2026Service Manual for Forthing Taikon 5 REEV Model

This maintenance manual provides specifications，diagnostics，and repair service information for the Forthing Taikon 5 REEV model.

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1.1 Precautions

Description

To protect the personal safety and properly conduct maintenance operations, please read the following precautions.

Precautions for supplemental restraint system SRS "airbag" and "seat belt tensioner".

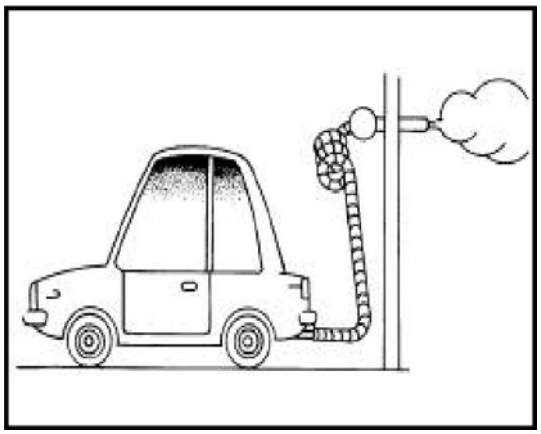
Simultaneous use of SRS such as "airbags" and "seat belt tensioners" with seat belts helps reduce injury risk or severity for the driver and front passenger in case of vehicle collision. The SBS and SB sections of the Service Manual contain the information needed to safely service this system.

WARNING:

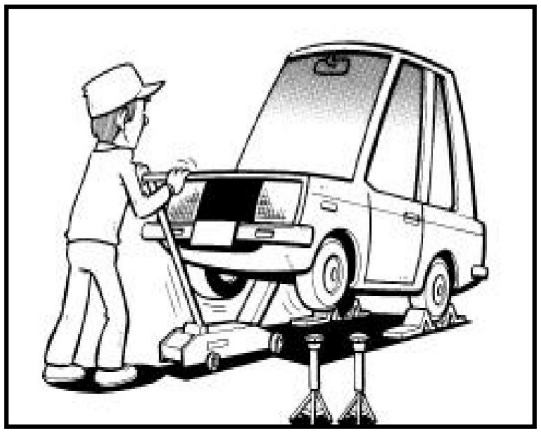
1. **Warning:** To avoid increasing risks of injury or death in a vehicle collision caused by SRS faults, all maintenance operations shall be conducted in the authorised service centre of Dongfeng Forthing Jingyi Exclusive Shop.
2. **Warning:** Improper maintenance, including improper disassembling and assembling of the SRS, may cause unexpected operation of the system, resulting in personal injury or death. For the removal method of the spiral cable and the SRS module, please see the relevant section.
3. **Warning:** Do not use electrical test equipment to test any circuit of the SRS except for operations described in this manual. The SRS circuit harness can be identified by a yellow and orange harness or harness connectors.

Precautions:

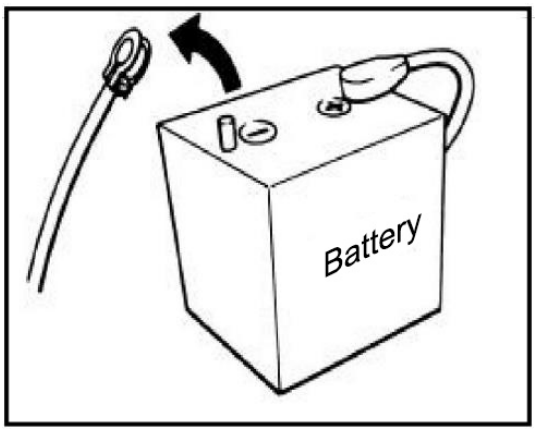
1. **Caution:** If there is no proper exhaust ventilation equipment, do not let the engine run for a long time. Keep the work area well ventilated and away from flammable materials. Be especially careful when handling flammable or toxic materials such as petrol, refrigerant, or natural gas. When working in a pit or other confined space, make sure the area is well ventilated before handling hazardous materials. No smoking when working on the vehicle.



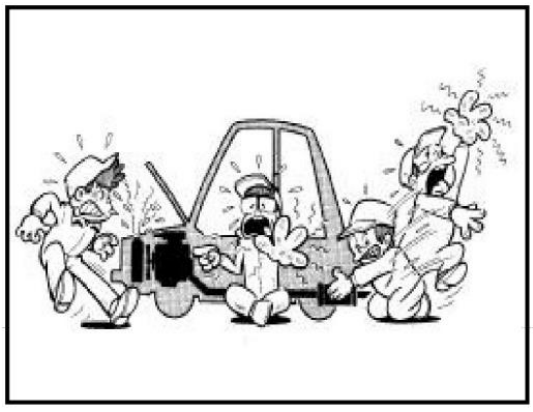
2. **Caution:**Before jacking the vehicle, place wheel pads or other tyre stopper blocks under the wheels to prevent the vehicle from moving. After the vehicle is lifted, use secure brackets to support the vehicle at the specified lifting points before starting work. This operation shall be carried out on level ground.



3. **Caution:** When removing heavy parts and components such as the engine or transmission, make sure not to shift the balance and cause them to fall. At the same time, exercise caution to prevent them from coming into contact with nearby parts, especially brake pipe and master cylinder.
4. **Caution:** Before starting any repair work that does not require power supply, turn off the ignition switch. Disconnect the battery negative cable.
5. **Caution:** After the battery negative terminal is disconnected, the memory stored in the radio and other control devices will be cleared.



6. **Caution:** To prevent burns, avoid touching hot metal parts. When the engine is hot, do not remove the radiator cap.



7. **Caution:** Treat discharged engine oil or solvent for cleaning parts and components by using a suitable method.
8. **Caution:** Do not try to add more fuel after the nozzle automatically shuts off. Continuing to add fuel will cause overflow, resulting in fuel splash and possible fire.
9. **Caution:** Before checking and assembling, clean the removed parts and components with specified liquid or solvent.

10. **Caution:** Replace oil seals, gaskets, packing, O-rings, lock washers, cotter pins, self-locking nuts, and other parts with new ones.

11. **Caution:** Replace the inner and outer rings of tapered roller bearings and needle bearings together as a whole.

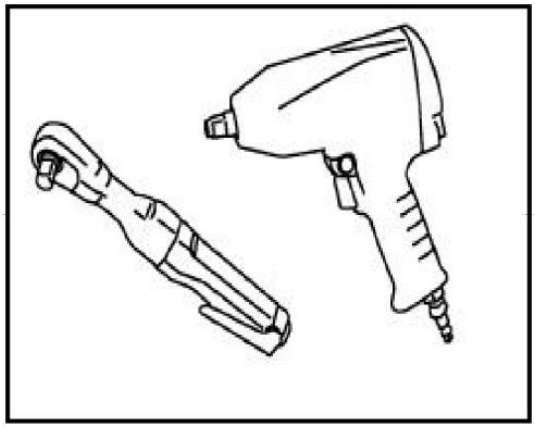
12. **Caution:** Place the removed parts in their original assembly positions and order.

13. **Caution:** Do not touch the ports of electronic components using a microcomputer (such as ECM) with your hands. Static electricity may damage the internal electronic components.

14. **Caution:** After disconnecting vacuum or air pipes, attach labels indicating their correct connection method.

15. **Caution:** Use only the oil/fluid and lubricant recommended in this manual. Use approved adhesive, sealant, or equivalent product when necessary.

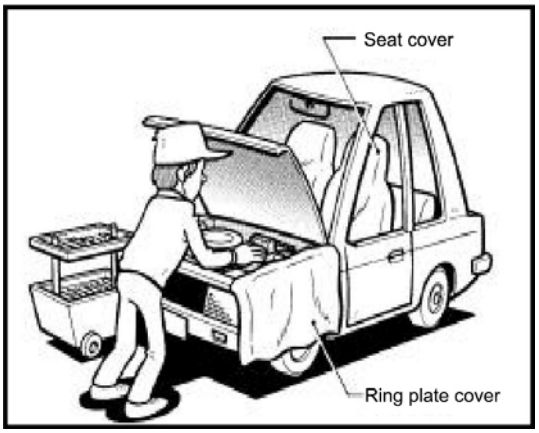
16. **Caution:** To safely and efficiently carry out repair work, use manual tools, electric tools (for disassembling only) and special tools properly.



17. **Caution:** When the repair work carried out involves fuel, oil, water, vacuum, or exhaust system, check all relevant lines for leakage.

Before repairing the vehicle

Place suitable covers over the fender, trim and carpet. Exercise caution not to scratch the paintwork with keys, buttons, or similar objects.



Warning: To prevent the ECU from wrongly storing DTCs, do not disconnect harness connectors related to the engine control system unless necessary. Only unplug these connectors as directed by the engine control fault diagnosis flowchart.

Precautions for three-way catalytic converter

If a large amount of unburned fuel enters the three-way catalytic converter, its temperature will rise sharply. To prevent this from happening, follow the instructions below:

1. Use unleaded petrol only. Leaded petrol will seriously damage the three-way catalyst.
2. Conduct a spark plug test or measure the cylinder pressure in really necessary conditions only and complete the test or measurement quickly.
3. Do not run the engine when the fuel level in the fuel tank is very low. Otherwise, the engine may stall, causing damage to the three-way catalyst.

Never park the vehicle on flammables. Keep flammables away from exhaust pipes and the three-way catalytic converter.

Precautions for fuel

Use unleaded petrol with an octane rating of #92 or higher.

Caution: Do not use leaded petrol. The use of leaded petrol will damage the three-way catalytic converter. Using fuels other than the specified type can damage emission control equipment and systems, and may also void the warranty.

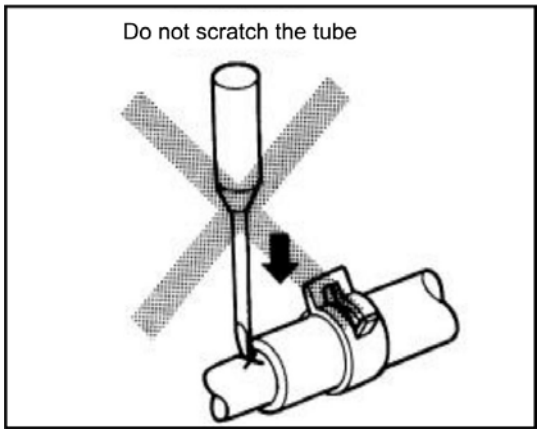
Precautions for multi-point fuel injection system or engine control system

1. **Caution:** Before connecting and disconnecting the harness connector of multi-point fuel injection system or ECM: turn the ignition switch to "OFF" position and disconnect the negative terminal of battery. Otherwise, the ECM may be damaged.
2. **Caution:** Before disconnecting the high-pressure fuel pipeline between the fuel pump and the fuel spray nozzle, be sure to release the fuel pressure.
3. **Caution:** Take care not to vibrate the ECM, mass air flow sensor and similar parts and components.

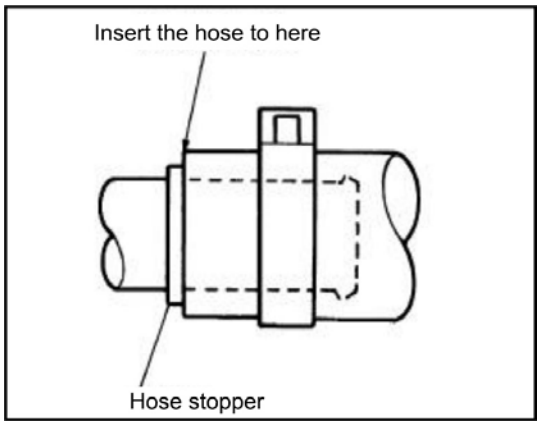
Precautions for hose

1. Removal and installation of hoses

1. To prevent damage to the rubber hose, do not pry the rubber hose with a pointed tool or screwdriver.

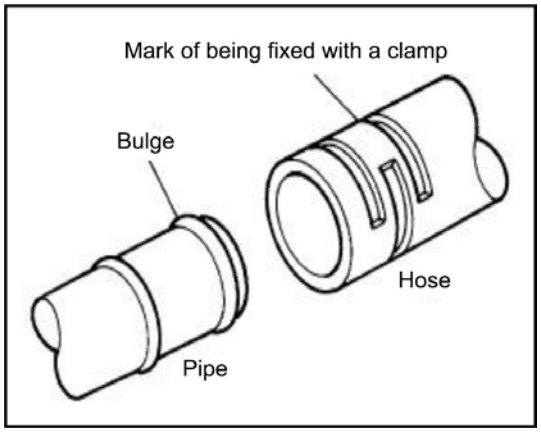


2. To securely fix the hose, make sure that the hose insertion length is sufficient and the clamping position is correct (If the metal pipe has a hose stopper, the hose should be inserted to the hose stopper).



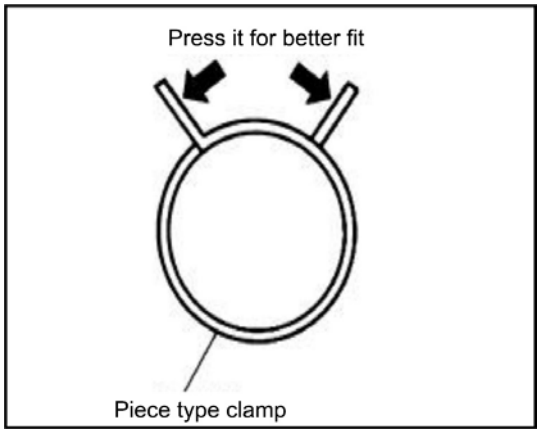
2. Hose clamp.

1. If the old rubber hose is to be reused, install the clamp in its original position (at the original clamp indentation mark). If there is a trace of metal pipe protrusion on the rubber hose, align the rubber hose with that position.



2. Discard the old clamp; use a new clamp.

3. After installing the spring piece type clamp, evenly press the rubber hose by exerting force in the directions shown in the figure.



Precautions for engine oil

Prolonged and repeated contact with used engine oil may cause skin cancer. Therefore, direct contact between used engine oil and skin shall be avoided. If such contact occurs, remove the engine oil thoroughly with soap or detergent as soon as possible.

Precautions for health protection

1. **Caution:** Avoid prolonged and repeated contact with engine oil, particularly used oil.
2. **Caution:** Wear protective uniform and if conditions permit, isolation gloves.
3. **Caution:** Do not put oily rags in your pockets.
4. **Caution:** Do not allow clothes, especially underwear, to be contaminated by engine oil.
5. **Caution:** Do not wear particularly dirty clothes and oily shoes. The entire set of work clothes should be cleaned regularly.
6. **Caution:** For skin trauma and other physical injuries, immediate emergency care should be available.
7. **Caution:** Before starting work, apply isolation skin cream on the skin to clean oil stains.
8. **Caution:** Wash with soap and water, making sure all oil is removed (skin cream and nail brush will help). Use lanolin to replace the oil of natural skin that is washed off.
9. **Caution:** Do not use petrol, kerosene, diesel, gas oil, thinners or solvents to clean your skin.

10. **Caution:** If skin discomfort occurs, take medical measures immediately.

11. **Caution:** If feasible, remove oil stains before using parts and components.

12. **Caution:** If a danger of ingress to eyes exists, wear goggles or a face mask; in addition, provide eye wash facilities.

Precautions for environmental protection

Waste oil and oil filters should be handed over to officially approved waste disposers and sent to designated waste disposal sites, or to waste oil recycling companies. If you have any questions about waste disposal, contact the local authorities. It is illegal to pour used engine oil on the ground, into sewers, drains or water sources. Laws and regulations on pollution vary with the region.

Precautions for A/C

When the refrigerant in the A/C system needs to be discharged, use the specified refrigerant recovery equipment. For detailed instructions, see the A/C section.

1.2 How to use this manual

Terms

1. The "warning" and "caution" sections are used to remind you of the steps you must follow to avoid personal injury and/or damage to vehicle parts and components.
2. The "warning" indicates an emergency that may result in personal injury if the instructions are not followed.
3. The "cautions" indicate an emergency which may result in damage to parts and components if the instructions are not followed.
4. In addition to "warnings" and "cautions", the texts in bold letters also provide useful information.
5. Standard value: an acceptable value in check and adjustment.
6. Limit value: a maximum or minimum limit that shall not be exceeded in check and adjustment.

Unit

1. This manual mainly uses SI UNIT (International System of Units) for units of measurement. "Example": sleeve lock nut: 59-78 N · m.

Table of Contents

1. The "Contents" is provided on the first page of each section.
2. Titles are provided in the upper parts and components of each page, indicating the part or component or system involved in that page.
3. Each section is marked with a page number.
4. A small illustration shows inspection, use of special tools, operative skills and implicit or complex steps that are not shown in a previous large figure.

How to carry out fault diagnosis in steps:

Caution:

Each fault diagnosis section provides operation steps necessary for carrying out effective fault diagnosis. Read the following instructions before diagnosis:

1. After repair, recheck if the fault has been thoroughly removed.
2. To determine parts and components and harness connectors and their positions, please refer to the description of these parts and components and harness connectors and their positions of the system provided in that section.

3. If a more detailed inspection of conduction between harness connectors is to be performed (for example, where any branch harness is available), please refer to the circuit diagrams and harness layout plans in each section to identify the harness connectors.

4. Before checking the circuit conductivity, make sure that the ignition switch is in the OFF position.

5. Before checking the voltage of a connector, check the battery voltage first.

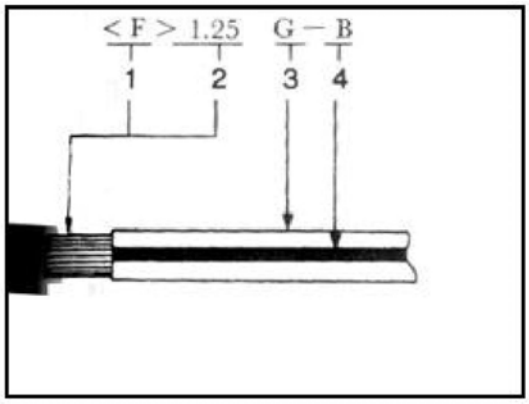
6. After completing the diagnosis steps and inspection of electrical components, make sure that all harness connectors have been re-connected according to their original conditions.

Harness wire colour representation method

Wire colours are identified via the following codes:

Code	Wire colour	Code	Wire colour
B	Black	P	Pink
Br	Brown	R	Red
G	Green	W	White
Gr	Grey	L	Blue
Lg	Light green	V	Purple
O	Orange	Y	Yellow

If the cable has two colours, the first character in the codes of these two colours represents the basic colour (that of the cable coating) and the second character represents the marker colour.



S/N	Meaning
1	<F>: flexible wire
	<T>: stranded wire
2	Size (mm^2)
3	Basic colour
4	Marker colour

Remarks

1. The wire for which the code is not specified is of a cross section of 0.5mm^2.

2. The cable colour code in the bracket indicates that its cross section is 0.3mm^2.

How to read circuit diagram

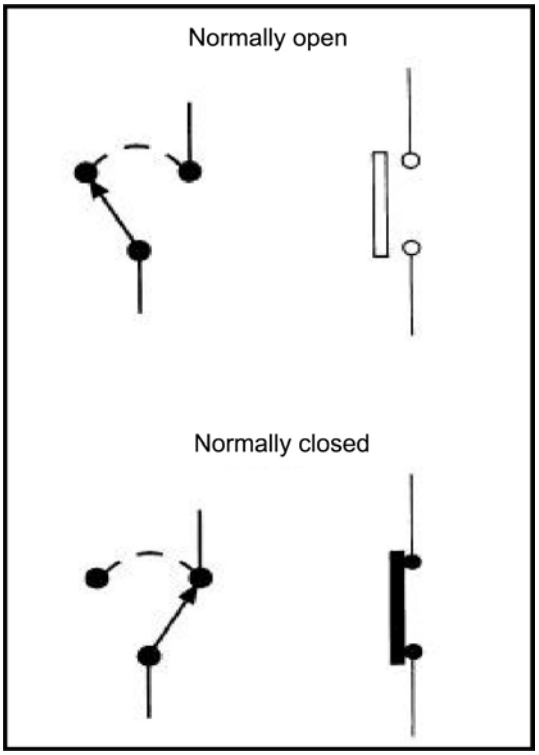
Connector symbols

Most connector symbols in the circuit diagrams are shown in the view from the port side.

1. A connector symbol shown in a view from the port side is represented by single-line box and direction mark.

2. A connector symbol shown in a view from the harness side is represented by double-line box and direction mark.

3. Some systems and elements, especially those related to OBD, may use a switch position.



The switch position shown in a circuit diagram is the condition when a vehicle is in the "normal " state. The "normal " state of a vehicle requires that:

1. The ignition switch is in the "OFF " position.

2. The doors, engine bonnet and boot lid are closed.

3. No pedal is depressed.

4. The parking brake is released.

Multi-way switch

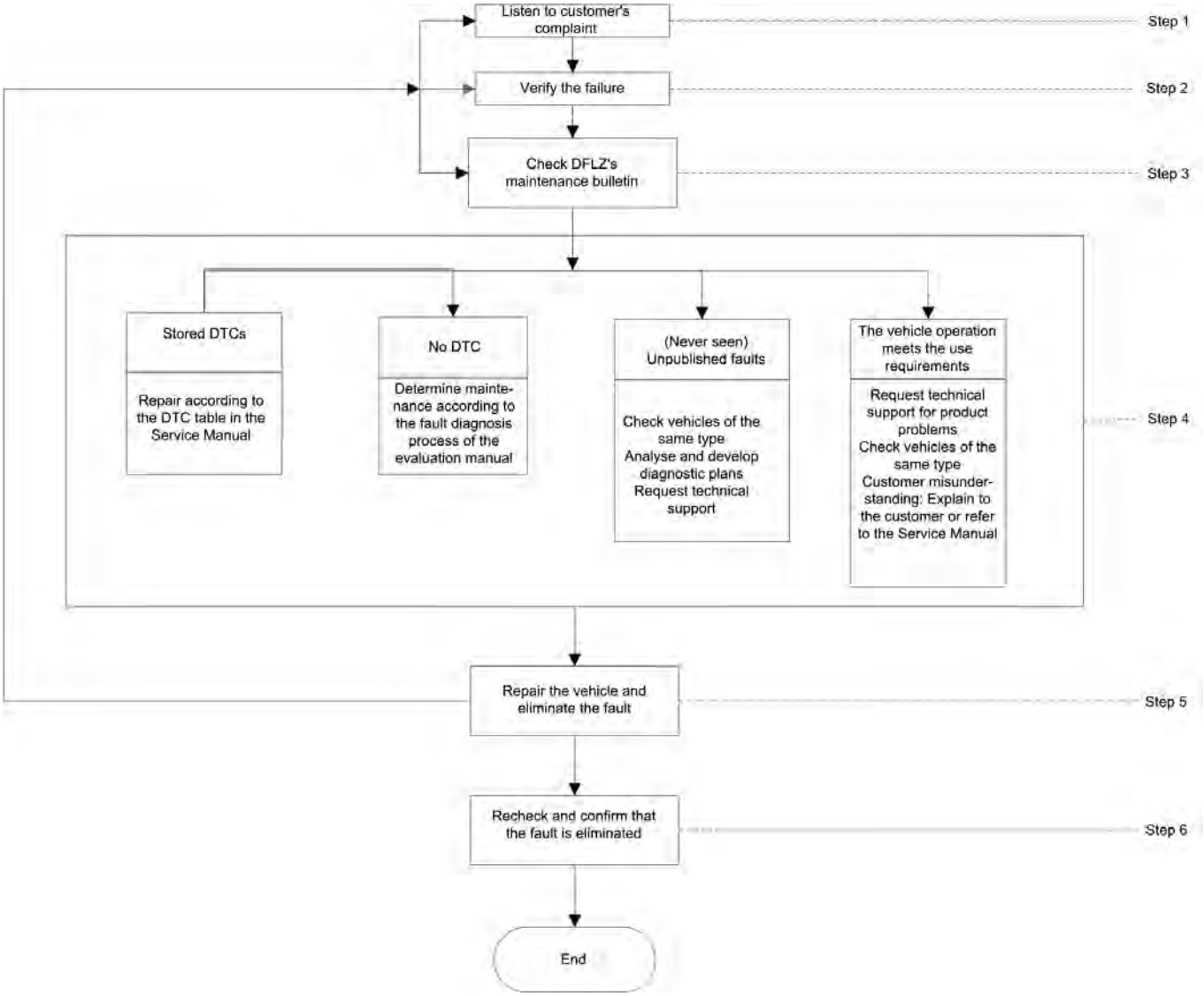
The continuity of a multi-way switch can be represented in the following two manners.

1. A switching table used in a schematic diagram.

2. A switching chart used in a circuit diagram.

1.3 Fault Repair Information

Diagnostic procedure



Steps	Description	
Step 1	Get detailed information about the relevant situation and environmental conditions when the fault occurs. The following key information helps to make a correct analysis:	
	What	Vehicle type, engine, transmission/ transaxle and systems (e.g. radio).
	When	Date, time, weather conditions and frequency of occurrence.
	Where	Road conditions, altitude and traffic conditions.
	How	System symptoms and operation conditions (impacts of other components). Service history and whether other accessories have been installed after sale.

Step 2	Run the system, and carry out a road test if necessary. Identify the fault parameters. If the fault does not recur, please refer to the "fault simulation test ".
Step 3	If DFLZ after-sales releases repair guidelines for related faults, follow the guidelines to repair and eliminate them.
Step 4	Diagnose according to the form of the fault, including: DTC detected No DTC There are corresponding parts in the service manual and evaluation manual. Determine where to start the work according to the customer's description and your knowledge.
Step 5	Check the system for tangled wires, loose joints, or damaged wires. Determine the circuits and elements involved in the fault and diagnose the fault based on the power supply circuit and harness layout plan. Repair or replace faulty circuits or elements.
Step 6	Run the system in all modes. Make sure that the system can work normally under all conditions. Ensure that there is no failure caused due to your carelessness during diagnosis or repair.

Fault simulation test

Introduction

Sometimes, when the vehicle is sent in for repairs, the fault does not appear. Therefore, it is necessary to simulate the conditions and environment in which the fault occurs. This helps avoid unnecessary fault diagnosis. The following section uses diagrams to show the conditions and environment in which an electrical fault occurs.

This part is divided into 6 subjects:

1. Vehicle Vibration

2. Heat sensitivity

3. Freezing

4. Immersion

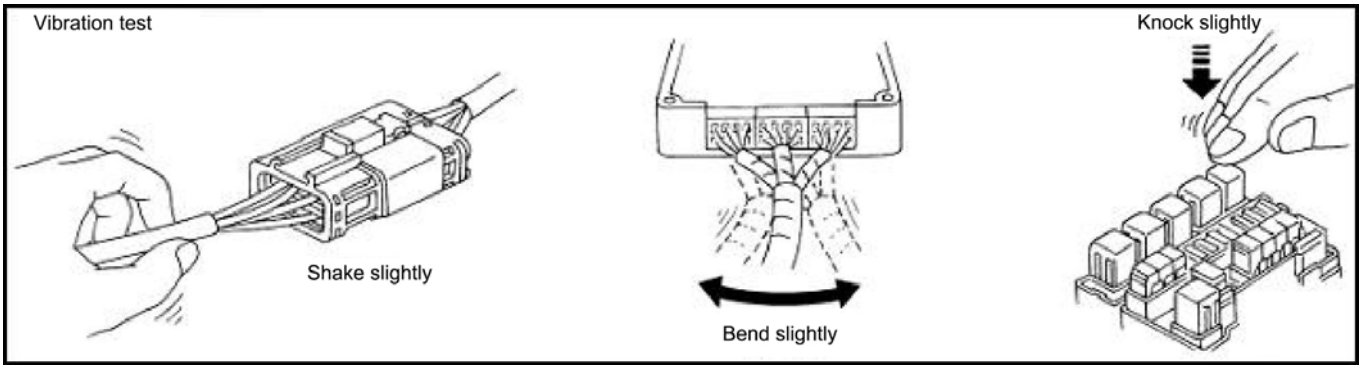
5. Electrical load

6. Cold start or hot start

Have the customer describe in detail how the incident happened. It is very important to simulate the conditions under which the fault occurs.

1. Vehicle Vibration

When the vehicle is running on a rough road or when the engine vibrates (A/C operates at idle speed), the fault may occur or the symptoms become more obvious. In this case, check for conditions related to vibration. Refer to the figure below:



Connectors and harnesses

Find out which connectors and harnesses affect the electrical system being checked. Then gently wiggle each connector and harness, and watch if the system fails again. This helps to find any loose or poor electrical connections.

Harness

Moisture exposure can cause a thin layer of corrosion on connector terminals. A fault in a connected joint cannot be detected by visual inspection. If the fault happens off and on, corrosion may be the cause. Therefore, it's best to disassemble, inspect, and clean the connectors' ports related to the system.

Sensors and relays

Gently shake the sensors and relays in the system you are checking. This can help you find if any sensor or relay is loose or not fixed properly.

Engine compartment

There are several reasons for electrical issues caused by vehicle or engine vibration. The following are some issues that should be checked:

1. The connector is not fully in place.

2. The harness length is insufficient and it will be stressed when the engine vibrates or shakes.

3. The wire contacts a bracket or moving components.

4. The ground wire is loose, dirty, or corroded.

5. The circuit is too close to the hot parts.

When checking components under the engine bonnet, start by making sure the GND wire is in good condition. First, confirm that the system is properly grounded. Then gently shake the wire or component as described above to check whether the connection is loose. Use the circuit diagram to check the continuity of the circuit.

Rear side of Instrument panel

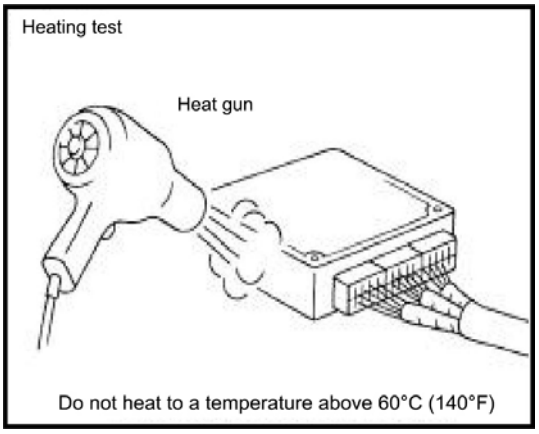
When installing accessories, incorrect wiring or an unsecured harness may be pinched. Vibration of the vehicle will damage the harnesses arranged along the bracket or close to the screws.

Underneath the seat

Loose or unsecured harnesses can cause wires to be pinched by seat components such as slide rails when the vehicle vibrates. If wires run under the seat, check whether the harness is damaged or pinched

2. Heat sensitivity

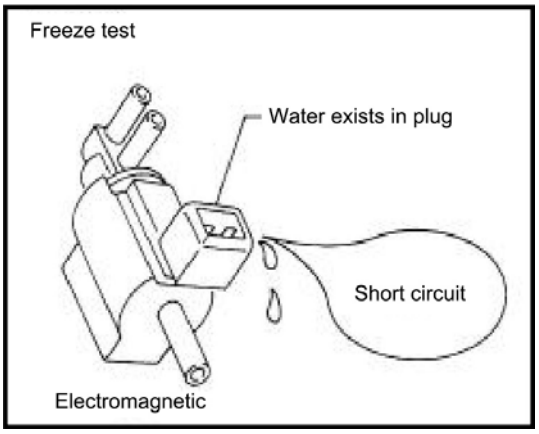
Sometimes customers experience problems in hot weather or after stopping for a short time. In this case, you should inspect the thermal sensitivity. To determine if an electrical component is thermally sensitive, use a heat gun or a similar tool to heat the component. Do not heat parts above 60 °C (140 °F). If a fault occurs while heating the unit, replace or properly isolate the element.



3. Freezing

The customer may point out that the fault disappears after warm-up (in winter). The reason for this may be related to the icing of some part of the electrical system.

There are two ways to check. The first is to leave the customer's vehicle overnight. To reproduce the fault described by the customer, make sure the ambient temperature is low enough. Park the vehicle in the open air overnight. The next morning, perform a quick and comprehensive check of the possibly affected electrical elements. The second method is to freeze the suspected parts in the freezer for a long enough time until freezing occurs. Reinstall the parts and check if the fault recurs. If any, repair or replace the parts and components.

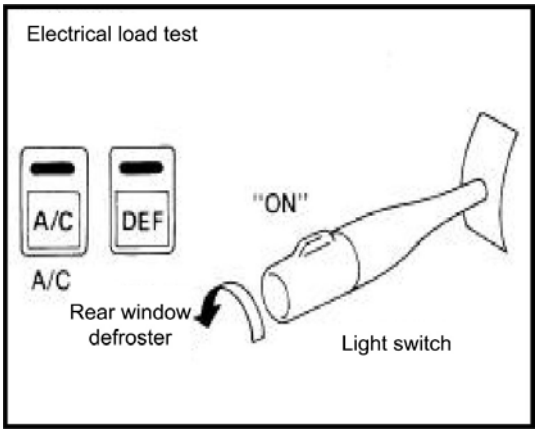


4. Immersion

The fault may only occur in high humidity or rainy and snowy weather. In this case, the fault may be caused by water intrusion into electrical elements. Fault conditions can be simulated by soaking the vehicle or driving it through a car wash.

Caution: Do not spray water on any electrical element

5. Electrical load



The fault may also be caused by the sensitivity to electrical loads. Turn on all accessories (including A/C, rear window defroster, radio, fog light, etc.) before diagnosis.

6. Cold start or hot start

In some cases, an electrical fault occurs only during the cold start of a vehicle or a hot start after the engine is stalled. In this case, leave the vehicle overnight for proper diagnosis.

Circuit inspection

Introduction

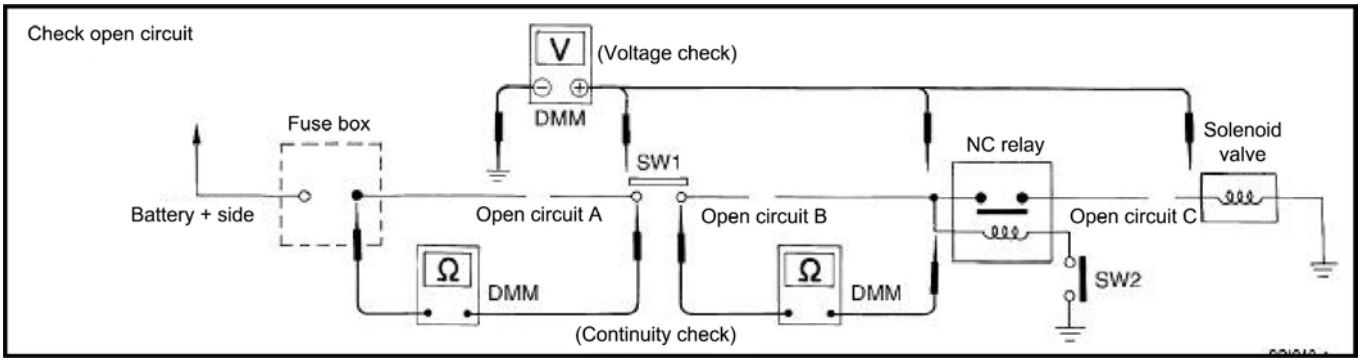
Generally, it is easy to test the circuit if it is operated in a logical and systematic way. First, you must understand all relevant information about the system being tested. Similarly, you need to fully understand how the system works. Then you will be able to choose the right equipment and follow the correct test steps.

When testing electrical components, you have to simulate vehicle vibration. When simulating vibration, the harness or electrical components should be gently shaken.

Open-circuited	When a part of the circuit is not conducting, it is open-circuited
Short-circuited	There are two forms of short circuits
	l Line short circuit: one line contacts another line and causes a change in normal resistance
	l GND short circuit: the line contacts the ground wire and makes the circuit grounded

Check "open circuit" of a line

Before diagnosing and checking a system, draw a sketch of the system. This helps to perform the diagnostic steps logically during the diagnosis process. Sketching can also improve your understanding of the system operation.



Continuity check method

The continuity inspection is used to find an open circuit in the circuit. The digital multimeter is set to the resistance range. If the reading exceeds the measuring range, it indicates an open circuit (no "beep" sound or no resistance symbol). Always start checking from the highest resistance range on the digital multimeter. To help understand the diagnosis of open circuits, please refer to the figure above.

1. Disconnect the battery negative cable.
2. Start checking from one end of the line until the other end. (Fuse device in the figure)
3. Connect one probe of a digital multimeter to the fuse port on the load side.
4. Connect the other probe to the fuse block (power supply) side of SW1. Resistance being small or zero indicates that this section of the circuit has good continuity. If the circuit is open, the digital multimeter will show "over range" or infinite resistance (point A).
5. Connect the probe between SW1 and the relay. Resistance being small or zero indicates that this section of the circuit has good continuity. If the circuit is open, the digital multimeter will show "over range" or infinite resistance (point B).
6. Connect the probe between relay and solenoid valve. Resistance being small or zero indicates that this section of the circuit has good continuity. If the circuit is open, the digital multimeter will show "over range" or infinite resistance (point C).

All circuits can be checked using the above method.

Voltage check method

To help understand the diagnosis of open circuits, please refer to the figure above.

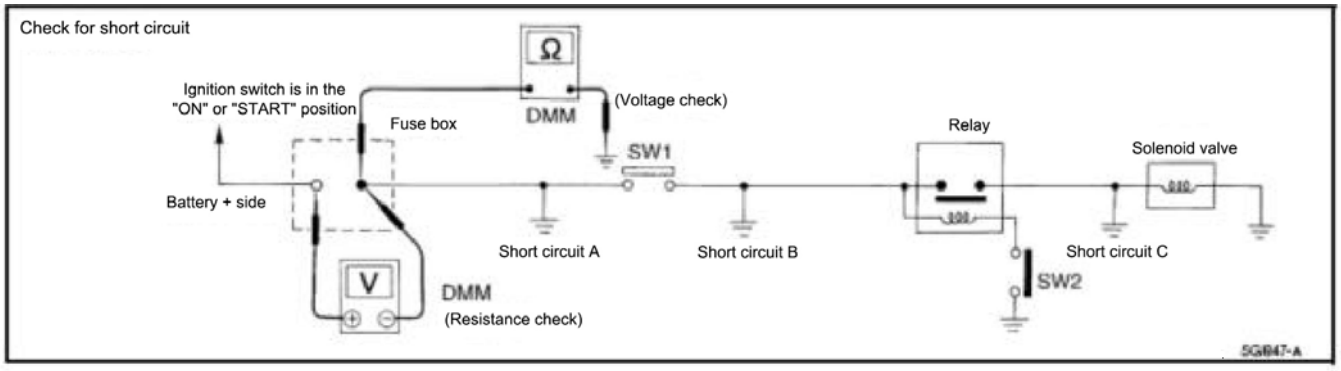
In any live line, an open circuit can be identified by methodically checking the voltage in the system. At this point, switch the digital multimeter to the voltage setting.

1. Connect one probe of the digital multimeter to a known good earth wire.
2. Check the circuit from one end to the other end.
3. Disconnect switch SW1 and measure the voltage at SW1
4. If voltage exists, the open circuit point is far behind SW1.
5. If no voltage exists, the open circuit point is between the fuse box and SW1 (Point A).
6. If no voltage exists, the short circuit point is far behind SW1.
7. Close SW1, disconnect the relay and the solenoid valve, and connect the digital multimeter probes across the fuse port to measure the voltage.
8. If voltage exists, the short circuit point is between SW1 and the relay (Point B).
9. If no voltage exists, the short circuit point is far behind the relay.
10. Close SW1 and close the relay by applying a jumper with fuse across the relay to measure voltage.
11. When there is voltage, the short circuit point is behind the relay line or between the relay and the disconnected solenoid valve (point C).
12. If no voltage exists, return to the check procedure and check the power supply of the fuse box.

All live lines can be diagnosed using the above method.

Check "short circuit" of a line

To simplify the discussion of short circuit in a system, please refer to the figure below.



Resistance check method

1. Disconnect the battery negative pole and remove the fuse that has blown.
2. Disconnect all loads powered through the fuse (disconnect SW1, relay and solenoid valve).
3. Connect one probe of the ohmmeter to the load side of the fuse port. Connect another probe to a known good earth wire.
4. Disconnect SW1 and check for continuity.
5. Continuity: the short circuit point is between the fuse and SW1 (Point A).
6. No continuity: the short circuit point is far behind SW1.
7. Close the SW1 and disconnect the relay. Place the probe between the load side of the fuse port and a known good ground. Then check for continuity.
8. Continuity: the short circuit point is between SW1 and the relay (Point B).
9. No continuity: the short circuit point is far behind the relay.
10. Close SW1 and engage the relay by using a jumper. Place the probe between the load side of the fuse port and a known good ground. Then check for continuity.

    When the circuit is conductive: the short circuit point is between the relay and the solenoid valve (point C).

    If the circuit is not conductive, check the solenoid valve and return to the check process.

Voltage check method

1. Remove the blown fuse and disconnect all loads powered through the fuse (i.e., disconnect SW1, relay and solenoid valve).
2. Turn the ignition switch to the ON or START position. Confirm that the battery positive side at the fuse port is the battery voltage (by connecting one probe to the fuse box and battery positive port side and the other probe to a known good grounding point).
3. Disconnect SW1, and apply the DMM probes across the fuse to its two ports to measure the voltage

    Voltage exists: the short circuit is between the fuse box and SW1 (point A).

    No voltage: the short circuit is further after SW1.
4. Close SW1, disconnect the relay and the solenoid valve, and connect the probes of the digital multimeter across the fuse port to both sides to measure the voltage

    When there is voltage, the short circuit point is between the SW1 and the relay (point B).

    When there is no voltage: the short circuit point is further behind the relay.
5. Close SW1 and close the relay by applying a jumper with fuse across the relay to measure voltage.

When there is voltage, the short circuit is behind the relay line or between the relay and the disconnected solenoid valve (point C).

When there is no voltage: return to the check procedures and check the fuse box Power supply.

GND inspection

1. Remove the ground wire bolts or screws.

2. Check all contact surfaces for darkening, dirt, rust, or others.

3. Clean the contact points as required and ensure good contact.

4. Reinstall the bolts or screws securely.

5. Inspect whether "additional" accessories will interfere with the GND circuit.

6. If several wires are twined on a metal ring of ground wire, check whether the wire is twisted correctly. Make sure all circuits are clean, tight, and well grounded.

