rear glass and tonneau cover is -1 ~ 2 mm, and the matching surface difference between sliding roof glasses at left/right sides and tonneau cover is -1.5 ~ 1.5 mm. Interference fit between glass weatherstrip and tonneau cover should be ensured without any gap, so as to seal and prevent water leakage.
- When the matching between sliding roof glass and tonneau cover does not meet the requirements, the adjustment of sliding roof should be performed by two operators (One operator adjusts inside the vehicle, and the other operator assists outside the vehicle). The operator inside the vehicle should adjust height of sliding roof according to the instructions of operator outside the vehicle, so that it reaches the matching requirements with tonneau cover. When the matching indicated by the operator outside the vehicle meets the requirements, the operator inside the vehicle should tighten the bolt (torque is 5 ± 0.5 N·m).

Sliding Roof Drain Hose

Removal

⚠ Caution

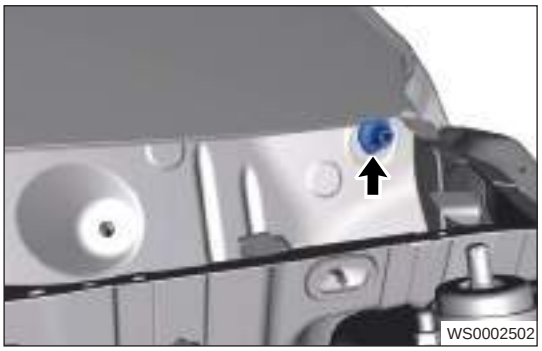
- Be sure to wear safety equipment to prevent accidents, when removing sliding roof drain hose.
- Prevent interior from being scratched during operating, when removing sliding roof drain hose.
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front windshield lower trim board assembly.
4. Remove the left A-pillar upper protector assembly.
5. Remove the left B-pillar upper protector assembly.
6. Remove the left C-pillar upper protector assembly
7. Remove the roof assembly.
8. Remove the front left drain hose.
   a. Using clamp pliers, remove clamp (arrow) from front left drain hose.


WS0002302

b. Using an interior pry bar, carefully pry off band (arrow) from front left drain hose.

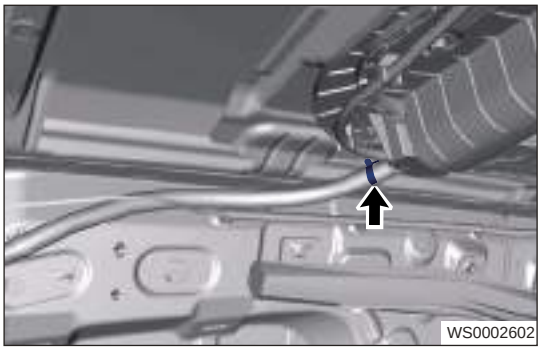
c. Disengage lower part of sliding roof front drain hose (-arrow) from plug hole on big round hole.



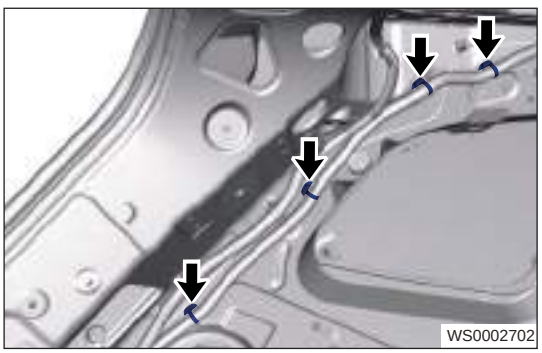
d. Remove the sliding roof front left drain hose.

9. Remove the sliding roof rear drain hose assembly.

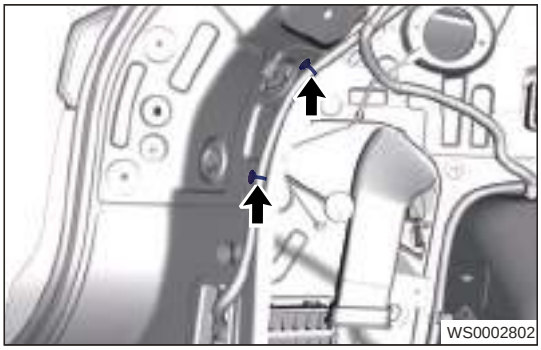
a. Using clamp pliers, remove clamp (arrow) from rear left drain hose.



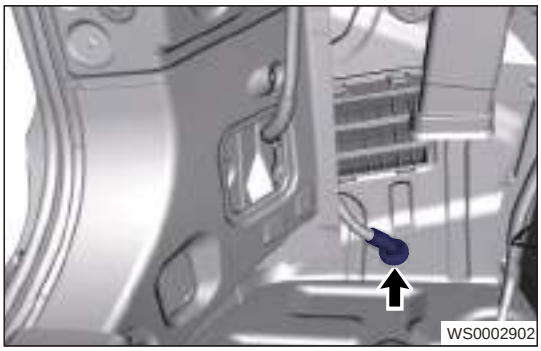
b. Using an interior pry bar, carefully pry off band (arrow) from rear left drain hose.



c. Using an interior pry bar, carefully pry off band (arrow) from rear left drain hose.



d. Disengage the connection (arrow) between sliding roof rear drain hose and sliding roof drain hose, remove sliding roof rear drain hose.



Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- After installation, check drain hose for distortion to avoid rough draining or blockage.
- Note that the sponges on drain hose is installed in place and make sure that drain hose should not be scratched by metal panel.
- The drain hose blocking part should be installed in place and connected with drain hose and metal panel without any looseness.

Sliding Roof Assembly

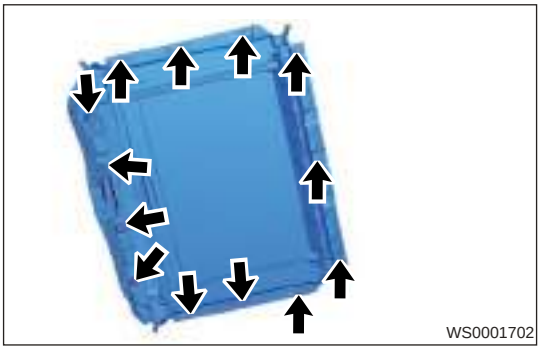
Removal

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing sliding roof assembly.
- Appropriate force should be applied when removing sliding roof assembly. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the roof assembly.
4. Remove the sliding roof glass motor.
5. Disconnect the sliding roof drain hose.
6. Remove the sliding roof assembly.

a. Remove fixing screws (arrow) from sliding roof assembly, and remove sliding roof assembly carefully.



Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Connect connector in place and tighten fixing screws to specified torque, when installing sliding roof assembly.
- After sliding roof is installed, there should be no abnormal noise and resistance when opening and closing the sliding roof.

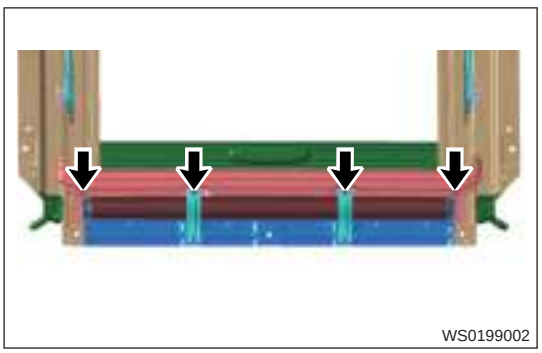
Remove Sliding Roof Sun Visor Assembly

Removal

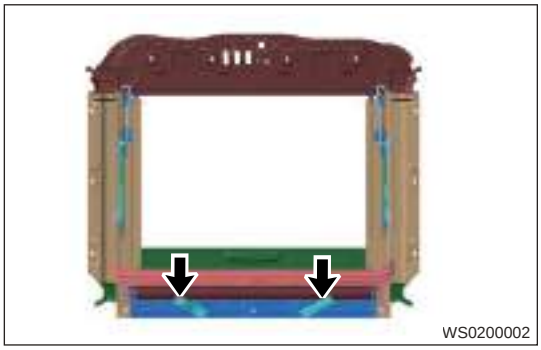
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing sliding roof sun visor assembly.
- Try to prevent interior from being scratched during operation, when removing sliding roof sun visor assembly.

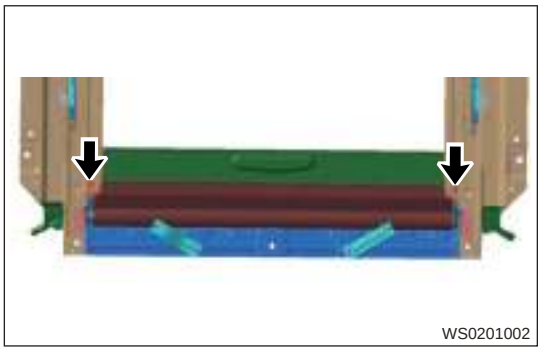
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the sliding roof sun visor.
   a. Remove the drain channel first, and then remove 4 screws with a cross screwdriver.



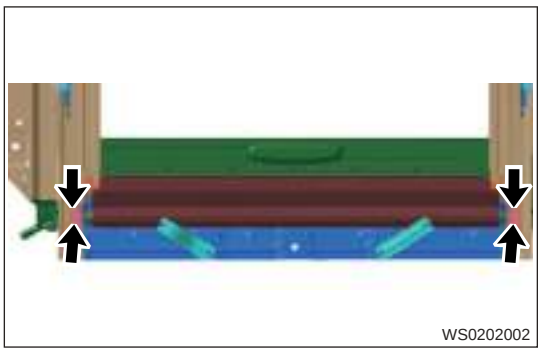
b. Rotate the connecting bracket, and then take out the drain channel horizontally


WS0200002

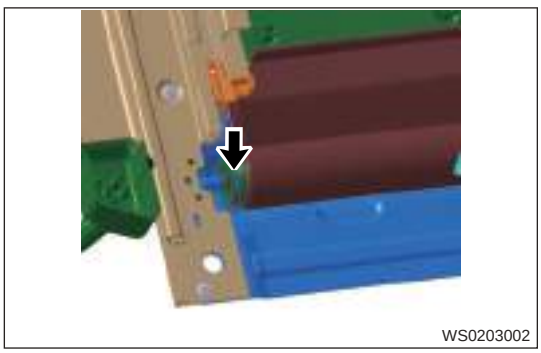
c. Remove the buffer block with a cross screwdriver.


WS0201002

d. Remove the sun visor press block with a cross screwdriver.


WS0202002

e. Insert a Ø3mm pin as shown in the illustration (also insert a Ø3mm pin for the other side).


WS0203002

f. Remove the nylon cord on the sun visor from the roller and carefully pull the sun visor handle out of the guide rail in parallel to avoid damage.

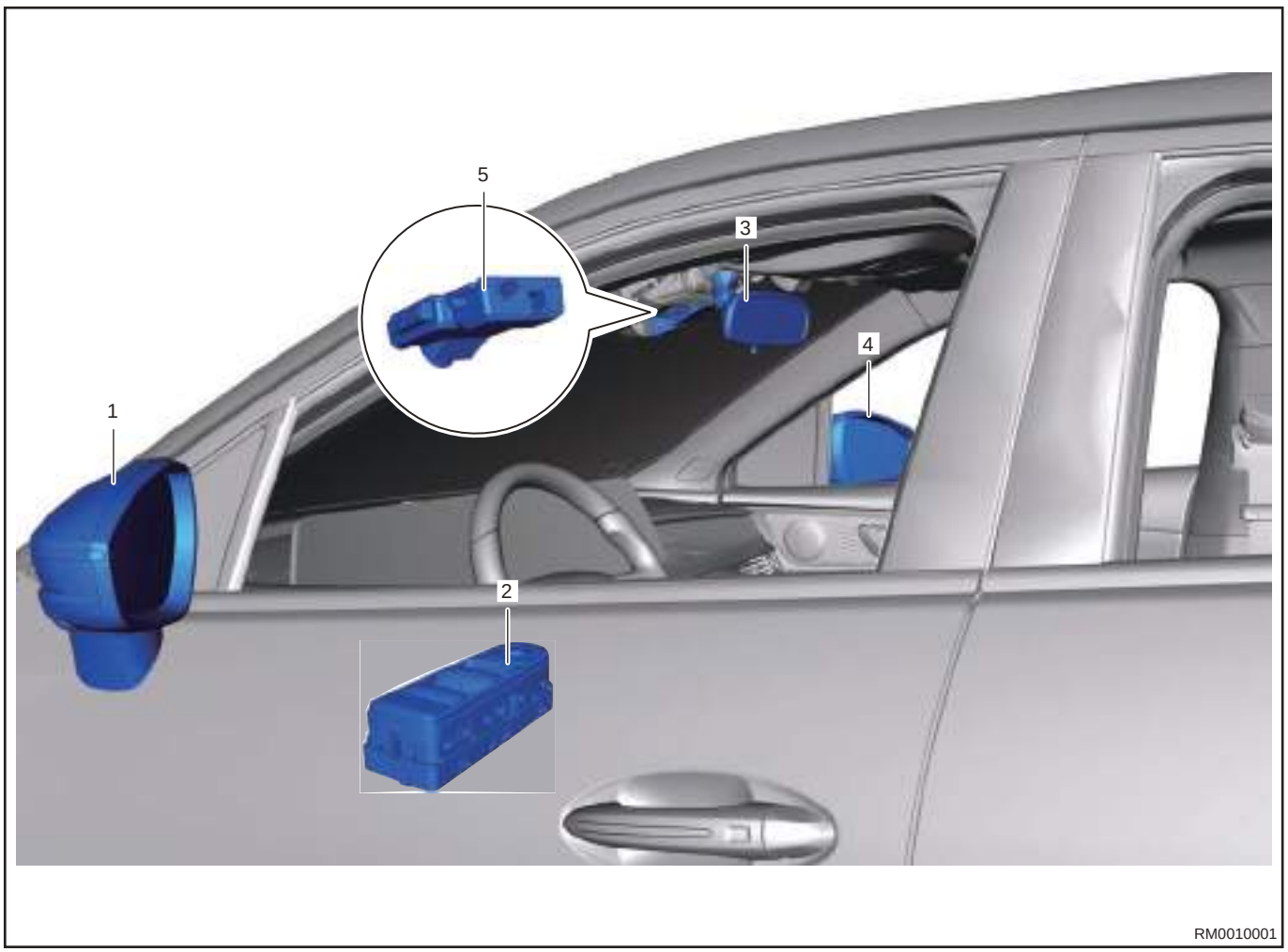
Installation

1. Installation is in the reverse order of removal.

INSIDE AND OUTSIDE REAR VIEW MIRROR/DRIVE RECORDER

System Description

System Components

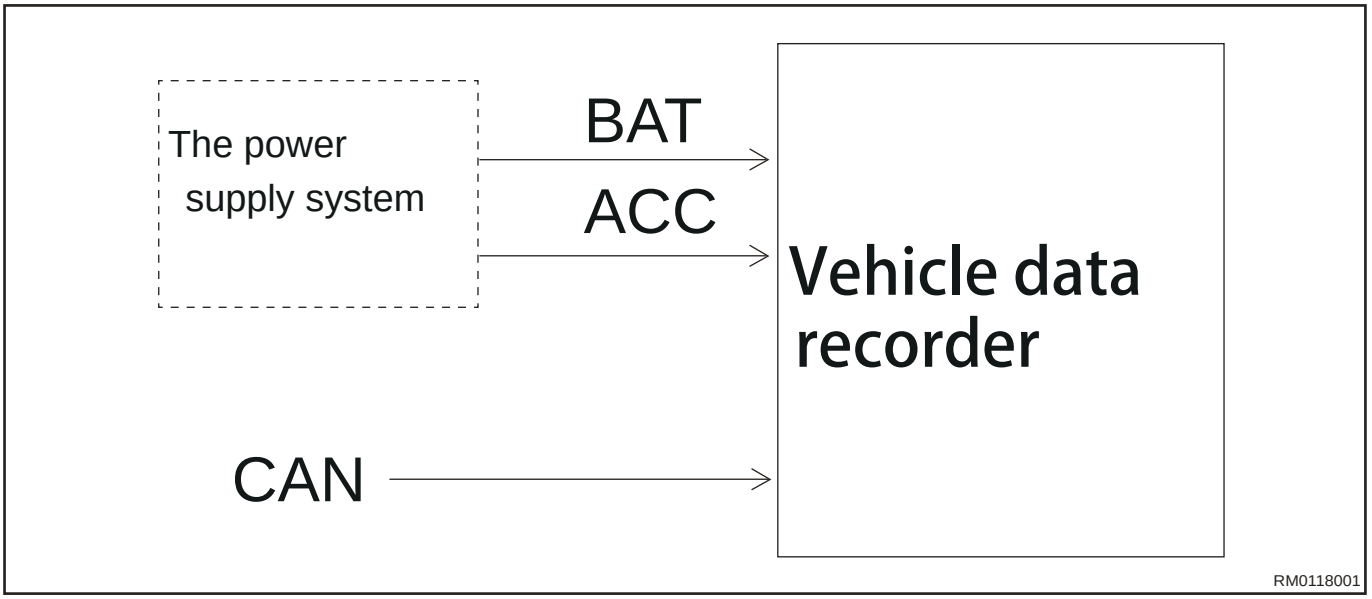


1	Left Outside Rear View Mirror Assembly	4	Right Outside Rear View Mirror Assembly
2	Rear View Mirror Folding Switch	5	Drive Recorder
3	Inside Rear View Mirror Assembly		

This vehicle is equipped with power outside rear view mirror assembly and inside rear view mirror assembly.
Power outside rear view mirror assembly: Driver can control the rotation of motor by operating the outside rear view mirror adjustment switch in vehicle, thus adjusting the mirror surface to a required visual angle and folding mirror.
Outside rear view mirror adjustment switch: Located on front left door protector. With ENGINE START STOP switch ON, press the outside rear view mirror adjustment switch to “L” or “R” position to select left or right outside rear view mirror assembly, and then press the up or down and left or right button of outside rear view mirror adjustment switch to a required visual angle.

Manual glare-resistant inside rear view mirror assembly: It is necessary to adjust inside rear view mirror to desired direction with hands. When driving at night, to reduce glare, adjust the inside rear view mirror assembly to required angle by pulling glare-resistant rod backward.
Automatic glare-resistant inside rear view mirror assembly (if equipped): It is composed of a special mirror, two photosensitive diodes and an electronic controller. The electronic controller receives the front and back light signals from the photosensitive diodes. If light shines on the inside rear view mirror, for example if the light behind is brighter than that in front, the electronic controller will output a voltage to the conductive layer. The voltage on conductive layer will change the color of electrochemical layer on mirror surface. The higher the voltage is, the darker the color of electrochemical layer is. At this time, ever if a strong light shines on the rear view mirror, a dark light will be reflected on the driver’s eyes through the glare-resistant inside rear view mirror assembly, which will not be glaring. The electrochemical layer on mirror surface will change continuously and automatically according to the incident intensity of light behind, thus preventing glare. When reversing the vehicle, the glare-resistant function of glare-resistant inside rear view mirror will be released.

System ON



System ON Logic Is as Shown in Table Below

BAT	ON (KL15)	CAN Communication	Parking monitoring	System Condition
OK	OFF	Available	ON or OFF	System starts and starts to record automatically
		Not available	ON	When vibration intensity of vehicle exceeds the set threshold, the drive recorder will be waken up by the signal from built-in G-sensor to record 20s video. After recording the video, if there is no continuous G-sensor signal, the system will shut

BAT	ON (KL15)	CAN Communication	Parking monitoring	System Condition
				down automatically. (- There is time watermark, but there is no driving behavior information)
			OFF	Vehicle vibrates and drive recorder cannot be waken up to record video
	ON	Available or not available	ON or OFF	System starts and starts to record automatically
NG	/	/	/	System cannot start (less than 6 V or more than 18 V)

System OFF

System OFF Logic Is as Shown in Table Below

BAT	ON (KL15)	CAN Communication	System Condition
OK	ON	Available	System operates normally
		Interrupted	Drive recorder can record video properly, but CAN related function cannot operate properly
	OFF	Available	System is in normal operating status, recording is normal and system does not turn off
		Interrupted	System off
NG	/	/	System off

Ambient Temperature

1. Operating temperature range: -40℃ to 85℃;
2. Storage temperature without load: -40℃ to 95℃.
3. Relative humidity: 0 to 85%.

Operating Current

1. Single head unit: ⩽ 300 mA

Static Current

1. Drive recorder system: ⩽ 0.1mA.
2. Start drive recorder with BATT terminal of head unit connector connected to multimeter (dialed to current band), cuts off the power supply at ON position under normal operating status, and the stable current value measured by multimeter after head unit enter sleep mode (CAN network is turned off and system does not operate) is the static current.

Product Feature

Function Overview

Function	Description	Note
DVR Video Output	120° ± 5° in horizontal, 140° ± 5° in diagonal	It is 5G Wi-Fi connection by default, 2.4G Wi-Fi is optional, IHU display realizes display function, time delay ⩽ 500 ms
Frame Rate	30 fps	/
Lens Pixels	⩾ 1920*1080	/
Low-light Level	0.1 lux	/
Dynamic Range	＞ 95 dB	/
Signal Noise Ratio	＞ 40 dB	/
Storage Medium	TF card (8 GB ~ 128 GB supported)	/
Record Function	Support	Synchronous sound recording when recording
Parking Monitoring	Support	/
Power-off Storage Protection	Support	/
ON Position Signal Detection	Support	/
Snapshotting	Steering wheel drive-by-wire Mode button snapshotting (Mode button is defined as snapshotting), or snapshot by voice control	Sound prompt is necessary when taking photos
File Playback	Support	/
General/Emergency Recording	Support	/

Function	Description	Note
CAN Communication	Support	/
Indicator	Dual color (red and blue) indicator Device operates normally (-normal recording): Blue indicator remains on; Wi-Fi connection/data interaction: Blue indicator flashes slowly; Device failure/function abnormality: Red indicator remains on; Recording abnormality/no TF card: Red indicator flashes slowly; Software upgrade: Red and blue indicators flash alternately.	Blue indicator blinks slowly, red indicator blinks slowly: Blinks at a frequency of 1 Hz; Red and blue indicator blinks alternately: Blinks at a frequency of 1 Hz. Priority of red indicator is higher than that of blue indicator.

System Parameter

Function	Description	Note
Drive Recorder	Starts to record automatically after starting	/
Recording resolution	1080P (by default), 720P	/
Recording Time	1 minute, 3 minutes (by default), 5 minutes	/
Driving information overlay	ON (by default), OFF	/
Recording	ON, OFF (by default)	/
Gravity Sensing Sensitivity	High, Medium (by default), Low	/
Wide Dynamic	ON (by default), OFF	/
Snapshotting	Taking photo, short video, taking photo + short video (by default)	/

System Features

Primary Function	Secondary Function	Description	Note
General recording	Video recording	Video recording is circularly covered, video is saved in TF card;	Folder is full without prompt
	Video recording switch	Video recording switch	ON by default
	Recording resolution	1920*1080@30 frame/ 1280*720@30 frame	1920*1080@30 frame by default
	Sound recording switch	ON/OFF	Sound recording OFF by default

Primary Function	Secondary Function	Description	Note
	Recording file time	1 minute/3 minutes/5 minutes	3 minutes by default
	Driving information overlay	Driving information overlay switch	ON by default
		Driving information is from CAN network;	/
		Driving information includes: Vehicle speed, gear position, accelerator pedal, high beam light, low beam light, rear fog light, left turn signal light, right turn signal light, parking brake, foot brake, seat belt	Real-time preview screen does not display
	Time watermark	Current time watermark is on the screen of video file, which can be seen during video playback; The source of time: DVR RTC clock (at each cold start of DVR, CAN is obtained to perform time calibration);	Real-time preview screen does not display
	HDR switch	HDR switch	ON is for DVR function screen by default
Emergency recording	Emergency recording	When vibration is greater than vibration acceleration threshold of emergency recording, 10 s video before and after vibration moment is saved in emergency video area separately; After IG ON, get the vehicle acceleration value from CAN; before IG ON, get the vibration value from Gsensor on DVR Emergency video file is circularly covered;	When recording is off, emergency recording will not be turned off; When emergency video folder is full, prompt box that shows “Emergency video folder of driving recorder is full, please remove the file in card timely” will pop up on IHU screen
	Vibration acceleration induction sensitivity	Three vibration acceleration thresholds: High, medium, low	Medium by default
	Emergency recording overwriting	If the storage area of emergency recording	/

Primary Function	Secondary Function	Description	Note
		has been full, new emergency video will replace the oldest emergency video.	
Parking monitoring	Parking monitoring	If vibration is greater than the parking monitoring vibration acceleration threshold with driving recorder turned off, it will turn off after turning on to record for 20 seconds.	Duration is the same as that of emergency recording video
	Parking monitoring switch	Parking monitoring switch	ON by default
Taking pictures	Taking pictures	• Photo resolution is the same as the current video resolution; • During taking pictures, recording is not paused; • The photo is stored in photo storage area of TF card; • The photo is overwritten circularly;	When photo folder is full, prompt box that shows “Photo folder of driving recorder is full” will pop up on IHU screen.
	Steering wheel button control capturing	If IHU defines steering wheel line control Mode button as “Driving recorder capturing”, it will response to steering wheel button and take picture; Customized capturing setting can be set on setting screen of driving recorder: Capturing option function can be customized. Customized option (- taking pictures, short video, taking pictures + short video). Duration of captured video is 10 seconds, which consists of first 5 seconds and last 5 seconds of video that responds to the moment of capturing.	• During emergency recording, it cannot respond to capturing. If it is in the process of capturing for recording currently, it cannot respond to emergency video recording. • If capturing setting is “short video”, “taking pictures + short video”, it will not respond to the capturing command again during short video recording, until the recording is completed. It will respond to next capturing command when “Mode”

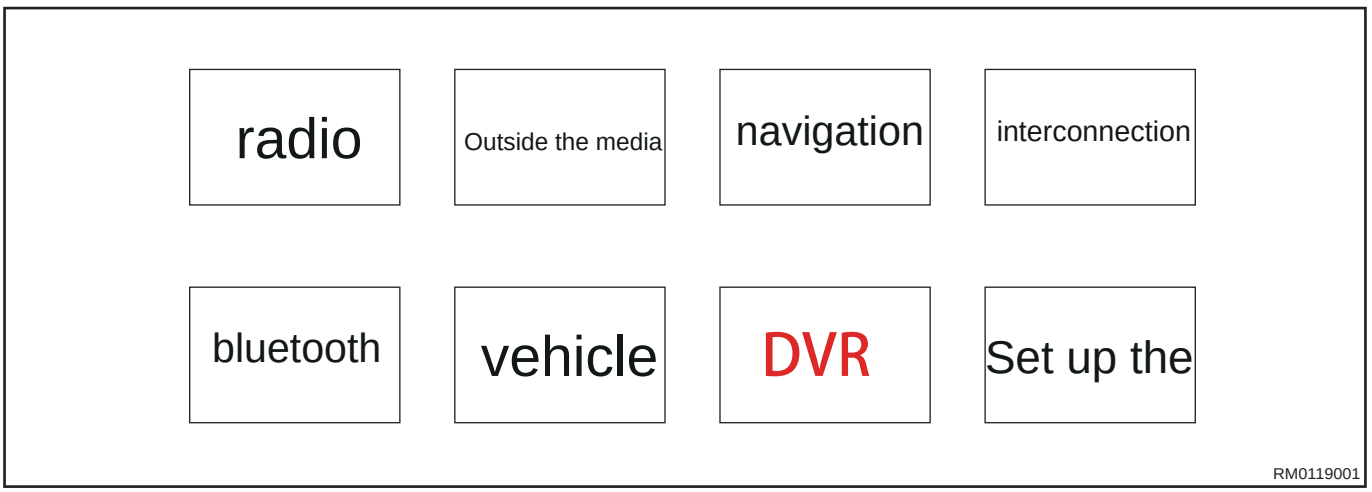
Primary Function	Secondary Function	Description	Note
			button is pressed again
Playback	Video playback	Play the video file recorded by driving recorder in TF card on central control navigation head unit.	/
	Photo playback	Play the photo file recorded by driving recorder in TF card on central control navigation head unit.	/
File management	File management	Manage (delete) the video (common and emergency video) and photo file stored in TF card of DVR on central control navigation head unit.	/
	Formatting TF card	Format the TF card by central control navigation screen operation.	/
AR navigation video output	AR navigation video output	Intercept 1488*616 (-tentative) resolution video output;	Specific angle is subject to real vehicle calibration
DVR video output and interaction	DVR video output and interaction	DVR outputs video and interacts via Wi-Fi	/
		After DVR application is turned on by central control navigation head unit, it connects with Wi-Fi and start to transmit data; After exiting DVR application, it stops data transmission and interaction, central control keeps connected with Wi-Fi of DVR.	When user clicks central control APK with central control AP (hot spot) turned off, AP (hot spot) is turned on by central control automatically
		Wi-Fi ID and password are transmitted through CAN network.	Wi-Fi ID is unique.
		Use RTSP transport protocol to transmit real-time screen	/
		Function includes: Real-time preview, normal	/

Primary Function	Secondary Function	Description	Note
		video playback, taking pictures, file management, setting, etc.	
		Switching between Wi-Fi 2.4G and 5G via CAN	DVR Wi-Fi uses 5G frequency band by default, when 2.4G frequency band switching request is received by DVR sent from central control, DVR switches to 2.4G frequency band.
Power management, CAN network	ON position signal response	When power is turned on in ON position, system turns on and starts recording; When power is turned off in ON position and there is no CAN communication, system turns off and stops recording, and saves the video file;	/
	Video storage protection with power off	When it detects that B+ power supply is cut off, start to save the video when stopping recording. Use super capacitor to save power and save the recording file before the moment of power off.	/
	CAN network wake-up	System starts after receiving wake-up command from CAN network.	/
	Transmit information	1. Vehicle driving information	/
		2. Wake-up command	/

Primary Function	Secondary Function	Description	Note
Status indication	Indicator	Dual color (red and blue) indicator Device operates normally: Blue indicator remains on Wi-Fi connection/data interaction: Blue indicator blinks slowly Device fault/abnormal function: Red indicator remains on Abnormal recording/no TF card: Red indicator blinks slowly Software upgrading: Red and blue indicator blinks alternately	Blue indicator blinks slowly: Blinks at a frequency of 1Hz Red indicator blinks slowly: Blinks at a frequency of 1Hz Red and blue indicator blinks alternately: Blinks at a frequency of 1Hz

Functional Requirement

- Note: As there are two proportions of central control display: 8:3 and 16:9, so there are two proportions of UI in central control. This specification takes UI of 8:3 as an example, the difference of UI for 16:9 is only the layout and style, function is the same as UI of 8:3. The UI screen diagram in this section is only for assisting function description, specific UI is subject to actual design.
- This product is a two-in-one product with a driving recorder and an AR navigation camera. The video display operation and AR navigation video of driving recorder need to be displayed on central control navigation screen. The operation method of DVR depends on whether central control navigation head unit supports it. The function introduction in this section takes touch method as an example. Button operation method depends on whether there are buttons on button panel that support DVR operation. Driving recorder can be turned on and off and perform capturing through voice command.



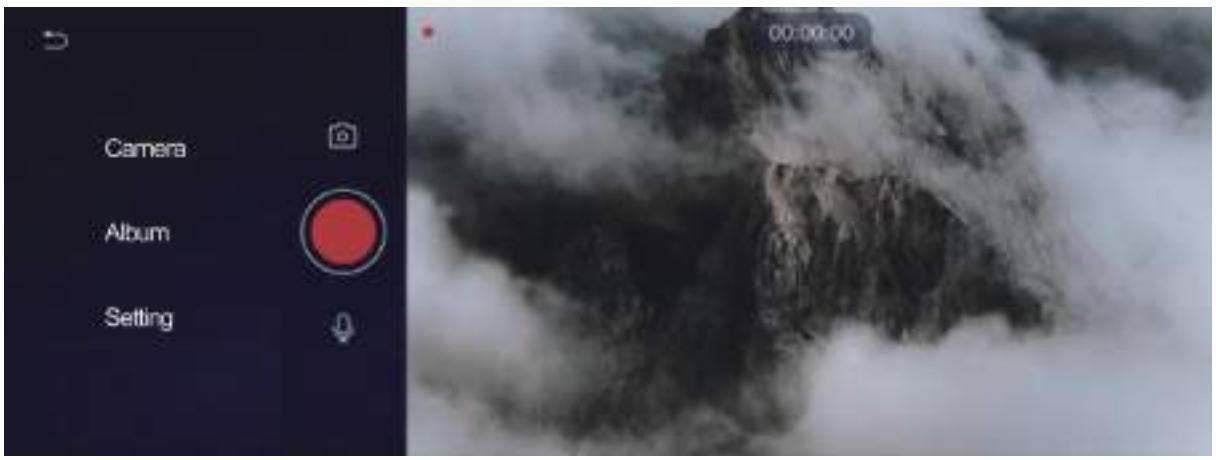
Driving Recorder Connection

- Driving recorder communicates with IHU via Wi-Fi, real-time screen uses RTSP protocol (Real Time Streaming Protocol). IHU acts as Wi-Fi AP (hot spot), and DVR connects with Wi-Fi AP (hot spot) of IHU. IHU Wi-Fi hot spot uses 5G frequency band by default. For some models, IHU Wi-Fi can be switched to 2.4G. After IHU Wi-Fi is set to 2.4G by user, prompt box that shows “Current WiFi hot spot is 2.4G, which will affect the experience. It is recommended to switch to 5G” will pop up when entering DVR screen by clicking driving recorder icon on IHU!
- When user clicks APK, prompt box that shows precautions as followings will pop up.

⚠ Caution

1. Please use brand memory card of Class 10 or later purchased from regular channels. For details, refer to user manual;
2. Memory card is consumable. Please export important files regularly and save them to other storage media to avoid file loss;
3. WiFi of audio system is unavailable during driving recorder connection. (For audio head unit with dual MAC address function, cancel this prompt).

- If user does not select “Do not prompt any more” and click OK, prompt box will pop up again when clicking APK next time. After selecting “Do not prompt any more” and clicking OK, prompt box will not pop up any more when entering APK next time.
- If Wi-Fi is in AP mode when IHU is turned on, IHU will send SSID and password to DVR via CAN when it is turned on. When clicking IHU DVR APK to enabled it, IHU will send connecting request to DVR via CAN to establish connection between DVR and IHU;
- If Wi-Fi AP is turned off or in STA mode (Internet mode) when IHU is turned on, IHU turns on AP automatically and sends SSID, password, connecting request, etc. to DVR to establish connection between DVR and IHU when IHU DVR APK is enabled.
- When exiting APK, if IHU is in AP mode, central control navigation Wi-Fi always keep connected with driving recorder. If user disconnect the Wi-Fi connection of driving recorder and central control manually, for example, IHU Wi-Fi is switched to STA internet mode by user, IHU will switch back to AP mode automatically and send SSID, password, connecting request, etc. to DVR to establish connection between DVR and IHU when IHU DVR APK is enabled again.
- On real-time preview screen, decode and display H.264 video streaming from head unit camera of DVR in real time (there is a certain delay due to video capture, encoding, transmission, decoding and player cache, the delay is less than 500 MS);
- If Wi-Fi is disconnected abnormally on any screen of DVR APK, APK will return to real-time preview screen, UI previews black screen of video area and prompts “Driving recorder connection is not connected”.
- Click “Back” ICON on upper left corner to exit to central control main screen. Wi-Fi will remain connected after exiting.
- In normal conditions (no Wi-Fi interference for external environment), it is required that the first connection time does not exceed 5 seconds.



RM0263001

TF Card Album Folder

1. General video folder
   - Folder name: “NOR”

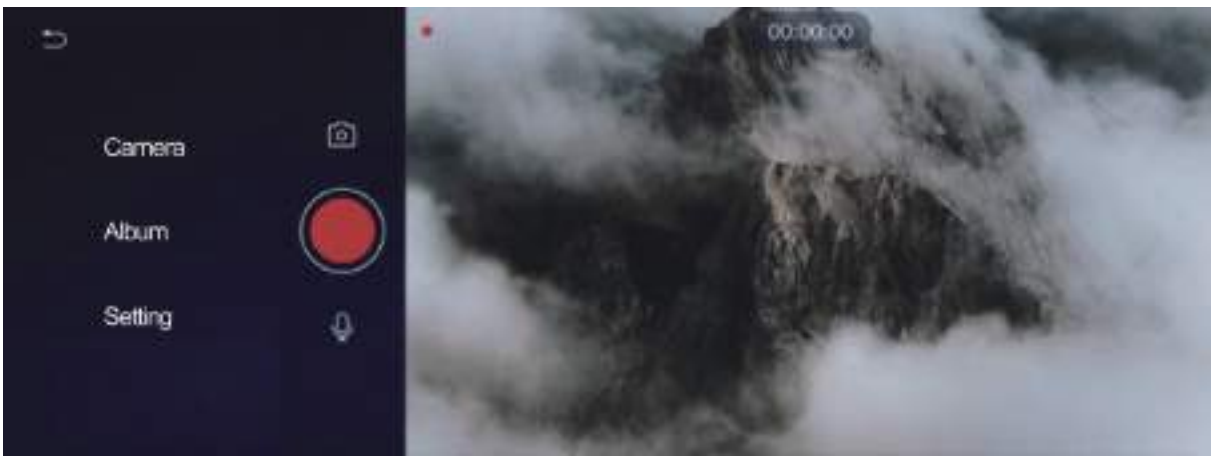
- Internal file name: NOR_date_time A.MP4 (NOR_20180723_123233A.MP4)
- Storage space = (total capacity of TF card - 500M (reserved buffer space) - 200M (photo folder space)) *3/4

2. Emergency video folder
   - Folder name: “EVT”
   - Internal file name: EVT_date_time A.MP4 (EVT_20180723_123233A.MP4)
   - Storage space = (total capacity of TF card - 500M (reserved buffer space) - 200M (photo folder space)) *1/4
3. Photo folder
   - Folder name: “PHO”
   - Internal file name: PHO_date_time A.JPG (PHO_20180723_123233A.JPG)
   - Storage space = 200M

General Recording

Recording Interface

1. When B+ and ON signal are powered on, or B+ is powered on and CAN network communication is normal, and voltage and power circuits are normal, driving recorder will automatically start recording.
2. After the central control navigation is connected with driving recorder, it will enter the real-time preview interface to view the real-time image of the recorder. If the drive recorder is recording video normally, there is REC on the interface accompanied with red dot flashing. If the drive recorder is not recording video normally, only one red dot is always ON but not flashing, and there is no REC.



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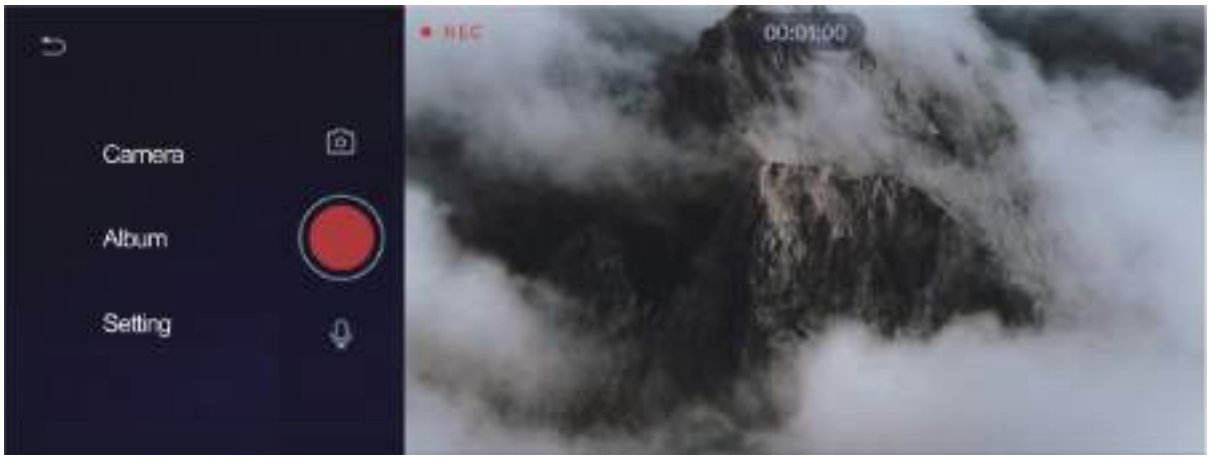
Video Operation



RM0266001

1. When the driving recorder is paused, click ICON to continue recording; ICON changes to with a REC logo and a red dot flashing (1 Hz frequency). When the driving recorder is in the recording state, click ICON to pause recording; ICON changes to , there is no REC logo and red dot flashing.
2. The driving recorder is equipped with MIC, which can record audio synchronously while recording video. The user can turn off or turn on the sound recording through the central control navigation screen. Sound recording is OFF by default. In the real-time preview interface, click ICON to turn on sound recording, ICON changes to . Click ICON to turn off sound recording, ICON changes to .

Video Recording

1. The video recording of the drive recorder has been continuing. Due to the limited capacity of the TF card, the memory card will be full after the TF card is recorded for a period of time. The drive recorder adopts the logic of cyclic storage of video. When the memory card is full, the latest video will overwrite the earliest recorded video in the folder.
2. The recorder supports up to 1080P resolution video, and the default is 1920*1080@30 frame; the user can change the resolution to 1280*720@30 frame through the central control navigation screen. After changing to 1280* 720@30 frame, it can also be manually changed back to 1920*1080@30 frame.
3. The length of the recorded video segment is 3 minutes.

4. The recorded video is stored by time segment. The system default is 3 minutes, which can be manually changed to 1 minute or 5 minutes.

Emergency Video Recording

Emergency Video Trigger

1. There are two sources of signals that trigger emergency recording: G-sensor of drive recorder and acceleration value of vehicle body. The vehicle transmits the key position status to driving recorder through CAN. When the driving recorder receives the key position status (ignition action) sent by the vehicle, it triggers the emergency recording by judging whether the body gravity acceleration value exceeds the set threshold value (the threshold value needs to be set according to the actual vehicle verification).
2. When the driving recorder receives the vehicle key position state turns to ON position signal disconnection state after ignition, during ON position signal disconnection and next ignition state, the driving recorder triggers emergency recording through its own G-sensor signal. When the acceleration of vibration exceeds the threshold set by G-sensor, the recorder will be triggered to store an emergency video.
3. The inductive sensitivity of G-sensor can be set to "high", "medium" and "low" through the large screen navigation of central control. The default is "medium".

Emergency Video Storage Mechanism

1. The emergency video is a 20s video, which is stored in the "emergency video" folder. The 20s video consists of 10s video before and after the time when the vibration is sensed. The resolution of the emergency video is the same as that of the normal video currently set. If the normal video is set to 1080P or 720P, the resolution of the emergency video is also 1080P or 720P.
2. Due to the space of the "emergency video" folder is also limited, the memory card in "emergency video" folder will also be full, so the emergency video folder also adopts the mechanism of circular coverage. When the “emergency video” folder is full, the newly generated emergency video will cover the earliest recorded emergency video. When the “emergency video” folder is full, a prompt box will pop up on the IHU interface: “Emergency video folder of recorder is full”.

Time Watermark

1. The time watermark is corrected by CAN, and it will be corrected once when starting up. The time watermark contains date and time information in the format of "year-month-day hour: minute: second". The time watermark is not displayed in the real-time preview interface, and is visible in the upper left corner of the video during playback.

RM0267001

Driving Information Overlay

1. DVR will receive the vehicle driving information from CAN network and save it in the video recording file in the form of watermark icon. The information watermark of DVR is acquired according to the CAN signal. When there is no CAN signal, the information watermark will not be displayed and CAN network will not actively wake up other ECU.

   See the table below for driving information.

Display Composite Information	Icon
Vehicle speed	20km/h
Gear position	D
Accelerator pedal	
High beam light	
Low beam light	
Rear fog light	
Right turn signal light	
Left turn signal light	
Hand brake	
Foot brake	
Safety belt warning status (consistent with instrument warning light status)	

2. The watermarks of light, brake and seat belt display as follows:

RM0121101

Driving information comes from CAN network. When the vehicle performs corresponding actions and the driving recorder receives corresponding CAN information, the corresponding icon will be

highlighted; if the corresponding actions are not performed, the corresponding icon will be grayed out; if the high beam light is turned on, the high beam light icon will be highlighted; if the high beam light is turned off, the high beam light icon will be grayed out. Vehicle speed information display: Numbers km/h.

3. These vehicle status information is not visible on real-time preview interface, but it will be superimposed and recorded on the video stored in TF card. When the user plays back the recorded video, the vehicle driving information can be seen.
4. If a configuration is abnormal and the corresponding CAN message is not received during use, the corresponding watermark will be displayed as "-".

Video Storage Protection with Power Off

1. Under the condition of B+ power normal working, when the system detects the shutdown command (ON power off), the system will immediately stop recording and start video saving, and use the battery to complete the saving of the video file before shutdown.
2. The driving recorder has built-in super capacitor. When driving recorder works normally, it will start to charge, and it will be full for about 1 minute. When the driving recorder B+ is abnormal or disconnected and the super capacitor is fully charged, the super capacitor will supply power to driving recorder to complete the saving of the video file before shutdown, and the video saving time is about 2s.

Parking Monitoring

1. If the user sets the parking monitoring function as ON, when the vehicle stops and stalls, the ON gear is power off, and the driving recorder is shut down, if the vehicle vibrates and the vibration acceleration value exceeds the threshold value of G-sensor, the driving recorder will be awakened and recorded for a period of 20s video after awakening, which is stored in the "emergency video" folder. After recording this video, if G-sensor continues to sense vibration exceeding the threshold value, it will continue to record a 20s video. If the G-sensor does not continue to sense vibration exceeding the threshold value, the driving recorder will shutdown. The CAN network of the whole vehicle cannot be woken up during the parking monitor awakens recorder.
2. When the parking monitor function is turned on, if the system detects that the battery voltage is lower than 12V, the stall state can only be awakened for 3 times.
3. The parking monitor function is ON by default. The user can turn off or turn on the parking monitor function through the central control navigation.

Photograph Operation and Control

1. With driving recorder ON, such as the “Snapshot Setting” is set to “Photograph” via driving recorder, you can take photos quickly through photograph button (Mode button) on drive-by-wire of steering wheel. Button signal is transfered via CAN for high configuration models, and hard line is adopted for low configuration models. Take a photo each time you press the button. Sound prompt is necessary when taking photos. You can take photos by clicking ICON in UI interface of central control navigation. The minimum response interval between two consecutive photographing commands is 500 ms.

RM0268001

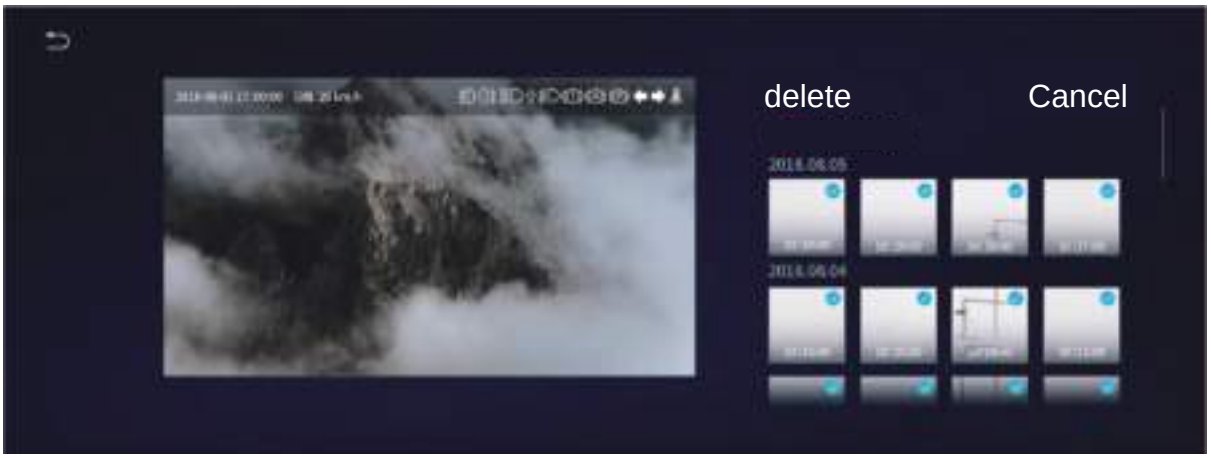
Photograph Storage

1. The photos taken are consistent with the currently set video resolution, such as if the set video is 1080P or 720P, and the photos taken are also 1080P or 720P. Photographs are taken during the video recording process, and the video recording is not affected. Photograph storage uses the logic of circular overlay. When the "Photograph" folder is full, the latest photograph will overwrite the earliest photograph.

Playback and Deleting of Video in TF Card

RM0269001

1. On video list interface in TF card, press and hold one video in list, there will be a small circle at top right corner of the video thumbnail, it indicates that this video is selected when there is a “√”. Click the small circle in front of “XXX files in total”, you can check all or cancel all selections. Click “Delete” to delete from the earliest recorded video, and the deleted video cannot be recovered.



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2. On video list interface in TF card, select one video and click “▷” to start playing the current video.

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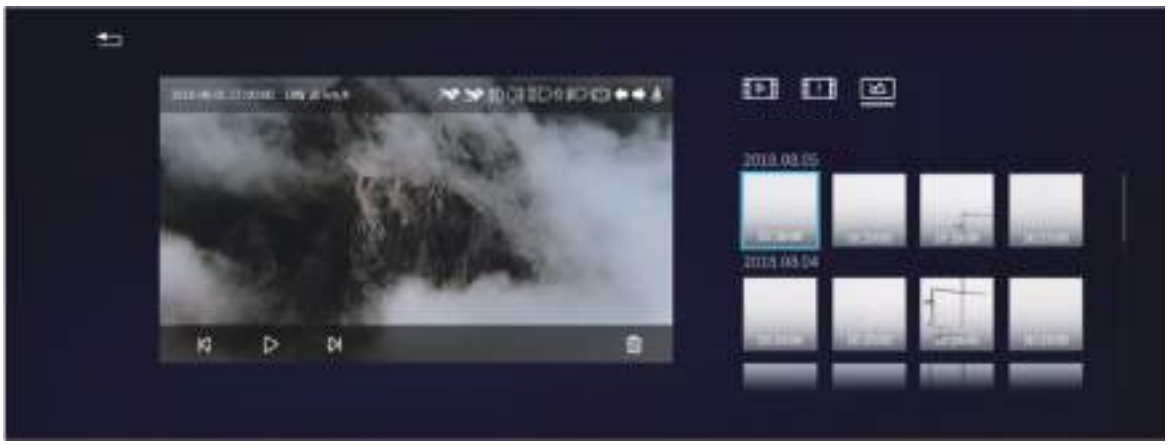
3. Time watermark and driving status information (such as “driving information” setting is on during video capture) can be displayed on the video playback interface. Click ⏸ ICON to pause playback, ICON will change to ▷, click ▷ ICON to continue to play; ICON will change to ⏸. Drag the time progress bar to quickly locate the video playback time.
4. Click “⏮” or “⏭” ICON, it will change to previous (recorded earlier) or next video (recorded later).
5. Click the non-touch area of video to enter full screen interface, the ratio of video is 16:9. It cannot be fully displayed on the 8:3 display screen in full screen, and the area above the screen will be intercepted to cover the display screen. Click “⮌” to exit full screen playback interface, click “⮌” again to exit playback interface to return to DVR main interface.

Playback and Deleting of Photos in TF Card

1. On photo list interface in TF card, press and hold one photo in list, there will be a small circle at top right corner of the video thumbnail, it indicates that this photo is selected when there is a “√”. Click the small circle in front of “XXX files in total”, you can check all or cancel all selections. Click “Delete” to delete from the earliest photo taken, and the deleted photo cannot be recovered.

2. On photo list interface in TF card, click one photo, this photo will be displayed at left area of screen.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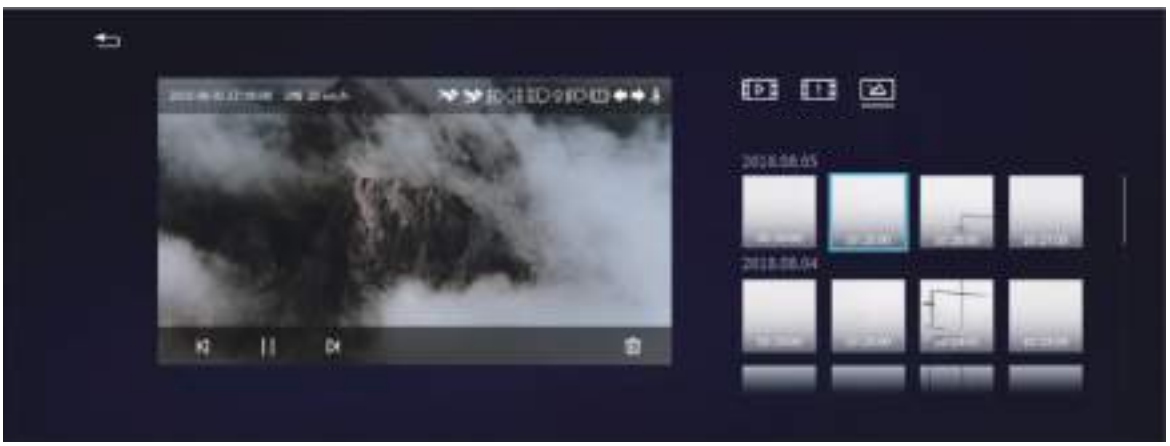
3. Time watermark and driving information (such as “driving information” setting is on during photo taking) can be displayed on the photo playback interface. Click ▷ ICON, the photos will be played automatically at speed of 3 seconds per photo from the current photo, ICON will change to ⏸, click ⏸ will pause automatic play, ICON returns to ▷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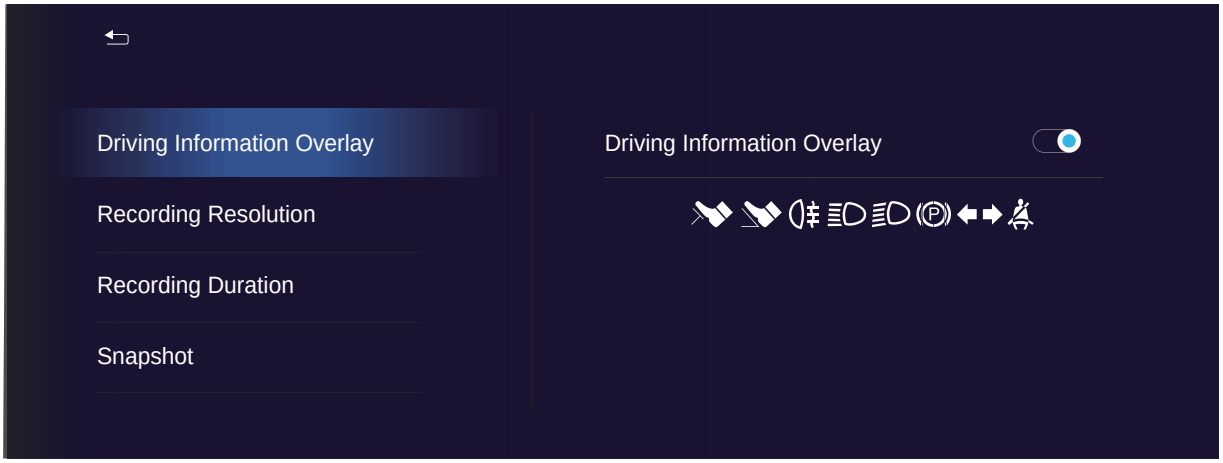
4. Click “⏮” or “⏭” ICON, it will change to previous picture (recorded earlier) or next picture (-recorded later).
5. Click the non-touch area of picture to enter full screen interface, the picture ratio took by DVR is 16:9. It cannot be fully displayed on the 8:3 display screen in full screen, and the area above the screen will be intercepted to cover the display screen. Click “⮌” to exit full screen playback interface, click “⮌” again to exit playback interface to return to DVR main interface.

Setting

1. On the real-time preview interface, click setting ICON to enter setting menu interface of drive recorder, setting items of drive recorder contains the following:



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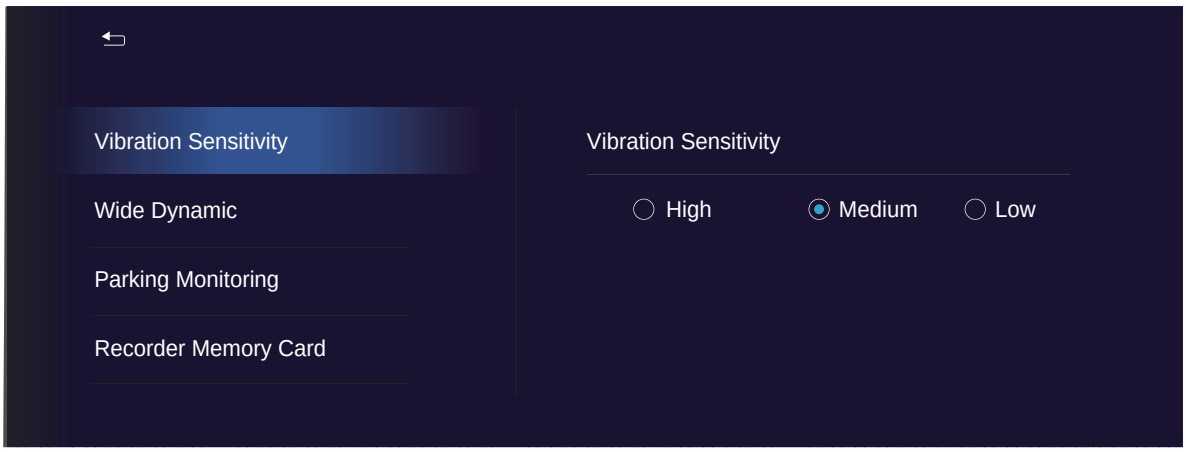

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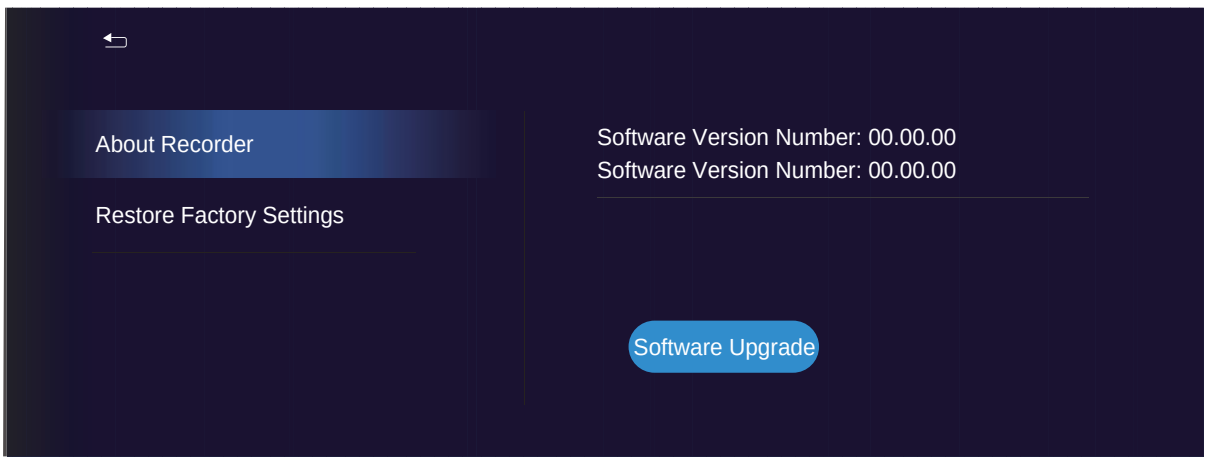


RM0262001

Driving information overlay: ON (default) and OFF
Resolution: 1080P (default) and 720P
Video duration: 1 minute, 3 minutes (default) and 5 minutes
Vibration sensitivity: High, Medium (default) and Low

Wide dynamic: ON (default) and OFF

Parking monitoring: ON (default) and OFF

Snapshot: Photo taking, short video and photo taking + short video (default)

Recorder memory card: TF capacity and operable formatted TF card are displayed

As for recorder: Displays the hardware version number and software version number of the recorder, and can operate and upgrade the driving recorder software

Factory reset: Restore the factory default settings of the recorder

⚠ Caution

a. The target market is domestic models and supports Chinese and English system voice. When the central control IHU changes the system language, APK of DVR changes synchronously with the system language of the central control IHU. The target market is international models, Chery provides translation in minority languages, and Skyworth adapts that to APK.
b. On “As for recorder” interface, click the text position of version number continuously for 10 times to enter factory mode to view version number of APK. The version number rule is APP: YY.ZZ.WW build (A), for example, APP: 00.01.02 build (8). Rule of YY.ZZ.WW is the same as software version rule of Chery, build (8) indicates the 8th official release version. When any digit in YY.ZZ.WW is changed, the number in build (A) is not zeroed, this number in build (A) is accumulated with the number of APK releases during the whole APK development process. If the APK is not officially released but is only an internal temporary version, this number is not accumulated, only YY.ZZ.WW changes.

AR Navigation Video Output

When DVR is turned on, video streaming of AR navigation is always transmitted; If DVR detects that ON signal is turned off, and after CAN network is turned off, DVR turns off AR navigation video output.

AR Navigation Video Requirement

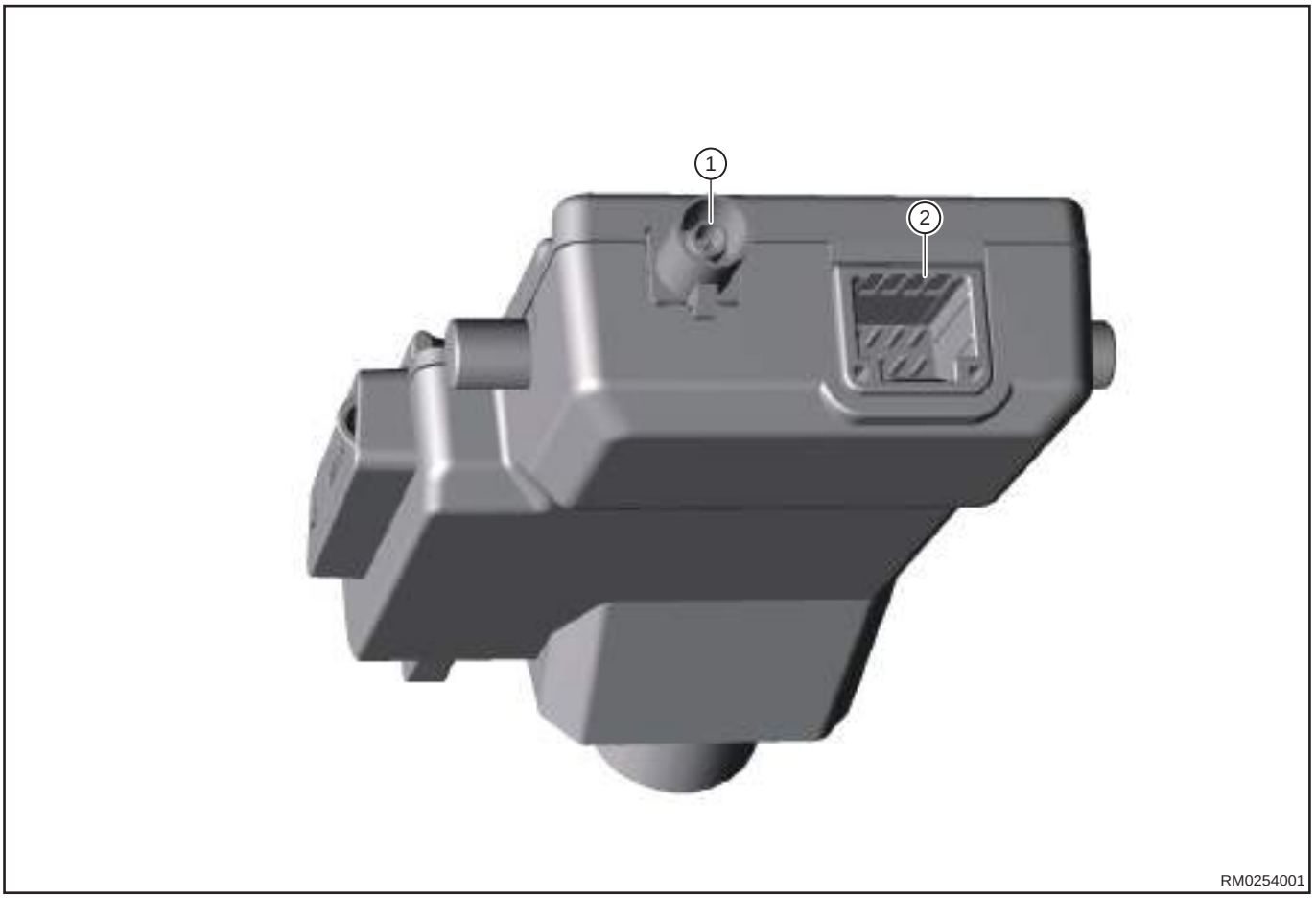
1. DVR head unit intercepts the video at the center of the camera with a resolution of 1488*616 (-tentative), transmits it to central control navigation head unit via LVDS, for AR navigation map analysis and processing; Output video frame rate requires 30 frames;
2. If user changes the recording resolution from 1080P to 720P in recorder setting interface, a prompt box will pop up: “720P does not support AR navigation. When AR navigation is turned on, the resolution will automatically switch back to 1080P”.
3. When user starts AR navigation, a prompt box will pop up: “Automatically switch to HD mode for you, please wait.”
4. Note: Resolution remains 1080P after exiting AR navigation.

Status Indication

Status indicator is located next to the TF card slot, indicator is red-blue indicator.
Blue indicator constant on indicates that device operates normally;
Blue indicator flashes slowly, that is, blue indicator flashes at a frequency of 1 HZ, indicating that the Wi-Fi connection is successful;
Red indicator constant on indicates that device failure/abnormal function, including abnormal TF card or low card speed, video stopping and machine fault;
Red indicator flashes slowly, that is, red indicator flashes at a frequency of 1 HZ, indicating that video is abnormal/there is no TF card;
Alternating red and blue flashes indicate that the software is being upgraded;

System Connector Definition

Connector Model



There are two external connectors for the product, the main connector and LVDS connector (refer to the circuit diagram of the driving recorder system for details).

Name	Type	Supplier
Main connector	GT25H2-8DP-2.2H (8PIN)	HRS
LVDS connector	59S2AQ-40MT5- K-1	Rosenberger

Main Connector Pin Function Definition

Main connector						
			DVR terminal	GT25H2-8DP-2.2H (8PIN)		
			Wire terminal	HS'G: 1717103-1 TM'L: 1674311-1		
Pin	Function	Rated Current	Minimum Value Imin	Maximum Value Imax	Signal Type	Note
1	B+ (Battery Positive)	300MA	0.1MA	500MA	Power Supply	/
2	IGN (ON Signal)	10MA	0MA	10MA	Signal Wire	/

3	CAN_H (CAN Bus Positive)	100MA	10uA	100MA	Signal Wire	/
4	SWC+ (-Photograph Button Positive)	10MA	0MA	10MA	Signal Wire	Reserved
5	GND (-Battery Negative)	300MA	0.1MA	500MA	GND	/
6	NC (Vacant)	/	/	/	/	/
7	CAN_L (CAN Bus Negative)	100MA	10uA	100MA	Signal Wire	/
8	SWC- (-Photograph Button Negative)	10MA	0MA	10MA	Signal Wire	Reserved

LVDS Connector Pin Function Definition

Main connector						
			DVR terminal	59S2AQ-40MT5- K-1		
			Wire terminal	HS'G: 59Z113-000-K TM'L: 59K16B-102T4		
Pin	Function	Rated Current	Minimum Value Imin	Maximum Value Imax	Signal Type	Note
1	LVDS+	100MA	0.1MA	100MA	High Speed Signal Wire	/
2	GND	100MA	0.1MA	100MA	GND	/

Indicator Color Definition

LED Indicator	Red	Blue

Drive-by-wire Button Definition

“Mode” button on steering wheel is the user-customizable button, which can be defined by the user as: sound source switching or drive recorder snapshot. If it is defined as drive recorder snapshot, you can perform drive recorder snapshot function by pressing Mode button. User can customize the snapshot in the setting interface of the driving recorder: Photo taking, short video and photo taking + short video (default)

Interaction Between DVR and Central Control

Drive recorder function involves the interaction among central control IHU, central control APK and drive recorder.
Main functions of central control are:

1. As a hot spot, central control needs to support DVR Wi-Fi access
2. It is necessary to provide CAN writing interface to send CAN data for central control APK

3. It is necessary to provide CAN data callback interface, notify APK when central control receives relevant CAN data
4. DVR interface display and interactive operation

Main functions implemented by APK:

1. Interact with the DVR through Wi-Fi
2. Notify the DVR of some central control information (such as Wi-Fi SSID, etc.) through the CAN writing interface provided by the central control
3. Feedback the CAN information (such as TF card status, etc.) received by the central control from DVR

Main functions implemented by DVR:

1. Basic functions of driving recorder
2. Report DVR status and other information through CAN
3. Respond APK by requirements sent from CAN (such as TF card status, etc.)

The CAN command interacting with DVR is an event message, and the time interval between two messages is not less than 20 ms. Like a CAN message which is composed of multiple frames, the sending interval of two frames is 20 ms.
The main protocols for CAN interaction between central console and DVR are as follows.

Command Type	Parameter Length	Sending Timing	Note
MAC Address	6 Byte	1. Sending as IHU opening 2. Sending as changing 3. Sending as DVR sends requirements and IHU responds (as DVR opening)	Such as: 00:23: DE:2C:34:DF, sending from start to end; parameter length (6 Byte) + 1 (1 Byte check digit) is the total data length.
Wi-Fi Name	64 Bytemax	1. Sending as IHU opening 2. Sending as changing 3. Sending as DVR sends requirements and IHU responds 4. Sending as IHU turns on AP	Wi-Fi name is variable length. When the overall length of data is more than 6, it is necessary to send it by frame.
Wi-Fi Password	64 Bytemax	1. Sending as IHU opening 2. Sending as changing 3. Sending as DVR sends requirements and IHU responds 4. Sending as IHU turns on AP	Wi-Fi name is variable length. When the overall length of data is more than 6 Byte, it is necessary to send it by frame.
Wi-Fi Connection	1 Byte	When DVR APK starts/ exits	/
UDP broadcast terminal number	2 Byte	1. When head unit APK starts 2. DVR requests actively	Used for notifying APK to connect with DVR by DVR broadcasting
TF card status	1 Byte	1. DVR sends actively when TF status changes	The status of card includes: 1. TF card status is normal

Command Type	Parameter Length	Sending Timing	Note
		2. DVR is sent passively when APK requires actively (when APK starts)	2. Card is not inserted (- displayed in IHU: storage card in driving recorder is not inserted) 3. TF card is not formatted (displayed in IHU: storage card in driving recorder is not formatted) 4. Card is abnormal (- displayed in IHU: storage card in driving recorder is abnormal)
DVR Status	1 Byte	1. DVR sends actively when DVR status changes 2. DVR is sent passively when APK requires actively (when central console starts)	Included status: 1. DVR status is normal 2. DVR status is abnormal
Photo folder status	1 Byte	1. DVR sends actively when photo space is full 2. DVR is sent passively when APK requires actively	Included status: 1. Photo space is not full 2. Photo space is full (- displayed in IHU: the photo folder in driving recorder has been full)
Emergency video folder status	1 Byte	1. DVR sends actively when emergency video space is full 2. DVR is sent passively when APK requires actively	Included status: 1. Emergency video space is not full 2. Emergency video space is full (displayed in IHU: the photo folder in driving recorder has been full)
DVR Requirement	1 Byte	When DVR needs to actively acquire the central console information	SSID information and others needs to be known when DVR starts
APK Requirement	1 Byte	When APK needs to actively acquire the DVR status	APK requires actively. After DVR receives this requirement, TF card status, DVR status, photo space status and emergency video space is sent by CAN

Diagnosis & Testing

Problem Symptoms Table

Hint:

- Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area	Recommended Repair Method
Outside rear view mirror cannot adjust angle	Fuse	Check if fuse is blown
	Outside rear view mirror switch	Check if outside rear view mirror switch is damaged
	Outside rear view mirror motor	Check if outside rear view mirror motor is damaged
	Wire harness or connector	Check if wire harnesses or connector is normal
Outside rear view mirror cannot be defrosted and defogged	Fuse and relay	Check if fuse and relay are normal
	Outside rear view mirror defogging switch	Check if outside rear view mirror defogging switch is damaged
	Outside rear view mirror heating wire	Check if outside rear view mirror heating wire is normal
	Wire harness or connector	Check if wire harnesses or connector is normal
	Body Control Module (BCM)	Check if Body Control Module (BCM) is normal

Diagnostic Help

- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.

Intermittent Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- Check for broken, bent, protruded or corroded terminals.
- Inspect the mounting conditions of rear view mirror assembly, wire harness or wire harness connector and so on for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to malfunction.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to normal operation of circuit, which are normal or not can seriously affect the entire circuit system. Ground points are often exposed to moisture, dirt and other corrosive

environments. Corrosion (rust) may increase load resistance. In such cases, the circuit operation will be seriously affected. Circuit is sensitive to ground. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

- Remove ground bolt or nut.
- Check all contact surfaces for tarnish, dirt and rust, etc.
- Clean as necessary to ensure that contact is in good condition.
- Reinstall ground bolt or nut securely.
- Check if any additional accessories interfere with ground circuit.
- If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnosis Procedure

Hint:
Use following procedures to troubleshoot the rear view mirror control system.

1	**Vehicle brought to workshop**

Next

2	**Examine vehicle and check basic items**

Check system power supply voltage, and check that fuse, wire harness and connector are connected normally.

OK

Standard voltage: Not less than 12 V.

Result

NG → **Check and replace malfunctioning parts**

OK

3	**Using a diagnostic tester, read related DTC and data stream information**

Result

Result	Go to
No DTC	A
DTC occurs	B

A → **Perform troubleshooting procedure without DTCs according to malfunction symptom**

B

4	**Troubleshoot according to DTCs troubleshooting procedure**

Result

Result	Go to
Problem is not resolved	A
Problem is resolved	B

A → **Return to procedure 1 and troubleshoot the process again**

B

5	**According to rear view mirror system malfunction repair completion inspection and delivery, confirm if malfunction is resolved.**

Result

Result	Go to
Delivery inspection is failed	A
Delivery inspection is qualified	B

A → **Return to procedure 1 and troubleshoot the process again**

B

6	**Finished**

Diagnostic Trouble Code (DTC) Chart

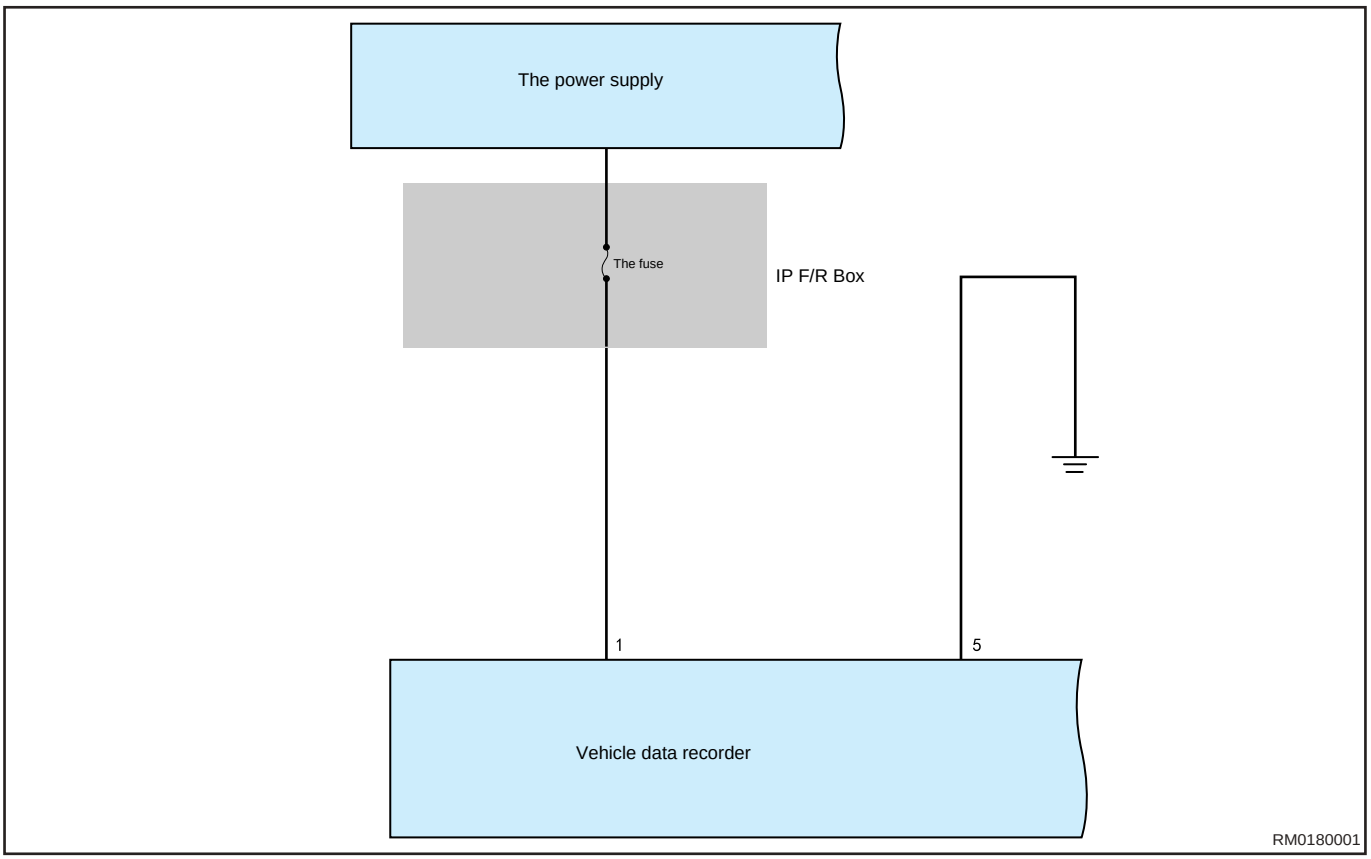
DTC	DTC	Detection Condition	Possible Cause	Maintenance Advice
B1000-16	Power Supply Circuit Voltage Below Threshold	/	Fuse/battery/wire harness/module damaged	/
B1000-17	Power Supply Circuit Voltage Above Threshold	/		/
B1B50-00	Abnormal Image Acquisition	/	Module damaged	/
B1B51-00	DSP Failure	/	Module damaged	/
B1B52-00	WIFI module abnormal	/	Module damaged	/

DTC	DTC	Detection Condition	Possible Cause	Maintenance Advice
B1B53-00	Abnormal collision sensing	/	Module damaged	/
B1B54-4A	Low Write Speed of Memory Card/ Serious Fragmentation of Memory Card/ Memory Card Damage	/	Memory card damaged	/
U0073-88	CAN Bus Error	/	Refer to "CAN" system for inspection	/
U0100-87	Lost Communication with EMS	/		/
U0101-87	Lost Communication with TCU	/		/
U0129-87	Lost Communication with BSM	/		/
U0140-87	Lost Communication with BCM	/		/
U0155-87	Lost Communication with ICM	/		/
U1300-55	Software Configuration Error	/		/
U0100-87	Lost Communication with EMS	/		/

DTC Diagnosis Procedure

DTC	B1000-16	Power Supply Circuit Voltage Below Threshold
DTC	B1000-17	Power Supply Circuit Voltage Above Threshold

Description
System Schematic Diagram



DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Start engine, and use voltage band of multimeter to check if battery voltage is normal. (Rated voltage: Not less than 12 V)

Multimeter Connection	Condition	Specified Condition
Battery (+) - Battery (-)	ENGINE START STOP switch “ON”	Not less than 12 V

NG → **Repair or replace battery/alternator**

OK

2	Check fuse

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Check for continuity of instrument panel fuse with a digital multimeter.

NG → **Replace fuse**

OK

3	Check interior power supply wire harness

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

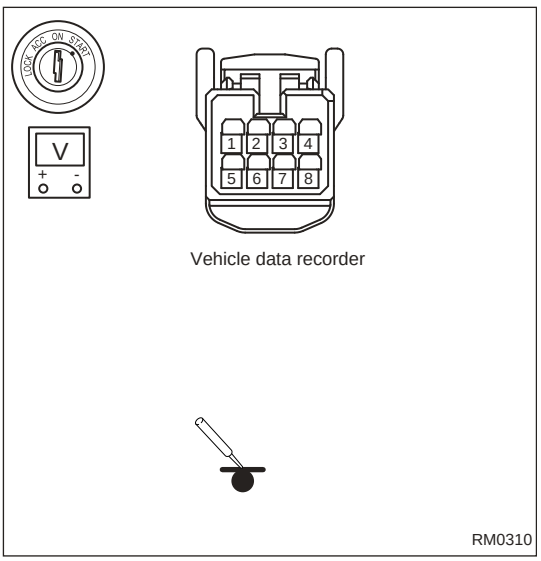
(c) Disconnect the drive recorder connector.

(d) Connect the negative battery cable.

(e) Turn ENGINE START STOP switch to ON.

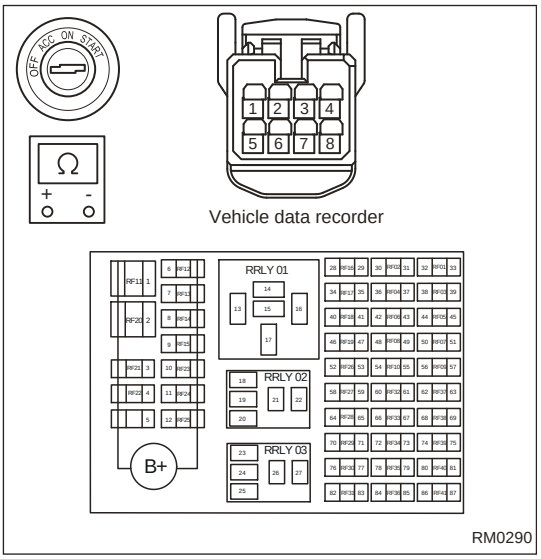
(f) Using a digital multimeter, measure voltage between drive recorder connector power supply terminal and ground according to table below.

Multimeter Connection	Condition	Specified Condition
Drive recorder connector power supply terminal - Body ground	ENGINE START STOP switch "ON"	Not less than 12 V



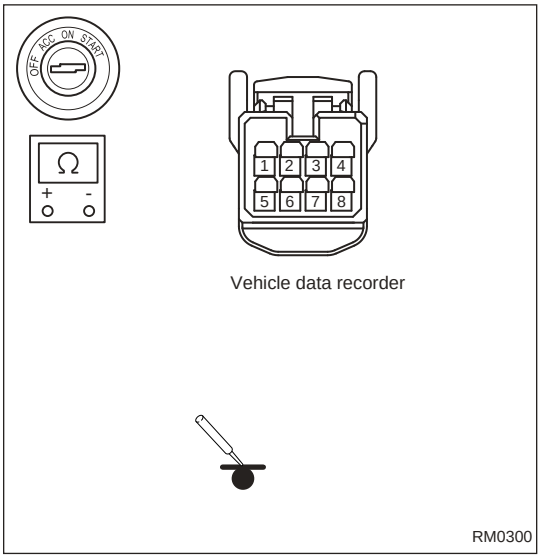
(g) Using a digital multimeter, measure resistance between drive recorder connector and instrument panel fuse and relay box according to table below.

Multimeter Connection	Condition	Specified Condition
Visual controller connector power supply terminal - Instrument panel fuse and relay box (- corresponding terminal)	ENGINE START STOP switch "OFF"	Less than 1 Ω



(h) Using a digital multimeter, measure resistance between visual controller connector ground terminal and ground according to table below.

Multimeter Connection	Condition	Specified Condition
Drive recorder connector ground - Body ground	ENGINE START STOP switch "OFF"	Less than 1 Ω



NG → **Repair or replace related wire harness**

OK

4	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect the negative battery cable.

(b) Use diagnostic tester to clear DTCs.

(c) Start the engine.

(d) Check if the same DTCs are still output.

NG → **Replace drive recorder module**

OK → **System is normal**

DTC	**B1B50-00**	**Abnormal Image Acquisition**
DTC	**B1B51-00**	**DSP Failure**
DTC	**B1B52-00**	**WIFI module abnormal**
DTC	**B1B53-00**	**Abnormal collision sensing**

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect the negative battery cable.

(b) Use diagnostic tester to clear DTCs.

(c) Start the engine.

(d) Check if the same DTCs are still output.

NG	**Replace drive recorder.**
OK	**System is normal**

DTC	B1B54-4A	Low Write Speed of Memory Card/Serious Fragmentation of Memory Card/Memory Card Damage

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check memory card

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Replace memory card with a new one for running test.

OK	**Replace memory card.**

NG

2	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect the negative battery cable.

(b) Use diagnostic tester to clear DTCs.

(c) Start the engine.

(d) Check if the same DTCs are still output.

NG	**Replace drive recorder.**
OK	**System is normal**

DTC	U0073-88	CAN Bus Error
DTC	U0100-87	Lost Communication with EMS

DTC	**U0101-87**	**Lost Communication with TCU**
DTC	**U0129-87**	**Lost Communication with BSM**
DTC	**U0140-87**	**Lost Communication with BCM**
DTC	**U0155-87**	**Lost Communication with ICM**
DTC	**U1300-55**	**Software Configuration Error**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

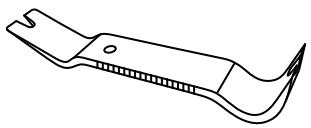
1	**Refer to CAN network system**

On-vehicle Service

Torque Specifications

Description	Torque (N·m)
Outside Rear View Mirror Fixing Bolt	7.0 ± 1.5 N·m
Inside Rear View Mirror Fixing Bolt	1.5 ± 0.5 N·m

Tool

Tool Name	Tool Drawing
Interior Crow Plate	 RCH002506

Outside Rear View Mirror Assembly

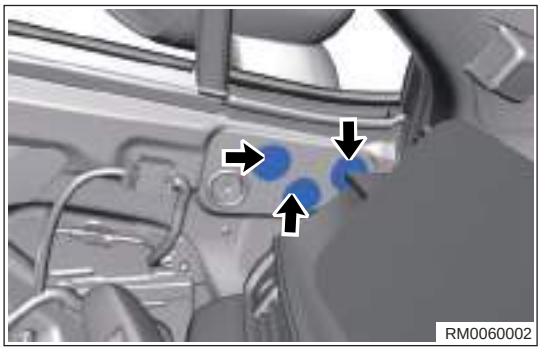
Removal

Hint:
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

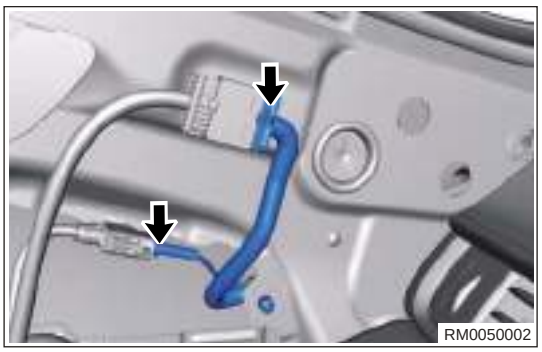
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing outside rear view mirror assembly.
- Operate carefully to prevent components from being damaged, when removing outside rear view mirror assembly.
- Try to prevent interior and body paint surface from being scratched, when removing outside rear view mirror assembly.

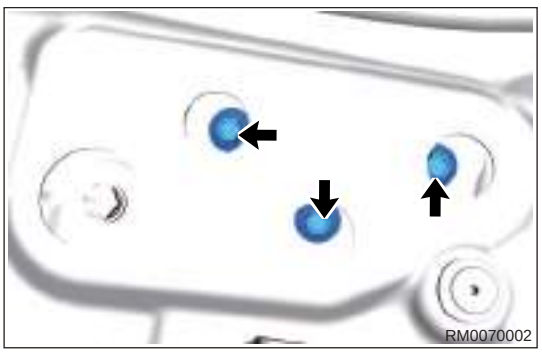
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door inner protector assembly.
4. Remove the left outside rear view mirror assembly.
   a. Remove the front left door protector block cover.



   b. Disconnect the left outside rear view mirror connector.



   c. Remove 3 fixing bolts from left outside rear view mirror.
      Tightening torque: 7.0 ± 1.5 N·m



Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Install connector in place and tighten fixing bolts to specified torque when installing outside rear view mirror assembly.
- Make sure the outside rear view mirror assembly can move smoothly, flexibly and reliably after installing.
- After installing outside rear view mirror assembly, it is necessary to perform panoramic image calibration (if equipped).

Outside Rear View Mirror Lens Assembly

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Avoid breaking claw when removing outside rear view mirror lens assembly.
- Avoid damaging lens due to dropping when removing outside rear view mirror lens assembly.
- Try to prevent body paint surface from being scratched when removing outside rear view mirror lens assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the left outside rear view mirror lens assembly.
   a. Press the outside rear view mirror surface to tilt it.
   b. Apply protective tape around exterior frame of outside rear view mirror.
   c. Using an interior crow plate, pry off the claws of outside rear view mirror lens assembly.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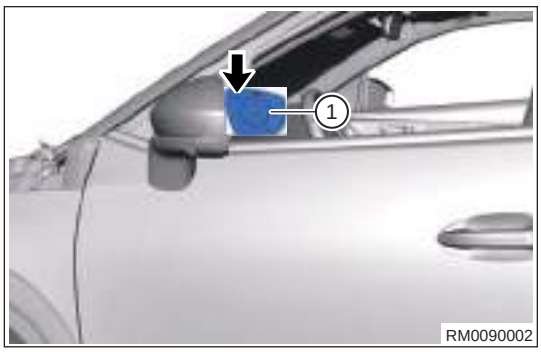
   d. Disconnect the connector (arrow) from rear view mirror lens assembly, and remove left outside rear view mirror lens assembly (1) (if equipped with rear view mirror heater).



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Inspection

1. Check the outside rear view mirror lens assembly. (If equipped with rear mirror heater)

a. Apply battery voltage to terminals of outside rear view mirror lens assembly connector, and check operation of outside rear view mirror lens assembly according to table below.

Measurement Condition		Specified Condition
Battery positive (+)	Battery negative (-)	Outside rear view mirror lens becomes warm

2. If result is not as specified, replace outside rear view mirror lens assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Make sure the lens can move smoothly, flexibly and reliably after installing outside rear view mirror lens assembly.

Outside Rear View Mirror Adjustment Switch

Removal

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing outside rear view mirror adjustment switch.
- DO NOT scratch instrument panel assembly when removing outside rear view mirror adjustment switch.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the outside rear view mirror adjustment switch.
   a. Remove the power glass regulator switch rubber pad.

   b. Remove the fixing bolt (arrow).

c. Using an interior crow plate, pry off outside rear view mirror adjustment switch and remove the outside rear view mirror adjustment switch.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Operate carefully to prevent damage to other components when installing outside rear view mirror adjustment switch.
- Install connectors in place, when installing outside rear view mirror adjustment switch.
- Check that switch can operate normally after installing outside rear view mirror adjustment switch.

Inside Rear View Mirror Assembly (Low Configuration)

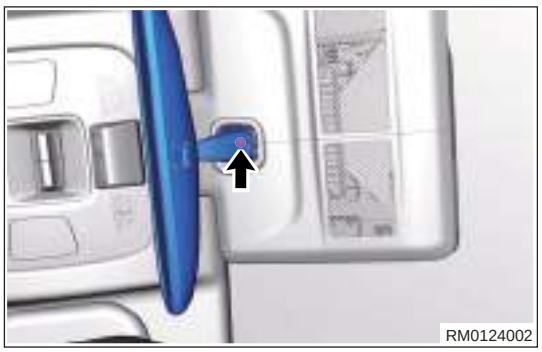
Removal

⚠ Caution

- Appropriate force should be applied when removing inside rear view mirror assembly. Be careful not to operate roughly.
- Try to prevent front windshield assembly from being scratched when removing inside rear view mirror assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the inside rear view mirror assembly.
   a. Remove inner hexagon head bolt (arrow) from inner rear view mirror base and remove inner rear view mirror assembly.

      Tightening torque: 1.5 ± 0.5 N·m



Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Before installation, check if there is any obvious appearance defects (such as scratches, material missing, damage, etc.) and select the qualified parts.
- Check that the inside rear view mirror should be within the normal range required by view and the lens assembly should be matched with lens base assembly firmly without any looseness.

Inside Rear View Mirror Assembly (High Configuration)

Removal

⚠ Caution

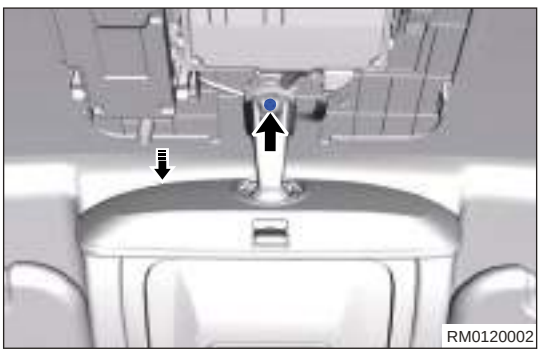
- Appropriate force should be applied when removing inside rear view mirror assembly. Be careful not to operate roughly.
- Try to prevent front windshield assembly from being scratched when removing inside rear view mirror assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the inside rear view mirror assembly.
   a. Using an interior crow plate, pry off the inner rear view mirror left protective cover.

   b. Using an interior crow plate, pry up the inner rear view mirror right protective cover.

   c. Remove screw (arrow) from inner rear view mirror base and remove inner rear view mirror assembly in direction of arrow.

      Tightening torque: 1.5 ± 0.5 N • m



Installation

1. Installation is in the reverse order of removal.

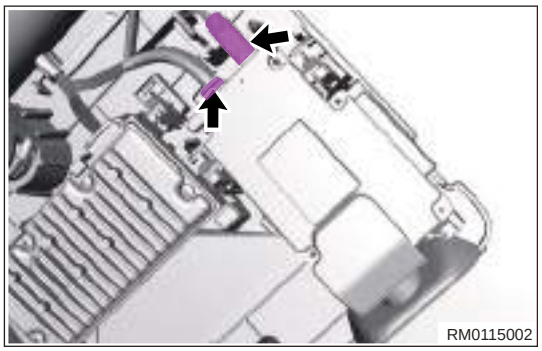
> **⚠ Caution**
>
> - Before installation, check if there is any obvious appearance defects (such as scratches, material missing, damage, etc.) and select the qualified parts.
> - The inside rear view mirror should be within the normal range required by view and the lens assembly should be matched with lens base assembly firmly without any looseness.
> - Driving recorder SD card interface position should be matched correctly with the gap between left and right covers.

Drive Recorder

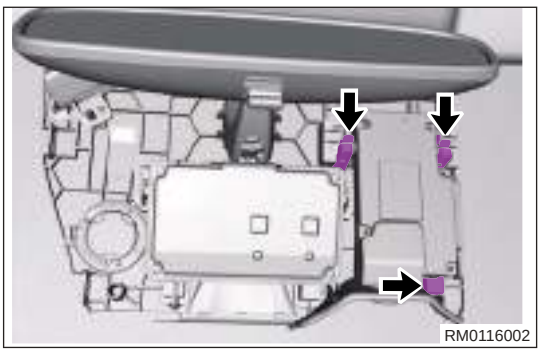
Removal

> **⚠ Caution**
>
> - Appropriate force should be applied when removing driving recorder. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the inside rear view mirror left protective cover.
4. Remove the inside rear view mirror right protective cover.
5. Remove the driving recorder.
   a. Remove the drive recorder connectors (arrow).



   b. Remove the fixing columns (arrow) on both sides of driving recorder along the upward direction of bracket base, and take out the lens of driving recorder and front end pin, and finally remove driving recorder.



Installation

1. Installation is in the reverse order of removal.

HORN SYSTEM

System Overview

Description

1	Horn Switch	2	Engine Compartment Fuse and Relay Box
3	Middle Pitched Horn	4	Anti-theft Horn

This vehicle is equipped with electronic horn system. Horn system consists of following components:

- Horn switch: Horn switch is installed on steering wheel.
- Horn fuse: Horn fuse is located in engine compartment fuse and relay box.
- Horn relay: Horn relay is located in engine compartment fuse and relay box.

Diagnosis & Testing

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Low pitched horn does not sound	Low pitched horn (damaged)
	Wire harness (open)

Symptom	Suspected Area
	Connector (loose)
High pitched horn does not sound	High pitched horn (damaged)
	Wire harness (open)
	Connector (loose)
Horn does not sound	Horn fuse (blown)
	Horn relay
	Horn switch (damaged)
	Spiral cable (damaged)
	Wire harness (short or open)

Horn System Inspection

Press and release the horn button

Treatment	Normal Result	Abnormal Result
Press and release the horn button	Horn sounds when horn button is pressed. Horn stops sounding when horn button is released.	Horn does not sound, horn sounds abnormally

Horn does not sound or sounds abnormally

Problem Symptom	Troubleshooting
Horn sounds hoarsely	Check the battery or power supply circuit
Only high pitched horn or low pitched horn sounds	Check and repair wire harness of horn that does not sound or replace horn
Both high pitched and low pitched horns do not sound	Check horn fuse or relay box
Button horn sounds, but wireless door locking does not sound	Check if the audio is set as “only fortify light”. Set “fortify horn + light” if it is possible. If the setting is correct and the fault exists, check and repair BCM and path.
Horn does not sound when pressing button, and sounds when locking vehicle with remote controller	Check and repair horn button and its circuit

Troubleshooting for Abnormal Horn Sound

1. If horn sound is obviously abnormal, perform the following routine inspection:
   a. Check terminals for poor contact; repair any poor contact problem;
   b. Check ground circuit; if there is poor contact, repair it;
   c. Make sure horn assembly fixing bolt is properly fastened;
   d. Make sure there is no contact between horn assembly and any other objects; if contact occurs, determine the correct position of other objects again, bend the horn assembly bracket if necessary, and operate horn to determine if the situation still exists.
2. If the situation is still obvious, perform the following specific inspection:
   a. Determine the type of sound produced by horn: Grave, sharp.

b. If it is obviously grave, it indicates that the current is too high and the horn assembly must be replaced.
c. If it is obviously sharp, foreign matters may attach to horn, remove horn assembly and check for foreign matters.
d. Remove any attached foreign matters and reinstall the horn assembly.

⚠ Warning
If no foreign matter is found, or if the foreign matter cannot be removed, replace horn assembly.

Horn Fuse Inspection

1. Identify the horn fuse in engine compartment fuse and relay box.
2. Check the horn fuse.
   a. Using a fuse puller, remove the horn fuse.
   b. Check if fuse is blown. Replace fuse if it is blown.

⚠ Caution
Use a fuse with the same specification as original fuse to avoid affecting the normal use of electrical equipment.

Horn Relay Inspection

1. Identify the horn relay in engine compartment fuse and relay box.
2. Check the horn relay.
   a. Remove the horn relay, and press meter inspection.

Multimeter Connection	Condition	Specified Condition
Terminal 3 – Terminal 5	When battery voltage is not applied between terminal 2 and terminal 1	∞
Terminal 3 – Terminal 5	When battery voltage is applied between terminal 2 and terminal 1	⩽ 1 Ω

If result is not as specified, replace relay.

Horn Ground Point Inspection

Ground position of horn is located in steering wheel, it is grounded over steering column and body, and the resistance cannot be greater than 1 Ω.

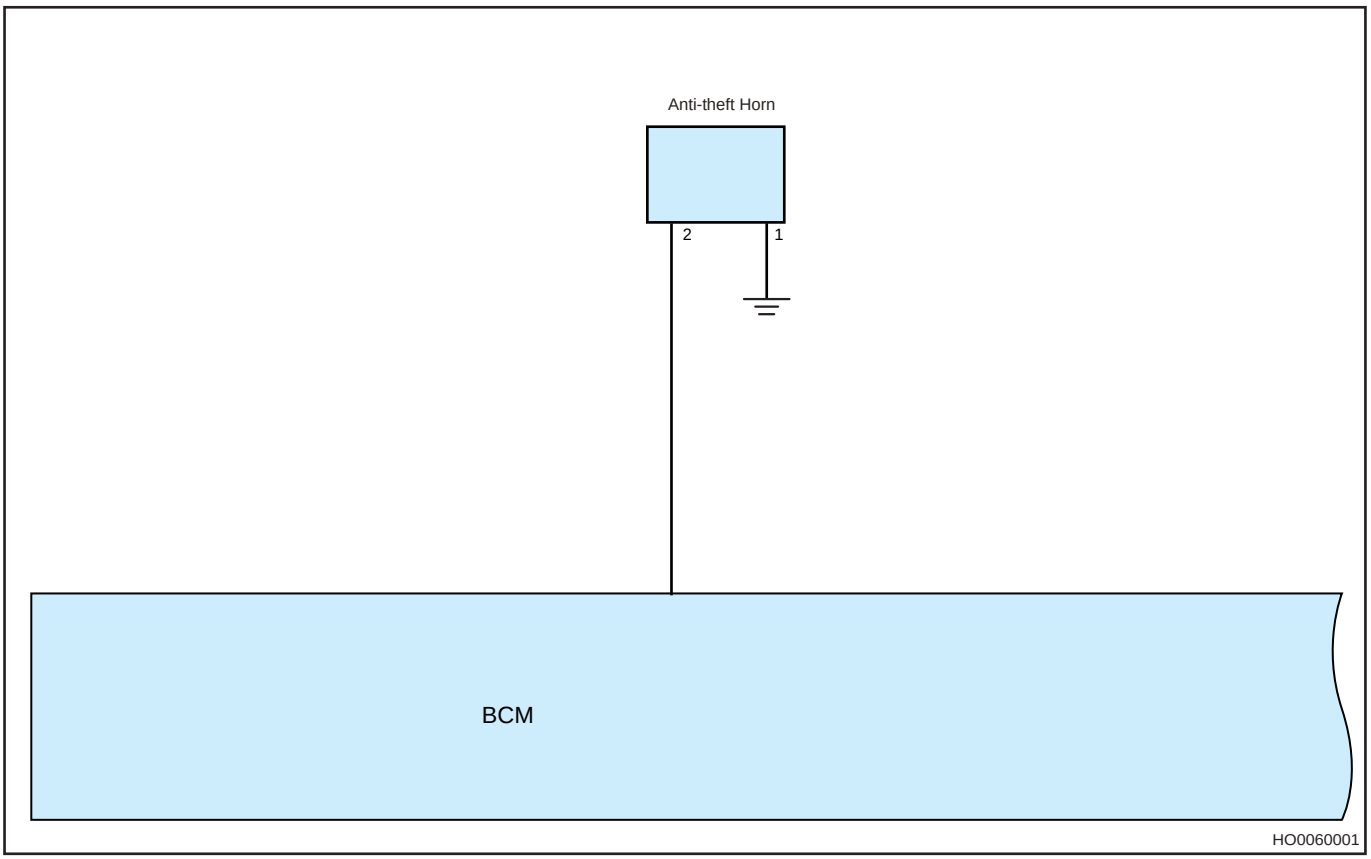
Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Fault Detection Condition	Possible Causes	Maintenance Advice
B101D-11	Siren Output Control Circuit	/	• Horn failure • Module failure	/

DTC Diagnosis Procedure

DTC	B101D-11	Siren Output Control Circuit

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

1	**Check anti-theft horn**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Replace the original anti-theft horn with a new one for running test.

OK → **Replace anti-theft horn**

NG

2	**Check for open or short in wire harness**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect anti-theft horn connector and body control module connector.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

(g) Using ohm band of digital multimeter, check for continuity between anti-theft Horn (2) and BCM to check circuit for open.

Multimeter Connection	Condition	Specified Condition
Anti-theft horn (2) - Body control module (to terminal)	Always	⩽ 1 Ω

Use circuit diagram as a guide to perform the following inspection procedures:

(h) Using ohm band of digital multimeter, check for continuity between anti-theft Horn (1) and body ground.

Multimeter Connection	Condition	Specified Condition
Anti-theft horn (1) - Body ground	Always	⩽ 1 Ω

NG → **Replace wire harness**

OK →

3	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

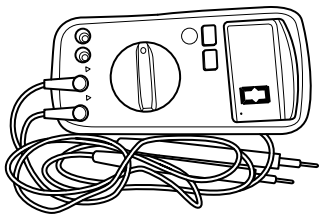
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace body control module**

OK → **Conduct test and confirm malfunction has been repaired.**

On-vehicle Service

Tool

Tool Name	Tool Drawing
Digital Multimeter	 RCH0002006

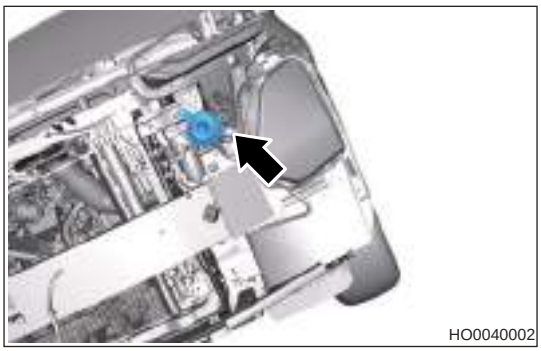
Torque Specifications

Description	Torque (N·m)
Horn Bracket Fixing Nut	16 ± 2

Horn Assembly

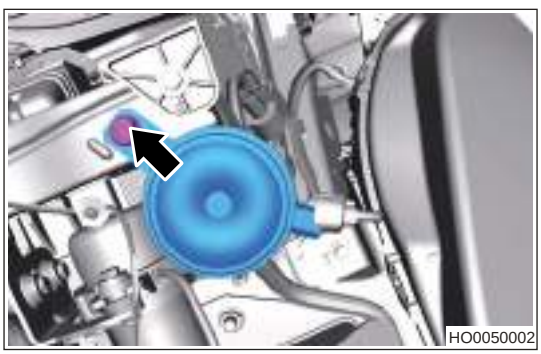
Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Disconnect the horn wire harness connector.


HO0040002

5. Remove the horn fixing nut.

   Tightening Torque
   16 ± 2 N·m


HO0050002

Installation

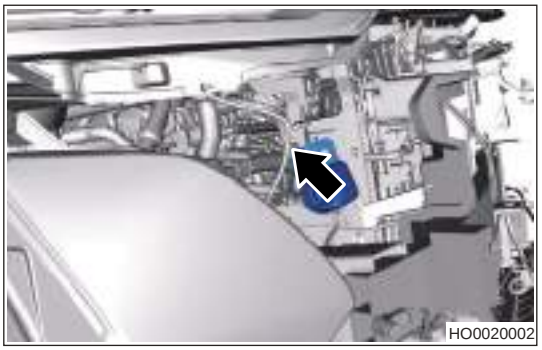
⚠ Caution
• Tighten fixing nut to the specified torque. • Install connectors securely.

1. Installation is in the reverse order of removal.

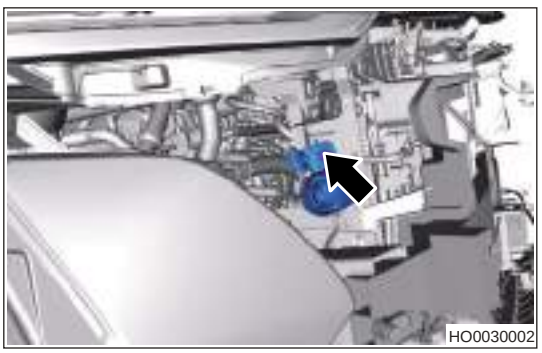
Anti-theft Horn Assembly

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Disconnect the anti-theft horn wire harness connector.



5. Remove the anti-theft horn fixing nut.



Installation

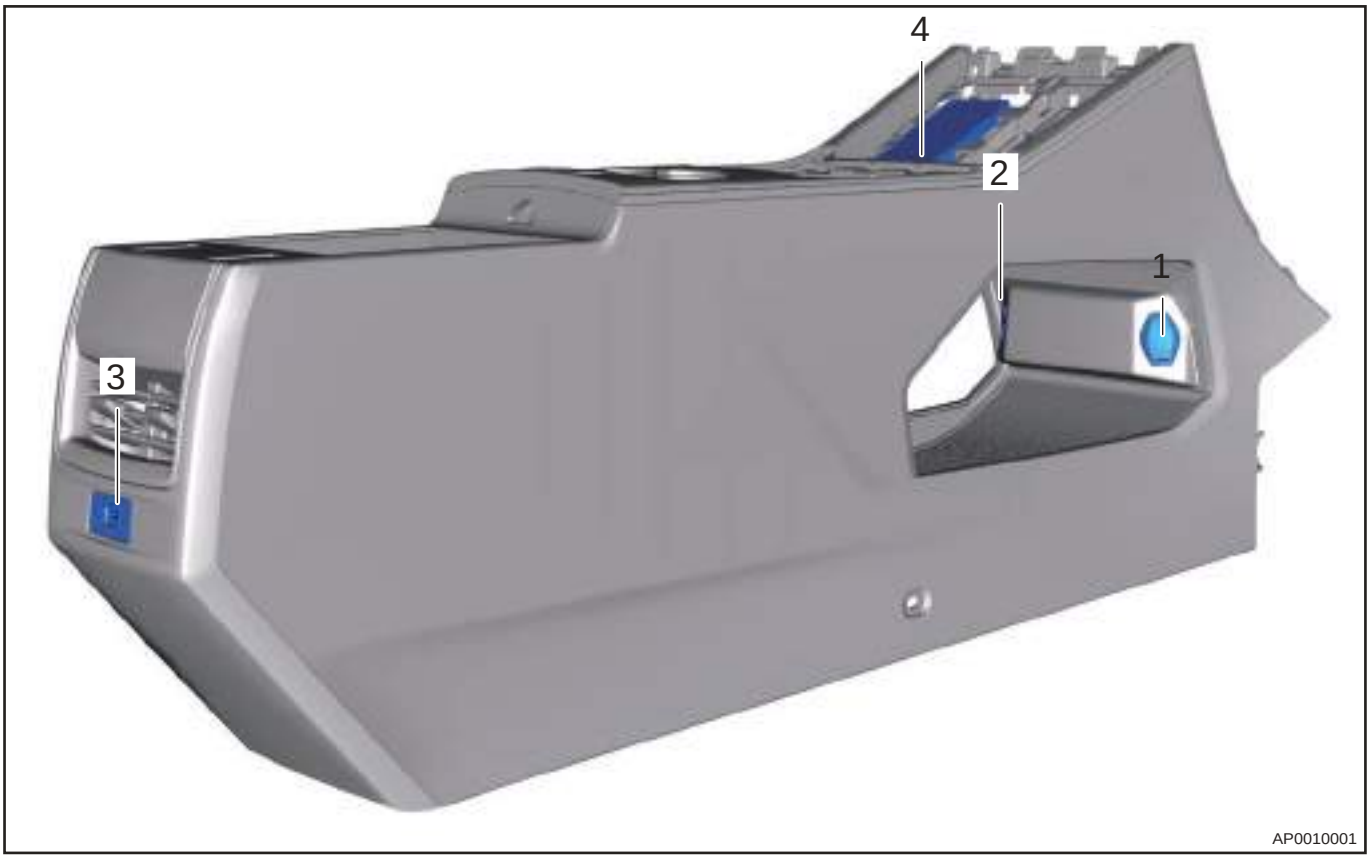
⚠ Caution
• Tighten fixing nut to the specified torque. • Install connectors securely.

1. Installation is in the reverse order of removal.

WIRELESS CHARGING SYSTEM

System Overview

System Components Diagram



1	Backup Power Supply Assembly	2	Multi-function Interface
3	USB Charging Module	4	Mobile Phone Wireless Charging Module

This vehicle is equipped with a 12 V backup power supply, which is located on the USB panel assembly for easy charging at any time.Wireless charging adopts an electromagnetic induction technology with convenience, versatility, novelty and safety, so that you can have a better experience while driving.

Wireless Charging Usage Description

1. Turn ENGINE START STOP switch to ON mode and place mobile phone in the wireless charging sensing area, then the wireless charging starts to operate, and the audio head unit displays a normal charging symbol; After charging is completed, audio head unit will display a charging completed symbol.

2. Wireless charging may not work properly in the following conditions:
   - The back of mobile phone is more than 8 mm away from wireless charging sensing area, and mobile phone cannot be charged.
   - There is thick metal on back of mobile phone (such as 1 yuan coin, metal housing of mobile phone), mobile phone cannot be charged, and audio head unit displays a mark with exclamation mark.
   - Wireless charging operation frequency is close to keyless entry working frequency, which is easy to interfere with each other; When door is open/closed, the vehicle will recognize whether the key is left in vehicle, the keyless entry starts to work. At this time, it's necessary to shield charging function for 30 seconds; Wait for 30 seconds, the wireless charging function resumes.

⚠ Caution

If your mobile phone does not support the wireless charging function, it is recommended that you do not use the wireless charging paster. The quality of wireless charging paster in the market is uneven and easy to be damaged if used frequently (function failure, poor interface contact, identification failure in metal foreign objects, etc.).

3. Phone forgetting reminder function: When ENGINE START STOP switch is switched to OFF mode and driver side door is opened, if mobile phone is placed in the wireless charging sensing area, the system will sound an alarm for 20 seconds and alarm stops if the phone is removed within 20 seconds.

⚠ Caution

- Phone forgetting reminder function only supports the mobile phone with wireless charging function.
- Phone forgetting reminder function needs to be set in the audio system.

4. For Wireless Charging System (CWC) function settings and status display item suggestions and signals, refer to signal list

Level 1 Menu	Level 2 Menu	Selection Item	Note
Vehicle settings	Mobile phone wireless charging function	ON	IHU is set to ON by default, CWC will keep the wireless charging function ON until "OFF" signal is sent from IHU. With wireless charging function ON, CWC starts the wireless charging operation after mobile phone is detected in charging position and ACC signal is received.
		OFF	
	Phone forgetting reminder function	ON	Phone forgetting reminder function will keep ON until "OFF" signal is sent from IHU. With forgetting reminder function ON, an alarm signal will be sent to DVD when forgetting reminder condition is detected, and no alarm is sent when forgetting reminder is off.
		OFF	
Display status	/	In charging	Three display statuses (no icon will be displayed on head unit when vehicle is not charged).
		Charging completed	
		Charging fault	
Forgetting reminder		Sending alarm signal	With mobile phone on CWC, CWC starts to count the time and sends alarm signal to IHU after ACC off signal and driver side door open signal are received by CWC, then head unit alarms. CWC stops sending alarm signal after 20s or if mobile phone is removed within 20s, then head unit stops alarming.
		Stopping alarm signal	

Diagnosis & Testing

Diagnostic Help

1. Connect diagnostic tester X-431 3G (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all CD system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

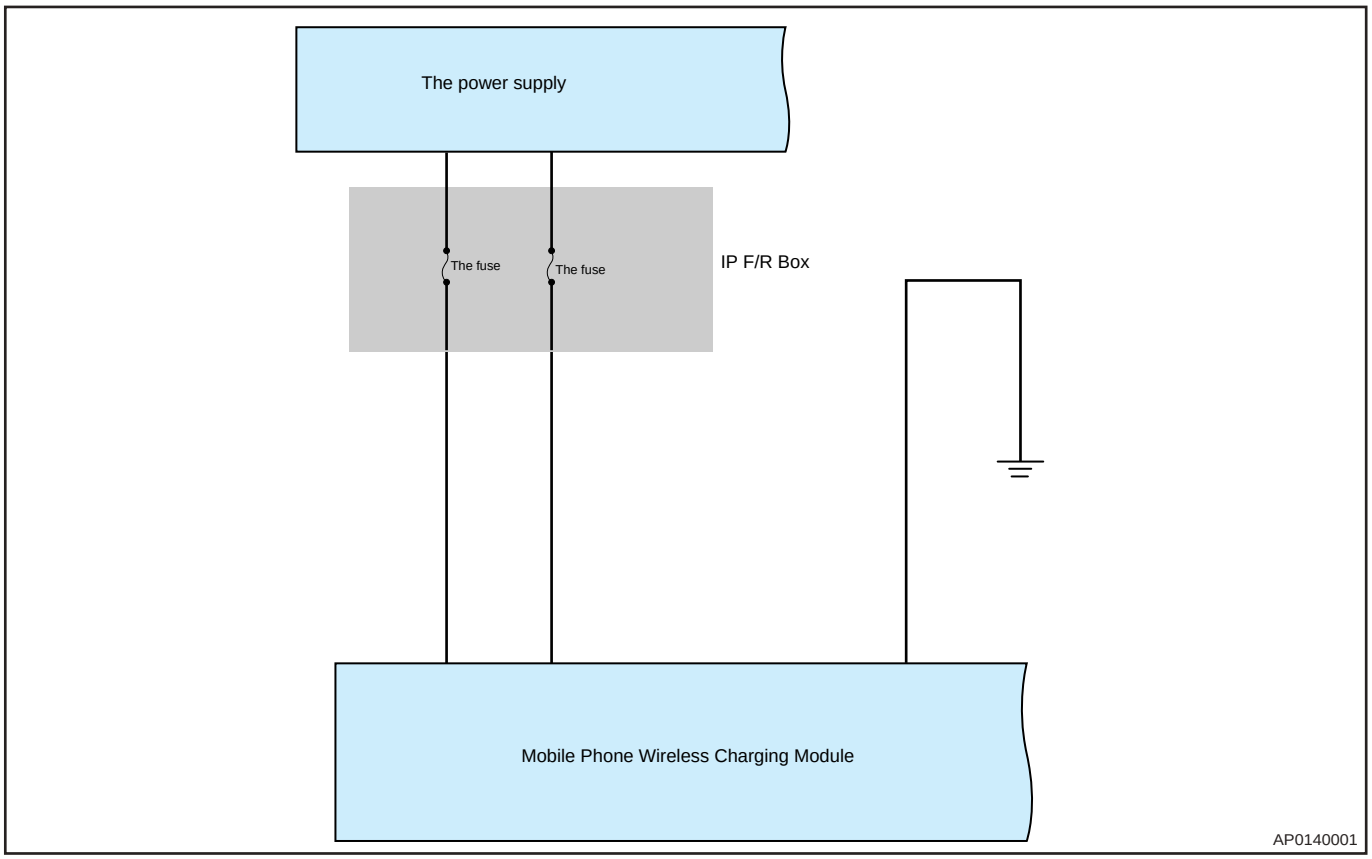
Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Fault Detection Condition	Possible Causes	Maintenance Advice
B1B32-16	Power Supply Circuit Voltage Below Threshold	/	• Disconnection or poor connection between battery and instrument panel after engine starting • Power supply is not stable, and some loads may decrease suddenly • Power supply is not stable, and load fails suddenly • Instrument panel wire harness and connector fault	/
B1B33-17	Power Supply Circuit Voltage Above Threshold	/		/
B1B30-92	Foreign Matters Exist - Performance or Incorrect Operation	/	• Foreign matters exist between mobile phone and wireless charging • Excessive charing time • Wireless charging paster damaged • Charging operation out of standard	/
B1B31-98	Component or System Temperature Too High	/		/
U0073-88	CAN Bus Off	/	Refer to CAN communication system	/
U0140-87	Lost Communication with BCM	/		/
U0214-87	Lost Communication With PEPS	/		/
U1300-55	Software Configuration Error	/		/

DTC Diagnosis Procedure

DTC	**B1B32-16**	**Power Supply Circuit Voltage Below Threshold**
DTC	**B1B33-17**	**Power Supply Circuit Voltage Above Threshold**

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Confirm DTCs**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect the instrument panel wire harness connector.

(c) Check if wire harnesses are worn, pierced, pinched or partially broken.

(d) Check for broken, bent, protruded or corroded terminals.

(e) Check if related connector pins are in good condition.

NG → **Repair or replace wire harness and connector**

OK ↓

2	**Check instrument panel power supply voltage**

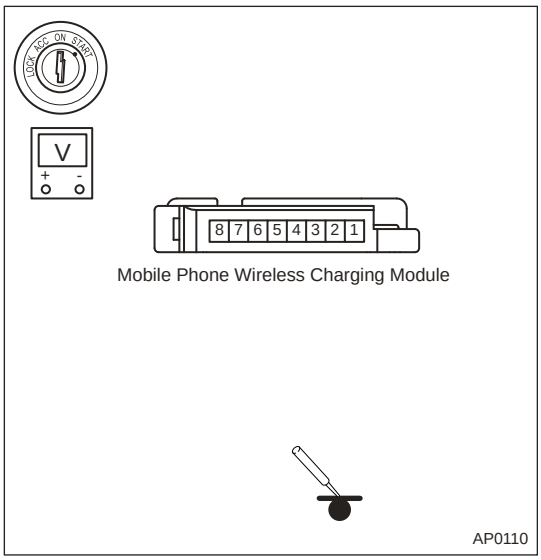
(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect the wireless charging connector.

(c) Connect the negative battery cable, and turn ENGINE START STOP switch to ON.

(d) Using a digital multimeter, check for voltage between wireless charging connector power supply terminal and ground to check if there is an open in instrument panel power supply circuit according to the table below.

Multimeter Connection	Specified Voltage
Wireless charging connector (1) - Ground	Not less than 12 V
Wireless charging connector (2) - Ground	Not less than 12 V



NG → **Check if instrument panel fuse is burnt**

OK ↓

3	**Using a 21 W test lamp, test power supply voltage**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect the wireless charging connector.

(c) Connect the negative battery cable, and turn ENGINE START STOP switch to ON.

(d) Using a 21 W test lamp, check voltage between the terminals of instrument panel fuse and relay box to check if power supply of instrument panel power supply voltage is normal according to the table below.

Multimeter Connection	Specified Condition
Instrument panel fuse and relay box (corresponding terminal) - Ground	Test light comes on normally
Instrument panel fuse and relay box (corresponding terminal) - Ground	Test light comes on normally

NG → **Check or replace instrument panel wire harness or connector**

OK

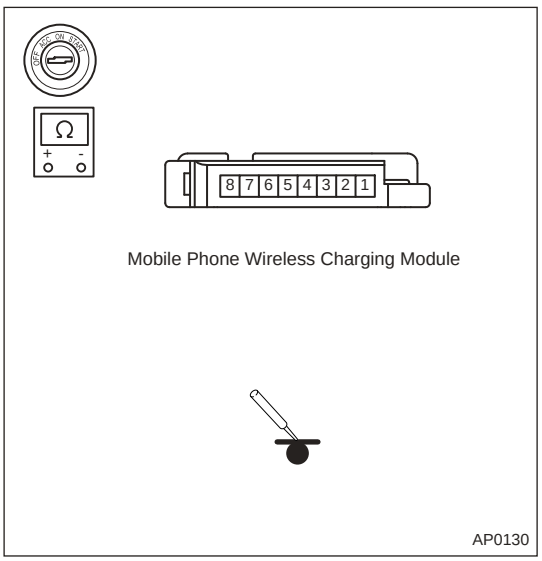
4	Check ground

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect the wireless charging connector.

(c) Measure resistance between wireless charging connector ground terminal and ground and check if it is open according to the table below.

Multimeter Connection	Condition	Specified Condition
Wireless charging connector (- ground terminal) - Body ground	Always	⩽ 1 Ω



NG → **Check and repair instrument panel ground wire harness and ground point.**

OK

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG	**Replace wireless charging module**
OK	**System operates normally**

DTC	**B1B30-92**	**Foreign Matters Exist - Performance or Incorrect Operation**
DTC	**B1B31-98**	**Component or System Temperature Too High**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Confirm DTCs**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.
(b) Disconnect the wireless charging wire harness connector.
(c) Check if wire harnesses are worn, pierced, pinched or partially broken.
(d) Check for broken, bent, protruded or corroded terminals.
(e) Check if related connector pins are in good condition.

NG	**Repair or replace wire harness and connector**

OK

2	**Check for foreign matters**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.
(b) Disconnect the wireless charging wire harness connector.
(c) Check for foreign matters between wireless charging module and mobile phone.

NG	**Remove foreign matters.**

OK

3	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace wireless charging module**

OK → **System operates normally**

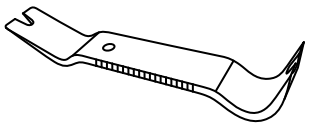
DTC	**U0073-88**	**CAN Bus Off**
DTC	**U0140-87**	**Lost Communication with BCM**
DTC	**U0214-87**	**Lost Communication With PEPS**
DTC	**U1300-55**	**Software Configuration Error**

DTC Confirmation Procedure
Refer to CAN communication system

On-vehicle Service

Tool

General Tool

Tool Name	Tool Drawing
Interior Crow Plate	 RCH002506

Fasteners Torque List

Torque Specifications

Item	Tightening Torque
Wireless Charging Module Fixing Bolt	1.5 ± 0.5 N·m

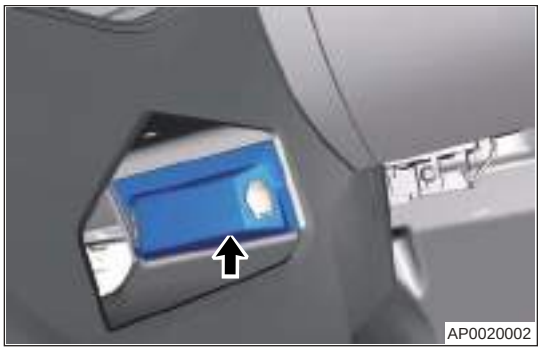
Front Backup Power Supply

Removal

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing front backup power supply.
- Appropriate force should be applied, when removing front backup power supply. Be careful not to operate roughly.
- Try to prevent USB panel assembly from being scratched, when removing front backup power supply.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front backup power supply.
   a. Pry off clip from USB panel assembly and release the panel.



   b. Disconnect connector from backup power supply.
   c. Press fixing clip of backup power supply and remove backup power supply.

Installation

⚠ Caution

- Check backup power supply for proper operation after installing backup power supply assembly.

1. Installation is in the reverse order of removal.

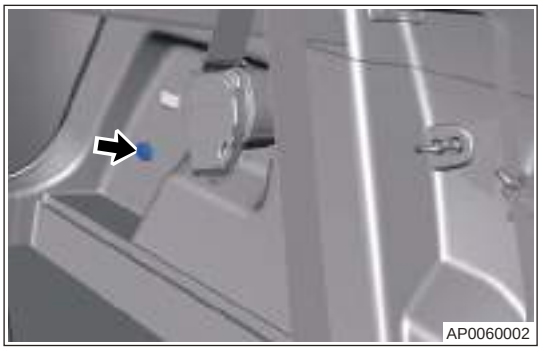
Rear Backup Power Supply

Removal

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing rear backup power supply.
- Appropriate force should be applied, when removing rear backup power supply. Be careful not to operate roughly.
- Try to prevent protector from being scratched, when removing rear backup power supply.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear backup power supply.
   a. Pry off rear backup power supply, disconnect the connector and remove rear backup power supply.



Installation

⚠ Caution

- Check backup power supply for proper operation after installing backup power supply assembly.

1. Installation is in the reverse order of removal.

Multi-function Interface

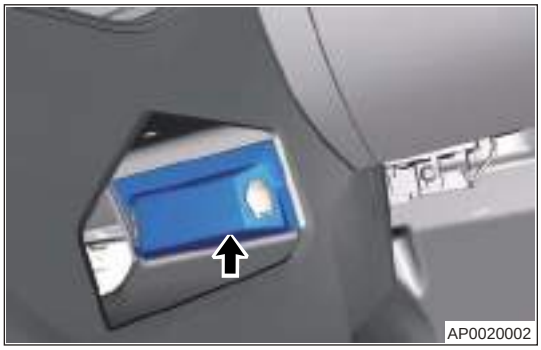
Removal

⚠ Caution

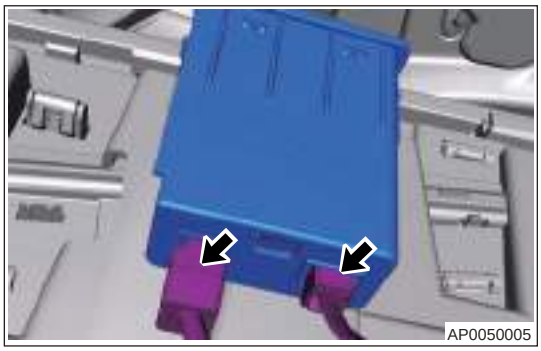
- Be sure to wear safety equipment to prevent accidents, when removing multi-function interface assembly.
- Appropriate force should be applied when removing multi-function interface assembly. Be careful not to operate roughly.
-

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the multi-function interface assembly.

a. Pry off clip from USB panel assembly and release the panel.



b. Disconnect connector from backup power supply.



c. Press 2 clips and remove multi-function interface.

Installation

⚠ Caution
• Check multi-function interface for proper operation after installing the multi-function interface assembly.

1. Installation is in the reverse order of removal.

USB Charging Module

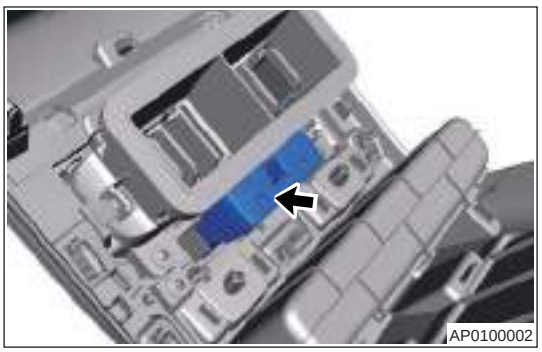
Removal

⚠ Caution
• When removing USB charging module, be sure to wear safety equipment to prevent accidents. • Appropriate force should be applied, when removing USB charging module assembly. Be careful not to operate roughly. • Try to prevent auxiliary fascia console rear cover assembly from being scratched, when removing USB charging module assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.

2. Disconnect the negative battery cable.
3. Remove the USB charging module.
   a. Remove the auxiliary fascia console rear cover assembly.

   b. Disconnect the USB charging module connector.
   c. Press the clip, remove the USB charging module.



Installation

⚠ Caution
• Check USB charging module for proper operation after installing USB charging module assembly.

1. Installation is in the reverse order of removal.

Wireless Charging Module

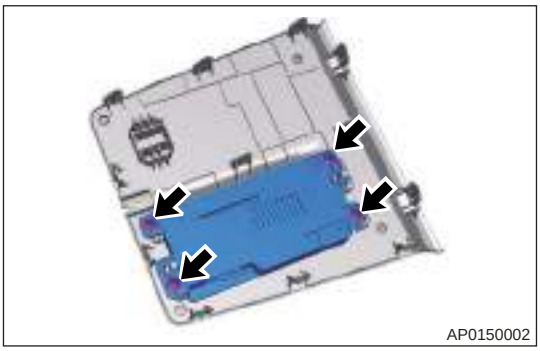
Removal

⚠ Caution
• Be sure to wear safety equipment to prevent accidents, when removing wireless charging module assembly. • Appropriate force should be applied, when removing wireless charging module assembly. Be careful not to operate roughly. • Try to prevent auxiliary fascia console assembly from being scratched, when removing wireless charging module assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the wireless charging module.

a. Pry off the storage box cover plate assembly with interior crow plate, and disconnect mobile phone wireless charging module connector.

b. Remove 4 fixing screws from wireless charging module.



c. Remove the wireless charging module.

Installation

⚠ Caution
• Check wireless charging module for proper operation after installing wireless charging module assembly.

1. Installation is in the reverse order of removal.

BODY CONTROL SYSTEM

System Overview

Description

Body control module is called BCM for short which integrates most of vehicle electrical appliances, and it is an important part of the body electrical system.

Function Description

1. Tire pressure monitoring function (if the vehicle is equipped with tire pressure monitoring function): Tire pressure monitoring system is an active safety device, which can monitor tire pressure and temperature in real time and display tire pressure and temperature on meter. When tire pressure is too low or temperature is too high, tire pressure monitoring system will warn the driver of driving danger.
2. Window jam protection function (if the vehicle is equipped with jam protection function): When window auto up or remote one-button window up function is operated, if a passenger is jammed by automatically rising window due to carelessness, the jam protection control module control glass regulator motor to operate in reverse before motor reaches the jam protection set force, so that window glass lowers at a certain distance and prevent passenger being jammed.
3. The main functions are as below: defrost, turn signal light, lane change, hazard warning light, position light, park light, low beam light, follow me home, car location, high beam, passing light, rear fog light control, daytime running light, battery save, dome light, third row dome light, rear view mirror ground light, window, PEPS button background light control, anti-theft management, trunk opening management (with PLG), door status, central lock, front wiper control, front washer control, back-up light control, key status position signal, sudden braking hazard warning light double flashing alarm function, assist steering illumination, brake light control, rear view mirror folding, DVD settings, remote control function, LIN ambient light.

BCM Installation Position

It is installed on body under instrument panel.

BCM Function Test Reporter

Defrost Function

1. Defroster operation conditions: (1) IGN ON; (2) defroster signal active
   a. Active the defroster switch when the key is in OFF, ACC or START, the defroster will not operate.
2. When defroster is operating: Defroster stopped when 20 minutes elapsed
3. When defroster is operating: Active the defroster signal again, defroster stops
4. When defroster is operating: Key is switched from IGN ON to ACC or OFF, defroster stops
5. When defroster is operating: After the operation time reaches to 20 min ± 5 s, defroster stops

6. When defroster is operating: When it is in Crank, defroster is paused. After Crank is finished, defroster resumes

Hint:
When voltage is below 11.5 V for more than 5 s, defroster output is shut down temporarily. If voltage is above 12.5 V for more than 15 s in the following counting time, the output will be restarted.

Turn Signal Light Function

1. Left turn signal light operating conditions: IGN ON; left turn signal light switch is activated
2. When left turn signal light is operating: the flashing frequency of left turn signal light is 400 ms on and 400 ms off.
   a. When left turn signal light is operating: Key is switched from ON to OFF, left turn signal light stops operating and meter stops flashing.
3. When left turn signal light is operating
   a. The corresponding bulb is intact, BCM sends CAN signal and the frequency is the same as left turn signal light;
   b. If the corresponding 21 W bulb is damaged, BCM sends CAN signal and the frequency is 2 times of normal operating frequency. No matter whether the bulb is damaged or not, BCM will work and send signals.
4. Right turn signal light operating conditions: IGN ON; right turn signal light switch is activated
5. When right turn signal light is operating: the flashing frequency of right turn signal light is 400 ms on and 400 ms off.
   a. When right turn signal light is operating: key is switched from ON to OFF, right turn signal light stops operating and meter stops flashing.
6. When right turn signal light is operating
   a. The corresponding bulb is intact, BCM sends CAN signal and the frequency is the same as right turn signal light;
   b. If the corresponding 21 W bulb is damaged, BCM sends signal and the frequency is 2 times of normal operating frequency. No matter whether the bulb is damaged or not, BCM will work and send signals.
7. When left/right turn signal light is operating: left/right turn signal light input is deactivated, left/right turn signal light should stop operating immediately
8. When left/right turn signal light is operating: Key is switched from IGN ON to ACC or OFF, and left/right turn signal light stops operating immediately.

Lane Change Function

1. Left lane change operating conditions: IGN ON; left turn signal light switch activates shortly (50 ms～1000 ms)
2. When left lane change is operating: left turn signal light flashes 3 times at frequency of 400 ms on and 400 ms off
3. When left lane change is operating
   a. The corresponding bulb is intact, BCM sends CAN signal and the frequency is the same as left turn signal light;
   b. If the corresponding 21 W bulb is damaged, BCM sends CAN signal and the frequency is 2 times of normal operating frequency. No matter whether the bulb is damaged or not, BCM will work and send CAN signals.
4. During left lane change operation: left turn signal light switch is activated (50 ms～1000 ms) shortly again, and left turn signal light flashes 3 times again
5. When left lane change is operating: Left turn signal switch remains active (> 1000 ms) and automatically switches to left turn signal light operating logic.
6. When left lane change is operating: Key is switched from IGN ON to ACC or OFF, and left turn signal light stops operating immediately.

7. When left lane change is operating: After flashing 3 times, left turn signal light should stop operating immediately.
8. Right lane change operating conditions: IGN ON; right turn signal light switch activates shortly (50 ms ～1000 ms)
9. When right lane change is operating: right turn signal light flashes 3 times at frequency of 400 ms on and 400 ms off
10. When right lane change is operating
    a. The corresponding bulb is intact, BCM sends CAN signal and the frequency is the same as left turn signal light;
    b. If the corresponding 21 W bulb is damaged, BCM sends CAN signal and the frequency is 2 times of normal operating frequency. No matter whether the bulb is damaged or not, BCM will work and send CAN signals.
11. During right lane change operation: right turn signal light switch is activated (50 ms～1000 ms) shortly again, and right turn signal flashes 3 times again
12. When right lane change is operating: Right turn signal switch remains active (>1000 ms) and automatically switches to right turn signal light operating logic
13. When right lane change is operating: key is switched from IGN ON to ACC or OFF, and right turn signal light stops operating immediately
14. When right lane change is operating: After flashing 3 times, right turn signal light should stop operating immediately

Hazard Warning Light Function

1. Hazard warning light function activation conditions: hazard warning light switch is activated when hazard warning light is not activated
2. When hazard warning light is activated: Flashing frequency of left/right turn signal light and hazard warning light indicator are 400 ms on and 400 ms off
3. When hazard warning light is activated
    a. The corresponding bulb is intact, BCM sends CAN signal and the frequency is the same as turn signal light;
    b. If any 21 W bulb is damaged, the CAN signal frequency of turn signal light and the flashing frequency of hazard warning indicator will be 2 times of normal operating frequency.
4. When hazard warning light is activated: hazard warning light switch is activated again and hazard warning light function is turned off; left/right turn signal light stops operating immediately
5. When ABM sends a collision signal, hazard warning light function should be activated automatically (CAN signal of left/right turn signal light, indicator and turn signal light). Automatically activated hazard warning light function due to collision can be canceled as key is switched to OFF, then to ON or hazard warning light button is pressed
6. When turn signal light function and hazard warning light function are both effective, BCM should perform the next action

Hint:
In a ignition cycle, BCM responds to one collision signal only.

Position Light

1. Position light activation conditions: IGN ON or ACC; small light input or low beam light input is activated
2. When position light is operating: BCM should send CAN signal
3. When position light is operating: When small light input and low beam input are deactivated, small light stops operating
4. When position light is operating: when key is switched to OFF, small light stops operating and sends CAN signal

Parking Light

1. Parking light activation conditions: Key is switched to OFF; small light switch is activated

2. When parking light is activated: small light comes on and BCM should send CAN signal
3. When parking light is activated: small light switch is deactivated and small light is turned off, BCM should send CAN signal

Low Beam Light

1. Low beam light activation conditions: IGN ON; low beam light switch is activated
2. When low beam light is activated: BCM sends signal
3. When low beam light is activated: when low beam switch input is canceled, low beam light turns off immediately
4. When low beam light is activated: Key is switched from IGN ON to ACC or OFF, low beam light turns off immediately.

Follow Me Home

1. Light is in manual mode
   a. FMH function activation condition: Flash switch is activated within 2 minutes after key is switched to OFF, and it can be activated again within 2 minutes regardless of whether FMH function is manually turned off or automatically turned off due to overtime.
   b. When FMH function is activated: Low beam light and small light are illuminated, and both CAN signal and FMH time are sent
   c. When FMH function is activated: default duration is 30 S. Activating Flash switch again for a short time will increase duration of FMH function by 30 S each time, but no more than 8 times
   d. When FMH function is activated: Flash switch is activated for 2 seconds, FMH function will be manually turned off - low beam light and small light will turn off immediately and cumulative duration of FMH will be reset.
   e. When FMH function is activated: key is switched to ACC or IGN ON, FMH function will be turned off - low beam light and small light will turn off immediately and cumulative duration of FMH will be reset.
   f. When FMH function is activated: FMH function will be automatically turned off after set FMH working time is reached: low beam light and small light will turn off immediately.
2. Light is in automatic mode
   a. The vehicle has fortification condition, light combination switch is in AUTO, remote controller lock button is pressed, and BCM receives valid signal sent from rain sensor, and low beam light and position light are automatically turned on for 30s.
   b. After 30 S or ignition key is switched to OFF/ON/ACC or light combination switch is switched from AUTO, low beam light and position light are turned off.

Car Locating

1. Light is in manual mode
   a. LMC function activation condition: IGN OFF; FMH is activated in this same ignition cycle (-ON≥ACC≥OFF) and automatically turns off due to overtime; remote control unlock signal is received; four doors are closed.
   b. When LMC function is activated: Low beam light and small light are on and send CAN signal.
   c. When LMC function is activated: FMH function cannot be activated, low beam light and small light operate in LMC mode.
   d. When LMC function is activated: Remote control lock signal (four doors are closed) is received, LMC function is turned off - low beam light and small light are off.
   e. When LMC function is activated: Any door is opened, LMC function is turned off - low beam light and small light are off.
   f. When LMC function is activated: Any key is switched to ACC or IGN ON, LMC function is turned off - low beam light and small light are off.
   g. When LMC function is activated: After receiving remote control unlock signal, LMC function delays 60 s (subject to remote control unlock time received)

h. When LMC function is activated: Longest duration is 60 s, LMC function will turn off automatically after overtime.

2. Light is in automatic mode
   a. The key is in OFF, light combination switch is in AUTO, remote controller unlock button is pressed, and BCM receives valid signal sent from rain sensor, and low beam light and position light turn on for 30 seconds.
   b. After 30 seconds or ignition key is switched to ACC, low beam light and position light are turned off.
   c. When LMC function is activated, if the activation conditions are met again or FMH function is activated, it counts down from 30 s again and the light will not flash.

Automatic Lighting

1. Automatic light activation conditions: IGN in ON position; light switch in AUTO; LIN valid signal sent from rain sensor received
2. After automatic light ON function is activated, BCM sends low beam light and position light CAN signals to instrument cluster.
3. Low beam lights turn off if any condition is met
   a. IGN switch is not in ON position.
   b. Light switch is switched from AUTO.
   c. Rain sensor LIN signal is invalid.
4. Position lights go out if any condition is met.
   a. IGN switch is not in ON position.
   b. After light switch is switched away from AUTO for 2 s.
   c. After rain sensor LIN signal is valid for 5 s.

High Beam Light

1. High beam light operating conditions: IGN ON; low beam lights are in activating status, high beam light switch is activated
2. When high beam light is operating: high beam lights come on and send CAN signal
3. When high beam light is operating: when vehicle is in Crank, high beam lights temporarily stop operating but CAN data will be sent continuously and resume operation after Crank.
4. When high beam light is operating: High beam light switch is deactivated and high beam lights turn off
5. When high beam light is operating: Low beam light switch is deactivated and high beam lights turn off
6. When high beam light is operating: Key is switched from IGN ON to ACC or OFF, high beam lights turn off.

Flash Function

1. Flash operating conditions: IGN ON; Flash switch is activated
2. When Flash is operating: high beam lights come on and send signal
3. When Flash is operating: when vehicle is in Crank, high beam lights temporarily stop operating, but CAN data will be sent continuously, and resume operation after Crank
4. When Flash is operating: When Flash switch is deactivated, high beam lights turn off
5. When Flash is operating: Key is switched from IGN ON to ACC or OFF, high beam lights turn off.

Front Fog Light Control

1. Front fog light operating conditions: IGN ON; position lights are in activating status, front fog lights switch is activated
2. When front fog lights are operating: Front fog lights come on and sends CAN signal
3. When front fog light is operating: Front fog switch activation is canceled and front fog lights go out
4. When front fog lights are operating: Key is switched from IGN ON to ACC or OFF, front fog lights go out
5. When front fog light is operating: Small light is turned off; front fog lights go out and send CAN signal

Rear Fog Light Control

1. Rear fog light operating conditions: IGN-ON; front fog light or low beam light load is activated; rear fog light switch is activated.
2. When rear fog light is operating: Rear fog light comes on and sends CAN signal.
3. When rear fog light is operating: When rear fog light switch is activated again, rear fog lights turn off.
4. When rear fog light is operating: When key is switched from IGN ON to ACC or OFF, rear fog lights turn off.
5. When rear fog light is operating: When low beam light or front fog light is turned off, rear fog light turns off at the same time.

Daytime Running Light

1. Daytime running light operating conditions: engine is started; low and high beam lights are not activated
2. When daytime running light is operating: when engine is stopped, daytime running light function is turned off
3. When daytime running light is operating: The activation of position light, low beam light and front fog light will cause daytime running lights to be turned off
4. When daytime running light is operating: Flash function does not affect daytime running light

Battery Save

1. Battery save function remains active during IGN ON or IGN ACC
2. Battery save function remains active without other wake-up sources within 15 minutes after IGN OFF
3. Battery save timing within 15 minutes after key is turned to OFF: Any door or back door unlocking signal received, key insertion or removal will reset timing to 15 minutes

Hint:

- Battery save load includes: Key light, dome light and luggage compartment light.
- Battery Save can be woken up by central control unlock or mechanical unlock after Battery Save is turned off.

Dome Light

1. Key insertion and removal, dome light and key light control
   a. When key is removed, BCM turns on dome light and key light is on for 3 minutes (fades in and fades out).
   b. Within 3 minutes of dome light operation: Key insertion does not affect the operation timing of dome light and key light.
   c. Within 3 minutes of dome light operation: When the key is turned to IGN ON, dome light and key light will fade out immediately.
   d. Within 3 minutes of dome light operation: If all doors are closed after any door is opened, dome light and key light continue to work for 8 seconds, and then fade out.
2. Door status, dome light and key light control
   a. If any of doors is opened and remains open, dome light comes on for 3 minutes (fades in and fades out).
   b. Within 3 minutes of dome light operation: If another door is opened while one door remains open, dome light continues to come on for 3 minutes, and then fads out.
   c. Within 3 minutes of dome light operation: When the key is turned to ON, all doors are closed, dome light will fade out immediately.
   d. Within 3 minutes of dome light operation: When the key is turned to OFF or ACC and all doors are closed, dome light will fade out after 8 s; if the key is turned to IG ON within 8 s, dome light will fade out immediately.
3. Remote control key, dome light and key light control
   a. When BCM receives unlock signal from remote controller: No matter what status the door is in, dome light comes on for 15 seconds (fades in and fades out).

b. Within 15 seconds of dome light operation: When the key is turned to ING ON, the dome light will fade out immediately.
c. Within 15 s of dome light operation: When RF is fortified successful, dome light will come off immediately.
d. Within 15 s of dome light operation: When any door is opened, dome light enters into mode 2.

4. Collision signal, dome light and key light control
   a. When the key is turned to IG ON, if CAN signal value is not “00”, BCM will illuminate dome light for 30 minutes. There is no fade-in process, including fade-out process.
   b. Within 30 minutes of dome light illumination: If key is switched to OFF, dome light will fade out immediately.
   c. Within 30 minutes of dome light illumination: If BCM receives RF key lock signal, dome light turns off immediately and there is no fade-out process.

Hint:
- Please turn rear dome light switch to door control gear to test above function logic.
- In any of above conditions (key insertion and removal, door status, remote control key) triggers dome light to come on, another event is triggered again, and dome light illumination time is reset.

Luggage Compartment Light

1. Luggage compartment light operating conditions: Luggage compartment is opened and luggage compartment light continuously turn on for 15 minutes.
2. Luggage compartment light is operating: Luggage compartment is closed and luggage compartment light turns off immediately.

Rear View Mirror Foot Light

1. Remote control and foot light function
   a. With key in OFF/ACC, perform unlock operation through key or remote function, foot light turns on for 15 seconds.
   b. In OFF status, BCM receives wireless fortifying/remote fortifying/PLG fortifying signal, and vehicle enters fortifying mode successfully, foot light turns on for 15 seconds.
   c. With key in ON or after counting down for 15 seconds, foot light turns off.
2. Foot light function controlled by door status signal
   a. With key in OFF/ACC/ON, open any door, BCM controls the foot light to turns on for 3 minutes.
   b. Within 3 minutes of foot light operation: If another door is opened while one door remains open, foot light continues to come on for 3 minutes, and then fades out.
   c. In OFF/ACC status, foot light comes on, four doors close, BCM controls foot light to come on for 8 seconds and then go off; Turn key to ON within 8 seconds after foot light is on, and foot light turns off immediately.
   d. When ground light comes on, with IGN in ON condition, the ground light will go out immediately if four doors are closed.

Hint:
- When ground light comes on, BCM enters door condition signal control ground light logic if any door is opened.
- Ground light will not illuminate if back door is opened.
- When the ground light comes on, if BCM is fortified or unfortified, BCM enter remote control signal/ PEPS signal control ground light logic.

Window

1. Window activating conditions: Within 2 minutes since IGN ON or IGN switches away from ON position and both front doors were not opened; enable window switch
2. Window switch has 4 states
   a. Manual UP: When switch is in this position, window is moving up. When switch leaves this position, window stops;

b. Manual DOWN: When switch is in this position, window is moving down. When switch leaves this position, window stops;
c. Auto UP: When switch is in this position, window is moving up automatically until it stops due to block or position changed;
d. Auto DOWN: When switch is in this position, window is moving down automatically until it stops due to block or position changed.

3. When window is operated under auto mode: Press corresponding window up or down switch again to stop the operation.
4. When window is operated under auto mode: For example, after 2 minutes which described in point 1, the operating window stops after finishing this operation.
5. When window is operated under manual mode: For example, after 2 minutes which described in point 1, the operating window stops immediately.
6. Within 2 minutes when key is in ACC or OFF: If any front door opens, window function is disabled.
7. When window disable switch is activated: Input of passenger side will be disabled; if the operating window is activated by switch of passenger side, it will stop immediately. When window disable switch cancel is activated, passenger side input disable is canceled and window disable indicator goes off
8. When key is in ACC or OFF: Window switch input will be invalid if any front door is opened (it is still invalid when closing the door after front door is opened); And if window is operating when front door is opened, stop the window immediately.
9. When engine starts, the operating window will stop immediately and it cannot resume after engine has started

PEPS ENGINE START STOP switch backlight control

1. When position light is on: BCM continuously sends CAN signal to illuminate PEPS backlight
2. When small light is off
   a. The door status changes as follows:

- When any door is opened, BCM continuously sends CAN signal to turn on the backlight for 3 minutes, and then sends CAN signal after 3 minutes to turn off the backlight.
- Within 3 minutes of backlight illumination, if another door is opened, timing will restart again.
- In IGN-ON state, during 3 minutes of backlight illumination, if all doors are closed, backlight will be turned off after 3 seconds.
- In IGN-OFF/ACC status, within 3 minutes of backlight illumination, if all doors are closed, backlight will turn off after continuously turning on for 11 s.

   b. PEPS SMART/RKE control:

- When BCM receives locking failure signal (regardless of door status) for 2 times, BCM continuously illuminates backlight for 18 s and then turn it off after 18 s.
- If key is switched to ON within 18 s, backlight will turn off immediately.
- If key LOCK signal is received within 18 s, backlight will be turned off immediately.
- If any door is opened within 18 S, it is performed according to door status control strategy.

Anti-theft Management

1. Fortifying mode
   a. Trigger conditions:

- IGN is in OFF (it is not in IGN ON or ACC)
- Four doors & two covers are closed;
- BCM receives remote control lock command.
  b. BCM feedback when fortifying mode is entered:

- Turn signal light flashes once (turn on for 500 ms) and sends the corresponding CAN signal;
- Theft deterrent indicator is continuous flash at frequency of 100ms, 1900ms.
- Actuate the anti-theft horn 50 ms and high and low pitched horns 15 ms.

2. Fortifying failure mode
   a. Trigger conditions:

- IGN is in OFF (it is not in IGN ON or ACC)
- Any of four doors & two covers is open;
- BCM receives remote control lock command.
  b. BCM light feedback when fortifying failure mode is entered:
- Turn signal light flashes two times (flashing for 500 ms, interval time is 1s) and sends the corresponding CAN signal.
  c. When entering fortifying failure mode:
- If four doors are closed and any of the two covers is opened, BCM will perform central control lock once;
- If two covers are closed and any of the doors is opened, BCM will perform central control lock then unlock (the interval time is 500 ms)

3. Intrusion mode
   a. Trigger conditions: BCM will enter to alarm status after the following conditions are met when the vehicle is in fortifying mode:

- Doors or engine hood is opened;
- Key is turned to IGN ON;
- Luggage compartment is opened forcibly.
  b. After entering to intrusion mode, BCM feedback the conditions within one alarm cycle (30 s):
- Anti-theft horn (high and low pitched horns sound at frequency of 500 ms ON and 500 ms OFF) operates for 28 ± 2s, pause for 5s;
- Left and right turn signal lights flash 28s at frequency of 75 times/min (400 ms on, 400 ms off) and pause for 5s, and send the corresponding signals;
- Anti-theft indicator continuously flashes at frequency of 100 ms on, 200 ms off, 100 ms on, 600 ms off.
  c. All doors, engine hood, luggage compartment and IGN ON illegal activation action are alarm trigger sources:
- In the same alarm source, a single trigger source can trigger 3 alarm cycles at most;
- In multiple alarm trigger sources, BCM can trigger 8 alarm cycles at most (after 8 alarm cycles, the sound and light alarm will stop);
- If the intrusion ends, BCM will stop alarm after the current alarm cycle. If the same alarm source is triggered again after the alarm is over, BCM will perform the remaining alarm cycles.
- If the four doors & two covers are closed at the end of the alarm, BCM will enter fortifying mode.

4. Fortifying deactivation mode
   a. Activation conditions: vehicle is in alarm mode; BCM receives RF unlock command or BCM detects signals for 1 s continuously after 2 s when the key is switched to IGN ON.
   b. When the alarm is released: vehicle exits anti-theft function mode; anti-theft horn (high and low pitched horns (if equipped)) stops working, and the turn signal light stops flashing.
   c. After alarm is released, if key is not in IGN ON, anti-theft indicator light still flashes at a frequency of 100 ms on, 200 ms off, 100 ms on and 600 ms off; if the key is in IGN ON, anti-theft indicator light stops flashing.
5. Re-fortifying mode
   a. Trigger conditions:

- Vehicle is in fortifying mode;
- BCM receives remote control unlock command.

b. BCM feedbacks when fortifying mode is released.

- Theft deterrent indicator turns off immediately;
- Turn signal light flashes 2 times at frequency of 500 ms on and 500 ms off, and sends the corresponding CAN signals.

c. Within 30 ± 2 seconds after fortifying mode is released:

- If any of all doors, engine hood or luggage compartment are open, BCM exits anti-theft mode;
- If all doors, engine hood and luggage compartment are always closed, BCM will lock automatically and enter the fortifying state after 30 s, and anti-theft indicator will flash at the frequency of 100 ms on and 1900 ms off.

6. Luggage compartment opening mode

a. Trigger conditions:

- Vehicle is in fortifying mode;
- BCM receives the remote control luggage compartment open command for more than 1.5 s.

b. BCM feedback when luggage compartment opening mode is triggered:

- Turn signal light illuminates for 1 s and sends the corresponding signals.
- Luggage compartment is open and no alarm is triggered.

c. Then close the luggage compartment, vehicle returns to the fortifying state, and if there is no legal key, the luggage compartment switch cannot open luggage compartment.

d. After using remote control to open the luggage compartment: After BCM receives remote control lock command, vehicle will immediately lock and return to fortifying state, but the turn signal light prompts fortifying failure.

e. After using remote control to open the luggage compartment and close it again: After BCM receives remote control lock command, vehicle will immediately lock and return to fortifying state, but the turn signal light prompts fortifying successfully. If there is no registered key after the luggage compartment closed, the switch will not open the luggage compartment.

Luggage Compartment Opening Management (without PLG)

1. When the central control lock is in unlock state
   a. When the luggage compartment opening switch is activated, the luggage compartment opens.
2. When the central control lock is in lock state
   a. Luggage compartment is opened

- IGN OFF;
- BCM receives RF open trunk command for more than 1.5s.
- Turn signal light illuminates and sends CAN signals to open trunk;

3. After luggage compartment is opened by remote control, close it manually, if there is no registered key (PKE), the luggage compartment will not open by the luggage compartment button.

⚠ Caution

- When luggage compartment is opened, the luggage compartment light turns on.
- When luggage compartment is opened, the actuate time of motor is 200 ms.
- When the vehicle speed reaches 10km/h, the luggage compartment will not be opened (please note that the ignition remains in IGN while testing - BSM is 15 nodes).

Luggage Compartment Opening Management (with PLG)

1. When vehicle is in fortifying deactivation mode
   a. When trunk switch is activated, trunk opens/closes; Turn signal light flashes twice with a frequency of 200 ms ON - 200 ms OFF.
   b. During back door opening/closing, short press remote controller to stop back door at current position.

c. With global fortifying, BCM performs vehicle fortifying after trunk closer switch is pressed and the following conditions are met:

- IGN OFF;
- Four doors and engine hood are closed;
- Back door is locked within 10 s.

2. When vehicle is in fortifying deactivation mode

a. Luggage compartment is open/closed

- IGN OFF/ACC position.
- BCM receives remote control trunk command for more than 1.5 s with turn signal light flashing twice at a frequency of 200 ms on - 200 ms Off.

b. During back door opening/closing, short press remote controller to stop back door at current position.

c. After back door is closed, the vehicle returns to fortifying state.

Door, Hood and Luggage Compartment Door Status

1. BCM sends CAN signal to open/close front left door.
2. BCM sends CAN signal to open/close front right door.
3. BCM sends CAN signal to open/close rear left door.
4. BCM sends CAN signal to open/close rear right door.
5. BCM sends CAN signal to open/close engine compartment cover
6. BCM sends CAN signal to open/close trunk.

Central Control Lock

1. Central control lock activation conditions

- Close all four doors;
- Vehicle is not in anti-theft state;
- Central control lock locked switch is activated.

2. Central control unlock activation conditions

- Central control lock unlocked switch is activated;
- Vehicle is not in anti-theft state.

3. Mechanical lock locked/unlocked activation conditions

- Central control lock or mechanical lock locked switch is activated;
- Vehicle is not in anti-theft state.

4. Auto unlock (if equipped) activation conditions

- Vehicle speed is 0 km/h;
- Door lock is locked;
- Key is switched to OFF from other positions.

Hint:
The bench testing needs to ensure that there is no speed signal after IGN is turned off.

5. Collision unlock

- After BCM receives CAN signal when IGN ON: BCM performs central control unlocking twice and the interval time is 1 s (regardless of the door state); locking is prohibited; key is switched to OFF, prohibit locking is canceled.

⚠ Caution

- BCM receives unlocking or locking command twice in 1 S and the second time will be ignored.
- BCM is powered on again after powered off, BCM has no lock or unlock action.
- For remote control lock and unlock function, please refer to lock and unlock contents in anti-theft management.

Front Wiper Control

1. Low speed wiper mode (Note: Wiper switch)
   a. Activation conditions: IGN ON; low speed range switch of the wiper is activated.
   b. When low speed wiper is operating: When wiper switch is switched to other operation mode, the wiper will work in other modes immediately.
   c. When wiper switch is switched to OFF from low speed range, the wiper will operate at low speed automatically until it returns to wiper stop position (whether it is IGN ON or not).
2. High speed wiper mode
   a. Activation conditions: IGN ON; high speed range switch of the wiper is activated.
   b. When high speed wiper is operating: When wiper switch is switched to other operation mode, the wiper will work in other modes immediately.
   c. When wiper switch is switched to OFF from high speed range, the wiper will operate at low speed automatically until it returns to wiper stop position (whether it is IGN ON or not).
3. Intermittent wiper mode (without rain sensor)
   a. Activation conditions: IGN ON; wiper intermittent/automatic switch is activated.
   b. There are 4 gear positions on wiper sensitivity switch: 13 s, 8 s, 4 s, 2 s.
   c. When the intermittent wiper activation status switches intermittent time to other gear positions, the operation status of wiper is as below:

- When new time interval is shorter than the original one: If wiper is in pause status, wiper will operate at new interval at once; If wiper is in moving status, wiper will operate at new interval since it is paused.
- When new time interval is longer than the original one: If wiper is in pause status, wiper will operate in new intermittent since it is paused at the next time after completing the current cycle; If wiper is in moving status, wiper will operate at new interval since it is paused.

4. Auto wiper (with rain sensor)
   a. With switch in Auto, BCM receives LIN signal sent from rain sensor, and drives wiper to operate.
   b. Once LIN signal S_AUTO_H is received, high speed wiper operates.
   c. Once LIN signal S_AUTO_L is received, low speed wiper operates.
   d. When LIN signal is interrupted or ignition key is out of ON position, if wiper is not in Park position, it will continue to operate until reaching Park position.
   e. Operation stops during ignition and restores when ignition is finished.

Front Washer Control

1. Front washer operation condition: IGN ON
2. Front washer operation will keep on outputting when front washer is activated
3. Washing starts operating after IGN-CRANK stops operating and resumes operating after starting
4. When front washer operation is over

- When wiper switch is in OFF position, wiper will operate for 3 cycles at low speed, and it operates for 1 cycle again after 6 ± 0.2 seconds; If BCM receives new front washer operation requirements during 3 cycles and 6 seconds of this wiper, wiper will perform new operation.
- When wiper is in intermittent mode, wiper will operate for 3 cycles at low speed, and then it keeps the intermittent mode.

Rear Wiper Control

1. Activation conditions: IGN ON; rear wiper is activated
2. During rear wiper is operating, if rear wiper switch is turned to OFF and rear wiper is not in Stop position, rear wiper will continue to operate until it stops at stopping position
3. During rear wiper is operating, if ignition key is turned to ON and rear wiper is not in Stop position, rear wiper will continue to operate until it stops at stopping position
4. During rear wiper operation, the rear wiper when engine starts, and resumes operating after engine has started.
5. When BCM judges front wiper is opened and reverse gear is input, rear wiper operates automatically with interval of 4 s. When either front wiper or reverse gear is closed, rear wiper stops.

Rear Washer Control

1. Rear washer operation condition: IGN ON
2. Rear washer operation will keep on outputting when front washer is activated
3. Rear washing starts operating after IGN-CRANK stops operating and resumes operating after starting
4. When rear washer operation is finished

- When wiper switch is in OFF position, wiper will operate for 3 cycles at low speed; If BCM receives new rear reset operation requirements during 3 cycles, wiper will perform new operation.
- When wiper is in sweeping mode, wiper will sweep in original condition and continue to keep original condition after washer switch is released.

Back-up Light Control

1. Back-up light operating conditions: IGN in ON
2. After receiving reverse switch signal or CAN signal sent from TCU, BCM turns on backup light.
3. If there is no switch signal and CAN signal, it will turn off back-up light.

Key Status Position Signal

1. BCM sends the corresponding KeySts according to the actual location of the key
2. The continuous activation time is up to 10 s when engine starts, and KeySts is sent after 10s. If ACC and ON positions change, BCM sends the corresponding key KeySts according to the actual position of key.

Sudden Braking Hazard Warning Light Alarm Function

1. If the following conditions are met, hazard warning light is activated (CAN signals of left/right turn signal light, indicator light and turn signal light flash at frequency of 140 ms on/140 ms off)

- The key position is in ON position.
- CAN signal sent from ESP is received.

2. If any of following conditions is met, stop the hazard warning light (left/right turn signal light, indicator light and turn signal light CAN signal) flashes

- CAN signal sent from ESP is received;
- Key position is in OFF position.

⚠ Caution

- When hazard warning light of this function is operating, operate hazard warning light switch, this function stops immediately.
- During this operation, BCM receives collision signal and function stops immediately.

Assist Steering Illumination

1. When following conditions are met, turn on the fog light auxiliary light function
- Key position is in ON position.
- The turn signal light turns on or steering column rotates by 45° or more.
- Low beam light turns on.
- Vehicle speed is less than 40km/h.
2. When any of following conditions is met, turn off the fog light auxiliary light function
- Key position is in ACC or OFF position.
- Turn signal light turns off and steering column is turned by less than 10°.
- Low beam light turns on.
- Vehicle speed is less than 40km/h.
3. When fog light auxiliary light is activated, meter indicator is not activated
4. This function can perform a on-line configuration.

Brake Light Control

1. When any of following conditions is met, turn on the brake light function.
- When brake switch is pressed, brake switch is a high level self-locking switch;
- CAN signal sent from EPB is received;
- CAN signal sent from ESP is received.
2. When brake light function is turned on, left and right brake lights and high mounted stop light turn on at the same time.
3. When all the above conditions are not met, left and right brake lights and high mounted stop light turn off simultaneously.

Rear View Mirror Folding

1. The switch is point contact type. Press the folding switch, the mirror is automatically folded, and press it again, the mirror is automatically unfolded
2. When it is powered on again after powered off, BCM stores the switch state before powered off
3. When the vehicle speed is greater than 10km/h, the folding function is shielded and the unfolding function works
4. When the vehicle is in Crank, the unfold/fold function is paused and the function is restored after crank is finished

DVD Settings

1. Daytime running light function
- DVD setting is ON to turn on the daytime running light function; DVD setting is OFF to turn off the daytime running light function.
2. Fortifying prompt
- DVD is set to Light, turn signal light flashes once and horn does not sound when it is fortified;
- DVD is set to Horn, horn sounds and turn signal light does not flash when it is fortified;
- DVD setting is light and Horn that turn signal light flashes and horn sounds when it is fortified.
3. Auto lock
- DVD is set to ON to turn on the auto lock function; DVD setting is OFF to turn off the auto lock function.
4. Headlight delay
- DVD is set to On to turn on the headlight delay function; DVD is set to off to turn off the headlight delay function.

5. Rear view mirror folding

- DVD is set to On to turn on the rear view mirror folding function; DVD is set to off to turn off the rear view mirror folding function.

Remote Control Function

1. Remote fortifying mode
   a. Trigger conditions:

- IGN is in OFF (it is not in IGN ON or ACC)
- Four doors & two covers are closed;
- BCM receives remote fortifying command.
  b. BCM feedback when fortifying mode is entered:
- Turn signal light flashes once (turn on for 500 ms) and sends the corresponding signal;
- Theft deterrent indicator is continuous flash at frequency of 100ms, 1900ms.
- Actuate the anti-theft horn 50 ms and high and low pitched horns 15 ms.