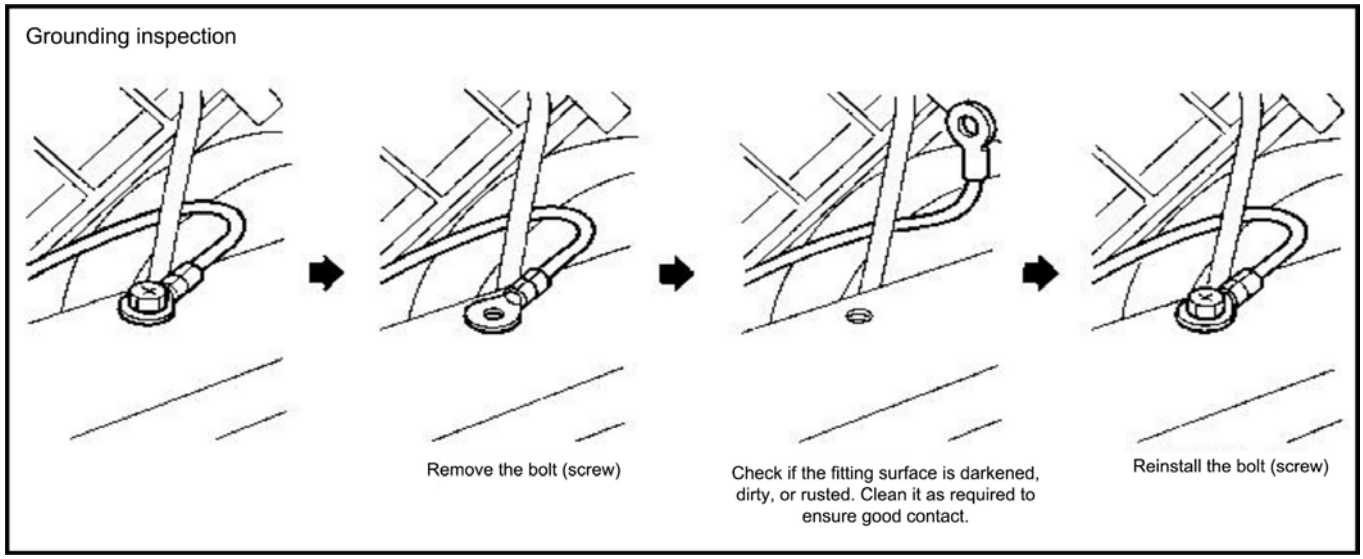
7. If multi-strand wires are installed in a GND metal ring, ensure that there is no wire with excessive insulation.

8. For details about GND distribution, please refer to the electrical repair part in this manual.

GND connections are important for the normal operation of electrical and electronic circuits. GND connections are often exposed to moisture, dirt, and other corrosive chemicals. Corroded (rusty) points will generate additional resistance. Extra resistance will affect the circuit's operation.

Electronic control circuits are very sensitive to proper GND connection. Loose or corroded GND wires can seriously affect electronic control circuits. The circuit is easily affected by poor contact or corrosion. Even if the GND wire looks clean, its surface may also have a thin layer of rust.

Inspect the ground wire connection as follows:



Voltage drop test

Voltage drop detection is often used to find parts or circuits with excessive resistance. The voltage drop in the circuit is caused by the resistance of the circuit during operation. Check the wire in the figure When the resistance is measured with an ohmmeter and a single-strand conductor is connected, the reading will be zero. This shows the circuit is normal. but a single-strand of conductor cannot carry the current of circuit during operation. A single-strand conductor will generate high resistance to current. This will generate a small voltage drop.

Many of the following conditions may generate additional resistance:

1. Too thin wire (e.g. single-strand conductor)

2. Corrosion of switch contacts

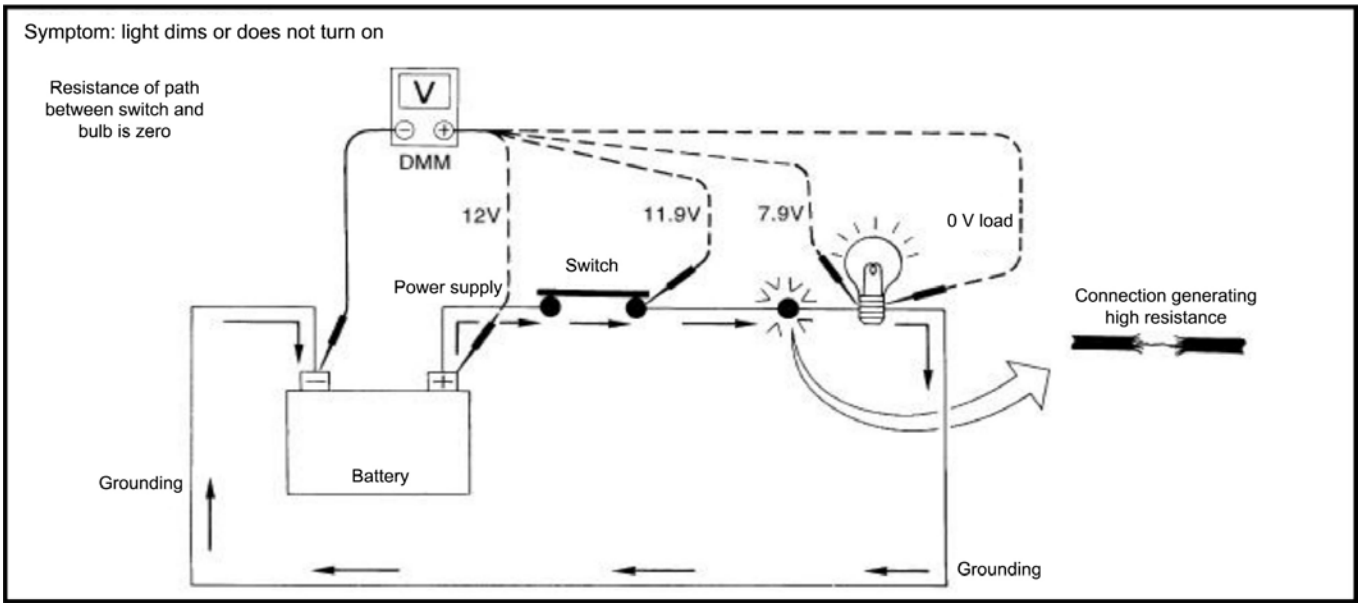
Measurement of voltage drop – accumulation method

1. Connect a voltmeter across the connector or component of the circuit to be checked. The positive pole of the voltmeter should be placed near the power supply, and the negative pole should be near the ground switch.

2. Make the circuit operate.

3. The voltmeter displays the voltage of the circuit through which current flows.

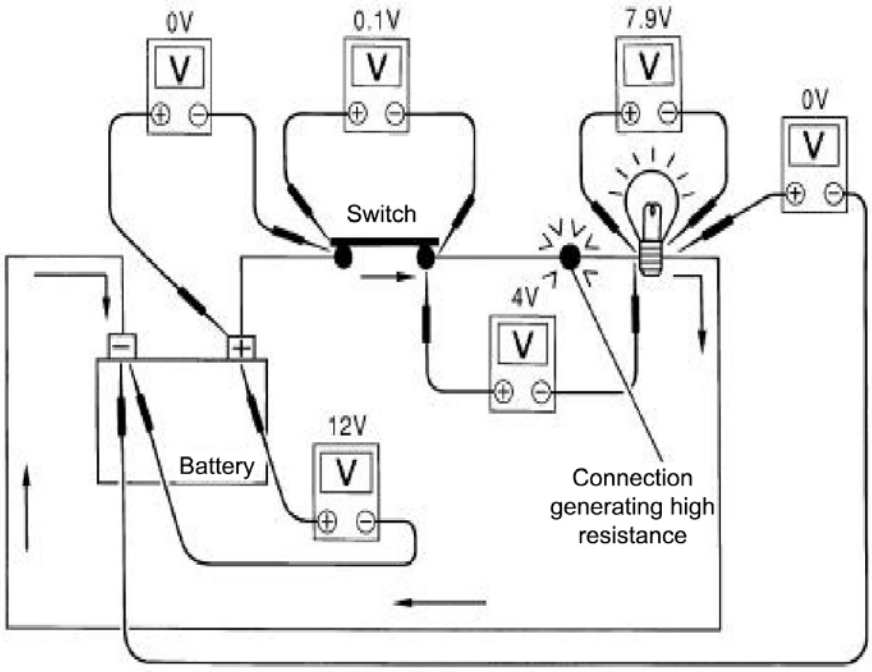
Caution: In the illustration, there is an excessive voltage drop of 4.1 V between the battery and the light.



Measurement of voltage drop - step-by-step method

The step-by-step method is the most effective way to inspect too large voltage drop in a Low-voltage/pressure system (e.g. "computer control system").

The operating current in the circuit of a "computer control system" is very low. The operation of the computer control system will be adversely affected due to any resistance change within it. Resistance changes can be caused by poor contact, incorrect installation, improper wire specifications or corrosion. By voltage drop measurement using the step-by-step method, parts and components or wires with too large resistance can be identified.



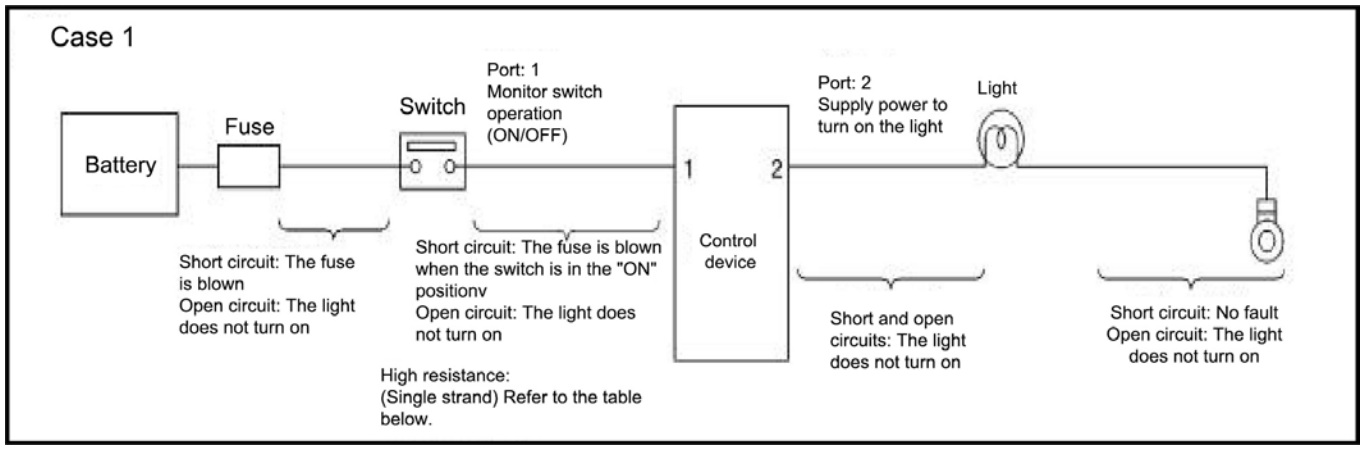
1. Connect the voltmeter as shown in the figure. Switch on the battery and operate around the circuit.
2. An abnormal voltage drop indicates that a component or wire needs to be repaired.
As illustrated above, a poor connection results in a 4V drop.

The table below lists the maximum allowable voltage drop. These values are for information only. The specific of each part or component should be determined depending on the actual condition.

Parts and components	Voltage drop
Cables	Negligible <.001 volts
Grounding connection	About 0.1 V
Switch contacts	About 0.3 V

Control unit circuit test

System description: When the switch is in the ON position, the control unit will light the bulb.

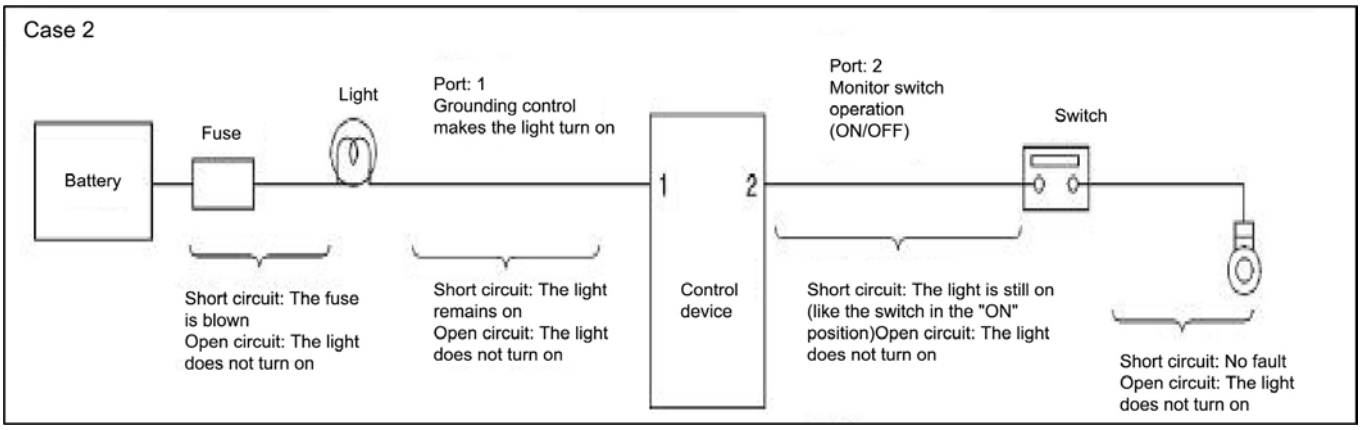


Input-output voltmeter

Pin No.	Item	Test Conditions	Voltage value <V>	For example, when a single-strand wire has high resistance [V]*
1	Switch	Switch ON	Battery voltage	Lower than the battery voltage, about 8 (for example)
		Switch OFF	About 0	About 0
2	Bulb	Switch ON	Battery voltage	About 0 (the light is not on)
		Switch OFF	About 0	About 0

The voltage value is based on the body GND.

High resistance exists in the circuit on the switch side (caused by a single wire), so at port 1, you cannot read the battery voltage. Even if the switch is in the ON (connected) position, the control unit cannot detect whether the switch is on or off. Therefore, the control unit does not supply power to the light to make it illuminate.



Input - Output Voltmeter

Pin No.	Item	Test conditions	Voltage value "**V**"	For example, when a single-strand wire has high resistance **[V]***
1	Switch	Switch ON	About 0	Battery voltage (the bulb is not on)
		Switch OFF	Battery voltage	Battery voltage
2	Bulb	Switch ON	About 0	Above 0 is about 4 (example)
		Switch OFF	About 5	About 5

The voltage value is between the item tested and body GND.

High resistance exists in the circuit on the switch side (caused by single-strand wire), and a voltage of about 0V cannot be measured at port 2. Even if the switch is in the ON (connected) position, the control unit cannot monitor whether the switch is on or off. Therefore, the control unit does not provide a GND signal to the bulb to illuminate. Control unit and electrical parts and components.

Control unit and electrical parts and components

Caution: Do not reverse the positive and negative terminals of the battery

Caution: Install only specified parts and components onto the vehicle

Caution: Before replacing the control device, check the input and output functions of the parts and components

Caution: Do not use excessive force when disconnecting the connector

Caution: If a connector is installed by fastening bolts, loosen the fixing bolts and then remove them by hand

Caution: Before installing the joint, first confirm that the port is not bent or damaged, and then install it correctly

. When installing the joint with fastening bolts, fix it with fastening mounting bolts until the protrusion of the joint is flush with the surface. Do not drop or hit the control device

Caution: Prevent condensation inside the control unit caused by rapid temperature changes. Do not allow the control unit to come into contact with water or rain. If water gets into the control unit, let it dry completely before installing it in the vehicle.

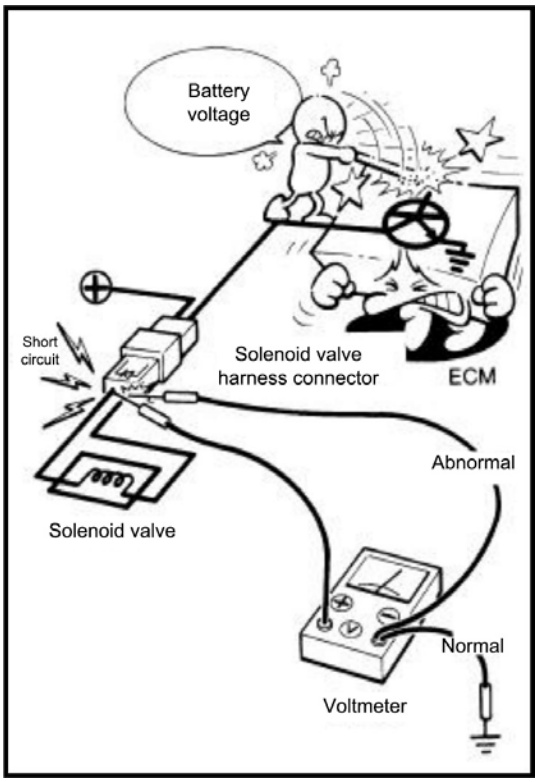
Caution: Be careful not to let engine oil stick to the control device connector

Caution: Do not use volatile oil to clean the control device

Caution: Do not disassemble the control device and remove the upper and lower covers

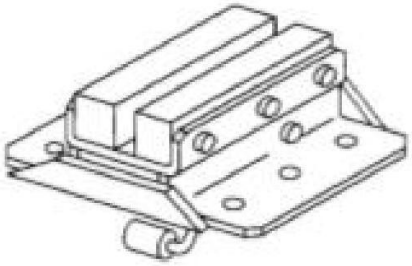
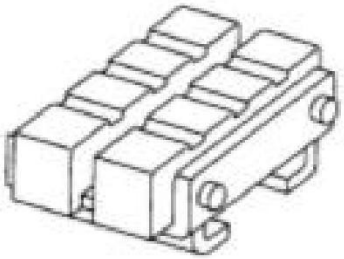
Caution: When using a digital multimeter, be careful not to let the test probes get close to each other to avoid a battery short circuit and damage to the power transistor in the control unit.

When checking the input and output signals of the control device, please use the specified inspection connector



1.4 Lifting Point

Repair tools

Tool name	Description
Supporting plate lifter accessory	
Safety bracket accessory	

1. **Caution:** Be sure to confirm that the vehicle is empty when lifting.
2. **Caution:** Because the gravity centre of a vehicle changes as main components (engine, transmission, suspension, etc.) in the front part of the vehicle are removed, use a lifter or equivalent tool to support the fulcrum of the workshop lifter at the rear.
3. **Caution:** Because the centre of gravity of the vehicle changes as the main components (rear axle, suspension, etc.) in the rear part of the vehicle are removed, use a lifter or equivalent tool to support the fulcrum of the workshop lifter at the front.
4. **Caution:** Be careful not to collide with the circuit or perform any operation that may affect the pipeline.

Workshop jacks and safety bracket

1. **Warning:** When using a lifter, park the vehicle on level ground. Make sure that the pipelines and pipes under the vehicle will not be damaged.
2. **Warning:** When the vehicle is supported by a jack only, do not crawl under the vehicle. When crawling under the vehicle is a must, use a secure bracket to support the vehicle.
3. **Warning:** Place wheel cushion blocks in front of and behind the grounded wheels.

Two-post lift

1. **Warning:** When lifting a vehicle, spread the lifting arms as much as possible to balance the vehicle in terms of its front and rear ends.
2. **Warning:** When placing the lifting arms, do not allow them to contact the brake pipeline, brake cable, fuel pipeline, and side beam spoiler.

Pallet lift

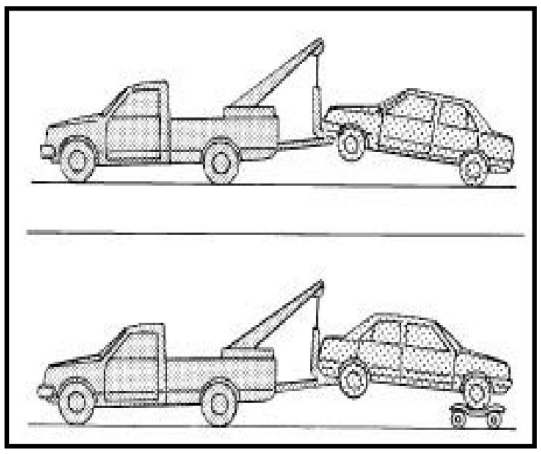
1. **Caution:**Be sure to confirm that the vehicle is empty before lifting.
2. **Caution:**Place the pallet lift accessory at the front of the vehicle at the front of the side beam under the front door.
3. **Caution:** Place the accessory at the front and rear ends of the pallet lift.

Trailer Towing

1. **Caution:** Be sure to comply with all local laws applicable to towing operations.

2. **Caution:** Always use the proper towing device during towing to prevent vehicle damage. The towing work must comply with the provisions of the dealer's towing procedure manual.

3. **Caution:** When towing with the front wheels off the ground, there is no limit on speed or distance, as shown in the figure.



1.5 Lifting the vehicle

Rear wheel

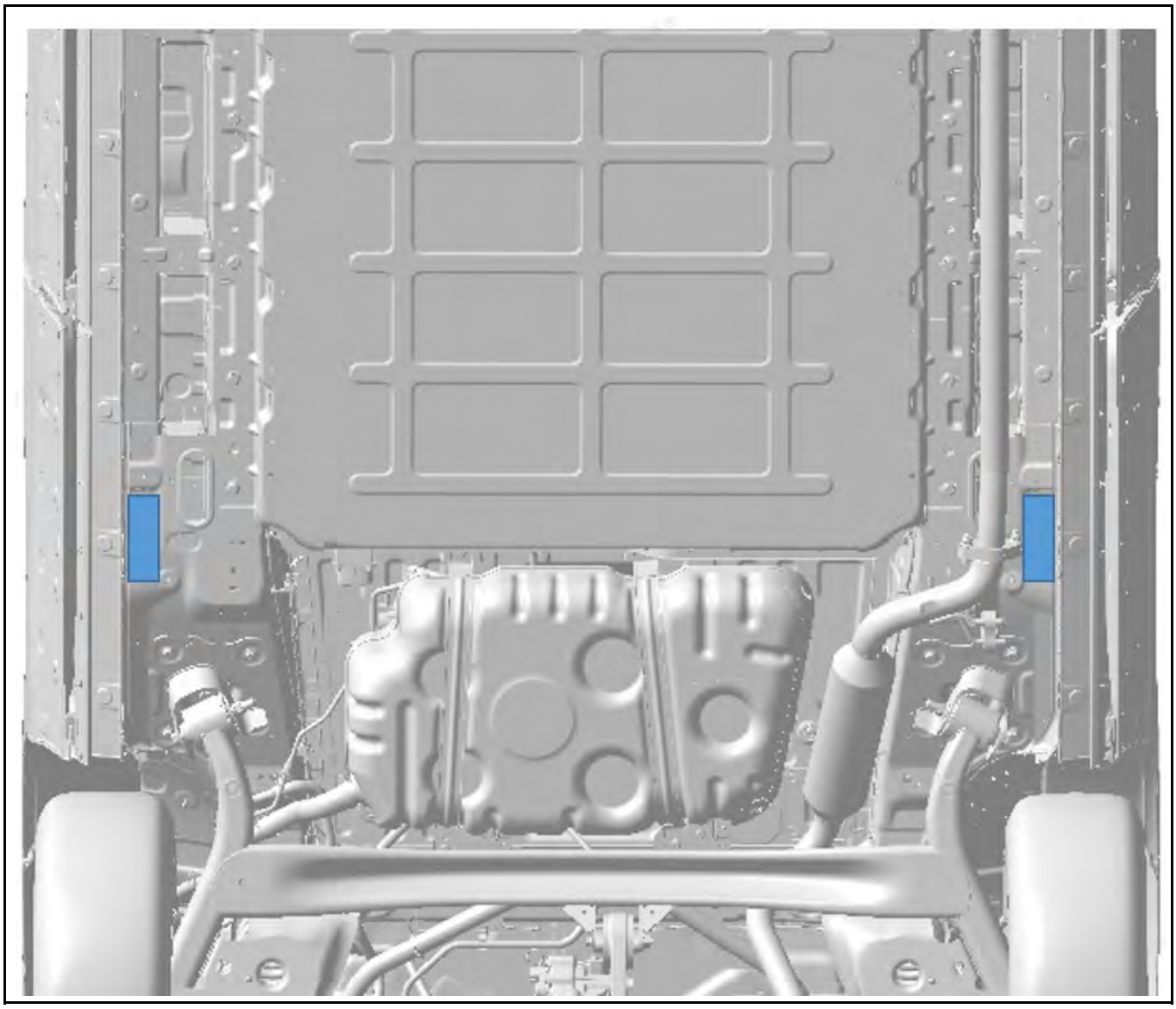
Warning: Place the vehicle on a hard surface. If the vehicle must perform jacking operations on a soft surface, load distribution cushion blocks should be use d under the jack. A wedge shall be provided on the outside of the wheel opposite to the lifting point. Failure to follow this warning may cause personal injury.

Caution: It is very important to use the correct jack at the appropriate support points.

Caution: When jacking the vehicle, refer to the user manual for correct operation guidance.

Caution: When lifting the vehicle, the lifting point should not be in the middle of the rear axle housing; otherwise, it will cause component damage.

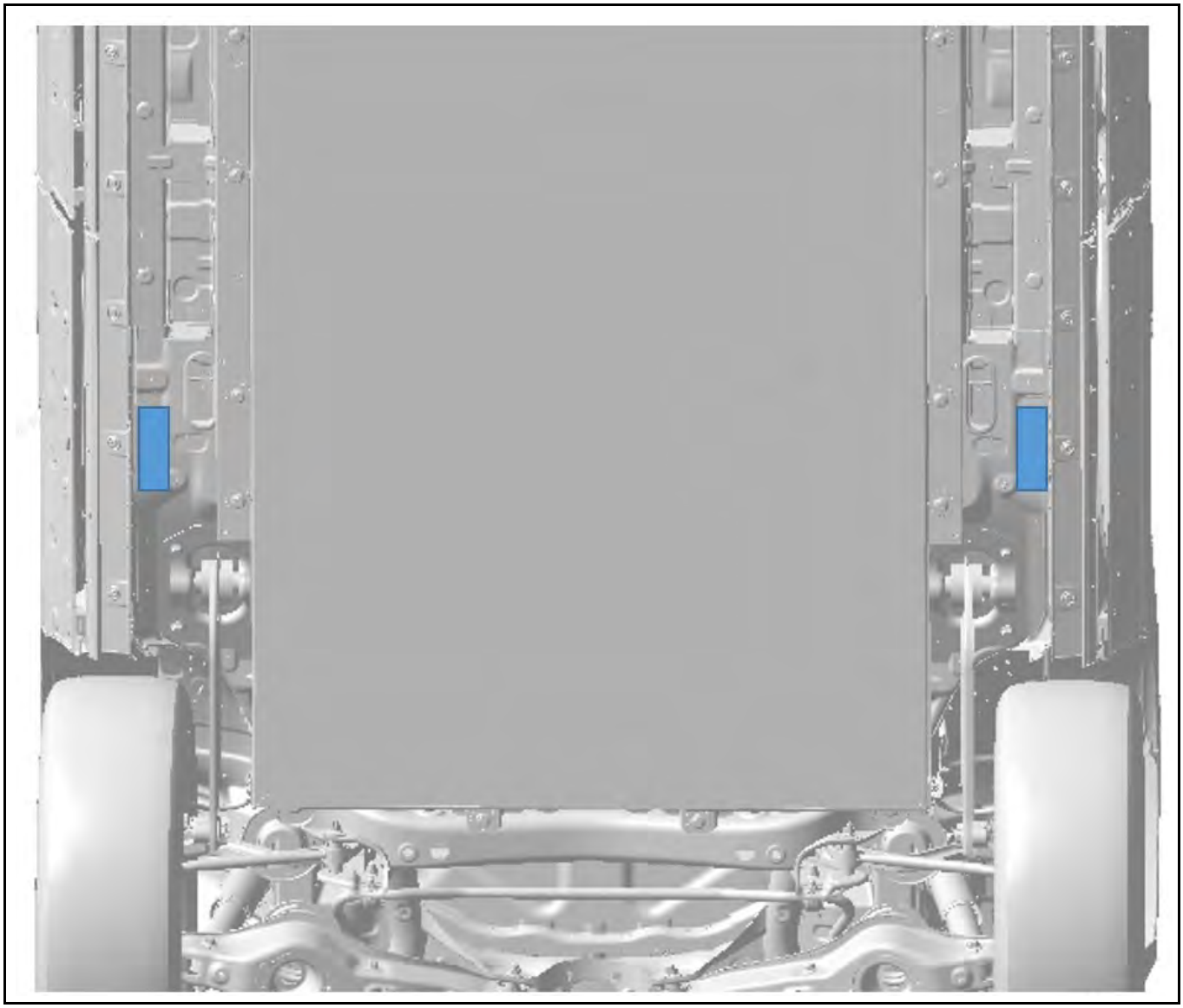
Caution: Use the correct lifting and support position at all times.



Front wheel

Caution: It is very important to use the correct jack at the appropriate support points.

Caution: When jacking the vehicle, refer to the user manual for correct operation guidance.



1.6 Tightening Torques for Standard Bolts

Tightening torque table

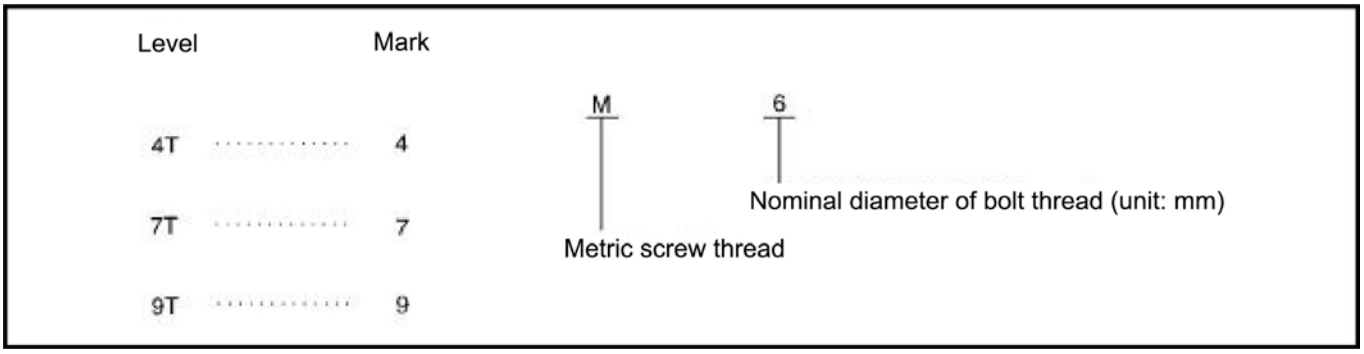
Level	Bolt specification	Bolt Diameter (mm)	Thread pitch, mm	Tightening torque (no lubricant)	
				Hexagon head bolt	Hexagon flange bolt
				N·m	N·m
4T	M6	6.0	1.0	5.5	7
	M8	8.0	1.25	13.5	17
			1.0	13.8	17
	M10	10.0	1.5	28	35
			1.25	28	35
	M12	12.0	1.75	45	55

Level	Bolt specification	Bolt Diameter (mm)	Thread pitch, mm	Tightening torque (no lubricant)	
				Hexagon head bolt	Hexagon flange bolt
				N·m	N·m
			1.25	45	65
	M14	14.0	1.5	80	100
7T	M6	6.0	1.0	9	11
	M8	8.0	1.25	22	28
			1.0	22	28
	M10	10.0	1.5	45	55
			1.25	45	55
	M12	12.0	1.75	90	100
	M14	14.0	1.25	90	100
			1.5	190	170
9T	M6	6．0	1.0	11	13.5
	M8	8.0	1.25	28	35
			1.0	28	35
	M10	10.0	1.5	55	80
			1.25	55	80
	M12	12.0	1.75	100	130
			1.25	100	130
	M14	14.0	1.5	170	210

Note:

1. Special parts are not included.

2. These criteria are also applicable to bolts whose heads are engraved with the following marks.



1.7 Identification Information

Vehicle's factory nameplate

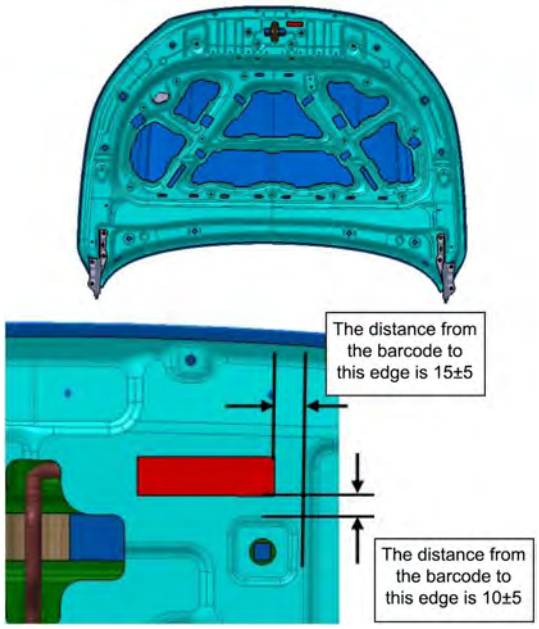
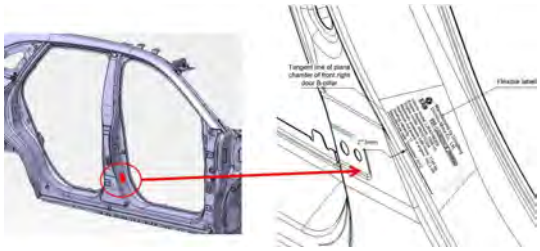
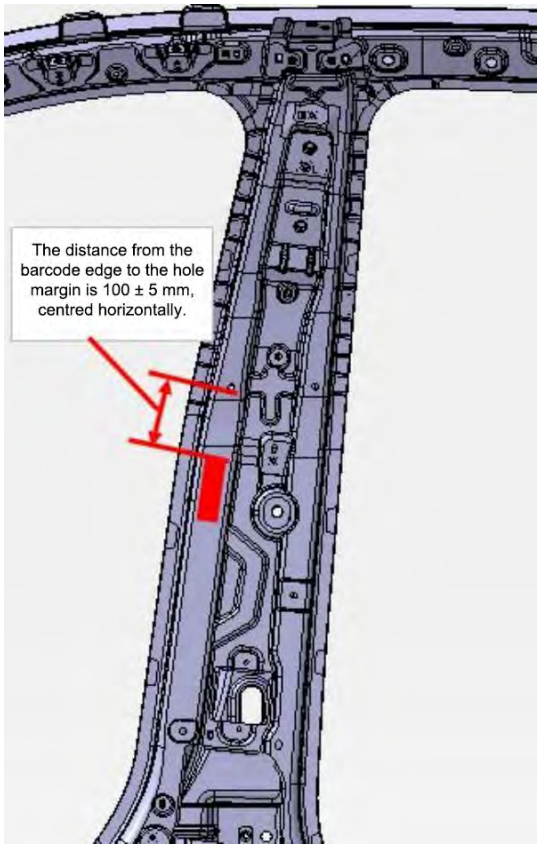
The vehicle's factory nameplate is at the lower external surface of the middle column at the right side of the vehicle body.

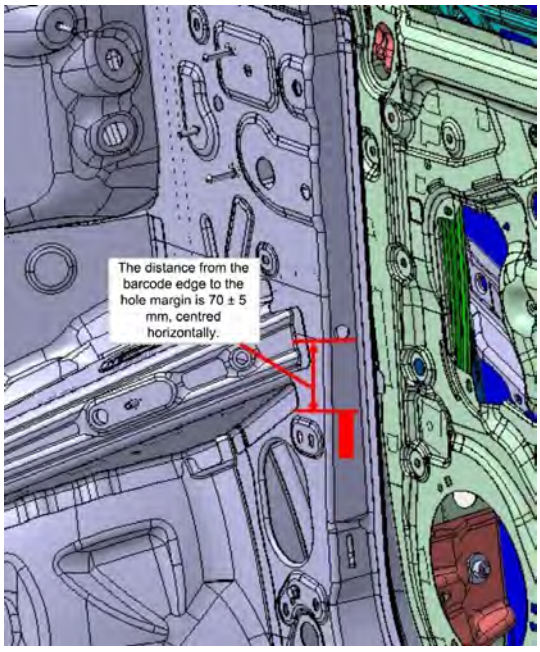
VIN

The VIN is engraved on the body crossmember under the front passenger seat and can be seen by lifting the carpet opening.

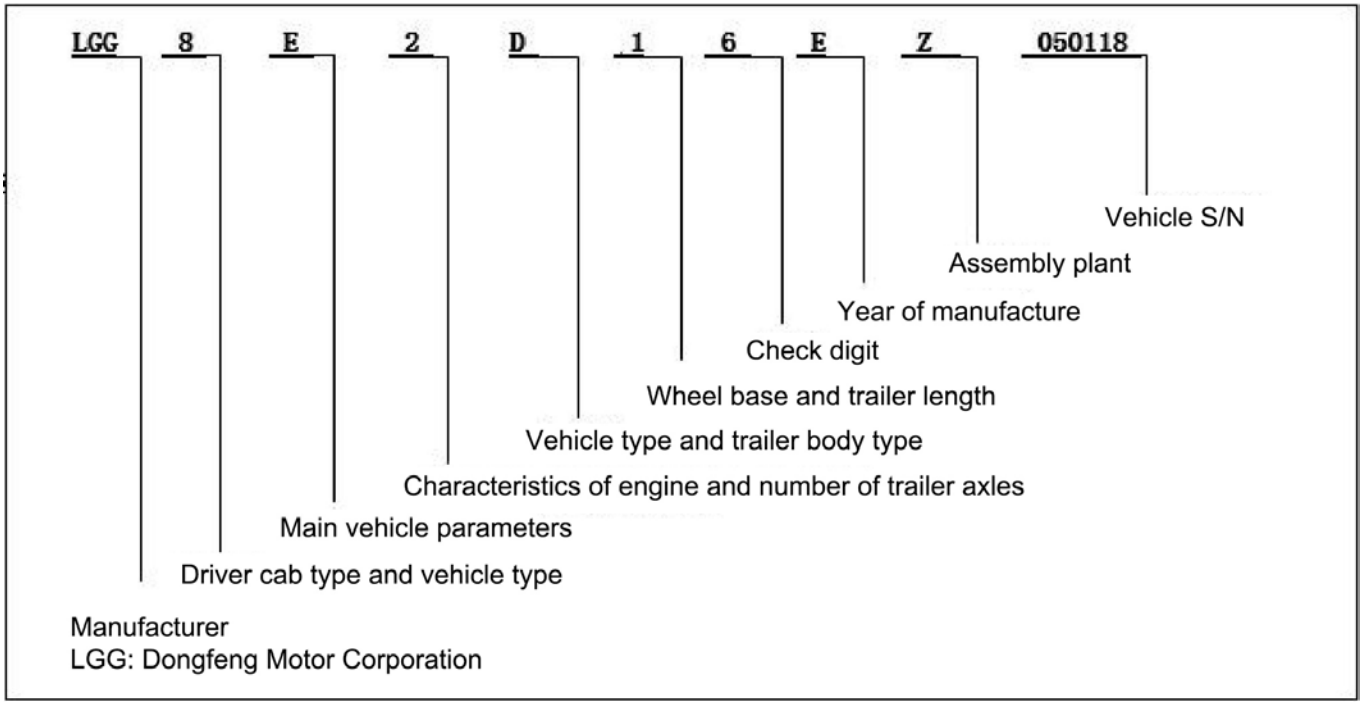
It is pasted on the dashboard body assembly.

Identification number

Position	Illustration
Location of VIN label on the inner panel of the bonnet	
Location of VIN label on the inner side of the right B-pillar surface	
Location of VIN label on the inner panel of the B-pillar	

Position	Illustration
Location of VIN label in the middle of the inner panel of the A-pillar of the front right wall	
VIN code pasting position of the right hinge of the boot lid	

Encoding of vehicle identification number

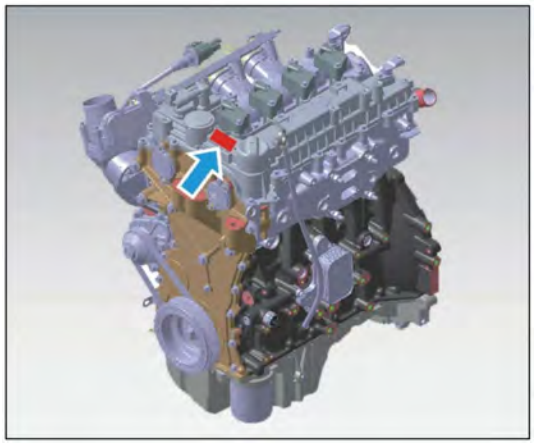


Location of engine model and number

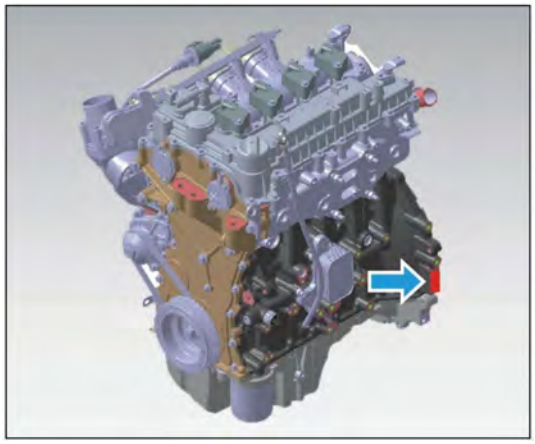
4F15N engine number engraving position

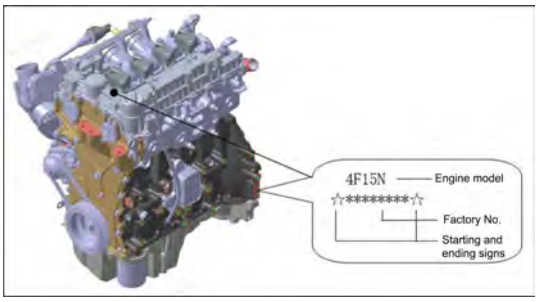
The engine model and serial number are printed on the engine block, with a permanent label affixed to the cylinder head cover.

Label position



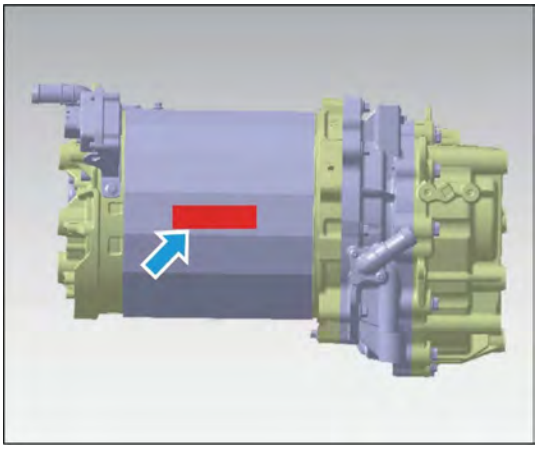
Engraving position





Drive motor information

The drive motor steel code is located in the middle of the rear part of the motor housing.



Main dimension parameters of vehicle

Item	Unit	Luxury model
Vehicle length	mm	4600
Vehicle width	mm	1860
Vehicle height	mm	1700
Front wheel track	mm	1590
Rear wheel track	mm	1595
Wheelbase	mm	2715

Vehicle mass parameters

Item	Unit	Luxury model
Kerb mass	Kg	1810
Front axle kerb mass	Kg	985
Rear axle kerb mass	Kg	825
Maximum mass	Kg	2185
Maximum mass of front axle	Kg	1108
Maximum mass of rear axle	Kg	1077
Number of passengers	Person	5

Range extender parameters

Item	Unit	Parameter
Range extender model	-	4F15N
Type	-	In-line four-cylinder
Displacement	L	1.5
Cylinder diameter × stroke	mm	72×92
Compression ratio	-	14.5
Rated power	kW/rpm	75/6000
Maximum net power	kW/rpm	72/6000
Maximum net torque	N · m/rpm	125/4000

Item	Unit	Parameter
Ignition order	-	1-3-4-2
Overall emission level	-	Euro VI

Drive motor parameters

Item	Unit	Parameter
Model of drive motor	-	TZ180XSE21
Type	-	Permanent magnet synchronous motor
Rated power	kW	55
Peak power	kW	120
Rated speed	rpm	5029
Maximum rotation speed	rpm	16000
Rated torque	N · m	105
Maximum torque	N · m	240
IP rating	-	IP67

Power battery parameters

Item		Parameter
Power battery model		TP Li 31.9-307
Power battery type		Lithium iron phosphate battery
Battery cell information	Rated voltage (V)	3.2
	Rated capacity (Ah)	104
Power battery information	Voltage (V)	307
	Capacity (Ah)	104
	Power battery pack mass (kg)	266
	IP rating	IP67
	Number of power battery packs	1

Main assembly parameters of chassis

Item		Parameter
Suspension system	Front suspension	MacPherson independent suspension
	Rear suspension	Trailing arm type dependent suspension
Steering system	Power steering type	Electric power assistance
Brake system	Structural type	"X " type double-circuit hydraulic layout
	Front brake	Disc brake
	Rear brake	Disc brake
	Free stroke of brake pedal	1mm ~ 12mm
	Brake clearance of front and rear brakes	0.1mm ~ 0.4mm

Braking parameters

Item		Parameter
Front wheel brake disc	Setting value (mm)	25
	Service limit (mm)	23
Front wheel brake pad	Setting value (mm)	9.5
	Service limit (mm)	2
Rear wheel brake disc	Setting value (mm)	12
	Service limit (mm)	10
Rear wheel brake pad	Setting value (mm)	9
	Service limit (mm)	2

Performance parameters

Item	Unit	Parameter
Maximum speed	km/h	170
Maximum gradeability	%	30

Vehicle trafficability parameters

Item	Unit	Parameter
Approach angle (full load)	°	16
Departure angle (full load)	°	27
Ramp Angle (Full Load)	°	17
Minimum turning diameter	m	< 11.8
Minimum ground clearance (full load)	mm	165

Terms

Explanation of terms in this manual.

DG	Speed sensor
DVE	Electronic throttle
DR	Fuel pressure adjuster
FPM	Accelerator pedal
ECU	ECU (known as: computer)
EKP	Fuel pump
EMS	EMS
EV	Fuel injector
LSH	Heated oxygen sensor
KS	Knock sensor
KSZ	Fuel distribution pipe assembly
KVS	Fuel distribution pipe
PG	Phase sensor
ROV	Ignition system with distributor
RUV	Ignition system without distributor

TEE	Fuel pump bracket assembly
TEV	Carbon canister control valve
TF-W	Coolant temperature sensor
ZSK	Ignition coil

1.8 Maintenance

Regular maintenance

Daily inspection items:

Item	Inspection contents
Engine oil level	Check the oil level each time when refuelling.
Coolant level	Check the coolant level each time when refuelling.
Power battery coolant level	During daily maintenance, it is necessary to check the coolant expansion tank level, which shall not be lower than the Min line.
Brake pedal	Check the brake pedal for its manoeuvrability before driving each time.
Horn	Check whether the horn is normal before driving each time.
Door	Check if the boot lid and all other doors (including rear doors) can be opened/closed freely and locked firmly.
A/C system	Check the operation of A/C every week.
Washer fluid	Check the remaining amount of washer fluid once a month.
Wiper	Check the wiper once a month.
Brake	Check the brake fluid level once a month.
Tyre	Check the tyre pressure once a month. Check the tread for wear and foreign objects.
12V low-voltage battery	Check the condition of 12V low-voltage battery and the corrosion of terminals once a month.
Front windscreen defroster	Check the air vent of defroster each time when using the heater and A/C.
Vehicle lights	Check the condition of headlights, clearance lights, taillights, high-mounted brake lights, and licence plate lights once a month.

Maintenance items and mileage:

Service according to the specified distance or time (whichever comes first)	
Replace brake fluid	Every 2 years or 40,000 km
A/C filter	Every 2 years or 20,000 km
Change the engine coolant	Every 2 years or 40,000 km

Service according to the specified distance or time (whichever comes first)	
Replacing the fuel filter	Recommended every 3 years or 60,000 kilometres or when fuel contamination is found
Dust filter of the refuelling pipe	Check once every 1 year or 20,000 km. If the dust filter is blocked, adjust or replace it if necessary.

Specification and capacity of oil, fluid and coolant

Item	Specification	Filling amount
Petrol	Please refer to the model marked on the fuel tank cap	43L
Range extender oil (4F15N)	SP5W-30	4L
Range extender coolant (4F15N)	OAT-35	10.4L
Reducer lubricating oil	BOT384	0.8±0.1L
Three-in-one coolant	OAT-35	6L
Power battery coolant	OAT-35	4L
Brake fluid	DOT3 or DOT4	0.7±0.1L
Windscreen washer fluid	NFC-60	2.5L
A/C refrigerant	R-134a/1234YF	470±20g

Tyre inflation pressure:

Tyre model	Rim specification	At no load	At full load
235/55 R19	19×7J	260kPa	260kPa
235/60 R18	18×7J	260kPa	260kPa
225/65 R17	17x7J	260kPa	260kPa
T155/90 R17	420±5kPa		

Note: It is only valid for cold tyres, and the air pressure unit is (kPa).

Engine maintenance

Engine coolant and cooling system

Inspection of coolant level:

The translucent coolant expansion tank is installed in the engine compartment. The coolant level in this expansion tank should be kept between the "MINI " and "MAX " marks. Check the coolant level when the engine is cool.

Check whether the coolant level is between the upper limit (MAX) and the lower limit (MIN) scale marks. If it is lower than the lower limit scale line, add coolant to the coolant reservoir to the position between the upper limit and lower limit.

Coolant refilling:

Open the coolant reservoir cap to add coolant, and tighten it after adding.

Warning: Please use the all-season antifreeze coolant specified by Dongfeng Forthing.

Warning: Do not add any rust inhibitor or other additives to the cooling system.

Warning: Do not replace the four-season antifreeze coolant with a different brand of coolant or water, otherwise it is easy to cause chemical reactions and affect the service life of the range extender.

Warning: Wipe off the overflowing coolant in time; otherwise, parts and components in the range extender compartment may be damaged.

Warning: Dongfeng Liuzhou Motor Co., Ltd. will not assume any responsibility for water tank blockage and other damages caused by the use of tap water or coolant not specified by it.

Warning: Be sure to confirm that the range extender and radiator have completely cooled down before opening the coolant reservoir cap; otherwise, the coolant may spray out, causing serious scald.

Replace the coolant:

Under normal circumstances, the coolant needs to be replaced every 2 years or 40,000 km, whichever comes first.

Body and Chassis Maintenance

Brake fluid

Check the brake fluid level in the reservoir. The brake fluid level must be between the "MAX" and "MIN" marking lines on the reservoir. When the brake pads wear down, the brake fluid level will drop slightly.

If the brake fluid level drops noticeably in a short time, it means there is a leak in the braking system. In this case, the vehicle shall be immediately sent to a service station recognised by DFLZ for maintenance.

The brake fluid specified by Dongfeng Forthing shall be used. Brake fluid is a water-absorbing liquid. Excessive water in the brake fluid will reduce the braking performance. Do not remove the sealing cover on the brake fluid reservoir at will. Brake fluid cannot be mixed with liquid containing mineral oil, which will damage the seals of the brake device. The sealing cover of the brake fluid reservoir must be kept clean when it is removed.

The brake fluid level is monitored by a level sensor. When the brake fluid level drops below the "MIN" mark, the brake fluid warning light will light up.

Replace brake fluid

Brake fluid can absorb moisture, Therefore, it will absorb moisture from the surrounding air over time, but excessive water content in the brake fluid can cause corrosion damage to the brake system. In addition, the boiling point of brake fluid will drop obviously. Therefore, the brake fluid should be replaced in time according to the requirements of the regular maintenance table.

Caution: If brake fluid has been used for too long, bubbles will be generated in the braking system at a very high braking load. In this case, the braking performance and driving safety performance will be severely compromised.

Caution: Be sure to use the brake fluid specified by Dongfeng Forthing or products of the same grade approved by Dongfeng Forthing. Different brake fluids cannot be mixed.

Caution: When replacing the brake fluid, it is necessary to drain the original brake fluid in the brake hydraulic circuit and thoroughly clean the brake circuit with new brake fluid to ensure that the two brake fluids are not mixed. The brake fluid discharged cannot be used anymore.

Caution: Brake fluid is harmful to the human body! Therefore, it must be properly stored in its original sealed container, and children should be kept away from it. In addition, pay attention to preventing the brake fluid from corroding the vehicle topcoat.

Caution: Be careful when handling brake fluid. It can injure your eyes and skin, and damage painted surfaces. In case of accidental splashing on the human body, wash it with clean water immediately

Caution: Keep the reservoir clean and tighten the reservoir cap to prevent dirt from entering.

Caution: Before filling the brake fluid, wipe the fluid reservoir cap and fluid filler port with a clean cloth. Then fill designated clean brake fluid.

Caution: If the brake fluid deteriorates, immediately discharge the brake fluid that has deteriorated from the braking system. Then fill with designated clean brake fluid.

Check the brake pipeline

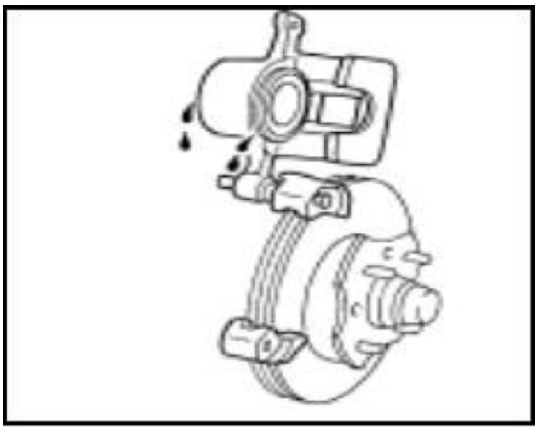
Check whether the brake pipeline is in the correct position and whether there are leaks, wear, scratches and aging.

Inspection of disc brake

Brake disc: Check its condition for wear and damage.

Category	Front	Rear
Standard thickness	25mm	12mm
Maximum runout	≤0.05mm	≤0.05mm
Minimum thickness (wear limit)	23mm	10mm

Brake caliper: Check for oil leakage.



Brake pads: Check for wear and damage.

Category	Front (mm)	Rear (mm)
Standard thickness	9.5	9
Minimum thickness (wear limit)	2	2

Tyre

Tyre inflation:

Make sure that tyres have a proper pressure, which can provide the best status of maneuverability, tread life and ride comfort.

Underinflated tyres wear unevenly, which will affect handling and increase energy consumption, leading to overheating and air leakage.

Over-inflated tyres will reduce riding comfort, and are more likely to be damaged due to uneven road surfaces, resulting in uneven tyre wear.

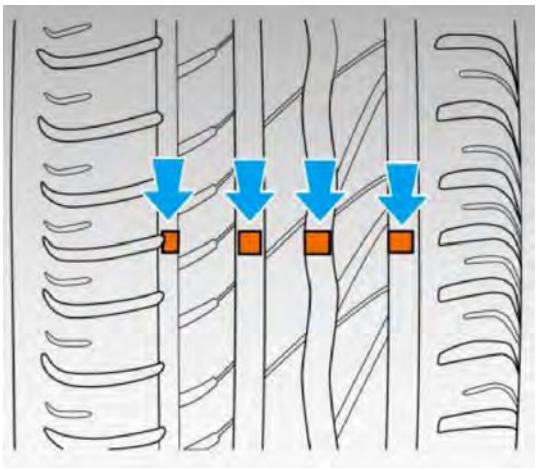
Check the tyres:

Each time you check the tyre inflation state, you should also check the tyres for external injury, puncture by foreign objects and wear. Specific inspections are as follows:

1. Damage or bulge of tyre tread or side. If any of the conditions is found, replace the tyre.

2. Scratches, cracks or fractures on the side of the tyre. to the fabric or cord.

3. If the tread is excessively worn, replace the tyre.



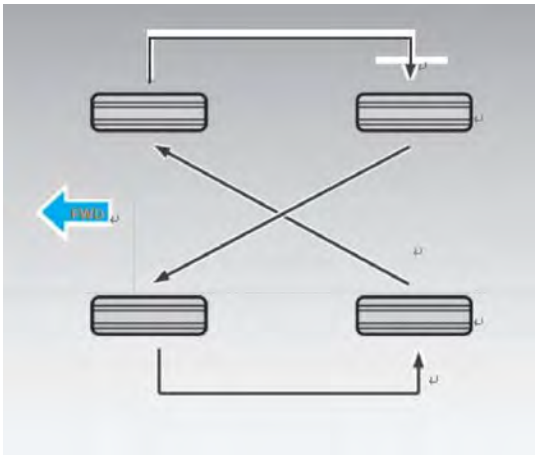
The tyre must be kept in good condition, and the tread pattern on the tyre surface shall be deep enough. The tyre wear degree can be measured by the raised points in the tyre driving belt. If the tread depth is ≤1.6 mm, you must replace the tyre. These tyres have poor grip on wet roads.

Tyre maintenance:

In addition to proper inflation, correct wheel alignment also aids in reducing tyre wear. If you find that the tyres are unevenly worn or feel some continuous vibration while driving, you need to perform maintenance.

Tyre rotation:

In order to prolong the service life of the tyre and make the tyre wear evenly, the tyre position shall be changed every 10,000 km. Each time of transposition, the operation shall be carried out according to the method shown in the figure below.



Replacement of tyres and wheels:

Replace with radial tyres having the same size, load scope, speed level and maximum cold tyre pressure (indicated on the tyre wall). Mixed use of radial and diagonal tyres may reduce the vehicle's braking capacity, driving force (ground adhesive force) and steering accuracy. Using tyres of different sizes or structures will cause the ABS system to fail to work normally.

The ABS system works by comparing the speed of wheels. Therefore, when replacing tyres, be sure to use tyres with the same size as the original ones. Inconsistent tyre size and structure will affect wheel speed and may lead to uncoordinated system action. Replacing only one tyre will seriously affect the maneuverability of the vehicle. If it is necessary to replace tyres, it is recommended to replace two front tyres or rear tyres in pairs. If necessary, replace four tyres at the same time.

If the wheel needs to be replaced, make sure that the specifications of the new wheel are consistent with those of the original wheel. Before replacing the wheel, please contact an authorised service station of Dongfeng Forthing.

Specifications of wheels and tyres

Rim specifications: 19×7J, 18×7J, 17×7J.

Tyre specifications: 235/55R19, 235/60R18, 225/65R17.

Regarding the tyre size suitable for this vehicle, the tyre pressure label affixed to the driver's side door frame shall prevail.

Alignment parameters

Item		Parameter
Front wheel toe-in	Front wheel	0.08 ° ±0.04 °
/	Rear wheel	0.1 ° ±0.25 °
Wheel camber angle	Front wheel	-0.3 ° ±0.5 °
/	Rear wheel	-1.0 ° ±0.4 °
Kingpin caster angle	Front wheel	6.01 ° ±0.5 °
Kingpin inclination angle	Front wheel	13.29 ° ±0.5 °

2.1 Front suspension

2.1.1 Specification

2.1.1.1 General specifications

Item		Data
Front wheel toe-in	Front wheel	0.08°±0.04°
	Rear wheel	0.1°±0.25°
Wheel camber angle	Front wheel	-0.3°±0.5°
	Rear wheel	-0.1°±0.4°
Kingpin caster angle	Front wheel	6.01°±0.5°
Kingpin inclination angle	Rear wheel	13.29°±0.5
Suspension system	Front suspension	MacPherson type independent suspension + horizontal stabiliser bar
	Rear suspension	Rear trailing arm dependent suspension

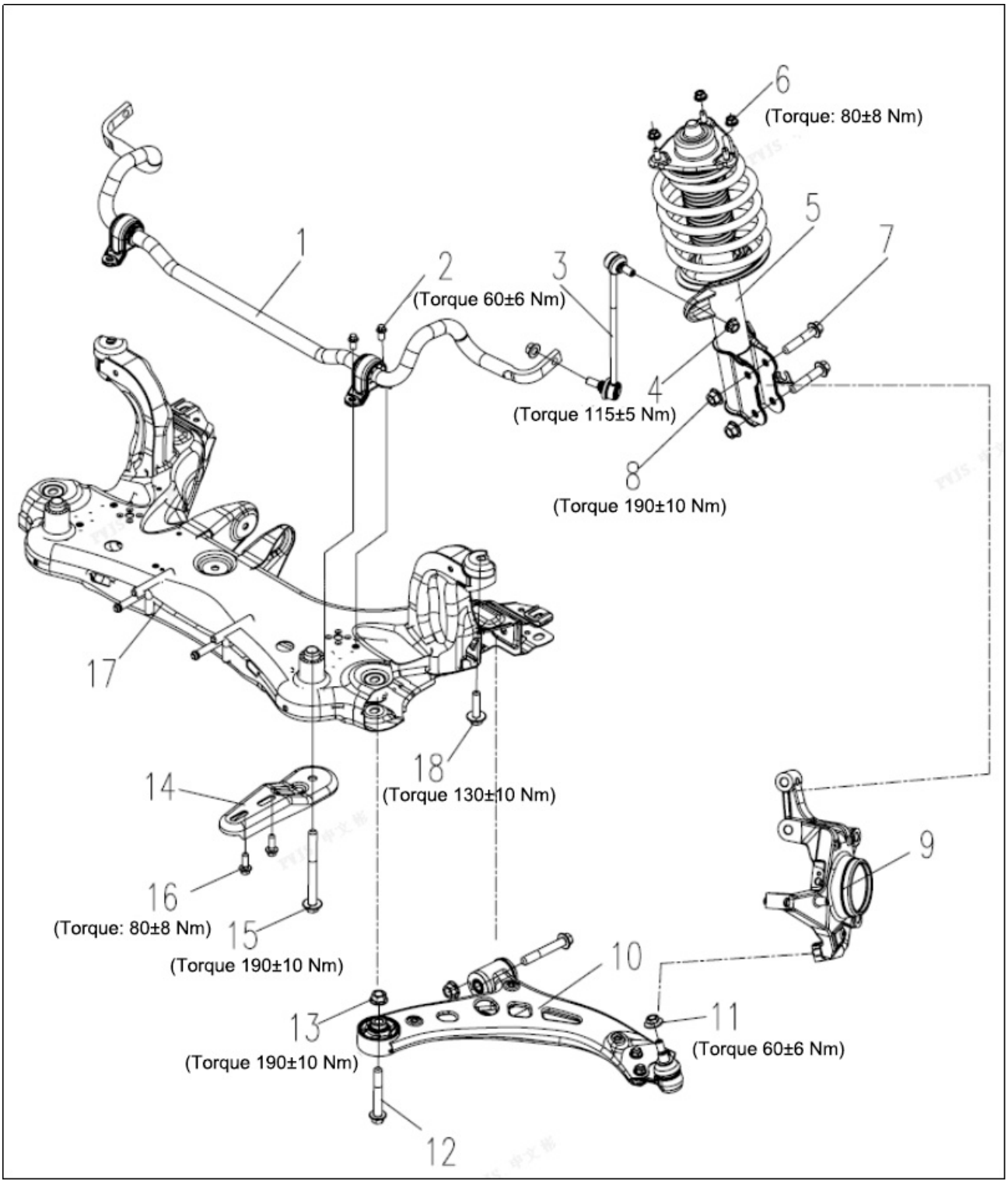
2.1.1.2 Torque specification

Name	Nm
Connecting bolt of front strut and steering knuckle	190±10
Connecting nut of front strut and steering knuckle	190±10
Connecting bolt of front strut and vehicle body	70±2
Mounting bolt for front stabiliser bar bracket	60±6
Mounting bolt of front swing arm	190±10
Mounting nut of front swing arm	190±10
Front swing arm ball joint lock nut	60±6
Front mounting bolt of front subframe	130±10
Rear mounting bolt of front subframe	190±10
Mounting bolt of front subframe connecting plate	70±2
Linkage ball joint lock nut of front suspension	155±45
Lock nut of steering knuckle connecting front swing arm ball joint	60±6
Ball joint nut of steering knuckle connecting steering gear tie rod	60±6
Bolt of steering knuckle connecting front brake	150±15
Nut of steering knuckle connecting front wheel hub bearing unit assembly	95±9
Bolt of steering knuckle connecting front wheel speed sensor	8±2
Screw of steering knuckle connected to front brake mudguard	9±1
Nut of front hub bearing unit assembly connecting wheel	130±10

2.1.2 Operation Manual

2.1.2.1 Exploded view

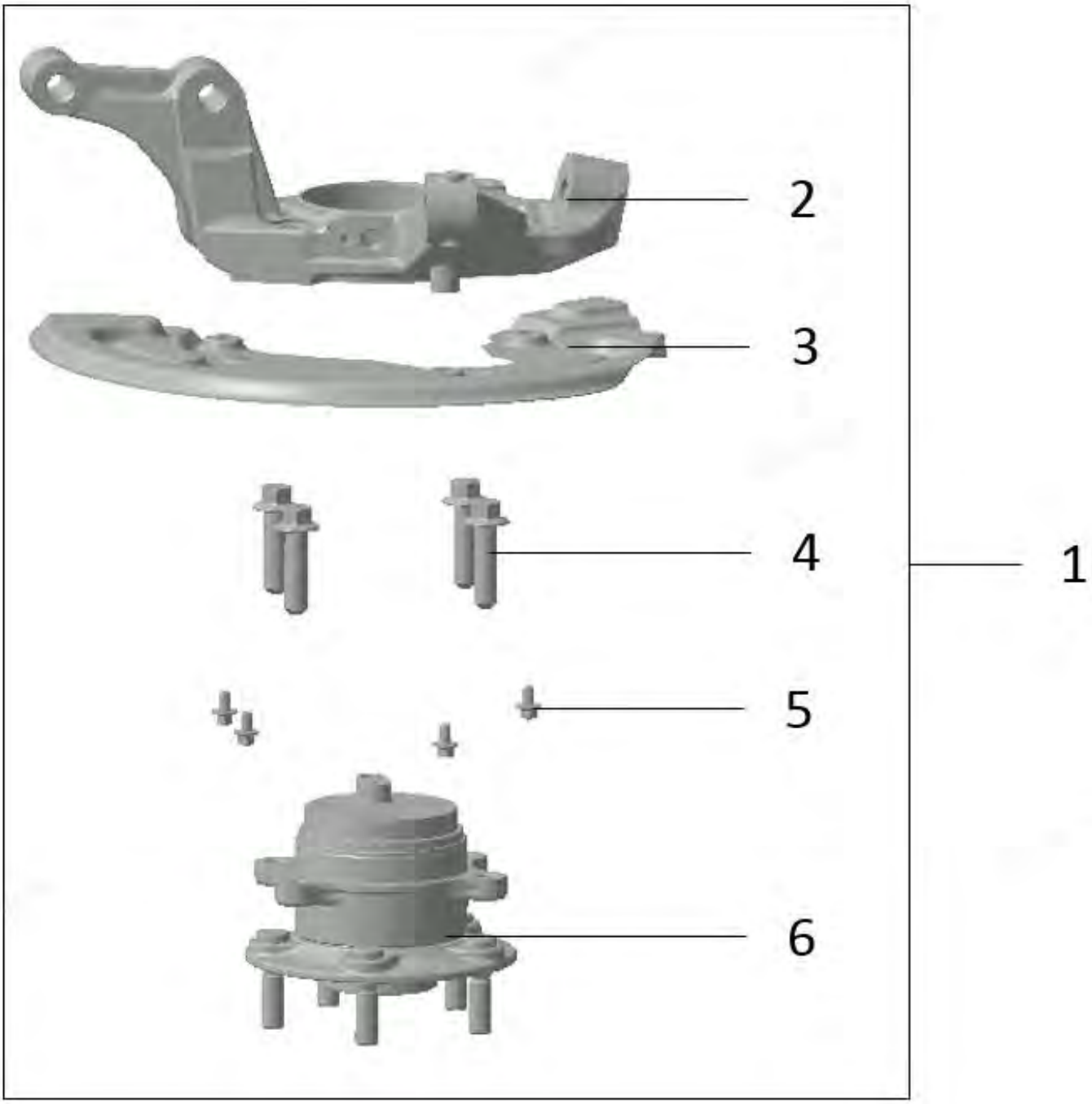
Front suspension



Item	Name	Item	Name
1	Front lateral stabiliser bar with bushing assembly	10	Front left/right swing arm assemblies

2	Mounting bolt of front stabiliser bar bracket	11	Front swing arm ball joint lock nut
3	Front left/right stabiliser bar link assembly	12	Mounting bolt of front swing arm
4	Stabiliser bar connecting rod mounting nut	13	Mounting nut of front swing arm
5	Front left/right suspension strut assemblies	14	Front left/right subframe connecting plate
6	Front suspension strut to vehicle body nut	15	Rear mounting bolt of subframe
7	Bolt for connection between front suspension strut and steering knuckle	16	Mounting bolt of subframe connecting plate
8	Nut for connection between front suspension strut to steering knuckle	17	Front subframe assembly
9	Left/right steering knuckle	18	Front mounting bolt of subframe

Steering Knuckle Assembly with A Hub



Mark number	Name	Mark number	Name
1	Left/right steering knuckle with hub assembly	4	Wheel hub bearing mounting bolt
2	Front left steering knuckle	5	Brake mudguard mounting screw
3	Front left brake mudguard	6	Front hub bearing unit assembly

2.1.2.2 Overview

item name		Suspension configuration
Suspension system	Front suspension	MacPherson independent suspension + lateral stabiliser bar

The front suspension uses MacPherson suspension, which absorbs the impact energy from the wheels when driving on uneven roads and dissipates this energy throughout the suspension system. The suspension system determines vehicle ride comfort based on the ratio of energy dissipation to energy absorption. The suspension system is designed for ride comfort and cannot be adjusted. The steering knuckle is suspended between the lower control arm and the strut assembly. The lower control arm is connected to the steering knuckle at its outermost point. This connection is made via a ball joint. The innermost end of the control arm is connected to the frame at two points through bushings. The upper part of the steering knuckle is connected to the strut assembly. The strut assembly is connected to the vehicle body by an upper bearing. The steering knuckle can move vertically, independent of the body structure and frame. When the vehicle travels over uneven roads, most of the steering knuckle's vertical movement is absorbed by the coil spring. The spring is kept under tension on the strut assembly. Each end of the strut serves as a connection point between the suspension system and the vehicle and as a seat for the coil spring. This allows the strut to use damping action to individually reduce the spring's reaction force. The lower control arm can rotate vertically on the frame. The ball joint keeps the steering knuckle perpendicular to the road surface. The front suspension system is equipped with a stabiliser bar. The stabiliser bar is connected between the left and right lower control arm assemblies through stabiliser links and stabiliser bar bushings. The stabiliser bar controls the independent displacement of the suspension system during vehicle cornering.

Steering knuckle with hub bearing

The steering knuckle with wheel hub assembly and rear wheel hub assembly system mainly includes the front steering knuckle, brake mudguard and front and rear wheel hub bearing unit assemblies. It is a bridge connecting the suspension system and the braking system. When the whole vehicle is working, it provides basic support and rotation functions.

2.1.2.3 Precautions

Note

1. Before removing parts, the vehicle should be powered off and the battery grounding cable should be disconnected.
2. Disassemble in a clean working area. It is important to avoid the internal parts being polluted by dust or other foreign objects.
3. Place the disassembled parts on part racks in sequence for easier and more accurate assembling.
4. Please use genuine parts for maintenance work, and do not reuse unusable parts.
5. Please follow the standard maintenance diagnosis process for maintenance work, and make sure that there is no oil stain or grease on the tightening surface.
6. After replacing the steering knuckle and wheel hub bearing parts, the wheel alignment must be checked.
7. Establish environment protection awareness and effectively dispose of waste produced during maintenance.

Precautions during repair

1. Upon assembling of the rubber bushing, final tightening must be done when the vehicle is not loaded and on ground. The rubber bushing shall not contact with engine oil during removal and installation as the engine oil will shorten service life of rubber bushing
2. When a vehicle is not loaded, it means the fuel oil, engine coolant, and lubricant are all full, and spare tyre, jack, on-board tool, and foot pad are all in specified positions.
3. Wheel alignment must be checked after the suspension parts and components are installed.
4. The self-locking nuts shall not be reused; new self-locking nuts must be used upon each assembling. Do not wipe off the grease precoated on new self-locking nuts when tightening them.
5. The tightening interface must be free from oil stains or grease.

2.1.3 Diagnosis and testing

2.1.3.1 Front Suspension - Troubleshooting of Noise, Vibration and Harshness

The table below helps identify the cause of symptoms. Repair or replace these parts as necessary.

Front suspension		Symptoms				
		Noise	Shaking	Vibration	Judder	Uncomfortable riding or difficult to operate
Possible cause and suspicious parts	Improper installation and looseness	●	●	●	●	●
	Deformation, damages or distortion of strut	●	●	●	●	●
	Deterioration of bushing or mounting positions	●	●	●	●	●
	Interference of parts and components	●	●	●	●	●
	Spring fatigue	●		●		●
Possible cause and suspicious parts	Suspension looseness	●	●			
	Incorrect wheel alignment				●	●
	Stabiliser bar fatigue					●
	Front axle and front suspension	●	●	●	●	●
	Wheels	●	●		●	●
	Brake	●	●		●	
	Steering	●	●	●	●	
	Damage of upper steering bearing of front strut	●				

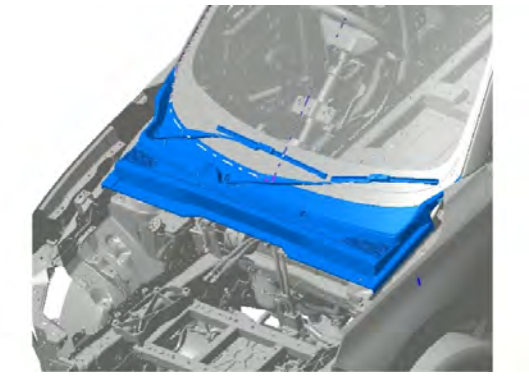
– Applicable

2.1.4 Removal and installation

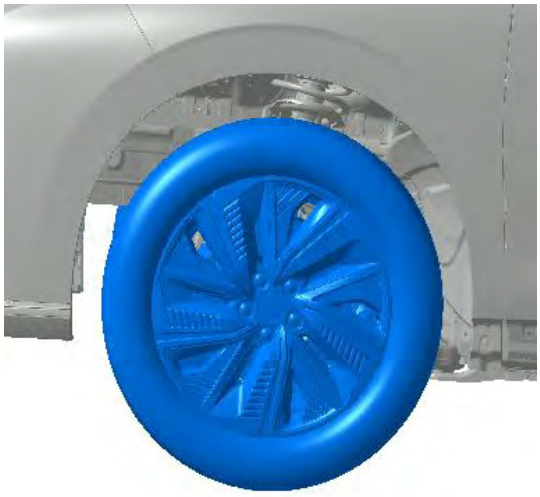
2.1.4.1 Front suspension strut assembly

Removal

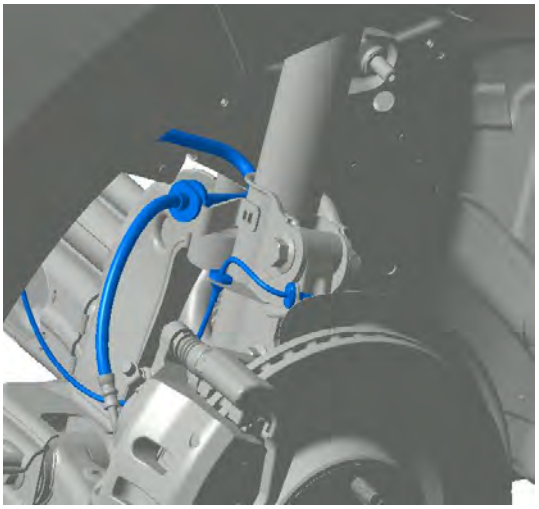
1. Open the bonnet.
2. Remove the wiper arm. Refer to: Wiper Arm.
3. Remove the cover plate.



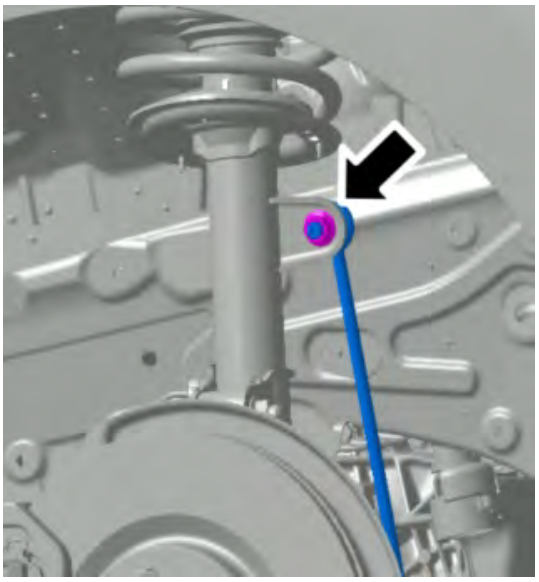
4. Lift and support the vehicle. Refer to: Lifting the vehicle.
5. Remove the tyre.



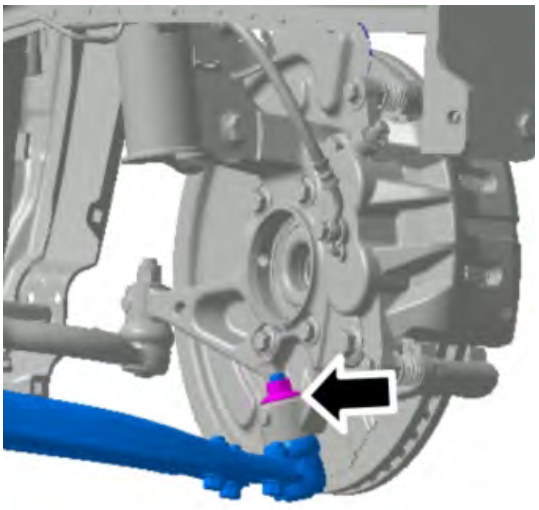
6. Remove the ABS wheel speed sensor and brake hose from the front strut.



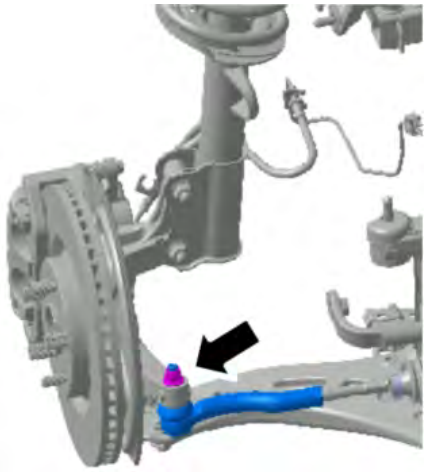
7. Unscrew the nut connecting the stabiliser bar link to the front strut.



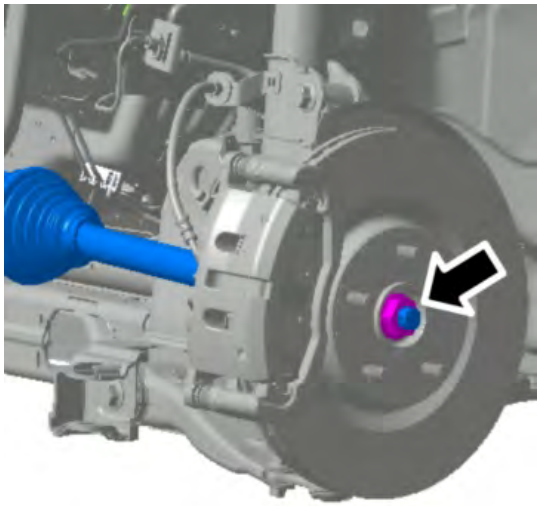
8. Remove the fixing nuts of the front swing arm assembly and the steering knuckle.



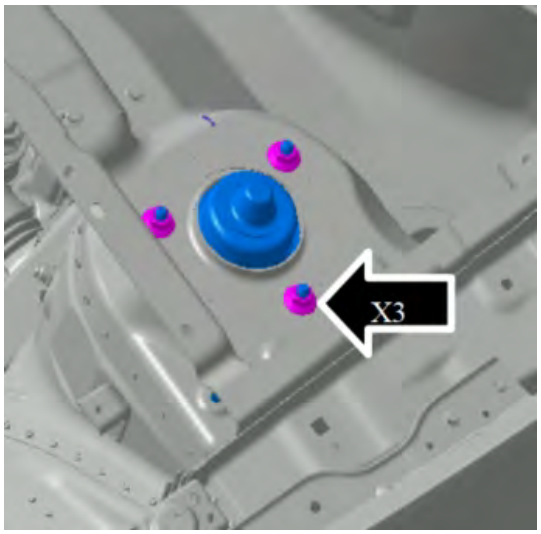
9. Remove the fixing nuts of steering tie rod and steering knuckle.



10. Remove the drive shaft.



11. Remove the fixing nut of the front suspension strut assembly in the engine compartment, and remove the strut with bearing assembly.



12. Remove the front suspension strut assembly and the front axle with caliper assembly, and unscrew the bolts connecting the strut to the front axle with caliper assembly.

13. Separate the front suspension strut assembly from the front axle with caliper assembly.

Inspection after removal

1. Check the front strut assembly for deformation, cracks, or other damage.
2. Check for shock absorber oil leaks.
3. Check the rubber parts for cracks and damage.

Installation

1. The installation order is the reverse of the removal order.

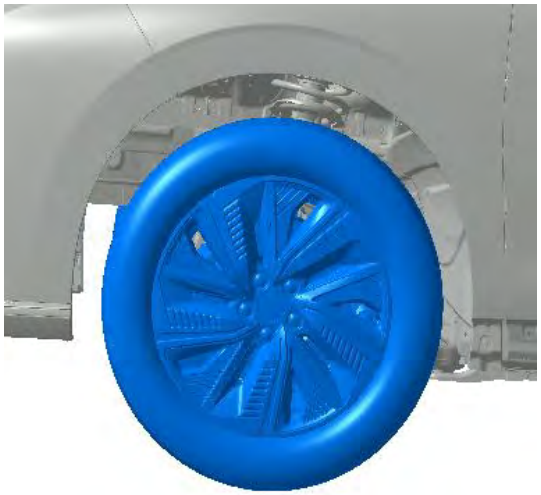
Inspection after installation

1. Check the wheel alignment.

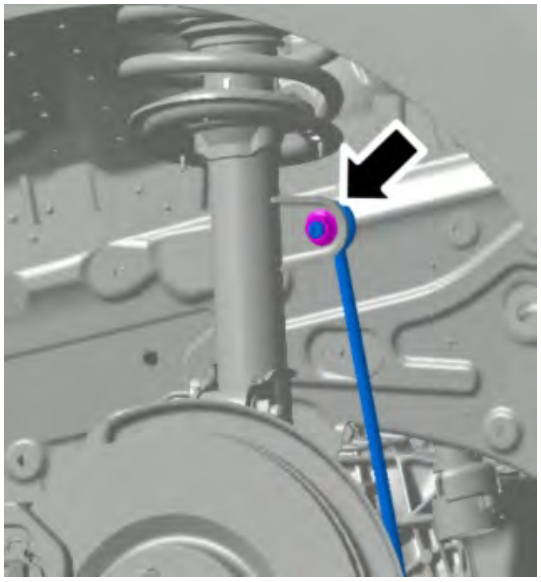
2.1.4.2 Front stabiliser bar and tie rod assembly

Removal

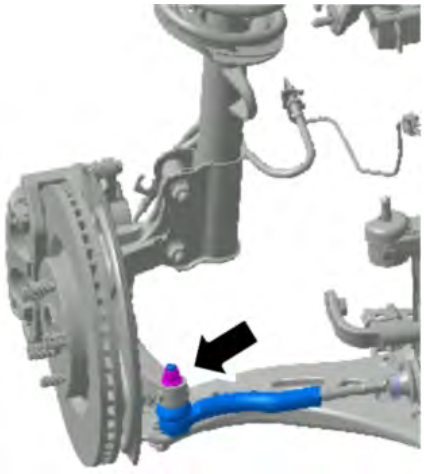
1. Lift and support the vehicle. Refer to: Lifting the vehicle.
2. Remove tyres from the vehicle.