2. Remote fortifying deactivation mode
   a. Trigger conditions:

- IGN is in OFF (it is not in IGN ON or ACC)
- Four doors & two covers are closed;
- BCM receives remote fortifying command.
  b. BCM feedback when remote fortifying deactivation mode is entered:
- BCM performs fortifying deactivation, four doors and luggage compartment unlocks and left/right turn signal lights flash twice (500 ms on and 500 ms off, continuous for two times)

3. Remote open luggage compartment mode
   a. Trigger conditions:

- Key position is in OFF;
- BCM receives remote open luggage compartment command.
  b. BCM feedback when luggage compartment opening mode is triggered:
- Turn signal light illuminates for 1 s and sends the corresponding signals.
- Trunk is open to start motor and no alarm is triggered.

4. Remote car location mode
   a. Trigger conditions:

- IGN-OFF/IGN-ACC;
- BCM receives car location function command.
  b. BCM feedback when remote start mode is entered
- High and low pitched horns sound 3 s, left and right turn signal lights flash 3 s and low beam light turns on 15 s.

5. Remote start mode
   a. Trigger conditions: BCM receives PEPS signal
   b. BCM feedback when remote start mode is entered

- Anti-theft alarm function caused by ON gear position is shielded, but caused by four doors, engine hood and back door is not shielded.
- After BCM shields the alarm, it sends signals (CAN1) to PEPS and (CAN2) to CLM (when PEPS receives the signals, it will control the vehicle to start).
- After BCM receives engine state signal, it will turn on position light and send signals.
  c. Exit remote start mode: Turn the key to OFF position

d. BCM feedback when remote start mode is exited:

- BCM will not shield the anti-theft alarm caused by ON gear position.
- BCM sends signals.

LIN Ambient Light

1. Initial status
   - When vehicle rolls from the line and powered on for the first time or vehicle battery is powered on again after disconnection, ambient light function default is on, and it turns on/off according to DVD setting.
2. Ambient light turns on/off
   a. When all the following conditions are met, BCM sends LIN signals (ambient light ON)

- The position light output is in activated condition.
- DVD setting is ON.

   b. Position light output is deactivated or DVD setting is OFF, ambient light turns off.
3. Door control logic related to ambient light
   a. When all the following conditions are met, BCM sends LIN signals (ambient light ON)

- Position light output is not activated.
- Vehicle is in fortifying deactivation mode.
- Any door is opened.
- DVD setting is ON.

   b. Ambient light turns on for 3 minutes
   c. Close all doors within 3 minutes after ambient light comes on, and the light turns off after 8 seconds delay
   d. Open any other door within 3 minutes after ambient light is turned on, then count again for 3 minutes after the last door is opened
   e. When the position light output is not activated, if any condition is met, BCM will immediately send LIN signal (ambient light turns off)
      - The vehicle is fortified successfully.
      - DVD settings are turned off.
4. Ambient light color
   a. After the vehicle is powered on first time after leaving production line or powered on after battery is disconnected and reconnected from vehicle, the related driving mode is OFF by default. Then turn on/off according to DVD settings.
   b. When the related driving mode is OFF: Ambient light colour is blue by default, then choose different colour according to DVD settings.
   c. When related driving mode is turned on
      - In ECO mode, ambient light illuminates in green.
      - In SPORT mode, ambient light illuminates in red.
      - In NORMAL mode, ambient light illuminates in blue.
5. Ambient light brightness (musical rhythm)
   a. Initial status
      - When vehicle rolls from the line and powered on for the first time or vehicle battery is powered on again after disconnection, musical rhythm mode default is off.
   b. When musical rhythm mode is off: Ambient light brightness is Level 3, and different levels can be selected according to DVD setting.
   c. When musical rhythm mode is on: According to different brightness level signals sent from IHU, it changes levels from zero with the musical rhythm

Matching Learning

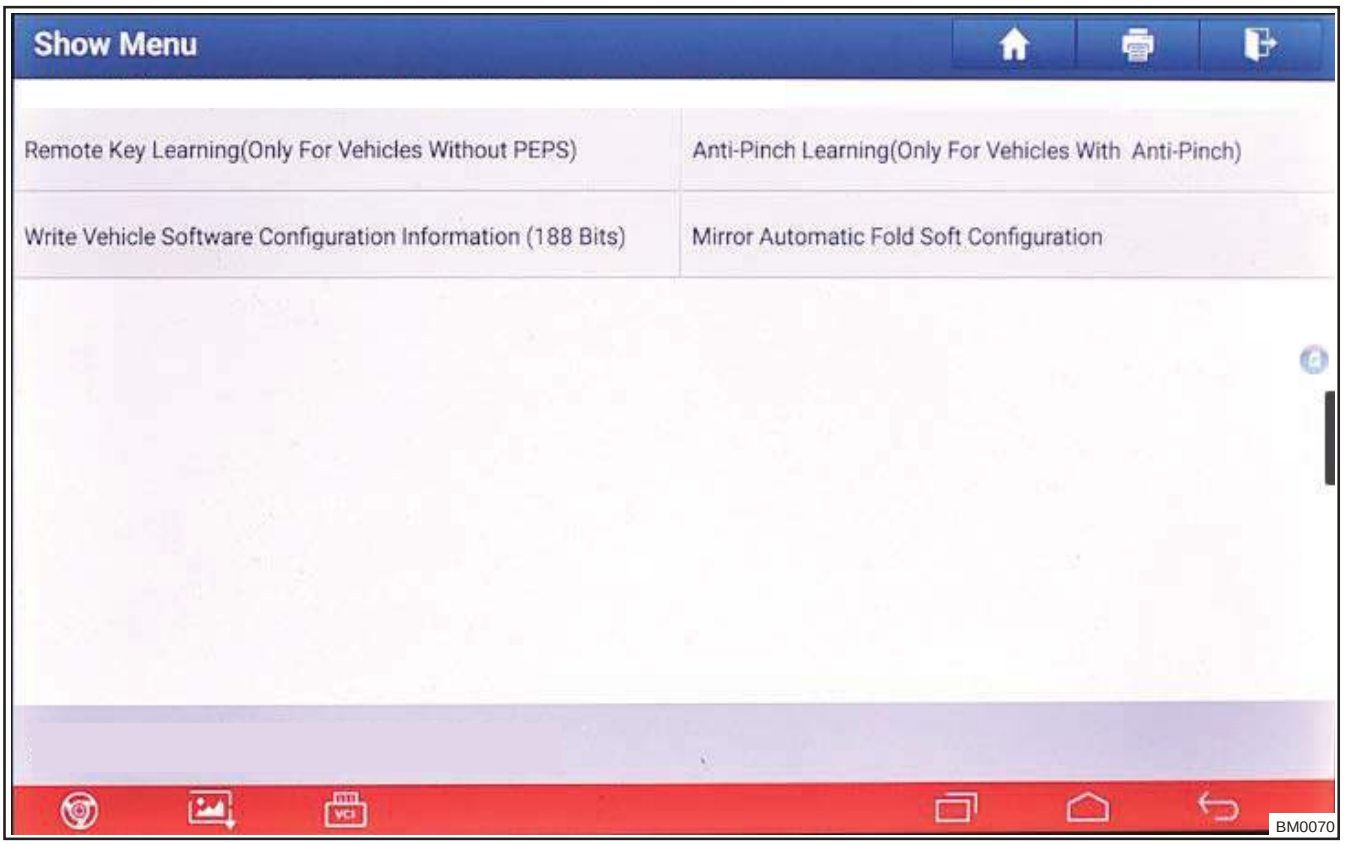
Software Configuration Information Writing

⚠ Caution

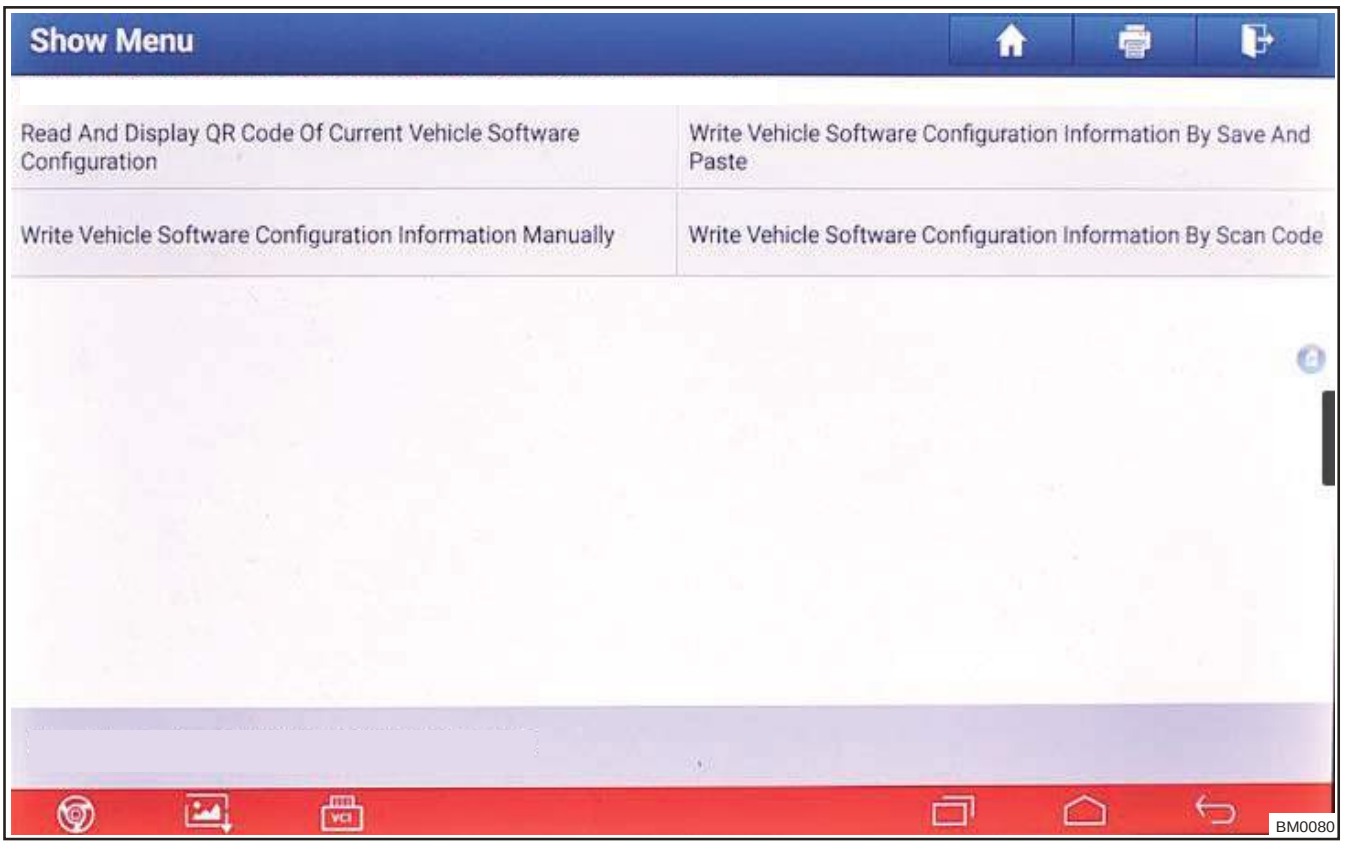
- Write the configuration code after replacing BCM with a new one.
- If it is a non-PEPS model and has engine immobilizer configuration, it needs to be configured for anti-theft matching and then for remote control matching, if it is a PEPS model, there is no need to do the operation in this step.
- Perform tire pressure sensor learning if the vehicle has a tire pressure configuration.
- Perform jam protection learning if the vehicle has a window jam protection configuration.

1. Use the diagnostic tester to connect the vehicle to enter the system. Click Body Control Module (BCM).
2. Click Special Function.

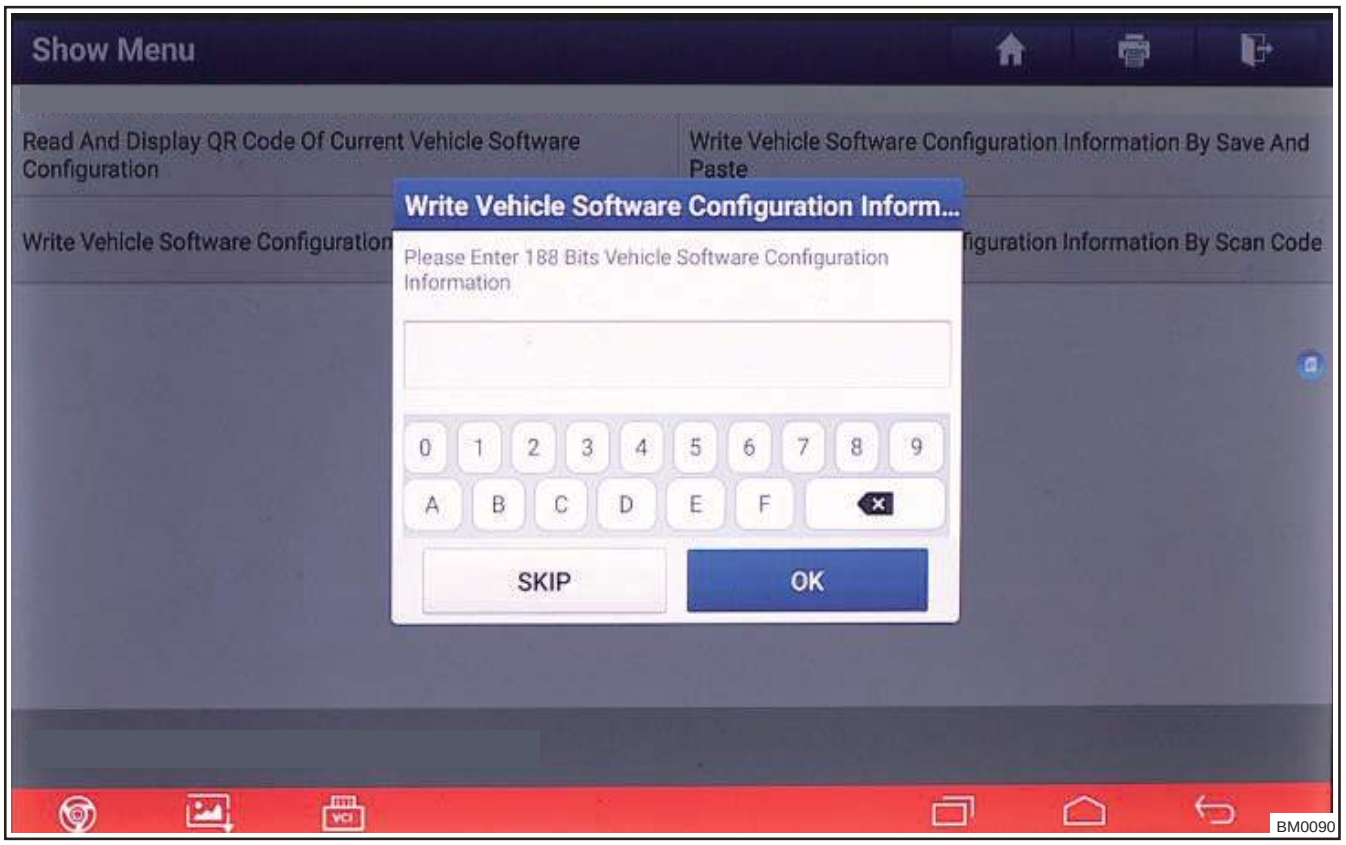
3. Click “Write Vehicle Software Configuration Information”.



4. Click “Write Vehicle Software Configuration Information Manually”.



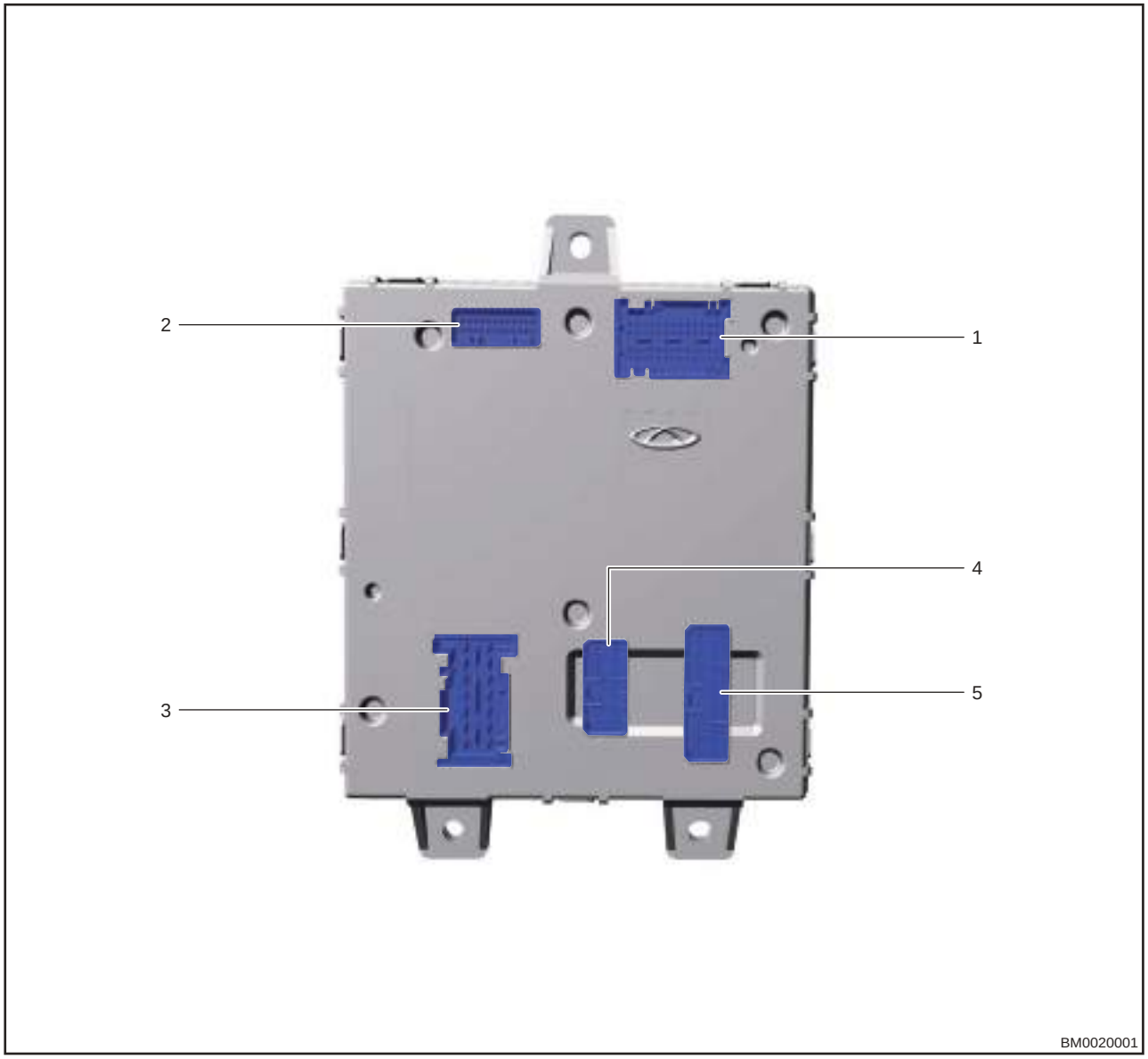
5. Enter software configuration information according to prompt, and click “OK”.


Show Menu
Read And Display QR Code Of Current Vehicle Software Configuration
Write Vehicle Software Configuration Information By Save And Paste
Write Vehicle Software Configuration
iguration Information By Scan Code
Write Vehicle Software Configuration Inform...
Please Enter 188 Bits Vehicle Software Configuration Information
0 1 2 3 4 5 6 7 8 9
A B C D E F
SKIP
OK
BM0090

Diagnosis & Testing

Body Control Module Terminal Definition

Terminal Definition



1-52	Pin Connector	2-24	Pin Connector
3-14	Pin Connector	4-12	Pin Connector
5-20	Pin Connector		

52-Pin connector terminal definition

PIN	Description	PIN	Description
1-01	-	1-27	Dome Light Output
1-02	-	1-28	Luggage Compartment Light Output

PIN	Description	PIN	Description
1-03	LIN	1-29	Rear Defroster Output
1-04	Central Lock Switch Lock Indicator	1-30	High Speed Wiper Output
1-05	Front Windshield Heating 1	1-31	Steering Wheel Heating Relay
1-06	Front Windshield Heating 2	1-32	-
1-07	Hard Wire Crash	1-33	Front Window Regulator SW RH
1-08	Movable Side Rear Turn Light Diagnosis	1-34	Front Left Window Regulator Switch
1-09	Front Turn Light Diagnosis	1-35	-
1-10	Rear Left Door Open Signal	1-36	Passenger Side Window Regulator Disabled SW
1-11	Headlight Leveling	1-37	Front Right Door Open Signal
1-12	Rear Right Door Open Signal	1-38	-
1-13	Left Front Door Lock Status Signal	1-39	Brake SW Input
1-14	Rear View Mirror Ground Light Output	1-40	Passenger Side Window Regulator Disabled Switch Operation Indicator
1-15	-	1-41	NTC+
1-16	LIN Signal (Shifting Module)	1-42	Low Speed Wiper Output
1-17	-	1-43	Low Beam Light Output
1-18	High Beam Light Output	1-44	Horn Output
1-19	Rear Window Regulator SW RH	1-45	Analog Ground
1-20	Passenger Side Front Right Window Regulator Switch	1 - 46	Turn Light SW
1-21	Passenger Side Rear Left Window Regulator Switch	1 - 47	Rear Window Regulator SW LH
1-22	Passenger Side Rear Right Window Regulator Switch	1-48	-

PIN	Description	PIN	Description
1-23	Front Left Door Open Signal	1-49	Central Control Lock SW Input
1-24	Front Wiper Stop Position Signal	1 - 50	Central Control Unlock SW Input
1-25	Steering Wheel Heating Input	1-51	Fixing Side Rear Turn Light Diagnosis
1-26	Rear Wiper Stop Position Signal	1-52	Engine Hood Contact Switch

24-Pin connector terminal definition

PIN	Description	PIN	Description
2-01	Steering Wheel Heating Signal	2-13	Turn Light Enable
2-02	B-CAN L	2-14	Hazard Light Operation Indicator Light
2-03	DA-CAN L	2-15	B-CAN H
2-04	-	2-16	DA-CAN H
2-05	ACC Signal Input	2-17	IGN Signal Input
2-06	Front Fog Light Input	2-18	-
2-07	Rear Fog Light Input	2-19	Rear Washer Input
2-08	Front Wiper Input	2-20	Front Washer Input
2-09	The driver opens the back door	2-21	Rear Wiper Input
2-10	Rear View Mirror Folding Input	2-22	Front Wiper Input
2-11	Hazard Warning Light Input	2-23	Lighting Input
2-12	High Beam - Flash Input	2-24	Wiper Sensitivity Switch

14-Pin connector terminal definition

PIN	Description	PIN	Description
3-01	Power Source 3	3-08	Rear Left Window Up Output
3-02	Power Source 6	3-09	Rear Left Window Down Output
3-03	Ground 1	3-10	Power Source 1
3-04	Ground 2	3-11	Front Right Window Up Output

PIN	Description	PIN	Description
3-05	Rear Right Window Down Output	3-12	Front Right Window Down Output
3-06	Rear Right Window Up Output	3-13	Front Left Window Up Output
3-07	Power Source 2	3-14	Front Left Window Down Output

12-Pin connector terminal definition

PIN	Description	PIN	Description
4-01	Fog Light FR	4-07	Welcome Light Enable
4-02	Central Control Unlock Output	4-08	-
4-03	Central Control Lock Output	4-9	Power Source 5
4-04	-	4-10	Rear Wiper Output
4-05	Front Washer Output	4-11	-
4-06	Fog Light FL	4-12	Rear Washer Output

20-Pin connector terminal definition

PIN	Description	PIN	Description
5-01	-	5-11	High Mounted Stop Light Output
5-02	Outer Rear View Mirror Unfolding Output	5-12	-
5-03	Outer Rear View Mirror Folding Output	5-13	Nozzle Heater
5-04	Left Turn Light Output	5-14	Left Daytime Running Light Output
5-05	Right Turn Light Output	5-15	Right Daytime Running Light Output
5-06	Horn Output	5-16	Battery Save Output
5-07	Back-up Light Output	5-17	Rear Fog Light Output
5-08	Left and Right Brake Light Output	5-18	-
5-09	Front Position Light + Backlight	5-19	-
5-10	Rear Position Light Output	5-20	Power Source 4

Problem Symptoms Table

<table>
<tr><th>Symptom</th><th>Probable Cause and Recommended Countermeasures</th></tr>
<tr><td>Remote controller failure or distance of remote control is close</td><td>(For PEPS model, remote controller failure has nothing to do with BCM. BCM cannot be replaced)
• Battery voltage of remote controller is low - Replace the battery. (Voltage of new replaced battery should be more than 2.9 V), it needs to rematch
• Metallic films are attached to windows, which causes signal to be shielded and vehicle is malfunctioning without any reason. Peel off the metallic films to solve the problem.
• There is electromagnetic interference. Perform the test at another place.
• If remote controller is damaged, replace and rematch it.</td></tr>
<tr><td>Rear defroster does not operate</td><td rowspan="10">Refer to operation principle (control logic). Check the input and output signal. For diagnosis, please refer to “Perform Diagnosis According to Symptoms”</td></tr>
<tr><td>Turn signal light does not come on</td></tr>
<tr><td>Small light does not come on</td></tr>
<tr><td>High beam light does not come on</td></tr>
<tr><td>Fog light does not come on</td></tr>
<tr><td>Daytime running light does not come on</td></tr>
<tr><td>Glass cannot raise up and down</td></tr>
<tr><td>Door lock cannot lock/unlock/luggage compartment cannot open</td></tr>
<tr><td>Wiper washer dose not operate or operate abnormally</td></tr>
<tr><td>Only horn alarms or only turn signal light flashes when it fortifies</td><td>It can be set on DVD/navigation interface, refer to On-vehicle Service section</td></tr>
</table>

Diagnostic Help

1. Connect diagnostic tester X-431 3G (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all CD system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Malfunction Diagnosis Repair Flow

⚠ Caution
When reading DTCs, some DTCs are not related to trouble symptom. And these functions are normal and not affect vehicle use, clear them.

1. Check if DTC occurs again

- If malfunction does not occur, check and repair the suspected wire harness and electrical connector. Proceed to the next step if malfunction occurs again.

2. Check for DTCs

- Perform reading to check whether there is any DTC. Proceed to the diagnostic procedures based on malfunction symptoms when there is no DTC. Proceed to the next step when DTC is found:

3. Clear and read DTCs again

- Record DTCs and clear them. Perform test and read DTC again to check whether there is any DTC. Proceed to the diagnostic procedures based on malfunction symptoms when there is no DTC. Proceed to the next step when DTC related to malfunction symptom is found.

4. Deal with the malfunction symptom according to DTC
5. After inspection and repair, perform test again according to DTC strategy

- Check and repair it again if malfunction has not been solved.

6. After malfunction has been solved, prevent the malfunction from reoccurring according to malfunction causes.
7. Malfunction diagnosis ends.

Trouble Symptom Diagnosis

⚠ Caution

- If a function of BCM is failed, but there is no DTC, perform diagnosis according to trouble symptom.
- This diagnosis needs to combine with control logic (see Operation section). Check input/output signal of BCM for normal operation. If input/output is normal, there is a malfunction in BCM. Otherwise, check the input or output part.

1. Check if DTC occurs again

- If malfunction does not occur, check and repair the suspected wire harness and electrical connector. Proceed to the next step if malfunction occurs again.

2. Check if power supply and ground of controller are normal

- If it is abnormal, repair the power supply and ground based on the electronic diagram. Proceed to the next step if it is normal.

3. According to the control logic, read related data stream with diagnostic tester and check if it is normal

- If it is abnormal, repair the related input signals based on the circuit diagram. Proceed to the next step if it is normal.

4. Perform operation test using diagnostic tester to see if there is any related operations performed by diagnostic tester.

- If it is normal, input part has no malfunction. Otherwise, proceed to the next step.

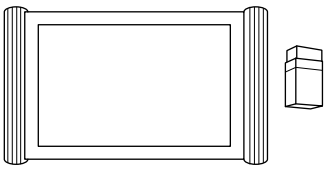
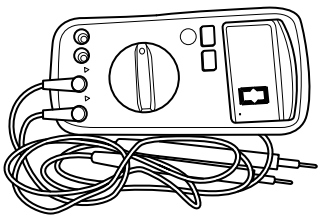
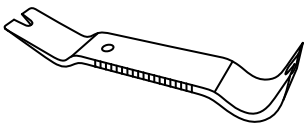
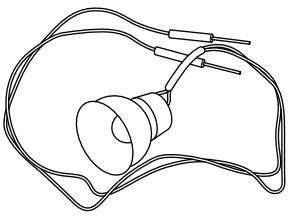
5. Check if actuator is normal.

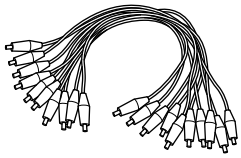
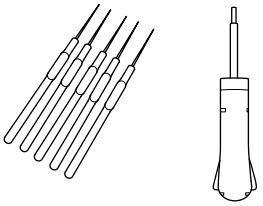
- If result is abnormal, check and repair actuator.

6. If above diagnostic results are normal, replace BCM.

On-vehicle Service

Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Digital Multimeter	 RCH0002006
Interior Crow Plate	 RCH002506
Bulb Test Light (21 W)	 RCH008706

Tool Name	Tool Drawing
Jumper Wire	 RCH008806
Wire Harness Terminal Tools	 RCH008906

Torque Specifications

Description	Torque (N · m)
Body Control Module Bracket Fixing Nut	7 ± 1
Instrument Panel Lower Left Protector Assembly	1.5 ± 0.5
Instrument Panel Fuse and Relay Box Fixing Nut	7 ± 1

Body Control Module

Removal

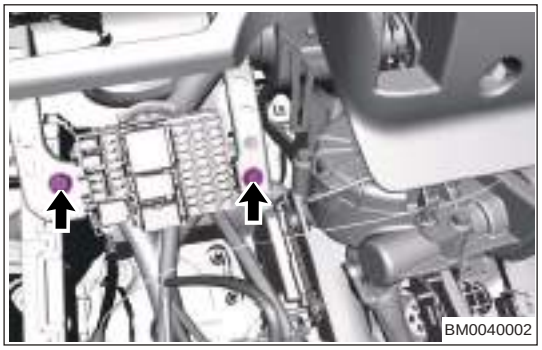
Hint:

- Before replacing BCM, read configurations of the original software. After replacing it, write the original configuration codes.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the body control module.
   a. Remove the instrument panel left end panel assembly.
   b. Remove the instrument panel left lower protector assembly.
   c. Remove the instrument panel left lower protector assembly.

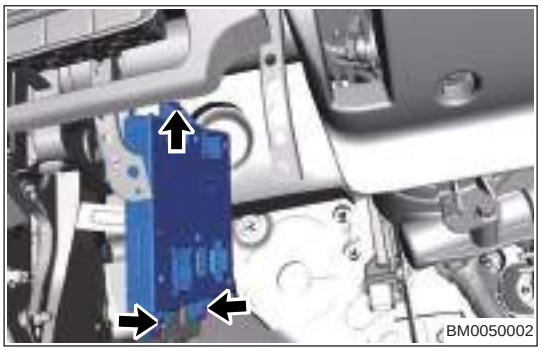
d. Remove 2 bolts from instrument panel fuse and relay box, and move away instrument panel fuse and relay box.

Tightening Torque
7 ± 1 N • m



e. Detach the BCM wire harness connector, remove bolts from BCM and then remove BCM.

Tightening Torque
5 ± 1 N • m



Installation

1. Installation is in the reverse order of removal.

DRIVING ASSIST SYSTEM

Warnings and Precautions

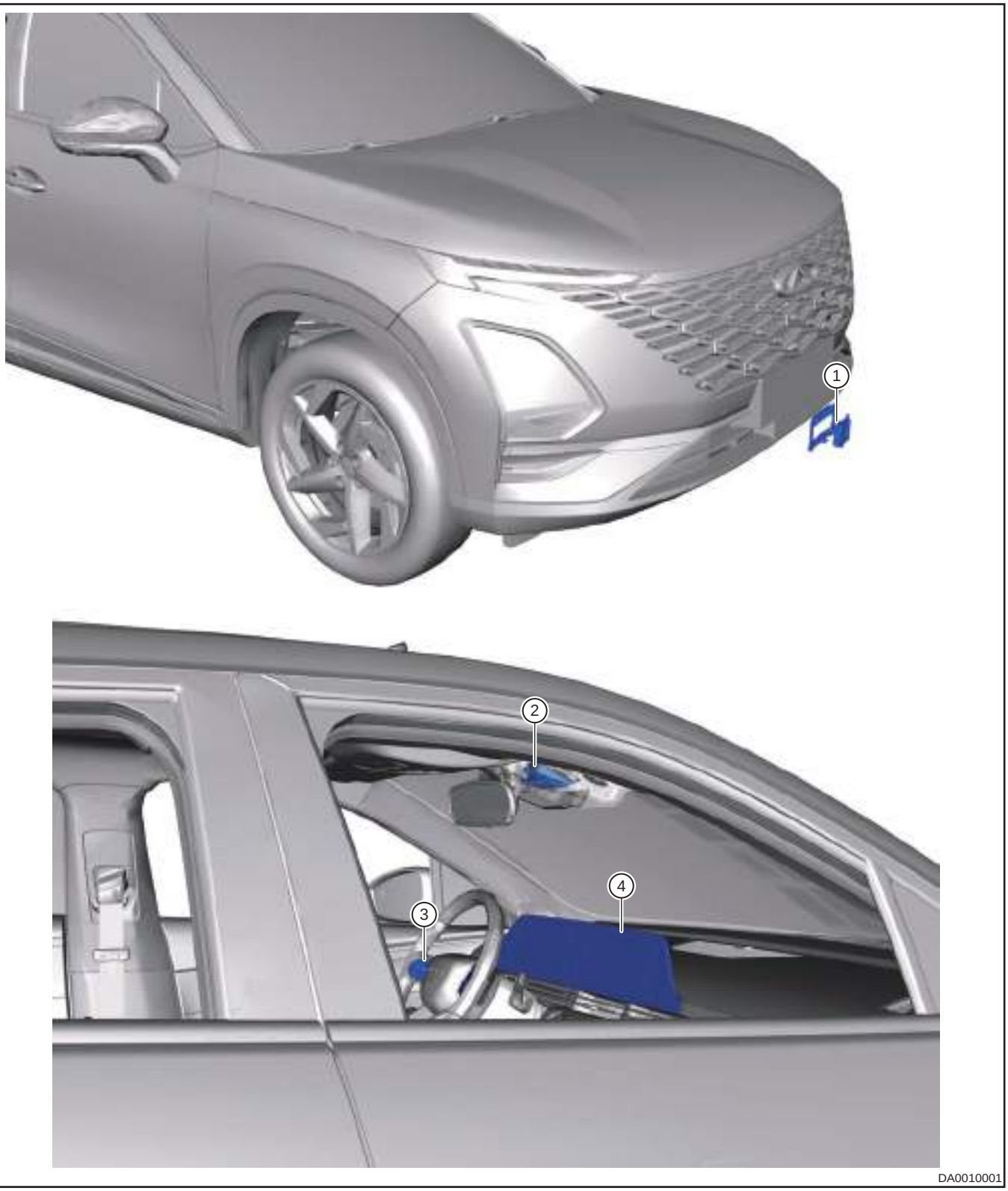
Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

1. Be sure to wear necessary safety equipment to prevent accidents, when removing multi-function front camera.
2. Appropriate force should be applied when removing multi-function front camera. Be careful not to operate roughly.

System Overview

System Components Diagram



1	Microwave Radar Module	2	Multi-function Front Camera
3	Multi-function Steering Wheel Button	4	Hyperscreen

System Function Description

Constant Speed Cruise/Active Speed Limit
Turn on the constant speed cruise control switch after vehicle reaches a certain speed, and the set vehicle speed can be maintained by constant speed cruise control, without accelerator depressed. When active speed limit function is turned on, vehicle speed does not exceed the speed limit set. Cruise control system consists of the following components:

- Constant speed cruise control switch (multi-function switch).
- Instrument Cluster Meter (ICM).
- Engine Control Module (ECM).
- Transmission Control Unit (TCU).
- ABS/ESP control module.
- Accelerator pedal.
- Brake switch.
- Clutch switch.

⚠ Caution

Do not use cruise control in the following situations. Otherwise, it may result in a loss of vehicle control and cause an accident, resulting in serious injury or even death.

- In traffic congestion areas.
- On roads with sharp bends.
- On winding roads.
- On wet and slippery roads, such as those covered with rain, ice or snow.
- On steep hills. Vehicle speed may be higher (or lower) than the set speed. It will cause that engine speed rises sharply and briefly to increase the vehicle speed to the set speed range.

Operation
Engine Control Module (ECM) receives button signal from constant speed cruise control switch (multi-function switch), and then Engine Control Module (ECM) turns on the indicator on the meter via CAN net. According to speed signal, brake signal, acceleration and deceleration signal and current working conditions, ECM determines whether to enter or cancel cruise state. After entering state, ECM controls throttle opening angle to stabilize the vehicle within the set vehicle speed range.

Function Description

1. Cruise control mode inspection
   - With ENGINE START STOP switch ON, when the cruise main switch is pressed, cruise indicator on instrument cluster illuminates and blinks (pre-cruise state, normal condition).
   - When vehicle is driving at speed range of 40 km/h - 150 km/h, for example, press SET/- button of cruise when vehicle speed is 45 km/h, vehicle will drive at constant cruise speed of 45 km/h (the speed when SET/- button is pressed). Meanwhile, cruise indicator on the meter is always on without blinking. If the meter is color screen, it will be displayed on upper left corner of the screen.
2. Cruise setting
   - Under the cruise state, depress the accelerator pedal or brake pedal to increase or decrease vehicle speed. Press SET/- button of cruise system while release the accelerator pedal or brake pedal, vehicle is cruising at new vehicle speed, and indicator on the meter remains on. If the meter is color screen, the new set speed will be displayed on the screen.
3. Cruise short/long press to acceleration
   - In the cruise state, short press RES/+ button once (over 0.02 seconds) to increase vehicle speed by 2 km/h. Cruise indicator on the meter remains on. If the meter is color screen, the target cruise speed displayed on left bottom will increases by 1km/h.

- Under the cruise state, long press the RES/+ button (over 0.4 seconds) to accelerates vehicle continuously. Release the RES/+ button to stop acceleration, and vehicle is cruising under the speed while the RES/+ button is released. Cruise indicator on the meter remains on. If the meter is color screen, the target cruise speed displayed on left bottom changes simultaneously with actual speed.

4. Cruise short/long press to declaration
   - In the cruise state, short press SET/- button once (over 0.02 seconds) to decrease vehicle speed by 2km/h. Cruise indicator on the meter remains on. If the meter is color screen, the target cruise speed displayed on left bottom will decrease by 1km/h.
   - Under the cruise state, long press the SET/- button (over 0.4 seconds) to decelerate vehicle continuously. Release the SET/- button to stop acceleration, and vehicle is cruising at speed when the SET/- button is released. Cruise indicator on the meter remains on. If the meter is color screen, the target cruise speed displayed on left bottom changes simultaneously with actual speed.
5. Cruise resume
   - In the cruise state, depress the brake pedal to flash the cruise indicator on the meter (pre-cruise state, normal condition), and the vehicle speed decreases.
   - When vehicle speed is over 40 km/h, release the brake pedal and press RES/+ button, then the vehicle accelerates until the cruise state before depressing the brake pedal is returned. Cruise indicator on the meter remains on.
   - When vehicle speed is below 40 km/h, release the brake pedal and press RES+ button, the vehicle can not return to the cruise state before depressing the brake pedal. However, further depress the accelerator until vehicle speed is over 40 km/h, release the brake pedal and press RES+ button, the vehicle accelerates until the cruise state before depressing the brake pedal is returned. Cruise indicator on the meter remains on.
6. Cruise cancellation
   - Press the cruise main switch under the cruise state to cancel the cruise state and indicator on the meter turns off.
   - Press the CANCEL button to cancel the cruise state and cruise indicator on the meter blinks (- enters the pre-cruise state). If the meter is color screen, it will be displayed on upper left corner of the screen;
   - Pull up the EPB button, depress brake pedal, engine speed exceeds set range (600 - 6240), gear shift exceeds set range (1 - -6), and vehicle speed exceeds set range (35 - 155), the cruise state is canceled, and indicator on the cruise indicator blinks. If the meter is color screen, it will be displayed on upper left corner of the screen.

Function Description of Active Speed Limit

1. Active speed limit entering
   - With ENGINE START STOP switch ON, when active speed limit LIM button is pressed, active speed limit indicator on the meter (left bottom of middle color screen) illuminates and sends default target limit vehicle speed “30 km/h” and blinks indicating pre-limit state is entered.
   - Vehicle does not start or vehicle speed is below 30 km/h while driving, press SET- button of the active speed limit function to set the target limit vehicle speed to 30 km/h. Meanwhile, active speed limit on the meter displays ON.
   - When vehicle is driving at speed range of 30 - 200 km/h, for example, press SET/- button of active speed limit function when vehicle speed is 110 km/h, vehicle perform speed limit function at the target speed when SET/- button is pressed. Meanwhile, active speed limit on the meter displays ON.
2. Active speed limit cancellation
   - Press active speed limit LIM button.
   - Press the CANCEL button to cancel the speed limit state and active speed limit indicator on the meter displays.

- When KD is canceled, low voltage is too low (ub < 7 V), engine speed exceeds specified range (600 - 6240), active speed limit is canceled, active speed limit indicator on the meter blinks.

3. Active speed limit KD cancellation
   - In the active speed limit state, when driver fully depresses the accelerator pedal for overtaking or others, speed limit state is canceled temporarily. Active speed limit indicator on the meter blinks.
   - When actual vehicle speed is higher than the limited speed set previously after KD, speed limit state or overtaking state is not entered. Vehicle speed can be increased or decreased regardless of accelerator depressing level. Active speed limit indicator on the meter blinks. When actual speed is lower than the limited speed set previously, speed limit state is entered again and active speed limit on the meter displays ON.
4. Active speed limit overtaking state
   - During the active speed limit, if target limit speed is lower than actual vehicle speed through short press or long press, vehicle enters over speed state and active speed limit indicator on the meter blinks and buzzer sounds for 3 times until the actual speed is lower than new limit speed again. Vehicle enters speed limit state again and active speed limit on the meter displays ON.
5. Active speed limit short/long press to accelerate
   - In the active speed limit state, short press RES/+ button once (over 0.02 seconds) to increase target limit speed by 1 km/h. Active speed limit on the meter displays ON.
   - In active speed limit state, long press RES/+ button (over 0.4 seconds) to increase target limit speed from current speed to 5 times of current speed and then increases by unit of 5 km/h. Active speed limit on the meter displays ON.
6. Active speed limit short/long press to decelerate
   - In the active speed limit state, short press SET- button once (over 0.02 seconds) to decrease target limit speed by 1 km/h. Active speed limit on the meter displays ON.
   - In the active speed limit state, long press SET- button (over 0.4 seconds) to decrease target limit speed from current speed to 5 times of current speed and then decreases by unit of 5 km/h. Active speed limit on the meter displays ON.
7. Inspection with cruise exiting active speed limit function
   - In the active speed limit process, if cruise main switch is pressed, active speed limit is canceled, active speed limit indicator turns off, cruise indicator on the meter flashes, pre-cruise state is entered.

Adaptive Cruise

Adaptive Cruise Control System (ACC) can keep vehicle driving at the speed set by the driver. When it detects a preceding vehicle and its speed is lower than the speed set by own vehicle, the system will keep the vehicle to drive with the set safety distance to preceding vehicle. The stop-and-go adaptive cruise control system can also follow the preceding vehicle to decelerate until vehicle stops. It can also start vehicle and follow the preceding vehicle automatically, or start driving according to driver’s command.

⚠ Caution

Do not use adaptive cruise control in the following situations. Otherwise, it may result in a loss of vehicle control and cause an accident, resulting in serious injury or even death.

- In traffic congestion areas.
- On roads with sharp bends.
- On winding roads.
- On wet and slippery roads, such as those covered with rain, ice or snow.
- On steep hills. Vehicle speed may be higher (or lower) than the set speed. It will cause that engine speed rises sharply and briefly to increase the vehicle speed to the set speed range.

Function Description
Adaptive Cruise System (ACC), Automatic Emergency Braking System (AEB) and Front Collision Warning System (FCW) share a radar and camera sensor.

⚠ Caution

- ACC system can not violate the laws full screwdriver with a flat physics and there are some limitations, driver must always control the vehicle and take full responsibility for the vehicle.
- ACC system can not respond to stationary objects and vehicles, crossing vehicles, oncoming vehicles, pedestrians, bicycles, and animals.
- ACC system can only realize limited braking, if the vehicle ahead applies emergency braking suddenly, another vehicle cuts in front of the vehicle quickly, ACC system may not be able to respond or respond too slowly, in this case, driver should take over control of the vehicle in time.
- The driver must adjust the appropriate distance between the vehicle and the vehicle ahead according to traffic and weather conditions, and is responsible for the safe vehicle stopping. In severe weather such as rain, snow, fog, etc., ACC system may not be able to recognize vehicle ahead. In this case, ACC system should be turned off.
- ACC system is suitable for highways and roads in good condition, and is not recommended for urban roads, narrow roads, mountain roads, hills, tunnels, etc. If ACC system is used on curve, it may cause the loss of vehicle ahead target or delay of target selection due to the limitation of sensor detection range. In these cases, ACC system will control the vehicle to accelerate to set speed.
- If the vehicle is too close to a vehicle in adjacent lane, ACC system may select the vehicle as a front tracking target to respond.
- When following the vehicle ahead to stop, ACC system may not recognize the end of vehicle but the lower or upper part of vehicle (for example, rear axle of truck with a higher chassis, upper part of a lower flat trailer). In these cases, system will not be able to guarantee a proper stopping distance or even lead to collision. Therefore, the driver must be alert and take over control of vehicle at any time during this process
- When ACC system controls the vehicle to stop for a short time, driver must ensure that there are no obstacles or other traffic participants, such as pedestrians, bicycles, animals, etc. in front of the vehicle.
- When the ACC system controls the vehicle, do not inadvertently step on accelerator pedal, otherwise, ACC system will not apply brake to vehicle, driver should be ready to brake actively at any time to ensure safety.
- Two sensors, radar and camera, are mounted on the front area of vehicle and behind the windshield. It should be noted that the field of vision of sensor should not be blocked by pollutants, and there should be no modification or license plate decoration frame in the front or surrounding areas, especially when the snow completely covers the sensor, the ACC system function will exit. The sensor may also be affected by vibration or collision, resulting in system performance degradation or no function. In this case, recalibrate the sensor.
- When ACC system function fails, yellow warning light on instrument cluster turns on, the ACC will not function at this time and need to be repaired.
- All the above precautions do not cover all the situations that may affect normal operation of system function. The system function may not bring expected effect due to other reasons. Driver must always take responsibility for the vehicle control.

1. Turning on adaptive cruise
    - Start the engine and press ACC ON/OFF button on steering wheel, then ACC system is ON and enters stand-by status. Gray icon on instrument cluster turns on. If a preceding vehicle is identified, gray icon on instrument cluster displays and it will not display without target.
2. System activation
    - When activation condition is met after ACC system is ON, press SET- button while driving to enable ACC function; With vehicle stopped and brake pedal depressed by driver, press SET- button and

release brake pedal within 3 seconds (slightly depress acceleration pedal after 3 seconds) to enable ACC function. ACC icon turns to green after activation and default vehicle speed is 30 km/h.

- When parking brake is applied, that is electronic parking brake system (EPB) or automatic parking (AVH) is in activated state, after SET- button is pressed to enable ACC system, there is a prompt “Please depress accelerator pedal to activate adaptive cruise system” on instrument cluster, driver will depress accelerator pedal lightly to activate adaptive cruise system according to the prompt.

3. Cruise speed setting
   - Increase set speed: After ACC function is enabled, press RES+ button to increase set speed. Shortly press it once to increase speed by 1 km/h and long press it once to increase speed by 5 km/h. The speed can be increased to 150 km/h. When set speed is over 80 km/h, long press it once to increase speed by 10 km/h.
   - Decrease set speed: After ACC function is enabled, for example, current set speed is more than 30 km/h, press SET- button to reduce set speed. Shortly press it once to decrease the speed by 1 km/h and long press it once to decrease the speed by 5 km/h. The speed can be decreased to 30 km/h. When set speed value is over 80 km/h, long press it once to reduce speed by 10 km/h.
   - There are no vehicles ahead in the same lane of this vehicle, or there are vehicles ahead in the same lane and driving speed is higher than set speed, the vehicle will drive at set speed.
   - There are vehicles ahead in the same lane and driving speed is not higher than set speed of the vehicle, ACC system will control the vehicle to follow the vehicles ahead.
   - When driving uphill, speed will be slightly lower than set speed, and when driving downhill, speed will be slightly higher than set speed.
4. Following distance adjustment
   - Press following distance adjustment button to adjust following distance, the distance is divided into three grades (“maximum distance”, “standard distance” and “minimum distance”). Grade is changed once when the button is pressed once. The instrument cluster synchronously shows the current grade. Following distance adjustment and memory function can be set on DVD head unit. Setting method is as follows: Enter “Vehicle Setting”→“Assist Driving Setting”, and set options of “Adaptive Cruise System”. When memory function is not set, system default following distance is “standard distance”.
   - Though following distance is in the same grade, distance between own vehicle and preceding vehicle changes according to vehicle speed of own vehicle. The distance increases with increase of speed.
   - If the following distance is “minimum distance”, the distance from vehicle ahead is very small when following the vehicle ahead at low speed. In view of safety considerations, the maximum distance should be selected when following on slippery road.
5. Function exiting

   During normal operation of ACC system, if one or more of the following situations occur, ACC system functions will exit, and ACC icon on instrument cluster will change from green to gray.
   - Depress brake pedal;
   - Pull up electronic parking button;
   - Change shift lever to position other than forward position;
   - Press the pause button;
   - Turn off the electronic stability system;
   - Electronic stability system is activated;
   - Anti-lock brake system is activated;
   - Hill descent system is on;
   - Driver door is open;
   - Driver seat belt is unfastened;
   - Acceleration pedal is depressed for more 15 minutes by driver;

- Automatic emergency braking system is activated.

6. Function restore
   - After the above conditions that cause function to exit are restored, press RES+ button, ACC system function is activated again and restore the state before exiting.
7. Exceeding set speed
   - During normal operation of ACC system, driver can depress acceleration pedal to override ACC control. After acceleration pedal is released, ACC returns to previous control state. During exceeding set speed, if the distance from vehicle ahead is too small, the instrument cluster will pop up “Ask the driver to take over vehicle”, accompanied by rapid alarm sound to remind driver to take a avoidance measures.
8. Curve speed control
   - When the vehicle controlled by ACC system is driving into a curve , driving speed will be decreased appropriately to assist the driver to safely pass through the curve.
   - This function can assist driving only in certain level. Driver should operate vehicle at all time and decreases vehicle speed while vehicle is driving into a curve.
   - When driving into a curve, due to the limitation of radar sensor in detecting the target, the system may not be possible to detect the vehicle ahead of the same driving track in time, in this case, the driver should be ready to take over control of the vehicle at any time.
9. Stop-and-go function

   During driving following the vehicle ahead with stop-and-go ACC system, if the vehicle ahead decreases speed to stop, the vehicle also decreases speed to stop, after stopping:
   - Vehicle ahead starts to drive away within 3 seconds and the vehicle starts automatically to follow vehicle ahead.
   - If the vehicle ahead stops for more than 3 seconds, and starts to drive away within 3 seconds to 10 minutes, driver needs to depress acceleration pedal lightly to activate ACC system.
   - During 10 minutes of parking, when driver unfastens seat belt or opens driver door, Electrical Parking Brake (EPB) system will activate automatically for parking.
   - If parking for more than 10 minutes, ACC system exits and Electrical Parking Brake (EPB) system will activate automatically for parking.
   - Electronic stability system continues to brake during decreasing speed following the vehicle ahead, motor rotation can generate operating sound, this is normal.
   - When driving following the vehicle ahead, always pay attention to whether ACC icon is in green filled state. If it is in non-filled state, it means that the target ahead of ACC system has been lost, and the vehicle will accelerate according to set speed.
10. Power adaption mode
    - Power system has ECO and SPORT modes. ACC system will match different control strategies according to the power mode selected by the driver. In the ECO mode, ACC system has a soft acceleration, and it has a fast acceleration in the SPORT mode.
11. Turning off adaptive cruise system
    - With ACC system ON, ACC system is turned off when pressing ACC ON/OFF button on steering wheel or active speed limit switch to turn on active speed limit function.

Front Collision Warning System

For Front Collision Warning System (FCW), when FCW system detects that there is a dangerous situation ahead, it will firstly trigger pre-alarm function. If driver does not brake or steer to avoid, the dangerous situation will continue to deteriorate, and FCW system will trigger emergency alarm function. In some sudden situations (such as fast cut in or strong braking of vehicle ahead), both alarms may be triggered at the same time.

⚠ Caution

- Pre-collision system will not sound an alarm when the vehicle speed is lower than 30 km/h. For static target ahead, the system will not sound an alarm when the vehicle speed is higher than 85 km/h.
- FCW and AEB share a same sensor, and detectable target is the same as AEB system. See the description of AEB system below for details.
- When FCW sounds an alarm continuously, if the driver actively depresses brake pedal, it should be depressed with a large force to trigger emergency brake assist function, achieving the best braking effect.
- System does not work if seat belt is not fastened and doors are not closed.
- System does not work if electronic stability system and FCW are not in ON.
- If yellow alarm symbol on instrument cluster comes on, please go to the Chery service station for inspection and repair.

Usage Description

1. Alarm type
   - FCW is ON by default when the vehicle is powered on, if user does not turn off this function and the speed is higher than 30 km/h, when system judges that there is potential collision risk, pre-alarm function will be triggered, an alarm symbol and warning text “Front Collision Warning System ON” pop up on instrument cluster accompanied by rapid alarm sound to remind driver to take avoidance measures.
   - If collision risk continues to deteriorate and upgrade, the emergency alarm function will be activated, and a alarm symbol and warning text “Front Collision Warning System ON” also pop up on instrument cluster. At the same time, the system will adopt short brake to remind driver to take avoidance measures.
   - When vehicle speed exceeds 65 km/h and is close to the vehicle ahead for a long time, a safety distance alarm message “Attention, vehicle/pedestrian approaches” pops up on instrument cluster to remind driver to adjust following distance properly.
2. System off
   - FCW system and safe distance alarm can be turned on or off through DVD head unit, After setting FCW system, it will still return to ON state at next ignition. After setting safe distance alarm, the previous setting options will be memorized.
3. Sensitivity setting
   - Alarm trigger time can be set on the DVD unit head. When the next ignition is performed after completing setting, system will memorize the last setting options and the setting options are divided into three distance levels: "Long", "Standard" and “Short". Distance level represents the different distance between the vehicle and the potential collision target when alarm function is triggered. If the setting is "Long", the alarm will be triggered earlier.

Automatic Emergency Braking System (AEB)

For Automatic Emergency Braking System (AEB), after FCW alarm function is activated (there is no FCW alarm when speed is lower than 30 km/h), if driver does not take measures, collision risk will continue to deteriorate, and system will start AEB automatically when the conditions are met, trying to avoid possible collision or reduce the speed during collision and reduce the loss caused by collision.

Usage Description

AEB is ON by default when the vehicle is powered on. It can be turned off on DVD head unit as necessary, but it will still be ON by default at the next ignition. Setting method are as follows: Enter "Vehicle Setting" → "Assist Driving Setting" to set options of "Automatic Emergency Braking System".

⚠ Caution

- System does not work if seat belt is not fastened and doors are not closed.
- System does not work if electronic stability system and AEB are not in ON.
- After vehicle is automatically braked to stop, vehicle will not remain stationary and driver needs to take over the vehicle.
- During the activation of AEB, if driver turns steering wheel quickly or depresses accelerator pedal firmly, AEB function will exit.
- AEB activation speed is higher than 4 km/h, the collision can not be avoided completely if the speed is higher than 40 km/h.
- For stationary vehicle, operating speed range of AEB is 4 km/h to 53 km/h. For pedestrians and cyclists, operating speed range of AEB is 4 km/h to 64 km/h.
- If yellow alarm symbol on instrument cluster turns on, system will not work, please go to the Chery service station for inspection and repair.

Detection Target

- Vehicle target: Targets can be detected by the system include passenger vehicles, buses and trucks. There are certain limitations in the detection of some restructured vehicles, such as cement tankers, special vehicles with higher or lower chassis, etc.
- Bicycle target: Only when the system detects the contours information of body and bicycle, as well as movements of normal ride, it can play its best role. System does not regard an oncoming cyclist as a target.
- Pedestrian target: Only when the system detects that people's head, arm and leg swings conform to the characteristics of normal walking, it can play its best role. Pedestrians crossing the lane of the vehicle will be regarded as targets. Pedestrians walking vertically in this lane, walking in curves and blocked by other objects may not be regarded as targets by the system.

⚠ Caution

- System can not violate the laws of physics and there are some limitations, driver must always control the vehicle and take full responsibility for the vehicle.
- Driver should control speed and the distance between the vehicle ahead and the vehicle according to weather, road surface and traffic conditions.
- System does not respond to animals or crossing vehicles, as well as oncoming vehicles, bicycles or pedestrians.
- Under some special circumstances, the system may perform unnecessary warning and braking, such as crossing the railroad track, entering the turning of the underground parking lot, etc. Some conditions will affect and weaken sensor detection, such as tunnel, the light of oncoming vehicle, the reflection of wet road surface, etc, affecting related functions of system.
- System performance will be greatly limited to the target that quickly cuts into the lane, the target that is detected after the vehicle changes the lane, and the target in the curve.
- All passengers on the vehicle must fasten their seat belts and secure the loaded objects to avoid danger when AEB system is triggered.
- Two sensors, radar and camera, are mounted on the front area of vehicle and behind the windshield. It should be noted that the field of vision of sensor should not be blocked by pollutants, and there should be no modification or license plate decoration frame in the front or surrounding areas, especially when the snow completely covers the sensor, the system function will exit. The sensor may also be affected by vibration or collision, resulting in system performance degradation or no function. In this case, recalibrate the sensor.
- When system function fails, yellow warning light on instrument cluster turns on, the system will not function at this time and need to be repaired.
- When installing non-full size spare tire, it is recommended to turn off FCW and AEB systems and replace original full size tire in time.
- All the above precautions do not cover all the situations that may affect normal operation of system function. The system function may not bring expected effect due to other reasons. Driver must always take responsibility for vehicle control.

Lane Departure Warning System (LDW)

Lane Departure Warning System (LDW) can help drivers reduce traffic accidents caused by lane departure and improve driving safety by providing alarm. This model adopts independent LDW. The system consists of a multi-function front camera and hyperscreen. On the instrument cluster, it warns (-sound and image) for unconscious (turn signal light is not on) deviation from the lane. When lane departure warning system is ON, camera will detect lane marking all the time and obtain the position parameters of the vehicle in the current lane through image processing. When it detects vehicle deviates from the lane, sensor will collect data and operation condition of driver, and then controller sends alarm message to remind immediately. If driver turns on turn signal light (active lane departure) and drive the vehicle to another lane, lane departure system will not make any alarm.

- System allows instrument cluster to send alarm signal (acoustic, visual), including two alarm methods.
- Support white solid line, continuous long white line, yellow solid line and continuous long yellow line lane detection. When one side of the lane line is missing or undetectable, a substituted virtual line and warning line on the virtual line side will be marked automatically (default width between two lanes is 3.75 m).

Function ON

1. Lane departure warning system will be turned on when following conditions are met at the same time:
   - Camera initialization is completed.
   - Driver turns on LDW function by hard switch or software, or it was turned on in the previous ignition cycle.
   - LDW does not detect trouble code.

- LDW is turned on through vehicle configuration code.

⚠ Caution

- Drive the vehicle carefully, even though the vehicle is equipped with lane departure warning system.
- During the whole operation, you are responsible for controlling vehicle, monitoring management system, and intervening as necessary.
- If sensor is interfered, system will not function.
- Sensor may be misled by temporary construction markings line on the road, etc., resulting in false and incorrect alarms.
- In the cold or bad weather, system may not operate. Rain, snow, fog or intensive illumination can affect the sensor.
- If sensor can not trace road lines on the ground, system will not operate.
- The system may not operate in the road construction area.
- The system may not operate at sharp curve or narrow road.
- If suspension components of the vehicle are not approval by us, the system may not operate normally.
- Make sure the left and right cameras are free of foreign objects, such as bird dung, insect and ice etc.
- The system may not operate on the cement roads and other non-standard lanes.
- The system may not operate when there is only a single lane line or lane line is damaged.
- The system operates only when vehicle speed is more than 65 Km/h, and stops operating when vehicle speed decreases to 60 Km/m or less.

Function OFF

1. LDW will be deactivated if all of the following conditions are met.
   - Driver turns off LDW function by switch or soft switch, or function was turned off in the previous ignition cycle;
   - When LDW detects a permanent malfunction, driver needs to turn on the function again after malfunction is cleared.

   Hint:

   - Power voltage is more than 20.5 V.
   - Power voltage is lower than 4.5 V.
   - Camera permanent lighting failure (more than 45 minutes).
   - Temperature is high, outside sensor temperature is more than 100 ℃.

Threshold Speed and Switch

Threshold ON speed is 65 km/h, threshold OFF speed is 60 km/h.

1. Vehicle has physical switch configuration
   - LDW and LKA shares one hard switch which connects to instrument cluster and can be selected to operate detailed function; The signal is sent to central gateway through instrument cluster to indicate which function is selected by customer. System runs the previous option selected by customer in each ignition cycle. MPC2 memorizes customer option. IGN ON, after instrument cluster sends signal “LDWLKA_LaneAssitTypeReq=0X0”, and receives feedback signal “LDWLKA_LaneAssitTypefeedback” feedback value from MPC2, it synchronizes with MPC2.
2. Vehicle has no physical switch configuration
   - LDW switch is soft switch on audio unit. System runs the previous option selected by customer in each ignition cycle. MPC2 memorizes the option. IGN ON, after IHU sends signal “LDWonoffReq=0x2 default” and receives signal “LDWonoffsts” from MPC2, IHU synchronizes with MPC2. LDW function will be turned on by default next time.

Detection Requirement
Identification of Lane Line Types

No.	Road Type	Performance Requirements
1	Applicable road curvature radius	More than 250m (class II highway standard)
2	Effective lane width	(2.5 m, 5.2 m)
3	Effective lane marker line width	(8 cm, 60 cm)
4	Visible range of lane line	Influenced by environmental factors, the farthest visible range of lane line is 60-100 m
5	Lane line definition	Visible to the naked eye
6	Judging accuracy of distance between vehicle and lane line	The error is less than 4 cm
7	Lane line types	Double line, solid line, virtual solid line, dotted line
8	Lane line colors	White, yellow, orange, blue
9	Road geometry	Straight, curve
10	Road conditions	Asphalt, cement

Alarm Threshold

- Furtherest warning line position from vehicle lane: After departure, 0.3 m away from inner edge of lane.
- Unconditional warning ending position: After departure, 0.75 m from inner edge of lane.
- Lateral departure speed variable threshold is supported. Detailed logic is shown as follows:

Warning Line Position (m)	Low Sensitivity	High Sensitivity
/	Wheels are 0 m from inner edge of lane	Wheels are 0.1 m from inner edge of lane

Function Strategy

1. System performs self-inspection. MPC sends signal to instrument cluster. Instrument cluster turns LDW system icon to green. After 3 seconds, MPC sends LDW-LKA-status to meter according to speed value.
2. The sensitivity can be adjusted through audio head unit. High and low options are available, and default value is low.
3. When vehicle speed is more than 65 km/h, WLDW function operates. LDW starts to alarm if lane departure is detected and the turn signal switch on the appropriate side is not operated.
4. When vehicle speed is more than 65 m/h, LDW function operates. LDW will not alarm under following conditions if there is no other restraint conditions.
   - When vehicle passes curve and drives over the marking line at speed of more than 65 km/h, system will virtually move lane edge to inner side of lane by 10 cm as warning line, in order to avoid alarms that disturb the driver.
   - In the case of lane merging, the own lane narrows down gradually. If no departure occurs and vehicle drives over the marking line, LDW will not alarm.
   - If lane is too narrow (less than 2.5 m), system will virtually expand the left and right lane lines by 10cm as the warning lines to delay the alarm.

- If there is only one marking line on the road, LDW only alarms for the side where lane marking line exists.

Lane Keeping Assist System

Lane keeping assist system is a assist system which can be used to assist driver, however, it can not replace the driver in driving. When selecting the lane keeping assist system, the driver has to always concentrate all his attention and hold the steering wheel. Get ready to correct the steering wheel or take over the vehicle at any time, otherwise it may cause an accident and personal injury. The lane keeping assist system is not able to recognize the lane line all the time. Sometimes it may mistake poor quality road surfaces, certain road structures or objects for the lane line. In this situation, be sure to turn off the lane assist system immediately. The lane keeping assist system detects lane line through front camera. When the lane lines on the left and right sides are identified by the system, the system applies corrective steering intervention to make the vehicle always drive in the middle of the lane. Driver can correct steering wheel at any time. When function is ON, it intervenes when the speed is higher than 60 km/h and exits when the speed is lower than 55 km/h.

1. Though the lane keeping assist system is turned on, but the function will exit or cannot be activated under the following conditions:
   - System recognizes that the driver has not operated the steering wheel for a period of time;
   - The driver controls the steering wheel when system applies corrective steering control;
   - When camera can not detect lane marking line target due to coverage or weather;
   - When the lane line is too thin, broken, blurred;
   - When driving on a curve with a small turning radius;
   - Road is too narrow;
   - Driving on a road without lane marking line;
   - The vehicle has just entered the road with road lanes;
   - Vehicle is changing lanes;
   - The vehicle swings too fast in lateral direction;
   - Vehicle speed is lower than 55 km/h or higher than 180 km/h;
   - Driver turns on the turn signal light;
   - Driver turns on the hazard warning light;
   - Driver rapidly depresses accelerator pedal or deeply depresses brake pedal.
2. It is recommended to turn off the lane keeping assist system in the following situations:
   - Drive the car in sport mode;
   - Under bad whether, such as rain, snow, heavy fog;
   - At night or surrounding light is dark;
   - When driving on road with bad conditions;
   - When driving on paved road;
   - When driving on road with multiple curves.

⚠ Caution

- When lane is added or merged, driver needs to take active control.
- When driving in complex traffic environment (such as road crossing, traffic congestion), driver needs to take active control.
- When driving on a sharp curve, driver needs to take active control.

Speed Limit Marking Recognition Function

Speed limit marking recognition function detects speed limit traffic mark on the road and displays the detected speed limit value on the instrument cluster. The displayed sign will disappear after driving for a certain distance or time. If a new sign is detected when it displays, the speed limit value displayed on the

instrument cluster will be updated. If current speed is more than displayed value, instrument cluster will zoom in the icon or make a sound alarm.

Function ON and OFF
TSR function can be turned on and off in the instrument setting menu. After function is turned on, user can select options between visual warning and visual warning + audio warning. Vehicle will record setting value in the previous ignition cycle.

System State Instrument Cluster Display
When the setting is image display only, if the speed limit sign is detected, the instrument cluster will display correspondingly. The displayed speed limit sign will disappear after driving for a period of time or distance. If there is a new speed limit sign, the display will be updated. When the vehicle speed is greater than the detected vehicle speed by 5 km/h, instrument cluster will zoom in the icon to alert the driver that vehicle is over speed. When the setting is imagine display + audio alert, if the speed limit sign is detected, the instrument cluster will display correspondingly. The displayed speed limit sign will disappear after driving for a period of time or distance. If there is a new speed limit sign, the display will be updated. When the vehicle speed is greater than the detected vehicle speed by 5 km/h, instrument cluster zoom in the icon to alert the driver that vehicle is over speed.

Traffic Jam Assist (TJA) and Integrated Cruise Assist (ICA)

1. System introduction

   - For traffic jam assist system and integrated cruise assist system (TJA and ICA), TJA and ICA can reduce workload of drivers and provide driving assist function in monotonous driving environment or traffic jam. The function mainly relies on multi-function camera on the front windshield to detect lane lines for both vertical and horizontal control of vehicle.
   - It is called TJA when speed range is below 60 km/h, and vehicle will be kept running near lane center. If no lane line is detected, the vehicle will follow the vehicle ahead as a target. If lane line and vehicle target are not detected, the function will be canceled.
   - It is called ICA when speed range is 60 km/h - 150 km/h, and vehicle will be kept running near lane center. If no lane line is detected, no matter whether there is a target vehicle ahead, the function will be canceled.

2. System activation

   Just like the method for activating ACC, when all ACC activation conditions are met, press "SET-" button to activate ACC function first. Meanwhile, camera determines if there is a lane line or a vehicle ahead as a target. When activation conditions are met, green operating indicator on instrument cluster turns on, and cruising speed and following distance will be adjusted as ACC system.

3. Function exiting

   During normal operation of TJA/ICA system, if one or more of the following situations occur, system functions will exit, and icon on instrument cluster will change from green to gray.

   - Any one of conditions for exiting ACC function;
   - Lanes are too wide or too narrow;
   - Curving radius of lane is too small;
   - Lane lines are not detected;
   - Driver actively turns steering wheel;
   - Steering wheel is out of hands;
   - Turn on turn signal light;
   - Turn on hazard warning light;
   - Vehicle speed is lower than 1 km/h.

⚠ Caution

Be sure to carefully read the following precautions when using TJA/ICA system:

- TJA/ICA is a driving assist system and can not violate the laws of physics, there are some limitations, driver must always control of the vehicle and take full responsibility for the vehicle.
- The vertical control of TJA/ICA system is carried out by ACC system, and horizontal control is carried out by Lane Keeping System (LKA). All precautions of ACC and LKA systems are also applicable to this system.
- This system does not provide automatic driving function and does not allow off-hand driving. Under such conditions as turning, crossing, merging and cutting in of vehicles ahead, driver should control the vehicle at all times to ensure the safety of vehicle.
- System performance is affected by weather, illumination and lane line clarity. For example, under the conditions of backlight, sunset, night, snow and ice on the road surface and unclear lane lines due to road wear, the performance will be significantly reduced or even lost.
- When system fails, yellow warning light on instrument cluster turns on, TJA/ICA will not function at this time and contact Chery service station for inspection and repair.
- All the above precautions do not cover all the situations that may affect normal operation of system function. The system function may not bring expected effect due to other reasons. Driver must always take responsibility for vehicle control.

Matching Learning

FCM and FRM Software Package Refresh

Description

This operation process can be used as a reference for manual matching of newly installed FCM and FRM modules and operation of replacement parts for after-sales service in Chery. After installing FCM and FRM modules with full state, the calibration program needs to be refreshed and can be used normally after ADAS station calibration or after-sales calibration.

⚠ Caution

FRM&FCM software can only be refreshed in ON position, and the refresh will report failure in start condition.

FCM and FRM After-sales Refresh Update and Model Corresponding Table

Part No.	Assembled Configuration Model	Refresh File (Drive)	Refresh File (-Calibration Parameters)
704000454AA (FCM) Main software: TBD	Exalted	S0000000059.CBF	TBD
704000453AA (FRM) Software: TBD	Luxury, exalted	/	TBD
			TBD

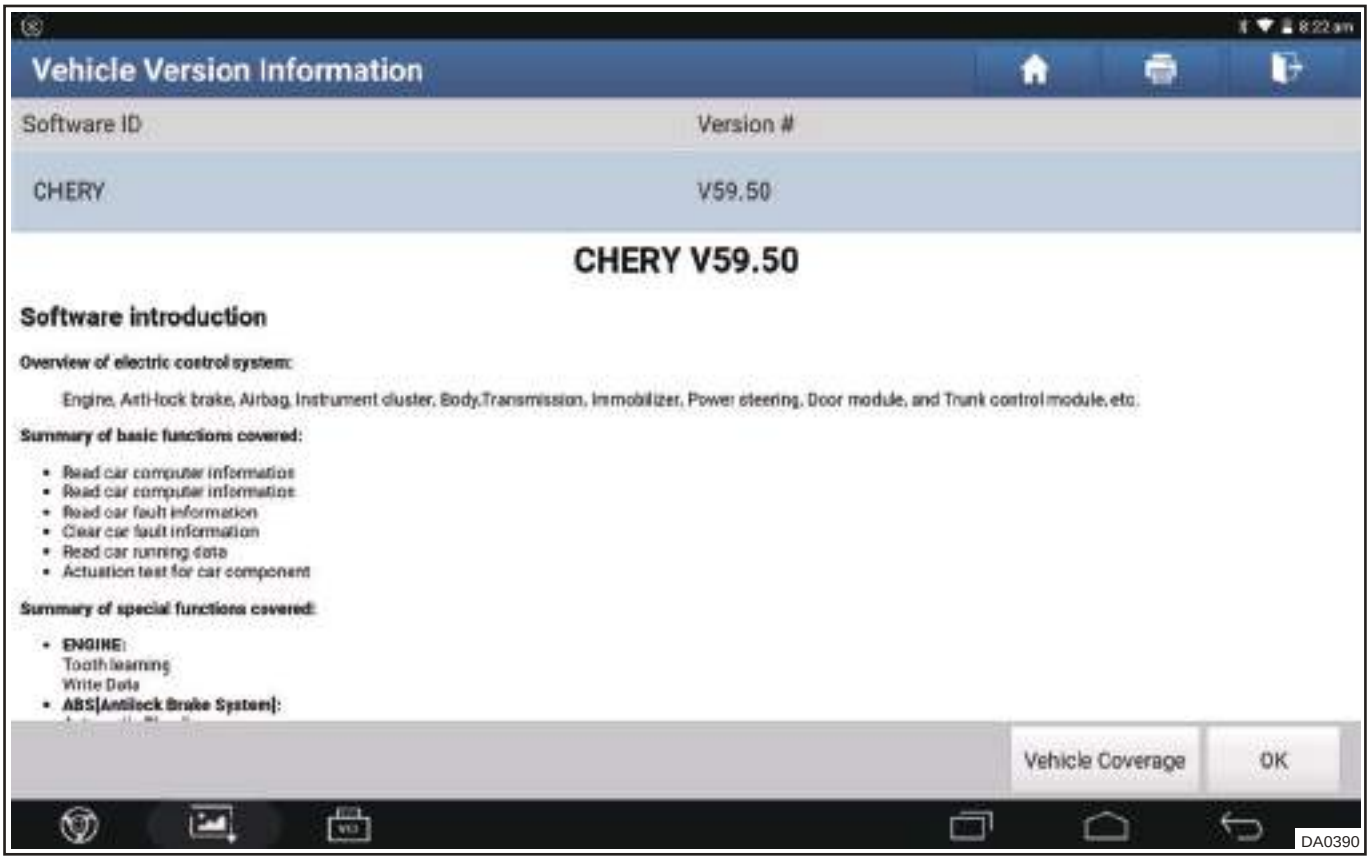
⚠ Caution

The version "VXX" of the refresh file is real-time, please refer to the refresh file provided after-sales.

FCM/FRM Calibration Program Refresh Operation Flow

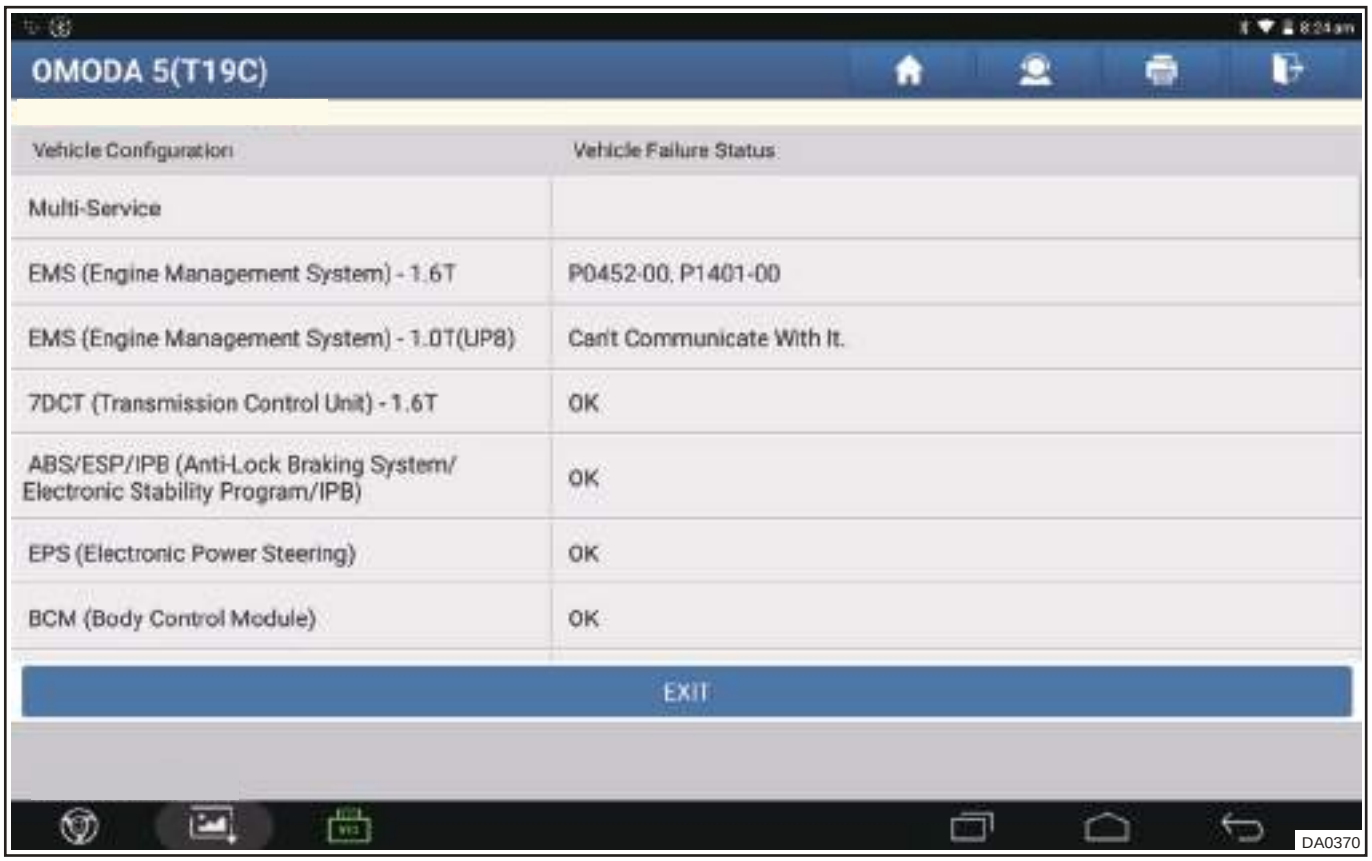
1. Turn on diagnostic tester operation interface, select “Chery Automobile Only”.
2. Select “Chery Only”.

3. Select diagnostic tester version and click OK.

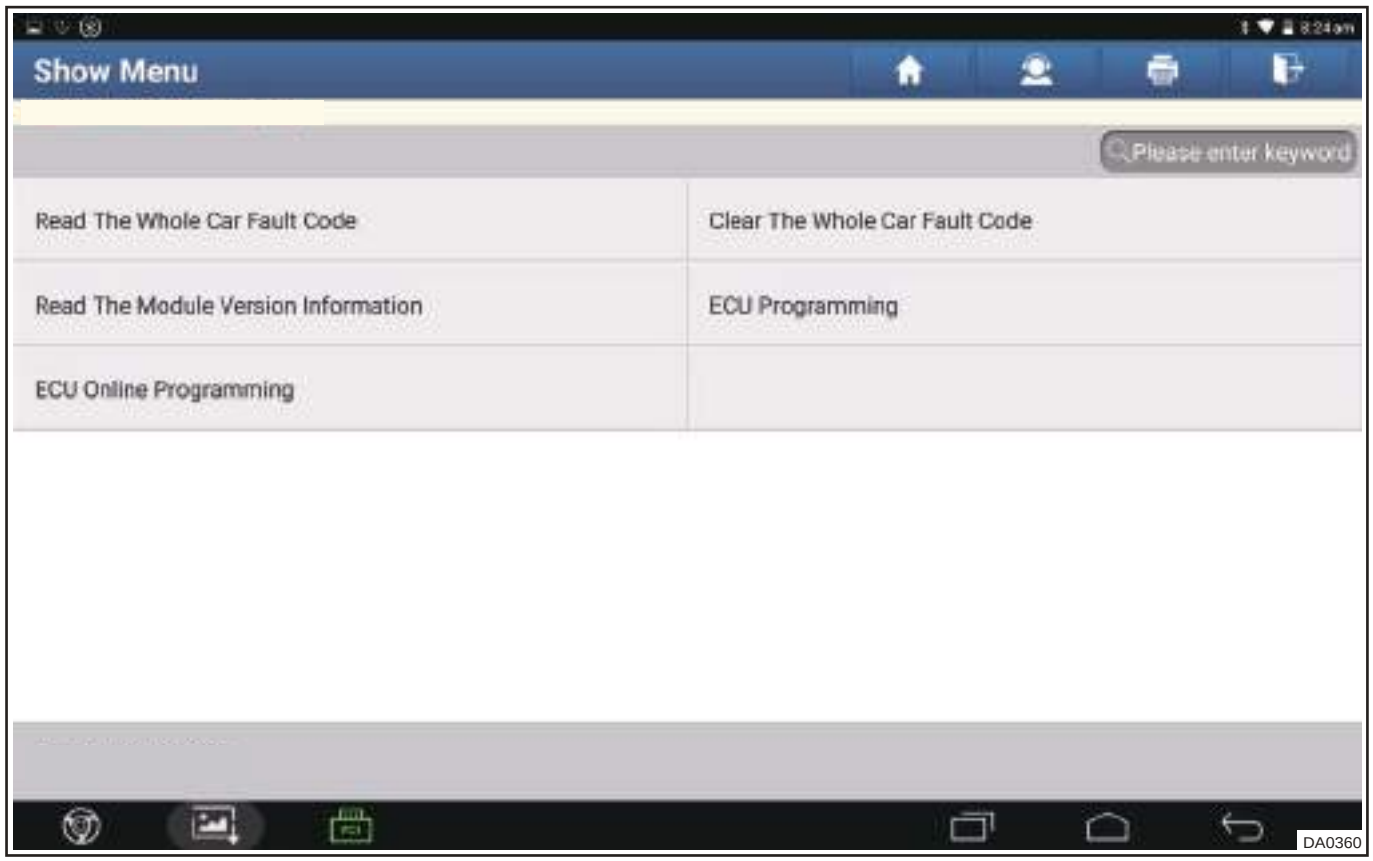


4. Select the model.

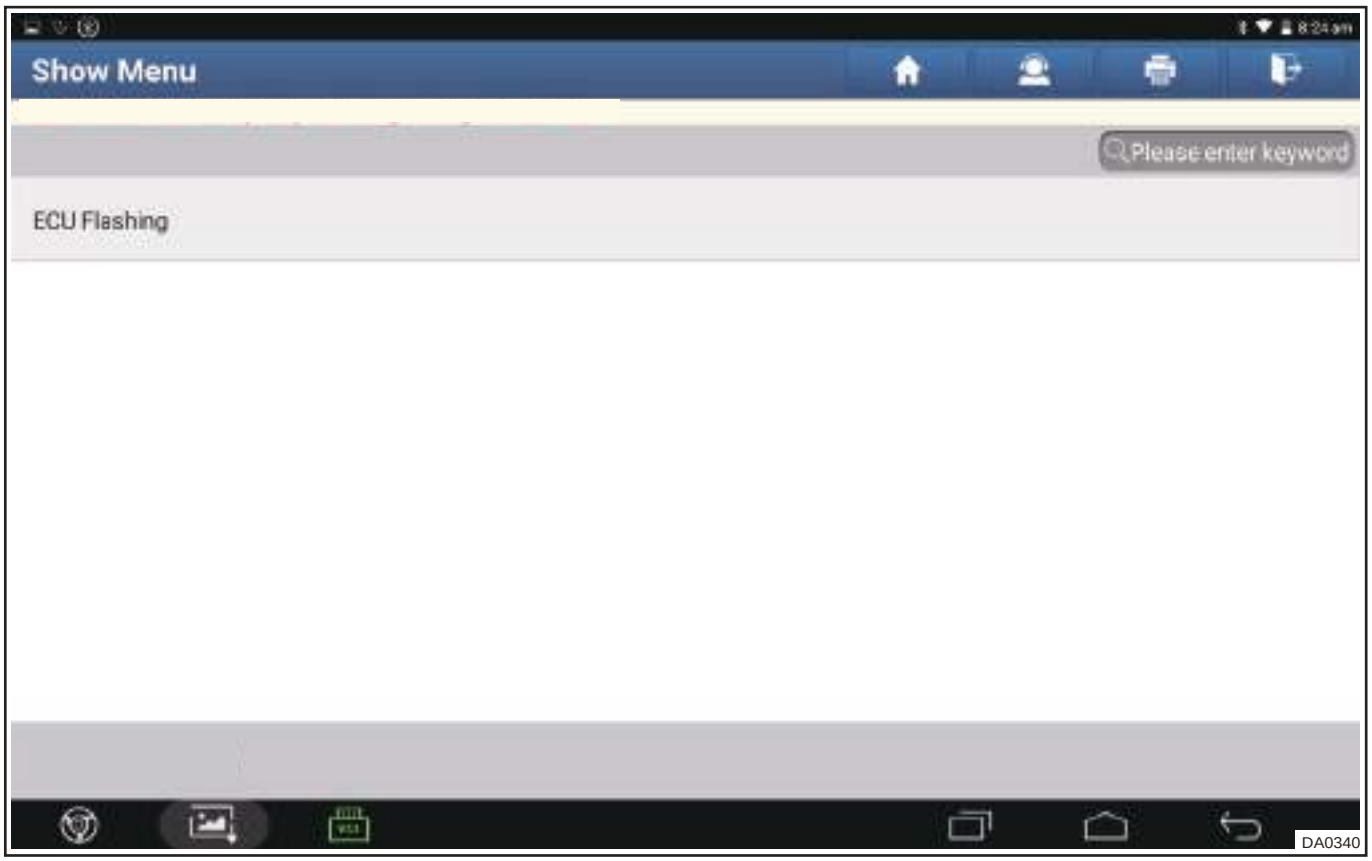
5. Wait for diagnostic tester to scan fault status of controller of whole vehicle. If the operation cannot be performed during scanning process, select "Multi-Service" after the scanning is completed.



6. Select “ECU Programming”.



7. Select “CBF Refresh, ECU Refresh, CBF General File Refresh” after entering.



8. Select “FCM/FRM Refresh File”.
   a. According to the model, select the corresponding software package, after-sales calibration only needs to refresh the calibration file, so it is necessary to delete the application file selection to reduce file first.

b. Click application refresh file and delete the application refresh file bar.

c. As shown in the picture after deleting, click “Return To File Select”.

d. Select Driver Refresh File → Driver Refresh Signature File → Calibration Refresh File → Calibration Refresh Signature File in order, which can be distinguished by software number, intermediate file attribute name and file suffix.

9. After selecting the file, click “Start Refresh”.
10. On the pop-up screen, part number and version information of new and old calibration files can be viewed. Select “Yes” after confirming that it is correct.
11. Enter the refresh process.

⚠ Caution

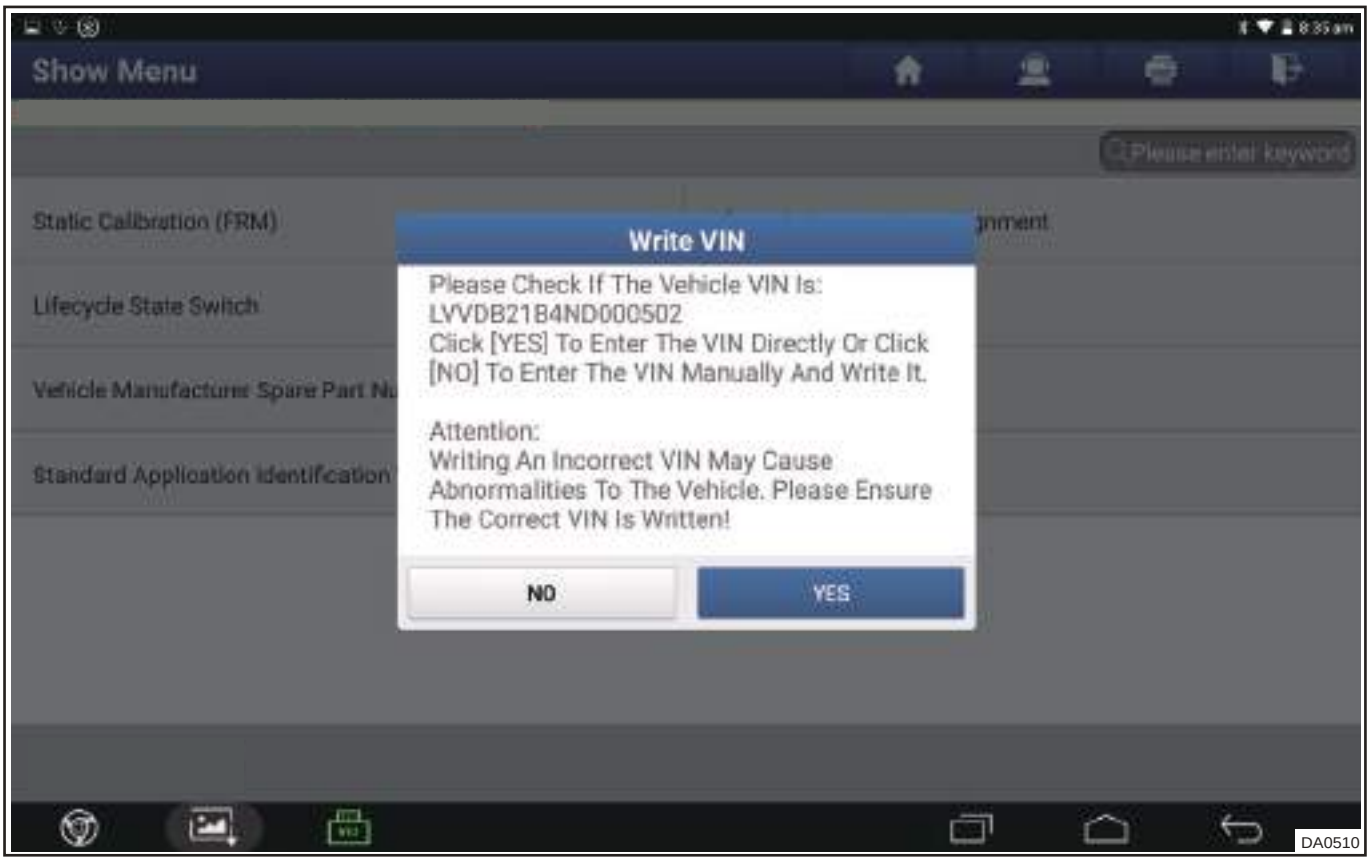
If FCM and FRM cannot work normally after refreshing, they must be calibrated at ADAS station of the production line (new off-line vehicles) or calibrated with after-sales calibration program (after-sales replacement parts). For details, refer to after-sales calibration methods of FCM and FRM below.

Microwave Radar

Write VIN Code

1. Connect diagnostic tester, enter the system, select model and click “Special Function”.
2. Click “VIN Data Write-In”

3. Compare VIN code displayed on screen with vehicle. If the code is same, click “YES”, otherwise click “NO” and input it manually.



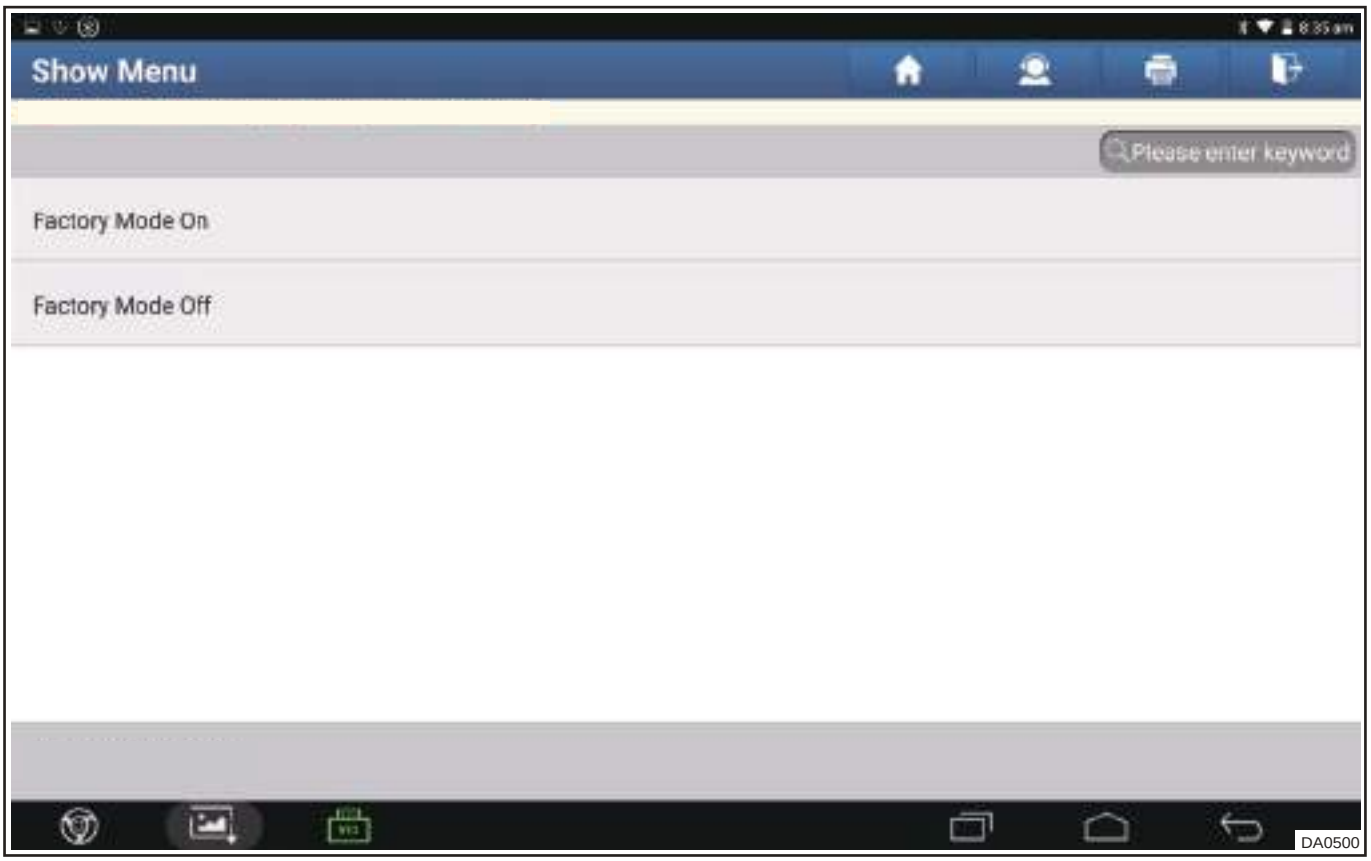
4. Input corresponding VIN code and click “OK”.

Factory Mode

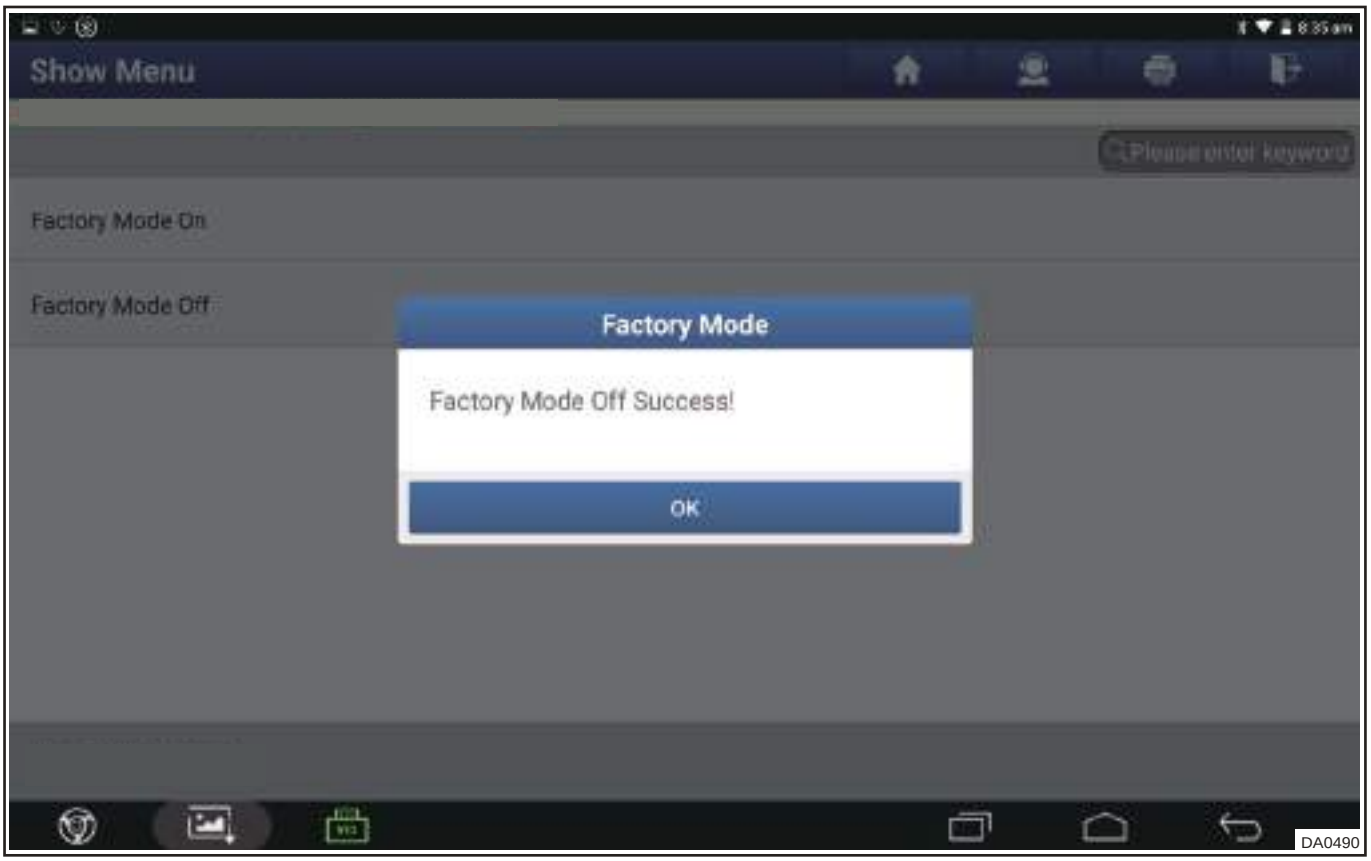
Hint:
Turn off factory mode before calibration

1. Connect diagnostic tester, enter the system, select model and click “Special Function”.
2. Click “Factory Mode”.

3. Click “Factory Mode Off”.


Show Menu
Please enter keyword
Factory Mode On
Factory Mode Off
DA0500

4. Click “OK”.


Show Menu
Please enter keyword
Factory Mode On
Factory Mode Off
Factory Mode
Factory Mode Off Success!
OK
DA0490

Front Radar Driving Calibration

1. Click “Front Radar Driving Calibration (For after sales only)”.

2. Enter calibration screen after confirmation.

3. The progress bar jumps to 100%. Radar calibration is completed.

⚠ Caution

- Driving conditions always do not meet requirements: Surrounding references, road conditions.
- Communication between diagnostic tester and body is interrupted during calibration.
- Installation deviation of radar is too large.

Front Camera

Matching Learning

Writing VIN code

1. Connect diagnostic tester, enter the system, select model and click “Special Function”.

2. Click “VIN Data Write-In”

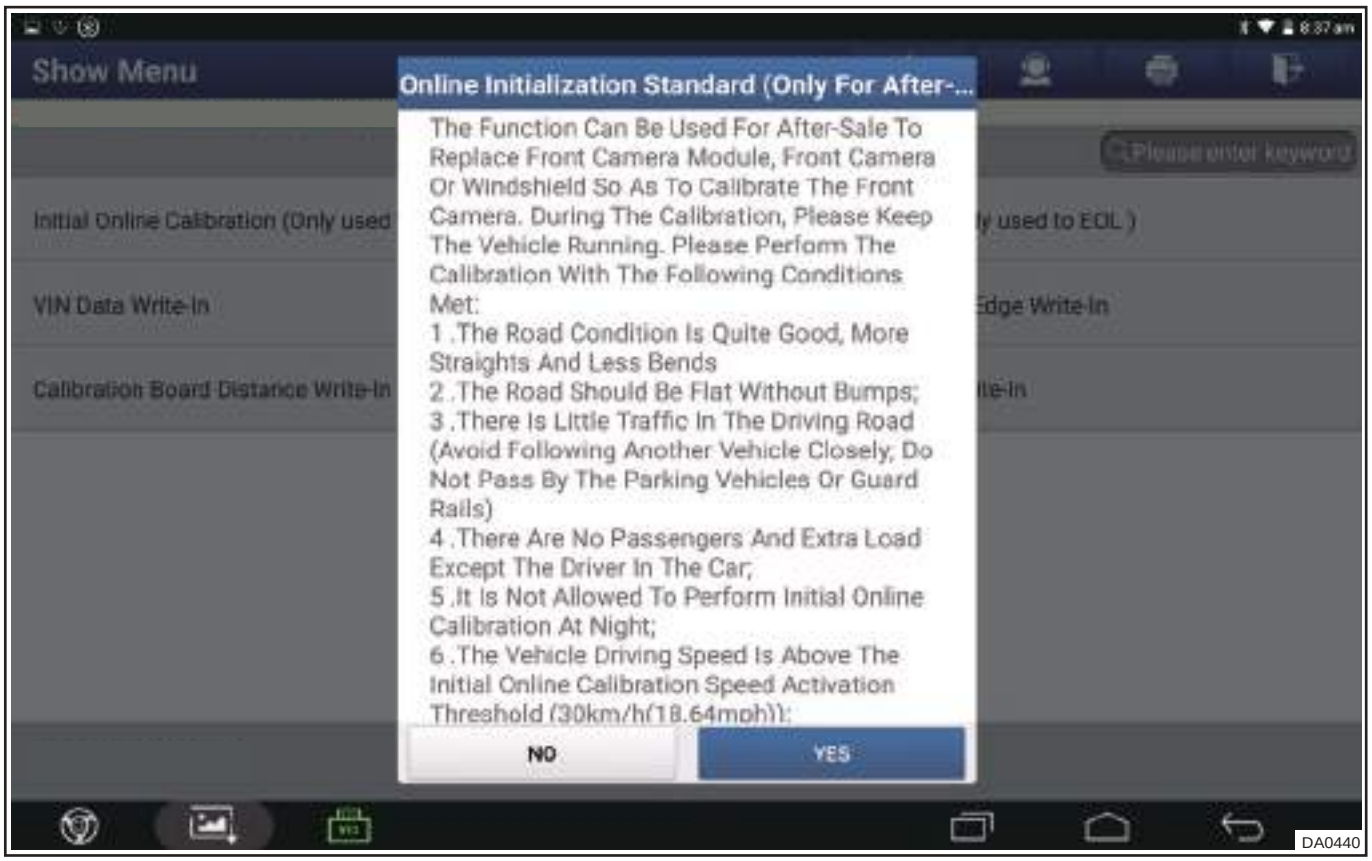
3. Compare VIN code displayed on screen with vehicle. If the code is same, click “YES”, otherwise click “NO” and input it manually.

4. Input corresponding VIN code and click “OK”.

Online Initialization Calibration

1. Click “Initial Online Calibration (Only used to after-sales)”.

2. Carefully read calibration precautions, confirm and click “YES”.



3. Pop up calibration progress screen.
4. During driving, the progress bar jumps and the time does not complete countdown. If the calibration is not completed after the end of countdown, it is regarded as calibration failure. Generally, the completion time is 1~2 minutes.
5. After calibration, the calibration completion screen pops up.

Diagnosis & Test

Problem Symptoms Table

⚠ Caution
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
LDW/LKA malfunction indicator ON	Fuse
	Wire harness fault
	Front camera module
CAN network fault	Fuse
	Wire harness fault
	Central gateway
	Front camera module

Symptom	Suspected Area
Vehicle speed can not be set (Meter indicator does not illuminate)	Wire harness or connector
	Instrument cluster
	Engine control module
Vehicle speed can not be set (Meter indicator comes on normally)	Constant speed cruise control switch
	Brake switch
	ESP and EPB
	Wire harness or connector
	Body control module
	Engine control module

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to LOCK.
2. Connect diagnostic tester (the latest software) to diagnostic interface.
3. Connect diagnostic tester (the latest software) to diagnostic interface.
4. Use the diagnostic tester to record and clear DTCs stored in the detection system.
5. Turn ENGINE START STOP switch to LOCK and wait for a few seconds.
6. Turn ENGINE START STOP switch to ON, and then select read DTC.
7. If DTC is detected, it indicates current malfunction. Go to inspection procedure - Step 1.
8. If no DTC is detected, malfunction indicated by the DTC is intermittent.

Diagnostic Help

1. Connect diagnostic tester X-431 PAD (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all CD system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.

- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Front Camera Module (FCM) (DTC Chart)

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
C1400-16	Voltage Too Low	/	Voltage is too low	Check battery, alternator or wire harness
C1400-17	Voltage Too High	/	Voltage is too high	
C1401-16	ECU Internal Low Voltage Fault	/	Internal circuit output voltage is low	(1) Turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: MPC can be reused. If DTC is still present/ active: (5) Replace MPC
C1401-17	ECU Internal High Voltage Fault	/	Internal circuit output voltage is high	(1) Turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: MPC can be reused. If DTC is still present/ active: (5) Replace MPC
C1402-97	MPC Camera Failure	/	MPC camera is faulty	(1) Turn off the ignition switch (2) Check front of camera for obstruction (3)

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
				Power on again and wait for 5 seconds (4) Clear DTC (5) Read DTC. If there is no DTC: MPC can be reused. If DTC is still present/ active: (6) Replace MPC
C1403-98	ECU Temperature Exceeds Maximum Value	/	ECU temperature exceeds the maximum value	(1) Turn off the ignition switch (2) Take appropriate heat dissipation measures (such as turning on air conditioning in vehicle) (3) Power on again and wait for 5 seconds (4) Clear DTC (5) Read DTC. If there is no DTC: MPC can be reused. If DTC is still present/active: (6) Replace MPC
C1404-98	ECU Temperature Exceeds Operating Value	/	ECU temperature exceeds operating value	(1) Turn off the ignition switch (2) Take appropriate heat dissipation measures (such as turning on air conditioning in vehicle) (3) Power on again and wait for 5 seconds (4) Clear DTC (5) Read DTC. If there is no DTC: MPC can be reused. If DTC is still present/active: (6) Replace MPC
C1405-49	ECU Internal Hardware Fault	/	ECU internal electrical malfunction	Replace MPC hardware
C1406-49	Internal Circuit Failure	/	ECU internal electrical malfunction	
C1406-55	Calibration Data Error	/	Calibration data is wrong	(1) Refresh the correct software and DATASET again (2) Power on

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
C1406-57	Mismatch between Calibration Data and Main Software	/		again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: MPC can be reused. If DTC is still active: (5) Replace MPC
C1407-48	ECU Software Fault	/	ECM software fault	(1) Turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: MPC can be reused. If DTC is still present/ active: (5) Replace MPC
C1407-57	Data Fusion Failure	/	Software component invalid/ incompatible	(1) Refresh the correct software and DATASET again (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: MPC can be reused. If DTC is still active: (5) Replace MPC
C1408-48	ECU Software Temporary Fault	/	ECU software is faulty temporarily	(1) Turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: MPC can be reused. If DTC is still present/ active: (5) Replace MPC
C1409-48	ECU Self-check Fault	/	ECU self-check fault	(1) Turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: MPC can be reused. If DTC is still present/

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
				active: (5) Replace MPC
C140A-54	MPC No Calibration Fault	/	MPC no calibration failure	(1) Recalibration (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: MPC can be reused. If DTC is still present/ active: (5) Replace MPC
C140B-4A	FCM Installation Deviation Out of Limit	/	Component installation error	Check installation of MPC and surrounding parts
C140B-57	MPC Online Calibration Out of Range	/	MPC online calibration out of range	(1) Recalibration (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: MPC can be reused. If DTC is still present/ active: (5) Replace MPC
C140D-57	MPC Calibration Input Parameter Fault	/	MPC calibration input parameter fault	(1) Recalibration (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: MPC can be reused. If DTC is still present/ active: (5) Replace MPC
C140E-57	MPC Calibration Execution Timeout Fault	/	MPC calibration execution timeout fault	(1) Recalibration (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: MPC can be reused. If DTC is still present/ active: (5) Replace MPC
C140F-00	RLCR System Fault	/	MPC calibration execution timeout fault	Check RLCR
C1410-00	RRCR System Fault	/		Check RRCR
C1411-00	ESP System Fault	/		Check ESP

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
C1412-00	EPB System Fault	/		Check EPB
C1413-00	EPS System Fault	/		Check EPS
C1414-00	ICM System Fault	/		Check ICM
C1415-00	TCU System Fault	/		Check TCU
C1416-00	YAS System Fault	/		Check YAS
C1417-87	Lost Communication with Front Radar	/		Check FRM
C1418-81	Front Radar Signal Invalid or Front Radar System Fault	/		Check FRM
U0073-88	Public CAN Network Bus Off	/	Refer to “CAN” network system	Check CAN bus or replace ECU
U0100-87	Lost Communication with EMS	/		
U0101-87	Lost Communication with TCU	/		
U0128-87	Lost Communication with EPB	/		
U0129-87	Lost Communication with ESP	/		
U0131-87	Lost Communication with EPS	/		
U0140-87	Lost Communication with BCM	/		
U0146-87	Lost Communication with CGW Node	/		
U0151-87	Lost Communication with YAS	/		
U0155-87	Lost Communication with ICM	/		
U0164-87	Lost Communication with CLM	/		

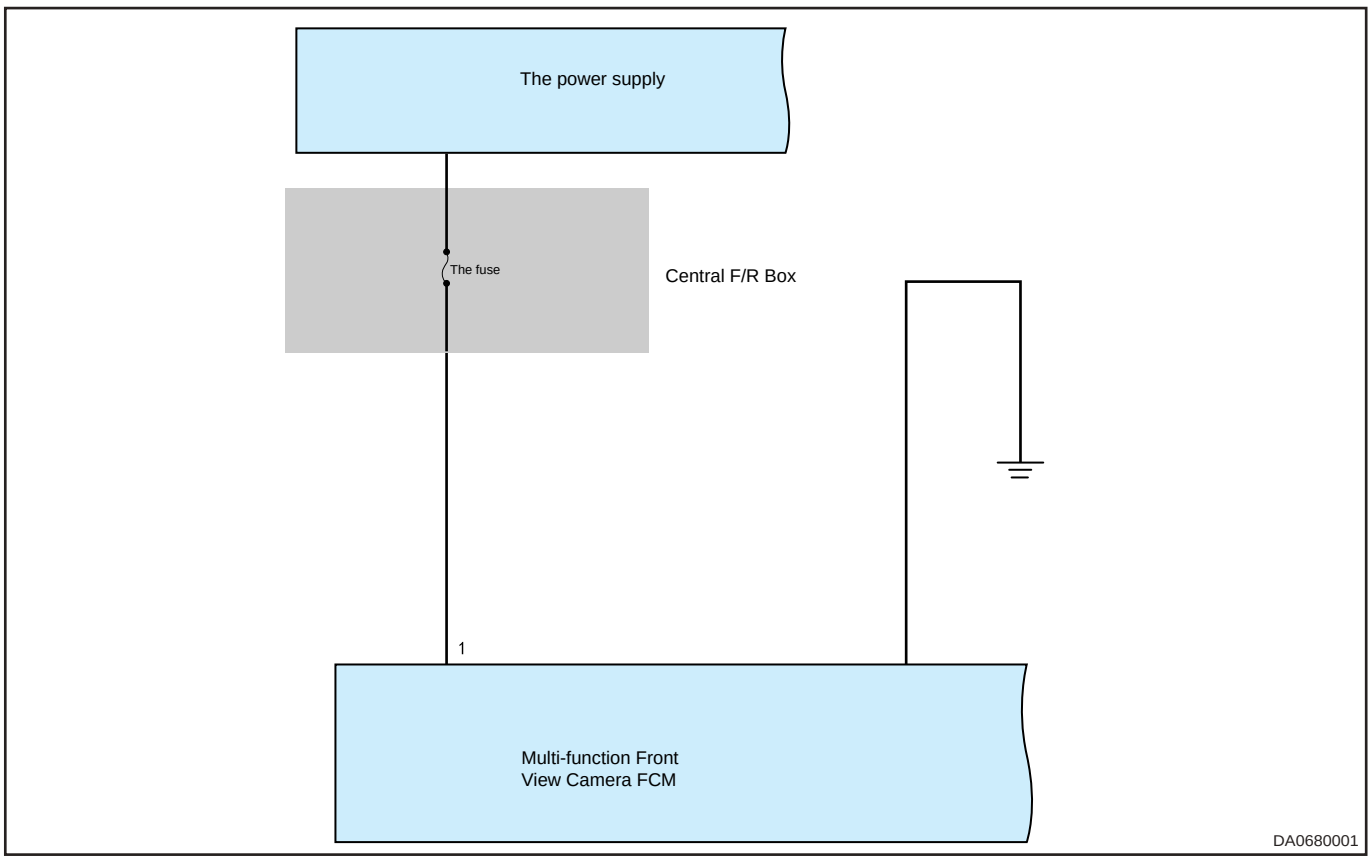
DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U0245-87	Lost Communication with TIHU	/		
U0401-81	EMS Signal Invalid	/		
U0402-81	TCU Signal Invalid	/		
U0418-81	ESP Signal Invalid	/		
U0420-81	EPS Signal Invalid	/		
U0422-81	BCM Signal Invalid	/		
U0423-81	ICM Signal Invalid	/		
U0424-81	CLM Signal Invalid	/		
U0447-81	DTC_INVALID_ DATA_CGW	/		
U0452-81	YAS Signal Invalid	/		
U0546-81	TIHU Signal Invalid	/		
U059B-81	MFS Signal Invalid	/		
U1161-87	Lost Communication with RLCR	/		
U1169-87	Lost Communication with RRCR	/		
U1189-87	Lost Communication with MFS Node	/		
U12A1-88	Private CAN Network Bus Off	/		
U1300-55	ECU Configuration Information Not Written	/		Check CAN configuration
U1435-81	RLCR Signal Invalid	/		Check CAN bus or replace ECU
U1436-81	RRCR Signal Invalid	/		

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U3000-51	Calibration Data Missing	/		(1) Refresh the correct software and DATASET again (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: MPC can be reused. If DTC is still active: (5) Replace MPC

DTC Diagnosis Procedure

DTC	C1400-16	Voltage Too Low
DTC	C1400-17	Voltage Too High

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.

- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

(a) Check if fuse in instrument panel fuse and relay box is blown.

NG → **Replace fuse.**

OK ↓

2	**Check output voltage of instrument panel fuse and relay box**

(a) Turn ENGINE START STOP switch to ON.

(b) Check the voltage between instrument panel fuse and relay box and ground. (When using digital multimeter)

Multimeter Connection	Condition	Normal Condition
Instrument panel fuse and relay box - Body ground	ON	9 - 14.5 V

NG → **Replace instrument panel fuse and relay box assembly**

OK ↓

3	**Check for open in wire harness**

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect front camera module connector and instrument panel fuse and relay box connector.

(d) Using ohm band of digital multimeter, measure if resistance of front camera module connector, instrument panel fuse and relay box connector to check wire harness for open.

Multimeter Connection	Condition	Normal Condition
Front camera module (1) - Instrument panel fuse and relay box (connected terminal)	ENGINE START STOP switch “OFF”	⩽ 1 Ω

NG	**Repair or replace related wire harness.**
OK	**Replace front camera module.**

Power Supply Voltage Fault

DTC	**C1401-16**	**ECU Internal Low Voltage Fault**
DTC	**C1401-17**	**ECU Internal High Voltage Fault**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTC occurs again.

NG	**Turn off vehicle power supply (- disconnect negative battery cable), then clear DTCs again.**

OK

2	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG	**Replace front camera module.**
OK	**Conduct test and confirm malfunction has been repaired.**

DTC	**C1402-97**	**MPC Camera Fault**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.
The following detection takes rear bumper antenna as an example.

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTCs and read front camera control system DTCs again.
(b) Check if DTCs occur again.

OK → **System is normal.**

NG

2	**Check front camera module**

(a) Check if front camera module is covered by foreign matters and clean dirt on the surface of front camera module.

NG → **Replace front camera module assembly.**

OK → **Turn off vehicle power supply (-disconnect the negative battery cable), then clear DTC again.**

DTC	**C1403-98**	**ECU Temperature Exceeds Maximum Value**
DTC	**C1404-98**	**ECU Temperature Exceeds Operating Value**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.
The following detection takes rear bumper antenna as an example.

1	**Take appropriate heat dissipation measures**

(a) Take appropriate heat dissipation measures (such as turning on air conditioning in vehicle).

OK → **System is normal.**

NG

2	**Check for DTCs**

(a) Using diagnostic tester, clear DTCs and read front camera control system DTCs again.

(b) Check if DTCs occur again.

NG → **Replace front camera module assembly.**

OK → **Turn off vehicle power supply (- disconnect the negative battery cable), then clear DTC again.**

DTC	**C1405-49**	**ECU Internal Hardware Fault**
DTC	**C1406-49**	**Internal Circuit Failure**

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTC and read DTC again.

(b) Check if DTC occurs again.

NG → **Turn off vehicle power supply (- disconnect negative battery cable), then clear DTCs again.**

OK

2	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace front camera module.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**C1406-55**	**Calibration Data Error**
DTC	**C1406-57**	**Mismatch between Calibration Data and Main Software**
DTC	**C1407-57**	**Data Fusion Failure**
DTC	**C140A-54**	**MPC No Calibration Fault**

DTC	**C140B-57**	**MPC Online Calibration Out of Range**
DTC	**C140C-57**	**MPC Initial Calibration Out of Range**
DTC	**C140D-57**	**MPC Calibration Input Parameter Fault**
DTC	**C140E-57**	**MPC Calibration Execution Timeout Fault**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Rewrite calibration data**

(a) Using diagnostic tester, rewrite the calibration data.

OK → **Perform running test after clearing DTCs.**

NG → **Replace front camera module, rewrite configuration data.**

DTC	**C140B-4A**	**FCM Installation Deviation Out of Limit**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Reinstall it**

OK → **System is normal.**

NG

2	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace front camera module.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**C140F-00**	**RLCR System Fault**
DTC	**C1410-00**	**RRCR System Fault**
DTC	**C1411-00**	**ESP System Fault**
DTC	**C1412-00**	**EPB System Fault**
DTC	**C1413-00**	**EPS System Fault**
DTC	**C1414-00**	**ICM System Fault**
DTC	**C1415-00**	**TCU System Fault**
DTC	**C1416-00**	**YAS System Fault**
DTC	**C1417-87**	**Lost Communication with Front Radar**
DTC	**C1418-81**	**Front Radar Signal Invalid or Front Radar System Fault**

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check each system**

NG → **Refer to each system for test.**

OK →

2	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace front camera module.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**U0073-88**	**Public CAN Network Bus Off**
DTC	**U0100-87**	**Lost Communication with EMS**
DTC	**U0101-87**	**Lost Communication with TCU**

DTC	U0128-87	Lost Communication with EPB
DTC	U0129-87	Lost Communication with ESP
DTC	U0131-87	Lost Communication with EPS
DTC	U0140-87	Lost Communication with BCM
DTC	U0146-87	Lost Communication with CGW Node
DTC	U0151-87	Lost Communication with YAS
DTC	U0155-87	Lost Communication with ICM
DTC	U0164-87	Lost Communication with CLM
DTC	U0245-87	Lost Communication with TIHU
DTC	U0401-81	EMS Signal Invalid
DTC	U0402-81	TCU Signal Invalid
DTC	U0418-81	ESP Signal Invalid
DTC	U0420-81	EPS Signal Invalid
DTC	U0422-81	BCM Signal Invalid
DTC	U0423-81	ICM Signal Invalid
DTC	U0424-81	CLM Signal Invalid
DTC	U0447-81	DTC_INVALID_DATA_CGW
DTC	U0452-81	YAS Signal Invalid
DTC	U0546-81	TIHU Signal Invalid
DTC	U059B-81	MFS Signal Invalid
DTC	U1161-87	Lost Communication with RLCR
DTC	U1169-87	Lost Communication with RRCR
DTC	U1189-87	Lost Communication with MFS Node
DTC	U12A1-88	Private CAN Network Bus Off
DTC	U1300-55	ECU Configuration Information Not Written
DTC	U1435-81	RLCR Signal Invalid
DTC	U1436-81	RRCR Signal Invalid
DTC	U3000-51	Calibration Data Missing

DTC Confirmation Procedure
Refer to CAN communication system.

Front Radar Module (FRM) DTC Chart

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
C1300-17	Voltage Too High	/	Battery, wire harness, radar module	Check battery voltage. Check charging system. Check ground circuit. Check ignition switch circuit. Check wire harness for obvious sign of damage. Replace radar sensor
C1300-16	Voltage Too Low	/		
C131B-00	Calibration File Not Written	/	Calibration file refresh is improper	Refresh proper calibration file
C131C-00	Calibration File Invalid	/		
C1304-53	Factory Mode On	/	Factory mode turns on	Check factory mode status and it is turned off by diagnostic service
C1302-78	No Calibration	/	Calibration is not performed	Calibration is performed
C1303-78	Calibration Failure	/	Calibration failure	Adjust radar and recalibrate
C131A-76	Radar Blocked	/	Radar is blocked	1. Power radar again 2. Check whether radar surface is covered with debris
C1305-78	Radar Horizontal Misalignment	/	Radar is misaligned horizontally	Recalibrate it
C1306-78	Radar Vertical Misalignment	/	Radar is misaligned vertically	Check bracket for proper installation. Check if sensor in bracket is proper. Check bracket for damage. Replace radar sensor only when there is visible damage. If the front of vehicle is damaged in an accident, replace bracket and sensor assembly. Run SDA for horizontal alignment

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
C1301-09	Driver Test Mode Failed	/	Module damaged	Replace hardware
C1307-52	Factory Data Error	/		
C1308-41	PFlash Checksum Error	/	Module damaged	(1) Power radar again or turn off the ignition switch (2) Check whether the radar is installed correctly (3) Power on again and wait for 5 seconds (4) Clear DTC (5) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/active: (6) Replace hardware
C1309-47	Power Supply Management System Fault	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C1305-04	UC Internal System Fault	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C130A-96	Hardware Fault	/		Replace hardware
C130B-17	PMIC Processor Over-voltage Fault	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
				is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C130C-17	MMIC Over-voltage Fault	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C130D-16	PMIC Processor Under-voltage Fault	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C130E-16	MMIC Under-voltage Fault	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C130F-05	Radar Adjustment Configuration Failed	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
				active: (5) Replace hardware
C1310-03	Radar Modulation Failed	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C1311-48	Software Error	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C1312-8F	Radar Front Area Data Processing Failed	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C1313-48	Software Temporary Fault	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
C1314-4B	UC Temperature Out of Normal Range	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C1315-98	MMIC Temperature Out of Normal Range	/	Temperature Too High	(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C1316-98	MMIC Temperature Out of Process Value	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C1317-96	ADC Self-check Fault	/	Module damaged	(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C1318-53	VMC Does not Work	/		(1) Power radar again or turn off the ignition switch (2) Power on again and

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
				wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
C1319-09	DA Core Value Higher Than Specifications	/		(1) Power radar again or turn off the ignition switch (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: Radar can be reused. If DTC is still present/ active: (5) Replace hardware
U0131-87	Lost Communication with EPS	/	Refer to “CAN” system	Check CAN bus or replace ECU
U0420-81	Invalid Data Received from EPS	/		
U1189-87	Lost Communication with MFS	/		
U059B-81	Invalid Data Received from MFS	/		
U0164-87	Lost Communication with CLM	/		
U0424-81	Invalid Data Received from CLM	/		
U0129-87	Lost Communication with ESP	/		
U0418-81	Invalid Data Received from ESP	/		
U0128-87	Lost Communication with EPB	/		
U0417-81	Invalid Data Received from EPB	/		

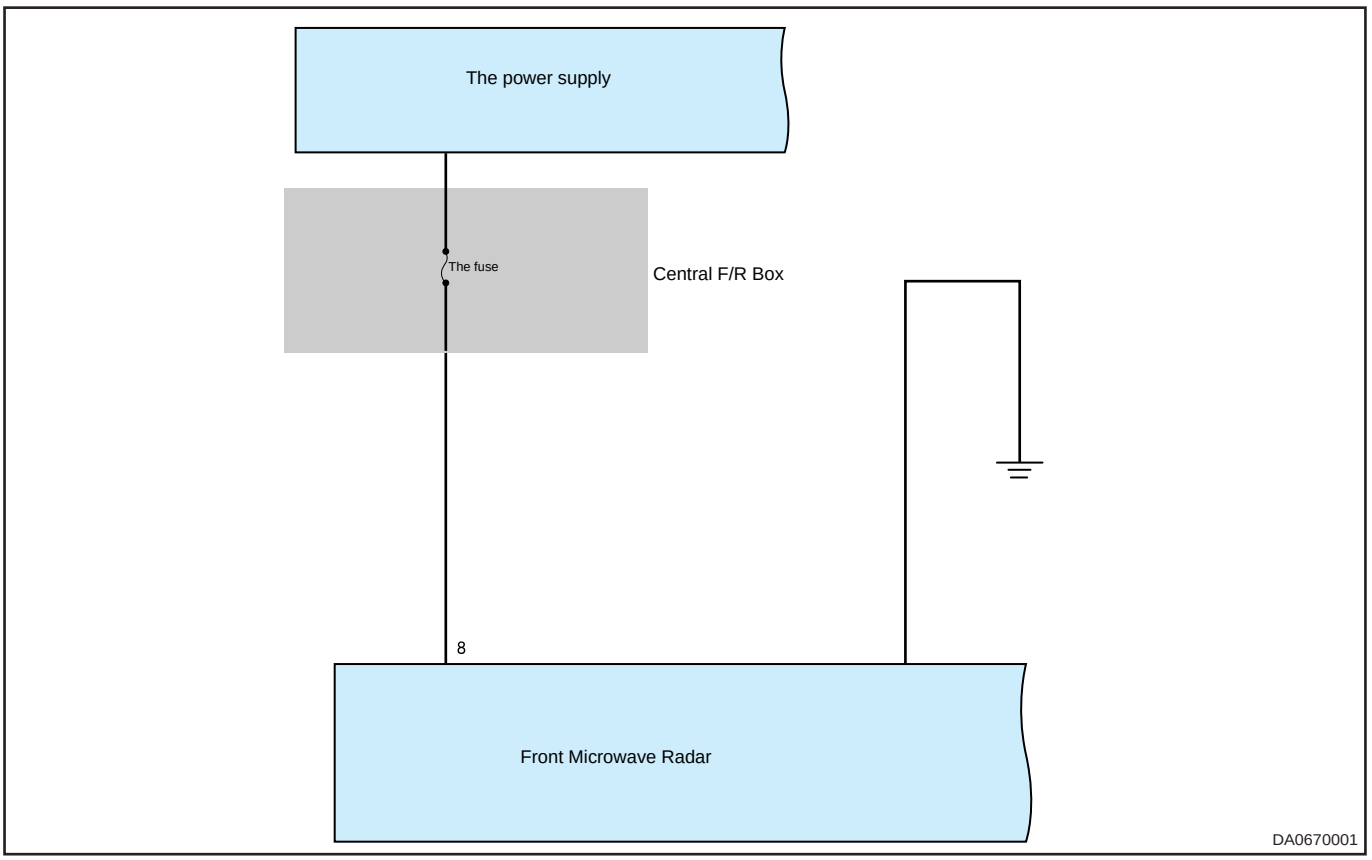
DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U0151-87	Lost Communication with YAS	/		
U0452-81	Invalid Data Received from YAS	/		
U0140-87	Lost Communication with BCM	/		
U0422-81	Invalid Data Received from BCM	/		
U0155-87	Lost Communication with ICM	/		
U0423-81	Invalid Data Received from ICM	/		
U0245-87	Lost Communication with IHU	/		
U0546-81	Invalid Data Received from IHU	/		
U0100-87	Lost Communication with EMS	/		
U0401-81	Invalid Data Received from EMS	/		
U0101-87	Lost Communication with TCU	/		
U0402-81	Invalid Data Received from TCU	/		
U1162-87	Lost Communication with FCM	/		
U1405-81	Invalid Data Received from FCM	/		
U0073-88	Lost Communication with Public CAN	/		
U0038-88	Lost Communication with Private CAN	/		

DTC Diagnosis Procedure

Power Supply Voltage Fault

DTC	**C1300-17**	**Voltage Too High**
DTC	**C1300-16**	**Voltage Too Low**
DTC	**C130B-17**	**PMIC Processor Over-voltage Fault**
DTC	**C130C-17**	**MMIC Over-voltage Fault**
DTC	**C130D-16**	**PMIC Processor Under-voltage Fault**
DTC	**C130E-16**	**MMIC Under-voltage Fault**

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Check battery voltage (not less than 12 V) with a digital multimeter.

NG → **Replace battery assembly.**

OK ↓

2	**Check fuse**

(a) Check if fuse is blown.

NG → **Replace fuse.**

OK ↓

3	**Check output voltage of instrument panel fuse and relay box**

(a) Turn ENGINE START STOP switch to ON.
(b) Check the voltage between instrument panel fuse and relay box and ground. (When using digital multimeter)

Multimeter Connection	Condition	Normal Condition
Instrument panel fuse and relay box - Body ground	ON	9 - 14.5 V

NG → **Replace instrument panel fuse and relay box assembly.**

OK ↓

4	**Check for open in wire harness**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect front radar module connector and instrument panel fuse and relay box connector.
(d) Using ohm band of digital multimeter, measure resistance of front radar module connector, instrument panel fuse and relay box connector to check wire harness for open.

Multimeter Connection	Condition	Normal Condition
Instrument panel fuse and relay box (connected terminal) - Front radar module (8)	ENGINE START STOP switch "OFF"	⩽ 1 Ω

NG → **Repair or replace related wire harness.**

OK → **Replace radar module.**

DTC	C131B-00	Calibration File Not Written
DTC	C131C-00	Calibration File Invalid

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check DTC

(a) Using diagnostic tester, clear DTCs and read front radar control system DTCs again.
(b) Check if DTCs occur again.

OK → **System is normal.**

NG

2	Rewrite calibration file

NG → **Replace radar module.**

OK → **Turn off vehicle power supply (- disconnect the negative battery cable), then clear DTC again.**

DTC	C1304-53	Factory Mode On

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.
The following detection takes rear bumper antenna as an example.

1	Check factory mode status and it is turned off by diagnostic service

DTC	C1302-78	No Calibration
DTC	C1303-78	Calibration Failure

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.
The following detection takes rear bumper antenna as an example.

1	Check for DTCs

(a) Using diagnostic tester, clear DTCs and read front radar control system DTCs again.
(b) Check if DTCs occur again.

OK → **System is normal.**

NG

2	Adjust radar and recalibrate

NG → **Replace radar module.**

OK → **Turn off vehicle power supply (-disconnect the negative battery cable), then clear DTC again.**

DTC	C131A-76	Radar Blocked

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTCs and read front radar control system DTCs again.
(b) Check if DTCs occur again.

OK → **System is normal.**

NG

2	**Check if front radar is covered by foreign matters and clean dirt on the surface of front radar**

NG → **Replace front radar module assembly.**

OK → **Turn off vehicle power supply (- disconnect the negative battery cable), then clear DTC again.**

DTC	**C1314-4B**	**UC Temperature Out of Normal Range**
DTC	**C1315-98**	**MMIC Temperature Out of Normal Range**
DTC	**C1316-98**	**MMIC Temperature Out of Process Value**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Clear DTC to relieve overheat protection**

DTC	**C1305-78**	**Radar Horizontal Misalignment**
DTC	**C1306-78**	**Radar Vertical Misalignment**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).

- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
Possible cause of malfunction: Front radar calibration is not performed or corresponding calibration conditions are not met.

1	**Refer to front radar calibration method and perform calibration again**

DTC	**C1301-09**	**Driver Test Mode Failed**
DTC	**C1307-52**	**Factory Data Error**
DTC	**C1308-41**	**PFlash Checksum Error**
DTC	**C1309-47**	**Power Supply Management System Fault**
DTC	**C1305-04**	**UC Internal System Fault**
DTC	**C130A-96**	**Hardware Fault**
DTC	**C130F-05**	**Radar Adjustment Configuration Failed**
DTC	**C1310-03**	**Radar Modulation Failed**
DTC	**C1311-48**	**Software Error**
DTC	**C1312-8F**	**Radar Front Area Data Processing Failed**
DTC	**C1313-48**	**Software Temporary Fault**
DTC	**C1317-96**	**ADC Self-check Fault**
DTC	**C1318-53**	**VMC Does not Work**
DTC	**C1319-09**	**DA Core Value Higher Than Specifications**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTC occurs again.

NG → **Turn off vehicle power supply (- disconnect negative battery cable), then clear DTCs again.**

OK

2	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace front radar module.**

OK → **Conduct test and confirm malfunction has been repaired.**

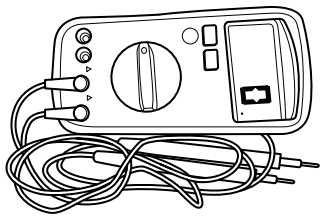
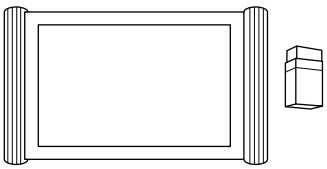
DTC	**U0131-87**	**Lost Communication with EPS**
DTC	**U0420-81**	**Invalid Data Received from EPS**
DTC	**U1189-87**	**Lost Communication with MFS**
DTC	**U059B-81**	**Invalid Data Received from MFS**
DTC	**U0164-87**	**Lost Communication with CLM**
DTC	**U0424-81**	**Invalid Data Received from CLM**
DTC	**U0129-87**	**Lost Communication with ESP**
DTC	**U0418-81**	**Invalid Data Received from ESP**
DTC	**U0128-87**	**Lost Communication with EPB**
DTC	**U0417-81**	**Invalid Data Received from EPB**
DTC	**U0151-87**	**Lost Communication with YAS**
DTC	**U0452-81**	**Invalid Data Received from YAS**
DTC	**U0140-87**	**Lost Communication with BCM**
DTC	**U0422-81**	**Invalid Data Received from BCM**
DTC	**U0155-87**	**Lost Communication with ICM**
DTC	**U0423-81**	**Invalid Data Received from ICM**
DTC	**U0245-87**	**Lost Communication with IHU**
DTC	**U0546-81**	**Invalid Data Received from IHU**
DTC	**U0100-87**	**Lost Communication with EMS**
DTC	**U0401-81**	**Invalid Data Received from EMS**
DTC	**U0101-87**	**Lost Communication with TCU**
DTC	**U0402-81**	**Invalid Data Received from TCU**
DTC	**U1162-87**	**Lost Communication with FCM**
DTC	**U1405-81**	**Invalid Data Received from FCM**
DTC	**U0073-88**	**Lost Communication with Public CAN**
DTC	**U0038-88**	**Lost Communication with Private CAN**

DTC Confirmation Procedure
Refer to CAN communication system.

On-vehicle Service

Tools

General Tools

Tool Name	Tool Drawing
Digital Multimeter	 RCH0002006
X-431 PAD Diagnostic Tester	 RCH0001006

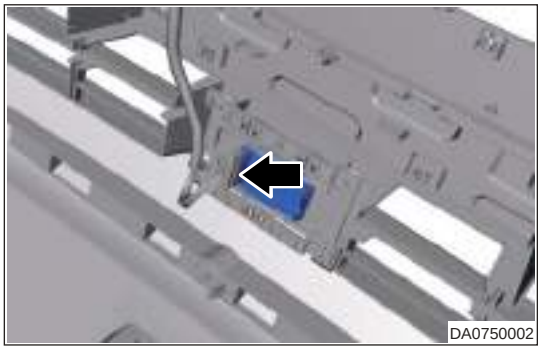
Microwave Radar Replacement

Removal

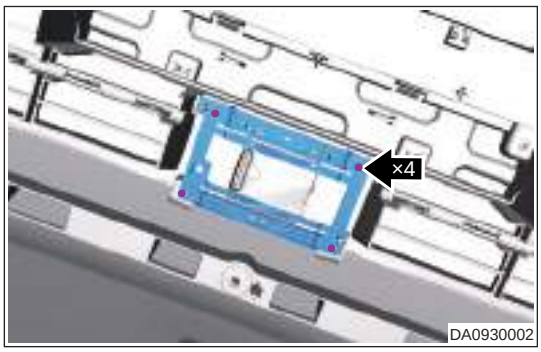
Caution
• Be sure to wear necessary safety equipment to prevent accidents, when removing front bumper assembly. • Appropriate force should be applied, when removing front bumper assembly. Be careful not to operate roughly. • Avoid breaking claws, when disassembling front bumper assembly. • Avoid damage when detaching fixing clip of microwave radar.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.

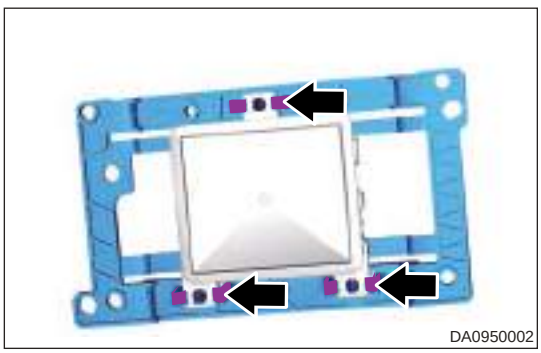
4. Disconnect the microwave radar connector.



5. Remove the fixing bolts.



6. Loosen 3 fixing clips.



7. Carefully remove the microwave radar.

Installation

Caution
• Try to prevent body paint surface from being scratched, when installing front bumper assembly. • Make sure that front bumper is installed correctly and fitting clearance between front bumper and body is appropriate, when installing front bumper assembly.

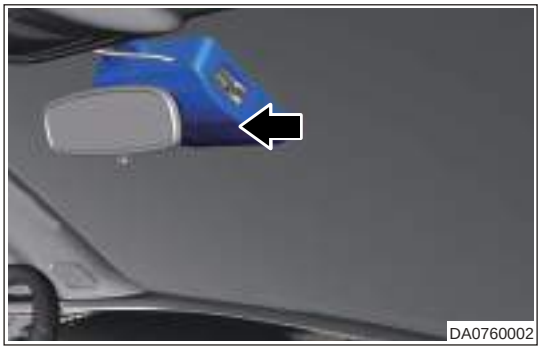
1. Installation is in the reverse order of removal.

Front Camera Replacement

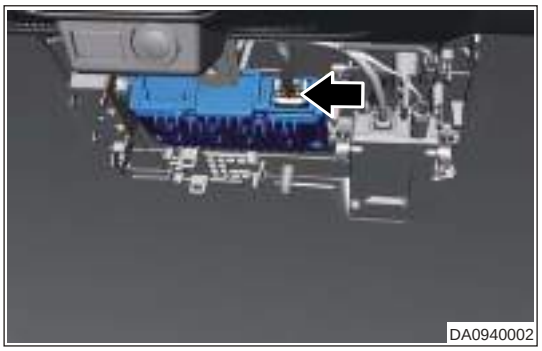
Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.

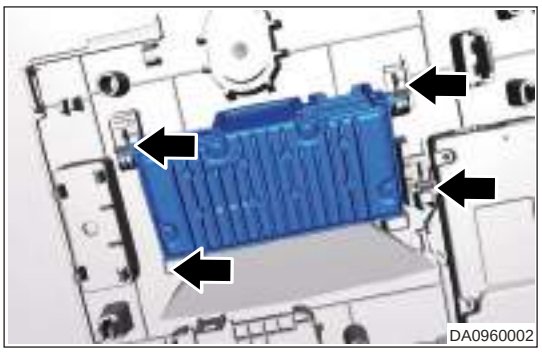
3. Remove left and right protective covers from inside rear view mirror.



4. Disconnect the front camera connector.



5. Remove 4 fixing clips and front camera.



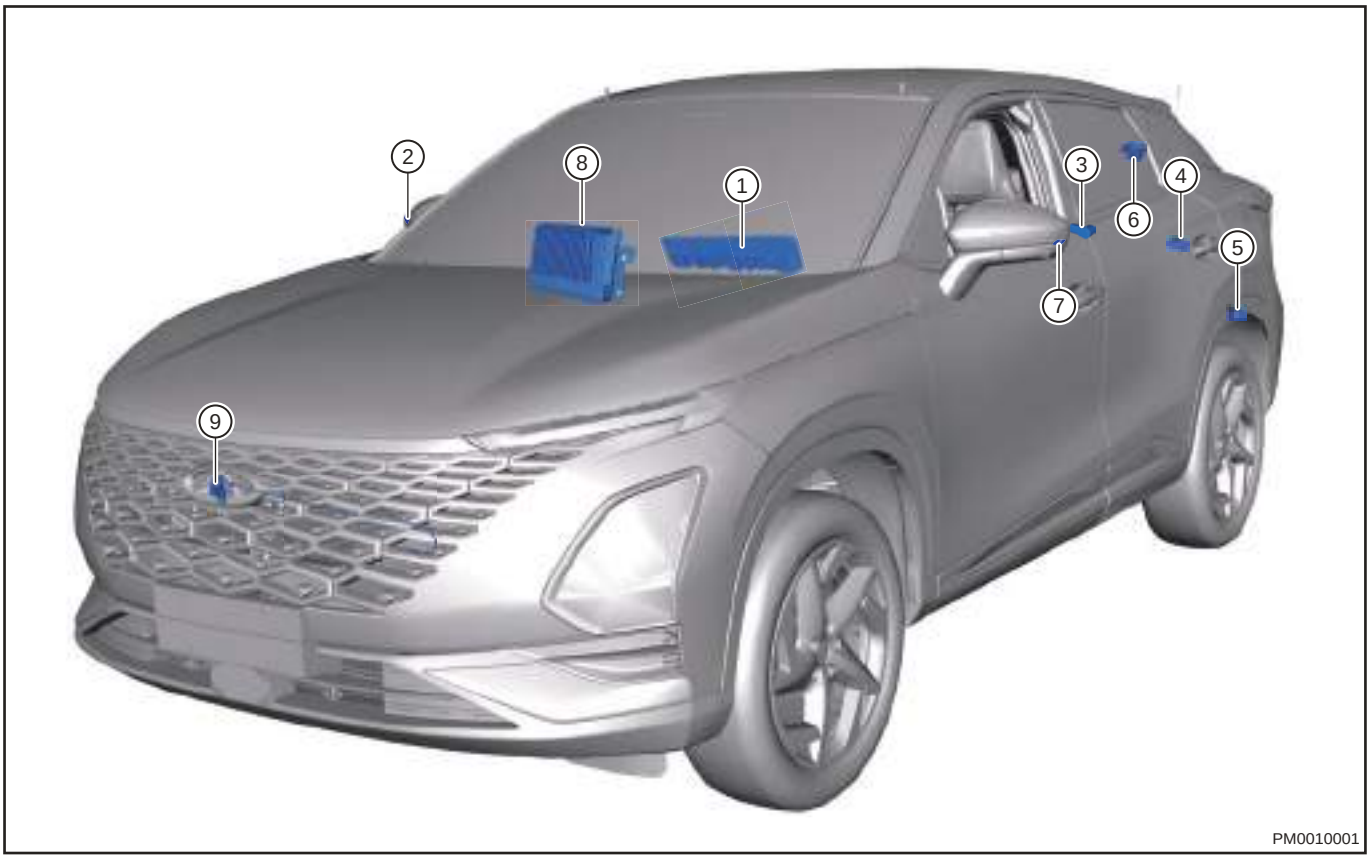
Installation

1. Installation is in the reverse order of removal.

PARKING RADAR SYSTEM

System Overview

Description



1	Hyperscreen	2	Right Camera Assembly
3	Rear Right Radar Sensor	4	Rear Center Radar Sensor
5	Rear Left Radar Sensor	6	Rear Camera Assembly
7	Left Camera Assembly	8	Domain Controller
9	Front Camera Assembly		

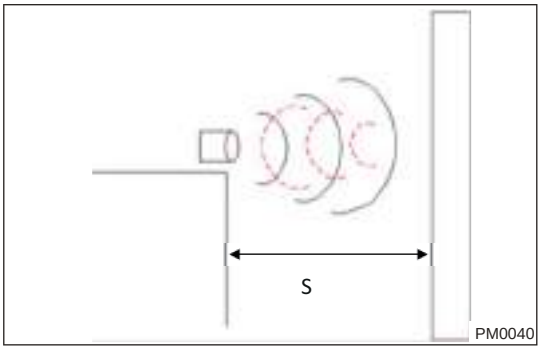
Reversing Radar System

System Schematic Diagram

Parking radar auxiliary system uses digital sensors and ultrasonic technology to measure distance, which can remind the driver of the distance between the rear of vehicle and other objects, and give sound prompts and image display to reduce personnel injury or vehicle damage caused by reversing.

Operating Principle

Parking radar system uses ultrasonic reflection principle to detect distance. After parking radar sensors send out ultrasonic and receive back wave from obstacle, control module calculates obstacle distance (S= t×340÷2) according to ultrasonic distance measuring principle, and sends data to display terminal to display and alarm.



System Composition

Reversing radar system consists of instrument cluster, 1 radar control module and 4 sensors (digital ultrasonic sensors) or 8 sensors. Sensors adopt separated structure. Sensor bodies are same, but installation angles are different. Parts related to system consist of ENGINE START STOP switch, reverse switch, instrument cluster or DVD, PAS switch and vehicle speed (8 sensors system). ENGINE START STOP switch provides operating power for system; Reverse switch provides operation activation signal for system; Instrument cluster or DVD is end terminal of the system and provides sound alarm prompt and distance display function for driver. The PAS switch and speed signal are only related with the 8 sensors system.

Reversing Radar Normal Alarm Display

When ENGINE START STOP switch is turned on, shift lever is moved to R and vehicle is reversing at a speed below 5 km/h, reversing radar is activated. The corresponding measured message will be displayed on multi-information display and alarms with buzzer in instrument cluster.The response way of reversing radar system is buzzer sounding. The table below shows the correspondence between buzzer response frequency and actual obstacle distance:

Alarm Type	1st Section	2nd Section	3rd Section	4th Section	5th Section
Displayed Area	Safe area	Pre-warning area	Amble area	Park area	Park area
Alarm Distance Range (cm)	＞ 150	95 - 150	65 - 90	40 - 60	⩽ 35
Buzzer Sound Frequency	No sound (OFF)	1Hz (ON 500 ms / OFF 500 ms)	2Hz (ON 250ms / OFF 250 ms)	4Hz (ON 125 ms / OFF 125 ms)	Continuous sound

⚠ Caution

- When ignition switch is ON and shift lever is in R, small vehicle screen is displayed on instrument cluster. If no obstacle information is detected (obstacle distance is more than 150 cm), only small vehicle is displayed on instrument cluster, while arc is not displayed.
- If multiple sensors have detected an obstacle, instrument cluster will display distances between each sensor and obstacle, sound alarm will be sound from nearest obstacle, and processed based on signal from radar.

Dynamic Track HD Visual Parking Assist System

Operation

Composition: Instrument cluster, navigation, camera, 4 rear radar sensors and radar module.Reversing view monitor system consists of radar sensor (sensor), camera, control module and display alarm device etc. After starting vehicle, reversing radar system functions when shifting to reverse gear. When the radars

detects an obstacle, multi-information display in instrument cluster will display distance information and buzzer sounds. Navigation system displays color image behind vehicle in real time and provides static or dynamic guidelines for driver reference. By this way, the system can help driver to eliminate blind areas and blurred vision, improving driving safety.

Reversing View Display

⚠ Caution
In the panoramic view monitor system, rear camera of high configuration model is connected to panoramic view monitor system controller, and rear camera of medium configuration model is connected to navigation system.

1. Description
   - High and medium configuration models are fitted with reversing camera. The camera captures the views behind the vehicle which will be presented to driver by navigation system. Also, navigation system provides static guidelines or dynamic guidelines that move as turning of steering wheel so as to estimate the vehicle’s reversing track lines.
2. Dynamic back guidelines and local view of rear area
   - After entering surrounding + rear view screen by shifting to reverse gear, static/dynamic back guidelines and local view of rear area will be displayed on rear view image.
3. Definition of static back guidelines
   - Red guidelines indicate about 0.5 m away from bumper;
   - Yellow guidelines indicate about 1 m away from bumper;
   - The closer green guidelines indicate about 2 m away from bumper;
   - The far green guidelines indicate about 3 m away from bumper.
4. Dynamic track lines
   - Dynamic track lines are used for prejudging the vehicle’s traveling trace, which varies as the wheel rotation.

360 Panoramic View Monitor System

Function

Composition: Panoramic view monitor system consists of four HD (100 W) cameras (front camera, rear camera, left camera and right camera), domain controller, AVM system switch, LVDS video transmission line and connecting wire harness. Domain controller and head unit are connected by shielded wire.
Function description: Panoramic view monitor system consists of a controller, four ultra wide angle cameras and LVDS video transmission lines, etc. It captures images from four directions (front, rear, left and right) and splices them into an aerial view around the vehicle using image processing algorithms, then displays it on the navigation display. Panoramic view monitor system provides surrounding view + single side view, three-dimensional surrounding view roaming, three-dimensional left/right side view, and dynamic/static reversing track. Side camera is integrated into the outside rear view mirror assembly. Panoramic control system module is located inside the glove box on front passenger side and shares a bracket with central gateway; front camera is located on the middle grille of front bumper and installed on the front bumper; rear camera is located under the back door and installed on the back door open switch assembly.

Function	Description
Single side and birds-eye view	Single side view of front, rear, left and right, and splicing view. Single side view can be switched
3D view and birds-eye view	Click on the birds-eye view to switch the corresponding 3D view, and the 3D view can be switched to any viewpoint by sliding

Function	Description
Wide-angle view	Combine the front view/rear view into a triplet wide-angle view through distortion correction
Panoramic startup animation	When AVM is starting, surround the vehicle all around
Turn signal light activating panoramic	When the turn signal light switch is turned on, the 3D view of rear left or rear right side of vehicle is displayed
Steering wheel steering angle activating panoramic	When steering wheel angle is higher than 180°, the 3D view of rear left or rear right side of vehicle is displayed
Enlarging view	Click on the enlarging view button to display the front/rear enlarged view. When the auto enlarge setting option is turned on, it will receive the ultrasonic radar information, and automatically switch to the front/rear enlarged view when it is less than 30 cm
Virtual door opening view	Receive door signal, engine hood signal and sliding roof signal, and display the corresponding view on the birds-eye view and 3D view when the four doors, engine hood, back door and sliding roof are opened
Vehicle guideline	Click on to select the opening and closing of the vehicle guideline
Visual radar	Ultrasonic radar transmits the distance information to the panoramic controller, and displays the distance or alarm prompt information on the panoramic screen
License plate number setting	Receive the license plate number sent by audio head unit and display it in 3D vehicle icon
3D view switch button	Click the button around the vehicle to switch the corresponding view of 3D view
Front wheel steering	Receive the steering wheel angle signal and accurately display the steering angle of front wheels in 3D view
Real-time wheel speed	Receive the wheel speed signal and accurately display the wheel speed in 3D view
Real-time turn signal light display	Real-time display of turn signal light information when switch the turn signal light switch
RCTA warning information	Integrate BSD radar information, and display warning information in the view when RCTA alarms
Obstacles activating panoramic	Activate the panoramic view monitor after receiving the parking radar information

System Activation and Exiting Mode

⚠ Caution

- Panoramic view monitor system has professionally calibrated before leaving factory. Any removal and installation behaviors without permission that cause changes in installation position and angle of camera may affect the function and effect of panoramic view monitor system.
- Panoramic view monitor system functions to provide driving assist, however, object in image does not indicate the actual size and distance from it. There is a slight delay and blind spot in image relative to the actual condition, so this function is not a substitute for driver’s operation and judgment. During on, off and use of the function, driver should pay attention to the surroundings to ensure safe driving.
- Never use panoramic view monitor when outside rear view mirrors are folded. Make sure to close back door securely when operating vehicle using panoramic view monitor.
- Distance from object seen from panoramic view monitor is different from the actual distance.
- Cameras are installed on front grille, outside rear view mirrors and above the rear license plate. Do not put anything on the camera.
- Do not spray water around the camera when washing vehicle with high pressure water. Otherwise, water drop may enter camera and condense on the lens, causing malfunction, fire or electric shock.
- Do not tap the cameras. They are precision instruments. Failure to do so may cause malfunction or damage, leading to fire or electric shock.

- Be careful not to scratch the lens when cleaning dirt or snow on the surface of camera.
- Use the displayed route and aerial view as reference. Displayed route and aerial view are greatly affected by numbers of passenger in vehicle, fuel amount, vehicle location, road surface condition and road surface grade.

<table>
<tr><th colspan="2">Activation Condition</th><th rowspan="2">System Activation</th><th colspan="2">Exit Condition</th></tr>
<tr><th>Preconditions</th><th>Trigger Condition</th><th>Corresponding Exit Condition</th><th>Priority Exit Condition</th></tr>
<tr><td rowspan="6">Vehicle speed < 20 km/h</td><td>Shift to R</td><td>R is activated</td><td>Exit R position, the duration is longer than 15 seconds, and there is no effective operation within the duration</td><td rowspan="6">Vehicle speed > 30 km/h</td></tr>
<tr><td rowspan="2">AVM switch is pressed</td><td rowspan="2">AVM switch is activated</td><td>Press AVM switch again</td></tr>
<tr><td>Operate other high priority switches</td></tr>
<tr><td rowspan="2">Turn on the turn signal light</td><td rowspan="2">Turn signal light is activated</td><td>Turn off the turn signal light and there is no effective operation within 500 ms</td></tr>
<tr><td>Operate other high priority switches</td></tr>
<tr><td>Steering wheel angle > 190°</td><td>Steering wheel angle is activated</td><td>Steering wheel angle is less than 180° and the duration is longer</td></tr>
</table>

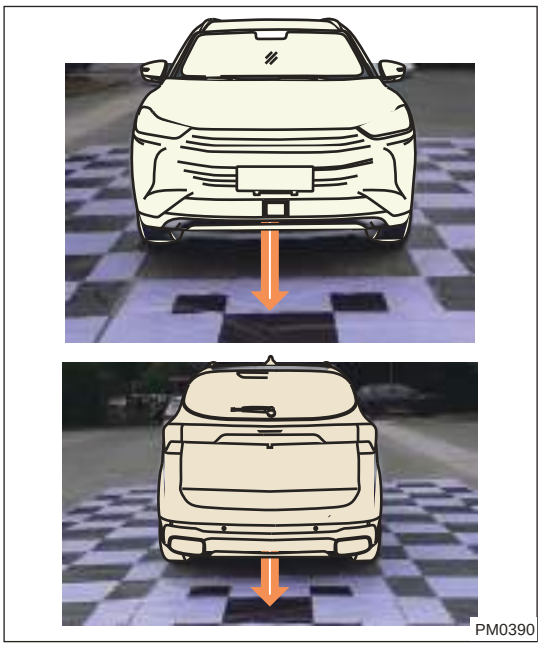
Activation Condition		System Activation	Exit Condition	
Preconditions	**Trigger Condition**		**Corresponding Exit Condition**	**Priority Exit Condition**
			than 1 seconds, and there is no effective operation within the duration time	
			Operate other high priority switches	
D	Parking radar obstacle distance signal is received	Obstacles is activated	Exit after 15 seconds after obstacle-free distance information	Press the AVM switch, operate other high-priority switches, N or P, press the exit button
			N or P	
Vehicle speed = 0KM/h, remote start mode	Remote AVM request to turn on	Remote AVM is activated	Remote AVM request to turn off	Remote start mode is exited

Matching Learning

Panoramic Control System

Camera Calibration

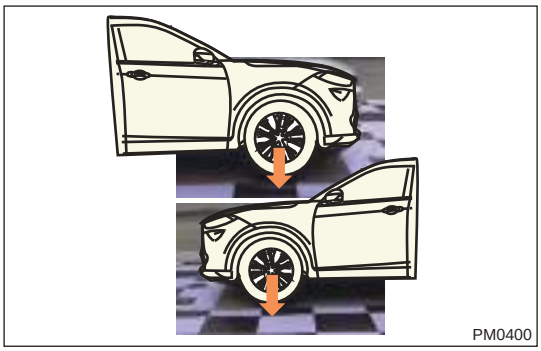
1. Situations needs to perform camera calibration:
   a. When service station removes or installs camera or rear view mirror with camera.
   b. When camera position changes due to vehicle accident.
   c. After replacing panoramic view monitor system controller.
   d. When removing and installing front and rear bumpers.
2. Calibration method:
   a. Park vehicle at the fixed location.
   b. Lay calibration cloth (front and rear sides) at front and rear of vehicle.



⚠ Caution

- “Front center” of calibration cloth corresponds to the front side of vehicle.
- Center line position of calibration cloth should align with the middle position of front and rear of vehicle.

c. Unfold calibration cloth (left and right sides) and lay it onto both sides of vehicle.
   - Center line corresponds to front left and right wheel positions.
   - Left and right sides and front and rear sides of calibration cloth should be placed in accordance with single and double arrow marks respectively.

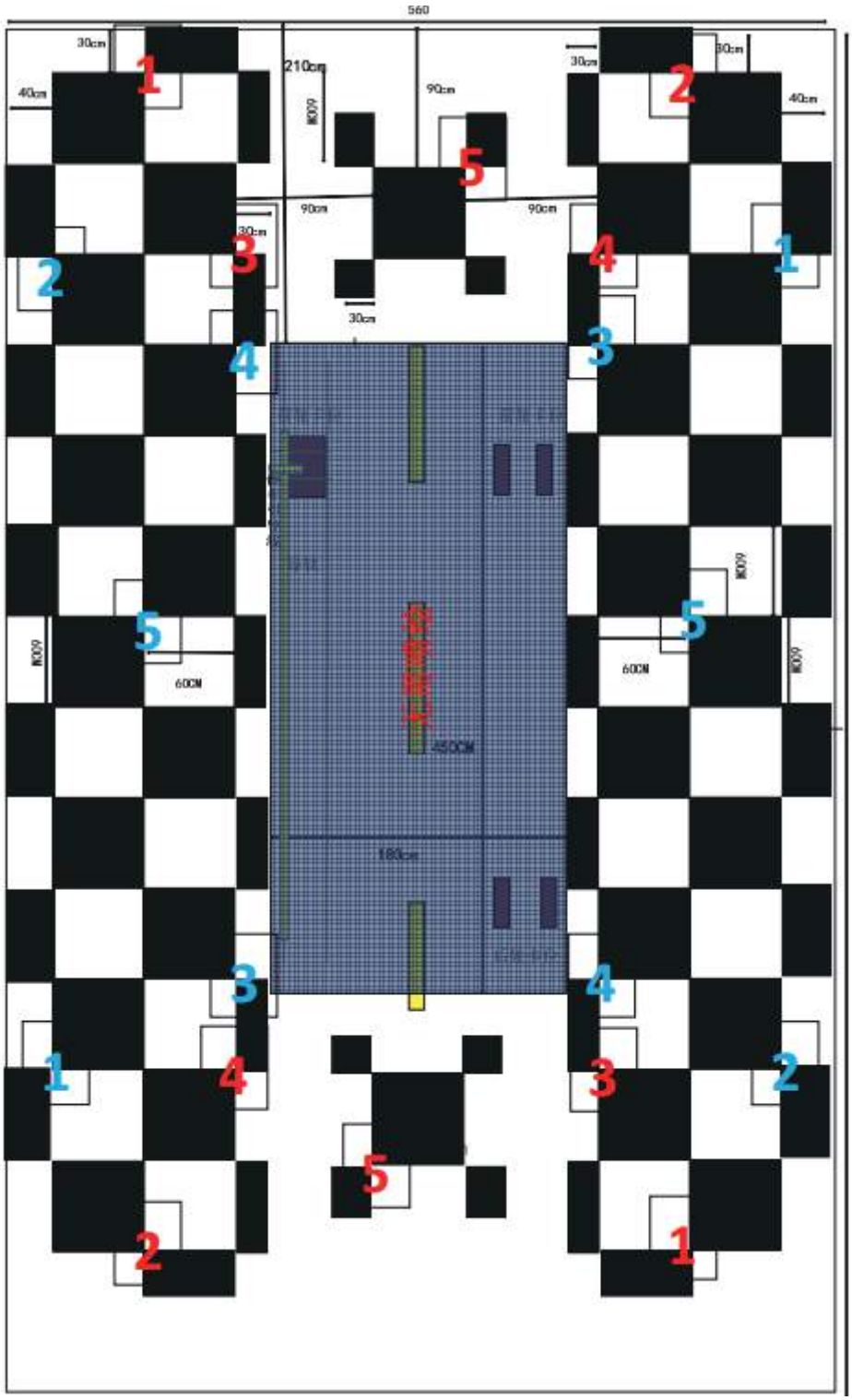


d. Enter calibration mode (calibration function is activated): when ignition switch is on, touch MVM switch, and panoramic image interface is displayed. Click 3 times on left and 3 times on right to enter panoramic image calibration interface.

3. Switch view
   a. Enter panoramic monitoring, press back button to exit panoramic monitoring setting
   b. Enter panoramic display, touch 2D/3D button to switch 2D/3D angle.
   c. Enter panoramic display, touch front/rear wide-angle button to switch front/rear wide-angle.
   d. Enter panoramic display and click button to switch to corresponding view.
   e. Enter panoramic monitoring, click shortcut button on right side of panoramic monitoring to enter panoramic monitoring settings.
4. Calibration environment requirement
   a. Site requirement: Calibration site size: About 5.6 m in width and 8.4 m in length, which can accommodate the vehicle driving and calibration cloth laying.
   b. Ground flatness and calibration cloth laying requirement:
      - To ensure the calibration effect, calibration site requires the ground as flat as possible, and calibration cloth has no any obvious bumps after laying;
      - When laying a calibration cloth, pay attention that it is fully unfolded and laid smoothly, and each piece should be corresponded according to requirement.
   c. Lighting conditions: There is no special requirement for light environment of calibration site. Make sure each positioning triangle and its focus can be clearly seen during calibration.
   d. Storage of calibration cloth: Calibration cloth should be rolled up smoothly (with left and right sides separated) after use for safekeeping.

⚠ **Caution**
If calibration cloth is wet, please dry it and then roll it up. Avoid wrinkles during rolling, so as not to affect the subsequent use.

5. Calibration cloth drawing



Diagnosis & Testing

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
After reverse gear is engaged, there is no reversing view monitor and the meter does not display the reverse distance	Observe whether the back-up light is come on: If it is come on, check the reverse signal input of DVD/ navigation system and BCM. If it is not come on, check the back-up light switch and line
After reverse gear is engaged, there is no reversing view monitor and the meter display the reverse distance	Check the reverse signal input of DVD/navigation system, camera and line.
After reverse gear is engaged, there is reversing view monitor (if equipped with reversing view monitor) but the meter does not display the reverse distance	Check the reverse signal input of BCM, the LIN of BCM and reversing radar controller, and check the reversing radar controller
Sensor failure, and instrument cluster send an alarm	Check whether there is dirt on reversing radar sensor. If so, remove the dirt on the sensor and check whether the sensor is damaged. If necessary, replace the inspection sensor wire harness

Diagnostic Help

1. Connect diagnostic tester X-431 3G (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all CD system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Reversing Radar System Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1A01-25	Front Left Sensor Failure - Waveform Failure	/	• Signal or wire harness connector damaged • Main reversing radar damaged	It is recommended to check and repair parking radar assist system
B1A02-25	Front Left Center Sensor Failure - Waveform Failure	/		
B1A03-25	Front Right Center Sensor Failure - Waveform Failure	/		
B1A04-25	Front Right Sensor Failure - Waveform Failure	/		
B1A05-25	Rear Left Sensor Failure	/		
B1A06-25	Rear Left Center Sensor Failure	/		
B1A07-25	Rear Right Center Sensor Failure	/		
B1A08-25	Rear Right Sensor Failure	/		
UO140-87	Lost Communication with BCM	/	Refer to CAN communication system	
U0129-87	Lost Communication with Brake System Control Module	/		

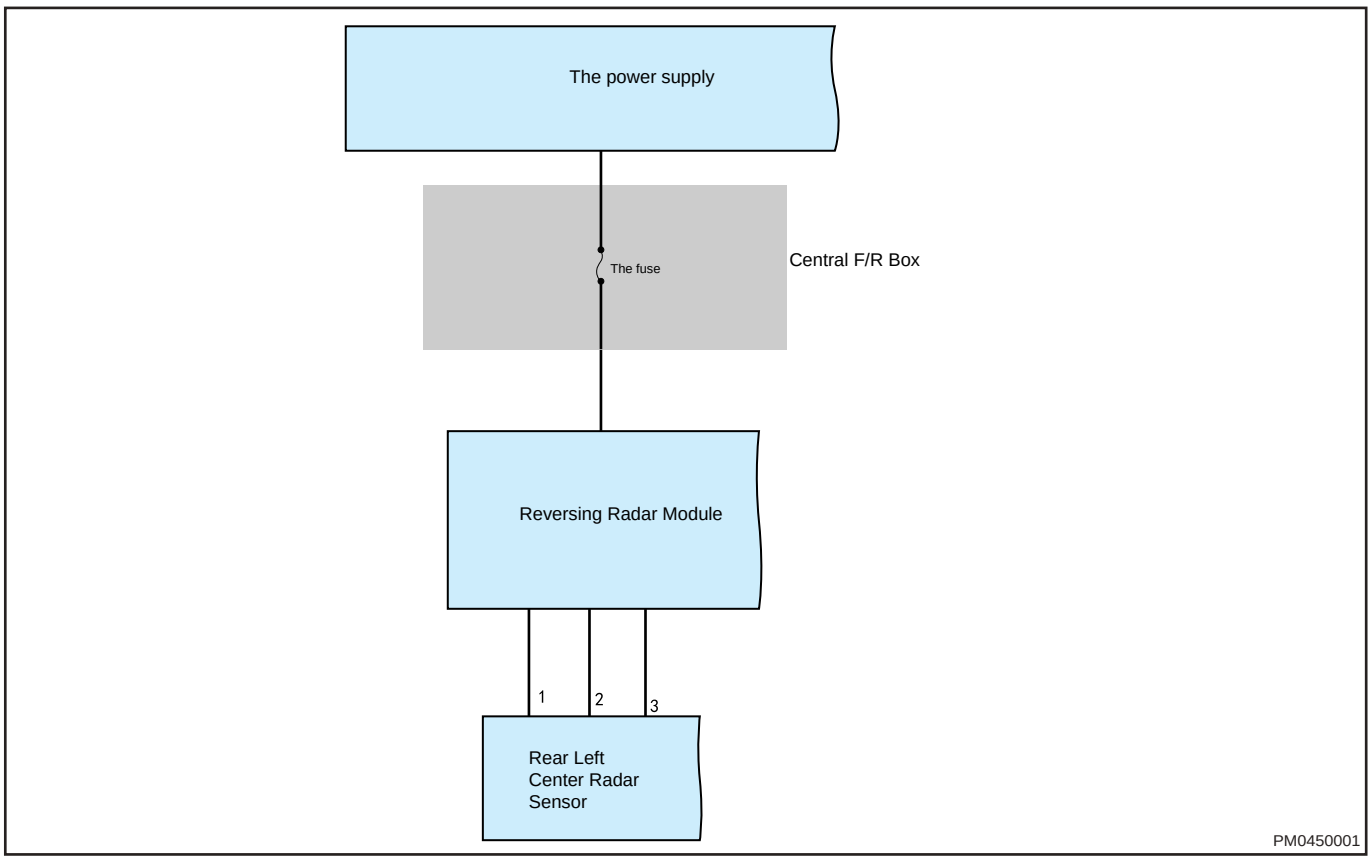
DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U0155-87	Lost Communication with Instrument Panel Cluster (IPC) Control Module	/		

DTC Diagnosis Procedure

DTC	**B1A01-25**	**Front Left Sensor Failure - Waveform Failure**
DTC	**B1A02-25**	**Front Left Center Sensor Failure - Waveform Failure**
DTC	**B1A03-25**	**Front Right Center Sensor Failure - Waveform Failure**
DTC	**B1A04-25**	**Front Right Sensor Failure - Waveform Failure**
DTC	**B1A05-25**	**Rear Left Sensor Failure**
DTC	**B1A06-25**	**Rear Left Center Sensor Failure**
DTC	**B1A07-25**	**Rear Right Center Sensor Failure**
DTC	**B1A08-25**	**Rear Right Sensor Failure**

Hint:
Detection of each radar is the same. Take the rear center radar as an example.