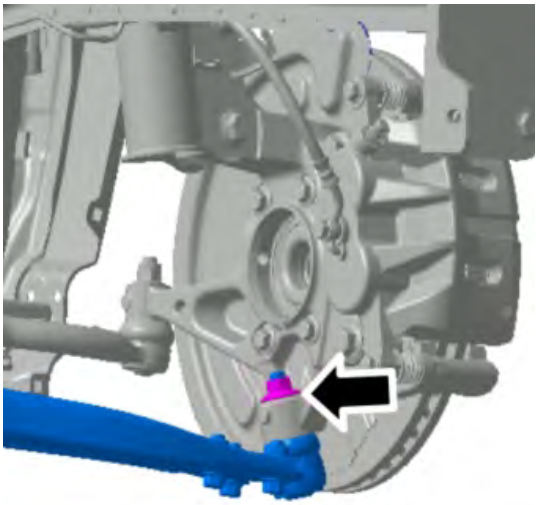
3. Remove the nut connecting the stabiliser bar link to the strut.



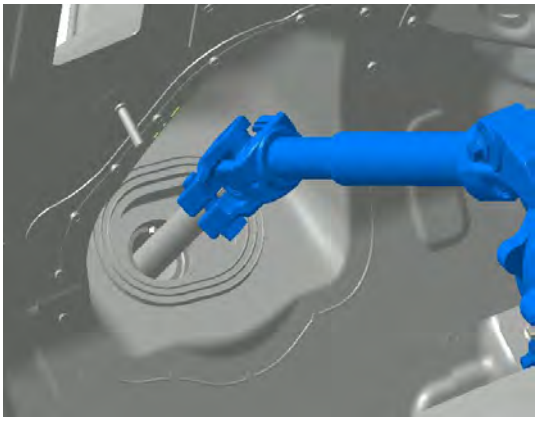
4. Remove the steering outer tie rod from the steering knuckle.



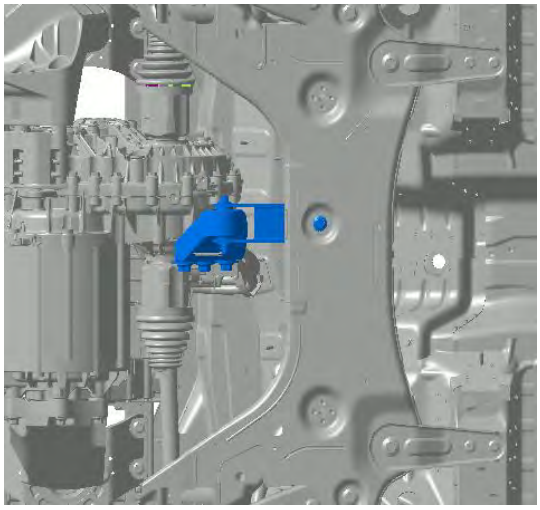
5. Disassemble the ball joint of swing arm from steering knuckle;



6. Remove the intermediate shaft fastening bolts and separate the intermediate shaft.

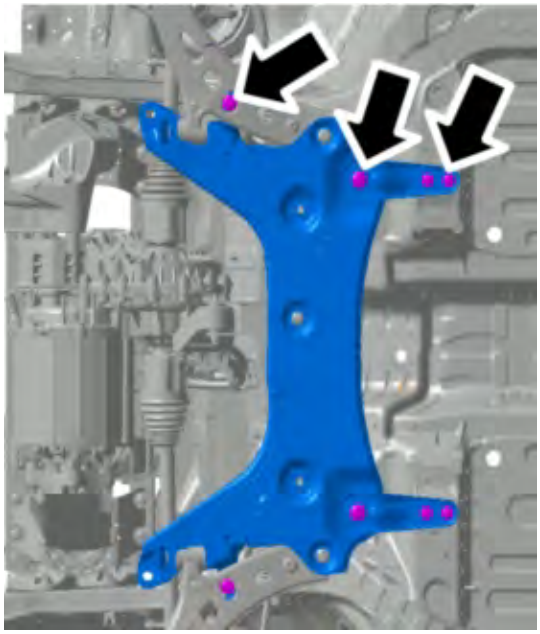


7. Remove the engine rear mount.



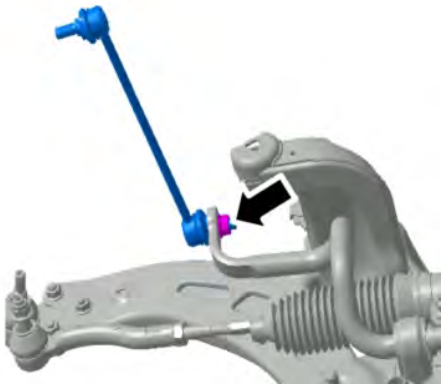
8. Fix an appropriate jack under the front subframe;

9. Remove the assembling bolts of the front subframe.

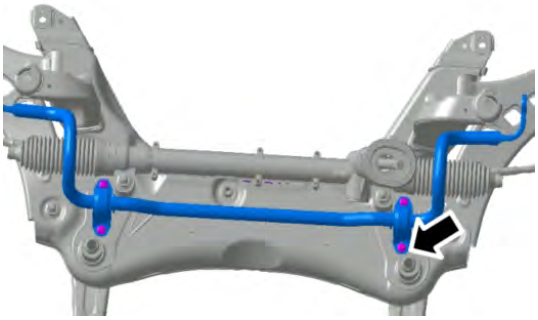


10. Gradually lower the jack to remove the front subframe assembly.

11. Remove the stabiliser bar connecting rod and the stabiliser bar connecting nut to obtain the stabiliser bar connecting rod.



12. Remove the stabiliser bar and subframe mounting bolts.



Inspection after removal

1. Check whether the stabilizer bar and its tie rod, bushing, and mounting bracket have such defects as deformation, crack or damage, and replace the defective one(s) where necessary. Replace the defective one(s) where necessary.

Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

Note: Ensure that the mounting bolts of the swing arm and subframe are tightened when the vehicle is in the unloaded condition.

Inspection after installation

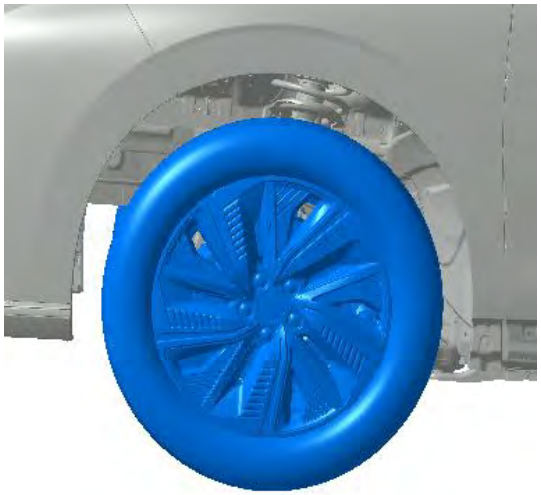
1. Check the wheel alignment.

2.1.4.3 Front swing arm assembly

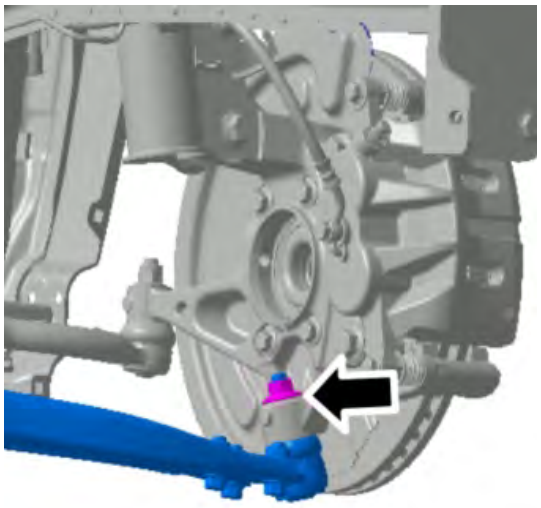
Removal

1. Lift and support the vehicle. Refer to: Lifting the vehicle.

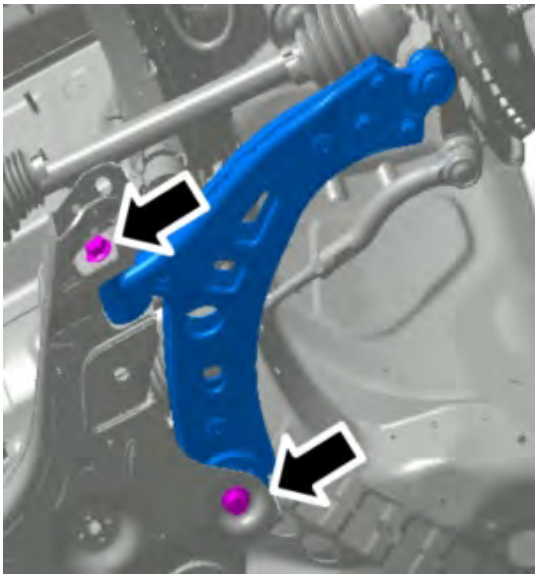
2. Remove tyres from the vehicle.



3. Use a special ball head disassembly and assembly tool to remove the front swing arm ball head from the steering knuckle. Be careful not to hit the front swing arm with hard objects such as hammers.



4. Disassemble the front swing arm assembly from front subframe assembly.



Inspection after removal

1. Visually inspect the following:

   1. Check whether the front swing arm assembly, ball joint and bushing are deformed, cracked, or damaged. Replace it if necessary.

   2. Check the ball joint dust cover for crack and other damage, and grease leakage Replace it if necessary.

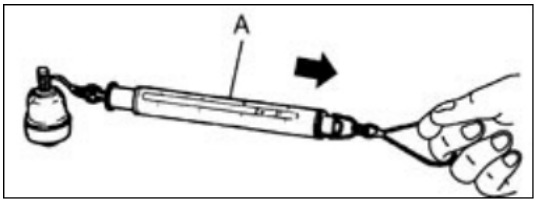
2. Manually move the ball pin to check whether it can move flexibly.

3. Inspection of shaking moment:

   1. Manually move the ball pin at least ten times before measuring to check whether it can move flexibly.

   2. Make spring scale (A) hook the fixing hole of cotter pin. Confirm that the spring scale measurement value is within the specified range when the ball pin starts to move. If the swing torque exceeds the standard range, replace the front swing arm assembly.

   3 Swing torque: 0.5~5.0Nm



4. Inspection of shaft end play:

   1 Move the end of the ball pin axially to check whether it is loose. If the axial end clearance exceeds the standard value, replace the front swing arm assembly.

   2 Standard shaft end clearance: 0mm

Installation

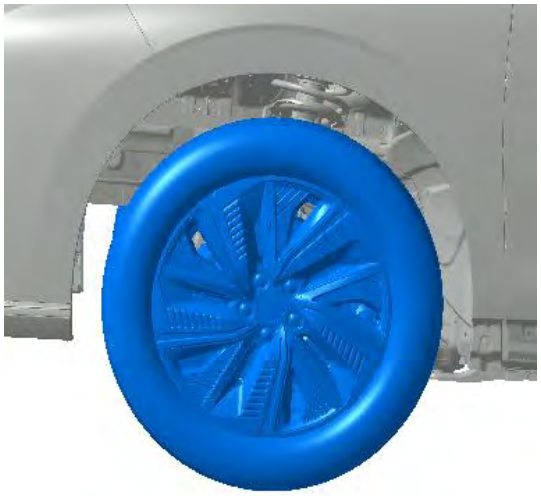
1. The installation order is reverse to the removal order. Pay attention to the following points:

Note: Ensure that the mounting bolts of the swing arm and subframe are tightened when the vehicle is in the unloaded condition.

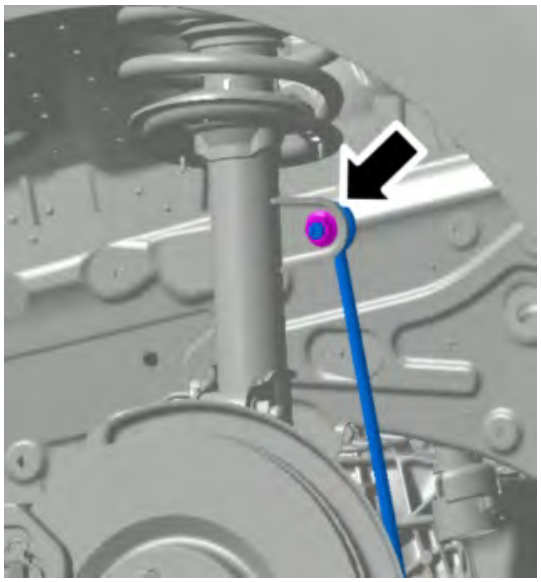
2.1.4.4 Front subframe assembly

Removal

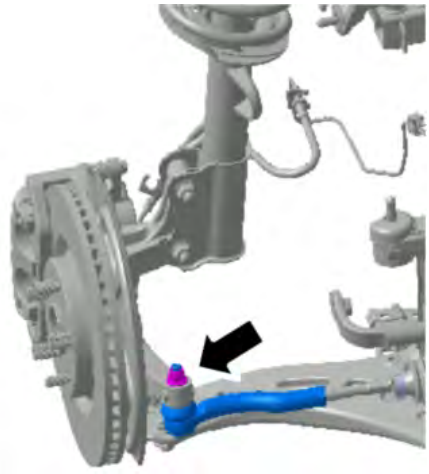
1. Lift and support the vehicle. Refer to: Lifting the vehicle.
2. Remove tyres from the vehicle.



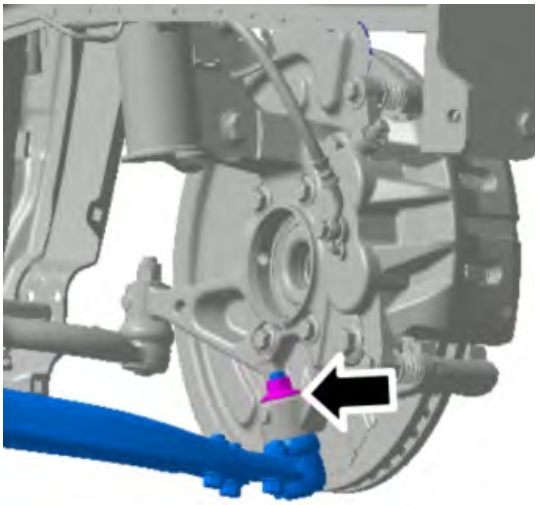
3. Remove the nut connecting the stabiliser bar link to the strut.



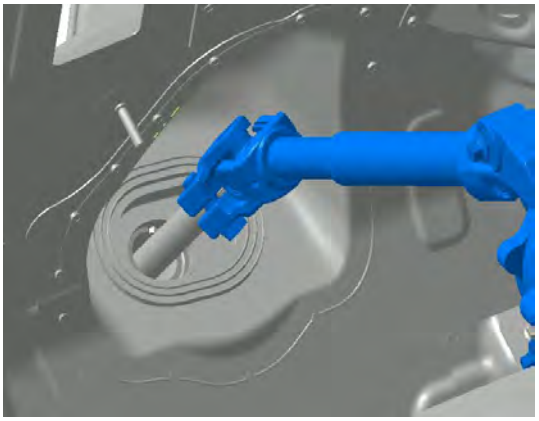
4. Remove the steering outer tie rod from the steering knuckle.



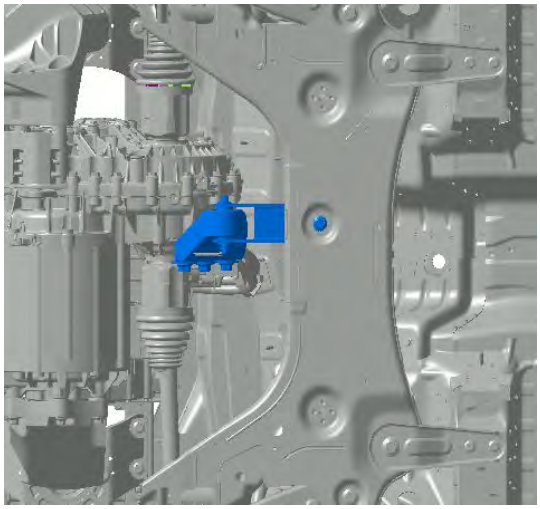
5. Disassemble the ball joint of swing arm from steering knuckle;



6. Remove the intermediate shaft fastening bolts and separate the intermediate shaft.

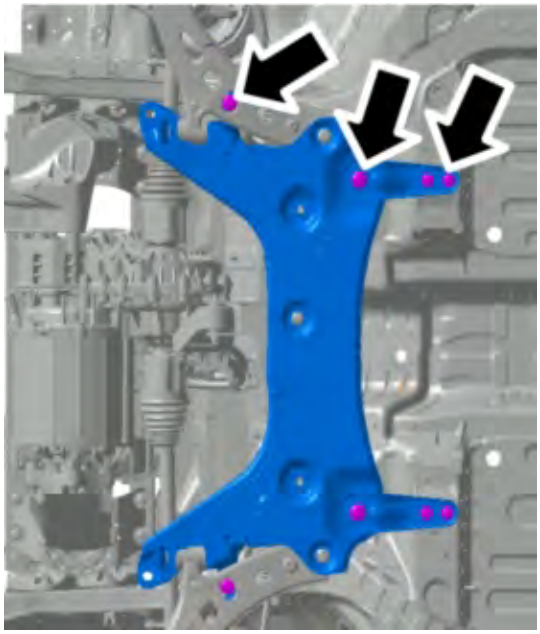


7. Remove the engine rear mount.



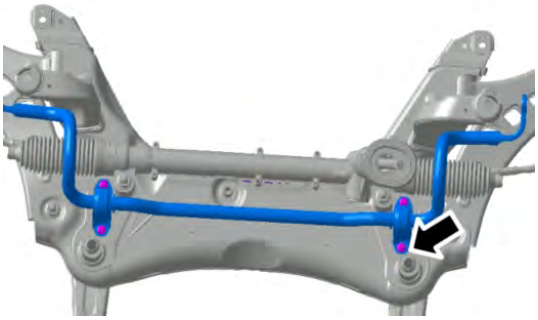
8. Fix an appropriate jack under the front subframe;

9. Remove the assembling bolts of the front subframe.



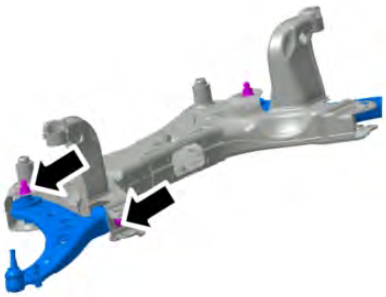
10. Gradually lower the jack to remove the front subframe assembly.

11. Remove the stabiliser bar and subframe mounting bolts.



12. Remove the steering gear to subframe mounting bolts.

13. Remove the swing arm and subframe mounting nuts.



Inspection after removal

1. Check whether the front subframe (including subframe bushing) is obviously deformed, cracked or otherwise damaged. Replace it if necessary.

Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

Note: Ensure that the mounting bolts of the swing arm and subframe are tightened when the vehicle is in the unloaded condition.

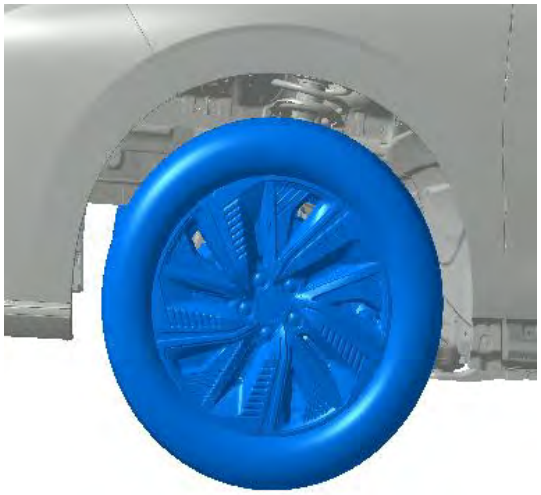
Inspection after installation

1. Check the wheel alignment.

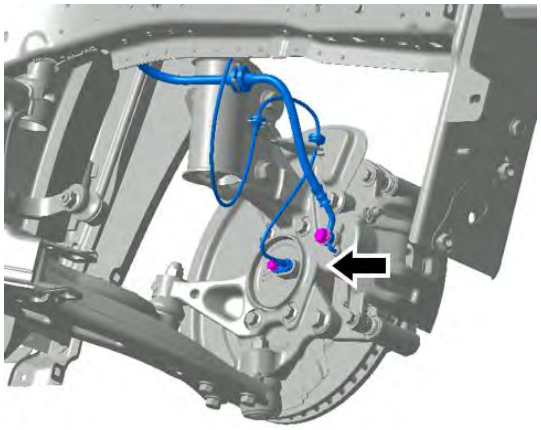
2.1.4.5 Steering knuckle with hub bearing

Removal

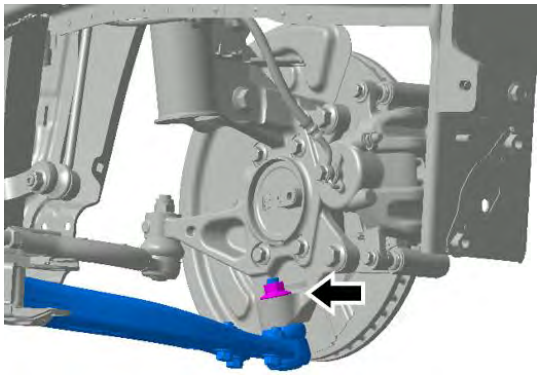
1. Lift and support the vehicle. Refer to: Lifting the vehicle.
2. Remove the wheel (above the lifting platform). Refer to: Wheel Assembly.



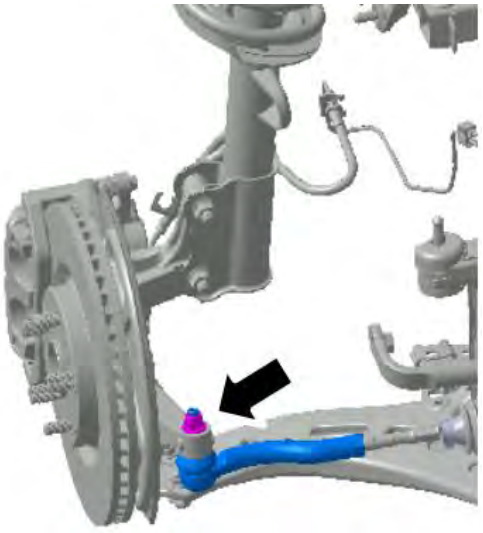
3. Remove the ABS wheel speed sensor and brake hose from the front strut. Refer to Brake Harness and Pipeline.



4. Remove the fixing nuts of the front swing arm assembly and the steering knuckle.

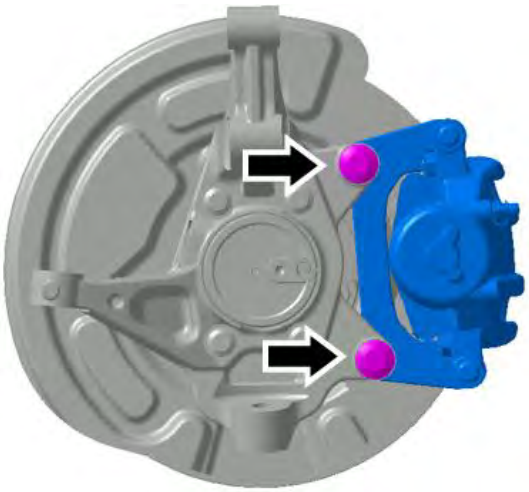


5. Remove the fixing nuts of steering tie rod and steering knuckle.

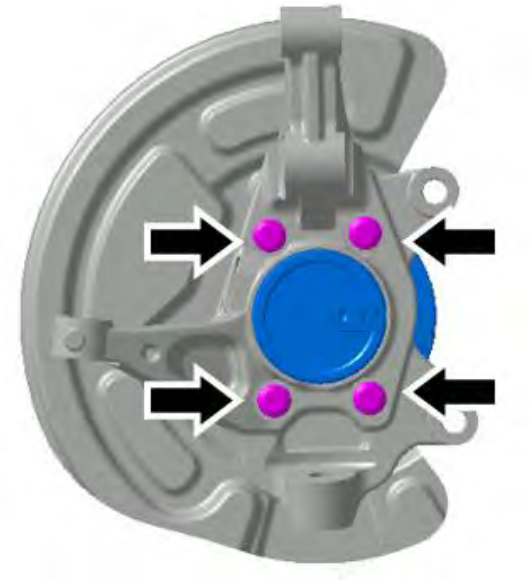


6. Remove the fixing bolts and nuts of the front suspension strut assembly and the front axle with caliper assembly, and remove the front axle with caliper assembly.

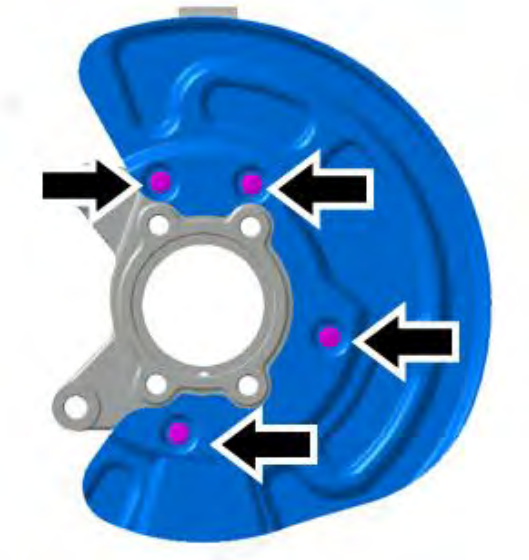
7. Remove the front brake assembly and brake disc.



8. Remove the front hub bearing unit assembly.



9. Remove the front brake mudguard.



Inspection after removal

1. Check the steering knuckle for deformation, cracks or other damage.
2. Check the hub bearing for oil leakage.
3. Check whether the wheel hub bearing rotates smoothly, whether there is a sense of jamming or abnormal rotation noise, etc.

Replace the defective one(s) where necessary.

Installation

The installation order is the reverse of the removal order.

For details on front wheel alignment, please refer to the front wheel alignment requirements of the suspension system.

Inspection after installation

1. Confirm fixation (looseness and gaps) of each part; ensure normal status (wear, damage and deformation) of all the parts.
2. Check the front hub bearing unit assembly for grease leakage and damage, and replace it if any fault is found.

2.1.5 Removal and installation

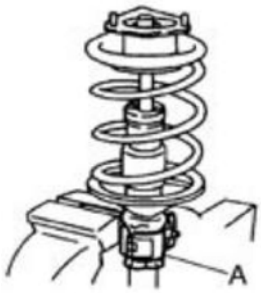
2.1.5.1 Front suspension strut assembly

Note: Do not damage the piston rod of front strut assembly when removing parts from the front suspension strut assembly.

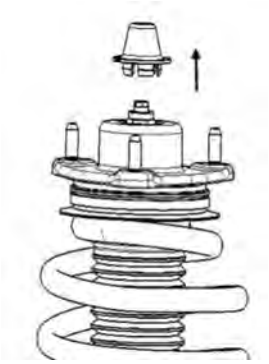
Removal

1. Assemble the front strut holder (A) (special service tool) to front suspension strut assembly and fix it in a bench vice.

   Note: Wrap the outer tube of the front strut absorber with a rag to avoid damage to it when assembling the front strut holder to the front strut.



2. Remove the waterproof cover by hand.

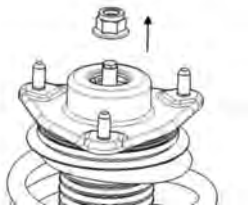


3. Use spring compressor (A) (general service tool) to compress the coil spring between front strut bearing and spring cushion (on the front strut assembly) until the coil spring and spring compressor can move freely.

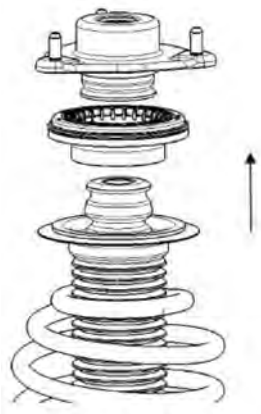
   Note: Ensure that the spring compressor is securely connected to the coil spring and compress the coil spring.

   Note: Use a rag or other articles to protect the spring to avoid damage to the spring surface during removal and installation.

4. Ensure that the coil spring between the front strut bearing and spring cushion (on the front strut assembly) and the spring compressor can move freely. Fix the piston rod end to prevent it from rotating and remove the piston rod lock nut.

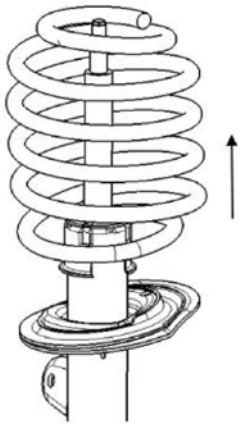


5. Remove the front strut outer adapter sleeve subassembly, front strut bearing, dust cover, and bumper block.

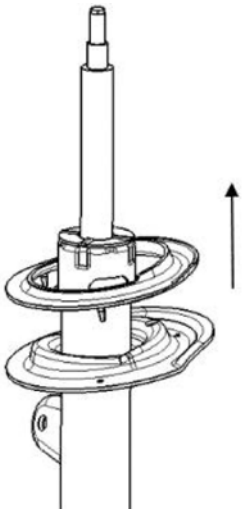


6. Remove the coil spring using a spring compressor, then slowly loosen the compressor and remove the coil spring.

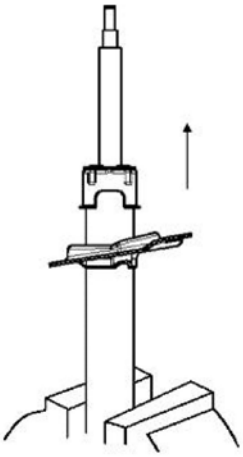
   Note: Loosen the accessories after ensuring that the position of the coil spring accessories is not displaced.



7. Remove the spring cushion from the front strut.



8. Remove the front strut holder from the front strut.



Inspection after disassembly

1. Check the following items for the front strut absorber and replace parts if necessary.

   Check if the front strut absorber is deformed, cracked, or damaged.

   Check whether the piston rod is damaged, unevenly worn, or deformed.

   Oil leakage.

2. Inspection of strut installation insulation and rubber parts.

   Check if the front strut outer adapter sleeve subassembly is cracked and if the rubber parts are worn. Replace it if necessary.

3. the coil spring.

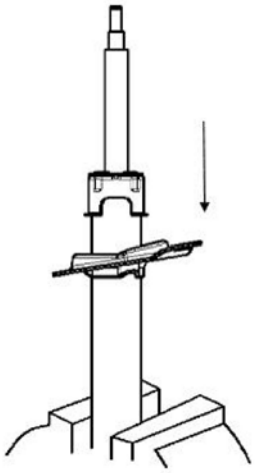
   Check the coil spring for cracks, wear, or damage. Replace if necessary.

   Note: Ensure that the grouping colours of the left and right springs are the same before replacing the front strut assembly or front coil spring; the grouping colours of spare springs include: green, yellow, and white. The left and right springs must be the same colour during maintenance or replacement.

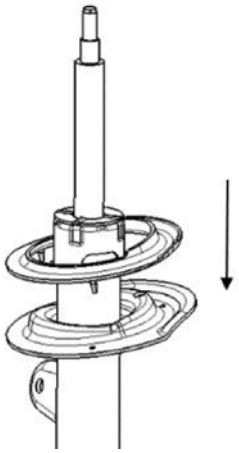
Installation

1. Install the front strut holder to the strut and fix it in a bench vice.

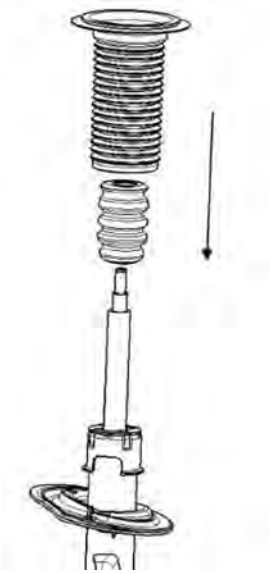
   Note: Wrap the outer tube of the front strut absorber with a rag to avoid damage to it when assembling the front strut holder to the front strut.



2. Install the spring cushion.



3. Install the dust cover and bumper block onto the front strut absorber.



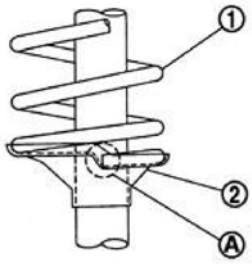
4. Use a spring compressor (general repair tool) to compress the coil spring, and then install it onto the front shock absorber.

Note: Install the coil spring (1) with its tubular end facing downwards and flat end facing upwards. Align the lower end (A) with the spring cushion (2).

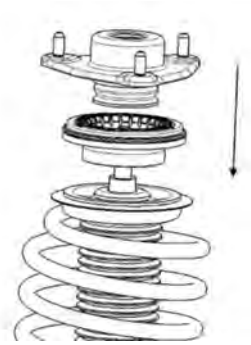
Note: Ensure that the spring compressor is securely connected to the coil spring and compress the coil spring.

Note: Install the coil spring; the coil spring and end (A) of the spring cushion must be aligned with the spring tray of the front strut absorber and seated in place.

Note: Use a rag or other articles to protect the spring to avoid damage to the spring surface during removal and installation.



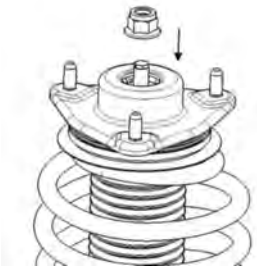
5. Install the front strut bearing and outer adapter sleeve subassembly in sequence on the front strut absorber.



6. Fix the piston rod end to prevent it from rotating and tighten the piston rod lock nut to the specified torque.

Torque standard: 80 ~ 90 N·m

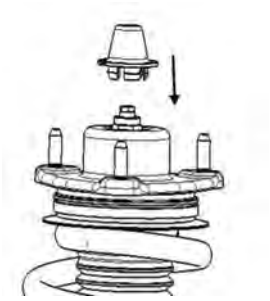
Note: Do not reuse the piston rod lock nut; a new lock nut must be used for each assembly.



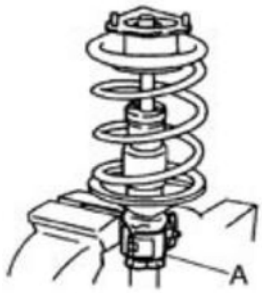
7. Gradually release the spring compressor, then remove it from the coil spring.

Note: Loosen the accessories after ensuring that the position of the coil spring accessories is not displaced.

8. Tighten the waterproof cover by hand.



9. Remove the front strut holder from the front suspension strut assembly.

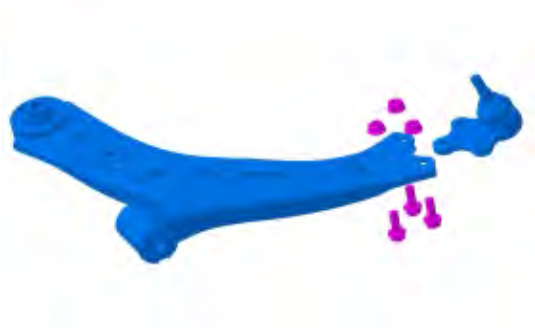


2.1.5.2 Front swing arm assembly

Disassembly

1. Remove the swing arm ball joint mounting bolts and nuts, and separate the front swing arm body from the swing arm ball joint pin assembly.

   Tightening torque of bolt and nut: 78±5 N.m



Installation

The installation order is the reverse of the removal order.

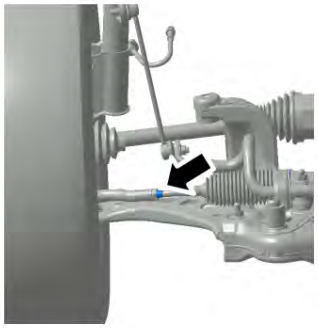
2.1.6 General procedures

2.1.6.1 Adjustment of toe-in

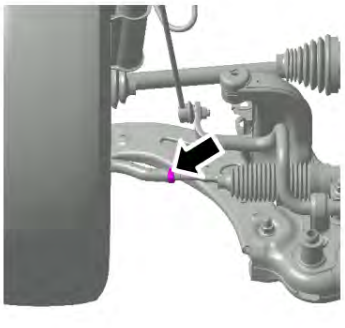
Carry out the following steps at the lifting station.

1. Before adjusting toe-in, ensure that the camber angle, caster angle, and kingpin inclination angle meet requirements or are adjusted to meet standards.
2. Lock the steering wheel with a steering wheel lock in the straight direction of the vehicle tyres and lift the vehicle to the adjustment position. Refer to: Lifting the vehicle.
3. Measure the length of the threads at both the left and right ends of the rack.

   Standard: The length difference of threads at the ends of left and right racks shall not exceed 1.5 mm (equivalent to 1 thread pitch)

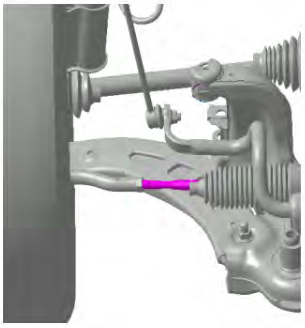


4. Remove the fixing clip of the dust cover at the telescopic end of the rack.
5. Loosen the tie rod ball joint lock nut.



6. Rotate the left and right rack ends to adjust toe-in to the specified value.

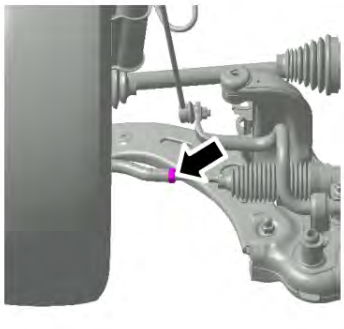
   Tip: Adjust the end thread lengths of left and right racks to be equal as much as possible.



7. Tighten the tie rod end locking nut.

   Torque: 54 ~ 66 N·m

   Note: Make sure that the tie rod ball joint is not deflected



8. Place the dust cover on the seat and install the retaining clip.

   Note: Make sure that the dust cover is not twisted.

9. Lower the vehicle and remove the steering wheel lock.

2.1.6.2 Inspection of camber angle and caster angle

Inspection

1. Before inspection, drive the vehicle onto the lifting frame workstation of four-wheel aligner and keep the vehicle level. The front wheels shall be in the centre of corner plate and the rear wheels shall be in sliding plate.
2. Inspect camber, caster, kingpin inclination, and toe according to the instrument instructions.

2.1.6.3 Front wheel alignment

Check the following:

1. Proper tyre pressure and tyre wear.
2. If the wheels bounce: check balance condition of tyres.
3. End play of wheel bearings: check the wheel bearings.
4. Ball head end play of front swing arm: check the ball head end play.

5. Operation of front suspension strut assembly.

6. If retaining elements of suspension are loose and deformed.

7. Check whether the front subframe assembly, subframe connecting plate assembly, and front swing arm assembly have any cracks, deformation, or other damage.

8. Vehicle height (position).

Front wheel alignment parameter table

Positioning angle value	Numerical value	Remarks
Front wheel camber (no load)	-0.3°±0.5°	Left and right difference within 0.55°
Front wheel toe-in (no load)	0.08°±0.04°	Left/right difference does not make a judgement
Kingpin inclination (no load)	13.29°±0.5°	Left/right difference does not make a judgement
Kingpin caster (no load)	6.01°±0.5°	Left and right difference within 0.55°

Note: The front wheel camber, kingpin inclination, and caster angles cannot be adjusted. If the front wheel camber angle is not within the standard range, check for wear or damage in the front suspension components. Replace suspicious parts if any faults are found. Check the wheel alignment when a vehicle is not loaded and on ground.

Note: When a vehicle is "not loaded", it means that the fuel oil, engine coolant, and lubricant are all full, and spare tyre, jack, manual tools, and foot pads are all in specified positions.

2.2 Rear suspension

2.2.1 Specification

2.2.1.1 General specifications

Item		Data
Front wheel toe-in	Front wheel	0.08°±0.04°
	Rear wheel	0.1°±0.25°
Wheel camber angle	Front wheel	-0.3°±0.5°
	Rear wheel	-0.1°±0.4°
Kingpin caster angle	Front wheel	6.01°±0.5°
Kingpin inclination angle	Rear wheel	13.29°±0.5
Suspension system	Front suspension	MacPherson type independent suspension + horizontal stabiliser bar
	Rear suspension	Rear trailing arm dependent suspension

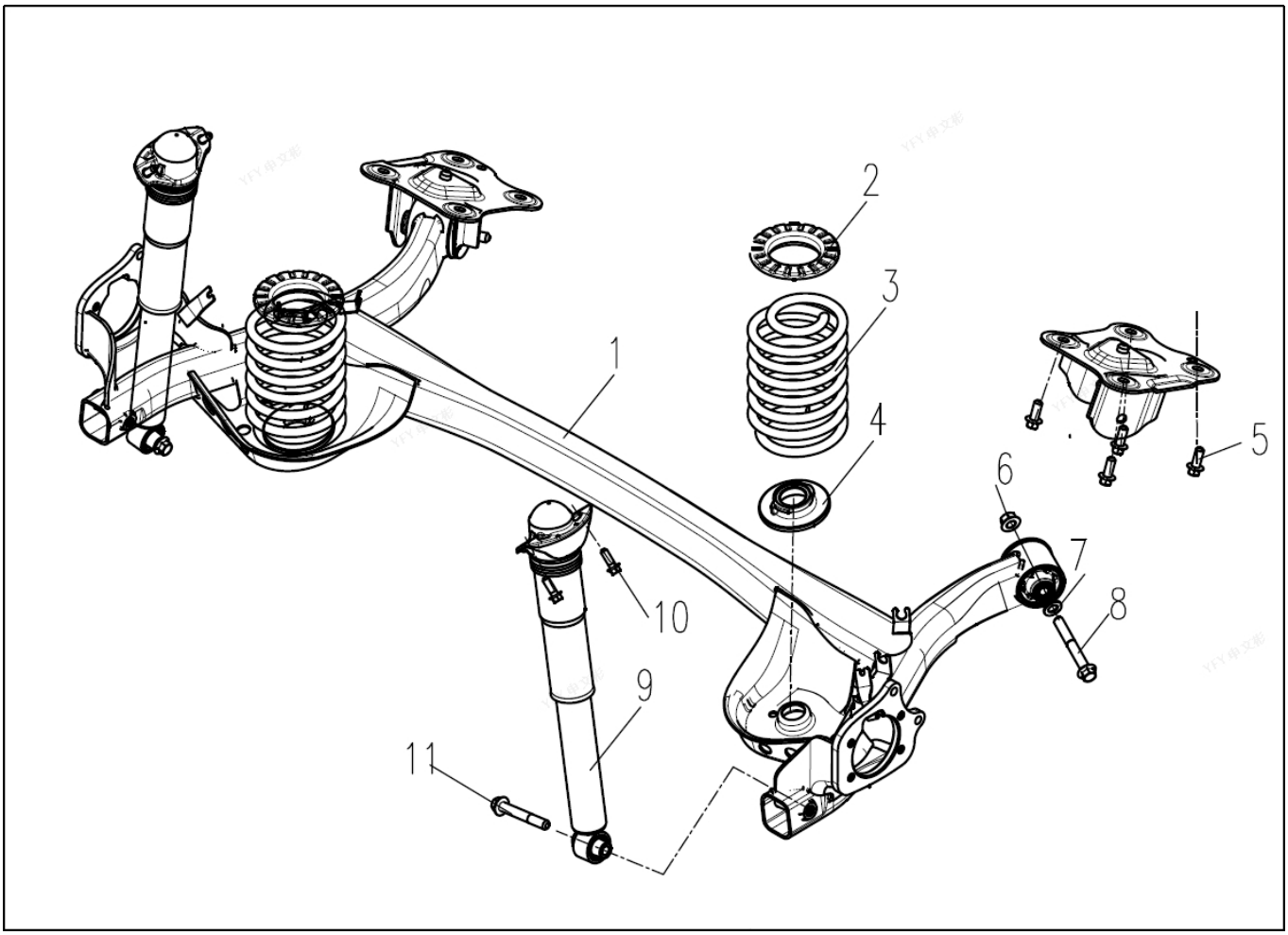
2.2.1.2 Torque specification

Application	Specification
Bolts for connecting rear axle to vehicle body	130±10 Nm
Bolts and nuts connecting the rear axle body to the rear axle bracket	190±10 Nm
Bolts for connecting rear shock absorber to rear axle	190±10 Nm
Bolts for connecting rear shock absorber to vehicle body	80±8 Nm
Connecting drive shaft nut of rear hub bearing unit assembly	295±15
Bolts connecting the rear wheel hub bearing unit assembly to the rear torsion beam assembly	95±9
Rear hub bearing unit assembly connecting wheel nut	130±10
Rear wheel hub bearing unit assembly to rear wheel speed sensor bolt	8±2

2.2.2 Operation Manual

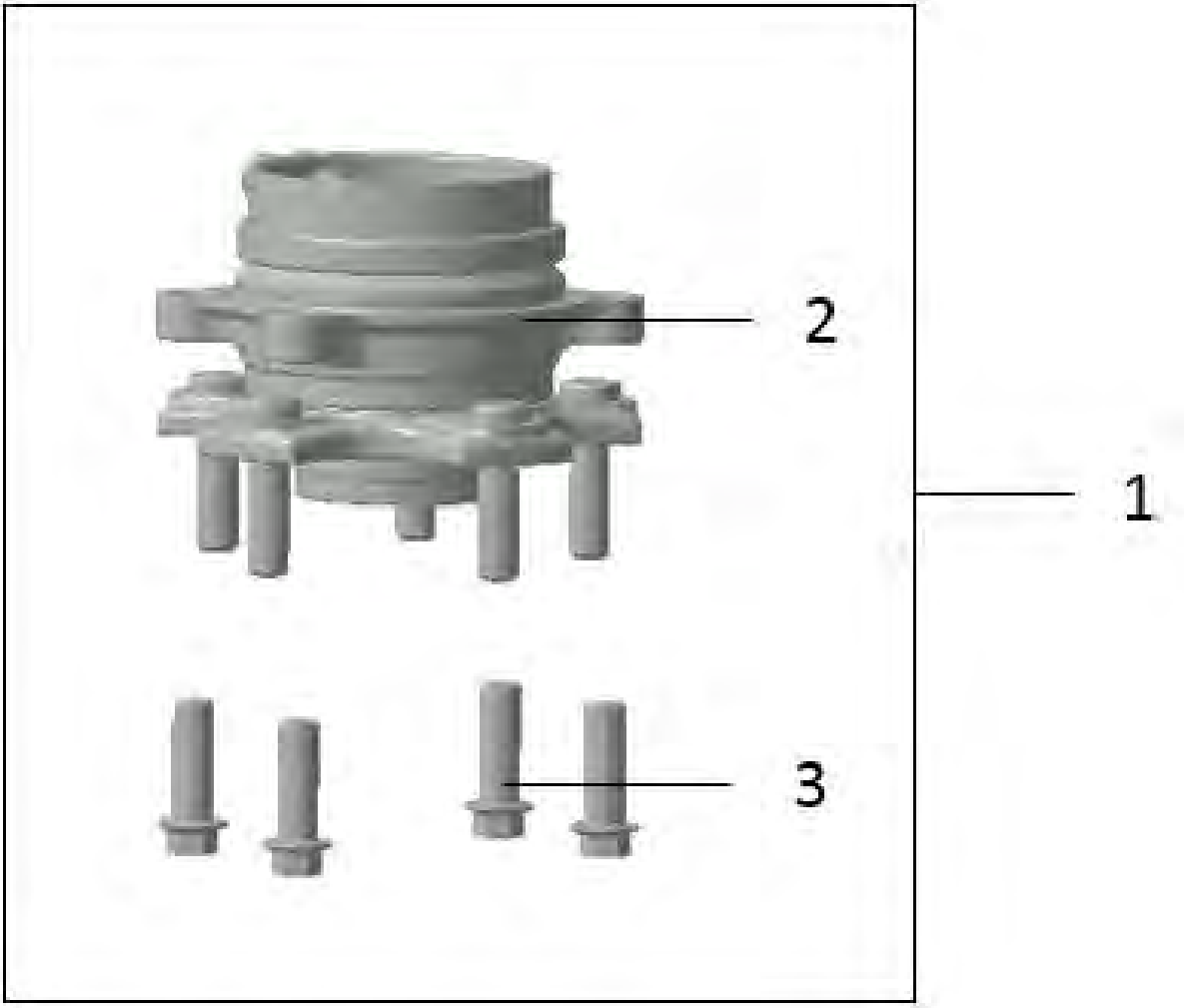
2.2.2.1 Exploded view

Rear suspension



Item	Description	Item	Description
1	Assembly of rear axle with bracket	7	Gasket
2	Rear coil spring upper cushion block	8	Rear axle bracket connecting bolt
3	Rear coil spring	9	Rear shock absorber assembly
4	Rear coil spring lower cushion block	10	Bolts for connecting rear shock absorber to vehicle body
5	Bolts for connecting rear axle to vehicle body	11	Bolts for connecting rear shock absorber to rear axle
6	Rear axle bracket connecting nut		

Rear hub bearing



S/N	Name
1	Rear hub assembly module
2	Rear hub bearing unit assembly
3	Rear hub mounting bolt

2.2.2.2 Overview

Suspension configuration project name

Project		Name
Suspension system	Rear suspension	Multi-link independent suspension & rear trailing arm Non-independent rear suspension

The rear suspension system of SX5GREEV is a non-independent rear trailing arm suspension. The suspension is connected to the wheels through the rear torsion beam assembly, and absorbs the impact energy transmitted by the wheels through the coil spring, shock absorber and suspension bushing.

Steering knuckle with hub bearing

The steering knuckle with wheel hub assembly and rear wheel hub assembly system mainly includes the front steering knuckle, brake mudguard and front and rear wheel hub bearing unit assemblies. It is a bridge connecting the suspension system and the braking system. When the whole vehicle is working, it provides basic support and rotation functions.

2.2.2.3 Precautions

Caution

1. Before removing parts, the vehicle should be powered off and the battery GND cable should be disconnected.
2. Disassemble in a clean working area. It is important to avoid the internal parts being polluted by dust or other foreign objects.
3. Place the disassembled parts on part racks in sequence for easier and more accurate assembling.
4. Please use genuine parts for maintenance work, and do not reuse unusable parts.
5. Please follow the standard maintenance diagnosis process for maintenance work, and make sure that there is no oil stain or grease on the tightening surface.
6. After replacing the steering knuckle and wheel hub bearing parts, the wheel alignment must be checked.
7. Establish environment protection awareness and effectively dispose of waste produced during maintenance.

Precautions during repair

1. Upon assembling of the rubber bushing, final tightening must be done when the vehicle is not loaded and on ground. The rubber bushing shall not contact with engine oil during removal and installation as the engine oil will shorten the service life of the rubber bushing.
2. \"No load\" means that the fuel, engine coolant, and lubricant are all full, and spare tyre, jack, on-board tool, and foot pad are all in specified positions.
3. Wheel alignment must be checked after the suspension parts and components are installed.
4. The self-locking nuts shall not be reused; new self-locking nuts must be used upon each assembling. Do not wipe off the grease precoated on new self-locking nuts when tightening them.
5. The tightening faces must be free from oil stain or grease.

2.2.3 Diagnosis and testing

2.2.3.1 Rear Suspension - Troubleshooting of Noise, Vibration and Harshness

The table below helps identify the cause of symptoms. Repair or replace these parts as necessary.

Rear suspension		Symptoms				
		Noise	Shaking	Vibration	Judder	Uncomfortable riding or difficult to operate
Possible cause and suspicious parts	Improper installation and looseness	•	•	•	•	•
	Deformation, damages or distortion of shock absorber	•	•	•	•	•
	Deterioration of bushing or mounting positions	•	•	•	•	•
	Interference of parts and components	•	•	•	•	•
Possible cause and suspicious parts	Spring fatigue	•		•		•
	Suspension looseness	•	•			
	Incorrect wheel alignment				•	•
	Rear axle and rear suspension	•	•	•	•	•
	Tyre	•	•	•	•	•
	Wheels	•	•		•	•
	Brake	•	•		•	

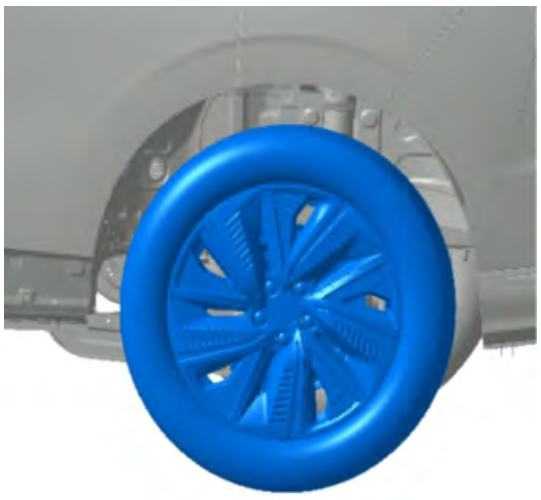
– Applicable

2.2.4 Removal and installation

2.2.4.1 Rear shock absorber assembly

Removal

1. Lift and support the vehicle. Refer to: Lifting the vehicle.
2. Remove the rear wheel tyres.



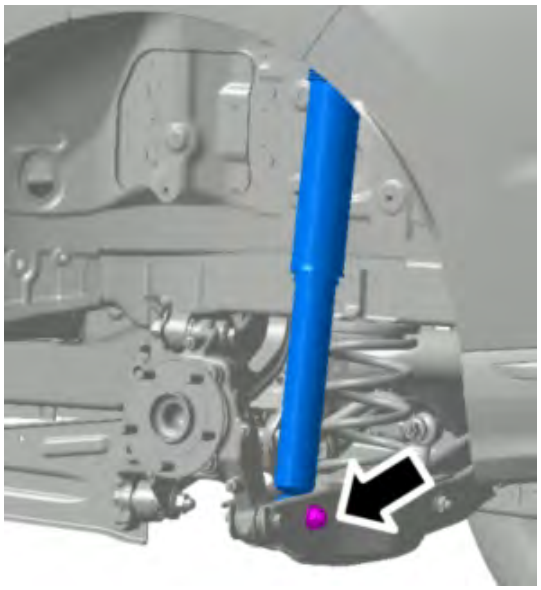
3. Use a suitable jack to support under the spring control arm.

   Note: In this step, the jack is only used as support during disassembling.

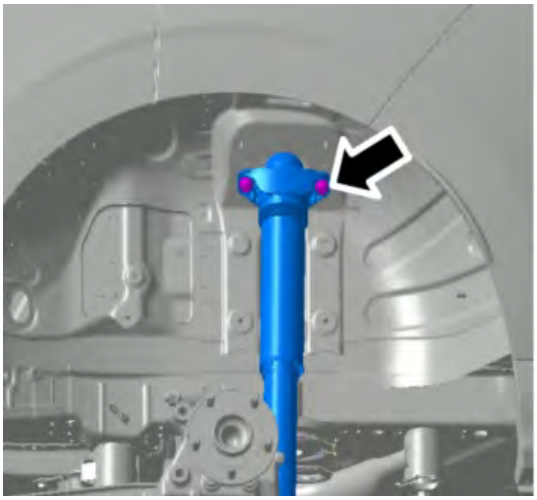
   Note: Do not allow the jack to damage the spring swing arm assembly.

   Note: Check whether the state is stable when using a jack.

4. Remove the mounting bolts and nuts of the shock absorber.



5. Remove the upper bolts and nuts of the shock absorber.



Inspection after removal

1. Check whether the shock absorber has such defects as deformation, crack or damage.
2. Whether the engine oil leaks.
3. Check whether the upper and lower rubber bushings have cracks or are damaged.

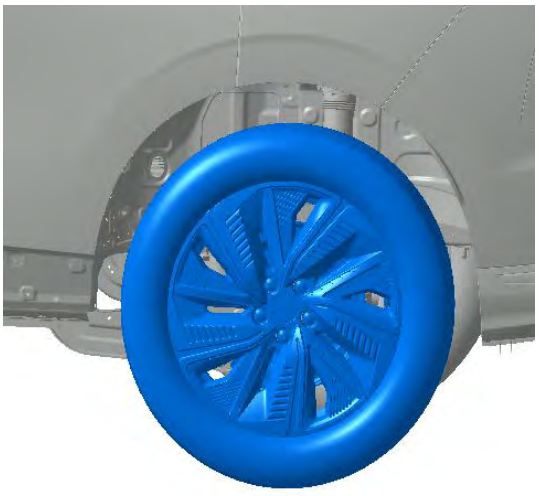
Installation

The installation order is the reverse of the removal order.

2.2.4.2 Rear coil spring and spring pad

Removal

1. Lift and support the vehicle. Refer to: Lifting the vehicle.
2. Remove the rear wheel tyre (above the lifting platform). Refer to: Tyre.



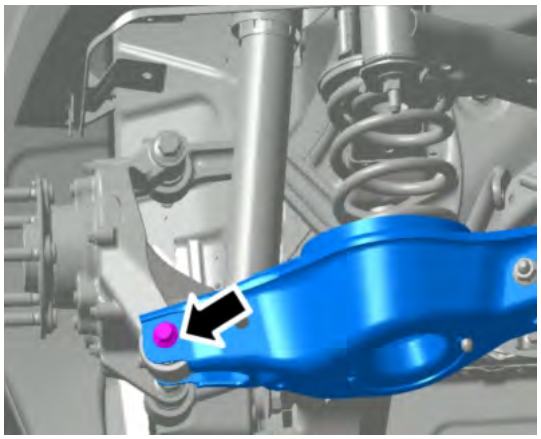
3. Fix an appropriate jack under the rear axle assembly spring carrier or shock absorber bracket. (It is recommended to support the left spring tray to remove the left spring, and support the right spring tray to remove the right spring).

Note: In this step, the jack is only used as support during disassembling.

Note: Do not allow the jack to damage the rear axle assembly.

Note: Check whether the state is stable when using the jack.

4. Remove the bolts and nuts connecting the spring swing arm and the steering knuckle.



Inspection after removal

– Check the rubber seat, bounce buffer, and coil spring for deformation, cracks, or damage. Replace if necessary.

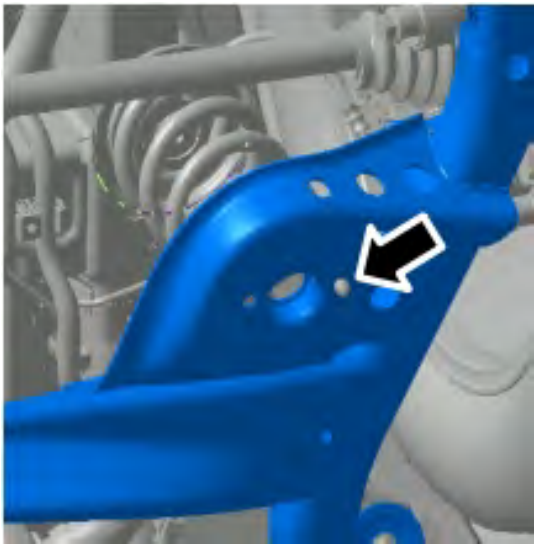
Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

Note: When installing the rear shock absorber and the rear axle assembly, tighten them when the vehicle is in no-load state.

Note: The top of the coil spring is a flat head shape to firmly install the coil spring, and the lower end is aligned with the stop end of the rear coil spring lower pad.

Note: The positioning pin of the lower end positioning protrusion of the rear coil spring lower pad should fall into the corresponding locating hole of the spring tray of the rear axle assembly.

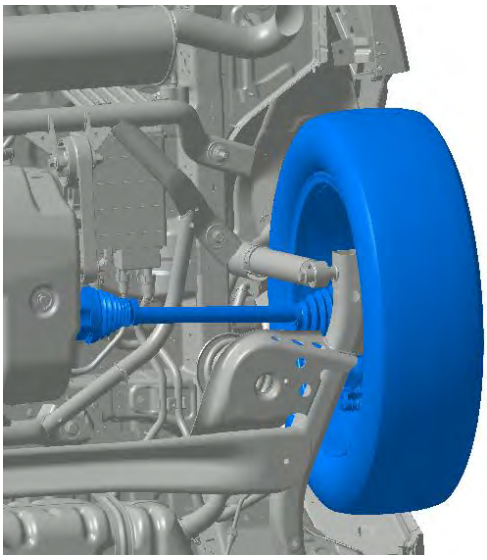


2.2.4.3 Rear axle assembly

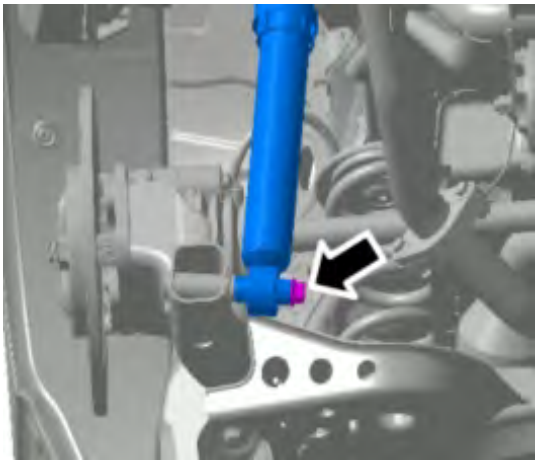
Removal

1. Lift and support the vehicle. Refer to: Lifting the vehicle.

2. Remove the rear drive shaft (above the lifting platform).

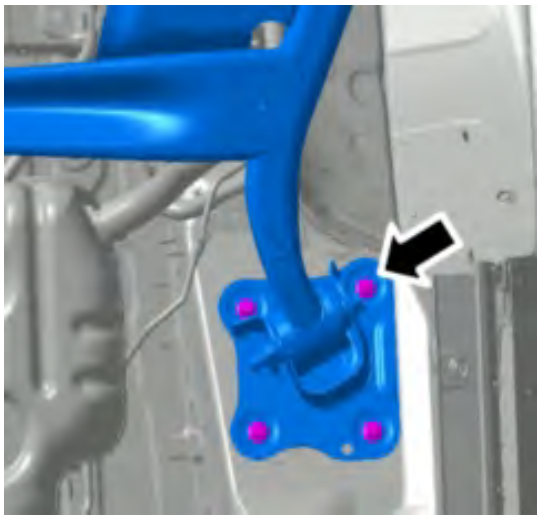


3. Remove the lower mounting bolts of shock absorber.



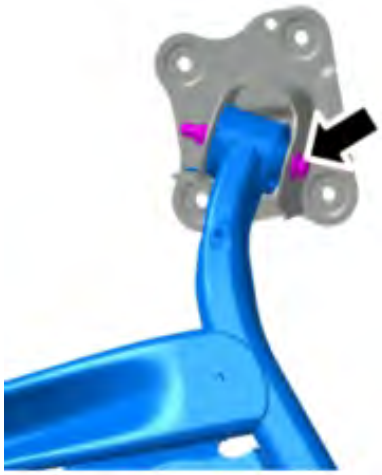
4. Take out the spring.

5. Hold the rear axle assembly crossmember with bracket, and then remove the mounting bolt connecting the rear axle bracket to vehicle body.



6. Slowly lower the bracket and remove the entire rear axle assembly.

7. Remove the mounting bolts and nuts of torsion beam bracket.



Inspection after removal

1. Visually inspect the rear axle assembly (including the rear axle bushing) for obvious deformation, crack or other damage. Replace it if necessary.

Installation

1. The installation order is opposite to that of removal.

2. Before installation, make sure that the bolts and nuts connecting the rear axle body to the rear axle bracket are not tightened. After the rear axle with bracket assembly is installed onto the vehicle body, tighten the bolts and nuts connecting the rear axle body to the rear axle bracket when the vehicle is on the ground without load.

Inspection after installation

1. Check whether the caliper harness is connected correctly.

2. Adjust the brake and check whether the air in the brake pipe is completely vented to ensure proper operation of the brake system.

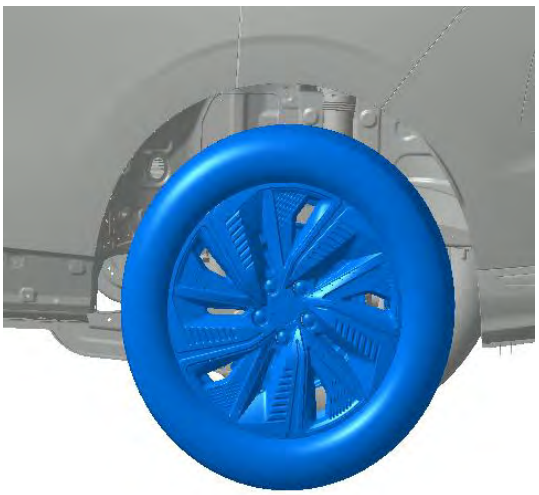
3. Check the wheel alignment.

2.2.4.4 Removal and installation

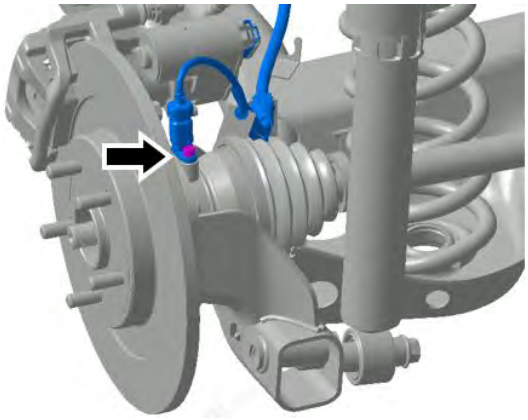
Removal

1. Lift and support the vehicle. Refer to: Lifting the vehicle.

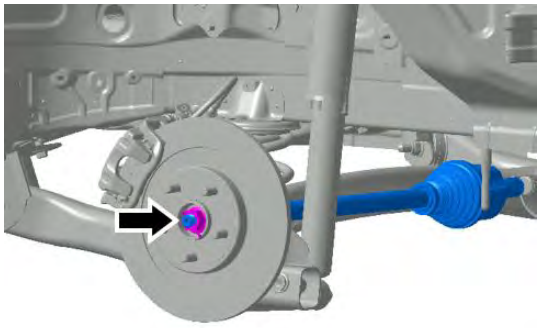
2. Remove the rear wheel tyre (above the lifting platform). Refer to: Tyre.



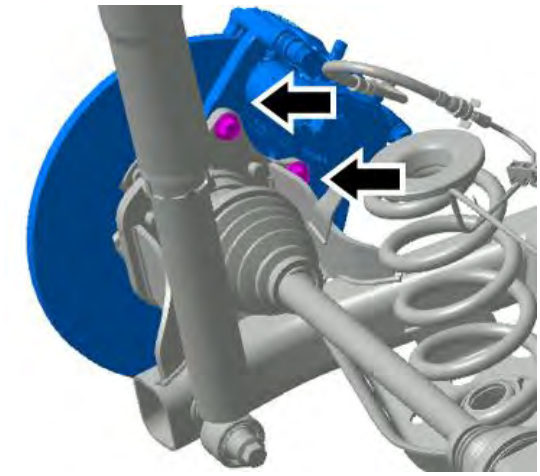
3. Remove the rear wheel speed sensor and harness.



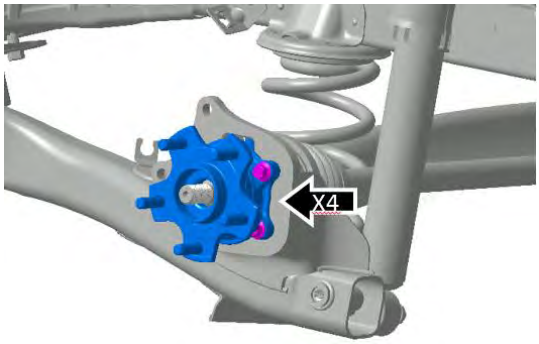
4. Remove the drive shaft nut.



5. Remove the bolts of rear brake assembly.



6. Remove the fixing bolt of rear hub bearing unit.



Inspection after removal

1. Check the rear steering knuckle for deformation, cracks or other damage.
2. Check the hub bearing for oil leakage.
3. Check whether the wheel hub bearing rotates smoothly, whether there is a sense of jamming or abnormal rotation noise, etc.

Replace the defective one(s) where necessary.

Installation

The installation order is the reverse of the removal order.

For details on rear wheel alignment, please refer to the rear wheel alignment requirements of the suspension system. Refer to: Rear Wheel Alignment.

Inspection after installation

1. Confirm fixation (looseness and gaps) of each part; ensure normal status (wear, damage and deformation) of all the parts.
2. Check the rear hub bearing unit assembly for grease leakage and damage, and replace it if any fault is found.

2.2.5 General procedures

2.2.5.1 Rear wheel alignment

Check the following:

1. Proper tyre pressure and tyre wear.
2. If the wheels bounce: check balance condition of tyres.
3. End play of wheel bearings: check the wheel bearings.
4. If retaining elements of suspension are loose and deformed.
5. Check if the subframe, each link, or control arm has any cracks, deformation, or other damage.
6. Vehicle height (position).

Rear wheel alignment parameter table

Positioning angle	value	Remarks
Rear wheel camber	-0.1°±0.4°	Left/right difference is not judged
Rear wheel toe	0.1°±0.25°	Left/right difference is not judged

2.2.5.2 Inspection of camber angle and caster angle

Inspection

1. Before inspection, drive the vehicle onto the lifting frame workstation of four-wheel aligner and keep the vehicle level. The front wheels shall be in the centre of corner plate and the rear wheels shall be in sliding plate.
2. Inspect camber, caster, kingpin inclination, and toe according to the instrument instructions.

2.3 Steering system

2.3.1 Specification

2.3.1.1 Torque specification

Standard and limit

Item		Standard value	Limit value
Steering wheel free play		\	30mm
Steering angle	Inner wheel	36.0 ° ± 1 °	\
	Outer wheel	30.1 ° ±1	\
Starting torque at ball joint of steering tie rod Nm		1．5～3	\

Tightening torque

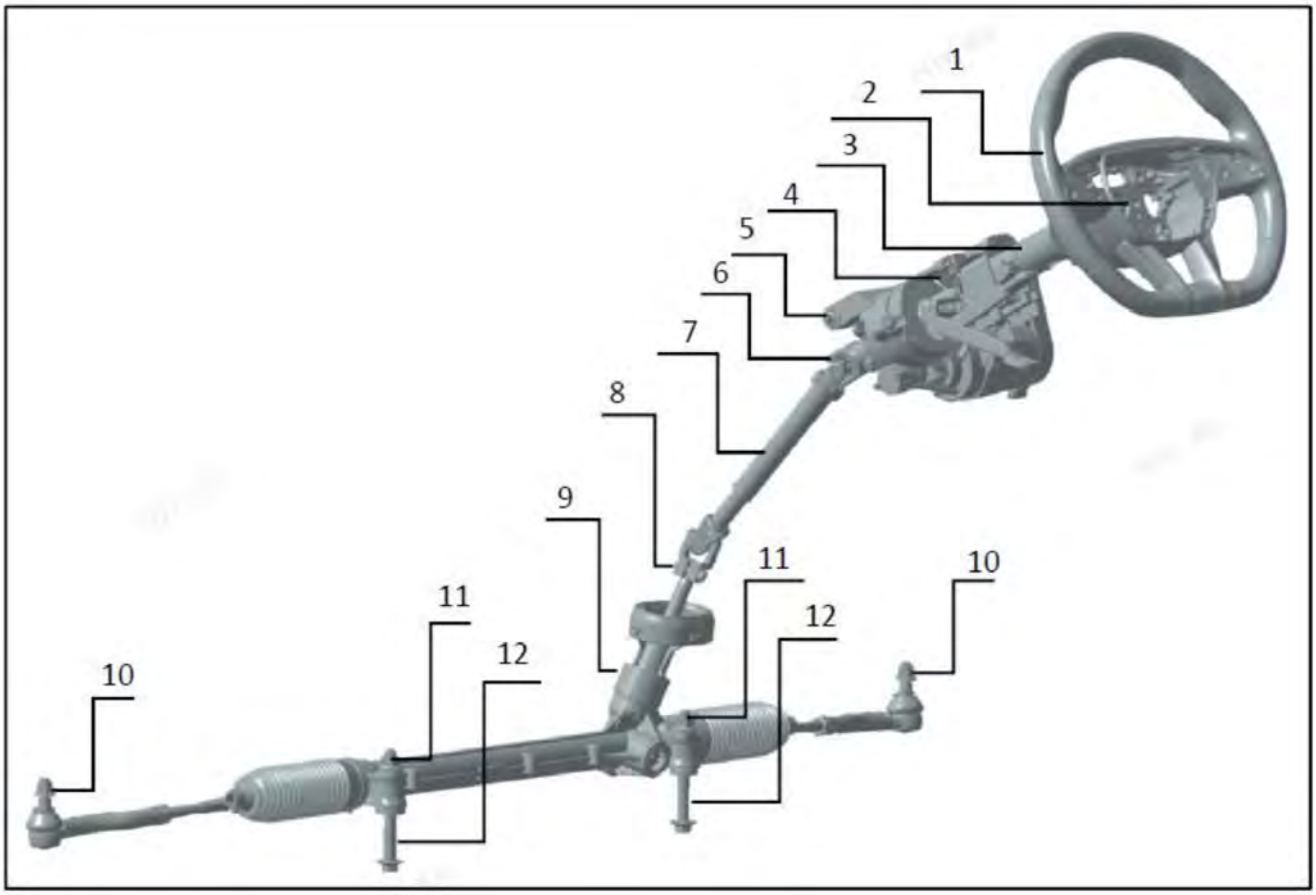
Application	Nm
Lock nut of steering wheel	35±3
Fixing nut of steering column	28±2
Connecting bolt between steering drive shaft and steering column	67±3
Connecting bolt between steering drive shaft and steering gear	65±5
Tie rod end connecting to the steering knuckle arm	60±6
Mounting bolt of steering gear assembly	150±15
Lock nuts at both ends of steering tie rod	100±10

Unspecified bolt, nut tightening torque requirements for the steering system are as follows:

Thread Specification	Nm
M5	5
M6	9
M8	24
M10	45
M12	85
M14	130
Tightening torque tolerance shall not exceed 10%	

2.3.2 Operation Manual

2.3.2.1 EPS 结构



项目	说明
1	方向盘总成
2	方向盘压紧螺母
3	EPS转向管柱总成
4	六角法兰面螺母
5	六角法兰面螺栓
6	六角法兰面螺栓
7	电动转向传动轴总成
8	六角法兰面螺栓
9	机械式转向器总成
10	非金属嵌件六角法兰面螺母
11	六角法兰面螺母
12	六角法兰面螺栓

2.3.2.2 Overview

Necessary materials for maintenance

Lubricants:

Application	Item	Specified lubricant	Qty
Steering wheel assembly	Spline	Lithium-based grease	As per prescribed requirements
Steering transmission equipment	Cross shaft	Lithium-based grease #2	As per prescribed requirements
Steering gear assembly	Corrugated pipe	Silicone grease	As per prescribed requirements
	Upper oil seal	#3 lithium-based grease	As per prescribed requirements

Sealant:

Item	Specified sealant	Remarks
Screws for bearing cover of mechanical steering rack	3M ATD product number 8661 or equivalent products	Semi-dry sealant
Dust cover lip for ball joint at the end of steering tie rod		

System Description

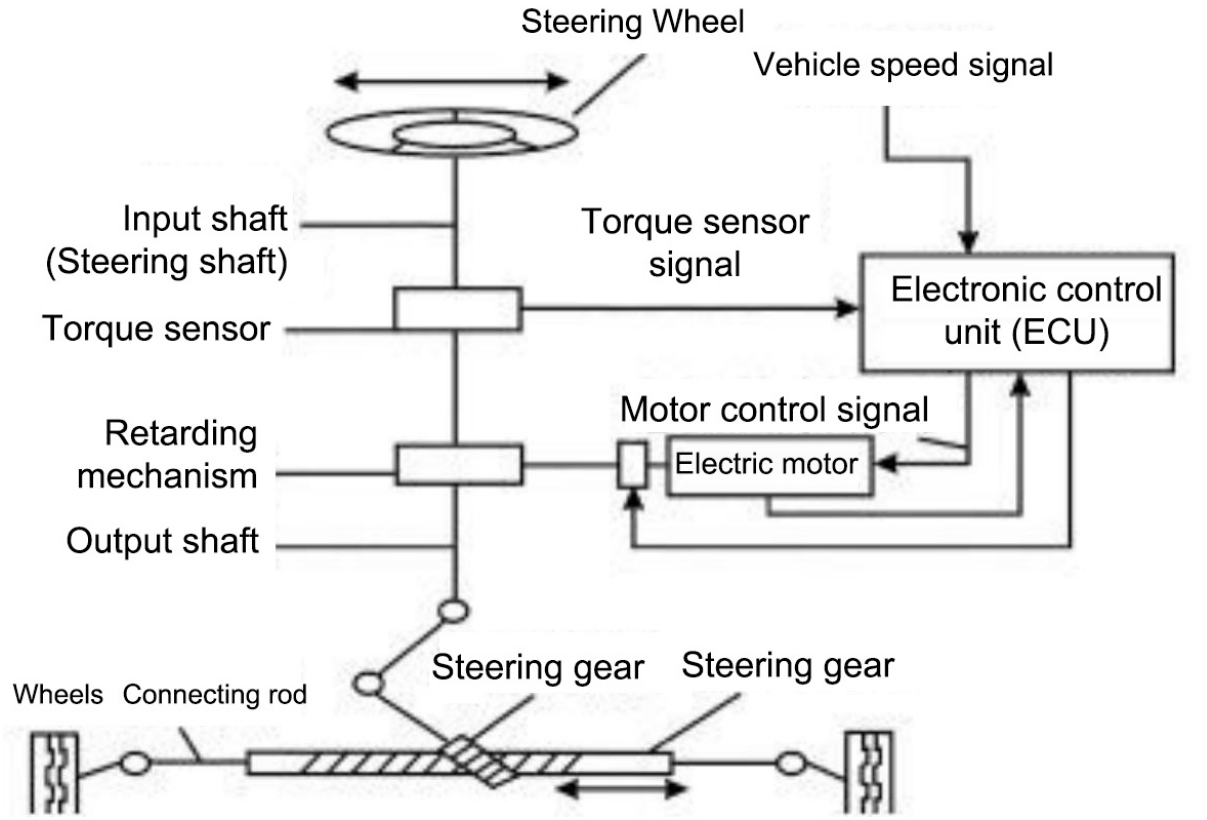
This vehicle is equipped with an electric power steering system.

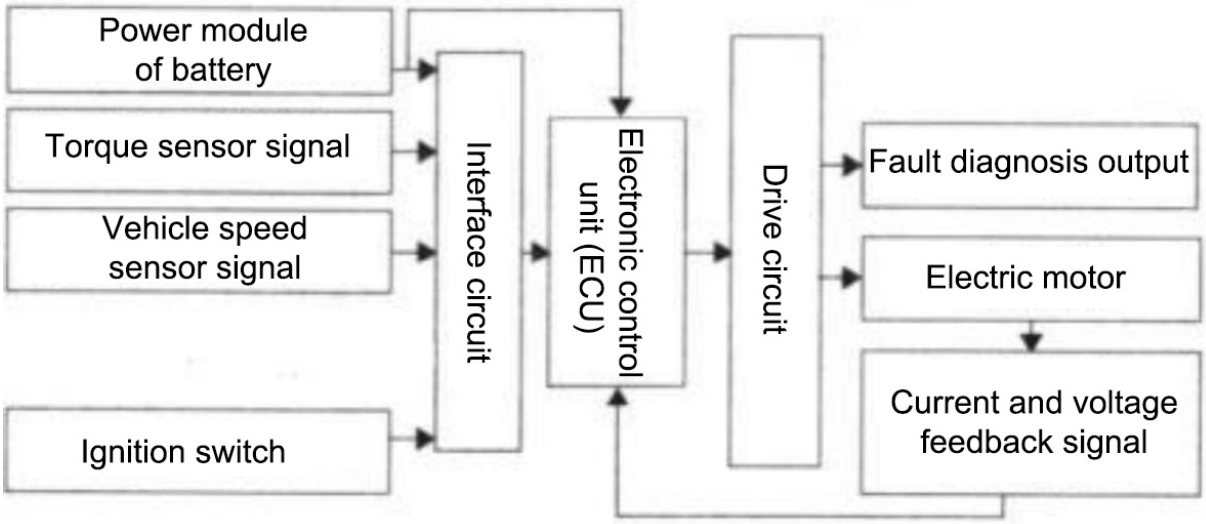
The EPS system mainly consists of steering wheel assembly, EPS column assembly, mechanical steering gear assembly, electric power steering drive shaft assembly and other main parts and components. The EPS column assembly is mainly composed of torque (steering) sensor, ECU, motor, and reduction mechanism. When the vehicle is running straight and there is no torque input to the steering wheel, the motor stops working; when the vehicle turns, i.e. there is torque input on the steering wheel, the ECU of EPS control unit will control the motor torque output according to the input torque of the steering wheel, vehicle speed and steering wheel angle signal, so as to complete power-assisted steering.

Working principle

EPS principle:

Electric power steering (EPS) system is mainly composed of torque (steering) sensor, electronic control unit (ECU), motor, and reduction mechanism. When the vehicle is travelling in a straight line, the motor stops operating. The system provides real-time power steering only when the vehicle is turning.





2.3.2.3 Precautions

Precautions for steering system

1. **Note: In case the steering system goes wrong, item-by-item check should be performed in accordance with the steps and methods as specified in the fault criterion and aimless replacement of components must be avoided.**

During installation of steering gear, the tie rod of pull rod must be tightened up finally after the vehicle is reliably grounded and in the no-load condition and before wheel alignment.

Precautions for Removal

1. **Note: Thoroughly clean the outside of the device before removing it.**
2. **Note: Disassemble in a clean working area to avoid that internal components and parts are polluted by dust or other foreign objects.** Preventing internal parts and components from pollution by dust or other foreign objects is very important.

3. **Note: Place the removed parts on the parts rack for easier and more accurate assembly.**
4. **Note: Clean the parts and components with nylon cloth or tissue as ordinary shop rags may leave cloth scraps that will affect the operation thereof.**
5. **Note: Never reuse non-reusable parts.**
6. **Note: Lubricate the designated parts and components with specified grease before assembling.**

2.3.3 Diagnosis and testing

2.3.3.1 Steering System - Troubleshooting of noise, vibration and harshness

The table below helps identify the cause of symptoms. Repair or replace these parts as necessary.