Description
Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check radar sensor**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Replace radar sensor with a new one, connect negative battery cable, turn ENGINE START STOP switch to ON and turn on parking radar system. Using diagnostic tester, read DTC and observe if DTC still exists.

OK → **Replace radar sensor**

NG

2	**Check fuse**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check if fuse is blown.

NG → **Replace fuse**

OK

3	**Check wire harness and connector**

Use circuit diagram as a guide to perform the following inspection procedures:

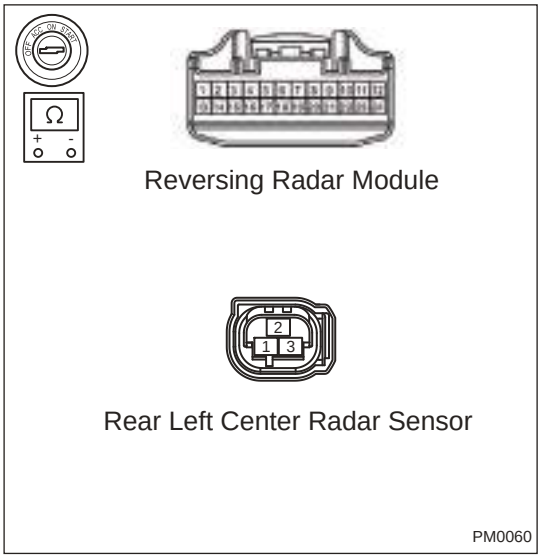
(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect reversing radar module connector and radar sensor connector.

Use circuit diagram as a guide to perform the following inspection procedures:

(c) Using ohm band of multimeter, check for continuity between reversing radar module and sensor separately

Multimeter Connection	Condition	Specified Condition
Reversing radar module (- connected terminals) - Sensor (1)	Always	⩽ 1 Ω
Reversing radar module (- connected terminals) - Sensor (2)		⩽ 1 Ω
Reversing radar module (- connected terminals) - Sensor (3)		⩽ 1 Ω



NG → **Replace wire harness and connector**

OK →

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace reversing radar module**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**UO140-87**	**Lost Communication with BCM**
DTC	**U0129-87**	**Lost Communication with Brake System Control Module**
DTC	**U0155-87**	**Lost Communication with ICM**

DTC Confirmation Procedure

Refer to CAN communication system

Panoramic Control System (AVM) Diagnostic Trouble Code (DTC) Chart

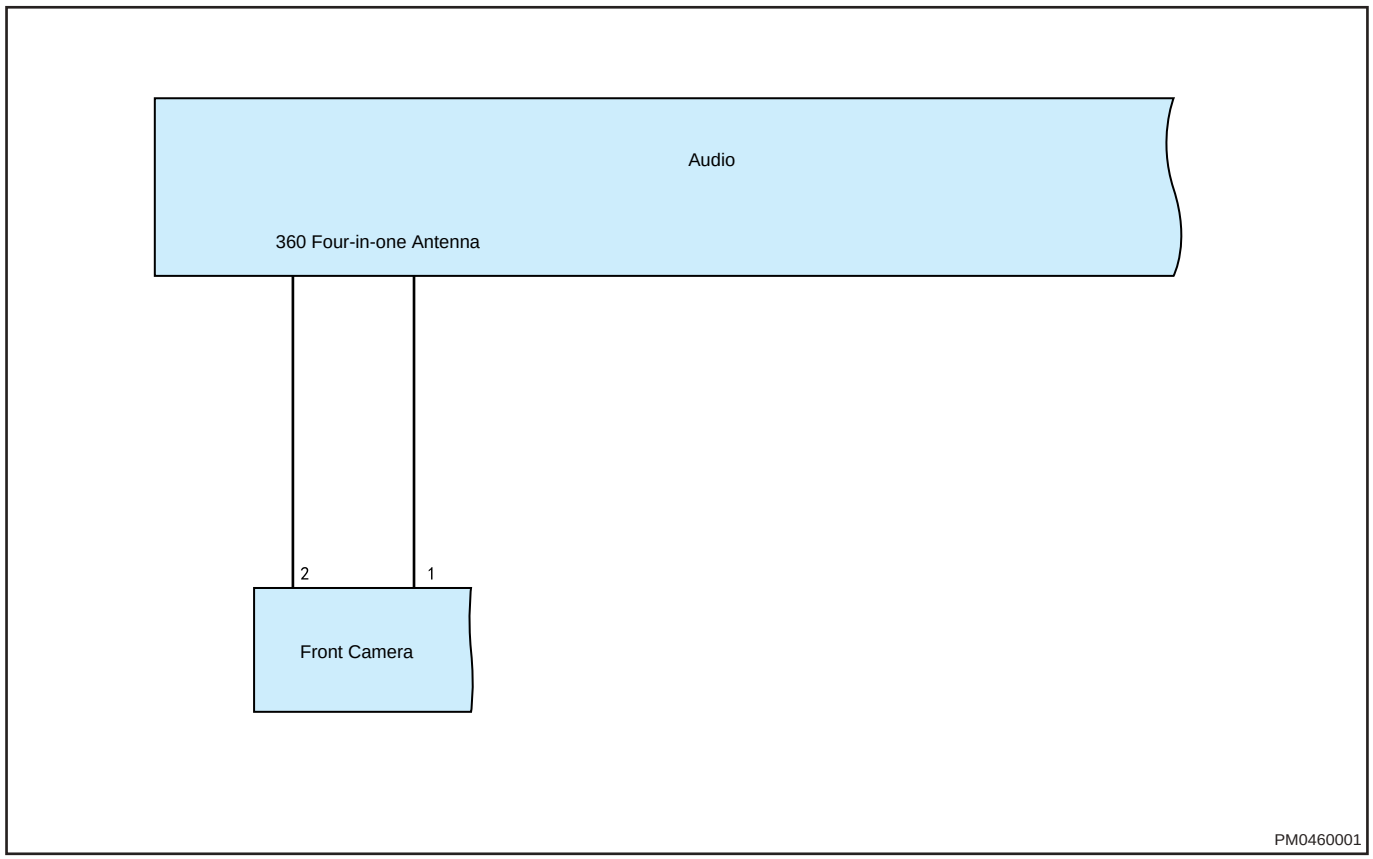
DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1850	AVM Front Camera Power Short to Ground	/	• Camera • Wire harness • Domain Controller	/
B1851	AVM Front Camera Power Short to Battery Positive	/		/
B1852	AVM Front Camera LVDS Cable Open	/		/
B1853	AVM Rear Camera Power Short to Ground	/		/
B1854	AVM Rear Camera Power Short to Battery Positive	/		/
B1855	AVM Rear Camera LVDS Cable Open	/		/
B1856	AVM Left Camera Power Short to Ground	/		/
B1857	AVM Left Camera Power Short to Battery Positive	/		/
B1858	Open in AVM Left Camera Wire Harness	/		/
B1859	AVM Right Camera Power Short to Ground	/		/
B185A	AVM Right Camera Power Short to Battery Positive	/		/
B185B	Open in AVM Right Camera Wire Harness	/		/
B185C	AVM No Calibration	/	Recalibrate it	/
B1849	Panoramic Controller Connection Failure - System Internal Failure	/	Module failure	/

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U014087	Lost Communication with BCM	/	Refer to CAN communication system	/
U015587	Lost Communication with ICM	/		/
U014187	Lost Communication with Reversing Radar	/		/
U012687	Lost Communication with SAM	/		/
U024587	Lost Communication with MMI (RRM)	/		/
U010187	Lost Communication with Transmission	/		/
U010087	Lost Communication with EMS	/		/
U012987	Lost Communication with ESC	/		/
U007388	CAN Bus Off	/		/

DTC Diagnosis Procedure

DTC	**B1850**	**AVM Front Camera Power Short to Ground**
DTC	**B1851**	**AVM Front Camera Power Short to Battery Positive**
DTC	**B1852**	**AVM Front Camera LVDS Cable Open**

Description
Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Replace camera with a new one**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Replace front camera with a new one, connect negative battery cable, and turn ENGINE START STOP switch to ON. Start panoramic view monitor system and observe if the camera is working properly.

OK → **Replace front camera**

NG

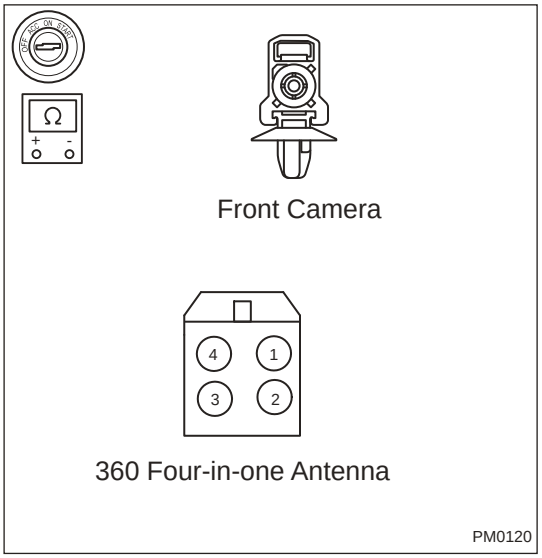
2	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect four-in-one antenna connector and front camera connector.

(c) Using ohm band of multimeter, check for continuity between four-in-one antenna connector and front camera connector.

Multimeter Connection	Condition	Specified Condition
Four-in-one antenna (- connected terminal) - Front camera (1)	Always	⩽ 1 Ω
Four-in-one antenna connector (- connected terminal) - Front camera connector (2)	Always	⩽ 1 Ω



NG → **Repair or replace wire harness and connector**

OK

3	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

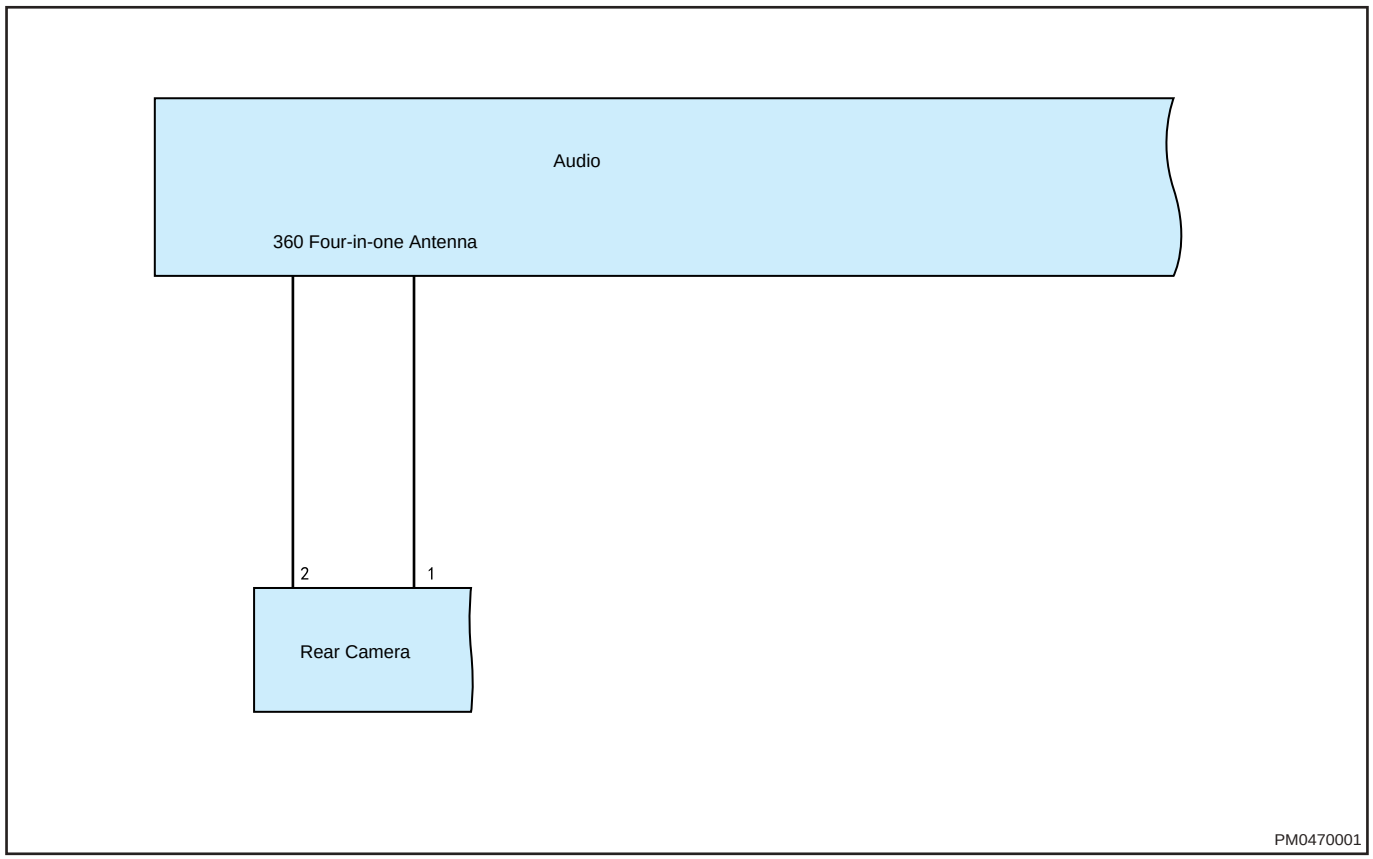
NG → **Replace domain controller**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1853**	**AVM Rear Camera Power Short to Ground**
DTC	**B1854**	**AVM Rear Camera Power Short to Battery Positive**
DTC	**B1855**	**AVM Rear Camera LVDS Cable Open**

Description

Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Replace camera with a new one**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

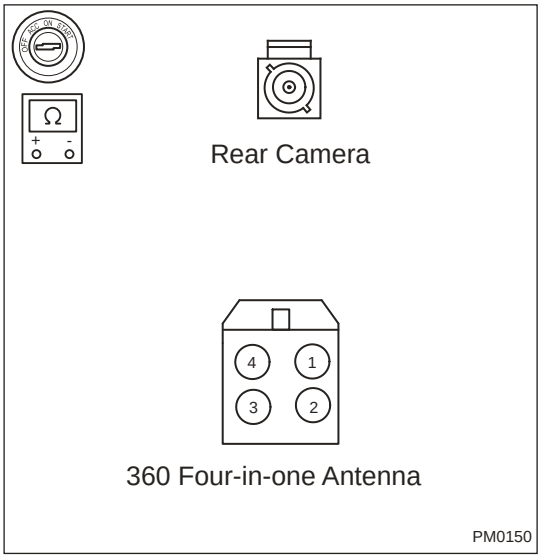
(b) Replace rear camera with a new one, connect negative battery cable, and turn ENGINE START STOP switch to ON. Start panoramic view monitor system and observe if the camera is working properly.

OK → **Replace rear camera**

NG

2	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.
(b) Disconnect four-in-one antenna connector and rear camera connector.
(c) Using ohm band of multimeter, check for continuity between four-in-one antenna connector and rear camera connector.



Multimeter Connection	Condition	Specified Condition
Four-in-one antenna connector (- connected terminal) - Rear camera connector (1)	Always	⩽ 1 Ω
Four-in-one antenna (- connected terminal) - Rear camera (2)	Always	⩽ 1 Ω

NG → **Repair or replace wire harness and connector**

OK

3	**Reconfirm DTCs**

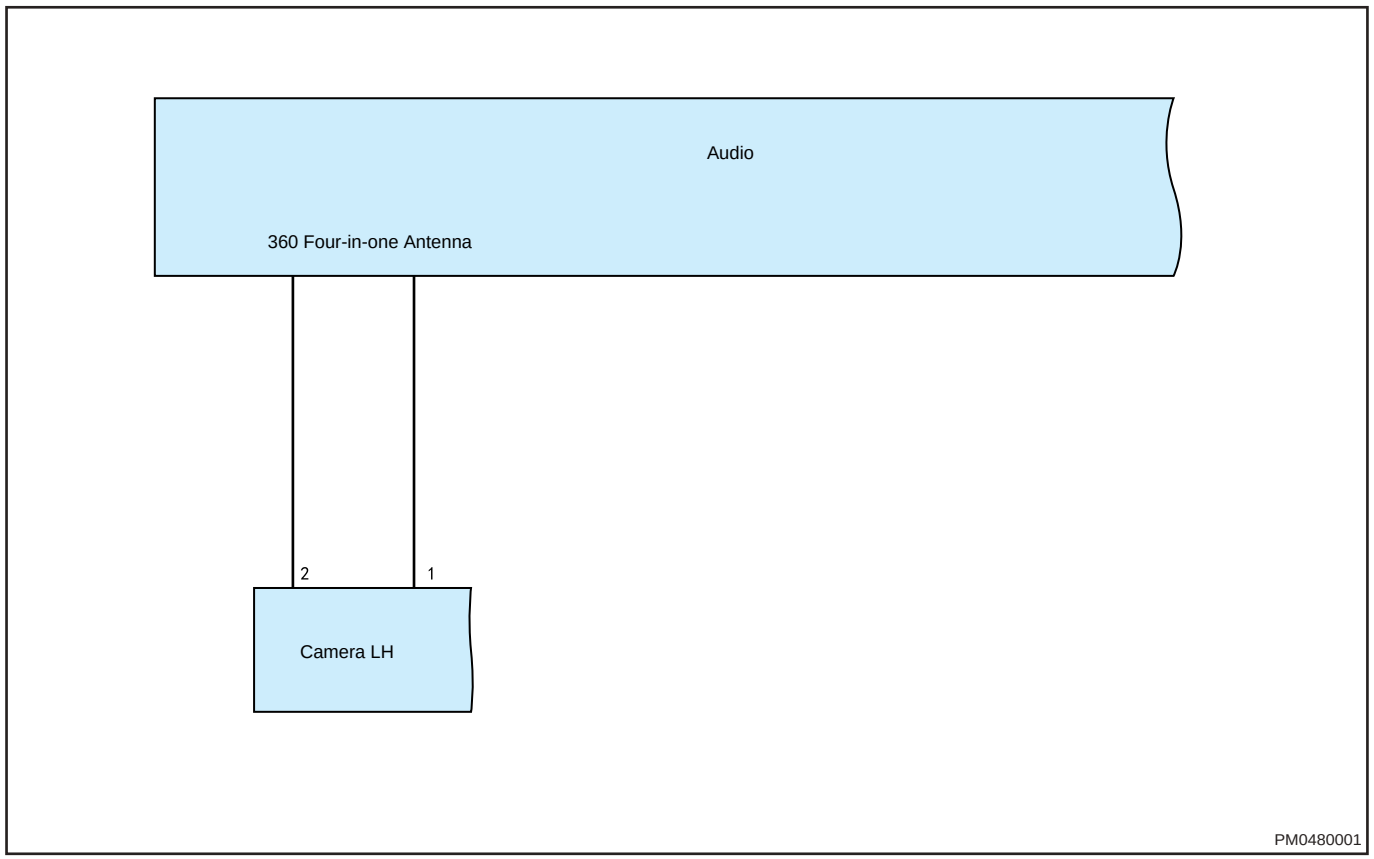
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace domain controller**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1856**	**AVM Left Camera Power Short to Ground**
DTC	**B1857**	**AVM Left Camera Power Short to Battery Positive**
DTC	**B1858**	**Open in AVM Left Camera Wire Harness**

Description
Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Replace camera with a new one**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Replace left camera with a new one, connect negative battery cable, and turn ENGINE START STOP switch to ON. Start panoramic view monitor system and observe if the camera is working properly.

OK → **Replace left camera**

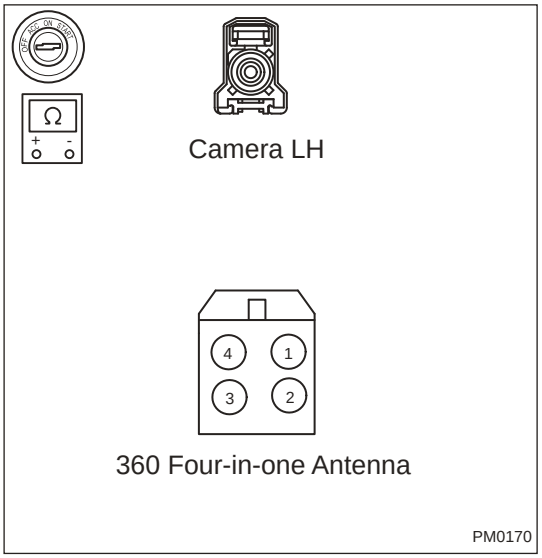
NG

2	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect four-in-one antenna connector and left camera connector.

(c) Using ohm band of multimeter, check for continuity between four-in-one antenna connector and left camera connector.



Multimeter Connection	Condition	Specified Condition
Four-in-one antenna (- connected terminal) - Left camera (1)	Always	⩽ 1 Ω
Four-in-one antenna connector (- connected terminal) - Left camera connector (2)	Always	⩽ 1 Ω

NG → **Repair or replace wire harness and connector**

OK

3	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

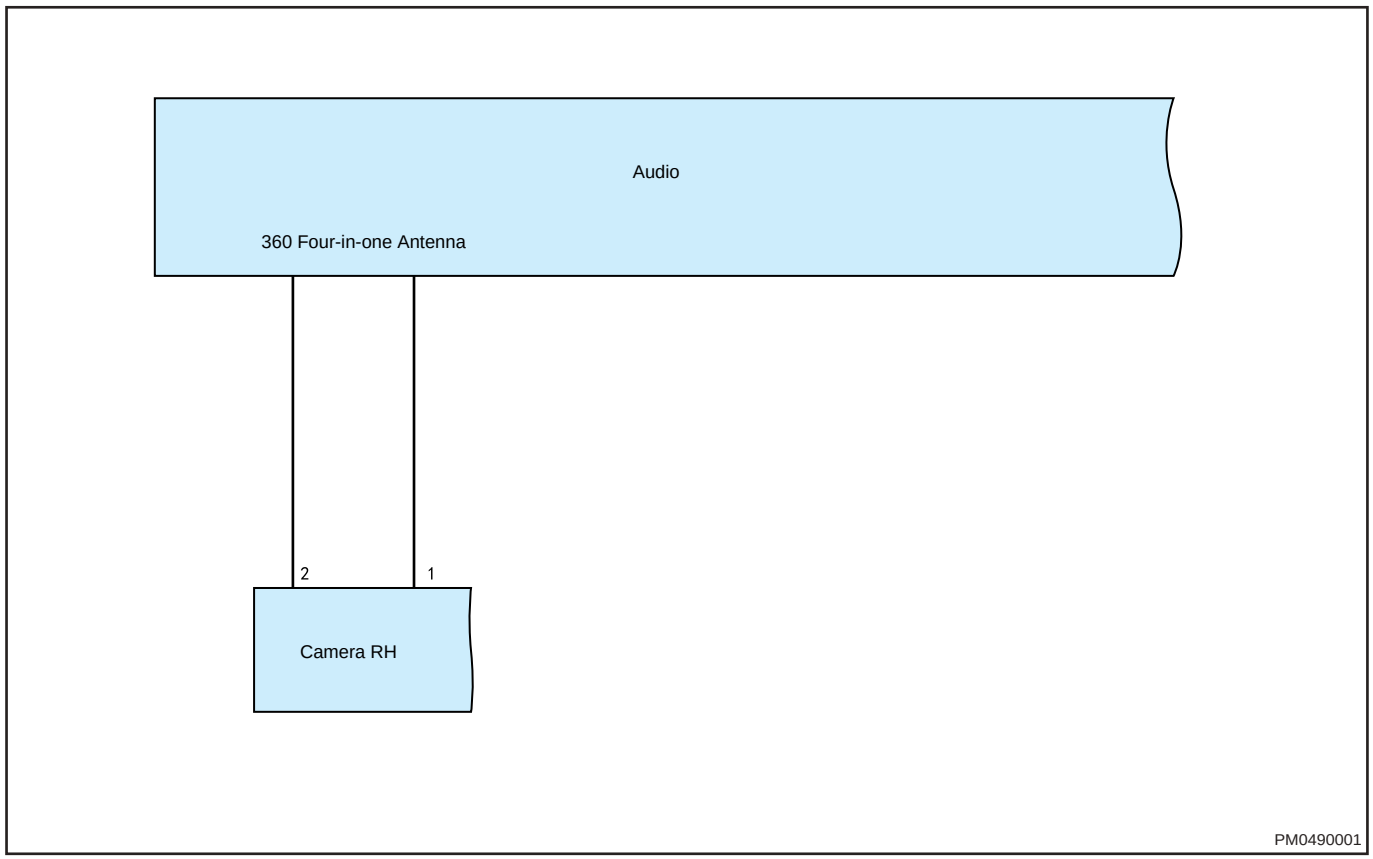
NG → **Replace domain controller**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1859**	**AVM Right Camera Power Short to Ground**
DTC	**B185A**	**AVM Right Camera Power Short to Battery Positive**
DTC	**B185B**	**Open in AVM Right Camera Wire Harness**

Description

Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Replace camera with a new one**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Replace right camera with a new one, connect negative battery cable, and turn ENGINE START STOP switch to ON. Start panoramic view monitor system and observe if the camera is working properly.

OK → **Replace right camera**

NG

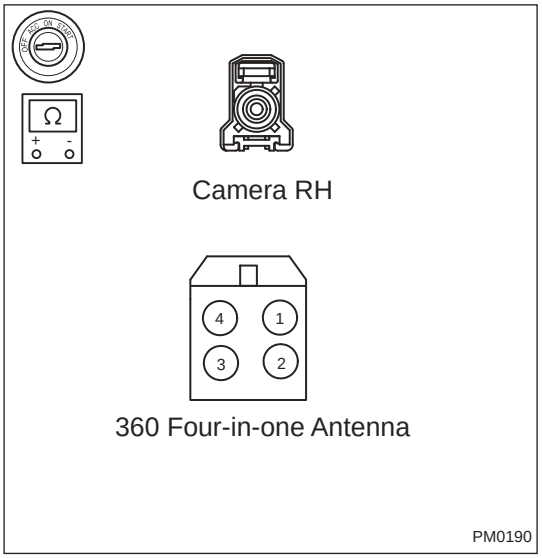
2	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect four-in-one antenna connector and right camera connector.

(c) Using ohm band of multimeter, check for continuity between four-in-one antenna connector and right camera connector.

Multimeter Connection	Condition	Specified Condition
Four-in-one antenna (- connected terminal) - Right camera (1)	Always	⩽ 1 Ω
Four-in-one antenna (- connected terminal) - Right camera (2)	Always	⩽ 1 Ω



NG → **Repair or replace wire harness and connector**

OK

3	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace domain controller**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B185C	AVM No Calibration

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check for DTCs

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTCs occur again.

NG → **Recalibrate the module.**

OK

2	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new control module to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1849	Panoramic Controller Connection Failure - System Internal Failure

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check for DTCs

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTC occurs again.

NG → **Turn off vehicle power supply (- disconnect negative battery cable), then clear DTCs again.**

OK

2	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new module to check if fault reoccurs.**

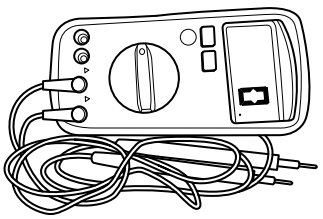
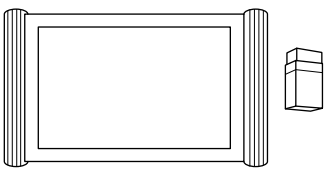
OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**U014087**	**Lost Communication with BCM**
DTC	**U015587**	**Lost Communication with ICM**
DTC	**U014187**	**Lost Communication with Reversing Radar**
DTC	**U012687**	**Lost Communication with SAM**
DTC	**U024587**	**Lost Communication with MMI (RRM)**
DTC	**U010187**	**Lost Communication with Transmission**
DTC	**U010087**	**Lost Communication with EMS**
DTC	**U012987**	**Lost Communication with ESC**
DTC	**U007388**	**CAN Bus Off**

DTC Confirmation Procedure
Refer to CAN communication system

On-vehicle Service

Tools

Tool Name	Tool Drawing
Digital Multimeter	 RCH0002006
X-431 PAD Diagnostic Tester	 RCH0001006

Reversing Radar Sensor

Removal

⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents, when removing reversing radar sensors.
- Operate carefully to avoid damaging reversing radar sensors, when removing reversing radar sensors.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear bumper.
4. Disconnect the reversing radar sensor connector.

5. Remove reversing radar sensor from slots of rear bumper assembly.

Installation

⚠ Warning

When installing reversing radar sensor, align the boss at end of reversing radar sensor with the slot on rear bumper assembly, and then firmly install reversing radar sensor.

⚠ Caution

- Install connectors in place when installing reversing radar sensors.
- Check reversing radar system for proper operation, after installing reversing radar sensors.

1. Installation is in the reverse order of removal.

Rear Camera Assembly (If Equipped)

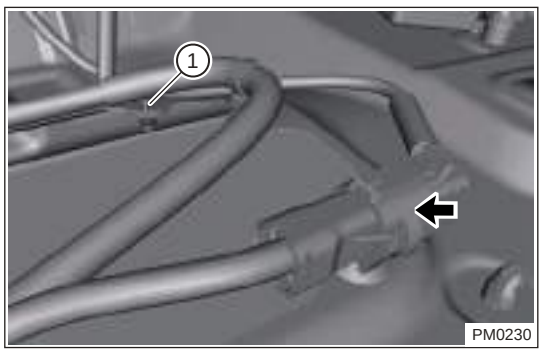
Removal

⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents, when removing rear camera assembly.
- Appropriate force should be applied when removing rear camera assembly. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the back door lower protector assembly.
4. Pry off rear camera from outside with an interior crow plate.

5. Disconnect rear camera connector, pry up fixing clip (1) from camera connector and remove rear camera.



6. Remove the rear camera assembly.

Installation

1. Installation is in the reverse order of removal.

Front Camera Assembly (If Equipped)

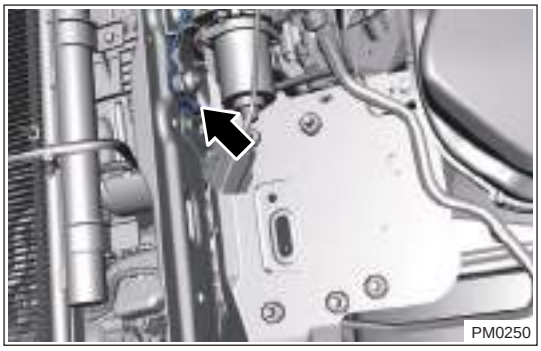
Removal

⚠ Warning

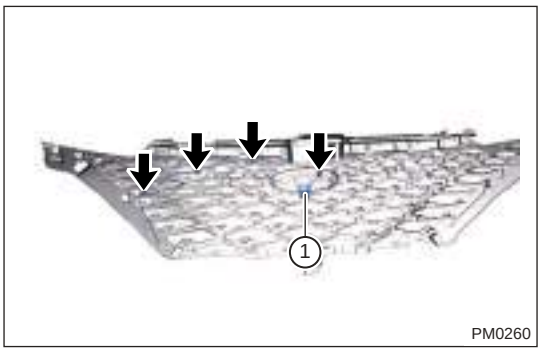
- Be sure to wear necessary safety equipment to prevent accidents, when removing front camera assembly.
- Appropriate force should be applied when removing front camera assembly. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the bumper assembly.

4. Remove connector (arrow) from front camera.



5. Remove bumper and remove 2 fixing bolts (arrow) from camera with a cross screwdriver, then pry off clips and remove camera (1).



Installation

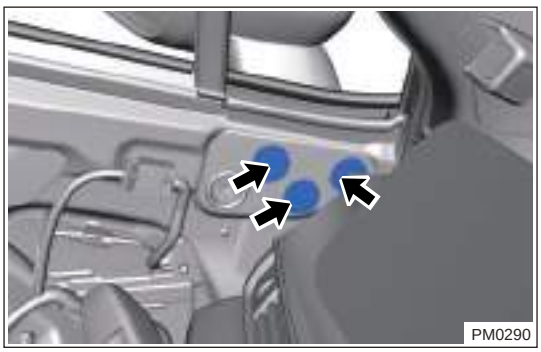
1. Installation is in the reverse order of removal.

Side Camera Assembly (Both Sides) (If Equipped)

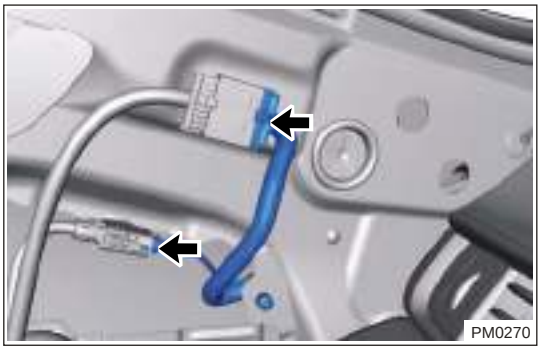
Removal (Take left side as an example)

⚠ Warning
As side camera is installed inside the outside rear view mirror assembly, it must be replaced together with outside rear view mirror assembly when damaged.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door protector assembly.
4. Remove the front left door protector block cover.

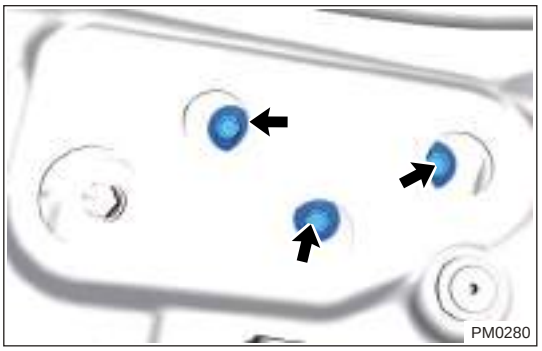


5. Disconnect the left outside rear view mirror connector.



6. Remove 3 fixing bolts from left outside rear view mirror.

   Tightening Torque
   7 ± 1 N·m



7. Remove the left outside rear view mirror assembly.

Installation

⚠ Caution

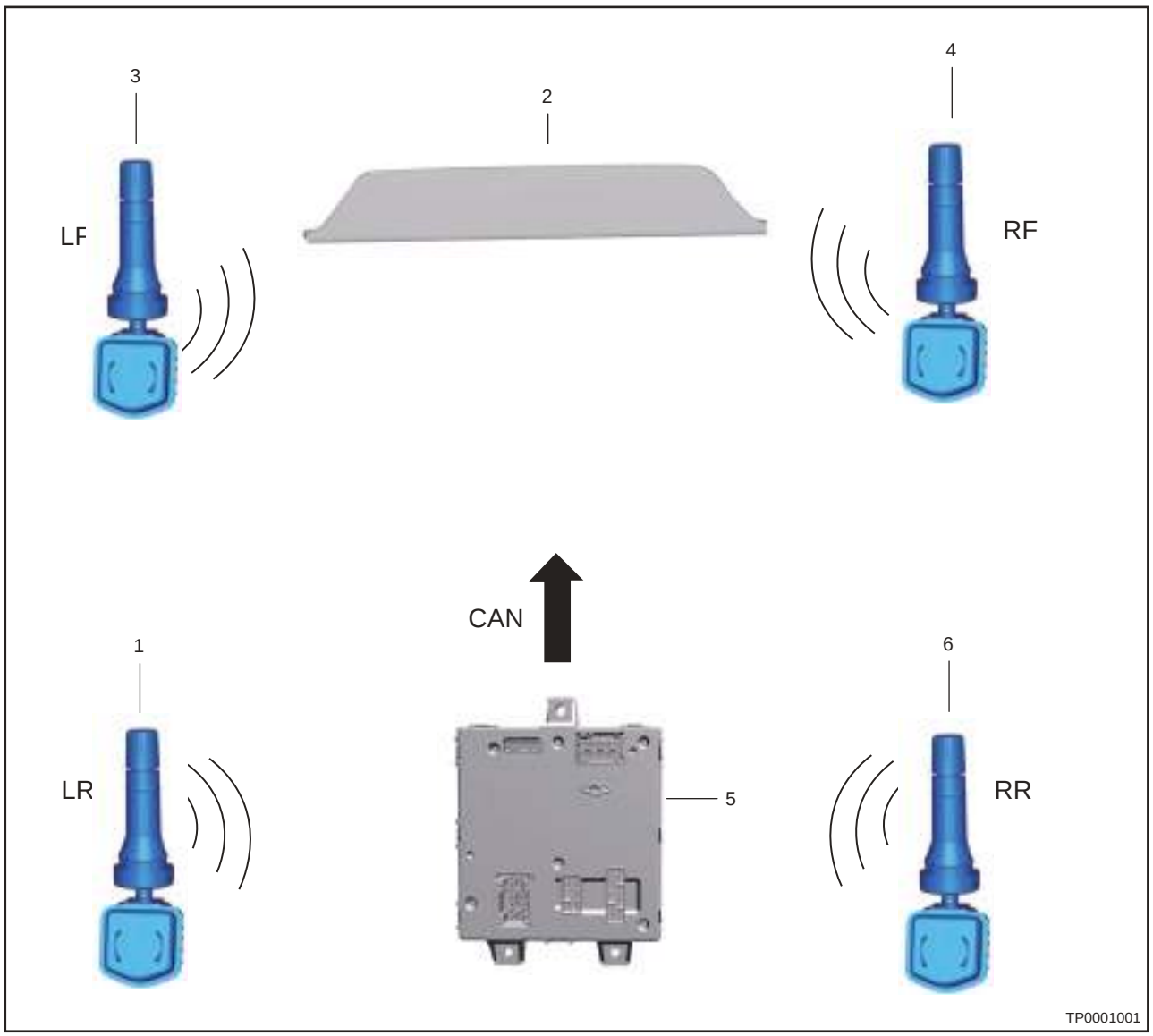
- Install connector in place and tighten fixing nuts to the specified torque, when installing the outside rear view mirror assembly.
- Make sure the outside rear view mirror assembly can move smoothly, flexibly and reliably after installing.
- After installing outside rear view mirror assembly, it is necessary to perform panoramic image calibration.

1. Installation is in the reverse order of removal.

TIRE PRESSURE MONITORING SYSTEM

System Overview

Description



1	Rear Left Tire Pressure Sensor	2	Front Left Tire Pressure Sensor
3	Instrument Cluster	4	Front Right Tire Pressure Sensor
5	Rear Right Tire Pressure Sensor	6	Body Control Module

Tire Pressure Monitoring System (TPMS) is an active safety device, which can monitor tire pressure and temperature in real time and display tire pressure and temperature on meter. When tire pressure is too low or temperature is too high, tire pressure monitoring system will warn the driver of driving danger.

Operation

Tire pressure sensor is the transmitting terminal of tire information, body control module is the receiving terminal of tire information, meter is the display terminal of tire information, and tire pressure sensor is the core of tire pressure monitoring system. Tire pressure sensor is installed on rim, which collects data such as pressure, temperature inside tire, and sends these data to body control module as radio-frequency signal. The wireless communication frequency between tire pressure sensor and body control module is 433 MHz.The body control module receives radio-frequency signal sent from tire pressure sensor and processes these data. Body control module processes data of tire pressure sensor, then sends them to meter via CAN bus. Tire pressure value is displayed on meter via CAN bus signal. When tire pressure is too high or too low, or temperature is too high, it informs driver of abnormal tire.

Tire Pressure System Warning Information

High Temperature or Low Pressure
When there is a low pressure or high temperature alarm due to abnormal pressure or temperature inside the wheel, the tire pressure warning light on meter illuminates immediately and the meter switches to tire pressure monitoring system display screen automatically from normal display screen and indicates which tire is sending the alarm.

System Malfunction
When system malfunction is received by meter, the tire pressure warning light on meter flashes for 75 seconds and then remains on, the center meter display will display “Please inspect the tire pressure monitoring system”, and then the meter switches to tire pressure monitoring system display screen automatically from normal screen.

Low Pressure Alarm
When vehicle tire pressure is less than 1.8 bar, and the vehicle is continuously driving with a speed higher than 30 Km/h, the system will send a low pressure alarm within 5 minutes. With ENGINE START STOP switch turned from OFF to ON position, the system will also send a low pressure alarm if tire pressure displayed on meter is less than 1.8 bar. When there is a low pressure alarm, the waring light remains on and normal screen switches into tire pressure screen directly: The tire with low pressure (e.g., front right tire) will flash and its tire pressure and temperature will be displayed.If the tire pressure is too low, please resume it to normal pressure as soon as possible. Too low tire pressure will increase fuel consumption and tire wear. And seriously worn tire will cause an accident such as flat tire.Please resume the tire pressure to 2.3 bar (with an error limit of 0.1 bar). When the vehicle tire pressure resumes to 2.3 bar (with an error limit of 0.1 bar) and the vehicle is continuously driving with a speed higher than 30 Km/h, the system will deactivate the low pressure alarm automatically within 5 minutes.

High Temperature Alarm
When the vehicle tire temperature is higher than 85 ℃ and the vehicle is continuously driving with a speed higher than 30 Km/h, the system will send a high temperature alarm automatically within 5 minutes. With ENGINE START STOP switch turned from OFF to ON position, the system will also send a high temperature alarm if tire temperature displayed on meter is higher than 85 ℃.When temperature of front wheel reaches 88 ℃, which is higher than high temperature alarm threshold (85 ℃), the system will send high temperature alarm, front left wheel symbol will flash, the tire pressure and temperature values will be displayed and tire pressure warning light remains on.When there is a high temperature alarm, the warning light remains on and normal screen switches to tire pressure screen directly: The tire with high temperature (e.g., front right tire) will flash and its tire pressure and temperature values will be displayed. When a high temperature alarm occurs, stop vehicle to cool the tire naturally, otherwise there is a danger of accident. When tire temperature is too high, never cool the tire by pouring cold water, otherwise, tire may be damaged, resulting in an accident.When the vehicle wheel temperature is lower than 80 ℃ and the vehicle is continuously driving with a speed higher than 30 Km/h, the system will deactivate high temperature alarm automatically within 5 minutes. The system stores the history DTCs.

System Malfunction
When the vehicle speed is higher than 30 Km/h, if the tire pressure monitoring system fails to receive radio frequency signal from one or more sensors within 10 minutes, it will send a system malfunction alarm, the meter will display “Please inspect and repair the tire pressure monitoring system”, and the

indication symbol will remain on after flashing for 75 seconds. The meter system will also switch to tire pressure monitoring system display screen automatically.

High Pressure Display

- If the tire pressure is higher than 3.5 bar, the tire pressure will be displayed as –; but the temperature will be displayed normally.
- If the tire pressure is less than 3.50 bar, it will resume normal display within 5 minutes.
- If the alarm is caused by high tire pressure, just resume it to 2.3 bar.

Detection Requirements of Tire Pressure Sensor
If assembly of tire pressure sensor is performed in tire sub assembly workshop, it is necessary to perform test after tire assembly is assembled. After tire assembly is assembled, the sensor should meet:

- The low frequency wake-up function of tire pressure sensor is intact, that is, low frequency trigger device can wake up the tire pressure sensor.
- Detection function of tire pressure sensor is intact, that is, sensor can detect pressure value and temperature value inside tires.
- Communication function of tire pressure sensor is intact, that is, sensor can send pressure value and temperature value inside tires as high frequency signal.

Configuration & Learning for Tire Pressure Monitoring System

Tire Pressure Sensor Learning Methods

Precautions

No.	Precautions	Details
1	Avoid error learning of tire	Tire learned on diagnostic tester menu must be matched with bleeding tire
2	Avoid error learning of tire	Only operate one tire every time, and do not bleed (or inflate) other tires at this time
3	Avoid error learning of tire	Keep away from other vehicles with tire pressure sensor, avoiding error learning or interference

If only one tire is to be replaced, other tires should not be replaced and their positions should not be changed, only learn one tire separately.

Correction Methods for Tire Pressure Monitoring System Are As Follows:

- Keep vehicle speed more than 30 Km/h for about 45 seconds.
- If tire pressure monitoring system can operate normally, pressure information of four tires will be displayed.
- If certain tire pressure information is still not displayed, tire configuration may error and needs to be relearned.

Tire Pressure Learning Method for Inflating/Bleeding
Learning Process

Hint:
After learning is finished, use tire pressure gauge to inflate tire to standard pressure, then perform correction on tire pressure monitoring system with vehicle speed higher than 30 Km/h for 45 seconds.

1	**Start**

Next

2	**There is enough pressure in tire (full loaded pressure is recommended)**

Next

3	**Tire pressure monitoring system enters learning status by operating diagnostic tester**

Next

4	**Perform tire pressure bleeding (for about 20 seconds)**

Next

5	**Learned tire pressure value can be displayed on meter**

Next

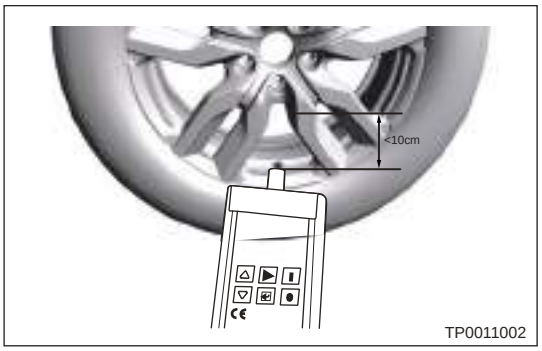
6	**Learning is successful**

Next

7	**End**

Tire Pressure Learning Method for Low-Frequency Trigger

1. If the malfunction is suspected in tire pressure sensor, use the low-frequency trigger to perform test.
2. After turning the ENGINE START STOP switch to IGN-ON and learning status is entered, the sensor can send wireless tire pressure signal with low-frequency trigger (- without inflating/deflating the tire). After the triggering operation is finished, tire pressure for the wheel learned will be displayed on the meter, which indicates that the learning is finished successfully.
3. Distance between low-frequency trigger and tire pressure sensor is less than 10 cm. Place the antenna of low-frequency trigger near the tire with tire pressure sensor on the wheel, and then press triggering button on low-frequency trigger. After the low-frequency trigger is successfully triggered, relative information about learned tire such as tire ID, pressure and temperature will be displayed, which indicates that the sensor is operating normally. Otherwise, replace the tire pressure sensor.



TP0011002

1	**Start**

Next

2	**ENGINE START STOP switch is in IGN-ON**

Next

3	**Tire pressure monitoring system enters learning status by operating diagnostic tester**

Next

4	**Trigger tire pressure sensor to be learned using low-frequency trigger**

Next

5	**Tire pressure sensor ID, temperature and pressure values are displayed on low-frequency trigger**

Next

6	**Learning is successful**

Next

7	**End**

Inspection of Tire Pressure Monitoring System Learning Status

1. After reconfiguring tire pressure monitoring system, use reading datastream function to perform inspection for each tire pressure sensor learning status in tire pressure monitoring system (take front left wheel as an example).
   a. Front left sensor ID can be read using diagnostic tester, if learning status is successful, it indicates that body control module is matched with front left sensor successfully. If not, it indicates that the match is not successful and front left wheel sensor should be relearned.
2. Use diagnostic tester to read following datastreams with vehicle speed higher than 30 Km/h for more than 45 seconds:
   a. Front left sensor pressure: 2.2 Bar
   b. Front left sensor temperature: 26 ˚C
   c. Temperature is not default and tire pressure is close to the value displayed on meter, which indicate that body control module can receive wireless signals from front left tire pressure sensor. Or, it indicates that learning is not successful or tire pressure sensor is faulty.

Diagnosis & Testing

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area	Troubleshooting
Low pressure alarm (warning light remains on, malfunctioning wheel symbol flashes)	Tire pressure is less than 1.9 bar	Check and charge tire pressure
	Tire pressure sensor function is disabled	Replace, perform configuration and learning
	Body Control Module (BCM) damage	Replace body control module and perform sensor learning
High temperature alarm (warning light remains on, wheel symbol flashes)	Tire temperature is higher than 85°C	Cool down naturally
	Tire pressure sensor function is disabled	Replace, perform configuration and learning
	Body Control Module (BCM) damage	Replace body control module and perform sensor learning
	Tire pressure system set	Check and repair
System malfunction alarm (- warning light remains on after flashing for 75 seconds, tire pressure value of corresponding wheel does not display and wheel symbol will flash)	Tire pressure sensor function is disabled	Replace, perform configuration and learning
	Incorrect sensor configuration and learning when replacing with new wheel (spare tire included)	Perform configuration and learning
	Electromagnetic interference/ shield	Eliminate shielded objects outside of tire/strong electromagnetic radio interference
	Body Control Module (BCM) damage	Replace
	Tire pressure system set	Check and repair
All tire pressure information cannot be displayed (all tire pressure information for four wheels display as “–”)	Display status cannot be reached	Vehicle speed is more than 30 Km/h for 45 seconds
	Replaced tire pressure sensor is not configured correctly, sensor is not learned	Perform configuration and learning
	Body Control Module (BCM)	Replace body control module and perform sensor learning
	Electromagnetic interference/ shield	Eliminate shielded objects outside of tire/strong electromagnetic radio interference
	Four sensors are not installed or all of them are damaged (very rare)	Reinstall or replace
Certain tire pressure information cannot be displayed (certain tire pressure information displays as “–”)	Tire pressure sensor function is disabled	Replace, perform configuration and learning

Symptom	Suspected Area	Troubleshooting
	Incorrect sensor configuration and learning when replacing with new wheel (spare tire included)	Perform configuration and learning
	Electromagnetic interference/ shield	Eliminate shielded objects outside of tire/strong electromagnetic radio interference
	Body Control Module (BCM) damage	Replace
	Tire pressure system set	Check and repair

Diagnostic Help

1. Connect diagnostic tester X-431 3G (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all CD system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.

3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Precautions for Maintaining Tire Pressure Monitoring System

Tire Inflation

- Do not inflate tires depending on values displayed from tire pressure monitoring system. Tire pressure monitoring system can monitor tire pressure and temperature in real time only when vehicle speed is more than 30 km/h. If inflating tires using pressure values displayed from tire pressure monitoring system, inflation value may be higher than tire standard value, which will cause accidents. Do not inflate tires with high tire temperature, which will cause serious damage to the tire, even blowouts, resulting in accidents.

Tire Pressure Sensor

- When system is faulty or disabled, check tire pressure sensor and judge if it is the tire pressure sensor in Tiggo 5x of Chery Automobile Co., Ltd. If tire pressure sensor of other manufacturers (not in Chery Automobile Co., Ltd.) is used by customer, configuration and learning for tire pressure sensor cannot be performed and system is abnormal or disabled.
- Tire pressure sensor is integrated with functions of common air valve, and inflating/deflating operation is the same as common air valve. Use genuine sensor fittings, without replacing components inside of sensor. After maintenance, install genuine waterproof cap of tire pressure sensor correctly. Do not reuse disposed tire pressure sensor components, otherwise air leakage may be caused, resulting in a possibility of danger. When performing inflation/deflation and tire removal operations, it is not necessary to remove nut from the sensor. If the tire pressure sensor nut is removed with tire pressure higher than atmosphere pressure, there is possibility of danger.
- Always use torque wrench when installing tire pressure sensor, with a torque of 8 ±1 N·m. If the torque is relatively low, air leakage may occur, resulting in a risk of danger; if the torque is relatively high, tire pressure sensor or related components may be damaged, resulting in a risk of danger.

Tire Pressure Value Increasing

- When vehicle is driving normally, heat is generated in the tire due to friction, which will cause tire pressure to increase. For every 10°C increase in tire temperature, tire pressure will increase by about 0.1 bar.

Tires Replacement

- If replacing tires with tire pressure monitoring system with ones without tire pressure monitoring system, system malfunction alarm will occur. If replacing with tire equipped with tire pressure sensor (-Tiggo 5x of Chery Automobile Co., Ltd.), system malfunction alarm still will occur without performing configuration and learning. Spare tire in Tiggo 5x is not equipped with tire pressure sensor, so tire pressure monitoring system is still malfunctioning when spare tire is used in vehicle with tire pressure monitoring system.
- When replacing tire, perform operations following assembly specification of tire pressure, to avoid damaging tire pressure sensor during replacement. For installation and removal of tire, refer to Installation and Removal of Tire Pressure Sensor sections. Never allow tire bead breaker and tire tread to squeeze the sensor.

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Fault Detection Condition	Possible Causes	Maintenance Advice
C1403-29	Front Left Hand Sensor Signal Invalid	/	Tire pressure sensor fails to send RF signal or the sent signal is too weak. The reception effect of body control module is poor, and no RF signal is received.	/
C1403-55	Front Left Hand Sensor Not Configured	/	Perform BCM function configuration, learning function is not finished.	/
C1403-96	Front Left Hand Sensor Component Internal Fail	/	Sensor operates abnormally, and RF data sent shows a malfunction in sensor.	/
C1404-29	Front Right Hand Sensor Signal Invalid	/	Tire pressure sensor fails to send RF signal or the sent signal is too weak. The reception effect of body control module is poor, and no RF signal is received.	/
C1404-55	Front Right Hand Sensor Not Configured	/	Perform BCM function configuration, learning function is not finished.	/
C1404-96	Front Right Hand Sensor Component Internal Fail	/	Sensor operates abnormally, and RF data sent shows a malfunction in sensor.	/
C1405-29	Rear Left Hand Sensor Signal Invalid	/	Tire pressure sensor fails to send RF signal or the sent signal is too weak. The reception effect of body control	/

DTC	DTC Definition	Fault Detection Condition	Possible Causes	Maintenance Advice
			module is poor, and no RF signal is received.	
C1405-55	Rear Left Hand Sensor Not Configured	/	Perform BCM function configuration, learning function is not finished.	/
C1405-96	Rear Left Hand Sensor Component Internal Fail	/	Sensor operates abnormally, and RF data sent shows a malfunction in sensor.	/
C1406-29	Rear Right Hand Sensor Signal Invalid	/	Tire pressure sensor fails to send RF signal or the sent signal is too weak. The reception effect of body control module is poor, and no RF signal is received.	/
C1406-55	Rear Right Hand Sensor Not Configured	/	Perform BCM function configuration, learning function is not finished.	/
C1406-96	Rear Right Hand Sensor Component Internal Fail	/	Sensor operates abnormally, and RF data sent shows a malfunction in sensor.	/
C1413-98	Front Left Hand Tire Temperature Component or System Over Temperature	/	Sensor operates abnormally, and RF data sent shows a malfunction in sensor. Sensor operates abnormally, and RF data sent shows a malfunction in sensor.	/
C1414-98	Front Right Hand Tire Temperature Component or System Over Temperature	/		/
C1415-98	Rear Left Hand Tire Temperature Component or	/		/

DTC	DTC Definition	Fault Detection Condition	Possible Causes	Maintenance Advice
	System Over Temperature			
C1416-98	Rear Right Hand Tire Temperature Component or System Over Temperature	/		/
C1417-16	Front Left Hand Sensor Voltage, Component or System Low Voltage	/	Battery is depleted	/
C1418-16	Front Right Hand Sensor Voltage, Component or System Low Voltage	/		/
C1419-16	Rear Left Hand Sensor Voltage, Component or System Low Voltage	/		/
C141A-16	Rear Right Hand Sensor Voltage, Component or System Low Voltage	/		/
C142A-49	Receiver Internal Electronic Failure	/	CAN system fault	/

DTC Diagnosis Procedure

DTC	**C1403-29**	**Front Left Hand Sensor Signal Invalid**
DTC	**C1404-29**	**Front Right Hand Sensor Signal Invalid**
DTC	**C1405-29**	**Rear Left Hand Sensor Signal Invalid**
DTC	**C1406-29**	**Rear Right Hand Sensor Signal Invalid**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check power supply voltage of body control module

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Using a digital multimeter, measure voltage between power supply terminal of body control module and ground.

(b) Power supply voltage should be not less than 12 V.

NG → **Check and repair battery and power supply system.**

OK ↓

2	Check body control module ground circuit

(a) Check if the body control module ground is loose or corroded.

NG → **Tighten or replace body control module ground circuit.**

OK ↓

3	Check configuration of tire pressure monitoring system

(a) After configuration is finished, drive vehicle with a speed higher than 30 km/h for a period of time.

NG → **Reconfigure tire pressure sensor of malfunctioning wheel.**

OK ↓

4	Check tire pressure sensor of malfunctioning wheel

(a) After replacement, perform configuration and test.

NG → **Replace tire pressure sensor of malfunctioning wheel.**

OK ↓

5	Check Body Control Module (BCM)

(a) After replacement, it is necessary to perform configuration.

NG → **Repair or replace Body Control Module (BCM).**

OK → **System operates normally.**

DTC	**C1403-55**	**Front Left Hand Sensor Not Configured**
DTC	**C1404-55**	**Front Right Hand Sensor Not Configured**
DTC	**C1405-55**	**Rear Left Hand Sensor Not Configured**
DTC	**C1406-55**	**Rear Right Hand Sensor Not Configured**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check power supply voltage of body control module**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Using a digital multimeter, measure voltage between power supply terminal of body control module and ground.

(b) Power supply voltage should be not less than 12 V.

NG → **Check and repair battery and power supply system.**

OK

2	**Check body control module ground circuit**

(a) Check if the body control module ground is loose or corroded.

NG → **Tighten or replace body control module ground circuit.**

OK

3	**Check configuration of tire pressure monitoring system**

(a) After configuration is finished, drive vehicle with a speed higher than 30 km/h for a period of time.

NG → **Reconfigure tire pressure sensor of malfunctioning wheel.**

OK

4	**Check body control module of malfunctioning wheel**

(a) After replacement, perform configuration and test.

NG → **Replace body control module of malfunctioning wheel.**

OK

5	Check tire pressure sensor of malfunctioning wheel

(a) After replacement, it is necessary to perform configuration.

NG → **Replace tire pressure sensor of malfunctioning wheel.**

OK → **System operates normally.**

DTC	C1403-96	Front Left Hand Sensor Component Internal Fail
DTC	C1404-96	Front Right Hand Sensor Component Internal Fail
DTC	C1405-96	Rear Left Hand Sensor Component Internal Fail
DTC	C1406-96	Rear Right Hand Sensor Component Internal Fail

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check power supply voltage of body control module

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Using a digital multimeter, measure voltage between power supply terminal of body control module and ground.

(b) Power supply voltage should be not less than 12 V.

NG → **Check and repair battery and power supply system.**

OK

2	Check body control module ground circuit

(a) Check if the body control module ground is loose or corroded.

NG → **Tighten or replace body control module ground circuit.**

OK ↓

3	Check configuration of tire pressure monitoring system

(a) After configuration is finished, drive vehicle with a speed higher than 30 km/h for a period of time.

NG → **Reconfigure tire pressure sensor of malfunctioning wheel.**

OK ↓

4	Check body control module of malfunctioning wheel

(a) After replacement, perform configuration and test.

NG → **Replace body control module of malfunctioning wheel.**

OK ↓

5	Check tire pressure sensor of malfunctioning wheel

(a) After replacement, it is necessary to perform configuration.

NG → **Replace tire pressure sensor of malfunctioning wheel.**

OK → **System operates normally.**

DTC	**C1413-98**	**Front Left Hand Tire Temperature Component or System Over Temperature**
DTC	**C1414-98**	**Front Right Hand Tire Temperature Component or System Over Temperature**
DTC	**C1415-98**	**Rear Left Hand Tire Temperature Component or System Over Temperature**
DTC	**C1416-98**	**Rear Right Hand Tire Temperature Component or System Over Temperature**

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check power supply voltage of body control module**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Using a digital multimeter, measure voltage between power supply terminal of body control module and ground.

(b) Power supply voltage should be not less than 12 V.

NG → **Check and repair battery and power supply system.**

OK ↓

2	**Check body control module ground circuit**

(a) Check if the body control module ground is loose or corroded.

NG → **Tighten or replace body control module ground circuit.**

OK ↓

3	**Check configuration of tire pressure monitoring system**

(a) When the temperature of one or more tires is higher than 85 ˚C and the vehicle is continuously driving with a speed higher than 30 Km/h for certain period of time, the system will send a high temperature alarm.

(b) When a high temperature alarm occurs, stop vehicle to cool the tire naturally, otherwise there is a danger of accident.

(c) When tire temperature is too high, never cool the tire by pouring cold water, otherwise, tire may be damaged, resulting in an accident.

(d) When the vehicle is continuously driving with a speed higher than 30 Km/h for certain period of time and tire temperature is less than 85 ˚C, the high temperature alarm can be deactivated automatically.

NG → **Cool down naturally.**

OK ↓

4	**Check body control module of malfunctioning wheel**

(a) After replacement, perform configuration and test.

NG → **Replace body control module of malfunctioning wheel.**

OK

5	Check tire pressure sensor of malfunctioning wheel

(a) After replacement, it is necessary to perform configuration.

NG → **Replace tire pressure sensor of malfunctioning wheel.**

OK → **System operates normally.**

DTC	**C1417-16**	**Front Left Hand Sensor Voltage, Component or System Low Voltage**
DTC	**C1418-16**	**Front Right Hand Sensor Voltage, Component or System Low Voltage**
DTC	**C1419-16**	**Rear Left Hand Sensor Voltage, Component or System Low Voltage**
DTC	**C141A-16**	**Rear Right Hand Sensor Voltage, Component or System Low Voltage**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check power supply voltage of body control module

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Using a digital multimeter, measure voltage between power supply terminal of body control module and ground.

(b) Power supply voltage should be not less than 12 V.

NG → **Check and repair battery and power supply system.**

OK

2	Check body control module ground circuit

(a) Check if the body control module ground is loose or corroded.

NG → **Tighten or replace body control module ground circuit.**

OK

3	Check if tire pressure information is displayed

(a) If tire pressure information of malfunctioning wheel is still not displayed, it is necessary to replace tire pressure sensor.

NG → **Replace tire pressure sensor.**

OK

4	Check body control module of malfunctioning wheel

(a) After replacement, perform configuration and test.

NG → **Replace body control module of malfunctioning wheel.**

OK → **System detection is normal.**

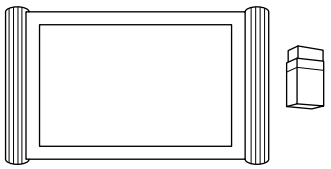
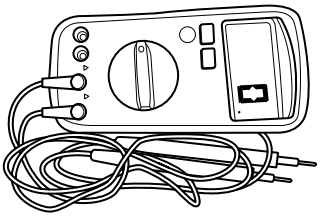
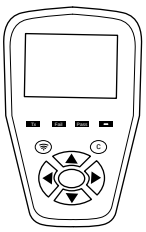
DTC	C142A-49	Receiver Internal Electronic Failure

⚠ Caution

- When above DTCs occur, perform inspection on CAN system of entire vehicle to find out the trouble area and perform troubleshooting.

On-vehicle Service

Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Digital Multimeter	 RCH0002006
Low Frequency Trigger	 RCH009806

Torque Specifications

Description	Torque (N·m)
Body Control Module Fixing Nut	5 ± 1
Tire Pressure Sensor Fixing Nut	5 ± 1

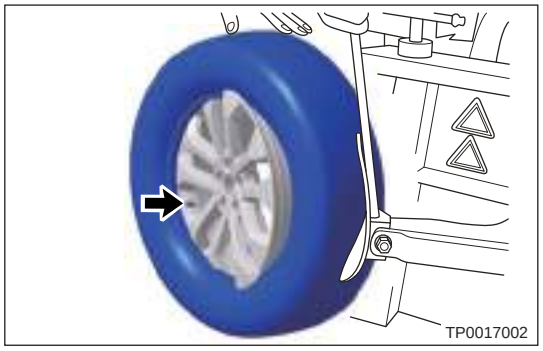
Tire

Removal

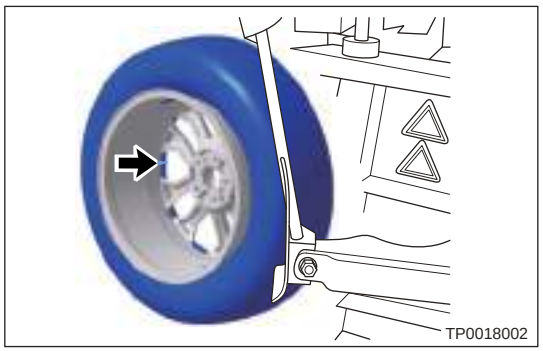
1. Remove tire and deflate tire completely.

   Hint:
   During tire bead breaking, follow the operation specification, never damage the tire pressure sensor.

2. Keep one side with tire pressure sensor 30 cm away from separation shovel (arrow), and put shovel block between rim and tire, then depress the pedal to separate rim and tire.



3. Turn over tire to keep one side with tire pressure sensor 30 cm away from separation shovel (arrow), and put shovel block between rim and tire, then depress the pedal to separate rim and tire.



4. Lock tire on wheel, lower replacer head and keep it 5 - 15 cm away from sensor.

5. Use crowbar to pry out outside tire, and sleeve it to replacer head, then take away crowbar.

   Hint:
   Both crowbar and tire cannot contact with sensor!

6. Remove the wheel.

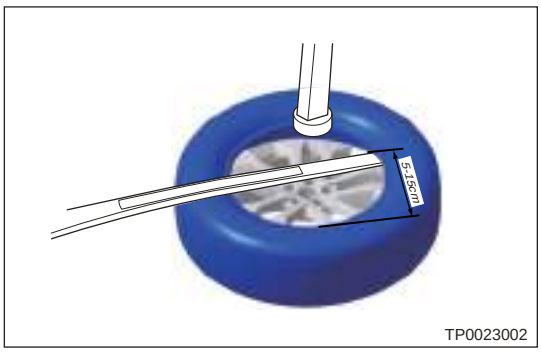
a. Rotate wheel, and the movable direction of wheel should be the direction that replacer head is gradually kept away from tire pressure sensor (rotation arrow), then remove upper part of tire.


TP0021002

b. Lift tire and pry out lower part of tire using crowbar.

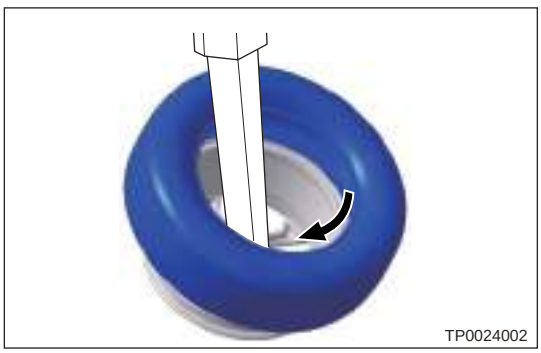

TP0022002

c. Lower replacer head and pry out lower side tire tread using crowbar, then sleeve it on replacer head and keep it 5 - 15 cm away from sensor.



TP0023002

d. Rotate wheel, and the movable direction of wheel should be the direction that replacer head is gradually kept away from tire pressure sensor (rotation arrow), then pry out tire completely.


TP0024002

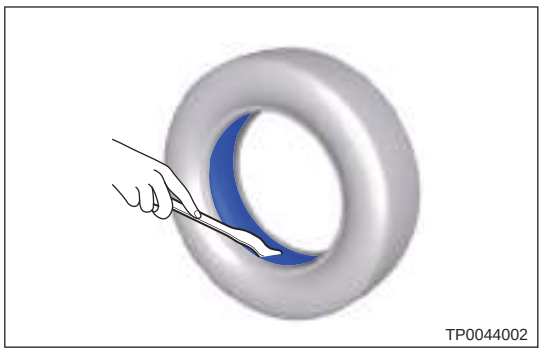
Installation

⚠ Caution

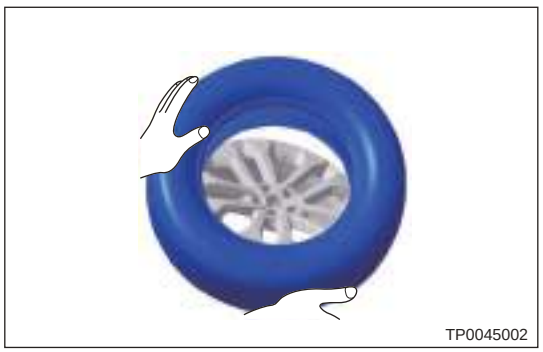
- Be sure to observe the operation regulation to prevent tire pressure sensor from being damaged.
- Both crowbar and tire cannot contact with sensor.
- Confirm that distance between intersection and valve stem is proper.

1. When the tire is packaged, the position of the tire pressure sensor should be 270° ± 10°, so as not to damage the tire pressure sensor directly or indirectly during the installation process.

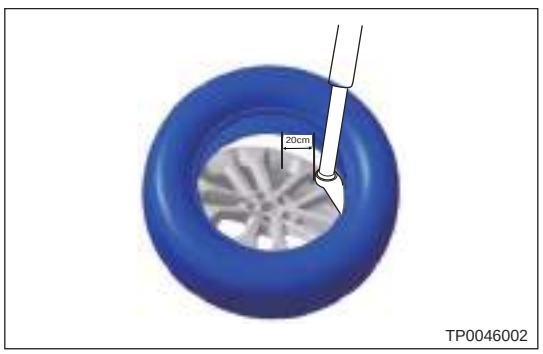
2. Installation is the same as common tire. Before loading tire, apply soapy water or glycerin to tire bead along inner circle.


TP0044002

3. Put tire on hub and keep intersection between hub and tire edge 15 - 20 cm away from valve stem.

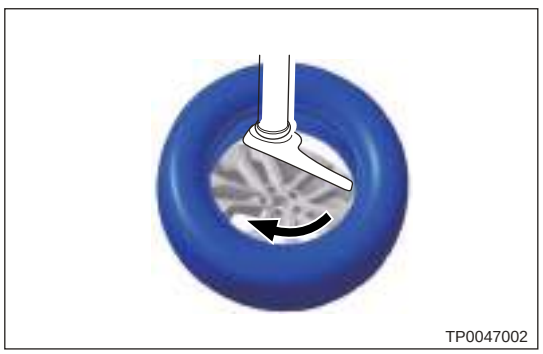

TP0045002

4. Install bottom tire to make sure the distance between intersection and valve stem is about 20 cm.



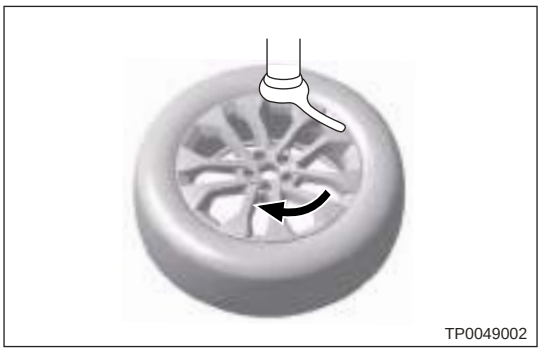
TP0046002

5. Rotate wheel to install one side of tire into hub. Rotation direction of wheel (rotation arrow) should be the direction that makes replacer head get farther and farther away from sensor.


TP0047002

6. Put another side of tire in place, so that intersection between tire edge and hub is 20 cm away from valve stem. Curving arrow indicates rotation direction of wheel.

7. Rotate wheel to install another side of tire into hub.



Tire Pressure Sensor

Removal

⚠ Caution

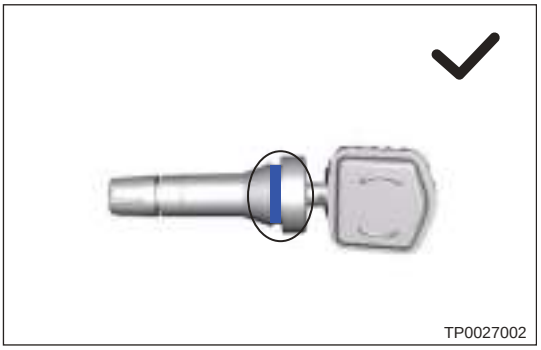
- Avoid dropping the sensor. If tire pressure sensor is dropped from a place 1m high to the ground, it is interpreted as fault in tire pressure sensor.
- Tire pressure sensor must be installed on clean and dry hub.
- Valve cap must be on the valve, except inflation, deflation, air pressure inspection, etc.
- Sensor air pressure inlet cannot be covered partially or completely by lubricant or other materials.
- During removal and installation of tire, used tools cannot contact with tire pressure sensor, and tires cannot extrude tire pressure sensor, to avoid damage to the tire pressure sensor.

1. Remove tire from wheel hub.
2. Remove tire pressure sensor from wheel hub.

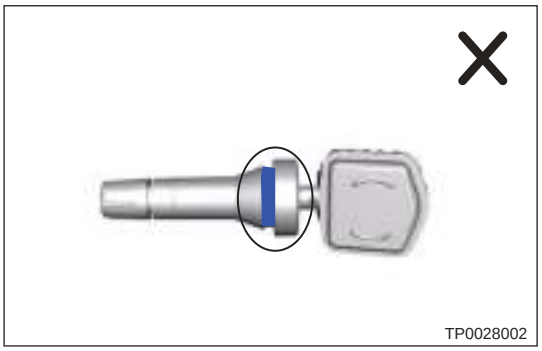
Installation

1. Adjust plane direction of seal washer cutout.
   a. When removing sensor body, first check if seal washer cutout plane is parallel with the polyester plane. If they are not parallel and there is an angle between two planes, turn seal washer to make seal washer cutout plane parallel with polyester plane.

b. If seal washer cutout plane is parallel with polyester plane, it indicates that assembly is qualified.


TP0027002

c. If seal washer cutout plane is not parallel with polyester plane and there is a large angle between two planes, it indicates that assembly is not qualified.


TP0028002

2. Insert valve stem of tire pressure sensor into hub.

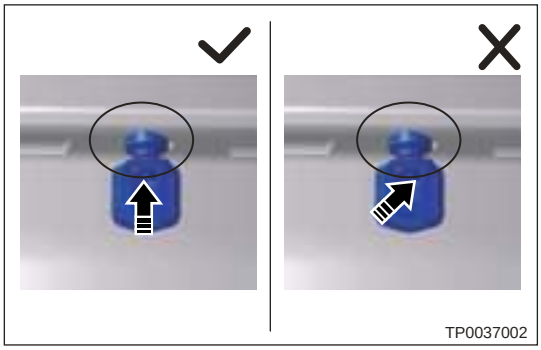
a. If valve stem is fully seated into the groove, sensor is fully fixed without any movement and sensor housing is pressed against rim firmly, it indicates that assembly is qualified.


TP0035002

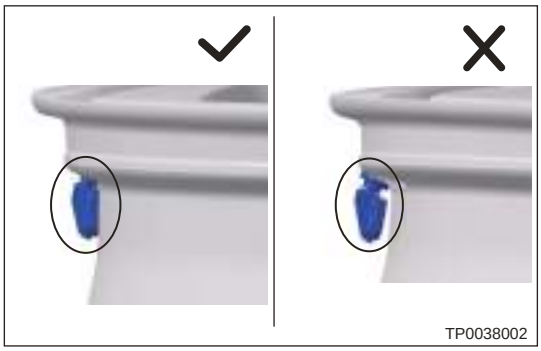
b. If the pretightened nut is not tightened into place with too much valve stem screw exposed and sensor is not fixed, it indicates that assembly is unqualified.


TP0036002

c. If the sensor valve stem slides out form metal groove after a horizontal inward component force is applied, it indicates that assembly is unqualified.



d. If right side of sensor is not pressed against the rim firmly, it indicates that assembly is unqualified.



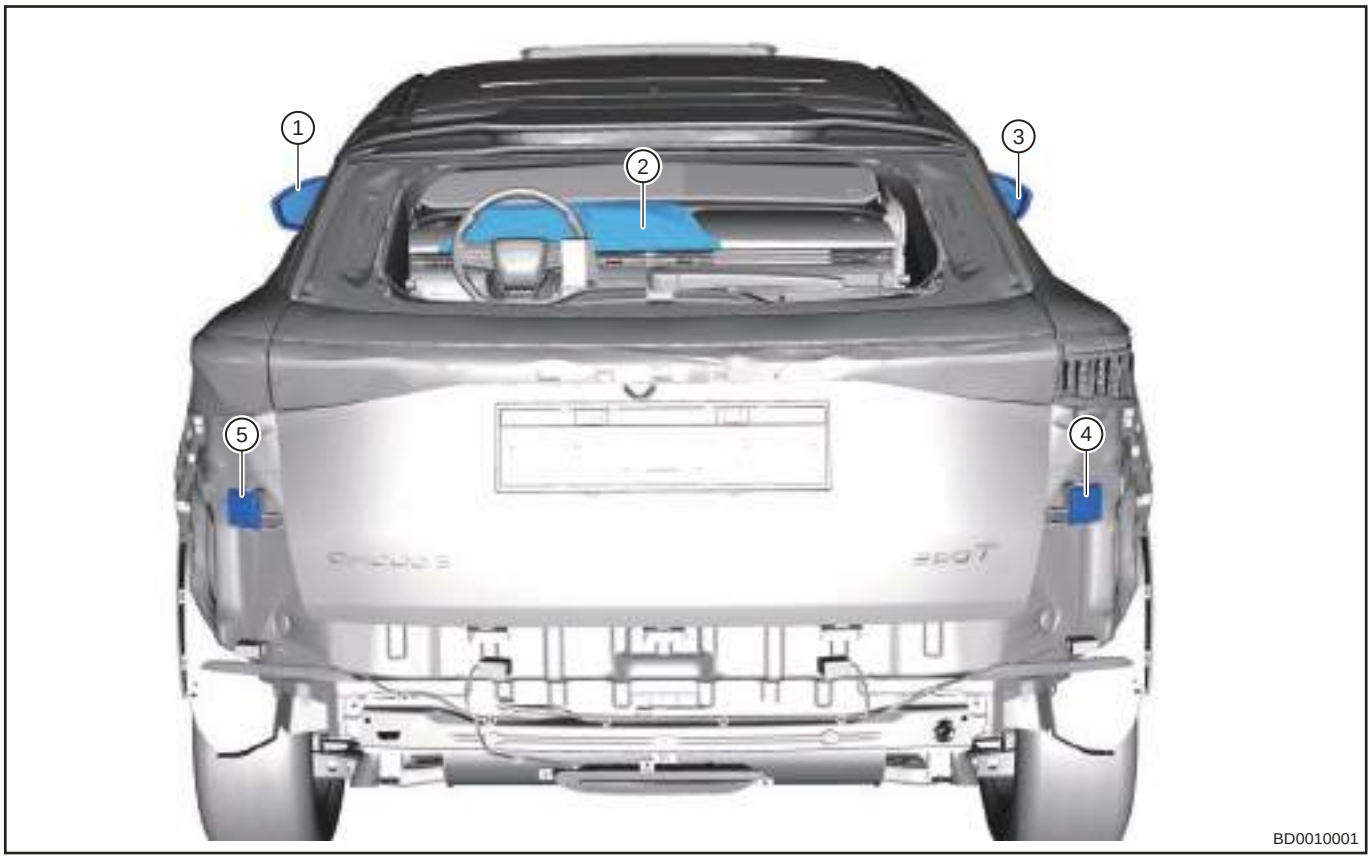
e. If left side of sensor is pressed against the rim firmly, it indicates that assembly is qualified.

f. If left side of sensor is not pressed against the rim firmly, it indicates that assembly is unqualified.

BLIND SPOT DETECTION STSTEM

System Overview

Description



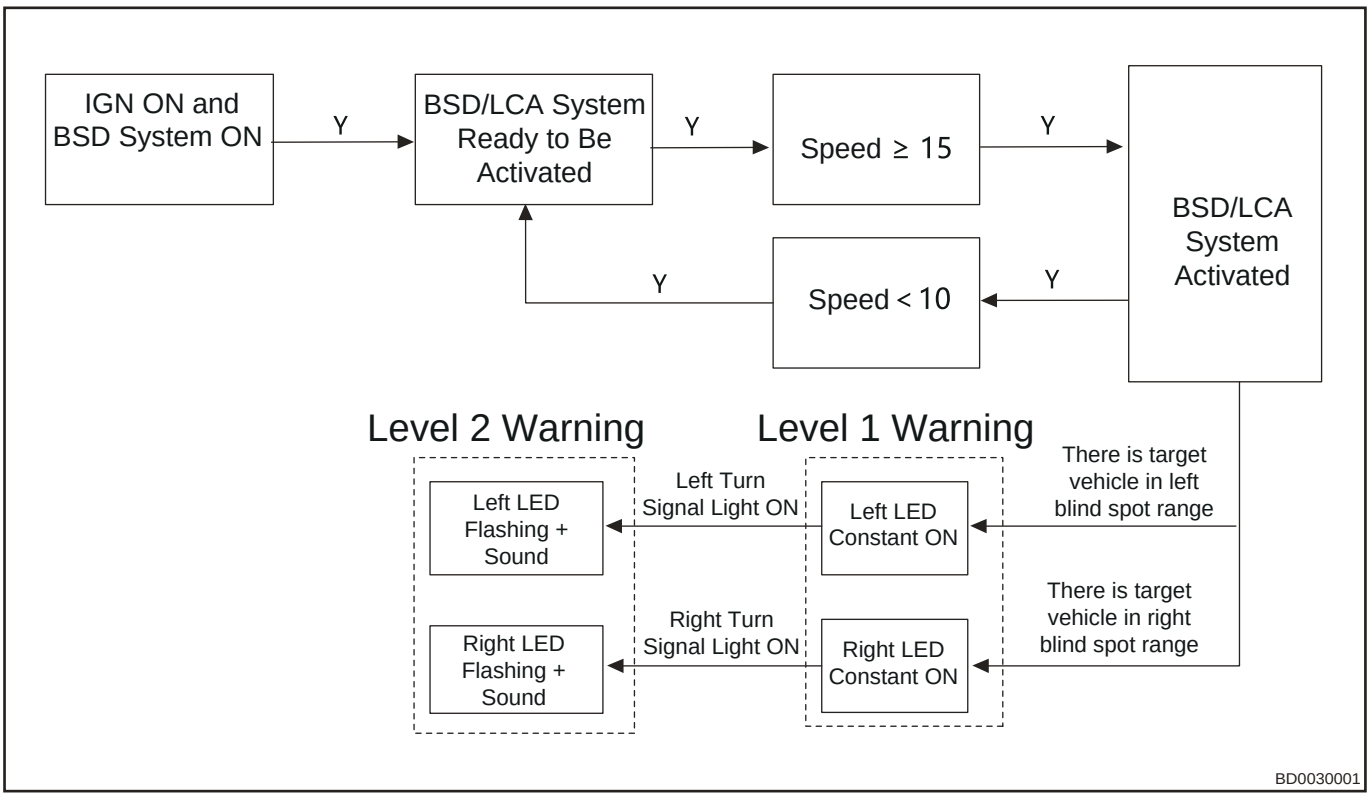
1	Left LED Light	2	Hyperscreen
3	Right LED Light	4	Sub Blind Spot Detection Module
5	Master Blind Spot Detection Module		

System Principle

Blind spot detection (SBD), door open collision warning system (DOW) and rear approach warning system (RCW) are turned on/off by audio head unit. Main blind spot detection radar/sub blind spot detection radar collects wheel speed signal, door open signal, gear signal, turn signal light signal and ENGINE START STOP switch status signal through CAN line. Outside rear view mirror LED indicator and rear door LED indicator operate and instrument cluster displays relevant warning information through data requirements analysis.

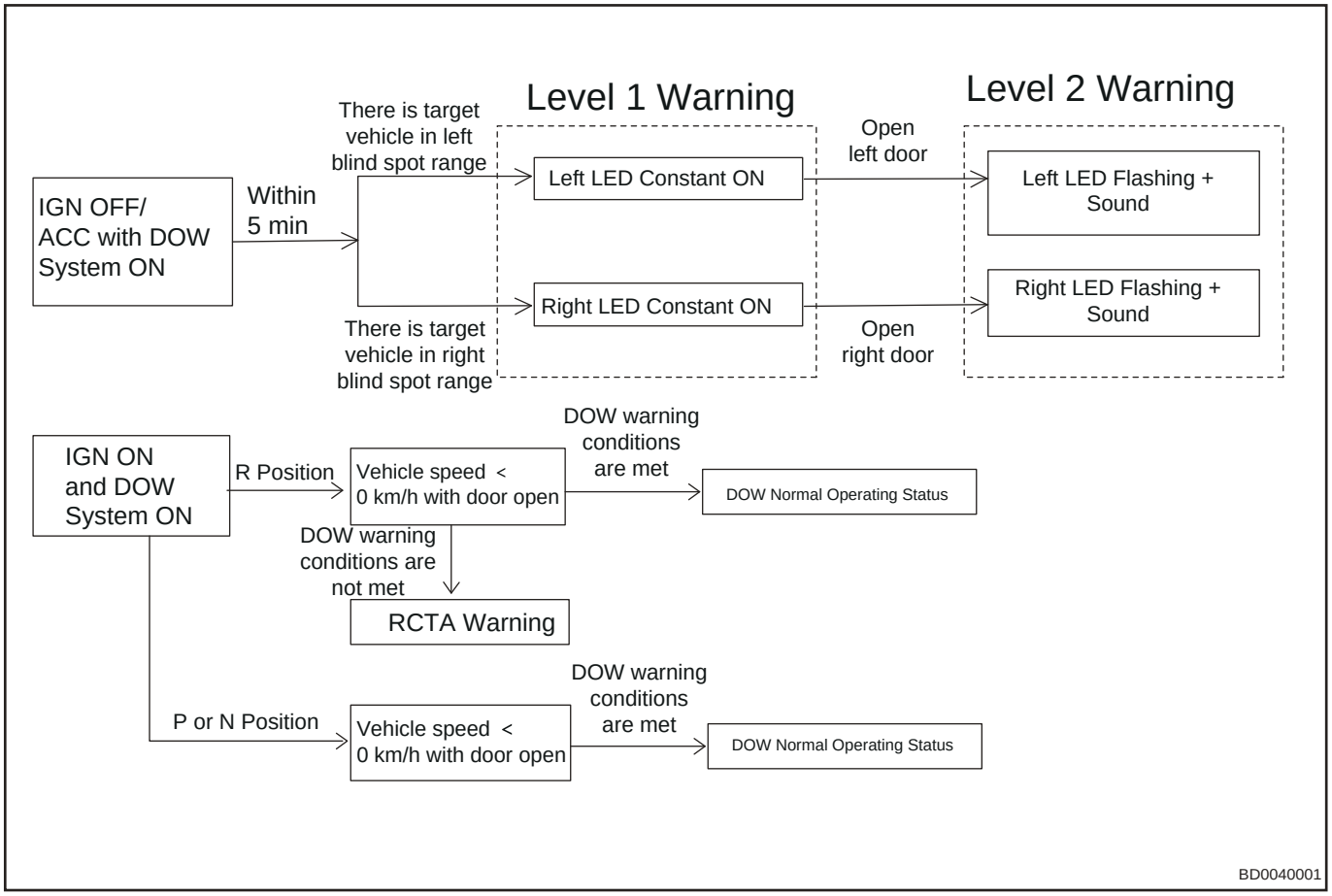
System Function

Blind Spot Detection (BSD)/Lane Change Assist (LCA)



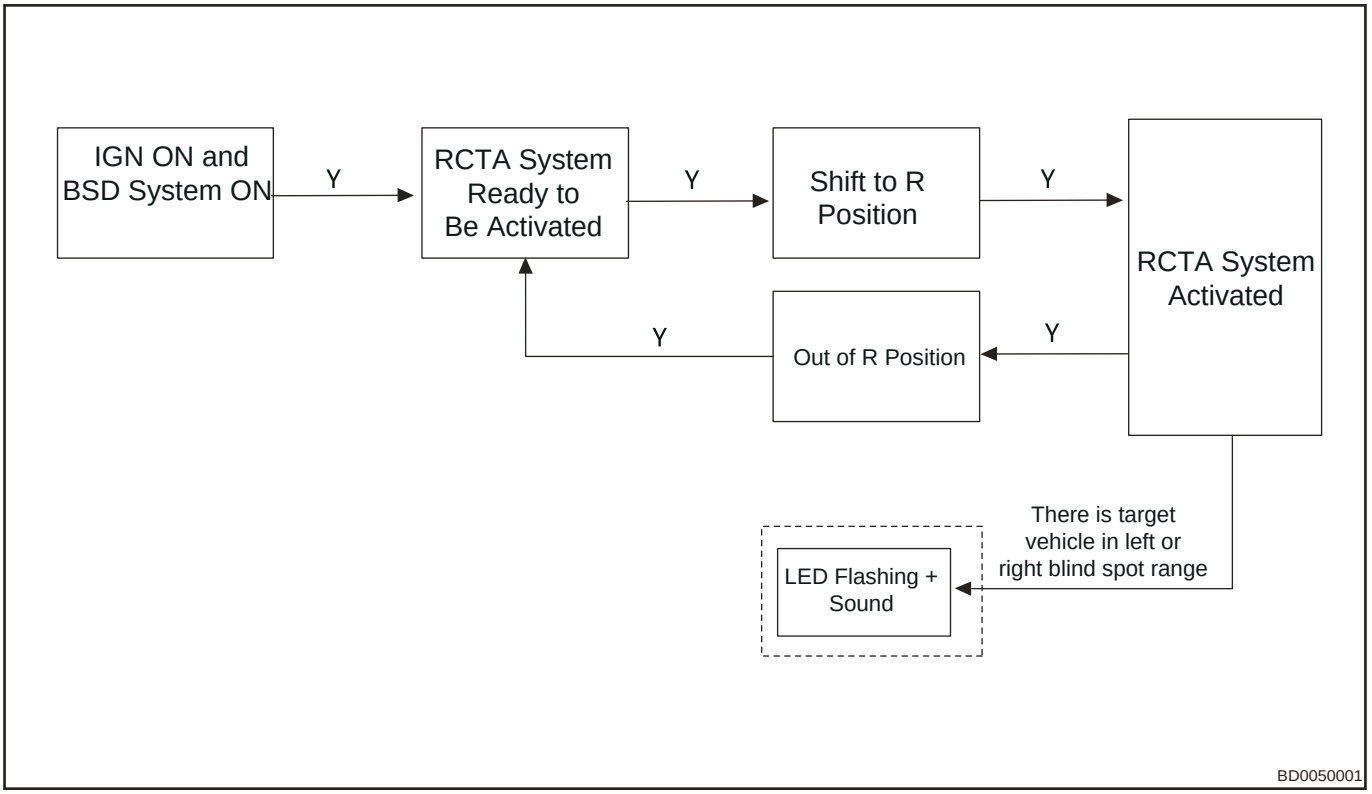
Blind spot detection/lane change assist monitors whether there are moving vehicles in the rear area of left and right sides of vehicle, and sends the information to driver to remind the driver to pay attention to driving safety and lane change safety. This system also extends door open collision warning system, rear cross traffic alert and rear approach warning system.

Door Open Collision Warning System (DOW)



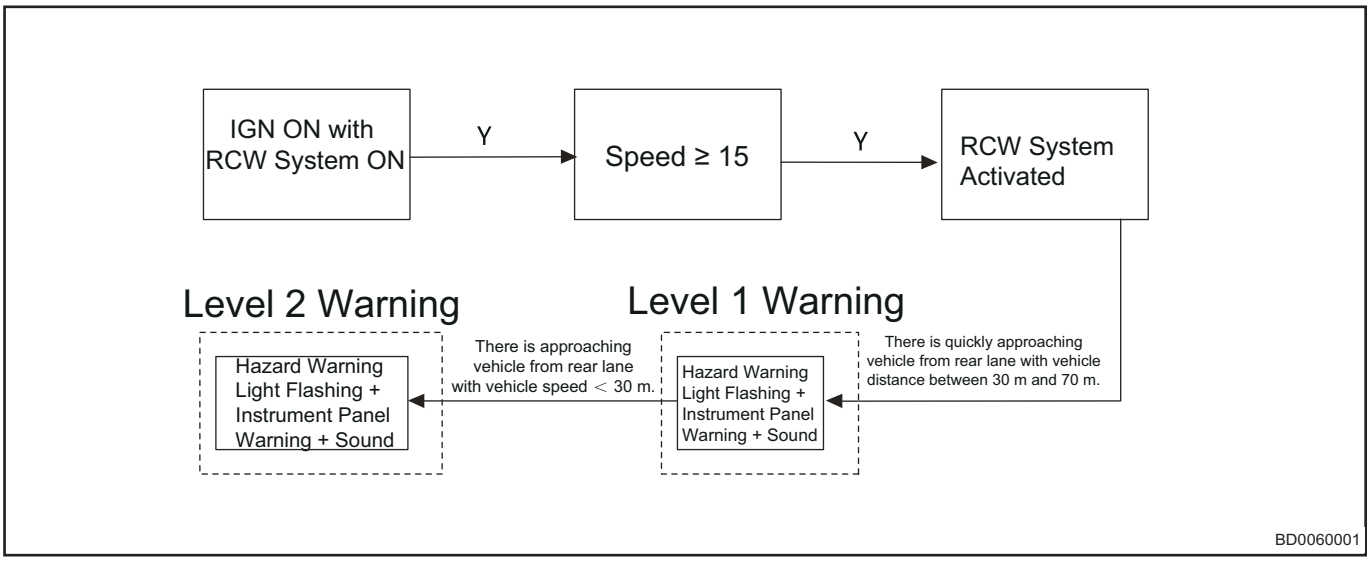
When the vehicle is stationary, blind spot detection detects that there are approaching vehicles on left and right sides and the door is opened, door open collision warning system will give an alarm to remind the driver/occupant to pay attention to the vehicle from rear side when exiting the vehicle to avoid collision.

Rear Cross Traffic Alert (RCTA)



When reversing (shift lever is in R), blind spot detection detects that there are approaching vehicles on left and right sides, it sends the information to driver to remind the driver to pay attention to the vehicle from rear side to avoid collision.

Rear Approach Warning System (RCW)



When driving, blind spot detection detects that there is a rapid approach in the rear of vehicle and there is a danger of rear collision with this vehicle, it sends the information to driver to remind the driver of this vehicle and following vehicle to avoid collision.

Component Operation Description

Main/Sub Blind Spot Detection Radar

Blind spot detection uses 77 GHz microwave radar technology to detect through the principle of ultrasonic reflection. Main/sub blind spot detection radar sends out ultrasonic and receive back wave from obstacle,

control module calculates obstacle position and distance according to ultrasonic distance measuring principle, and sends data to display terminal to remind.

Diagnosis & Testing

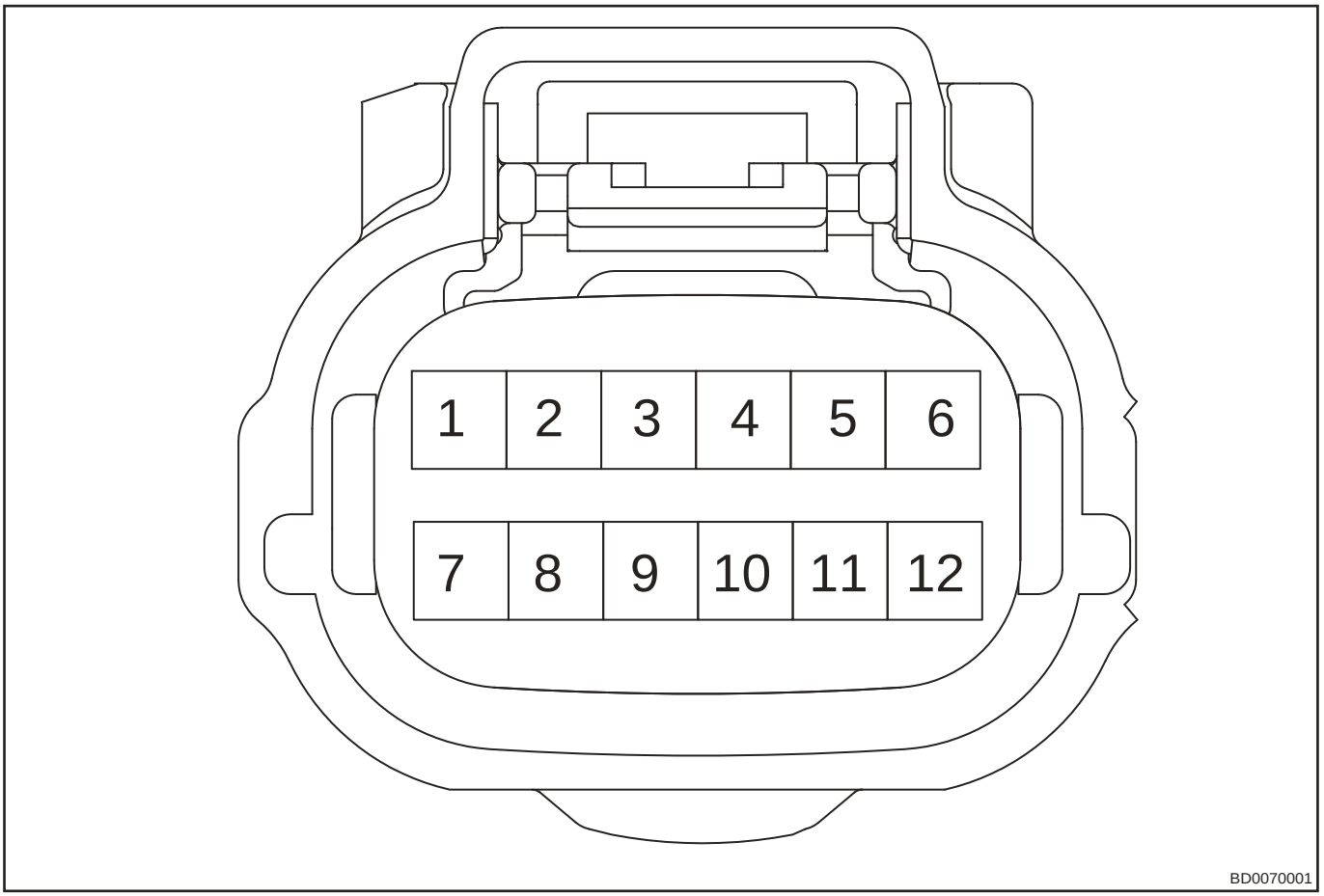
Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair or adjust faulty components, or replace as necessary.

Symptom	Possible Cause
Blind spot detection (BSD) malfunction indicator comes on	Fuse
	Wire harness fault
	Main/sub blind spot detection radar
Blind spot detection (BSD) operates abnormally	Main/sub blind spot detection radar
	Main/sub blind spot detection radar is obstructed or shielded
CAN network fault	Fuse
	Wire harness fault
	Central gateway (CGW)
	Main/sub blind spot detection radar

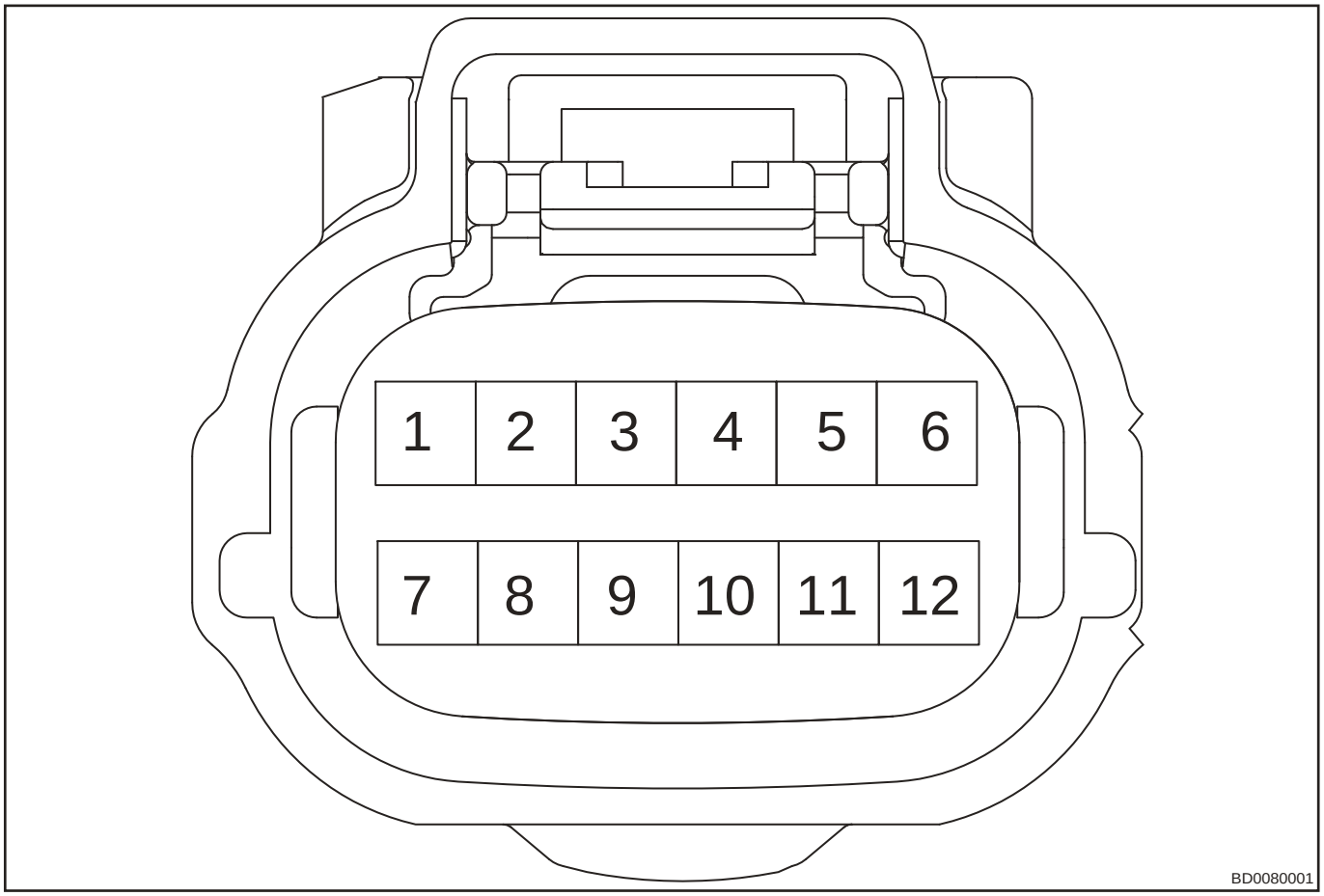
Blind Spot Detection Module Terminal Definition

Main Blind Spot Detection



PIN	Description	PIN	Description
1	DA-CAN H	2	DA-CAN L
3	Internal CAN-H	4	Internal CAN-L
5	-	6	-
7	Ground	8	KL30
9	Left Side BSD Indicator Signal	10	-
11	Ground	12	-

Sub Blind Spot Detection



PIN	Description	PIN	Description
1	DA-CAN H	2	DA-CAN L
3	Internal CAN-H	4	Internal CAN-L
5	-	6	-
7	Ground	8	KL30
9	Right Side BSD Indicator Signal	10	-
11	Ground	12	Ground

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to LOCK.
2. Connect diagnostic tester (the latest software) to diagnostic interface.
3. Connect diagnostic tester (the latest software) to diagnostic interface.
4. Use the diagnostic tester to record and clear DTCs stored in the blind spot detection system.
5. Turn ENGINE START STOP switch to LOCK and wait for a few seconds.
6. Turn ENGINE START STOP switch to ON, and then select read DTC.
7. If DTC is detected, it indicates current malfunction. Go to inspection procedure - Step 1.
8. If no DTC is detected, malfunction indicated by the DTC is intermittent.

Diagnostic Help

1. Connect diagnostic tester X-431 3G (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all CD system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnostic Trouble Code (DTC) Chart

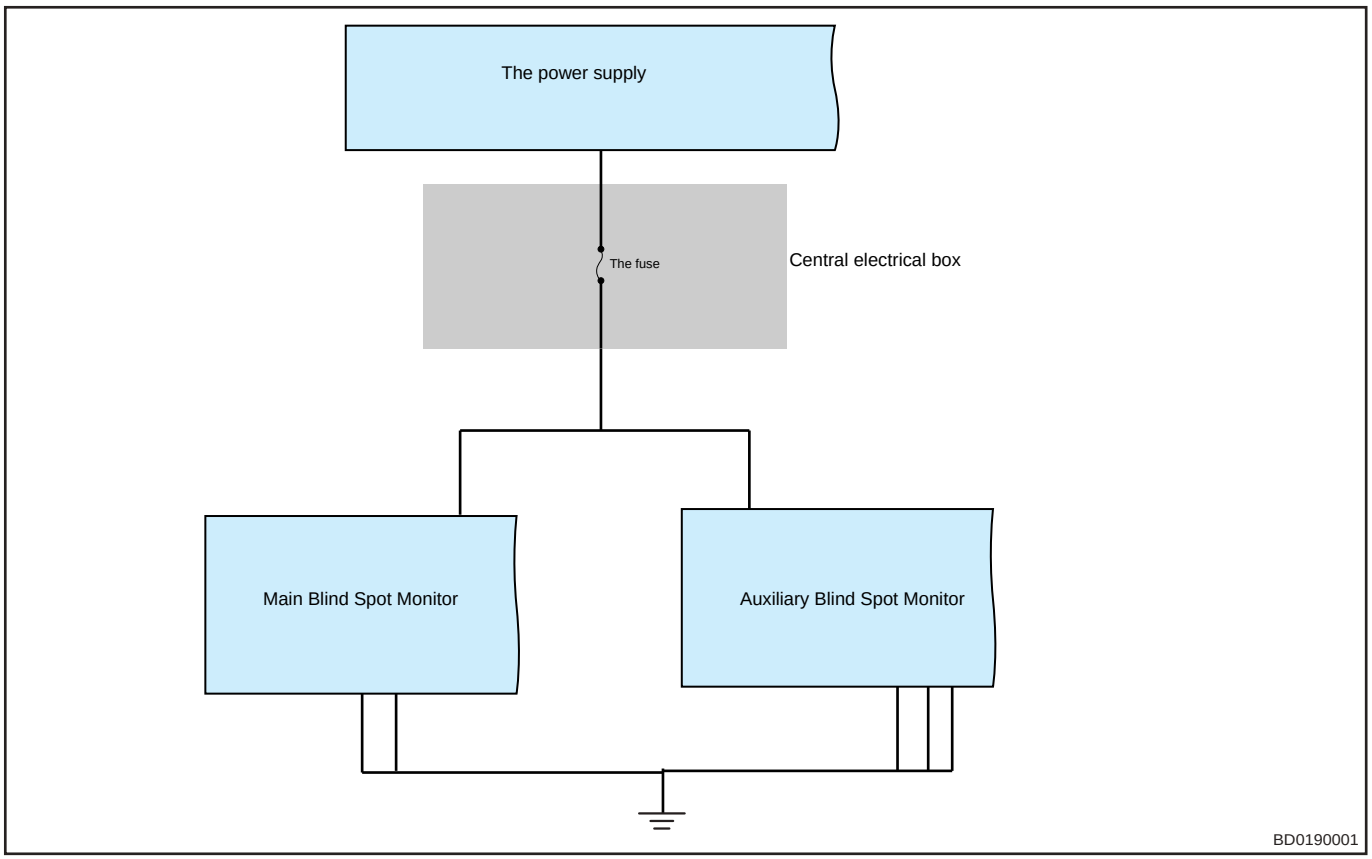
DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
C1700-16	Low Power Supply Voltage	/	Battery, alternator or wire harness	Check battery, alternator or wire harness
C1701-17	High Power Supply Voltage	/	Battery, alternator or wire harness	Check battery, alternator or wire harness
C1702-76	Radar Installation Angle Failure	/	Installation error	Check installation of BSD
C1703-11	LED Short Circuit Fault	/	Outside rear view mirror indicator or wire harness	Check outside rear view mirror BSD indicator
C1704-92	Radar Blockage	/	Radar is blocked	Remove foreign object from radar surface
C1705-56	Invalid Configuration	/	Software configuration error	Check software configuration
U0073-88	VCAN Bus Off	/	Refer to “CAN” system	Check CAN bus or replace ECU
U1162-87	Lost Communication with FCM	/		Check CAN bus or replace ECU
U0129-87	Lost Communication with BSM	/		Check CAN bus or replace ECU
U0140-87	Lost Communication with BCM	/		Check CAN bus or replace ECU
U0100-87	Lost Communication with EMS	/		Check CAN bus or replace ECU
U0155-87	Lost Communication with ICM	/		Check CAN bus or replace ECU
U0101-87	Lost Communication with TCU	/		Check CAN bus or replace ECU
U1405-81	Invalid Data Received from FCM	/		Check CAN bus or replace ECU
U0418-81	Invalid Data Received from BSM	/		Check CAN bus or replace ECU

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U0422-81	Invalid Data Received from BCM	/		Check CAN bus or replace ECU
U0401-81	Invalid Data Received from EMS	/		Check CAN bus or replace ECU
U0423-81	Invalid Data Received from ICM	/		Check CAN bus or replace ECU
U0402-81	Invalid Data Received from TCU	/		Check CAN bus or replace ECU
U3000-51	Calibration File Not Refreshed	/	Calibration file is not refreshed	(1) Refresh correct software and calibration file again (2) Power on again and wait for 5 seconds (3) Clear DTC (4) Read DTC. If there is no DTC: ECU can be reused. If DTC is still active: (5) Replace ECU
U1300-55	CAN Not Configured	/	Not configured	Check vehicle CAN configuration

DTC Diagnosis Procedure

DTC	C1700-16	Low Power Supply Voltage
DTC	C1701-17	High Power Supply Voltage

Description
Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

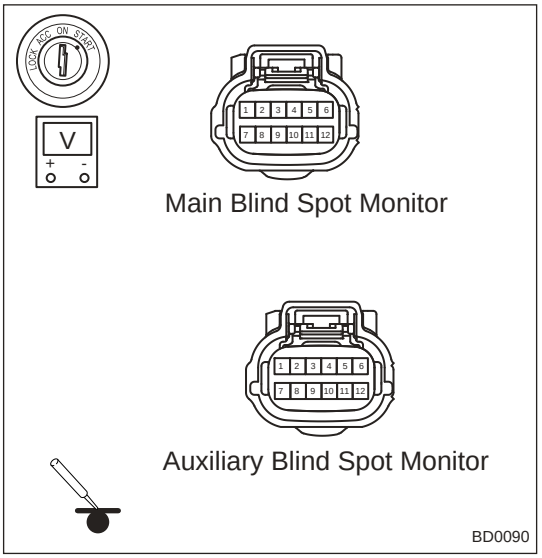
Use circuit diagram as a guide to perform the following inspection procedures:
(a) Check fuse

NG → **Replace fuse**

OK

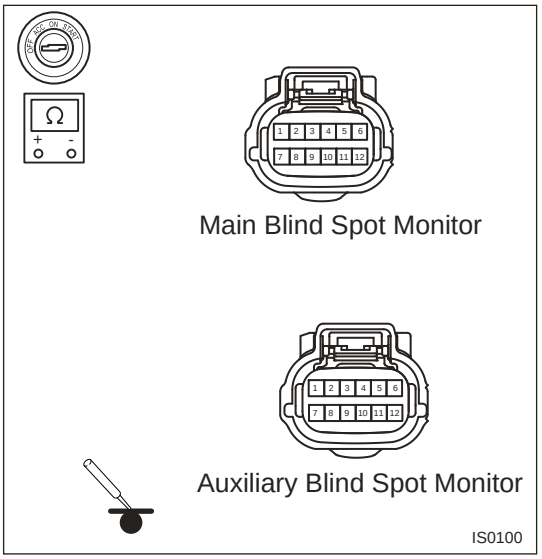
2	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to “OFF”, and disconnect the negative battery cable.
(b) Disconnect main blind spot detection module connector and sub blind spot detection module connector.
(c) Turn ENGINE START STOP switch to ON.
(d) Using ohm band of multimeter, check the voltage between main blind spot detection module power supply terminal and body ground, sub blind spot detection module power supply terminal and body ground separately.



Multimeter Connection	Condition	Specified Condition
Main blind spot detection module (power supply terminal) - Body ground	ENGINE START STOP switch OFF	Not less than 12 V
Sub blind spot detection module (power supply terminal) - Body ground		Not less than 12 V

(e) Using ohm band of multimeter, check the resistance between main blind spot detection module ground terminal and body ground, sub blind spot detection module ground terminal and body ground separately.



Multimeter Connection	Condition	Specified Condition
Main blind spot detection module (ground terminal) - Body ground	ENGINE START STOP switch OFF	⩽ 1 Ω
Sub blind spot detection module (ground terminal) - Body ground		⩽ 1 Ω

NG → **Repair or replace faulty wire harness**

OK

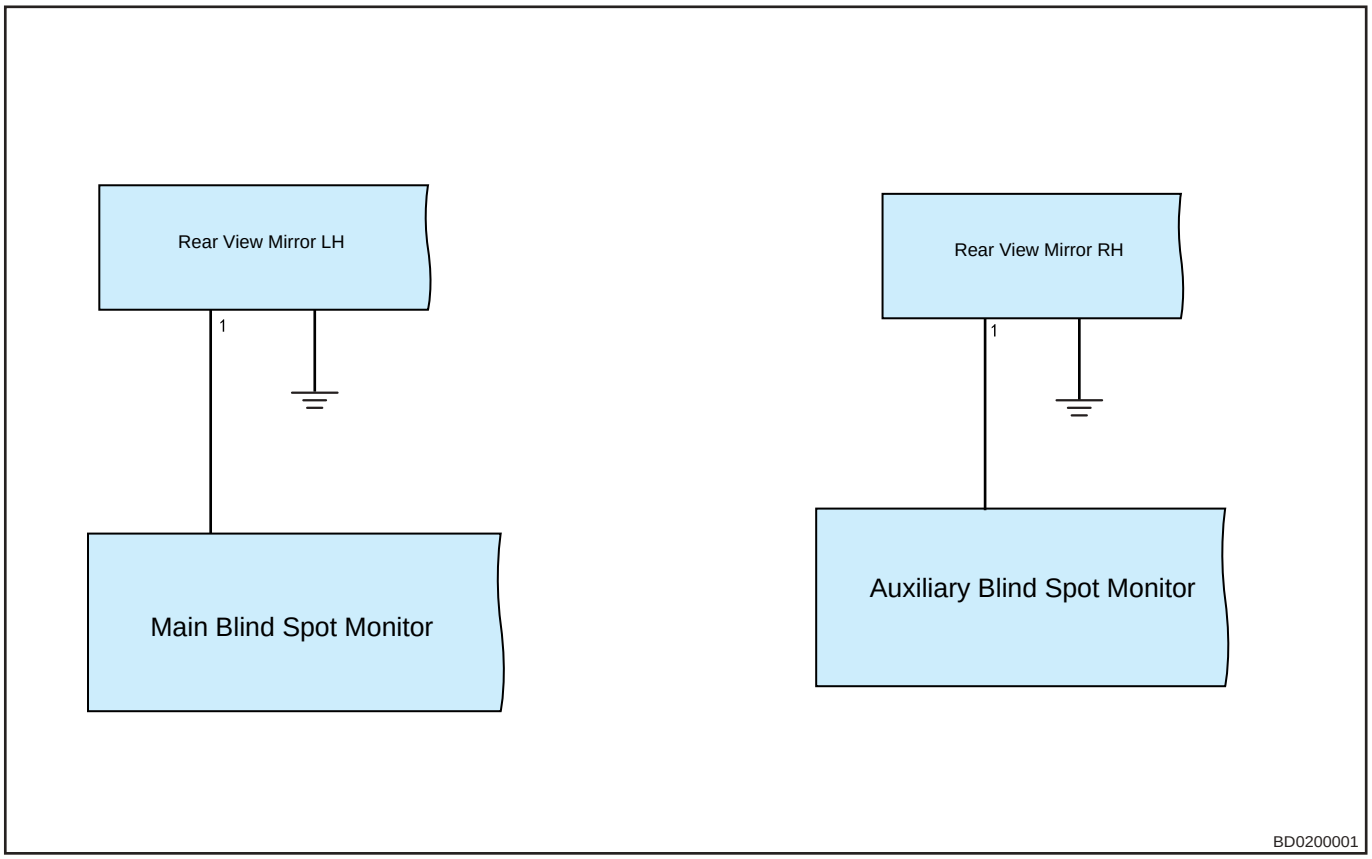
3	**Confirm DTCs again**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

OK	**Confirm that system is normal**
NG	**Replace main/sub blind spot detection module**

DTC	C1703-11	LED Short Circuit Fault

Description
System Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

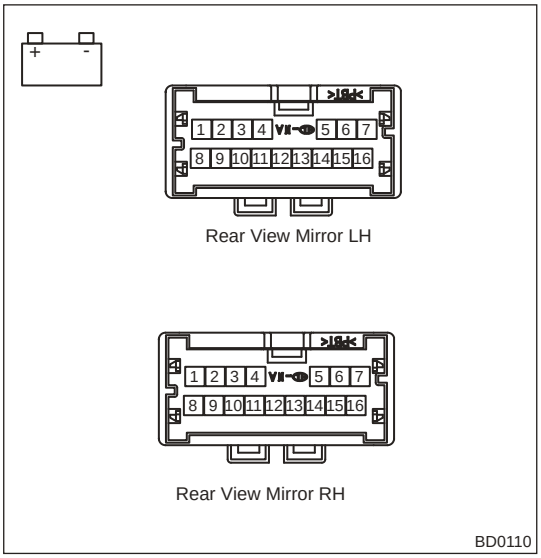
1	**Check LED light**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn off all electrical equipment and ENGINE START STOP switch.

(b) Disconnect the negative battery cable.

(c) Check if LED light comes on by connecting the positive battery cable to power supply terminal of front right power rear view mirror (power supply terminal of front left power mirror), and negative battery cable to ground terminal of left/right rear view mirror.



Multimeter Connection	Condition	Specified Condition
Left rear view mirror (power supply terminal) - Positive battery cable, left view mirror (ground terminal) - Negative battery cable	Always	LED light comes on
Right rear view mirror (power supply terminal) - Positive battery cable, right view mirror (ground terminal) - Negative battery cable		LED light comes on

NG → **Replace power rear view mirror/lens**

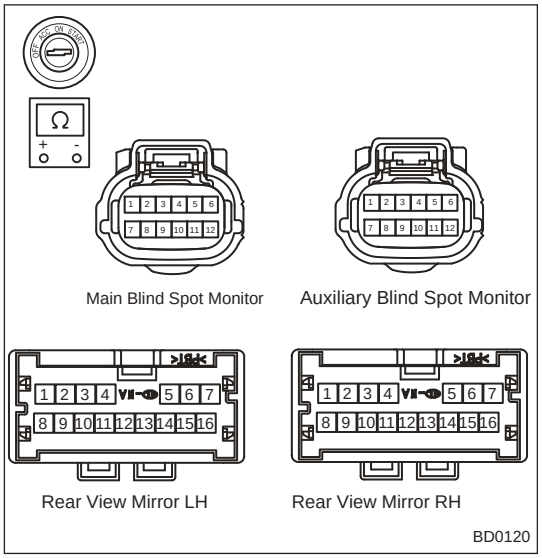
OK ↓

2	**Check wire harness and connector**

(a) Disconnect main and sub blind spot detection module, left and right rear view mirror connectors separately.

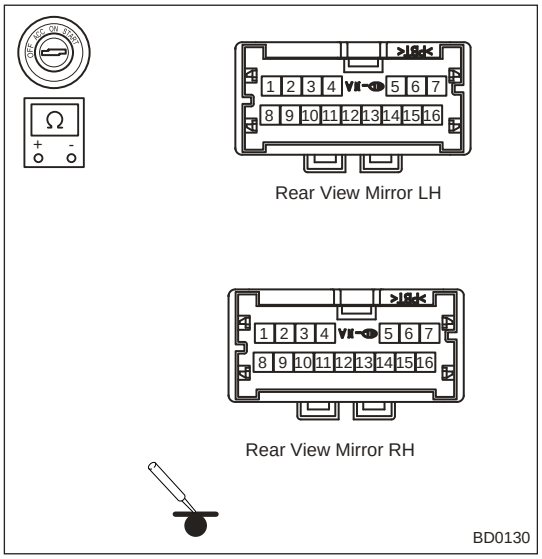
(b) Using ohm band of multimeter, check for continuity between main and sub blind spot detection modules, left and right rear view mirrors separately.

Multimeter Connection	Condition	Specified Condition
Main blind spot detection module (connected terminal) - Left rear view mirror (1)	ENGINE START STOP switch OFF	⩽ 1 Ω
Sub blind spot detection module (connected terminal) - Right rear view mirror (1)		⩽ 1 Ω



(c) Using ohm band of multimeter, check for continuity between left and right rear view mirror ground terminals and body ground separately.

Multimeter Connection	Condition	Specified Condition
Left rear view mirror (ground terminal) - Body ground	ENGINE START STOP switch OFF	⩽ 1 Ω
Right rear view mirror (ground terminal) - Body ground		⩽ 1 Ω



NG → **Repair or replace faulty wire harness**

OK

3	**Confirm DTCs again**

(a) Connect all the connectors.

(b) Connect the negative battery cable.

(c) Use diagnostic tester to clear DTCs.

(d) Start the engine.

(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG	**Replace sub blind spot detection module**

DTC	**C1702-76**	**Radar Installation Angle Failure**

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check installation of module**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn off all electrical equipment and ENGINE START STOP switch.

(b) Disconnect the negative battery cable.

(c) Check whether the module is improperly installed.

NG	**Reinstall it**

OK

2	**Confirm DTCs again**

(a) Connect all the connectors.

(b) Connect the negative battery cable.

(c) Use diagnostic tester to clear DTCs.

(d) Start the engine.

(e) Check if the same DTCs are still output.

OK	**Confirm that system is normal**
NG	**Replace blind spot detection module**

DTC	**C1704-92**	**Radar Blockage**

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check module**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn off all electrical equipment and ENGINE START STOP switch.

(b) Disconnect the negative battery cable.

(c) Check if module is blocked.

NG → **Remove obstruction**

OK

2	**Confirm DTCs again**

(a) Connect all the connectors.

(b) Connect the negative battery cable.

(c) Use diagnostic tester to clear DTCs.

(d) Start the engine.

(e) Check if the same DTCs are still output.

OK → **Confirm that system is normal**

NG → **Replace blind spot detection module**

DTC	**C1705-56**	**Invalid Configuration**

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTC and read DTC again.

(b) Check if DTCs occur again.

NG → **Rematch module.**

OK

2	**Reconfirm DTCs**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding malfunction diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new control module to check if fault reoccurs.**

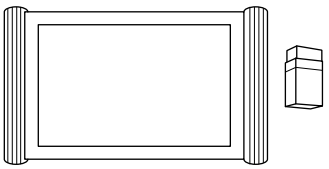
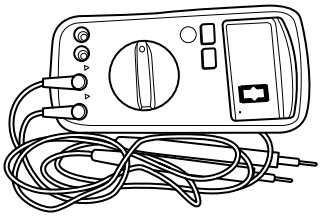
OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**U0073-88**	**VCAN Bus OFF**
DTC	**U1162-87**	**Lost Communication with FCM**
DTC	**U0129-87**	**Lost Communication with BSM**
DTC	**U0140-87**	**Lost Communication with BCM**
DTC	**U0100-87**	**Lost Communication with EMS**
DTC	**U0155-87**	**Lost Communication with ICM**
DTC	**U0101-87**	**Lost Communication with TCU**
DTC	**U1405-81**	**Invalid Data Received from FCM**
DTC	**U0418-81**	**Invalid Data Received from BSM**
DTC	**U0422-81**	**Invalid Data Received from BCM**
DTC	**U0401-81**	**Invalid Data Received from EMS**
DTC	**U0423-81**	**Invalid Data Received from ICM**
DTC	**U0402-81**	**Invalid Data Received from TCU**
DTC	**U3000-51**	**Calibration File Not Refreshed**
DTC	**U1300-55**	**CAN Not Configured**

DTC Confirmation Procedure
Refer to CAN communication system

On-vehicle Service

Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Digital Multimeter	 RCH0002006

Blind Spot Detection Module

Removal

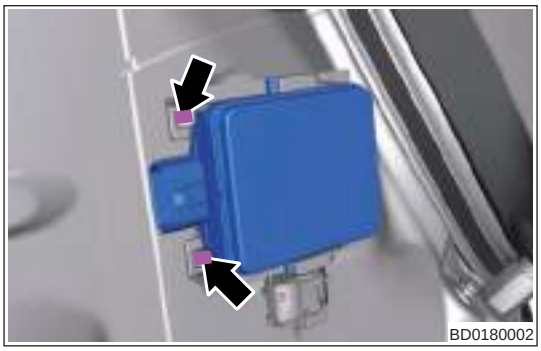
⚠ Warning

- Be sure to wear safety equipment to prevent accidents, when removing blind spot detection module.
- Operate carefully to prevent damage to blind spot detection module, when removing blind spot detection module.
- Removal and installation steps of main and sub blind spot detection modules are the same. Take main blind spot detection module as an example.

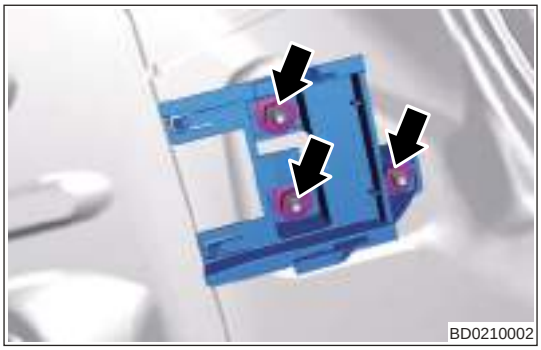
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable for more than 1 minute.
3. Remove the rear bumper assembly.
4. Remove the main blind spot detection radar module.

a. Disconnect the main blind spot detection radar module connector.

b. Press fixing clips from main blind spot detection module, and remove main blind spot detection module.



c. Remove 3 fixing screws from blind spot detection module bracket, and remove the bracket.



Installation

⚠ Caution

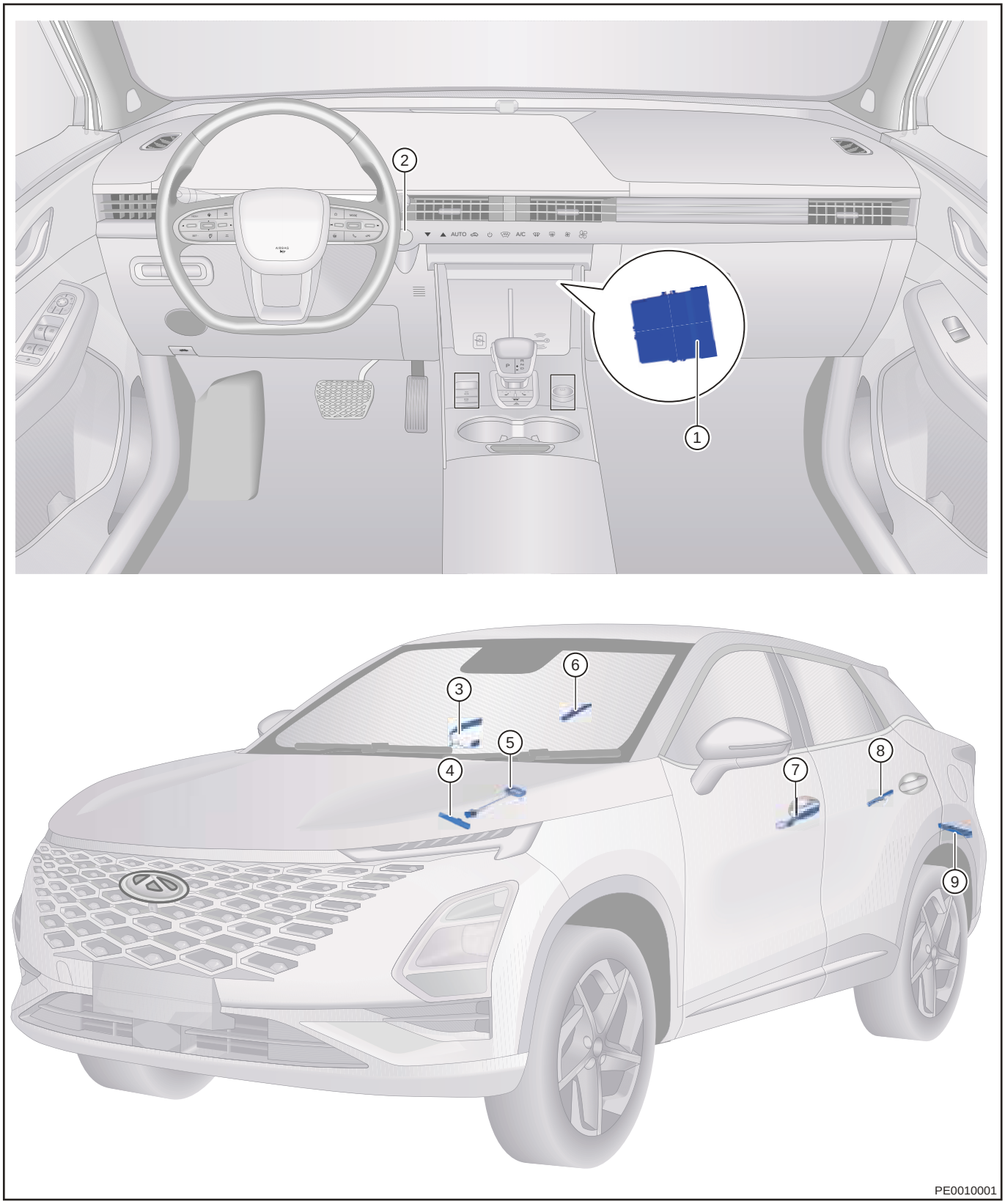
- Install connector in place, when installing blind spot detection module.
- Check blind spot detection module system for proper operation, after installing blind spot detection module.
- When sheet metal paint operation is performed on the rear bumper, there should not be a sudden change in the thickness of rear bumper. Dielectric constant of paint ＜ 100: Thickness of paint is less than 15um, weight of metal component is about 7％) dielectric constant of paint ＜ 50 (Thickness of paint is less than 45um)

1. Installation is in the reverse order of removal.

PEPS SYSTEM

System Overview

Description



1	PEPS module	2	ENGINE START STOP Switch
3	Front Right Door Outside Handle Sensor	4	Front Interior Low Frequency Antenna
5	Anti-theft Coil	6	High Performance Antenna
7	Front Left Door Outside Handle Sensor	8	High Performance Antenna
9	Rear Low Frequency Antenna (on Rear Bumper Crossmember Body)		

PEPS system consists of PEPS controller, ENGINE START STOP switch, built-in low frequency antenna (A total of 2 low-frequency antennas and 2 high-performance antenna are equipped in vehicle to detect key position), immobilizer coil for back up starting, front left/right door handle sensor (front left/right door handle), ESCL module (for MT models), back door microswitch, smart bracelet and remote controller (also called smart key).

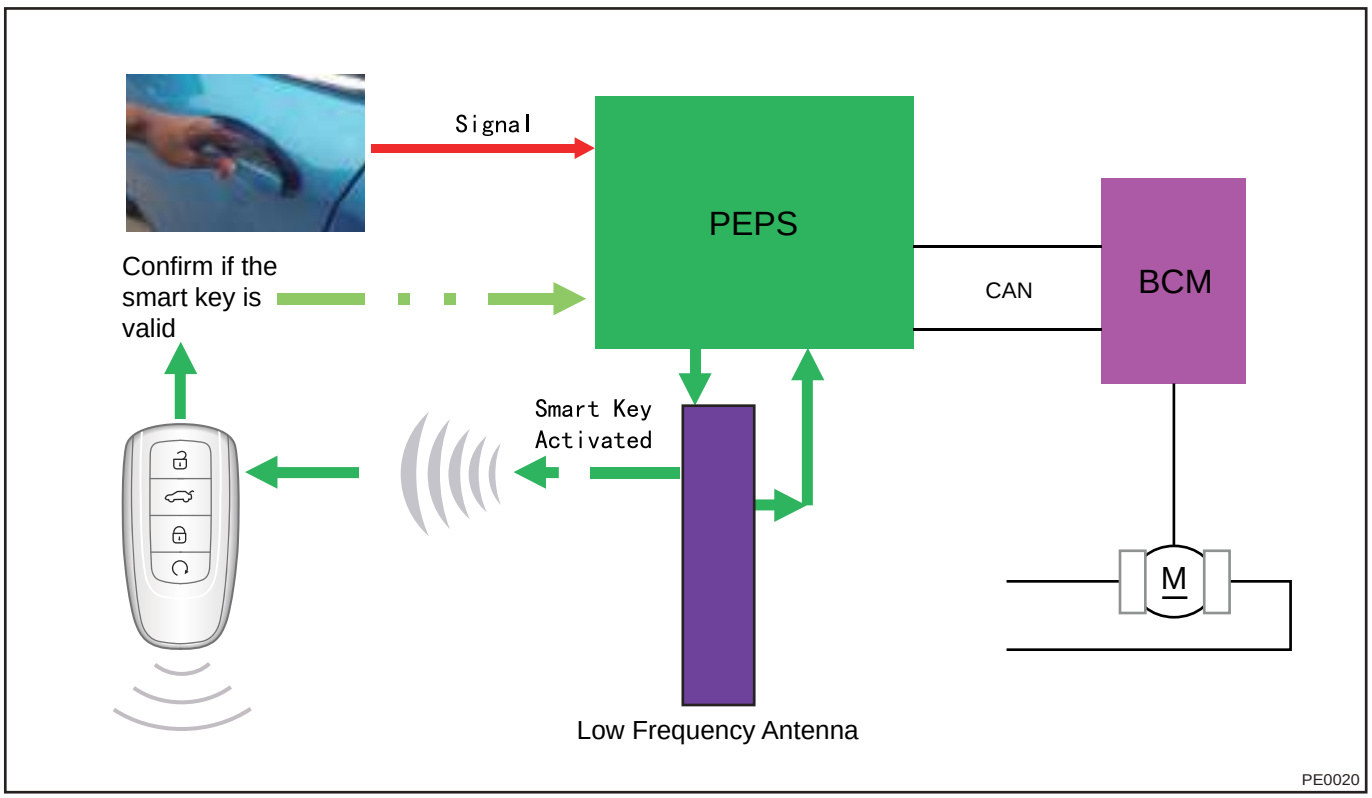
Function Introduction

Function	
1 - Smart Entry Function	2 - Keyless Entry Function
3 - Mechanical Entry Function	4 - One-button Start Function
5 - One-button Stop Function	6 - Emergency Stop Function
7 - Back Up Start Function	8 - Emergency Start Function
9 - Starting Times Limit Function	10 - Electric Steering Column Lock Control Function
11 - Prompt Function	12 - Engine Immobilizer Function

Smart Entry Function

⚠ Caution

- For safety, when remote control/central control or mechanical control is used to lock vehicle, if there is a smart key inside vehicle, system will disable door handle switch while remote control still can be used.
- In order to successfully perform door handle switch operation, do not rapidly operate door handle switch in succession within 0.5 second. and also do not rapidly operate luggage compartment external electronic switch.
- Smart keyless unlock and lock are only valid when power supply is shut off and four doors are closed properly, or system will not operate.
- Smart keyless unlock and lock are only valid when power supply is shut off and four doors are closed properly, or system will not operate.
- For power saving purpose, after vehicle is parked for 15 days, smart entry for front right door handle will be invalid, only smart entry for front left door handle can be used (it will return to normal if performing remote control unlock once or front left door HSU (door handle sensor) unlock once).
- In some particular situations, such as smart key is too close to door, system may determine the key is inside vehicle, induced door handle to be disabled. In this case, keyless entry function will not operate normally. At this time, it is necessary to use remote control to lock and unlock vehicle.



Smart Door Unlock (Keyless Fortifying Deactivation)

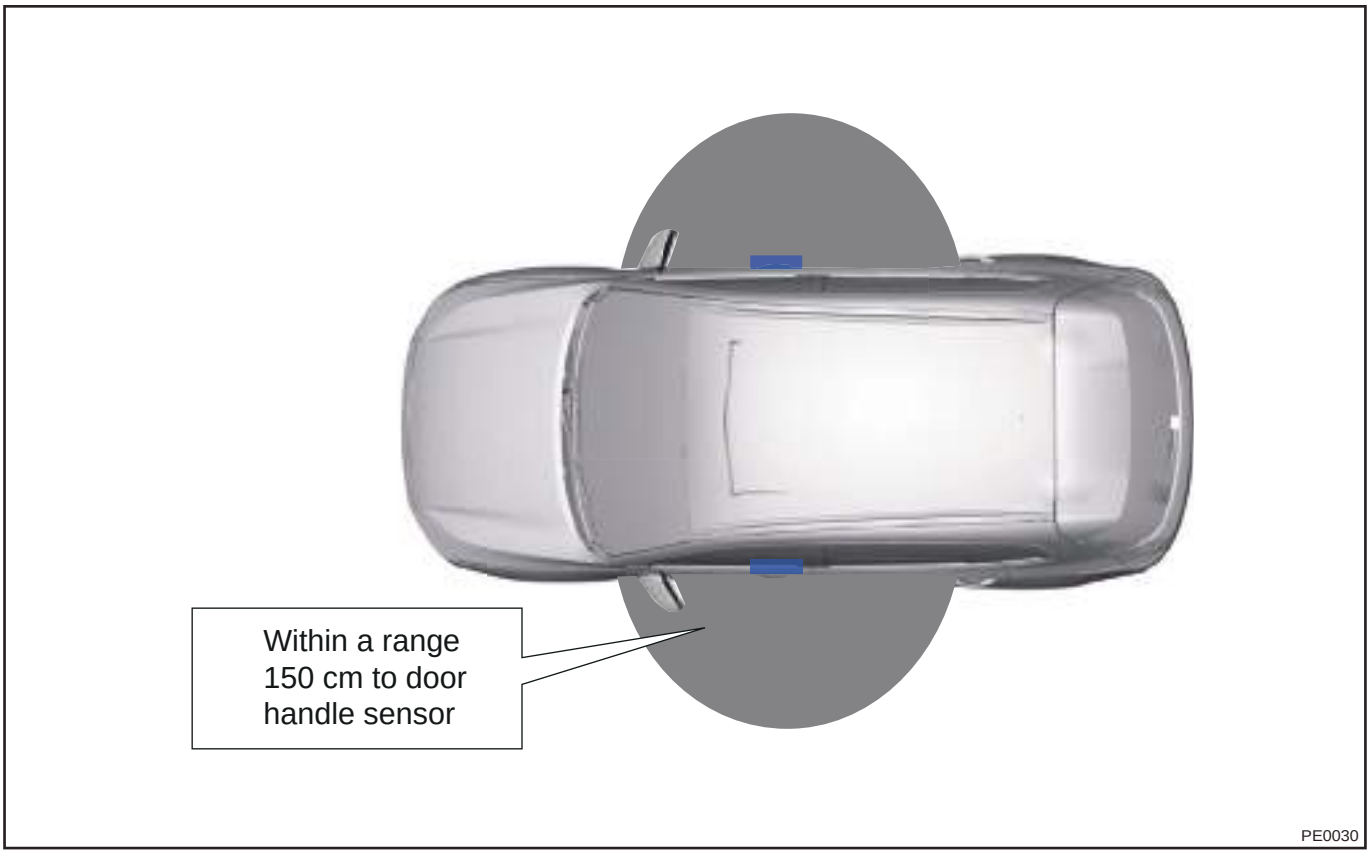
1. When the doors are locked, carry the smart key and touch the unlock sensing area of the door outside handle with four fingers. The system automatically recognizes the legitimacy of the smart key and the doors are automatically unlocked.

   Hint:
   Only front left and front right doors are equipped with sensing outside handle.

2. When bringing a smart key close to vehicle, the courtesy light turns on, the system automatically recognizes the legitimacy of the smart key and the doors are automatically unlocked.

3. No matter where the smart key is (put in pocket, hang in the belt or put in bag), as long as the key is within approximately 2.5 m of door handle, touch the sensing area of the door handle with four fingers, vehicle will enter fortifying deactivation mode (turn signal lights will flash twice and four doors will be unlocked).
4. If any of following operations is not performed within 30 seconds after touching the sensing area (-fortifying deactivation) of the door handle under fortifying mode, all doors will be locked automatically.
   - Open any door
   - Press the ENGINE START STOP switch
   - ENGINE START STOP switch is in ACC or ON position

Smart Door Lock (Keyless Fortifying)



1. When the doors are unlocked, carry the smart key and touch the lock sensing area with fingers. The system automatically recognizes the legitimacy of the smart key and the doors are automatically locked.
2. When exiting vehicle with smart key, the system automatically recognizes the legitimacy of the smart key and the doors are automatically locked.

   Hint:
   If any door is not closed properly, it will be unlocked automatically after locking to avoid leaving key inside vehicle.
3. Operation range:
   - Only distance between smart key and door outside handle is within specified operation range, smart key function can be used.
   - When smart key battery is discharged or there is strong radio wave in operation position, smart key system also will not operate normally.
   - It is recommended that do not place smart key together with mobile phone and other radio equipment.
   - Operation range is within about 250cm from sensing areas of two front door handles.

- If smart key is too close to door glass, handle or rear bumper, door handle sensor cannot be used.
- When smart key is within operation range, any one even without carrying smart key can press door handle sensing area on corresponding side to lock/unlock door.

4. When using smart key system, door handle sensor will not function in following conditions:
   - When ENGINE START STOP switch is in following positions (ACC or ON position).
   - Smart key is left in cab or luggage compartment (at this time, alarm will sound, turn signal lights will flash and “Smart Key inside Vehicle” will be prompted on instrument cluster if pressing door handle sensor.)
   - When smart key is not within exterior operation range.
   - When any door is opened or not closed properly.
   - When the smart key battery is discharged.

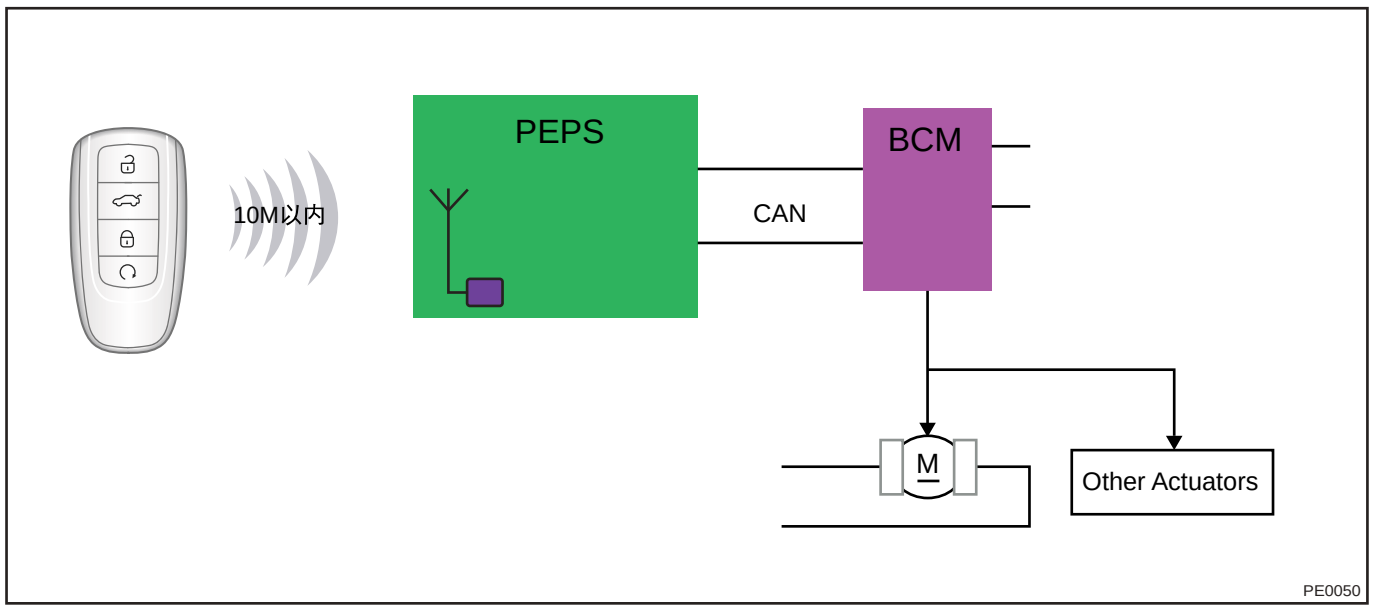
Smart Keyless Luggage Compartment Open

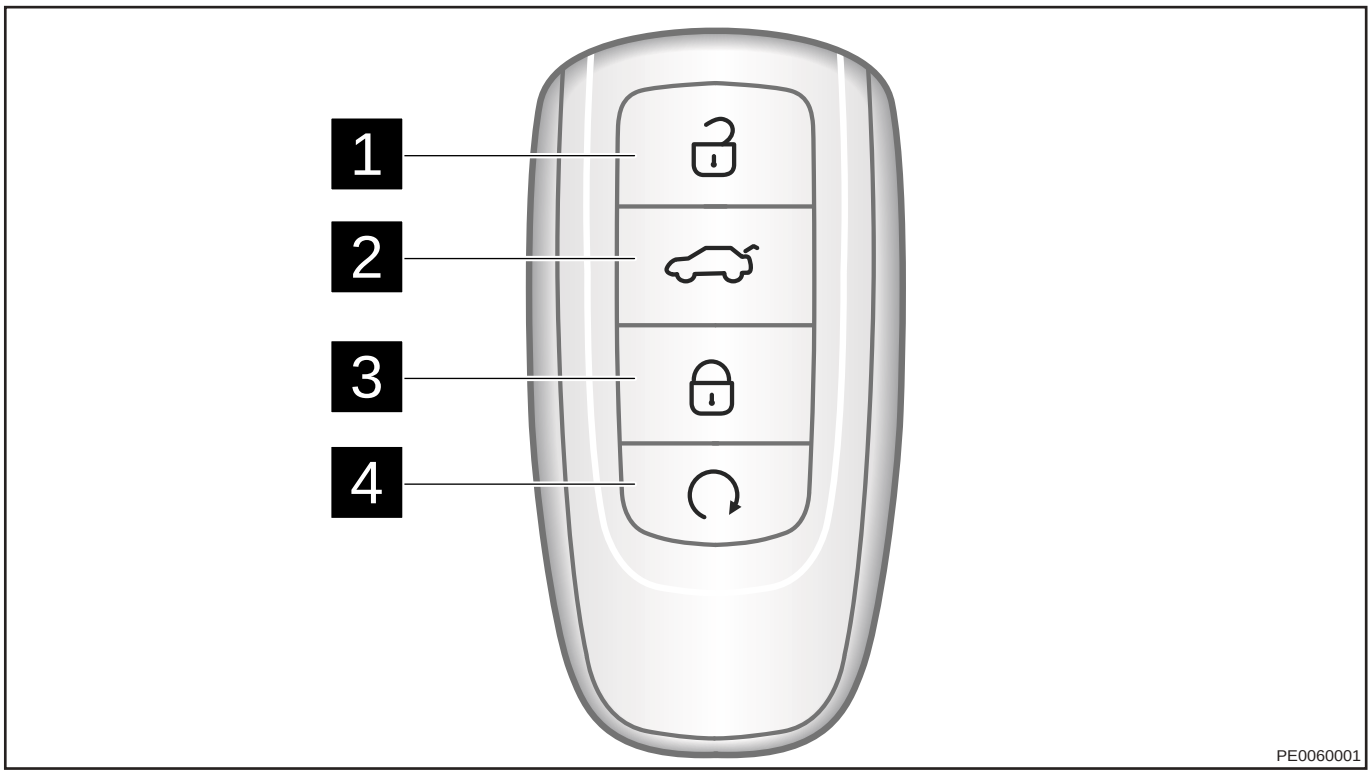
1. If all doors are unlocked, the luggage compartment external electronic switch is activated. At this time, press the switch to open luggage compartment without necessity of carrying smart key.
2. If door is under central lock state, luggage compartment external electronic switch will be disabled. At this time, it is necessary to bring smart key close to rear of vehicle and press electronic switch to open luggage compartment.

⚠ Caution

- For safety, when remote control/central control or mechanical control is used to lock vehicle, if there is a smart key inside vehicle, system will disable door handle switch while remote control still can be used.
- In order to successfully perform door handle switch operation, do not rapidly operate door handle switch in succession within 0.5 second. and also do not rapidly operate luggage compartment external electronic switch.
- Smart keyless unlock and lock are only valid when power supply is shut off and four doors are closed properly, or system will not operate.
- For power saving purpose, after vehicle is parked for 15 days, smart entry for front right door handle will be invalid, only smart entry for front left door handle can be used (it will return to normal if performing remote control unlock once or front left door HSU (door handle sensor) unlock once).
- In some particular situations, such as smart key is too close to door, system may determine the key is inside vehicle, induced door handle to be disabled. In this case, keyless entry function will not operate normally. At this time, it is necessary to use remote control to lock and unlock vehicle.

Remote Entry Function





1	Unlock Button	2	Back Door Open Button
3	Lock Button	4	Remote Start Button

Remote Lock (Fortifying) Function
Press lock button on smart key with power supply OFF, door will be locked, turn signal lights will flash (-once), horn will sound (once) and vehicle will enter fortifying mode.

1. Press lock button with four doors & two covers closed properly, door will be locked, body anti-theft system will be turned on and vehicle will enter fortifying mode.
2. If any door is not closed properly, lock system will not operate.
3. If power supply is in ACC or ON position, remote lock function will not operate to avoid misoperation.
4. If doors are closed properly while hood or luggage compartment door is not closed properly, lock system will lock doors, but body anti-theft system cannot be turned on and vehicle will not enter fortifying mode.

Remote Lock (Fortifying Deactivation) Function
Press the remote control unlock button, 4 door locks are unlocked, and turn signal lights flash twice, the vehicle enters the fortifying deactivation state.

Hint:
If any of following operations is not performed within 30 seconds after pressing remote unlock button (-fortifying deactivation) under fortifying mode, all doors will be locked automatically.

1. Open any door
2. Press the ENGINE START STOP switch
3. ENGINE START STOP switch is in ACC or ON position

⚠ Caution

- Press unlock button, so that door will be unlocked and luggage compartment door external switch will be activated (at this time, press luggage compartment external switch to open luggage compartment even if user does not bring valid key).
- Under fortifying or anti-theft alarm mode, press unlock button to cancel body anti-theft alarm system.

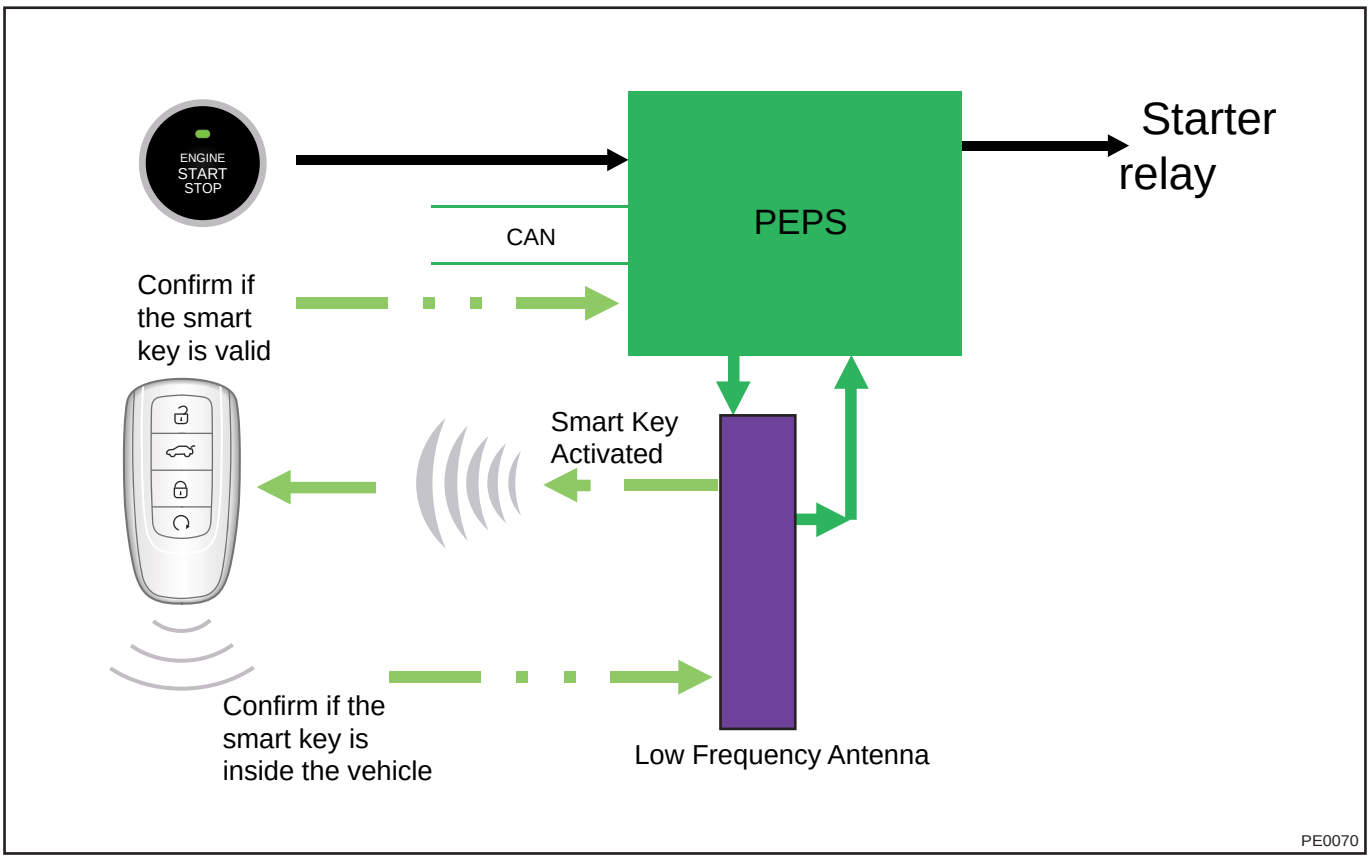
Remote Back Door Function
Long press remote luggage compartment button (about 1.5 seconds), luggage compartment door will be unlocked, at this time, it is still necessary to press back door release switch to open back door (for vehicles without power back door). For vehicles with power back door, the back door will be unlocked automatically.

Hint:
Opening back door by remote control cannot cancel vehicle fortifying.

One-button Start Function

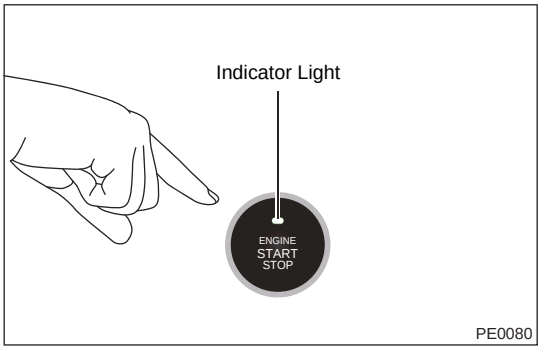
⚠ Caution

- For MT models: If clutch pedal is not depressed fully, system will not perform starting operation. For DCT models, if it is not in P or N position, system will not perform starting operation.
- During starting, if brake pedal (for DCT models) or clutch pedal (for MT models) is released halfway, system will suspend starting.
- Press ENGINE START STOP switch and then release it when starting, system will judge if starting is successful and stop starting properly.
- For AT models, if it is not in P position, vehicle power supply state (ACC, IGN) will not return to OFF state.

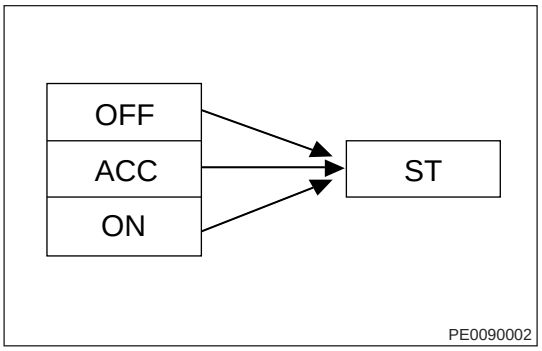


1. Indicator does not come on

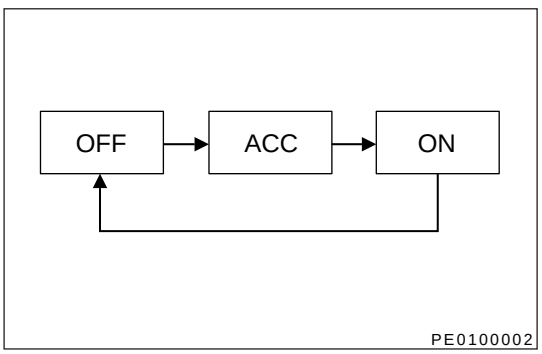
a. Power supply is OFF and brake pedal (for DCT models) or clutch pedal (for MT models) is not depressed, or engine has been started.



2. Amber
   a. Power supply state: ACC or ON, brake pedal (for DCT models) or clutch pedal (for MT models) is not depressed.
3. Green
   a. Brake pedal (for DCT models) or clutch pedal (for MT models) is depressed, and engine will start once pressing the button.
4. One-button start function: It can be activated at any power supply state (OFF, ACC, IGN) with legal smart key inside vehicle. Depress brake pedal (for DCT models) or clutch pedal (for MT models), press ENGINE START STOP switch to start engine.
   a. Switching power supply state



5. There are four positions for vehicle power supply: OFF, ACC, ON, ST (ignition). With brake pedal (for DCT models) or clutch pedal (for MT models) not depressed, press ENGINE START STOP switch:
   a. Switching power supply state



One-button Stop Function

For common engine stop mode, 4 km/h of vehicle speed must be met.

Hint:

- For DCT models, if it is not in P position, vehicle power supply mode cannot return to OFF, you must shift to P position before leaving vehicle after stopping. And check if power supply state is in OFF. Make sure that vehicle power supply is in OFF state and then leave vehicle. Otherwise, door cannot be locked.
- Simple method for distinguishing power supply in ACC or OFF:
  1. Judged by color of indicator on ignition switch.
  2. Under ACC state, instrument cluster will illuminate center display edge of LCD.
  3. Operate buttons on remote controller, if lock operation is failed and unlock operation is successful, it indicates that vehicle power supply is not in OFF position.

Emergency Stop Function

In order to stop engine in emergency, this system has emergency stop mode.

Hint:

- When vehicle speed is more than 4 km/h, press ENGINE START STOP switch for more than 3 seconds in succession.
- If pressing ENGINE START STOP switch for 3 times within 2 seconds with vehicle speed more than 4 km/h, engine will stop and power supply will return to ACC.

⚠ Caution

- If this condition is not met, engine will not shut down and ignition switch is kept in ON.
- During driving, emergency stop will seriously affect normal driving. Do not use this function unless in emergency.

Back Up Start Function

1. If key cannot be recognized by system due to weak battery or interference, PEPS system will not operate normally. At this time, system provides a method to back up engine start, following method can be used to start engine or turn on power supply.
   a. Lay key on bottom of rear cup holder with face up, and do not depress brake pedal (for DCT models) or clutch pedal (for MT models).
   b. Press the ENGINE START STOP switch once. Power supply state will switch to ON, and “Verification is Successful, it is Possible to Start” is displayed on instrument cluster.
   c. Depress brake pedal (for DCT/CVT models) or clutch pedal (for MT models) fully, press ENGINE START STOP switch to start engine.

Hint:
For MT models, communication between ESCL and PEPS is failed or verification does not pass, electric steering column lock cannot be unlocked successfully, power supply cannot switch to ON, engine cannot be started, so back up start function is invalid.

Emergency Start Function

1. To prevent engine cannot be started due to signal failure of brake pedal position (for DCT models) or clutch pedal position (For MT models) detected, this system has emergency start mode.

Hint:
Please contact service station for inspection and repair as soon as possible.

Starting Times Limit Function

⚠ Caution

- Only MT models have this function.
- Keyless entry and PEPS system obtains wheel speed signal from brake controller (ABS/ESP), if any wheel speed signal is malfunctioning, ABS/ESP system warning light in instrument cluster will come on.
- If malfunction does not be repaired and maximum start times is reached, it is not allowed to start vehicle. Please contact Chery service station for repair immediately and reset "rest start times" with diagnostic tester. Otherwise, if same malfunction occurs next time, start times offered by system will be less than 10 times. (Specific value depends on residual times last time malfunction occurs.)

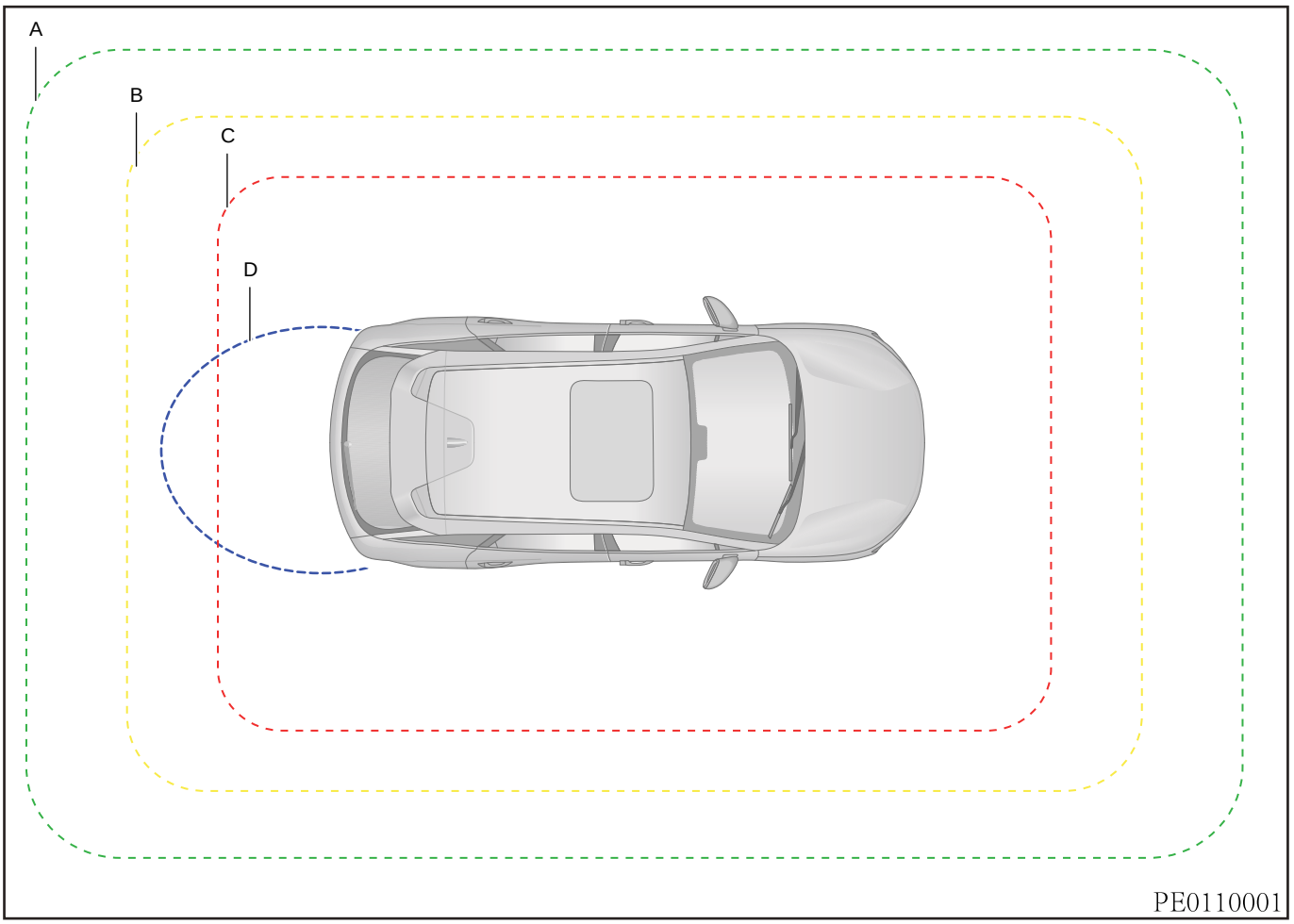
When serious damage occurs in system, in order to ensure driving safety and prevent steering system locking incorrectly, system will not allow user to start engine limitlessly and engine only can be started for 10 time. And each time engine starts successfully and travel, rest times will reduce one. Please contact Chery service station for repair as soon as possible.