Steering		Symptoms			
		Noise	Shaking	Vibration	Judder
Possible cause and suspicious parts	Ball joint swing torque	•			
	Ball joint torsional torque	•			
	Ball joint end clearance	•	•		
	Free travel of steering wheel	•	•		
	Steering gear rack and pinion clearance	•	•		
	Insufficient torque on the steering wheel gland nut	•	•	•	•
	Adjustment handle not locked	•	•	•	•
	Steering dust cover rubber interference	•		•	•
Possible cause and suspicious parts	Deformation or damage of steering column	•		•	
	Incorrect or loose installation of steering column		•	•	
	Excessive clearance in the steering drive shaft	•	•		•
	Insufficient torque on the steering drive shaft locking bolt	•	•	•	•
	Insufficient suspension system torque	•			
	Tyre	•	•		•

Steering		Symptoms			
		Noise	Shaking	Vibration	Judder
	Wheels	•	•	•	
	Drive shaft	•	•		•
	Brake	•			

2.3.3.2 Steering System - DTC and corresponding handling method

DTC and corresponding handling method

S/N	DTC	Description	Possible causes	Handling Method
1	U012100	Vehicle speed signal loss	ABS/ESP system abnormal	1. Clear the DTC with a diagnostic scanner, turn off the ignition switch, wait for two minutes, and restart to check whether the DTC reappears. 2. Check whether the ABS/ESP system is normal. If the ABS/ESP system also displays abnormal vehicle speed signal, handle it according to the chapter of ABS/ESP.
2	U012110	Speed signal invalid		
3	U010000	Engine speed signal loss	The engine system is abnormal and the engine stalls.	1. Clear the DTC with a diagnostic scanner, turn off the ignition switch, wait for two minutes, and restart to check whether the DTC reappears. 2. Check whether the engine system is normal. If the engine system also displays abnormal speed signal, handle it according to the engine chapter.
4	U010010	Engine speed signal invalid		

S/N	DTC	Description	Possible causes	Handling Method
5	U007300	CAN communication failure	CAN communication signal lost; vehicle CAN network abnormal; steering wheel angle sensor is additionally installed	1. Clear the DTC with a diagnostic scanner, turn off the ignition switch, wait for two minutes, and restart to check whether the DTC reappears. 2. Check the vehicle's CAN network. 3. Check whether the steering wheel angle sensor is additionally installed in the multi-function switch.
6	C105900	Absolute angle not calibrated	Steering wheel angle signal not calibrated	Perform zero calibration for the steering wheel angle signal with a diagnostic scanner according to the above zero calibration process.
7	C105910	Steering angle signal invalid	Steering angle signal invalid	1. Perform zero calibration for the steering wheel angle signal with a diagnostic scanner according to the above zero calibration process. 2. Clear the DTC with a diagnostic scanner, turn off the ignition switch, wait for two minutes, and restart to check whether the DTC reappears. 3. If the same DTC recurs, replace the EPS controller. 4. If no improvement after replacement of the EPS controller, replace the EPS steering column.

S/N	DTC	Description	Possible causes	Handling Method
8	C105800	Angle sensor fault	Angle sensor fault	1. Check whether the EPS sensor harness is well connected and whether there is interference at the connector position. 2. Clear the DTC with a diagnostic scanner, turn off the ignition switch, wait for two minutes, and restart to check whether the DTC reappears. 3. If the same DTC recurs, replace the EPS controller. 4. If no improvement after replacement of the EPS controller, replace the EPS steering column.
9	C105700	Column ECU fault	EPS controller fault	1. Visually check the controller cover for impact marks. 2. If the appearance is intact, clear the DTC first. The MIL will still be on after restart. Test the DTC again with a diagnostic tool for confirmation. If the DTC is consistent after confirmation, replace the EPS controller directly.

S/N	DTC	Description	Possible causes	Handling Method
10	C105600	RAM storage error	EPS controller fault	1. Visually check the appearance of the housing for impact marks. 2. If the appearance is intact, clear the DTC first. The MIL will still be on after restart. Test the DTC again with a diagnostic tool for confirmation. If the DTC is consistent after confirmation, replace the EPS controller directly.
11	C105710	Relay fault	Relay fault	1. Visually check the appearance of the housing for impact marks. 2. If the appearance is intact, clear the DTC first. The MIL will still be on after restart. Test the DTC again with a diagnostic tool for confirmation. If the DTC is consistent after confirmation, replace the EPS controller directly.

S/N	DTC	Description	Possible causes	Handling Method
12	C105720	Temperature sensor fault	ECU temperature sensor fault	1. Visually check the appearance of the housing for impact marks. 2. If the appearance is intact, clear the DTC first. The MIL will still be on after restart. Test the DTC again with a diagnostic tool for confirmation. If the DTC is consistent after confirmation, replace the EPS controller directly.
13	C105400	ROM storage error	EPS controller fault	1. Visually check the appearance of the housing for impact marks. 2. If the appearance is intact, clear the DTC first. The MIL will still be on after restart. Test the DTC again with a diagnostic tool for confirmation. If the DTC is consistent after confirmation, replace the EPS controller directly.
14	C105317	Battery overvoltage	17V	1. Check the generator and battery voltage. 2. Check whether the power harness connection is in good condition.
15	C105316	Battery undervoltage	<9V	1. Check the generator and battery voltage. 2. Check whether the power harness connection is in good condition.

S/N	DTC	Description	Possible causes	Handling Method
16	C105200	Motor rotor position signal abnormal	Motor fault.	1. Check whether the EPS sensor harness is well connected and whether there is interference at the connector position. 2. Clear the DTC with a diagnostic scanner, turn off the ignition switch, wait for two minutes, and restart to check whether the DTC reappears. 3. If the same DTC recurs, replace the EPS controller. 4. If no improvement after replacement of the EPS controller, replace the EPS steering column.
17	C105210	Motor voltage/current abnormal		
18	C105220	Short circuit or open circuit of motor		

S/N	DTC	Description	Possible causes	Handling Method
19	C105100	Torque sensor fault	Torque sensor fault	1. Check whether the EPS sensor harness is well connected and whether there is interference at the connector position. 2. Clear the DTC with a diagnostic scanner, turn off the ignition switch, wait for two minutes, and restart to check whether the DTC reappears. 3. If the same DTC recurs, replace the EPS controller. 4. If no improvement after replacement of the EPS controller, replace the EPS steering column.
20	C0176.54	Overheating protection	EPS enters thermal protection mode	Turn off the ignition switch, and start again after cooling for a while.

2.3.3.3 Steering System - Checklist of fault symptoms

Understand the fault symptoms and check as per possible causes.

Fault symptom		Possible causes	Checking sequence
Communication with X-431 fails	Communication with any systems fails	– Faults of diagnostic connectors – Faults of X-431 connectors – Faults of CAN communication lines – Faults of X-431	1
	Only unable to communicate with EPS.	– EPS fuse blown – Fault of CAN communication line (only connected to EPS part) – Fault of EPS connector – EPS-ECU fault	2

2.3.3.4 Steering System - Standard process for fault diagnosis

Standard flow chart of fault diagnosis

Steps	Diagnosis action	Yes	No
1	1. If possible, connect or install all parts that were previously disconnected or removed. 2. Turn the key to the ON position, and the vehicle does not start. 3. Connect the X431 main unit to the diagnostic interface of the vehicle via a diagnostic wire, and make it communicate with ECU. Make sure if the X431 main unit can communicate with the ECU.	Go to Step 2	Go to Step 4
2	Are there any current or stored diagnostic trouble codes?	Go to Step 3	Go to Step 7
3	1. Record the present DTC and occurrence time. 2. Record the previous DTC and occurrence time. Please do not clear the DTC before the X431 diagnostic host records the necessary information.		
4	Can the X431 main unit communicate with other modules (such as airbags) on the same data line?	Go to Step 5	Go to Step 6
5	To the DTC and corresponding handling method "CAN Communication Failure".		
6	Inspect the data link connector of the electrical diagnosis part.		

Steps	Diagnosis action	Yes	No
7	1. Remove the key. 2. Wait for 10 seconds. 3. Turn the key to the ON position, do not start the vehicle, and observe the orange EPS warning light. 4. Do the EPS and brake warning lights turn on and then off for an instant? (Bulb test)	Go to Step 8	Go to Step 9
8	System functions normally.		
9	Are there any lights still on?	Go to Step 10	Proceed to Step 11
10	Handle according to the current fault points recorded in Step 3, and restart the detection after troubleshooting (starting from Step 1).		
11	Check the circuit.		

2.3.3.5 Steering System - Common faults and troubleshooting methods of electric steering

Fault	Main Causes	Troubleshooting Methods
Heavy steering in one direction	1. Insufficient tyre pressure on one side.	Inspect the tyre pressure.
	2. Excessive deviation in the no-load torque value	X431 reads EPS data flow, and confirms whether the torque value of the steering wheel in the free state is within ±0.5Nm.
Heavy steering	1. Tyre pressure too low	Inspection of tyre pressure
	2. Incorrect front wheel alignment.	Check and adjust as per relevant provisions
	3. Friction due to bending of the steering drive shaft or denting of the steering column.	Correct or replace
	4. Steering tie rod system parts bent, and the friction of the ball pins too large	Lubricate or replace
	5. Vehicle speed signal abnormal	Diagnose with a diagnostic scanner
	6. EPS system fault	Diagnose with a diagnostic scanner
	7. Serious overload of vehicle	Reduce the load

Fault	Main Causes	Troubleshooting Methods
	8. EPS system overheating protection	Restart the vehicle. Avoid repeatedly turning the steering wheel sharply back and forth when the vehicle is stationary or at very low speed; avoid holding the steering wheel at either extreme lock position for more than 5 seconds.
	9. Insufficient battery voltage or poor harness contact	Check the battery voltage and harness connections.
Heavy steering when the vehicle is driven on uneven, bumpy roads	1. The EPS controller harness connector is loose, resulting in poor contact. When driving on bumpy roads, the signal becomes intermittent, causing heavy steering 2. The battery's positive and negative poles are loose, resulting in poor contact. When driving on bumpy roads, the power supply becomes intermittent, causing heavy steering	1. Check whether the power supply and communication interface connections are secure 2. Reconnect the power supply and communication plugs
Large free travel of steering wheel	1. Loose fitting between steering wheel and steering column.	Tighten the loose parts
	2. Insufficient torque of locking bolts at both ends of steering drive shaft.	Tighten the loose parts
	3. Looseness of steering gear fixing bolt.	Tighten the loose parts
	4. Worn front wheel bearings	Replace the front wheel bearing
	5. Worn components of the steering tie rod system.	Replace worn parts
	6. Worn steering gear pinion and rack.	Replace the steering gear.
Abnormal noise of mechanical system	1. Looseness of steering drive system.	Tighten the connectors, especially the locking bolts at both ends of the steering drive shaft.
	2. Worn steering system universal joints.	Replace the steering drive shaft and locking bolt.
	3. Excessively loose backlash adjustment or damage of steering gear racks	Adjust or replace the steering gear assembly.
Poor returnability	1. Different tyre pressures or insufficient tyre pressure for left and right tyres.	Adjust and inflate as per relevant provisions.
	2. Interference between steering gear input shaft and steering dust cover.	Adjust.
	3. Zero position deviation of steering wheel angle signal.	Check and adjust with X431.

Fault	Main Causes	Troubleshooting Methods
	4. Improper alignment of front wheels.	Adjust.
Unstable steering	1. Loose or worn steering system components	Tighten or replace.
	2. Loose or worn front suspension and wheel system parts	Tighten or replace.
	3. Non-compliance with wheel dynamic balance or four-wheel alignment parameters	Check and adjust.
Steering mode selection failure	1. Conditions not met.	Stop the vehicle and move your hands away from the steering wheel to make a selection.
	2. X431 set to "selection via diagnostic scanner"	Use X431 to set "select through the central control panel".
	3. The EPS system is faulty.	Carry out troubleshooting according to the "EPS system fault diagnosis" in this section.
	4. Fault present in the central control panel	Troubleshoot and rectify according to the In-Vehicle Infotainment (IVI) System section
EPS itself does not report a fault, but the ESP system reports an SAS fault	The zero position of the angle signal is incorrect.	Zero the steering wheel angle signal with X431 again according to the process (if EPS works normally and no fault is reported, do not replace the EPS column).

2.3.4 Removal and installation

2.3.4.1 Steering Wheel

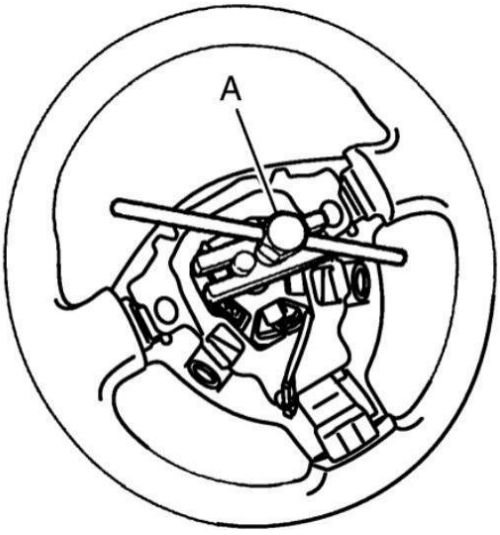
Removal

1. Remove the SRS (airbag). SRS parts are installed in this area. Before maintenance or service, review the SRS parts location, precautions and steps in the SRS section. Refer to: Driver SRS components.
2. Disconnect the horn connector, airbag connector, and multi-function switch connector (if equipped). Remove the driver's SRS module and place it in a safe, secure location to prevent damage.
3. Use a torque wrench to remove the lock nut of the steering wheel after the steering is locked.

   Torque: 35±3Nm

4. Pull the steering wheel out of the steering column spline tooth with a special tool.

   Note: Do not knock the steering wheel in any way when removing it.



Installation

Install in the reverse order of disassembly and pay attention to the following matters:

Note: The installation order is opposite to the disassembly order.

Note: Check the brake fluid level in the brake fluid reservoir, and fill the brake fluid to the maximum scale if necessary.

Note: Exhaust air from the brake system according to the specified method. Refer to: Brake system bleeding.

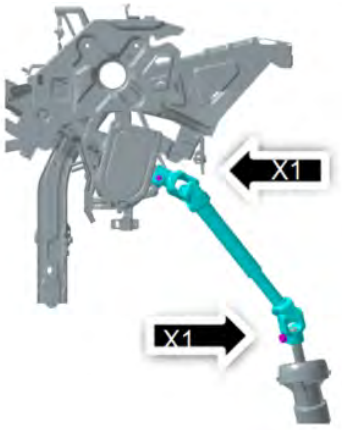
2.3.4.2 EPS steering column

Removal

1. Park the vehicle perfectly straight (straighten the steering wheel).
2. Unplug the vehicle harness connector from the controller, including power line and communication line.
3. Remove the steering wheel. Refer to: Steering Wheel.
4. Remove the upper and lower covers of steering column. Refer to: Steering Column Upper and Lower Shield Assembly.
5. Remove the instrument panel lower cover plate. Refer to: Instrument Panel.
6. Remove the multi-function switch. Refer to: Multi-function switch.
7. Remove the Start switch. Refer to: Start switch.
8. Disengage the harness connector and take out the multi-function switch and spiral cable from the steering column.
9. Remove the locking bolt of universal joint on the lower side of instrument panel (as shown in figure), and disconnect steering drive shaft from power steering gear and steering column.

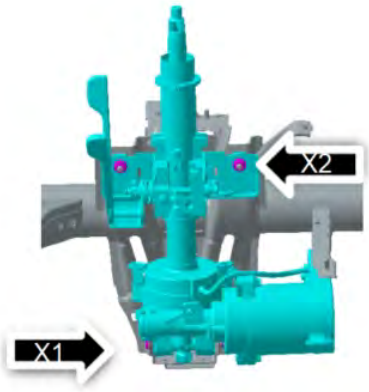
   1 Torque: 67±3Nm (upper M10 bolt)

   2 Torque: 65±5Nm (lower M10 bolt)



10. Firstly remove the (two) fixing nuts at the upper end of the steering column and then turn the steering column backward, prop up its lower end by hand and remove the (one) fixing bolt at the lower end.

    Torque: 28±2Nm



11. Hold the lower end of steering column with hand and take out the steering column assembly from vehicle.

    Note: Disconnect the steering drive shaft from the steering gear. The steering drive shaft must be taken out along the axis of the steering gear input shaft, and must also be installed along the axis of the steering gear input shaft during assembly. Gloves must be worn when taking out, placing and assembling the steering drive shaft; otherwise, it will cause rust.

    Note: Once the locking bolts at both ends of the steering drive shaft are removed, be sure to replace them. During each maintenance, please check the torque of locking bolt at the lower end of steering drive shaft and ensure that it is within the specified torque range.

    Note: During removal and assembling of EPS steering column, its lower end must be propped by hand, while its upper section should not be lifted. Otherwise, it may be damaged.

    Note: Avoid hitting the steering column assembly during removal and installation, especially the motor and controller. If the steering column assembly is dropped or subjected to severe impact, it must be replaced with a new one.

    Note: Do wear gloves when taking out and placing the EPS steering column. Handle with both hands (one hand for booster mechanism, one hand for protective pipe).

Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

Note: The four mounting points of the EPS steering column must be installed in the following order: tighten 2 bolts on the lower side → tighten right bolt → tighten left bolt → apply torque from the lower side first, then the right side and finally the left side. If this sequence is not followed, adjustment jamming may occur. Please follow the requirements.

Note: After the EPS steering column is installed, perform zero calibration for the steering wheel angle signal. The steering wheel angle signal must be zeroed every time any spline connection between the steering drive shaft and the steering gear, the steering drive shaft and the steering column, and the steering column and the steering wheel is reassembled. During zero calibration, ensure the front wheels are in the straight-ahead position.

1. X-431 diagnostic scanner path: Dongfeng Forthing-Forthing Jingyi Series-T5 EVO Series-System Selection-(EPS) Electric Power Steering System-Special Function-Steering Wheel Angle Sensor Zero Marking.

2. After entering, the interface shown in Fig. 1 is displayed, and DTC reading and clearing, EPS neutral position

calibration, etc. can be performed. During the neutral position calibration, tap "Calibration Neutral Position" and a prompt message as shown in Fig. 2 will pop up. If the prompt conditions are met, tap "OK" to start zero calibration. The EPS zero calibration is completed when a prompt message of "Calibration Succeeded" as shown in Fig. 3 pops up.

Fig. 1

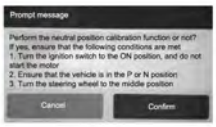


Fig. 2

Fig. 3

Inspection after installation

1. Properly assemble the steering wheel in the centre position and turn it left and right to the limit positions several times to ensure that it operates flexibly.
2. Check steering wheel free play
3. Check whether the steering column is securely locked. If not, be sure to adjust the adjustment handle of the steering column. Specifically, adjust the lock nut (left-hand nut) on the adjustment handle to make the adjustment handle in a proper locking state.
4. Check whether the angle adjustment of steering column is smooth. If it gets stuck:

   1. The upper mounting point is not parallel to the lower mounting point, i.e. the steering column collapses due to torsion

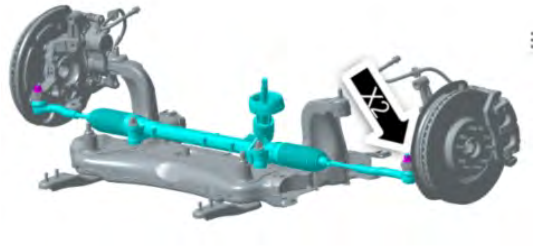
   2 Wrong tightening sequence
5. Adjustment scheme: Loosen the right bolt (do not completely remove it) → loosen the left bolt (do not completely remove it) → adjust the steering wheel up and down, forward and backward → tighten the right bolt → tighten the left bolt → adjust the steering wheel up and down, forward and backward to try the adjustment force → apply torque, first on the right side and then on the left side.
6. Check whether the EPS harness connector is firmly connected and whether the instrument panel fault indicator stays on; use X431 to check the DTC and clear it.

2.3.4.3 Mechanical steering gear assembly

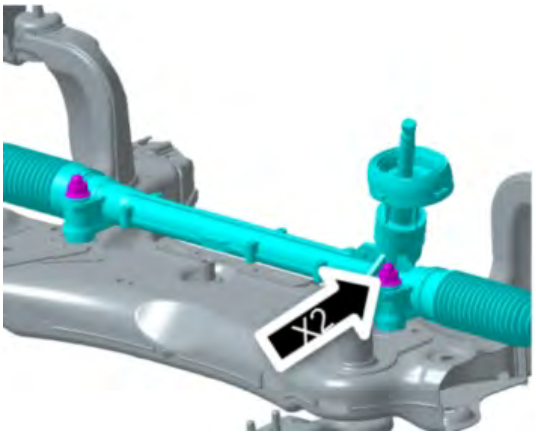
Removal

1. Park the vehicle perfectly straight (straighten the steering wheel).
2. Remove the connecting bolts of the universal joint and disconnect the steering column and power steering gear.
3. Remove the front left and right wheels. Refer to: Wheel Assembly.
4. Disconnect the steering tie rod and steering knuckle.

   Torque: 60±6Nm



5. Remove the front subframe. Refer to: Front Subframe.
6. Screw out the two bolts fixing the steering gear on the subframe and take out the steering gear. Torque tightening standard: 150±15Nm.



Installation

1. Assemble the steering gear onto the subframe.
2. Connect properly the steering column and tighten it as per torque requirements.
3. Turn the steering wheel to the limit position at one side and then turn it half back (about 1.35 turns) and maintain it.
4. Connect the steering gear ball joint tie rod to the steering knuckle under the condition that the front wheels face straight forward, and tighten to the required torque. If the steering wheel is misaligned at this time, reassemble it.

Note: After replacing the steering gear, recheck and adjust the four-wheel alignment and perform zero calibration for EPS with X431 diagnostic scanner.

2.4 Wheels and tyres

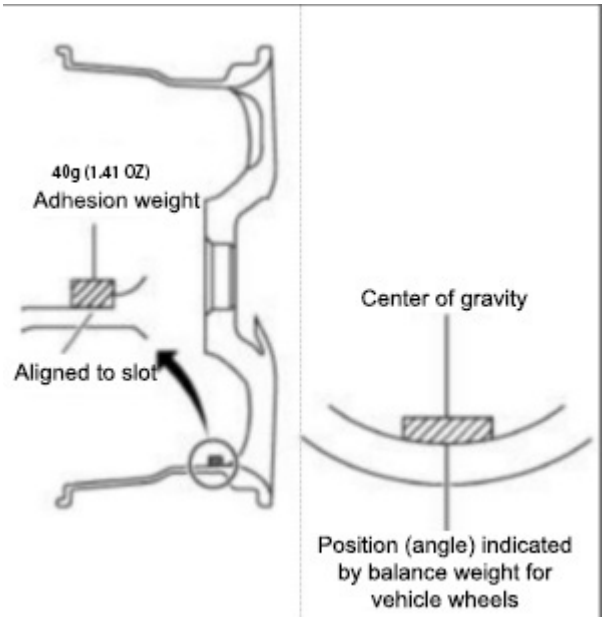
2.4.1 Specification

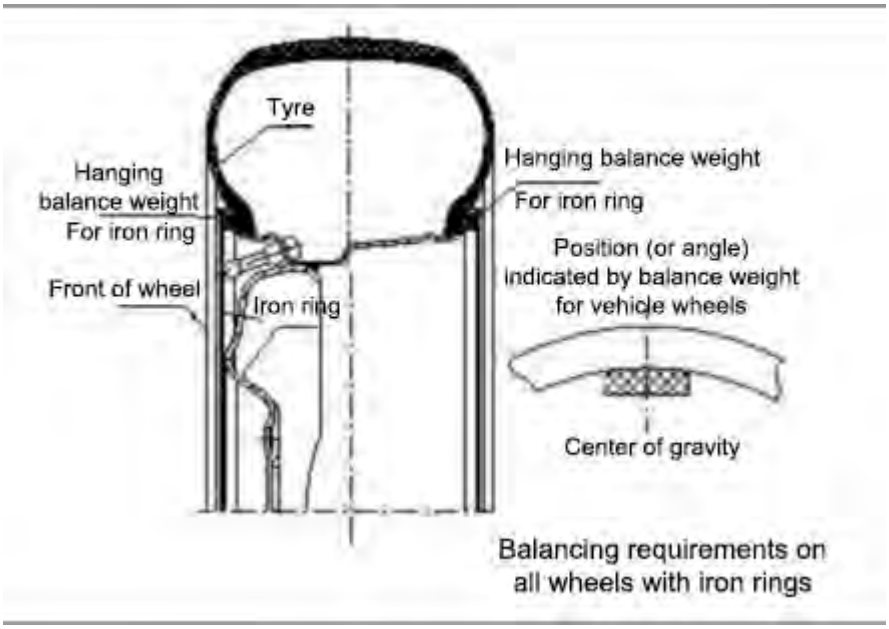
2.4.1.1 Tyre specification

Tyre configuration of this model

	Main tyre	Spare tyres	Remarks
Tyre specification	235/55R19, 235/60R18, 225/65R17	T155/90 R17	Radial tyre
Rim dimension	19×7J, 18×7J, 17×7J	17×4T	
Tyre pressure	Front wheel air pressure 260 ±5 kPa, rear wheel air pressure 260±5 kPa	420±5kPa	

The wheel balances (allowable maximum imbalance values)





Maximum allowable imbalance quantity	
Dynamic (edge of rim)	10 g (0.35 oz) (one side)
Static (edge of rim)	20 g (0.71 oz)

2.4.1.2 Torque specification

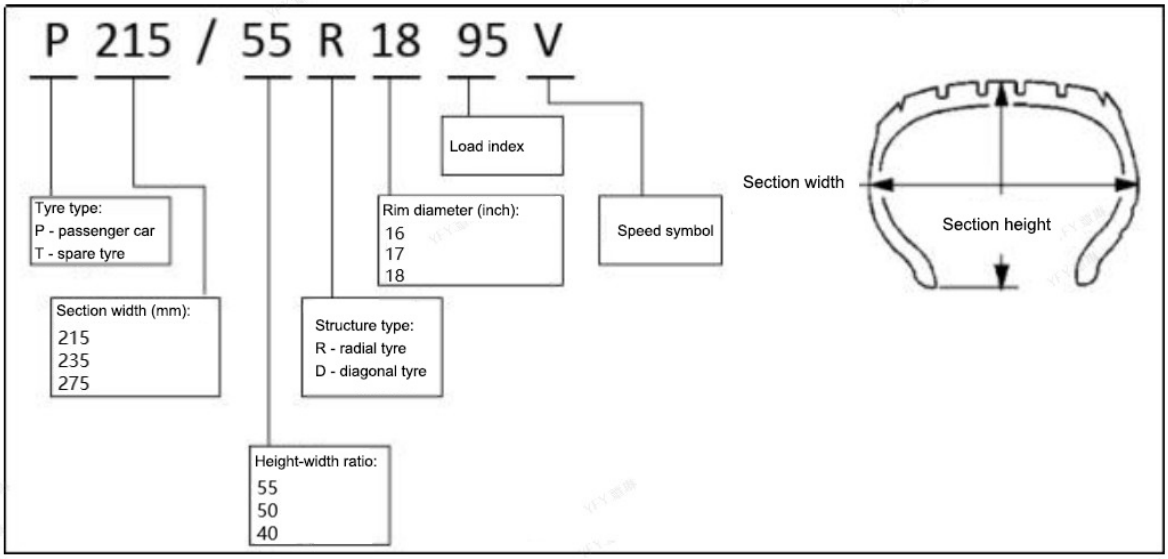
Name	Nm
Wheel nut	130±10

2.4.2 Operation Manual

2.4.2.1 Overview

Description of metric-size tyres for passenger vehicles

Replacement tyres should be of the same tyre performance criteria TPC specification number including the same size, the same load range, and the same construction as those originally installed on the vehicle.



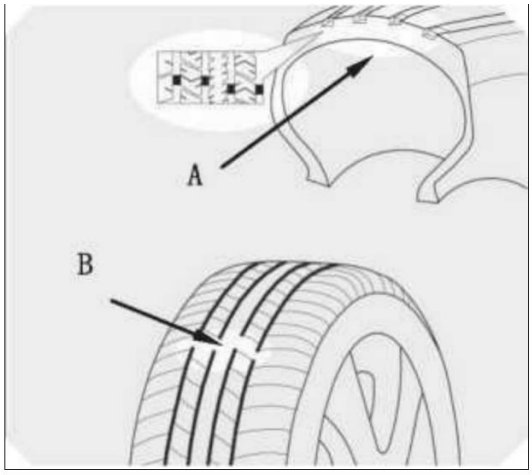
Wheel and tyre assembly

On-board inspection and maintenance

Check the tyres. Each time you check the tyre inflation state, you shall also check the tyres for external injury, puncture by foreign objects and wear. You shall check:

1. Replace a tyre if any damage or bulge If any of the conditions is found, replace the tyre.

2. Replace a tyre if its wall is scratched, cracked or ruptured to the fabric or cord.



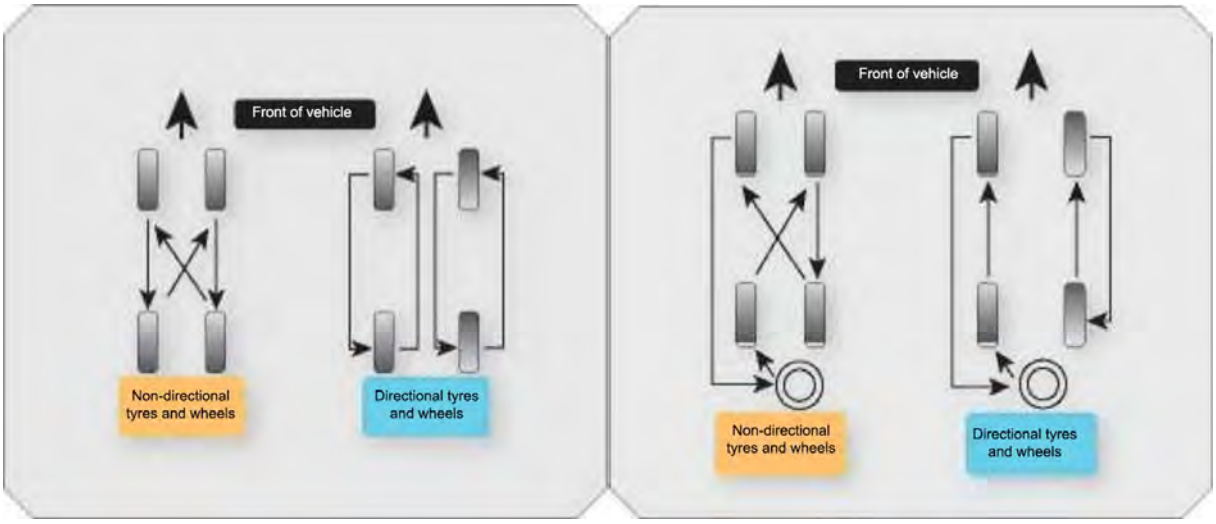
Excessive Tread Wear

The tyre must be kept in good condition, and the tread pattern on the tyre surface shall be deep enough. Tyres approved by Forthing Auto are marked with A to measure the wear degree of tyres, and this mark is the raised point inside the tyre running belt. When the raised point of a tyre is worn to the extent of B, the tyre must be replaced. At this time, the tread thickness is only 1.6 mm, and such a tyre lacks adhesion when running on wet roads.

Tyre maintenance

1. In addition to proper inflation, correct wheel alignment also helps reduce tread wear. If uneven tyre wear is found, the wheel alignment should be checked.
2. If you feel continuous vibration while driving, have the tyres checked. Tyre balancing must be performed whenever a tyre has been removed from the wheel. When installing a new tyre, be sure to balance the tyre so as to increase the riding comfort and prolong the service life of the tyre. It is best to have the installer do a tyre dynamic balancing.

Tyre rotation



To extend the service life of tyres and ensure even wear, the positions of tyres should be changed every 10,000 kilometres driven. Each time tyres are changed, reposition them as shown in the above figure. The above figure shows how to change the tyre position of a vehicle without a standard spare tyre.

Replacement of tyres and wheels

1. Replace with radial tyres having the same size, load scope, rated speed and maximum cold tyre pressure (indicated on the tyre wall). Mixed use of radial and diagonal tyres may reduce the vehicle's braking capacity, driving force (ground adhesive force) and steering accuracy. Using tyres of different sizes or structures will result in the ABS not functioning properly.
2. The anti-lock braking system (ABS) works by comparing the rotation speeds of the wheels. Therefore, when replacing tyres, you must use tyres with the same size as the original tyres. The size and structure of the tyre affect the wheel speed and may lead to uncoordinated operation of the system.
3. It is best to replace all four tyres at the same time. If it is not possible or not necessary to do so, the two front tyres or rear tyres shall be replaced in pairs. Replacing only one tyre will seriously affect the vehicle's handling performance.

2.4.2.2 Precautions

Note

1. **Note: Be sure to use a 12V battery**
2. **Note: Do not disconnect the battery cable when the engine is running.**
3. **Note: Before connecting or disconnecting the engine ECU harness connector, turn the ignition switch to OFF position and disconnect the ground cable of battery. Failure to do so may damage the engine ECU, because even if the ignition switch is turned to OFF position, the ECU still has 12V voltage.**
4. **Note: Before disassembling components, turn the ignition switch to the "OFF" position and disconnect the ground cable of the battery.**
5. **Note: Do not disassemble the engine ECU**

6. **Note: It is only allowed to use a digital multimeter to inspect the electronic fuel injection (EFI) system.**
7. **Note: Please use authentic components and parts for maintenance; otherwise, the EFI system may not operate properly.**
8. **Note: During maintenance, use unleaded petrol only.**
9. **Note: Please follow the specified maintenance and diagnostic procedures for maintenance work.**
10. **Note: Do not disassemble the components and parts of the EFI system during maintenance.**
11. **Note: During maintenance, take all electronic components (such as ECUs and sensors) carefully and never let them fall to the ground.**
12. **Note: Develop an awareness of environmental protection and effectively handle any waste generated during maintenance.**

Precautions during repair

Note: Tyre replacement may be dangerous, so it should be carried out by professionals using correct tools and following appropriate procedures. Be sure to carefully read and understand the manufacturer's warnings provided in the user manual or stamped on the tyre sidewall.

Note: Do not use the tyre changing equipment to scratch or damage the transparent coating on aluminium wheels. Scratching the clear coating may lead to corrosion of the aluminium wheels and cause the coating to peel away from the wheels.

Note: Improper wheel accessories or tyre installation procedures can cause damage to the tyre beads or wheel mounting holes. If the correct procedure is not followed, the tyre changer may exert excessive force on the tyre, causing the wheel to bend at the mounting surface. This kind of damage may result in vibration and/or wobble, and in severe cases can cause the wheel to crack.

Note: Do not stand on the tyre during inflation to avoid personal injury.

2.4.3 Diagnosis and testing

2.4.3.1 Tyres - Troubleshooting of noise, vibration and irregularity

Troubleshooting table

The table below helps identify the cause of symptoms. Repair or replace these parts as necessary.

Tyre		Symptoms				
		Noise	Shaking	Vibration	Judder	Uncomfortable riding or difficult to operate
Possible cause and suspicious parts	Improper installation and looseness	•	•		•	•
	Out of round	•	•		•	•
	unbalanced	•	•		•	•
	Improper tyre pressure	•	•	•	•	•
	Uneven tyre wear	•	•		•	•
	Deformation or damage	•	•		•	•
	Inconsistency	•			•	
	Inconsistent tyre size		•	•	•	•
Possible cause and suspicious parts	Abnormal front axle and front suspension	•	•	•	•	•
	Abnormal rear axle and rear suspension	•	•	•	•	•
	Abnormal tyre	•	•		•	•
	Abnormal wheels	•	•		•	•
	Abnormal drive shaft	•	•	•		
	Abnormal brake	•	•		•	
	Abnormal steering system	•	•	•	•	

2.4.3.2 Tyre - Common faults and troubleshooting methods

Common faults and troubleshooting methods

Fault	Possible causes	Troubleshooting Methods
Heavy steering	Inaccurate front wheel alignment	Correction
	Particularly high drag at the lower swing arm ball joint when steering	Replace
	Worn flat tyre	Replace tyre
	No power assistance	Repair or replace
Poor return of steering wheels	Inaccurate front wheel alignment	Adjust
	Too large clearance of the steering system	Adjust
	Interference of steering system	Adjust or replace relevant parts
Poor ride performance of suspension	Inaccurate front wheel alignment	Adjust
	Damage of shock absorber	Repair or replace
	Fractured or worn stabilizer bar	Replace
	Fractured or worn coil springs	Replace
	Lower swing arm bushing wear	Replace
	Improper inflation pressure of tyre	Correction
Abnormal tyre wear	Inaccurate front wheel alignment	Correction
	Wear of the shock absorber	Replace
Deviation	Inaccurate front wheel alignment	Correction
	Too low drag at the lower swing arm ball joint when steering	Repair
	Loose or worn bushing of lower swing arm	Replace
Frequent vehicle deviation towards one side	Inaccurate front wheel alignment	Correction
	Particularly high drag at the lower swing arm ball joint	Replace
	Fractured or worn coil springs	Replace
	Bent lower swing arm	Replace
Front wheel shimmy	Inaccurate front wheel alignment	Correction
	Wheel imbalance	Adjust
	Wheel deformation	Replace
	Particularly high drag at the lower swing arm ball joint	Replace
	Lower swing arm bushing wear	Replace
	Fractured or worn coil springs	Replace
Vehicle body droop	Fractured or worn coil springs	Replace
	Shock absorber faults	Replace
Abnormal sound	Loose parts	Re-tighten
	Damaged or worn wheel bearings	Replace

Fault	Possible causes	Troubleshooting Methods
	Shock absorber failure	Replace damaged parts
	Problematic tyre	Replace
Poor vehicle control performance	Tyre pressure too high	Adjust the pressure
	Shock absorber failure	Replace
	Loose wheel nut	Tighten to the specified torque
	Fractured or sagging coil springs	Replace
Vehicle body deviation towards one side	Problematic tyre	Replace
	Worn bushing	Replace
	Fractured or deformed stabiliser bar	Replace
	Problematic drive shaft and swing arm assembly	Replace
	Fractured or sagging coil springs	Replace

2.4.3.3 Tyre - Fault simulation test

Introduction

Sometimes, when the vehicle is sent in for repairs, the fault does not appear. Therefore, it is necessary to simulate the conditions and environment in which the fault occurs. This helps avoid unnecessary fault diagnosis. The following section uses diagrams to show the conditions and environment in which an electrical fault occurs.

This part is divided into 6 subjects:

– Vehicle Vibration

– Heat sensitivity

– Freezing

– Immersion

– Electrical load

– Cold start or hot start

Have the customer describe in detail how the incident happened. It is very important to simulate the conditions under which the fault occurs.

Vehicle Vibration

When the vehicle is running on a rough road or when the engine vibrates (A/C operates at idle speed), the fault may occur or the symptoms become more obvious. In this case, check for conditions related to vibration. Refer to the figure below.

– Connectors and harnesses

Find out which connectors and harnesses affect the electrical system being checked. Then gently wiggle each connector and harness, and watch if the system fails again. This helps to find any loose or poor electrical connections.

– hints

Moisture exposure can cause a thin layer of corrosion on connector terminals. A fault in a connected joint cannot be detected by visual inspection. If the fault happens off and on, corrosion may be the cause. Therefore, it's best to disassemble, inspect, and clean the connectors' ports related to the system.

– Sensors and relays

Gently shake the sensors and relays in the system you are checking. This can help you find if any sensor or relay is loose or not fixed properly.

– Engine compartment

There are several reasons for electrical faults caused by vehicle or engine vibration. Conduct the following checks:

– The connector is not fully in place.

– The harness is not long enough and will be stressed when the engine is vibrating or shaking.

– The wire contacts a support or moving components.

– The ground wire is loose, dirty, or corroded.

– The circuit is too close to the hot parts.

When checking components under the engine hood, start by making sure the ground wire is in good condition. First, confirm that the system is properly grounded. Then gently shake the wire or component as described above to check whether the connection is loose. Use the circuit diagram to check the continuity of the circuit.

– Rear side of Instrument panel

When installing accessories, incorrect wiring or an unsecured harness may be pinched. Vibration of the vehicle will damage the harnesses arranged along the bracket or close to the screws.

– Underneath the seat

Loose or unsecured harnesses can cause wires to be pinched by seat components such as slide rails when the vehicle vibrates. If wires run under the seat, check whether the harness is damaged or pinched.

Heat sensitivity

Sometimes customers experience problems in hot weather or after stopping for a short time. In this case, you should inspect the thermal sensitivity. To determine if an electrical component is thermally sensitive, use a heating gun or a similar tool to heat the component. Do not heat parts above 60 °C (140 °F). If a fault occurs while heating the unit, replace or properly isolate the element.

Freezing

The customer may point out that the fault disappears after warm-up (in winter). The reason for this may be related to the icing of some part of the electrical system.

There are two ways to check. The first is to leave the customer's vehicle overnight. To reproduce the fault described by the customer, make sure the ambient temperature is low enough. Park the vehicle in the open air overnight. The next morning, perform a quick and comprehensive check of the possibly affected electrical elements. The second method is to freeze the suspected parts in the refrigerator for a long enough time until freezing occurs. Reinstall the parts and check if the fault recurs. If any, repair or replace the part.

Immersion

The fault may only occur in high humidity or rainy and snowy weather. In this case, the fault may be caused by water intrusion into electrical elements. Fault conditions can be simulated by soaking the vehicle or driving it through a car wash.

Note: Do not spray water on any electrical element.

Electrical load

The fault may also be caused by the sensitivity to electrical loads. Turn on all accessories (including A/C, rear window defroster, radio, fog light, etc.) before diagnosis.

Cold start or hot start

In some cases, an electrical fault occurs only during the cold start of a vehicle or a hot start after the engine is stalled. In this case, leave the vehicle overnight for proper diagnosis.

2.4.3.4 Tyre - Fault repair information

Diagnostic procedure

<table>
<tr><th>Steps</th><th colspan="2">Description</th></tr>
<tr><td rowspan="5">Step 1</td><td colspan="2">Get detailed information about the relevant situation and environmental conditions when the fault occurs.
The following key information helps to make a correct analysis:</td></tr>
<tr><td>What</td><td>Vehicle type, engine, transmission/ transaxle and systems (e.g. radio).</td></tr>
<tr><td>When</td><td>Date, time, weather conditions and frequency of occurrence</td></tr>
<tr><td>Where</td><td>Road conditions, altitude and traffic conditions</td></tr>
<tr><td>How</td><td>System symptoms and operation conditions (impacts of other components).
Service history and whether other accessories have been installed after sale.</td></tr>
<tr><td>Step 2</td><td colspan="2">Run the system, and carry out a road test if necessary.
Identify the fault parameters. If the fault does not recur, please refer to the "fault simulation test".</td></tr>
<tr><td>Step 3</td><td colspan="2">If DFLZ after-sales releases repair guidelines for related faults, follow the guidelines to repair and eliminate them.</td></tr>
<tr><td>Step 4</td><td colspan="2">Diagnose according to the form of the fault, including:
– DTC detected
– No DTC
– There are corresponding parts in the service manual and evaluation manual.
Determine where to start the work according to the customer's description and your knowledge.</td></tr>
<tr><td>Step 5</td><td colspan="2">Check the system for tangled wires, loose joints, or damaged wires.
Determine the circuits and elements involved in the fault and diagnose the fault based on the power supply circuit and harness layout plan.
Repair or replace faulty circuits or elements.</td></tr>
<tr><td>Step 6</td><td colspan="2">Run the system in all modes. Make sure that the system can work normally under all conditions. Ensure that there is no failure caused due to your carelessness during diagnosis or repair.</td></tr>
</table>

2.4.3.5 Tyre - Circuit inspection

Introduction

Generally, it is easy to test the circuit if it is operated in a logical and systematic way. First, you must understand all relevant information about the system being tested. Similarly, you need to fully understand how the system works. Then you will be able to choose the right equipment and follow the correct test steps.

When testing electrical components, you have to simulate vehicle vibration. When simulating vibration, gently shake the harness or electrical component.

Open circuit	A circuit is open when a portion of it does not allow current to flow.
Short circuit	Short circuit comes in two types:
	1. Short circuit of lines: one line contacts another line, resulting in the change of the normal resistance.
	2. Grounding short circuit: a line contacts a ground wire, resulting in grounding of the line.

Check "open circuit" of a line

Before diagnosing and checking a system, draw a sketch of the system. This helps to perform the diagnostic steps reasonably during the diagnosis process. Sketch can also improve your understanding of the system operation.

Continuity check method

The continuity check is used to find an open circuit in the circuit. The digital multimeter is set to the resistance range. If the reading exceeds the measuring range, it indicates an open circuit (no "beep" sound or no resistance symbol). Always start checking from the highest resistance range on the digital multimeter.

To help understand the diagnosis of open circuits, please refer to the figure above.

– Disconnect the battery negative cable.

– Start checking from one end of the line until the other end. (Fuse device in the figure)

– Connect one probe of a digital multimeter to the fuse port on the load side.

– Connect the other probe to the fuse block (power supply) side of SW1. Resistance being small or zero indicates that this section of the circuit is well conducted. If the circuit is open, the digital multimeter will show "over range" or infinite resistance (point A).

– Connect the probe between SW1 and relay. Resistance being small or zero indicates that this section of the circuit is well conducted. If the circuit is open, the digital multimeter will show "over range" or infinite resistance (point B).

– Connect the probe between relay and solenoid valve. Resistance being small or zero indicates that this section of the circuit is well conducted. If the circuit is open, the digital multimeter will show "over range" or infinite resistance (point C).

All circuits can be checked using the above method.

Voltage check method

To help understand the diagnosis of open circuits, please refer to the figure above.

In any live line, open circuit can be identified by methodically checking the voltage in the system. At this point, switch the digital multimeter to the voltage setting.

– Connect one probe of the digital multimeter to a known good ground wire.

– Check the circuit from one end to the other.

– Disconnect switch SW1 and measure the voltage at W1.

– If voltage exists, the open circuit point is further beyond SW1.

– If no voltage exists, the open circuit point is between the fuse box and SW1 (Point A).

– If no voltage exists, the short circuit point is further beyond SW1.

– Close SW1, disconnect the relay and the solenoid valve, and connect the probes of the digital multimeter across both sides of the fuse port to measure the voltage.

– If voltage exists, the short circuit point is between SW1 and the relay (Point B).

– If no voltage exists, the short circuit point is further beyond the relay.

– Close the SW1 and close the relay by applying a jumper with fuse across the relay to measure voltage.

– When there is voltage, the short circuit point is behind the relay line or between the relay and the disconnected solenoid valve (point C).

– If no voltage exists, return to the check procedure and check the power supply of the fuse box.

All live lines can be diagnosed using the above method.

Check for a "short circuit" in a line

To simplify the discussion of short circuit in a system, please refer to the figure below.

Resistance check method

– Disconnect the battery negative pole and remove the fuse that has blown.

– Disconnect all loads powered through the fuse (disconnect SW1, relay and solenoid valve).

– Connect one probe of the ohmmeter to the load side of the fuse port. Connect another probe to a known good ground wire.

– Disconnect SW1 and check for continuity.

– If there is continuity, the short circuit point is between the fuse and SW1 (Point A).

– When the circuit is not conductive, the short circuit point is further beyond SW1.

– Close the SW1 and disconnect the relay. Place the probes on the load side of the fuse port and a known good ground. Then check for continuity.

– If there is continuity, the short circuit point is between SW1 and the relay (Point B).

– When the circuit is not conductive, the short circuit point is further beyond the relay.

– Close the SW1 and engage relay by using jumper. Place the probes on the load side of the fuse port and a known good ground. Then check for continuity.

When the circuit is conductive: the short circuit point is between the relay and the solenoid valve (point C).

If the circuit is not conductive, check the solenoid valve and return to the check process.

Voltage check method

– Remove the blown fuse and disconnect all loads powered through the fuse (i.e. disconnect SW1, relay and solenoid valve).

– Turn the ignition switch to ON or START position. Confirm that the battery positive side at the fuse port is the battery voltage (by connecting one probe to the fuse box and battery positive port side and the other probe to a known good grounding point).

– Disconnect SW1, and apply the DMM probes across both ports of the fuse to measure the voltage. If voltage exists, the short circuit point lies between the fuse box and SW1 (point A).

– Close SW1, disconnect the relay and the solenoid valve, and connect the probes of the digital multimeter across both sides of the fuse port to measure the voltage

When there is voltage, the short circuit point is between the SW1 and the relay (point B).

When there is no voltage: the short circuit point is further beyond the relay.

– Close the SW1 and close the relay by applying a jumper with fuse across the relay to measure voltage.

When there is voltage, the short circuit point is behind the relay line or between the relay and the disconnected solenoid valve (point C).

When there is no voltage: return to the check procedures and check the power supply of the fuse box.

Grounding inspection

Grounding connections are important for the normal operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt, and other corrosive chemicals. Corroded (rusty) points will generate additional resistance. Extra resistance will affect the circuit's operation.

Electronic control circuits are very sensitive to proper grounding. Loose or corroded ground wires can seriously affect electronic control circuits. The circuit is easily affected by poor contact or corrosion. Even if the ground wire looks clean, its surface may also have a thin layer of rust.

Inspect the ground wire connection as follows:

– Remove the ground wire bolts or screws.

– Check all contact surfaces for darkening, dirt, rust, or others.

– Clean the contact points as required and ensure good contact.

– Reinstall the bolts or screws securely.

– Inspect whether "additional" accessories will interfere with the grounding circuit.

– If several wires are twined on a metal ring of ground wire, check whether the wire is twisted correctly. Make sure all circuits are clean, tight, and well grounded.

– If multi-strand wires are installed in a grounded metal ring, ensure that there is no wire with excessive insulation.

– For details about grounding distribution, please refer to the electrical repair part in this manual.

Voltage drop test

– Voltage drop detection is often used to find parts or circuits with excessive resistance. The voltage drop in the circuit is caused by the resistance of the circuit during operation.

Check the wire in the figure. When the resistance is measured with an ohmmeter and a single-strand conductor is connected, the reading will be zero. This shows the circuit is normal. but a single-strand conductor cannot carry the circuit current during operation. A single-strand conductor will generate high resistance to current. This will generate a small voltage drop.

Many of the following conditions may generate additional resistance:

– Too thin wire (e.g. single-strand conductor)

– Corrosion of switch contacts.

Measurement of voltage drop – accumulation method

– Connect a voltmeter across the connector or component of the circuit to be checked. The positive pole of the voltmeter should be placed near the power supply, and the negative pole should be near the ground switch.

– Make the circuit operate.

– The voltmeter displays the voltage of the circuit through which current flows.

Note that an excessive voltage drop of 4.1 V exists between the battery and the bulb as shown in the figure.

Measurement of voltage drop - step-by-step method

The step-by-step method is the most effective way to inspect for an excessive voltage drop in a low-voltage system (e.g. "computer control system").

The operating current in the circuit of a "computer control system" is very low. The operation of the computer control system will be adversely affected due to any resistance change within it. Resistance changes can be caused by poor contact, incorrect installation, improper wire specifications or corrosion. By voltage drop measurement using the step-by-step method, components or wires with excessive resistance can be identified.

Control unit circuit test

System description: When the switch is in the ON position, the control unit will light the bulb.

Input-output voltage table

Pin No.	Item	Test Conditions	Voltage value <V>	For example, when a single-strand conductor has high resistance [V]*
1	Switch	Switch ON	Battery voltage	Lower than the battery voltage, about 8 (for example)
		Switch OFF	About 0	About 0
2	Bulb	Switch ON	Battery voltage	About 0 (the light is not on)
		Switch OFF	About 0	About 0

The voltage value is based on the body GND.

– High resistance exists in the circuit on the switch side (due to a single-strand wire), and battery voltage cannot be measured at port 1. Even if the switch is in the ON (connected) position, the control unit cannot monitor whether the switch is on or off. Therefore, the control unit does not supply power to the bulb, so it will not light up.

Input-output voltage table

Pin No.	Item	Test Conditions	Voltage value <V>	For example, when a single-strand conductor has high resistance [V]*
1	Switch	Switch ON	About 0	Battery voltage (the bulb is not on)
		Switch OFF	Battery voltage	Battery voltage
2	Bulb	Switch ON	About 0	Higher than 0 about 4 (example)
		Switch OFF	About 5	About 5

The voltage value is between the item tested and body GND.

– High resistance exists in the circuit on the switch side (caused by single-strand wire), and a voltage of about 0V cannot be measured at port 2. Even if the switch is in the ON (connected) position, the control unit cannot monitor whether the switch is on or off. Therefore, the control unit does not provide a ground signal to the bulb, so it will not light up.

Control unit and electrical components

Precautions

– Do not reverse the positive and negative ports of the battery.

– Install only specified parts and components onto the vehicle.

– Before replacing the control device, check the input and output functions of the parts and components.

– Do not exert excessive force when disconnecting connectors.

– If a connector is installed by fastening bolts, loosen the fastening bolts and then remove them by hand.

– Before installing a connector, make sure the port is not bent or damaged, and then install it correctly.

When installing a connector with fastening bolts, fix it with fastening bolts until its projection is flush with the surface. Do not drop or impact the control device.

– Take care to prevent rapid temperature changes from causing condensation in the control device, and do not expose the control device to water or rain. If water gets into the control unit, let it dry completely before installing it in the vehicle.

– Prevent the control device connector from being stained by engine oil.

– Do not clean the control device with volatile oil.

– Do not disassemble the control device or remove its upper or lower covers.

– When using a digital multimeter, take care not to allow the test probes to be close to each other to avoid damaging the power transistor in the control unit due to the battery being short-circuited. When checking the input and output signals of the control device, please use the designated connector for check.

2.4.3.6 Tyre and wear type diagnosis

<table>
<tr><td colspan="2">Tread centre wear</td><td>Tyre shoulder wear</td><td>Bulge</td><td>Wear on one side</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">Excessive inflation</td><td rowspan="3">Excessive over-inflation of the tyre</td><td>Insufficient pressure</td><td rowspan="3">There was a small piece of the tyre tread that became loose and was thrown out when the tyre was rotating at high speed.</td><td rowspan="3">Incorrect camber angle
Unfitness between the camber angle and front wheel toe-in
The speed is too high when turning.</td></tr>
<tr><td>Both sides bulge</td></tr>
<tr><td>Rapid wear</td></tr>
<tr><td>Worn bald points</td><td>Feathery edges</td><td>Incorrect tyre repair</td><td>Uneven tyre wear</td><td>Unsafe tyre</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Braking too harshly at high speed, causing the wheel to lock up</td><td>Excessive toe-in or toe-out</td><td>Using more than one patch to repair a leaking tyre, causing tread deformation and resulting in tyre damage.</td><td>Unbalanced wheel, suspension problems, steering gear or steering bearing problems</td><td>Tread wear has exceeded the limit mark</td></tr>
</table>

2.4.3.7 Troubleshooting of Tyre Pressure Monitoring System

3.2 The alarm information prompts of the instrument are summarized in Table below:

<table>
<tr><td colspan="2">Alarm mode</td><td>Buzzer</td><td>Vehicle body</td><td>Current tyre position light</td><td>Current tyre temperature value</td><td>Current tyre pressure</td><td>Frequency</td></tr>
<tr><td>Alarm for low tyre pressure</td><td>Fault warning mode</td><td>Sounding</td><td>On</td><td>Flash</td><td>On</td><td>Flash</td><td rowspan="3">1 Hz frequency Sounding/on 0.5 s Not sounding/off 0.5 s</td></tr>
<tr><td>Alarm for high tyre pressure</td><td>Fault warning mode</td><td>Sounding</td><td>On</td><td>Flash</td><td>On</td><td>Flash</td></tr>
<tr><td>Sensor loss warning</td><td>Fault warning mode</td><td>Not sounding</td><td>On</td><td>On</td><td>Display" "</td><td>Display " "</td></tr>
</table>

2.4.3.8 Handling of abnormal conditions

Abnormal phenomenon 1: abnormal tyre pressure

Abnormal phenomenon 2: There is no tyre pressure related information in the tyre pressure display area on the instrument

Use a diagnostic scanner to determine whether the tyre pressure part of BCM is correct (the configuration value corresponding to Baolong tyre pressure monitoring sensor is 0x08). If the battery or BCM is powered off, the tyre pressure data needs to reach 30km/h for more than one minute before it can be displayed.

Abnormal phenomenon 3: One or more tyre pressure sensors are missing

Abnormal phenomenon 4: All tyre pressure sensors are lost

2.4.3.9 Troubleshooting of Tyre Pressure Monitoring System

3.1 Brief description of troubleshooting:

All faults of the tyre pressure system can be reflected through the instrument. However, the alarm information of the tyre pressure system on the instrument does not necessarily indicate that the tyre pressure system is faulty. The following will briefly describe and handle several common situations.

3.2 The alarm information prompts of the instrument are summarized in Table below:

Alarm mode		Buzzer	Vehicle body	Current tyre position light	Current tyre temperature value	Current tyre pressure	Frequency
Alarm for low tyre pressure	Fault warning mode	Sounding	On	Flash	On	Flash	1 Hz frequency Sounding/on 0.5 s Not sounding/off 0.5 s
Alarm for high tyre pressure	Fault warning mode	Sounding	On	Flash	On	Flash	
Sensor loss warning	Fault warning mode	Not sounding	On	On	Display" "	Display " "	

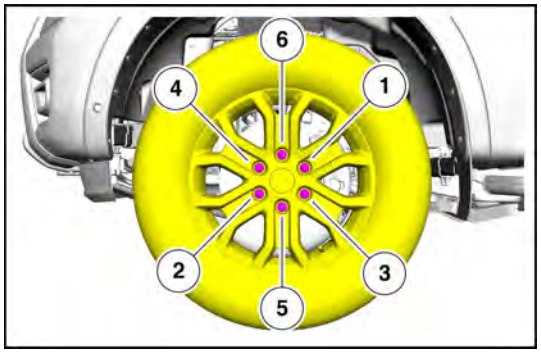
2.4.4 Removal and installation

2.4.4.1 Wheel assembly

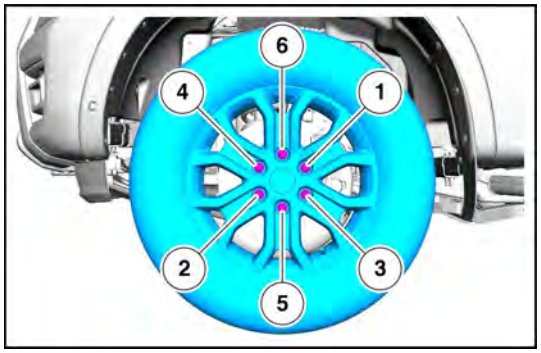
Removal

Note: Do not heat to loosen a stuck wheel nut; heating may damage the wheel and hub.

1. Loosen the wheel nuts in the sequence shown in the figure.



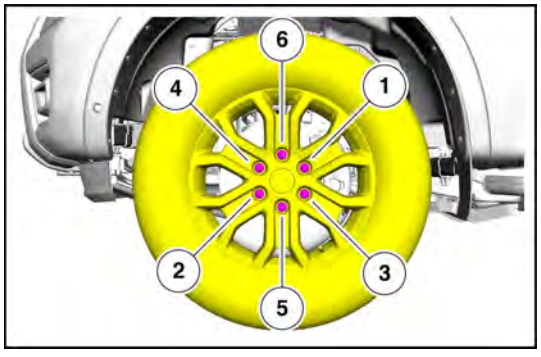
2. Lift and support the vehicle. Refer to: Lifting the vehicle.
3. Remove the wheels.



Installation

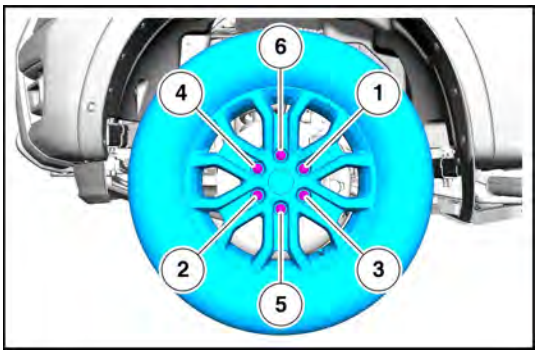
Warning: Remove the rust or dust on the installation faces of the wheel, hub or brake disc. Rust on the mounting surface may cause the wheel nut to loosen and the wheel to come off while the vehicle is in motion. Failure to observe these operating instructions may result in personal injury.

1. Clean the rust or dust on the wheel, hub or brake disc mounting surface.
2. Install the tyres and pre-tighten all wheel nuts.



3. Lower the vehicle.
4. Tighten the wheel nuts in the order shown in the figure.

   Torque: 133±13Nm



2.4.4.2 Tyre

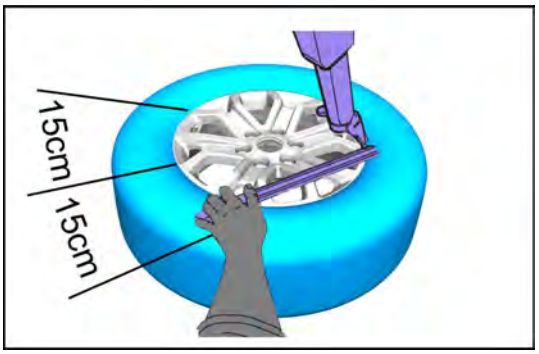
Removal

1. Remove the wheel. Refer to: Wheel Assembly.
2. Remove the tyre valve core and release all air in the tyre assembly.

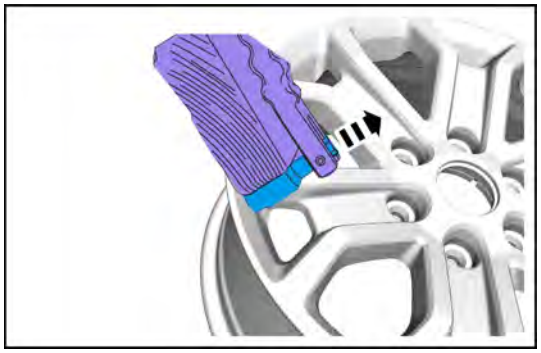
   Note: The tyre pressure sensor is installed on the valve. Do not damage the tyre pressure sensor during removal.

3. Use a tyre changer to remove the tyre.

   Note: The shovel of the tyre changer should not be lowered above the sensor, otherwise it will damage the sensor, especially for tyres that have been installed with this product. When disassembling, please keep more than 15cm away from the valve to remove the outer tyre.



4. Remove the fixing bolts of tyre pressure sensor, and take out the tyre pressure sensor. Refer to: Tyre Pressure Sensor.
5. Remove the tyre nozzle with a proper tool.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

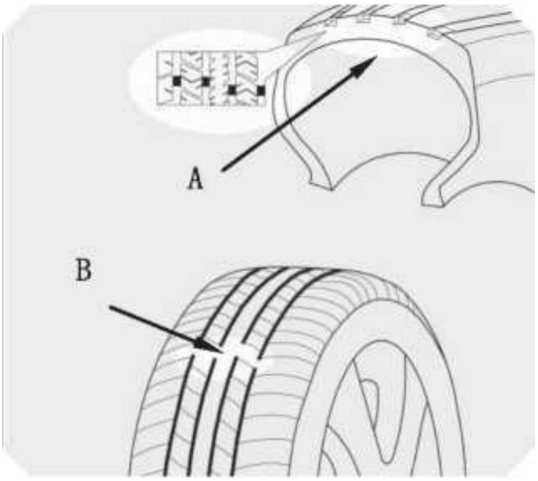
   Note: When installing the tyre valve and tyre pressure sensor, they must be installed in a direction parallel to the axis of the wheel rim hole. If there is an angle during installation, the tyre valve and tyre pressure sensor may be damaged.

2.4.5 General procedures

2.4.5.1 Tyre inspection

When checking the inflation state of the tyres, check the tyres for damage, penetration, and wear. You shall check:

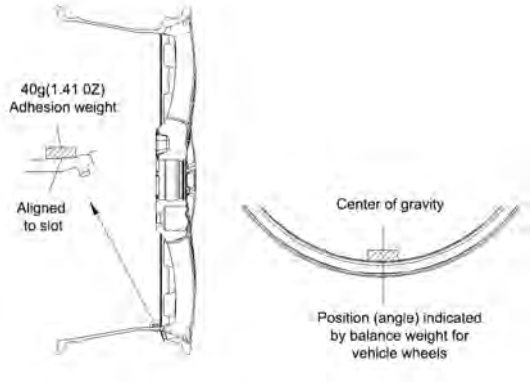
1. Replace a tyre if any damage or bulge If any of the conditions is found, replace the tyre.
2. Replace a tyre if its wall is scratched, cracked or ruptured to the fabric or cord.
3. Excessive tread wear. The tyre must be kept in good condition, and the tread pattern on the tyre surface shall be deep enough. Tyres approved by Forthing Auto are marked with A to measure the wear degree of tyres, and this mark is the raised point inside the tyre running belt. When the raised point of a tyre is worn to the extent of B, the tyre must be replaced. At this time, the tread thickness is only 1.6 mm, and such a tyre lacks adhesion when running on wet roads.



2.4.5.2 Adjustment for wheel balance

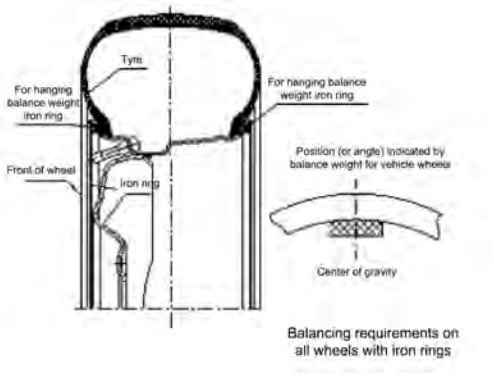
1. If the tyre balancing machine has two setting modes as the adhesive balance weight mode and the embedded balance weight mode, select the latter which applies to the driving wheels.
2. Mount the wheels on the balancing machine with the centre hole as the orientation. Start the tyre balancer.
3. Multiply the outside imbalance value by 5/3 to confirm the actual operational weight of balance weight when the imbalance values of both sides occur on the display of the wheel balancing machine. Then select the outer balance weight closest to the calculated value and install it at the specified outer position or at a specified angle relative to the wheel.

   Note: Install the outside balance weight before installing the inside balance weight. Be sure to clean the fitting surface of the wheel before installing the balance weight.



Note: Install the balance weight at the position shown in the figure above.

4. When installing the balance weight on the running wheel, first confirm the condition of the rim and then install as shown below. The balance weight should be placed in the groove area of the running wheel, with the centre of the balance weight aligned with the position (angle) indicated by the wheel balancing machine.



Mount the two balance weights on the same circumference if the calculated balance weight exceeds 50g (1.76 oz).

Note: Use the adhesive and hanging balance weights of Dongfeng Liuzhou Motor Co. Ltd. all along.

Note: Do not use one balance weight repeatedly, but a new one for each time.

Note: The adhesive balance weight used on each side of the 16-inch/17-inch aluminium wheel is not recommended to exceed 80g.

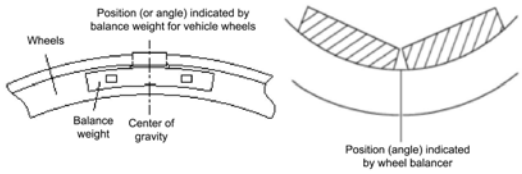
Note: It is recommended that the weight of (all) hanging balance weight for the single side of each wheel shall not exceed 50g.

Note: Only one hanging balance weight can be used for the single side of each wheel.

Note: Only hanging balance weights can be used for steel wheels.

5. Restart the wheel balancer.

6. Hang or paste the balance weight in the groove relative to the driving wheel in accordance with the position (angle) indicated by the tyre balancing machine.



7. Start up the balancing machine. Make sure that the residual inside and outside imbalance values are respectively 10g (0.35 oz) or lower. Repeat the steps of mounting balance weights if the residual imbalance value of any side exceeds 10g (0.35 oz).

The wheel balances (allowable maximum imbalance values)

Maximum allowable imbalance quantity	Dynamic (edge of rim)	10g (0.35oz) (one side)
	Static (edge of rim)	20g (0.71oz)

2.5 EHB

2.5.1 Specification

2.5.1.1 Material specifications

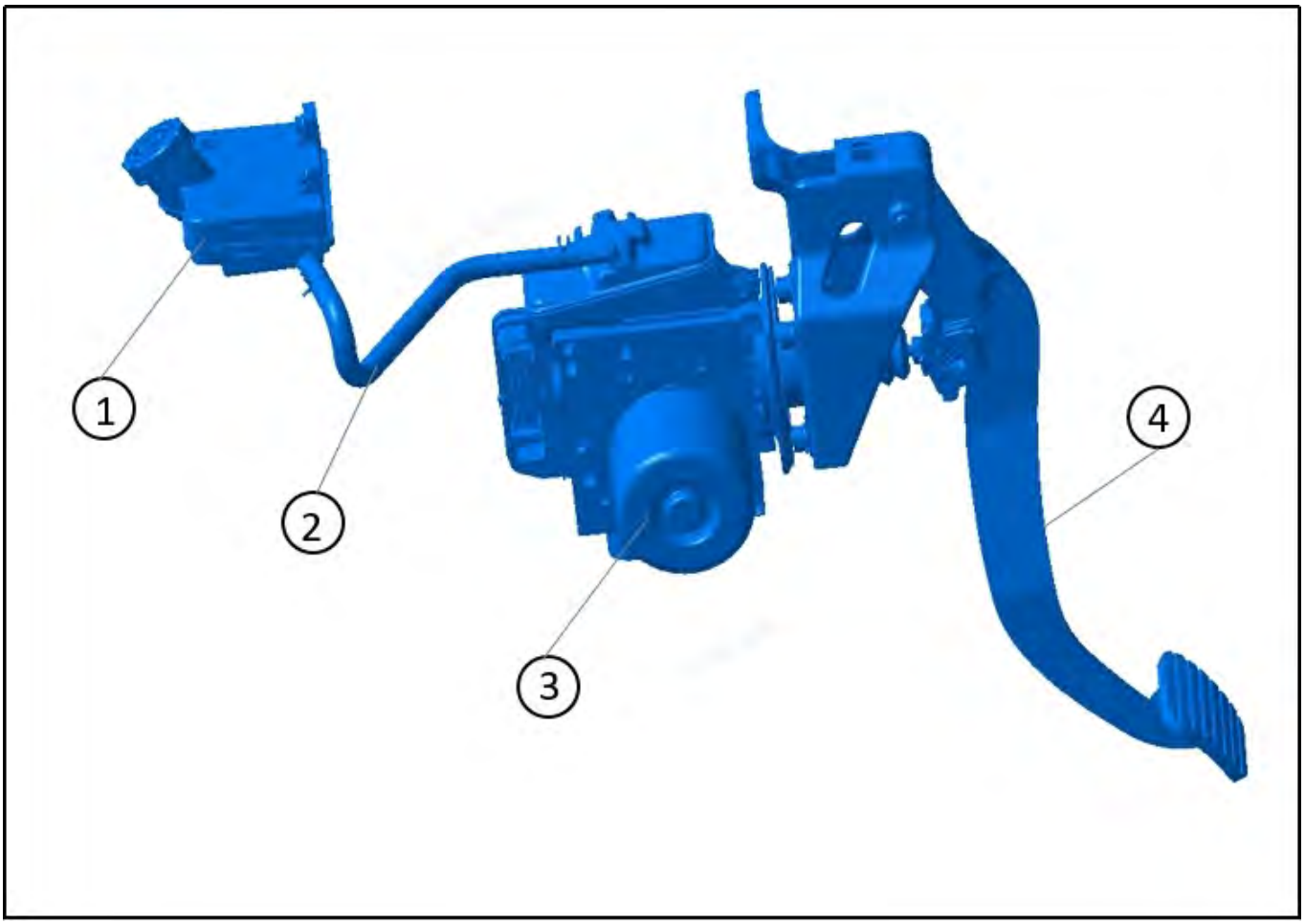
Name	Specification
Brake fluid model	DOT4
Number of ring gears and teeth of front axle	48
Number of ring gears and teeth of rear axle	48

2.5.1.2 Torque specification

Name	Nm
Fixing bolt of brake fluid reservoir	8±1.2
Brake steel pipe	16±1
Mounting nut for brake pedal assembly and EHB system brake system	25±4
Brake pipeline	16±1

2.5.2 Operation Manual

2.5.2.1 EHB system layout

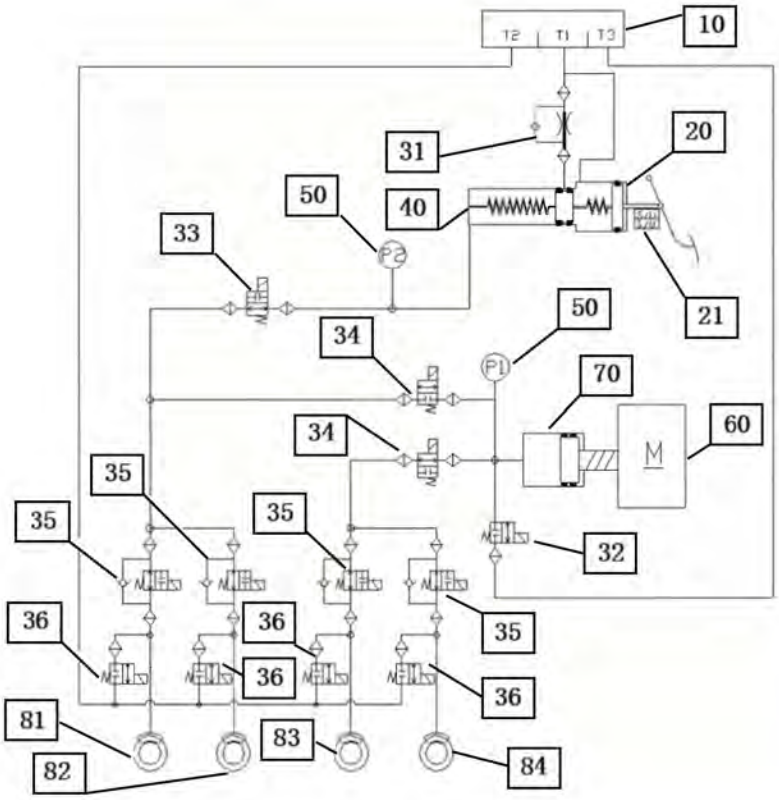


Item	Description
1	Brake fluid reservoir assembly
2	Brake fluid pipe assembly
3	EHB brake-by-wire system assembly
4	Brake pedal assembly

2.5.2.2 Overview

The EHB brake-by-wire system includes the ESP electronic stability system function and adopts a four-circuit configuration. Each circuit is equipped for the left front, right front, left rear and right rear wheels respectively. During emergency braking, the brake pressure of each wheel hydraulic circuit is adjusted by monitoring the rotation speed of each wheel. Reduce wheel slippage and body instability. Maintain directional stability and body stability.

EHB system layout



S/N	Name	S/N	Name
10	Brake fluid reservoir	40	Master cylinder
20	Pedal feel simulator	50	Pressure sensor
21	Pedal travel sensor	60	Brushless motor
31	Mechanical diagnostic valve	70	Booster cylinder
32	Oil supply valve	81	Front left wheel brake
33	Decoupling valve	82	Rear right wheel brake
34	Pressure supply valve	83	Rear left wheel brake
35	Pressure increasing valve	84	Front right wheel brake
36	Pressure relief valve		

2.5.2.3 Precautions

Note

1. **Note: The EHB brake-by-wire system must be repaired by technicians who have undergone professional training and mastered maintenance skills, and only parts from the original manufacturer are allowed for replacement.**
2. **Note: Before a diagnosis of the EHB brake-by-wire system, if the basic brake system has faults, the faults must be removed first such as:**

   Brake system noise

   Brake pedal or vehicle vibration during normal braking

   Vehicle braking deviation

EPB system fault

3. **Note: The EHB brake-by-wire system (excluding auxiliary devices such as brake pipelines and sensors) can only be replaced as a complete unit. It must not be disassembled for inspection or partially replaced/interchanged.** The relevant company does not provide individual spare parts, offers no warranty for disassembled EHB brake-by-wire system, and assumes no responsibility for any adverse consequences resulting from disassembly, partial replacement, or interchange of the EHB brake-by-wire system.

4. **Note: The following two cases indicate that the EHB brake-by-wire system detects a fault:**

   Turn on the power switch, and after the system self-check is completed, the warning light remains on.

   The warning light stays on during driving.

Warning: When the warning light stays on, the driver shall drive the vehicle with care to an authorised service station immediately for repair, so as to prevent greater faults from occurring and leading to accidents.

2.5.3 Diagnosis and testing

2.5.3.1 EHB - Elimination of occasional faults

In electronic system, instantaneous poor contact may come out at the electric circuit and the spots where signals are input and output, so as to bring about the random failure. Sometimes, the reasons of the failure may automatically disappear, so it will be hard to find them. In case of the random failure, simulate the failure in the following ways, and check if the failure will come out again.

S/N	Possible causes	Simulated Fault	Remarks
1	When vibration may be the main cause	Gently shake the EHB ECU connector upward, downward, leftward, and rightward. Shake the EHB harness gently upward, downward, leftward, and rightward. Gently shake the sensor upward, downward, leftward and rightward. Gently shake other moving components (such as wheel bearing).	If the wire harness is twisted or broken because of being too taut, it must be replaced with a new one. When the vehicle is running, the wheel speed sensor harnesses will form a temporary open/short circuit as the suspension system moves up and down. Therefore, the vehicle driving test must be performed when the sensor harness is checked.
2	When temperature may be the main cause	Heat the parts that may be faulty with a blower. Inspect for cold welding with cold spray.	
3	When excessively high power load may be the main cause	Turn on all switches of electrical appliances such as head lamp and wiper, so as to make the vehicle power supply work under high load.	

Note:

– If the fault does not recur at this time, the diagnosis and maintenance can only be carried out when the next fault recurs. Generally, random faults will gradually reappear, and they won't disappear on their own.

2.5.3.2 EHB DTCs and DTC troubleshooting methods

(RHD vehicle)

S/N	DTC	Fault description	Possible Cause	Repair recommendations
1	P120113	Wheel-speed sensor, front left: : Signal Line short to GND/Open; Supply Line open	The wheel speed sensor is damaged or the harness is open-circuited	Check the wheel speed sensor and harness
2	P120112	Wheel-speed sensor, front left: Supply Line short to UBATT	The wheel speed sensor is damaged, the harness is short-circuited, and water enters the connector	Check the wheel speed sensor, harness and connector
3	P120123	Wheel-speed sensor, front left: (signal failure) lost	The clearance between wheel speed sensor and ring gear is too large	Check the wheel speed sensor, harness and installation of wheel speed sensor
4	P12012F	Wheel-speed sensor, front left: (signal failure) erratic	Wheel speed sensor fault, loose installation, broken teeth of ring gear and water ingression into the connector	Check the wheel speed sensor, installation, connector and ring gear
5	P120125	Wheel-speed sensor, front left: (signal failure) dropout	The wheel speed sensor is not installed firmly	Check the wheel speed sensor and its installation
6	P120213	Wheel-speed sensor, front right: : Signal Line short to GND/Open; Supply Line open	The wheel speed sensor is damaged or the harness is open-circuited	Check the wheel speed sensor and harness
7	P120212	Wheel-speed sensor, front right: Supply Line short to UBATT	The wheel speed sensor is damaged, the harness is short-circuited, and water enters the connector	Check the wheel speed sensor, harness and connector
8	P120223	Wheel-speed sensor, front right: (signal failure) lost	The clearance between wheel speed sensor and ring gear is too large	Check the wheel speed sensor, harness and installation of wheel speed sensor
9	P12022F	Wheel-speed sensor, front right: (signal failure) erratic	Wheel speed sensor fault, loose installation, broken teeth of ring gear and water ingression into the connector	Check the wheel speed sensor, installation, connector and ring gear

S/N	DTC	Fault description	Possible Cause	Repair recommendations
10	P120225	Wheel-speed sensor, front right: (signal failure) dropout	The wheel speed sensor is not installed firmly	Check the wheel speed sensor and its installation
11	P120313	Wheel-speed sensor, rear left: : Signal Line short to GND/Open; Supply Line open	The wheel speed sensor is damaged or the harness is short-circuited	Check the wheel speed sensor and harness
12	P120312	Wheel-speed sensor, rear left:: Supply Line short to UBATT	The wheel speed sensor is damaged, the harness is short-circuited, and water enters the connector	Check the wheel speed sensor, harness and connector
13	P120323	Wheel-speed sensor, rear left:: (signal failure) lost	The clearance between wheel speed sensor and ring gear is too large	Check the wheel speed sensor, harness and installation of wheel speed sensor
14	P12032F	Wheel-speed sensor, rear left: (signal failure) erratic	Wheel speed sensor fault, loose installation, broken teeth of ring gear and water ingression into the connector	Check the wheel speed sensor, installation, connector and ring gear
15	P120325	Wheel-speed sensor, rear left:: (signal failure) dropout	The wheel speed sensor is not installed firmly	Check the wheel speed sensor and its installation
16	P120413	Wheel-speed sensor, rear right: : Signal Line short to GND/Open; Supply Line open	The wheel speed sensor is damaged or the harness is short-circuited	Check the wheel speed sensor and harness
17	P120412	Wheel-speed sensor, rear right:: Supply Line short to UBATT	The wheel speed sensor is damaged, the harness is short-circuited, and water enters the connector	Check the wheel speed sensor, harness and connector
18	P120423	Wheel-speed sensor, rear right:: (signal failure) lost	The clearance between wheel speed sensor and ring gear is too large	Check the wheel speed sensor, harness and installation of wheel speed sensor

S/N	DTC	Fault description	Possible Cause	Repair recommendations
19	P12042F	Wheel-speed sensor, rear right: (signal failure) erratic	Wheel speed sensor fault, loose installation, broken teeth of ring gear and water ingression into the connector	Check the wheel speed sensor, installation, connector and ring gear
20	P120425	Wheel-speed sensor, rear right:: (signal failure) dropout	The wheel speed sensor is not installed firmly	Check the wheel speed sensor and its installation
21	P120928	Wheel-speed Signal Error	Low tyre pressure or size mismatch	Check tyre pressure and tyre size
22	P120529	SAS Signal Fault	WCBS sensor is not calibrated or steering wheel angle signal is abnormal	1. Check the steering wheel angle sensor signal. 2. Perform zero calibration on the sensor.
23	P120629	Lateral Acceleration Sensor Signal Fault	WCBS sensor is not calibrated or lateral acceleration signal is abnormal	1. Perform zero calibration on the sensor. 2. Check the IMU sensor.
24	P120729	Longitudinal Acceleration Sensor Signal Fault	WCBS sensor is not calibrated or longitudinal acceleration signal is abnormal	1. Perform zero calibration on the sensor. 2. Check the IMU sensor.
25	P120829	Yaw Rate Acceleration Sensor Signal Fault	WCBS sensor is not calibrated or yaw angle acceleration signal is abnormal	1. Perform zero calibration on the sensor. 2. Check the IMU sensor.
26	P120A00	Master Cylinder Pressure Signal Failure	The signal line P1 of pressure sensor is poorly connected	1. Confirm whether the pressure sensor connection is normal. 2. Re-ignite and power on the vehicle. Confirm the fault status. If the fault persists, replace the EHCU assembly.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
27	P120A87	Master Cylinder Pressure Sensor Signal 2 Open or Short	The master cylinder pressure sensor and any one of the travel sensors are faulty	1. Confirm whether the pressure sensor connection is normal. 2. Re-ignite and power on the vehicle. Confirm the fault status. If the fault persists, replace the EHCU assembly.
29	P120A28	Secondary Master Cylinder Pressure Signal Failure	Pressure sensor damaged	1. Confirm whether the pressure sensor connection is normal. 2. Re-ignite and power on the vehicle. Confirm the fault status. If the fault persists, replace the EHCU assembly.
30	P120B00	Secondary Master Cylinder Pressure Sensor Signal 2 Open or Short	The signal line P1 of pressure sensor is poorly connected	1. Confirm whether the pressure sensor connection is normal. 2. Re-ignite and power on the vehicle. Confirm the fault status. If the fault persists, replace the EHCU assembly.
31	P120B04	Secondary Master Cylinder Pressure Signal Check Error	Second signal line P2 of the master cylinder pressure sensor open-circuited	1. Confirm whether the pressure sensor connection is normal. 2. Re-ignite and power on the vehicle. Confirm the fault status. If the fault persists, replace the EHCU assembly.
32	P120C00	Linear Position Sensor, Channel 1, Sensor Interanl Error	Pressure sensor damaged	1. Confirm whether the pressure sensor connection is normal. 2. Re-ignite and power on the vehicle. Confirm the fault status. If the fault persists, replace the EHCU assembly.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
33	P120E00	Linear Position Sensor, Power Supply Voltge Out of Range	The travel sensor power supply is abnormal	Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered;
34	P120C04	Linear Position Sensor, Channel 2, Sensor Internal Error	Hardware of travel sensor damaged /connection open-circuited/external temperature and magnetic field strength abnormal	1. Confirm whether the travel sensor connection is normal. 2. Re-ignite and power on the vehicle. Confirm the fault status. If the fault persists, replace the EHCU assembly.
35	P121016	Fluid Level Error	The fluid level in the fluid reservoir is too low	Replenish brake fluid
36	P121004	Brake Fluid Sensor Failure	Fault in brake fluid level sensor, open circuit or short circuit of harness	Check the brake fluid level sensor and harness
37	P12107A	Brake Fluid Not Assembly Failure	Vacuum filling failed; Manual filling status byte not written	Confirm the brake filling condition and write in the filling status byte
38	B111716	ECU Voltage Supply: Low Voltage	The power supply voltage is unstable	Check whether the battery voltage is stable
39	B111717	ECU Voltage Supply: High Voltage	The power supply voltage is unstable	Check whether the battery voltage is stable
40	P121323	AVH Switch Lock	AVH switch stuck	1. Check whether the AVH switch is stuck; 2. Check whether the connector of the AVH switch line is correctly connected to the switch;