Hint:
This system malfunction may be caused by any or several of the following reasons:

- Serious malfunction in the electric steering column lock
- Speed signal malfunction of front right wheel
- Speed signal malfunction of other three wheels

Intelligent Searching Function

This part includes three functions: Welcome function, approach unlocking function, exit locking function.



1. Welcome function
   - Customer enters into area A, PEPS controls courtesy light on the vehicle to turn on, realizing welcome function.
2. Approach unlocking function
   - Customer enters into area C, PEPS controls the vehicle to unlock.

     Hint:
     PEPS search strategy for enter unlocking: Within 3 days, if the vehicle searches a legal key, the search cycle is 400 ms; if the vehicle does not search a legal key, the search cycle is 1000 ms; 3 days later, the search stops.
3. Exit locking function
   - After customer gets off the vehicle and closes all doors, if there is no key in the vehicle, PEPS controls the vehicle to lock when customer gets off and enters the yellow area.

     Hint:
     PEPS search strategy for exit locking: Within 3 days, if the vehicle searches a legal key, the search cycle is 400 ms; if the vehicle does not search a legal key, the search cycle is 1000 ms; 3 days later, the search stops.

Prompt Function

To reduce misunderstanding of PEPS features from users and to facilitate the daily diagnosis of simple problems, system will prompt corresponding message to users through instrument cluster display, buzzer and external horn. Regardless of power supply state (OFF, ACC or ON), once PEPS sends information, instrument cluster will handle and display it.

Text Message Prompt	Buzzer	External Horn	Possible Cause
Smart key is not detected	Sound	\	There is no key in vehicle
Smart key is not detected	Sound	\	If you are in vehicle, find smart key and place it in vehicle, or check if passenger brings the key outside
System malfunction, it is allowed to start X times	Sound	\	Please contact Chery Service Station for repair immediately
Please check and repair PEPS system	Sound	\	Please contact Chery Service Station for repair immediately
Please shift to P or N to start	Sound	\	If you want to start engine, please shift to P or N.
If you want to start engine, depress brake pedal	Sound	\	If you want to start engine, depress brake pedal (for DCT models).
Please shift to P	Sound	\	Please shift to P and press ENGINE START STOP switch to turn off power supply.
Please pay attention that smart key is in vehicle	Sound	Sound 6 times	Be sure to carry smart key on person when leaving vehicle. Caution: Door handle switch will be disabled by system temporarily, please use remote controller to lock and unlock.
Verification is successful and it is possible to start	Sound	\	It is displayed only when performing back up start and verification passed, and key battery is fully discharged usually
Please turn off power supply	Sound	\	User may leave vehicle with shift position not in P and power supply not in OFF
Smart key battery is low	Sound	\	Key battery still can be used, but it comes to failure due to low voltage, it is necessary to replace battery

Engine and Vehicle Anti-theft Function

1. Anti-theft for models with PEPS can be divided into two types.
2. For DCT models, anti-theft can be divided into two separate parts - “PEPS and ECU encryption engine immobilizer”.
3. For MT models, anti-theft can be divided into two separate parts - “PEPS and ECU encryption engine immobilizer” and “PEPS and ESCL encryption steering column lock anti-theft”.

   a. For DCT models

- After power supply is turned to ON, ECU will send one frame of validation data to PEPS via CAN bus to verify. Then PEPS will feedback one frame of validation data as response and send to ECU. If response from PEPS is correct, ECU determines that anti-theft is released. Otherwise, ECU will not inject fuel and ignite.

   b. For MT models

- After power supply is turned to ACC, PEPS will perform encrypted anti-theft validation with ESCL via special LIN line. If validation passes, ESCL will unlock, or ESCL keeps locking and steering wheel cannot be turned. And power supply cannot be turned to ON.
- After power supply is turned to ON, ECU will send one frame of validation data to PEPS via CAN bus to verify. Then PEPS will feedback one frame of validation data as response and send to ECU. If response from PEPS is correct, ECU will determine anti-theft can be canceled. Otherwise, ECU will not inject fuel and ignite.

Anti-theft Matching

Software Configuration Code Writing

1. Click “PEPS (Passive Entry And Passive Start System)”.
2. Select and click “Special Function”.

3. Click “Write Software Configuration Code”.

4. Click “Write Vehicle Software Configuration Information Manually”.

5. Input corresponding configuration information and click “OK”.

Smart Key Replacement After Vehicle Sold

Description

⚠ Caution
If user lost a smart key with one key left, when replacing with a new smart key, perform as follows to replace with a new one: Learn the new key by “Add new key” service, delete all smart keys by “Delete all keys” service, then learn the remain two smart keys in order by “Add old key” service. If user finds the lost key, it can be reactivated by “Add old key” service on diagnostic tester. If not, even if the lost one is found, it cannot be used normally.

There are two match methods between smart key and system: “Replace with new key” and “Add old key”.

1. “Add new key” refers to match blank key (never match with any system) with system. It usually happens when user would have additional new key on the basis of the old ones.
2. “Add old key” refers to rematch learned key with system (it must be previous system).

Match Operation

⚠ Caution
Perform “Add new key” and “Add old key” when the ignition switch is in OFF position.

1. Anti-theft match description for “Add new key” is as follows:
   a. Technician reads VIN in EMS of user’s vehicle with diagnostic tester, then obtain PIN through VIN.
   b. Place the smart key to be matched on the key mark in cup holder, enter anti-theft control system program on diagnostic tester, select “Add new key” menu, input PIN, diagnostic tester will perform “Add new key” program automatically.

c. After that, press unlock button and check if left and right turn signal light indicators on instrument cluster blink. If the indicators blink, new key is matched successfully, otherwise, new key is not matched successfully.

2. Anti-theft match description for “Add old key” is as follows:
   a. Technician reads VIN in EMS of user’s vehicle with diagnostic tester, then obtain PIN through VIN.
   b. Enter anti-theft control system program on diagnostic tester, select “Delete all keys” menu.
   c. Place the smart key to be matched on the key mark in cup holder, enter anti-theft control system program on diagnostic tester, select “Add old key” menu, input PIN, diagnostic tester will perform “Add old key” program automatically.
   d. After that, press unlock button and check if left and right turn signal light indicators on instrument cluster blink. If the indicators blink, new key is matched successfully, otherwise, new key is not matched successfully.

⚠ Caution

- When performing “Add old key”, it is necessary to carry previous matched smart key and perform match operation one by one according to match procedures, or previous matched key will be disabled.
- Regardless of “Add new key” or “Add old key”, only one smart key can be kept in vehicle and keep key on key mark in cup holder. Make sure that there is no other key in vehicle. If there is other key, bring it to a position 2 m away from vehicle.

PEPS Module Replacement After Vehicle Sold

⚠ Caution

- Please contact Chery service station to obtain PIN.
- Unmatched smart keyless entry and PEPS can switch power supply from IGN OFF to IGN ON for 50 times. Once it exceeds 50 times, PEPS cannot be used. So, do not turn on and off power supply at will with PEPS unmatched.
- If ESCL accidentally enters “Anti-scanning” safe mode , it is necessary to perform “Delete ESCL”.

1. Technician reads VIN in EMS with diagnostic tester, then obtains PIN through VIN.
2. If vehicle is equipped with ESCL, make sure that ESCL is unlocked. After new PEPS is assembled successfully, press ignition switch (IG) to turn on power supply.
3. Enter anti-theft control system program on diagnostic tester, select “Program IMMO” menu; input PIN according to prompt on diagnostic tester, after “Program IMMO” is performed successfully, it will display “Program IMMO is successful”.
4. Then match previous keys one by one according to instructions of “Add old key”.
5. If vehicle is equipped with ESCL, enter anti-theft control system program on diagnostic tester and complete “Add old key”, then keep power supply in OFF position, check state of ESCL with diagnostic tester, if ESCL is not in Anti-scanning state, replacement is completed, if ESCL is in Anti-scanning state, select “Delete ESCL”, input PIN according to prompt on diagnostic tester, ESCL will be deleted successfully after about 10 minutes, then match ESCL according to description for ESCL replacement.

Engine Management System (EMS) Replacement After Vehicle Sold

1. Technician reads VIN in old EMS or smart keyless entry and PEPS unit with diagnostic tester, then obtains PIN through VIN.
2. After new EMS is assembled successfully, press ignition switch (IG) to turn on power supply.

3. Enter anti-theft control system program on diagnostic tester, select “Program EMS” menu; input VIN and PIN according to prompts on diagnostic tester. After “Program EMS” is performed successfully, it will display “Match EMS is successful”.
4. Depress brake pedal (for DCT models)/clutch pedal (for MT models), press ignition switch once to check if vehicle can be started successfully. If vehicle can be started successfully, EMS replacement is completed, if vehicle cannot be started successfully, EMS replacement is not completed.

Electric Steering Column Lock (ESCL) Replacement After Vehicle Sold

⚠ Caution
• Only apply to PEPS + MT models • Please contact Chery service station to obtain PIN.

1. Technician reads VIN in old EMS or smart keyless entry and PEPS unit with diagnostic tester, then obtains PIN through VIN.
2. After new ESCL is assembled successfully, keep power supply in OFF position.
3. Enter immobilizer control system program on diagnostic tester, select Program ESCL menu; Input PIN according to prompt on diagnostic tester, after Program ESCL is successful, “ESCL matching is successful” will be displayed on diagnostic tester.
4. Press ignition switch to switch power supply to IGN OFF state, open driver door and close it again, check if lock sound can be heard, then check if steering wheel can be turned. If lock sound can be heard and steering wheel cannot be turned, electric steering column lock is locked successfully.
5. Press ignition switch to switch vehicle power supply to IGN ON state, check if unlock sound can be heard, then check if steering wheel can be turned. If unlock sound can be heard and steering wheel can be turned, electronic steering column lock is unlocked successfully, ESCL matching is successful, or matching fails.

Diagnosis & Testing

Problem Symptoms Table

Symptom	Suspected Area
Luggage compartment cannot be opened	Back door switch fails (open, water leakage or sticking)
	Back door lock malfunction
	PEPS malfunction
	Short or open in wire harness
	BCM malfunction
Vehicle cannot be started (PEPS) (starter runs)	Anti-theft verification does not pass
Vehicle cannot be started (PEPS) (starter does not run)	Gear position is not in P/N (for DCT models)
	Clutch (for MT models)/brake switch (for DCT models) is abnormal
	ENGINE START STOP switch malfunction
	Circuit or starter relay is abnormal
	Starter malfunction
	Start times limit is activated

Symptom	Suspected Area
ESCL cannot be locked or unlocked	Vehicle is parked on slope (lock pin is stuck)
	Door signal is abnormal
	ENGINE START STOP switch cannot be turned on or off
	Short or open in wire harness
	Anti-theft verification fails
	Network communication malfunction

Problem Repair (No DTC)

If PEPS system has problems, but no DTC is stored in PEPS system, this problem is called a problem without DTC. Problems without DTC for PEPS system are divided into following types:

1. Indicator in instrument cluster does not come on or illuminates constantly (incorrect wire harness connection or indicator is damaged).
2. Troubleshooting recommendation: Check corresponding components according to problem symptom, and troubleshoot by following the vehicle repair manual.

Diagnostic Help

1. Connect diagnostic tester X-431 3G (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all CD system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

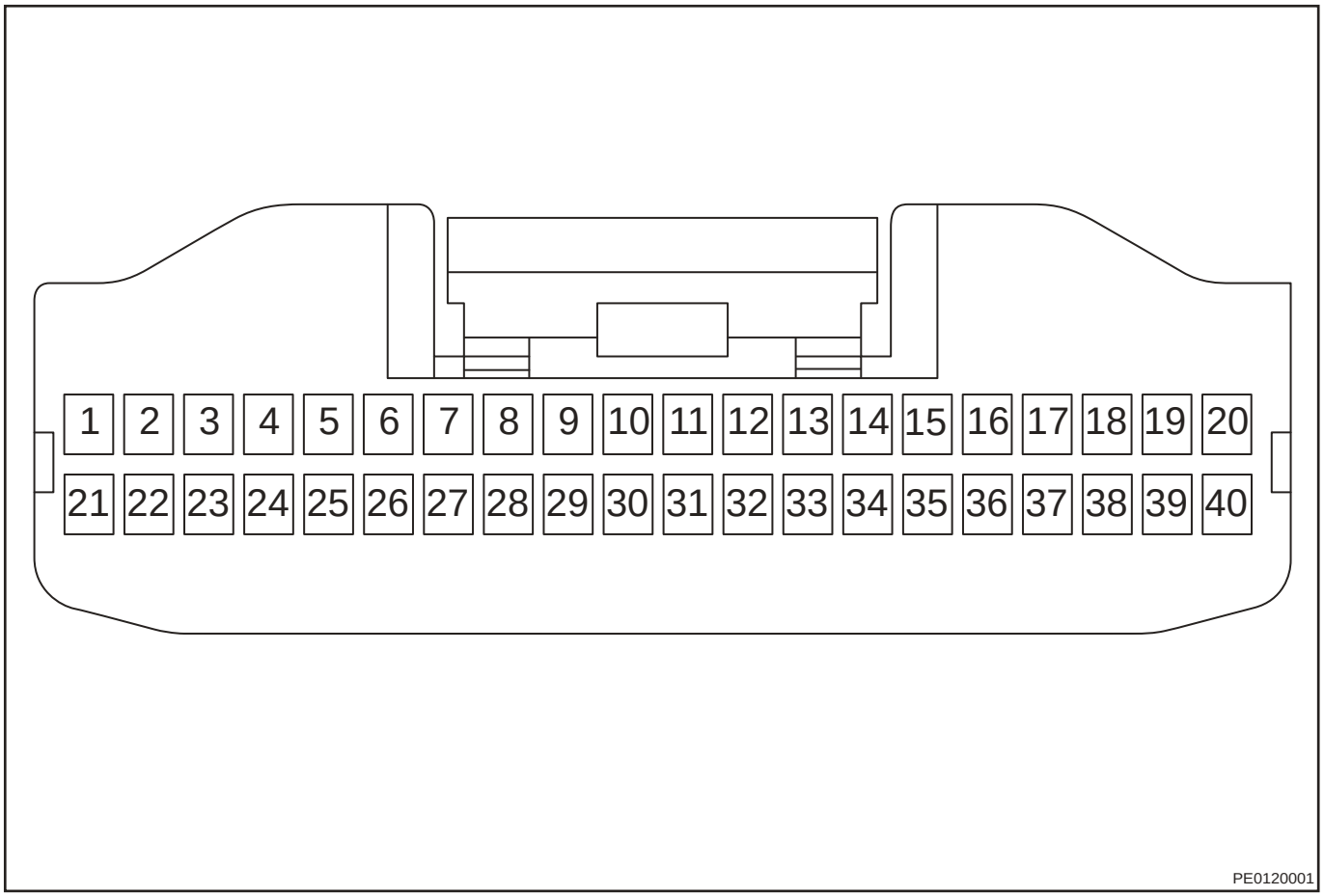
- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

PEPS Control Module Assembly Terminal List



Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
1	–	21	–
2	–	22	–
3	CAN_H	23	–
4	CAN_L	24	–

Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
5	–	25	SWIL ENGINE START STOP Switch Indicator (White)
6	Trunk Unlock Switch	26	STP Brake SW
7	ENGINE START STOP SW 2	27	–
8	ENGINE START STOP SW 1	28	ENGINE START STOP Switch GND
9	–	29	–
10	Rear Left Door High Performance Antenna (+)	30	Rear Left Door High Performance Antenna (-)
11	BACKUP ANT2 Anti-theft Coil (-)	31	BACKUP ANT1 Anti-theft Coil (+)
12	Rear Right Door High Performance Antenna (+)	32	Rear Right Door High Performance Antenna (-)
13	Front Low Frequency Antenna (+)	33	Front Low Frequency Antenna (-)
14	Rear Bumper Low Frequency Antenna (+)	34	Rear Bumper Low Frequency Antenna (-)
15	–	35	–
16	LH PSU/HSU +	36	LH PSU/HSU-
17	IG1 Feedback Input	37	Ground
18	IG1 Relay Drive (High)	38	Starter Relay Detection
19	–	39	Starter Relay
20	Ignition Signal	40	ACCD Relay Drive (High)

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Fault Detection Condition	Possible Causes	Maintenance Advice
B1300-00	Internal Control Module	/	PEPS module	/
B1301-00	Immobilizer and ECM Authenticatio-n Failed	/	It may be necessary to perform anti-theft match for PEPS and EMS module again	/

DTC	DTC Definition	Fault Detection Condition	Possible Causes	Maintenance Advice
B1515-45	ROM Checksum Failure	/		/
B1302	VIN Not Programmed	/	It may be necessary to input VIN into PEPS again	/
B1305-00	Immobilizer with No Key Stored	/	PEPS control module assembly is damaged	/
B1306	Security Code Not Programmed	/	PEPS control module assembly is damaged	/
B1500	Open Circuit of Driver Door Outside LF Antenna	/	PEPS control module or interior wire harness is damaged	/
B1524	Short Circuit Of (Driver Side) Rear Left LF Antenna	/	PEPS control module or interior wire harness is damaged	/
B1525	Short Circuit Of (- Passenger Side) Rear Right LF Antenna	/	PEPS control module or interior wire harness is damaged	/
B1501	Open Circuit of Passenger Door Outside LF Antenna	/	PEPS control module or interior wire harness is damaged	/
B1522	Open Circuit on Drive Door PSU	/	PEPS control module or interior wire harness is damaged	/
B1523	Open Circuit on Passenger Door PSU	/	PEPS control module or interior wire harness is damaged	/
B1529	Short Circuit on Driver Door HSU/ PSU	/	PEPS control module or interior wire harness is damaged	/
B152A	Short Circuit on Passenger Door HSU/ PSU	/	PEPS control module or interior wire harness is damaged	/

DTC	DTC Definition	Fault Detection Condition	Possible Causes	Maintenance Advice
B152B	Stuck on Driver Door HSU/PSU	/	PEPS control module or interior wire harness is damaged	/
B152C	Stuck on Passenger Door HSU/ PSU	/	PEPS control module or interior wire harness is damaged	/
B1502-13	Open Circuit of Front Internal LF Antenna	/	Front internal low frequency antenna or interior wire harness is damaged	/
B1526	Short Circuit of Front Internal LF Antenna	/		/
B1505	Open Circuit of Bumper LF Antenna	/	Low frequency antenna or wire harness is damaged	/
B1527	Short Circuit of Bumper LF Antenna	/		/
B152D	SSB Stuck	/	PEPS control module is damaged, ignition switch has failed, wire harness is damaged	/
B1506	Engine Switch Failure	/	PEPS control module is damaged, ignition switch has failed, wire harness is damaged	/
B1507	IG Circuit Failure	/	PEPS control module is damaged, ignition switch has failed, wire harness is damaged	/
B152E	START Fail	/	PEPS control module is damaged, ignition switch has failed, wire harness is damaged	/
B1508	ACC Circuit Failure	/	ACC relay, body ground and wire harness malfunction	/
B1509	Abnormality in Brake Signal	/	Wire harness, PEPS controller or brake switch is damaged	/

DTC	DTC Definition	Fault Detection Condition	Possible Causes	Maintenance Advice
B1518	Trunk/Back Door Unlock Switch Stuck Failure	/	Back door lock button, wire harness or PEPS control module is damaged	/
B152F	Battery Voltage Low Detection	/	Battery, wire harness or PEPS control module is damaged	/
B1530	Battery Voltage High Detection	/	Battery, wire harness or PEPS control module is damaged	/
U1300-55	Software Configuration Error	/	Configuration has error	/
B1521	Open Circuit Of Backup Antenna	/	PEPS control module is damaged	/
B1528	Short Circuit Of Backup Antenna	/		/

DTC Diagnosis Procedure

DTC	B1521	Open Circuit Of Backup Antenna
DTC	B1528	Short Circuit Of Backup Antenna

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check for DTCs

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTC occurs again.

NG → **Turn off vehicle power supply (- disconnect negative battery cable), then clear DTCs again.**

OK

2	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new PEPS module to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1300	Internal Control Module

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check for DTCs

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTC occurs again.

NG → **Turn off vehicle power supply (- disconnect negative battery cable), then clear DTCs again.**

OK

2	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new PEPS module to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1301	Immobilizer and ECM Authentication Failed
DTC	B1515	ROM Checksum Failure

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTC occurs again.

NG → **It may be necessary to perform anti-theft match for PEPS and EMS module again.**

OK

2	**Reconfirm DTCs**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new PEPS module to check if fault reoccurs.**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1302**	**VIN Not Programmed**

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTCs occur again.

NG → **Turn off vehicle power supply (-disconnect the negative battery cable), then clear DTC**

OK ↓

2	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Input VIN into PEPS again**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1305	Immobilizer with No Key Stored

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check for DTCs

(a) Using diagnostic tester, clear DTC and read DTC again.

(b) Check if DTCs occur again.

NG → **Enter anti-theft system and add key**

OK ↓

2	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new PEPS control module to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1306	Security Code Not Programmed

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check for DTCs

(a) Using diagnostic tester, clear DTC and read DTC again.
(b) Check if DTCs occur again.

NG → **Rematch PEPS module**

OK ↓

2	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new PEPS control module to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1500	Open Circuit of Driver Door Outside LF Antenna
DTC	B1501	Open Circuit of Passenger Door Outside LF Antenna
DTC	B1521	Short Circuit Of (Driver Side) Rear Left LF Antenna
DTC	B1501	Short Circuit Of (Passenger Side) Rear Right LF Antenna
DTC	B1522	Open Circuit on Drive Door PSU
DTC	B1523	Open Circuit on Passenger Door PSU
DTC	B1529	Short Circuit on Driver Door HSU/PSU
DTC	B152A	Short Circuit on Passenger Door HSU/PSU

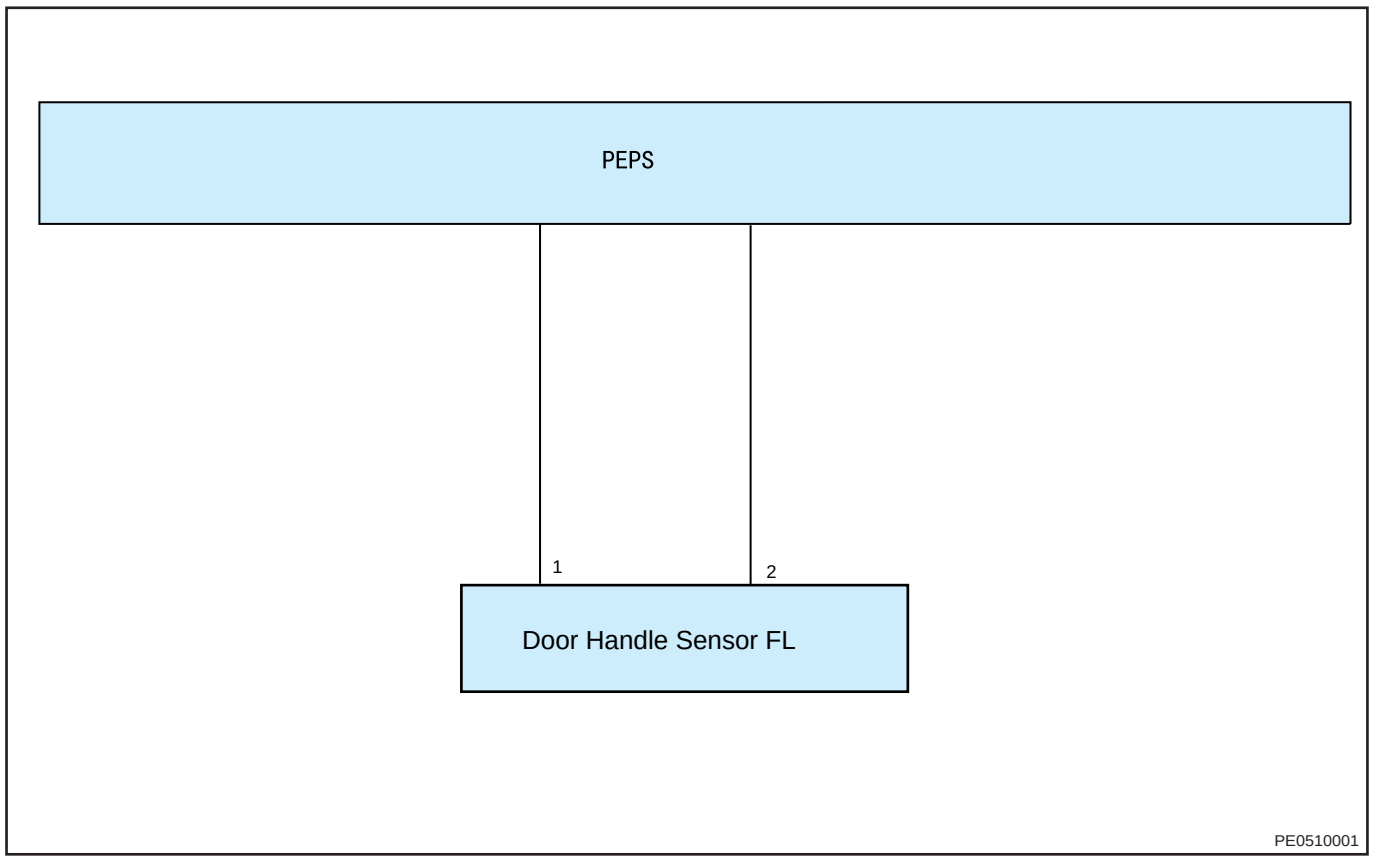
DTC	**B152B**	**Stuck on Driver Door HSU/PSU**
DTC	**B152C**	**Stuck on Passenger Door HSU/PSU**

Hint:

- Take the front left door handle sensor as an example to describe the troubleshooting steps. For other switches, refer to these steps.
- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Description

System Schematic Diagram



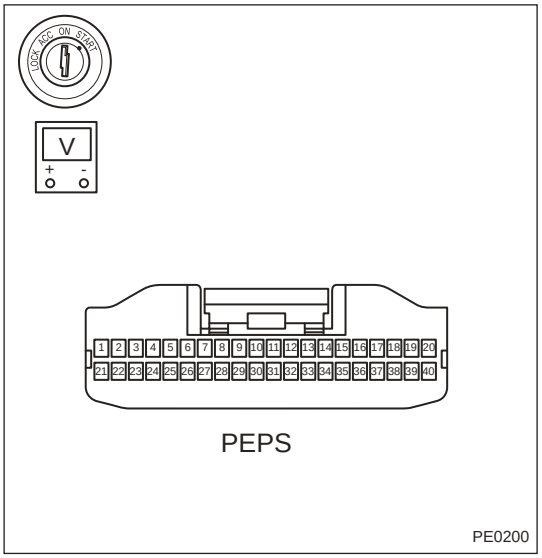
DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

1	**Check if PEPS module output voltage is normal**

(a) Turn ignition switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the PEPS module connector.
(d) Check if wire harnesses are worn, pierced, pinched or partially broken.
(e) Check for broken, bent, protruded or corroded terminals.
(f) Check if related connector pins are in good condition.
(g) Connect the negative battery cable, turn ENGINE START STOP switch to ON, use DC voltage band of digital multimeter to measure if voltage between PEPS power supply terminal and ground terminal.



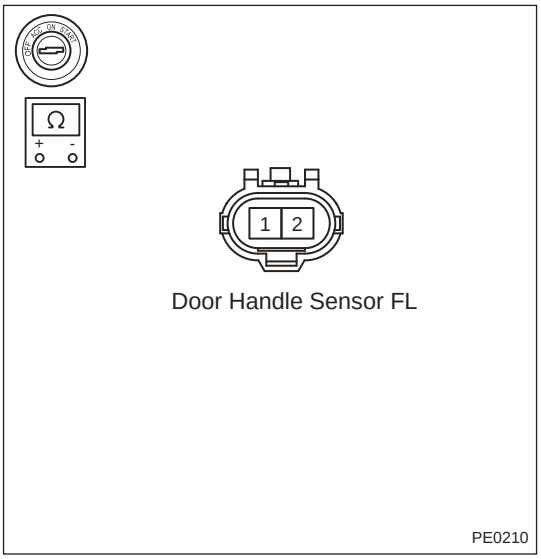
Multimeter Connection	Condition	Specified Condition
PEPS module (- power supply terminal) - PEPS module (ground terminal)	Always	12 V

NG → **Replace PEPS control module assembly**

OK

2	Check door handle sensor

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the front left door sensor connector.
(d) Check if wire harnesses are worn, pierced, pinched or partially broken.
(e) Check for broken, bent, protruded or corroded terminals.
(f) Check if related connector pins are in good condition.
(g) The outside handle is capacitive sensing type. Using ohm band of digital multimeter, measure the resistance of front left door outside handle.



Multimeter Connection	Condition	Specified Condition
Front left door sensor (1) - Front left door sensor (2)	OK	No continuity

NG → **Replace left door handle sensor**

OK

3	Check front left door wire harness for open or short

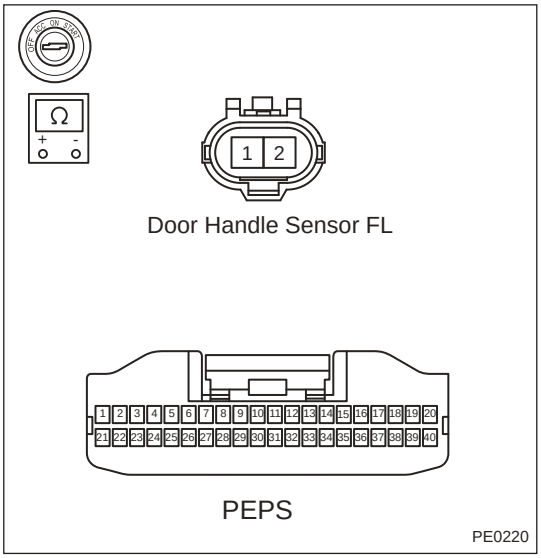
(a) Disconnect the front left door outside handle wire harness connector F-014.

(b) Check if wire harnesses are worn, pierced, pinched or partially broken.

(c) Check for broken, bent, protruded or corroded terminals.

(d) Check if related connector pins are in good condition.

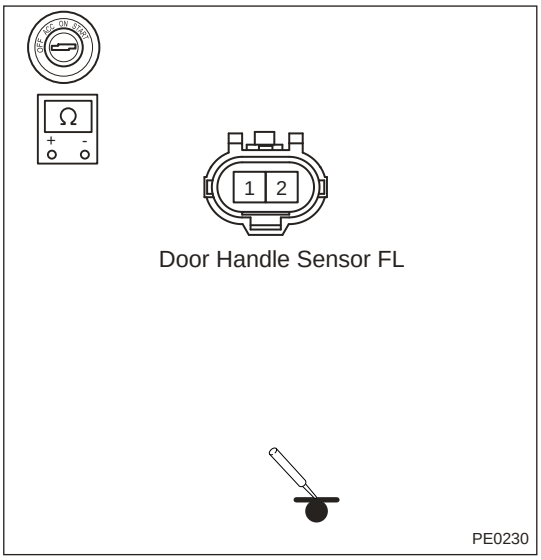
(e) Using ohm band of digital multimeter, check for continuity between terminals 1, 2 of front left door sensor and corresponding terminals of PEPS module connector to check for open in front left door wire harness.



Multimeter Connection	Condition	Specified Condition
Front left door sensor (1) - PEPS module (- connected terminals)	Always	⩽ 1 Ω
Front left door sensor (2) - PEPS module (- connected terminals)	Always	⩽ 1 Ω

NG → **Repair or replace ground circuit of front left door handle sensor**

(f) Using ohm band of digital multimeter, measure resistance between terminals 1, 2 of front left door wire harness connector and body ground separately to check for short to body ground in front left door wire harness.



Multimeter Connection	Condition	Specified Condition
Front left door sensor (1) - Body ground	Always	No continuity
Front left door sensor (2) - Body ground	Always	No continuity

NG → **Replace interior wire harness**

OK

4	**Reconfirm DTCs**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

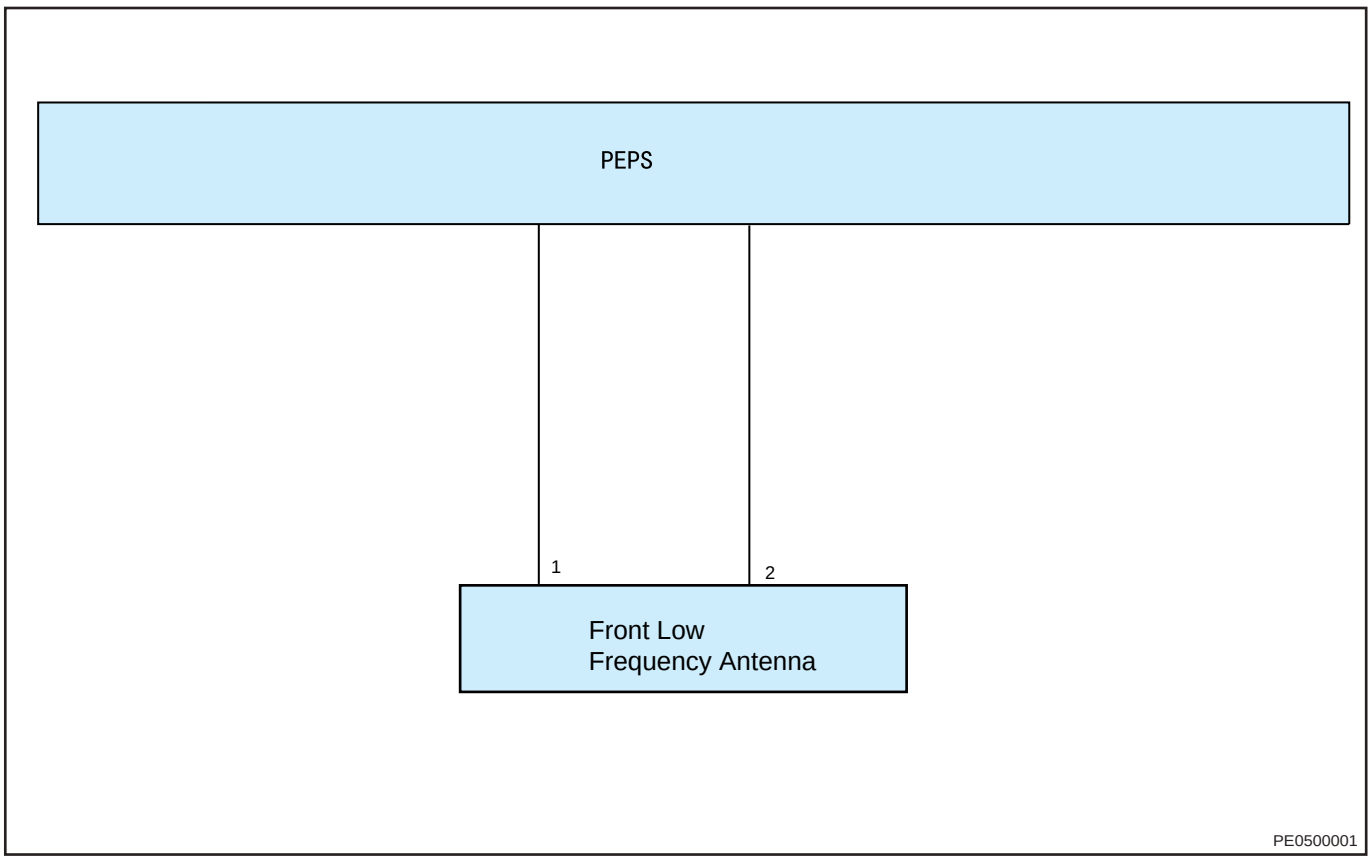
(c) Read the fault information and confirm that the fault has been solved.

NG	**Replace PEPS module.**
OK	**Conduct test and confirm malfunction has been repaired.**

DTC	**B1502**	**Open Circuit of Front Internal LF Antenna**
DTC	**B1526**	**Short Circuit of Front Internal LF Antenna**

Description

System Schematic Diagram



DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check if PEPS module software configuration code is correct**

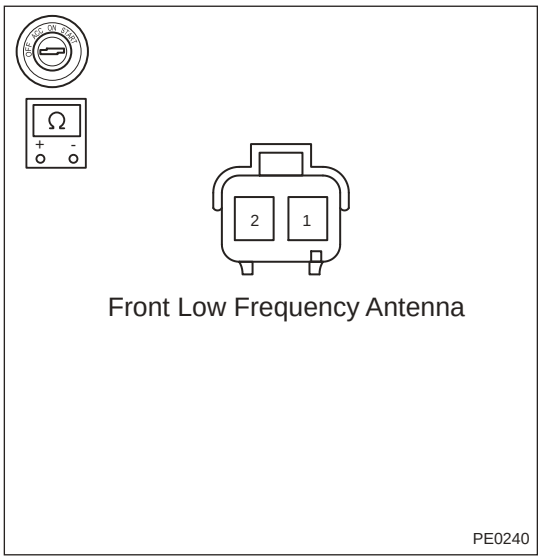
(a) Use diagnostic tester to enter PEPS system.
(b) Read software configuration code and check if it is correct.

NG → **Write configuration code again and clear DTC**

OK

2	**Measure resistance of front low frequency antenna**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the connector from front low frequency antenna.
(d) Check if wire harnesses are worn, pierced, pinched or partially broken.
(e) Check for broken, bent, protruded or corroded terminals.
(f) Check if related connector pins are in good condition.
(g) Using ohm band of digital multimeter, measure if resistance between terminals 1 and 2 of front low frequency antenna connector is normal.



Front Low Frequency Antenna

Multimeter Connection	Condition	Specified Condition
Front low frequency antenna (1) - Front low frequency antenna (2)	Always	Always ≈ 10 KΩ

NG → **Replace low frequency antenna**

OK

3	**Check interior wire harness for open or short**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

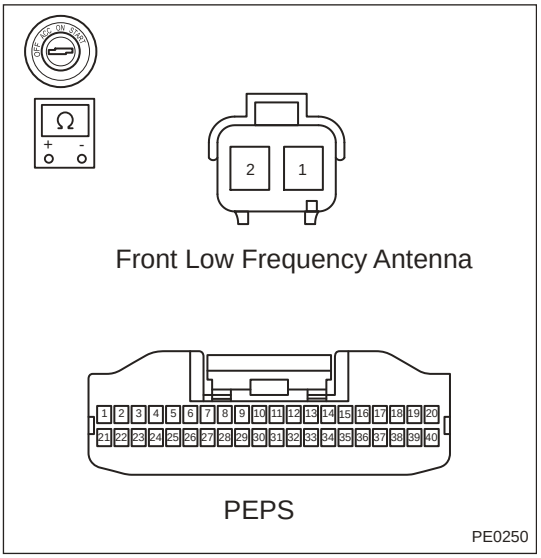
(c) Disconnect front low frequency antenna connector and PEPS module connector.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

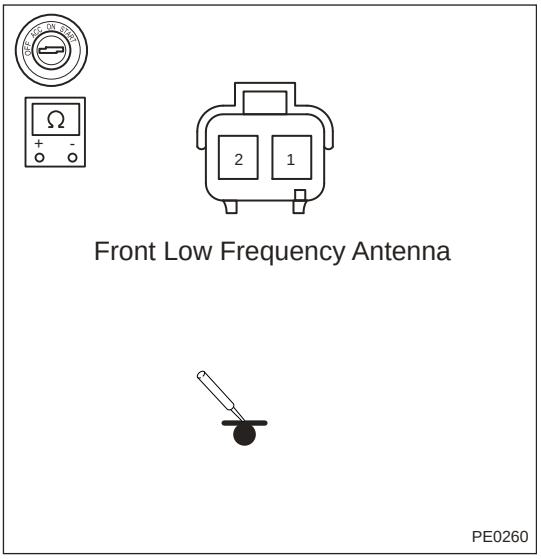
(g) Using ohm band of digital multimeter, check for continuity between terminals 1, 2 of front low frequency antenna and PEPS module (connected terminals) to check for open in instrument panel wire harness.



Multimeter Connection	Condition	Specified Condition
Front low frequency antenna (1) - PEPS module (- connected terminals)	Always	⩽ 1 Ω
Front low frequency antenna (2) - PEPS module (- connected terminals)	Always	⩽ 1 Ω

Use circuit diagram as a guide to perform the following inspection procedures:

(h) Using ohm band of digital multimeter, check for continuity between terminals 1, 2 of connector and body ground to check for short to ground in instrument panel wire harness.



Multimeter Connection	Condition	Specified Condition
Front low frequency antenna (1) - Body ground	Always	No continuity
Front low frequency antenna (2) - Body ground	Always	No continuity

NG → **Replace instrument panel wire harness**

OK

4	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

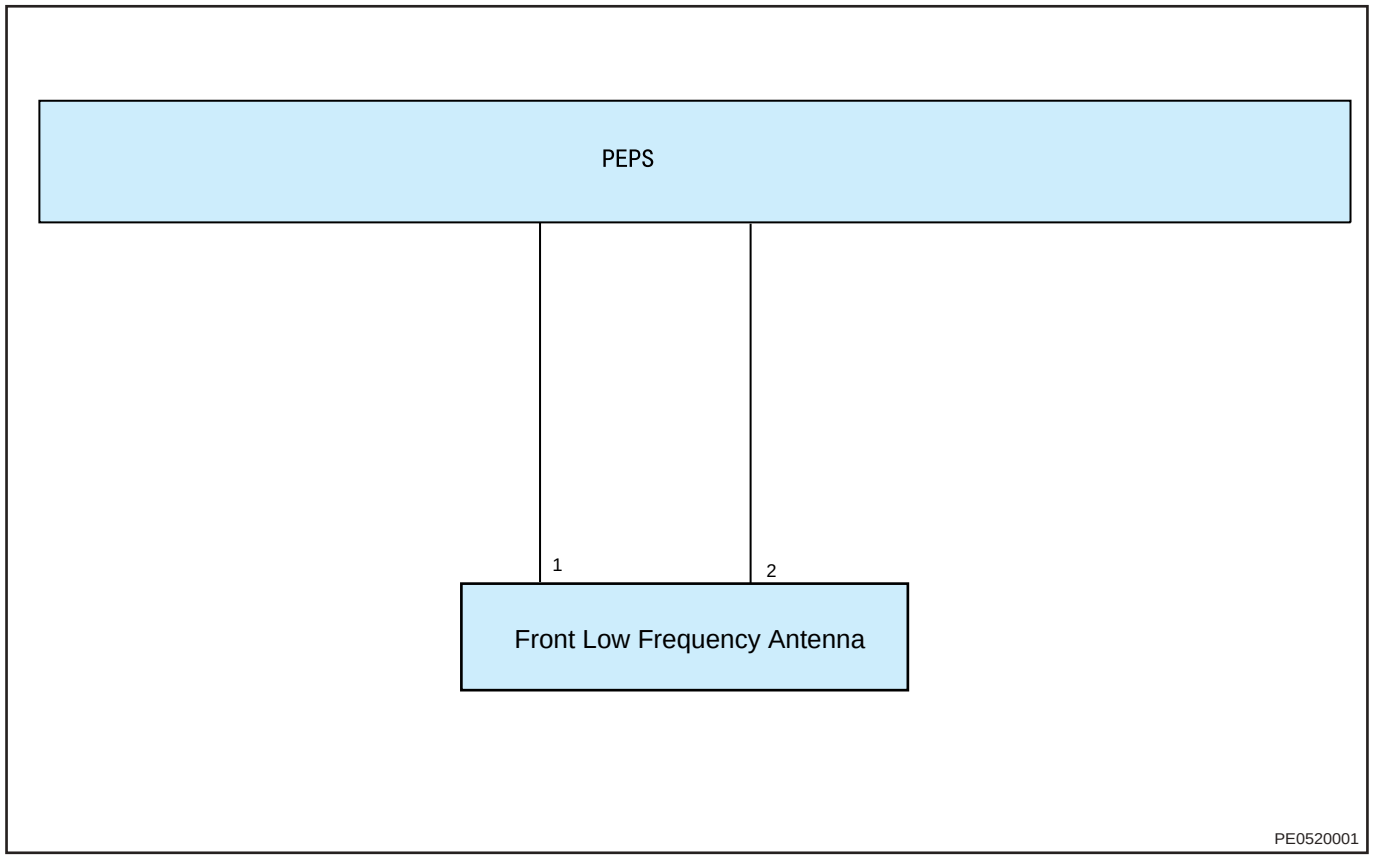
NG → **Replace PEPS module**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B1505**	**Open Circuit of Bumper LF Antenna**
DTC	**B1527**	**Short Circuit of Bumper LF Antenna**

Description

System Schematic Diagram



DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check if PEPS module software configuration code is correct**

(a) Use diagnostic tester to enter PEPS system.
(b) Read software configuration code and check if it is correct.

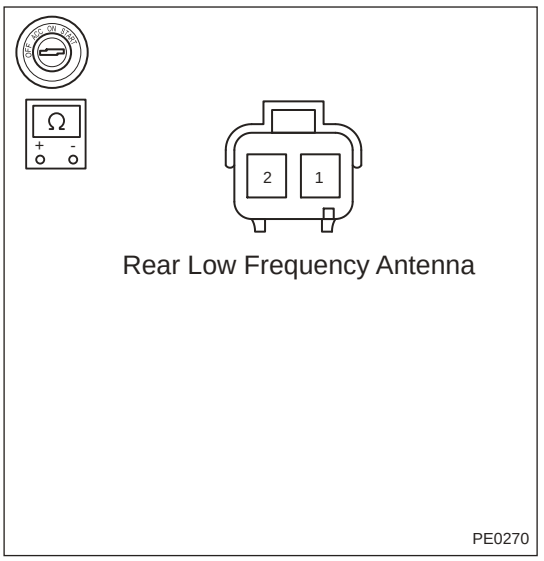
NG → **Input configuration code again and clear DTC**

OK ↓

2	**Measure resistance of bumper low frequency antenna**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the bumper low frequency antenna connector.
(d) Check if wire harnesses are worn, pierced, pinched or partially broken.
(e) Check for broken, bent, protruded or corroded terminals.
(f) Check if related connector pins are in good condition.
(g) Using ohm band of digital multimeter, measure if resistance between terminals 1 and 2 of front low frequency antenna connector is normal.

Multimeter Connection	Condition	Specified Condition
Bumper low frequency antenna (1) - Bumper low frequency antenna (2)	Always	≈ 10 KΩ



Rear Low Frequency Antenna

NG → **Replace bumper low frequency antenna**

OK ↓

3	**Check interior wire harness for open or short**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

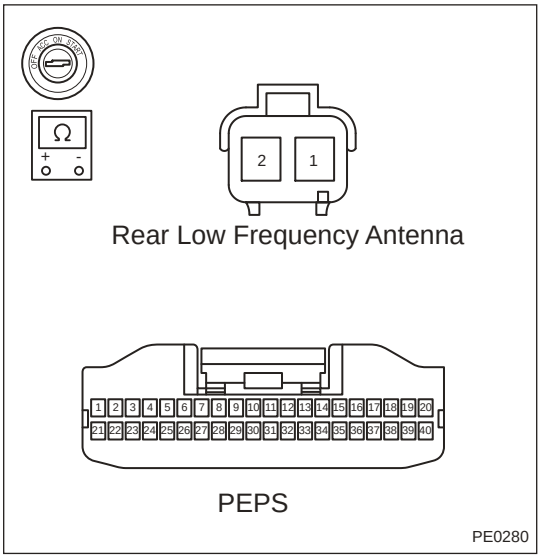
(c) Disconnect the bumper low frequency antenna connector and PEPS module connector.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

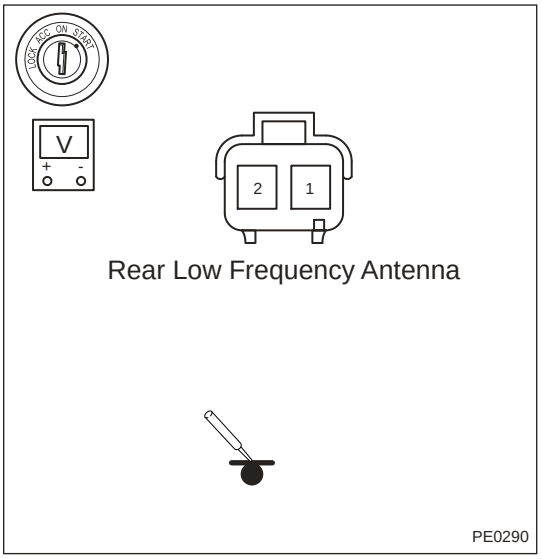
(g) Using ohm band of digital multimeter, check for continuity between terminals 1, 2 of bumper low frequency antenna and PEPS module (connected terminals) respectively to check for open in instrument panel wire harness.



Multimeter Connection	Condition	Specified Condition
Bumper low frequency antenna (1) - PEPS module (- connected terminals)	Always	⩽ 1 Ω
Bumper low frequency antenna (2) - PEPS module (- connected terminals)	Always	⩽ 1 Ω

Use circuit diagram as a guide to perform the following inspection procedures:

(h) Using digital multimeter, measure voltage between terminal 1 of bumper low frequency antenna and body ground to check if the PEPS module has power output.

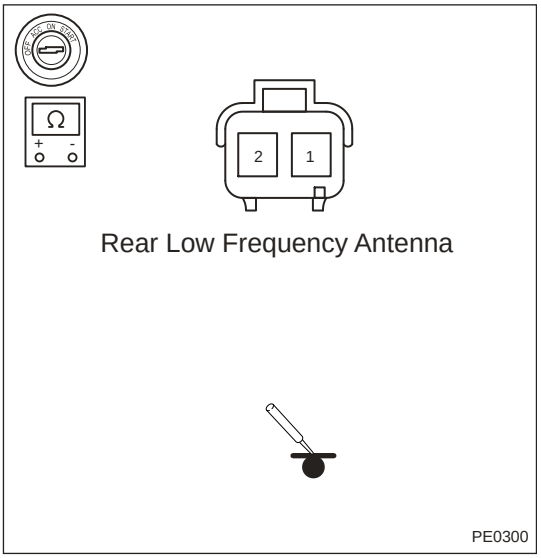


Multimeter Connection	Condition	Specified Condition
Bumper low frequency antenna (1) - Body ground	Always	12 V

Use circuit diagram as a guide to perform the following inspection procedures:

(i) Using ohm band of digital multimeter, check for continuity between terminals 1, 2 of bumper low frequency antenna and body ground to check for short to ground in instrument panel wire harness.

Multimeter Connection	Condition	Specified Condition
Bumper low frequency antenna (1) - Body ground	Always	No continuity
Bumper low frequency antenna (1) - Body ground	Always	No continuity



NG → **Replace instrument panel wire harness**

OK

4	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

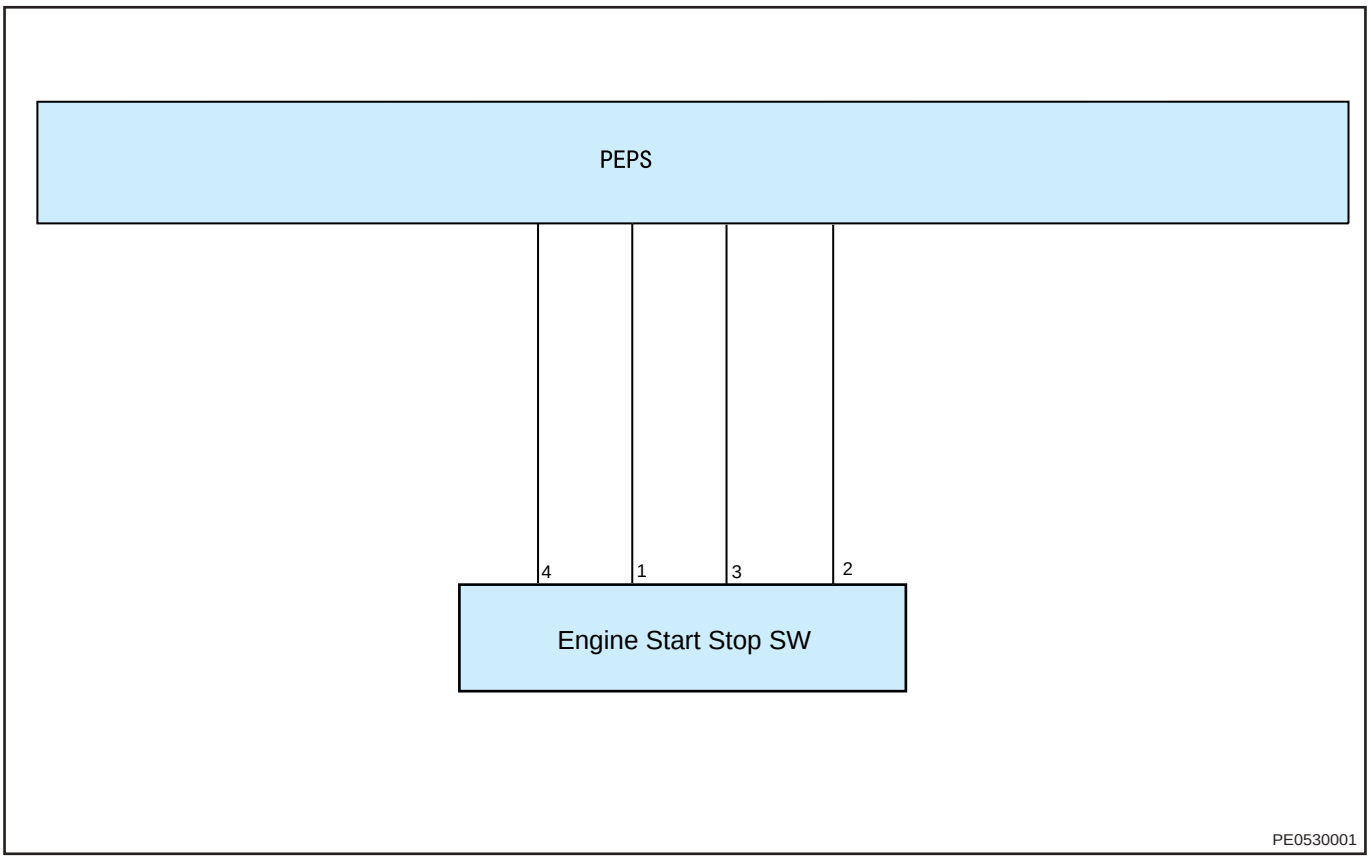
NG → **Replace PEPS module**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	**B152D**	**SSB Stuck**
DTC	**B1506**	**Engine Switch Failure**
DTC	**B1507**	**IG Circuit Failure**
DTC	**B152E**	**START Fail**

Description

System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Enter PEPS system and read related datastream**

(a) Read datastream “Power Supply Management and Starting State” and “Engine Switch Backlight State”.
(b) Press ENGINE START STOP switch, check datastream conversion activation state and backlight illumination state, To determine whether the ENGINE START STOP switch input is normal.

OK → **Turn off vehicle power supply (- disconnect the negative battery cable), then clear DTC again**

NG

2	**Check ENGINE START STOP switch**

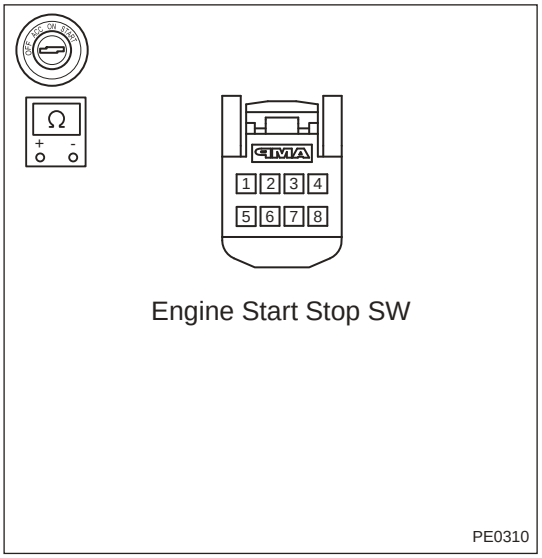
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect the ENGINE START STOP switch connector.

(d) Using ohm band of digital multimeter, measure resistance of ENGINE START STOP switch to check if ENGINE START STOP switch is normal.



Engine Start Stop SW

Multimeter Connection	Condition	Specified Condition
ENGINE START STOP switch terminal 2 - 1	Not pressed	No continuity
ENGINE START STOP switch terminal 2 - 1	Pressed	⩽ 1 Ω
ENGINE START STOP switch terminal 2 - 3	Not pressed	No continuity
ENGINE START STOP switch terminal 2 - 3	Pressed	⩽ 1 Ω
ENGINE START STOP switch terminal 1 - 3	Not pressed	No continuity
ENGINE START STOP switch terminal 1 - 3	Pressed	⩽ 1 Ω
ENGINE START STOP switch terminal 4 - 2	Not pressed	≈ 6.33 KΩ

NG → **Replace ENGINE START STOP switch**

OK →

3	**Check instrument cluster wire harness for open or short**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

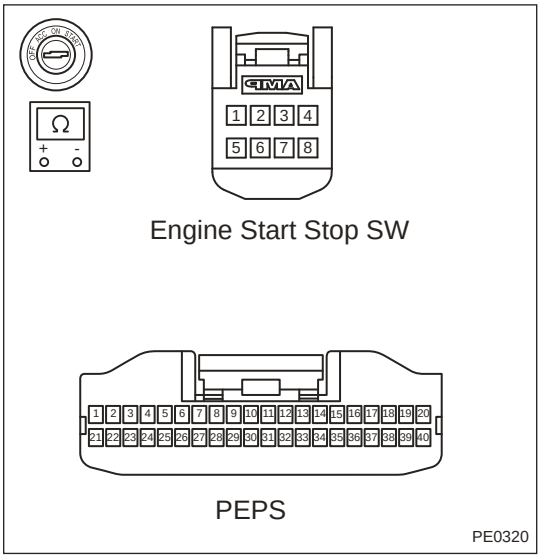
(c) Disconnect ENGINE START STOP switch connector and PEPS module connector.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

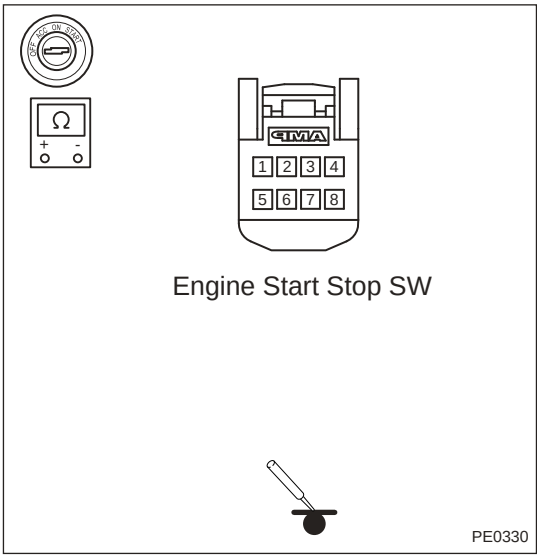
(g) Using ohm band of digital multimeter, check for continuity between ENGINE START STOP switch (1) and I-028 (8), ENGINE START STOP switch (2) and I-028 (28), ENGINE START STOP switch (3) and I-028 (7), ENGINE START STOP switch (4) and I-028 (25) to check circuit for open.



Multimeter Connection	Condition	Specified Condition
ENGINE START STOP switch (1) - PEPS module (- connected terminals)	Always	⩽ 1 Ω
ENGINE START STOP switch (2) - PEPS module (- connected terminals)	Always	⩽ 1 Ω
ENGINE START STOP switch (3) - PEPS module (- connected terminals)	Always	⩽ 1 Ω
ENGINE START STOP switch (4) - PEPS module (- connected terminals)	Always	⩽ 1 Ω

Use circuit diagram as a guide to perform the following inspection procedures:

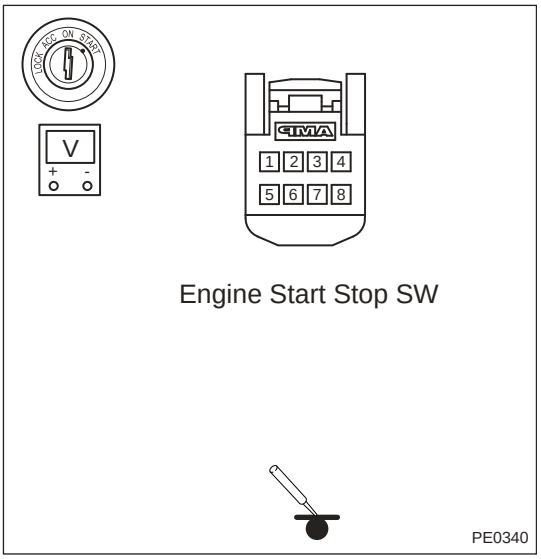
(h) Using ohm band of digital multimeter, check for continuity between terminals 1, 2, 3 and 4 of ENGINE START STOP switch and body ground to check for short to ground in instrument panel wire harness.



Multimeter Connection	Condition	Specified Condition
ENGINE START STOP switch (1) - Body ground	Always	No continuity
ENGINE START STOP switch (2) - Body ground	Always	No continuity
ENGINE START STOP switch (3) - Body ground	Always	No continuity
ENGINE START STOP switch (4) - Body ground	Always	No continuity

Use circuit diagram as a guide to perform the following inspection procedures:

(i) Connect the negative battery cable (confirm ENGINE START STOP switch and PEPS module connector are disconnected). Bridge joint ACC relay and IGN1 relay (-ENGINE START STOP switch is disabled). Using DC voltage band of digital multimeter, measure voltage between terminals 1, 2, 3 and 4 of ENGINE START STOP switch and body ground to check for short to power supply in instrument panel wire harness.



Multimeter Connection	Condition	Specified Condition
ENGINE START STOP switch (1) - Body ground	Always	0 V
ENGINE START STOP switch (2) - Body ground	Always	0 V
ENGINE START STOP switch (3) - Body ground	Always	0 V
ENGINE START STOP switch (4) - Body ground	Always	0 V

NG → **Replace instrument panel wire harness**

OK

4	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace PEPS module**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1508	ACC Circuit Failure

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check fuse

(a) Use circuit diagram as a guide to perform the following inspection procedures:

(b) Check if fuse is blown or no power.

NG → **Replace fuse or check the cause for no power**

OK

2	Check if fuse base jack is abnormal

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Remove fuse SB02-15A in engine compartment fuse and relay box, and check fuse base jack for excessive clearance.

NG → **Adjust fuse base jack**

OK

3	Exchange ACC relay

NG → **Replace ACC relay**

OK ↓

4	**Check if relay switch power supply is normal**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Unplug relay in engine compartment fuse and relay box.

(b) Using 21 W test light or digital multimeter, measure if power supply of ACC relay base No.30 jack is normal.

Multimeter Connection	Condition	Specified Condition
ACC relay base 30 - Body ground (digital multimeter)	Always	Not less than 12 V
ACC relay base 30 - Body ground (21 W test light)	Always	ON

NG → **Replace front bumper wire harness**

OK ↓

5	**Short connect the ACC relay base jack control switch**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Use a wire to bridge joint jacks 30 and 87 of relay base in engine compartment fuse and relay box, and check for open in engine compartment fuse and relay box.

NG → **Replace front bumper wire harness**

OK ↓

6	**Check ACC relay control body ground**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Using ohm band of digital multimeter, check for continuity between jack 86 of ACC relay base and terminal (- corresponding terminal) of engine compartment fuse and relay box to check engine compartment fuse and relay box for open.

Multimeter Connection	Condition	Specified Condition
ACC relay base 86 - Engine compartment fuse and relay box (- corresponding terminal)	Always	⩽ 1 Ω

Use circuit diagram as a guide to perform the following inspection procedures:

(b) Using ohm band of digital multimeter, check for continuity between terminal (corresponding terminal) of engine compartment fuse and relay box and ground point to check if ground circuit is normal.

Multimeter Connection	Condition	Specified Condition
ACC relay (- ground terminal) - Ground point	Always	⩽ 1 Ω

NG → **Adjust ground position or replace front bumper wire harness.**

OK ↓

7	**Check ACC relay control power supply terminal**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Disconnect the negative battery cable.

(b) Disconnect the PEPS module connector.

(c) Check if wire harnesses are worn, pierced, pinched or partially broken.

(d) Check for broken, bent, protruded or corroded terminals.

(e) Check if related connector pins are in good condition.

(f) Using ohm band of digital multimeter, measure resistance of wire harness between engine compartment fuse and relay box (signal terminal) and PEPS module (connected terminal).

Multimeter Connection	Condition	Specified Condition
Engine compartment fuse and relay box (signal terminal) - PEPS module (- connected terminal)	Always	⩽ 1 Ω

NG → **Replace wire harness**

OK →

8	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

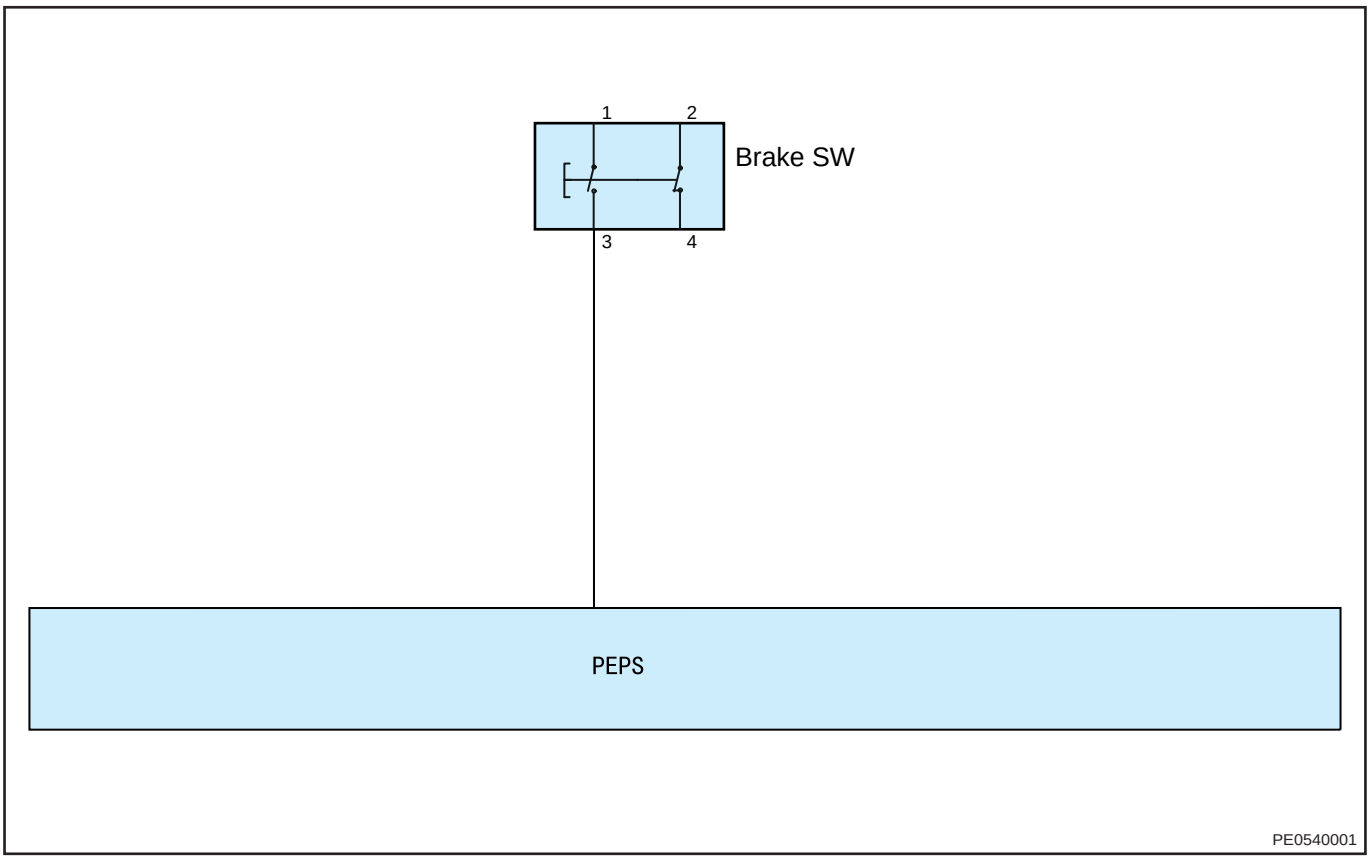
NG → **Replace PEPS module**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B1509	Abnormality in Brake Signal

Description

System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTC and read PEPS control module assembly DTC again.
(b) Check if DTCs occur again.

OK → **System is normal**

NG

2	**Using diagnostic tester, enter other system**

(a) Using diagnostic tester, enter other system (such as ESP module, TCU) and check if same DTC occurs.

NG

3	Check interior wire harness and connector

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

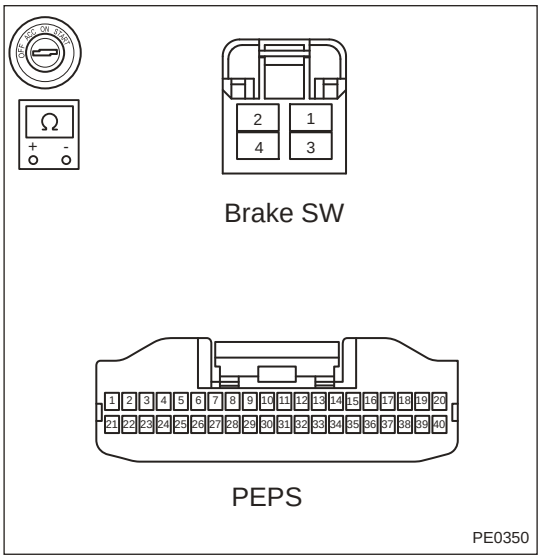
(c) Disconnect instrument panel wire harness connector, interior wire harness connector and PEPS module connector.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

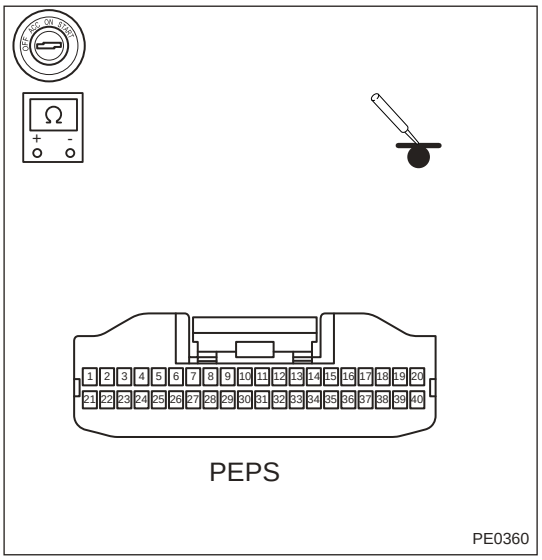
(g) Using ohm band of digital multimeter, check for continuity between terminal of PEPS module (connected terminal) and brake switch (3) to check circuit for open.



Multimeter Connection	Condition	Specified Condition
PEPS module (- connected terminal) - Brake switch (3)	Always	⩽ 1 Ω

Use circuit diagram as a guide to perform the following inspection procedures:

(h) Using ohm band of digital multimeter, check for continuity between terminal of PEPS module (brake signal) and body ground to check for short to body ground.



Multimeter Connection	Condition	Specified Condition
PEPS module (- brake signal terminal) - Body ground	Always	No continuity

NG → **Replace interior wire harness**

OK → **Replace PEPS module**

4	Check fuse

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Measure corresponding fuse in engine compartment fuse and relay box with 21 W test light.

NG → **Replace fuse**

OK

5	Check brake switch

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

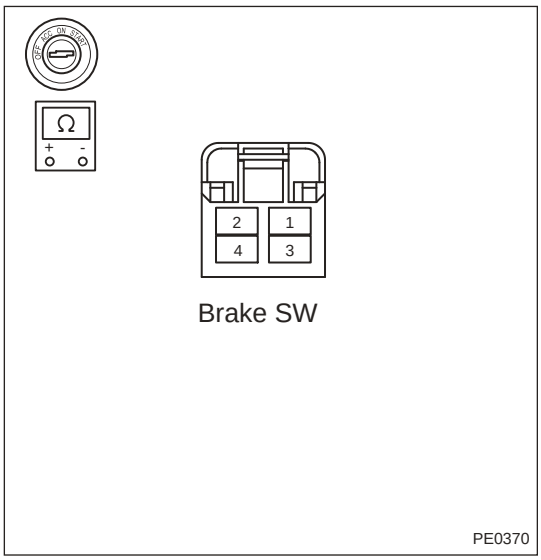
(c) Disconnect the brake switch connector.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

(g) Using digital multimeter, measure internal resistance of brake switch to check if brake switch is abnormal



Multimeter Connection	Condition	Specified Condition
Brake switch (1) - Brake switch (3)	Brake pedal not depressed	No continuity
Brake switch (1) - Brake switch (3)	Brake pedal depressed	⩽ 1 Ω
Brake switch (2) - Brake switch (4)	Brake pedal not depressed	⩽ 1 Ω
Brake switch (2) - Brake switch (4)	Brake pedal depressed	No continuity

NG → **Replace brake switch**

OK → **Turn on power supply again and clear DTC**

6	Check fuse base jack

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Remove corresponding fuse in engine compartment fuse and relay box and check base jack for excessive clearance.

NG → **Adjust fuse jack clearance**

OK

7	Check fuse base jack input power supply

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect the negative battery cable.

(b) Turn ignition switch to ON.

(c) Measure fuse jack input power supply with 21 W test light and check if test light comes on.

NG	**Replace relative fuse**

8	**Check brake switch power supply voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect the negative battery cable.

(b) Turn ignition switch to ON.

(c) Use a digital multimeter to check whether there is 12 V voltage between terminal of engine compartment fuse and relay box (brake switch power supply) and body ground.

(d) Using digital multimeter, check for continuity between terminal E9 of engine compartment fuse and relay box B-022 and terminal 1 of brake light switch B-101 to check for open in wire harness.

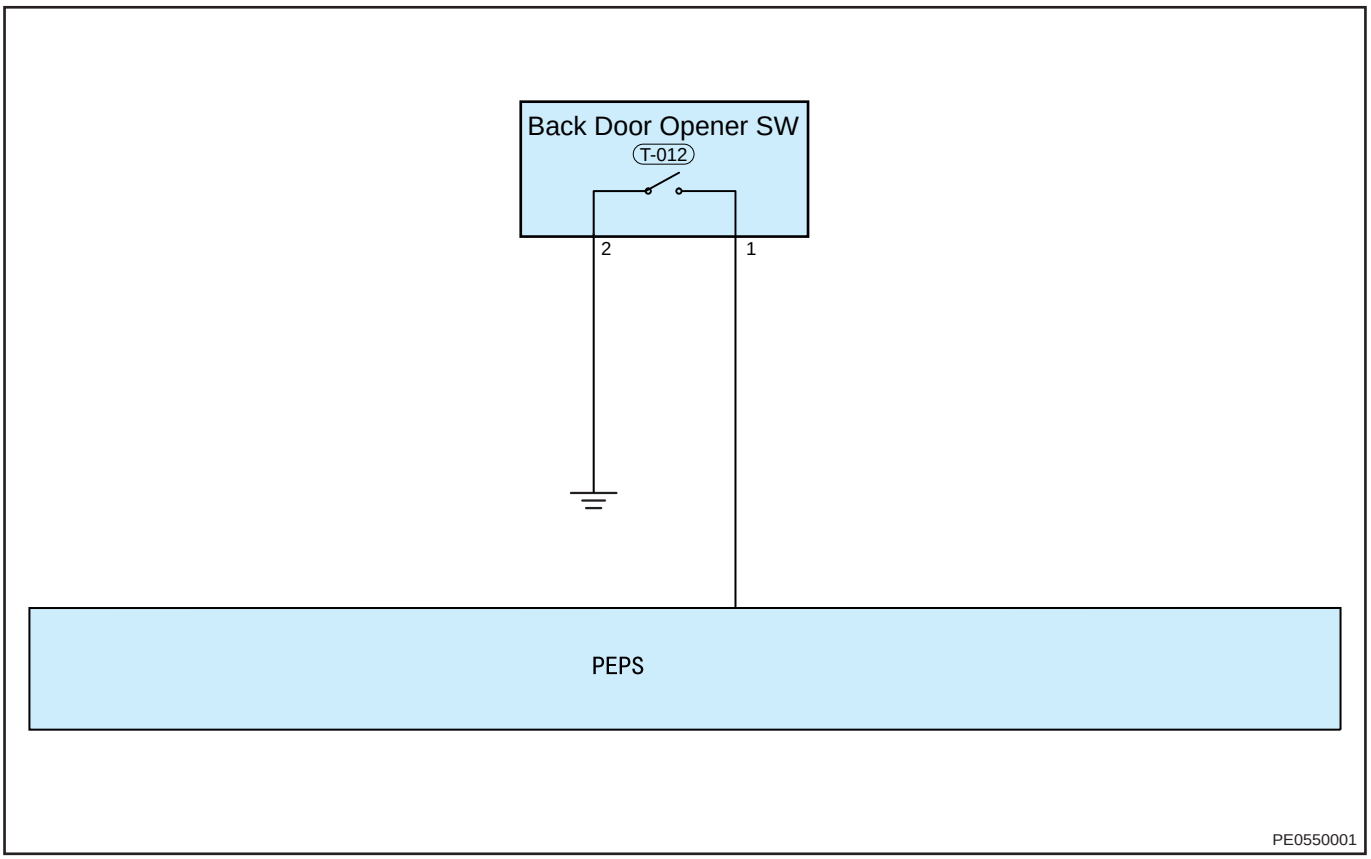
Multimeter Connection	Condition	Specified Condition
Engine compartment fuse and relay box (-brake switch power supply) - Brake switch (1)	Brake pedal not depressed	⩽ 1 Ω

NG	**Replace interior wire harness**
OK	**Replace PEPS module**

DTC	**B1518**	**Trunk/Back Door Unlock Switch Stuck Failure**

Description

System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check vehicle malfunction condition**

(a) Press back door release switch to check if back door is open.

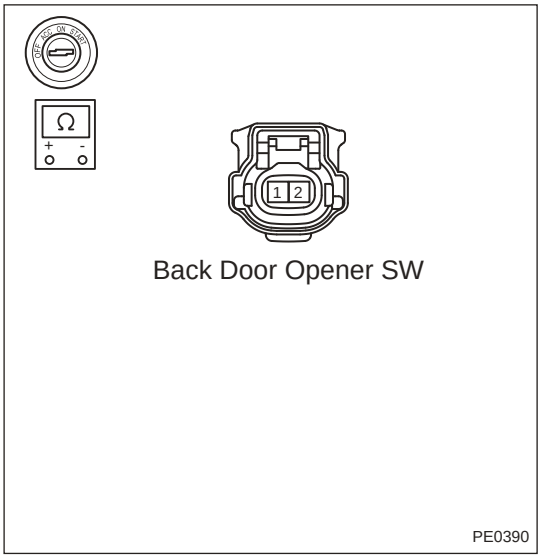
NG

Turn off vehicle power supply (-disconnect the negative battery cable), then turn on power supply again and clear DTC.

OK

2	**Check back door release switch**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the back door release switch connector.
(d) Check if wire harnesses are worn, pierced, pinched or partially broken.
(e) Check for broken, bent, protruded or corroded terminals.
(f) Check if related connector pins are in good condition.
(g) Using ohm band of digital multimeter, measure resistance of back door release switch to check if back door release switch is damaged.



Multimeter Connection	Condition	Specified Condition
Back door release switch (1) - Back door release switch (2)	Not pressed	No continuity
Back door release switch (1) - Back door release switch (2)	Pressed	⩽ 1 Ω

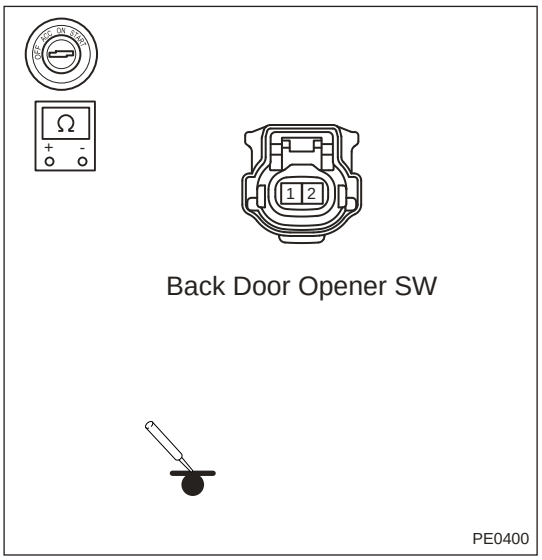
NG → **Replace back door release switch**

OK

3	**Check back door release switch ground side**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Using ohm band of digital multimeter, check for continuity between terminal 2 of back door release switch and ground point to check if ground side is normal.



Multimeter Connection	Condition	Specified Condition
Back door release switch (2) - Ground point	Always	⩽ 1 Ω

NG → **Handle ground point**

OK

4	Check back door release switch circuit signal voltage

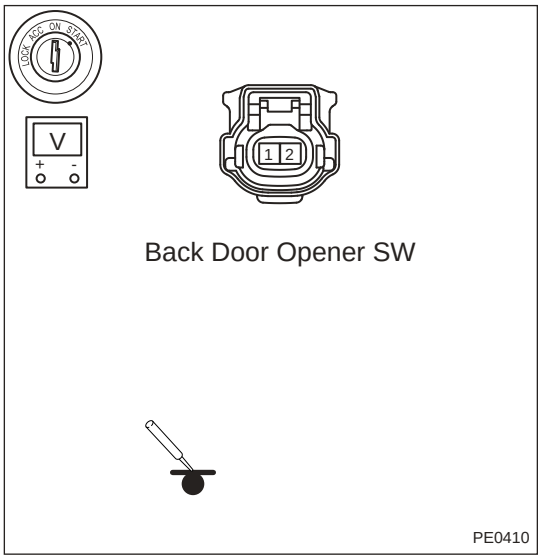
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect the negative battery cable.

(b) Turn ENGINE START STOP switch to ON.

(c) Using DC voltage band of digital multimeter, measure if signal voltage at terminal of back door release switch (1) is normal.

Multimeter Connection	Condition	Specified Condition
Back door release switch (1) - Body ground	ON state	Approximately 12 V



NG → **Repair or replace back door wire harness**

OK

5	Check interior wire harness for open or short

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Disconnect the PEPS module connector.

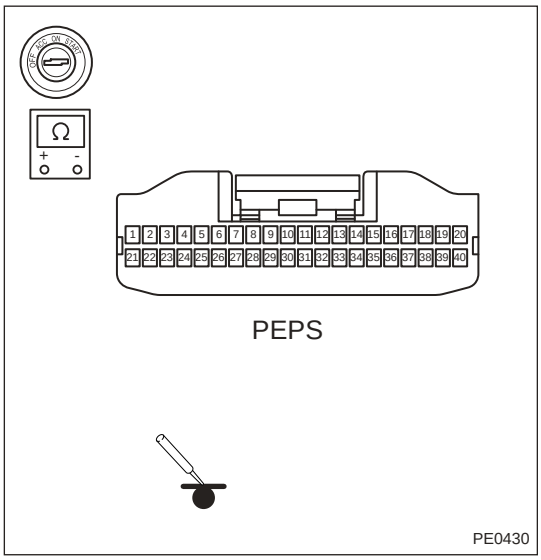
(b) Check if wire harnesses are worn, pierced, pinched or partially broken.

(c) Check for broken, bent, protruded or corroded terminals.

(d) Check if related connector pins are in good condition.

(e) Using ohm band of digital multimeter, measure resistance between terminal 6 of PEPS module and body ground to check for short to ground in interior wire harness.

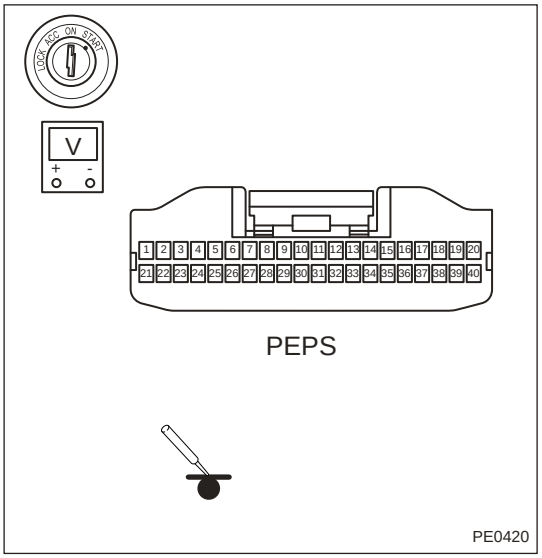
Multimeter Connection	Condition	Specified Condition
PEPS module (- connected terminal) - Body ground	Always	No continuity



Use circuit diagram as a guide to perform the following inspection procedures:

(f) Using voltage band of digital multimeter, measure voltage between terminal 6 of PEPS module and body ground to check for short to power supply in interior wire harness.

Multimeter Connection	Condition	Specified Condition
PEPS module (- connected terminal) - Body ground	Always	Approx. 0V



NG → **Replace interior wire harness**

OK →

6	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

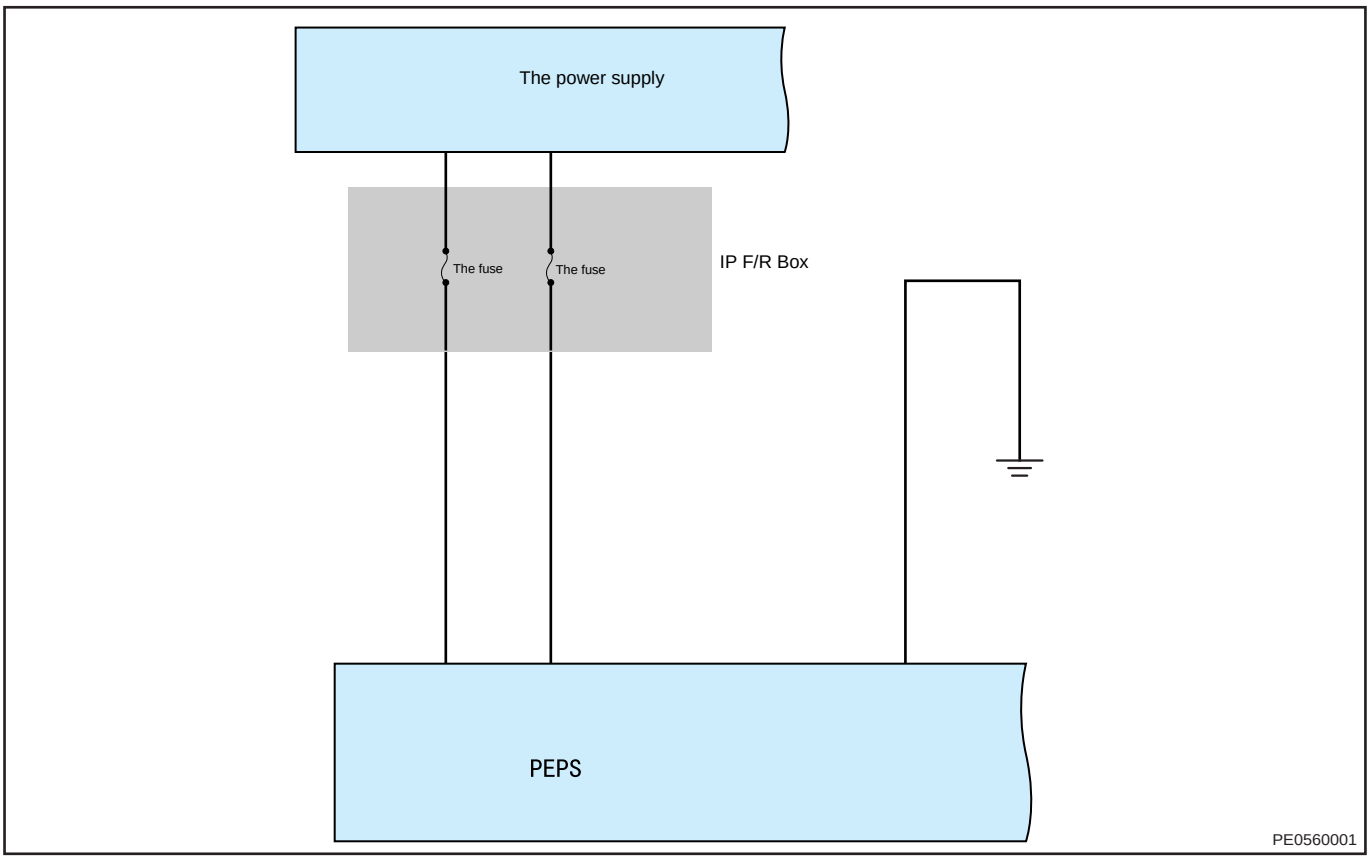
NG → **Replace PEPS module**

OK → **Conduct test and confirm malfunction has been repaired.**

DTC	B152F	Battery Voltage Low Detection
DTC	B1530	Battery Voltage High Detection

Description

System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Check battery voltage (not less than 12 V) with a digital multimeter.

NG → **Replace battery**

OK

2	**Check charging system**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Turn ENGINE START STOP switch to OFF.
(b) Check positive and negative battery cables for broken or damage.
(c) Turn ENGINE START STOP switch to ON.
(d) Start the engine.
(e) Check if voltage of positive and negative battery is normal with a digital multimeter (13.5V-14.8V).

NG → **Repair or replace positive and negative battery cables and alternator**

OK ↓

3	**Check PEPS module power supply fuse**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Turn ENGINE START STOP switch to OFF.
(b) Check if PEPS module power supply fuse is blown.

NG → **Replace power supply fuse**

OK ↓

4	**Check engine compartment fuse and relay box**

Use circuit diagram as a guide to perform the following inspection procedures:
(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the engine compartment fuse and relay box connector.
(c) Using digital multimeter, check for continuity between fuse and corresponding pin of fuse and relay box.
(d) Using digital multimeter, check for continuity between fuse and corresponding pin of engine compartment fuse and relay box.

Multimeter Connection	Condition	Normal Condition
Fuse - Fuse and relay box (- connected terminal)	Always	⩽ 1 Ω
Fuse - Fuse and relay box (- connected terminal)	Always	⩽ 1 Ω

NG → **Replace engine compartment fuse and relay box**

OK

5	Check PEPS module power wire harness

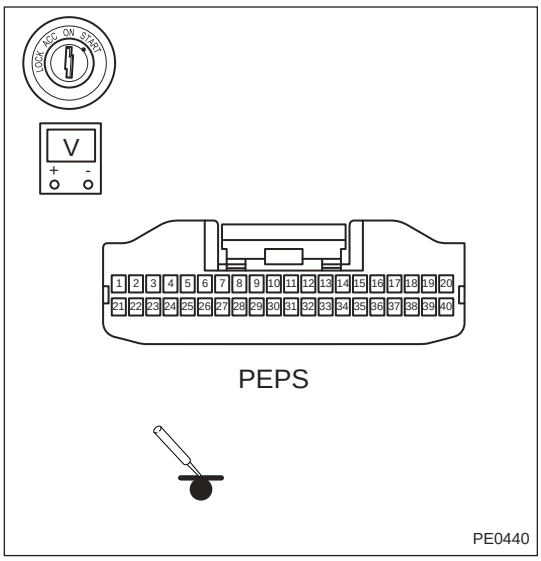
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to ON.

(b) Disconnect the PEPS connector.

(c) Using a digital multimeter, check if the voltage between PEPS module power supply terminal and body ground is normal.

Multimeter Connection	Condition	Normal Condition
PEPS module (- connected terminal with power supply) - Body ground	Always	Not less than 12 V
PEPS module (- connected terminal with power supply) - Body ground	Always	Not less than 12 V



Use circuit diagram as a guide to perform the following inspection procedures:

(d) Using digital multimeter, check for continuity between PEPS module connector (terminal 20 of power supply) and instrument panel fuse and relay box (corresponding terminal), PEPS module (terminal 17 of power supply) and terminal (corresponding terminal) of instrument panel fuse and relay box to check for open in power supply wire harness.

Multimeter Connection	Condition	Normal Condition
PEPS module (- power supply terminal) - Instrument panel fuse and relay box (- corresponding terminal)	Always	⩽ 1 Ω
PEPS module (- power supply terminal) - Instrument panel fuse and relay box (- corresponding terminal)	Always	⩽ 1 Ω

NG → **Repair or replace instrument panel wire harness**

OK

6	**Check the PEPS module ground circuit**

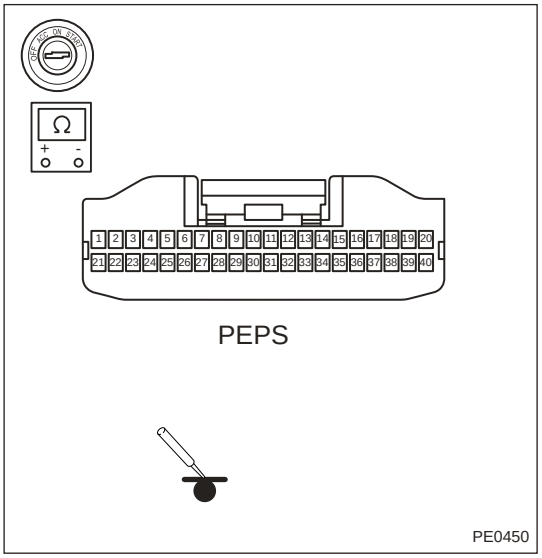
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to ON.

(b) Disconnect the PEPS module connector.

(c) Using digital multimeter, check for continuity between PEPS module (terminal 20) and ground wire harness to check ground wire harness for open.

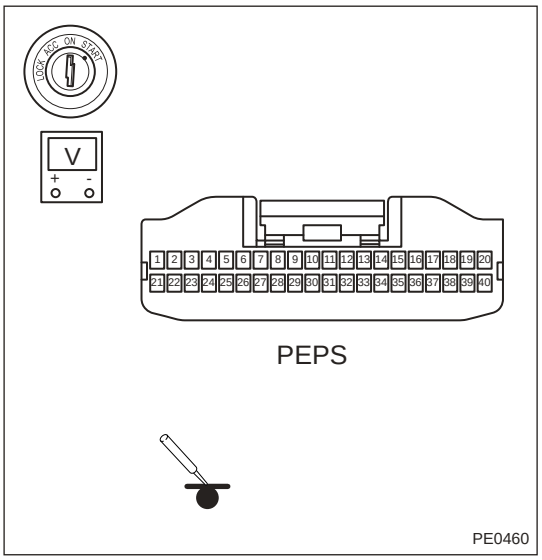
Multimeter Connection	Condition	Normal Condition
PEPS module (-terminal 20) - Ground point	Always	⩽ 1 Ω



Use circuit diagram as a guide to perform the following inspection procedures:

(d) Using voltage band of digital multimeter, measure voltage between terminal 17 of PEPS module and body ground to check for short to power supply.

Multimeter Connection	Condition	Normal Condition
PEPS module (-terminal 17) - Body ground	Always	0 V



NG → **Replace instrument panel wire harness**

OK → **Replace PEPS module**

DTC	B150F	ESCL Anti Scanning (Only for MT)

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).

- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Electric steering column lock enters anti-scanning state**

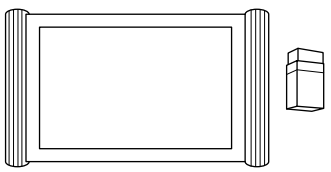
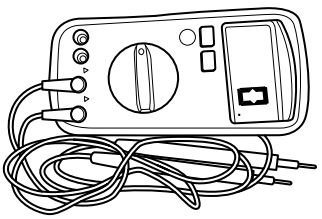
(a) Enter anti-theft control system, delete and learn ESCL.

DTC	**U0100**	**Lost of Communication with EMS**
DTC	**U0129**	**Lost Communication with BSM**
DTC	**U0140**	**Lost Communication with BCM**
DTC	**U0329**	**Lost Communication with Electronic Steering Column Lock**
DTC	**U0101**	**Lost of Communication with TCM**
DTC	**U0155**	**Lost Communication with ICM**
DTC	**U0230**	**Lost Communication with PLG**

DTC Confirmation Procedure
Refer to CAN communication system

On-vehicle Service

Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Digital Multimeter	 RCH0002006

Torque Specifications

Description	Torque (N·m)
Hexagon Flange Nut	7 ± 1

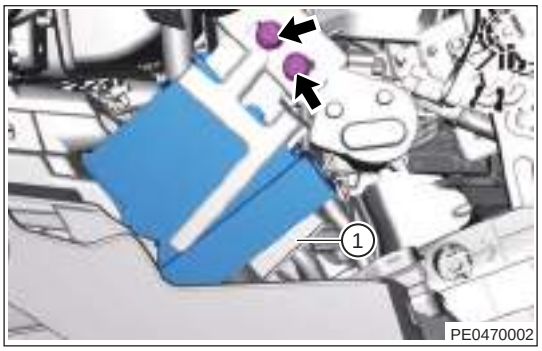
PEPS Control Module Assembly

Removal

⚠ Caution

- DO NOT separate PEPS controller and fixing bracket at will, or clamping structure of controller will be damaged, unless controller malfunction is confirmed by troubleshooting result, it can be removed and cannot be reused.
- DO NOT replace PCB board of PEPS controller at will, or it cannot be traced back and may make abnormal sound.
- After replacing PEPS controller assembly, before performing key learning and anti-theft matching, do not press ENGINE START STOP switch at will if nor necessary, to prevent PEPS controller from being locked and causing vehicle power supply not to be turned on.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the glove box assembly.
4. Remove the PEPS module.
   a. Remove 2 coupling bolts (arrow) between PEPS module mounting bracket and instrument panel crossmember, and disconnect PEPS module connector (1).



Tightening Torque
7 ± 1 N·m

   b. Carefully remove the PEPS module and mounting bracket assembly.

Installation

1. Installation is in the reverse order of removal.

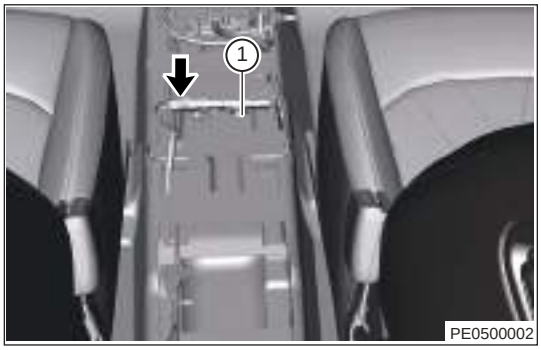
Front Low Frequency Antenna

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the auxiliary fascia console assembly.
4. Remove the front low frequency antenna.

a. Disconnect the connector (arrow) from front low frequency antenna.

b. Using an interior crow plate, detach low frequency antenna fixing clip from mounting bracket, and remove low frequency antenna assembly (1).



Hint:
DO NOT repeatedly remove and install it, and dispose it if it becomes loosen.

Installation

1. Installation is in the reverse order of removal.

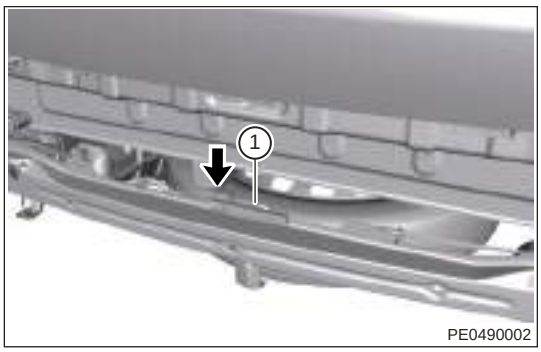
Rear Bumper Low Frequency Antenna

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear bumper assembly.
4. Remove the rear low frequency antenna assembly.

a. Disconnect the connector (arrow) from rear bumper low frequency antenna.

b. Using a tool, detach low frequency antenna fixing clip (1) from rear bumper crossmember.



Hint:
DO NOT repeatedly remove and install it, and dispose it if it becomes loosen.

Installation

1. Installation is in the reverse order of removal.

Anti-theft Coil

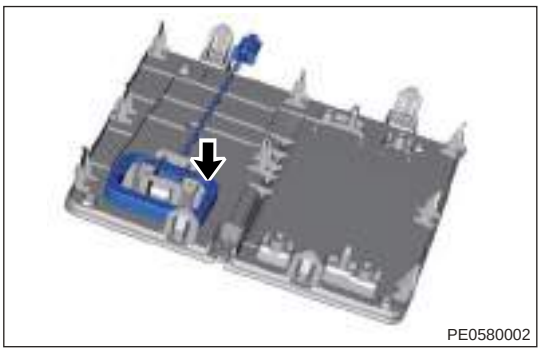
Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.

3. Remove the front storage box assembly.

4. Unplug the anti-theft coil connector.

5. Press two clips with left hand while hold coil with right hand, and unplug it in opposite direction of installation direction with large force.



Installation

⚠ Caution

The anti-theft coil must be installed with a smooth surface against the mounting surface, and ensure it is installed in place, otherwise it may fall off from the bracket, thus failing to carry out normal key learning and anti-theft matching.

1. Installation is in the reverse order of removal.

CAN SYSTEM

System Description

Description

CAN bus is a serial data communication protocol developed by German BOSCH company from the early 1980s to solve the data exchange between many control and test instruments in modern automobiles. It is a multi-main bus, and the communication medium can be twisted pair, coaxial cable or optical fiber. CAN bus communication interface integrates the physical layer and data link layer functions of CAN protocol, which can complete the framing processing of communication data, including bit stuffing, data block coding, cyclic redundancy check, priority distinguishing, etc.CAN protocol adopts CRC check and can provide corresponding error handling function, which ensures the reliability of data communication. With its excellent characteristics, extremely high reliability and unique design, CAN is especially suitable for the interconnection of industrial process monitoring equipment. Therefore, it has been paid more and more attention by the industry and has been recognized as one of the most promising field buses.

Operation

CAN bus is also called vehicle bus, and full name is “Controller Area Network” which means local area network, it connects all control units together in some way to form a complete system. Each control unit collects different signals by each sensor, and transmits data among modules under the same rules. Network information can meet different real-time requirements by its priority. Data transmitted via CAN bus control unit is level model of binary format, and data transmission line transmits the voltage signal.

Composition

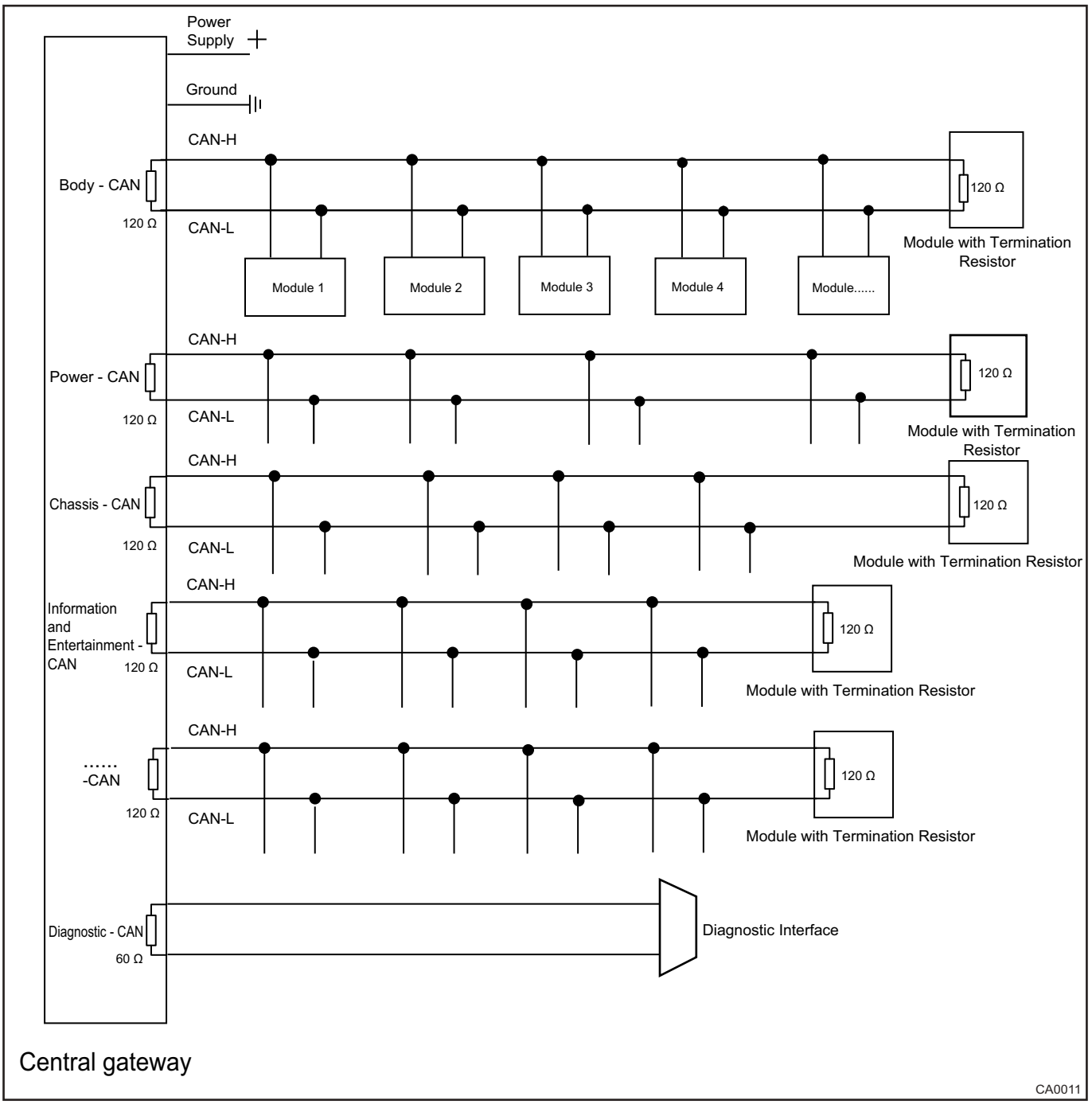
Equipped with Central Gateway Module, Vehicle Network Layout

1. Central Gateway
   - CAN gateway is the core of the entire CAN network and controls the transmitting and processing of various signals from different CAN buses (such as: body CAN, chassis CAN, power CAN, etc.) of the vehicle.
   - CAN gateway can receive network signals of different transmission rates from any CAN bus (and LIN bus). CAN gateway processes these signals according to certain standards and then broadcasts them to the vehicle network.
   - **CAN central gateway (CAN bridge)** is the infrastructure components of complex network structures that can be implemented. One CAN bridge can connect CAN networks with mutually different bit rates or protocols. It is based on the storage (modification) and transmitting principle, where CAN messages are received by the subnetwork and then transmitted to another subnetwork. Translation and filtering rules can also be used to allow porting of protocols between sub-networks to be performed.
   - CAN bridge is suitable for setting up hierarchical network, and only the information of the corresponding connected subnets is transmitted through the bridge. The bridging function can also be performed with the aid of other transmission systems. As an extension of CAN bridge, **CAN gateway** allows access to CAN network via other communication systems. In each case, the protocol of the connected bus system is mapped to another communication model.
   - Basic function includes:
     - 1. Connect CAN bus/LIN bus with different baud rate (transmission speed) to realize gateway relay function of CAN network.
     - 2. Diagnostic message/non-diagnostic message transmission
     - 3. Diagnostic firewall management
     - 4. Node online monitoring
     - 5. Gateway sleep and wakeup management

- 6. ECU upgrade/gateway upgrade
- 7. Voltage management

2. CAN bus

- Each CAN bus is generally composed of twisted pair consisting of 2 wires, one CAN_high (CAN-H) and one CAN_low (CAN-L) representing high level and low level respectively. Generally, different models have different CAN networks, which can be divided into the following buses:
  - PT CAN (PowerTrain CAN) bus. The following ECUs are generally available on the PT CAN bus: ECM (Engine Control Module), TCU (Transmission Control Unit), ESP (Electronic Stability Program). PT CAN is responsible for vehicle power and is a CAN bus with the highest signal priority and signal transmission rate in the vehicle CAN network.
  - CH CAN (Chassis CAN) bus. The following ECUs are generally available on the CH CAN bus: ABS (Antilock Brake System), ESP (Electronic Stability Program), EPS (Electric Power Steering) ⋯⋯ CH CAN is responsible for the vehicle chassis and the braking/stabilization/ steering of 4 wheels. Since it involves vehicle braking/power steering, etc., its network signal priority is also high.
  - Body CAN bus. The following ECUs are generally available on the Body CAN bus: AC (Air Condition), AVM (Around View Monitor), BCM (Body Control Module), sliding roof, window, fog light, turn signal light, wiper, IMMO (Immobilizer) ⋯⋯ Body CAN is responsible for the management and control of some intelligent hardwares on the body to improve comfort/safety, and its network signal has a lower priority, because the above devices are auxiliary devices.
  - Info CAN (Infomercial CAN) bus. The following ECUs are generally available on the Info CAN bus: On-board entertainment system (central control), IPK (Instrument Pack), current digital meter, having basic entertainment functions such as music, maps, calls, etc. ⋯⋯ Info CAN is an auxiliary optional equipment, so the priority is also low, and it is mainly responsible for the management and control of some intelligent hardwares on the body to improve entertainment.
  - DiagCAN (Diagnose CAN) bus. DiagCAN bus mainly provides diagnostic function and has only one diagnostic interface.



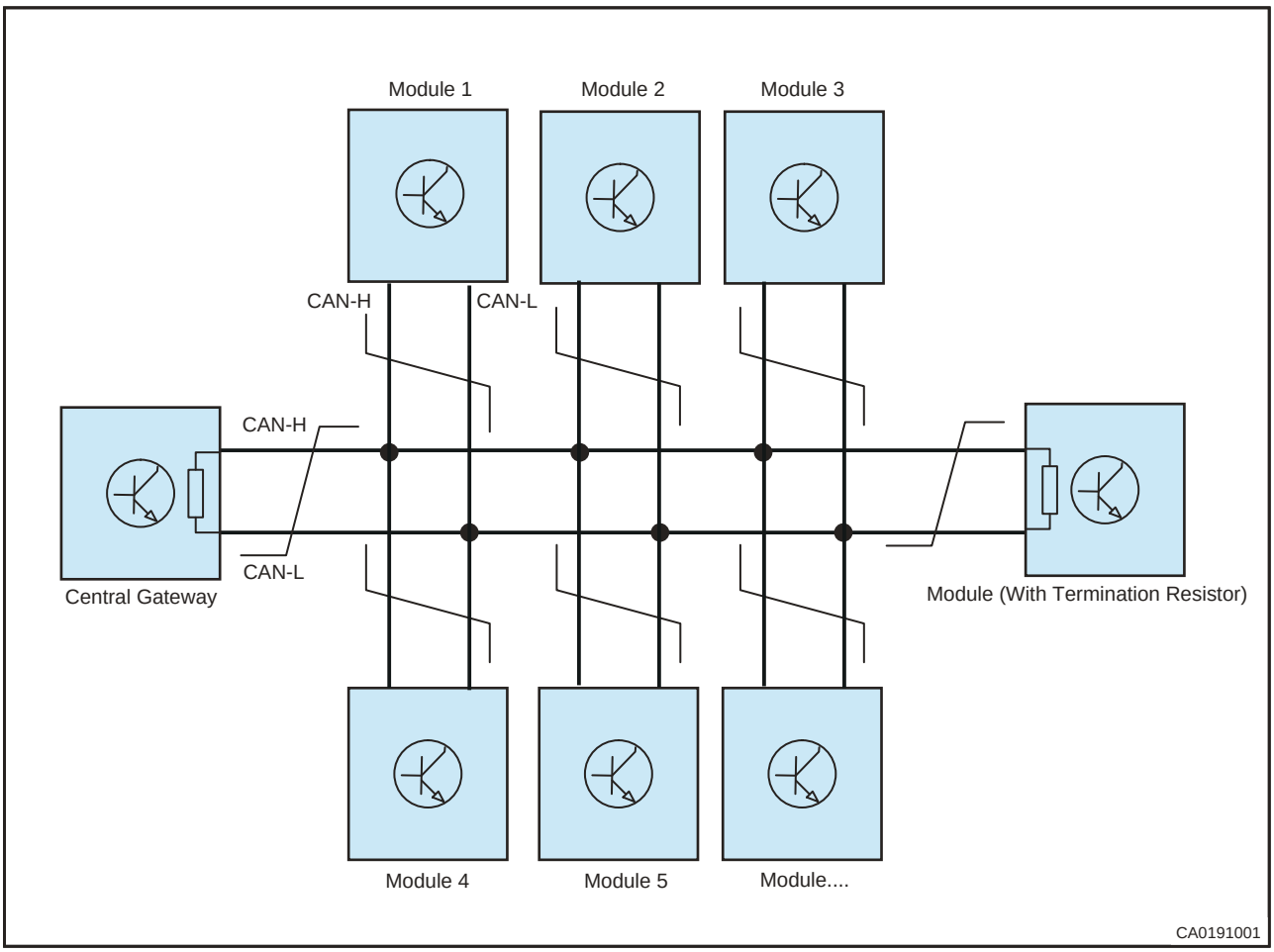
CAN Bus Composition

1. Single CAN bus composition

- Transceiver (module in this CAN network): The data provided by the CAN controller is converted into electrical signals, and then sent out through the data bus, and also receives the bus data and transmits them to the CAN controller. The on-board network CAN transceiver is a monolithic integrated circuit that combines CAN data transmitter with data receiver.
- Termination resistor: One CAN network is equipped with 2 terminal resistors, which are respectively integrated in the central gateway and the corresponding module with termination resistor (the resistance of termination resistor in a single module is about 120 Ω). Main functions:
  - 1. Improve anti-interference ability, allowing high-frequency and low-energy signals to be quickly eliminated;

- 2. Make sure the bus goes into a recessive state quickly, allowing the energy of the parasitic capacitance to be quickly eliminated;
- 3. Improve signal quality by placing at both ends of the bus to reduce reflected energy.

- Twisted pair: A part of a CAN network that uses two intertwined wires of CAN-L and CAN-H to transmit data in the network. CAN-H means that the voltage of the network cable is high in the dominant state, CAN-L means that the voltage is low in the dominant state. Twisted pair consists of two mutually insulated wires intertwined with each other. It is especially suitable for differential signal transmission occasions. Compared with parallel wires, it can suppress interference more effectively.
  - Difference between CAN-L and CAN-H:
    - 1. The two wires are different colors.
    - 2. One of the two wires is called CAN-High and the other is called CAN-Low. In the static state, the voltage of the two wires to the ground is 2.5 V. At this time, the voltage difference between the two wires is 0 V. This state is called a recessive state, and its digital signal is represented by 1. When the voltage to ground of CAN-High is 3.5 V, and the voltage to ground of CAN-Low is 1.5 V, the voltage difference between the two wires of CAN-High and CAN-Low at this time is 2 V, this state is called a dominant state, and its digital signal is represented by 0.
    - 3. Part of the CAN-H in body network transmission mode is the high data line, CAN-L is the low data line, and the two are twisted together, which can make the CAN bus insensitive to electromagnetic interference.



- Bus speed is: 500 Kbit/s;
- Cannot run in single line - If a CAN line of module is disconnected, CAN signal of this module cannot be transmitted;

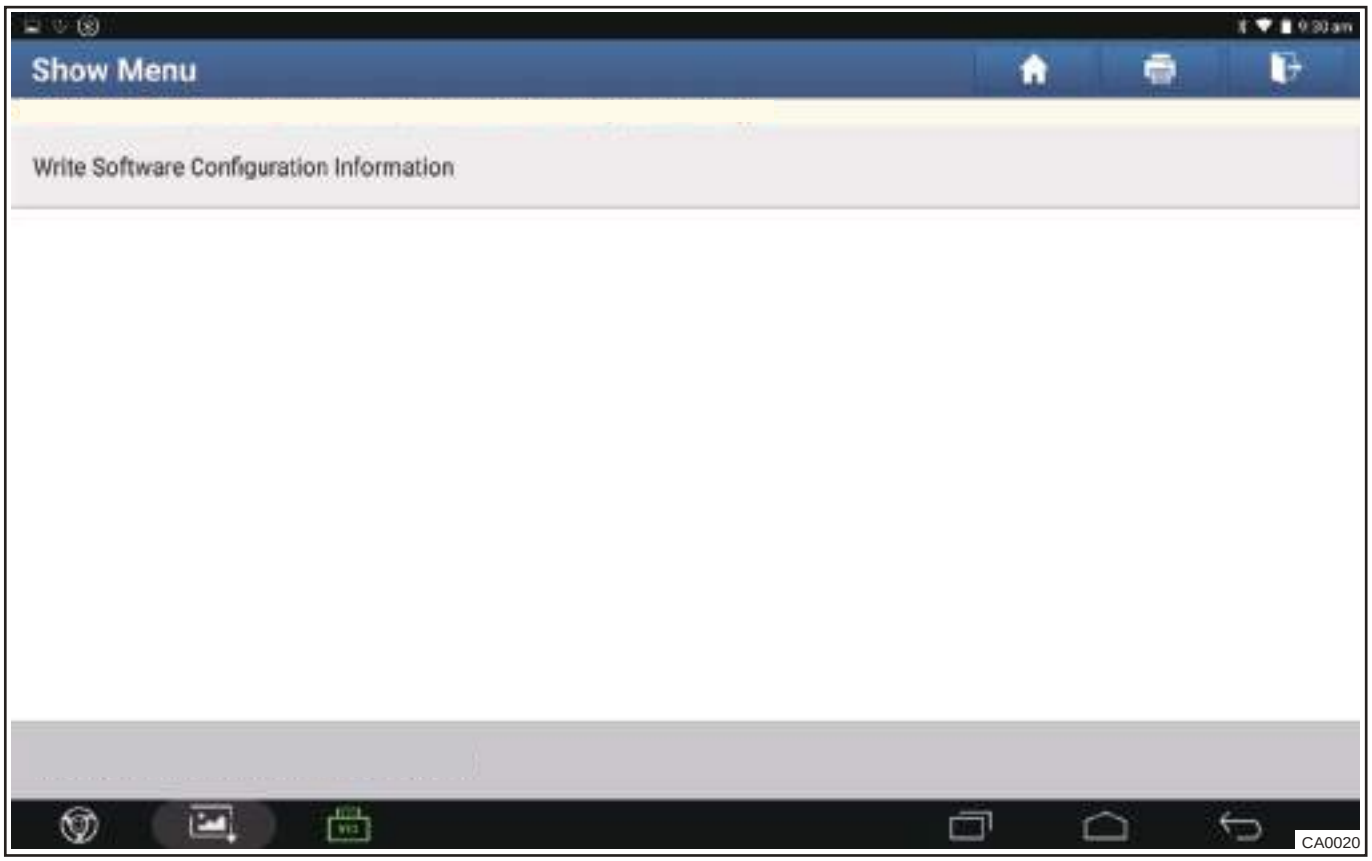
- Vehicle driving CAN diagnosis is performed through No.6 pin and No.14 pin of diagnostic interface.

Matching Learning

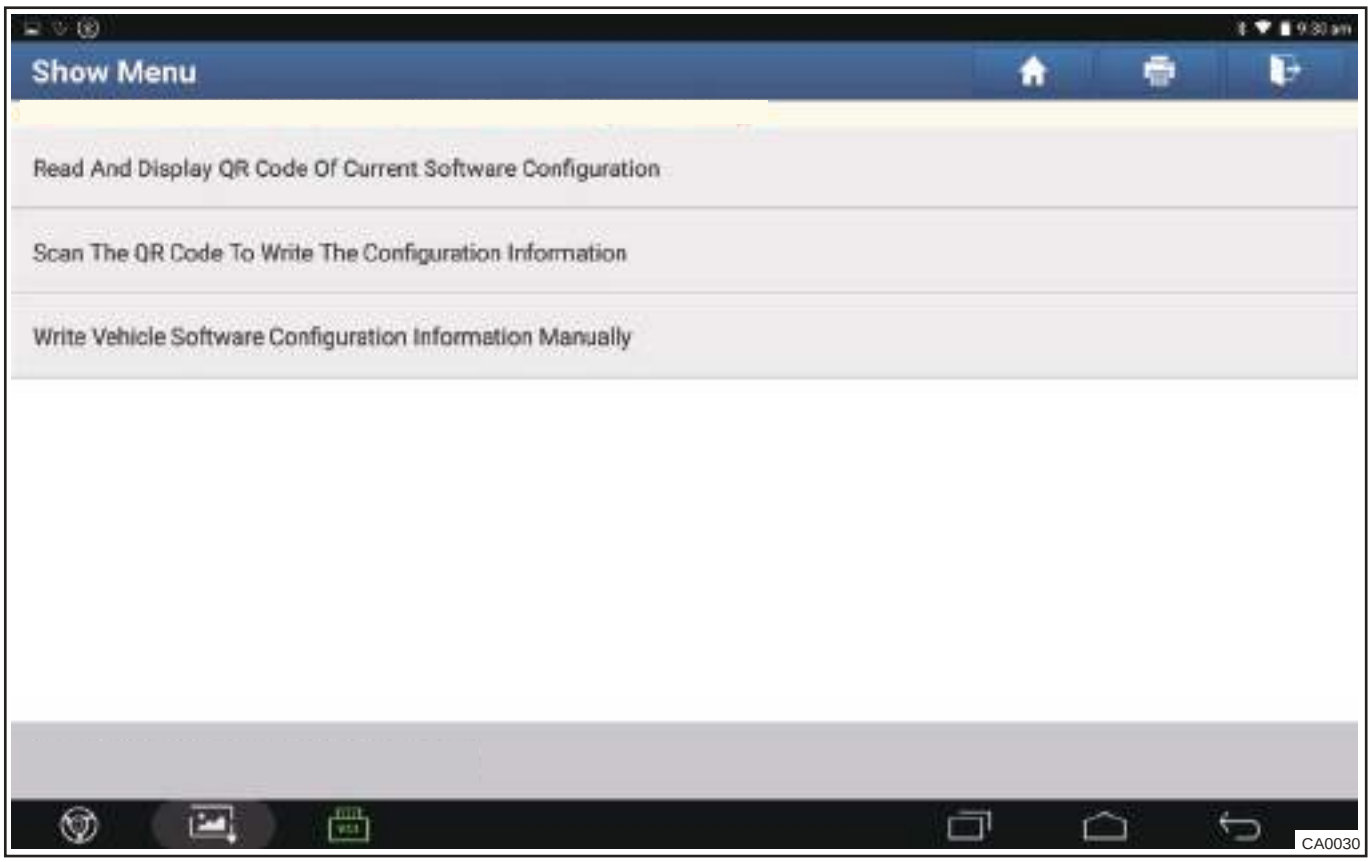
Software Configuration Information Writing

1. Connect the diagnostic tester, turn ENGINE START STOP switch to ON and select “T1E” model, then enter “CGW”.
2. Click “Special Function”.

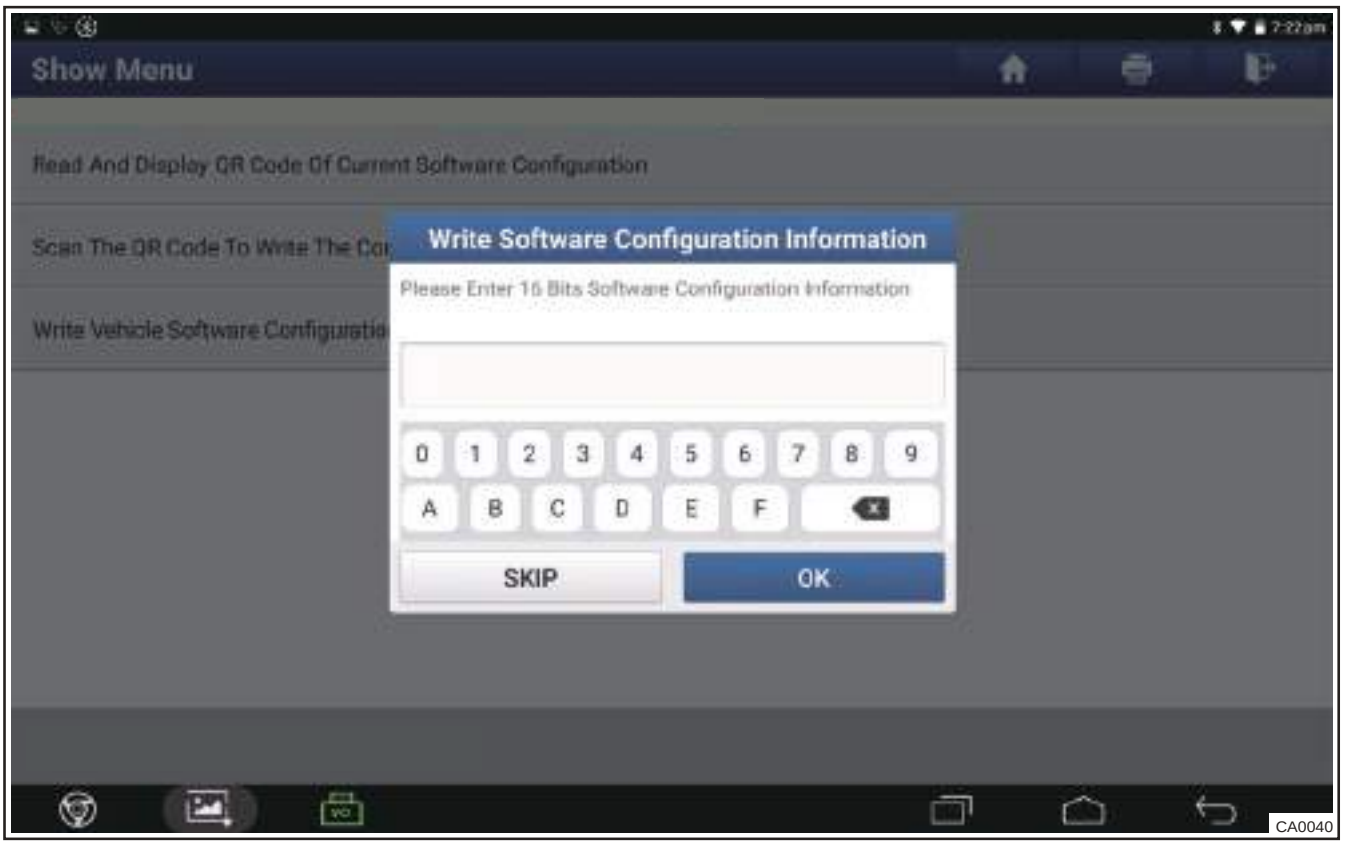
3. Enter next screen and click “Write Software Configuration Information”.



4. Enter next screen and click “Write Vehicle Software Configuration Information Manually”.



5. Input corresponding configuration information and click “OK”.



Diagnosis & Test

Problem Symptoms Table

⚠ Caution
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Possible Cause
Diagnostic interface cannot access to the system	Fuse
	CAN bus
	Gateway module
Engine control system failure	CAN bus
	Battery voltage
	Module damaged
	Ground wire
Brake control system failure	Wire harness or connector
	EPB module
Airbag system failure	ECM
	Wire harness and connector

Symptom	Possible Cause
	Airbag module failure
Body electrical failure	Body Control Module (BCM) failure
	Wire harness or connector
	Instrument cluster
Transmission failure	Transmission Control Module (TCU) failure
	Wire harness or connector
	ECM

Diagnosis Procedure

Hint:
Use following procedures to troubleshoot the control system.

1	**Vehicle brought to workshop**

Next

2	**Examine vehicle and check basic items**

Check system power supply voltage, and check that fuse, wire harness and connector are connected normally.

OK

Standard voltage: Not less than 12 V.

Result

NG → **Check and replace malfunctioning parts**

OK

3	**Using a diagnostic tester, read related DTC and data stream information**

Result

Result	Go to
No DTC	A
DTC occurs	B

A → **Perform troubleshooting procedure without DTCs according to malfunction symptom**

B

4	**Troubleshoot according to DTCs troubleshooting procedure**

Result

Result	Go to
Problem is not resolved	A
Problem is resolved	B

A → **Return to procedure 1 and troubleshoot the process again**

B

5	**According to airbag system malfunction repair completion inspection and delivery, confirm that malfunction is resolved**

Result

Result	Go to
Delivery inspection is failed	A
Delivery inspection is qualified	B

A → **Return to procedure 1 and troubleshoot the process again**

B

6	**Finished**

DTC Confirmation Procedure

Confirm that battery voltage is normal before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn ENGINE START STOP switch to ON.
- Use diagnostic tester to record and clear DTCs stored in supplemental restraint system.
- Turn the ENGINE START STOP switch to OFF and wait for several seconds.
- Turn ENGINE START STOP switch to “ON”, and then select read DTC.
- If DTC is detected, it indicates current malfunction. Go to inspection procedure - Step 1.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.

- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Failure Analysis Method

1. Use diagnostic tester to diagnose and analyze the trouble code.

   When a module or several modules need to receive the data sent by a module to complete the corresponding function, once the data is not received, the module received the data will generate trouble codes, which could be read by diagnostic tester as: “Lost communication with XX module”, “Communication with XX module is not normal”; When the bus is out of work, the trouble code will be read as CAN bus close; When there is malfunction on module CAN configuration, code will be reported as “configuration code error”.

   CAN network failures consist of the following types:

   a. Receive continuous invalid signals: This type of fault indicates communication effective bit received by control module is “invalid” or invalid signal after processing.
   b. Signal is below normal range: This type of fault indicates serial data bus signal is below normal range.
   c. Signal is above normal range: This type of fault indicates serial data bus signal is above normal range.
   d. Invalid signal: This type of fault indicates serial data bus signal does not match specified execution condition.
   e. Lost signal: This type of fault indicates specified no specified information is received.
   f. Bus closed: This type of fault indicates bus is out of work.
   g. Unstable signal: This type of fault indicates a transient distortion or interruption of a bus signal.

2. Waveform analysis.

   It is main method to determine the hardware fault of CAN bus system. Check operation of high speed CAN and low speed CAN and judge most CAN network hardware faults through oscilloscope.

For example, if bus waveform is abnormal, after sales staff can judge by “plug and unplug each joint and observe the waveform of oscilloscope at the same time”. If bus waveform is normal after unplugging a joint, the fault is in the module or the bus connected this module. This method is especially suitable for modules that do not have trouble code self-diagnosis.

3. Circuit diagram analysis.

   Use multimeter, oscilloscope, diagnostic tester and combine with circuit diagram to determine where is the fault.

Common Troubleshooting

1. Diagnostic tester reads trouble code of CAN configuration error.

   Fault expression: CAN or configuration code error is not performed by meter or BCM, read “Software configuration error”, “Configuration code error” with diagnostic tester.

   Exclusion methods and steps:

   This type of situation usually belongs to CAN system software failure. Write correct configuration code to these modules or sensors or calibrate these sensors, clear the trouble code and verify the malfunction phenomenon again.

2. Diagnostic tester cannot communicate with all modules.

   Malfunction symptom: If diagnostic tester can be used normally on other vehicle, but cannot communicate with each module on faulty vehicle, malfunction indicators or warning lights on the meter turn on.

   Malfunction reason: Diagnostic interface power supply and ground malfunction, diagnostic interface CAN line is open to normal CAN line, bus CAN-H is short to CAN-L, CAN-H is short to ground, CAN-L is short to ground, CAN-H is short to power supply, CAN-L is short to power supply, CAN line is mixed, node (module) is malfunctioning or power supply grounding is abnormal.

3. Exclusion methods and steps:

1	**Diagnose if power supply voltage and grounding resistance are correct.**

NG → **Inspect and repair diagnosis interface power supply or ground, verify the fault phenomenon again.**

OK ↓

2	**Use multimeter to detect parallel termination resistor, and check if resistance is correct**

NG → **Check and repair connecting wire between diagnostic interface and two modules with termination resistor or replace module with incorrect resistance to verify the malfunction symptom again.**

OK ↓

3	**Connect oscilloscope and observe waveform at the same time. Observe if waveform is normal.**

NG

Inspect and repair the power supply and ground of these modules, and verify the malfunction symptom again.

OK

4	**Determine type of fault waveform, inspect and repair, then reconfirm the fault phenomenon again.**

4. The diagnostic tester cannot communicate with several modules.

   Malfunction symptom: The diagnostic tester cannot communicate with several modules, but can communicate with at least one module.

   Malfunction cause: Module power supply malfunction, CAN main line open, CAN line mixed fitting, node (module) malfunction, gateway module malfunction.

5. Power supply malfunction (power supply and ground).

   The core part of vehicle multiplex system is an electronic control unit containing a communication IC chip. The normal operating voltage of the electronic control unit is generally in the range of operating voltage: 9 V $\leqslant$ U $\leqslant$ 16 V. CAN network communication voltage range: 6 V $\leqslant$ U $\leqslant$ 16 V. If the operating voltage provided by vehicle power system is lower than this value, some electronic control units with higher requirements on operating voltage will temporarily stop working, thus making multiplex system unable to communicate. The CAN hardware controller inside ECM may not work under 6 V. Use battery tester to detect, if it does not meet the requirements, charge the battery or replace the battery (and also detect the power generated by alternator).

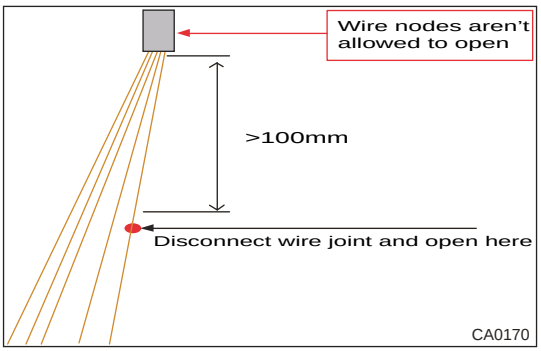
6. Link malfunction.

   Link refers to a communication connection line between nodes. Link malfunction refers to malfunction of data communication lines, such as short circuit, open circuit and communication signal attenuation or distortion caused by changes in physical properties of the lines. These factors often cause multiple electronic control units to fail to work properly or the control system to operate improperly. To determine whether the link is malfunctioning, use an oscilloscope or a specific vehicle CAN tester to observe whether the current data communication signal matches the standard data communication signal. Maintenance methods are generally to repair shorted or open twisted-pair lines, or to eliminate the root cause of changing the physical properties of twisted-pair lines.

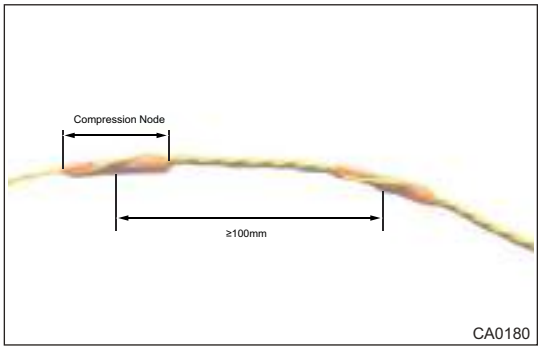
   a. Maintenance instructions for CAN line.

      Sometimes, in order to determine the malfunction, it is necessary to disconnect a control unit from line connection point and disconnect the CAN bus connected to the control unit, or to repair wire harness after the malfunction has been determined. The data transmitted by CAN bus may even affect vehicle safety and life safety of personnel. Improper maintenance of CAN bus may cause interference or loss of signals, resulting in these data not being transmitted. Therefore, the following regulations must be observed during maintenance:

      - During CAN bus maintenance, the disconnection point is required to be at least 100 mm away from the line node, and the line node must never be opened, maintained and updated;



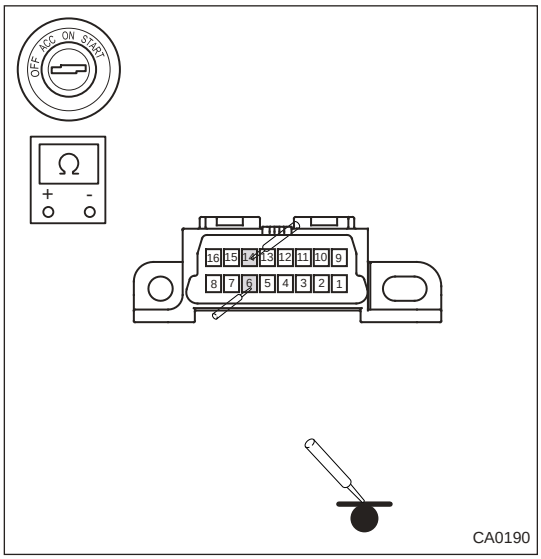
- If the CAN line is to be disconnected, it is only allowed to be carried out at a distance of ⩾ 100 mm from next pressure node; The twisting of CAN lines have decisive significance to the interference effect of CAN. Only if the twisting is not damaged, the CAN can be protected from interference, so keep as little interference with the twisting as possible during maintenance.



CA0180

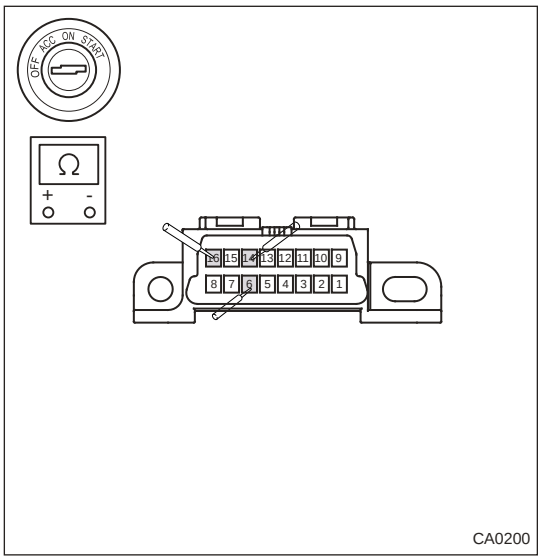
b. Use a multimeter to measure the resistance to ground and power supply of CAN-H and CAN-L.

   - After disconnecting battery for 5 minutes, the measured resistance values between diagnostic interfaces 6# (CAN-H) and 14# (CAN-L) and ground are both 32 MΩ.



CA0190

- After disconnecting battery for 5 minutes, the measured resistance values between diagnostic interfaces 6# (CAN-H) and 14# (CAN-L) and 16# are both 33.5 MΩ.



CA0200

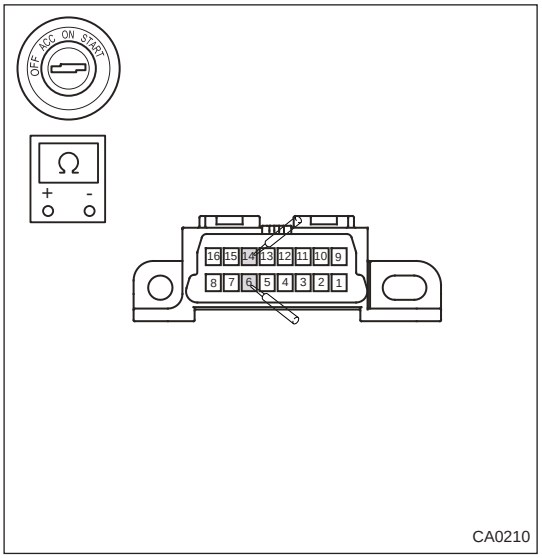
c. Termination resistor.

The termination resistor is installed in gateway module of system and is used to prevent CAN bus signal from reflecting the changing voltage on CAN bus. When the termination resistor fails and the square wave is transmitting, because of the reflection of line, if it is serious, the signal will be deformed and the signal of control unit will be invalid. When measuring the CAN bus signal with an oscilloscope, if the signal does not match standard signal, it is also necessary to check whether the termination resistor is damaged.

Measurement step of termination resistor:

1. Turn ENGINE START STOP switch to OFF, disconnect the negative battery cable;
2. Wait about 5 minutes until all capacitors are fully discharged;
3. Connect the measuring instrument and measure total resistance. Using ohmmeter, measure resistance between diagnostic interfaces (6) and (14) (standard resistance is 60 Ω).

Measured value (for reference only): the measured resistance between diagnostic interfaces 6 # and 14 # is 58.7Ω (the two termination resistors are connected in parallel), after gateway module is disconnected separately, and the measured resistance between diagnostic interfaces 6 # and 14 # is ∞.

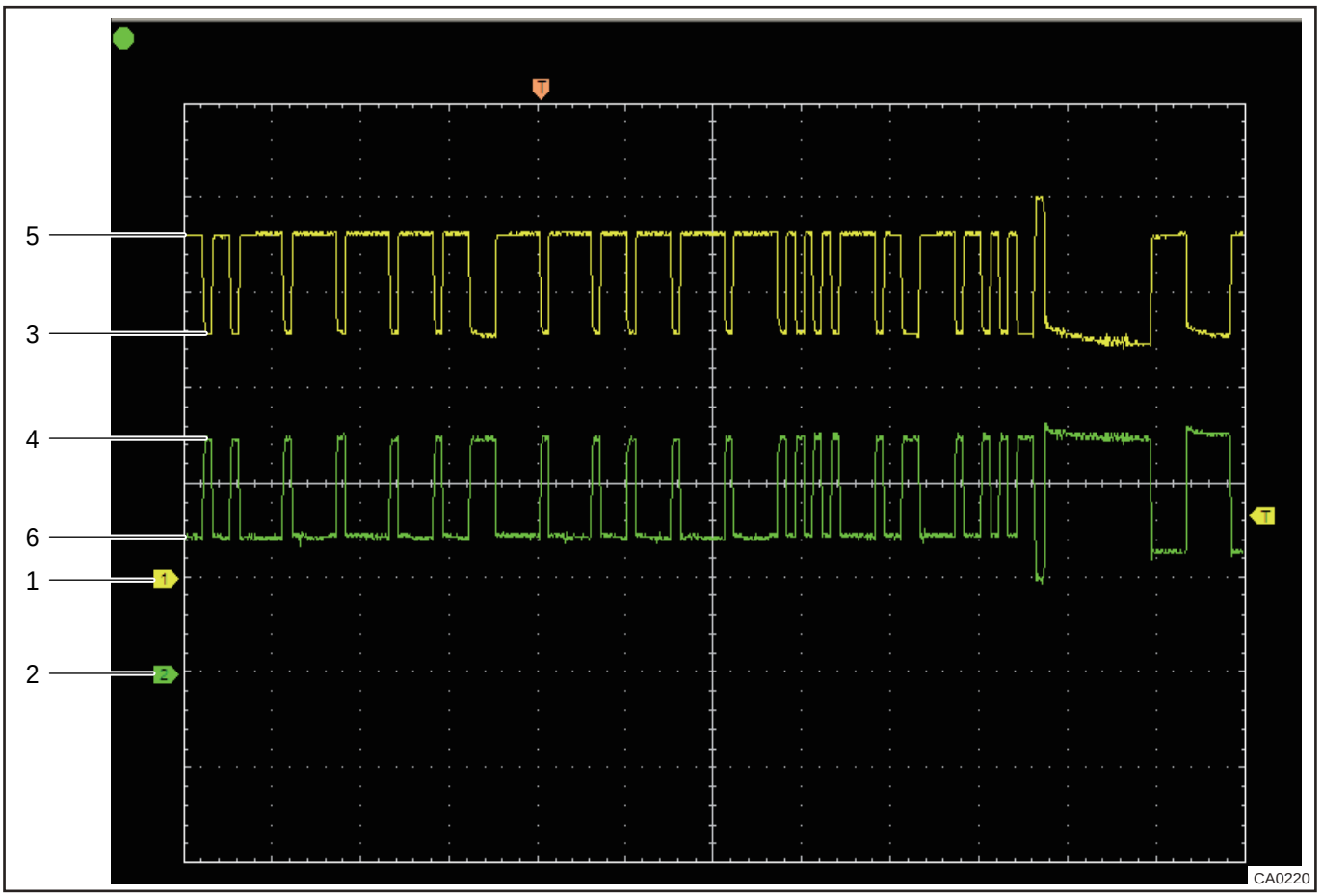


Oscilloscope Analysis

1. Oscilloscope connection

CH1 (channel 1) is connected to diagnostic interface 6# (CAN-H), CH2 (channel 2) is connected to diagnostic interface 14# (CAN-L), and alligator clip of the oscilloscope probe is connected to the common body ground.

Normal waveform



1	Zero potential of CAN-H	4	The recessive voltage potential of CAN-L is approximately 2.5 V (logic value 1)
2	Zero potential of CAN-L	5	The dominant voltage potential of CAN-H is approximately 3.6 V (logic value 0)
3	The recessive voltage potential of CAN-H is approximately 2.6 V (logic value 1)	6	The dominant voltage potential of CAN-L is approximately 1.4 V (logic value 0)

Potential	CAN-H - Ground	CAN-L - Ground	Voltage Difference
Dominant	3.6 V (3.5 V)	1.4 V (1.5 V)	2.2 V (2.0 V)
Recessive	2.6 V (2.5 V)	2.5 V (2.5 V)	0.1 V (0 V)

Hint:

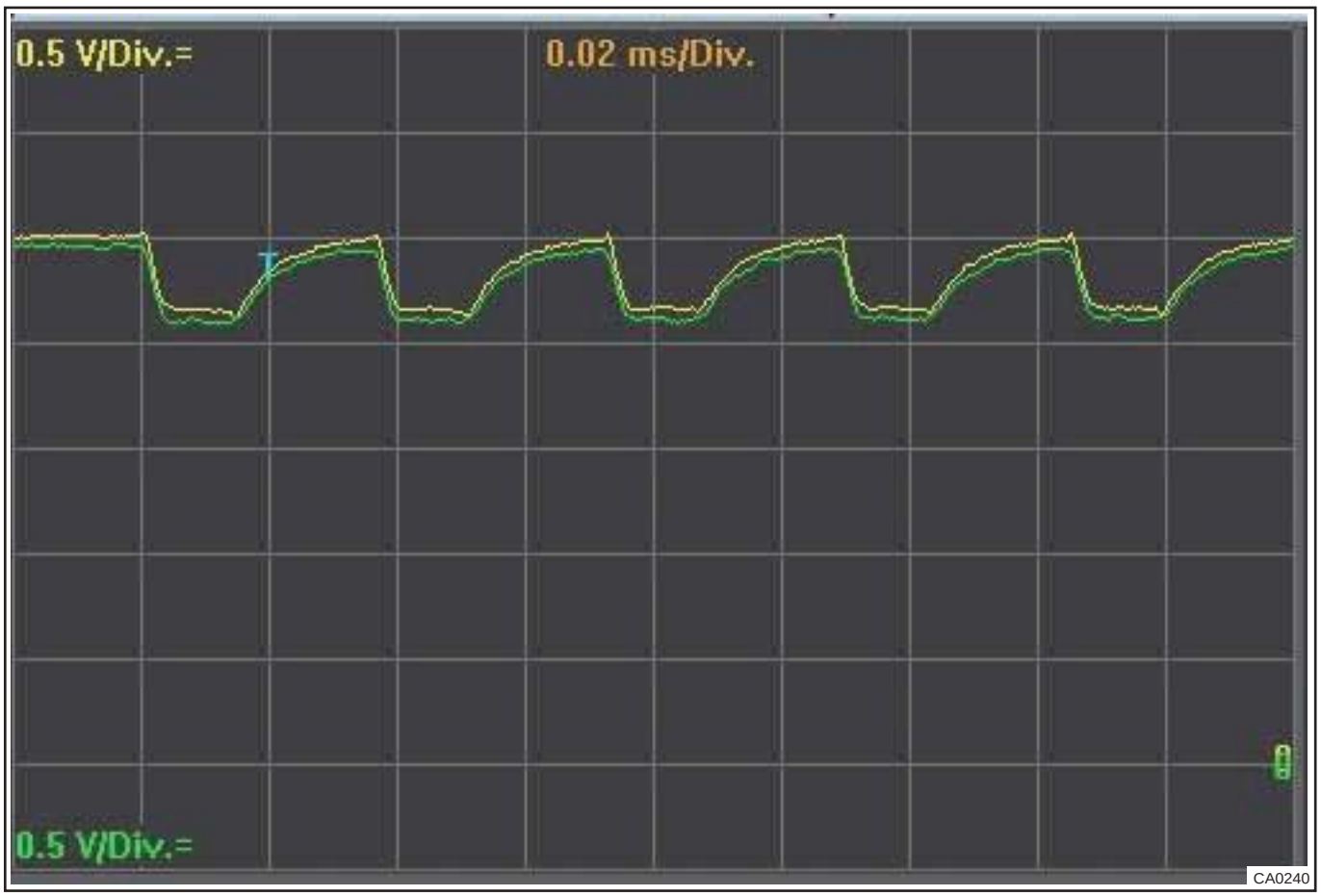
a. Always use voltage difference between two lines to confirm data. When voltage of CAN-H rises, the voltage of CAN-L decreases accordingly. The waveform is rectangular and symmetrical.

b. As the oscilloscope shows, CAN-Bus has only two operating states. At the recessive voltage potential, the two voltage values are very close. At the dominant voltage potential, the two voltage standard difference is 2.0 V.

c. The difference between measured voltage value and standard value is approximately 100 mV.

d. During communication, high-speed CAN operating voltage range: CAN-H: 2.75 V~4.5 V (-dominant), 2 V~3 V (recessive); CAN_L: 0.5 V~2.25 V (dominant), 2 V~3 V (recessive); No signal transmission means that CAN bus will transmit recessive signals when it is idle, and new information will start with dominant signals.

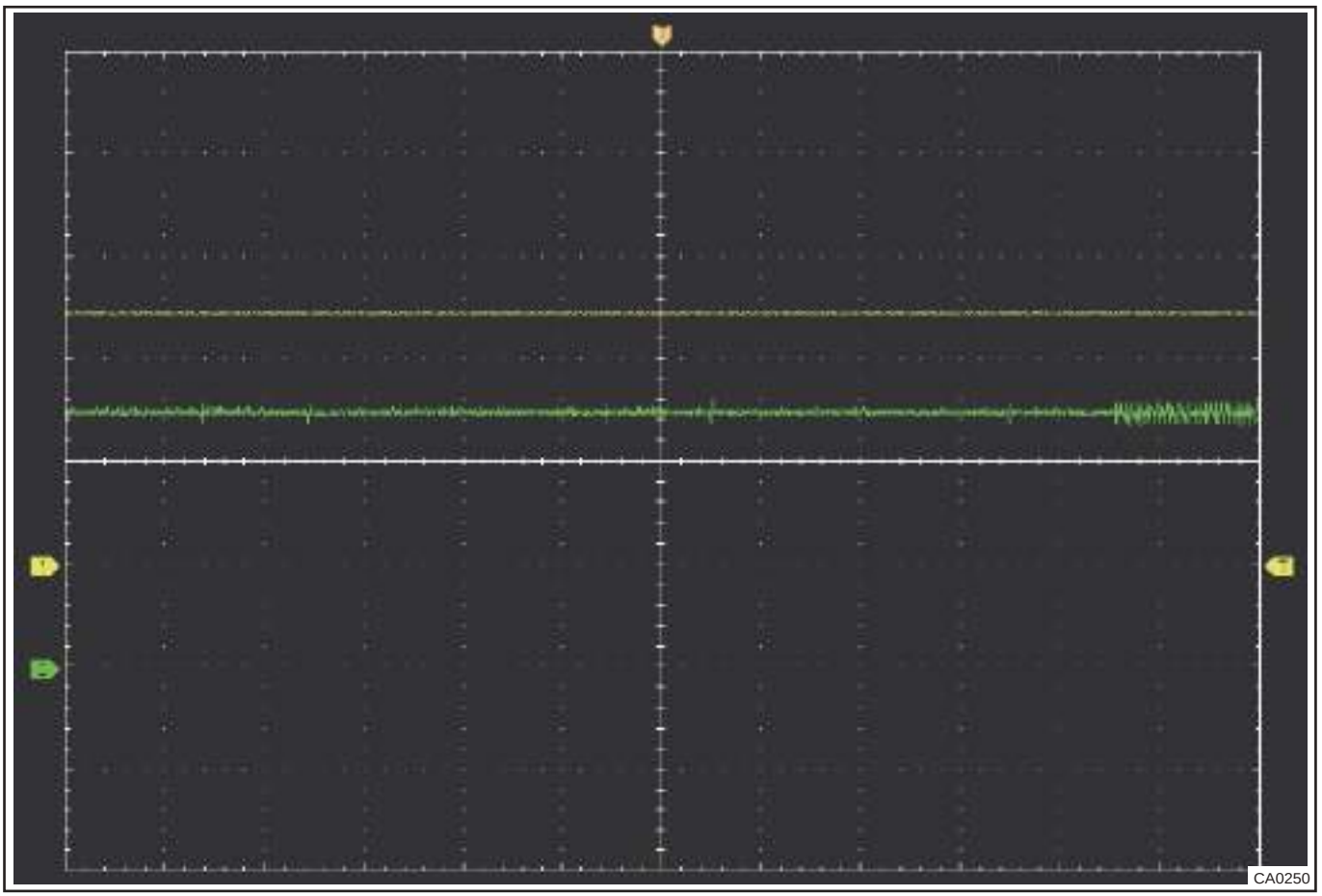
2. Short point (arrow) between CAN-H and CAN-L



Short circuit malfunction waveform of CAN-H and CAN-L

- Observe with an oscilloscope, the voltage potential is at recessive voltage value (approximately 2.5 V). By moving the position of zero potential on two oscilloscope channels to make the zero potential of two channels be coincident. It can be seen that waveforms of the CAN-H and CAN-L change consistently and their potentials are consistent;

- The short circuit waveforms of CAN-H and CAN-L during actual vehicle test are shown in following illustration. Both waveforms are straight line with a voltage of approximately 2.5 V. Use a multimeter to test that the termination resistor is close to or equal to 0 ohms. Power CAN and body CAN, CAN-H and CAN-L short circuit vehicles can not start.



Troubleshooting procedures:

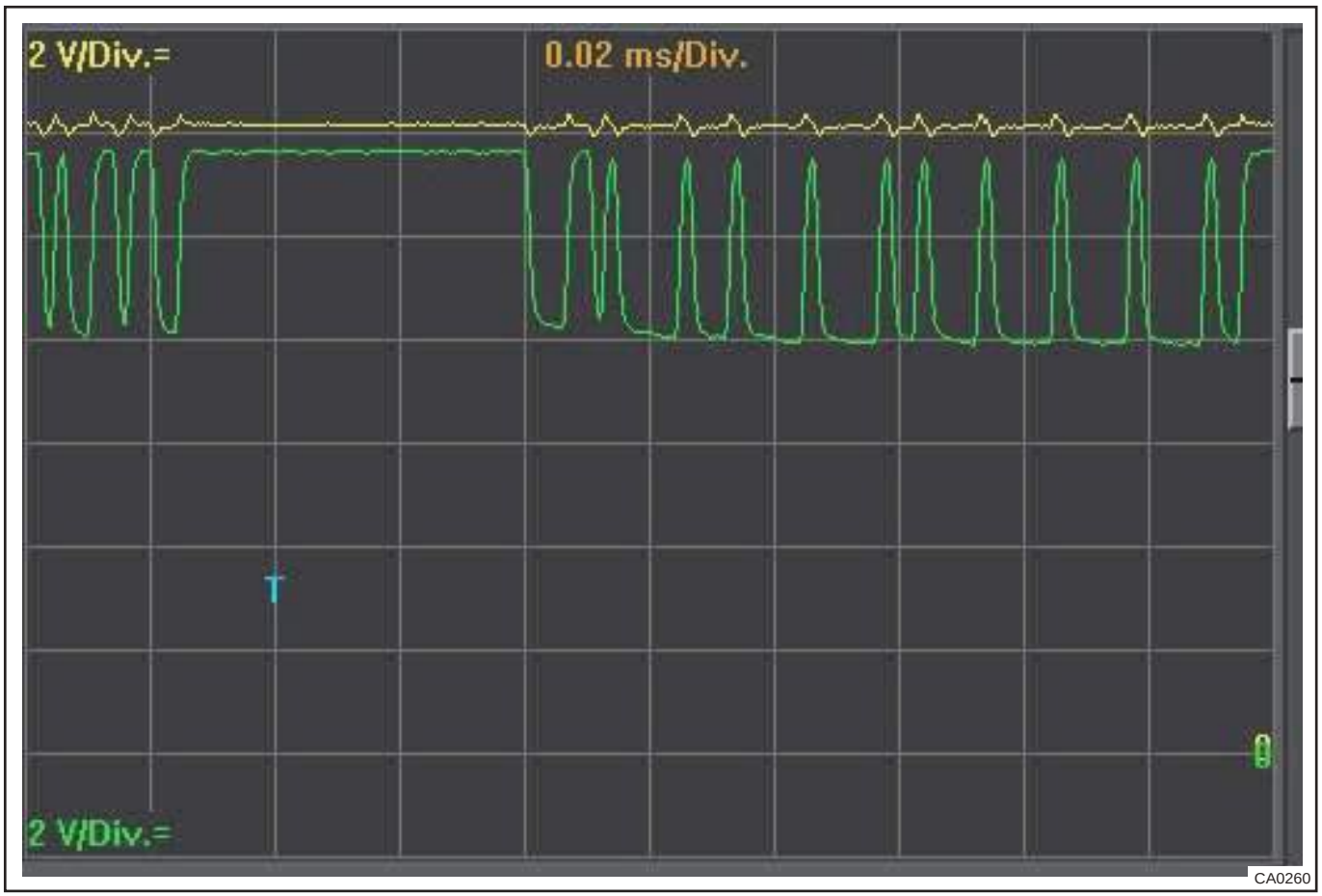
a. By plugging and unplugging control unit on CAN bus one by one and observing oscilloscope waveform at the same time, it can be judged whether it is a short circuit caused by the control unit or by the CAN-H and CAN-L line connection;

b. If the waveform returns to normal when unplugging the connector of a module, this module is malfunctioning;

c. For short circuit caused by short circuit of line, it is necessary to disconnect CAN wire groups (CAN-H and CAN-L) from wire harness connector or wire harness node in turn, and pay attention to waveform of oscilloscope; After disconnecting faulty wire group, waveform of oscilloscope returns to normal;

d. When there is no other measurement method, only CAN line can be disconnected from line connection point. Pay attention to maintenance instructions of CAN line.

3. CAN-H is short to power supply



Malfunction symptoms:

- Observe with an oscilloscope: the voltage potential of CAN-H line is placed at 12 V, the recessive voltage of CAN-L line is placed at approximately 12 V, and amplitude becomes larger due to internal connection of CAN-H and CAN-L in transceiver of control unit.

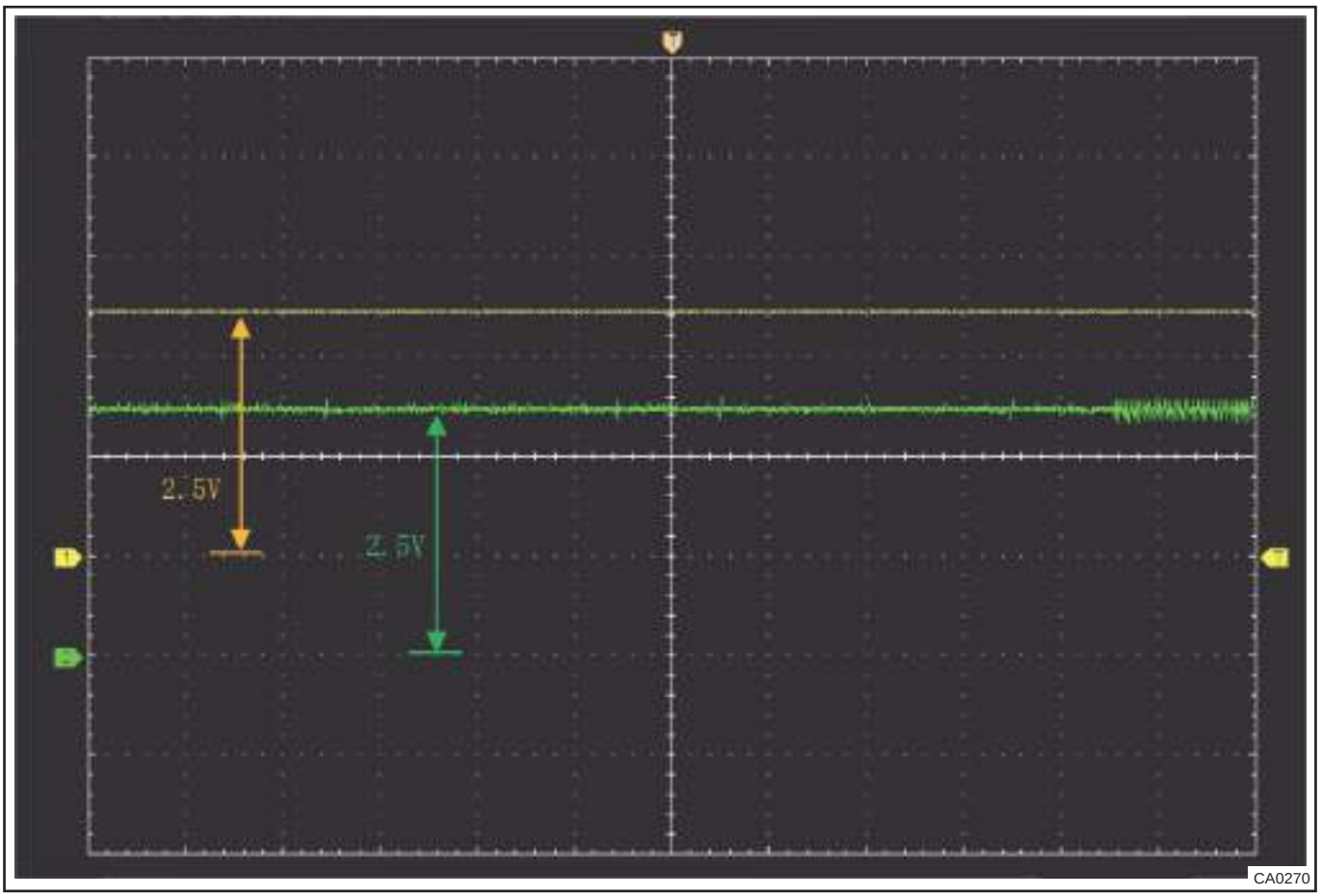
  Troubleshooting procedures:

  a. By plugging and unplugging control unit on CAN bus one by one and observing oscilloscope waveform at the same time, it can be judged whether it is a short circuit caused by the control unit or by the CAN-H line connection;

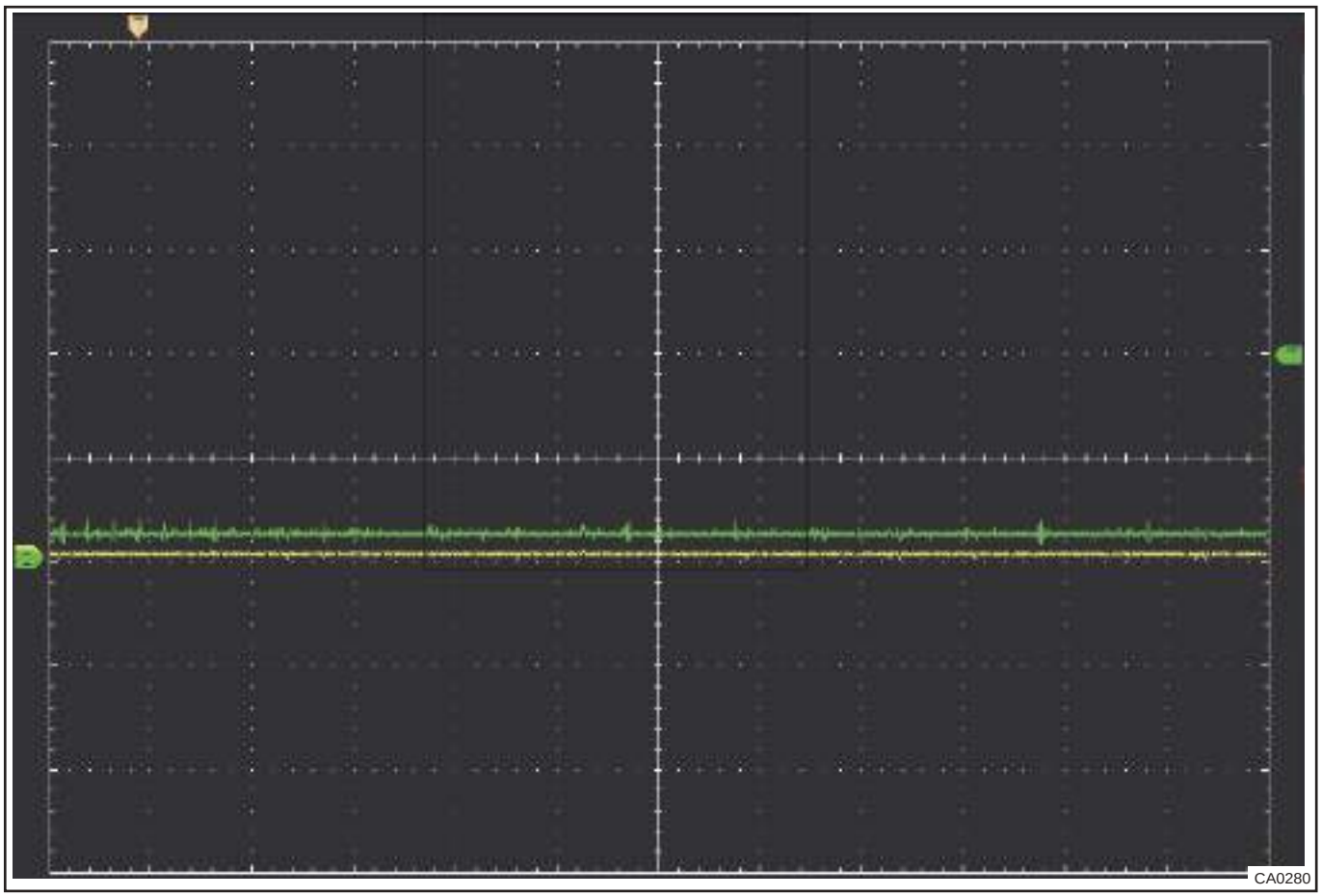
  b. If the waveform returns to normal when unplugging the connector of a module, this module is malfunctioning;

  c. When there is no other measurement method, only CAN line can be disconnected from line connection point. Pay attention to maintenance instructions of CAN line.

- The short circuit waveform to positive in CAN-H during actual vehicle test is shown in following illustration. The voltage potential of CAN-H line is placed at 12 V (battery voltage), and the recessive voltage of CAN-L line is placed at approximately 12 V (battery voltage). The amplitude becomes larger. The diagnostic tester cannot access each module. Power CAN and body CAN, CAN-H short to power supply, vehicles can not start.



4. CAN-H is short to ground
   Malfunction waveform



Malfunction symptoms:

- Observe with an oscilloscope: The voltage potential of CAN-H line is placed at 0 V, and the voltage of CAN-L line is placed at about 0.2 V (near 0 V).

Malfunction causes

- Bus CAN-H is short to ground, node (module) malfunction.

Troubleshooting procedures:

a. Plug and unplug control unit on CAN bus one by one, and observe if the oscilloscope waveform becomes normal?

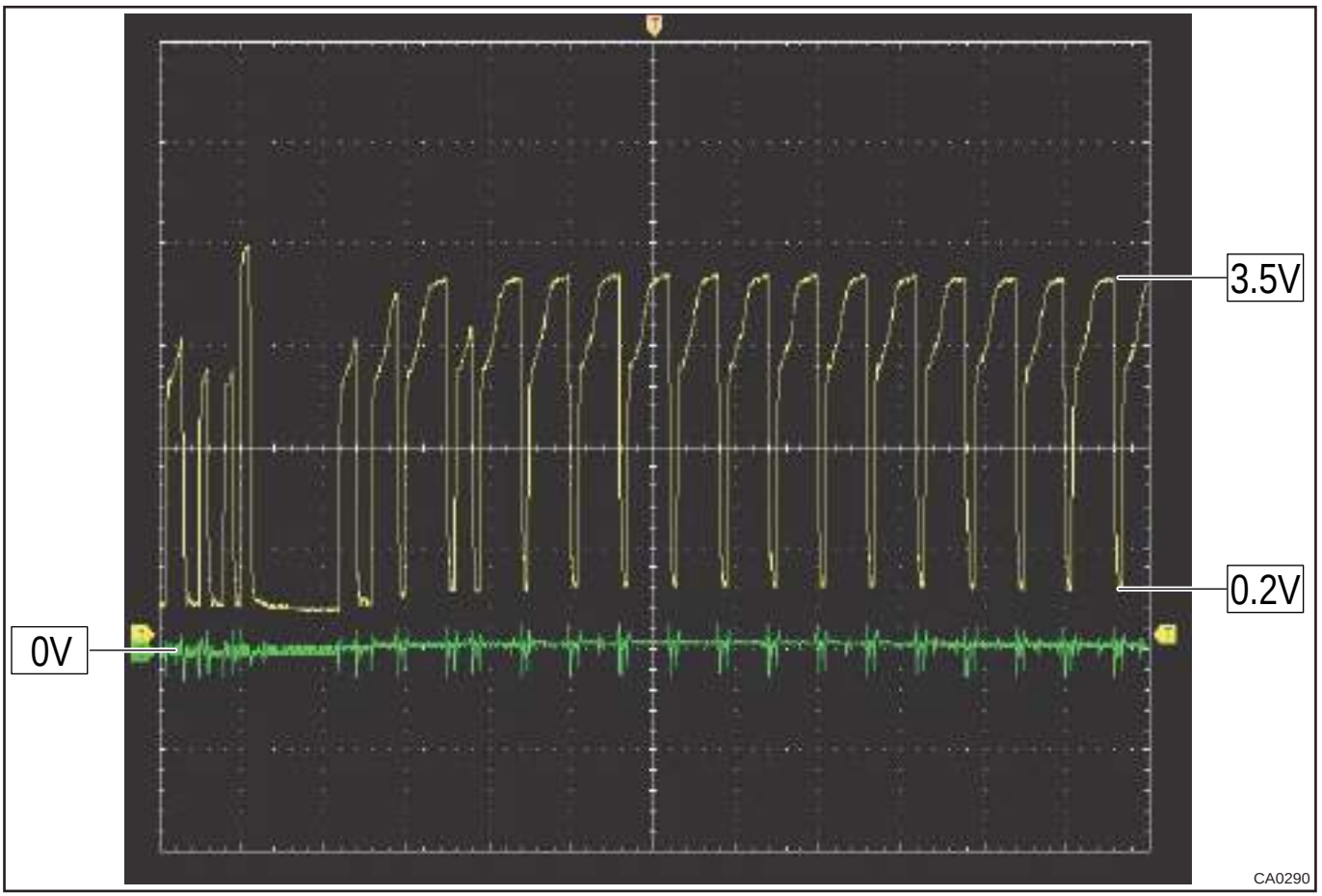
b. If the waveform returns to normal when unplugging the connector of a module, this module is malfunctioning;

c. When there is no other measurement method, only CAN line can be disconnected from line connection point. Pay attention to maintenance instructions of CAN line.

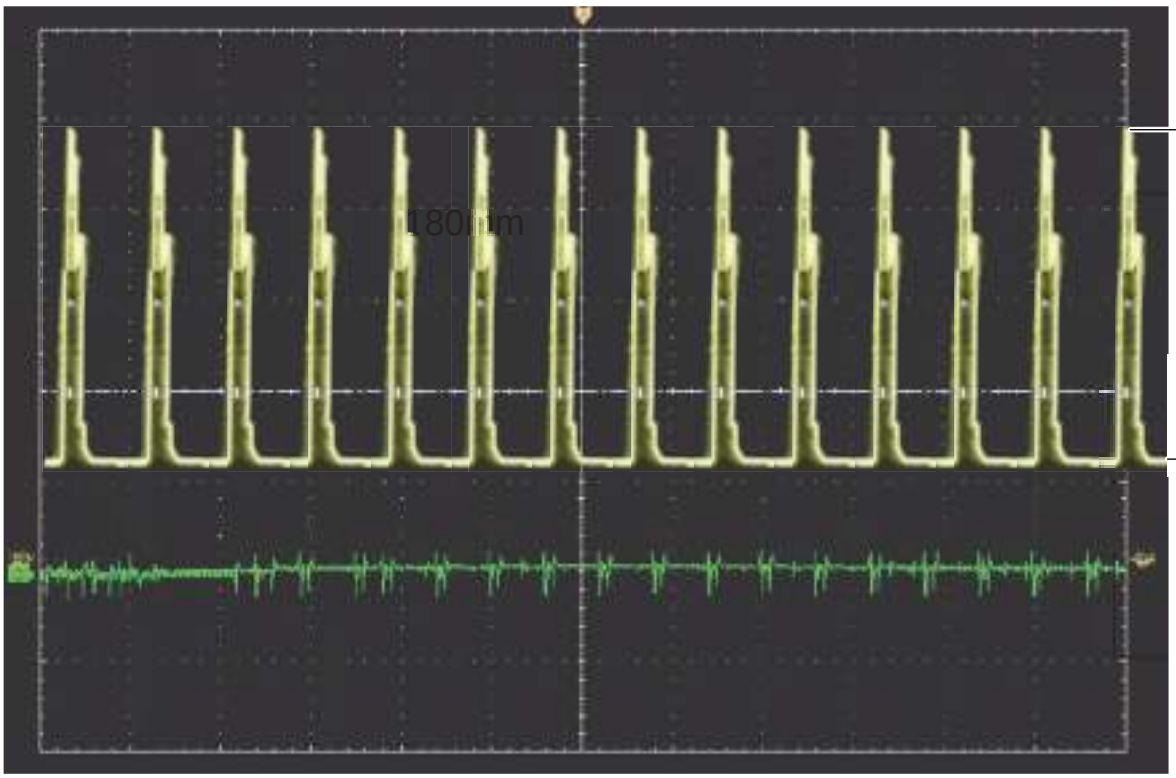
In the short circuit waveform to ground in CAN-H during actual vehicle test, the voltage potential of CAN-H line is placed at 0 V, and the recessive voltage of CAN-L line is placed at approximately 0.2 V. Power CAN and body CAN, CAN-H short to ground, vehicles can not start.

5. Short to ground in CAN-L

Malfunction waveform



CAN malfunction waveform



Malfunction symptoms:

- Observe with an oscilloscope: The voltage of CAN-L is approximately 0 V, and the recessive voltage of CAN-H line is also reduced to 0.2 V (near 0 V). Malfunction cause: Bus CAN-L is short to ground, node (module) malfunction.

Troubleshooting procedures:

a. By plugging and unplugging control unit on CAN bus one by one and observing oscilloscope waveform at the same time, it can be judged whether it is a short circuit caused by the control unit or by the CAN-L line ground;

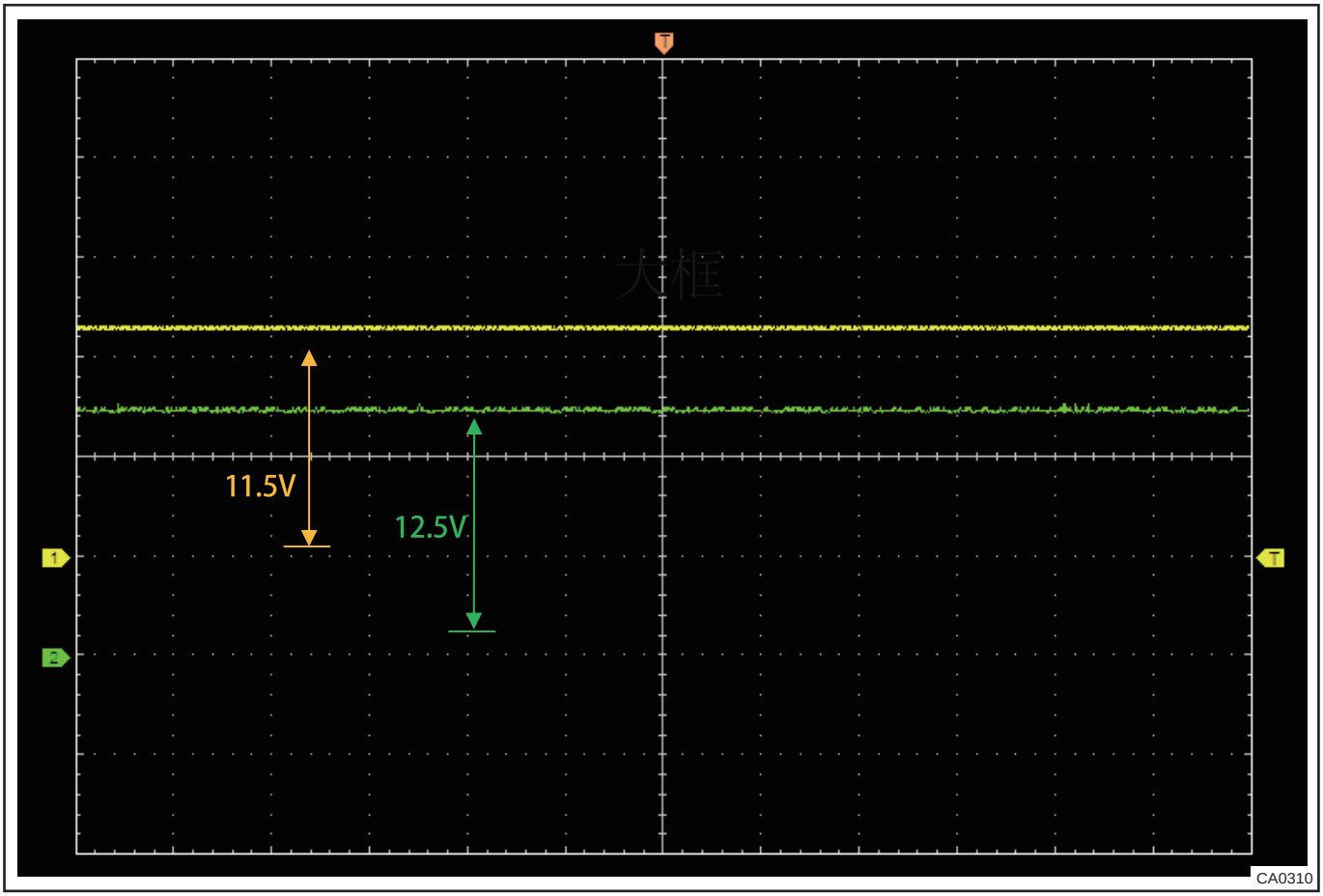
b. If the waveform returns to normal when unplugging the connector of a module, this module is malfunctioning;

c. When there is no other measurement method, only CAN line can be disconnected from line connection point. Pay attention to maintenance instructions of CAN line.

In the short circuit waveform to ground of CAN-L during actual vehicle test, the voltage potential of CAN-L line is placed at 0 V. Power CAN and body CAN, CAN-L short to ground, vehicles can not start.

6. CAN-L short to power supply

Malfunction waveform



Malfunction symptoms:

- Observe with an oscilloscope: Both bus voltages are approximately 12 V, and waveforms are straight lines.

  Malfunction cause: Bus CAN-L is short to power supply, node (module) malfunction.

  Troubleshooting procedures:

  a. By plugging and unplugging control unit on CAN bus one by one and observing oscilloscope waveform at the same time, it can be judged that the short circuit is caused by the control unit or short circuit to power supply in CAN-L line;

  b. If the waveform returns to normal when unplugging the connector of a module, this module is malfunctioning;

  c. When there is no other measurement method, only CAN line can be disconnected from line connection point. Pay attention to maintenance instructions of CAN line.

  After short circuit between CAN-L and power supply is judged during real vehicle test, power CAN and body CAN and CAN- L are short to power supply, and vehicle cannot start.

Diagnostic Trouble Code (DTC) Chart

Module Power Supply Fault

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B160116	Power Supply Fault-Circuit Voltage Below Threshold	Measured voltage is < 9 V within 500 ms;	• Fuse • Wire harness • Central gateway module	• Check fuse • Check wire harness • Check central gateway module
B160117	Power Supply Fault-Circuit Voltage Above Threshold	Measured voltage is > 16 V within 500 ms;		

Fault Summary for Node Missing and Communication Loss

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U0100-87	**Lost Communication with EMS Node**	\	**1. "Module with loss of communication" does not send messages normally according to the cycle;** **• Power supply, ground** **• Module initialization is incorrect** **• Module configuration is incorrect** **• There are strong magnetic fields or other disturbances in the surrounding environment** **• The distance between the two node modules is too far** **• Internal module fault, crash**	**1. Check if the "module with loss of communication" sends messages normally according to the cycle;** **• Check power supply, grounding and quality of power supply, such as voltage fluctuations.** **• Check the reason for the initialization failure.** **• Check if module configuration is incorrect.** **• Check if there are strong magnetic fields or other disturbances in the**
U0101-87	**Lost Communication with TCU Node**	\		
U0128-87	**Lost Communication with EPB**	\		
U0129-87	**Lost Communication with ABS_ESP Node**	\		
U0131-87	**Lost Communication with EPS Node**	\		
U0140-87	**Lost Communication with BCM Node**	\		
U0146-87	**Lost Communication with CGW Node**	\		
U0151-87	**Lost Communication with YAS Node**	\		

U0155-87	Lost Communication with ICM Node	\	2. CAN wire harness connection failure; · CAN_H open, CAN_L open, CAN_H short to CAN_L/ open, CAN_L short to VBAT, CAN_H short to GND, CAN_L short to GND, etc. · Termination resistor open 3. Controller itself is faulty. · Power supply, ground · Module initialization is incorrect · Module configuration is incorrect · There are strong magnetic fields or other disturbances in the surrounding environment	surrounding environment. · Check if the wire harness of the two node modules is modified or repaired, causing the distance to be too far. · Check the module for internal fault and crash, and replace it to troubleshoot if necessary. 2. Check if the wire harness connection between the two nodes is normal; · CAN_H open, CAN_L open, CAN_H short to CAN_L/ open, CAN_L short to VBAT, CAN_H short to GND, CAN_L short to GND, etc. · Check if the termination resistor is open or short, etc. 3. Check if the controller itself is faulty. · Power supply, ground · Module initialization is incorrect · Module configuration is incorrect
U0164-87	Lost Communication with CLM	\		
U0245-87	Lost Communication with TIHU_IHU Node	\		
U1161-87	Lost Communication with RLCR Node	\		
U1169-87	Lost Communication with RRCR Node	\		
U1189-87	Lost Communication with MFS Node	\		
U0151-87	Lost Communication With ABM	\		
U0214-87	Lost Communication with Passive Entry Passive Start Unit	\		
U0230-87	Lost Communication with PLG	\		
U1194-87	Lost Communication with Wireless Charging Module	\		
U0209-87	Lost Communication with First Row Driver Seat Heating Module	\		
U0210-87	Lost Communication with First	\		

	Row Passenger Seat Heating Module			
U0211-87	**Lost Communication with Second Row Left Seat Heating Module**	\		
U0247-87	**Lost Communication with Second Row Right Seat Heating Module**	\		
U0160-87	**Lost Communication with Auto A/C Control Panel**	\		
U0128-87	**Lost Communication with EPB**	\		
U1162-87	**Lost Communication with FCM**	\		
U0126-87	**Lost Communication with Steering Angle Sensor Module (ESP Only)**	\		
U0146-87	**Lost Communication with CLM**	\		
U1190	**Lost Communication with ESCL**	\		
U0100-00	**Lost Communication with YAS**	\		
U0170-04	**Lost Communication with SCM**	\		
U1193-87	**Lost**	\		

- **There are strong magnetic fields or other disturbances in the surrounding environment**

	Communication with Electric Shifting Controller			
U0293-87	Lost Communication with Hybrid Control Unit-Missing Message	\		
U0109-87	Lost Communication with DECOS (Oil Pump) Module	\		
U1163-87	Lost Communicate with Front Radar	\		

Fault Summary for Invalid Node Reception and Network Signal

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U0401-81	Invalid Data Received From EMS Node	\	1. Check if the data sent by the sender contains invalid data; · Module power supply stability · Module configuration problem · Signal interference · Module itself fault 2. CAN line connection fault 3. If the module itself receives data normally. · Module power supply stability · Module configuration problem	1. Check if the data sent by the sender contains invalid data; · Module power supply stability · Module configuration problem · Signal interference · Module itself fault 2. Check CAN line connection fault 3. Check If the module itself receives data normally. · Module power supply stability · Module configuration problem
U0402-81	Invalid Data Received From TCU Node	\		
U0418-81	Invalid Data Received From ABS_ ESP Node	\		
U0420-81	Invalid Data Received From EPS Node	\		
U0422-81	Invalid Data Received From BCM Node	\		
U0423-81	Invalid Data Received From ICM Node	\		

U0447-81	**Invalid Data Received From CGW Node**	\	• **Signal interference** • **Module itself fault**	• **Signal interference** • **Module itself fault**
U0452-81	**Invalid Data Received From YAS Node**	\		
U0546-81	**Invalid Data Received From TIHU_ IHU Node**	\		
U059B-81	**Invalid Data Received From MFS Node**	\		
U1435-81	**Invalid Data Received From RLCR Node**	\		
U1436-81	**Invalid Data Received From RRCR Node**	\		
U0417-81	**Invalid Data Received From EPB**	\		
U1405-81	**Invalid Data Received From FCM**	\		
U0531	**Invalid Data Received From PLG**	\		
U059C	**Invalid Data Received From ESCL**	\		
U0170-08	**Invalid Data Received From SCM**	\		
U0404-04	**Invalid Data Received From YAS**	\		
U0428-81	**Invalid Data Received From Steering Angle Sensor Module (ESP Only)**	\		

U0433-81	Invalid Data Received From ACC (ESP Only)	\		
U0447-81	Invalid Data Received From CLM	\		
U1417-81	AccPedalNet_ InvalidValue	\		
U1418-81	BTMNet_ InvalidValue	\		
U1421-81	SClutch_ InvalidValue	\		
U1422-81	EngineNet_ InvalidValue	\		
U1424-81	TCUNet_ InvalidValue	\		
U1425-81	VLCNet_ InvalidValue	\		
U1427-81	EngineNet_ InvalidValue	\		
U0424-81	CLM Signal Invalid	\		
U0170-81	SCM Invalid Value	\		

Fault Summary for Invalid Node Reception and Network Signal

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U040186-h	Engine Speed Signal Invalid	\	1. Check if the data sent by the sender contains invalid data; · Module power supply stability · Module configuration problem · Signal interference · All the histories on ECU are faulty · Module itself fault	1. Check if the data sent by the sender contains invalid data; · Module power supply stability · Module configuration problem · Signal interference · Module itself fault 2. Check all the related control units, including connectors
U040186-h	Engine Start/ Stop Status Signal Invalid	\		
U040186-h	Engine Idling Signal Invalid	\		
U040186-h	Engine Temperature Signal Invalid	\		
U040186-h	Accelerator Pedal Signal Invalid	\		
U040186-h	Driver Expected Torque Signal Invalid	\		

U040186-h	Engine Torque Signal Invalid	\	2. Check all the related control units, including connectors 3. CAN line connection fault 4. If the module itself receives data normally. · Module power supply stability · Module configuration problem · Signal interference · Module itself fault	3. Check CAN line connection fault 4. Check If the module itself receives data normally. · Module power supply stability · Module configuration problem · Signal interference · Module itself fault
U040186-h	Maximum Instantaneous Torque Signal invalid	\		
U040186-h	Minimum Instantaneous Torque Signal invalid	\		
U042386-h	Environment Temperature Signal Invalid	\		
U040186-h	Brake Pedal Signal Invalid	\		
U041686-h	Brake Pressure Signal Invalid	\		
U041786-h	Hand Brake Signal Invalid	\		
U041686-h	Front Left Wheel Speed Signal Invalid	\		
U041686-h	Front Right Wheel Speed Signal Invalid	\		
U041686-h	Rear Left Wheel Speed Signal Invalid	\		
U041686-h	Rear Right Wheel Speed Signal Invalid	\		
U040486-h	Shift Lever Signal Invalid	\		
U240586-h	Shift Signal Invalid	\		
U010000-h	Engine Node 1 Timeout	\		
U040182-h	Engine Node 1 Activated	\		
U040183-h	Engine Node 1 CRC	\		
U015100-h	Brake System Node 1 Timeout	\		

U011400-h	**Brake System Node 2 Timeout**	\		
U014000-h	**Brake System Node 3 Timeout**	\		
U042282-h	**Brake System Node 3 Activated**	\		
U042283-h	**Brake System Node 3 CRC**	\		
U012800-h	**Brake System Node 4 Timeout**	\		
U041782-h	**Brake System Node 4 Activated**	\		
U041783-h	**Brake System Node 4 CRC**	\		
U012200-h	**Brake System Node 5 Timeout**	\		
U041682-h	**Brake System Node 5 Activated**	\		
U041683-h	**Brake System Node 5 CRC**	\		
U015500-h	**Instrument Cluster Node 1 Timeout**	\		
U024800-h	**Shift Module Node 1 Timeout**	\		
U010300-h	**Shift Module Node 1 Timeout**	\		
U040482-h	**Shift Module Node 1 Activated**	\		
U040483-h	**Shift Module Node 1 CRC**	\		
U240500-h	**Shift Module Node 2 Timeout**	\		
U240582-h	**Shift Module Node 2 Activated**	\		

U240583-h	Shift Module Node 2 CRC	\		
U021200-h	Steering Node 1 Timeout	\		
U040486	Parking (P Position) Button Signal Invalid	\		

Faults for Other Categories

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U0073-88	Common CAN Bus Off	\	• Intermittent problem • Vehicle configuration problem • CAN line • Module failure • Central gateway	• Power on again • Check peripheral signal interference, etc. • Check vehicle configuration • Check central gateway • Check CAN line • Check module failure
U240088-h	Vehicle CAN Bus Disconnected	\		
U12A1-88	Private CAN Bus Off	\		
U1003-88	EV Network Segment Bus Off	\		
U1004-88	Power Bus Off	\		
U1005-88	Chassis Bus Off	\		
U1006-88	Information and Entertainment Bus Off	\		
U1007-88	Body CAN Bus Off	\		
U1008-88	Diagnostic Bus Off	\		
U1009-88	Support Network Segment Bus Off	\		
U100A-88	Support Network Segment Bus Off	\		

Faults for Bus Off

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
U1300-55	Vehicle CAN Configuration Not Written	\	Vehicle CAN configuration error	Check vehicle CAN configuration

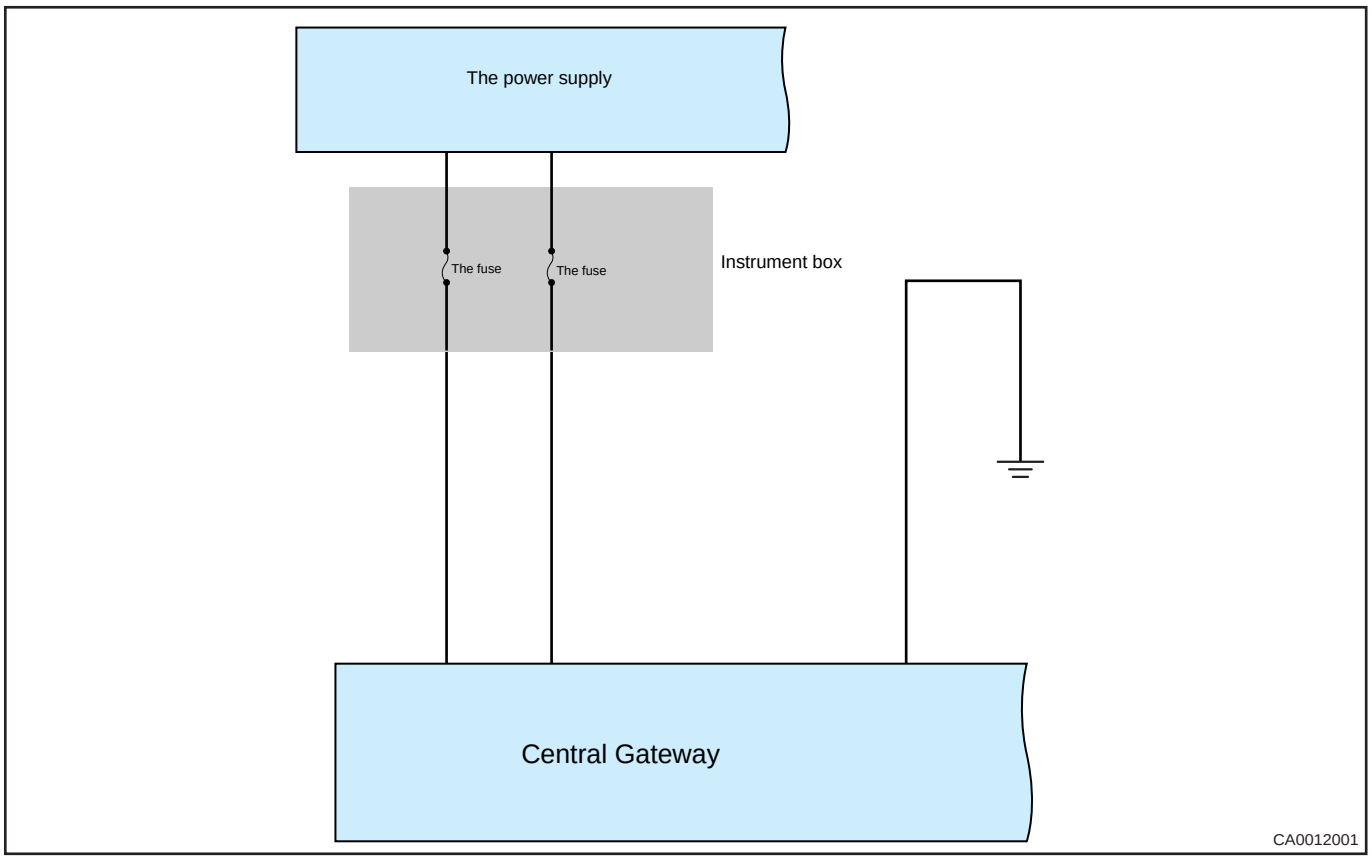
U3000-51	Calibration Data Missed	\	Control module not programmed	Programming module
U0005-00	High Speed CAN Communication Bus (+) High	\	• Intermittent problem • CAN line (CAN line is short to power supply) • Module failure • Central gateway	• Power on again • Check peripheral signal interference, etc. • Check central gateway • Check CAN line • Check module failure
U0007-00	High Speed CAN Communication Bus (-) Low	\	• Intermittent problem • Vehicle configuration problem • CAN line (CAN line is short to ground) • Module failure • Central gateway	• Power on again • Check peripheral signal interference, etc. • Check central gateway • Check CAN line • Check module failure

DTC Diagnosis Procedure

Module Power Supply Fault

DTC	B1E8016	Power Supply Circuit Voltage Below Threshold
DTC	B1E8017	Power Supply Circuit Voltage Above Threshold

Description
System Schematic Diagram



DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check battery voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Start engine, and use voltage band of multimeter to check if battery voltage is normal. (Rated voltage: Not less than 12 V)

Multimeter Connection	Condition	Specified Condition
Battery (+) - Battery (-)	ENGINE START STOP switch “ON”	Not less than 12 V

NG → **Repair or replace battery/alternator**

OK

2	Check fuse

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Check for continuity of instrument panel fuse with a digital multimeter.

NG → **Replace fuse**

OK

3	Check interior power supply wire harness

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

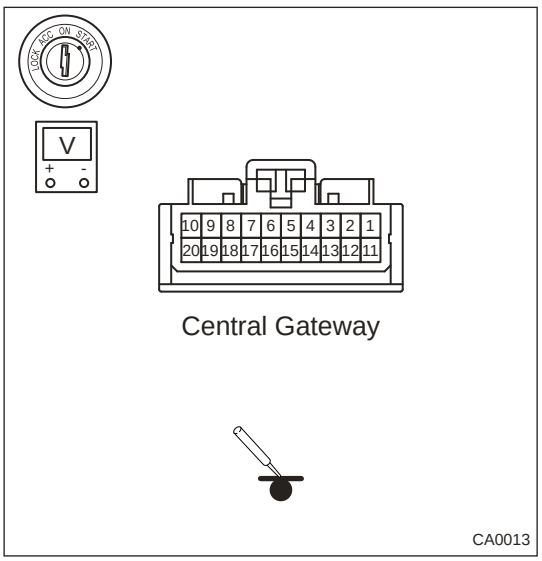
(c) Disconnect the central gateway connector.

(d) Connect the negative battery cable.

(e) Turn ENGINE START STOP switch to ON.

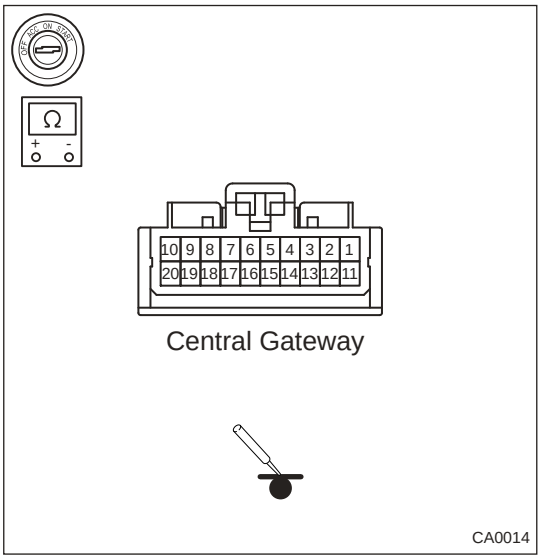
(f) Using a digital multimeter, measure voltage between central gateway connector power supply terminal and ground according to table below.

Multimeter Connection	Condition	Specified Condition
Central gateway power supply terminal - Body ground	ENGINE START STOP switch “ON”	Not less than 12 V



(g) Using a digital multimeter, measure resistance between central gateway ground terminal and ground according to table below.

Multimeter Connection	Condition	Specified Condition
Central gateway ground terminal - Body ground	ENGINE START STOP switch “OFF”	< 1 Ω



NG → **Repair or replace related wire harness**

OK

4	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect the negative battery cable.

(b) Use diagnostic tester to clear DTCs.

(c) Start the engine.

(d) Check if the same DTCs are still output.

NG → **Replace central gateway module.**

OK → **System is normal**

Fault Summary for Node Missing and Communication Loss

DTC	**U0100-87**	**Lost Communication with EMS Node**
DTC	**U0101-87**	**Lost Communication with TCU Node**
DTC	**U0128-87**	**Lost Communication with EPB**
DTC	**U0129-87**	**Lost Communication with ABS_ESP Node**
DTC	**U0131-87**	**Lost Communication with EPS Node**
DTC	**U0140-87**	**Lost Communication with BCM Node**
DTC	**U0146-87**	**Lost Communication with CGW Node**
DTC	**U0151-87**	**Lost Communication with YAS Node**
DTC	**U0155-87**	**Lost Communication with ICM Node**
DTC	**U0164-87**	**Lost Communication with CLM**
DTC	**U0245-87**	**Lost Communication with TIHU_IHU Node**
DTC	**U1161-87**	**Lost Communication with RLCR Node**
DTC	**U1169-87**	**Lost Communication with RRCR Node**
DTC	**U1189-87**	**Lost Communication with MFS Node**
DTC	**U0151-87**	**Lost Communication With ABM**
DTC	**U0214-87**	**Lost Communication with Passive Entry Passive Start Unit**
DTC	**U0230-87**	**Lost Communication with PLG**
DTC	**U1194-87**	**Lost Communication with Wireless Charging Module**
DTC	**U0209-87**	**Lost Communication with First Row Driver Seat Heating Module**
DTC	**U0210-87**	**Lost Communication with First Row Passenger Seat Heating Module**
DTC	**U0211-87**	**Lost Communication with Second Row Left Seat Heating Module**
DTC	**U0247-87**	**Lost Communication with Second Row Right Seat Heating Module**

DTC	**U0160-87**	**Lost Communication with Auto A/C Control Panel**
DTC	**U0128-87**	**Lost Communication with EPB**
DTC	**U1162-87**	**Lost Communication with FCM**
DTC	**U0126-87**	**Lost Communication with Steering Angle Sensor Module (ESP Only)**
DTC	**U0146-87**	**Lost Communication with CLM**
DTC	**U1190**	**Lost Communication with ESCL**
DTC	**U0100-00**	**Lost Communication with YAS**
DTC	**U0170-04**	**Lost Communication with SCM**
DTC	**U1193-87**	**Lost Communication with Electric Shifting Controller**
DTC	**U1163-87**	**Lost Communicate with Front Radar**
DTC	**U0293-87**	**Lost Communication with Hybrid Control Unit-Missing Message**
DTC	**U0109-87**	**Lost Communication with DECOS (Oil Pump) Module**

1	**Read if CAN bus has fault using the diagnostic tester**

NG → **Check and repair CAN bus fault, verify the fault phenomenon again.**

OK ↓

2	**Check if module that has lost communication, power supply and ground are normal.**

NG → **Check and repair faulty module power supply or ground, verify the fault phenomenon again**

OK ↓

3	**Using a multimeter, check if it is normal from module that has lost communication to CAN network wire harness connection and node.**

NG → **Check wire harness connection and node between modules, verify the fault phenomenon again.**

OK ↓

4	**Connect oscilloscope and observe waveform at the same time. Observe if waveform is normal.**

NG

Check and repair the cause of abnormal waveforms (such as interference from other equipment added to power supply and ground, etc.), verify the fault phenomenon again.

OK

5	**Replace the module that has lost communication.**

Verify the fault phenomenon again.

Module Not Programmed Fault

DTC	**U1300-55**	**Vehicle CAN Configuration Not Written**

1	**Check if module power supply and ground are normal.**

NG

Check and repair power supply or ground, verify the fault phenomenon again.

OK

2	**Check if line and node are connected normally.**

NG

Check and repair line and node, verify the fault phenomenon again.

OK

3	**Refresh calibration data.**

OK

Verify the fault phenomenon again.

NG

4	**Replace module, check and repair, then verify the fault phenomenon again.**

Faults for Invalid Node Reception and Network Signal

DTC	U0401-81	Invalid Data Received From EMS Node
DTC	U0402-81	Invalid Data Received From TCU Node
DTC	U0418-81	Invalid Data Received From ABS_ESP Node
DTC	U0420-81	Invalid Data Received From EPS Node
DTC	U0422-81	Invalid Data Received From BCM Node
DTC	U0423-81	Invalid Data Received From ICM Node
DTC	U0447-81	Invalid Data Received From CGW Node
DTC	U0452-81	Invalid Data Received From YAS Node
DTC	U0546-81	Invalid Data Received From TIHU_IHU Node
DTC	U059B-81	Invalid Data Received From MFS Node
DTC	U1435-81	Invalid Data Received From RLCR Node
DTC	U1436-81	Invalid Data Received From RRCR Node
DTC	U0417-81	Invalid Data Received From EPB
DTC	U1405-81	Invalid Data Received From FCM
DTC	U0531	Invalid Data Received From PLG
DTC	U059C	Invalid Data Received From ESCL
DTC	U0170-08	Invalid Data Received From SCM
DTC	U0404-04	Invalid Data Received From YAS
DTC	U0428-81	Invalid Data Received From Steering Angle Sensor Module (ESP Only)
DTC	U0433-81	Invalid Data Received From ACC (ESP Only)
DTC	U0447-81	Invalid Data Received From CLM
DTC	U1417-81	AccPedalNet_InvalidValue
DTC	U1418-81	BTMNet_InvalidValue
DTC	U1421-81	SClutch_InvalidValue
DTC	U1422-81	EngineNet_InvalidValue
DTC	U1424-81	TCUNet_InvalidValue
DTC	U1425-81	VLCNet_InvalidValue
DTC	U1427-81	EngineNet_InvalidValue
DTC	U0424-81	CLM Signal Invalid
DTC	U0170-81	SCM Invalid Value
DTC	U040186h	Engine Speed Signal Invalid
DTC	U040186h	Engine Start/Stop Status Signal Invalid

DTC	U040186h	Engine Idling Signal Invalid
DTC	U040186h	Engine Temperature Signal Invalid
DTC	U040186h	Accelerator Pedal Signal Invalid
DTC	U040186h	Driver Expected Torque Signal Invalid
DTC	U040186h	Engine Torque Signal Invalid
DTC	U040186h	Maximum Instantaneous Torque Signal invalid
DTC	U040186h	Minimum Instantaneous Torque Signal invalid
DTC	U042386h	Environment Temperature Signal Invalid
DTC	U040186h	Brake Pedal Signal Invalid
DTC	U041686h	Brake Pressure Signal Invalid
DTC	U041786h	Hand Brake Signal Invalid
DTC	U041686h	Front Left Wheel Speed Signal Invalid
DTC	U041686h	Front Right Wheel Speed Signal Invalid
DTC	U041686h	Rear Left Wheel Speed Signal Invalid
DTC	U041686h	Rear Right Wheel Speed Signal Invalid
DTC	U040486h	Shift Lever Signal Invalid
DTC	U240586h	Shift Signal Invalid
DTC	U040486	Parking (P Position) Button Signal Invalid
DTC	U010000h	Engine Node 1 Timeout
DTC	U040182h	Engine Node 1 Activated
DTC	U040183h	Engine Node 1 CRC
DTC	U015100h	Brake System Node 1 Timeout
DTC	U011400h	Brake System Node 2 Timeout
DTC	U014000h	Brake System Node 3 Timeout
DTC	U042282h	Brake System Node 3 Activated
DTC	U042283h	Brake System Node 3 CRC
DTC	U012800h	Brake System Node 4 Timeout
DTC	U041782h	Brake System Node 4 Activated
DTC	U041783h	Brake System Node 4 CRC
DTC	U012200h	Brake System Node 5 Timeout
DTC	U041682h	Brake System Node 5 Activated
DTC	U041683h	Brake System Node 5 CRC

DTC	**U015500h**	**Instrument Cluster Node 1 Timeout**
DTC	**U024800h**	**Shift Module Node 1 Timeout**
DTC	**U010300h**	**Shift Module Node 1 Timeout**
DTC	**U040482h**	**Shift Module Node 1 Activated**
DTC	**U040483h**	**Shift Module Node 1 CRC**
DTC	**U240500h**	**Shift Module Node 2 Timeout**
DTC	**U240582h**	**Shift Module Node 2 Activated**
DTC	**U240583h**	**Shift Module Node 2 CRC**
DTC	**U021200h**	**Steering Node 1 Timeout**

1	**Check if power supply and ground for sender module are normal.**

NG → **Check and repair power supply or ground, verify the fault phenomenon again.**

OK

2	**Check if vehicle module configuration is correct.**

NG → **Rewrite correct configuration code, verify the fault phenomenon again.**

OK

3	**Check if CAN bus and node are connected normally (CAN_H open, CAN_L open, CAN_H short to CAN_L/open, CAN_L short to VBAT, CAN_H short to GND, CAN_L short to GND, termination resistor open, etc.).**

NG → **Check and repair CAN bus and node, verify the fault phenomenon again.**

OK

4	**Check the signal for strong interference.**

NG → **Check if there is interference in the signal or the twisted pair is dropped with oscilloscope, verify the fault phenomenon again.**

OK

5	Check modules in network.

NG → Unplug or replace module, verify the fault phenomenon again.

OK

6	Replace module, check and repair, then verify the fault phenomenon again.

Bus Off Fault

DTC	U0073-88	Common CAN Bus Off
DTC	U240088h	Vehicle CAN Bus Disconnected
DTC	U12A1-88	Private CAN Bus Off
DTC	U1003-88	EV Network Segment Bus Off
DTC	U1004-88	Power Bus Off
DTC	U1005-88	Chassis Bus Off
DTC	U1006-88	Information and Entertainment Bus Off
DTC	U1007-88	Body CAN Bus Off
DTC	U1008-88	Diagnostic Bus Off
DTC	U1009-88	Support Network Segment Bus Off
DTC	U100A-88	Support Network Segment Bus Off

1	Check if central gateway module power supply and ground are normal.

NG → Check and repair power supply or ground, verify the fault phenomenon again.

OK

2	Check if CAN bus and node are connected normally (CAN_H open, CAN_L open, CAN_H short to CAN_L/open, CAN_L short to VBAT, CAN_H short to GND, CAN_L short to GND, termination resistor open, etc.).

NG → Check and repair CAN bus and node, verify the fault phenomenon again.

OK

3	Check the signal for strong interference.

NG → Check if there is interference in the signal or the twisted pair is dropped with oscilloscope, verify the fault phenomenon again.

OK

4	Check modules in network.

NG → Unplug or replace module, verify the fault phenomenon again.

OK

5	Replace module, check and repair, then verify the fault phenomenon again.

CAN Configuration Error

DTC	U1300-55	Vehicle CAN Configuration Not Written

1	Use diagnostic tester to check the configuration codes of the faulty module or sensor.

NG → Write correct configuration code to faulty module or sensor, verify the fault phenomenon again.

OK

2	Check if CAN bus and node are connected normally (CAN_H open, CAN_L open, CAN_H short to CAN_L/open, CAN_L short to VBAT, CAN_H short to GND, CAN_L short to GND, termination resistor open, etc.).

NG → Check and repair CAN bus and node, verify the fault phenomenon again.

OK

3	Check modules in network.

NG → **Unplug or replace module, verify the fault phenomenon again.**

OK ↓

4	**Replace module, check and repair, then verify the fault phenomenon again.**

Calibration Data Missed

DTC	**U3000-51**	**Calibration Data Missed**

1	**Using diagnostic tester, check calibration data for faulty module or sensor.**

NG → **Write correct calibration data to faulty module or sensor, verify the fault phenomenon again.**

OK ↓

2	**Check if CAN bus and node are connected normally (CAN_H open, CAN_L open, CAN_H short to CAN_L/open, CAN_L short to VBAT, CAN_H short to GND, CAN_L short to GND, termination resistor open, etc.).**

NG → **Check and repair CAN bus and node, verify the fault phenomenon again.**

OK ↓

3	**Check modules in network.**

NG → **Unplug or replace module, verify the fault phenomenon again.**

OK ↓

4	**Replace module, check and repair, then verify the fault phenomenon again.**

CAN Line Fault

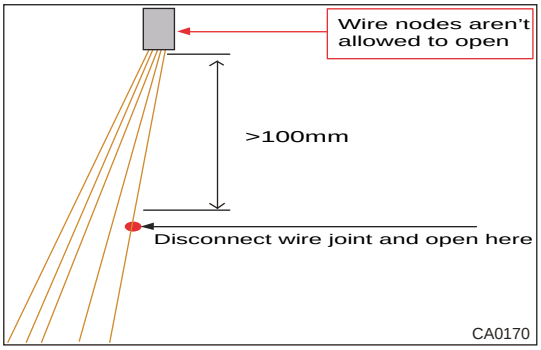
DTC	**U0005-00**	**High Speed CAN Communication Bus (+) High**
DTC	**U0007-00**	**High Speed CAN Communication Bus (-) Low**

1. Link malfunction.

Link refers to a communication connection line between nodes. Link malfunction refers to malfunction of data communication lines, such as short circuit, open circuit and communication signal attenuation or distortion caused by changes in physical properties of the lines. These factors often cause multiple electronic control units to fail to work properly or the control system to operate improperly. To determine whether the link is malfunctioning, use an oscilloscope or a specific vehicle CAN tester to observe whether the current data communication signal matches the standard data communication signal. Maintenance methods are generally to repair shorted or open twisted-pair lines, or to eliminate the root cause of changing the physical properties of twisted-pair lines.

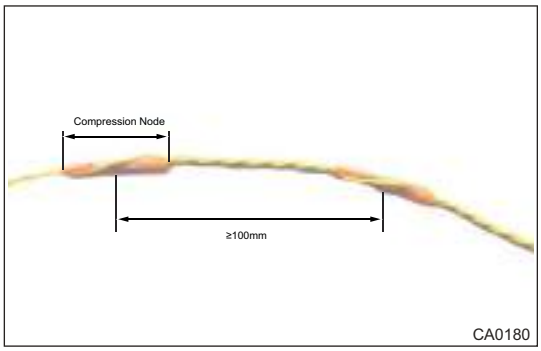
a. Maintenance instructions for CAN line.

Sometimes, in order to determine the malfunction, it is necessary to disconnect a control unit from line connection point and disconnect the CAN bus connected to the control unit, or to repair wire harness after the malfunction has been determined. The data transmitted by CAN bus may even affect vehicle safety and life safety of personnel. Improper maintenance of CAN bus may cause interference or loss of signals, resulting in these data not being transmitted. Therefore, the following regulations must be observed during maintenance:



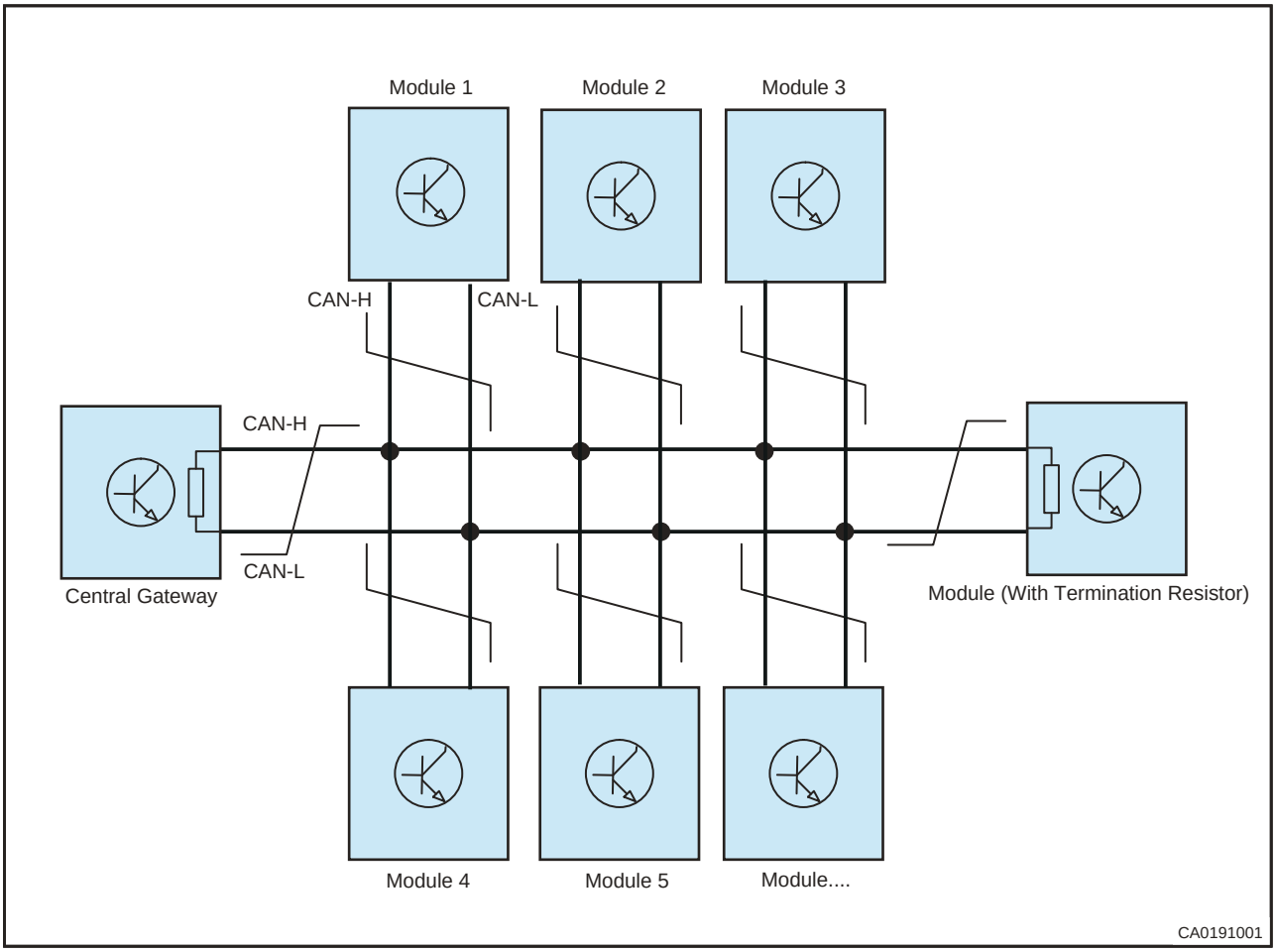
- During CAN bus maintenance, the disconnection point is required to be at least 100 mm away from the line node, and the line node must never be opened, maintained and updated;

- If the CAN line is to be disconnected, it is only allowed to be carried out at a distance of ⩾ 100 mm from next pressure node; The twisting of CAN lines have decisive significance to the interference effect of CAN. Only if the twisting is not damaged, the CAN can be protected from interference, so keep as little interference with the twisting as possible during maintenance.



b. Use a multimeter to measure the resistance to ground and power supply of CAN-H and CAN-L.

- Unplug any non-termination resistor module (easy to remove and install), after disconnecting battery for 5 minutes, the measured resistance values between diagnostic interfaces CAN-H and CAN-L and ground are both 32 MΩ.
- Unplug any non-termination resistor module (easy to remove and install), after disconnecting battery for 5 minutes, the measured resistance values between diagnostic interfaces CAN-H and CAN-L and ground are both about 33.5 MΩ.



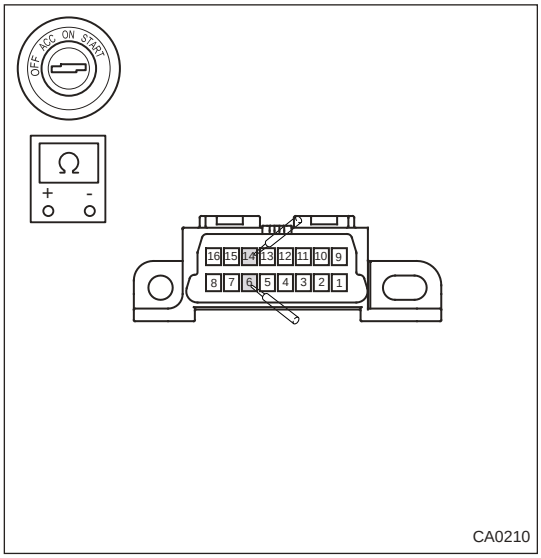
c. Termination resistor.

The termination resistor is installed in gateway module of system and is used to prevent CAN bus signal from reflecting the changing voltage on CAN bus. When the termination resistor fails and the square wave is transmitting, because of the reflection of line, if it is serious, the signal will be deformed and the signal of control unit will be invalid. When measuring the CAN bus signal with an oscilloscope, if the signal does not match standard signal, it is also necessary to check whether the termination resistor is damaged.

Measurement step of termination resistor:

1. Turn ENGINE START STOP switch to OFF, disconnect the negative battery cable;
2. Wait about 5 minutes until all capacitors are fully discharged;
3. Connect the measuring instrument and measure total resistance; Using ohmmeter, measure resistance between non-termination resistor modules (unplug any module which is easy to remove and install in CAN network, find terminals CAN-H and CAN-L according to circuit diagram) (- standard resistance is 60 Ω).

Measured value (for reference only): The measured resistance between terminals CAN-H and CAN-L (- parallel value of two termination resistors) is 58.7 Ω, unplug a module with termination resistor, and the measured resistance between terminals CAN-H and CAN-L is about 120 Ω.



OK

1	**Check modules in network.**

NG → **Unplug each module one by one or replace each module, verify the fault phenomenon again.**

OK

2	**Replace module, check and repair, then verify the fault phenomenon again.**

Diagnostic tester cannot communicate with all modules

1	**Check diagnostic interface power supply and ground**

NG → **Check diagnostic interface power supply and ground, and verify the fault phenomenon again.**

OK

2	**Check if diagnostic CAN bus is connected normally (CAN_H open, CAN_L open, CAN_H short to CAN_L/open, CAN_L short to VBAT, CAN_H short to GND, CAN_L short to GND, termination resistor open, etc.).**

NG → **Check and repair diagnostic CAN bus and node, verify the fault phenomenon again.**

OK

3	**Check if other CAN buses and nodes are connected normally (CAN_H open, CAN_L open, CAN_H short to CAN_L/open, CAN_L short to VBAT, CAN_H short to GND, CAN_L short to GND, termination resistor open, etc.).**

NG → **Check and repair other CAN buses and nodes, verify the fault phenomenon again.**

OK

4	**Check central gateway module.**

NG → **Check central gateway module, verify the fault phenomenon again.**

OK

5	**Check other modules in network.**

NG → **Unplug or replace faulty module, verify the fault phenomenon again.**

OK

6	**Connect oscilloscope and observe waveform at the same time. Observe if waveform is normal.**

NG → **Inspect and repair the power supply and ground of these modules, and verify the malfunction symptom again.**

OK

7	**Determine type of fault waveform, inspect and repair, then reconfirm the fault phenomenon again.**

Diagnostic tester cannot communicate with several modules

1	**Check power supply and ground of module that has lost communication**

NG → **Check power supply and ground of module that has lost communication, verify the fault phenomenon again.**

OK

2	**Check if main CAN bus is connected normally (CAN_H open, CAN_L open, CAN_H short to CAN_L/open, CAN_L short to VBAT, CAN_H short to GND, CAN_L short to GND, termination resistor open, etc.).**

NG → **Check and repair main CAN bus and node, verify the fault phenomenon again.**

OK

3	**Check central gateway module.**

NG → **Check central gateway module, verify the fault phenomenon again.**

OK

4	**Check other modules in network.**

NG → **Unplug or replace faulty module, verify the fault phenomenon again.**

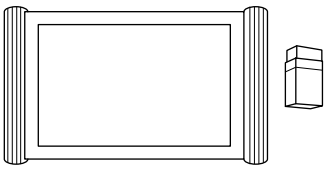
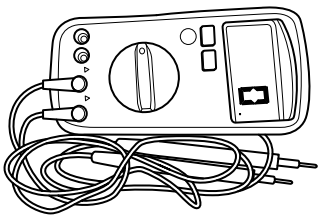
OK

5	**Connect oscilloscope and observe waveform at the same time. Observe if waveform is normal.**

NG → **Inspect and repair the power supply and ground of these modules, and verify the malfunction symptom again.**

On-vehicle Service

Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Digital Multimeter	 RCH0002006
Oscilloscope	 RCH006106

Hint:

- Oscilloscopes are available in the market as a general tool. Chery does not provide this tool.
- As a general diagnostic method, oscilloscope diagnosis can be replaced by other diagnostic methods.

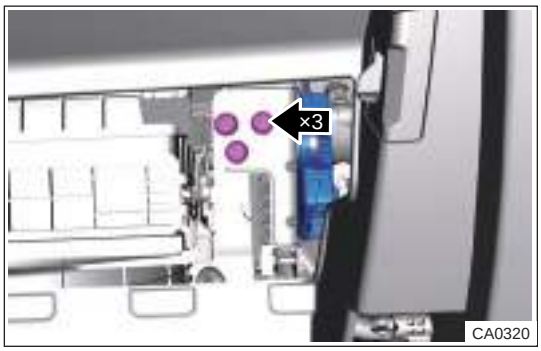
Gateway Module (CGW)

Removal

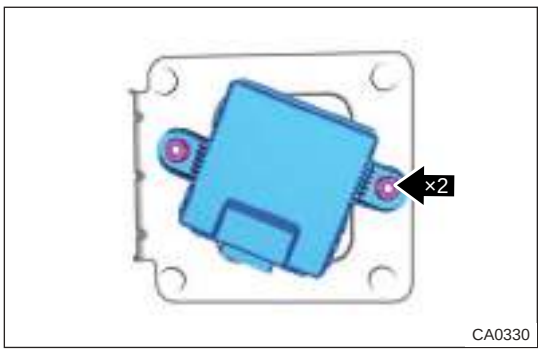
Caution
• Read configuration code of CGW module and record it with a diagnostic tester, before removing gateway module. • Try to prevent interior and body paint surface from being scratched, when removing gateway module.

1. Turn ENGINE START STOP switch to OFF.
2. Disconnect the negative battery cable.
3. Remove the glove box assembly.
4. Remove the gateway module.
   a. Disconnect the gateway module connector (arrow).

   b. Remove 3 fixing bolts (arrow) from gateway bracket.



   c. Remove 2 fixing nuts (arrow) from gateway module secured on gateway bracket.



   d. Remove the gateway module.

Installation

1. Installation is in the reverse order of removal.
2. Write configuration code with diagnostic tester to check module for proper operation after installation.

BODY

BODY

BODY

BODY

INSTRUMENT PANEL

Warnings and Precautions

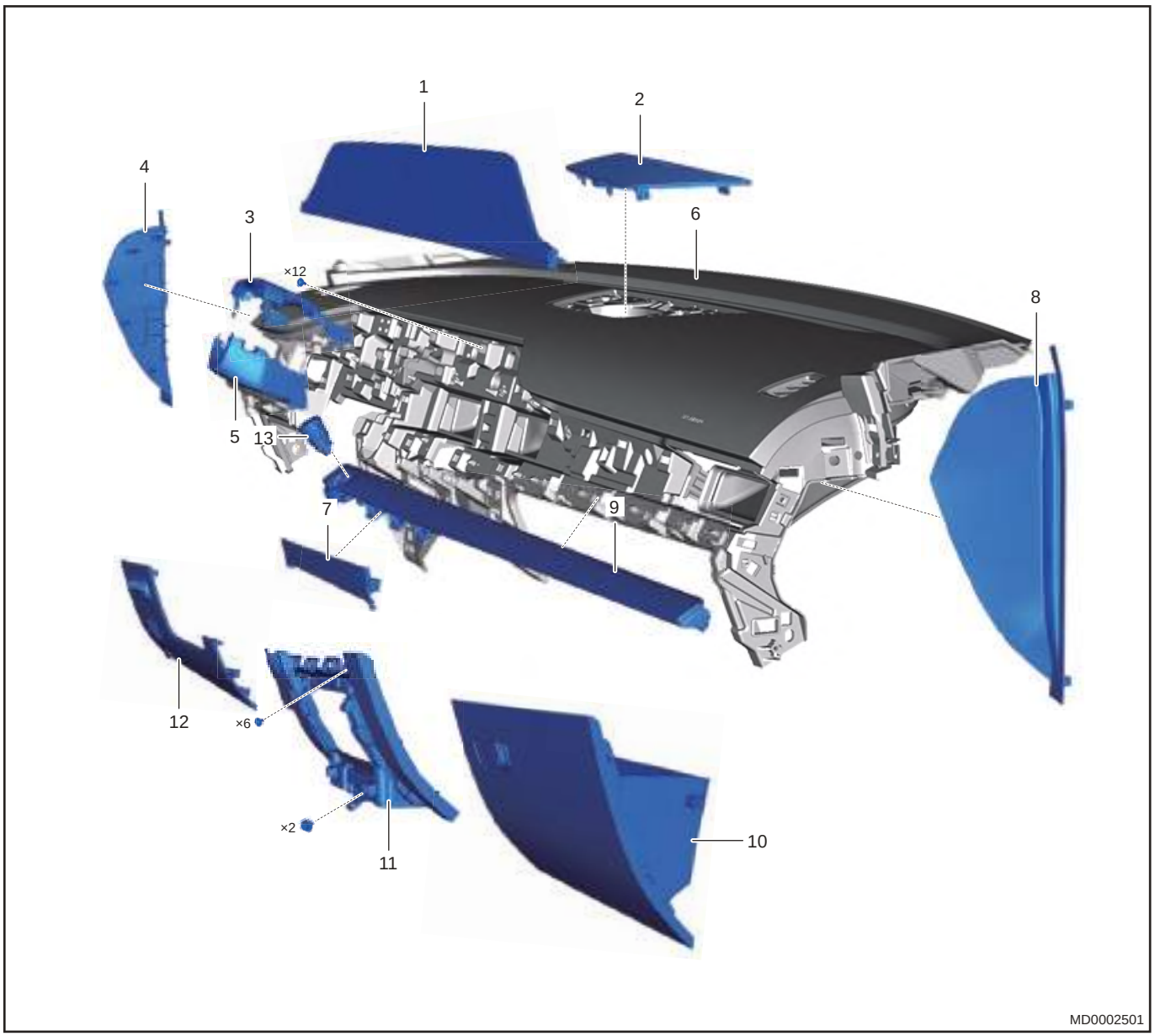
Precautions

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

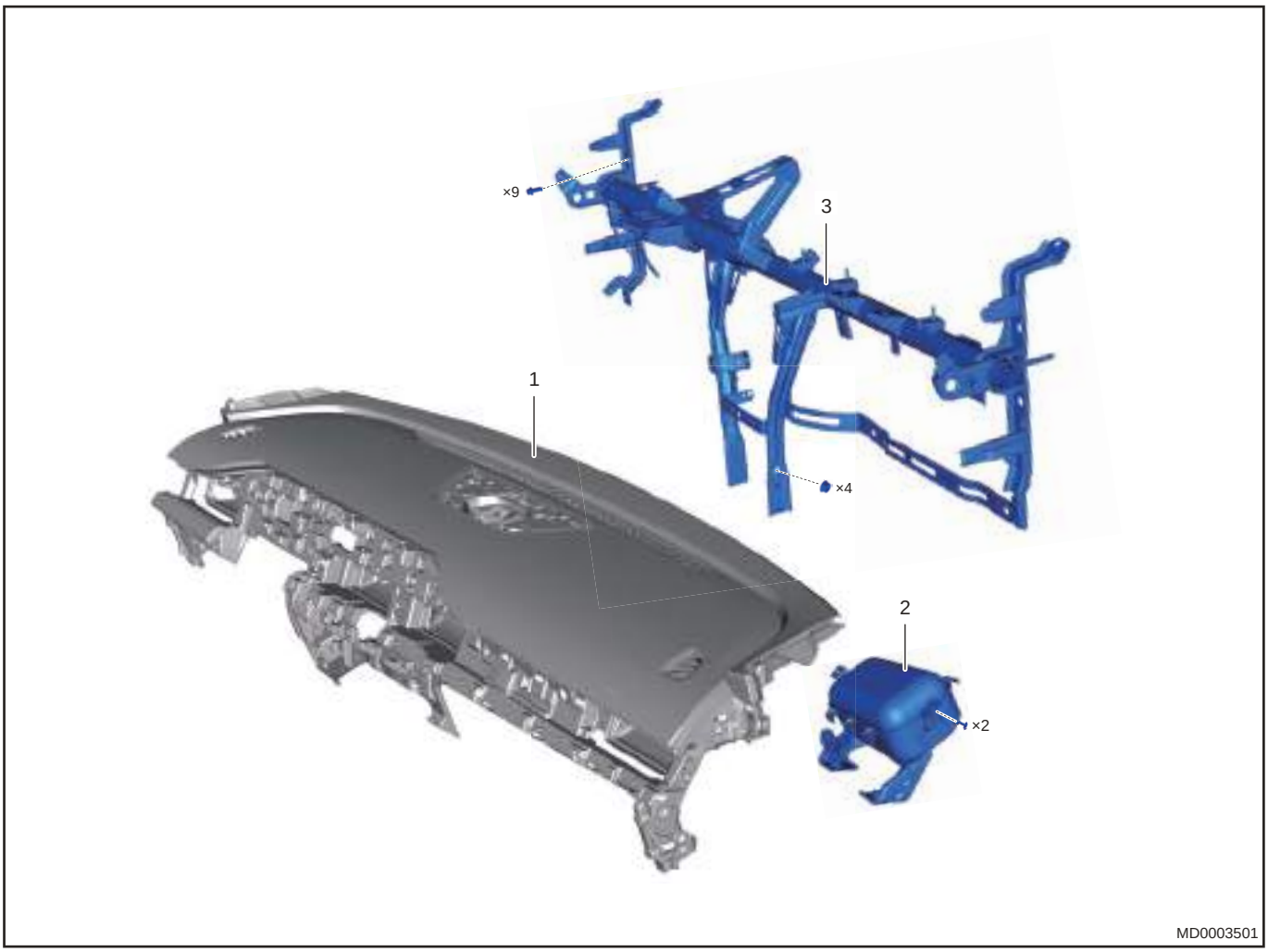
1. Be sure to wear safety equipment to prevent accidents, when removing instrument panel assembly.
2. Appropriate force should be applied, when removing instrument panel assembly. Be careful not to operate roughly.
3. DO NOT scratch interior and body paint, when removing instrument panel assembly.

System Overview

System Components Diagram



1	Dual LCD	8	Instrument Panel Right End Plate Assembly
2	Speaker Cover Assembly	9	A/C Control Panel Assembly
3	Combination Switch Upper Cover Assembly	10	Glove Box Assembly
4	Instrument Panel Left End Plate Assembly	11	Center Lower Protector Assembly
5	Combination Switch Lower Cover Assembly	12	Instrument Panel Lower Left Protector Assembly
6	Instrument Panel Assembly	13	ENGINE START STOP Switch
7	Auxiliary Fascia Console Bolt Plug		



1	Instrument Panel Assembly	3	Instrument Panel Crossmember Assembly
2	Front Passenger Airbag Assembly		

Specifications

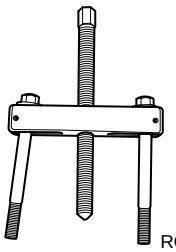
Torque Specifications

Description	Torque (N·m)
Instrument Panel Left Lower Protector Assembly Fixing Screw	1.5 ± 0.5
Combination Switch Lower Cover Fixing Screw	1.5 ± 0.5
Automatic A/C Control Panel Assembly Fixing Screw	1.5 ± 0.5
Fixing Bolt Between Passenger Side Airbag and Crossmember	23 ± 2
Instrument Panel Fixing Bolt	5 ± 1
Central Air Duct Fixing Screw	1.5 ± 0.5
Front Passenger Airbag Assembly Fixing Bolt	2.5 ± 0.5

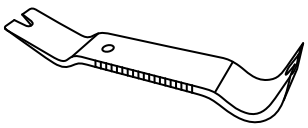
On-vehicle Service

Tools

Special Tool

Tool Name	Part No.	Tool Drawing
Steering Wheel Remover	ECH-0008	 RCH0000014

General Tool

Tool Name	Tool Drawing
Interior Crow Plate	 RCH0000006

Replacement of Instrument Panel Assembly

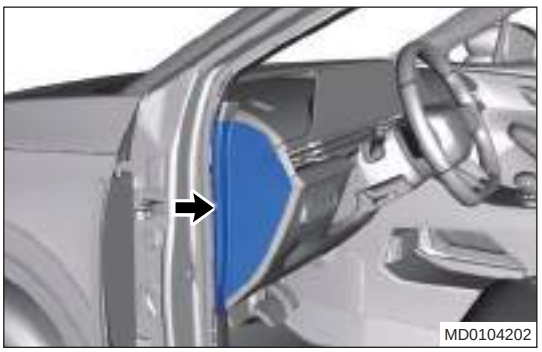
Removal

⚠ Warning

- Be sure to wear safety equipment to prevent accidents, when removing auxiliary fascia console assembly.
- All operations related with safety airbag components when removing the instrument panel should be performed after battery power supply is disconnected. Never operate it with power on. Because within 60 seconds after engine stalls or fuse removed, there is enough power remaining in the airbag control module for activating airbag, and the airbag can be accidentally activated, causing personal injury or vehicle damage.
- Never expose airbag components directly to hot air or open flame.
- Removed airbag should be well kept. If triggered accidentally, it may cause personal injury.
- Be sure to wear safety equipment to prevent accidents, when removing instrument panel assembly.
- DO NOT scratch interior and body paint, when removing instrument panel assembly.

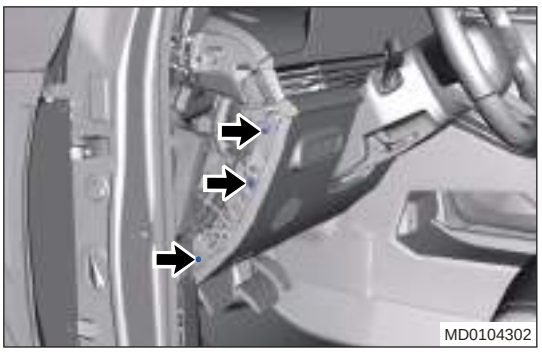
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door opening weatherstrip (arrow).

4. Using an interior crow plate, pry off clip from instrument panel left end panel assembly carefully and remove instrument panel left end panel assembly (arrow).



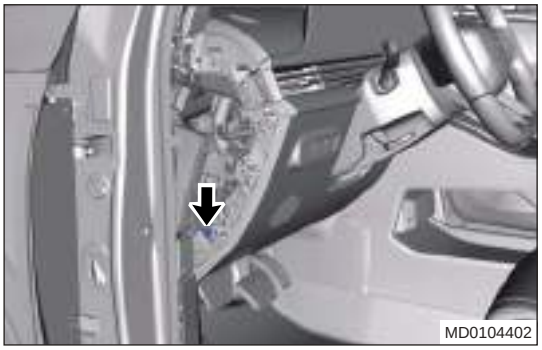
5. Remove 3 fixing screws (arrow) from instrument panel left end panel assembly.

   Tightening torque: 1.5 ± 0.5 N · m

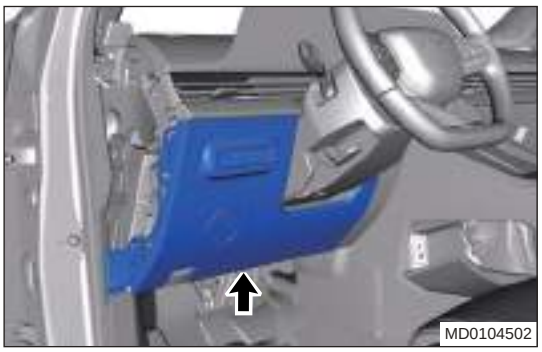


6. Remove 1 fixing bolt (arrow) from instrument panel left end panel assembly.

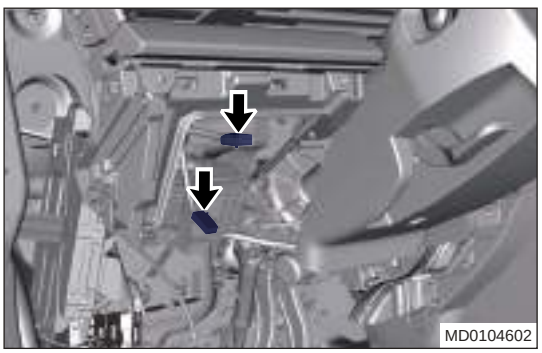
   Tightening torque: 5 ± 1.0 N · m



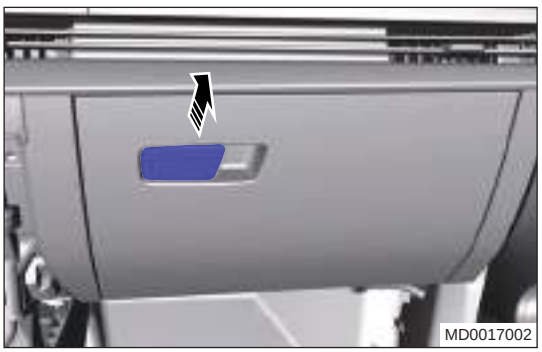
7. Pry up instrument panel lower left protector assembly (- arrow) with interior crow plate.



8. Disconnect driving assist switch connector and audio connector (arrow), and remove instrument panel lower left protector assembly.

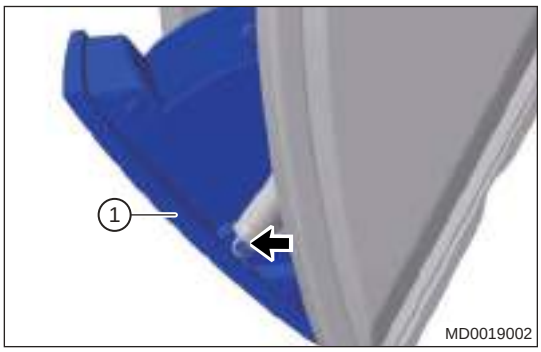


9. Remove the auxiliary fascia console assembly.
10. Press glove box switch and open glove box assembly in direction of arrow as shown in illustration.



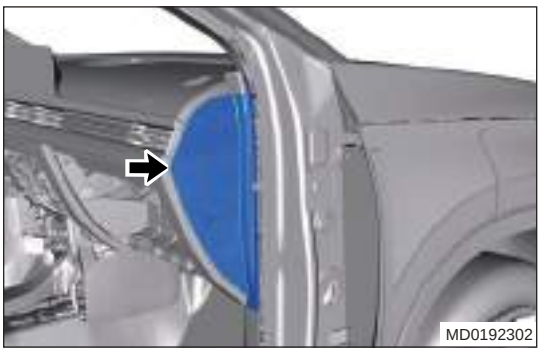
11. Rotate lock knob in direction of arrow as shown in illustration to remove it.

12. Detach the coupling clips between glove box and damper, detach claws from lower side of glove box assembly, and remove glove box assembly (1).



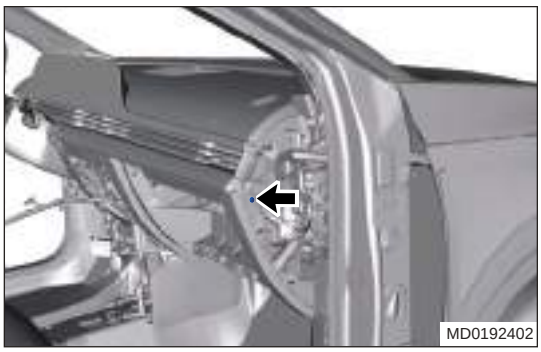
13. Remove the front right door opening weatherstrip (arrow).

14. Using an interior crow plate, pry off clip from instrument panel right end panel assembly carefully and remove instrument panel right end panel assembly (arrow).



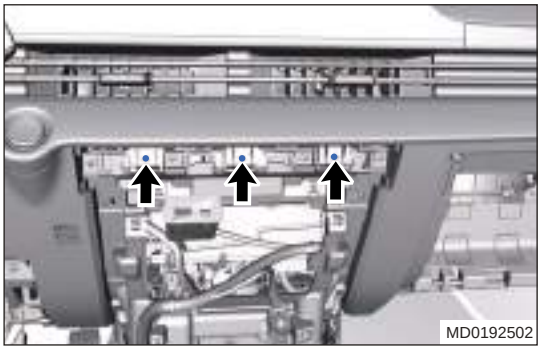
15. Remove 1 fixing screw (arrow) from A/C control panel assembly.

    Tightening torque: 1.5 ± 0.5 N · m

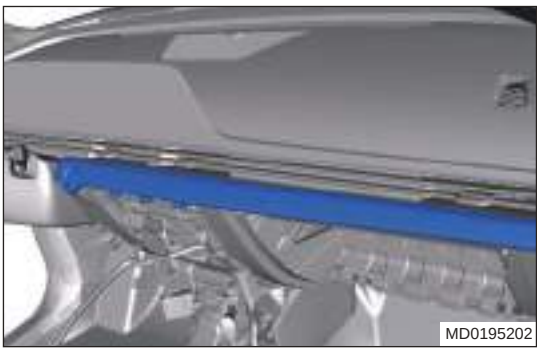


16. Remove 3 fixing screw (arrow) from A/C control panel assembly.

    Tightening torque: 1.5 ± 0.5 N · m

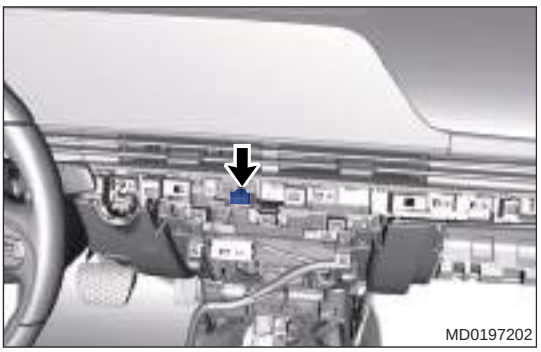


17. Using an interior crow plate, carefully pry off the A/C control panel assembly (arrow).



18. Disconnect the ENGINE START STOP switch connector (arrow).

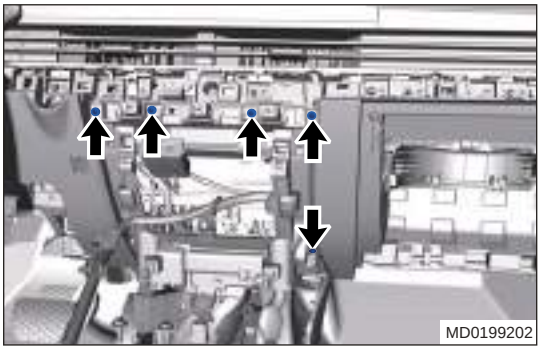
19. Disconnect connector (arrow) from A/C control panel.



20. Remove the A/C control panel assembly.

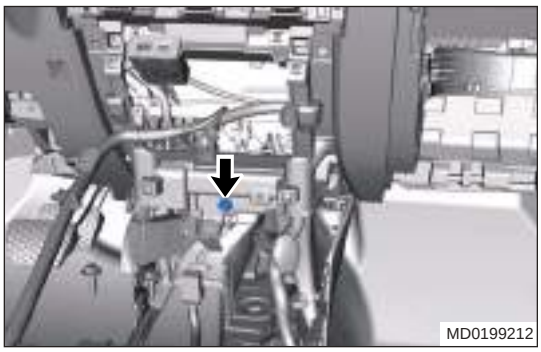
21. Remove 5 fixing screws (arrow) from center lower protector assembly.

    Tightening torque: 1.5 ± 0.5 N · m

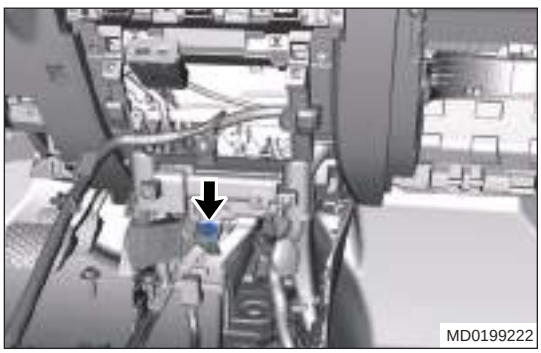


22. Remove 1 fixing bolt (arrow) from center lower protector assembly.

    Tightening torque: 5 ± 1.0 N · m

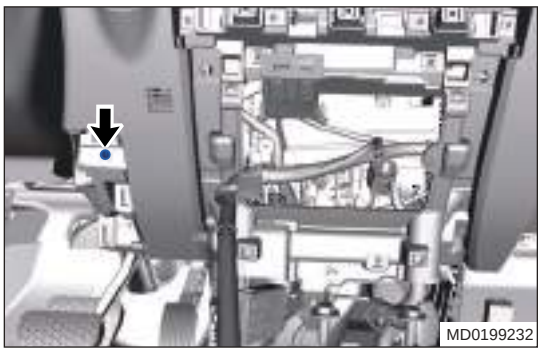


23. Remove 1 fixing clip (arrow) from center lower protector assembly.



24. Remove 1 fixing screw (arrow) from the left side of center lower protector assembly.

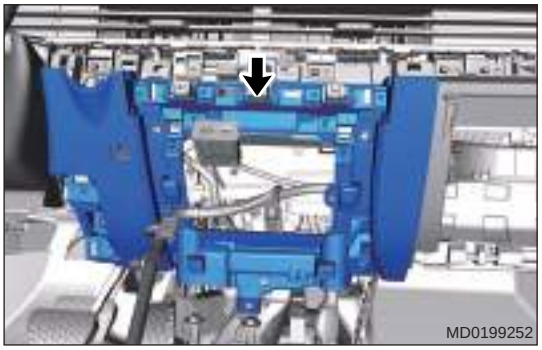
    Tightening torque: 1.5 ± 0.5 N · m



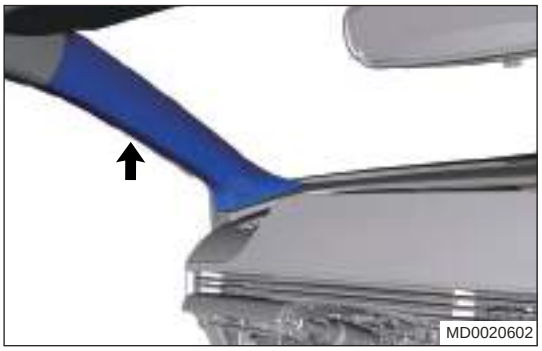
25. Remove 1 fixing bolt (arrow) from the left side of center lower protector assembly.

    Tightening torque: 5 ± 1.0 N · m

26. Pry up center lower protector assembly with interior crow plate.



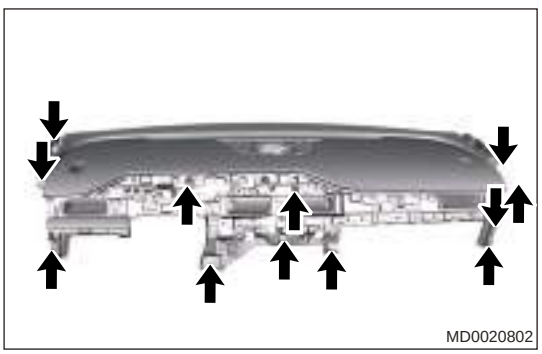
27. Remove the driver airbag assembly.
28. Remove the steering wheel assembly.
29. Remove the combination switch lower cover assembly.
30. Remove the combination switch assembly.
31. Remove the dual LCD.
32. Remove the front passenger airbag.
33. Remove the left A-pillar upper protector assembly (arrow).



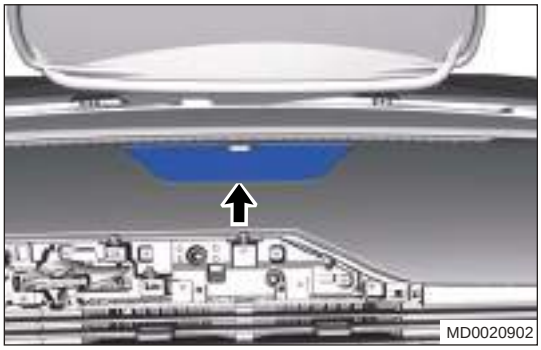
34. Remove the right A-pillar upper protector assembly (arrow).

35. Remove 12 fixing bolts (arrow) from instrument panel.

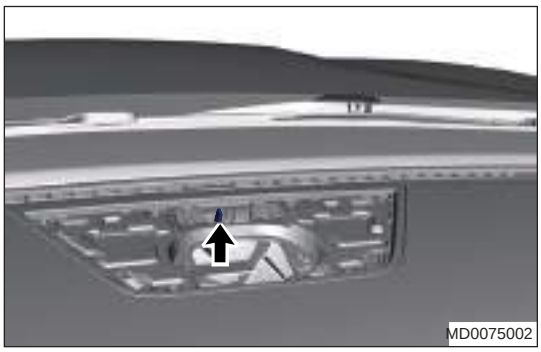
    Tightening torque: 5 ± 1 N · m



36. Pry off speaker cover assembly (arrow).



37. Disconnect speaker connector, and remove speaker assembly (arrow).



38. Remove the instrument panel assembly.

Installation

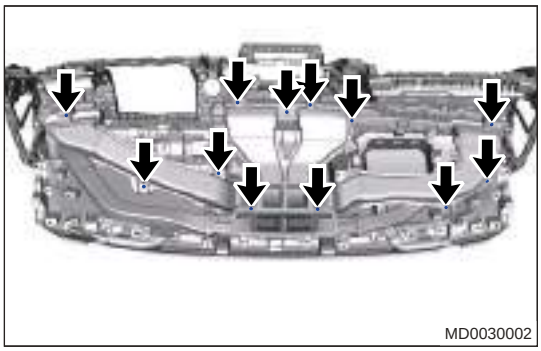
⚠ Caution
• Installation is in the reverse order of removal.

Disassembly

⚠ Caution
• Be sure to wear safety equipment to prevent accidents, when disassembling instrument panel. • Appropriate force should be applied, when disassembling instrument panel. Be careful not to operate roughly.

1. Remove 12 fixing screws (arrow) from central air duct.

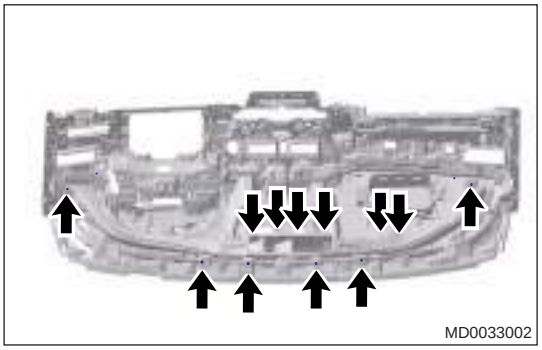
   Tightening torque: 1.5 ± 0.5 N · m



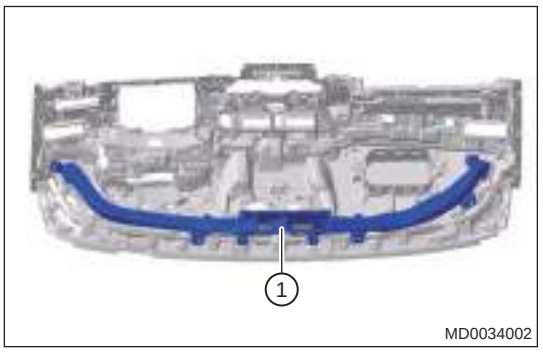
2. Remove the central air duct.

3. Remove 12 fixing screws (arrow) from central defroster duct.

   Tightening torque: 1.5 ± 0.5 N · m

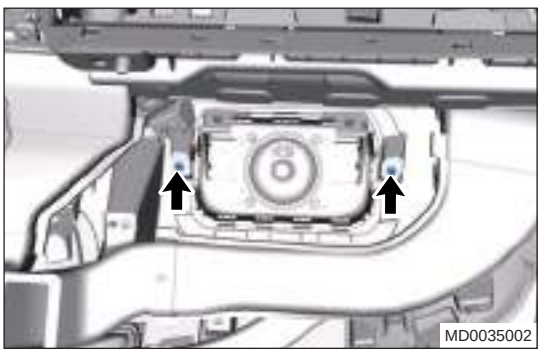


4. Remove the central defroster duct (1).

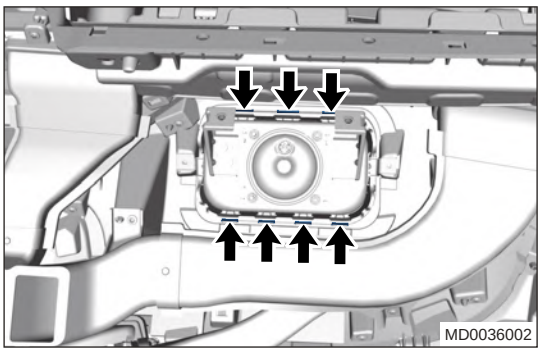


5. Remove 2 fixing screws (arrow) from front passenger airbag assembly.

   Tightening torque: 2.5 ± 0.5 N · m



6. Disengage 7 fixing clips (arrow) from front passenger airbag assembly.



7. Remove the front passenger airbag assembly.

Assembly

⚠ **Caution**
• Reassembly is in the reverse order of disassembly.

Replacement of Instrument Panel Crossmember Assembly

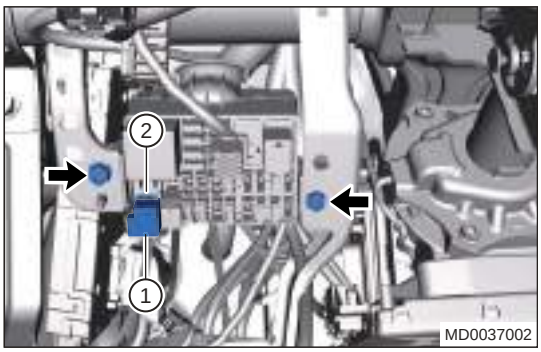
Removal

Warning

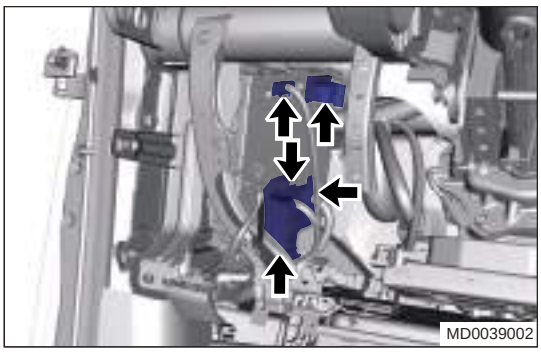
- Be sure to wear safety equipment to prevent accidents, when removing instrument panel crossmember assembly.
- Try to prevent interior and body paint surface from being scratched, when removing instrument panel crossmember assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel assembly.
4. Remove the front windshield lower trim board assembly.
5. Pry off the power supply protector cover (1) from instrument panel relay and fuse box and remove power supply cable fixing nut (2).
6. Remove 2 fixing bolts (arrow) from instrument panel and relay box.

   Tightening torque: 9 ± 1 N · m

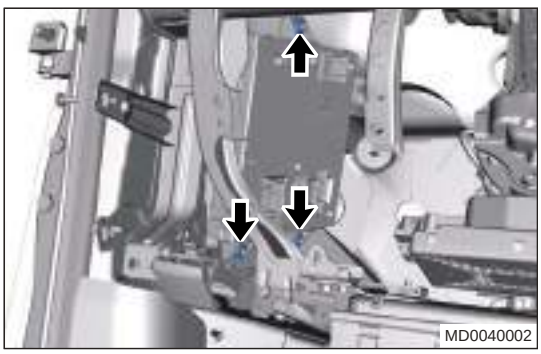


7. Disconnect 5 connectors (arrow) from Body Control Module (BCM).

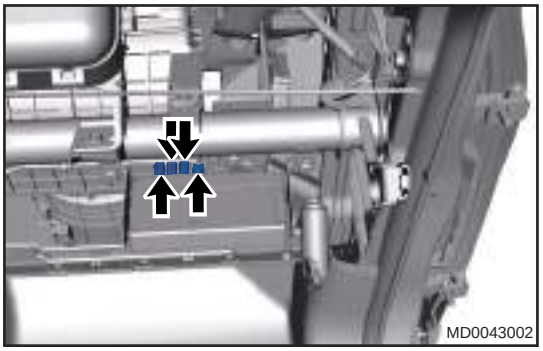


8. Remove 3 fixing nuts (arrow) from Body Control Module (BCM).

   Tightening torque: 7 ± 1 N · m

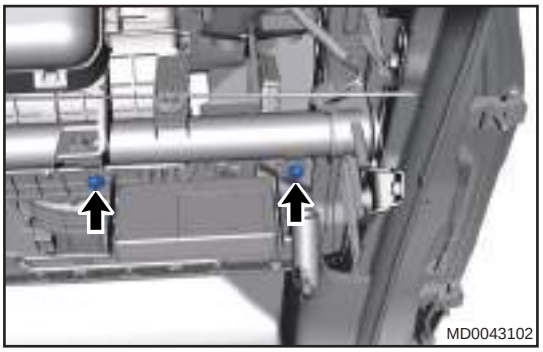


9. Disconnect the wireless communication module connector (arrow).

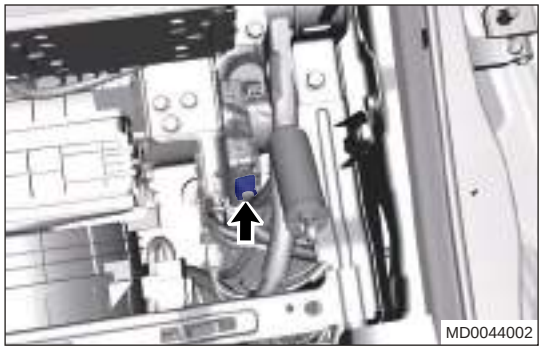


10. Remove 2 fixing bolts (arrow) from wireless communication module.

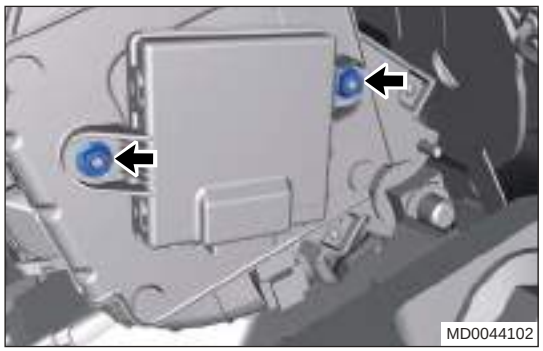
Tightening torque: 5 N · m



11. Disconnect the gateway module connector (arrow).

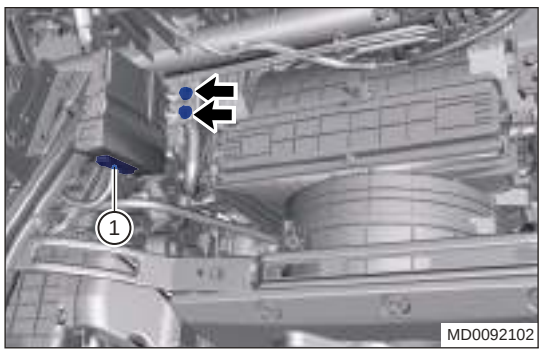


12. Remove 2 fixing nuts (arrow) from network module.

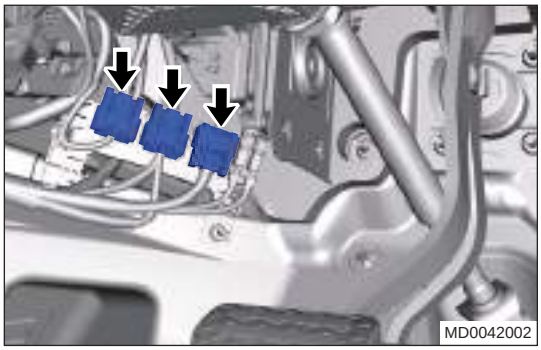


13. Disconnect PEPS module connector (1), remove 2 fixings bolts (arrow) from PEPS.

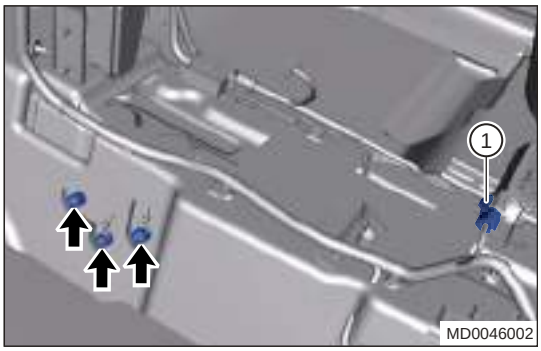
Tightening torque: 7 ± 1 N · m



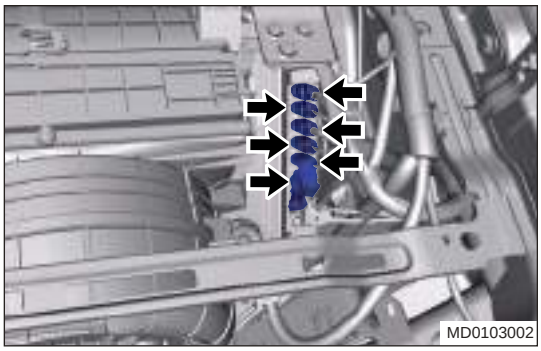
14. Remove the PEPS control module.
15. Disconnect 3 connectors (arrow) between instrument panel wire harness and interior wire harness.



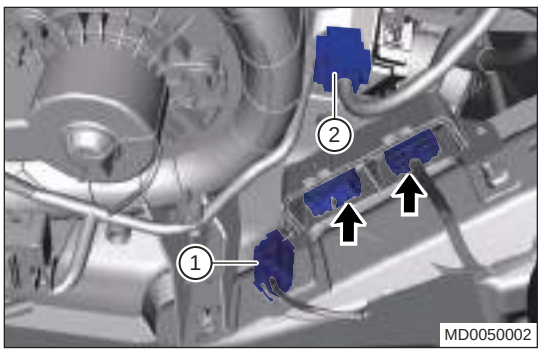
16. Fold back the front passenger carpet to remove instrument panel wire harness body ground nuts (arrow) and disconnect low frequency antenna connector (1).



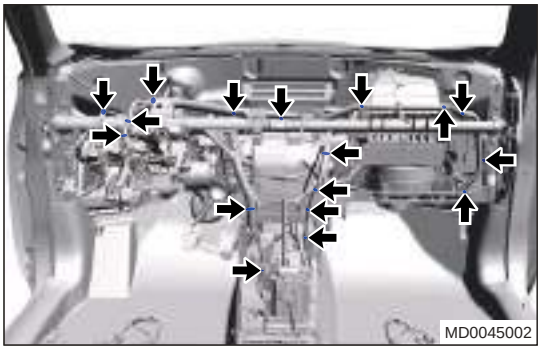
17. Disconnect 6 connectors (arrow) from panorama parking module.



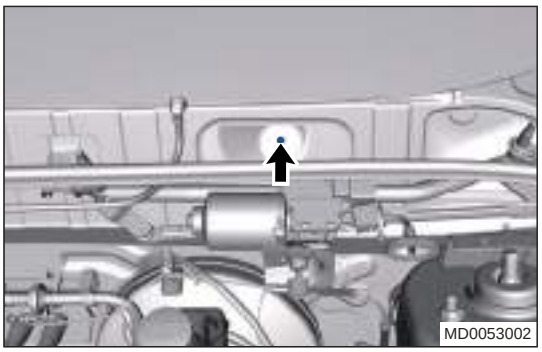
18. Disconnect radio antenna connector (1), A/C wire harness connector (2), 2 connectors (arrow) between instrument panel wire harness and interior wire harness.



19. Disconnect all wire harness fixing clips (arrow) from instrument panel crossmember.

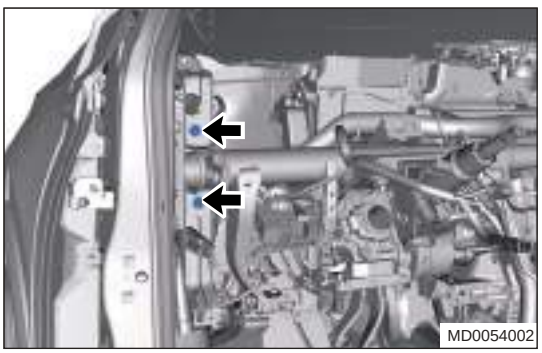


20. Remove 1 fixing bolt (arrow) under front windshield lower trim board outside the instrument panel.



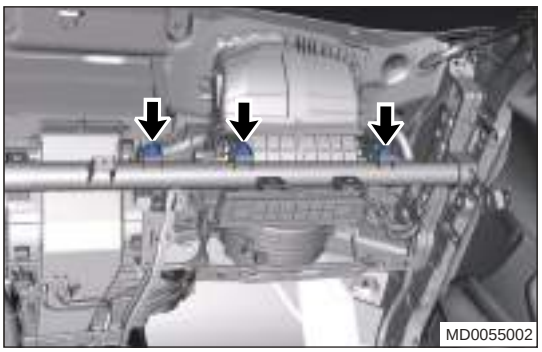
21. Remove 2 fixing bolts (arrow) from instrument panel crossmember (take left side as an example).

Tightening torque: 25 ± 3.5 N · m



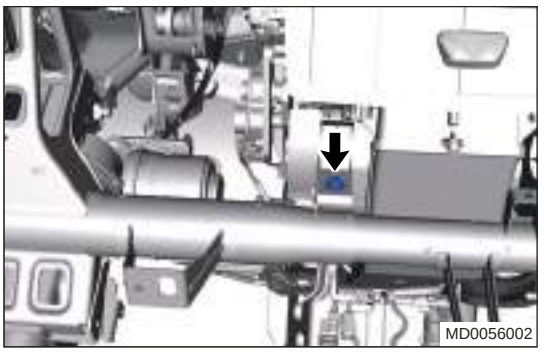
22. Remove 3 fixing nuts (arrow) between HVAC assembly and instrument panel crossmember.

Tightening torque: 5 ± 1 N · m



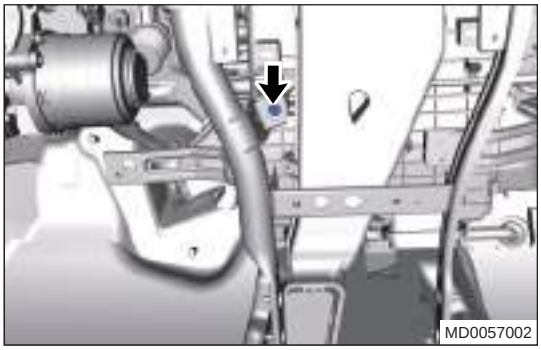
23. Remove fixing bolt (arrow) between HVAC assembly and instrument panel crossmember.

Tightening torque: 5 ± 1 N · m



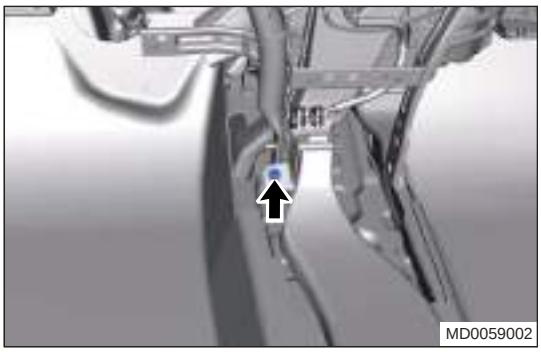
24. Remove fixing bolt (arrow) between HVAC assembly and instrument panel crossmember.

    Tightening torque: 2.5 ± 0.5 N · m



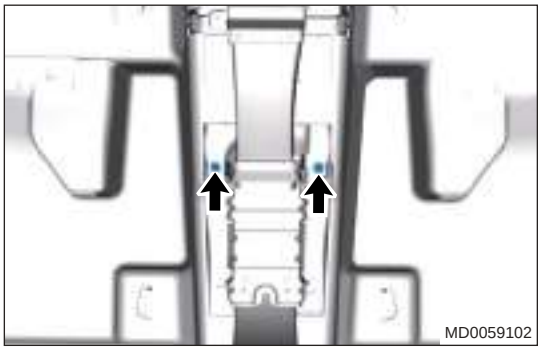
25. Remove 1 fixing screw (arrow) from front part of rear face air duct.

    Tightening torque: 1.5 ± 0.5 N · m



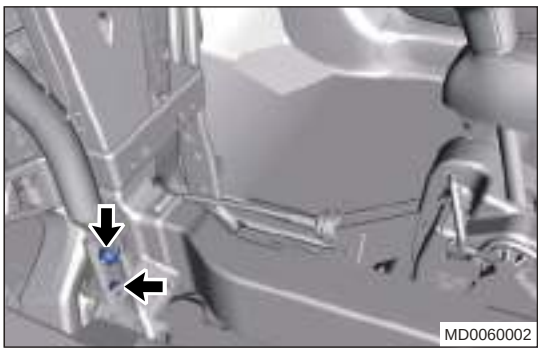
26. Remove 2 fixing screw (arrow) from front part of rear face air duct.

    Tightening torque: 1.5 ± 0.5 N · m



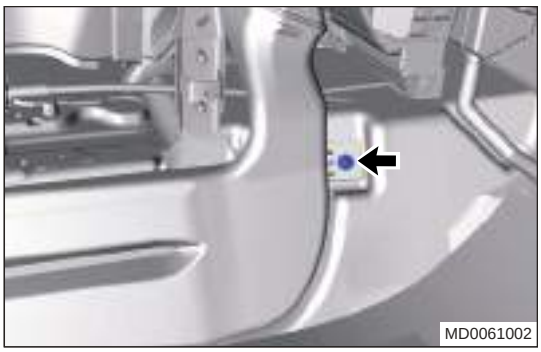
27. Remove 2 fixing nuts (arrow) from lower part of instrument panel crossmember (take left side as an example).

    Tightening torque: 23 ± 2 N · m



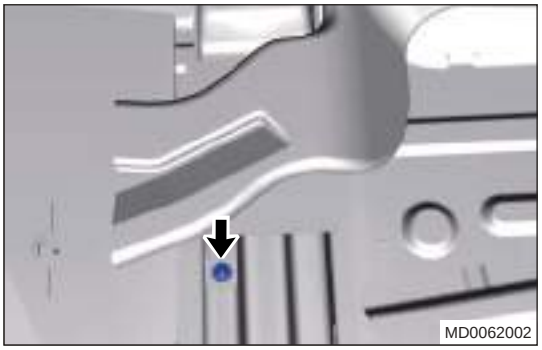
28. Fold back the front passenger carpet to remove 1 fixing screw (arrow) from right foot duct.

    Tightening torque: 5 ± 1 N · m

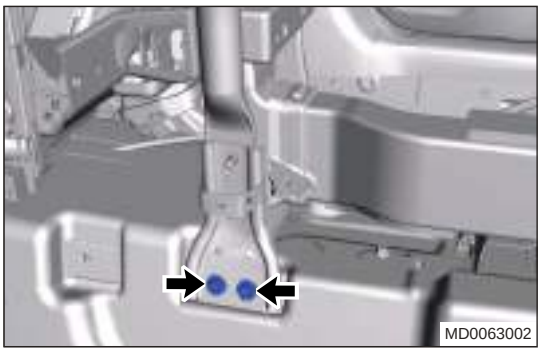


29. Fold back the front passenger carpet to remove fixing screw (arrow) from right foot duct and take away the right foot duct.

    Tightening torque: 5 ± 1 N · m

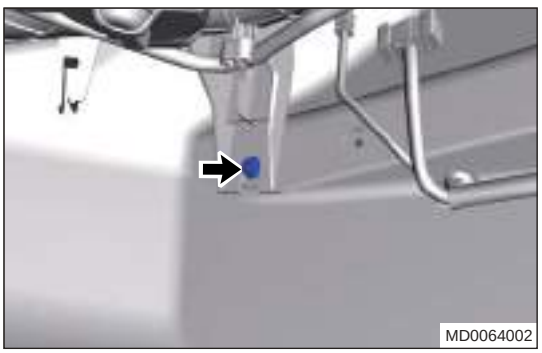


30. Remove 2 fixing bolts (arrow) from instrument panel crossmember fixing bracket (take left side as an example).

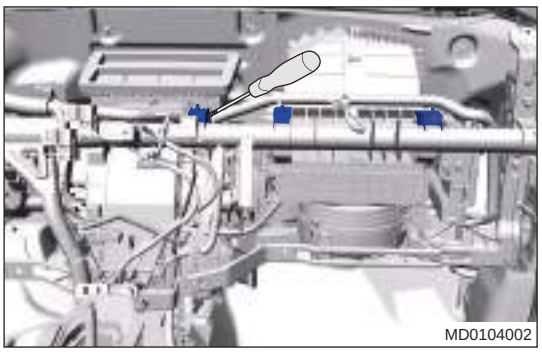


31. Remove fixing bolt (arrow) between HVAC assembly and body.

    Tightening torque: 5 ± 1 N · m



32. Detach HVAC assembly from instrument panel crossmember assembly with a flat tip screwdriver.



33. Carefully remove the instrument panel crossmember assembly.

Installation

- Installation is in the reverse order of removal.

⚠ Caution

- Be sure to tighten fixing bolts to specified torque, when installing instrument panel crossmember assembly.
- Check airbag for proper installation, after installing instrument panel crossmember assembly.
- Check each electrical equipment for proper operation, after installing instrument panel crossmember assembly.

AUXILIARY FASCIA CONSOLE

Warnings and Precautions

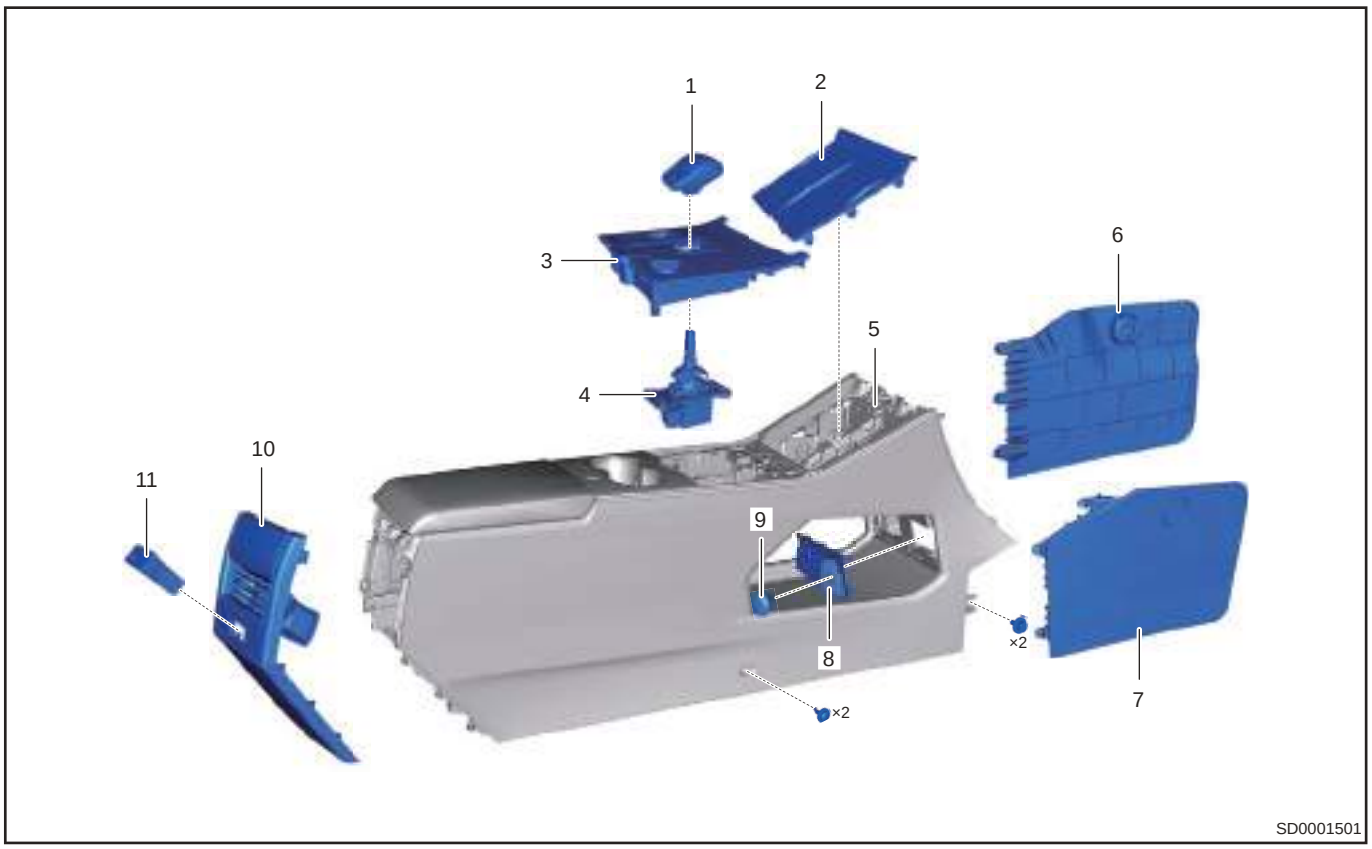
Precautions

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. Be sure to wear safety equipment to prevent accidents, when removing auxiliary fascia console assembly.
2. Appropriate force should be applied, when removing auxiliary fascia console assembly. Be careful not to operate roughly.
3. DO NOT scratch interior and body paint, when removing auxiliary fascia console assembly.

System Overview

System Components Diagram



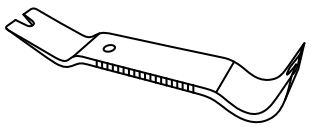
1	Electronic shift lever	7	Auxiliary Fascia Console Front Right Protector Assembly
2	Front Storage Box	8	Storage Box Block Cover
3	Auxiliary Fascia Console Control Panel	9	Backup Power Supply
4	Electronic Shift Mechanism	10	Auxiliary Fascia Console Rear Panel Assembly

5	Auxiliary Fascia Console Body	11	USB
6	Auxiliary Fascia Console Front Left Protector Assembly		

On-vehicle Service

Tool

General Tool

Tool Name	Tool Drawing
Interior Crow Plate	 RCH0000006

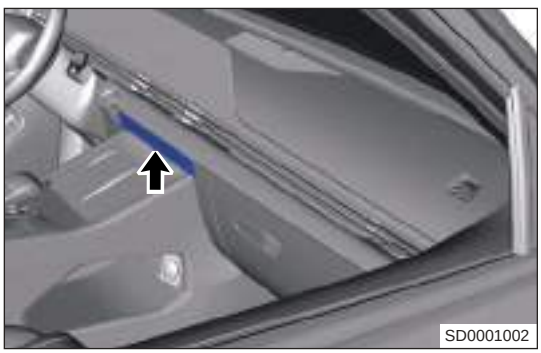
Replacement of Auxiliary Fascia Console

Removal

Warning

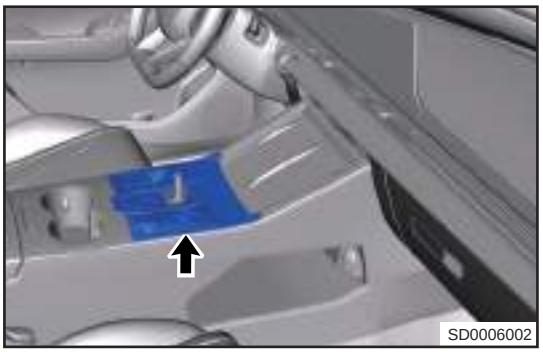
- Be sure to wear safety equipment to prevent accidents, when removing auxiliary fascia console assembly.
- Appropriate force should be applied, when removing auxiliary fascia console assembly. Be careful not to operate roughly.
- DO NOT scratch interior and body paint, when removing auxiliary fascia console assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable and wait for 30 seconds.
3. Remove auxiliary fascia console bolt plug (arrow) carefully with a small flathead screwdriver.

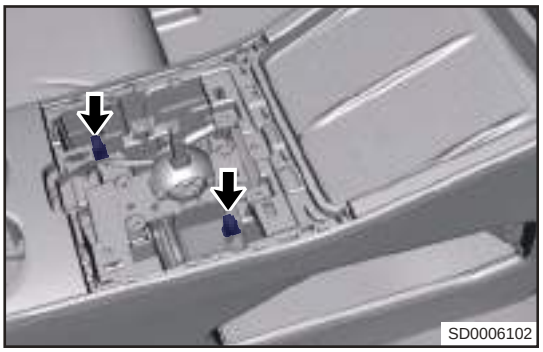

SD0001002

4. Hold electronic shift lever with both hands and pull it out forcibly (arrow).

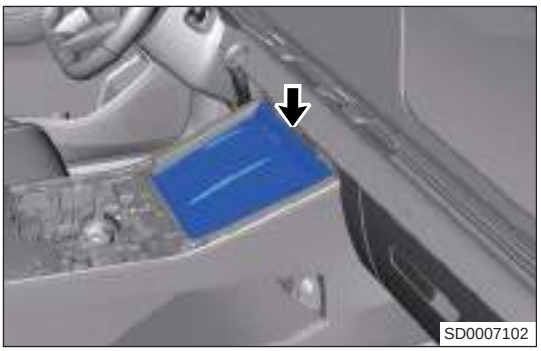
5. Using an interior crow plate, remove the auxiliary fascia console control panel (arrow).



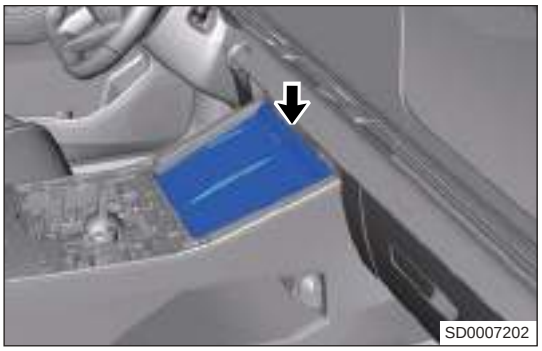
6. Disconnect 2 wire harness connectors (arrow) from auxiliary fascia console control panel.



7. Remove the auxiliary fascia console front storage box rubber gasket (arrow).



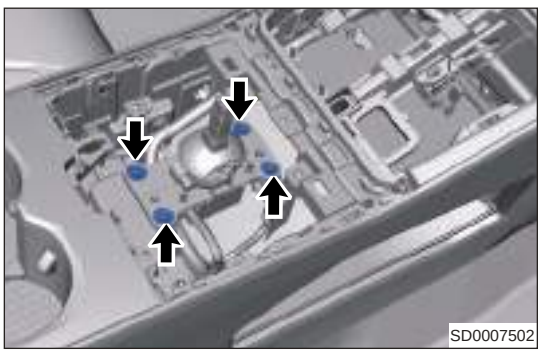
8. Remove front storage box (arrow) with a tool.



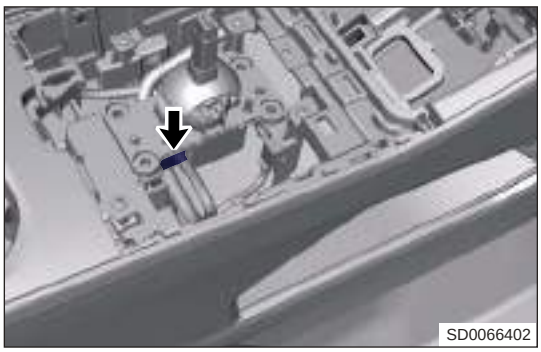
9. Disconnect 1 wire harness connector (arrow) from wireless charging module.

10. Disconnect 1 wire harness connector (arrow) from key induction coil.

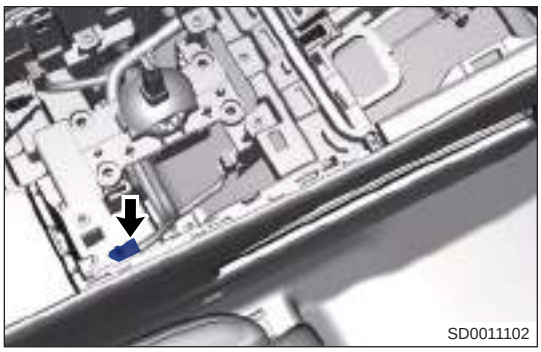
11. Remove 4 fixing bolts (arrow) from electronic shift mechanism.



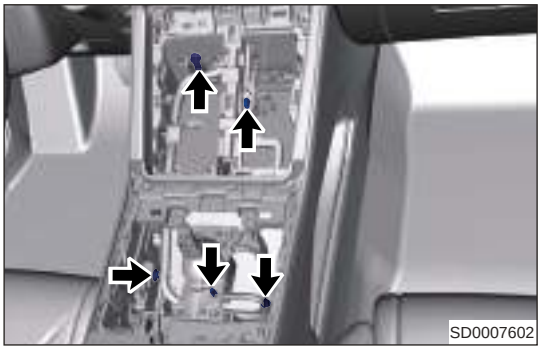
12. Disconnect 1 wire harness connector from electronic shift mechanism and remove electronic shift mechanism assembly (arrow).



13. Disconnect 1 wire harness connectors (arrow) from auxiliary fascia console.

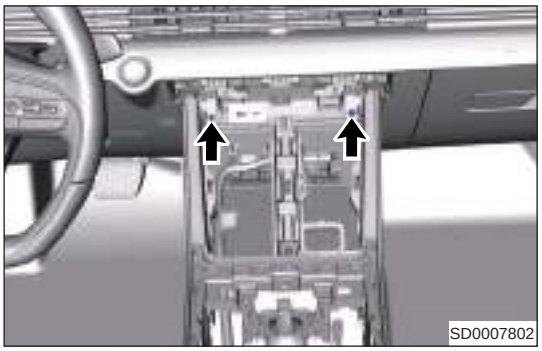


14. Remove 5 wire harness clips (arrow) with interior crow plate.



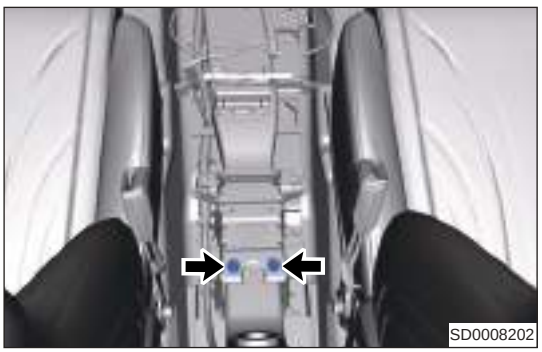
15. Pull the wire harness out from auxiliary fascia console.

16. Remove 2 fixing screws (arrow) from upper part of auxiliary fascia console.



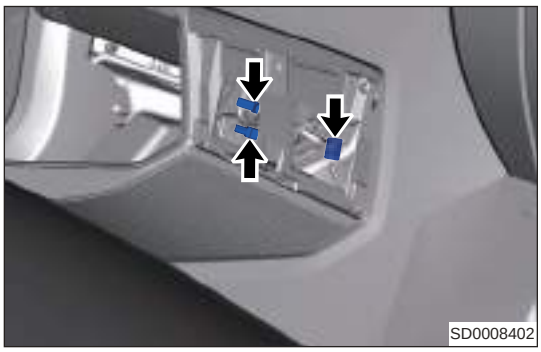
17. Remove the rubber pad (arrow) from center armrest box.

18. Remove 2 fixing bolts (arrow) from center armrest box.



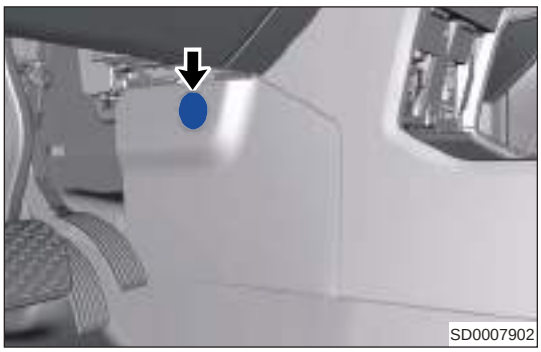
19. Remove storage box block cover (arrow) carefully with a small flathead screwdriver.

20. Disconnect 3 wire harness connectors (arrow) from storage box block cover.

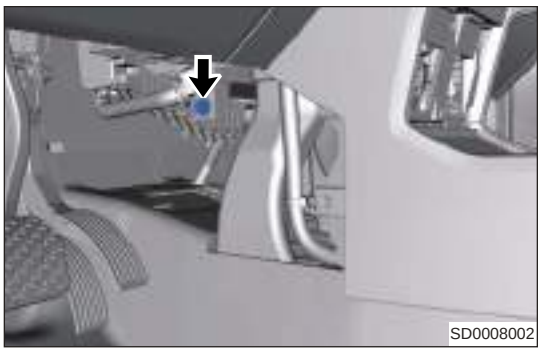


21. Remove 2 fixing screws (arrow) from lower part of auxiliary fascia console.

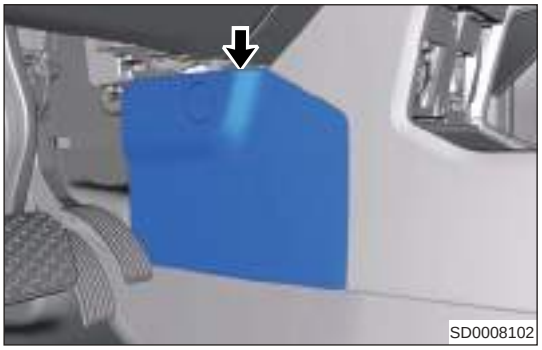
22. Remove the front left end cover plate block cover (arrow) carefully with a small flathead screwdriver.



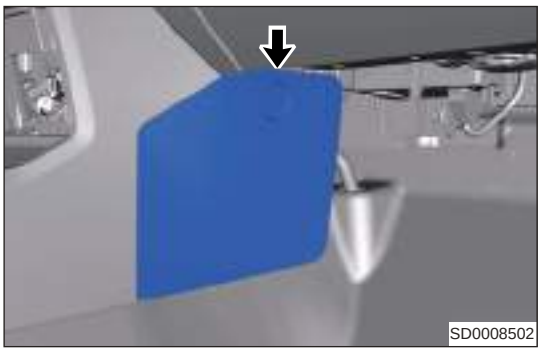
23. Remove 1 fixing bolt (arrow) from the auxiliary fascia console front left end cover plate.



24. Remove the auxiliary fascia console front left end protector (arrow).



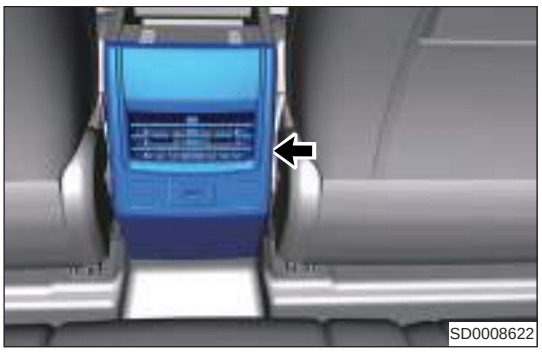
25. Remove the auxiliary fascia console front right end cover plate (arrow).



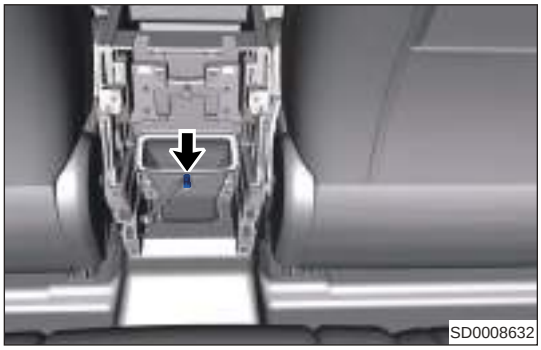
26. Remove 1 fixing bolt (arrow) from the auxiliary fascia console front left end (same to the right).

27. Remove 1 fixing screw from the center left part of auxiliary fascia console (same to the right).

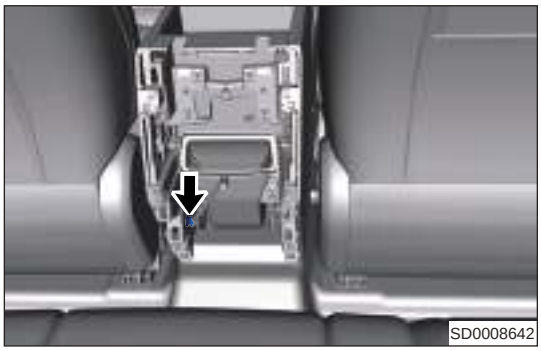
28. Using an interior crow plate, carefully remove he auxiliary fascia console rear panel assembly (arrow).



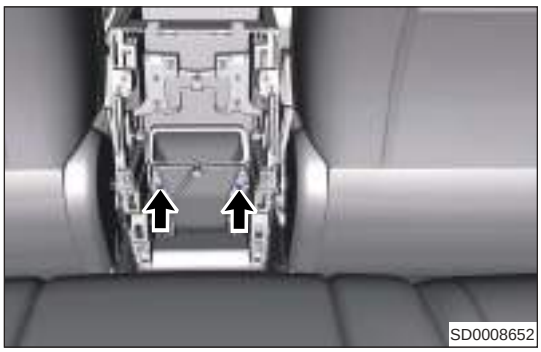
29. Disconnect 1 wire harness connector (arrow) from auxiliary fascia console rear panel assembly, and remove the auxiliary fascia console rear panel assembly.



30. Remove 1 wire harness clips (arrow) with interior crow plate.



31. Remove 2 fixing screws (arrow) from the rear part of rear face air duct assembly.



32. Remove the rear part of rear face air duct assembly.
33. Remove the auxiliary fascia console assembly.

Inspection

1. Inspect if front bracket of auxiliary fascia console is deformed and corroded.
2. Inspect if auxiliary fascia console has abnormal scratches.

Installation

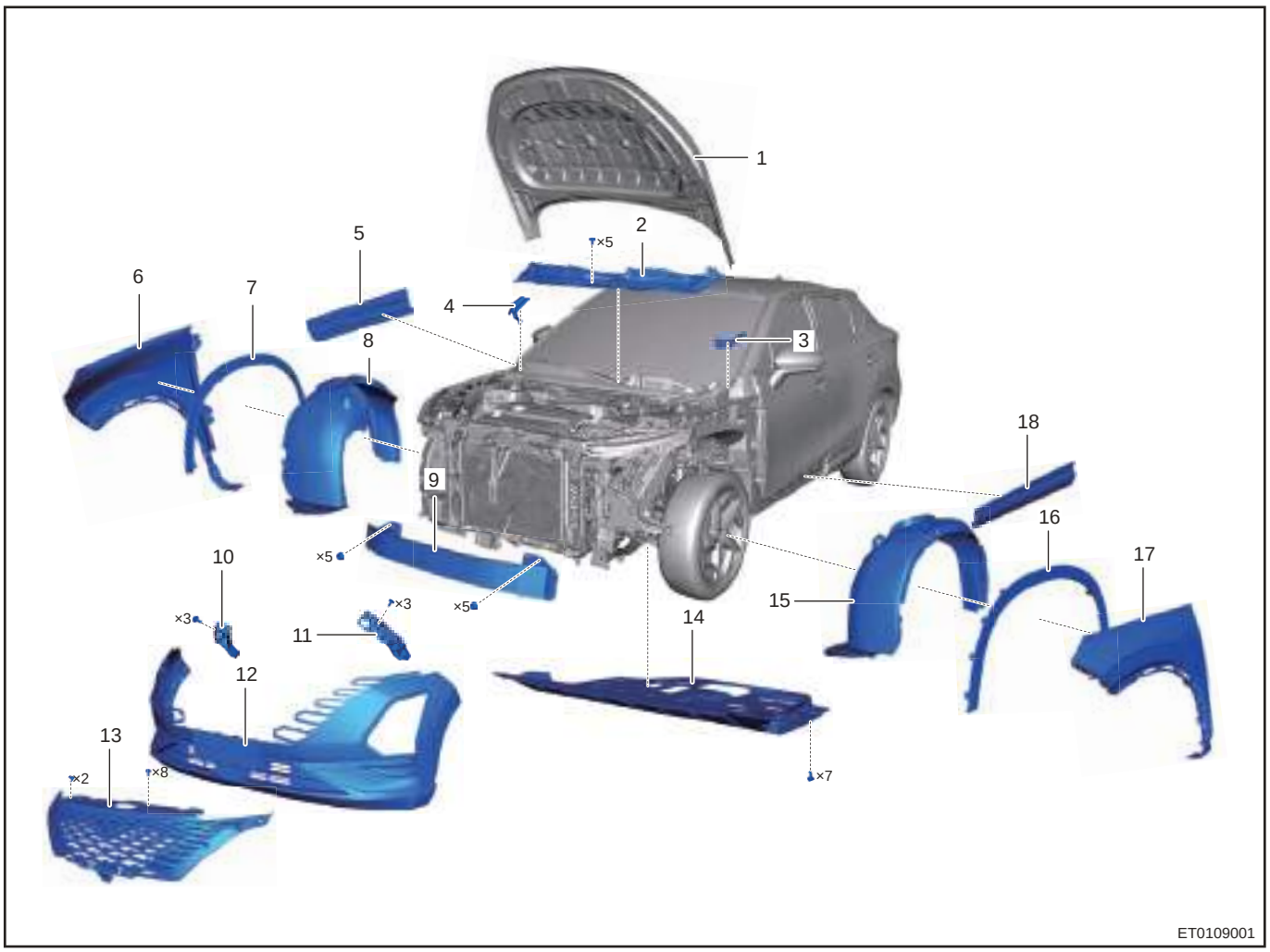
1. Assembly is in the reverse order of disassembly.

EXTERIOR

GENERAL INFORMATION

Description

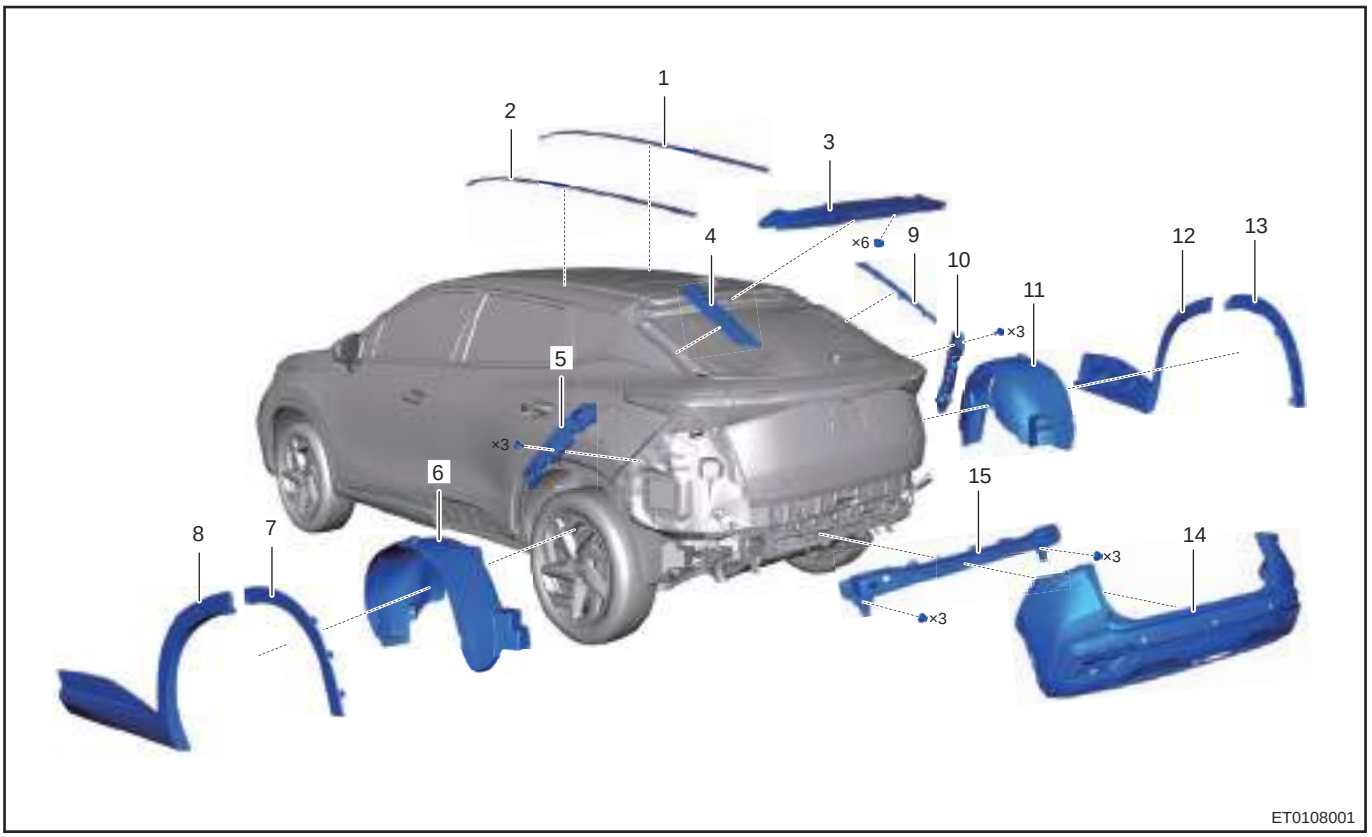
Front View



1	Engine Hood Assembly	10	Front Bumper Right Bracket
2	Front Windshield Lower Support Assembly	11	Front Bumper Left Bracket
3	Front Windshield Lower Trim Panel Left Cover Plate	12	Front Bumper Assembly
4	Front Windshield Lower Trim Panel Right Cover Plate	13	Radiator Grille Assembly
5	Front Right Door Trim Panel Assembly	14	Engine Lower Protector
6	Right Wing	15	Front Left Wheel House Protector Assembly

7	Front Right Wheel Arch Ornament Assembly	16	Front Left Wheel Arch Ornament Assembly
8	Front Right Wheel House Protector Assembly	17	Left Wing
9	Front Impact Crossmember Assembly	18	Front Left Door Trim Panel Assembly

Rear View



1	Right Rack Body	9	Right D-pillar Trim Board Assembly
2	Left Rack Body	10	Rear Bumper Right Mounting Bracket
3	Spoiler Assembly	11	Rear Right Wheel House Protector Assembly
4	Left D-pillar Trim Board Assembly	12	Rear Right Door Trim Panel Assembly
5	Rear Bumper Left Mounting Bracket	13	Rear Right Wheel Arch Ornament Assembly
6	Rear Left Wheel House Protector Assembly	14	Rear Bumper Body Assembly
7	Rear Left Wheel Arch Ornament Assembly	15	Rear Bumper Crossmember Body
8	Rear Left Door Trim Board Assembly		

Bumper assembly and bumper crossmember assembly are safety device to protect the front and rear body, which mainly absorb and reduce outside shock.

Exterior mainly consists of front bumper assembly, front bumper mounting bracket, front bumper crossmember assembly, grille, front wheel house protector, front wheel arch, wing assembly, wing trim panel assembly, side skirt protector assembly, door trim panel assembly, engine lower protector, rear bumper assembly, rear bumper mounting bracket, rear bumper bracket, rear bumper crossmember assembly, rear wheel house protector, front windshield lower support assembly, fuel filler cap assembly, fuel tank spoiler, D-pillar protector assembly, roof rack assembly, spoiler, etc.

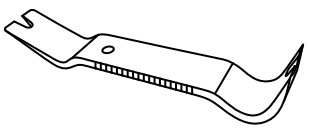
Specifications

Torque Specifications

Description	Torque (N·m)
Front Wheel Arch Fixing Screw	1.5 ± 0.5
Front Bumper Fixing Screw	1.5 ± 0.5
Front Bumper Fixing Bolt	5 ± 1
Radiator Grille Fixing Screw	1.5 ± 0.5
Front Camera Fixing Screw	1.5 ± 0.5
Front Bumper Bracket Fixing Bolt	5 ± 1.0
Front Bumper Crossmember Assembly Fixing Nut	48 ± 7.0
Front Windshield Lower Support Fixing Screw	1.5 ± 0.5
Wing Assembly Fixing Bolt	6 ± 1.0
Rear Spoiler Fixing Nut	5 ± 1
Engine Lower Protector Fixing Bolt	5 ± 1
Rear Wheel Arch Fixing Screw	1.5 ± 0.5

Tool

General Tool

Tool Name	Tool Drawing
Interior Crow Plate	 RCH0000006

ON-VEHICLE SERVICE

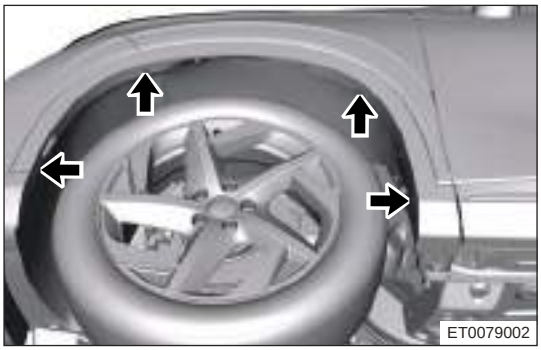
Front Bumper Assembly

Removal

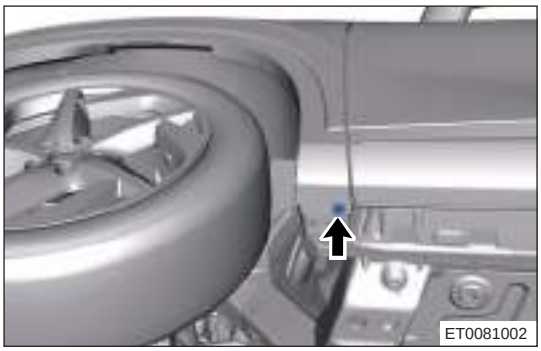
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing front bumper assembly.
- Appropriate force should be applied, when removing front bumper assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing front bumper assembly.
- Avoid breaking claws, when disassembling front bumper assembly.

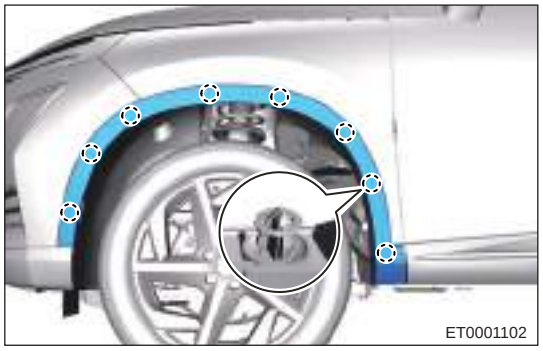
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove front left wheel arch assembly (take left side as an example).
   a. Remove 4 fixing screws (arrow) from upper side of front wheel arch.
      Tightening torque: 1.5 ± 0.5 N·m



   b. Remove 1 snap fasteners (arrow) from lower side of front wheel arch.



c. Using an interior crow plate, pry off fixing clip from rear left wheel arch.



d. Remove the front left wheel arch assembly.

4. Remove the front bumper assembly.

a. Remove fixing screw (arrow) from left side of front bumper.

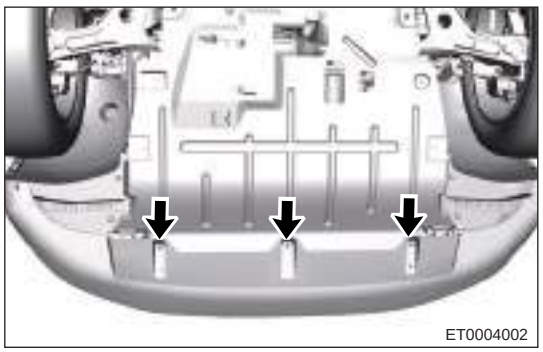
Tightening torque: 1.5 ± 0.5 N • m

b. Remove fixing screw (arrow) from right side of front bumper.

Tightening torque: 1.5 ± 0.5 N • m

c. Raise the vehicle to a proper position, remove 3 fixing bolts (arrow) from the lower part of front bumper assembly and engine lower protector.

Tightening torque: 5 ± 1 N • m

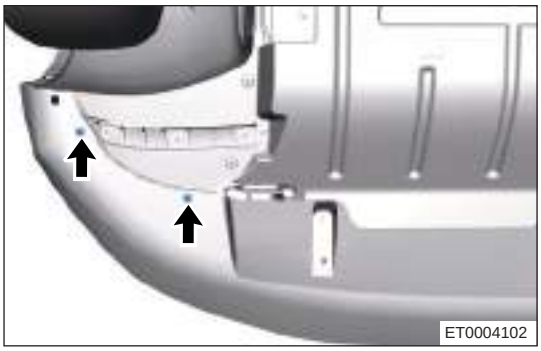


d. Remove 2 fixing screws (arrow) from lower part of front left wheel house protector.

Tightening torque: 1.5 ± 0.5 N • m

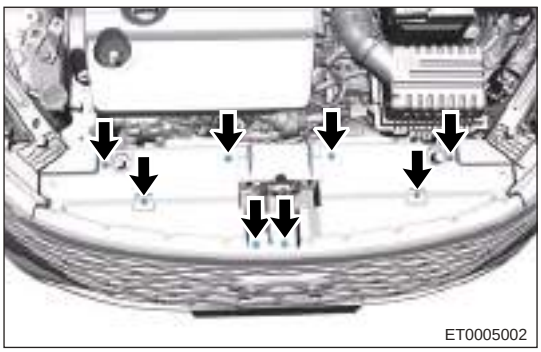
e. Remove 2 fixing screws (arrow) from lower part of front right wheel house protector.

Tightening torque: 1.5 ± 0.5 N • m



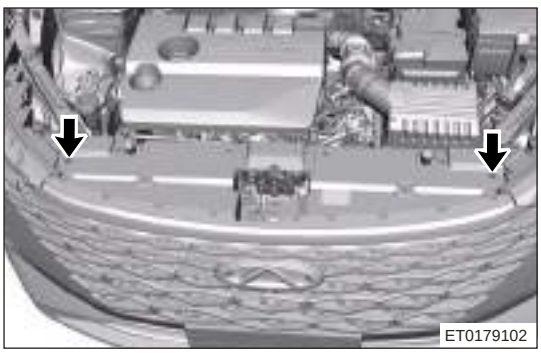
f. Remove 8 fixing bolts (arrow) from upper part of front bumper.

Tightening torque: 5 ± 1.0 N • m

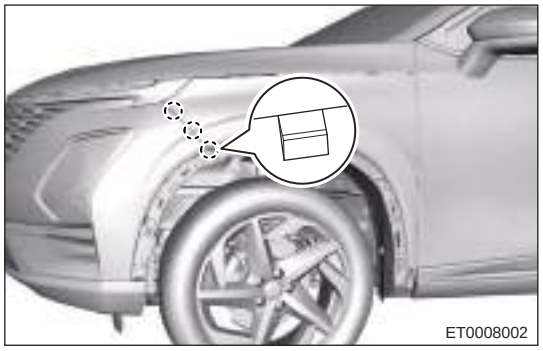


g. Remove 2 fixing screws (arrow) from upper part of front bumper.

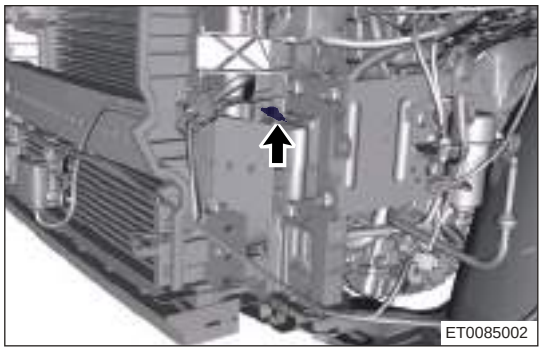
Tightening torque: 1.5 ± 0.5 N • m



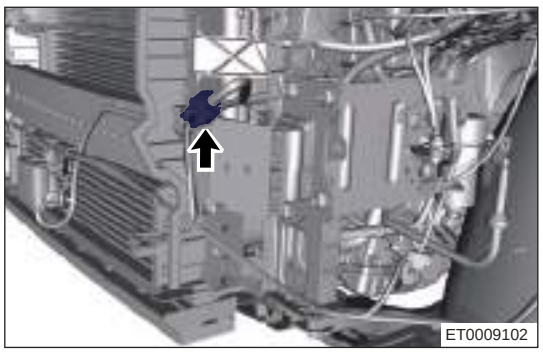
h. Disengage the claws from front bumper assembly (-take left side as an example).



i. Disconnect wire harness connector (arrow) from front camera.



j. Disconnect wire harness connector (arrow) from front bumper radar assembly.



k. Remove the front bumper assembly.

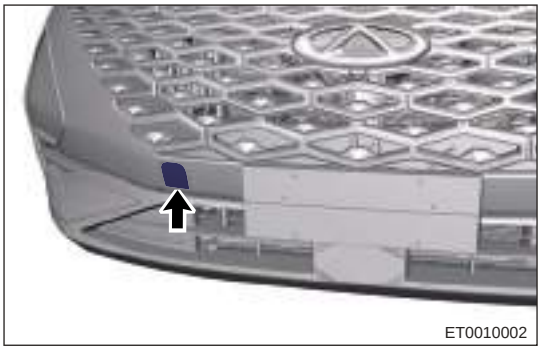
Disassembly

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when disassembling front bumper assembly.
- Appropriate force should be applied, when disassembling front bumper assembly. Be careful not to operate roughly.
- Avoid breaking claws, when disassembling front bumper assembly.

1. Remove the front bumper towing hook cover.

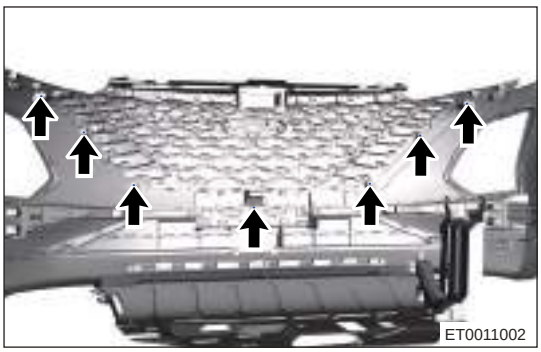
a. Using a screwdriver wrapped with protective tape, pry off front bumper towing hook cover (arrow).



b. Remove the front bumper towing hook cover.

2. Remove the radiator grille assembly.

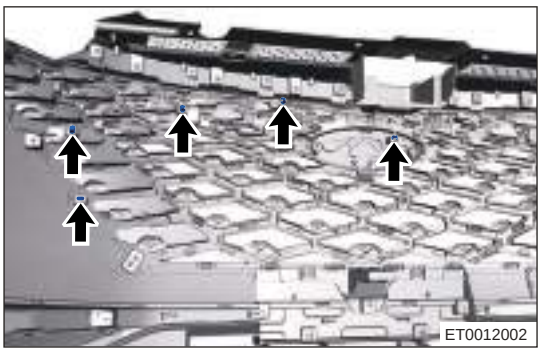
a. Remove 7 fixing screws (arrow) from radiator grille.
Tightening torque: 1.5 ± 0.5 N • m



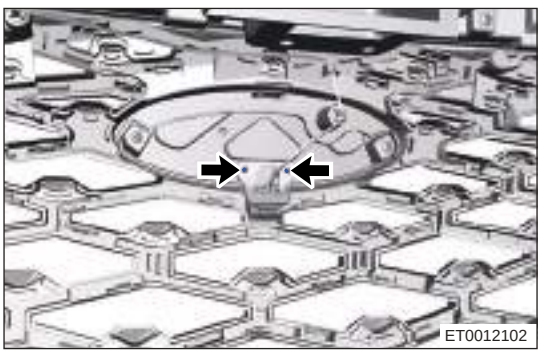
b. Using an interior crow plate, carefully pry off clip from radiator grille and remove radiator grille.

3. Remove the front camera assembly.

a. Using an interior crow plate, pry off fixing clips (-arrow) from front camera wire harness assembly.
Tightening torque: 1.5 ± 0.5 N • m



b. Remove 2 fixing screws (arrow) from front camera.
Tightening torque: 1.5 ± 0.5 N • m



c. Remove the front camera assembly.

Assembly

1. Assembly is in the reverse order of disassembly.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when assembling front bumper assembly.
- Try to prevent front bumper assembly paint surface from being scratched, when assembling front bumper assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when installing front bumper assembly.
- Try to prevent body paint surface from being scratched, when installing front bumper assembly.
- Make sure that front bumper is installed correctly and fitting clearance between front bumper and body is appropriate, when installing front bumper assembly.

Front Bumper Left Bracket

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

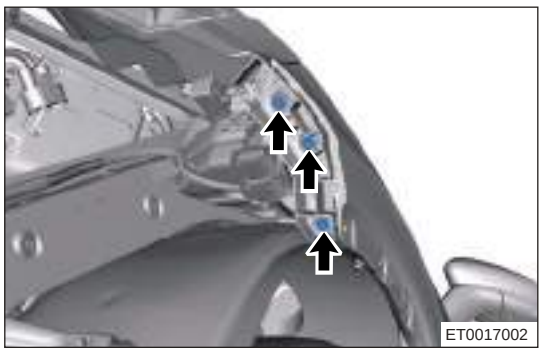
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing front bumper left bracket.
- Try to prevent body paint surface from being scratched, when removing front bumper left bracket.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the front bumper left bracket.

   a. Remove 3 fixing bolts (arrow) from front bumper left bracket.

      Tightening torque: 5 ± 1.0 N·m



b. Remove the front bumper left bracket.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution
• Be sure to wear necessary safety equipment to prevent accidents, when installing front bumper left bracket. • Try to prevent body paint surface from being scratched, when installing front bumper left bracket.

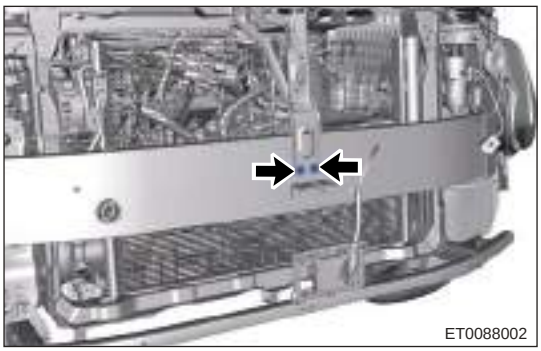
Front Bumper Crossmember Assembly

Removal

⚠ Caution
• Be sure to wear necessary safety equipment to prevent accidents, when removing front bumper crossmember assembly. • Try to prevent body paint surface from being scratched, when removing front bumper crossmember assembly.

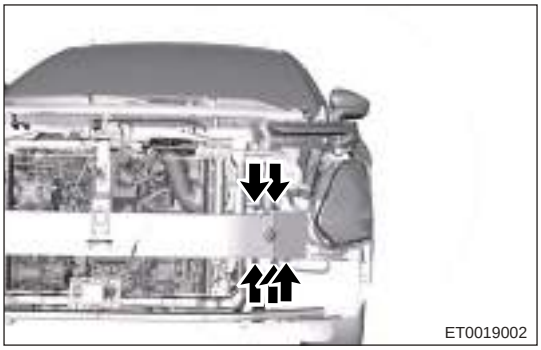
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the front bumper crossmember assembly.

a. Remove 2 fixing bolts (arrow) from front bumper crossmember assembly.


ET0088002

b. Remove 5 fixing nuts (arrow) from right side of front bumper crossmember assembly.

Tightening torque: 48 ± 7.0 N·m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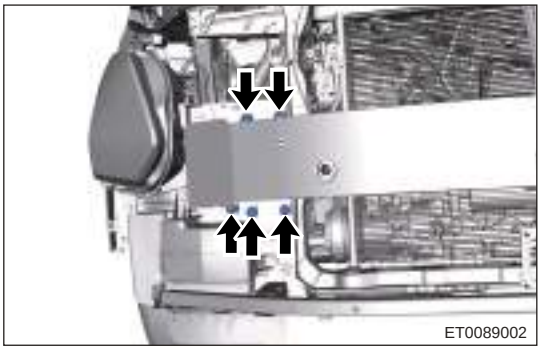
c. Remove 5 fixing nuts (arrow) from left side of front bumper crossmember assembly.

Tightening torque: 48 ± 7.0 N • m



d. Remove the front bumper crossmember assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when installing front bumper crossmember assembly.
- Try to prevent body paint surface from being scratched, when installing front bumper crossmember assembly.
- There should be no looseness, shaking and deformation, after installing front bumper crossmember assembly.

Air Deflector (Upper, Left and Right)

Removal

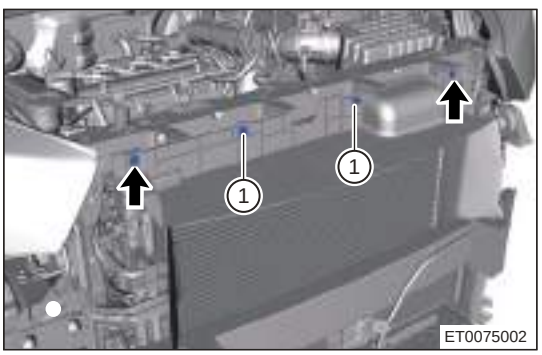
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing air deflector.
- Try to prevent body paint surface from being scratched, when removing air deflector.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the upper air deflector assembly.

a. Remove 2 fixing bolts (arrow) and 2 plastic clips (1) from upper air deflector.

Tightening torque: 5 ± 1.0 N • m

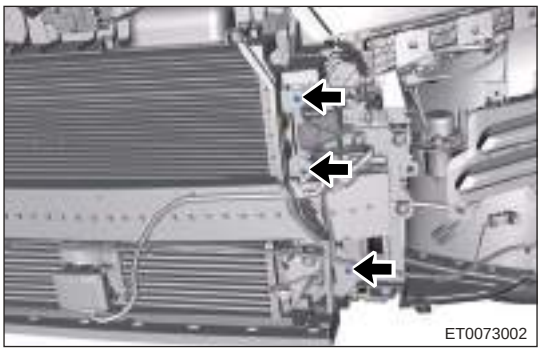


b. Remove the front upper air deflector assembly.

5. Remove the front left air deflector assembly (removal produces for left and right are same).

a. Remove 3 fixing bolts (arrow) from front left air deflector.

Tightening torque: 1.5 ± 0.5 N·m



b. Remove the front left air deflector assembly.

Installation

1. Installation is in the reverse order of removal.

Front Wheel House Protector

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

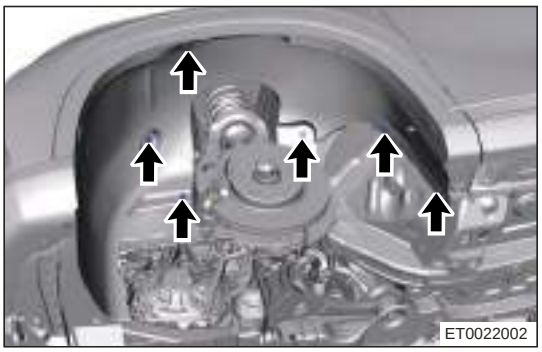
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing front wheel house protector.
- Try to prevent body paint surface from being scratched, when removing front wheel house protector.

1. Remove the front left wheel arch assembly.

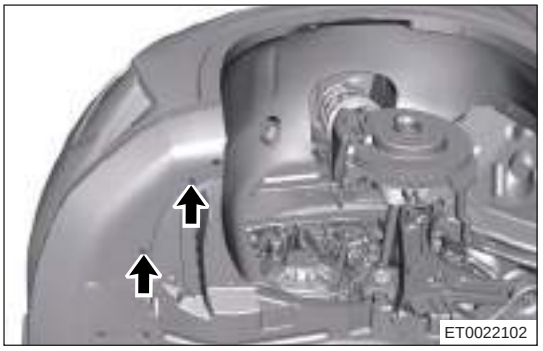
2. Remove the front left wheel house protector.

a. Remove 6 plastic snap fasteners (arrow) from upper part of front wheel house protector.



b. Remove 2 fixing screws (arrow) from lower part of front wheel house protector.

Tightening torque: 1.5 ± 0.5 N • m



c. Remove the front wheel house protector.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when installing front wheel house protector assembly.
- Try to prevent body paint surface from being scratched, when installing front wheel house protector assembly.

Front Windshield Lower Support Assembly

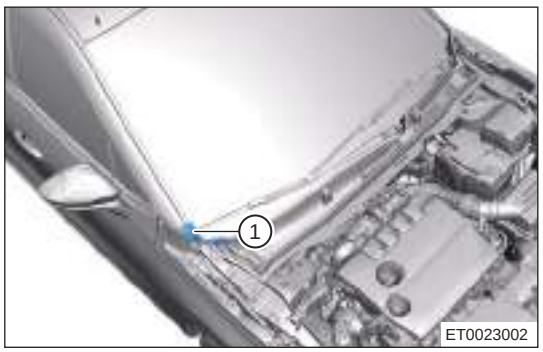
Removal

⚠ Caution

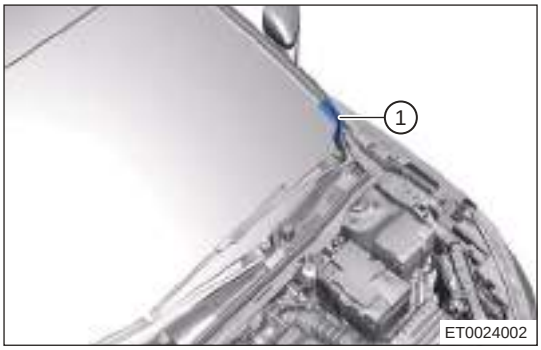
- Be sure to wear safety equipment to prevent accidents, when removing front windshield lower support assembly.
- Try to prevent body paint surface from being scratched, when removing front windshield lower support assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front wiper arm assembly.
4. Remove the front windshield lower trim board assembly.

a. Using a screwdriver wrapped with protective tape, pry off claw from front windshield lower trim board right cover plate, and remove front windshield lower trim board right cover plate (1).

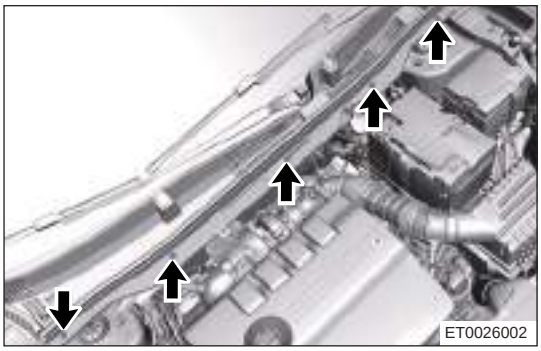


b. Using a screwdriver wrapped with protective tape, pry off claw from front windshield lower trim board left cover plate, and remove front windshield lower trim board left cover plate (1).



c. Remove 5 fixing screws (arrow) from front windshield lower trim board assembly.

Tightening torque: 1.5 ± 0.5 N • m



d. Disconnect front washer pipe 1 and remove front windshield lower trim board assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when installing front windshield lower support assembly.
- Try to prevent body paint surface from being scratched, when installing front windshield lower support assembly.

Wing Assembly

Removal

⚠ Caution

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

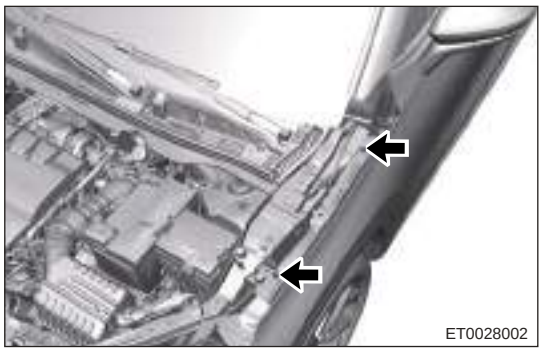
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing wing assembly.
- Try to prevent body paint surface from being scratched, when removing wing assembly.

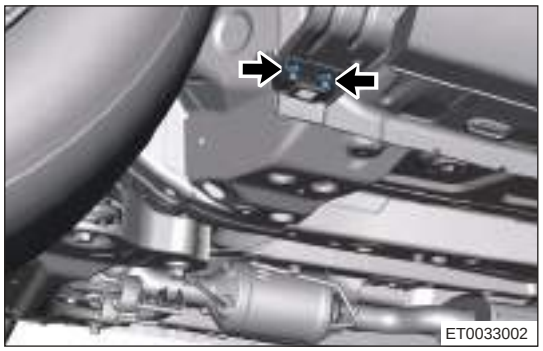
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left wheel arch assembly.

4. Remove the front bumper assembly.
5. Remove the left headlight assembly.
6. Remove the front left whee house assembly.
7. Remove the front left bumper bracket.
8. Remove the left wing assembly.

a. Remove 2 fixing bolts (arrow) between the upper part of wing assembly and the body.
   Tightening torque: 6 ± 1.0 N • m



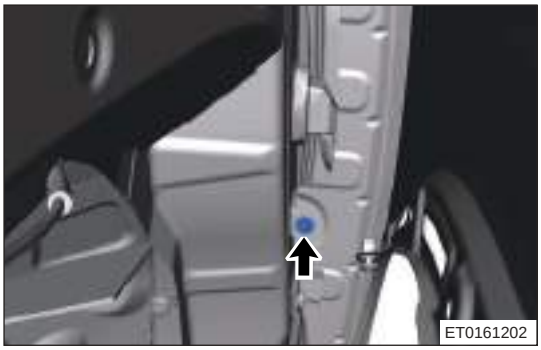
b. Remove 2 fixing bolts (arrow) between the lower part of wing assembly and the body.
   Tightening torque: 6 ± 1.0 N • m



c. Remove 1 fixing bolt (arrow) between the rear part of wing assembly and body.
   Tightening torque: 6 ± 1.0 N • m

d. Remove 1 fixing bolt (arrow) between the rear part of wing assembly and body.

Tightening torque: 6 ± 1.0 N • m



e. Remove the wing assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when installing front wing.
- Try to prevent body paint surface from being scratched, when installing front wing.
- Make sure that front wing is installed correctly and fitting clearance between front wing and body is appropriate, when installing front wing.

Roof Rack

Removal

Hint:

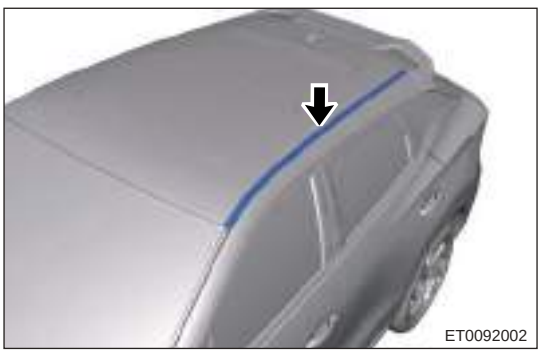
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing roof rack.
- Try to prevent body paint surface from being scratched, when removing roof rack.

1. Remove the roof rack.

a. Using an interior crow plate, carefully pry up roof rack (arrow).



Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when installing roof rack assembly.
- Try to prevent body paint surface from being scratched, when installing roof rack assembly.
- When installing, make sure that there is no clearance between the rubber pad of roof rack and quarter, roof. Pay attention to the alignment of clearance between rubber pad and roof.

Rear Spoiler Assembly

Removal

⚠ Caution

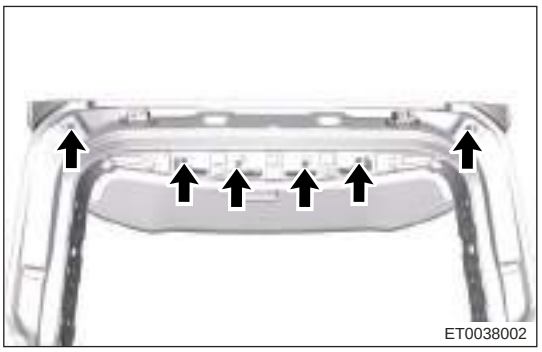
- Be sure to wear safety equipment to prevent accidents, when removing rear spoiler assembly.
- Try to prevent body paint surface from being scratched, when removing rear spoiler assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the back door left/right protector assembly.
4. Remove the rear spoiler assembly.

   a. Using an interior crow plate, pry off trim covers (-arrow) from rear spoiler.

   b. Remove 6 fixing nuts (arrow) from rear spoiler assembly.

      Tightening torque: 5 ± 1 N • m



c. Disconnect wire harness connector (arrow) from high mounted stop light.

d. Remove the rear spoiler assembly (1).

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when installing rear spoiler assembly.
- Try to prevent body paint surface from being scratched, when installing rear spoiler assembly.

Engine Lower Protector Assembly

Removal

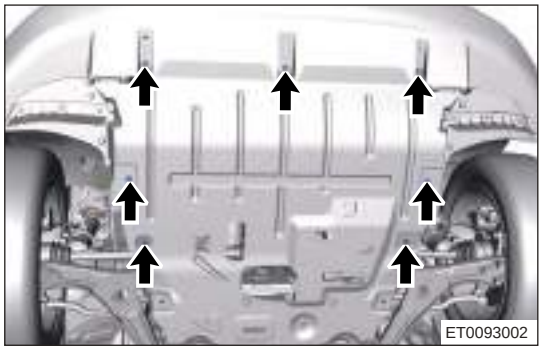
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing engine lower protector assembly.
- Try to prevent body paint surface from being scratched, when removing engine lower protector assembly.

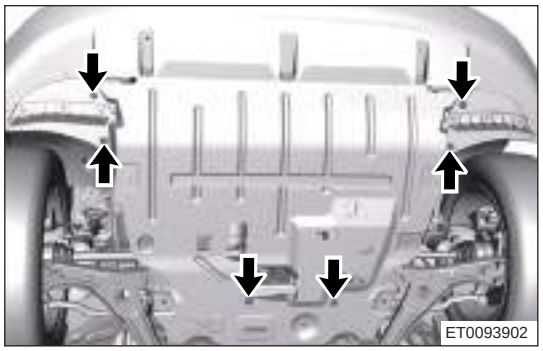
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the engine lower protector assembly.

a. Remove 7 fixing bolts (arrow) from engine lower protector assembly.

Tightening torque: 5 ± 1.0 N • m



b. Remove 6 fixing snap fasteners (arrow) from engine lower protector assembly.



c. Remove the engine lower protector assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when installing engine lower protector assembly.
- Try to prevent body paint surface from being scratched, when installing engine lower protector assembly.

Rear Bumper Assembly

Removal

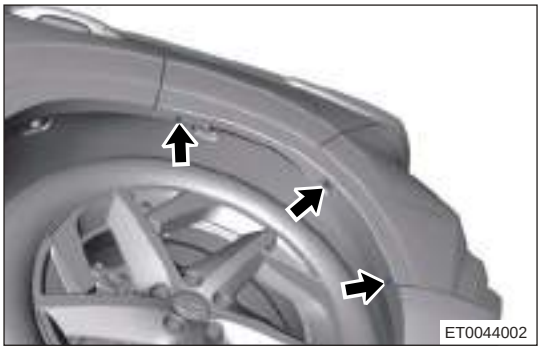
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing rear bumper assembly.
- Appropriate force should be applied, when removing rear bumper assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing rear bumper assembly.

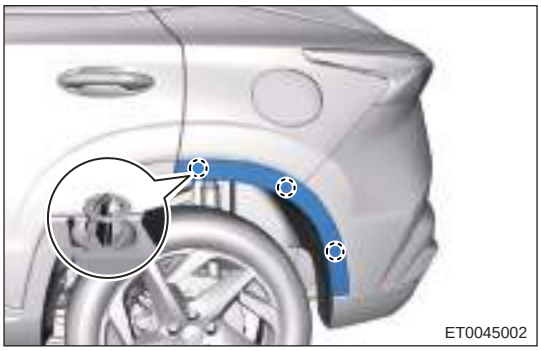
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear combination light (fixed part).
4. Remove rear left wheel arch assembly (take left side as an example).

a. Remove 3 fixing screws (arrow) from rear left wheel arch.

Tightening torque: 1.5 ± 0.5 N·m



b. Using an interior crow plate, pry off fixing clips from rear left wheel arch.

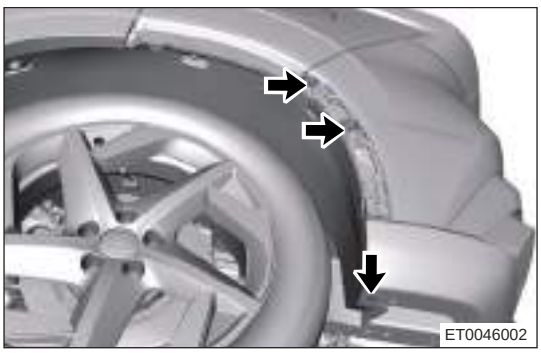


c. Remove the rear left wheel arch assembly.

5. Remove the rear bumper assembly.

a. Remove 3 fixing screws (arrow) from left side of rear bumper (take left side as an example).

Tightening torque: 1.5 ± 0.5 N·m



b. Remove 2 screw block covers (arrow) from rear bumper assembly and remove 2 fixing screws from the rear part of block cover.

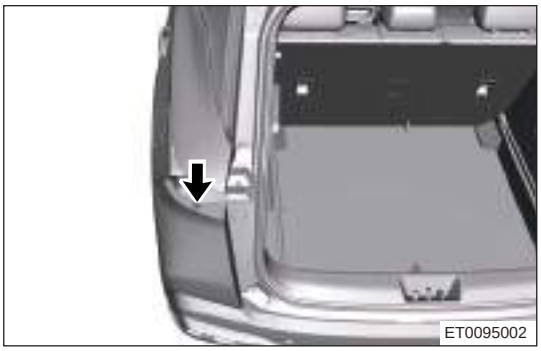
Tightening torque: 1.5 ± 0.5 N·m

c. Remove 2 fixing screws (arrow) from the rear bumper assembly.

Tightening torque: 1.5 ± 0.5 N • m

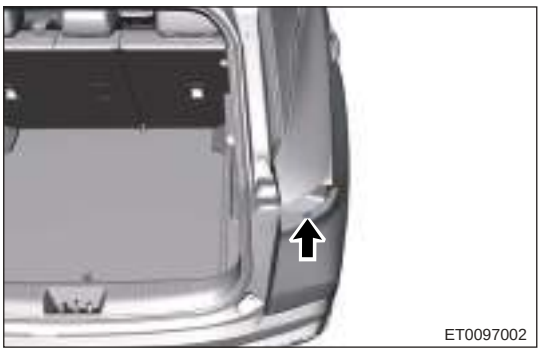
d. Remove 1 fixing bolt (arrow) from upper part of rear bumper assembly.

Tightening torque: 5 ± 1 N • m



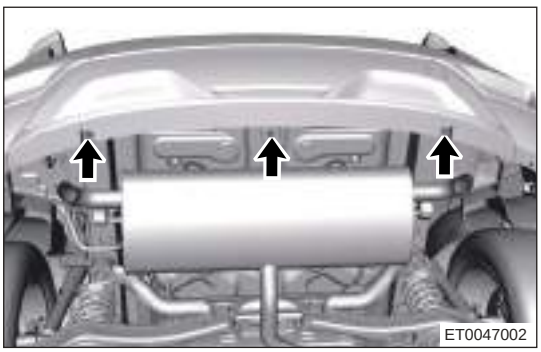
e. Remove 1 fixing bolt (arrow) from upper part of rear bumper assembly.

Tightening torque: 5 ± 1 N • m



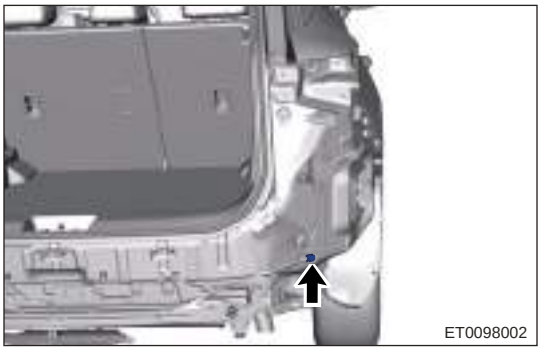
f. Remove 3 fixing bolts (arrow) from lower part of rear bumper assembly.

Tightening torque: 5 ± 1 N • m

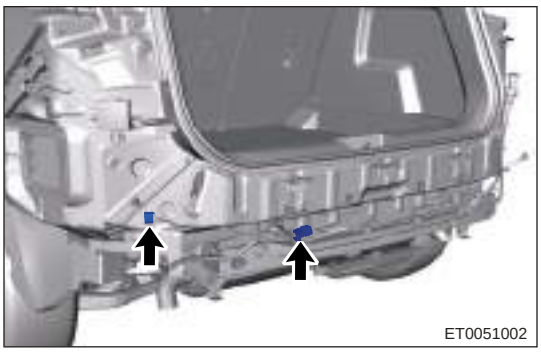


g. Disengage claws from rear bumper assembly (take left side as an example).

h. Disconnect wire harness connector (arrow) from rear bumper.



i. Disconnect wire harness connector (arrow) from rear bumper.



j. Remove the rear bumper assembly.

Disassembly

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when disassembling rear bumper assembly.
- Appropriate force should be applied, when disassembling rear bumper assembly. Be careful not to operate roughly.
- Avoid breaking claws, when disassembling rear bumper assembly.

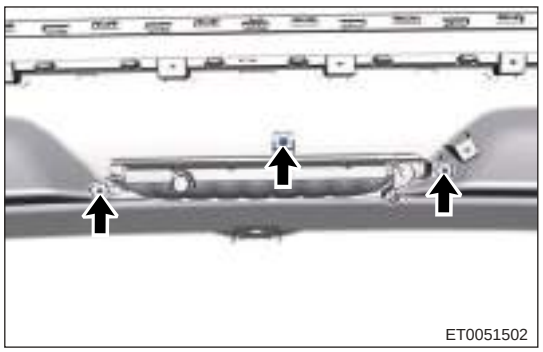
1. Remove the rear bumper towing hook cover.

a. Using a screwdriver wrapped with protective tape, pry off the claw from rear bumper towing hook cover.

b. Remove rear bumper towing hook cover from rear bumper assembly.

2. Remove the rear fog light (take left side as an example).

a. Remove 3 fixing screws (arrow) from rear fog light.
Tightening torque: 1.5 ± 0.5 N·m



b. Remove rear fog light from rear bumper assembly.

Assembly

1. Assembly is in the reverse order of disassembly.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when assembling rear bumper assembly.
- Try to prevent rear bumper assembly paint surface from being scratched, when assembling rear bumper assembly.

Installation

1. Assembly is in the reverse order of disassembly.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when installing rear bumper assembly.
- Try to prevent body paint surface from being scratched, when installing rear bumper assembly.
- Make sure that rear bumper is installed correctly and fitting clearance between rear bumper and body is appropriate, when installing rear bumper assembly.

Rear Bumper Mounting Bracket

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

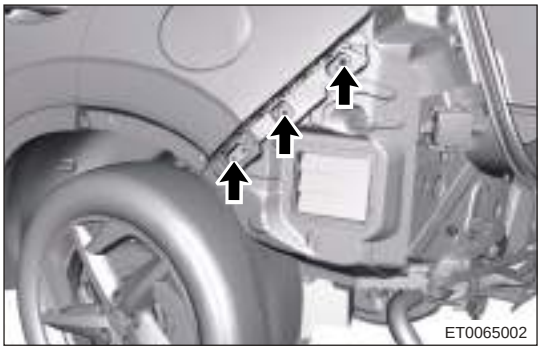
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing rear bumper mounting bracket.
- Try to prevent body paint surface from being scratched, when removing rear bumper mounting bracket.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear bumper assembly.
4. Remove the rear bumper left mounting bracket.

   a. Remove 3 fixing screws (arrow) from rear bumper mounting bracket.

      Tightening torque: 1.5 ± 0.5 N·m



   b. Remove the rear bumper left mounting bracket.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when installing rear bumper mounting bracket.
- Try to prevent body paint surface from being scratched, when installing rear bumper mounting bracket.

Rear Bumper Crossmember Assembly

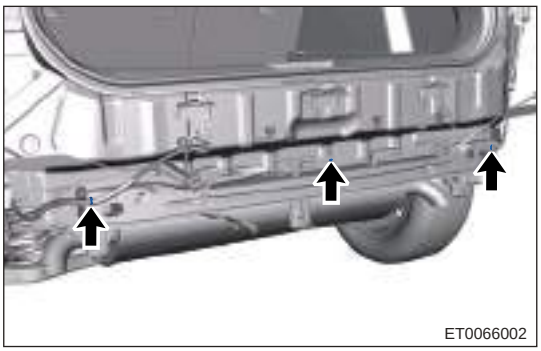
Removal

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing rear bumper crossmember assembly.
- Try to prevent body paint surface from being scratched, when removing rear bumper crossmember assembly.

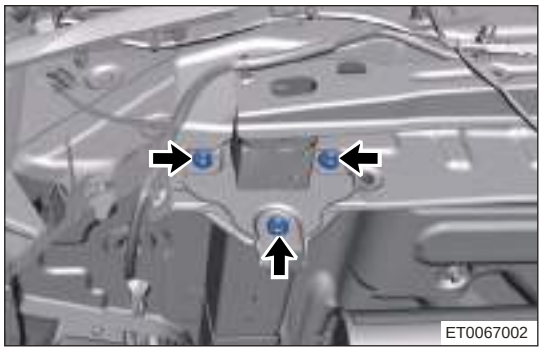
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear bumper assembly.
4. Remove the rear low frequency antenna.
5. Remove the rear bumper crossmember assembly.

   a. Remove fixing clips (arrow) from rear bumper crossmember upper wire harness.



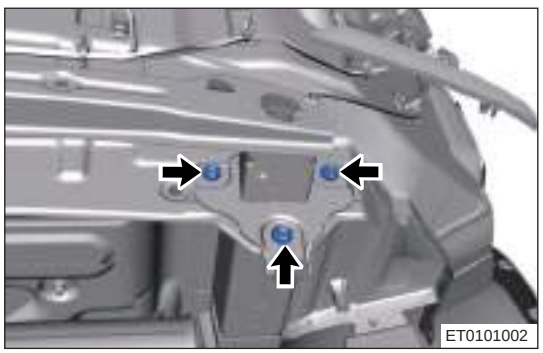
   b. Remove 3 fixing nuts (arrow) from left side of rear bumper crossmember assembly.

      Tightening torque: 25 ± 3.5 N • m



   c. Remove 3 fixing nuts (arrow) from right side of rear bumper crossmember assembly.

      Tightening torque: 25 ± 3.5 N • m



   d. Remove the rear bumper crossmember assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when installing rear bumper crossmember assembly.
- Try to prevent body paint surface from being scratched, when installing rear bumper crossmember assembly.
- There should be no looseness, shaking and deformation after installing rear bumper crossmember assembly.

Front Door Trim Panel Assembly

Removal

Hint:

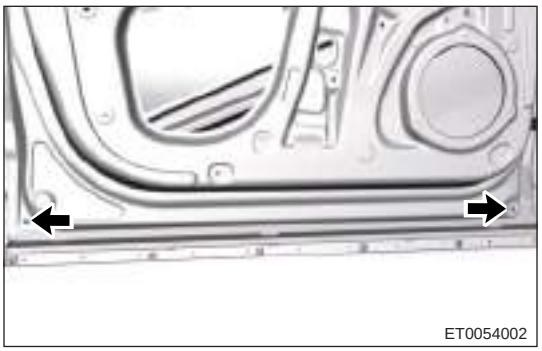
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

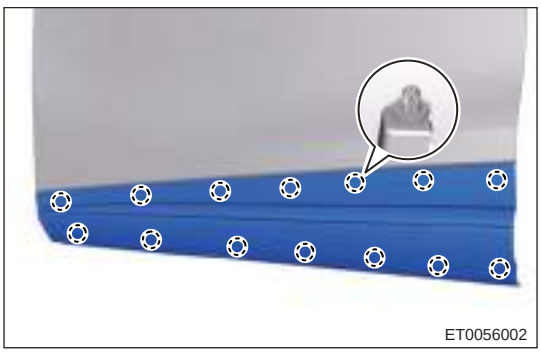
- Be sure to wear safety equipment to prevent accidents, when removing front door trim panel assembly.
- Try to prevent body paint surface from being scratched, when removing front door trim panel assembly.

1. Remove the front door trim panel assembly.

   a. Remove fixing screws (arrow) from front left door trim panel assembly.



   b. Using an interior crow plate, pry off fixing clips from front door trim panel assembly.



   c. Remove the front door trim panel assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when installing front door trim panel assembly.
- Try to prevent body paint surface from being scratched, when installing front door trim panel assembly.

Rear Door Trim Panel Assembly

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

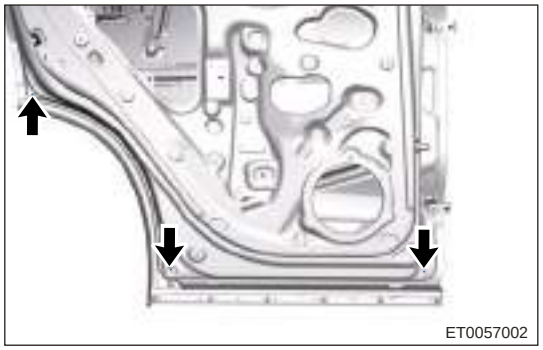
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing rear left door trim panel assembly.
- Try to prevent body paint surface from being scratched, when removing rear left door trim panel assembly.

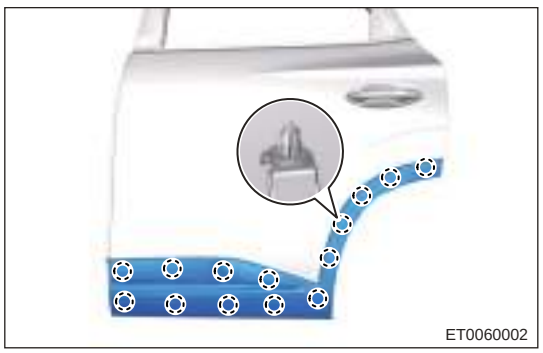
1. Remove the rear left door trim panel assembly.

   a. Remove fixing screws (arrow) from rear left door trim panel assembly.

      Tightening torque: 1.0 ± 0.2 N·m



   b. Using an interior crow plate, pry off fixing clips from rear left door trim panel assembly.



   c. Remove the rear left door trim panel assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when installing rear left door trim panel assembly.
- Try to prevent body paint surface from being scratched, when installing rear left door trim panel assembly.

Rear Wheel House Protector

Removal

Hint:

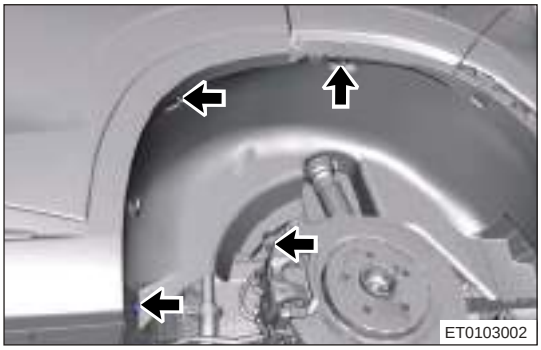
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

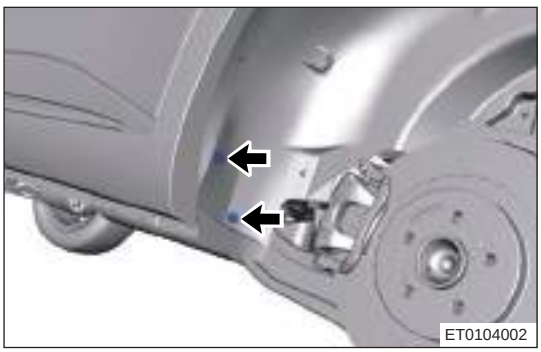
- Be sure to wear necessary safety equipment to prevent accidents, when removing rear left wheel house protector.
- Try to prevent body paint surface from being scratched, when removing rear left wheel house protector.

1. Remove the rear left wheel house protector assembly.

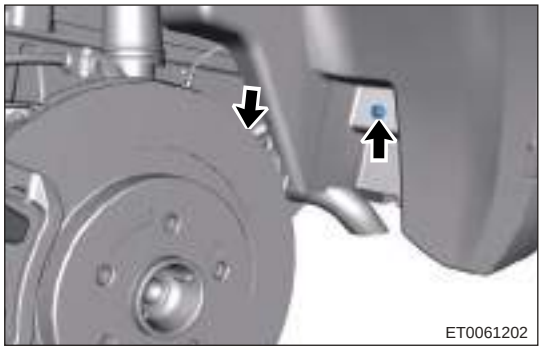
   a. Remove 4 plastic nuts (arrow) from rear left wheel house protector assembly.



   b. Remove 2 snap fasteners (arrow) from rear left wheel house protector assembly.



c. Remove 2 snap fasteners (arrow) from rear left wheel house protector assembly.



d. Remove the rear left wheel house protector assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when installing rear left wheel house protector.
- Try to prevent body paint surface from being scratched, when installing rear left wheel house protector.

D-pillar Trim Board Assembly

Removal

Hint:

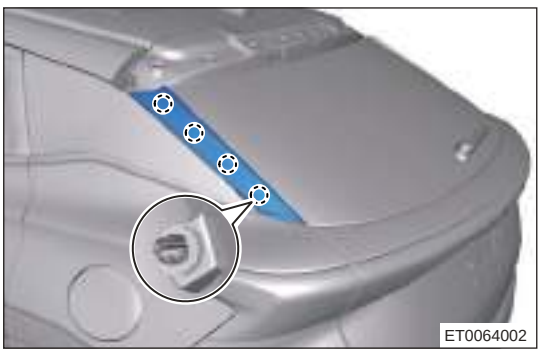
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing D-pillar trim board assembly.
- Try to prevent body paint surface from being scratched, when removing D-pillar trim board assembly.

1. Remove the rear spoiler assembly.
2. Remove the D-pillar trim board assembly.

a. Using an interior crow plate, pry off fixing clips from D-pillar trim board assembly.



b. Remove the D-pillar trim board assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when installing D-pillar trim board assembly.
- Try to prevent body paint surface from being scratched, when installing D-pillar trim board assembly.

Name Plate

Installation

1. Install "CHERY name plate (rear name plate)".

   a. Clean the places in which may be in contact with 3M glue. Do not allow any dirt or grease to remain, doing so may affect performance of 3M glue.

   b. Clean off release paper on the 3M double-sided tape around rear CHERY name plate, hands do not contact 3M double-sided tape.

   c. Clip CHERY dowel pin column into dowel pin hole mounted on name plate of back door decoration light assembly, apply a certain pressure (pressure: 3 kg/cm²), and prepress for 3 ".

⚠ Caution

- It is recommended to heat components when ambient temperature is below 15 ˚C (optimal range is 25 ˚C to 30 ˚C).
- Name plate can be exposed to the rain after it is pasted for 2 hours.

2. Install "CHERY".

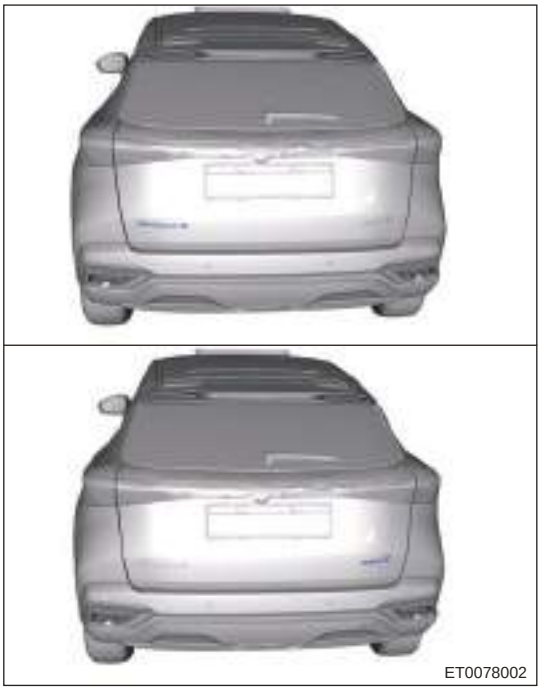
   a. Clean the places in which may be in contact with 3M glue. Do not allow any dirt or grease to remain, doing so may affect performance of 3M glue.

   b. Clean off release paper on the 3M double-sided tape around rear CAC name plate, hands do not contact 3M double-sided tape.

c. Install name plate to back door metal plate, apply a certain pressure (pressure: 3 kg/cm²), and prepress for 3 ".

⚠ Caution

- It is recommended to heat components when ambient temperature is below 15 ˚C (optimal range is 25 ˚C to 30 ˚C).
- Name plate can be exposed to the rain after it is pasted for 2 hours.



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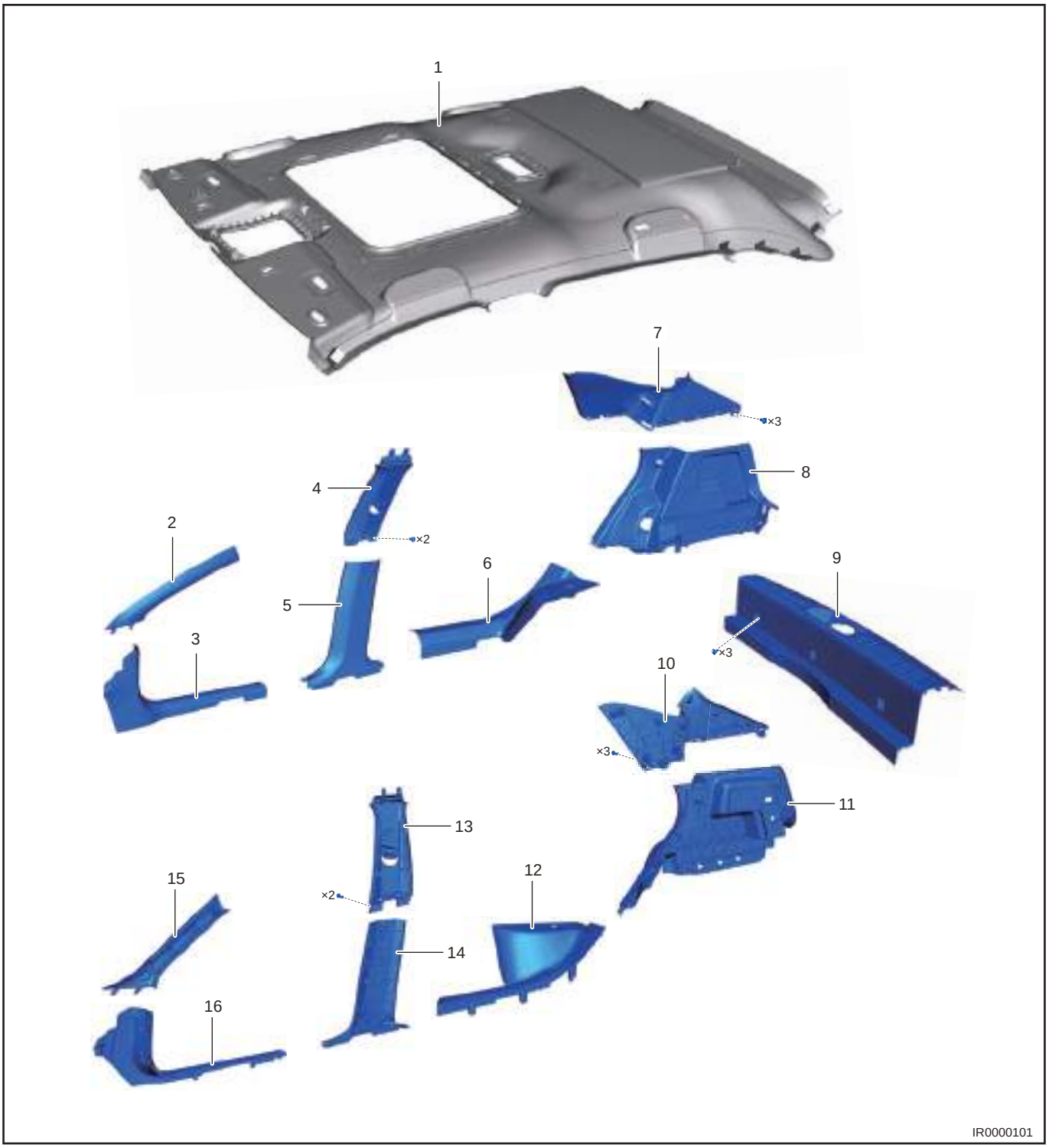
INTERIOR

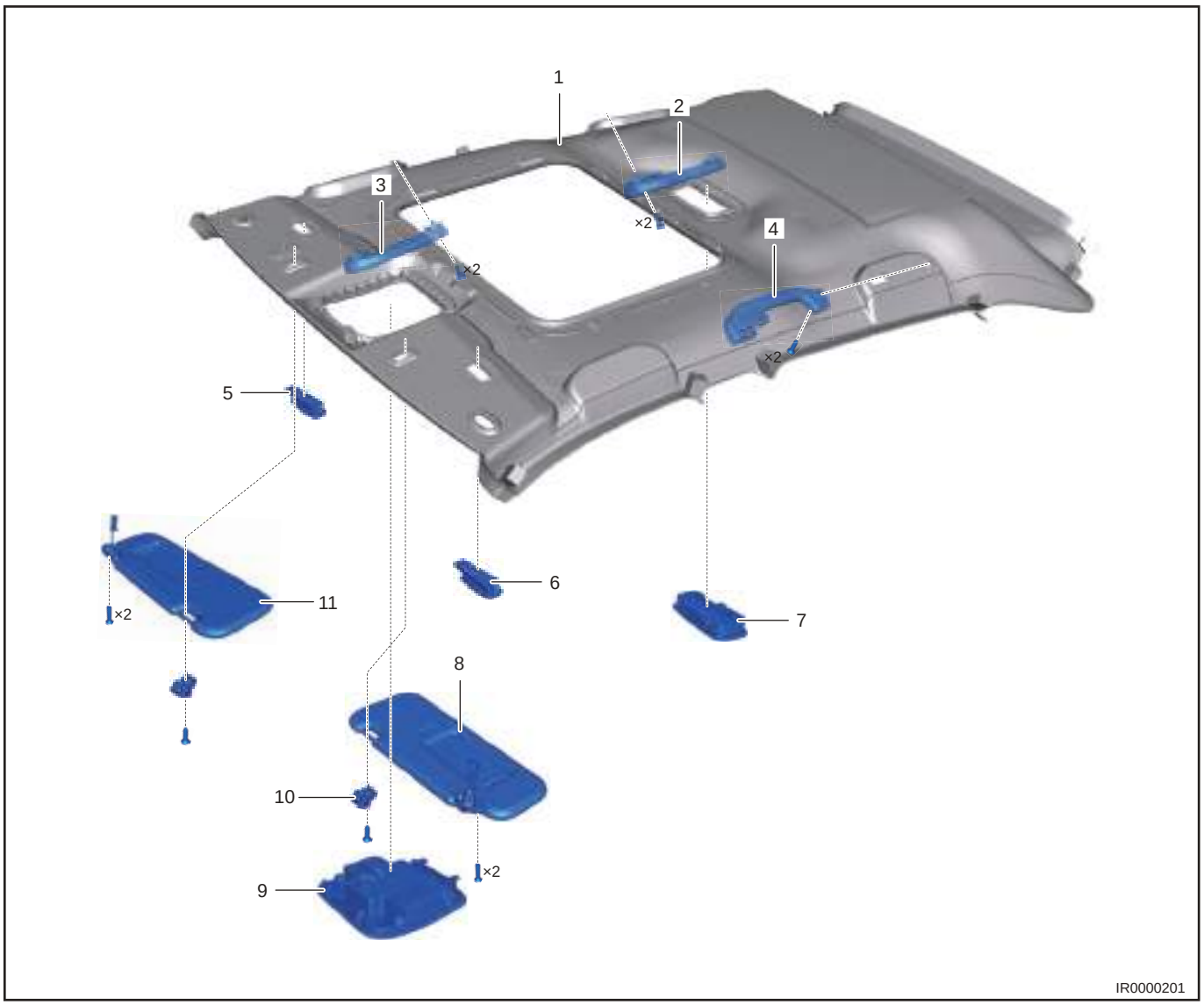
GENERAL INFORMATION

Description



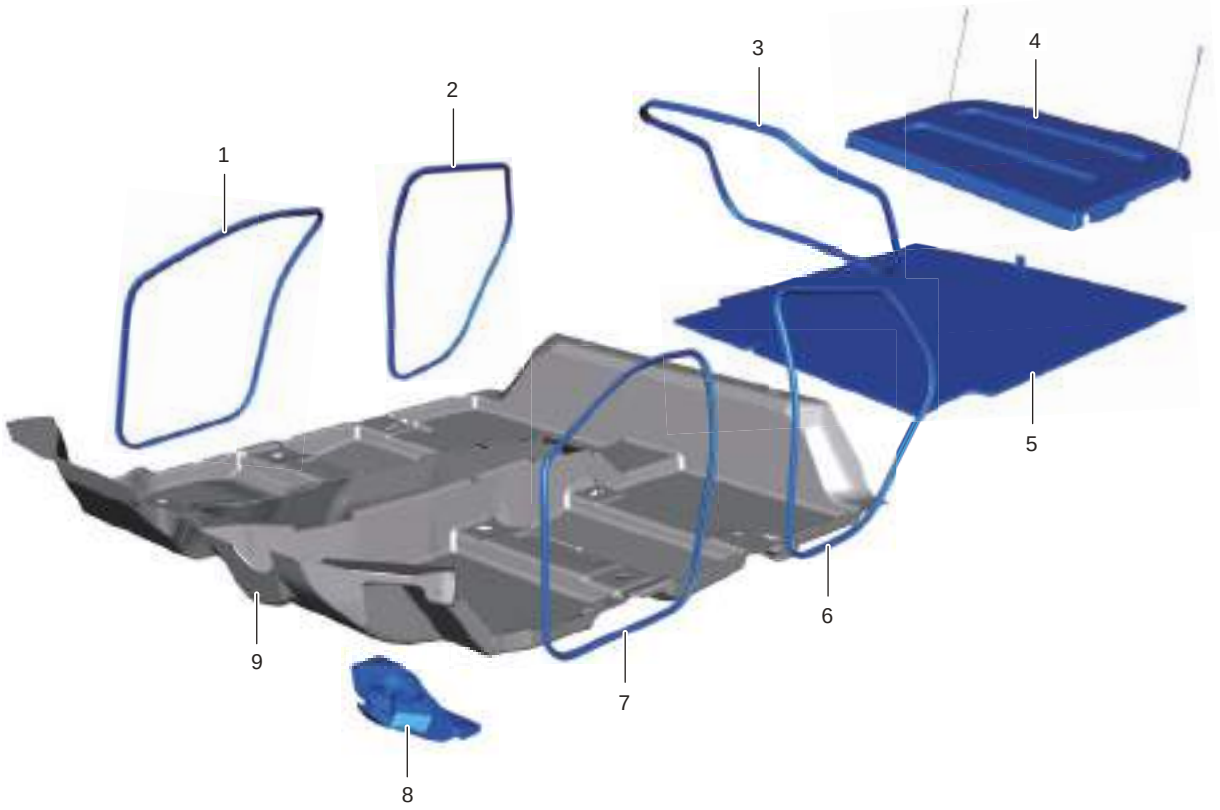
1	Roof Assembly	9	Back Doorsill Pressure Plate Assembly
2	Right A-pillar Upper Protector Assembly	10	Left C-pillar Upper Protector Assembly

3	Front Right Doorsill Pressure Plate Assembly	11	Left C-pillar Lower Protector Assembly
4	Right B-pillar Upper Protector Assembly	12	Rear Left Doorsill Pressure Plate Assembly
5	Right B-pillar Lower Protector Assembly	13	Left B-pillar Upper Protector Assembly
6	Rear Right Doorsill Pressure Plate Assembly	14	Left B-pillar Lower Protector Assembly
7	Right C-pillar Upper Protector Assembly	15	Left A-pillar Upper Protector Assembly
8	Right C-pillar Lower Protector Assembly	16	Front Left Doorsill Pressure Plate Assembly



1	Roof Assembly	7	Interior Dome Light Assembly
2	Rear Right Passenger Grip Assembly	8	Left Sun Visor Assembly
3	Passenger Grip Assembly	9	Interior Front Dome Light Assembly

4	Rear Left Passenger Grip Assembly	10	Holder B
5	Right Vanity Mirror Light	11	Right Sun Visor Assembly
6	Left Vanity Mirror Light		



1	Front Right Door Opening Weatherstrip	6	Rear Left Door Opening Weatherstrip
2	Rear Right Door Opening Weatherstrip	7	Front Left Door Opening Weatherstrip
3	Back Door Weatherstrip	8	Driver Side Foot Rest
4	Tonneau Cover Assembly	9	Front Carpet Assembly
5	Luggage Compartment Carpet Assembly		

Specifications

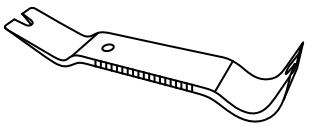
Torque Specifications

Description	Torque (N·m)
Front Seat Belt Assembly Lower Fixing Bolt	50 ± 5.0
B-pillar Upper Protector Assembly Fixing Screw	1.5 ± 0.5
C-pillar Upper Protector Assembly Fixing Screw	1.5 ± 0.5

Description	Torque (N·m)
C-pillar Lower Protector Assembly Fixing Screw	1.5 ± 0.5
Sun Visor Assembly Fixing Bolt	5 ± 1.0
Sun Visor Holder B Fixing Screw	2 ± 0.5
Passenger Grip Assembly Fixing Bolt	3 ± 0.5

Tool

General Tool

Tool Name	Tool Drawing
Interior Crow Plate	 RCH0000006

On-vehicle Service

Front Doorsill Pressure Plate Assembly

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing front doorsill pressure plate assembly.
- Appropriate force should be applied, when removing front doorsill pressure plate assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing front doorsill pressure plate assembly.

1. Remove the front left door opening weatherstrip.
2. Remove the front left doorsill pressure plate assembly.

a. Use an interior crow plate to pry off fixing clips from front left doorsill scuff plate.

b. Remove the front left doorsill pressure plate assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Replace damaged clips and install front doorsill pressure plate assembly in place, when installing front doorsill pressure plate assembly.
- Make sure that front doorsill pressure plate assembly is well fitted with B-pillar lower protector assembly and A-pillar lower protector assembly, after installing front doorsill pressure plate assembly.

Rear Doorsill Pressure Plate Assembly

Removal

Hint:

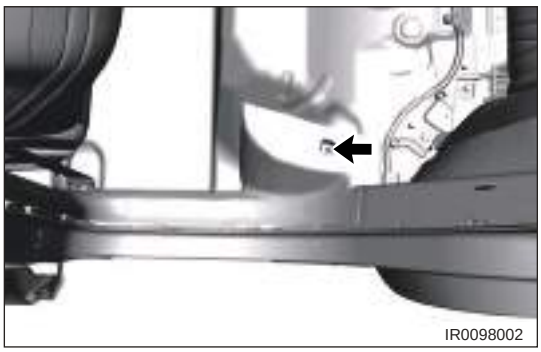
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

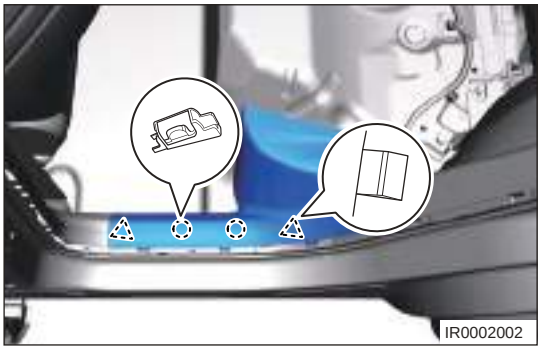
- Be sure to wear safety equipment to prevent accidents, when removing rear doorsill pressure plate assembly.
- Appropriate force should be applied, when removing rear doorsill pressure plate assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing rear doorsill pressure plate assembly.

1. Remove the rear left door opening weatherstrip.
2. Remove the rear left doorsill pressure plate assembly.
   a. Remove 1 fixing screw (arrow) from rear left doorsill pressure plate assembly.

      Tightening torque: 1.5 ± 0.5 N·m



b. Using an interior crow plate, pry off fixing clips from rear left doorsill pressure plate assembly.



c. Remove the rear left doorsill pressure plate assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Replace damaged clips and install rear doorsill pressure plate assembly in place, when installing rear doorsill pressure plate assembly.
- Make sure that rear doorsill pressure plate assembly is well fitted with B-pillar lower protector assembly and C-pillar lower protector assembly, after installing rear doorsill pressure plate assembly.

Back Doorsill Pressure Plate Assembly

Removal

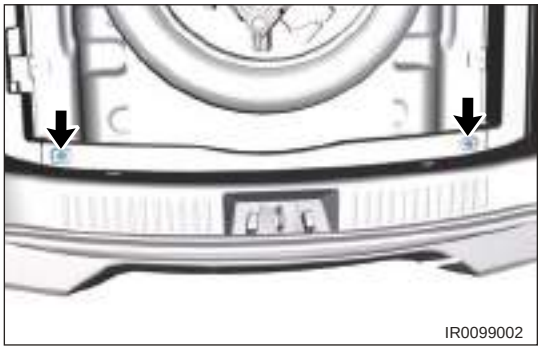
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing back doorsill pressure plate assembly.
- Appropriate force should be applied, when removing back doorsill pressure plate assembly. Be careful not to operate roughly.
- Prevent interior and body paint from being scratched, when removing back doorsill pressure plate assembly.

1. Remove the luggage compartment carpet assembly.
2. Remove the luggage compartment storage box assembly.
3. Remove the back doorsill pressure plate assembly.

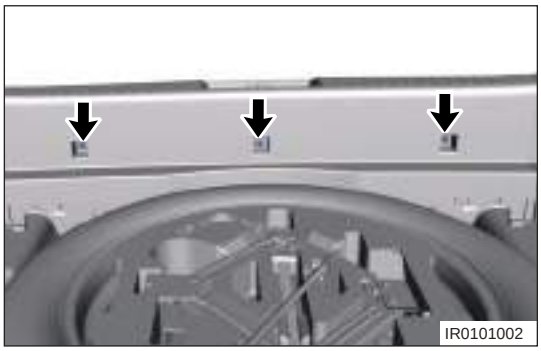
a. Using interior crow plate, pry off the back door lock striker cover plate (arrow).

b. Remove 2 plastic clips (arrow) from back doorsill pressure plate assembly.



c. Remove 3 fixing screws (arrow) from back doorsill pressure plate assembly.

Tightening torque: 1.5 ± 0.5 N • m



d. Using an interior crow plate, pry off fixing clip from back doorsill pressure plate assembly.

e. Remove the back doorsill pressure plate assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution
• Replace damaged clips and install back doorsill pressure plate assembly in place, when installing back doorsill pressure plate assembly.

Front Door Opening Weatherstrip

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing front door opening weatherstrip.
- Appropriate force should be applied, when removing front door opening weatherstrip. Be careful not to operate roughly.
- Try to prevent front door opening weatherstrip from being damaged, when removing front door opening weatherstrip.

1. Remove the front left door opening weatherstrip.
   a. Remove the front left door opening weatherstrip by gently pulling it along edges from one corner of front left door opening weatherstrip.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Front door opening weatherstrip and body should be fitted with a certain amount of clamping force and the weatherstrip should not fall off easily, when installing front door opening weatherstrip.
- When installing front door opening weatherstrip, tap all around uniformly with a rubber hammer to install it in place. The surface of weatherstrip should have no defects, such as tapped dents, deformation and warpage after installation.
- After installing front door opening weatherstrip, do not remove or install it unless it is necessary. Otherwise the installation holding force of weatherstrip may be reduced.

Rear Door Opening Weatherstrip

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing rear door opening weatherstrip.
- Appropriate force should be applied, when removing rear door opening weatherstrip. Be careful not to operate roughly.
- Try to prevent rear door opening weatherstrip from being damaged, when removing rear door opening weatherstrip.

1. Remove the rear left door opening weatherstrip.

a. Remove the rear left door opening weatherstrip by gently pulling it along edges from one corner of rear left door opening weatherstrip.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Rear door opening weatherstrip and body should be fitted with a certain amount of clamping force and the weatherstrip should not fall off easily, when installing rear door opening weatherstrip.
- When installing rear door opening weatherstrip, tap all around uniformly with a rubber hammer to install it in place. The surface of weatherstrip should have no defects, such as tapped dents, deformation and warpage after installation.
- After installing rear door opening weatherstrip, do not remove or install it unless it is necessary. Otherwise the installation holding force of weatherstrip may be reduced.

Back Door Opening Weatherstrip

Removal

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing back door opening weatherstrip.
- Appropriate force should be applied when removing back door opening weatherstrip. Be careful not to operate roughly.
- Try to prevent back door opening weatherstrip from being damaged, when removing back door opening weatherstrip.

1. Remove the back door opening weatherstrip.
   a. Remove back door opening weatherstrip by gently pulling it along edges from one corner of back door opening weatherstrip.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Back door opening weatherstrip and body should be fitted with a certain amount of clamping force and the weatherstrip should not fall off easily, when installing back door opening weatherstrip.
- When installing back door opening weatherstrip, tap all around uniformly with a rubber hammer to install it in place. The surface of weatherstrip should have no defects, such as tapped dents, deformation and warpage after installation.
- After installing back door opening weatherstrip, do not remove or install it unless it is necessary. Otherwise the weatherstrip holding force of installation may be reduced.

A-pillar Upper Protector Assembly

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

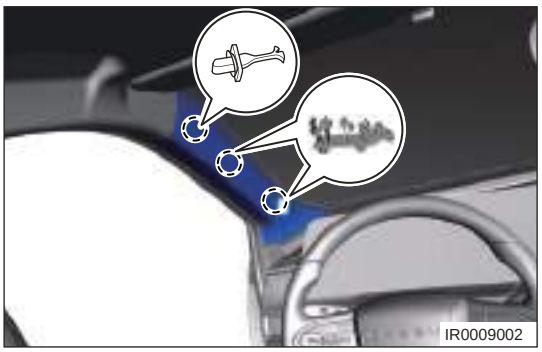
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing A-pillar upper protector assembly.
- Appropriate force should be applied, when removing A-pillar upper protector assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing A-pillar upper protector assembly.

1. Remove the front left door opening weatherstrip.
2. Remove the left A-pillar upper protector assembly.
   a. Using an interior crow plate, remove 1 airbag clip and 2 clips from left A-pillar upper protector assembly.

⚠ Warning

Use needle nose pliers to clamp the dovetail of airbag clip and rotate it 90° to separate the A-pillar upper protector from the sheet metal, the secondary clip is left on the sheet metal.



   b. Disconnect the speaker connector (arrow).

   c. Remove the left A-pillar upper protector assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Make sure that damaged clips are replaced and A-pillar upper protector assembly is installed in place, when installing A-pillar upper protector assembly.
- A-pillar upper protector assembly should be well fitted with instrument panel and roof headlining, after installing A-pillar upper protector assembly.
- A-pillar upper protector assembly and front door opening weatherstrip should be fitted closely, after installing A-pillar upper protector assembly.

B-pillar Lower Protector Assembly

Removal

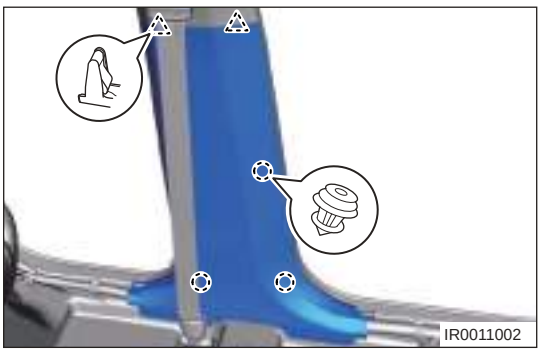
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing B-pillar lower protector assembly.
- Appropriate force should be applied, when removing B-pillar lower protector assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing B-pillar lower protector assembly.

1. Remove the front left doorsill pressure plate assembly.
2. Remove the front left door opening weatherstrip.
3. Remove the rear left doorsill pressure plate assembly.
4. Remove the rear left door opening weatherstrip.
5. Remove the left B-pillar lower protector assembly.
   a. Using an interior crow plate, pry off fixing clips from left B-pillar lower protector assembly.



   b. Remove the left B-pillar lower protector assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- ?Make sure that damaged clips are replaced and B-pillar lower protector assembly is installed, in place when installing B-pillar lower protector assembly.
- B-pillar lower protector assembly should be well fitted with front and rear doorsill pressure plate assemblies, after installing B-pillar lower protector assembly.
- B-pillar lower protector assembly and front and rear door opening weatherstrips should be fitted closely, after installing B-pillar lower protector assembly.

B-pillar Upper Protector Assembly

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing B-pillar upper protector assembly.
- Appropriate force should be applied, when removing B-pillar upper protector assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing B-pillar upper protector assembly.

1. Remove the front left doorsill pressure plate assembly.
2. Remove the front left door opening weatherstrip.
3. Remove the rear left doorsill pressure plate assembly.
4. Remove the rear left door opening weatherstrip.
5. Remove the left B-pillar lower protector assembly.
6. Remove the left B-pillar upper protector assembly.
   a. Remove 2 fixing screws (arrow) from lower part of left B-pillar upper protector.

      Tightening torque: 1.5 ± 0.5 N·m

   b. Remove the front seat belt lower fixing bolt, and pass the webbing through B-pillar upper protector cover plate.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- B-pillar upper protector assembly should be well fitted with B-pillar lower protector assembly and roof headlining, after installing B-pillar upper protector assembly.
- B-pillar upper protector assembly and front and rear door opening weatherstrips should be fitted closely, after installing B-pillar upper protector assembly.

C-pillar Lower Protector Assembly

Removal

Hint:

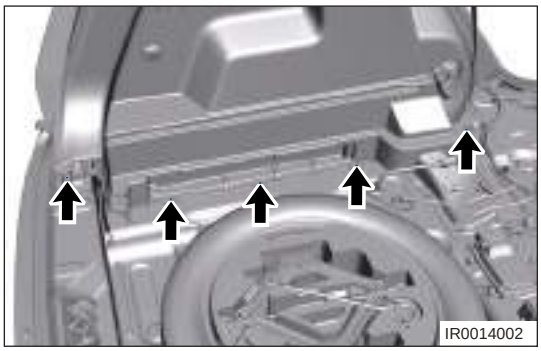
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing C-pillar lower protector assembly.
- Appropriate force should be applied, when removing C-pillar lower protector assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing C-pillar lower protector assembly.

1. Remove the rear seat assembly.
2. Remove the rear left door opening weatherstrip.
3. Remove the back door opening weatherstrip.
4. Remove the luggage compartment carpet assembly.
5. Remove the luggage compartment storage box assembly.
6. Remove the back doorsill pressure plate assembly.
7. Remove the left C-pillar lower protector assembly.
   a. Remove 5 fixing screws (arrow) from left C-pillar lower protector assembly.

      Tightening torque: 1.5 ± 0.5 N·m

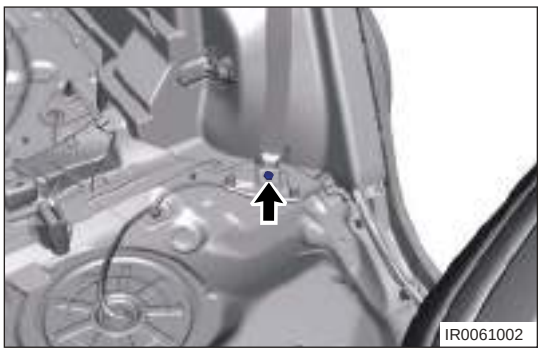


⚠ Caution

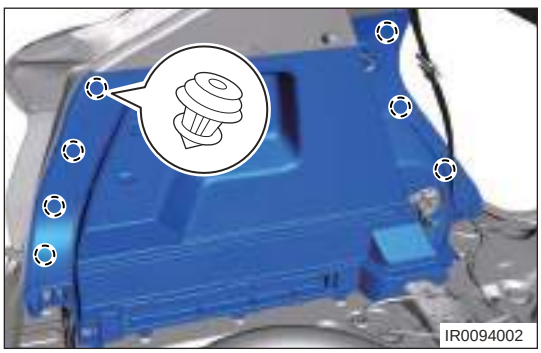
Five on the left and four on the right.

   b. Remove the seat belt lower fixing bolt (arrow).

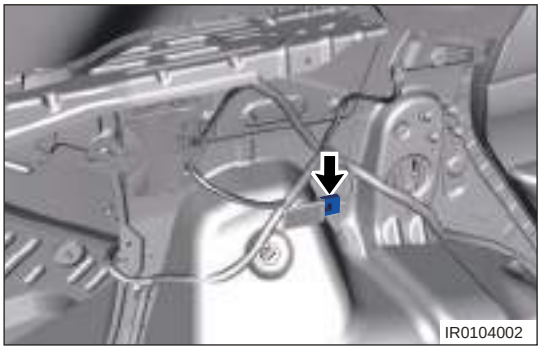
      Tightening torque: 50 ± 5.0 N·m



   c. Using an interior crow plate, pry off clips from left C-pillar lower protector assembly.



d. Disconnect the luggage compartment light connector (arrow).



e. Remove the left C-pillar lower protector assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Make sure that damaged clips are replaced and C-pillar lower protector assembly is installed in place when installing C-pillar lower protector assembly.
- C-pillar lower protector assembly should be well fitted with C-pillar upper protector assembly and rear doorsill pressure plate assembly, after installing C-pillar lower protector assembly.
- C-pillar lower protector assembly and rear door opening weatherstrip should be fitted closely, after installing C-pillar lower protector assembly.

C-pillar Upper Protector Assembly

Removal

Hint:

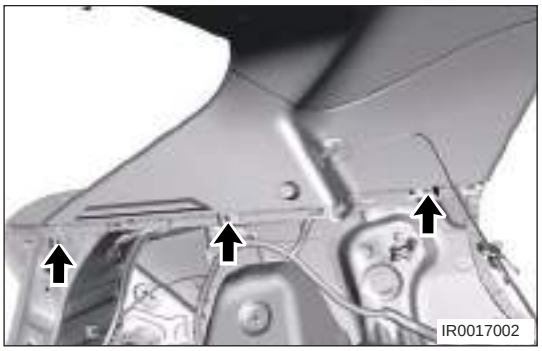
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing C-pillar upper protector assembly.
- Appropriate force should be applied, when removing C-pillar upper protector assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing C-pillar upper protector assembly.

1. Remove the left C-pillar lower protector assembly.
2. Remove the left C-pillar upper protector assembly.
   a. Remove 3 fixing screws (arrow) from the lower end of left C-pillar upper protector assembly.

      Tightening torque: 1.5 ± 0.5 N·m



b. Using an interior crow plate, pry off clips from left C-pillar upper protector assembly.

c. Remove the left C-pillar upper protector assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Replace damaged clips and install C-pillar upper protector assembly in place, when installing C-pillar upper protector assembly.
- C-pillar upper protector assembly should be well fitted with roof headlining, after installing C-pillar upper protector assembly.
- C-pillar upper protector assembly and rear door opening weatherstrip should be fitted closely, after installing C-pillar upper protector assembly.

Sun Visor Assembly

Removal

Hint:

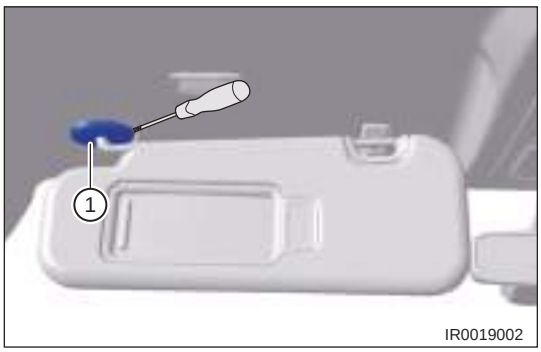
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing sun visor assembly.
- Appropriate force should be applied, when removing sun visor assembly. Be careful not to operate roughly.
- Try to prevent interior and roof from being damaged, when removing sun visor assembly.

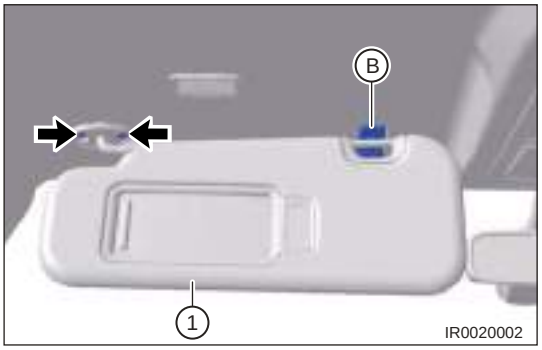
1. Remove the left sun visor assembly.

a. Using an interior crow plate, pry off trim cover (1) from left sun visor holder.

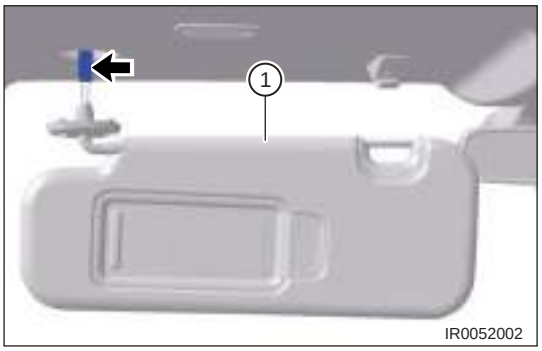


b. Detach sun visor assembly (1) from one side of the holder B, and remove 2 fixing screws (arrow) from left sun visor.

Tightening torque: 5 ± 1.0 N • m



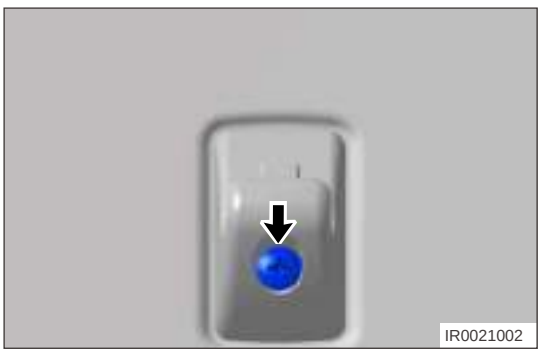
c. Disconnect the left sun visor connector (arrow) and remove sun visor assembly (1).



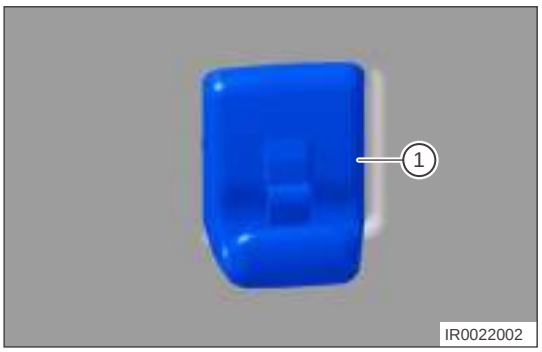
2. Remove the left sun visor holder B.

d. Remove 1 fixing screw (arrow) from sun visor holder B.

Tightening torque: 2 ± 0.5 N • m



e. Using a screwdriver wrapped with protective tape, pry off the left sun visor holder B (1).



Installation

1. Installation is in the reverse order of removal.

Passenger Grip Assembly

Removal

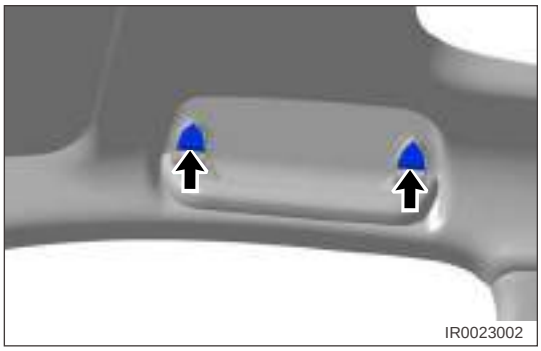
Hint:

- Use same procedures for rear left/rear right and front right sides.
- Procedures listed below are for front right side.

⚠ Caution

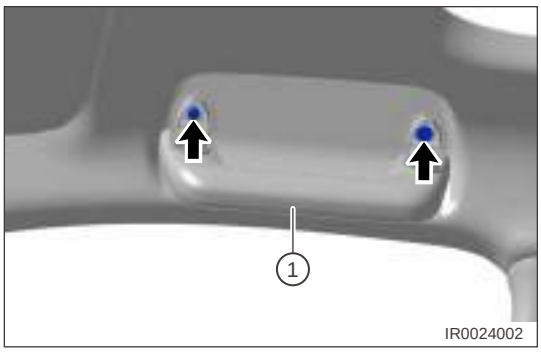
- Be sure to wear safety equipment to prevent accidents, when removing passenger grip assembly.
- Appropriate force should be applied, when removing passenger grip assembly. Be careful not to operate roughly.
- Try to prevent interior and roof from being damaged, when removing passenger grip assembly.

1. Remove the front right passenger grip assembly.
   a. Using an interior crow plate, pry off grip fixing screw block cover (arrow).



   b. Remove 2 fixing screws (arrow) from front right passenger grip assembly.

      Tightening torque: 3 ± 0.5 N • m



   c. Remove the front right passenger grip assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Passenger grip should be well fitted with roof and peripheral clearance should be even when it is not in use.
- Grip should return normally without any noise during operation.

Roof Assembly

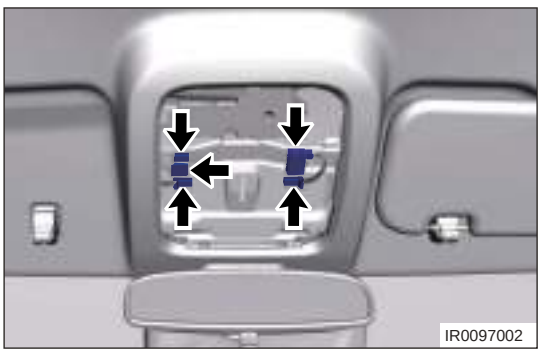
Removal

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing roof assembly.
- Appropriate force should be applied, when removing roof assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing roof assembly.

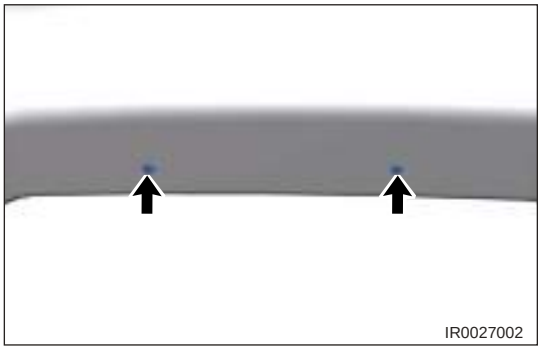
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the interior front dome light assembly.
   a. Using an interior crow plate, pry off interior front dome light assembly.

   b. Disconnect front dome light connectors (arrow).



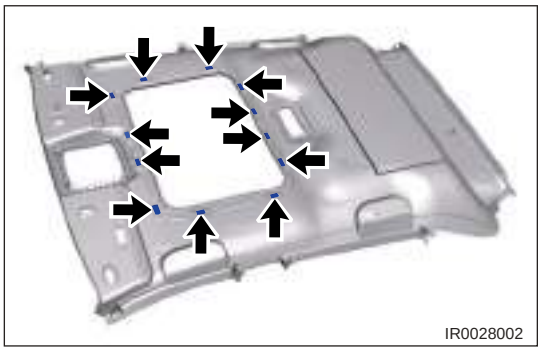
   c. Remove the interior front dome light assembly.
4. Remove the sun visor assembly.
5. Remove left and right vanity mirror light assemblies.
6. Remove the rear interior dome light assembly.
7. Remove the passenger grip assembly.
8. Remove the front door opening weatherstrip.
9. Remove the rear door opening weatherstrip.
10. Remove the back door opening weatherstrip.
11. Remove the A-pillar upper protector assembly.
12. Remove the B-pillar upper protector assembly.
13. Remove the C-pillar upper protector assembly.
14. Remove the roof assembly.

a. Remove 2 clips (arrow) from roof assembly.


IR0027002

> **⚠ Caution**
>
> There are 4 clips on the roof assembly of vehicles without sunroof.

b. Disconnect 12 mushroom buckles (arrow) between the roof and ceiling by force evenly downward around the roof.


IR0028002

c. Remove the roof assembly.

Installation

1. Installation is in the reverse order of removal.

> **⚠ Caution**
>
> - Replace damaged clips and install roof assembly in place, when installing roof assembly.
> - Roof assembly and pillar upper protector should be fitted closely, after installing roof assembly.
> - Roof assembly and door opening weatherstrip should be fitted closely, after installing roof assembly.

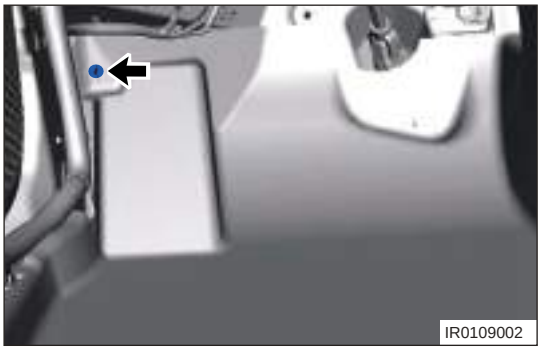
Front Floor Carpet Assembly

Removal

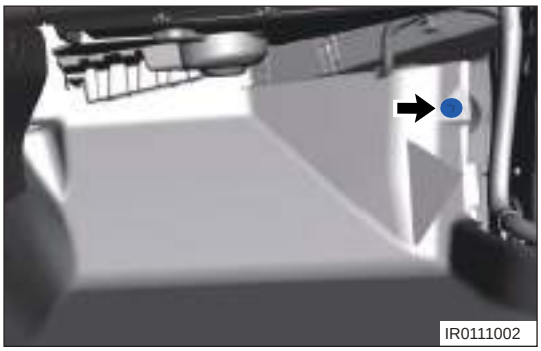
> **⚠ Caution**
>
> - Be sure to wear safety equipment to prevent accidents, when removing front floor carpet assembly.
> - Appropriate force should be applied, when removing front floor carpet assembly. Be careful not to operate roughly.
> - Prevent interior and body paint from being scratched, when removing front floor carpet assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the auxiliary fascia console assembly.
4. Remove the front seat assembly.
5. Remove the rear seat cushion assembly.
6. Remove the front doorsill pressure plate assembly.
7. Remove the front door opening weatherstrip.
8. Remove the rear doorsill pressure plate assembly.
9. Remove the rear door opening weatherstrip.

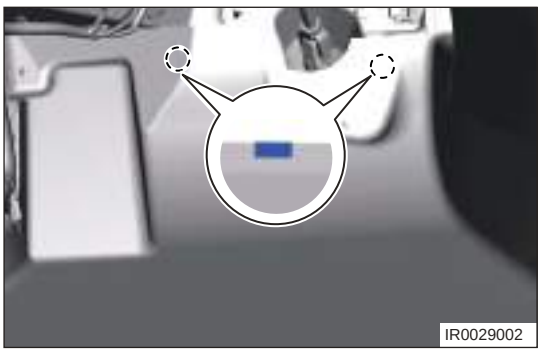
10. Remove the B-pillar lower protector assembly.
11. Remove the front floor carpet.
    a. Remove the front carpet left fixing clamping washer (arrow).



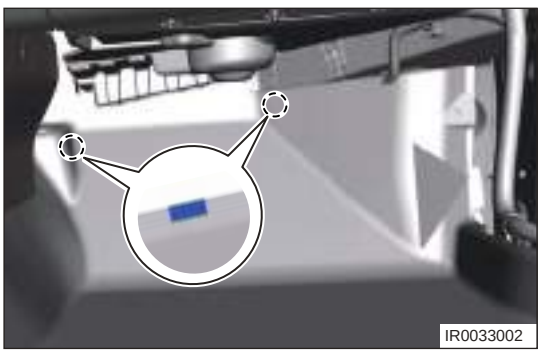
    b. Remove the front carpet right fixing clamping washer (arrow).



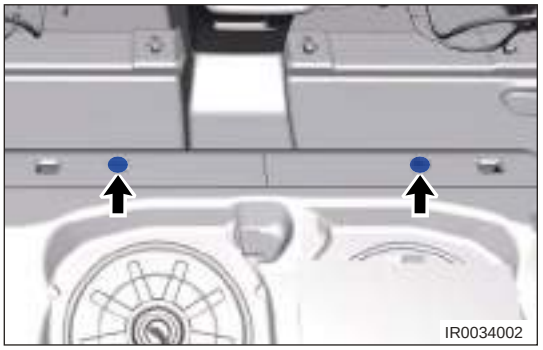
    c. Loosen buckle bonding between 2 magical buckles in front of carpet and front plate sound insulator.



    d. Loosen buckle bonding between 2 magical buckles in front of carpet and front plate sound insulator.



e. Loosen clamping washers (arrow) from left and right sides of the carpet rear end.



f. Remove the front carpet assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Always pay attention to the flatness around front floor carpet assembly and the routing of relative body wire harness, when installing front floor carpet assembly.
- Spread front floor carpet assembly along the bottom shape, with no obvious bumps and unevenness found. Expose installation holes, and front floor carpet assembly should be firmly abutted against the bottom.

Driver Side Foot Rest Bracket Assembly

Removal

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing driver side foot rest bracket.
- Appropriate force should be applied when removing driver side foot rest bracket. Be careful not to operate roughly.
- Prevent interior and body paint from being scratched, when removing driver side foot rest bracket.

1. Remove the front left doorsill pressure plate assembly.
2. Remove the front left door opening weatherstrip.
3. Remove the driver side foot rest bracket.
   a. Lift the carpet and floor cushion in the direction of the arrow.

b. Remove fixing clip (arrow) from driver side foot rest.

c. Remove the driver side foot rest bracket.

Installation

1. Installation is in the reverse order of removal.

Luggage Compartment Carpet Assembly

Removal

1. Remove the luggage compartment carpet assembly.
   a. First of all, lift the luggage compartment carpet grip and lift the luggage compartment carpet.
   b. Then move the luggage compartment carpet assembly backward and take out it.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution
• Make sure that the left and right sides of luggage compartment carpet assembly are fitted in place, when installing luggage compartment carpet assembly.

Rear Wheel House Sound Insulator

Removal

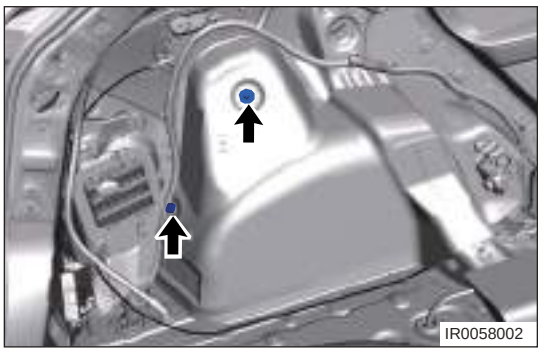
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

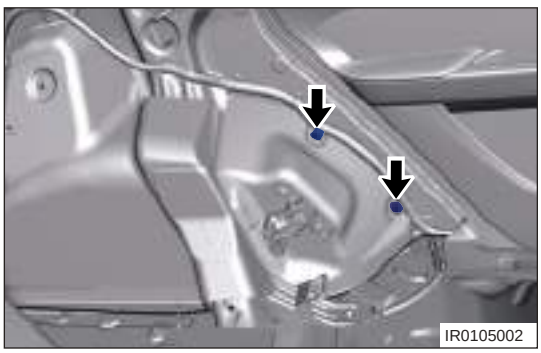
⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing rear wheel house sound insulator.
- Appropriate force should be applied, when removing rear wheel house sound insulator. Be careful not to operate roughly.
- Prevent interior and body paint from being scratched, when removing rear wheel house sound insulator.

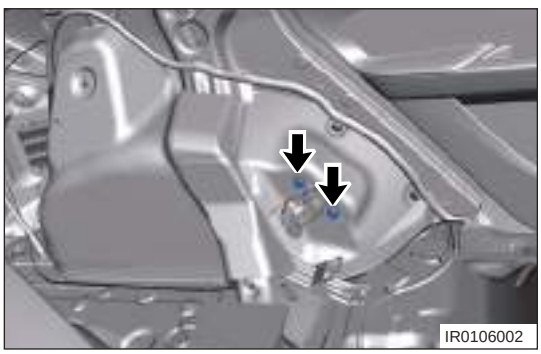
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear seat assembly.
4. Remove the luggage compartment storage box assembly.
5. Remove the left C-pillar lower protector.
6. Remove the rear left wheel house sound insulator assembly.
   a. Remove fixing clips (arrow) from rear wheel house sound insulator assembly.



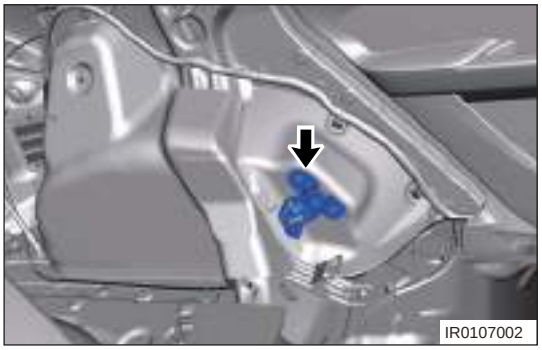
   b. Remove fixing clips (arrow) from rear wheel house sound insulator assembly.



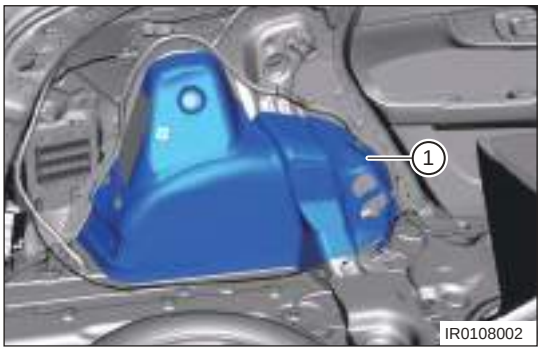
   c. Remove 2 fixing bolts (arrow) from rear seatback left connecting bracket assembly.



d. Remove the rear seatback left connecting bracket assembly.



e. Remove the rear wheel house sound insulator assembly (1).



Installation

1. Installation is in the reverse order of removal.

SEAT

GENERAL INFORMATION

Description

1	Front Passenger Seat Assembly	4	Driver Seatback Adjustment Switch
2	Driver Seat Assembly	5	Driver Seat Front-back Adjustment Switch
3	Rear Seat Assembly		

Front seat assembly can be moved forward and backward by seat track unlock handle, and seatback reclining can be adjusted by seat reclining adjuster handle.Rear seat position is not adjustable; however, rear seatback can be folded forward by pulling seatback unlock mechanism assembly, to help increase the storage space of luggage compartment.

Diagnostic Help

- Connect diagnostic tester (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all BCM system grounds related to the latest DTC.
- If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Check for broken, bent, protruded or corroded terminals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

- Remove ground bolt or nut.
- Check all contact surfaces for tarnish, dirt and rust, etc.
- Clean as necessary to ensure that contact is in good condition.
- Reinstall ground bolt or nut securely.
- Check if any additional accessories interfere with ground circuit.
- If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnosis Procedure

Hint:
Use following procedures to troubleshoot the seat control system.

1	**Vehicle brought to workshop**

Next

2	Examine vehicle and check basic items

Check system power supply voltage, and check that fuse, wire harness and connector are connected normally.

OK

Standard voltage: Not less than 12 V.

Result

NG → **Check and replace malfunctioning parts**

OK ↓

3	Using a diagnostic tester, read related DTC and data stream information

Result

Result	Go to
No DTC	A
DTC occurs	B

A → **Perform troubleshooting procedure without DTCs according to malfunction symptom**

B ↓

4	Troubleshoot according to DTCs troubleshooting procedure

Result

Result	Go to
Problem is not resolved	A
Problem is resolved	B

A → **Return to procedure 1 and troubleshoot the process again**

B ↓

5	According to seat system malfunction repair completion inspection and delivery, confirm if malfunction is resolved.

Result

Result	Go to
Delivery inspection is failed	A
Delivery inspection is qualified	B

A → **Return to procedure 1 and troubleshoot the process again**

B

6	**Finished**

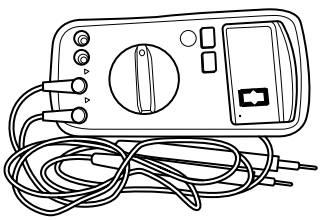
Specifications

Torque Specifications

Description	Torque (N·m)
Front Seat Assembly Fixing Bolt	50 ± 5.0
Seat Belt Buckle Assembly Fixing Bolt	50 ± 5.0

Tool

General Tool

Tool Name	Tool Drawing
Digital Multimeter	 RCH000206

Diagnosis & Test

Diagnostic Trouble Code (DTC) Chart

DTC	DTC
B2178-16	Supply Voltage is too Low
B2178-17	Supply Voltage is too High
B2179-24	Heating Output Relay Adhesion (Continuous High Level)

DTC	DTC
B217A-13	The Heating Output Load is Open
B217B-19	Excessive Seat Heating Current
B217B-18	Overcurrent of Seat Heating
B217C-1A	The NTC Input Feedback Value is too Small
B217C-00	The Heating NTC Input Feedback Value Does Not Change
B217D-16	The Power Supply Voltage is too Low
B217D-17	The Power Supply Voltage is too High
B217E-19	Height Adjustment Control Circuit High Current
B217E-18	Height Adjustment Control Circuit Low Current
B217F-19	Horizontal Adjustment Control Circuit High Current
B217F-18	Horizontal Adjustment Control Circuit Low Current
B2180-04	Seat Height Adjustment and Horizontal Control Circuit Internal Failure
B2181-19	Backrest Adjustment Control Circuit High Current
B2181-18	Backrest Adjustment Control Circuit Low Current
B2182-04	Backrest Control Circuit Internal Fault
B2183-77	The Key Card Lag
U0073-88	Bus Off
U1162-87	Lost Communication With FCM
U0129-87	Lost Communication With BSM
U0140-87	Lost Communication With BCM
U0100-87	Lost Communication With EMS
U0155-87	Lost Communication With ICM
U0101-87	Lost Communication With TCU
U1405-81	Invalid Data Received From FCM
U0418-81	Invalid Data Received From BSM
U0422-81	Invalid Data Received From BCM
U0401-81	Invalid Data Received From EMS
U0423-81	Invalid Data Received From ICM
U0402-81	Invalid Data Received From TCU
U3000-51	Control Module Not Programmed
U1300-55	Not Config
B2178-16	Supply Voltage is too Low

DTC	DTC
B2178-17	Supply Voltage is too High
B2179-24	Heating Output Relay Adhesion (Continuous High Level)
B217A-13	The Heating Output Load is Open
B217B-19	Excessive Seat Heating Current
B217B-18	Overcurrent of Seat Heating
B217C-1A	The NTC Input Feedback Value is too Small
B217C-00	The Heating NTC Input Feedback Value Does Not Change
B217D-16	The Power Supply Voltage is too Low
B217D-17	The Power Supply Voltage is too High
B217E-19	Height Adjustment Control Circuit High Current
B217E-18	Height Adjustment Control Circuit Low Current
B217F-19	Horizontal Adjustment Control Circuit High Current
B217F-18	Horizontal Adjustment Control Circuit Low Current
B2180-04	Seat Height Adjustment And Horizontal Control Circuit Internal failure
B2181-19	Backrest Adjustment Control Circuit High Current
B2181-18	Backrest Adjustment Control Circuit Low Current
B2182-04	Backrest Control Circuit Internal Fault
B2183-77	The Key Card Lag
U0073-88	Bus Off
U1162-87	Lost Communication With FCM
U0129-87	Lost Communication With BSM
U0140-87	Lost Communication With BCM
U0100-87	Lost Communication With EMS
U0155-87	Lost Communication With ICM
U0101-87	Lost Communication With TCU
U1405-81	Invalid Data Received From FCM
U1418-81	Invalid Data Received From BSM
U0422-81	Invalid Data Received From BCM
U0401-81	Invalid Data Received From EMS
U0423-81	Invalid Data Received From ICM
U0402-81	Invalid Data Received From TCU

DTC	DTC
U3000-51	Control Module Not Programmed
U1300-55	Not Config

DTC Diagnosis Procedure

DTC	**U0073-88**	**Bus Off**
DTC	**U1162-87**	**Lost Communication With FCM**
DTC	**U0129-87**	**Lost Communication With BSM**
DTC	**U0140-87**	**Lost Communication With BCM**
DTC	**U0100-87**	**Lost Communication With EMS**
DTC	**U0155-87**	**Lost Communication With ICM**
DTC	**U0101-87**	**Lost Communication With TCU**
DTC	**U1405-81**	**Invalid Data Received From FCM**
DTC	**U0418-81**	**Invalid Data Received From BSM**
DTC	**U0422-81**	**Invalid Data Received From BCM**
DTC	**U0401-81**	**Invalid Data Received From EMS**
DTC	**U0423-81**	**Invalid Data Received From ICM**
DTC	**U0402-81**	**Invalid Data Received From TCU**
DTC	**U3000-51**	**Control Module Not Programmed**
DTC	**U1300-55**	**Not Config**
DTC	**U0073-88**	**Bus Off**
DTC	**U1162-87**	**Lost Communication With FCM**
DTC	**U0129-87**	**Lost Communication With BSM**
DTC	**U0140-87**	**Lost Communication With BCM**
DTC	**U0100-87**	**Lost Communication With EMS**
DTC	**U0155-87**	**Lost Communication With ICM**
DTC	**U0101-87**	**Lost Communication With TCU**
DTC	**U1405-81**	**Invalid Data Received From FCM**
DTC	**U0418-81**	**Invalid Data Received From BSM**
DTC	**U0422-81**	**Invalid Data Received From BCM**
DTC	**U0401-81**	**Invalid Data Received From EMS**
DTC	**U0423-81**	**Invalid Data Received From ICM**
DTC	**U0402-81**	**Invalid Data Received From TCU**
DTC	**U3000-51**	**Control Module Not Programmed**
DTC	**U1300-55**	**Not Config**

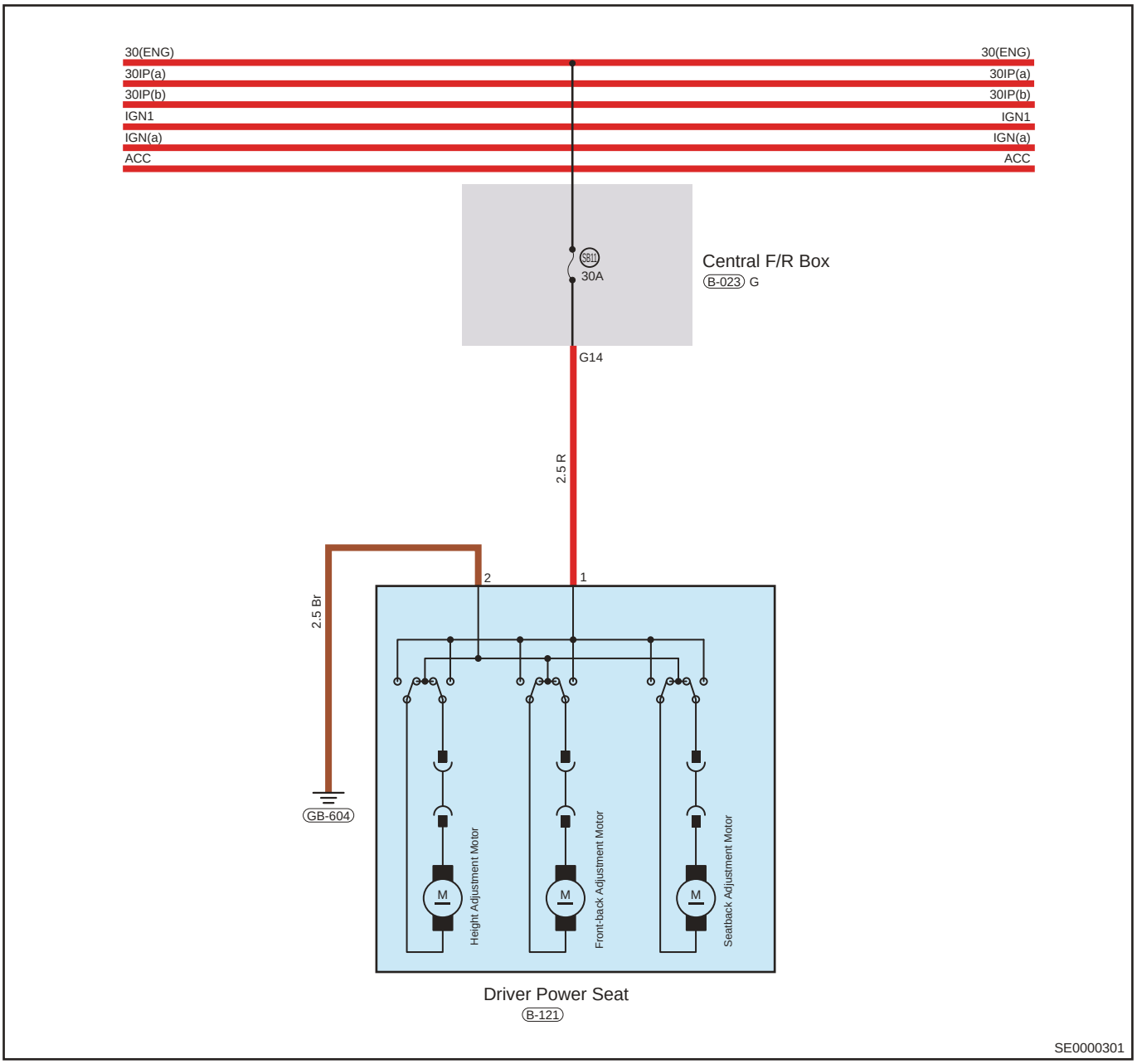
Description

DTC	Description
U0073-88	Bus Off
U1162-87	Lost Communication With FCM
U0129-87	Lost Communication With BSM
U0140-87	Lost Communication With BCM
U0100-87	Lost Communication With EMS
U0155-87	Lost Communication With ICM
U0101-87	Lost Communication With TCU
U1405-81	Invalid Data Received From FCM
U0418-81	Invalid Data Received From BSM
U0422-81	Invalid Data Received From BCM
U0401-81	Invalid Data Received From EMS
U0423-81	Invalid Data Received From ICM
U0402-81	Invalid Data Received From TCU
U3000-51	Control Module Not Programmed
U1300-55	Not Config
U0073-88	Bus Off
U1162-87	Lost Communication With FCM
U0129-87	Lost Communication With BSM
U0140-87	Lost Communication With BCM
U0100-87	Lost Communication With EMS
U0155-87	Lost Communication With ICM
U0101-87	Lost Communication With TCU
U1405-81	Invalid Data Received From FCM
U0418-81	Invalid Data Received From BSM
U0422-81	Invalid Data Received From BCM
U0401-81	Invalid Data Received From EMS
U0423-81	Invalid Data Received From ICM
U0402-81	Invalid Data Received From TCU
U3000-51	Control Module Not Programmed
U1300-55	Not Config

Description
Refer to CAN communication system

DTC	B2178-16	Low Power Supply Voltage
DTC	B2178-17	High Power Supply Voltage

Description
Control Schematic Diagram



DTC	Description
B2178-16	Low Power Supply Voltage
B2178-17	High Power Supply Voltage

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).

- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

(a) Check if fuse SB11 is blown.

NG → **Replace fuse**

OK ↓

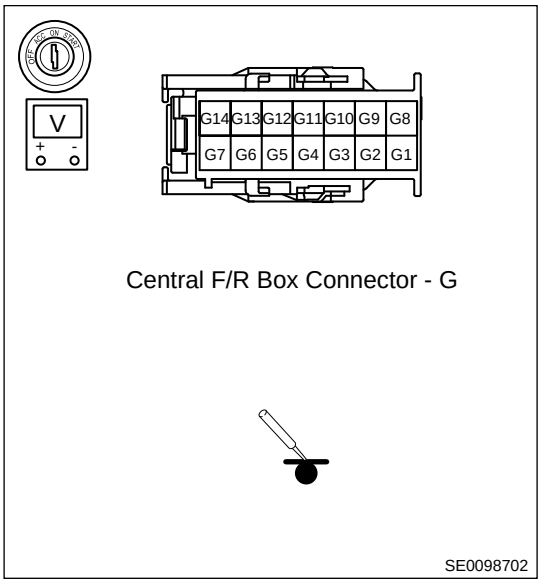
2	**Check output voltage of instrument panel fuse and relay box**

(a) Turn ENGINE START STOP switch to ON.

(b) Disconnect the engine compartment fuse and relay box connector B-023.

(c) Using a digital multimeter, measure voltage between connector B-023 (G14) and body ground.

Multimeter Connection	Condition	Specified Condition
B-023 (G14) - Body ground	ENGINE START STOP switch "ON"	⩽ 12 V



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NG → **Replace engine compartment fuse and relay box assembly.**

OK ↓

3	**Check for open in wire harness**

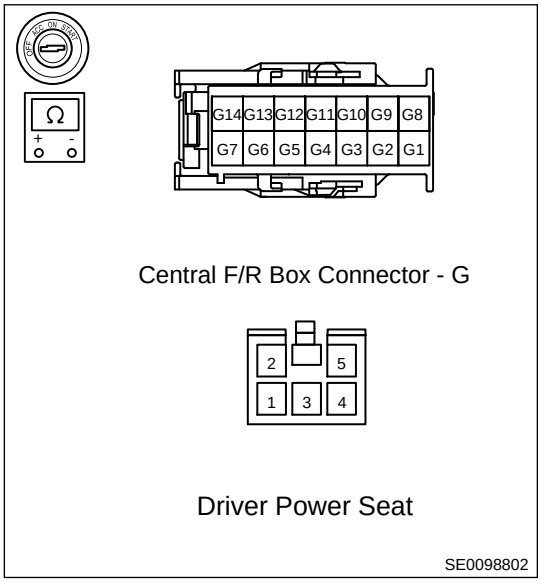
(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect driver seat connector B-121 and engine compartment fuse and relay box connector B-023.

(d) Using a digital multimeter, measure resistance between connectors B-121 (1) and B-023 (G14) to check for open in wire harness.

Multimeter Connection	Condition	Specified Condition
B-121 (1) - B-023 (G14)	ENGINE START STOP switch “OFF”	⩽ 1 Ω



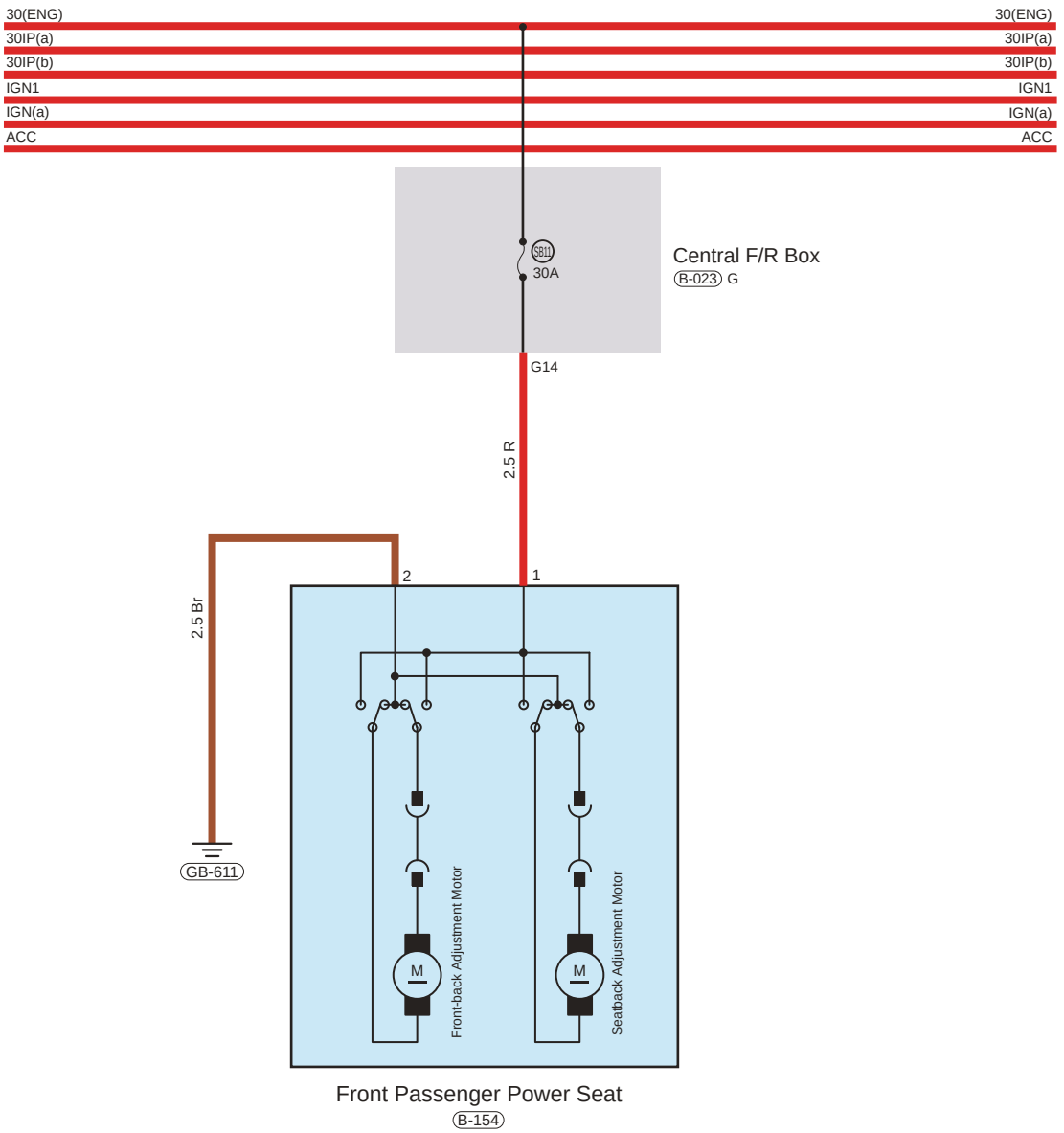
OK → **Replace the driver seat.**

NG → **Handle and repair related wire harness**

DTC	**B2178-16**	**Low Power Supply Voltage**
DTC	**B2178-17**	**High Power Supply Voltage**

Description

Control Schematic Diagram



DTC	Description
B2178-16	Low Power Supply Voltage
B2178-17	High Power Supply Voltage

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check fuse

(a) Check if fuse SB11 is blown.

NG → **Replace fuse**

OK ↓

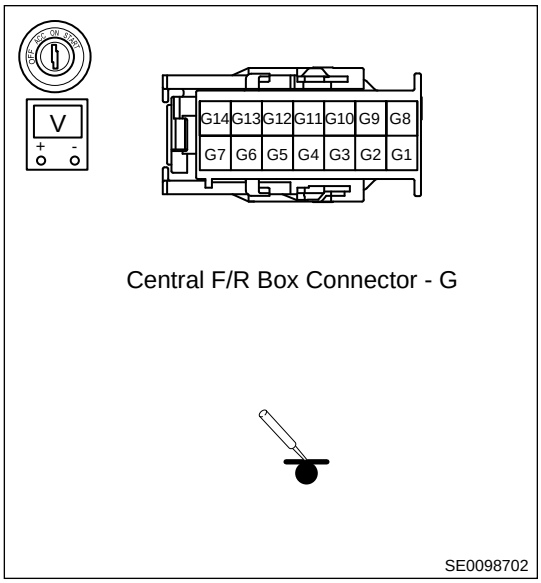
2	Check output voltage of instrument panel fuse and relay box

(a) Turn ENGINE START STOP switch to ON.

(b) Disconnect the engine compartment fuse and relay box connector B-023.

(c) Using a digital multimeter, measure voltage between connector B-023 (G14) and body ground.

Multimeter Connection	Condition	Specified Condition
B-023 (G14) - Body ground	ENGINE START STOP switch "ON"	⩽ 12 V



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NG → **Replace engine compartment fuse and relay box assembly.**

OK ↓

3	Check for open in wire harness

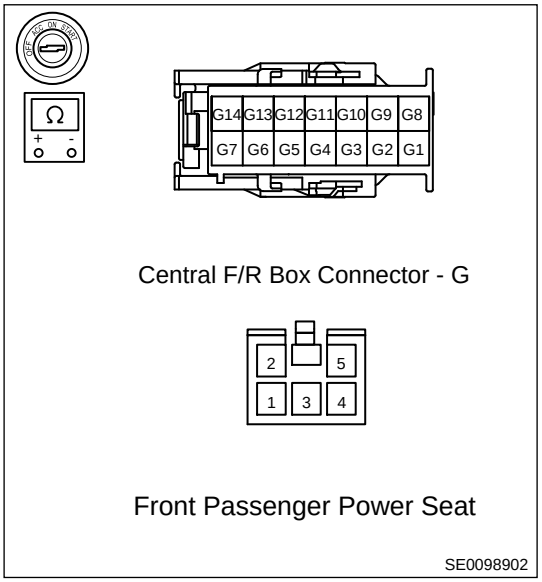
(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect front passenger seat connector B-154 and engine compartment fuse and relay box connector B-023.

(d) Using a digital multimeter, measure resistance between connectors B-154 (1) and B-023 (G14) to check for open in wire harness.

Multimeter Connection	Condition	Specified Condition
B-154 (1) - B-023 (G14)	ENGINE START STOP switch “OFF”	⩽ 1 Ω

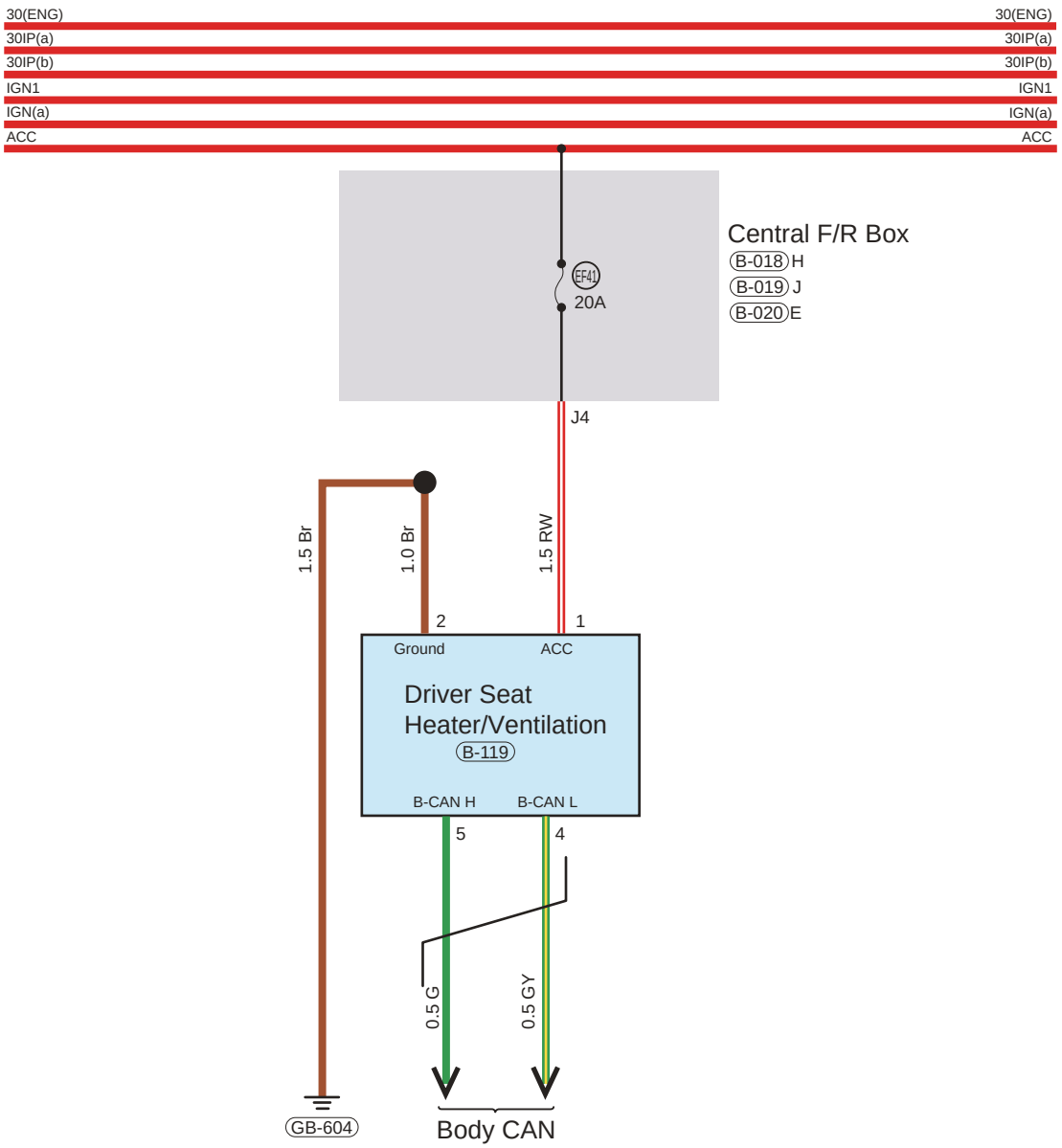


OK → **Replace the front passenger seat.**

NG → **Handle and repair related wire harness**

DTC	**B2179-24**	**Heating Output Relay Adhesion (Continuous High Level)**
DTC	**B217A-13**	**The Heating Output Load is Open**
DTC	**B217B-19**	**Excessive Seat Heating Current**
DTC	**B217B-18**	**Seat Heating Current is too Small**
DTC	**B217C-1A**	**Heating NTC Input Feedback Value is too Small**
DTC	**B217C-00**	**Heating NTC Input Feedback Value Does Not Change**

Description
Control Schematic Diagram



DTC	Description
B2179-24	Heating Output Relay Adhesion (Continuous High Level)
B217A-13	The Heating Output Load is Open
B217B-19	Excessive Seat Heating Current
B217B-18	Seat Heating Current is too Small
B217C-1A	Heating NTC Input Feedback Value is too Small
B217C-00	Heating NTC Input Feedback Value Does Not Change

DTC Confirmation Procedure

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

- Turn ENGINE START STOP switch to OFF.

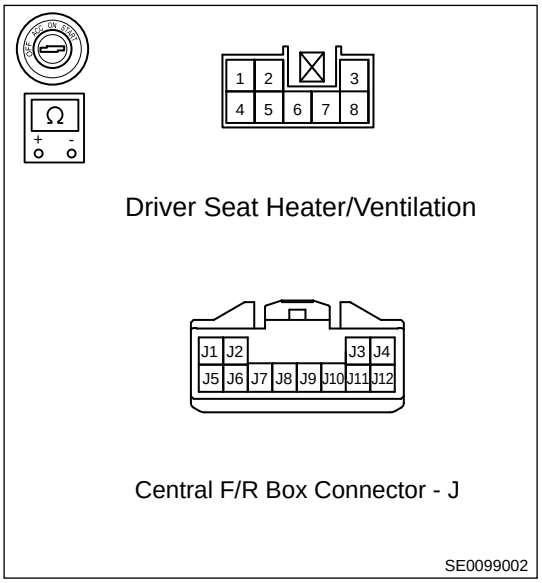
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

1	**Driver seat heating control circuit low current**

(a) Check sensor connectors, controller connectors for corrosion, poor contact, displacement and repair it if any symptom occurs.
(b) Check the continuity of sensor wire harness and replace wire harness if open circuit malfunction occurs.
(c) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.
(d) Disconnect the seat heating connector B-119.

(e) Using ohm band of multimeter, detect continuity between B-119 (1) and B-019 (J4), B-119 (2) and GB-604 separately.

Multimeter Connection	Condition	Specified Condition
B-119 (1) - B-019 (J4)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
B-119 (2) - GB-604	ENGINE START STOP switch “OFF”	⩽ 1 Ω

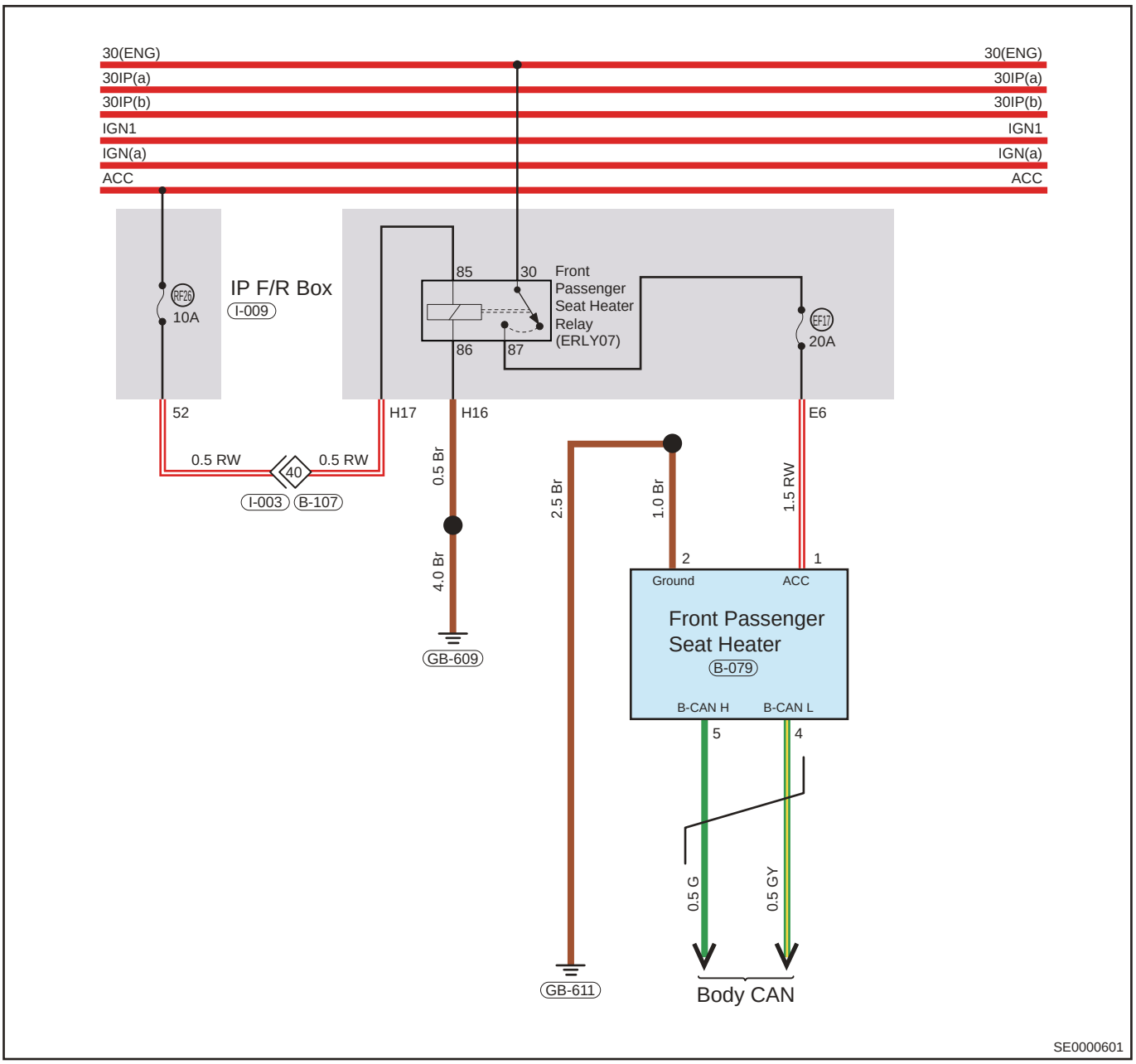


OK → **Replace the driver seat heating.**

NG → **Handle and repair related wire harness**

DTC	**B2179-24**	**Heating Output Relay Adhesion (Continuous High Level)**
DTC	**B217A-13**	**The Heating Output Load is Open**
DTC	**B217B-19**	**Excessive Seat Heating Current**
DTC	**B217B-18**	**Seat Heating Current is too Small**
DTC	**B217C-1A**	**Heating NTC Input Feedback Value is too Small**
DTC	**B217C-00**	**Heating NTC Input Feedback Value Does Not Change**

Description
Control Schematic Diagram



DTC	Description
B2179-24	Heating Output Relay Adhesion (Continuous High Level)
B217A-13	The Heating Output Load is Open
B217B-19	Excessive Seat Heating Current
B217B-18	Seat Heating Current is too Small
B217C-1A	Heating NTC Input Feedback Value is too Small
B217C-00	Heating NTC Input Feedback Value Does Not Change

DTC Confirmation Procedure

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

- Turn ENGINE START STOP switch to OFF.

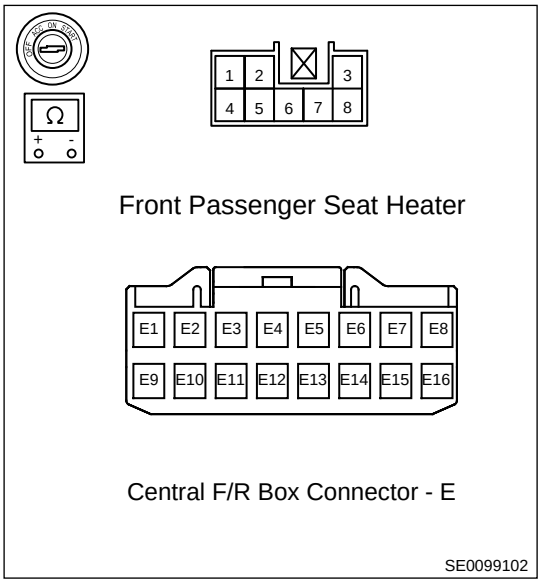
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

1	**Front passenger heating control circuit low current**

(a) Check sensor connectors, controller connectors for corrosion, poor contact, displacement and repair it if any symptom occurs.
(b) Check the continuity of sensor wire harness and replace wire harness if open circuit malfunction occurs.
(c) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.
(d) Disconnect the seat heating connector B-079.

(e) Using ohm band of multimeter, detect continuity between B-079 (1) and B-020 (E6), B-079 (2) and GB-611 separately.

Multimeter Connection	Condition	Specified Condition
B-079 (1) - B-020 (E6)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
B-079 (2) - GB-611	ENGINE START STOP switch “OFF”	⩽ 1 Ω

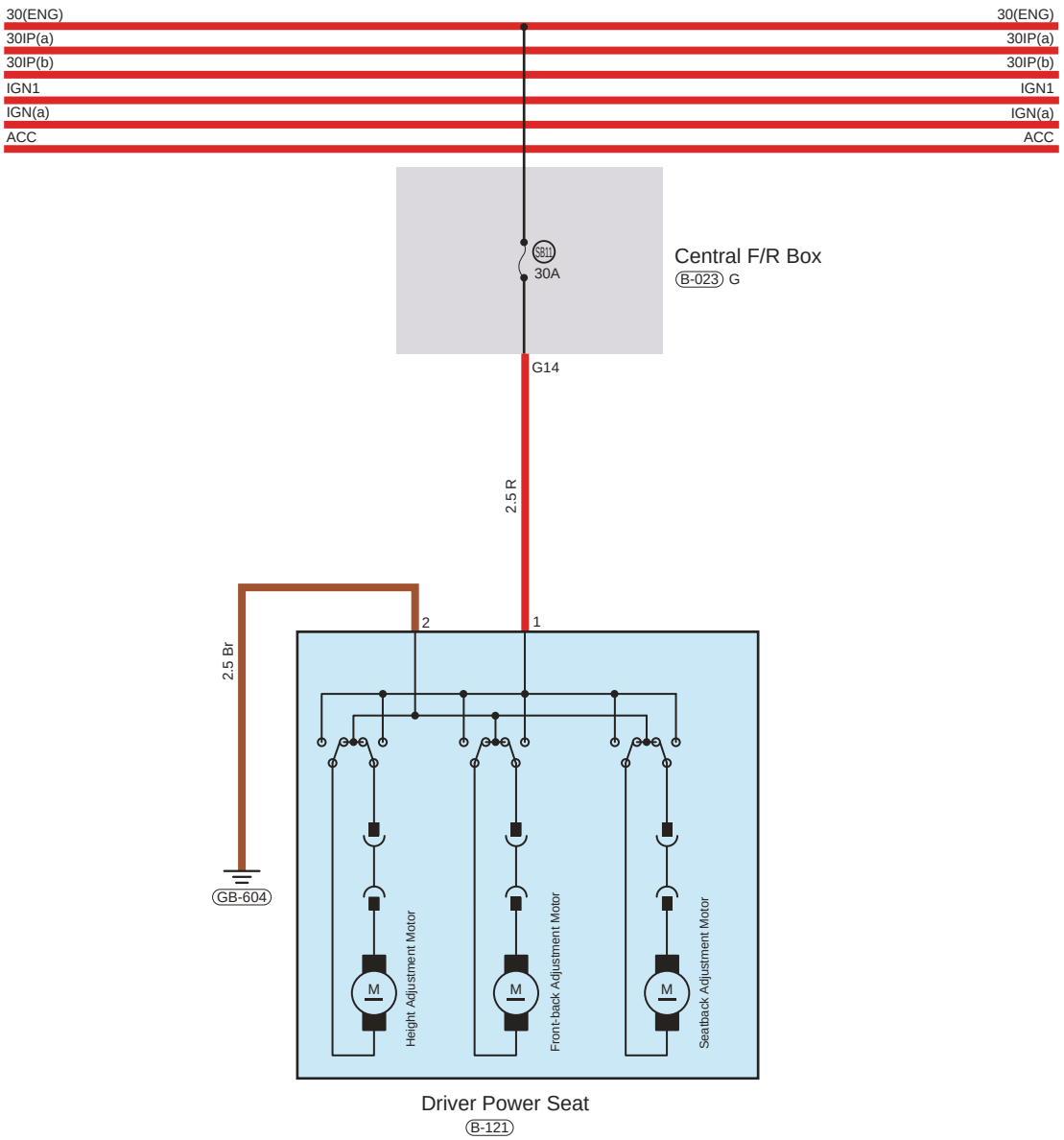


OK → **Replace the front passenger seat heating.**

NG → **Handle and repair related wire harness**

DTC	**B217E-19**	**Vertical adjustment control circuit high current**
DTC	**B217E-18**	**Height Adjustment Control Circuit Low Current**
DTC	**B217F-19**	**Horizontal Adjustment Control Circuit High Current**
DTC	**B217F-18**	**Horizontal Adjustment Control Circuit Low Current**
DTC	**B2180-04**	**Seat Height Adjustment and Horizontal Control Circuit Internal Failure**

Description
Control Schematic Diagram



DTC	Description
B217E-19	Vertical adjustment control circuit high current
B217E-18	Height Adjustment Control Circuit Low Current
B217F-19	Horizontal adjustment control circuit high current
B217F-18	Horizontal Adjustment Control Circuit Low Current
B2180-04	Seat Height Adjustment and Horizontal Control Circuit Internal Failure

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Seat height adjustment and horizontal control circuit**

(a) Check sensor connectors, controller connectors for corrosion, poor contact, displacement and repair it if any symptom occurs.

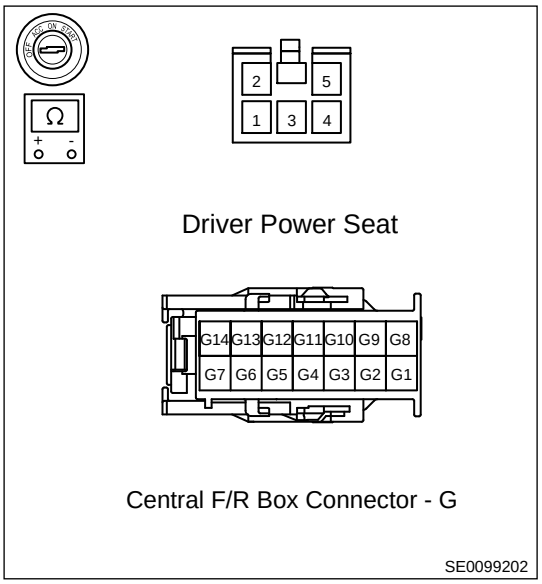
(b) Check the continuity of sensor wire harness and replace wire harness if open circuit malfunction occurs.

(c) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(d) Disconnect the driver horizontal motor connector B-121.

(e) Using ohm band of multimeter, detect continuity between B-121 (1) and B-023G (14), B-121 (2) and GB-604 separately.

Multimeter Connection	Condition	Specified Condition
B-121 (1) - B-023G (14)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
B-121 (2) - GB-604	ENGINE START STOP switch “OFF”	⩽ 1 Ω

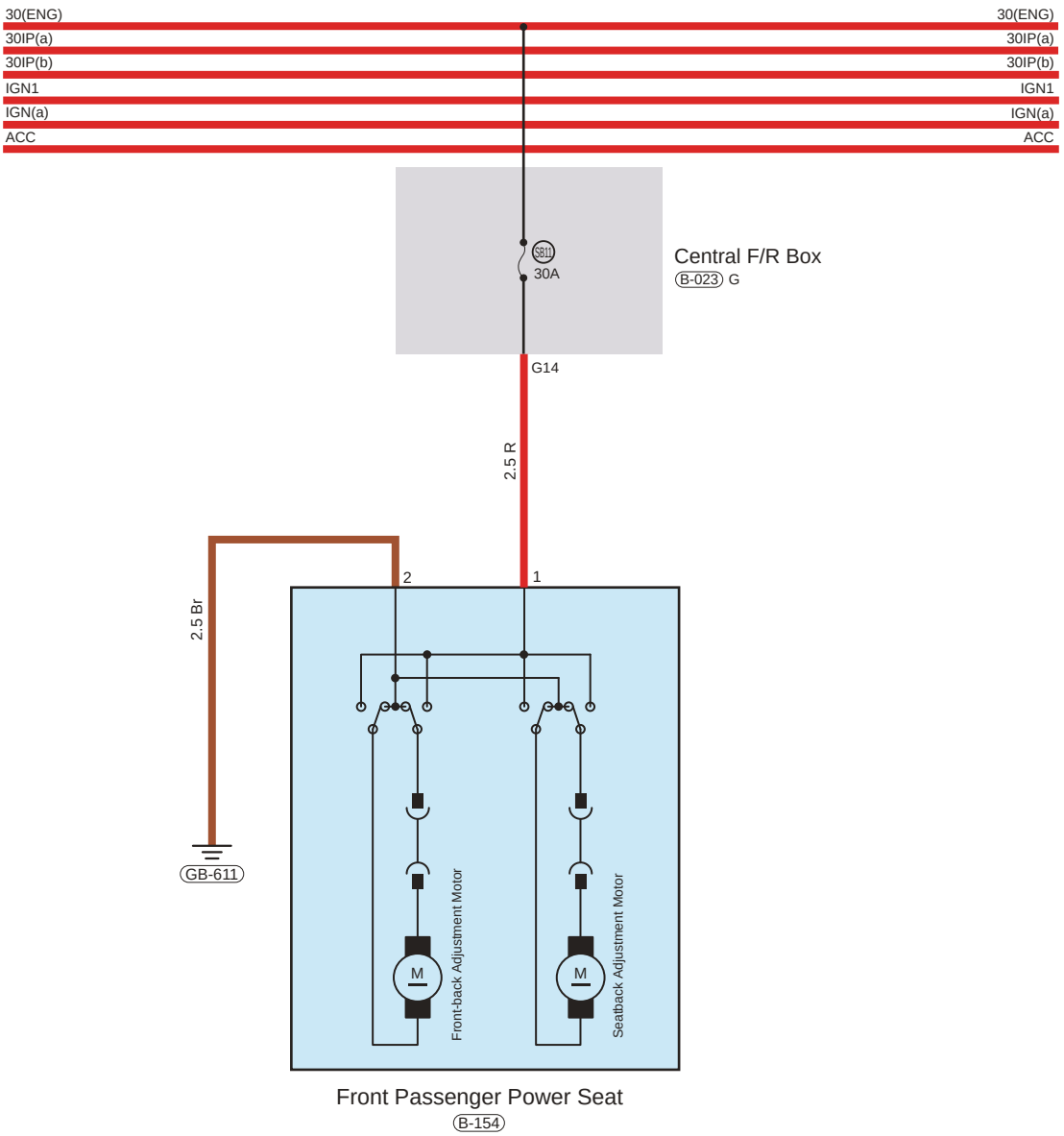


OK ➪ **Replace seat assembly.**

NG ➪ **Handle and repair related wire harness**

DTC	**B217E-19**	**Vertical adjustment control circuit high current**
DTC	**B217E-18**	**Height Adjustment Control Circuit Low Current**
DTC	**B217F-19**	**Horizontal adjustment control circuit high current**
DTC	**B217F-18**	**Horizontal Adjustment Control Circuit Low Current**
DTC	**B2180-04**	**Seat Height Adjustment and Horizontal Control Circuit Internal Failure**

Description
Control Schematic Diagram



DTC	Description
B217E-19	Vertical adjustment control circuit high current
B217E-18	Height Adjustment Control Circuit Low Current
B217F-19	Horizontal adjustment control circuit high current
B217F-18	Horizontal Adjustment Control Circuit Low Current
B2180-04	Seat Height Adjustment and Horizontal Control Circuit Internal Failure

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Seat height adjustment and horizontal control circuit**

(a) Check sensor connectors, controller connectors for corrosion, poor contact, displacement and repair it if any symptom occurs.

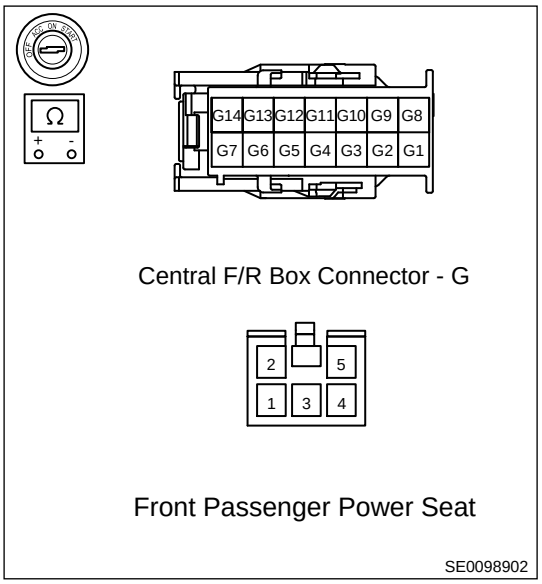
(b) Check the continuity of sensor wire harness and replace wire harness if open circuit malfunction occurs.

(c) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(d) Disconnect the front passenger horizontal motor connector B-154.

(e) Using ohm band of multimeter, detect continuity between B-154 (1) and B-023G (14), B-154 (2) and GB-611 separately.

Multimeter Connection	Condition	Specified Condition
B-154 (1) - B-023G (14)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
B-154 (2) - GB-611	ENGINE START STOP switch “OFF”	⩽ 1 Ω



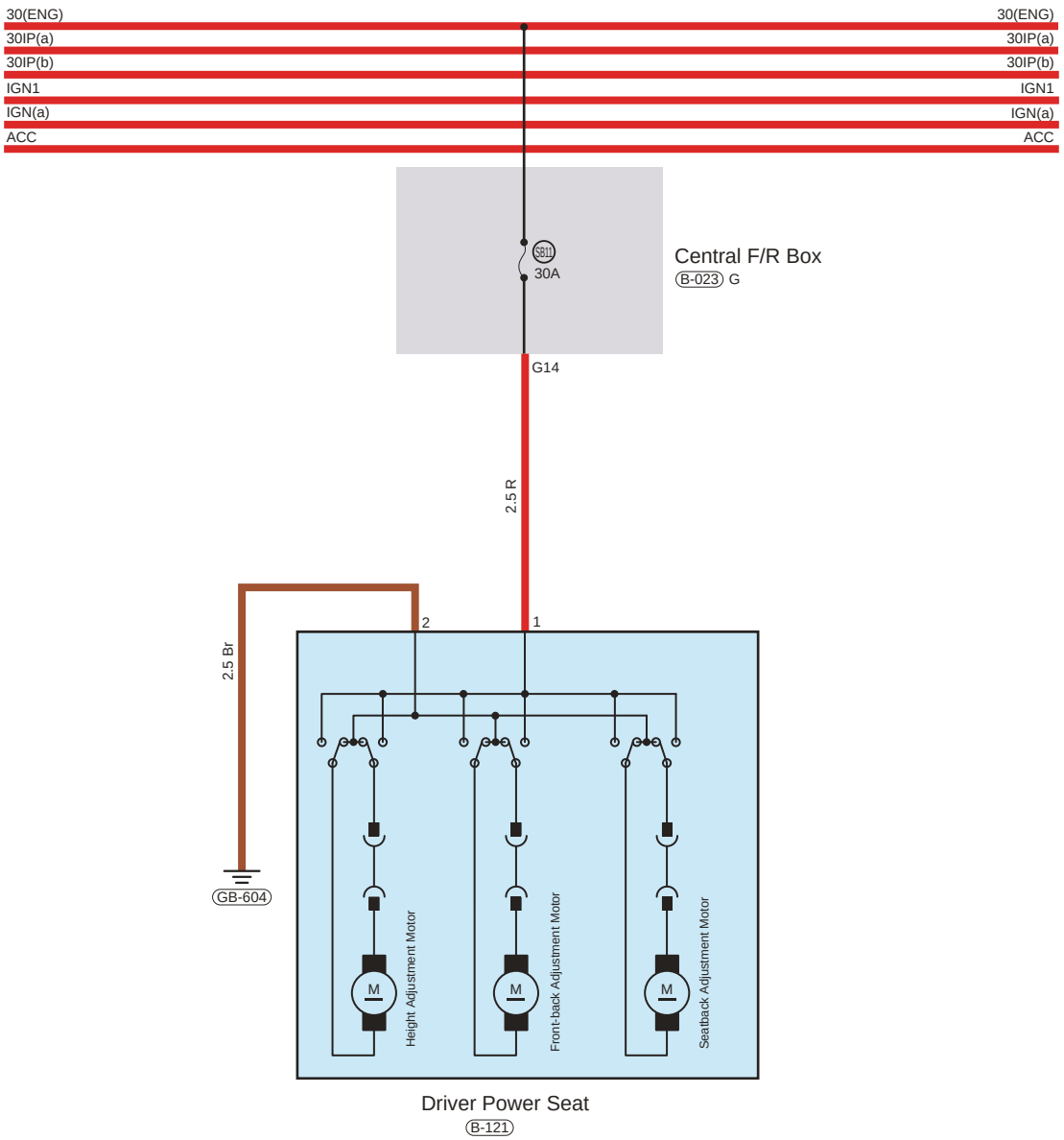
OK → **Replace seat assembly.**

NG → **Handle and repair related wire harness**

DTC	**B2181-19**	**Backrest Adjustment Control Circuit High Current**
DTC	**B2181-18**	**Backrest Adjustment Control Circuit Low Current**
DTC	**B2182-04**	**Backrest Adjustment Control Circuit Internal Fault**

Description

Control Schematic Diagram



DTC	Description
B2181-19	Backrest Adjustment Control Circuit High Current
B2181-18	Backrest Adjustment Control Circuit Low Current
B2182-04	Backrest Adjustment Control Circuit Internal Fault

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

(a) Check sensor connectors, controller connectors for corrosion, poor contact, displacement and repair it if any symptom occurs.

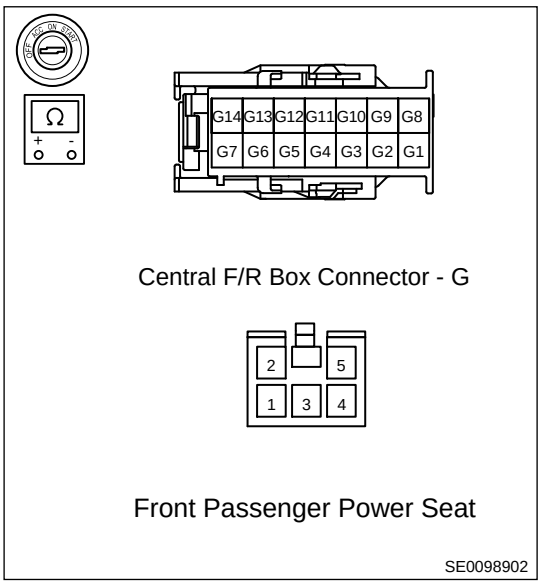
(b) Check the continuity of sensor wire harness and replace wire harness if open circuit malfunction occurs.

(c) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(d) Disconnect the driver seatback motor connector B-121.

(e) Using ohm band of multimeter, detect continuity between B-121 (1) and B-023G (14), B-121 (2) and GB-604 separately.

Multimeter Connection	Condition	Specified Condition
B-121 (1) - B-023G (14)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
B-121 (2) - GB-604	ENGINE START STOP switch “OFF”	⩽ 1 Ω



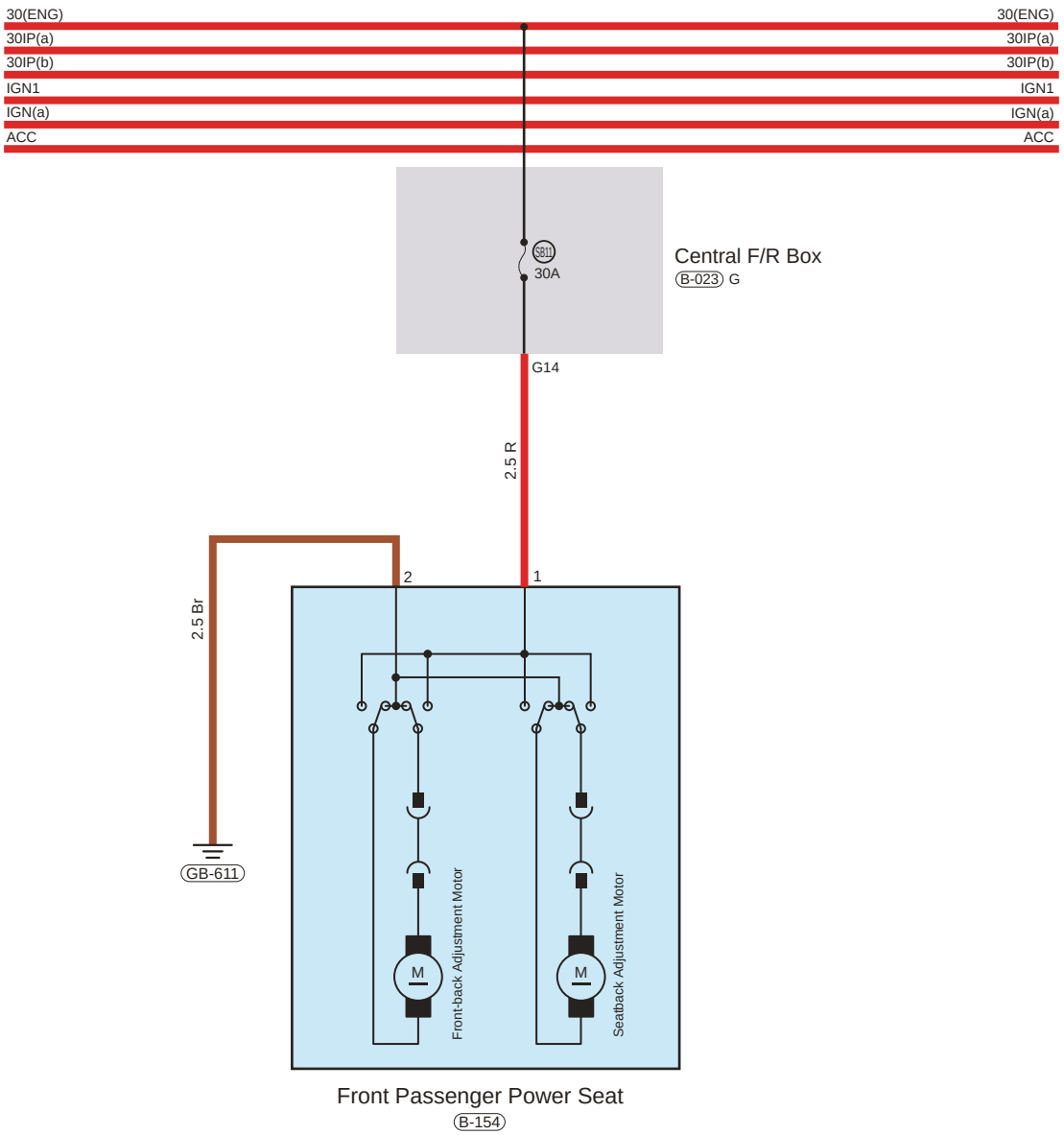
OK → **Replace seat assembly.**

NG → **Handle and repair related wire harness**

DTC	**B2181-19**	**Backrest Adjustment Control Circuit High Current**
DTC	**B2181-18**	**Backrest Adjustment Control Circuit Low Current**
DTC	**B2182-04**	**Backrest Adjustment Control Circuit Internal Fault**

Description

Control Schematic Diagram



DTC	Description
B2181-19	Backrest Adjustment Control Circuit High Current
B2181-18	Backrest Adjustment Control Circuit Low Current
B2182-04	Backrest Adjustment Control Circuit Internal Fault

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

(a) Check sensor connectors, controller connectors for corrosion, poor contact, displacement and repair it if any symptom occurs.

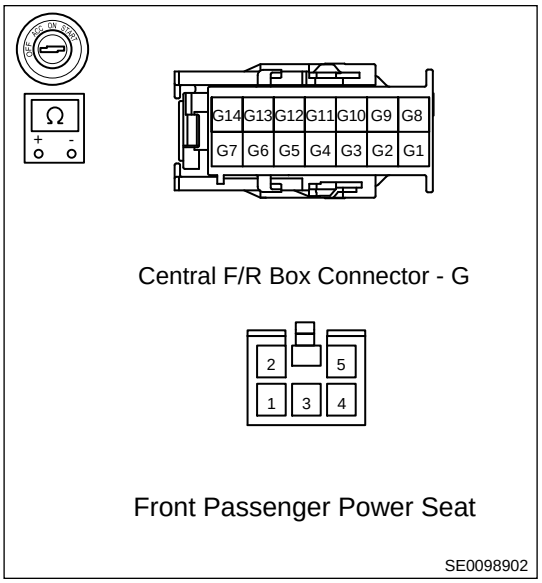
(b) Check the continuity of sensor wire harness and replace wire harness if open circuit malfunction occurs.

(c) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(d) Disconnect the front passenger seatback motor connector B-154.

(e) Using ohm band of multimeter, detect continuity between B-154 (1) and B-023G (14), B-154 (2) and GB-611 separately.

Multimeter Connection	Condition	Specified Condition
B-154 (1) - B-023G (14)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
B-154 (2) - GB-611	ENGINE START STOP switch “OFF”	⩽ 1 Ω



OK	**Replace seat assembly.**
NG	**Handle and repair related wire harness**

DTC	B2183-77	Button Stuck

Description

DTC	Description
B2183-77	Button Stuck

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check button

(a) Install button to a new vehicle, observe whether the same fault phenomenon occurs.

NG	**Replace button**

OK

2	Reconfirm DTCs

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to “ON”.
(d) Use diagnostic tester (the latest software) to read the DTCs stored in body control system again.

OK	**System is normal**
NG	**Replace seat assembly.**

On-vehicle Service

Front Seat Assembly

Removal

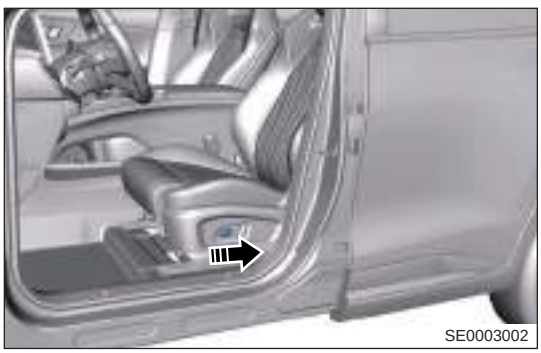
Hint:

- Use same procedures for front passenger seat assembly and driver seat assembly.
- Procedures listed below are for driver seat assembly.

⚠ Caution

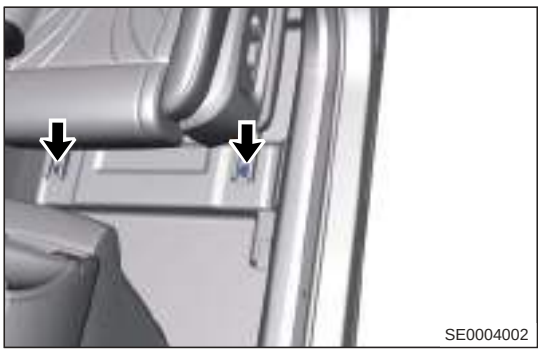
- Be sure to wear safety equipment to prevent accidents, when removing driver seat assembly.
- Appropriate force should be applied, when removing driver seat assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing driver seat assembly.

1. Remove the driver seat assembly.
   a. Press power seat front-back adjustment switch, and move seat assembly to rearmost position.

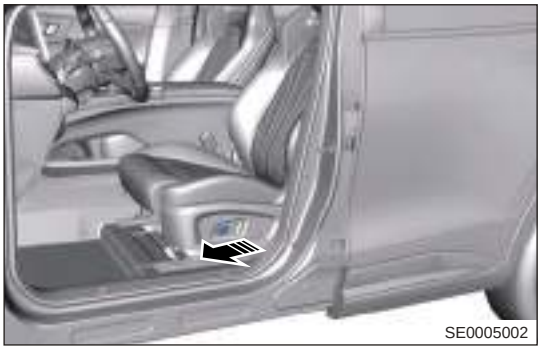

SE0003002

   b. Remove 2 fixing bolts (arrow) from front side of seat assembly.

      Tightening torque: 25 ± 4 N·m

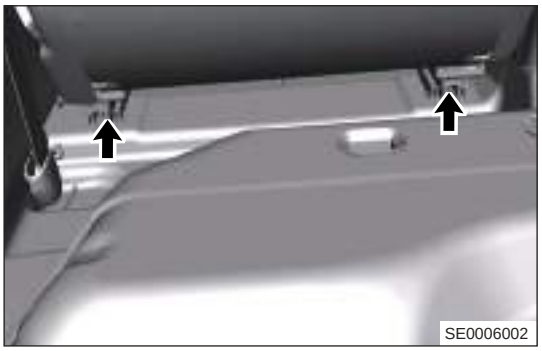

SE0004002

c. As shown in the illustration, press power seat front-back adjustment switch, and move seat assembly to foremost position.


SE0005002

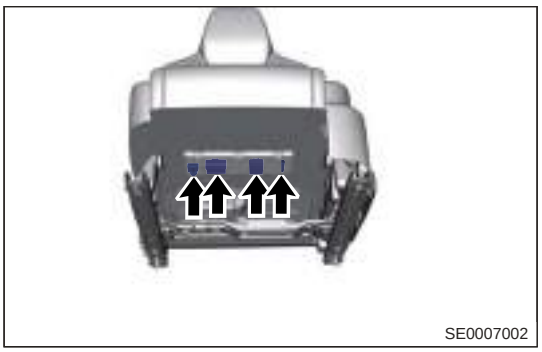
d. Remove 2 fixing bolts (arrow) from rear side of seat assembly.

Tightening torque: 25 ± 4 N • m


SE0006002

2. Turn off all electrical equipment and the ignition switch.
3. Disconnect the negative battery cable.

e. Disconnect wire harness connectors (arrow) under seat assembly.


SE0007002

f. Remove the driver seat assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when installing seat assembly.
- When installing seat assembly, be careful not to damage the body paint surface.
- Try to prevent carpet from being scratched or damaged, when installing seat assembly.

Inspection

1. After installation of seat assembly is completed, check the basic functions of seat assembly, and confirm that the following functions operate normally:

a. When sliding seat to the foremost and rearmost positions by pressing the power seat adjustment switch, check if the following malfunctions of seat occur: heavy operation, high sliding resistance, stuck and motor noise. If above conditions occur, repair or replace in time.

Hint:

- Whole stroke for forward and backward adjustment is 240 mm. From designed position, the seat is adjustable from 200 mm forward and 40 mm backward.


SE0009002

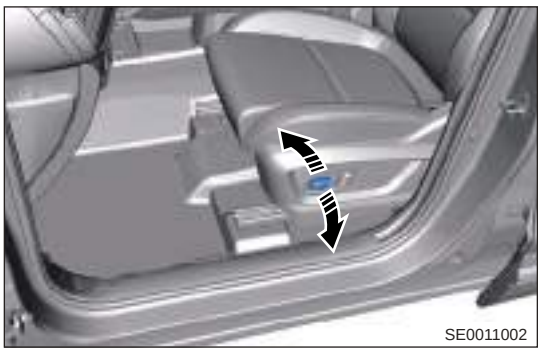
b. Adjust the seat reclining to the maximum and minimum angles by pressing the power seat reclining adjustment switch, to check if seatback is heavily turned over and stuck, motor noise, etc. If above conditions occur, repair or replace in time.

Hint:

- The designed seatback angle is 25° and it is adjustable within 30° forward and 50° backward.

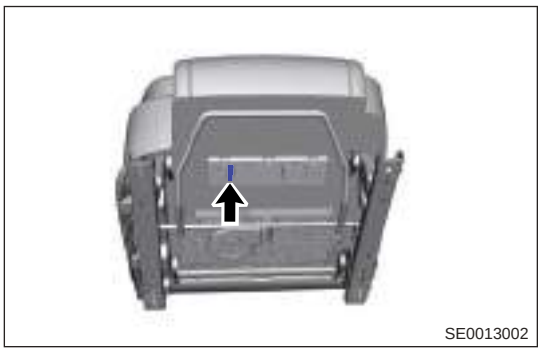

SE0010002

c. Adjust seat to maximum and minimum angle by pressing power seat height adjustment switch (for driver side), to check if the operation of seat is heavy and stuck, and motor noise, etc. If above conditions occur, repair or replace in time.


SE0011002

2. Inspect the seat occupancy sensor (for front passenger side).

a. Disconnect the seat occupancy sensor wire harness connector (arrow).


SE0013002

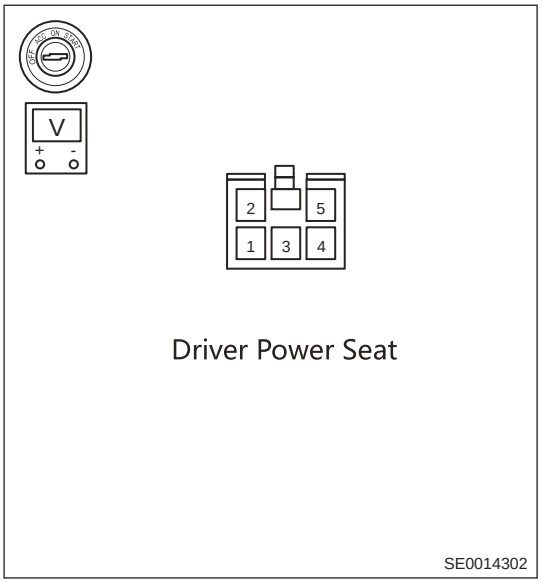
b. Measure the resistance of occupancy sensor with a digital multimeter, standard resistance is shown in the table below:

Multimeter Connection	Condition	Specified Condition
Terminal 1 and Terminal 2	Occupied	< 100 Ω
Terminal 1 and Terminal 2	No occupied	> 400 Ω

3. Check power seat power supply.

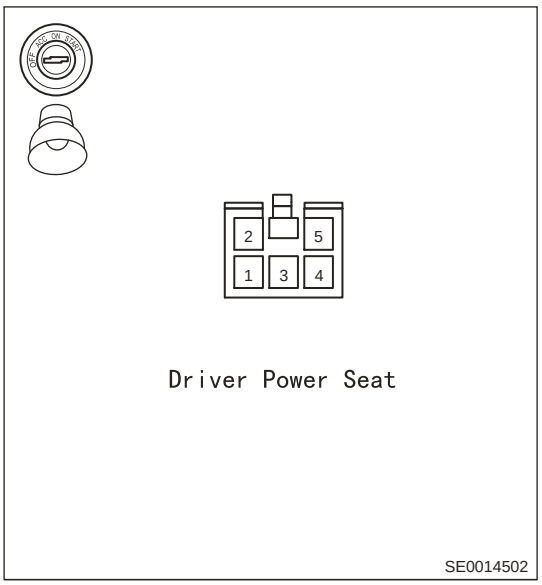
a. Disconnect power seat switch connector B-121. Using multimeter, measure the voltage between B-121 (1) and B-121 (2) to check if the power supply is normal.

Multimeter Connection	Specified Voltage
B-121 (1) - B-121 (2)	Not less than 12 V



b. Using the test light of 21 W, measure the load between B-121 (1) and B-121 (2) to check if the power supply is normal.

Test Light Connection	Specified Condition
B-121 (1) - B-121 (2)	Test light comes on normally



Rear Seat Assembly

Removal

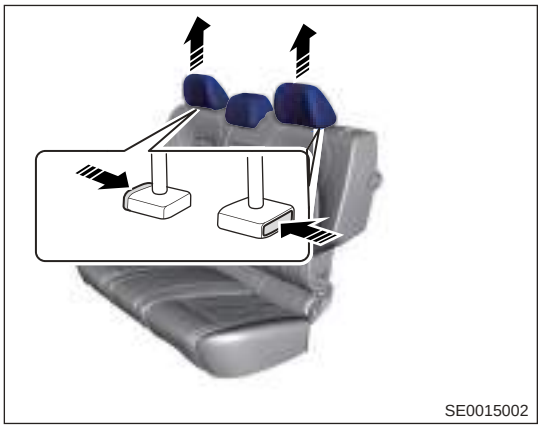
Hint:

- Use same procedures for rear left seat headrest and rear right seat headrest.
- Procedures listed below are for left seat headrest.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing rear seat assembly.
- Appropriate force should be applied, when removing rear seat assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing rear seat assembly.

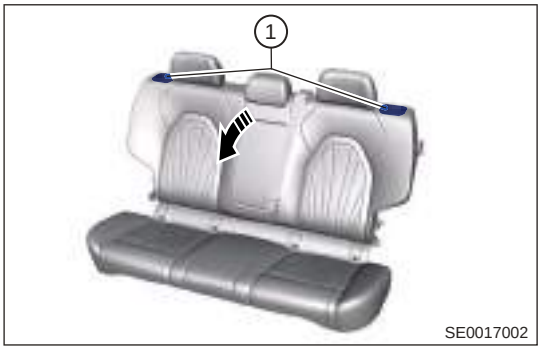
1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the luggage compartment carpet.
4. Remove the rear seat headrest assembly.
   a. As shown in the illustration, press the release button of seat headrest guide (w/ button), and remove rear seat headrest assembly.


SE0015002

5. Remove the rear seat cushion assembly.
   a. Using an interior crow plate, pry off center seat belt buckle switch (arrow), and loosen center seat belt (1).

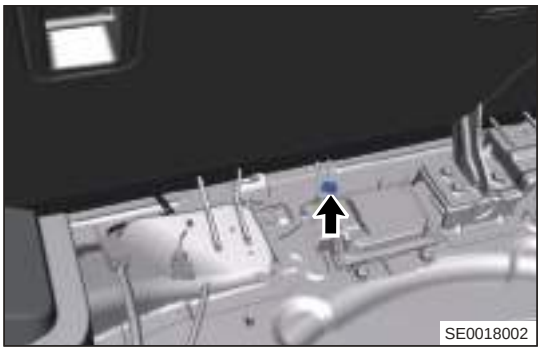
SE0016002

b. Press rear seatback switches (1) and put down rear seat.



c. Remove fixing bolts (arrow) between rear part of rear seat cushion and body.

Tightening torque: 50 ± 5.0 N • m



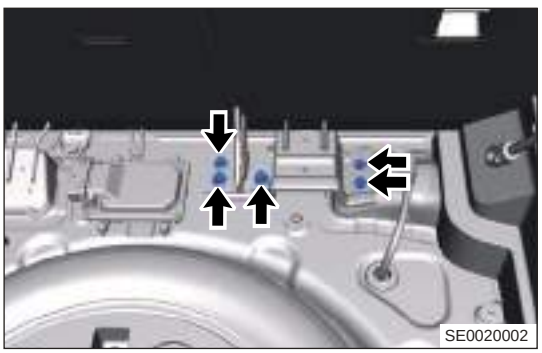
d. Raise up one side of rear seat cushion lightly, and detach fixing clip between cushion and body.

e. Remove the rear seat cushion assembly.

6. Remove the rear seatback assembly.

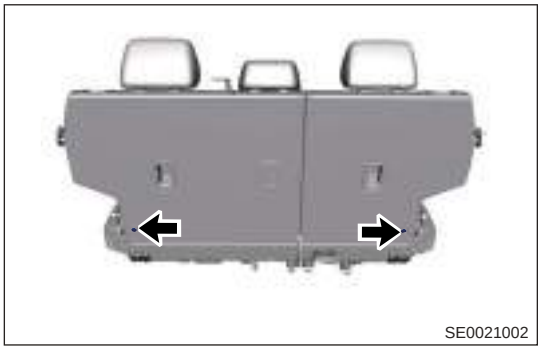
a. Remove 5 fixing bolts (arrow) between rear seatback and body.

Tightening torque: 50 ± 5.0 N • m



b. Remove 2 fixing bolts (arrow) between left and right ends of rear seat and body.

Tightening torque: 50 ± 5.0 N • m


SE0021002

c. Remove the rear seatback assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when installing rear seat assembly.
- When installing rear seat assembly, be careful not to damage the body paint surface.
- When installing rear seat assembly, try to prevent carpet from being scratched or damaged.

Inspection

1. After installing rear seat assembly, check the basic functions of rear seat assembly, and confirm that the following functions operate normally:
   a. Press rear seatback switch to pull down seatback, to check if operation of seat is hard, seatback not installed in position etc. If above conditions occur, repair or replace in time.

      Hint:
      - The designed seatback angle is 25° and it is adjustable within 100° forward and 0° backward.

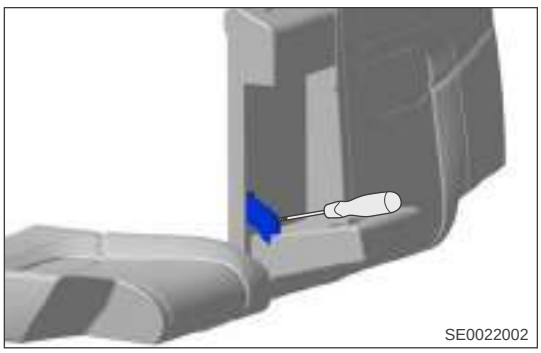
   b. Check if rear seat cushion is loose. If above conditions occur, replace cushion clips in time.
   c. Check extend and retract of rear seat headrest for stuck, noise etc. If above conditions occur, repair or replace in time.

Disassembly

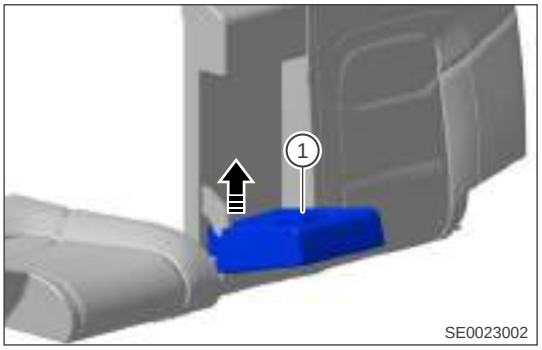
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when disassembling rear seat assembly.
- Appropriate force should be applied, when disassembling rear seat assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing rear seat assembly.

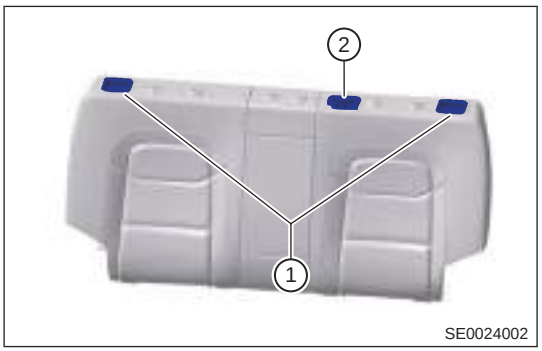
1. Remove the rear seat center armrest assembly.
   a. Using a screwdriver wrapped with protective tape, pry off trim cover (arrow) from center armrest.


SE0022002

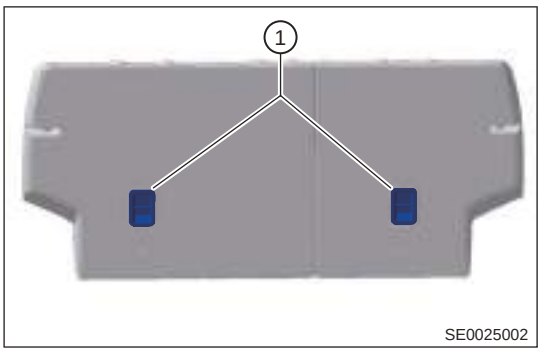
b. Remove center armrest assembly (1) in direction of arrow as shown in illustration.



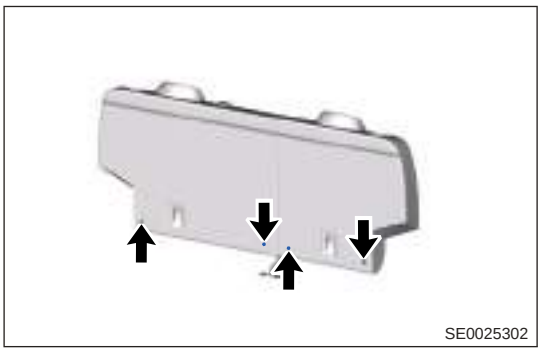
2. Remove rear seat release switch trim cover and center seat belt trim cover.
   a. Using an interior crow plate, pry off rear seat release switch (1) trim cover and center seat belt trim cover (2).



3. Remove the child seat interface trim cover.
   a. Using an interior crow plate, pry off the child seat fixture (1).



4. Remove the rear seat headrest guide.
   a. Open zippers (arrow) on back side of rear seatback.



   b. Remove the plastic lining plate of seatback.

c. Press and hold the lower part of seat headrest guide in the direction of arrow as shown in the illustration, and remove rear seat headrest guide.

Assembly

1. Assembly is in the reverse order of disassembly.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when assembling rear seat assembly.
- Be careful not to damage seat cover, when assembling rear seat assembly.
- When assembling rear seat assembly, replace damaged clips and band.
- When assembling rear seat assembly, keep seat cover clean and tidy, and try to prevent wrinkles.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when installing rear seat assembly.
- When installing rear seat assembly, be careful not to damage the body paint surface.
- When installing rear seat assembly, try to prevent carpet from being scratched or damaged.

DOOR LOCK

Warnings and precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. Be sure to wear necessary safety equipment to prevent accidents, when removing engine hood lock assembly.
2. Be sure to wear necessary safety equipment to prevent accidents, when removing engine hood cable assembly.
3. Be sure to wear necessary safety equipment to prevent accidents, when removing front door lock assembly.
4. Be sure to wear necessary safety equipment to prevent accidents, when removing front door key cylinder assembly.
5. Be sure to wear necessary safety equipment to prevent accidents, when removing front door lock striker assembly.

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

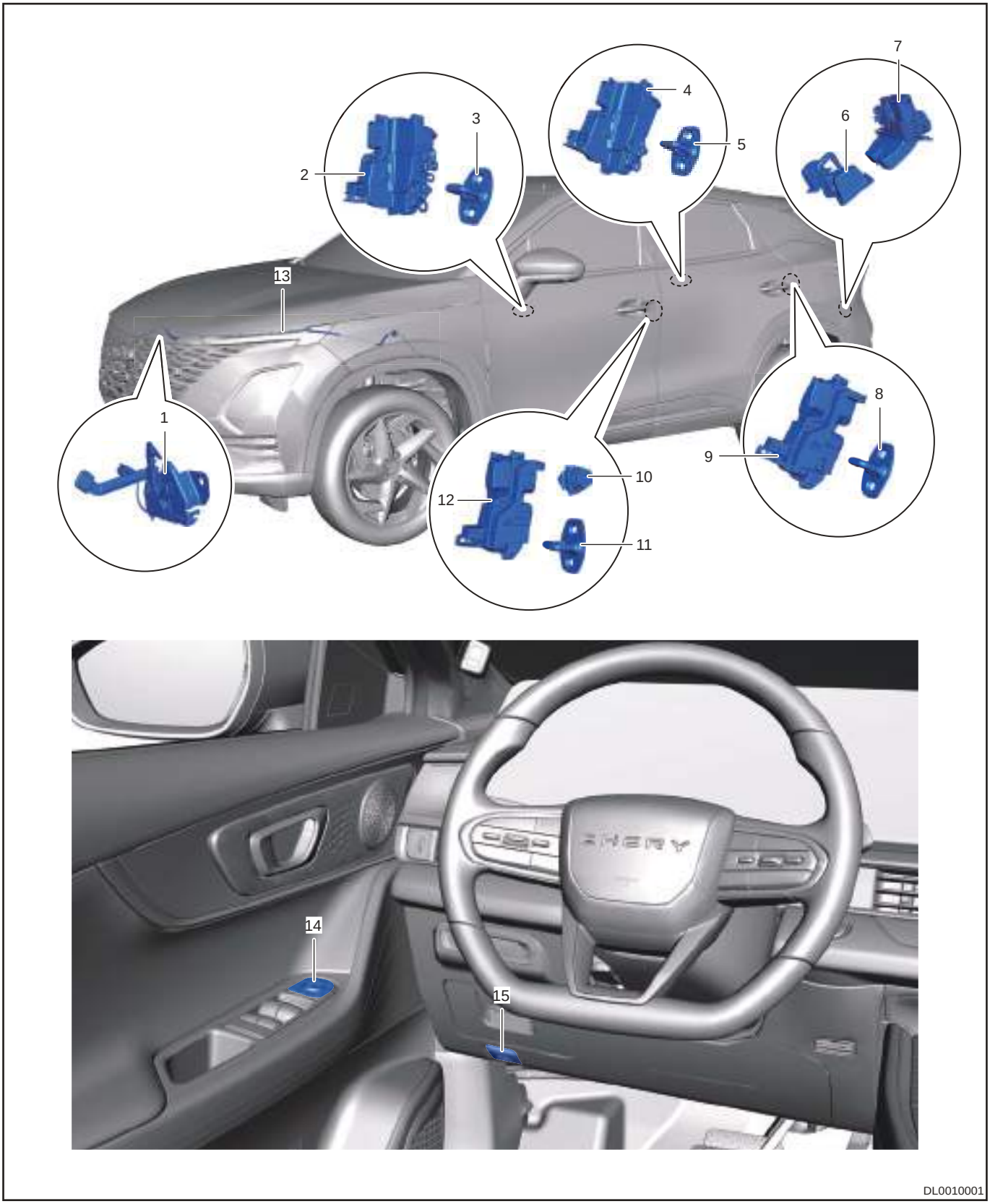
1. Side door lock is secured to door inner panel with 3 bolts, evenly apply appropriate amount of thread lock adhesive to 5 to 7 teeth of 3 door lock mounting bolts in advance; pay attention to keep child lock locking when assembling rear door lock.
2. Align middle lines in up-down and left-right directions on lock striker with line on quarter, which should be ensured at the center of lock mechanism to ensure flexible locking and unlocking.

System Overview

System Description

Door lock system is a device mounted on the door and its pillar, which can reliably lock the door and realize the opening and locking functions through its internal mechanism. It is a very important accessory of body. It has safety protection function, which must guarantee reliable locking of door in the normal use, preventing the door accident/unintentional recognition to open. It also guarantee that door needs to open smoothly, to ensure that door can open in normal or when an emergency occurs, so as not to cause casualties and property losses which belongs to safety regulations.

System Components Diagram



1	Engine Hood Lock Assembly	9	Rear left door lock assembly
2	Front right door lock assembly	10	Side Door Lock Cylinder

3	Right Door Lock Striker	11	Left Door Lock Striker
4	Rear right door lock assembly	12	Front left door lock assembly
5	Right Rear Door Lock Striker	13	Engine Hood Lock Cable Assembly
6	Back Door Lock Striker Assembly	14	Central Control Lock Switch
7	Back door lock assembly	15	Engine Hood Grip Assembly
8	Rear Left Door Lock Striker		

Anti-theft Management

1. Fortifying mode
   - Trigger conditions:
   - IGN = OFF (it is not in IGN ON or ACC);
   - Four doors & two covers are closed;
   - BCM receives remote control lock command.
   - BCM feedback when fortifying mode is entered:
   - Turn signal light flashes once (turn on for 500 ms) and sends the corresponding LHTurnsignalSts and RHTurnsignalSts;
   - Theft deterrent indicator is continuous flash at frequency of 100ms, 1900ms.
   - Actuate the anti-theft horn 50 ms and high and low pitched horns 15 ms.
2. Fortifying failure mode
   - Trigger conditions:
   - IGN = OFF;
   - Any of four doors & two covers is open;
   - BCM receives remote control lock command.
   - BCM light feedback when fortifying failure mode is entered:
   - Turn signal light flashes two times (flashing for 500 ms, interval time is 1 s) and sends the corresponding LHTurnsignalSts and RHTurnsignalSts signals.
   - When entering fortifying failure mode: If four doors are closed and any of the two covers is opened, BCM will perform central control lock command once; If two covers are closed and any of the doors is opened, BCM will perform central control lock command and then perform unlock command (the interval time is 500 ms).
3. Intrusion mode
   - Trigger conditions: BCM will enter to alarm status after the following conditions are met when the vehicle is in fortifying mode:
   - Doors or engine hood is opened;
   - Key is turned to IGN ON;
   - Luggage compartment is opened forcibly.
   - After entering to intrusion mode, BCM feedback the conditions within one alarm cycle (30 s):
   - Anti-theft horn (high and low pitched horns sound at frequency of 500 ms ON and 500 ms OFF) operates for 28 ± 2s, pause for 5s;
   - Left and right turn signal lights flash 28 s at frequency of 75 times/min (400 ms on, 400 ms off) and pause for 5s, and send the corresponding LHTurnsignalSts and RHTurnsignalSts (Bcan);
   - Anti-theft indicator continuously flashes at frequency of 100 ms on, 200 ms off, 100 ms on, 600 ms off.
   - Four doors & two covers and IGN ON illegal activation action are alarm trigger sources;
   - In the same alarm source, a single trigger source can trigger 3 alarm cycles at most;

- In multiple alarm trigger sources, BCM can trigger 8 alarm cycles at most (after 8 alarm cycles, the sound and light alarm will stop);
- If the intrusion ends, BCM will stop alarm after the current alarm cycle. If the same alarm source is triggered again after the alarm is over, BCM will perform the remaining alarm cycles.
- If the four doors & two covers are closed at the end of the alarm, BCM will enter fortifying mode.

4. Fortifying deactivation mode
   - Activation conditions: Vehicle is in alarm mode; BCM receives RF unlock command or BCM detects IMMOCodeWarningLightSts=0 for 1 s continuously after the key is switched to IGN ON for 2 seconds.
   - When the alarm is released: vehicle exits anti-theft function mode; anti-theft horn (high and low pitched horns (if equipped)) stops working, and the turn signal light stops flashing.
   - After alarm is released, if key is not in IGN ON, anti-theft indicator light still flashes at a frequency of 100 ms on, 200 ms off, 100 ms on and 600 ms off; if the key is in IGN ON, anti-theft indicator light stops flashing.
5. Pre-rearming mode
   - Trigger conditions:
   - Vehicle is in fortifying mode;
   - BCM receives remote control unlock command.
   - BCM feedbacks when fortifying mode is released.
   - Theft deterrent indicator turns off immediately;
   - Turn signal light flashes 2 times at frequency of 500 ms on and 500 ms off, and sends the corresponding LHTurnsignalSts and RHTurnsignalSts.
   - Within 30±2 s after fortifying mode is released:
   - If any of all doors, engine hood or luggage compartment are open, BCM exits anti-theft mode;
   - If all doors, engine hood and luggage compartment are always closed, BCM will lock automatically and enter the fortifying state after 30 s, and anti-theft indicator will flash at the frequency of 100 ms on and 1900 ms off.
6. Luggage compartment opening mode
   - Trigger conditions:
   - Vehicle is in fortifying mode;
   - BCM receives remote control luggage compartment open command for more than 1.5 s;
   - BCM feedback when luggage compartment opening mode is triggered:
   - Turn signal light illuminates and sends the corresponding LHTurnsignalSts and RHTurnsignalSts;
   - Luggage compartment is open and no alarm is triggered
   - Then close the luggage compartment, vehicle returns to the fortifying state, and if there is no legal key, the luggage compartment switch cannot open luggage compartment.
   - After using remote control to open the luggage compartment: After BCM receives remote control lock command, vehicle will immediately lock and return to fortifying state, but the turn signal light prompts fortifying failure.
   - After using remote control to open the luggage compartment and close it again: After BCM receives remote control lock command, vehicle will immediately lock and return to fortifying state, but the turn signal light prompts fortifying successfully. If there is no registered key after the luggage compartment closed, the switch will not open the luggage compartment;
7. Luggage Compartment Opening Management (without PLG)
   - When the central control lock is in unlock state:
   - When the luggage compartment opening switch is activated, the luggage compartment opens.
   - When the central control lock is in lock state:
   - Luggage compartment is opened.
   - IGN OFF;

- BCM receives RF luggage compartment command for more than 1.5 s.
- Turn signal light illuminates and sends the corresponding LHTurnsignalSts and RHTurnsignalSts;
- Luggage compartment is opened
- After luggage compartment is opened by remote control, close it manually, if there is no registered key (PKE), the luggage compartment will not open by the luggage compartment button.
- When luggage compartment is opened, the luggage compartment light turns on.
- When luggage compartment is opened, the actuate time of motor is 200 ms.
- When the vehicle speed reaches 10km/h, the luggage compartment will not be opened (please note that the ignition remains in IGN while testing - BSM is 15 nodes).

8. Luggage Compartment Opening Management (with PLG)
   - When the vehicle is in fortifying deactivation mode:
   - When the luggage compartment switch is activated, the luggage compartment opens/closes; turn signal light flashes twice, 200ms ON - 200ms OFF.
   - During the process of opening / closing back door, press remote control briefly to stop the current action of back door.
   - Global fortifying.
   - When GlobaSW is pressed and following conditions are met, BCM performs vehicle fortifying.
   - IGN OFF.
   - Four doors and engine hood are closed;
   - Back door is locked within 10 s.
   - When the vehicle is in fortifying mode:
   - Luggage compartment is open/closed.
   - IGN OFF/ACC position;
   - BCM receives remote control luggage compartment command for more than 1.5 s.
   - Turn signal light flashes twice, 200ms ON - 200ms OFF.
   - During the process of opening / closing back door, press remote control briefly to stop the current action of back door.
   - After back door is closed, the vehicle returns to fortifying state.
9. Central Control Lock
   - Central control lock activation conditions:
   - (1)Four doors are closed; (2) Vehicle is not in anti-theft state; (3) Central control lock locked switch is activated.
   - Central control unlock activation conditions:
   - (1) Central control lock unlocked switch is activated; (2) Vehicle is not in anti-theft state.
   - Mechanical lock locked/unlocked activation conditions:
   - (1) Central control lock or mechanical lock locked switch is activated; (2) Vehicle is not in anti-theft state.
   - Activation conditions for auto unlock (if equipped):
   - Vehicle speed is 0km/h;
   - Door lock is locked;
   - Key is switched to OFF from other positions.
   - The bench testing needs to ensure that there is no speed signal after IGN is turned off.
   - Collision unlock: After BCM receives CrashOutputSts≠00 CAN signal when IGN ON:
   - BCM performs central control unlocking twice and the interval time is 1 second (regardless of the door state); locking is prohibited; key is switched to OFF, prohibit locking is canceled.
   - BCM receives unlocking or locking command twice in 1 second and the second time will be ignored.

- BCM is powered on again after powered off, BCM has no lock or unlock action.
- For remote control lock and unlock function, please refer to lock and unlock contents in anti-theft management.

Diagnostic Information and Steps

Problem Symptoms Table

Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair or adjust faulty components, or replace it as necessary.
Power door lock control system:

Symptom	Suspected Area
All door lock/unlock functions do not operate	Body control module (BCM) fuse
	Power door unlock/lock switch button
	Wire harness or connector
	Body Control Module (BCM)
Only Driver Side Door Lock/Unlock Function does not Operate	Front Left Door Lock Assembly
	Wire harness or connector
Only passenger side door lock/unlock function does not operate	Front Right Door Lock Assembly
	Wire harness or connector
Only Rear Left Door Lock/Unlock Function does not Operate	Rear Left Door Lock Assembly
	Wire harness or connector
Only rear right door lock/unlock function does not operate	Rear Right Door Lock Assembly
	Wire harness or connector
Only back door open/close function does not operate	Back door lock assembly
	Wire harness or connector

Wireless Door Lock Control System:

Symptom	Suspected Area
Only wireless control function does not operate	Wireless key battery
	Anti-theft Matching
	Wire harness or connector
	Body Control Module (BCM)

Diagnostic Help

- Connect diagnostic tester (the latest software) to diagnostic interface, and make it communicate with vehicle electronic module through data network.
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If Diagnostic Trouble Code (DTC) cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.

- Visually check the related wire harness.
- Check and clean all system grounds related to the latest DTCs.
- If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Turn ENGINE START STOP switch to ON.
- Use the diagnostic tester to record and clear DTCs stored in the system.
- Turn ENGINE START STOP switch to OFF and wait several seconds.
- Turn ENGINE START STOP switch to ON and check DTCs in the system again.
- If DTC is detected, it indicates current malfunction.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate the conditions under which DTC was reset.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect the mounting areas of instrument cluster, wire harness or wire harness connector and so on for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- Remove instrument cluster from malfunctioning vehicle, then install it to a new vehicle and perform a test. If this DTC cannot be cleared, instrument cluster is malfunctioning. If DTC can be cleared, reinstall instrument cluster to original vehicle.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Groundings are very important to entire circuit system, which are normal or not can seriously affect the entire circuit system. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) and oxidation may increase load resistance. This case will seriously affect normal operation of circuit. Check the ground points as follows:

- Remove ground bolt or nut.
- Check all contact surfaces for tarnish, dirt and rust, etc.
- Clean as necessary to ensure that contact is in good condition.
- Reinstall ground bolt or nut securely.
- Check if any additional accessories interfere with ground circuit.
- If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnosis Procedure

Hint:
Use following procedures to troubleshoot the door lock system.

1	**Vehicle brought to workshop**

Next

2	**Examine vehicle and check basic items**

Check system power supply voltage, and check that fuse, wire harness and connector are connected normally.

OK

Standard voltage: Not less than 12 V.

Result

NG → **Check and replace malfunctioning parts**

OK

3	**Using a diagnostic tester, read related DTC and data stream information**

Result

Result	Proceed to
No DTC	A
DTC occurs	B

A → **Perform troubleshooting procedure without DTCs according to malfunction symptom**

B

4	**Troubleshoot according to DTCs troubleshooting procedure**

Result

Result	Proceed to
Problem is not resolved	A
Problem is resolved	B

A → **Return to procedure 1 and troubleshoot the process again**

B

5	**According to door lock system malfunction repair completion inspection and delivery, confirm that malfunction is resolved.**

Result

Result	Proceed to
Delivery inspection is failed	A
Delivery inspection is qualified	B

A → **Return to procedure 1 and troubleshoot the process again**

B

6	**Finished**

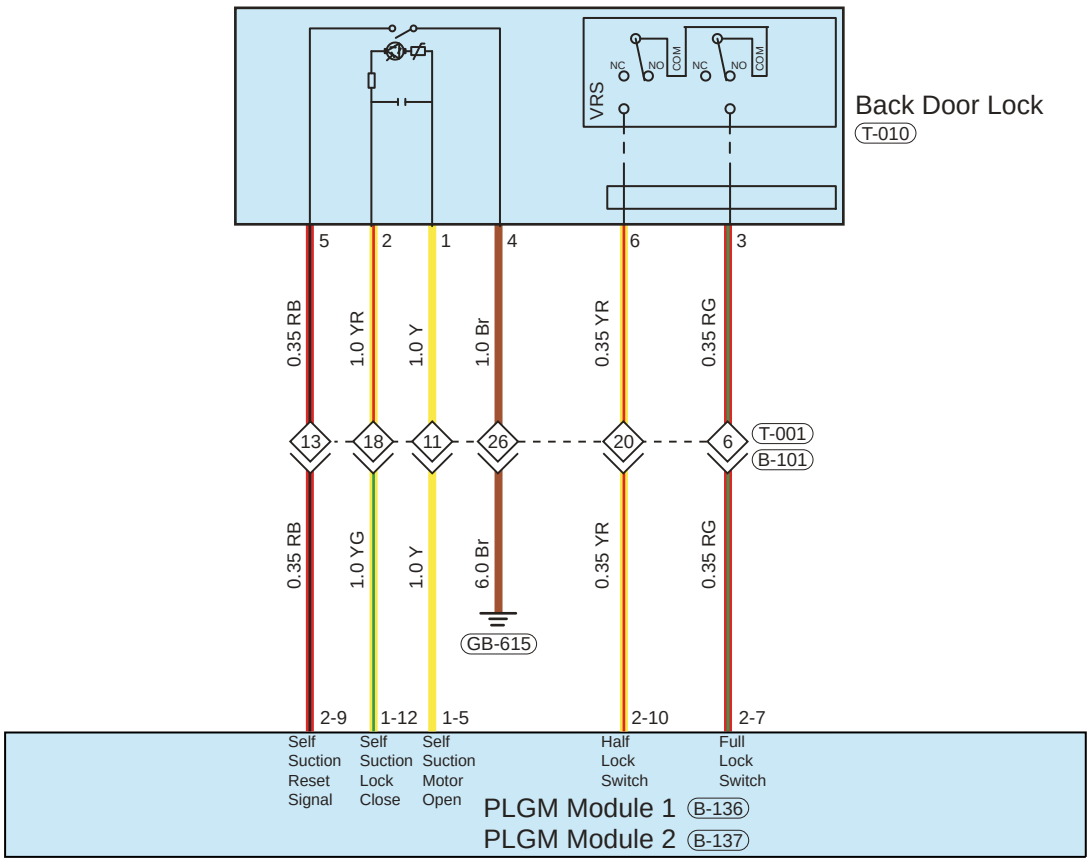
Diagnostic Trouble Code (DTC) Chart

DTC	DTC
B1024-71	Trunk Lock Control Circuit

DTC Diagnosis Procedure

DTC	**B1024-71**	**Trunk Lock Control Circuit**

Description
Control Schematic Diagram


VRS
NC
NO
COM
NC
NO
COM
Back Door Lock
T-010
5
2
1
4
6
3
0.35 RB
1.0 YR
1.0 Y
1.0 Br
0.35 YR
0.35 RG
13
18
11
26
20
6
T-001
B-101
0.35 RB
1.0 YG
1.0 Y
6.0 Br
0.35 YR
0.35 RG
GB-615
2-9
1-12
1-5
2-10
2-7
Self Suction Reset Signal
Self Suction Lock Close
Self Suction Motor Open
Half Lock Switch
Full Lock Switch
PLGM Module 1 B-136
PLGM Module 2 B-137
DL0001501

DTC	Description	Failure Category Definition	Fault Type	Detection Conditions (-Store Current DTC)	Recovery Conditions (-Save as History DTC)	Detection Conditions (-Store Current DTC) Software Actual Detection Strategy	Detection Conditions (-Store Current DTC) Software Actual Detection Strategy	Fault Lamp	Component Interface Circuit	Possible Cause
B102-4-71	Trunk Lock Control Circuit	Actuator Stuck	Output error	when output is OFF, V_BAT_SW is OFF, output voltage>7-V, it is stored as the current DTC. (The error is less than 10%, the time of duration is more than 100 MS, the software will detect once every	The output is invalid, the voltage in the circuit is less than 3V, clear the current DTC, and store it as history DTC (The error is less than 10%, the time of duration is more than 100 MS, the software	The output is not turned on and detected as valid (the diagnosis collects high level for more than 10 times (-detection starts after 2s of power on, once in 10ms)), it is stored as	The output is not turned on and detected as invalid (the diagnosis collects low level (-detection starts after 2s of power on, once in 10ms)) , clear the current DTC, and store it as history DTC.	/	/	• Back door lock assembly • Wire harness or connector • PLG-M module

DTC	Description	Failure Category Definition	Fault Type	Detection Conditions (-Store Current DTC)	Recovery Conditions (-Save as History DTC)	Detection Conditions (-Store Current DTC) Software Actual Detection Strategy	Detection Conditions (-Store Current DTC) Software Actual Detection Strategy	Fault Lamp	Component Interface Circuit	Possible Cause
				10M-S, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will be output	will detect once every 10M-S, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key	current DTC.				

DTC	Description	Failure Category Definition	Fault Type	Detection Conditions (-Store Current DTC)	Recovery Conditions (-Save as History DTC)	Detection Conditions (-Store Current DTC) Software Actual Detection Strategy	Detection Conditions (-Store Current DTC) Software Actual Detection Strategy	Fault Lamp	Component Interface Circuit	Possible Cause
				as long as operating conditions of load are met.)	position, load will be output as long as operating conditions of load are met.)					

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check back door lock assembly**

(a) Check back door lock assembly.

NG → **Replace back door lock assembly**

OK

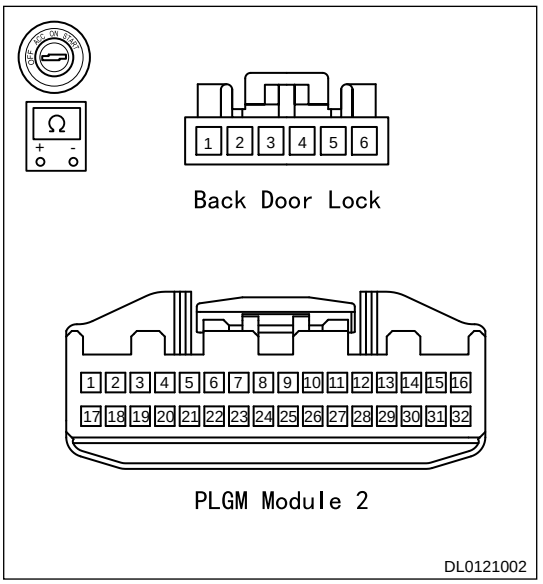
2	**Check back door lock wire harness**

(a) Turn ENGINE START STOP switch to “OFF”.

(b) Disconnect PLGM connector B-136 and back door lock connector T-010.

(c) Using ohm band of multimeter, check for continuity between PLGM terminal and back door lock terminal.

Multimeter Connection	Condition	Specified Condition
B-137 (2-9) - T-010 (5)	Always	⩽ 1 Ω
B-136 (1-12) - T-010 (2)	Always	⩽ 1 Ω
B-136 (1-5) - T-010 (1)	Always	⩽ 1 Ω
T-010 (4) - GB-615	Always	⩽ 1 Ω
B-137 (2-10) - T-010 (6)	Always	⩽ 1 Ω
B-137 (2-7) - T-010 (3)	Always	⩽ 1 Ω



NG → **Repair or replace back door lock wire harness**

OK ↓

3	Check PLGM module

(a) Install PLGM module to a new vehicle, observe whether the same fault phenomenon occurs.

NG → **Replace PLGM module**

OK ↓

4	Reconfirm DTCs

(a) Connect all the connectors.

(b) Connect the negative battery cable.

(c) Turn ENGINE START STOP switch to “ON”.

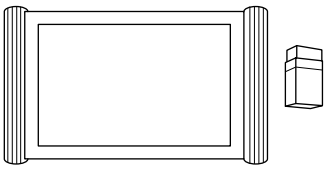
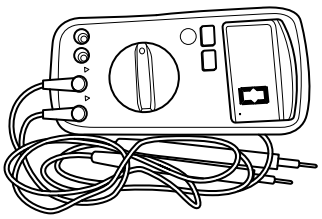
(d) Use diagnostic tester (the latest software) to read the DTCs stored in body control system again.

OK → **System is normal**

On-vehicle Service

Tools

General Tools

Tool Name	Tool Drawing
Diagnostic tester	 RCH0001006
Digital Multimeter	 RCH0002006

Replacement of Engine Hood Lock Assembly

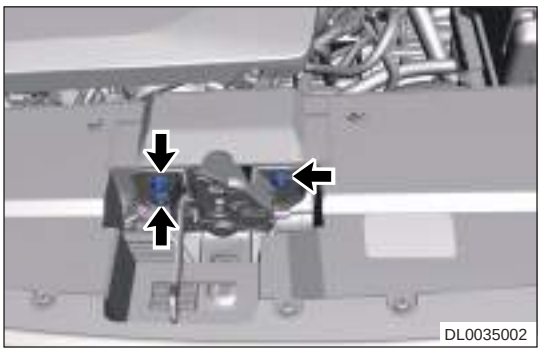
Removal

⚠ Warning

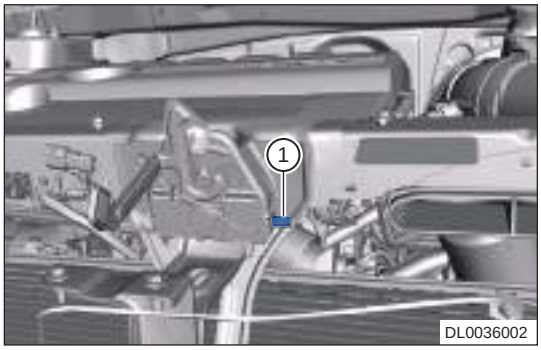
- Be sure to wear necessary safety equipment to prevent accidents, when removing engine hood lock assembly.
- Try to prevent body paint surface from being scratched, when removing engine hood lock assembly.

1. Remove 3 fixing nuts (arrow) from engine hood lock assembly.

   Torque: 9 ± 1.5 N · m


DL0035002

2. Disengage the engine hood cable assembly (1) from slot and remove the engine hood lock assembly.



Installation

1. Installation is in the reverse order of removal.

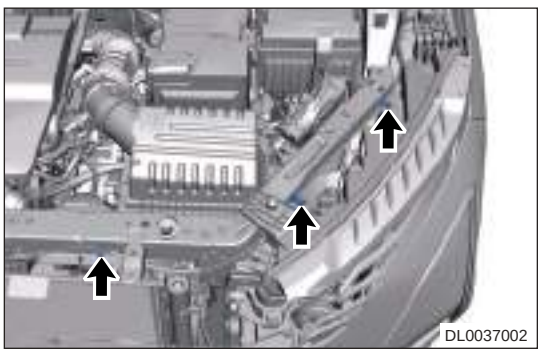
⚠ Caution
• Check if engine hood operates properly, after installing engine hood lock assembly.

Replacement of Engine Hood Cable Assembly

Removal

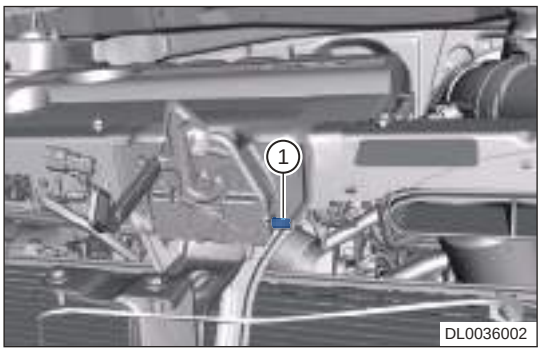
⚠ Warning
• Be sure to wear necessary safety equipment to prevent accidents, when removing engine hood cable assembly. • Try to prevent interior and body paint from being scratched, when removing engine hood cable assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the wing assembly.
4. Remove the engine hood lock assembly.
5. Disengage fixing clips (arrow) of engine hood cable assembly.

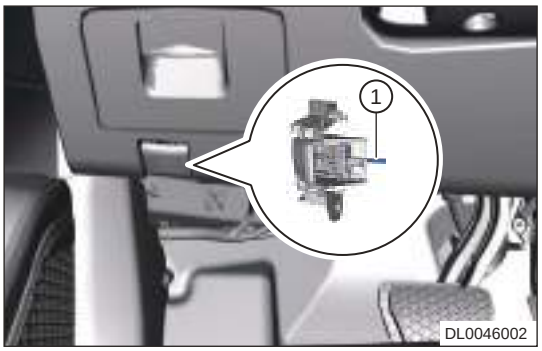


6. Disengage fixing clips (arrow) of engine hood cable assembly.

7. Disengage the engine hood cable assembly (1) from slot and remove the engine hood lock assembly.



8. Disengage engine hood cable assembly (1) from engine hood grip assembly.



9. Remove the engine hood cable assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution
• Check if engine hood operates properly, after installing engine hood lock assembly.

Replacement of Front Door Lock Assembly

Removal

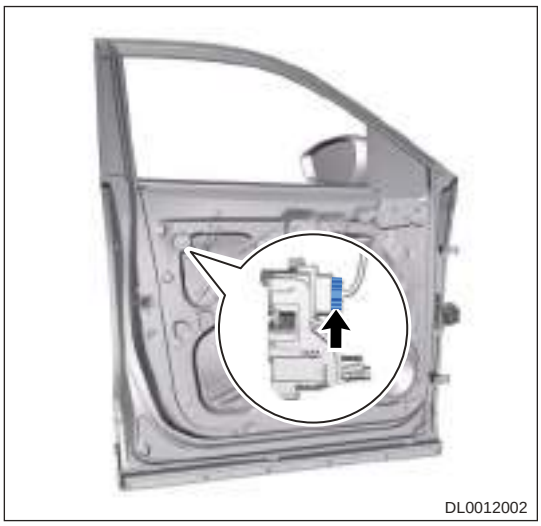
⚠ Warning
• Be sure to wear necessary safety equipment to prevent accidents, when removing front door lock assembly. • Try to prevent interior and body paint surface from being scratched, when removing front door lock assembly. • Use same procedures for right and left sides, procedures listed below are for left side.

1. Turn off all electrical equipment and ENGINE START STOP switch.

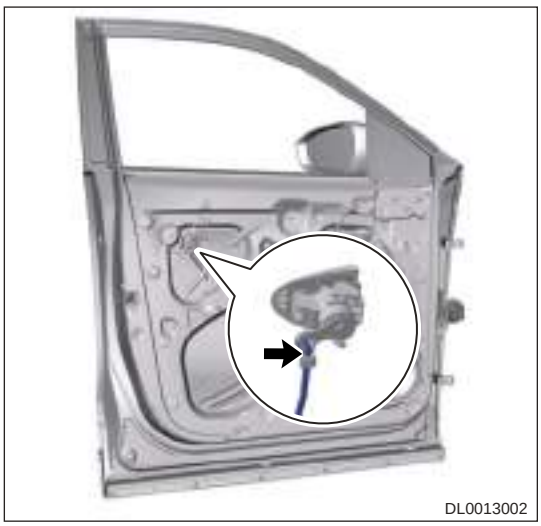
2. Disconnect the negative battery cable.
3. Remove the front left door inner protector assembly.
4. Remove the front left door protective film assembly.
5. Remove the front left door glass rear guide rail assembly.
6. Disengage cable fixing clip (arrow) carefully with an interior crow plate.


DL0013102

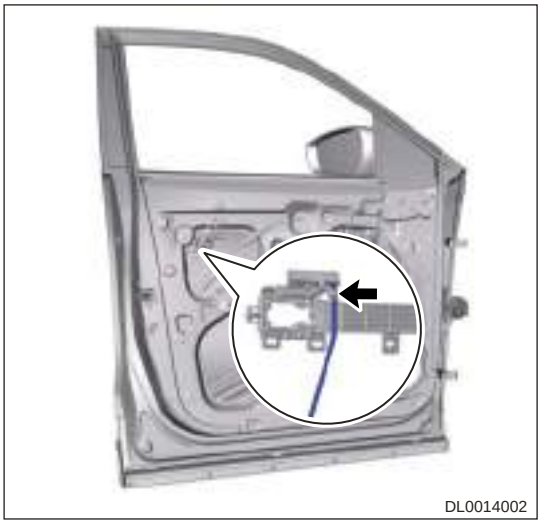
7. Disconnect the connector (arrow) from front left door lock assembly.


DL0012002

8. Disconnect the clip (arrow) between front left door lock assembly and front door key cylinder lever.

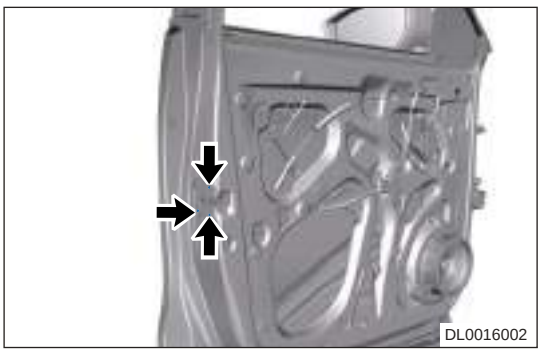

DL0013002

9. Disengage the front door outside push rod (arrow) from the slot of front door handle base.



10. Remove 3 fixing screws (arrow) from front door lock assembly, and remove the front door lock assembly.

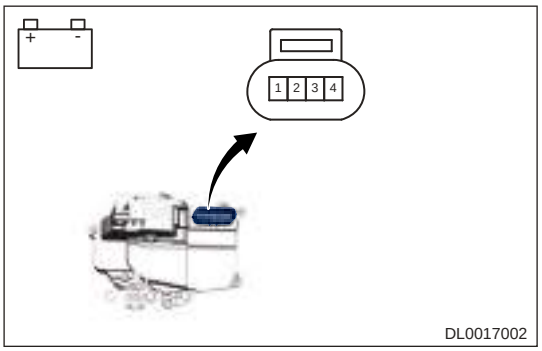
    Torque: 9 ± 1 N · m



Inspection

1. Apply battery voltage to the terminals of front door lock assembly (fastener assembly) connector and check if front door lock assembly operates normally according to the table below.

Measurement Condition	Specified Condition
Battery positive (+) - Terminal 1 Battery negative (-) - Terminal 2	Lock
Battery positive (+) - Terminal 2 Battery negative (-) - Terminal (1)	Unlock



   If result is not as specified, replace front door lock assembly.

Installation

⚠ Caution

- Check if connector is installed correctly, when installing front door lock assembly.
- Install the clips and cables in place, when installing front door lock assembly.
- Check if front door lock operates properly, after installing front door lock assembly.

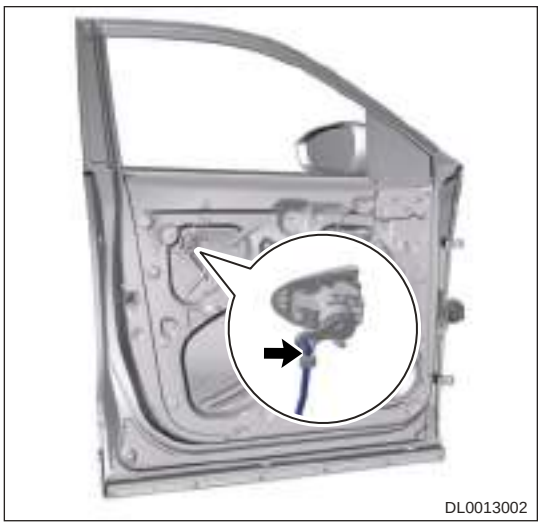
Replacement of Front Door Key Cylinder Assembly

Removal

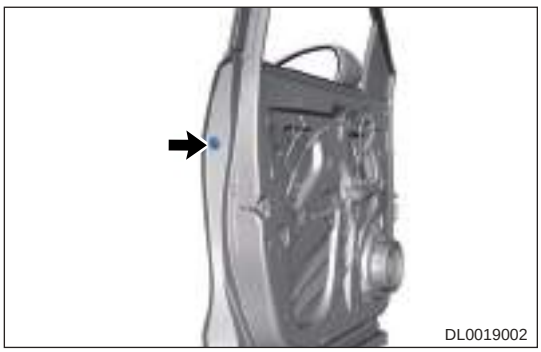
Warning

- Be sure to wear necessary safety equipment to prevent accidents, when removing front door key cylinder assembly.
- Try to prevent body paint surface from being scratched, when removing front door key cylinder assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door inner protector assembly.
4. Remove the front left door protective film assembly.
5. Disengage key cylinder lever (arrow).

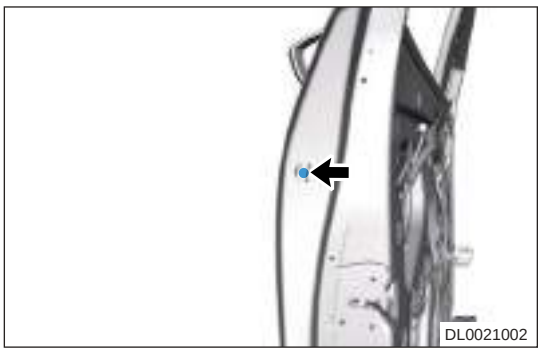

DL0013002

6. Remove the front door outside handle protective cover block cover (arrow).

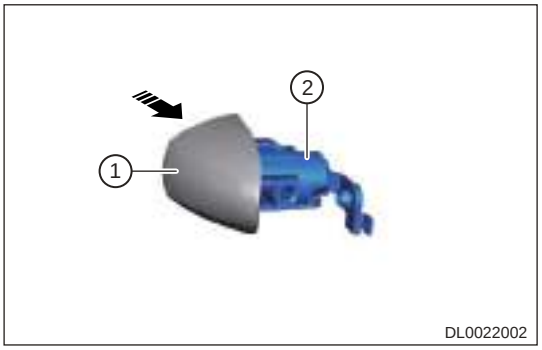

DL0019002

7. Loosen 1 fixing screw (arrow) from front door key cylinder assembly, and remove the front door key cylinder assembly and front door handle protective cover.

   Torque: 5 ± 1 N · m


DL0021002

8. Insert the key into the hole on lock cylinder protective cover and carefully pry the lock cylinder cover or using a screwdriver wrapped with protective tape, disengage the claws (arrow) and separate the front door handle protective cover (1) from front door key cylinder assembly (2).



Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Install clip on lever in place when installing front door key cylinder assembly.
- Check if front door key cylinder operates properly, after installing front door key cylinder assembly.

Replacement of Front Door Lock Striker Assembly

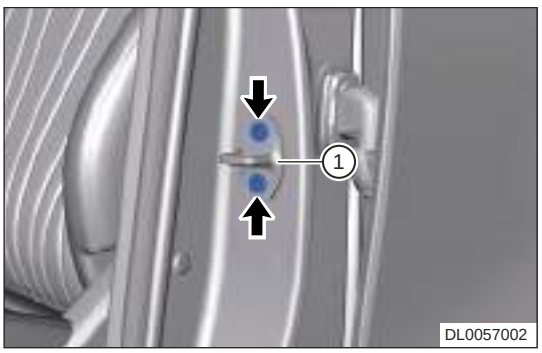
Removal

⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents, when removing front door lock striker assembly.
- Try to prevent body paint surface from being scratched, when removing front door lock striker assembly.
- Use same procedures for right and left sides, procedures listed below are for left side.

1. Remove 2 fixing screws (arrow) from front door lock striker assembly, and remove the front left door lock striker assembly (1).

   Torque: 23 ± 2 N · m



Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Before installation, lock striker position should be adjusted to ensure that lock cylinder of lock striker is engaged with lock body in the center line of lock mouth, ensure that the door is normally opened and closed.

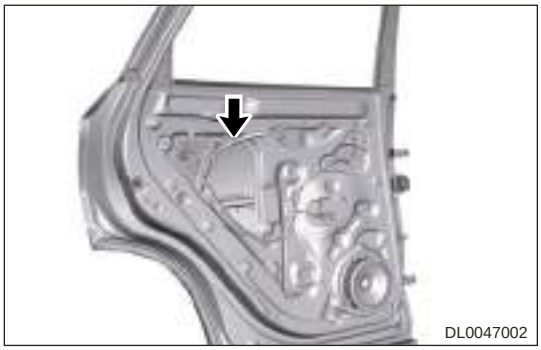
Replacement of Rear Door Lock Assembly

Removal

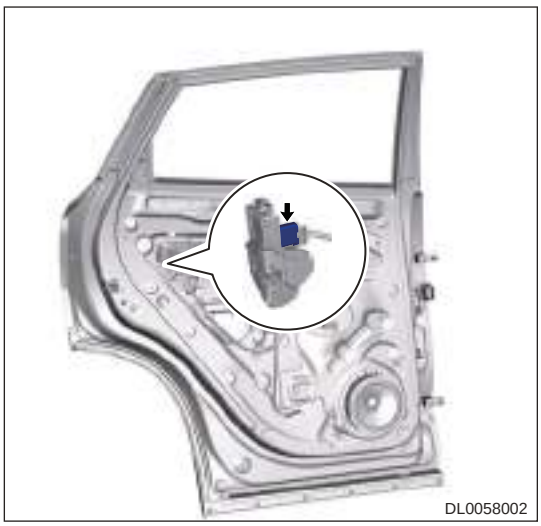
⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents, when removing rear door lock assembly.
- Try to prevent interior and body paint surface from being scratched, when removing rear door lock assembly.
- Use same procedures for right and left sides, procedures listed below are for left side.

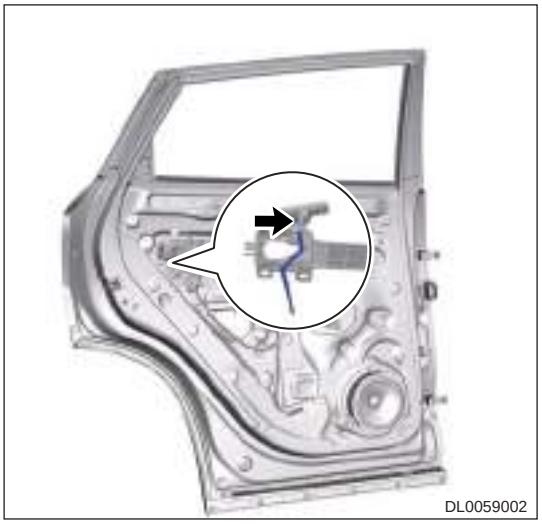
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left door inner protector assembly.
4. Remove the rear left door protective film assembly.
5. Remove the rear left door glass rear guide rail assembly.
6. Disengage cable fixing clip (arrow) carefully with an interior crow plate.



7. Disconnect the connector (arrow) from rear door lock assembly.

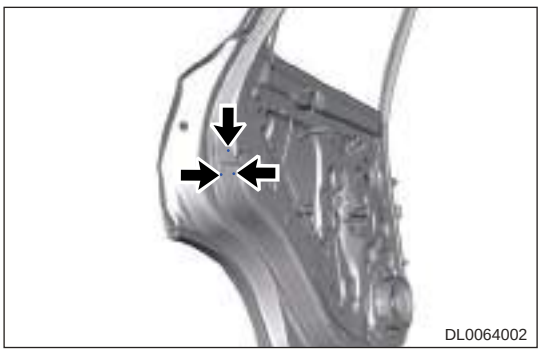


8. Disengage the outside push rod (arrow) from the clip of rear door handle base.



9. Remove 3 fixing screws (arrow) from rear door lock assembly, and remove the rear door lock assembly.

   Torque: 9 ± 1 N · m



Installation

1. Installation is in the reverse order of removal.

⚠ Caution
• Check if connector is installed correctly, when installing rear door lock assembly. • Install the cable in place, when installing rear door lock assembly. • Check if rear door lock operates properly, after installing rear door lock assembly.

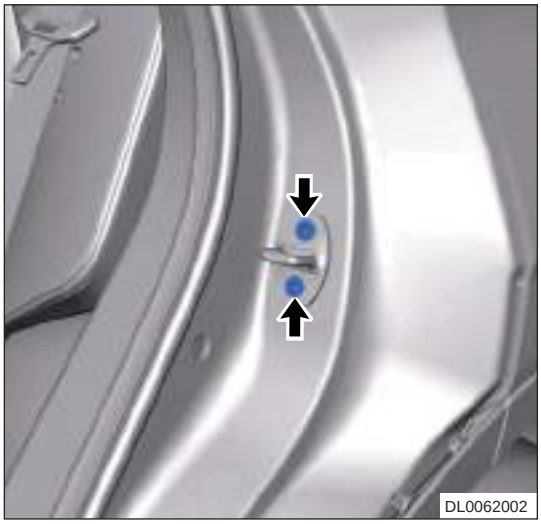
Replacement of Rear Door Lock Striker Assembly

Removal

⚠ Warning
• Be sure to wear necessary safety equipment to prevent accidents, when removing rear door lock striker. • Try to prevent body paint surface from being scratched, when removing rear door lock striker. • Use same procedures for right and left sides, procedures listed below are for left side.

1. Remove 2 fixing screws (arrow) from rear door lock striker, and remove the rear left door lock striker assembly.

   Torque: 23 ± 2 N · m



Installation

1. Installation is in the reverse order of removal.

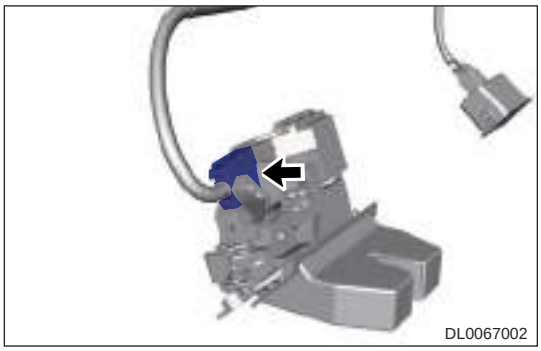
Replacement of Back Door Lock Assembly

Removal

⚠ Warning

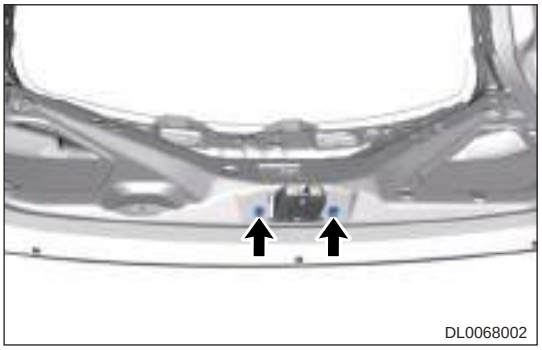
- Be sure to wear necessary safety equipment to prevent accidents, when removing back door lock assembly.
- Try to prevent interior and body paint from being scratched, when removing back door lock assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the back door lower protector assembly.
4. Disconnect the connector (arrow) from back door lock assembly.



5. Remove 2 fixing bolts (arrow) from back door lock assembly, and remove the back door lock assembly.

   Torque: 23 ± 2 N · m



Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Check if connector is installed correctly, when installing back door lock assembly.
- Check if back door lock operates properly, after installing back door lock assembly.

Replacement of Back Door Lock Striker Assembly

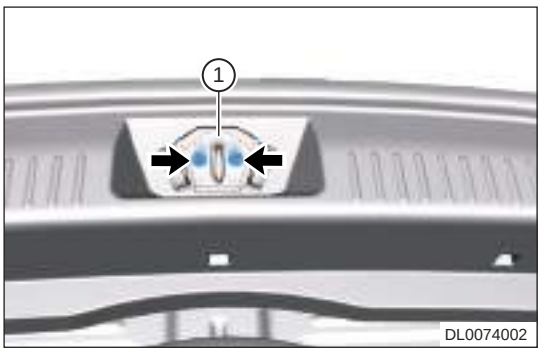
Removal

⚠ Warning

- Be sure to wear necessary safety equipment to prevent accidents, when removing back door lock striker assembly.
- Try to prevent body paint surface from being scratched, when removing back door lock striker assembly.

1. Remove the cover plug from back door lock striker assembly.
2. Remove 2 fixing screws (arrow) from back door lock striker assembly, and remove the back door lock striker assembly (1).

   Torque: 23 ± 2 N · m



Installation

1. Installation is in the reverse order of removal.

Sensing Outside Handle

Sensing Outside Handle Lock/Unlock Principle

The door handle and the key are certified through radio communication; The door handle is capacitance sensing, when touching the sensing area with finger, the door handle senses the capacitance change, thus triggering the key search process.

1. Handle antenna is short or open
   The lock/unlock function of the handle on open or short side fails, PEPS will record DTC at this time.

After the fault is eliminated, it needs to be locked/unlocked through the wireless key, and then the function will be restored.

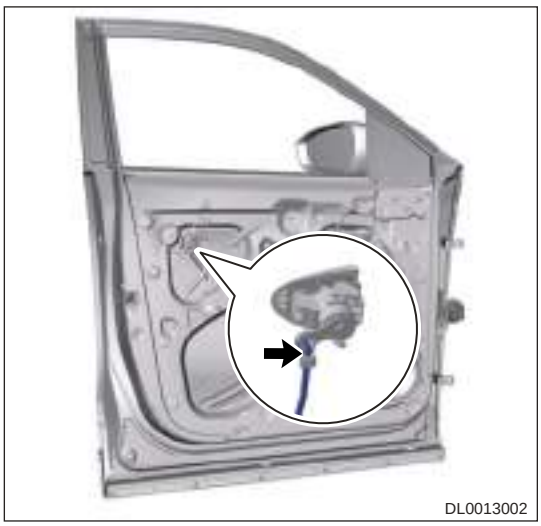
2. There is water, dirt or ice and snow in handle sensing area
   The capacitance noise caused by water, dirt and ice and snow interferes with the capacitance detection of the handle antenna, causing the antenna to enter the self-protection mode, or shielding off the capacitance sensing function, resulting in the decrease of lock/unlock sensitivity, and the lock/unlock function is temporarily unavailable in severe cases.
   Wipe the handle clean and wait for about 15s for the function to return to normal automatically; if the handle is frozen or water enters, wait for the water to be discharged.
3. The handle is continuously impacted by raindrops in rainy days
   Under the impact of raindrops, the handle sensing capacitance will continuously senses the capacitance change. In order to avoid false triggering sensing, the handle antenna enters the rain mode. In this mode, the lock sensing time is longer, and the lock/unlock induction sensitivity is reduced.
   When the impact of raindrop disappears, the function will return to normal automatically within 3.5 minutes later.
4. Electromagnetic interference or shield
   Radio communication will be affected by the same frequency interference and shielding effect. If there is an interference source, it will interfere with the normal communication between wireless key and antenna; if the wireless key or handle is equipped with a decorative cover that contains metal ingredient, it will weaken the strength of the communication signal. In this case, the lock/unlock function has potential failure risk.
   The function will recover automatically after the interference source is far away and the shield is eliminated.

Removal

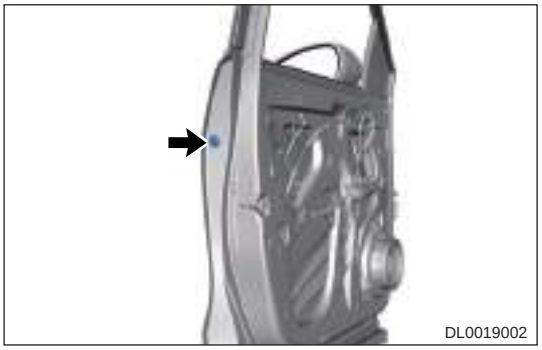
⚠ Warning

- Be sure to wear safety equipment to prevent accidents, when removing sensing outside handle assembly.
- Try to prevent body paint surface from being scratched, when removing sensing outside handle assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door inner protector assembly.
4. Remove the front left door protective film assembly.
5. Disengage the clip (arrow) between front door lock assembly and front door key cylinder lever.

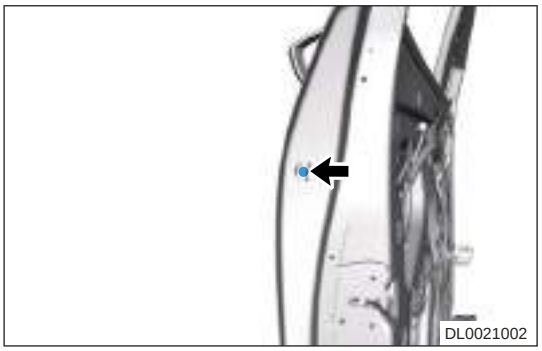


6. Remove the front door outside handle protective cover block cover (arrow).

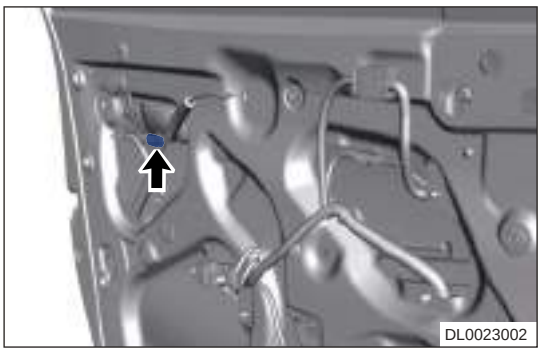


7. Loosen 1 fixing screw (arrow) from front door key cylinder assembly, and remove the front door key cylinder and protective cover assembly.

   Torque: 5 ± 1 N · m



8. Disconnect the front left outside handle wire harness connector (arrow).



9. Remove the front left outside handle assembly.

Installation

1. Installation is in the reverse order of removal.

ENGINE HOOD/DOOR

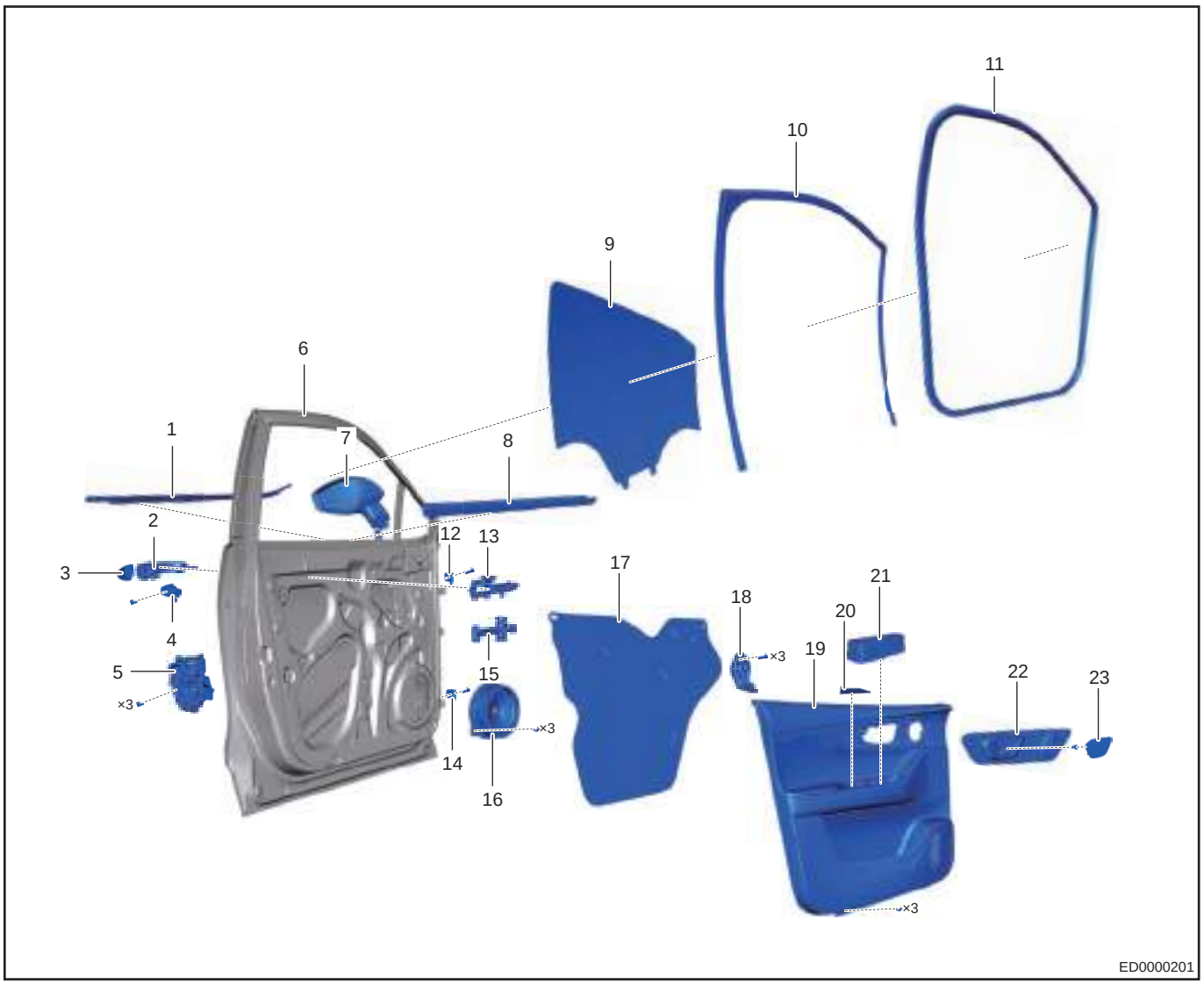
GENERAL INFORMATION

Description

Engine Hood Assembly

1	Engine Hood Assembly	4	Engine Hood Sound Insulator Pad
2	Engine Hood Right Hinge Assembly	5	Engine Hood Right Air Spring Assembly
3	Engine Hood Left Hinge Assembly		

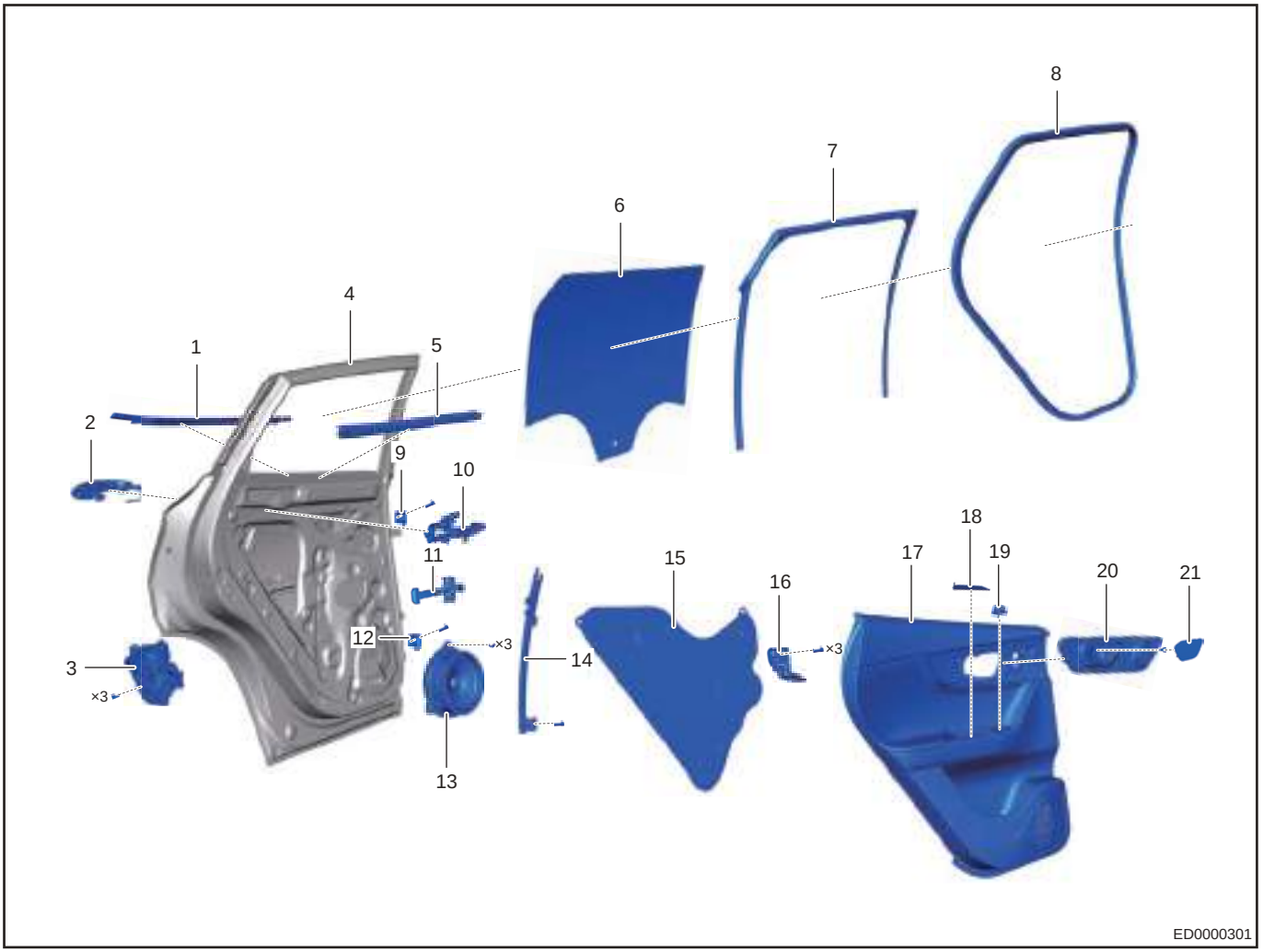
Front Door Assembly



1	Front Left Door Outer Weather Bar	13	Front Left Outside Handle Seat Assembly
2	Front Left Door Outside Handle	14	Left Door Hinge Assembly
3	Front Left Door Lock Cylinder Protector Cover	15	Front Door Stopper Assembly
4	Side Door Lock Cylinder	16	Front Door Woofer
5	Front Left Door Lock	17	Front Left Door Protective Film Assembly
6	Front Left Door Sheet Metal Assembly	18	Front Door Metal Bracket
7	Left Outside Rear View Mirror Assembly	19	Rear Left Door Protector Body

8	Front Left Door Inner Weather Bar	20	Handle Box Gasket
9	Front Left Side Door Glass Assembly	21	Driver Glass Regulator Switch
10	Front Left Door Run	22	Front Left Inside Handle Assembly
11	Front Left Door Opening Weatherstrip	23	Block Cover
12	Left Door Hinge Assembly		

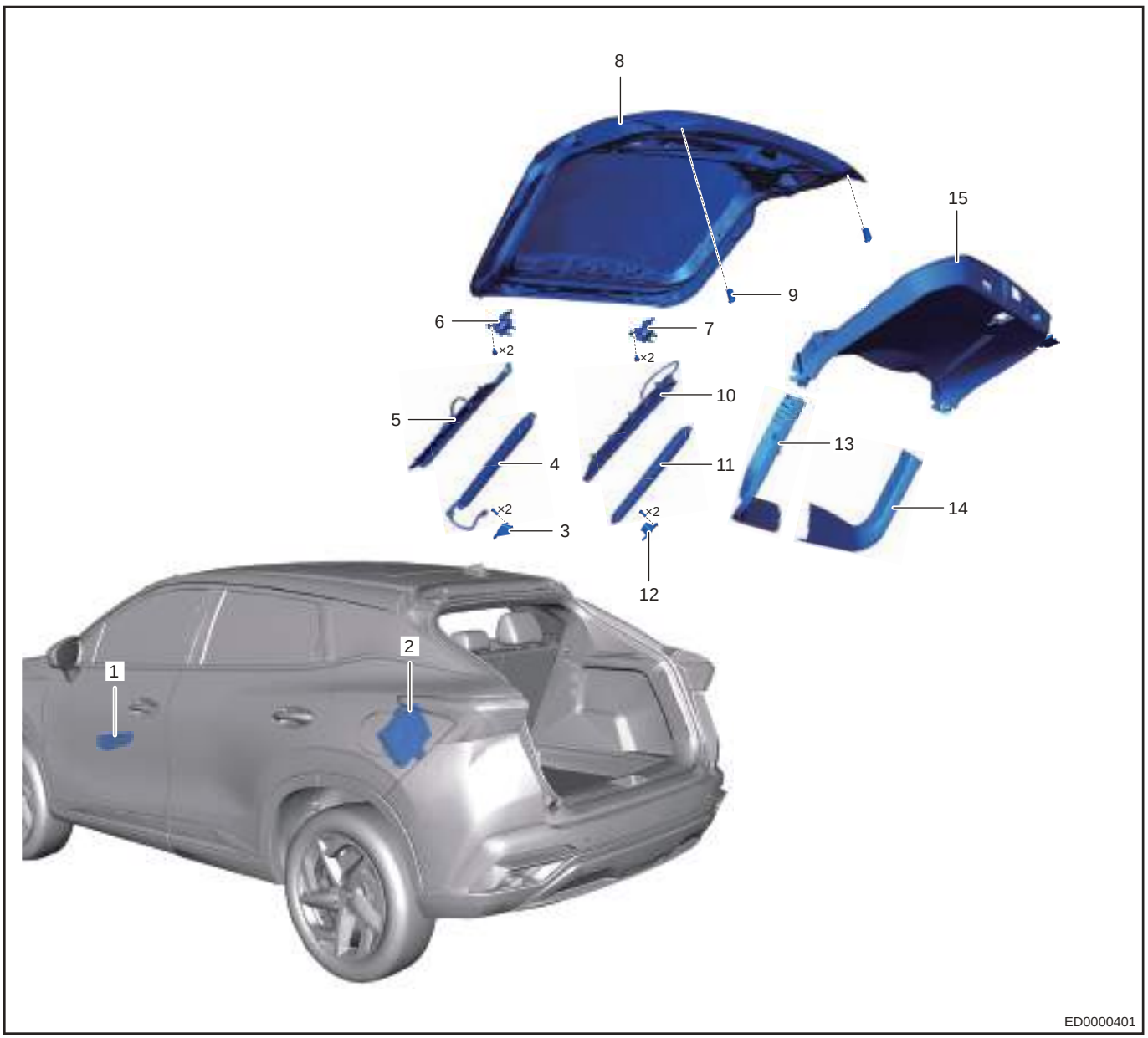
Rear Door Assembly



1	Rear Left Door Outer Weather Bar	12	Left Door Hinge Assembly
2	Side Rear Door Outside Handle	13	Rear Door Woofer
3	Rear Left Door Lock	14	Rear Left Door Glass Rear Lower Guide Rail Assembly
4	Rear Left Door Sheet Metal Assembly	15	Rear Left Door Protective Film Assembly
5	Rear Left Door Inner Weather Bar	16	Rear Left Door Metal Bracket
6	Rear Left Side Door Glass Assembly	17	Rear Left Door Protector Body
7	Rear Left Door Run	18	Handle Box Gasket

8	Rear Left Door Opening Weatherstrip	19	Single Glass Regulator Switch
9	Left Door Hinge Assembly	20	Rear Left Inside Handle Assembly
10	Rear Left Outside Handle Seat Assembly	21	Block Cover
11	Rear Door Stopper Assembly		

Back Door Assembly



1	Adjustment Switch Assembly	9	Engine Hood Adjusting Block
2	Power Back Door Module	10	Right Anti-pinch Strip Assembly
3	Rear Cover Upper Left Bracket	11	Right Balance Bar Assembly
4	Left Electric Support Assembly	12	Rear Trunk Lid Lower Left Bracket
5	Left Anti-pinch Strip Assembly	13	Back Door Left Protector

6	Back Door Hinge Assembly	14	Back Door Right Protector
7	Back Door Hinge Assembly	15	Back Door Lower Protector
8	Back Door Sheet Metal Assembly		

The vehicle is designed as a structure with four doors & two covers: Front left door, rear left door, front right door, rear right door, power back door (power back door system consists of PLG module, power support, anti-pinch strip, each functional switch, back door lock and self-engage mechanism, etc. When system receives functional switch signal, it opens or closes back door by motor drive) and engine hood.

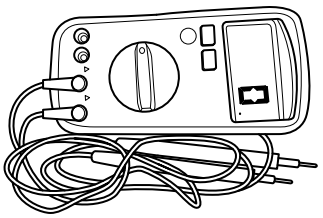
Specifications

Torque Specifications

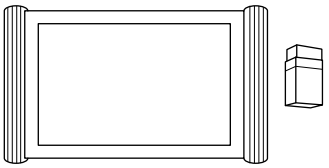
Description	Torque (N·m)
Engine Hood Hinge Assembly Fixing Nut	23 ± 2.0
Engine Hood Lock Assembly Fixing Nut	10 ± 1.5
Engine Hood Hinge Assembly Fixing Bolt	23 ± 2.0
Front Door Inside Protector Assembly Fixing Screw	1.5 ± 0.5
Front Door Inside Handle Fixing Screw	1.5 ± 0.5
Front Door Lock Striker Fixing Bolt	25 ± 3.75
Rear Door Inside Protector Assembly Fixing Screw	1.5 ± 0.5
Rear Door Inside Handle Fixing Screw	1.5 ± 0.5
Rear Door Metal Bracket Fixing Bolt	5 ± 1.0
Rear Door Lock Striker Fixing Bolt	25 ± 3.75
Back Door Lower Protector Assembly Fixing Screw	1.5 ± 0.5
Back Door Hinge Fixing Bolt	25 ± 2.0
Back Door Lock Striker Fixing Bolt	25 ± 3.75
Power Back Door Module Fixing Nut	5 ± 1.0

Tools

General Tool

Tool Name	Tool Drawing
Digital Multimeter	 RCH000206

Special Tool

Tool Name	Tool Drawing
Diagnostic Tester	 S00001

Function Introduction

Power Back Door Function Introduction

Function			
1	Instrument Panel Switch Opening or Closing Back Door	11	On-line Refresh Function
2	Back Door Outer Opener Switch Opening Back Door	12	DVD Setting Opening Height
3	Back Door Lower Edge Switch Closing Back Door	13	DVD Voice Opening/Closing Back Door
4	Wireless Key Opening or Closing Back Door	14	T-BOX APP
5	Opening Height Setting	15	Opening Condition Sleeping
6	Soft Stop Function	16	Environmental Self-adaption
7	Jam Protection Function	17	Emergency Stop Function
8	Violently Closing Self-protection	18	Diagnosis and Recording Function

Function			
9	Manual Operation of Back Door Function	19	Induction Opening
10	Mechanical Unlocking Function		

Power Back Door Opening Method

1. For convenience using, power back door can achieve various opening/closing methods, such as open/close back door manually, one button open/close, open/close by voice, remote open/close (if equipped), and can realize height adjustment function, make you fully feel the convenience of power back door.
   a.Power back door switch locates on left side of instrument panel. ENGINE START STOP switch is changed to OFF, ACC or ON mode and gear is switched to P position, so as to make vehicle in unfortified mode. In such condition, long press power back door switch to illuminate turn signal light and open/close power back door.
   b.ENGINE START STOP switch is changed to OFF, ACC or ON mode and gear is switched to P position: l Manually opening/closing door: with central control lock in unlocked condition, press back door switch to illuminate turn signal light and open/close power back door. l Manually opening/closing door: with central control lock in locked condition, carry smart key to approach rear of vehicle and press back door switch to illuminate turn signal light and open/close power back door.
   c.One button open/close: Long press back door open button on smart key, turn signal light comes on and power back door opens/closes.
   d.Voice opening and closing: opening: with power back door in closed condition, perform “Open back door” by voice patten in audio/visual system and power back door is opened; closing: with power back door in opened condition, perform “Close back door” by voice patten in audio/visual system and power back door is closed;
   e.For details about back door remote control, refer to Remote Control System.
   f.Smart key should not be placed together with wireless computer mouse and mobile phone, etc., which may cause the power back door to fail to sensing open/close.
   g.Three days after the vehicle is locked, the sensing open function of back door is closed, the engine needs to be restarted, and the function resumes.

Power Back Door Opening Height Setting

1. Perform setting via audio and entertainment system.
   a.Touch “Vehicle Setting” on no disc DVD screen to enter vehicle setting screen.
   b.Touch “Trunk Opening State” on “Vehicle Setting” screen to adjust opening height of back door.
   c.Range of back door adjustment height: 70% - 100%.
2. Perform setting by switch under back door.
   a.After power back door opens, adjust power back door to the desired height.
   b.Long press power back door button until vehicle gives a light signal, power back door opening height set is successful.

⚠ Caution

- It is recommended that the height of back door should not be too low, otherwise the opening height of the back door cannot be set.

Power Back Door Jam Protection Function

1. Forward jam protection: During opening of power back door, if there is resistance (such as wall, obstructions, etc.), the forward jam protection of back door will prevent damage to the vehicle.
2. Reverse jam protection: During closing of power back door, if there is resistance (such as children, luggage, etc.), the reverse jam protection of back door will prevent injury to children or damage to the vehicle.

Others

1. After power is shut off, it is necessary to perform power back door manual learning. Learning method: Close back door to lock position, press back door switch to open back door and wait until back door opens to Max. opening position. The learning is completed successfully.
2. When power back door is opened, never pull power support rod laterally, which may cause damage to relevant parts.
3. When power back door opens to highest position, do not push or support it upward by hands, otherwise, it may cause damage to relevant parts.
4. Make sure that there is no debris, wall, etc. within back door opening range before opening power back door, so as to avoid back door scratching.
5. Before vehicle is driving, confirm that back door is closed in place, so as to prevent accidents or damage to relevant parts as power back door is not closed completely.
6. When power back door is closed manually, perform closing operation slowly by hands. Never close it forcibly, or it may cause damage to motor and module.
7. The power back door may be unable to open or close due to the change in center of gravity on uphill or downhill. This phenomenon is normal. Please manually open/close the power back door.
8. During back door closing, ensure that there is no person is caught. If the closing operation is interrupt, it is necessary to perform back door closing operation again.
9. Before vehicle is driving, confirm that back door is closed in place, so as to prevent accidents or damage to relevant parts as power back door is not closed completely.
10. Although the vehicle is equipped with anti-pin function, never make any part of body test this function, so as to avoid personal injury.

Diagnostic Tester Menu Function and Data Stream

PLGM System

1. Version information

Version Information	-	Boot software version, part number, head unit factory ECU software version number, supplier code, head unit factory ECU hardware version number, head unit factory calibrated version

2. Read DTCs

Read DTCs	Read current DTC	Read current DTC, and display the fault information if there is a DTC. No DTC shows the "No DTC"
	Read history DTC	Read history DTC, and display the fault information if there is a DTC. No DTC shows the "No DTC"

3. Clear DTCs

Clear DTCs	Clean DTC conditions: 1. Turn ignition switch ON (ON position) 2. Engine cannot start (electric vehicle is non-ready condition)	DTC clearing is completed. All history DCTs are cleared. The current DTC still exists

4. Read Data Stream

- Back door input status

Read Data Stream	Back door input status	Driver side switch: Not activated, driver side switch is pressed: Activated
		Power back door inside switch: Not activated, inside switch is pressed: Activated
		Trunk opening switch: Not activated, trunk switch is pressed: Activated
		Global menu switch: Not Activated; Global menu switch is pressed： Activated
		Half-locked switch: Not Activated; Half-locked switch is pressed: Activated
		Full-locked switch: Not Activated; Full-locked switch is pressed: Activated

- Power supply voltage status

Read data stream	Power supply voltage status	Logic power supply voltage value: Normal voltage value is displayed
		Control power supply voltage value: Normal voltage value is displayed

- Sensor input

Read Data Stream	Sensor input	Left rod anti-pinch strip collecting AD value: Normal AD value is displayed
		Right rod anti-pinch strip collecting AD value: Normal AD value is displayed
		Temperature value: Normal operating temperature is displayed

- Vehicle information

Read Data Stream	Vehicle information	Power supply status: Correct switch positions OFF/ACC/ ON/CRANK ON are displayed
		Driver door lock status: Correct locking/unlocking information is displayed

		RKE_Trunk status: Correct back door switch information is displayed
		Information source: Information source: Correct information source RKE/PKE/ Smart Information is displayed
		Demand information: Correct signal source RKE/PKE/Smart lock/unlock signal is displayed
		Trip mileage: Actual mileage is displayed
		Outside temperature: Normal outside temperature is displayed
		Outside temperature fault status: Normal/Abnormal
		Start and stop status: Correct start and stop condition is displayed
		Vehicle speed: Correct vehicle speed is displayed
		Valid vehicle speed status: Displays whether the speed is valid or not
		Gear display: Real gear signal is displayed
		Collision status: Collision signal is displayed
		Back door position set by DVD: Back door setting height percentage value is displayed
		Voice control back door demand: Voice ON/OFF input is displayed
		TBOX control back door demand: Remote ON/OFF input is displayed
		Lateral acceleration signal is effectively identified: Displays whether the lateral acceleration signal is valid
		Lateral acceleration: The specific value of the lateral acceleration is displayed

		Longitudinal acceleration effective mark: Displays whether the longitudinal acceleration signal is valid
		Longitudinal acceleration: The specific value of the longitudinal acceleration is displayed

- Left support motor data

Read data stream	Left support motor data	Left support motor speed: Correct motor speed is displayed
		Left support motor moving direction: Correct open/close direction is displayed
		Left support motor position: Actual hall position is displayed
		Left support motor current: Actual drive current of support is displayed

- Back door status

Read Data Stream	Back door status	Lock position status: Half latch/full latch information is displayed
		Lock engagement status: Displays the correct action information such as engaging/ engagement completion
		Lock control status: Displays correct action information such as initialization/ engagement completion/engaging
		Ratchet position: PCM actual signals are displayed
		Back door position: back door actual position (Hall position) is displayed
		Back door position area: Back door actual area is displayed
		Back door operation status: Back door action status is displayed

		Main detected status of obstacle: Blocking is detected according to current
		Obstacle secondary detection status: blocking is detected according to anti-pinch strip

- Back door learning position

Read Data Stream	Back door learning position	Mechanical max. opening position: mechanical max. opening learning position is displayed
		User set opening position: user set max. opening position is displayed
		Differential value between two rods: /

- PLG software configuration code

Read Data Stream	PLG software configuration code	PLG Software configuration code: correct configuration code C001000000000000 is displayed

- Back door switch input detection

Read Data Stream	Back door switch input detection	Driver side switch: Detect whether the state of driver side switch has changed
		Power back door inner switch: Detect whether the state of power back door inner switch has changed
		Trunk opening switch: Detect whether the state of power back door switch has changed
		Global switch: Detect whether the state of power back door global switch has changed

5. Active test

- Lock status control

Active Test	Lock status control	Lock motor rotates clockwise: click “ON” Lock motor rotates clockwise: Click “OFF” Click “Back”

		Lock motor rotates counterclockwise: Click “ON” Lock motor rotates counterclockwise: Click “OFF” Click “Back”
		Unlock motor control: Click “ON” Lock motor rotates clockwise: Click “OFF” Click “Back”

- Left support motor control

Active Test	Left support motor control	Left support motor ON: The user can select three speeds to drive the support to open the back door: 50%, 75% and 100% Click “Back” to cancel the drive
		Left support motor OFF: The user can select three speeds to drive the support to close the back door: 50%, 75% and 100% Click “Back” to cancel the drive

- Left support hall power supply

Active Test	Left support Hall power supply	Click “ON”: Turn on the Hall power supply
		Click “OFF”: Turn off the Hall power supply
		Click “Back”

- LED indicator output

Active Test	LED indicator output	Click “ON”: Turn on LED background indicator
		Click “OFF”: Turn off LED background indicator
		Click “Back”

6. Special operation
   - Software configuration information writing

Special operation	Software configuration information writing	User enters 16-bit software configuration information: Software configuration information is written successfully; Failed to write software configuration information

- PLG self-learning

Active Test	PLG self-learning	Click the “Special operation-PLG self-learning” menu: Start self-learning
		Click the “Emergency stop” menu: You can stop self-learning as an emergency
		Click “Back”

Diagnostic Help

- Connect diagnostic tester (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all BCM system grounds related to the latest DTC.
- If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Check for broken, bent, protruded or corroded terminals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

- Remove ground bolt or nut.

- Check all contact surfaces for tarnish, dirt and rust, etc.
- Clean as necessary to ensure that contact is in good condition.
- Reinstall ground bolt or nut securely.
- Check if any additional accessories interfere with ground circuit.
- If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnosis Procedure

Hint:
Use following procedures to troubleshoot the power back door control system.

1	**Vehicle brought to workshop**

Next

2	**Examine vehicle and check basic items**

Check system power supply voltage, and check that fuse, wire harness and connector are connected normally.

OK

Standard voltage: Not less than 12 V.

Result

NG → **Check and replace malfunctioning parts**

OK

3	**Using a diagnostic tester, read related DTC and data stream information**

Result

Result	Go to
No DTC	A
DTC occurs	B

A → **Perform troubleshooting procedure without DTCs according to malfunction symptom**

B

4	**Troubleshoot according to DTCs troubleshooting procedure**

Result

Result	Go to
Problem is not resolved	A
Problem is resolved	B

A → **Return to procedure 1 and troubleshoot the process again**

B

5	**According to power back door control system malfunction repair completion inspection and delivery, confirm if malfunction is resolved.**

Result

Result	Go to
Delivery inspection is failed	A
Delivery inspection is qualified	B

A → **Return to procedure 1 and troubleshoot the process again**

B

6	**Finished**

Diagnosis & Test

Diagnostic Trouble Code (DTC) Chart

DTC	DTC
U0073-88	CAN Busoff Failure
U0140-87	Lost Communication with BCM
U0214-87	Lost Communication With PEPS
U0151-87	Lost Communication with ABM
U0164-87	Lost Communication with CLM
U0155-87	Lost Communication with ICM
U0101-87	Lost Communication with TCU
U0129-87	Lost communication with BSM
U0100-87	Lost Communication with EMS

DTC	DTC
U1300-55	Software Configuration Error
B1A90-16	VBAT Power is Open Circuit
B1A91-15	LH Pinch Strip Sensor Failure
B1A92-15	RH Pinch Strip Sensor Failure
B1A93-07	Driver Switch Failure
B1A94-07	Handle Switch Failure
B1A95-07	Inner Switch Failure
B1A96-07	Global Switch Failure
B1A97-01	LH Hall Pulse is Out of Range
B1A98-13	LH Hall Sensor Failure (LH Spindle Unit Failure)
B1A99-14	LH Hall Sensor Power Supply Failure
B1A9A-1C	LH Spindle Motor Output Failure
B1A9B-1D	LH Spindle Motor Overload
B1A9C-01	RH Hall Pulse is Out of Range
B1A9D-13	RH Hall Sensor Failure (RH Spindle Unit Failure)
B1A9E-14	RH Hall Sensor Power Supply Failure
B1A9F-1C	RH Spindle Motor Output Failure
B1AA0-1D	RH Spindle Motor Overload
B1AA1-1C	Cinch Latch Motor Output Failure
B1AA2-1D	Cinch Latch Motor Overload
B1AA3-1C	Release Motor Output Failure
B1AA4-07	Half/Full Latch Abnormality
B1AA5-07	PCM Switch Failure
B1AA6-07	PLG Position is Out of Range
B1AA7-07	Dual Spindles Position Misalignment
B1AA8-07	Cinch Failure
B1AAA-04	ECU fault

DTC Diagnosis Procedure

DTC	**U0073-88**	**CAN Busoff Failure**
DTC	**U0140-87**	**Lost Communication with BCM**
DTC	**U0214-87**	**Lost Communication With PEPS**
DTC	**U0151-87**	**Lost Communication with ABM**

DTC	**U0164-87**	**Lost Communication with CLM**
DTC	**U0155-87**	**Lost Communication with ICM**
DTC	**U0101-87**	**Lost Communication with TCU**
DTC	**U0129-87**	**Lost communication with BSM**
DTC	**U0100-87**	**Lost Communication with EMS**
DTC	**U1300-55**	**Software Configuration Error**

Description

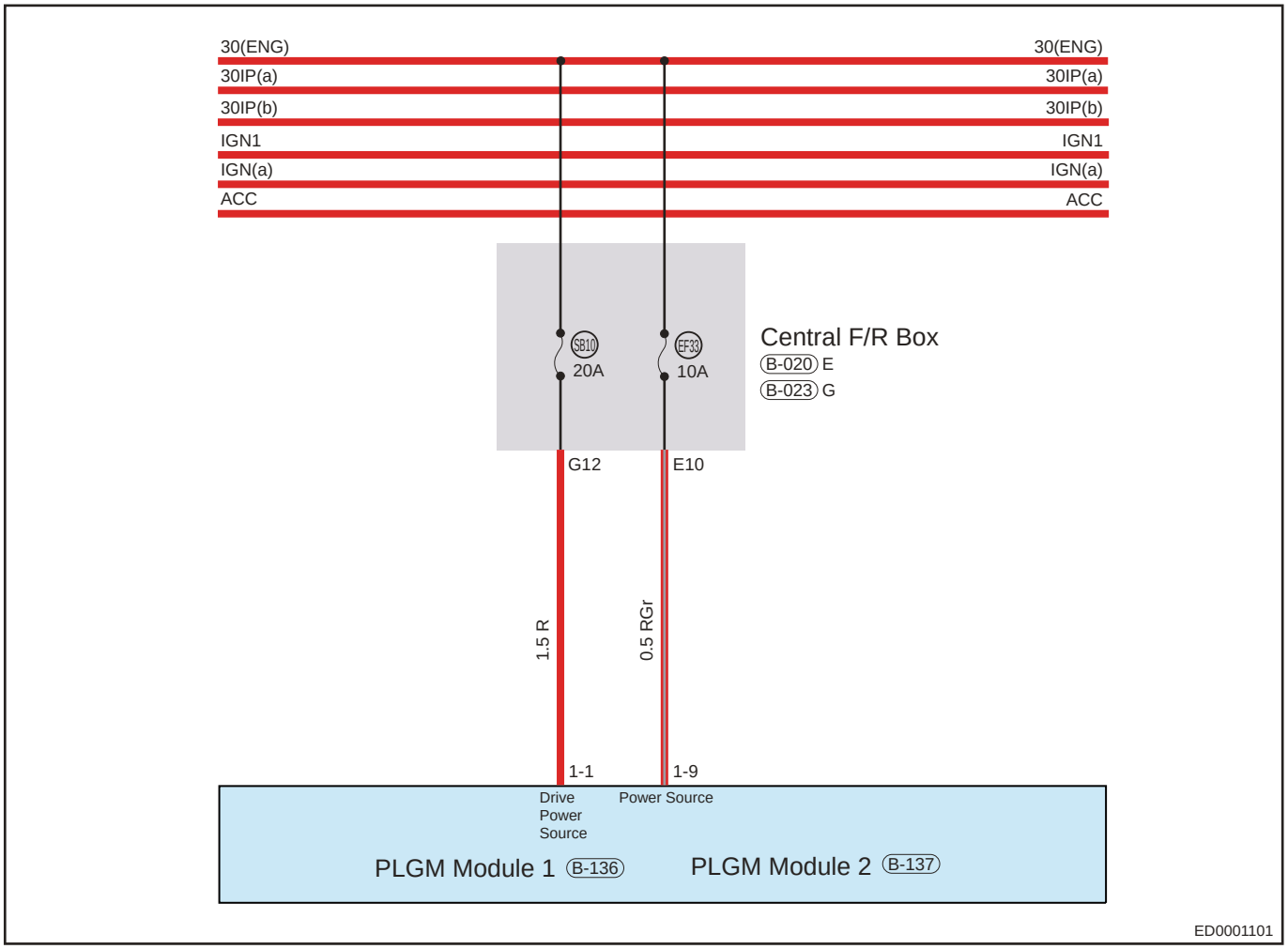
DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
U0-07-3-88	CAN Busoff Failure	/	Bus off	Bus enters busoff mode for 2s, which is stored as current fault.	A frame of message is sent successfully, current fault is cleared which is stored as history fault	Bus is short to ground, power supply, CANH and CANL has short circuit and open circuit.	All network signal uses default value; Door opening operation is stopped while closing operation still continue; New door operation is prohibited.	Bus off
U0-14-0-87	Lost Communication with BCM	/	Message missing	BCM message is not received for 4000 ms	A frame of BCM message is received, current fault is cleared which is stored as history fault	BCM node off	All BCM signal uses default value.	Message missing
U0-21-4-87	Lost Communication With PEPS	/	Message missing	PEPS message is not received for 4000 ms	A frame of PEPS message is received, current fault is cleared which is stored as history fault	PEPS node off	All PEPS signals use default values.	Message missing
U0-15-1-87	Lost Communication	/	Message missing	ABM message is not received for 4000 ms	A frame of ABM message is received, current fault is cleared	ABM node off	All ABM signals use default values.	Message missing

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
	with ABM				which is stored as history fault.			
U0-16-4-87	Lost Communication with CLM	/	Message missing	CLM message is not received for 4000 ms	A frame of CLM message is received, current fault is cleared which is stored as history fault.	CLM node off	All CLM signals use default values.	Message missing
U0-15-5-87	Lost Communication with ICM	/	Message missing	ICM message is not received for 4000 ms	A frame of ICM message is received, current fault is cleared which is stored as history fault.	ICM node off	All ICM signal uses default value.	Message missing
U0-10-1-87	Lost Communication with TCU	/	Message missing	TCU message is not received for 4000 ms	A frame of TCU message is received, current fault is cleared which is stored as history fault.	TCU node off	All TCU signal uses default value.	Message missing
U0-12-9-87	Lost communication with BSM	/	Message missing	BSM message is not received for 4000 ms	A frame of BSM message is received, current fault is cleared which is stored as history fault.	BSM node off	All BSM signal uses default value.	Message missing
U0-10-0-87	Lost Communication with EMS	/	Message missing	EMS message is not received for 4000 ms	A frame of EMS message is received, current fault is cleared which is stored as history fault.	EMS node off	All EMS signals use default values.	Message missing
U1-30-0-55	Software Configuration Error	/	Not configured	Controller is not configured	Configuration is completed, clear the current fault and it is stored as history fault.	/	New operation command is prohibited	Not configured

Description
Refer to CAN communication system

DTC	B1A90-16	VBAT Power is Open Circuit

Description
Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1-A9-0-16	VBAT Power is Open Circuit	/	Power supply circuit voltage below threshold	The voltage is less than 3 V for 5 s.	When the voltage is higher than 9 V for 500 ms, clear the current fault and it is stored as history fault.	Fuse is broken	Stop the back door current operation and prohibit new operation command.	Power supply circuit voltage below threshold

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.

- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check fuse

(a) Check if fuse of center fuse and relay box is blown.

NG → **Replace fuse**

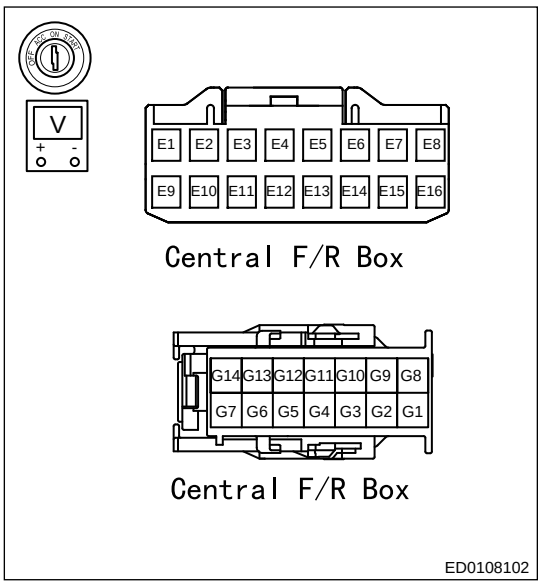
OK ↓

2	Check output voltage of center fuse and relay box

(a) Turn ENGINE START STOP switch to ON.

(b) Check the voltage between center fuse and relay box E10, center fuse and relay box G12 and ground.

Multimeter Connection	Condition	Specified Condition
Center fuse and relay box (E10) - Body ground	ON	Not less than 12 V
Center fuse and relay box (G12) - Body ground	ON	Not less than 12 V



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NG → **Replace center fuse and relay box**

OK ↓

3	Check for open in wire harness

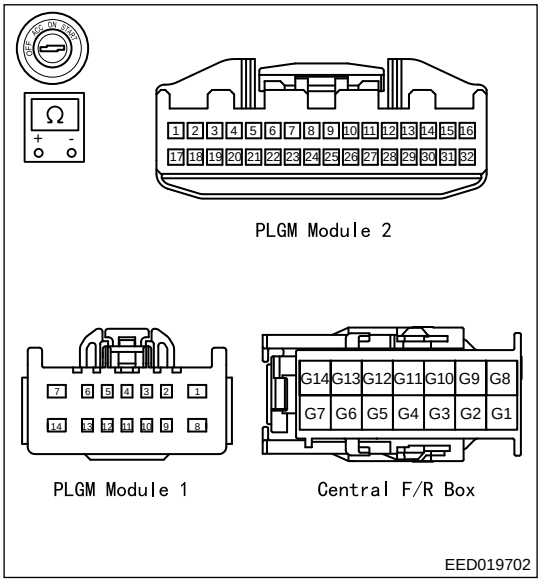
(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect power back door module connector, engine compartment fuse and relay box connector.

(d) Using ohm band of digital multimeter, measure if resistance between connector power back door module back door power supply 1 and fuse, power back door module back door signal power supply and fuse is normal to check wire harness for open.

Multimeter Connection	Condition	Specified Condition
Power back door module back door power supply 1 - Fuse	ENGINE START STOP switch “OFF”	⩽ 1 Ω
Power back door module back door signal power supply - Fuse	ENGINE START STOP switch “OFF”	⩽ 1 Ω



OK	**Replace power back door module**
NG	**Handle and repair related wire harness**

DTC	**B1A93-07**	**Driver Switch Failure**
DTC	**B1A94-07**	**Handle Switch Failure**

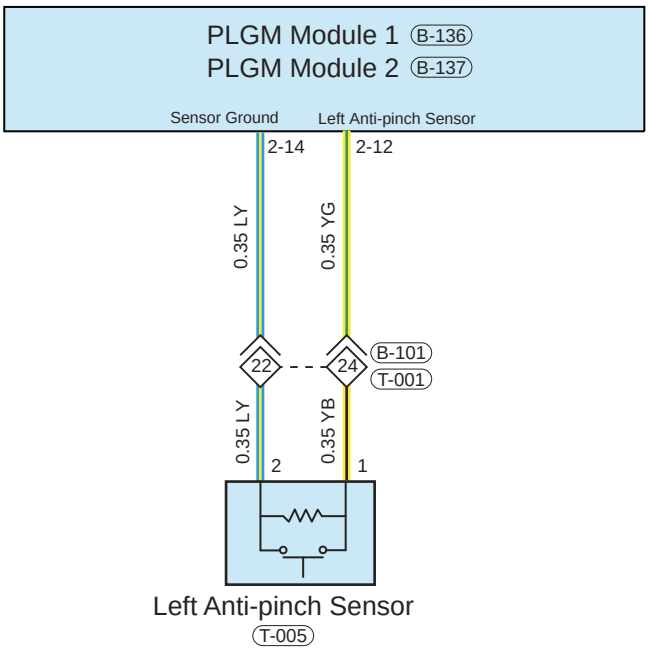
Description

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1A93-07	Driver Switch Failure	/	Mechanical malfunction	The switch is valid for 30s	The switch is invalid, clear the current fault and it is stored as history fault.	The switch is stuck or short to ground	Setting switch input is invalid	Mechanical malfunction
B1A94-07	Handle Switch Failure	/	Mechanical malfunction	The switch is valid for 30s	The switch is invalid, clear the current fault and it is stored as history fault.	The switch is stuck or short to ground	Setting switch input is invalid	Mechanical malfunction

Description
Refer to PEPS system

DTC	**B1A91-15**	**LH Pinch Strip Sensor Failure**
DTC	**B1A92-15**	**RH Pinch Strip Sensor Failure**

Description
Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1-A9-1-15	LH Pinch Strip Sensor Failure	/	Circuit is short to power supply or open	The collected AD value is above threshold for 500ms	When the collected AD value is within normal range for 100ms, clear the current fault and it is stored as history fault.	Circuit is open or short to power supply	The back door current closing operation is stopped	Circuit is short to power supply or open
B1-A9-2-15	RH Pinch Strip Sensor Failure	/	Circuit is short to power supply or open	The collected AD value is above threshold for 500ms	Clear the current fault and it is stored as history fault.	Circuit is open or short to power supply	The back door current closing operation is stopped	Circuit is short to power supply or open

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.
Take left rod anti-pinch strip as an example. For right rod anti-pinch strip, refer to LH side.

1	**Check left rod anti-pinch strip connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the left anti-pinch sensor connector.
(d) Check wire harness, connector and terminal for deformation, bending or damage.

NG → **Repair or replace left anti-pinch sensor wire harness**

OK

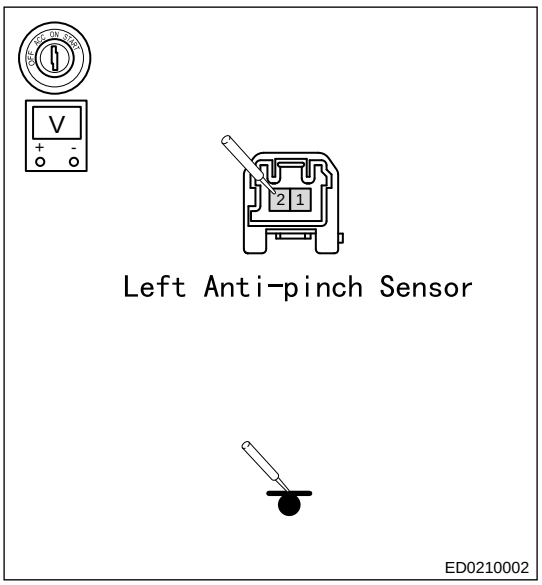
2	**Left anti-pinch sensor wire harness short check**

(a) Connect the negative battery cable.

(b) Turn ENGINE START STOP switch to ON.

(c) Disconnect the left anti-pinch sensor connector, measure if left anti-pinch sensor is short to power supply.

Multimeter Connection Terminal	Condition	Specified Condition
Left anti-pinch sensor (2) - Body ground	Always	≈ 0 V
Left anti-pinch sensor (1) - Body ground	Always	5 V



NG → **Repair or replace left anti-pinch sensor wire harness**

OK

3	**Test left anti-pinch sensor**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect left anti-pinch sensor connector, measure internal resistance of left anti-pinch sensor with digital multimeter.

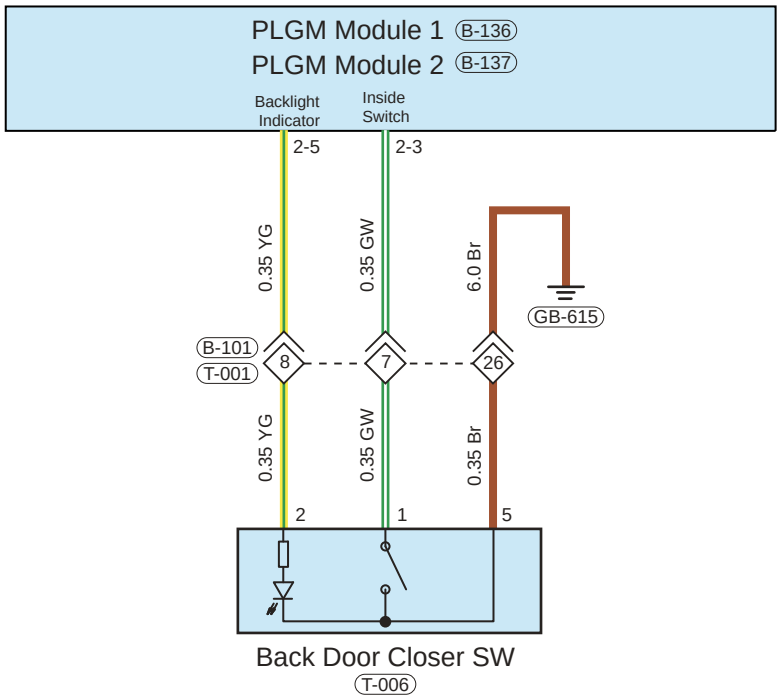
OK → **System is normal**

NG	Replace the left anti-pinch sensor

DTC	B1A95-07	Inner Switch Failure
DTC	B1A96-07	Global Switch Failure

Description

Control Schematic Diagram



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DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1A95-07	Inner Switch Failure	/	Mechanical malfunction	The switch is valid for 30s	The switch is invalid, clear the current fault and it is stored as history fault.	The switch is stuck or short to ground	Setting switch input is invalid	Mechanical malfunction
B1A96-07	Global Switch Failure	/	Mechanical malfunction	The switch is valid for 30s	The switch is invalid, clear the current fault and it is stored as history fault.	The switch is stuck or short to ground	Setting switch input is invalid	Mechanical malfunction

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.

- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check vehicle malfunction condition**

(a) Press back door close switch to check if back door can close normally.

NG → **Turn off vehicle power supply (- disconnect the negative battery cable), then turn on power supply again and clear DTC.**

OK

2	**Check if back door close switch power supply is normal**

(a) Turn ENGINE START STOP switch to “ON”.

(b) Detect back door switch signal with a digital multimeter according to the table below.

Multimeter Connection Terminal	Condition	Specified Condition
Back door closer switch (1) - Body ground	Initial status	12V
	Internal switch pressed	1.5V
Back door closer switch (2) - Body ground	Internal switch pressed	12V
Back door closer switch (5) - Body ground	Always	0V

NG → **Check if power supply fuse is burnt**

OK

3	**Check wire harness and connector**

(a) Disconnect the connector.
(b) Check if wire harnesses are worn, pierced, pinched or partially broken.
(c) Check for broken, bent, protruded or corroded terminals.
(d) Check if terminal contact pins of related connectors are in good condition.

NG → **Repair or replace wire harness connector**

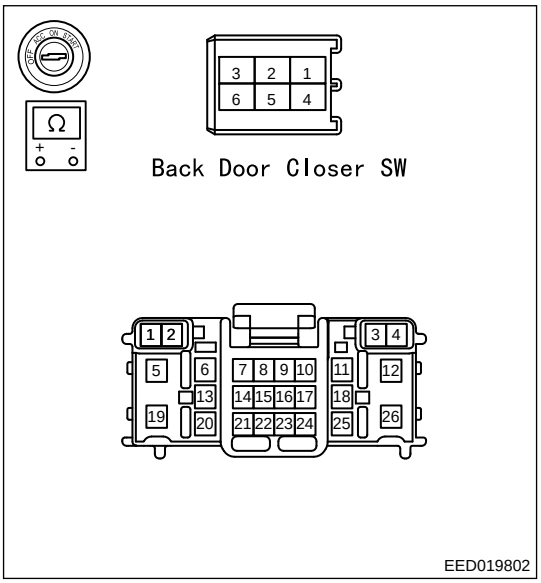
OK

4	Check back door close switch wire harness

(a) Turn ENGINE START STOP switch to “OFF”.

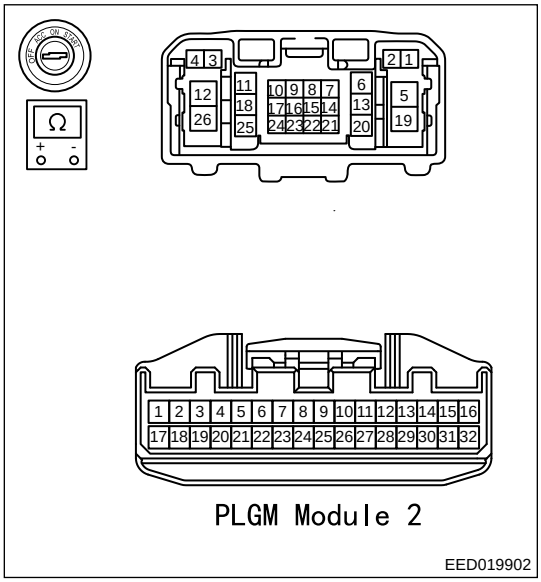
(b) Disconnect the connector back door closer switch, and interface between left back door wire harness and interior wire harness.

(c) Using ohm band of multimeter, measure resistance between back door closer switch (2) and interface between left back door wire harness and interior wire harness (8), back door closer switch (1) and interface between left back door wire harness and interior wire harness (7), back door closer switch (5) and interface between left back door wire harness and interior wire harness (26).



Multimeter Connection Terminal	Condition	Specified Condition
Back door closer switch (2) - Interface between left back door wire harness and interior wire harness (8)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
Back door closer switch (1) - Interface between rear left back door wire harness and interior wire harness (7)		⩽ 1 Ω
Back door closer switch (5) - Interface between rear left back door wire harness and interior wire harness (26)		⩽ 1 Ω

(d) Using ohm band of multimeter, measure resistance between interface between interior wire harness and left back door wire harness (8) and power back door module 2 (205), interface between interior wire harness and left back door wire harness (7) and power back door module 2 (203), interface between interior wire harness and left back door wire harness (26) and GB-615.



Multimeter Connection Terminal	Condition	Specified Condition
Interface between interior wire harness and left back door wire harness (8) - Power back door module 2 (205)	ENGINE START STOP switch "OFF"	⩽ 1 Ω
Interface between interior wire harness and rear left back door wire harness (7) - Power back door module 2 (203)		⩽ 1 Ω
Interface between interior wire harness and left back door wire harness (26) - GB-615		⩽ 1 Ω

NG → **Replace back closer switch wire harness**

OK

5	**Reconfirm DTCs**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to "OFF".
(d) Use diagnostic tester (the latest software) to read the DTCs stored in body control system again.

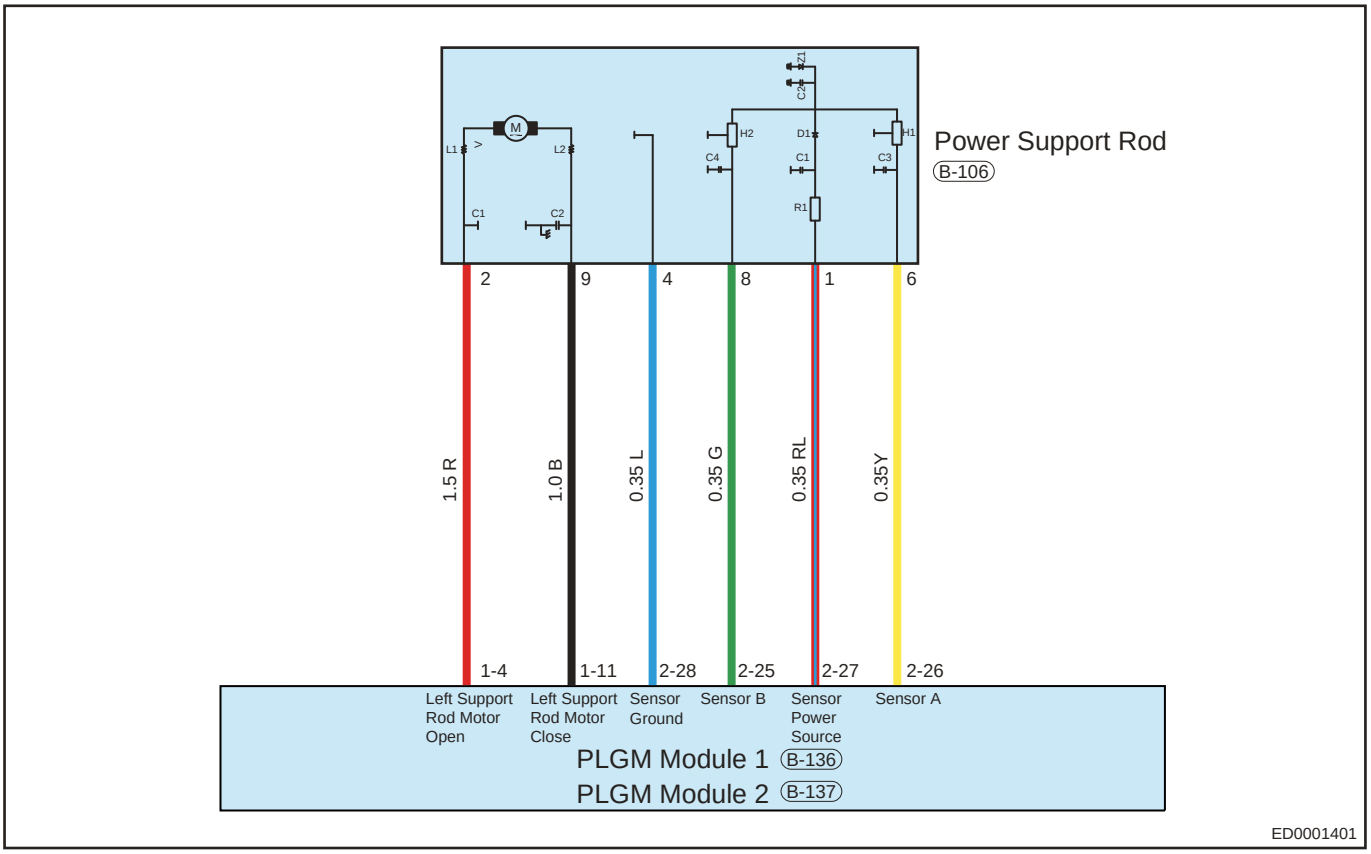
OK → **System is normal**

NG → **Replace power back door module**

DTC	**B1A97-01**	**LH Hall Pulse is Out of Range**
DTC	**B1A98-13**	**LH Hall Sensor Failure (LH Spindle Unit Failure)**
DTC	**B1A99-14**	**LH Hall Sensor Power Supply Failure**

Description

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1-A9-7-01	LH Hall Pulse is Out of Range	/	General electrical fault	Three HALL cycles which are less than 100 us occur in one running	If it returns to normal, clear the current fault and it is stored as history fault.	HALL signal is interfered or HALL sensor has fault	/	General electrical fault
B1-A9-8-13	LH Hall Sensor Failure (LH Spindle Unit Failure)	/	Circuit is open	When motor is running, A/B channel has no HALL signal, meanwhile, more than 5 HALL signals are detected in B/A channel	If there is HALL signal in A/B channel, clear the current fault and it is stored as history fault.	HALL signal input is open, or short to ground, power supply, or sensor has fault	Stop the back door current operation and set the position abnormal	Circuit is open
B1-A9-9-14	LH Hall Sensor Power Supply Failure	/	Circuit is short to ground or open	Over-current is output for 500ms	The over-current fault lasts for 1 s, clear the current fault and it is stored as history fault.	The signal input is short to ground, power supply is shut off, or sensor is short to ground	Stop the back door current operation and position set the position to abnormal. If over-current fault still exits, cut off the power supply output	Circuit is short to ground

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check left support wire harness connector**

(a) Turn ENGINE START STOP switch to “OFF”, disconnect the power support connector.
(b) Check for broken, bent, protruded or corroded terminals.
(c) Check if wire harnesses are worn, pierced, pinched or partially broken.

NG → **Repair or replace wire harness connector.**

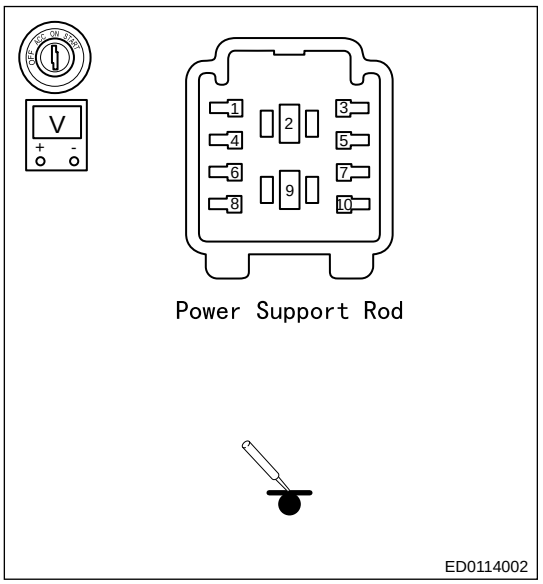
OK

2	**Check sensor power supply**

(a) Turn ENGINE START STOP switch to “ON”.

(b) Disconnect the connector power support, measure voltage between terminal 1 and body ground with a multimeter, it should be not less than 12 V.

Multimeter Connection Terminal	Condition	Specified Condition
Power support (1) - Body ground	ENGINE START STOP switch “OFF”	Not less than 12 V



NG → **Repair or replace wire harness connector**

OK

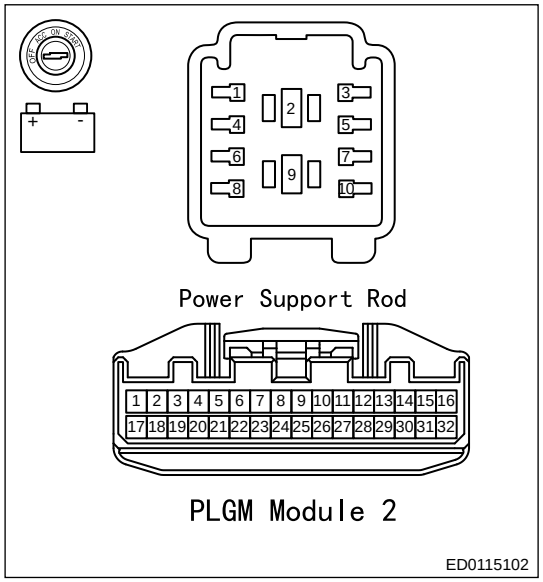
3	**Check power supply wire harness**

(a) Turn ENGINE START STOP switch to “OFF”.

(b) Disconnect connector from power back door module.

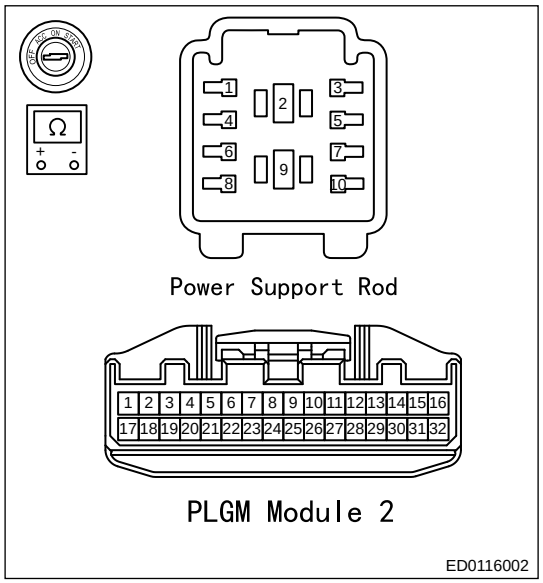
(c) Using ohm band of multimeter, check if power back door module-2 (227) and power support (1) are short to power supply separately.

Multimeter Connection Terminal	Condition	Specified Condition
Power back door module-2 (227)- Battery (+)	ENGINE START STOP switch “OFF”	∞
Power support (1) - Battery (+)	ENGINE START STOP switch “OFF”	∞



(d) Using ohm band of multimeter, check for continuity between power back door module-2 (227) and power support (1).

Multimeter Connection Terminal	Condition	Specified Condition
Power back door module-2 (227) - Power support (1)	ENGINE START STOP switch “OFF”	⩽ 1 Ω



NG → **Repair or replace power support**

OK

4	Reconfirm DTCs

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to “ON”.
(d) Use diagnostic tester (the latest software) to read the DTCs stored in body control system again.

OK → **System is normal**

NG → **Replace power back door module**

DTC	B1AA6-07	PLG Position is Out of Range

Description

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1-A-A6-07	PLG Position is Out of Range	/	Mechanical malfunction	HALL position is out of Max. value	If the HALL position returns to normal, clear the current fault and it is stored as history fault.	/	/	Mechanical malfunction

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check appearance of power support**

(a) Check appearance of power support for deformation or damage.

NG → **Replace power support**

OK ↓

2	**Check power support**

(a) Install power support to a new vehicle, observe whether the same fault phenomenon occurs.

NG → **Replace power support**

OK ↓

3	**Reconfirm DTCs**

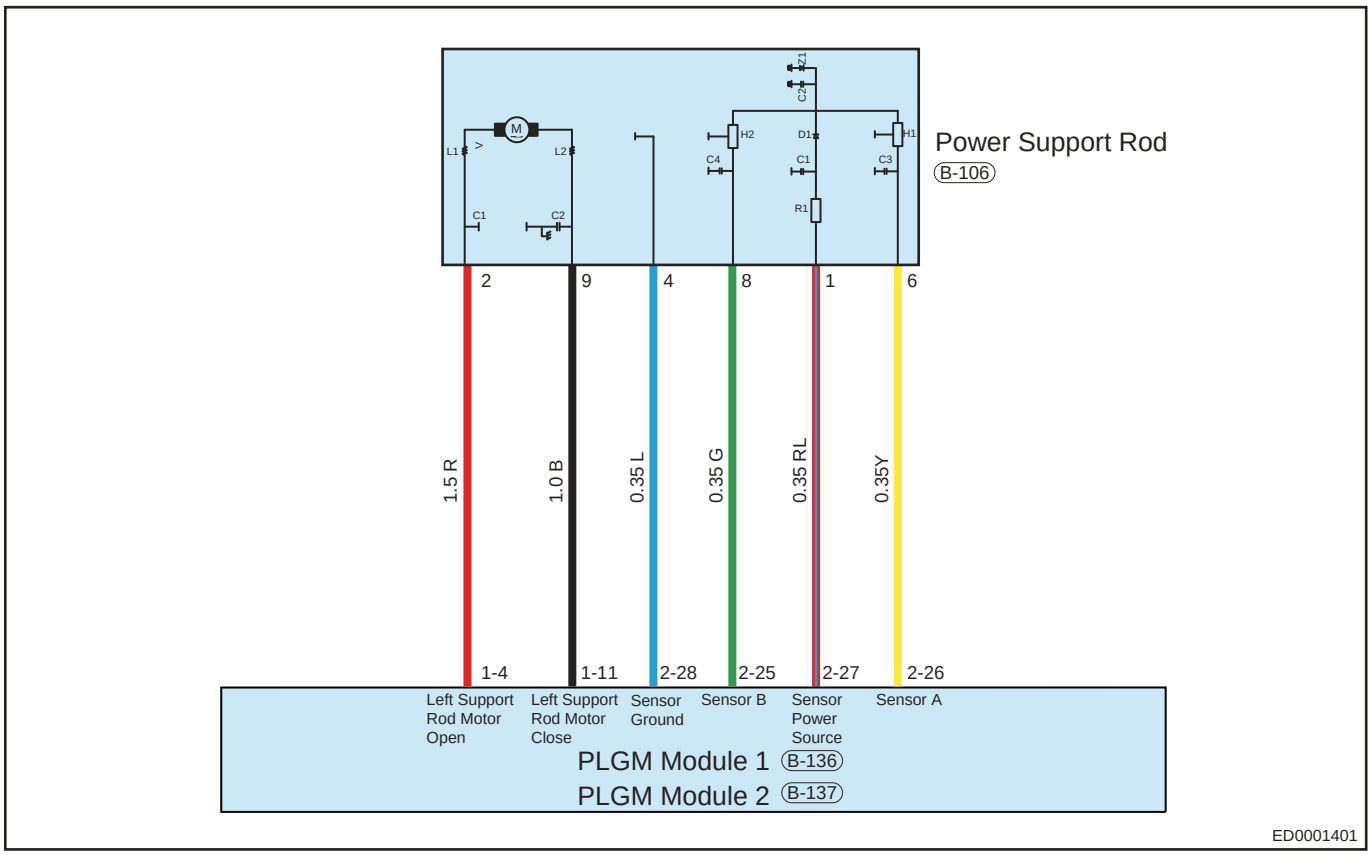
(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to “ON”.
(d) Use diagnostic tester (the latest software) to read the DTCs stored in body control system again.

OK → **System is normal**

NG → **Replace power back door module**

DTC	B1A9A-1C	LH Spindle Motor Output Failure
DTC	B1A9B-1D	LH Spindle Motor Overload

Description
Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1A9A-1C	LH Spindle Motor Output Failure	/	Circuit voltage is out of range	The voltage feedback value detection fault occurs for 600ms	If voltage feedback value restores for 500 ms, clear the current fault and it is stored as history fault.	Motor output is open or short to ground or power supply	New operation command is prohibited	Circuit voltage is out of range
B1A9B-1D	LH Spindle Motor Overload	/	Circuit current is out of range	Motor current is over 35A for 50ms	If there is new operation command, clear the current fault and it is stored as history fault.	Motor output short to ground	Stop the back door current closing operation	Circuit current is out of range

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check left support motor connector**

(a) Turn ENGINE START STOP switch to “OFF”.
(b) Disconnect the connector power support, check if connector terminals are damaged or displaced.

NG → **Repair or replace power support**

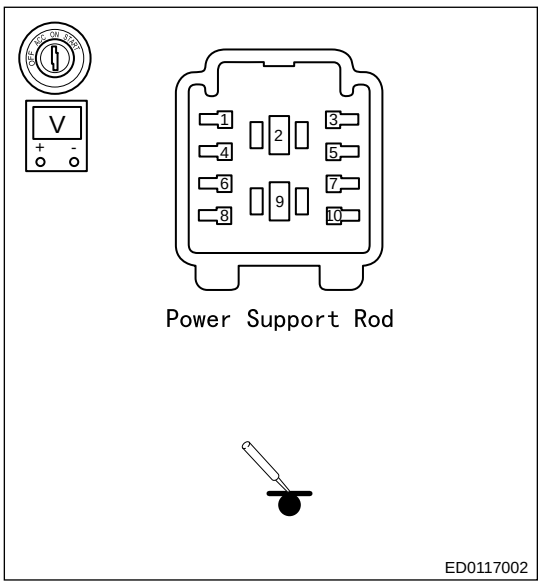
OK

2	**Check motor power supply**

(a) Turn ENGINE START STOP switch to “ON”.

(b) Disconnect connector power support, measure voltage between power support (2) and ground using multimeter, it should be not less than 12 V.

Multimeter Connection Terminal	Condition	Specified Condition
Power support (2) - Body ground	ENGINE START STOP switch “ON”	Not less than 12 V



NG → **Repair or replace power supply wire harness**

OK

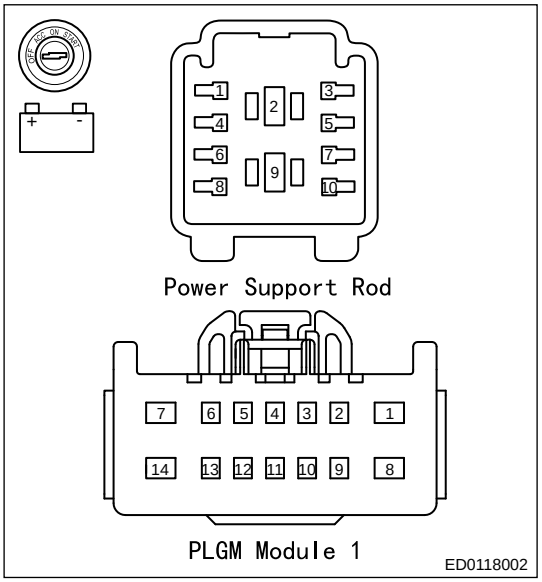
3	**Check motor wire harness.**

(a) Turn ENGINE START STOP switch to “OFF”.

(b) Disconnect connector from power back door module.

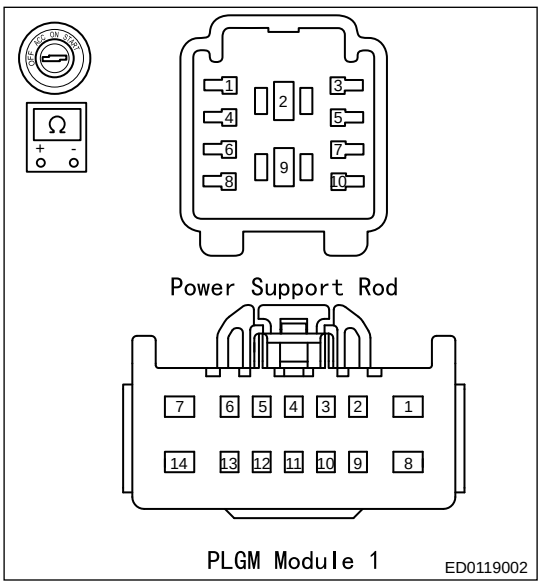
(c) Using ohm band of multimeter, check for continuity between power back door module 1 (104), power support (2) and battery (+) and check if it is short to power supply.

Multimeter Connection Terminal	Condition	Specified Condition
Power back door module 1 (4) - Battery (+)	ENGINE START STOP switch "OFF"	∞
Power support (2) - Battery (+)		∞



(d) Using ohm band of multimeter, check for continuity between power back door module 1 (104) and power support (2), power back door module 1 (11) and power support (9) and check if there is open.

Multimeter Connection Terminal	Condition	Specified Condition
Power back door module 1 (104) - Power support (2)	ENGINE START STOP switch "OFF"	⩽ 1 Ω
Power back door module 1 (11) - Power support (9)		⩽ 1 Ω



NG → **Repair or replace left support motor**

OK

4	Reconfirm DTCs

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to "ON".
(d) Use diagnostic tester (the latest software) to read the DTCs stored in body control system again.

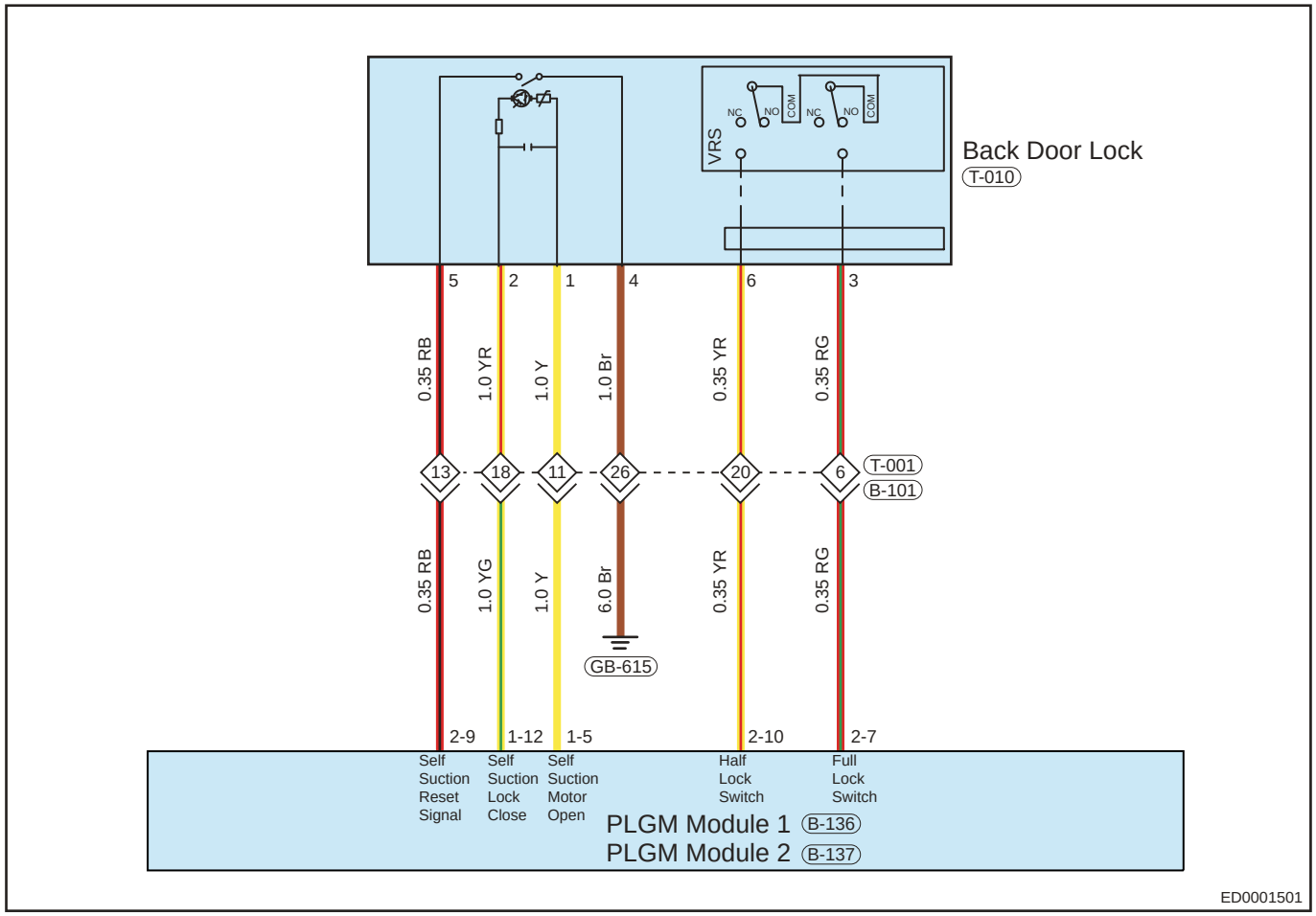
OK → **System is normal**

NG → **Replace power back door module**

DTC	B1AA1-1C	Cinch Latch Motor Output Failure
DTC	B1AA2-1D	Cinch Latch Motor Overload

Description

Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1-A-A1-1C	Cinch Latch Motor Output Failure	/	Circuit voltage is out of range	The voltage feedback value detection fault occurs for 600ms	If voltage feedback value restores for 500 ms, clear the current fault and it is stored as history fault.	Motor output is open or short to ground or power supply	New operation command is prohibited	Circuit voltage is out of range
B1-A-A2-1D	Cinch Latch Motor Overload	/	Circuit current is out of range	Motor current is over threshold for 100 ms	If there is new operation command and command operation is successful, clear the current fault and it is stored as history fault.	Motor output short to ground	Stop the back door current closing operation	Circuit current is out of range

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check lock motor connector**

(a) Turn ENGINE START STOP switch to “OFF”.
(b) Disconnect back door lock connector and check terminal.

NG → **Repair or replace motor wire harness**

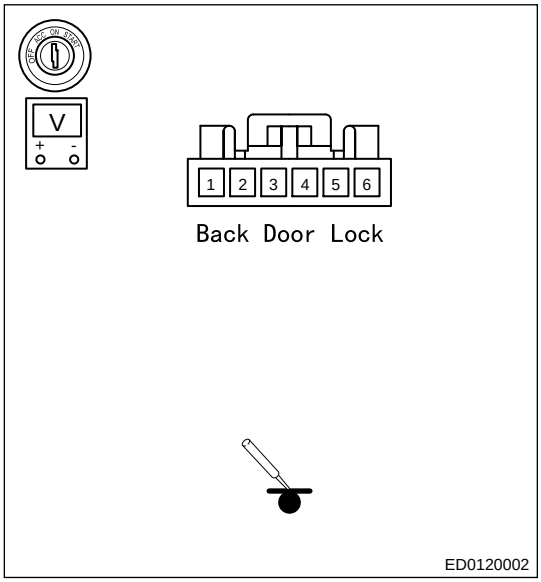
OK ↓

2	**Check lock motor signal voltage**

(a) Turn ENGINE START STOP switch to “ON”.

(b) Measure voltage of back door lock (5) with voltage band of multimeter, it should be not less than 12 V.

Multimeter Connection Terminal	Condition	Specified Condition
Back door lock (5) - Ground	ENGINE START STOP switch "ON"	Not less than 12 V



NG → **Repair or replace motor wire harness**

OK ↓

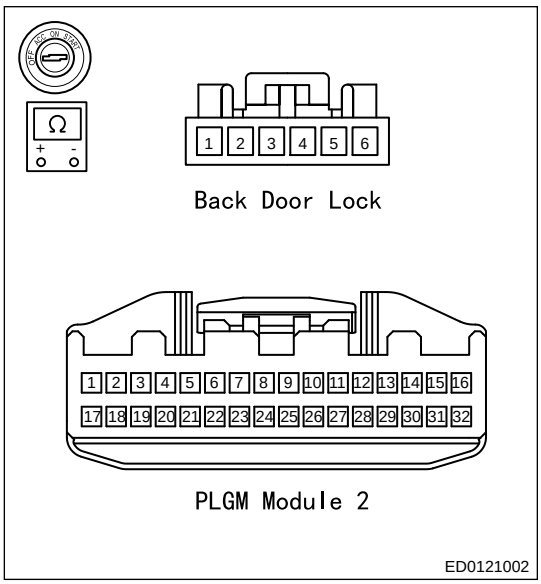
3	Check lock motor wire harness

(a) Turn ENGINE START STOP switch to "OFF".

(b) Disconnect connector from back door lock. Disconnect connector from power back door module.

(c) Using ohm band of multimeter, check for continuity between back door lock (5) and power back door module 2 (209).

Multimeter Connection Terminal	Condition	Specified Condition
Back door lock (5) - B-Power back door module 2 (209)	ENGINE START STOP switch "OFF"	⩽ 1 Ω
Back door lock (4) - B-GB-615		⩽ 1 Ω



NG → **Repair or replace motor wire harness**

OK ↓

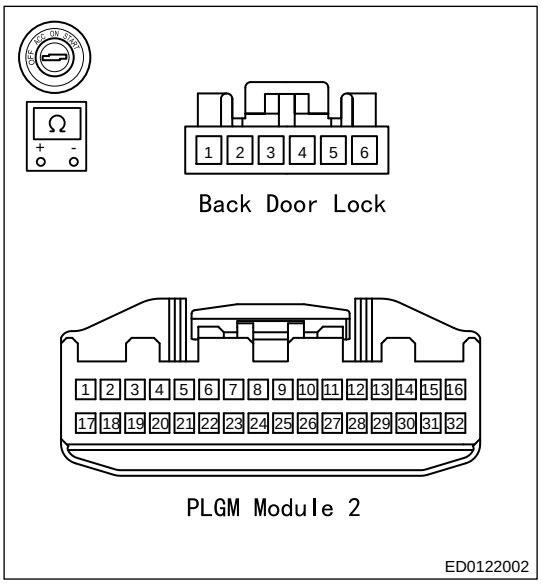
4	Check motor control circuit

(a) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.

(b) Disconnect connector from back door lock. Disconnect connector from power back door module.

(c) Using ohm band of multimeter, check for continuity between back door lock (5), T-back door lock (4) and power back door module.

Multimeter Connection Terminal	Condition	Specified Condition
Back door lock (5) - B-Power back door module 2 (209)	ENGINE START STOP switch “OFF”	⩽ 1 Ω
Back door lock (4) - B-GB-615		⩽ 1 Ω



NG → **Repair or replace motor wire harness**

OK

5	Reconfirm DTCs

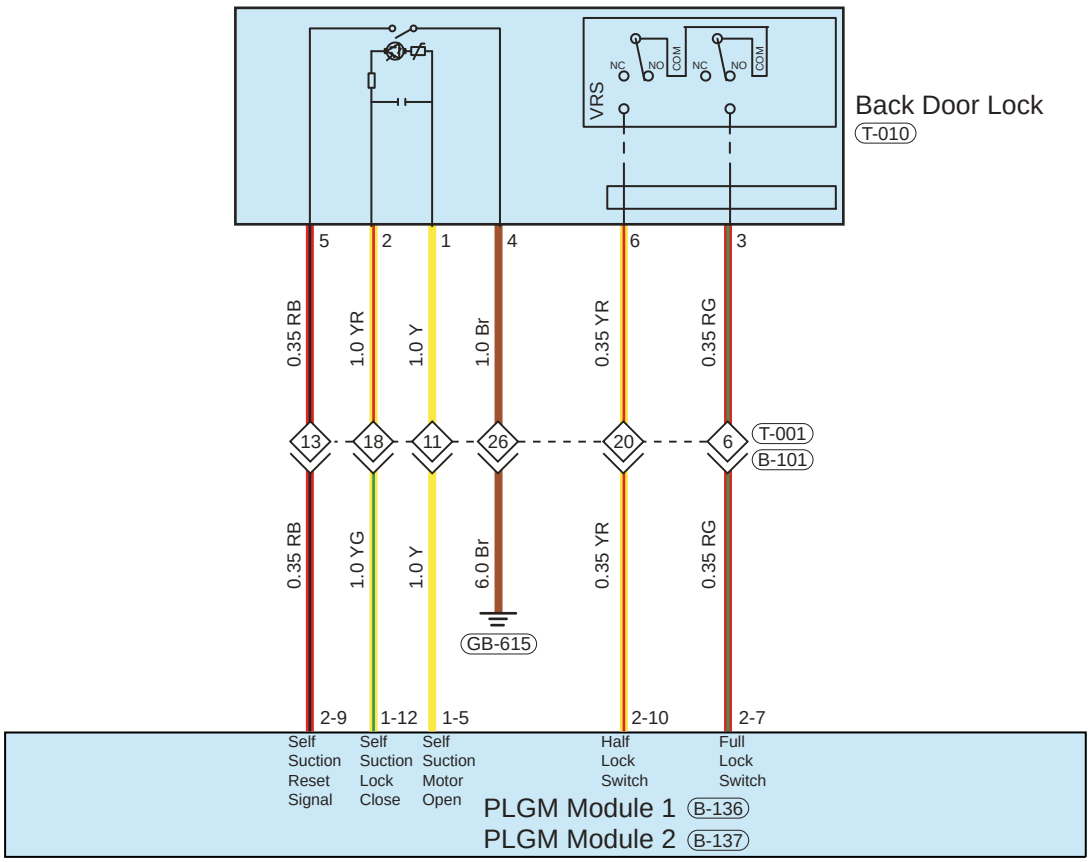
(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to “ON”.
(d) Use diagnostic tester (the latest software) to read the DTCs stored in body control system again.

OK → **System is normal**

NG → **Replace fastener assembly**

DTC	B1AA3-1C	Release Motor Output Failure

Description
Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1-A-A3-1C	Release Motor Output Failure	/	Circuit voltage is out of range	The feedback status and control status is inconsistent for 200 ms	If the feedback status and control status is consistent for 100 ms, clear the current fault and it is stored as history fault.	Relay is short to ground or power supply	Stop the motor current operation and prohibit the new operation	Circuit voltage is out of range

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check unlock motor connector**

(a) Turn ENGINE START STOP switch to “OFF”, disconnect the negative battery cable.
(b) Disconnect back door lock connector.
(c) Check if wire harnesses are worn, pierced, pinched or partially broken.
(d) Check for broken, bent, protruded or corroded terminals.

NG → **Repair or replace back door lock wire harness**

OK

2	**Check unlock motor wire harness connector**

(a) Disconnect back door lock connector.

(b) Turn ENGINE START STOP switch to “ON”.

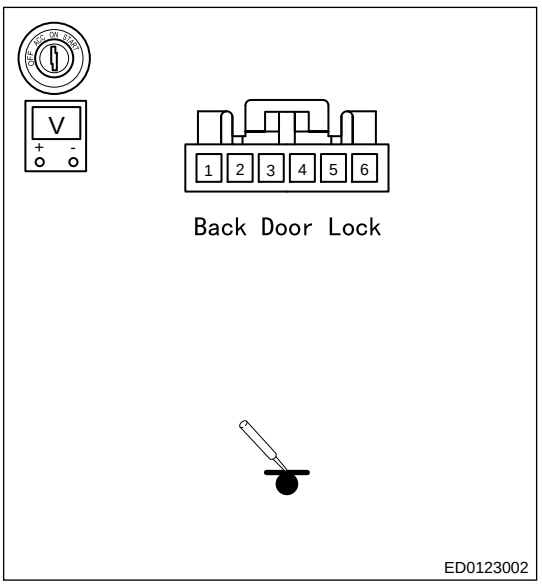
(c) Measure voltage of back door lock (1) with voltage band of multimeter, it should be not less than 12 V.

Check power supply voltage

Multimeter Connection	Condition	Specified Condition
Back door lock (1) - Body ground	ENGINE START STOP switch “ON”	Not less than 12 V

Check for Open

Multimeter Connection	Condition	Specified Condition
Back door lock (2) - Body ground	ENGINE START STOP switch “OFF”	⩽ 1 Ω



NG → **Repair or replace back door lock wire harness**

OK

3	**Check back door lock**

(a) Install back door lock of malfunctioning vehicle to new vehicle, and test if inspection is normal.

NG → **Replace back door lock**

OK

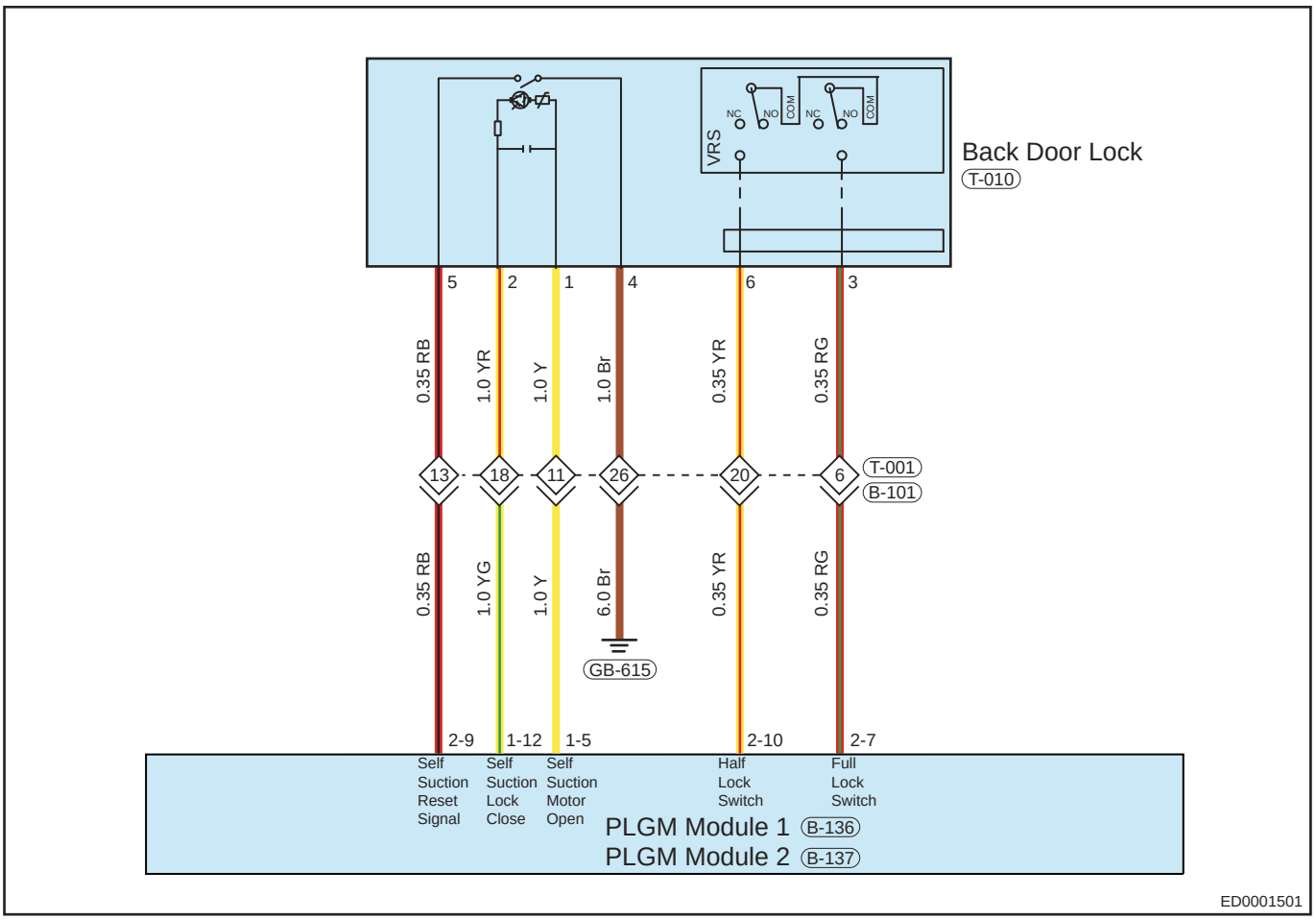
4	**Reconfirm DTCs**

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to “ON”.
(d) Use diagnostic tester (the latest software) to read the DTCs stored in body control system again.

OK	**System is normal**
NG	**Replace power back door module**

DTC	**B1AA4-07**	**Half/Full Latch Abnormality**
DTC	**B1AA5-07**	**PCM Switch Failure**

Description
Control Schematic Diagram



DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1-A-A4-07	Half/Full Latch Abnormality	/	Mechanical malfunction	Unlocking 200ms is timeout, full opening status signal is not detected	If unlocking is successful next time, clear the current fault and it is stored as history fault.	/	/	Mechanical malfunction
B1-A-A5-07	PCM Switch Failure	/	Mechanical malfunction	Pulling-in 2s is timeout, PCM pulling-in signal is not detected, but full locking signal can be detected Or returning 2s is timeout, PCM returning signal is not detected	If PCM timing order is correct during pulling-in and returning, clear the current fault and it is stored as history fault.	/	/	Mechanical malfunction

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check back door lock wire harness connector**

(a) Disconnect the connector.
(b) Check if wire harnesses are worn, pierced, pinched or partially broken.

NG → **Repair or replace back door lock wire harness**

OK

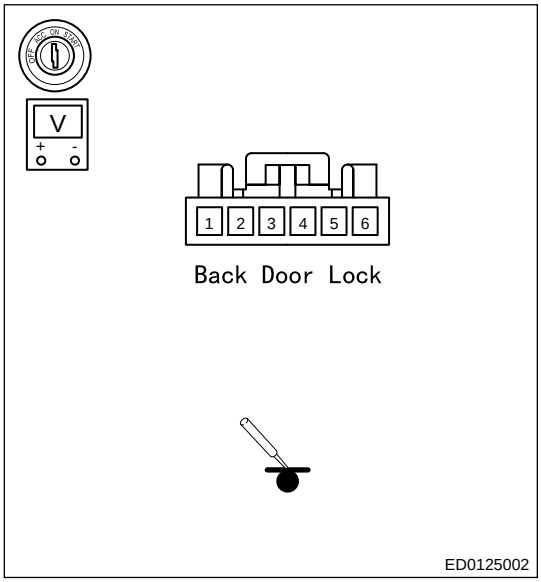
2	**Check half-lock/full-lock position signals**

(a) Disconnect the wire harness connector.

(b) Turn ENGINE START STOP switch to “ON”.

(c) Measure voltage of back door lock (6) and back door lock (3) with voltage band of multimeter, they should be not less than 12 V.

Multimeter Connection	Condition	Specified Condition
Back door lock (6) - Body ground	ENGINE START STOP switch "ON"	Not less than 12 V
Back door lock (3) - Body ground		Not less than 12 V



Check for Open

Multimeter Connection	Condition	Specified Condition
Back door lock (4) - Body ground	ENGINE START STOP switch "OFF"	⩽ 1 Ω

NG → **Repair or replace back door lock wire harness**

OK

3	Check back door lock

(a) Install back door lock of malfunctioning vehicle to new vehicle, and test if inspection is normal.

NG → **Replace back door lock**

OK

4	Reconfirm DTCs

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to "ON".
(d) Use diagnostic tester (the latest software) to read the DTCs stored in body control system again.

OK → **System is normal**

NG → **Replace power back door module**

DTC	B1AAA-04	ECU fault

Description

DTC	Description	Fault Class Definition	Fault Type	Store Current DTC	Save as History DTC	Possible Causes	Malfunction Protection Measures	Malfunction Light
B1-AA-A-04	ECU fault	/	System internal failure	MCU failure	If MCU fault disappears, clear the current fault and it is stored as history fault.	/	/	System internal failure

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Clear DTCs**

(a) Using diagnostic tester to enter PLG system and clear DTCs.

(b) Reconfirm DTCs after clearing DTCs.

OK → **Reconfirm power back door control function**

NG → **Replace PLG module assembly**

ON-VEHICLE SERVICE

Engine Hood Assembly

Removal

⚠ Caution

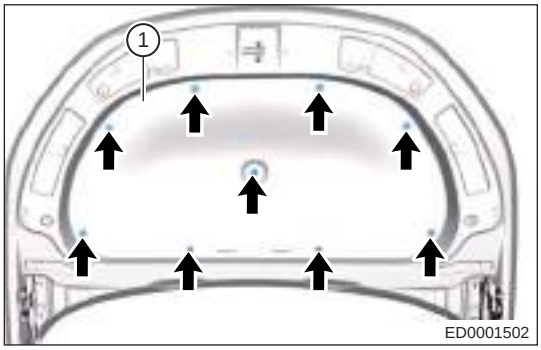
- Be sure to wear safety equipment to prevent accidents, when removing engine hood assembly.
- When removing engine hood assembly, try to prevent engine hood from falling down during operation, resulting in damage to body or front windshield.

Hint:

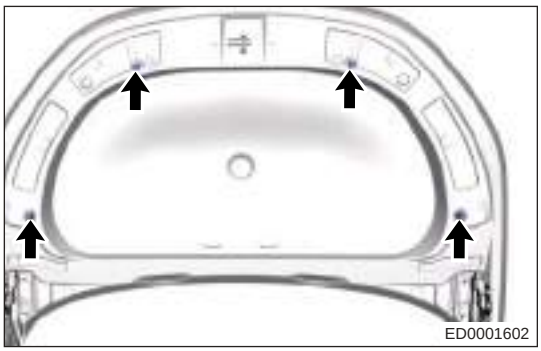
- When removing engine hood assembly, an assistant is needed to hold engine hood. Try to prevent engine hood from falling down or closing suddenly during operation, resulting in accidents.

1. Remove the engine hood sound insulator.

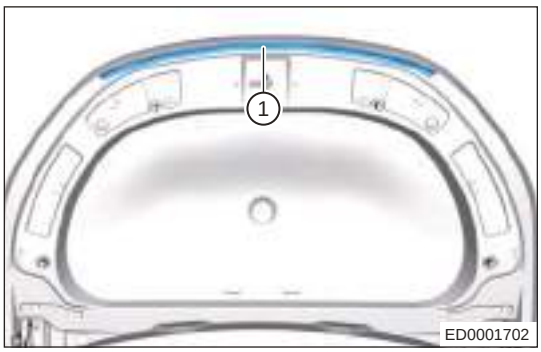
a. Remove clips (arrow) from engine hood sound insulator, and remove engine hood sound insulator (1).



2. Remove the engine hood adjustable buffer block.
   a. Rotate engine hood adjustable buffer block (arrow) counterclockwise and remove it.

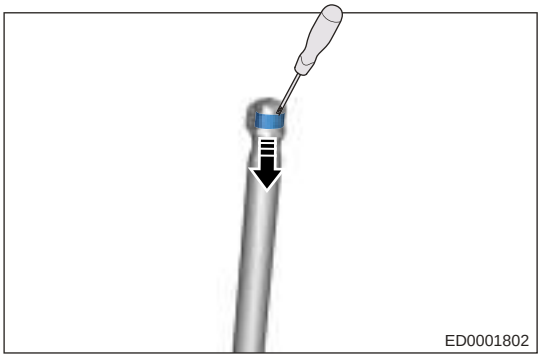


3. Remove the engine weatherstrip.
   a. Disengage clips from engine weatherstrip and remove engine weatherstrip (1).



4. Remove the left/right air spring assembly.

a. Using a screwdriver wrapped with protective tape, pry off fixing clips from upper end of engine hood left air spring assembly (Use same procedures for right side).



⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing left/right air spring assembly.
- Try to prevent body paint surface from being scratched, when removing left/right air spring assembly.
- During removal of left/right air spring assembly, avoid engine hood falling off during operation, resulting in damage to body or front windshield.

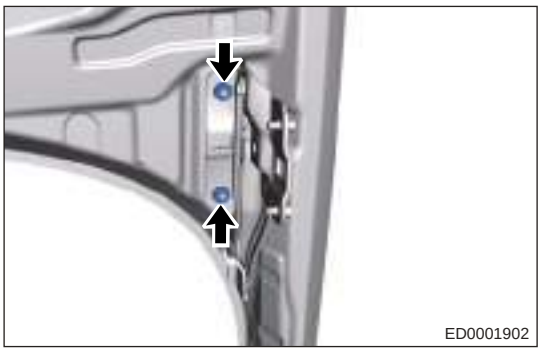
Hint:

- When removing left/right air spring assembly, an assistant is needed to hold it. Try to prevent engine hood from falling down or closing suddenly during operation, resulting in accidents.

5. Remove the engine hood assembly.

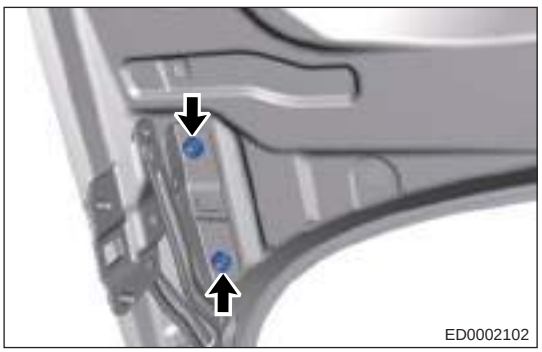
a. Remove 2 fixing nuts (arrow) between engine hood assembly and engine hood left hinge assembly.

Tightening torque: 23 ± 2.0 N • m



b. Remove 2 fixing nuts (arrow) between engine hood assembly and engine hood right hinge assembly and remove engine hood assembly.

Tightening torque: 23 ± 2.0 N • m



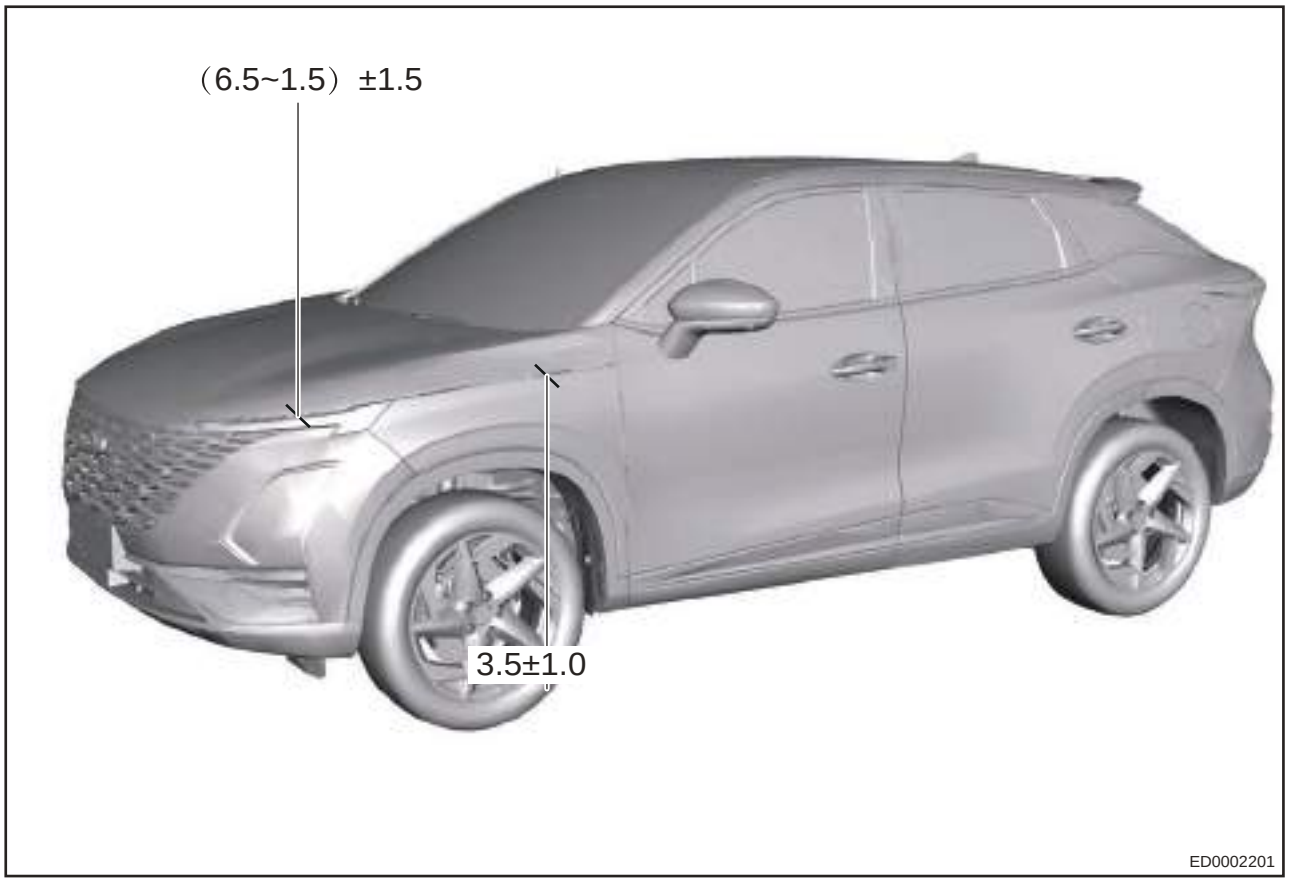
Installation

1. Installation is in the reverse order of removal.

Disassembly

1. Adjust the engine hood assembly.
   a. Loosen fixing bolts of engine hood hinge assembly.
   b. Adjust the clearance of engine hood assembly within standard range and pre-tighten fixing bolts of engine hood hinge assembly.

c. Standard ranges of clearance between installation position of engine hood assembly and each part are as in illustration.



d. After adjustment, tighten fixing bolts between engine hood hinge assembly and engine hood assembly to specified torque.

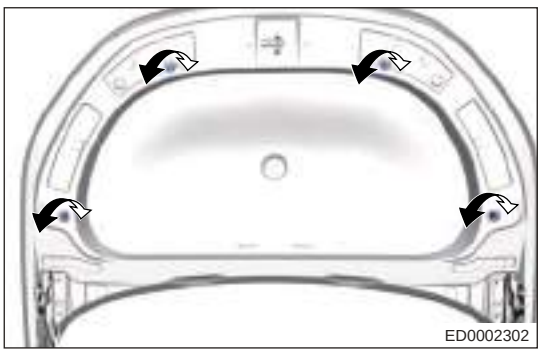
   Tightening torque: 23 ± 2.0 N·m

e. After adjustment, tighten fixing bolts between engine hood hinge assembly and body to specified torque.

   Tightening torque: 23 ± 2.0 N·m

2. Adjust the height of engine hood front end with adjustable buffer blocks.

a. Raise or lower the hood front end by rotating the adjustable buffer blocks clockwise or counterclockwise.



b. After adjustment, make sure that alignment between engine hood assembly and wing assembly is within the standard range.

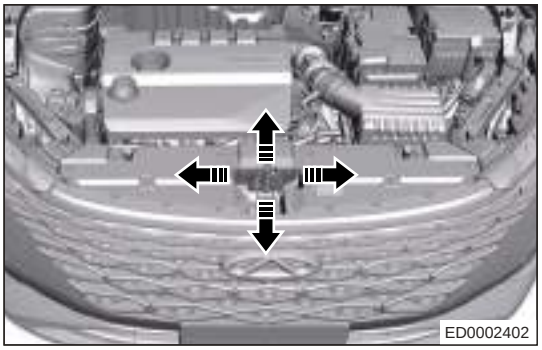
   Standard alignment height: 3.5 ± 1.0//1.0

c. After adjustment, make sure that alignment between engine hood assembly and front combination light is within the standard range.

   Standard alignment height: 6.5 ± 1.5//1.5

3. Adjust the engine hood lock assembly.

a. Slightly loosen the fixing nuts of engine hood lock assembly, and adjust the engine hood lock assembly in direction of arrow.



b. Tighten the engine hood lock assembly fixing nuts to specified torque after adjustment.
Tightening torque: 10 ± 1.5 N • m

Inspection

1. Check hood for wear or deformation during installation, and repair as necessary.
2. Check if fixing bolts are installed in place. Tighten them to specified torque as necessary.
3. Check if clearance and alignment between engine hood assembly installation position and each part are within the specified range. Adjust as necessary.

Engine Hood Hinge Assembly

Removal

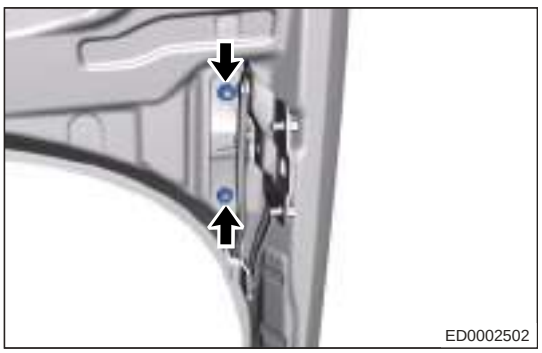
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

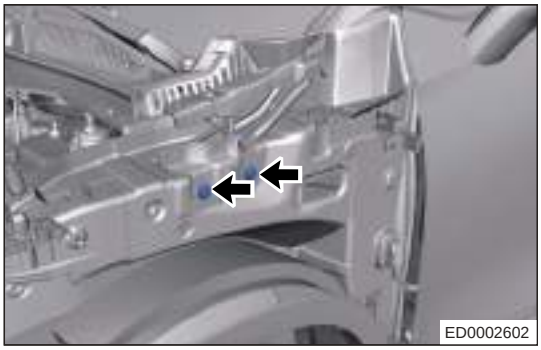
- Be sure to wear safety equipment to prevent accidents, when removing engine hood hinge assembly.
- When removing engine hood hinge assembly, try to prevent engine hood from falling down during operation, resulting in damage to body or front windshield.
- When removing engine hood hinge assembly, an assistant is needed to hold engine hood. Try to prevent engine hood from falling down or closing suddenly during operation, resulting in accidents.

1. Remove the engine hood left hinge assembly
   a. Remove the wing assembly.
   b. Remove 2 fixing nuts (arrow) between left hinge assembly and engine hood assembly.
   Tightening torque: 23 ± 2.0 N • m



c. Remove 2 fixing bolts (arrow) between engine hood left hinge assembly and body.

Tightening torque: 23 ± 2.0 N • m



d. Remove the engine hood left hinge assembly.

Installation

1. Installation is in the reverse order of removal.

Front Door Inside Protector Assembly

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing front door inner protector assembly.
- Try to prevent front door inside protector surface from being damaged, when removing front door inside protector assembly.

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door inner protector assembly.

a. Using interior crow plate, pry off inside handle screw block cover (arrow).

a. Remove the inside handle box cover gasket (arrow).

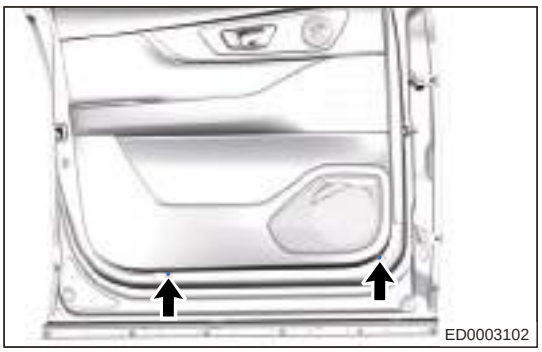
a. Remove 1 fixing screw (arrow) from door protector.
   Tightening torque: 1.5 ± 0.5 N • m


ED0002902

b. Remove 1 fixing screw (arrow) from door protector.
   Tightening torque: 1.5 ± 0.5 N • m


ED0003002

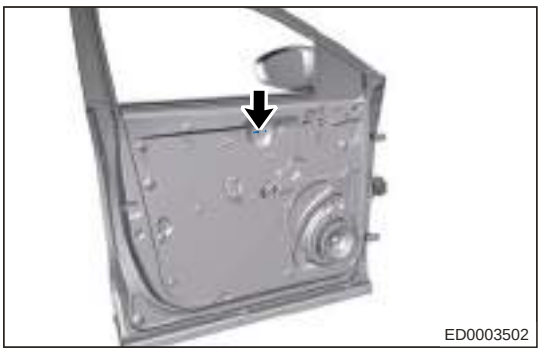
c. Remove 2 fixing screws (arrow) from bottom of door protector.
   Tightening torque: 1.5 ± 0.5 N • m


ED0003102

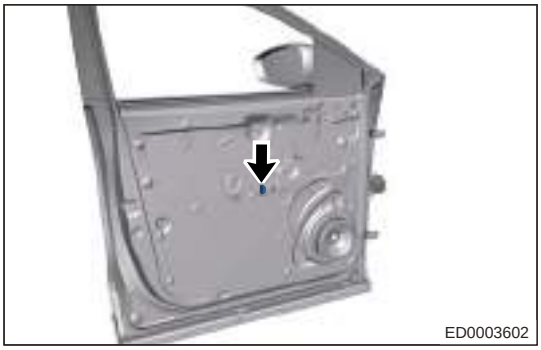
d. Using an interior crow plate, carefully pry off clips on front door inner protector assembly, and loosen front door inner protector assembly in direction of arrow as shown in illustration.


ED0003302

e. Disengage the front door inside handle cable (arrow) from front door inside handle.


ED0003502

f. Disconnect the connector from front door power glass regulator switch connector (arrow).

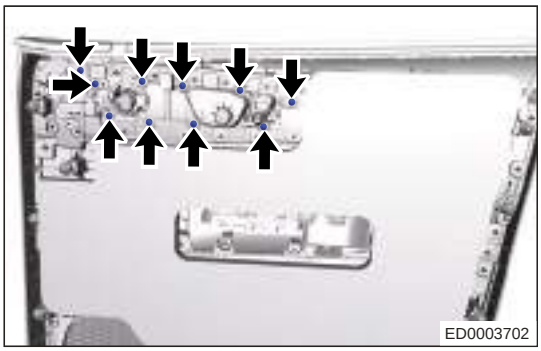


g. Remove the front left door inside protector assembly.

4. Remove the front door inside handle

a. Remove 10 fixing screws (arrow) from front door inside handle.

Tightening torque: 1.5 ± 0.5 N • m



b. Remove the front door inside handle.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Replace damaged clips and install front door inner protector assembly in place, when installing front door inner protector assembly.
- Install connectors in place, when installing front door inner protector assembly.
- Check that each function can operate properly, after installing front door inner protector assembly.

Front Door Assembly

Removal

Hint:

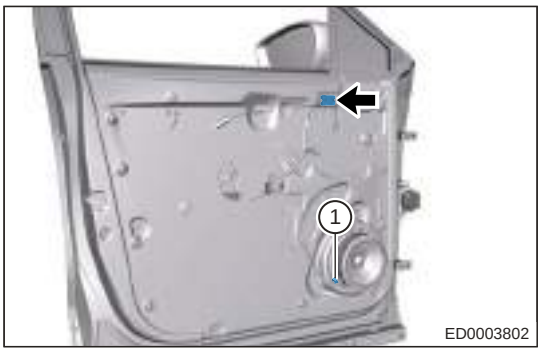
- Use same procedures for right and left sides.
- Procedures listed below are for left side.
- When removing front door assembly, an assistant is needed to hold it, to prevent front door from falling down during operation, resulting in accidents.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing front door assembly.
- Try to prevent body paint surface from being scratched, when removing front door assembly.

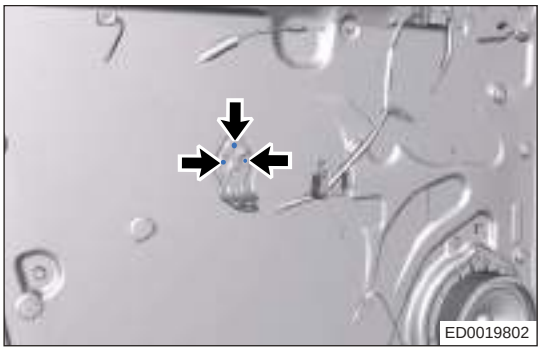
1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left door inner protector assembly.

4. Remove the front left door protective film assembly.
   a. Disconnect the left rear view mirror connector plug (arrow).
   b. Disconnect the full-range speaker connector (1).



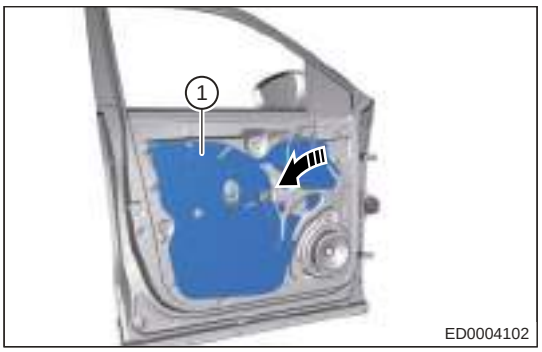
   c. Remove 3 fixing bolts (arrow) and front left door metal bracket.

      Tightening torque: 5 ± 1.0 N • m



   d. As shown in illustration, remove the front left door protective film assembly (1) by gently peeling it along edges from one corner.

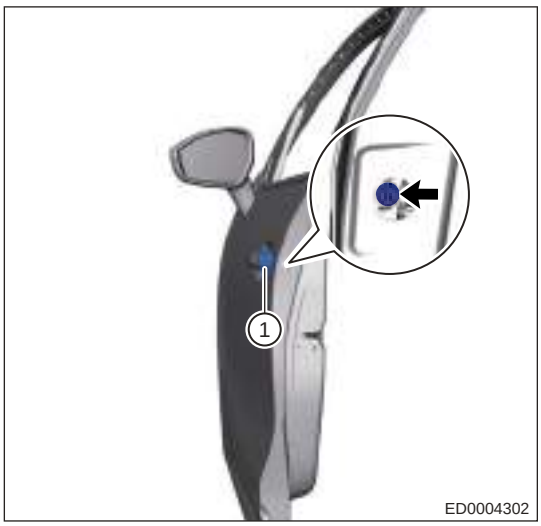
      Hint:
      - Try to prevent front door protective film from being damaged, when removing front door protective film assembly.
      - Place front door protective film assembly properly after removal, and prevent adhesive sticker on front door protective film assembly from sticking to other components.



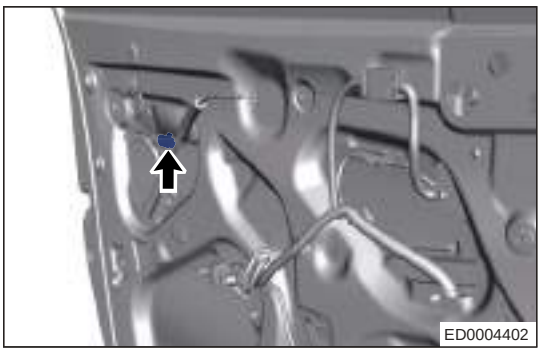
5. Remove the front left door full-range speaker assembly.
6. Remove the front left door weather bar.
7. Remove the front door glass upper run.
8. Remove the front door glass assembly.
9. Remove the front door power glass regulator.
10. Remove the front left door lock assembly.
11. Remove the front left door outside handle.

a. Using an interior crow plate, pry off front left door lock block cover (arrow).

b. Loosen fixing screw (arrow) from front door outside handle and remove lock cylinder assembly (1).



c. Disconnect the left door handle sensor connector (arrow).



d. Slide and pull front door outside handle in direction of arrow as shown in illustration, and remove it.

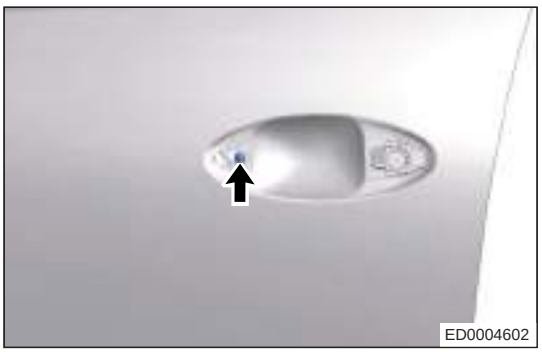
   - It is not necessary to remove the fixing screw from front door outside handle cover because fixing screw is integrated with front door handle base.


ED0004502

12. Remove the front left door outside handle seat assembly.

a. Remove the fixing screw (arrow) from front door outside handle seat assembly.

   Tightening torque: 1.5 ± 0.5 N·m

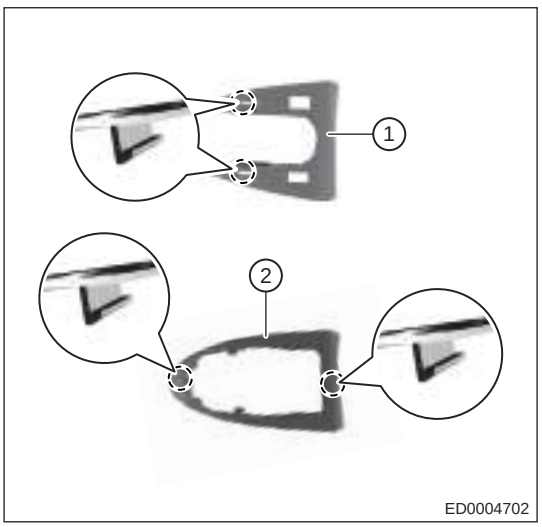

ED0004602

b. Disengage clips from door lock connecting rod and remove front left door outside handle seat assembly.

13. Remove the front left door outside handle gasket.

a. Disengage claws from front door outside handle front shim, and remove front left door outside handle front shim (1).

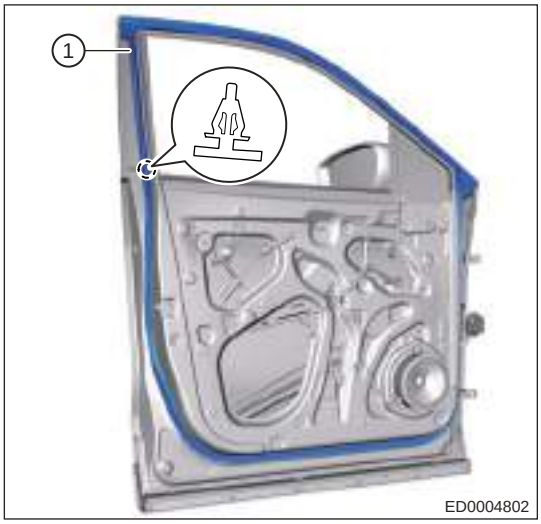
b. Disengage claws from front door outside handle rear shim, and remove front left door outside handle front shim (2).



ED0004702

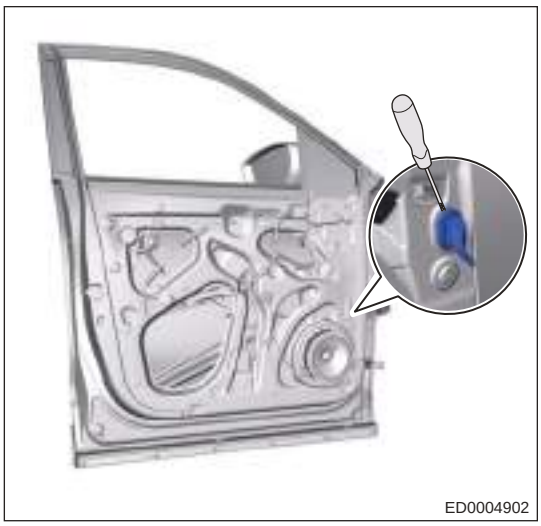
14. Remove the front left door frame weatherstrip.

a. Disengage clips from front door frame weatherstrip, and remove front left door frame weatherstrip (1).

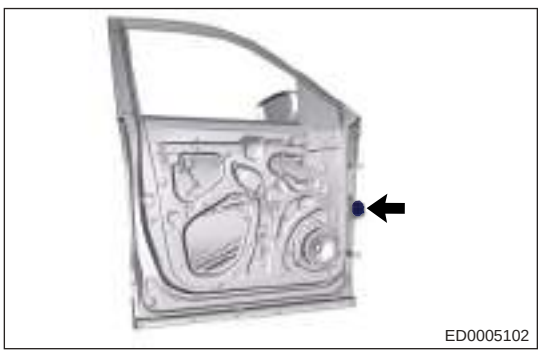


15. Disconnect the front left door wire harness connector.

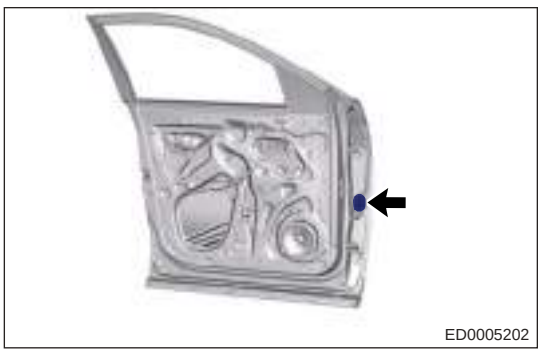
a. Using a screwdriver wrapped with protective tape, pry off front door wire harness dust boot.



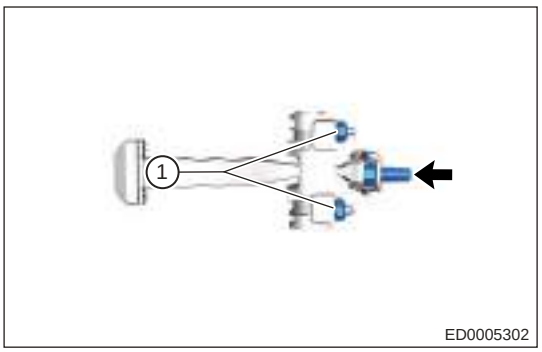
b. Using screwdriver wrapped with tape, pry off claws (-arrow) of front left door wire harness connector.



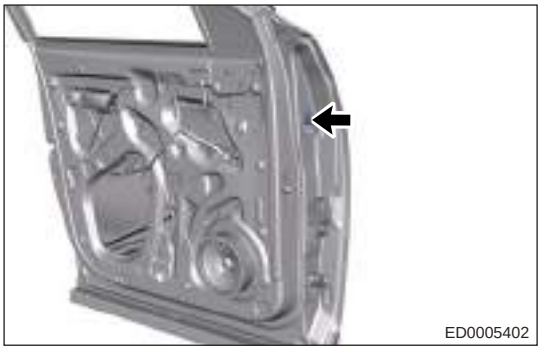
c. Disconnect the front left door wire harness connector (arrow).



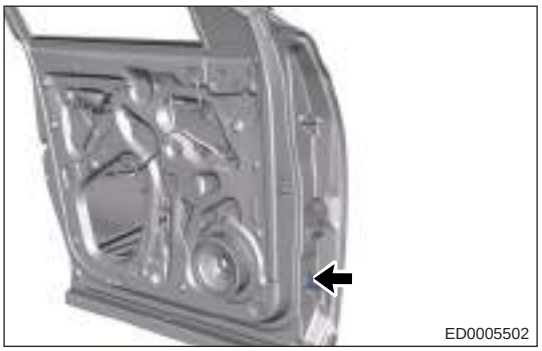
16. Remove the front left door check assembly.
    a. Remove coupling nut (1) between door check and door.
       Tightening torque: 9 ± 1.0 N • m
    b. Remove 1 coupling bolt (arrow) between door check and front left door.
       Tightening torque: 32 ± 2.5 N • m



    c. Remove the front left door check assembly.
17. Remove the front left door assembly.
    a. Disconnect the front left door wire harness connector.
    b. Remove the front left door check assembly.
    c. Remove 1 fixing bolt (arrow) between door and upper hinge.
       Tightening torque: 55 ± 5.0 N • m



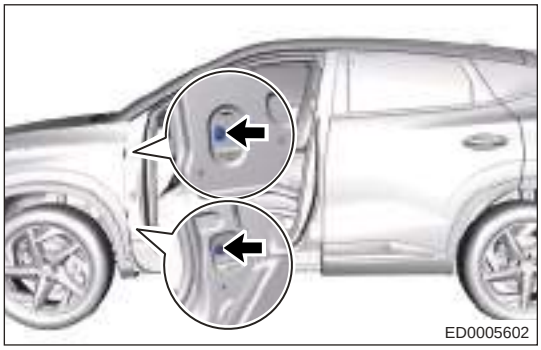
    d. Remove 1 fixing bolt (arrow) between door and lower hinge.
       Tightening torque: 55 ± 5.0 N • m



    e. Remove the front left door assembly.
18. Remove the front left door hinge assembly.
    a. Remove 2 fixing bolts (arrow) between front door upper hinge assembly and quarter assembly.
       Tightening torque: 32 ± 3.0 N • m

b. Remove 2 fixing bolts (arrow) between front door lower hinge assembly and quarter assembly.

Tightening torque: 32 ± 3.0 N • m


ED0005602

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Replace damaged clips and install front door inner protector in place, when installing front door inner protector.
- Stick protective film in specified position, not in a wrong position or an asymmetric position between left and right sides or cover the mounting holes of other installation parts.
- DO NOT drag protective film when sticking. It should be installed under its original condition and ensure sheet metal is clean before installation.
- Finished protective film should have no defects, such as wrinkles, bubbles or turnups.
- Finished protective film should have powerful adherence. Protective film sticking should be finished at one time. Avoid repeat sticking.

Hint:

- When installing front door assembly, an assistant is needed to hold it, to prevent front door from falling down during operation, resulting in accidents.
- Be sure to wear necessary safety equipment to prevent accidents, when installing front door assembly.

Adjustment

1. Adjust the front door assembly.
   a. Loosen fixing bolts between front door hinge assembly and quarter, and adjust the front door assembly position in direction of arrow as shown in illustration.
   b. After adjustment, tighten fixing bolts on front door hinge assembly to specified torque.

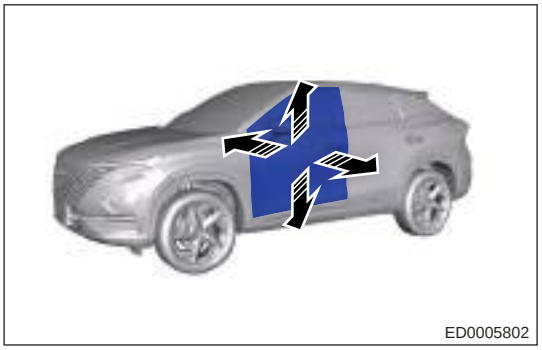
      Tightening torque: 32 ± 3.0 N • m


ED0005702

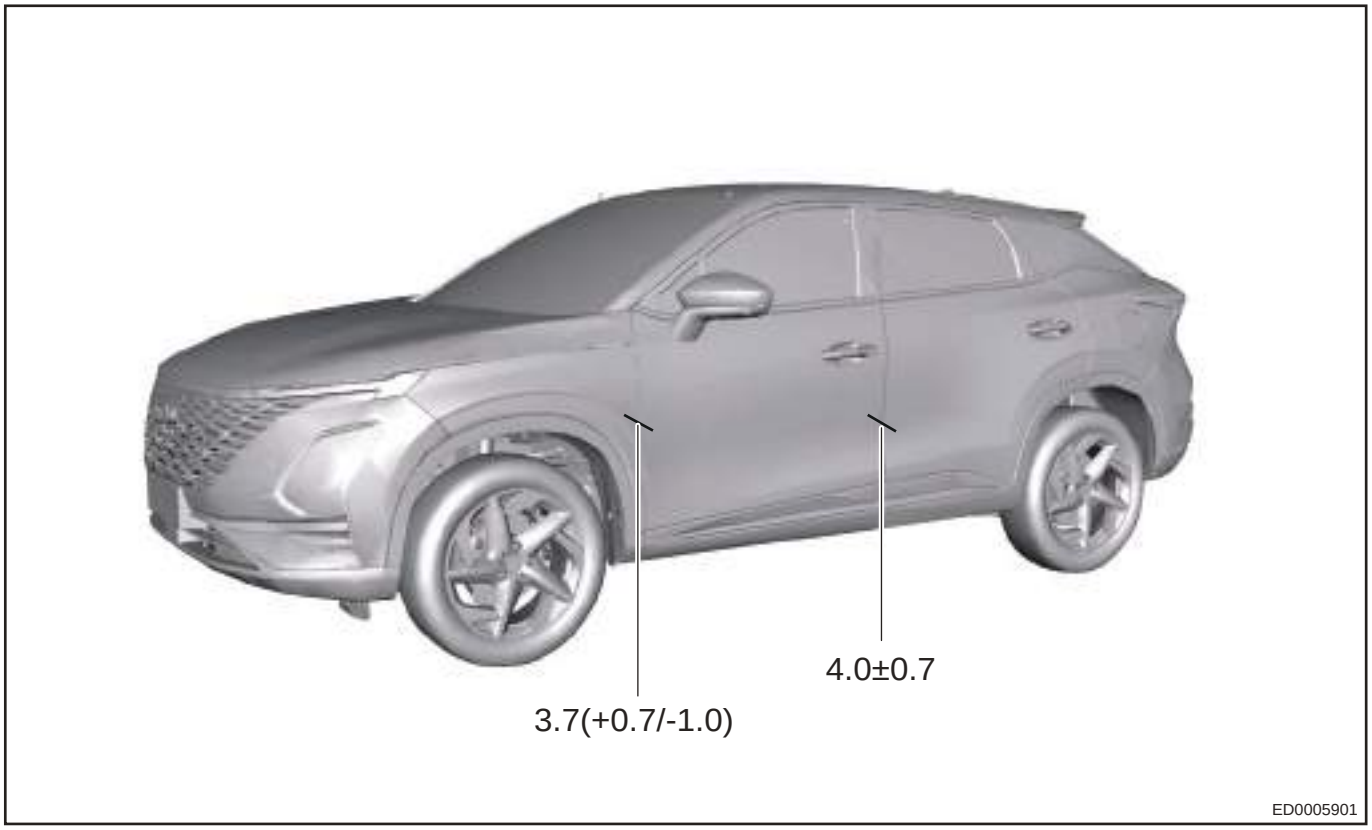
   c. Loosen fixing bolts between front door hinge assembly and door, and adjust the front door assembly position in direction of arrow as shown in illustration.

d. After adjustment, tighten fixing bolts on front door hinge assembly to specified torque.

   Tightening torque: 32 ± 3.0 N • m


ED0005802

e. Standard ranges of clearance between installation positions of front door assembly and each part are as shown in illustration.



ED0005901

f. After adjustment, make sure that alignment between front door assembly and rear door assembly is within standard range.

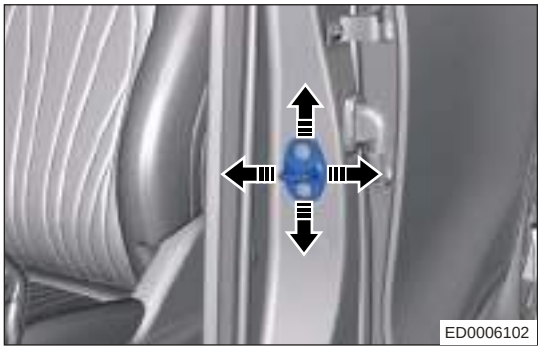
   Standard alignment height: 4.0 ± 0.7 mm

g. After adjustment, make sure that alignment between front door assembly and wing assembly is within standard range.

   Standard alignment height: 3.7 (+0.7/-1.0) mm

2. Adjust the front door lock striker.

a. Slightly loosen the fixing bolts on front door lock striker and tap it with a plastic hammer in direction of arrow to adjust the lock striker position.



b. Tighten fixing bolts on front door lock striker to specified torque after adjustment.
Tightening torque: 25 ± 3.75 N·m

Adjustment

1. Check front door assembly for wear or deformation during installation, and repair as necessary.
2. Check if fixing bolts are installed in place. Tighten them to specified torque as necessary.
3. Check if clearance and alignment between installation position of front door assembly and each part are within specified range. Adjust as necessary.

Rear Door Inside Protector Assembly

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing rear door inner protector assembly.
- Try to prevent rear door inner protector surface from being damaged, when removing rear door inner protector assembly.

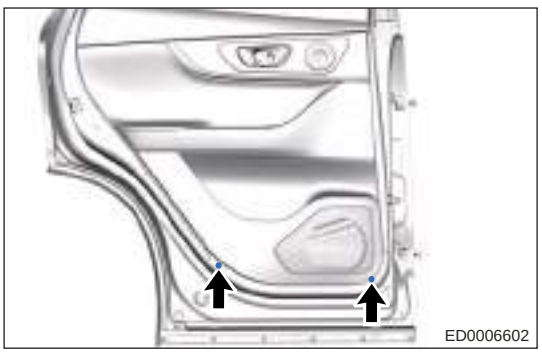
1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left door inner protector assembly.
   a. Using interior crow plate, pry off inside handle block cover (arrow) carefully.

a. Remove 1 fixing screws (arrow).
   Tightening torque: 1.5 ± 0.5 N • m

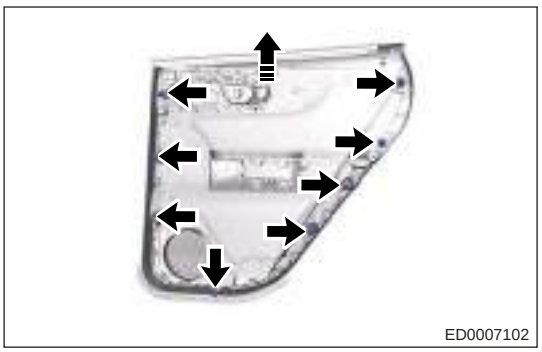
b. Remove the inside handle box cover gasket (arrow).

c. Remove 1 fixing screw (arrow) on the rear side of rear door handle box block cover.
   Tightening torque: 1.5 ± 0.5 N • m

d. Remove 2 fixing screws (arrow) from lower side of rear left door inner protector assembly.
   Tightening torque: 1.5 ± 0.5 N • m

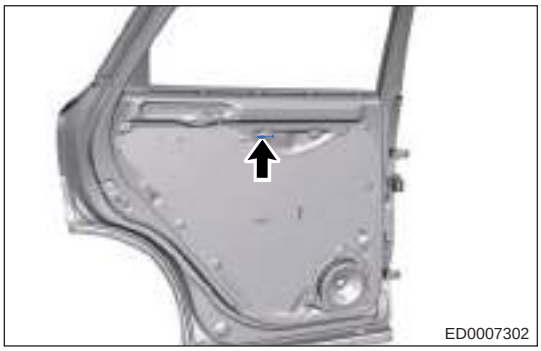


e. Using an interior crow plate, pry up clips on rear door inner protector assembly, and remove rear door inner protector assembly in direction of arrow.

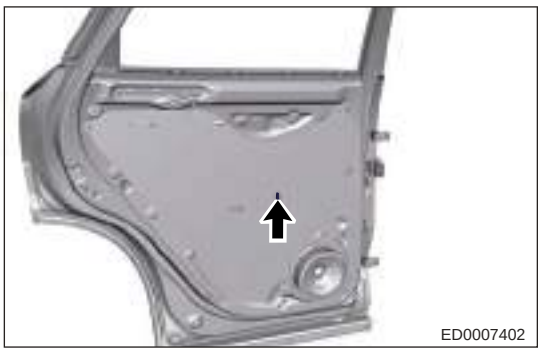


f. Disconnect the connector (arrow) from low frequency antenna.

g. Disengage handle cable (arrow) from rear door inside handle.



h. Disconnect the rear door power glass regulator switch connector plug (arrow).

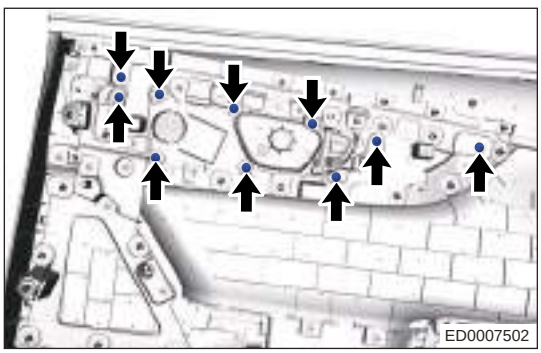


i. Remove the rear left door inner protector assembly.

4. Remove the rear door inside handle.

a. Remove 10 fixing screws (arrow) from rear door inside handle.

Tightening torque: 1.5 ± 0.5 N·m



b. Using interior crow plate, pry off claws from rear door inside handle, and remove rear door inside handle.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Replace damaged clips and install rear door inner protector assembly in place, when installing rear door inner protector assembly.
- Check that inside handle assembly can operate properly, after installing rear door inner protector assembly.

Rear Door Assembly

Removal

⚠ Caution

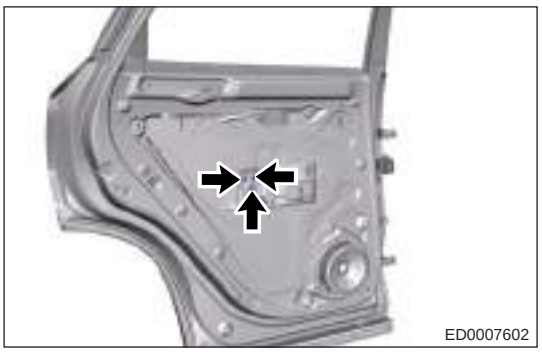
- Use same procedures for right and left sides, procedures listed below are for left side.
- When removing rear door assembly, an assistant is needed to hold rear door, to prevent front door from dropping to cause accidents during operation.

⚠ Caution

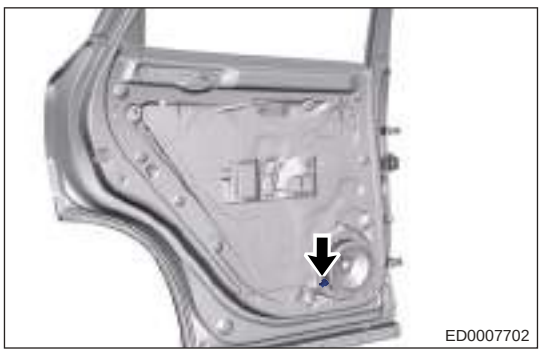
- Be sure to wear necessary safety equipment to prevent accidents, when removing rear door assembly.
- Try to prevent body paint surface from being scratched, when removing rear door assembly.

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left door inner protector assembly.
4. Remove the rear left door protective film assembly.
   a. Remove 3 fixing bolts (arrow) from rear door metal bracket and remove rear left door metal bracket.

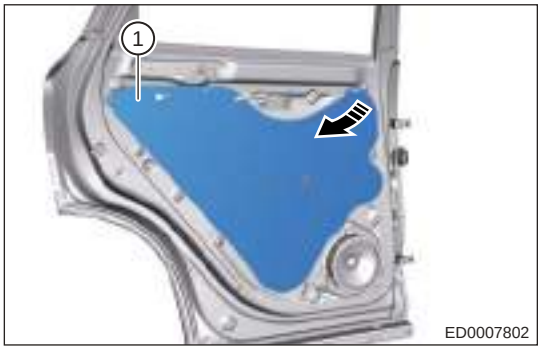
      Tightening torque: 5 ± 1.0 N • m



   b. Disconnect the full-range speaker connector (arrow).



c. As shown in illustration, remove the rear left door protective film assembly (1) by gently peeling it along edges from one corner.



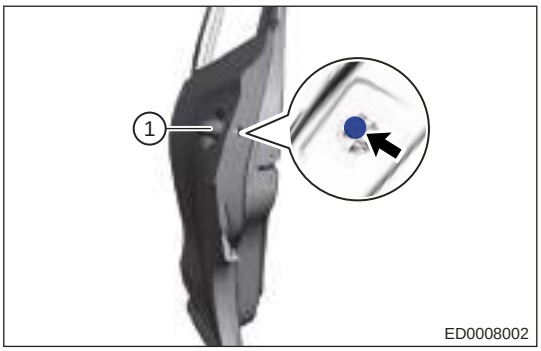
⚠ Caution

- Try to prevent rear door protective film from being damaged, when removing rear door protective film assembly.
- Place rear door protective film assembly properly after removal, and avoid adhesive sticker on rear door protective film assembly from sticking to other components.

5. Remove the rear left door full-range speaker.
6. Remove the rear left door weather bar.
7. Remove the rear door glass upper run.
8. Remove the rear door glass assembly.
9. Remove the rear door glass guide rail assembly.
10. Remove the rear door power glass regulator.
11. Remove the rear left door lock assembly.
12. Remove the rear left door outside handle cover.
    a. Remove the rear door outside handle block cover (arrow).

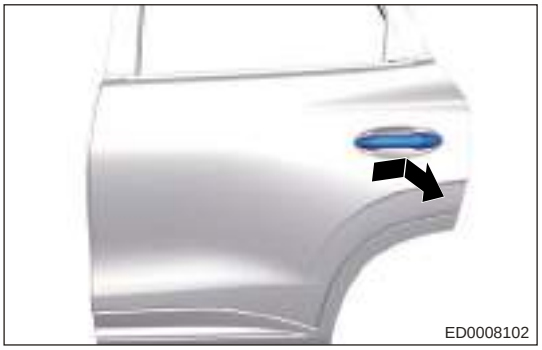
    b. Loosen fixing screw (arrow) on rear door outside handle cover, and remove the rear door outside handle cover (1).

    Tightening torque: 5 ± 1.0 N • m



13. Remove the rear left door outside handle.

a. As shown in illustration, slide and pull the rear door outside handle in direction of arrow, and remove it.



14. Remove the rear left door outside handle seat assembly.

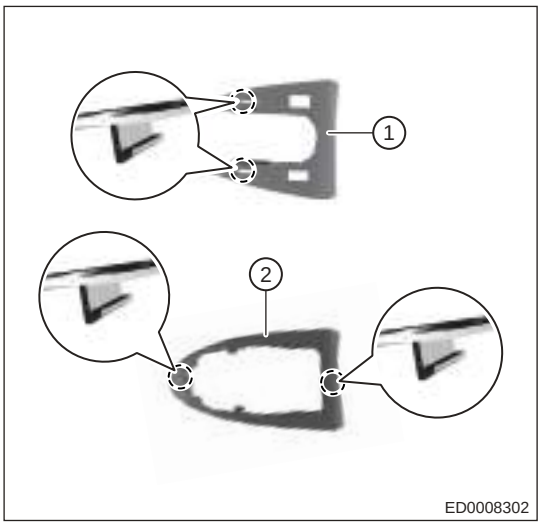
a. Remove fixing screw (arrow) from rear door outside handle seat assembly, and remove rear door outside handle seat assembly.

Tightening torque: 1.5 ± 0.5 N • m

15. Remove the rear left door outside handle shim.

a. Disengage claws from rear door outside handle front shim, and remove rear left door outside handle front shim (1).

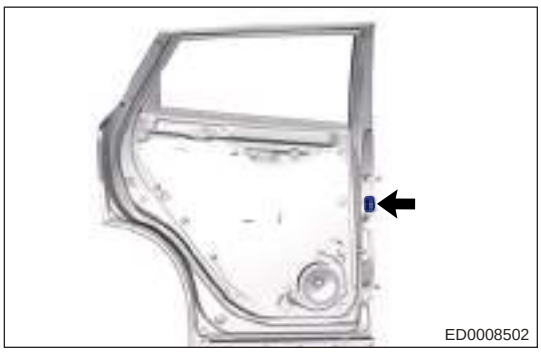
b. Disengage claws from rear door outside handle rear shim, and remove rear left door outside handle rear shim (2).



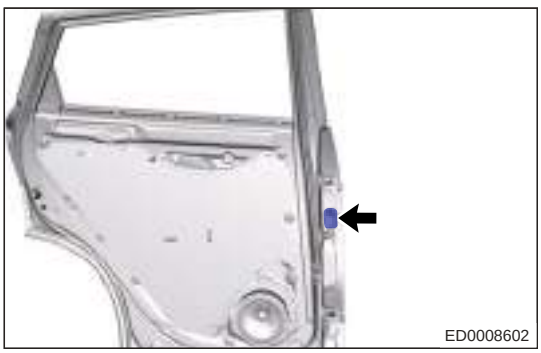
16. Remove the rear left door frame weatherstrip.

a. Disengage clips from rear door frame weatherstrip, and remove rear left door frame weatherstrip (1).

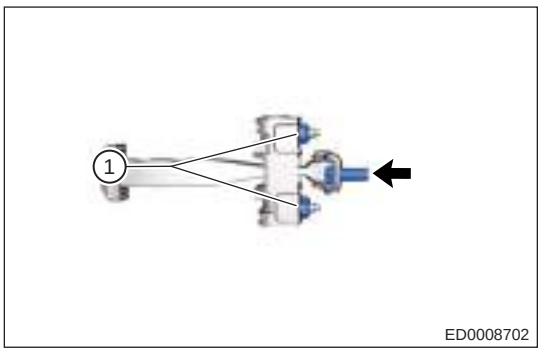
17. Disconnect the rear left door connector.
    a. Using an interior crow plate, pry up the rear door dust boot.
    b. Using an interior crow plate, pry up the claw of connector (arrow).



    c. Disconnect the rear left door wire harness connectors (arrow).



18. Remove the rear left door check.
    a. Remove 2 nuts (1) between door check and rear left door.
       Tightening torque: 9 ± 1.0 N • m
    b. Remove coupling bolt (arrow) between door check and body.
       Tightening torque: 32 ± 2.5 N • m



c. Remove rear left door check assembly from door assembly.

19. Remove the rear left door assembly.

a. Remove fixing bolt (arrow) between rear door upper hinge assembly and rear door assembly.

Tightening torque: 55 ± 5.0 N • m

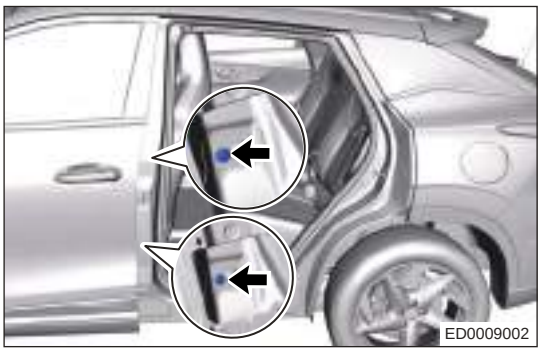
b. Remove fixing bolt (arrow) between rear door lower hinge assembly and rear door assembly.

Tightening torque: 55 ± 5.0 N • m

20. Remove the rear left door hinge assembly.

a. Remove 2 fixing bolts (arrow) between front door upper hinge assembly and quarter panel.

Tightening torque: 32 ± 3.0 N • m



b. Remove 2 fixing bolts (arrow) between front door lower hinge assembly and quarter.

Tightening torque: 32 ± 3.0 N • m

c. Remove the rear left door hinge assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Replace damaged clips and install rear door inner protector in place, when installing rear door inner protector.
- Stick protective film in specified position, not in a wrong position or an asymmetric position between left and right sides or cover the mounting holes of other installation parts.
- DO NOT drag protective film when sticking. It should be installed under its original condition and ensure sheet metal is clean before installation.
- Finished protective film should have no defects, such as wrinkles, bubbles or turnups.
- Finished protective film should have powerful adherence. Protective film sticking should be finished at one time. Avoid repeat sticking.

Hint:

- Be sure to wear safety equipment to prevent accidents, when installing rear door assembly.
- When installing rear door assembly, an assistant is needed to hold it, prevent rear door from falling down during operation, resulting in accidents.

Adjustment

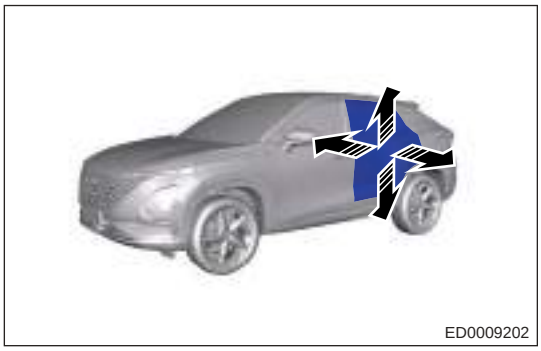
1. Adjust the rear door assembly.
   a. Loosen fixing bolts between rear door hinge assembly and door, and adjust rear door assembly position in direction of arrow as shown in illustration.
   b. After adjustment, tighten fixing bolts on rear door hinge assembly to specified torque.

      Tightening torque: 55 ± 5.0 N·m

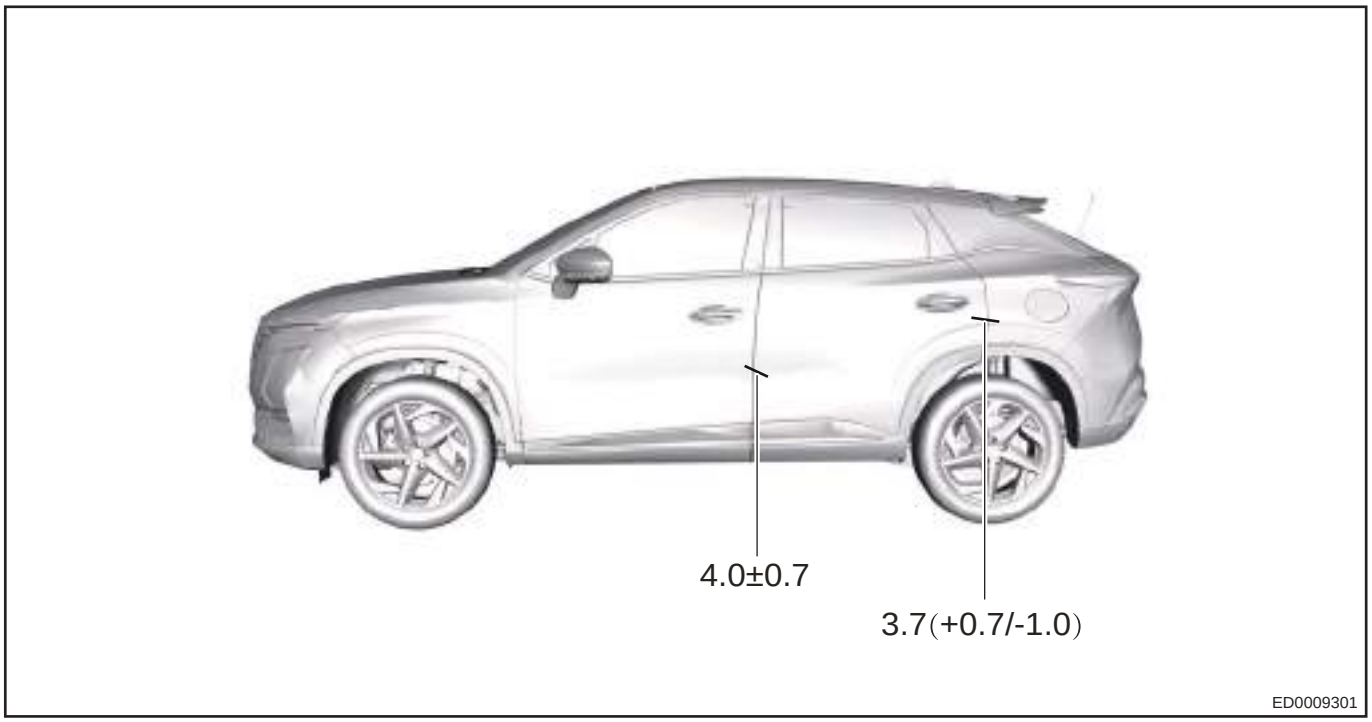

ED0009102

   c. Loosen fixing bolts between rear door hinge assembly and quarter, and adjust rear door assembly position in direction of arrow as shown in illustration.
   d. After adjustment, tighten fixing bolts on rear door hinge assembly to specified torque.

      Tightening torque: 32 ± 3.0 N·m


ED0009202

e. Standard ranges of clearance between installation position of rear door assembly and each part are as shown in illustration.



f. After adjustment, make sure that alignment between rear door assembly and front door assembly is within standard range.

Standard alignment height: 4.0 ± 0.7 mm

g. After adjustment, make sure that alignment between rear door assembly and body outside panel is within standard range.

Standard alignment height: 3.7 (+0.7/-1.0) mm

2. Adjust the rear left door lock striker assembly.

a. Slightly loosen fixing bolts on rear door lock striker and tap it with a plastic hammer in direction of arrow to adjust the lock striker position.

b. Tighten fixing bolt on rear door lock striker assembly to specified torque after adjustment.

Tightening torque: 25 ± 3.75 N·m

Inspection

1. Check rear door assembly for wear or deformation during installation, and repair as necessary.
2. Check if fixing bolts are installed in place. Tighten them to specified torque as necessary.
3. Check if clearance and alignment between installation position of rear door assembly and each part are within specified range. Adjust as necessary.

Back Door Protector Assembly

Removal

⚠ Caution

- Be sure to wear safety equipment when removing back door protector assembly.
- Try to prevent body paint surface from being scratched, when removing back door protector assembly.

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the trunk lid adjustable buffer block.
   a. Rotate 2 trunk lid adjustable buffer blocks (arrow) counterclockwise and remove them.


ED0009502

4. Remove the left back door protector assembly.
   a. Using a screwdriver wrapped with protective tape, pry off plastic clips from left back door protector assembly carefully.
   b. Remove the left back door protector assembly.


ED0009602

5. Remove the right back door protector assembly.
   a. Using a screwdriver wrapped with protective tape, pry off plastic clips from right back door protector assembly carefully.
   b. Remove the right back door protector assembly.


ED0009702

6. Remove the emergency block cover.
   a. Using a screwdriver wrapped with protective tape, pry off the claw from emergency block cover.

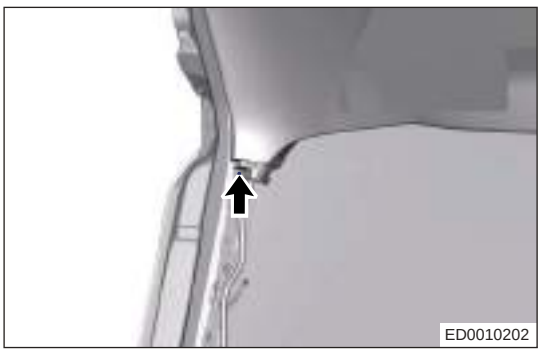
b. Remove the emergency block cover (1).

7. Remove the back door lower protector assembly.

a. Using a screwdriver wrapped with protective tape, pry off handle box block cover (arrow), and remove fixing screws from back door lower protector assembly.

b. Remove the fixing screws (arrow) from back door lower protector assembly.

Tightening torque: 1.5 ± 0.5 N·m



c. Remove the fixing screws (arrow) from back door lower protector assembly.

Tightening torque: 1.5 ± 0.5 N·m

d. Using a screwdriver wrapped with protective tape, pry off small block cover (1) and disconnect the connector.

e. Using a screwdriver wrapped with protective tape, pry off claws from back door lower protector assembly.

f. Remove the back door lower protector assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when installing back door protector assembly.
- Try to prevent body paint surface from being scratched, when installing back door protector assembly.

Back Door Assembly

Removal

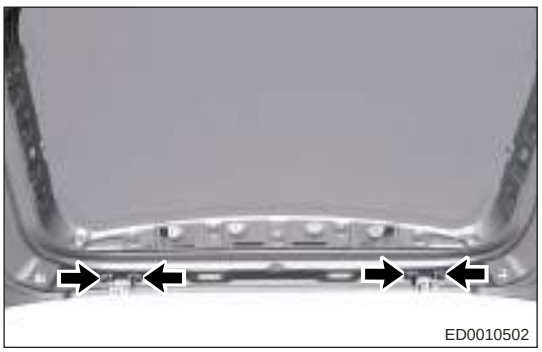
⚠ Caution

- When removing back door assembly, be sure to wear safety equipment to prevent accidents.
- When removing back door assembly, try to prevent body paint surface from being scratched.
- When removing back door assembly, an assistant is needed to hold the trunk lid. Try to prevent trunk lid from falling down or closing suddenly during operation, resulting in accidents.

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the back door protector assembly.
4. Remove the back door wiper arm.
5. Remove the back door wiper motor assembly.
6. Remove the back door wiper washer nozzle.
7. Remove the combination taillight.
8. Remove the back door switch assembly.
9. Remove the back door opening weatherstrip.

10. Remove the roof assembly.
11. Remove the back door assembly.
    a. Remove 4 fixing bolts (arrow) from back door left and right hinges.

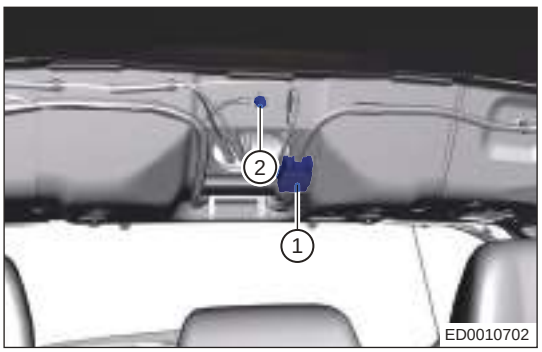
       Tightening torque: 25 ± 2.0 N • m


ED0010502

    b. Using an interior crow plate, pry up back door wire harness dust boot (arrow).


ED0010602

    c. Disconnect back door wire harness assembly connector plug (1), back door wire harness ground fixing nut (2) and back door wiper spraying pipe joint.



ED0010702

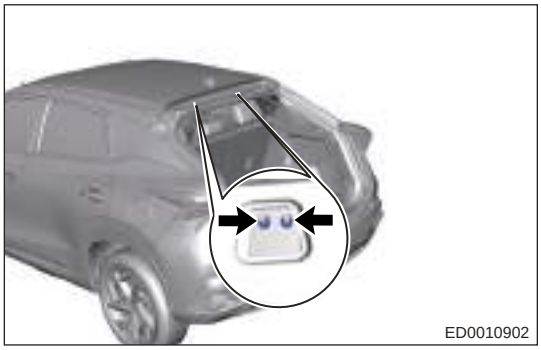
    d. Using a screwdriver wrapped with protective tape, pry off the upper fixing clips (arrow) between left power support and right air spring.


ED0010802

    e. Remove the back door assembly.
12. Remove the back door hinge assembly.

a. Remove 4 fixing bolts (arrow) from back door hinge.

Tightening torque: 25 ± 2.0 N • m


ED0010902

b. Remove the back door hinge assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- When installing back door hinge assembly, an assistant is needed to hold back door. During operation, prevent the back door from dropping, which may cause an accident.
- Be sure to wear safety equipment to prevent accidents, when installing back door assembly.
- Try to prevent body paint surface from being scratched, when installing back door assembly.
- After installing back door assembly, it is necessary to perform panoramic image calibration.

Adjustment

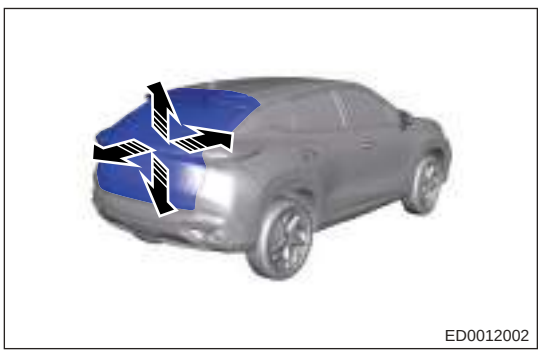
1. Adjust the back door assembly.
   a. Loosen the fixing bolts on back door assembly and adjust back door assembly position in direction of arrow.
   b. Tighten back door assembly fixing bolts to specified torques after adjustment.

      Tightening torque: 25 ± 2.0 N • m

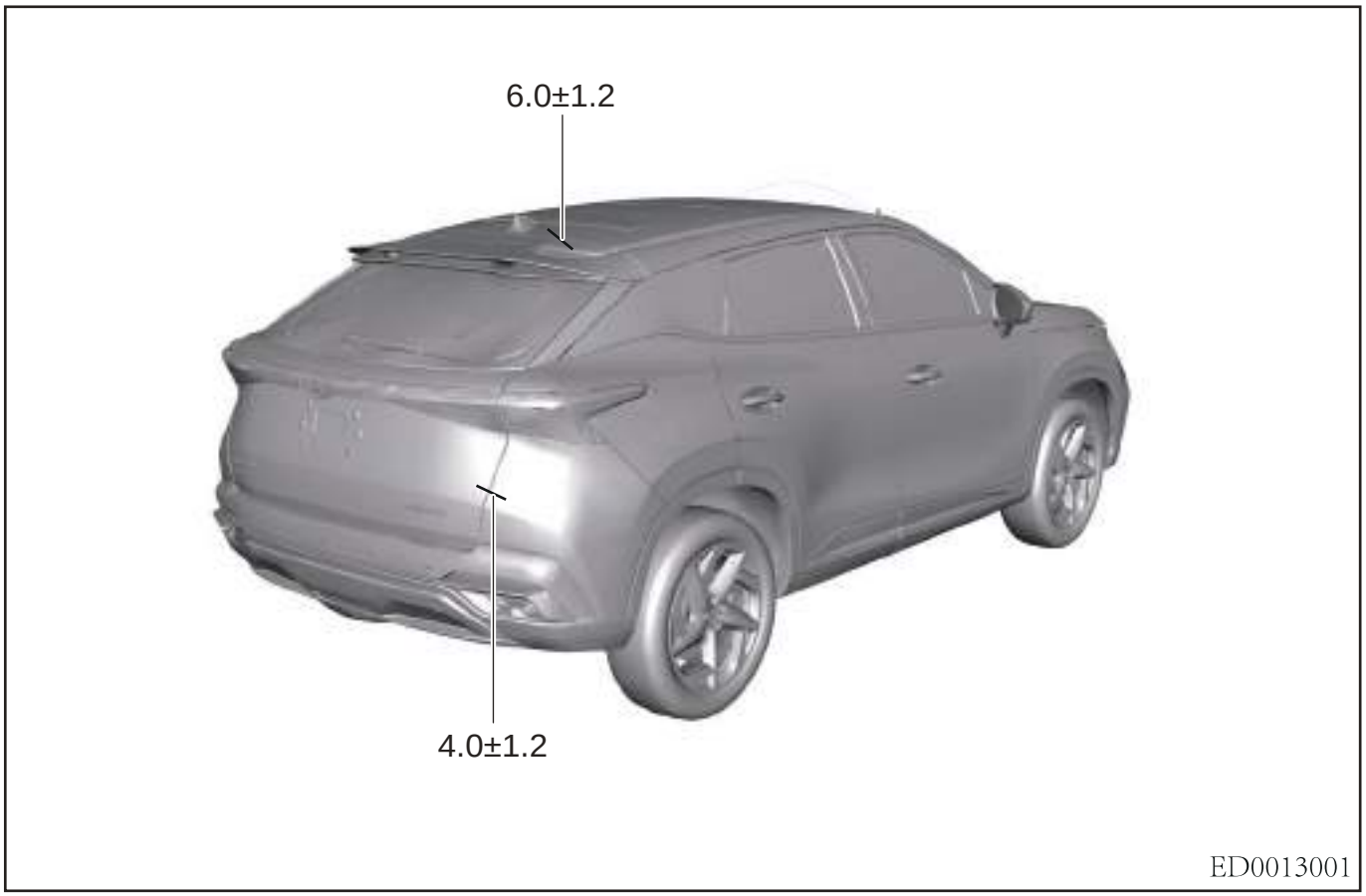

ED0011002

   c. Loosen the fixing bolts on back door assembly and adjust back door assembly position in direction of arrow.
   d. Tighten back door assembly fixing bolts to specified torques after adjustment.

      Tightening torque: 25 ± 2.0 N • m

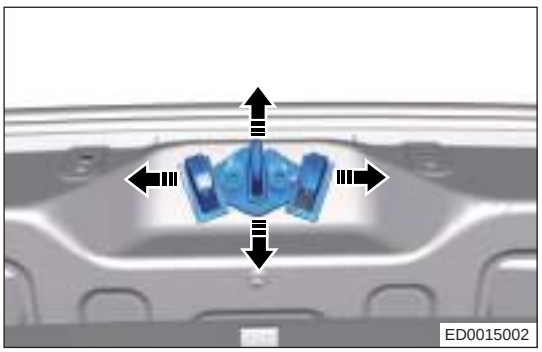

ED0012002

e. Standard ranges of clearance between installation position of back door assembly and each part are as shown in illustration.



2. Adjust the height of back door assembly with back door assembly adjustable buffer block.
   a. Lower or raise the back door by rotating the back door assembly adjustable buffer blocks clockwise or counterclockwise.

3. Adjust the back door assembly.
   a. Slightly loosen the fixing bolts on back door lock striker assembly, and tap it with a plastic hammer in direction of arrow as shown in illustration to adjust the back door assembly position.



b. Tighten the fixing bolts on back door lock striker assembly to specified torque after adjustment.
Tightening torque: 25 ± 3.75 N • m

Back Door Assembly

Inspection

1. Check back door for wear or deformation during installation, and repair as necessary.
2. Check if fixing bolts, fixing screws are set in position. Tighten them to specified torque as necessary.
3. Check if clearance and alignment between back door assembly installation position and each part are within the specified range. Adjust as necessary.

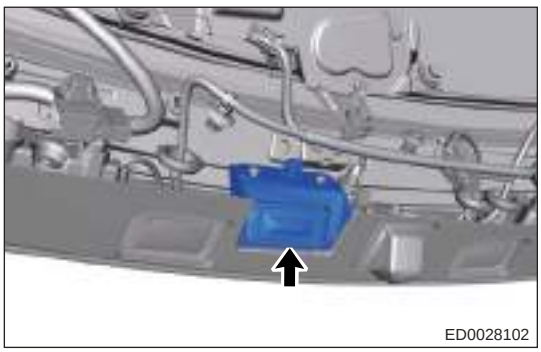
Back Door Switch Assembly

Removal

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing back door switch assembly.
- When removing back door switch assembly, try to prevent body paint surface from being scratched.

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the back door switch assembly.
   a. Using an plastic crow plate, pry off switch from mounting hole.
   b. Disconnect back door wire harness connector, and remove back door switch assembly.


ED0028102

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- After back door opener switch assembly is installed, install the connector into place.
- After back door opener switch assembly is installed, it is necessary to confirm that the function can operate normally.

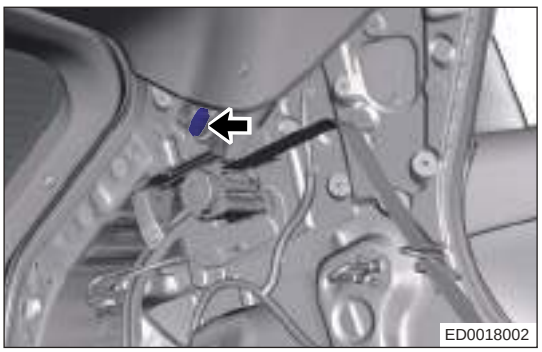
Back Door Power Support Assembly

Removal

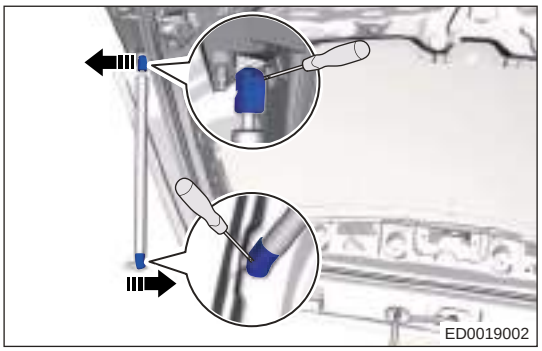
⚠ Caution

- Left side is power support with wire harness and right side is balance bar without wire harness.
- The following is the operation procedure of power support.
- Be sure to wear necessary safety equipment to prevent accidents, when removing back door power support assembly.
- When removing back door power support assembly, try to prevent body paint surface from being scratched.
- When removing back door power support assembly, pay attention to not separate power support by lateral force and during removal, one assistance is needed to hold back door; avoid back door falling down or closing suddenly during opening, resulting in accidents.
- Handle the removed power support assembly carefully and avoid it falling down. Once it falls down, internal mechanical damage may occur, which may cause it impossible to use.

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the left back door power support assembly.
   a. Using a screwdriver wrapped with protective tape, pry off left C-pillar upper protector (until it is possible to disconnect power support connector).
   b. Disconnect the power support connector (arrow).



   c. Using a screwdriver wrapped with protective tape, pry off fixing clips from upper and lower parts of back door power support.



   d. Remove the power support assembly in direction of arrow.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- When installing back door power support assembly, one assistance is needed to hold back door; avoid back door falling down or closing suddenly during opening, resulting in accidents.
- Be sure to wear necessary safety equipment to prevent accidents, when installing back door power support assembly.
- When installing back door power support assembly, it is necessary for wire harness grommet to be installed in place. If not, water leakage may occur at this area.

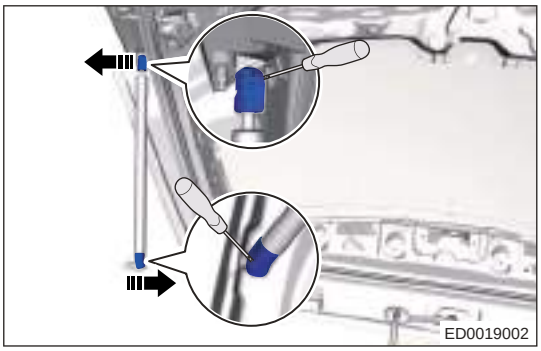
Back Door Air Spring Assembly

Removal

⚠ Caution

- When removing back door air spring assembly, be sure to wear necessary safety equipment to prevent accidents.
- When removing back door air spring assembly, try to prevent body paint surface from being scratched.
- When removing back door air spring assembly, one assistance is needed to hold back door; avoid back door falling down or closing suddenly during opening, resulting in accidents.

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the right back door air spring assembly.
   a. Using a screwdriver wrapped with protective tape, pry off fixing clips (arrow) from upper part of back door air spring.
   b. Using a screwdriver wrapped with protective tape, pry off fixing clips (arrow) from lower part of back door air spring.



   c. Remove the air spring assembly in direction of arrow.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- When installing back door air spring assembly, one assistance is needed to hold back door; avoid back door falling down or closing suddenly during opening, resulting in accidents.
- When installing back door air spring assembly, be sure to wear necessary safety equipment to prevent accidents.

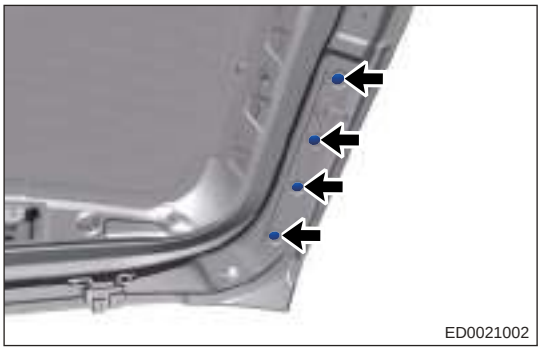
Back Door Anti-pinch Strip Assembly

Removal

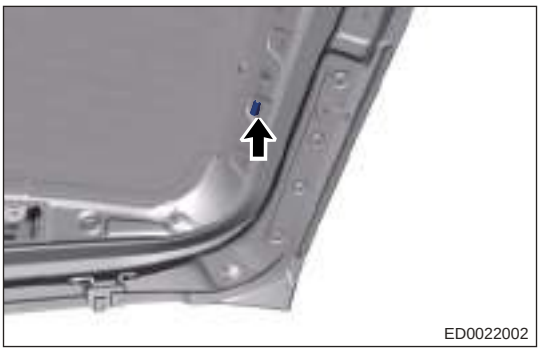
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing back door anti-pinch strip assembly.
- When removing back door anti-pinch strip assembly, try to prevent body paint surface from being scratched.
- Use the same procedures for left anti-pinch strip assembly and right anti-pinch strip assembly, procedures listed below are for left anti-pinch strip.

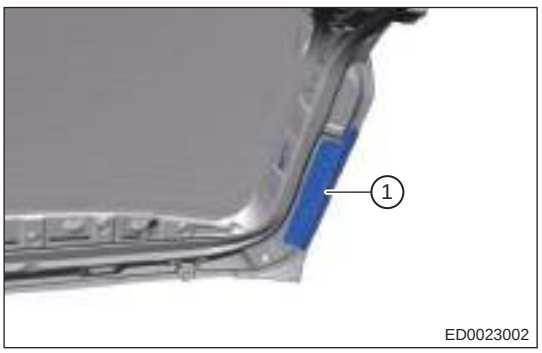
1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the left back door protector assembly.
4. Remove the back door left anti-pinch strip assembly.
   a. Using a screwdriver wrapped with protective tape, pry off fixing plastic nuts (arrow) from back door anti-pinch strip assembly.


ED0021002

   b. Disconnect the anti-pinch strip connector (arrow).


ED0022002

   c. Remove the back door anti-pinch strip assembly (1).



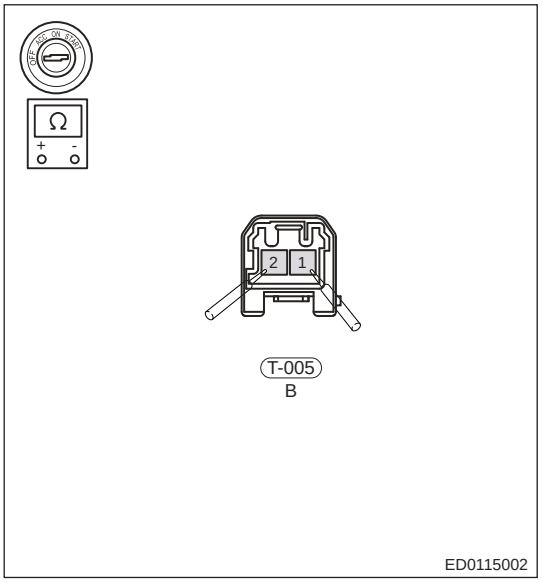
ED0023002

Inspection

1. Check the jam protection function.

d. Turn ENGINE START STOP switch to OFF position. Measure the resistance of anti-pinch strip sensor with a digital multimeter, standard resistance is shown in the table below:

Multimeter Connection	Condition	Specified Condition (at room temperature)
T-005 (1) - T-005 (2)	Jam protection ON	31 Ω
T-005 (1) - T-005 (2)	Jam protection OFF	5560 Ω



Installation

1. Installation is in the reverse order of removal.

Power Back Door Module Assembly

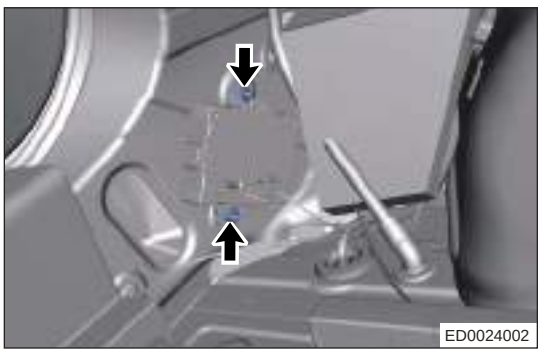
Removal

⚠ Caution

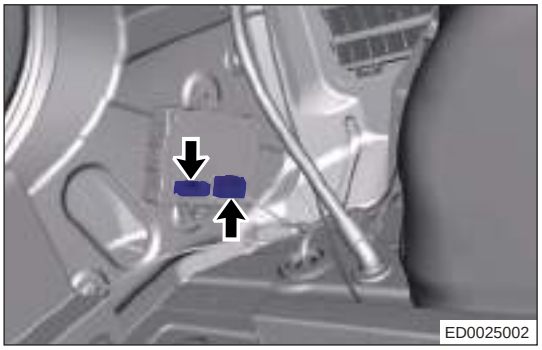
- Be sure to wear safety equipment to prevent accidents, when removing power back door module assembly.
- When removing power back door module assembly, try to prevent body paint surface from being scratched.

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the power back door module assembly.
   a. Remove fixing nuts (arrow) from power back door module.

      Tightening torque: 5 ± 1.0 N • m



b. Disconnect the power back door module wire harness connectors (arrow).



c. Remove the power back door module.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- After replacing power back door module, use diagnostic tester to perform self-learning operation, perform corresponding operation on each functional switch after learning is successful, so as to check each function of power back door operates normally.
- When disconnecting battery negative cable or power back door module power supply; after power is turned on again, it is necessary to perform fortifying on vehicle.

Power Back Door Instrument Cluster Switch Assembly

Removal

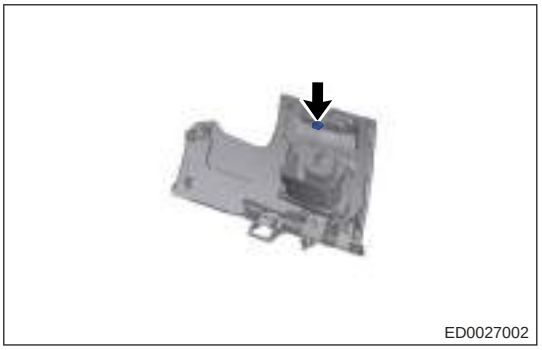
⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing power back door instrument cluster switch assembly.
- When removing power back door instrument cluster switch assembly, try to prevent body paint surface from being scratched.

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the power back door instrument cluster switch assembly.

a. Using a screwdriver wrapped with protective tape, pry off power back door instrument cluster switch assembly.

b. Disconnect the power back door instrument cluster switch connector (arrow).



c. Remove the power back door instrument cluster switch assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Install the power back door instrument cluster switch assembly, and install the connector in place.
- After power back door instrument cluster switch assembly is installed, it is necessary to confirm that the function can operate normally.

BODY DIMENSIONS

General Information

Service materials of Collision

Body collision accidents usually cause symptoms such as construction deformation, steel plate cracks, weld points desoldering, etc., sometimes also cause local damage of other assembling parts such as engine and chassis, etc. Adhesive, sealant, anti-loose solvent, surface protection materials, anti-corrosion materials and chemical materials may be used during the body collision service, so please operate it strictly in accordance with the use, scope of use and use specifications in the Product Description. Select the service materials with the same functions according to the functional requirements of parts and materials in the process of body service. The service materials that may be used in the process of body service are listed in following table for reference only.

Products	Base Materials	Usage	Recommended Model
Car Seal Gum	One-component polyurethane	It used for the bonding of components such as body outer panel, interior and exterior decoration, body construction, etc. This adhesive has strong adhesion and cohesion and has good adhesion with metal, various paint surfaces, etc.	1922, 1923
Weld Seal Gum	One-component polyurethane type	As the room temperature solidifying type adhesive, it is used for the sealing of body welds and the fine sealing of doors, engine cover and luggage compartment (trunk) foldings.	C8802
Anti-stone-chipping primer	Rubber and resin	As the room temperature solidifying type chassis protection adhesive, it is used to form a permanent anti-aging elastic corrosion protection coating at the bottom and wheel house, and there is no crack at low temperature. This product can replace PVC coating because of the excellent functions such as anti-rust, sound insulation, anti-stone-chipping, anti-	C312DW

Products	Base Materials	Usage	Recommended Model
		oxidization and protective coating.	
Windshield Gum	One-component polyurethane	As the room temperature solidifying polyurethane adhesive, it is used for direct adhesion and sealing of car window glass. This adhesive has strong adhesion performance, when it reacts with moisture in the air, it forms excellent performance such as high strength, anti-aging, anti-vibration fatigue, low temperature resistance and no corrosion, etc.	C8802 1956, 1924
Primer	-	Before applying windshield gum, apply a primer to the body and glass to make the windshield and the body bond more firmly.	-
Cleaner	-	It’s used to clean all surfaces contacting with premier coating and adhesive.	-
Pressure Sensitive Tape	Acrylic tape	It is used for bonding such as scuff strip, name plate, fender apron, door edge protection, various body trim strips, etc. This tape has excellent weather resistance and durability.	3M 4229P, 4215, 4221L

Products	Base Materials	Usage	Recommended Model
Heat Sensitive Tape	Acrylic tape	It is mainly used for rubber weatherstrip system on the car. This type of tape should have a strong bonding force and strong sealing performance to avoid the gap and corrosion problems caused by poor bonding.	3M 4237P
Primer for Tape	-	Select different primers according to the materials of bonding surface. The bonding surface should be clean, and apply the primer evenly to the surface to be adhered with a brush after it is completely dry, and apply the tape after it is dry. The tape has strong adhesion.	3M C-100, K-500/520, N-200

Basic Description of Body Service

Body service should be carried out by professional technicians in accordance with the manufacturer's requirements in order to keep the guarantee of “no rust” and “no paint defects”.

1. Only use the materials selected by the manufacture.
2. It’s necessary to apply paint protective coating inside the body firstly when welding body outside metal.
3. It’s necessary to use zinc coating during spot welding.
4. Apply a layer of filling coating inside and outside welding position before performing air seal.
5. Apply a protective layer to prevent stone collision before using paint to protect the chassis.
6. All openings at this position should be fixed with fixing parts after spraying paint to the coating.
7. In some cases, it’s necessary to raise the vehicle to lift platform because the distribution of each component of the body when removing parts.
8. It’s necessary to remove battery connectors before performing spot welding. Check if the ventilation condition is good enough before welding.
9. Pay attention to other vehicles in this area when repairing the body within a certain area.
10. Be careful when perform sandblasting or welding around fuel tank or fuel system parts.
11. Pay attention to preventive measures of preventing accidents when performing body repairing or sandblasting.
12. The spot welding current should be increased by 30% with a pointed electrode, and the clamping force of the electrode should be increased when welding galvanized steel plate; the welding current should be further increased when performing gas shielded welding.
13. Neither the air conditioning parts nor the parts that may be heated can not be welded on the vehicle. When painting and repairing the frame, the temperature should not exceed 80°C in the baking furnace or in preheating stove.

The following measures have to be taken in the process of welding to prevent electrical welding device from bumping.

1. Connect the electrical welding device ground wire to welding position. Carefully check that there is no part or insulator part between ground wire and spot welding position during connection.
2. Firstly remove ECU and electrical device or circuits to avoid contacting ground wire or welding rod.

Calibration

The production of body and chassis is completed through low temperature tempering and cold casting process on the assembly line. Therefore, it's necessary to use the same process to restore it to its original appearance and it cannot be heated after the metal part is damaged in an accident. If the damage is so severe that it cannot be restored, the damaged part can only be removed after the connector surface has been calibrated.

Safety Precautions

It's necessary to observe the following safety precautions when performing body metal plate service:

1. It's necessary to wear protective clothing, goggles, gloves and working shoes when performing body metal plate welding, cutting and polishing.
2. Ensure the ventilation is well in welding area.
3. Disconnect battery and cover the post before welding.
4. If spark may be generated when working near the battery, it's necessary to remove the battery.
5. Before removing the vehicle parts, the vehicle should be fixed on the lifting frame to avoid the change of the vehicle gravity, which may affect the operation safety.
6. Connect the ground wire of the welding device directly to the parts that need to be welded, and ensure that there is no conductive part between the ground point and the welding point when operating.
7. Ground wire or welding electrode is forbidden to contact with electronic control unit and cable.
8. Never park an unprotected vehicle in the body service area, because splashing sparks may cause fire, damage paint surface and glass.
9. Special care should be taken when polishing and welding near fuel tank or other components that contain fuel, and all suspected components that may affect safety should be removed.
10. Never weld, hard solder or soft solder any compartment of air conditioning system that contains refrigerant, or weld other parts of vehicle that may cause the temperature of air conditioning system components to rise, which may cause explosion of the air conditioning system. If it's necessary to carry out electric welding near the refrigerant hose, the refrigerant must be recovered, because the invisible ultraviolet ray generated when performing electric welding can penetrate the refrigerant hose and cause the refrigerant to decay.
11. It's necessary to disconnect the battery ground wire when operating the airbag system or carrying out body calibration; the temperature around airbag components should not exceed 100℃ (212°F).

State of Components

Before the repaired car or parts are sent to the paint shop for painting, its surface must be flat, filled and polished with abrasive paper. The preparation process is completed by metal plate worker. The body and floor compartments are mainly formed by cold stamping with steel plates. Therefore, the same method should be used to restore the shape of the damaged area caused by an accident. If the damaged area cannot be restored to the original appearance, the adjacent area should be calibrated, the damaged area should be removed and replaced according to the integrity of the parts. Do not cut the parts separately. The rigidity, driving safety and service convenience of the vehicle will be affected after cutting and welding.

Description of Welding Types

Common welding types include spot welding, gas shielded welding and soldering. Never reduce the number of welding spots when performing spot welding. Generally speaking, when the spot welding device can not be carried out, plug welding can be carried out by means of gas shielded welding after

drilling it. When spot welding is used, if it is the connection of three-layer plates, only the outer plate is replaced and the welding points must be placed on the original welding points. When spot welding is used, single weld, double weld and double offset weld can be generated. When gas shielded welding is used, lap weld, continuous weld and continuous weld (intermittent) can be generated. Soldering is often used to weld and repair areas with low tensile strength and relatively thinner component thickness.

Anti-corrosion Treatment

1. It’s necessary to use approved materials to restore standard anti-corrosion layer after service.
2. It’s necessary to apply primer to inside and outside of all welds before sealing.
3. It’s necessary to apply sealant to metal plates with primer coating.
4. It’s necessary to seal lap metal plates, metal edges, butt welds and welds with sealant.
5. Apply long-term deck protection agent to the vehicle deck.
6. It’s necessary to deal with the cavity in the service area with the protection material in the cavity after spraying the finish paint.
7. Clean drain after the protection material in the cavity is dry.

Environment Protection Treatment Method of Car Disposal Parts

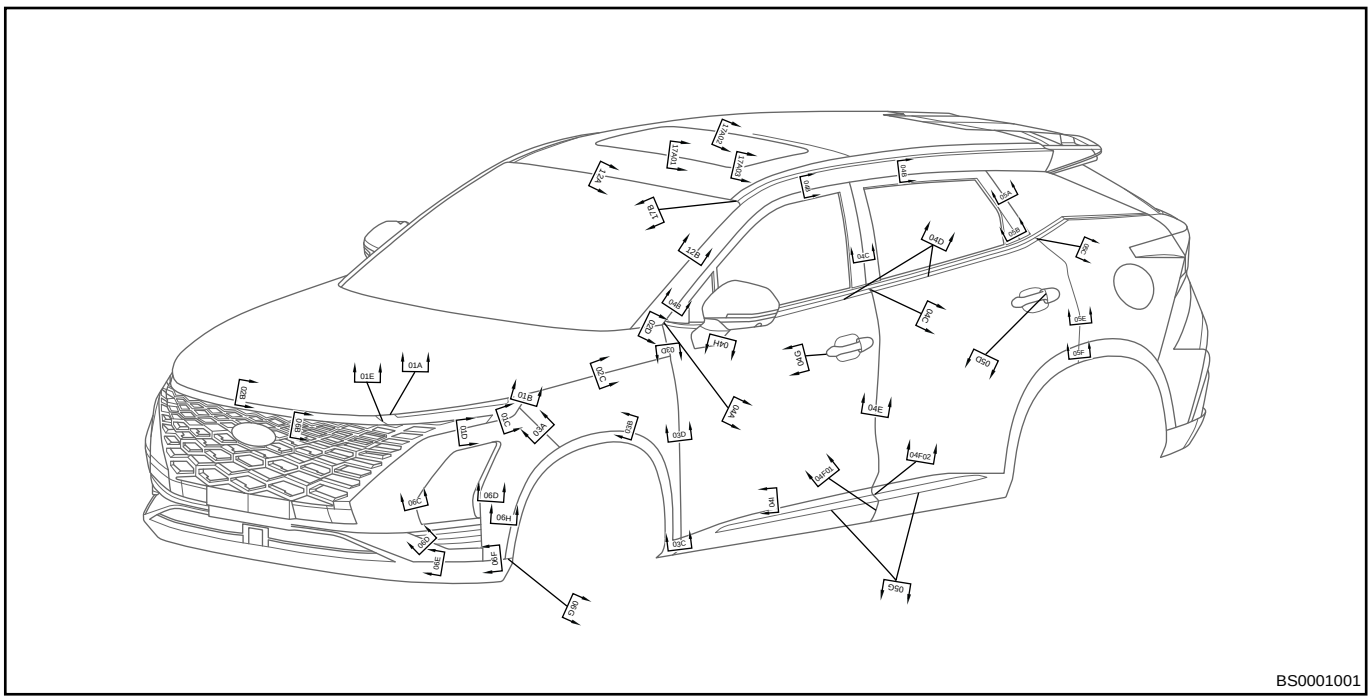
1. It’s necessary to collect disposal materials according to the types after car maintenance or service.
2. Classify disposal materials and check if they can be used repeatedly.

Body Surface Gap/Surface Difference

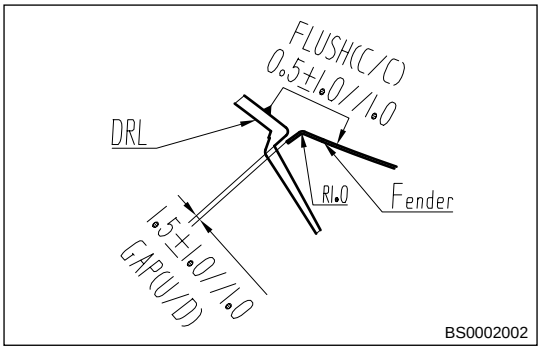
Hint:

- Gap dimensions are always in millimeter/inch.
- Use plastic gap adjustment gauge to adjust or check gap dimensions.

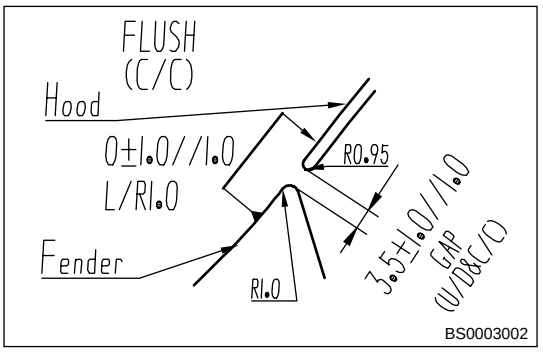
Front Body Assembly



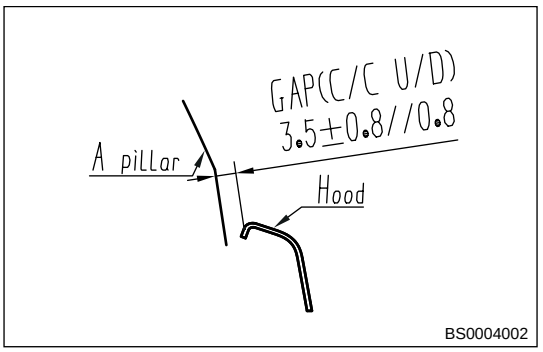
1. Assembly clearance between daytime running light and wing.



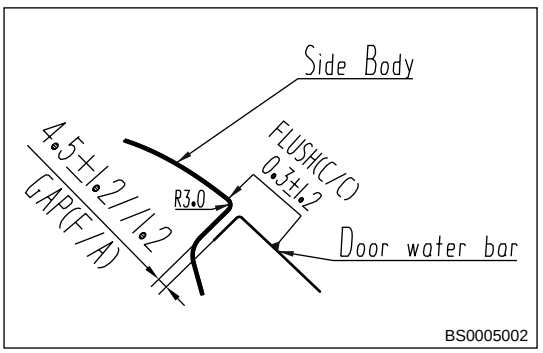
2. Assembly clearance between engine hood and wing.



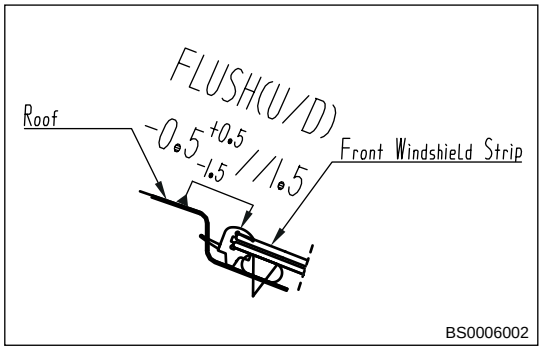
3. Assembly clearance between A-pillar and engine hood.



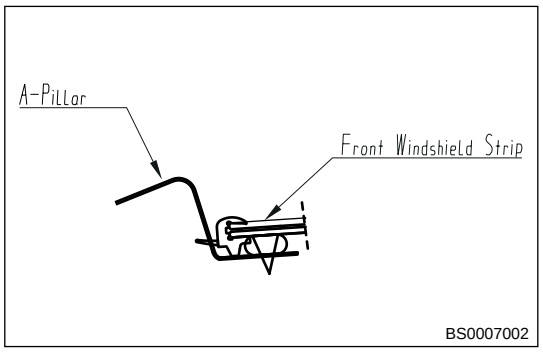
4. Assembly clearance between quarter and outer weather bar.



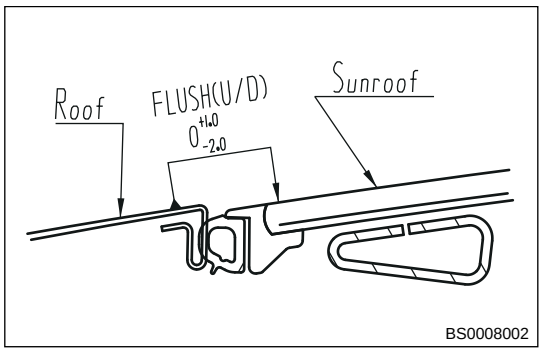
5. Assembly clearance between roof cover and front windshield strip.



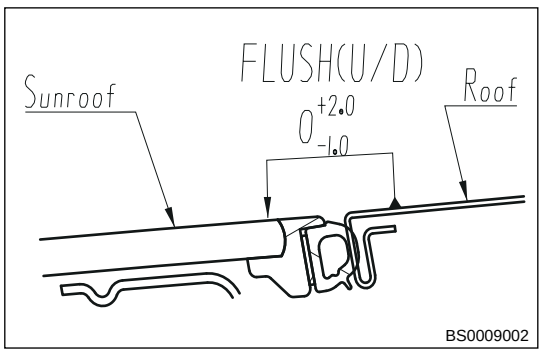
6. Assembly clearance between quarter A-pillar and front windshield strip.



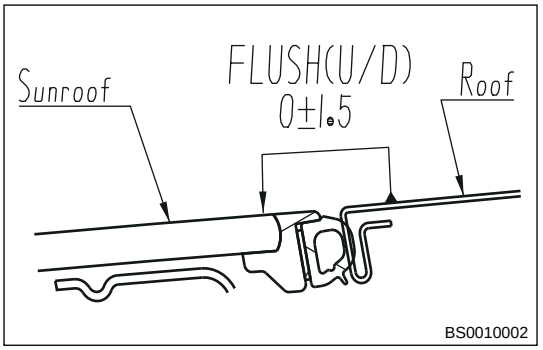
7. Assembly clearance between roof cover and roof.



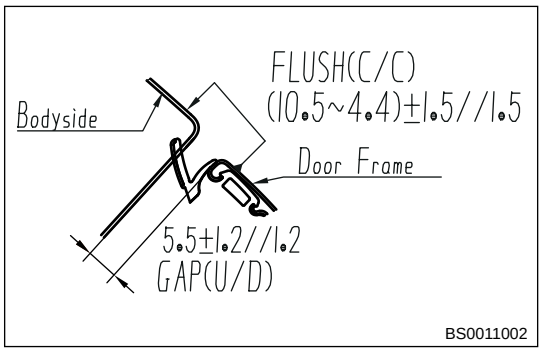
8. Assembly clearance between roof and roof cover.



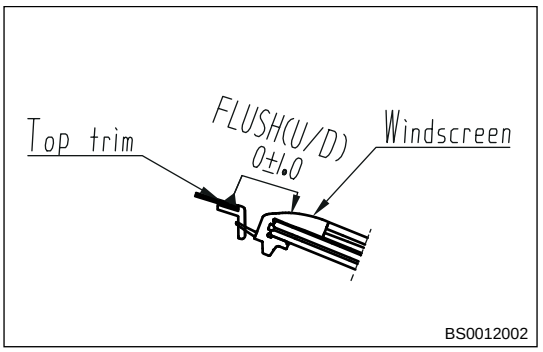
9. Assembly clearance between roof and roof cover.



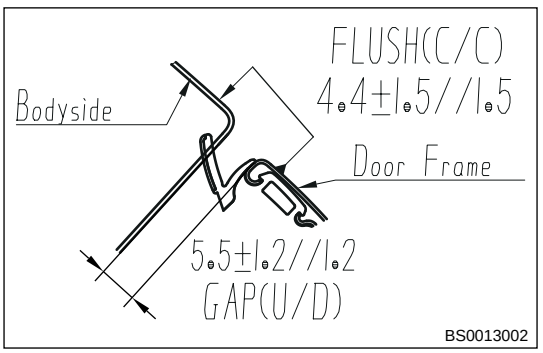
10. Assembly clearance between quarter and front/rear door upper frame.



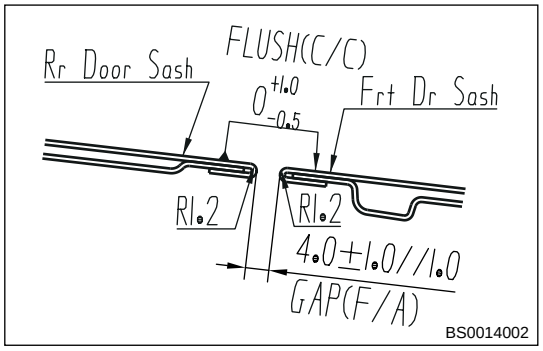
11. Assembly clearance between roof trim strip and front windshield with strip.



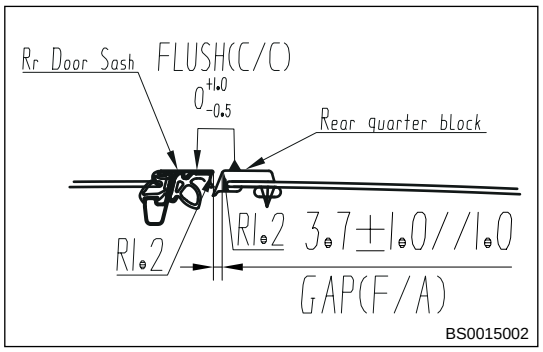
12. Assembly clearance between quarter and front/rear door upper frame.



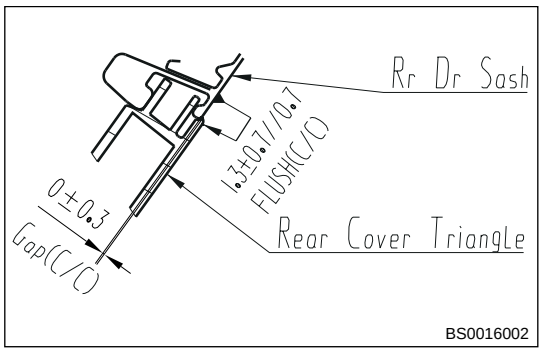
13. Assembly clearance between rear door window frame and front door window frame.



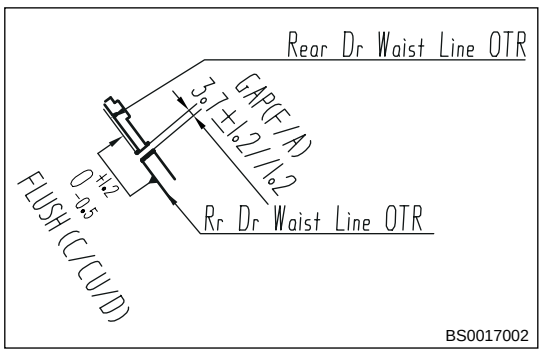
14. Assembly clearance between rear door window frame and rear quadrangular block.



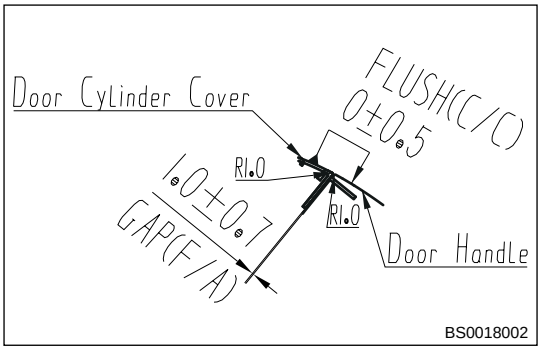
15. Assembly clearance between rear door window frame and rear triangular block window frame.



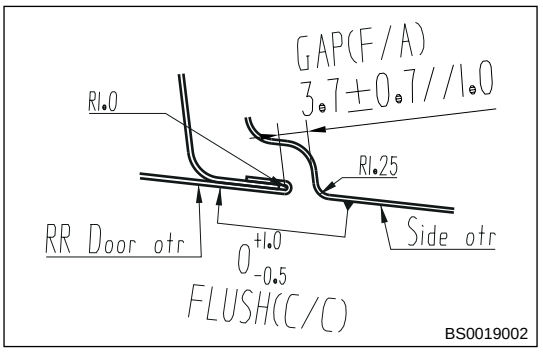
16. Assembly clearance between rear door glass outer weather bar and rear quarter window weather bar.



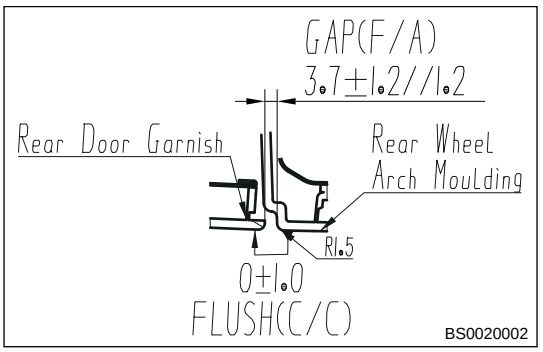
17. Assembly clearance between handle cover panel and door handle.



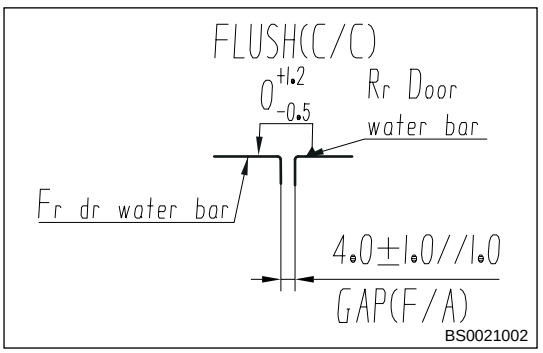
18. Assembly clearance between rear door outer panel and quarter outer panel.



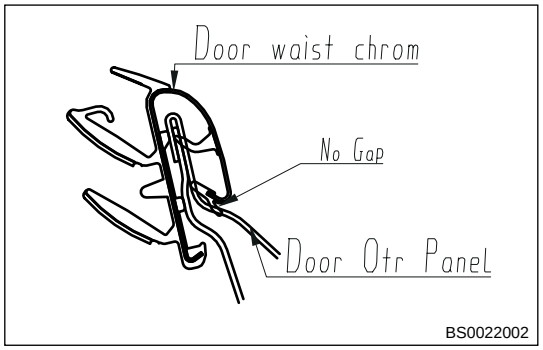
19. Assembly clearance between rear door trim panel and rear wheel arch trim panel.



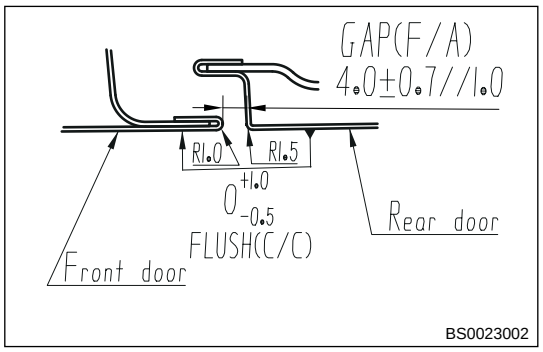
20. Assembly clearance between front door weather bar and rear door weather bar.



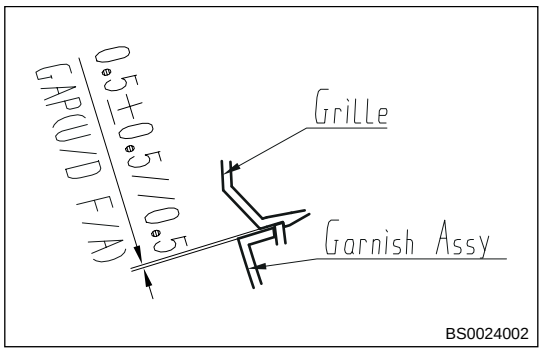
21. Assembly clearance between outer weather bar and door outer panel.



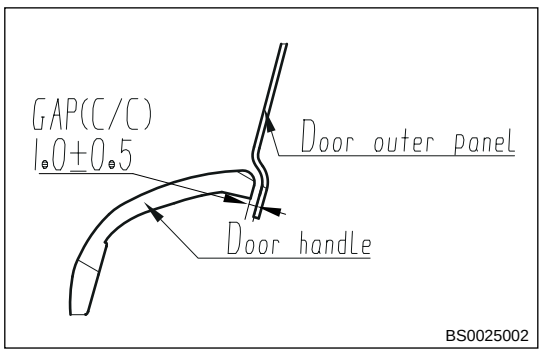
22. Assembly clearance between front door outer panel and rear door outer panel.



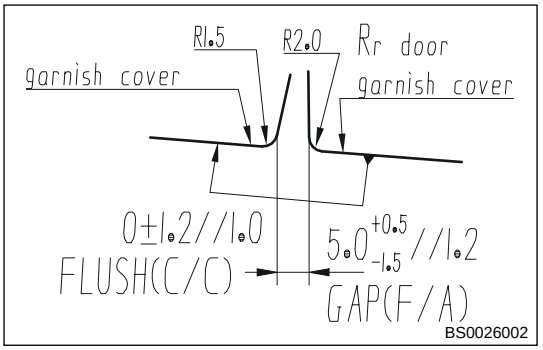
23. Assembly clearance between trim panel strip and door trim panel.



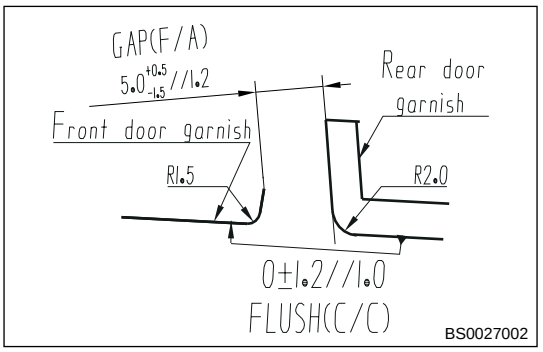
24. Assembly clearance between door outer panel and door handle.



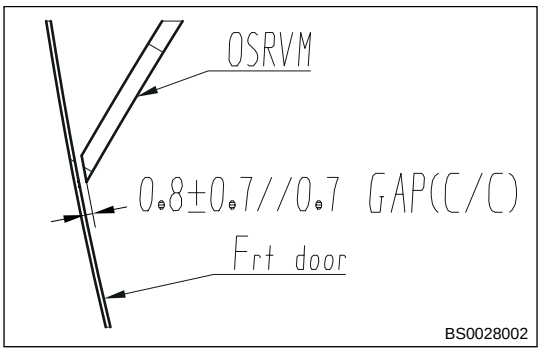
25. Assembly clearance between front door trim panel strip and rear door trim panel strip.



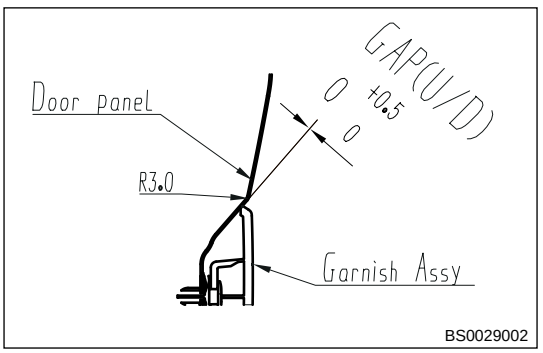
26. Assembly clearance between rear door trim panel and rear door trim panel.



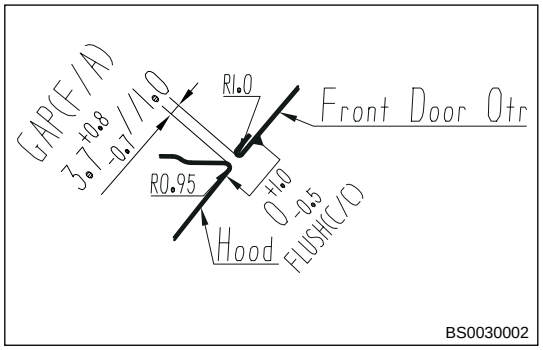
27. Assembly clearance between outside rear view mirror and front door outer panel.



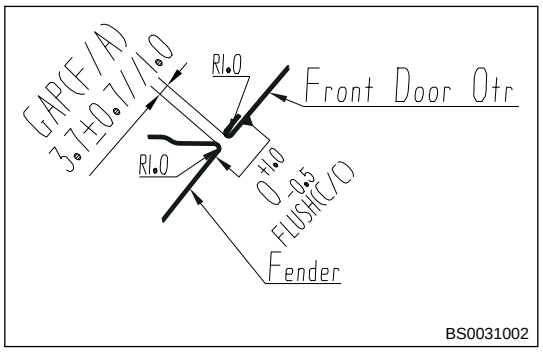
28. Assembly clearance between front/rear door outer panel and front/rear door trim panel.



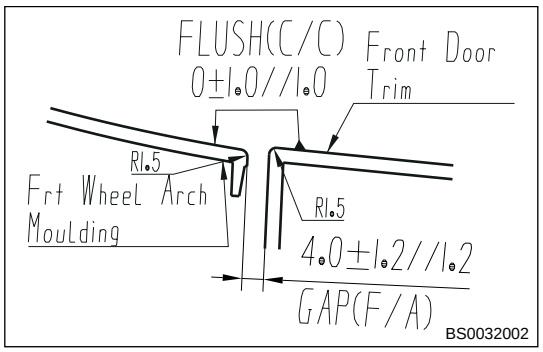
29. Assembly clearance between front door outer panel and engine hood.



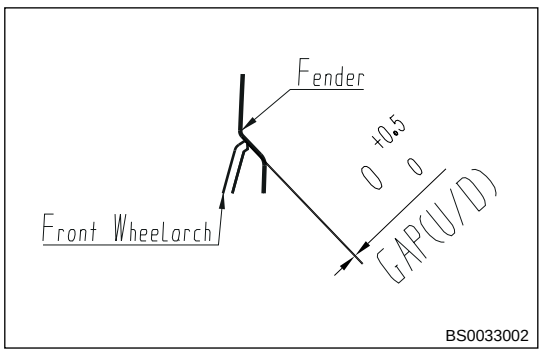
30. Assembly clearance between front door outer panel and wing.



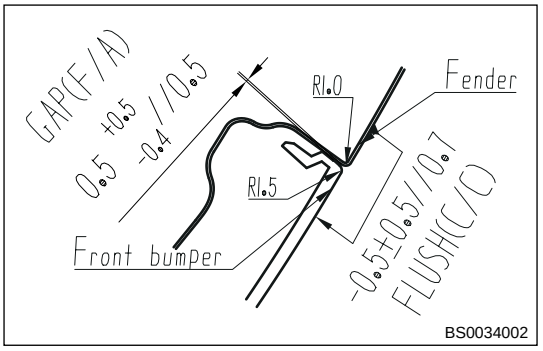
31. Assembly clearance between front wheel arch trim panel and front door trim panel.



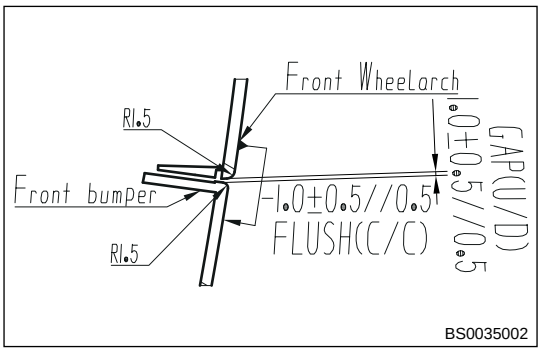
32. Assembly clearance between front wheel arch and wing.



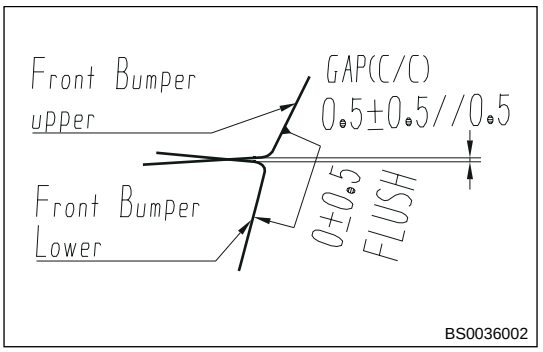
33. Assembly clearance between front bumper and wing.



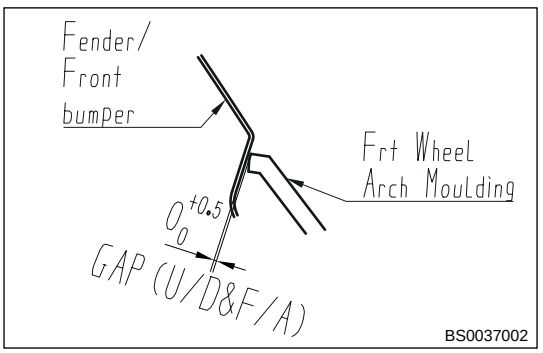
34. Assembly clearance between front bumper and front wheel arch.



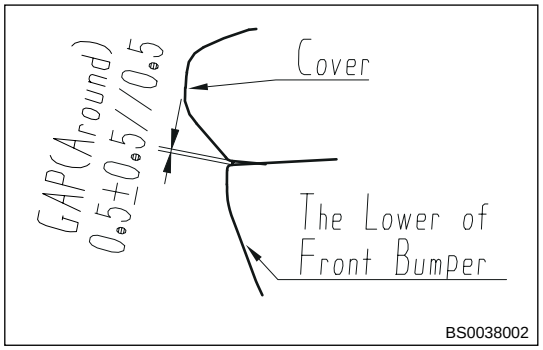
35. Assembly clearance between front bumper upper body and front bumper lower body.



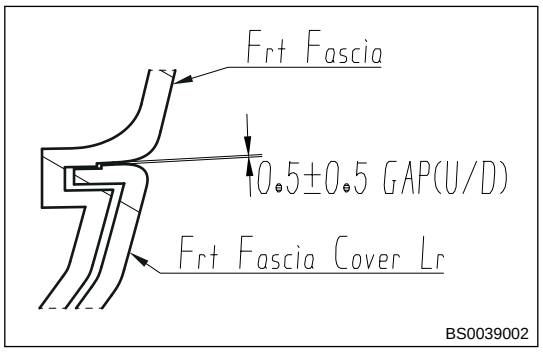
36. Assembly clearance between wing/front bumper and front wheel arch trim panel.



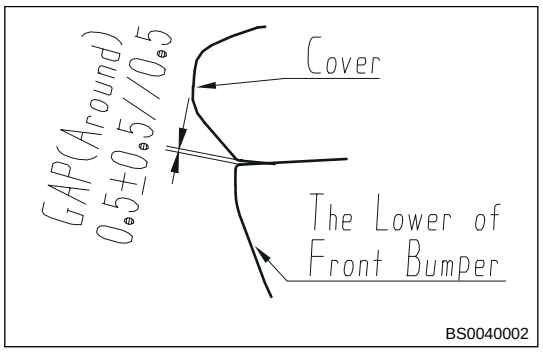
37. Assembly clearance between headlight trim cover and front bumper upper body.



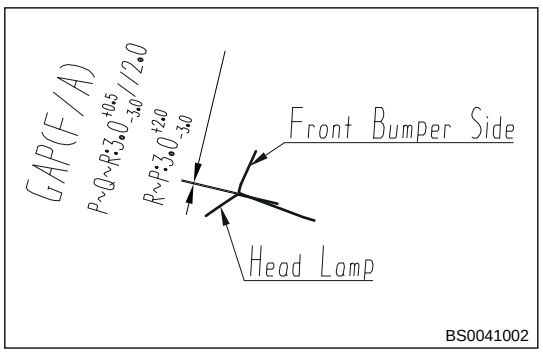
38. Assembly clearance between front bumper body and front bumper lower body.



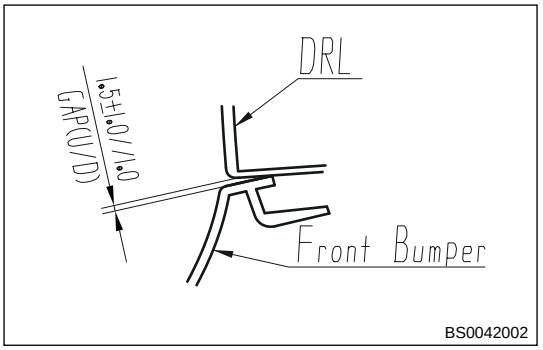
39. Assembly clearance between trim cover and front bumper upper body.



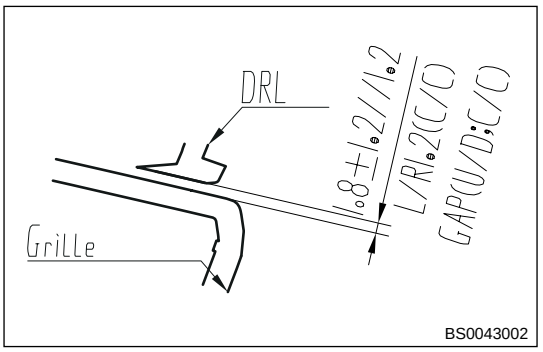
40. Assembly clearance between front bumper body and headlight.



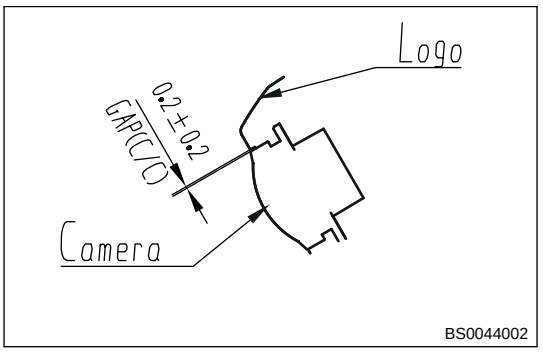
41. Assembly clearance between daytime running light and front bumper body.



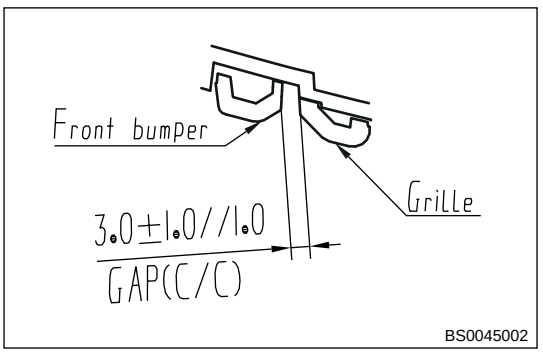
42. Assembly clearance between grille and daytime running light.



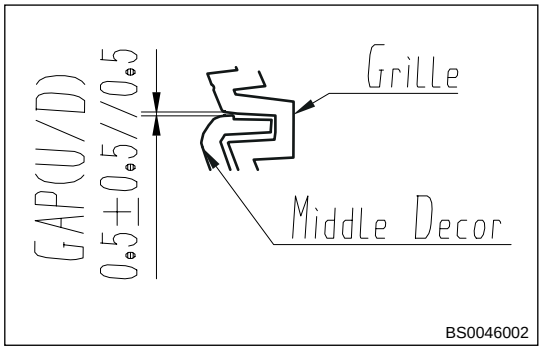
43. Assembly clearance between camera and LOGO.



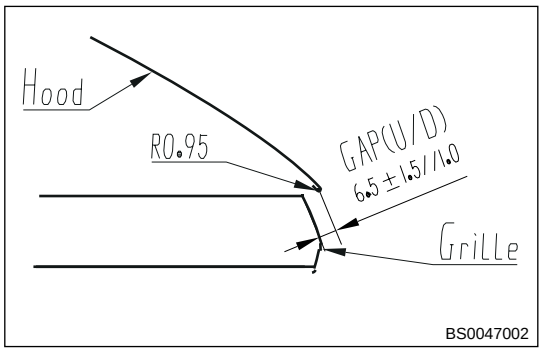
44. Assembly clearance between front grille and front bumper.



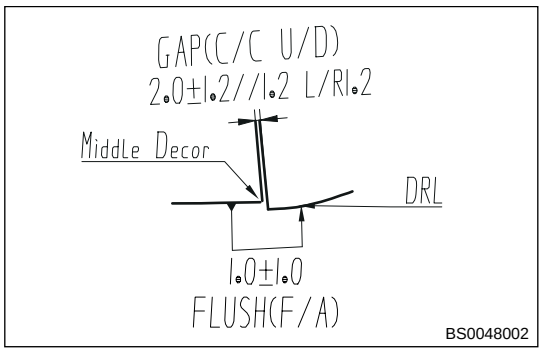
45. Assembly clearance between grille and center trim strip.



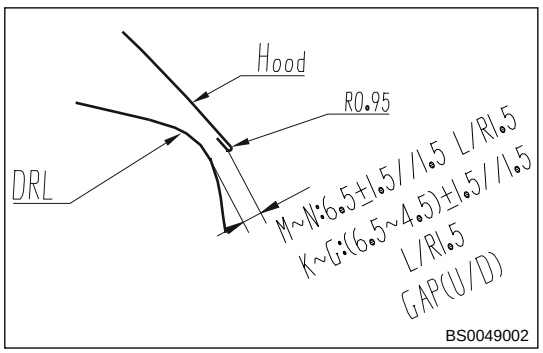
46. Assembly clearance between engine hood and grille.



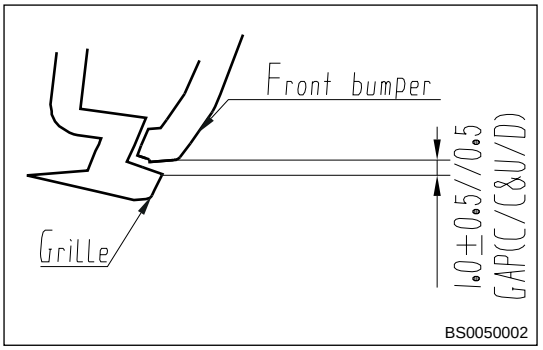
47. Assembly clearance between center trim strip and daytime running light.



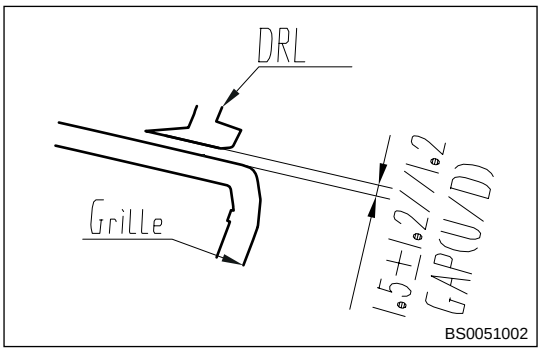
48. Assembly clearance between daytime running light and engine hood.



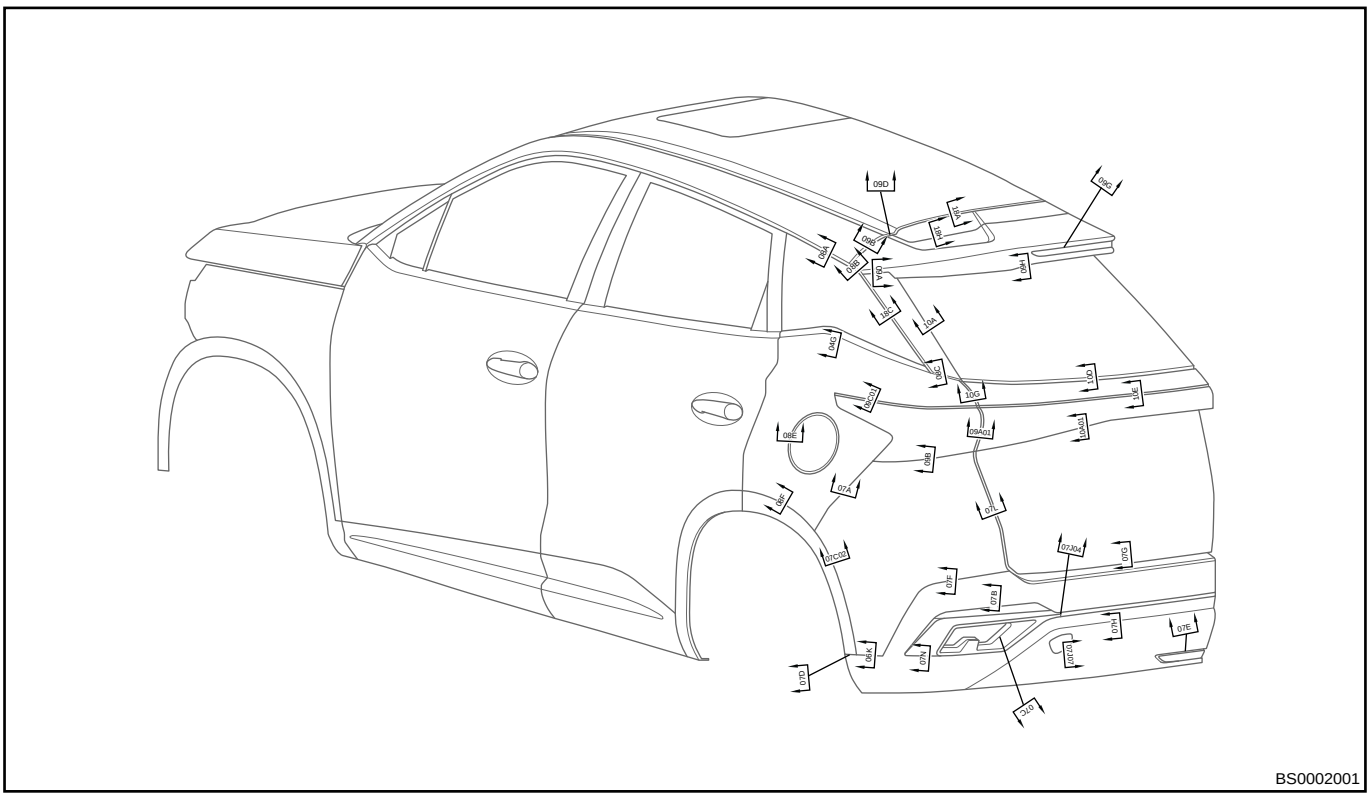
49. Assembly clearance between front bumper and grille.



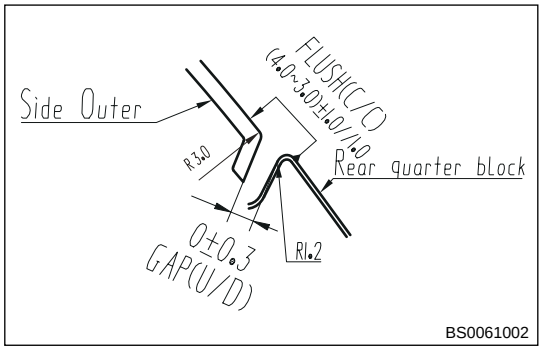
50. Assembly clearance between grille and daytime running light.



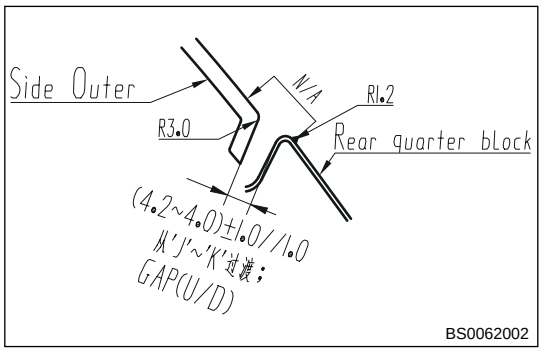
Rear Body Assembly



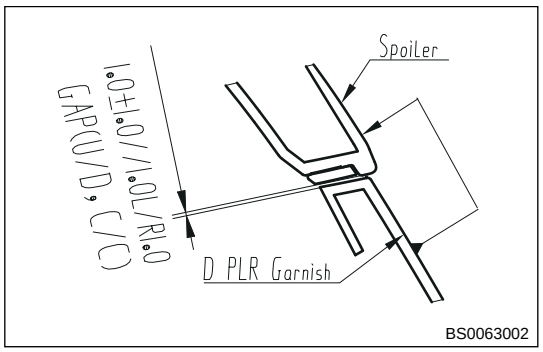
51. Assembly clearance between quarter outer panel and rear quadrangular block.



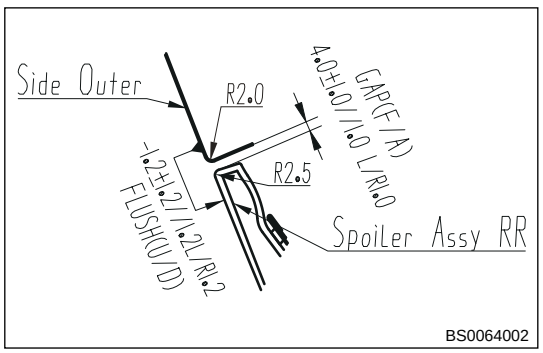
52. Assembly clearance between spoiler and rear quadrangular block.



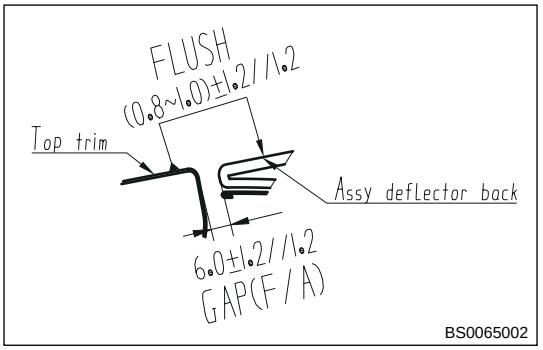
53. Assembly clearance between spoiler and D-pillar trim panel.



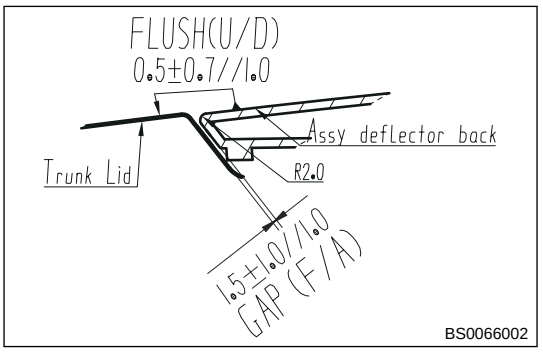
54. Assembly clearance between quarter outer panel and spoiler assembly.



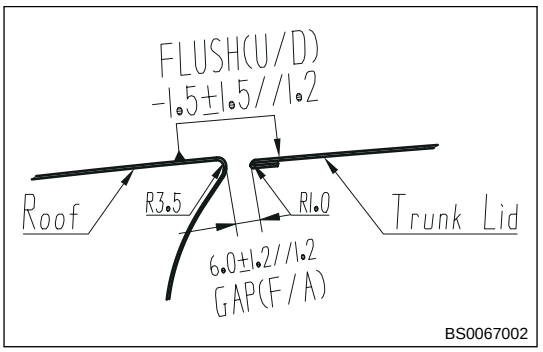
55. Assembly clearance between roof trim strip and rear spoiler assembly.



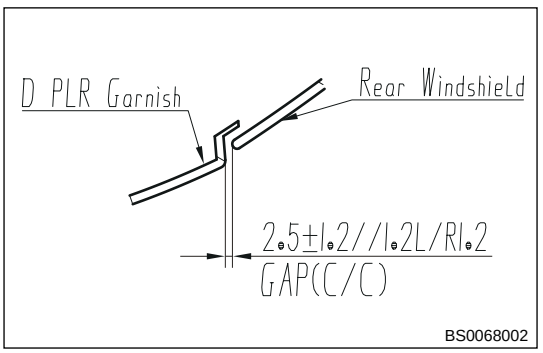
56. Assembly clearance between back door outer panel and spoiler.



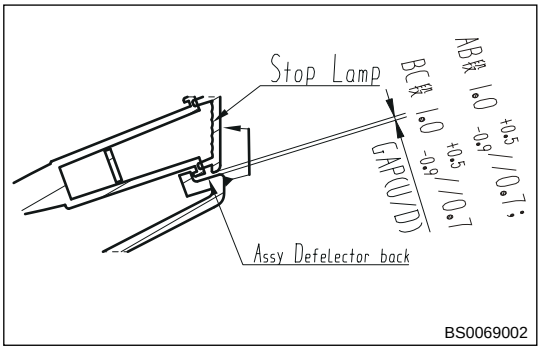
57. Assembly clearance between roof cover and back door.



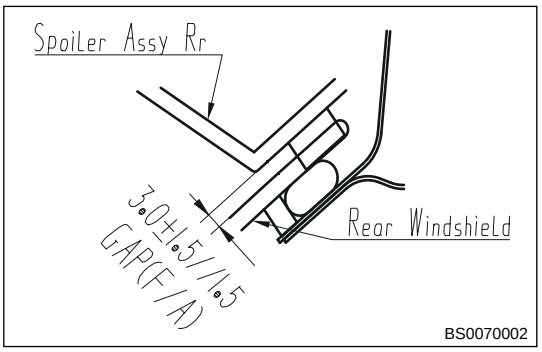
58. Assembly clearance between D-pillar trim panel and rear windshield.



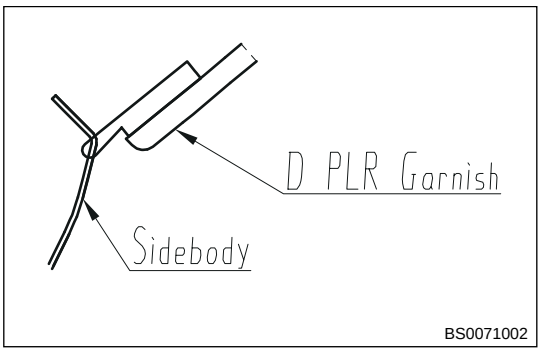
59. Assembly clearance between high mounted brake light and spoiler.



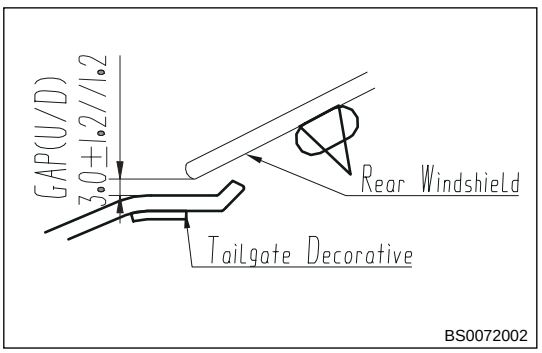
60. Assembly clearance between spoiler assembly and rear windshield.



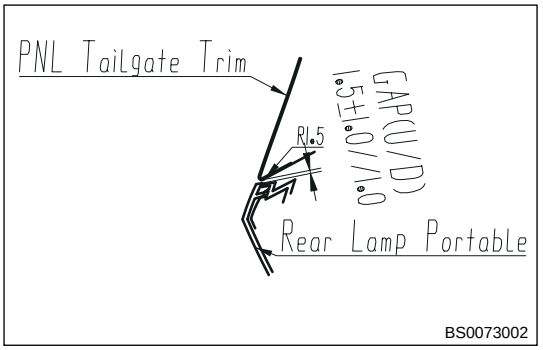
61. Assembly clearance between D-pillar trim panel and quarter outer panel.



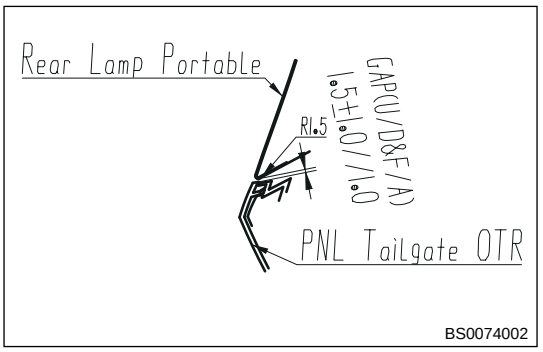
62. Assembly clearance between rear windshield and back door trim panel.



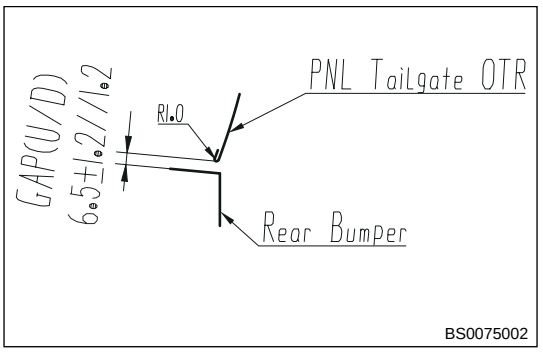
63. Assembly clearance between back door trim panel and combination light (movable).



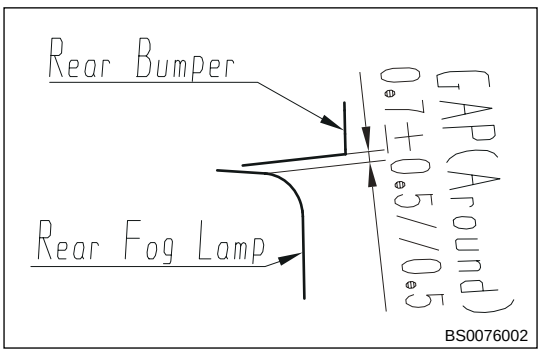
64. Assembly clearance between combination light (-movable) and back door outer panel.



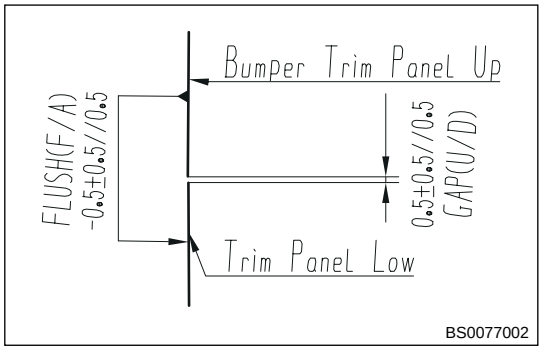
65. Assembly clearance between back door outer panel and rear bumper body.



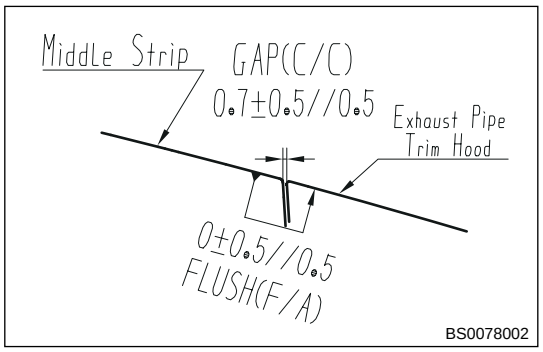
66. Assembly clearance between rear bumper and rear fog light.



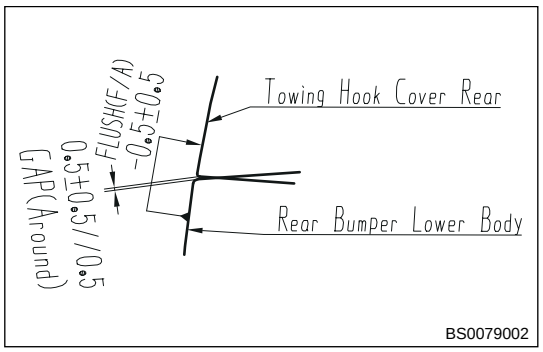
67. Assembly clearance between upper part and lower part of rear bumper trim panel.



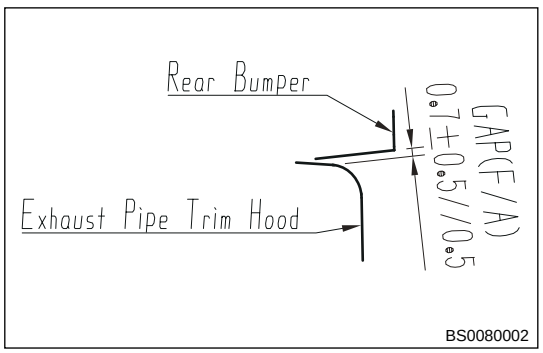
68. Assembly clearance between center strip and exhaust pipe trim cover.



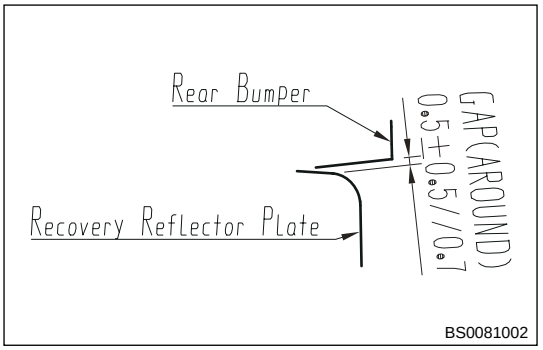
69. Assembly clearance between rear towing hook cover and rear bumper lower body.



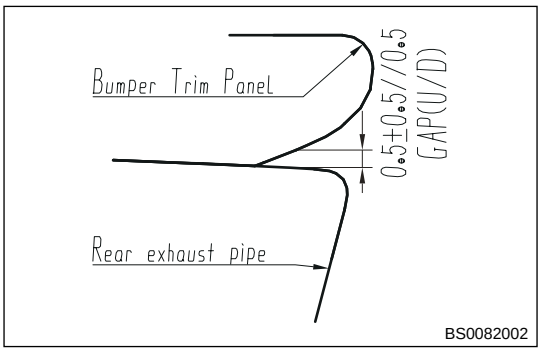
70. Assembly clearance between rear bumper and exhaust pipe trim cover.



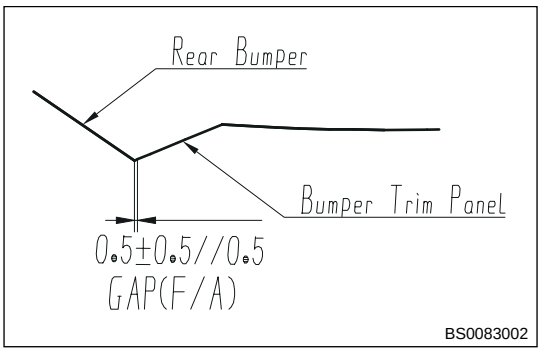
71. Assembly clearance between rear bumper and retro-reflector plate.



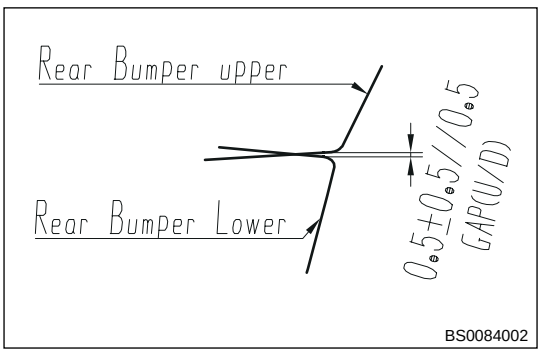
72. Assembly clearance between rear bumper trim panel and exhaust tailpipe.



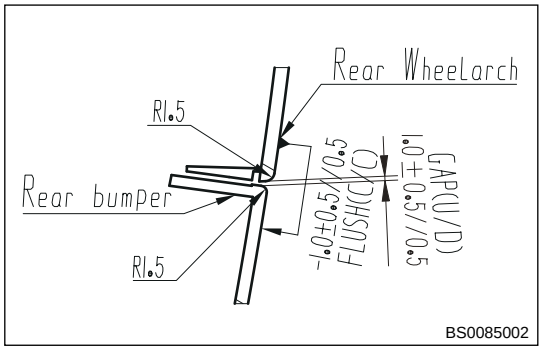
73. Assembly clearance between rear bumper and rear bumper trim panel.



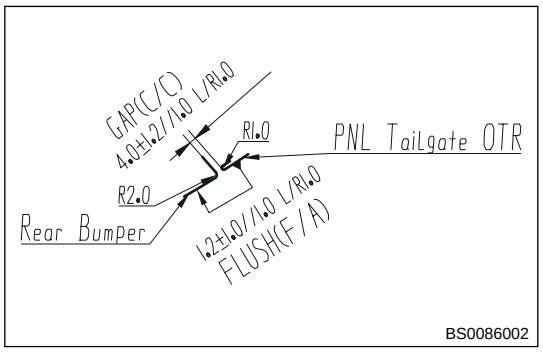
74. Assembly clearance between rear bumper upper body and rear bumper lower body.



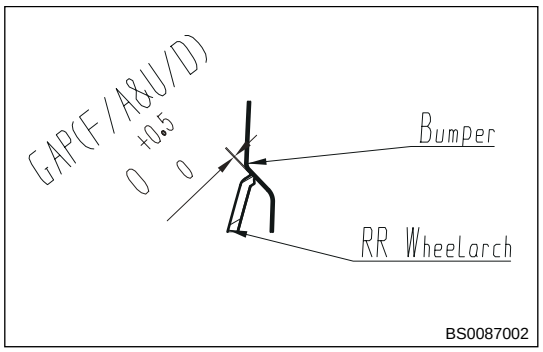
75. Assembly clearance between rear bumper and rear wheel arch.



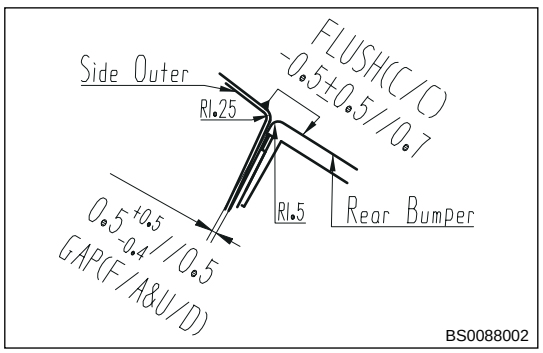
76. Assembly clearance between rear bumper body and back door outer panel.



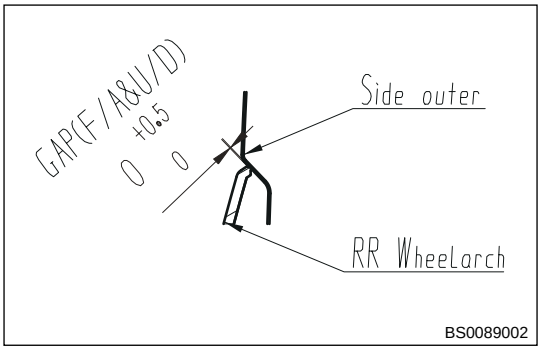
77. Assembly clearance between rear bumper and rear wheel arch.



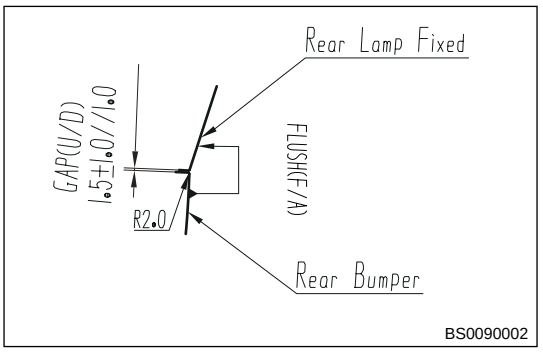
78. Assembly clearance between quarter outer panel and rear bumper body.



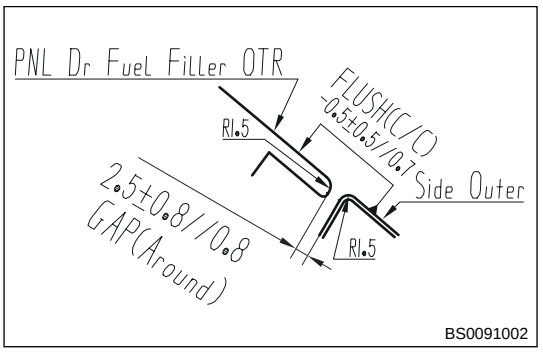
79. Assembly clearance between quarter and rear wheel arch.



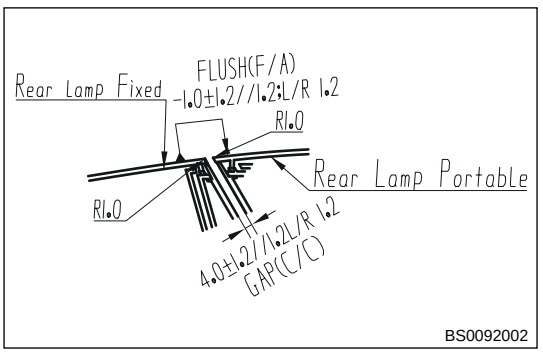
80. Assembly clearance between combination light (fixed) and rear bumper body.



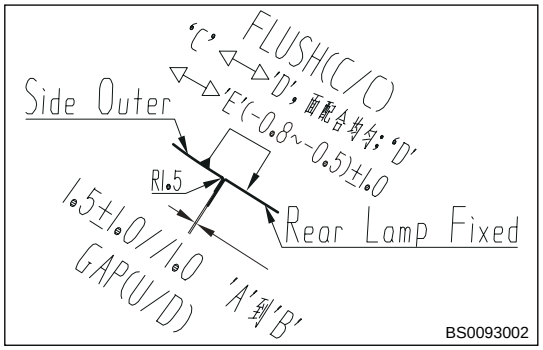
81. Assembly clearance between fuel filler cap outer panel and quarter outer panel.



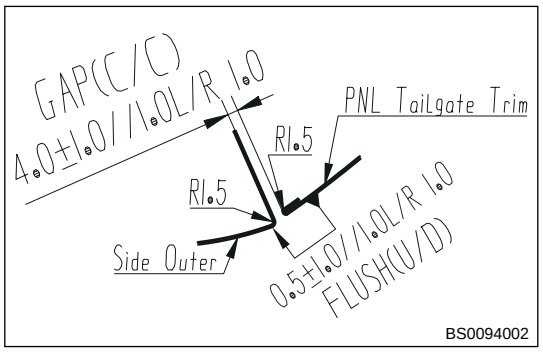
82. Assembly clearance between combination light (fixed) and combination light (movable).



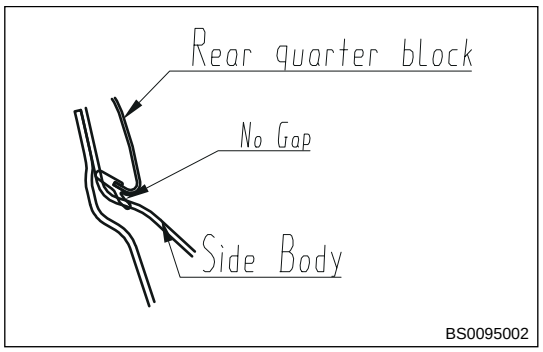
83. Assembly clearance between quarter outer panel and combination light (fixed).



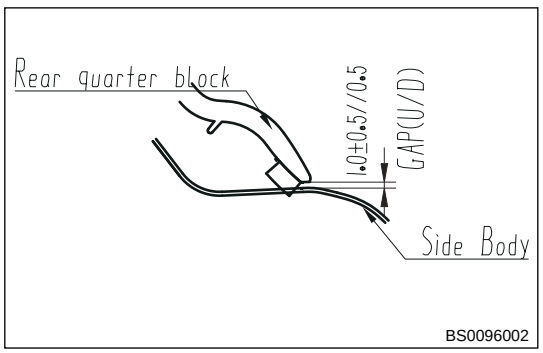
84. Assembly clearance between quarter outer panel and back door trim panel.



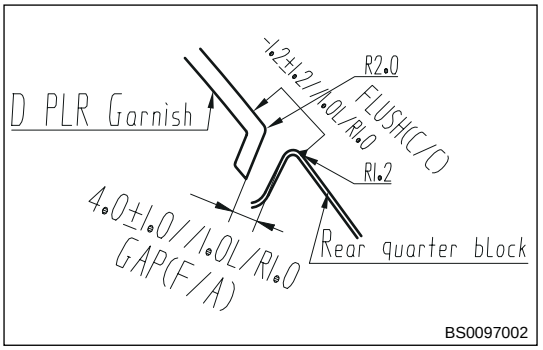
85. Assembly clearance between rear quadrangular block and quarter.



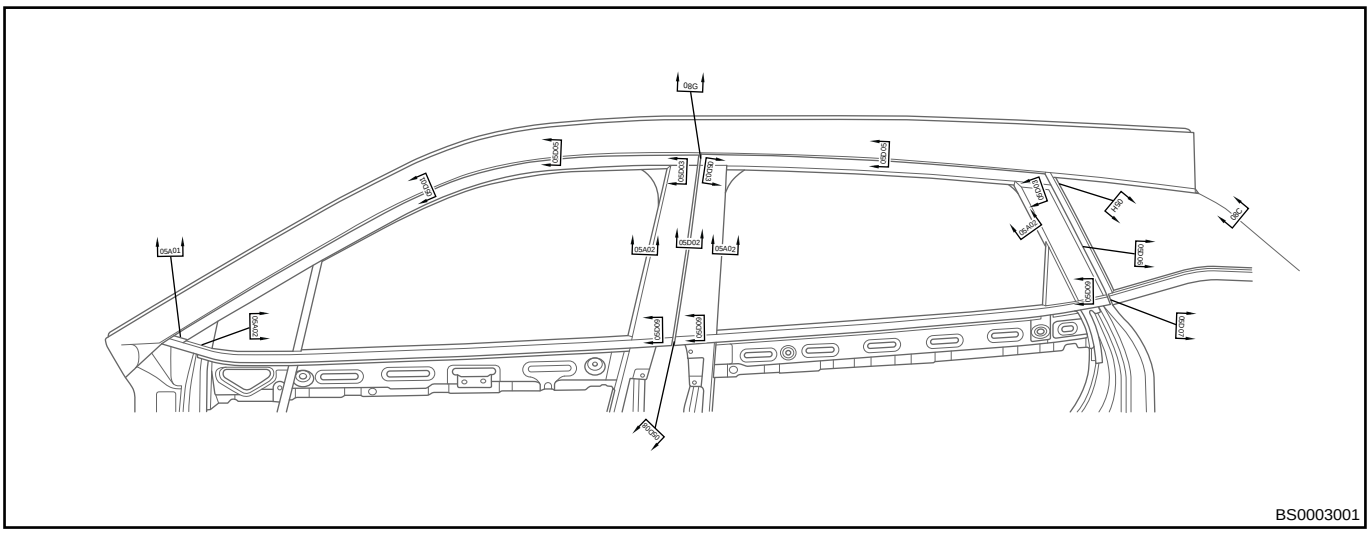
86. Assembly clearance between rear quadrangular block (-black) and quarter.



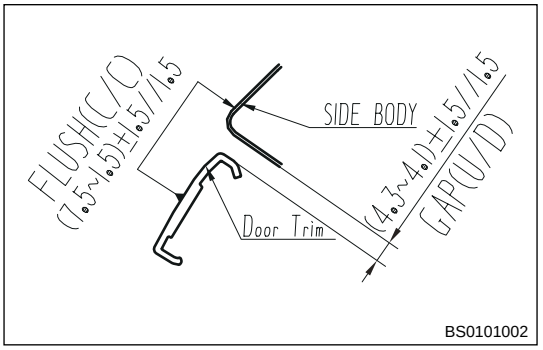
87. Assembly clearance between D-pillar trim panel and rear quadrangular block.



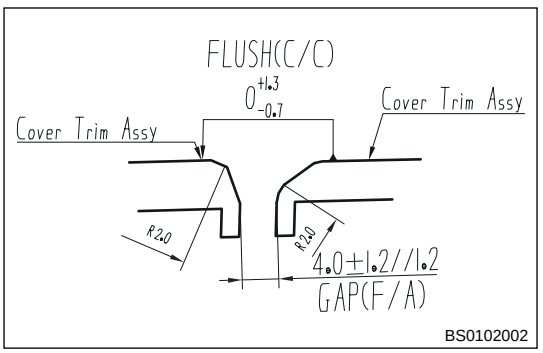
Rear Body Assembly



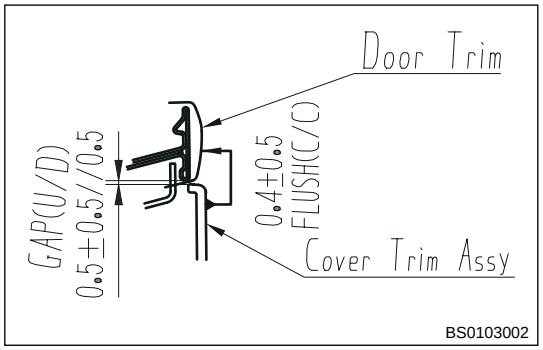
88. Assembly clearance between quarter outer panel and trim strip.



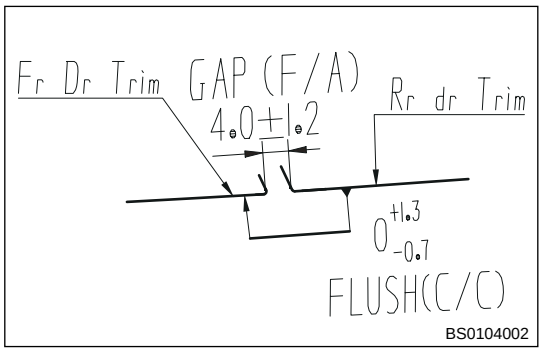
89. Assembly clearance between front door cover plate and rear door cover plate.



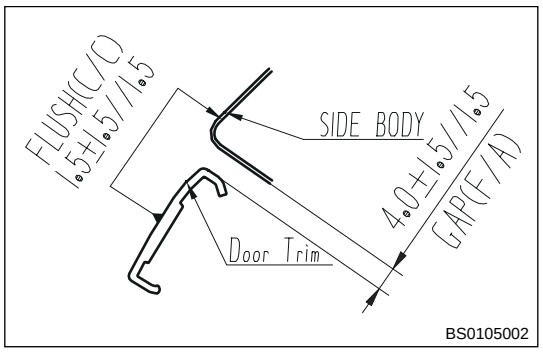
90. Assembly clearance between door trim strip and door cover plate.



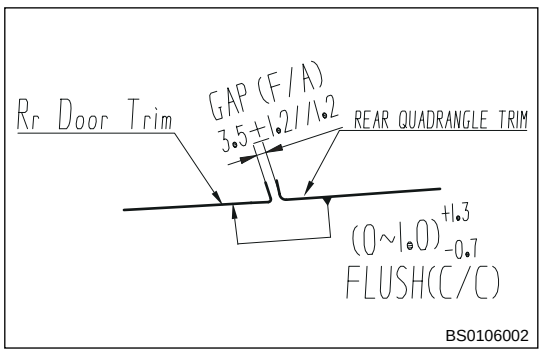
91. Assembly clearance between front door trim strip and rear door trim strip.



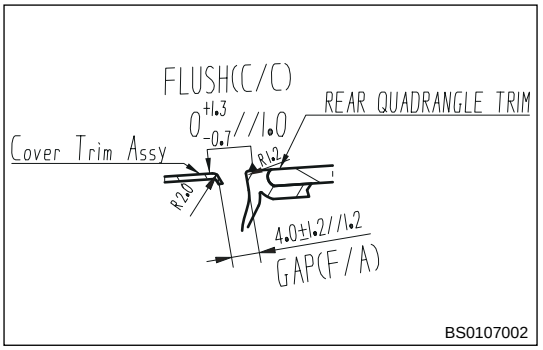
92. Assembly clearance between trim strip and quarter outer panel.



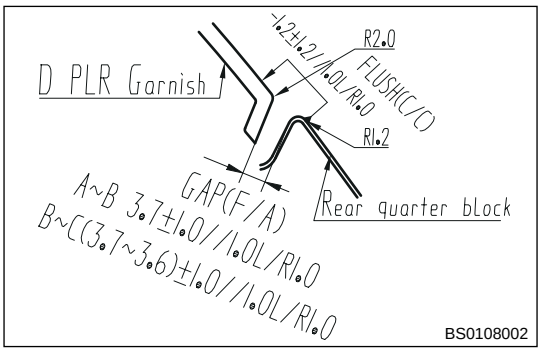
93. Assembly clearance between rear door strip and rear quadrangular trim panel.



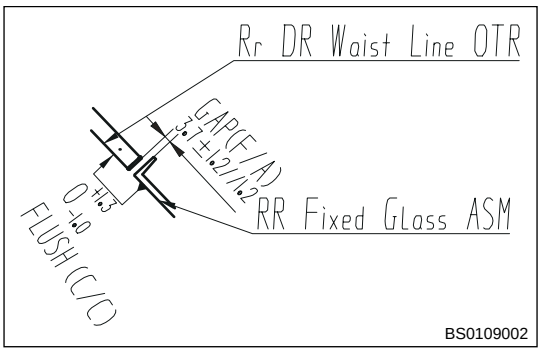
94. Assembly clearance between rear door cover plate and rear quadrangular trim panel.



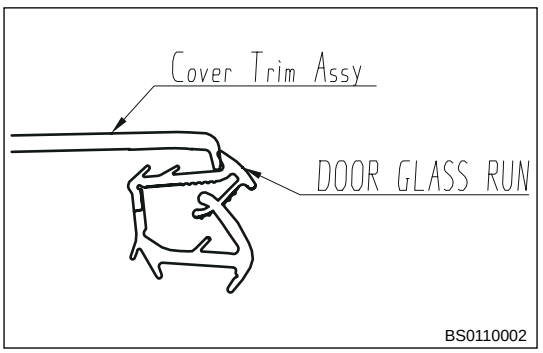
95. Assembly clearance between D-pillar trim panel and rear quadrangular block.



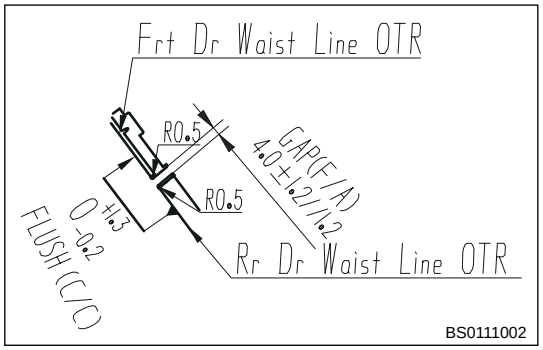
96. Assembly clearance between rear door glass outer weather bar and rear side window glass assembly.



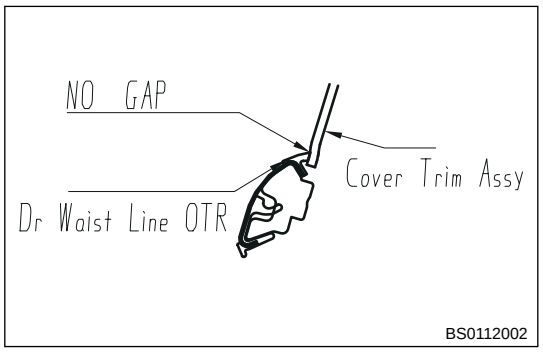
97. Assembly clearance between cover plate and glass run.



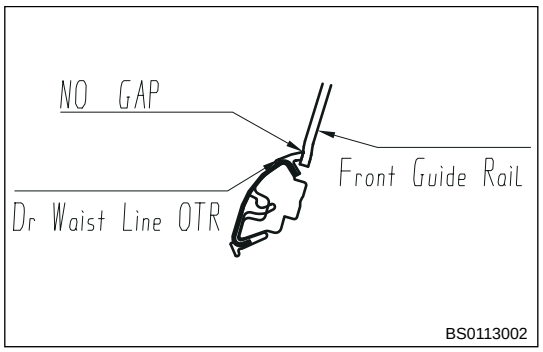
98. Assembly clearance between front door glass outer weather bar and rear door glass outer weather bar.



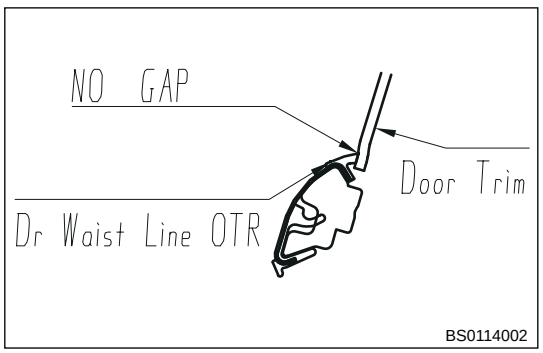
99. Assembly clearance between outer weather bar and cover plate.



100. Assembly clearance between outer weather bar and front door guide rail.



101. Assembly clearance between outer weather bar and trim strip.



Diagnostic Information and Steps

Diagnosis of Accident Vehicle

In the procedure of repairing body, professional technicians need to use beam calibrator, electronic measurement system, body metal plate repair machine, welding machine and various polishing and cutting tools to ensure that the vehicle can restore to the original level in terms of geometric dimensions

and usage performance. However, sometimes it is unable to find the driving system failure and mounting failure that may cause serious results when repairing the accident vehicle. Therefore, in addition to checking the necessary body geometric dimensions, special attention must be paid to the following components:

1. Check to make sure that the steering mechanism and steering link can operate correctly within the number of rotations of steering wheel, and visually check for bent or cracked parts.
2. Check all components of the driving system (such as fork pipe/rail arm, suspension sliding arm, steering knuckle, lateral stabilizer bar, frame, and mounting) for bending, twist and crack.
3. Check wheel and tire for damage, concentric rotation and unbalance. Check the tire pattern and tire wall for cuts, and check the tire pressure.
4. Check engine/transmission/exhaust system mounting for damage.
5. Perform a road test to ensure vehicle driving ability, finally deliver the vehilcle to users.

Removal and Installation

- Before replacing the critical parts of the body, it’s necessary to use the universal body calibration frame to calibrate the body, and then determine the damaged parts to be replaced. Before welding, it is necessary to perform accurate positioning of components, and then carry out measurement to ensure that the components meet the requirements of body dimensions before welding. In the process of welding, measure frequently to ensure the correct assembly.
- It’s necessary to understand the welding and assembly relationship among body metal plates before removal. Please refer to Body Metal Plate Components View. Cutting the parts separately is not suggested. The rigidity, driving safety and service convenience of the vehicle will be affected after cutting and welding.

Removal

1. Remove all plates and components related with replacement components.
2. Remove sealant and anti-corrosion materials if necessary.
3. Locate, mark and drill all factory welding points that connect components to be replaced.
4. Remove the damaged replacement component.
5. Remove the residue material.

Installation

1. Treat the mating surface beforehand if necessary.
2. Select the correct welding method according to original vehicle welding type. Use shielded welding where it’s inconvenient for resistance welding. If plug welding is selected, drill holes for plug welding on new parts, and determine the diameters and spaces of plug welding holes according to the original welding points.
3. Place new parts on the vehicle temporally.
4. Assemble and secure the new components with the calibration support (locate service plate correctly).
5. Measure positions of new parts to ensure their correct assembly dimensions.
6. Perform the corresponding welding.
7. Clear all welding surfaces.
8. Spray the primer.
9. Spray the sealant and anti-corrosion materials if necessary.
10. Install all related plates and components.

Paint/Coating Description

Paint is a kind of mixed liquid, which can be applied on a variety of base material. After the paint is dry, it forms a solid paint film to protect the base material and beautify the appearance. When the vehicle is delivered out of the factory, the following four layers of paint have been applied to make it have good anti-corrosion and gloss.

1. Electrophoretic primer.
2. Intermediate paint.
3. Pigmented paint.
4. Celluloid paint (transparent external coating).

Main functions of electrophoretic primer:

1. Anti-rust.
2. Improve the adhesion during working.
3. Provide limited filling capability.

Functions of intermediate paint:

1. Filling capability.
2. Isolation/sealing.
3. Serve as the pigmented paint.

Functions of pigmented paint:

1. Enrich the color.
2. Improve the gloss.

Functions of celluloid paint:

1. It contains ultraviolet-proof materials, which can resist the ultraviolet rays in the sun.
2. Resist the corrosion of environmental dust (acid rain) on the paint surface.
3. Make the paint surface friction resistant.
4. Make paint surface have better gloss.

Daily Maintenance of Vehicle Paint Surface

The maintenance of the body aims mainly to prevent the early aging and damage of the coating to keep the body clean and beautiful. In addition, keeping the body clean helps to find the damage of the body coating at any time to repair it in time.

1. Washing the body.
   a.It’s necessary to wash the body frequently to keep good paint surface and beauty of the body. However, it should not be performed in strong sunlight or in low temperature condition. In any case, do not wash it until body surface cools. Wash the dirt on the body surface with pressure water flow when using spraying-water washing, and then scrub the body surface with soft and clean sponge or towel from top to bottom. If car detergent is used, wash it with large amount of water. When using the high-pressure washing machine, do not turn the nozzle directly to transmission, steering gear, radiator, engine cover, rubber protective parts of various components and external ornaments. After washing the car, use high-quality white gauze to dry the body surface. Never use gasoline, kerosene, trichloroethylene, strong alkaline water and alcohol to scrub the body surface and organic glass surface.
2. Cleaning the body.
   a. Before using the wax on the car body coating, remove the oxide, road dirt, oil stain and the dirt that cannot be cleaned firstly. Do not scrape off the asphalt or gasoline stains on the body and bumper, and do not use gasoline or fabric decontamination agent, but use special decontamination products to remove them in time.
   b. For cleaning of body exterior ornaments and light alloy, firstly use soapy water or water that adds a small amount of decontamination agent or detergent, and then wash with a large amount of water. For scrubbing of windshield and door glass, it is better to use the washer fluid supplied by CHERY CAR TECH. SERVICE STATION so as to obtain high-quality scrubbing effect, instead of using silicone based products.
3. Waxing and polishing the body.
   a.Waxing the body surface is one effective method that protects the gloss of paint coating surface. Wax can protect the paint coating surface well because after waxing, enough grease is kept on the

paint surface, which cuts off the contact between water, air and the paint coating, and the coating is free from oxidization, which can effectively prevent the body surface from being eroded. Before waxing, make sure that the body surface is clean and dry; if the paint surface is discolored or oxidized, it’s necessary to paint it before waxing.

b.It’s better to use the waxing tool for polishing wax. If not, wax it with a soft napkin or a soft and lint-free cotton or flannel. Because waxing will change in the sunlight in most cases, sometimes there will be spots on the body surface when waxing in the sunlight, do not wax it in the direct sunlight.

c.Water droplet test can be used to check if waxing the body is good. If the water forms a water ball on the body surface, it proves there is the wax layer, otherwise, it needs to be cleaned and waxed. Do not wipe off the wax on the body too early and polish it after drying. Polishing the body paint should be carried out when the surface is clean and dry with a polisher (or by hand). Polishing any plastic parts is forbidden.

4. Restoring scratch on the body.

   a.When the scratch on the body surface is not serious and does not reach the metal, the special paint repair spraying tank can be used. Spraying the paint marked the same color to the scratch surface. The repaired paint will be dry in the air. CHERY CAR TECH. SERVICE STATION can provide paint spraying tanks filled with various colors (the paint number is marked in the designated vehicle area).

   b.If the scratch on the body surface has damaged the metal with rust stain, remove the rust firstly, then scratch the putty with rubber or nylon scraper, and then perform general repair treatment for the paint and coating surface.

5. Maintenance of the bottom protective layer.

   a.There is a protective layer on the bottom of the car, which has a permanent anti-chemical corrosion and mechanical trauma. The car bottom may contact with the road during driving, causing damage to the protective layer of the car bottom. It needs regular inspection and timely service.

6. Treatment of cavity anti-corrosion.

   a.If the external temperature is very high, the wax may flow out of the cavity, which can be removed with a plastic scraper. At this time, pay attention to safety and environmental protection. All cavities that may be corroded on the car have been filled with wax for anti-corrosion before leaving factory. Maintenance is free in general condition.

WARNING:

- In the process of mixing and spraying paint, diffuse solvents can cause serious respiratory disease. It’s necessary to operate in strict accordance with the manufacturers’ instruction manual of paint, device and safety device. When performing the operation of this procedure, wear special labor protection appliances such as gas mask, anti-static clothing, protective glasses and gloves etc. to prevent injury.

CAUTION:

Never mix paint systems of different manufacturers or substitute products. When incompatible products are mixed, the following phenomena will occur:

- Primer peels off.
- Adhesion between coatings is poor.
- Curing is not completely.
- Gloss is reduced.
- Color accuracy is poor.
- Coating is damaged (dent, bubble, wrinkle without gloss).

CAUTION:

Precautions during Finish Varnish Maintenance and Repair

- Avoid washing vehicle in direct sunlight.

- Avoid using strong soap and chemical detergent.
- Use the brushless automatic car-cleaning equipment.
- Avoid using products containing acid and alkali.
- Do not use a brush or broom to remove snow or ice.
- After cleaning it completely, wipe the remaining rinse water immediately and forbid to make it dry on the surface. It is recommended to dry it with soft chamois leather.
- When the defect on the surface can be eliminated by polishing, the vehicle can be polished.
- If the surface defect is not serious, try to eliminate the repairing area.
- Avoid removing too much celluloid paint, otherwise it cause the paint damage prematurely.
- Use electric polishing device in strict accordance with the requirements recommended by the polishing manufacturer. Do not use wax or silicone products to cover the vortex imprinting (the imprinting will reappear soon and make the user unsatisfied).

CAUTION:

Precautions of Anti-corrosion Treatment

- When spraying sound insulation or anti-corrosive materials, oreventive measures must be taken to avoid spraying into component openings (such as door locks, window regulator slots, window regulators and seat belt retractors) and any moving and rotating components, especially the parking brake cable. After spraying the materials, make sure that all drain holes on the body are open.
- When using open flame to repair the body, it’s necessary to remove the foamed sound insulation materials at the repair areas. When reinstalling the sound insulation materials, avoid inhaling dust that is harmful to the human body.
- When performing the operation of this procedure, wear special protective glasses and gloves to prevent injury.
- When the vehicle leaves the factory, it’s necessary to deal with the body metal plates by means of spraying electrophoretic primer. After repairing and / or replacing parts, it’s necessary to deal with all exposed metal surfaces with anti-rust primer.
- If the original coating or anti-corrosive material is burnt during welding or heating operation, remove it and carry out anti-corrosion treatment again.
- When carrying out collision service, the metal will be exposed, and it’s necessary to spray these surfaces with special anti-corrosion materials.
- Sealant can prevent water and dust from entering the vehicle and it has anti-corrosion function. The original sealed joint is obvious, if these seals are damaged, reseal to calibrate them. Reseal the connection of the newly replaced plate. The sealant used should be flexible after curing and painting. Fill the opening seams sealed with sealant with high consistency filler. Perform operation according to the instructions for the selected material.
- The sound insulation material can control the general noise level in the vehicle. When the sound insulation layer is damaged due to service operation or replacing new panels, it’s necessary to replace it with the same material.

Diagnostic Information and Steps

Examples and Treatment of Common Car Paint Surface Defects

Name	Cause	Treatment Method
Efflorescence	1. The paint film is strongly eroded, such as strong ultraviolet ray. 2. The paint mix ratio is not correct during application. 3. Light and weather resistance of coating is poor. 4. Do not wash the car frequently or do not wash it completely. 5. The selected car cleaner is not suitable or the polishing wax is too coarse.	1. Polishing and beatifying treatment. 2. General grinding, polishing and beatifying treatment. 3. Depth grinding, polishing and refurbishing treatment. 4. Local spraying paint and repair.
Peeled off Paint on Plastic Parts	1. The adhesion between the coating and the base material is too poor or the upper coating is harder than the lower coating. 2. The coating is too thick, and the paint film is eroded by moisture, acid and alkali in the air. 3. The recoatability of the lower coating is not good, or the treatment is not good; the upper coating have defects such as pinholes, exposed bottom, etc.	1. Polishing and beatifying treatment. 2. General grinding, polishing and beatifying treatment. 3. Depth grinding, polishing and refurbishing treatment. 4. Local spraying paint and repair.
Honeycomb Cracks	1. Do not mix primer coating completely before spraying it. 2. Finish paint coating is too thick. 3. Floating coating is too thick.	1. Polishing and beatifying treatment. 2. General grinding, polishing and beatifying treatment. 3. Depth grinding, polishing and refurbishing treatment. 4. Local spraying paint and repair.
Bird Droppings Erosion	1. Bird droppings erode.	1. Polishing and beatifying treatment. 2. General grinding, polishing and beatifying treatment. 3. Depth grinding, polishing and refurbishing treatment. 4. Local spraying paint and repair.
Abrasion Imprinting	1. The paint film harness is not enough. 2. Hard objects scratch.	1. Polishing and beatifying treatment. 2. General grinding, polishing and beatifying treatment. 3. Depth grinding, polishing and refurbishing treatment.

Name	Cause	Treatment Method
		4. Local spraying paint and repair.
Corrosion	1. The paint film at the edge is thinner. 2. Collision damage causes corrosion. 3. Acid and alkali erode.	1. Polishing and beatifying treatment. 2. General grinding, polishing and beatifying treatment. 3. Depth grinding, polishing and refurbishing treatment. 4. Local spraying paint and repair.
Peeled off Paint	1. The adhesion between the coating and the base material is too poor or the upper coating is harder than the lower coating. 2. The coating is too thick, and the paint film is eroded by moisture, acid and alkali in the air. 3. The recoatability of the lower coating is not good, or the treatment is not good. 4. The upper coating have defects such as pinholes, exposed bottom, etc.	1. Polishing and beatifying treatment. 2. General grinding, polishing and beatifying treatment. 3. Depth grinding, polishing and refurbishing treatment. 4. Local spraying paint and repair.
Acid Rain Corrosion	1. Acid rain erodes	1. Polishing and beatifying treatment. 2. General grinding, polishing and beatifying treatment. 3. Depth grinding, polishing and refurbishing treatment. 4. Local spraying paint and repair.

Name	Cause	Treatment Method
Loss of Gloss	1. The paint film is strongly eroded by acid, alkali, electric arc, sea water and salt mist. 2. The maintenance method of the paint film is not correct in the severe condition. 3. Durability of paint itself is not enough. 4. When the paint is applied, the incorrect mix ratio causes poor durability of the paint film.	1. Polishing and beatifying treatment. 2. General grinding, polishing and beatifying treatment. 3. Depth grinding, polishing and refurbishing treatment. 4. Local spraying paint and repair.
Bubble	1. When the paint film is exposed to the humid environment for a long time, the moisture penetrates into the paint film and moisture raises bubbles when the temperature rises. 2. Base materials are corroded by penetrating materials. 3. The paint film is eroded by gasoline, acid and alkali.	1. Polishing and beatifying treatment. 2. General grinding, polishing and beatifying treatment. 3. Depth grinding, polishing and refurbishing treatment. 4. Local spraying paint and repair.

Removal and Installation

Examples of Common Paint Film Defects Treatment Process

- During operation, keep the machine moving smoothly and gently, and avoid operating too long to avoid overheating and burning the paint surface.
  1. Clean the surface to be polished with degreasing material before polishing.
  2. Make the sponge wet firstly and squeeze out the excessive water.
  3. Apply a small amount of polishing wax to the surface to be polished, and adjust the speed of polishing machine.
  4. After the sponge contacts the paint surface, start the machine with the speed of 2500 - 3000 r/min. Then press it for 3 ~ 5 seconds gently before polishing.
  5. Wipe off excessive polishing wax with waxing cloth.

Example of General Grinding, Polishing and Beatifying Treatment Process

- Keep the machine moving smoothly and gently and avoid grinding too much. Make sure that the grinding time is as short as possible and the grinding area is as small as possible.
- During operation, keep the machine moving smoothly and gently, and avoid operating too long to avoid overheating and burning the paint surface.
  1. Clean the surface to be polished with degreasing material before polishing.
  2. Apply a appropriate amount of polishing paste to the surface to be polished, adjust the speed of polishing machine.
  3. After the polishing wool pad contacts the paint surface, start the machine with the speed of 2500 - 3000 r/min.
  4. Make the sponge wet firstly and squeeze out the excessive water; Apply a small amount of polishing wax to the surface to be polished, and start the machine with the speed of 2500 - 3000 r/min after the sponge contacts the paint surface. Then press it for 3 - 5 seconds gently before polishing.

5. Make the sponge wet firstly and squeeze out the excessive water; Apply a small amount of polishing wax to the surface to be polished, and start the machine with the speed of 2500 - 3000 r/min after the sponge contacts the paint surface. Then press it for 3 - 5 seconds gently before polishing.

Example of Depth Grinding and Polishing Treatment Process

- Keep the machine moving smoothly and gently and avoid grinding too much. Make sure that the grinding time is as short as possible (3- 5 seconds) and the grinding area is as small as possible.
- During operation, keep the machine moving smoothly and gently, and avoid operating too long to avoid overheating and burning the paint surface.

1. Grind the damaged paint surface with # 2000 waterproof abrasive paper, make it parallel and contact with the paint surface to be ground, and carry out circular grinding.
2. Clean grinding dust on the surface.
3. Apply a appropriate amount of polishing paste to the surface to be polished, adjust the speed of polishing machine.
4. After the polishing wool pad contacts the paint surface, start the machine with the speed of 2500 - 3000 r/min.
5. Make the sponge wet firstly and squeeze out the excessive water; Apply a small amount of polishing wax to the surface to be polished, and start the machine with the speed of 2500 - 3000 r/min after the sponge contacts the paint surface. Then press it for 3 - 5 seconds gently before polishing.

Tips on Spraying Process of Paint with Rigid Surface

- Take the wing as an example to illustrate the local spraying (paint repair) process.

1. If the scratch on the wing is severe, use local spraying (paint repair) process.
2. Grind (circularly grind) the damaged paint surface with # P500 wet (waterproof) abrasive paper.
3. Degrease and clean it with degreasant after grinding.
4. When spraying he primer, try to control the scope of the primer and make sure the coating at the edge should be gradual instead of stair-step shape.
5. Flash off for 4 - 5 minutes, and dry it and bake it for 20 - 30 minutes. The temperature of baking finish house is 70 - 80℃(158 - 176°F).
6. After baking, carry out the wet polishing with # P800-1000 abrasive paper.
7. Grind it with # 2000 fine waterproof abrasive paper and expand grinding range.
8. After polishing is completed, use sticky gauze to remove dust before spraying the paint.
9. Spray the base coat.
10. Flash off for 2 - 3 minutes, and spray the second base coat until the interface position is not obvious.
11. Flash off for 4 -5 minutes, and dry it for 20 - 30 minutes.
12. After drying is completed, use sticky gauze to remove dust before spraying the varnish.
13. When spraying celluloid paint, the spraying range should cover the base coat range completely.
14. Flash off for 2 - 3 minutes, and spray the second celluloid paint, the spraying range should cover the first varnish range completely.
15. After spraying celluloid paint is completed, immediately replace it with barge saliva or add interface additive or thiner into the original celluloid paint.
16. Spray barge saliva or diluted celluloid paint for 2 - 3 times at interface position.
17. Bake it for 20 - 30 minutes in the baking finish house.

Spraying Procedure of Paint with Rigid Surface After Repairing Metal Plate

1. Spraying procedure of Paint with rigid surface after repairing metal plate is similar to spraying process of paint with rigid surface, except that the following steps are added after the primer is ground and before the primer is sprayed:
   a. Scrape and apply the atomic ash.
   b. Grind the atomic ash.
   c. Blow dust, remove oil and clean.
   d. Scrape and apply the filling eye gray.
   e. Brush the old paint film surface.

Repairing Procedure of Paint Surface on Plastic Part Surface

1. There are three basic requirements for the paint surface repairing on plastic part surface:
   a. The paint and plastic have certain adhesion without damaging mechanical properties.
   b. The paint film shall be flexible enough to deform with the plastic without cracks.
   c. The original particles and coarse texture on some plastic part surfaces.

Description & Operation

The materials of interior and exterior surface covering parts are modified PP, ABS, PC + ABS and PVC (-artificial leather materials), which are all thermoplastic plastics and its modified materials. The materials of interior and exterior non-surface covering parts also uses POM, PA and HDPE materials etc.
Thermosetting plastic is rarely used in interior and exterior trims, and only ashtray uses phenolic plastic. Thermosetting plastic is mainly used as construction part in electronic appliance and safety component. Repairing thermoplastic part uses hot soldering iron plastic materials to fill the welding machine, but the common service uses replacement method. Thermosetting plastic can use epoxy resin or other harder two-component service materials. In this chapter, its service method is simply introduced while the service is not suggested.

Classification of Plastic

Thermosetting plastic refers to the plastic that can solidify or has insoluble (melting) characteristics under heating or other conditions, such as phenolic plastic, epoxy plastic, etc. Thermoplastic refers to the plastic that can be repeatedly heated, softened, cooled and hardened within a specific temperature range, such as polyethylene, polytetrafluoroethylene, etc. Thermoplastic and thermosetting plastics can be either hard plastic or soft plastic.

Repair Precaution of Plastic Part

1. Apply protective cream to exposed skin to prevent skin irritation.
2. Wear rubber gloves.
3. Wear protective glasses when using compressed air and sanding.
4. Immediately clear any mixture that contacts your skin because mixture solidifies quickly.
5. Wear dust boot and protective glasses when grinding or sanding.
6. Clean your skin with cold water to reduce the slight irritation of resin dust on your skin.
7. Avoid service materials sticking to your clothes.
8. Use service materials in a well ventilated environment because the soot particles produced by the service materials are toxic.
9. After using, close all service material containers. Dust or moisture will pollute service materials and reduce service effect.

Repair of Thermosetting Plastic Dent

1. Clean and dry the components to be repaired.
2. Heat the dent position with a hot air blower until the dent can be flattened with an appropriate tool.

3. Polish the dent area with abrasive paper/emery paper.
4. Then clean service area with cleaner and dry it out for 5 minutes.
5. Apply a thin layer of adhesive on it and dry it out for 10 minutes.
6. Fill the uneven surface with adhesive and smooth it with trowel.
7. Accelerate solidifying process with infrared lamp, adjust the temperature to 60-70℃ (140-158°F) and heat it for 15 minutes.
8. Polish the dent area with abrasive paper.
9. Remove dust and debris.
10. Apply a thin layer of adhesive on it and dry it out for 10 minutes.
11. Restore paint surface according to the repairing procedure on paint surface of plastic parts.

Repair of Thermosetting Plastic Scratch

1. Clean and dry the area to be repaired.
2. Remove protruding materials with abrasive paper.
3. Then clean service area with cleaner and dry it out for 5 minutes.
4. Apply a layer of adhesive on it and dry it out for 10 minutes.
5. Fill the uneven surface with adhesive and smooth it with trowel.
6. Accelerate solidifying process with infrared lamp, adjust the temperature to 60-70℃ (140-158ºF) and heat it for 15 minutes.
7. Polish the pit area with abrasive paper.
8. Remove dust/debris.
9. Apply a thin layer of adhesive on it and dry it out for 10 minutes.
10. Restore paint surface according to the repairing procedure on paint surface of plastic parts.

Repair of Thermosetting Plastic Crack (The Length is Less Than 100 mm)

1. Clean and dry the area to be repaired.
2. Chisel crack end for 5mm (0.19in) and polish crack to V-shape to internal stress and protruding area.
3. Then clean service area with cleaner and dry it out for 5 minutes.
4. Apply a layer of adhesive on it and dry it out for 10 minutes.
5. Stick reinforcing tape to the back of service part with adhesive and overlap the damaged part for at least 20mm (0.79in).
6. Accelerate solidifying process with infrared lamp, adjust the temperature to 60-70℃ (140-158ºF) and heat it for 15 minutes.
7. Fill the front part of crack with adhesive and smooth it with trowel.
8. Accelerate solidifying process of the front part of crack with infrared lamp.
9. Polish the pit area with abrasive paper.
10. Apply a thin layer of adhesive on it and dry it out for 10 minutes.
11. Remove dust/debris.
12. Apply a layer of adhesive on it and dry it out for 10 minutes.
13. Restore paint surface according to the repairing procedure on paint surface of plastic parts.