S/N	DTC	Fault description	Possible Cause	Repair recommendations
41	P121300	AVH Button switch lamp failure	AVH switch indicator drive is open-circuited	1. Re-ignite and power on, and confirm the fault status. If the fault is not recovered, replace the AVH drive lamp.
42	P121423	ESC Switch Lock	ESC switch stuck	1. Check whether the ESC switch is stuck; 2. Check whether the connector of the ESC switch line is correctly connected to the switch;
43	P121400	ESC Button switch lamp failure	ESC switch indicator drive is open-circuited	1. Check whether there is any problem with the ESC switch light circuit drive of the ECU; 2. Re-ignite and power on to confirm the fault status. If the fault is not eliminated, replace the ESC drive light
44	P121604	LF Inlet Valve General Fault	Front left normally open valve coil or drive-related hardware fault	Check whether the coil is open-circuited or short-circuited; The drive time of the coil is too long;
45	P121704	LF Outlet Valve General Fault	Front left normally closed valve coil or drive-related hardware fault	Check whether the coil is open-circuited; The drive time of the coil is too long;
46	P121504	RF Inlet Valve General Fault	Front right normally open valve coil or drive-related hardware fault	Check whether the coil is open-circuited or short-circuited; The drive time of the coil is too long;
47	P121804	RF Outlet Valve General Fault	Front right normally closed valve coil or drive-related hardware fault	Check whether the coil is open-circuited; The drive time of the coil is too long;

S/N	DTC	Fault description	Possible Cause	Repair recommendations
48	P121904	LR Inlet Valve General Fault	Rear left normally open valve coil or drive-related hardware fault	Check whether the coil is open-circuited or short-circuited; The drive time of the coil is too long;
49	P121A04	LR Outlet Valve General Fault	Rear left normally closed valve coil or drive-related hardware fault	Check whether the coil is open-circuited; The drive time of the coil is too long;
50	P121B04	RR Inlet Valve General Fault	Rear right normally open valve coil or drive-related hardware fault	Check whether the coil is open-circuited or short-circuited; The drive time of the coil is too long;
51	P121C04	RR Outlet Valve General Fault	Rear right normally closed valve coil or drive-related hardware fault	Check whether the coil is open-circuited; The drive time of the coil is too long;
52	P121D04	SSV General Fault	SSV coil or drive-related hardware fault	Check whether the coil is open-circuited or short-circuited; Whether the drive time of the coil is too long; Detect whether the coil current feedback circuit has the fault of open or short of the sampling resistor;
53	P121E04	CSV_0 General Fault	CSV_0 coil or drive-related hardware fault	Check whether the coil is open-circuited or short-circuited; Whether the drive time of the coil is too long; Detect whether the coil current feedback circuit has the fault of open or short of the sampling resistor;

S/N	DTC	Fault description	Possible Cause	Repair recommendations
54	P121F04	CSV_1 General Fault	CSV_1 coil or drive-related hardware fault	Check whether the coil is open-circuited or short-circuited; Whether the drive time of the coil is too long; Detect whether the coil current feedback circuit has the fault of open or short of the sampling resistor;
55	P122004	PSV_0 General Fault	PSV_0 coil or drive-related hardware fault	Check whether the coil is open-circuited or short-circuited; Whether the drive time of the coil is too long; Detect whether the coil current feedback circuit has the fault of open or short of the sampling resistor;
56	P122104	PSV_1 General Fault	PSV_1 coil or drive-related hardware fault	Check whether the coil is open-circuited or short-circuited; Whether the drive time of the coil is too long; Detect whether the coil current feedback circuit has the fault of open or short of the sampling resistor;
58	P122313	WCB Safe Highside MOS Open to Battery（HD_D PIN）	1. Transient voltage of ECU power supply too low. 2. HD_D PIN resistor open-circuited.	1. Check whether the system power supply voltage is abnormally low. 2. Re-ignite and power on the system. Confirm the fault status. If the fault persists, replace the EHCU assembly.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
59	P122312	WCB Safe Highside MOS Short to Battery	1. WCB solenoid valve high-side MOS tube short-circuited. 2. WCB solenoid valve high-side drive short-circuited	1. Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
60	P122913	ABS Safe Highside Driver Open or Short to GND	1. ABS solenoid valve high-side MOS tube open-circuited. 2. ABS solenoid valve high-side drive open-circuited	1. Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
61	P122912	ABS Safe Highside MOS Short to Battery	1. ABS solenoid valve high-side MOS tube short-circuited. 2. ABS solenoid valve high-side drive short-circuited	1. Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
62	P122412	Motor Overcurrent	Overcurrent of brushless motor	1. Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
63	P120D04	Position Sensor Failure	Damage or internal fault occurs in the position sensor	1. Re-ignite and power on, confirm the fault status, and replace the position sensor if the fault is not recovered.
64	P122E04	ECU System Internal Failure	System self-inspection error, FLASH self-inspection error, ASIC over-temperature, internal power supply error, system stack error, coprocessor error, RAM error and other internal faults	1. Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
65	P122513	Motor Power Supply Open	The connector is open-circuited	1. Re-ignite and power on, check the connector harness, confirm the fault status, and replace the EHCU assembly if the fault is not recovered.
66	P122613	Valve Power Supply Open	The connector is open-circuited	1. Re-ignite and power on, check the connector harness, confirm the fault status, and replace the EHCU assembly if the fault is not recovered.
67	P127513	Battery Lowside Open	Internal power supply MOS tube open-circuited	1. Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
68	P127613	Motor Driver Failure	Internal power supply MOS tube open-circuited	1. Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
69	P127004	Bridge Fault	Bridge fault	1. Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
70	P124018	Left actuator - No motor start detected	The internal transmission mechanism of EPB caliper assembly is damaged and the motor current is too low	Check the left actuator and power on again
71	P124119	Left actuator - Circuit current above threshold	The current of EPB caliper assembly continuously exceeds the threshold value during action	Check whether the left actuator harness is short-circuited or the motor is stuck

S/N	DTC	Fault description	Possible Cause	Repair recommendations
72	P124274	Left actuator - Actuator slipping	The EPB caliper assembly is installed incorrectly, and the actuator keeps idling during clamping	Check whether the left EPB caliper assembly is installed correctly or the brake pad is not installed correctly
73	P124303	Left actuator - Apply failed	The EPB caliper assembly cannot reach the set clamping force	Check the power supply, left EPB caliper assembly and left actuator assembly
74	P124472	Left actuator - Release failed	The EPB caliper assembly cannot reach the set release position	Check the left EPB caliper assembly and actuator assembly
75	P12451E	Left actuator - Wrong operating characteristics detect	Excessive internal resistance of harness connected to EPB caliper assembly or excessive contact internal resistance of connector	Check the harness from left ECU to actuator
76	P124692	Left actuator - High mechanical resistance	Excessive idling resistance of EPB caliper assembly	Check the left EPB caliper and actuator
77	P124797	Left actuator - Action Limited	ESP detects a fault and does not allow EPB caliper assembly to move	Check ESP-related faults
78	P124800	Right actuator - No motor start detected	The internal transmission mechanism of EPB caliper assembly is damaged and the motor current is too low	Check the right actuator and power on again
79	P124919	Right actuator - Circuit current above threshold	The current of EPB caliper assembly continuously exceeds the threshold value during action	Check whether the right actuator harness is short-circuited or the motor is stuck

S/N	DTC	Fault description	Possible Cause	Repair recommendations
80	P124A74	Right actuator - Actuator slippin	The EPB caliper assembly is installed incorrectly, and the actuator keeps idling during clamping	Check whether the right EPB caliper assembly is installed correctly or the brake pad is not installed correctly
81	P124B73	Right actuator - Apply failed	The EPB caliper assembly cannot reach the set clamping force	Check the power supply, right EPB caliper assembly and right actuator assembly
82	P124C72	Right actuator -Release failed	The EPB caliper assembly cannot reach the set release position	Check the right EPB caliper assembly and actuator assembly
83	P124D1E	Right actuator - wrong operating characteristics detect	Excessive internal resistance of harness connected to EPB caliper assembly or excessive contact internal resistance of connector	Check the harness from the right ECU to the actuator
84	P124E92	Right actuator - High mechanical resistance	Excessive idling resistance of EPB caliper assembly	Check the right EPB caliper and actuator
85	P124F97	Right actuator - Action Limited	ESP detects a fault and does not allow EPB caliper assembly to move	Check ESP-related faults
86	P125029	PBC EEPROM fault	EEPROM data is invalid or checksum failed	Execute diagnostic service "Assembly Test" for recalibration
87	P125117	Supply voltage - Over Voltage	The system power supply voltage is too high, higher than 16V	Check the battery or vehicle power supply
88	P125216	Supply voltage - Low Voltage	The system power supply voltage is too low, lower than 9V	Check the battery or vehicle power supply

S/N	DTC	Fault description	Possible Cause	Repair recommendations
89	P125354	Assembly Test not performed	The EPB does not perform offline calibration when it is offline	Perform diagnostic service "Assembly Test" for calibration
90	P125453	EPB Maintenance Mode	EPB is in maintenance mode	Execute the diagnostic service "Exit maintenance mode" to exit the maintenance mode
91	P125594	Hydric Support Failed	HPS unavailable	Check the power supply voltage or ESP related faults
92	P122704	EPB Button Line Failure	1. Line connecting the EPB switch and the ECU short-circuited or open-circuited. 2. Internal circuit fault of the EPB switch.	1. Check whether the line connected to the EPB switch is short-circuited or open-circuited. 2. Check whether the connector of the EPB switch line is correctly mated to the switch.
93	P122823	EPB Button Blocked	1. There is a stuck fault in EPB switch	1. Check whether the EPB switch has sticking problems. 2. Check whether the connector of the EPB switch line is correctly mated to the switch. 3. Check whether the internal circuit of the EPB switch meets the design requirements.
94	P122A04	EPB Button switch failure	1. The EPB switch light drive is open-circuited; 2. The EPB switch light circuit of the ECU is short-circuited to power supply;	1. Check whether the EPB switch light circuit of the ECU is open or short-circuited; 2. Check whether the internal circuit of the EPB switch light meets the design requirements;

S/N	DTC	Fault description	Possible Cause	Repair recommendations
95	P126613	EPB Left Motor Open Failure	1. The EPB left motor is open-circuited;	1. Check whether the EPB actuator is damaged and whether the assembly is correct. 2. Re-ignite and power on, confirm the fault status, and replace the EPB actuator assembly if the fault persists.
96	P120904	EPB Left Motor Unintended Run	The EPB left motor action is abnormal	1. Check whether the EPB actuator is damaged and whether the assembly is correct. 2. Re-ignite and power on, confirm the fault status, and replace the EPB actuator assembly if the fault persists.
97	P126712	EPB Left Motor Short Failure	1. EPB left motor connection line shorted to GND. 2. Connection line of the EPB left motor short-circuited to GND. 3. EPB left motor short-circuited to battery.	1. Check whether the EPB actuator is damaged and whether the assembly is correct. 2. Re-ignite and power on, confirm the fault status, and replace the EPB actuator assembly or EHCU assembly if the fault persists.
98	P126804	EPB Left Motor Driver Failure	1. EPB left motor drive chip fault. 2. EPB left motor drive circuit fault.	1. Check whether the system power supply voltage is abnormal; 2. Re-ignite and power on the system. Confirm the fault status. If the fault persists, replace the EHCU assembly.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
99	P12691D	EPB Left Motor Driver Overcurrent Failure	1. EPB left motor overload. 2. EPB left motor stall.	1. Check whether the EPB actuator is damaged and whether it is properly assembled. 2. Check whether the system power supply voltage is abnormal. 3. Re-ignite and power on the system. Confirm the fault status. If the fault persists, replace the EHCU assembly.
100	P126A87	EPB Left Motor Driver Timeout Failure	1. PBC control command of EPB left motor is abnormal	1. Check whether the EPB actuator is damaged and whether it is properly assembled. 2. Check whether the software version is the latest released version.
101	P120F04	EPB Right Motor Unintended Run	The EPB left motor action is abnormal	1. Check whether the EPB actuator is damaged and whether the assembly is correct. 2. Re-ignite and power on, confirm the fault status, and replace the EPB actuator assembly if the fault persists.
102	P126B13	EPB Right Motor Open Failure	1. The EPB right motor is open-circuited;	1. Check whether the EPB actuator is damaged and whether the assembly is correct. 2. Re-ignite and power on, confirm the fault status, and replace the EPB actuator assembly if the fault persists.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
103	P126C12	EPB Right Motor Short Failure	1. EPB right motor connection line shorted to GND. 2. Connection line of the EPB right motor short-circuited to GND. 3. EPB right motor short-circuited to Battery.	1. Check whether the EPB actuator is damaged and whether the assembly is correct. 2. Re-ignite and power on, confirm the fault status, and replace the EPB actuator assembly or EHCU assembly if the fault persists.
104	P126D04	EPB Right Motor Driver Failure	1. EPB right motor drive chip fault. 2. EPB right motor drive circuit fault.	1. Check whether the system power supply voltage is abnormal; 2. Re-ignite and power on the system. Confirm the fault status. If the fault persists, replace the EHCU assembly.
105	P126E1D	EPB Right Motor Driver Overcurrent Failure	1. EPB right motor overload. 2. EPB right motor stall.	1. Check whether the EPB actuator is damaged and whether it is properly assembled. 2. Check whether the system power supply voltage is abnormal. 3. Re-ignite and power on the system. Confirm the fault status. If the fault persists, replace the EHCU assembly.
106	P126F87	EPB Right Motor Driver Timeout Failure	1. The PBC control command of EPB right motor is abnormal	1. Check whether the EPB actuator is damaged and whether it is properly assembled. 2. Check whether the software version is the latest released version.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
107	P121187	EPB Motor Control Signal Check Error	EPB control command abnormal	Re-ignite and power on, confirm the fault status, and contact the manufacturer for confirmation if the fault is not recovered.
108	P121204	Pressure Sensor Supply Voltage Failure	System internal power supply fault	Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
109	P122B04	RPS Supply Voltage Failure	System internal power supply fault	Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
110	P122C04	Internal Communication Failure 1（Master And Slaver Communication Timeout,Msater And Slaver CheckSum Error）	System internal communication fault	Re-ignite and power on, confirm the fault status, check the communication node, and replace the EHCU assembly if the fault is not recovered.
112	P123404	Internal Communication Failure 3 (UART Communication failure)	System internal communication fault	Re-ignite and power on, confirm the fault status, check the communication node, and replace the EHCU assembly if the fault is not recovered.
114	P127404	ECU Slaver System Failure	Auxiliary system fault	Re-ignite and power on, confirm the fault status, check the communication node and power supply voltage, and replace the EHCU assembly if the fault is not recovered.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
115	P128804	Diagnostics Enter Rollerbench Mode	Enter the rotating hub mode via diagnostic commands	1. Request to exit the rotating hub mode via diagnosis. 2. Power on again.
116	P127204	WCB inhibit diagnostic stop wire control brake function	Use diagnostic commands to disable the wire control brake function	1. Re-enable the wire control brake function via diagnosis. 2. Power on again.
117	P123604	ABS Calibration Check Error	RAM/ROM damaged; Software with problematic calibration parameters has been flashed	1. Check whether the software version is the latest released version. 2. Re-ignite and power on, confirm the fault status, and replace the ECU if the fault persists.
118	P123704	WCBS Calibration Check Error	RAM/ROM damaged; Software with problematic calibration parameters has been flashed	1. Check whether the software version is the latest released version. 2. Re-ignite and power on, confirm the fault status, and replace the ECU if the fault persists.
119	P123804	PMSM Calibration Error	RAM/ROM damaged; Software with problematic calibration parameters has been flashed	1. Check whether the software version is the latest released version. 2. Re-ignite and power on, confirm the fault status, and replace the ECU if the fault persists.
120	P123A04	PBC Calibration Error	RAM/ROM damaged; Software with problematic calibration parameters has been flashed	1. Check whether the software version is the latest released version. 2. Re-ignite and power on, confirm the fault status, and replace the ECU if the fault persists.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
121	P123C04	EPB Calibration Error	RAM/ROM damaged; Software with problematic calibration parameters has been flashed	1. Check whether the software version is the latest released version. 2. Re-ignite and power on, confirm the fault status, and replace the ECU if the fault persists.
122	P123D04	BSW Calibration Error	RAM/ROM damaged; Software with problematic calibration parameters has been flashed	1. Check whether the software version is the latest released version. 2. Re-ignite and power on, confirm the fault status, and replace the ECU if the fault persists.
123	U007300	BUS OFF Failure	CAN bus short-circuited, terminal resistance mismatch, CAN ID conflict	Re-ignite and power on, confirm the fault status, and check the CAN network environment
124	P123913	PMSM Motor Driver PDD PIN Open	System internal fault	Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
125	P12394B	PMSM Motor Driver Over-Temperature	System internal fault	Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
126	P123904	PMSM Motor Driver Chip Failure	System internal fault	Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
127	P125604	BSM Hard Pedal Characteristic Failure	The master cylinder or PFS is stuck	Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
128	P125704	BSM Soft Pedal Characteristic Failure	Master cylinder leaks or air exists	Exhaust air again, and confirm whether the fault exists after braking again
130	P126004	Hydraulic Internal Faults	There are faults in the system that affect the pressure build-up of the auxiliary master cylinder, such as abnormal sealing of the auxiliary master cylinder	Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
131	P123B04	Brake Circuit Air or Leak Alarm	There is a small amount of air or slow leakage in hydraulic circuit or caliper, but it can be pressurised normally	Exhaust air again, and confirm whether the fault exists after braking again
132	P126104	Brake System Air Check Or Leak Check Error	Too much or a large amount of air in the hydraulic circuit or caliper leaks, which makes it impossible to build pressure normally	Exhaust air again, and confirm whether the fault exists after braking again
133	P126204	The Motor Works Abnormally	Brushless motor power supply absence or ECU control error	Re-ignite and power on, confirm the fault status, and replace EHCU assembly if the fault is not recovered.
134	P126304	Sensor Not Calibration Failure	Sensor inside the system not calibrated	Calibrate the sensor, power it on again, and confirm the fault status
135	P123E81	Yaw Rate Sensor Signal Invalidation	The fault of the frame signal sending node causes that the invalid signals are sent or the value exceeds the normal range	Re-ignite and power on, confirm the fault status, and replace the yaw rate sensor assembly if the fault is not recovered.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
136	P123F81	Invalid Torque Signal/ Invalid Gear Signal/ Invalid Pedal Signal	The fault of the frame signal sending node causes that the invalid signals are sent or the value exceeds the normal range	Re-ignite and power on, confirm the fault status, and if the fault is not recovered, check the corresponding sending node problem (VCM).
137	P122F81	Angle Signal Corrupt	The fault of the frame signal sending node causes that the invalid signals are sent or the value exceeds the normal range	Re-ignite and power on, confirm the fault status, and if the fault is not recovered, check the corresponding sending node problem (EPS).
138	U012200	VCM Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the VCM node status if the fault is not recovered.
139	U012281	VCM Message Invalid	The fault of the frame signal sending node causes that the invalid signals are sent or the value exceeds the normal range	Re-ignite and power on, confirm the fault status, and check the VCM node status if the fault is not recovered.
140	U011000	MCU Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the MCU node status if the fault is not recovered.
141	U011081	MCU Message Timeout	The fault of the frame signal sending node causes that the invalid signals are sent or the value exceeds the normal range	Re-ignite and power on, confirm the fault status, and check the MCU node status if the fault is not recovered.
142	U012600	SAS Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the SAS node status if the fault is not recovered.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
143	U010300	GSM Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the GSM node status if the fault is not recovered.
144	U016400	AC Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the AC node status if the fault is not recovered.
145	U120000	SRS Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the SRS node status if the fault is not recovered.
146	U014000	BCM Message Tiemout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the BCM node status if the fault is not recovered.
147	U015600	ICE Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the ICE node status if the fault is not recovered.
148	U014001	PEPS Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the PEPS node status if the fault is not recovered.
149	U015500	IC Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the IC node status if the fault is not recovered.
150	P123E87	Yaw Rate Sensor Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the Yaw Rate Sensor node status if the fault is not recovered.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
151	U011100	BMS Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the BMS node status if the fault is not recovered.
152	U010000	ECU Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the ECU node status if the fault is not recovered.
160	U017000	APA Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the APA node status if the fault is not recovered.
161	U017081	APA Message Invalid	The fault of the frame signal sending node causes that the invalid signals are sent or the value exceeds the normal range	Re-ignite and power on, confirm the fault status, and check the APA node status if the fault is not recovered.
162	U018000	DAS Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the DAS node status if the fault is not recovered.
163	U018081	DAS Message Invalid	The fault of the frame signal sending node causes that the invalid signals are sent or the value exceeds the normal range	Re-ignite and power on, confirm the fault status, and check the DAS node status if the fault is not recovered.
164	U019000	HCU Message Timeout	The frame signal cannot be received due to the fault of the frame signal sending node	Re-ignite and power on, confirm the fault status, and check the HCU node status if the fault is not recovered.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
165	P127716	Wheel speed sensor supply voltage low fault	1. The power supply voltage of the vehicle is abnormal. 2. Abnormal ECU power supply	1. Check the vehicle power supply. 2. Check the power supply of WCBS harness.
166	P127717	Wheel speed sensor supply voltage high fault	1. The power supply voltage of the vehicle is abnormal. 2. Abnormal ECU power supply	1. Check the vehicle power supply. 2. Check the power supply of WCBS harness.
167	P127808	Auxiliary system internal fault	epb control hierarchy signals are abnormal	check epb control hierarchy signals
168	P127996	Power chip hardware reset fault	Abnormal voltage	Replace the ECU assembly
169	P127A96	Power supply chip software reset fault	1. The system scheduling is abnormal, resulting in failure to feed the dog normally; 2. Abnormal power supply causes MCU to fail to operate normally.	1. Check whether the internal and external power supply of WCBS is normal; 2. Check whether the system operates normally; 3. Replace the ECU assembly.
170	P127B64	Abnormal SPI communication of power chip	Abnormal SPI communication of power chip	Replace the ECU assembly
171	P128A29	RPS_SINGLE_ SIGNAL_ERR RPS	1. Poor contact and open circuit of sensor spring; 2. Sensor spring short-circuited to power supply, ground wire and other signal wires; 3. There are foreign objects at the sensor PCBA or connecting spring; 4. Failure of sensor hardware signal link	1. Record the ambient temperature, magnetic field environment, weather, vehicle power supply status, assembly working status and other fault condition information at the time of the fault; 2. Try to reproduce the fault based on the fault condition; 3. Replace parts

S/N	DTC	Fault description	Possible Cause	Repair recommendations
172	P128B29	Rotor position sensor raw signals Implausible	1. Poor contact and open circuit of sensor spring; 2. Sensor spring short-circuited to power supply, ground wire and other signal wires; 3. There are foreign objects at the sensor PCBA or connecting spring; 4. Failure of sensor hardware signal link	1. Record the ambient temperature, magnetic field environment, weather, vehicle power supply status, assembly working status and other fault condition information at the time of the fault; 2. Try to reproduce the fault based on the fault condition; 4. Replace parts
173	P128C91	RPS_SIGNAL_VOLT_OVER_RANGE	1. Poor contact and open circuit of sensor spring; 2. Sensor spring short-circuited to power supply, ground wire and other signal wires; 3. There are foreign objects at the sensor PCBA or connecting spring; 4. Failure of sensor hardware signal link	1. Record the ambient temperature, magnetic field environment, weather, vehicle power supply status, assembly working status and other fault condition information at the time of the fault; 2. Try to reproduce the fault based on the fault condition; 5. Replace parts
174	P128D91	RPS_LISSAJOUS_CHECK_FAIL	1. Poor contact and open circuit of sensor spring; 2. Sensor spring short-circuited to power supply, ground wire and other signal wires; 3. There are foreign objects at the sensor PCBA or connecting spring; 4. Failure of sensor hardware signal link	1. Record the ambient temperature, magnetic field environment, weather, vehicle power supply status, assembly working status and other fault condition information at the time of the fault; 2. Try to reproduce the fault based on the fault condition; 9. Replace parts
175	P128E91	RPS_COMMON_MODE_CHECK_FAIL		

S/N	DTC	Fault description	Possible Cause	Repair recommendations
176	P128F22	Implausible too high angle jump in RPS signal	1. Poor contact and open circuit of sensor spring; 2. Sensor spring short-circuited to power supply, ground wire and other signal wires; 3. There are foreign objects at the sensor PCBA or connecting spring; 4. Failure of sensor hardware signal link	1. Record the ambient temperature, magnetic field environment, weather, vehicle power supply status, assembly working status and other fault condition information at the time of the fault; 2. Try to reproduce the fault based on the fault condition; 17. Replace parts
177	P128083	Brushless motor pre-drive SPI communication fault	1. The SPI communication address error of the brushless motor pre-drive chip lasts for 50ms; 2. The SPI communication CRC check error of the brushless motor pre-drive chip lasts for 50ms	1. Check supply voltage; 2. Re-ignite, check status; 3. If failure is not recovered after the above operation, replace the EHCU assembly.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
178	P128009	Brushless motor pre-drive three-phase bridge MOS fault	1. The voltage between the three-phase bridge MOS and DS of the brushless motor pre-drive exceeds 0.6V for 50ms, and the three-phase bridge MOS is short-circuited; 2. The brushless motor pre-drive chip detects that the SL_A voltage exceeds 2V for 50ms, and the low side of the three-phase bridge MOS has overcurrent; 3. The brushless motor pre-drive chip detects that the upper and lower bridge MOS are turned on at the same time for 50ms.	1. Check supply voltage; 2. Re-ignite, check status; 3. If failure is not recovered after the above operation, replace the EHCU assembly.
179	P12801C	Brushless motor pre-drive voltage fault	1. The power supply voltage of the brushless motor pre-drive chip exceeds the range of 4.5~32V (battery power supply) for 50ms; 2. The charge pump voltage of the brushless motor pre-drive chip is not within 4.4V~15V (pre-drive chip's own charge pump voltage) for 50ms.	1. Check supply voltage; 2. Re-ignite, check status; 3. If failure is not recovered after the above operation, replace the EHCU assembly.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
180	P128049	Internal circuit fault of brushless motor pre-drive	1. The internal analogue circuit and digital circuit fault of the brushless motor pre-drive chip lasts for 50ms; 2. The internal clock fault, dead zone fault and current regulator fault of the brushless motor pre-drive chip last for 50ms.	1. Ignition off and on again; 2. If no recovery after the above operation, replace ECU or EHCU.
181	P12801D	Brushless motor pre-drive detection current fault	1. The pre-drive reference current of the brushless motor is not within the normal range (1.5673V ~ 1.7326V), and a fault will be reported if the condition persists for 50ms. 2. The static bias current of the brushless motor pre-drive is not within the normal range (-10A ~ 10A), and a fault will be reported if the condition persists for 50ms. 3. A fault will be reported if the V phase dynamic control current of the brushless motor exceeds 140A and lasts for 50ms.	1. Check supply voltage; 2. Re-ignite, check status; 3. If failure is not recovered after the above operation, replace the EHCU assembly.

S/N	DTC	Fault description	Possible Cause	Repair recommendations
182	P128095	Brushless motor drive 9183	1. The brushless motor pre-drive chip configuration failed more than 3 times. 2. The brushless motor pre-drive chip itself enters an error state but does not report the pre-drive chip DTC for 50ms. 3. The power supply voltage is below 5.6V for more than 100ms.	1. Check supply voltage; 2. Re-ignite, check status; 3. If failure is not recovered after the above operation, replace the EHCU assembly.
183	P128149	Master cylinder pressure sensor circuit fault	1. Abnormal internal power supply of the pressure sensor; 2. The sensor power supply voltage is too high or too low; 3. Any one of the 3 PINs of the pressure sensor is open-circuited or short-circuited;	Replace the parts
184	P128200	The sensor signal verification time is too long	The lateral acceleration sensor, steering wheel Angle sensor and yaw rate sensor does not match	Calibrate the IMU correctly or replace the IMU
185	P128129	Internal abnormality of master cylinder pressure sensor	1. Pressure sensor internal fault	Replace the parts
186	P12814B	Abnormal temperature of master cylinder pressure sensor	1. The internal temperature of the sensor is higher than 150°C or lower than -50°C	Replace the parts
187	C121208	Vehicle model unconfigured	Model configuration not performed	Configure the vehicle model and power on and off again

2.5.3.3 EHB - No DTC troubleshooting

If the brake system has a fault but the EHB has not stored a fault code, this is known as a no-DTC fault. No-DTC faults are generally caused by a failure in the basic brake system, such as:

1. Brake fluid leakage (possibly resulting in soft brake, brake pedal travel excessively large, or even braking failure).

2. Use of inferior brake fluid (which will corrode the brake pipelines and the EHB brake-by-wire system internal components or even cause brake failure in a serious condition)

3. Air in brake pipeline (possibly resulting in brake pedal too soft or even braking failure).

4. Brake pipeline blocked (possibly resulting in brake pedal too hard or even braking failure).

5. Brake disc excessive wear (possibly resulting in brake pedal too soft and brake pedal travel excessively large).

Brake pipeline connection error (may lead to decreased EHB performance, tail-flicking, longer braking distances, etc.). For the correct installation method, please refer to the identification near the oil hole on EHB brake-by-wire system; FL represents the front left wheel cylinder oil pipe; FR represents the front right wheel cylinder oil pipe; RL represents the rear left wheel cylinder oil pipe; RR represents the rear right wheel cylinder oil pipe).

Note:

– No power supply or abnormal interruption of EHB will cause ABS and ESP warning lights to stay on without DTC.

– Troubleshooting recommendations: inspect the appropriate components for the malfunction phenomenon, and carry out troubleshooting according to the vehicle service manual.

2.5.3.4 EHB-Diagnostic Process

2.5.4 Removal and installation

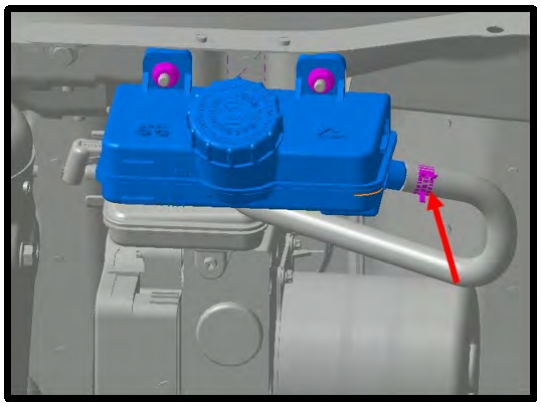
2.5.4.1 Brake fluid reservoir

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative terminal.
2. Drain the brake fluid.

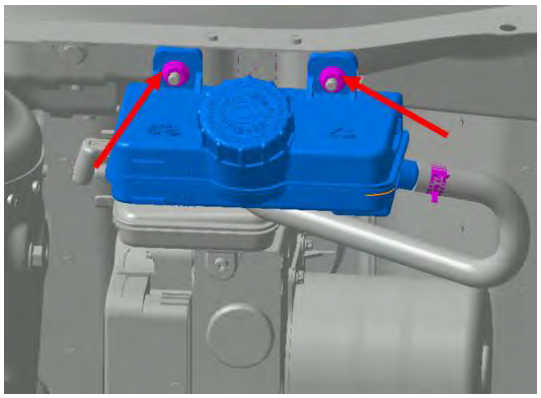
   Warning: The brake fluid contains polyglycol ether and polyglycol. Avoid contact with the eyes. Wash hands thoroughly after maintenance. If brake fluid comes into contact with eyes, rinse them with clean water for 15min. If discomfort persists, seek medical attention immediately. In case of ingestion or if it enters drinking water, which can lead to vomiting, seek medical attention immediately or it may lead to personal injury.

   Note: If the brake fluid splashes out on the paintwork, flush the area with cold water immediately.
3. Loosen the clamp and disengage the brake supply hose assembly.



4. Remove the fixing bolt of brake fluid reservoir.

   Torque: 8 ± 1.2 Nm



5. Remove the brake fluid reservoir.

Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

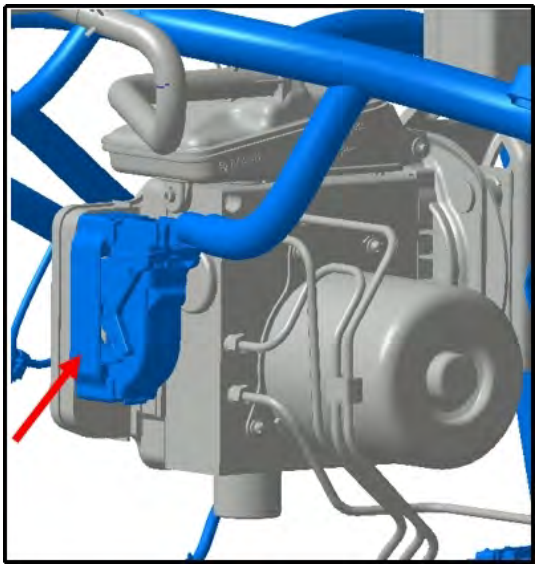
Note: Check the brake fluid level in the brake fluid reservoir, and fill the brake fluid to the maximum scale if necessary.

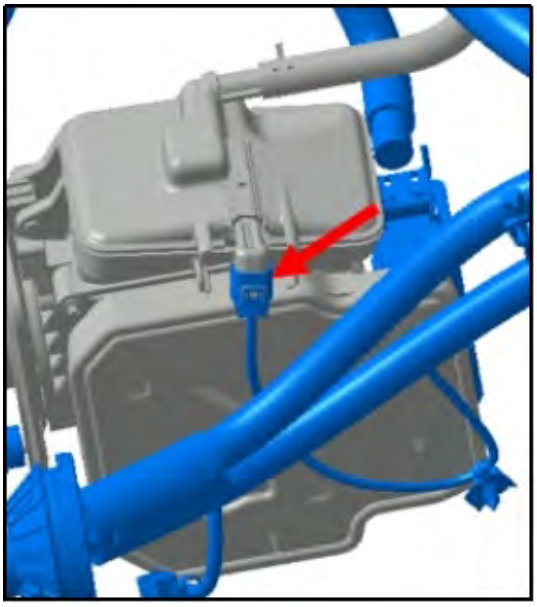
Note: Bleed the brake system according to the specified method. Refer to: Brake system bleeding.

2.5.4.2 EHB assembly

Removal

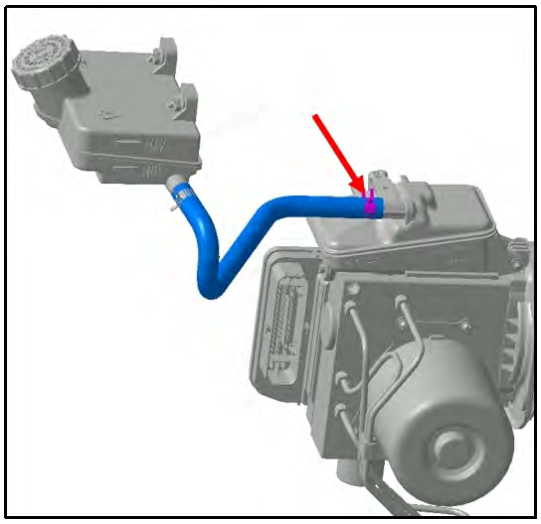
1. The power switch is in the OFF position and the negative terminal of the battery is disconnected. Refer to: Disconnect the battery negative terminal.
2. Remove the harness from the EHB assembly and liquid level sensor.





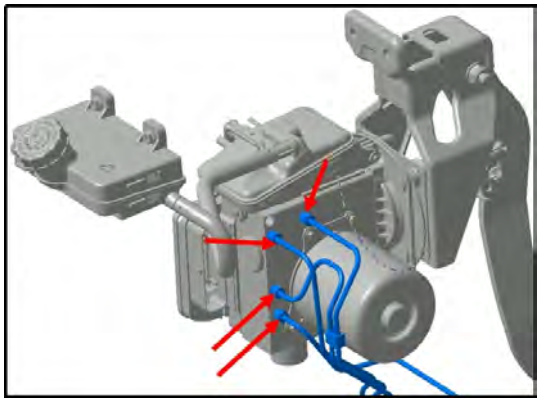
3. Remove the brake fluid pipe assembly from EHB assembly.

Warning: The brake fluid contains polyglycol ether and polyglycol. Avoid contact with the eyes. Wash hands thoroughly after maintenance. If brake fluid comes into contact with eyes, rinse them with clean water for 15min. If discomfort persists, seek medical attention immediately. In case of ingestion or if it enters drinking water, which can lead to vomiting, seek medical attention immediately or it may lead to personal injury.

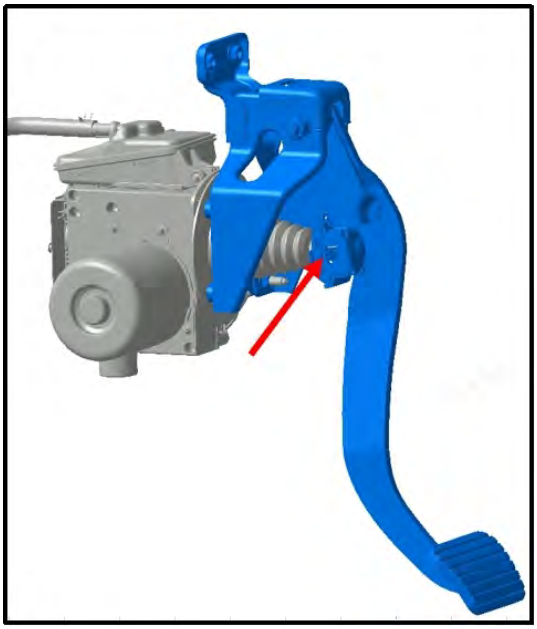


4. Remove the brake steel pipe from EHB assembly.

   Torque: 16±1 Nm

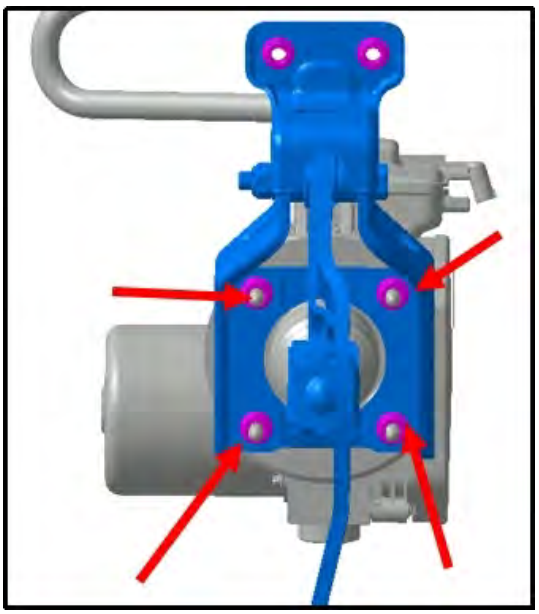


5. Remove the ball joint connection structure from the brake pedal assembly.



6. Remove the mounting nuts of brake pedal assembly and EHB system from front wall mounting plate.

   Torque: 21~29 Nm



Installation

The installation order is reverse to the removal order. Pay attention to the following points:

1. Check the brake fluid level in the brake fluid reservoir and, if necessary, add brake fluid to the Max.
2. Bleed the brake system according to the specified method. Refer to: Brake system bleeding.
3. Be sure to calibrate the steering wheel angle sensor and yaw rate sensor upon replacing the EHB assembly.

2.6 Brake system

2.6.1 Specification

2.6.1.1 General specifications

Brake fluid specifications

Name	Specification
Brake fluid	DOT4

Front disc brake specification

Application	Unit (mm)
Thickness service limit of brake disc	23
Initial thickness of brake disc (new)	25
Initial thickness of brake pad (single side)	9.5
Thickness limit of brake pad (single side)	2
Brake disc friction surface thickness deviation (new product)	0.009
End face runout limit of brake disc	0.025 (single-disc runout)

Specification of EPB caliper assembly

Application	Unit (mm)
Thickness service limit of brake disc	10
Initial thickness of brake disc (new)	12
Initial thickness of brake lining (single side)	9
Thickness limit of brake lining (single side)	2
Brake disc friction surface thickness deviation (new product)	0.009
End face runout limit of brake disc	0.025 (single-disc runout)

Maintenance data

Brake pedal parameters	mm
Height of brake pedal	150.3±8
Free stroke of brake pedal	1 ~ 12

2.6.1.2 Torque specification

Front disc brake torque

Name	Nm
Front caliper connecting screw	33 ~ 38
Front caliper bracket bolt	135 ~ 165
Front caliper bleed screw	9~11
Front brake hose connected to front brake caliper (hollow bolt)	35 ~ 45
Brake steel pipe joint	15 ~ 17
Wheel speed sensor bolt	6 ~ 10

Brake pedal

Name	Nm
Brake pedal mounting nut tightening torque	25±4

Rear brake

Name	Nm	Remarks
Pin screw	22 ~ 32	Connection of caliper body and fixing frame
Caliper mounting bolt	105 ~ 115	Connection of mounting bracket and caliper assembly
MGU bolt	9 ~ 11	Connection of MUG motor unit
Oil inlet hollow bolt	35 ~ 45	Connection of caliper and brake hose
Bleed screw	5 ~ 8	Connection of exhaust hole

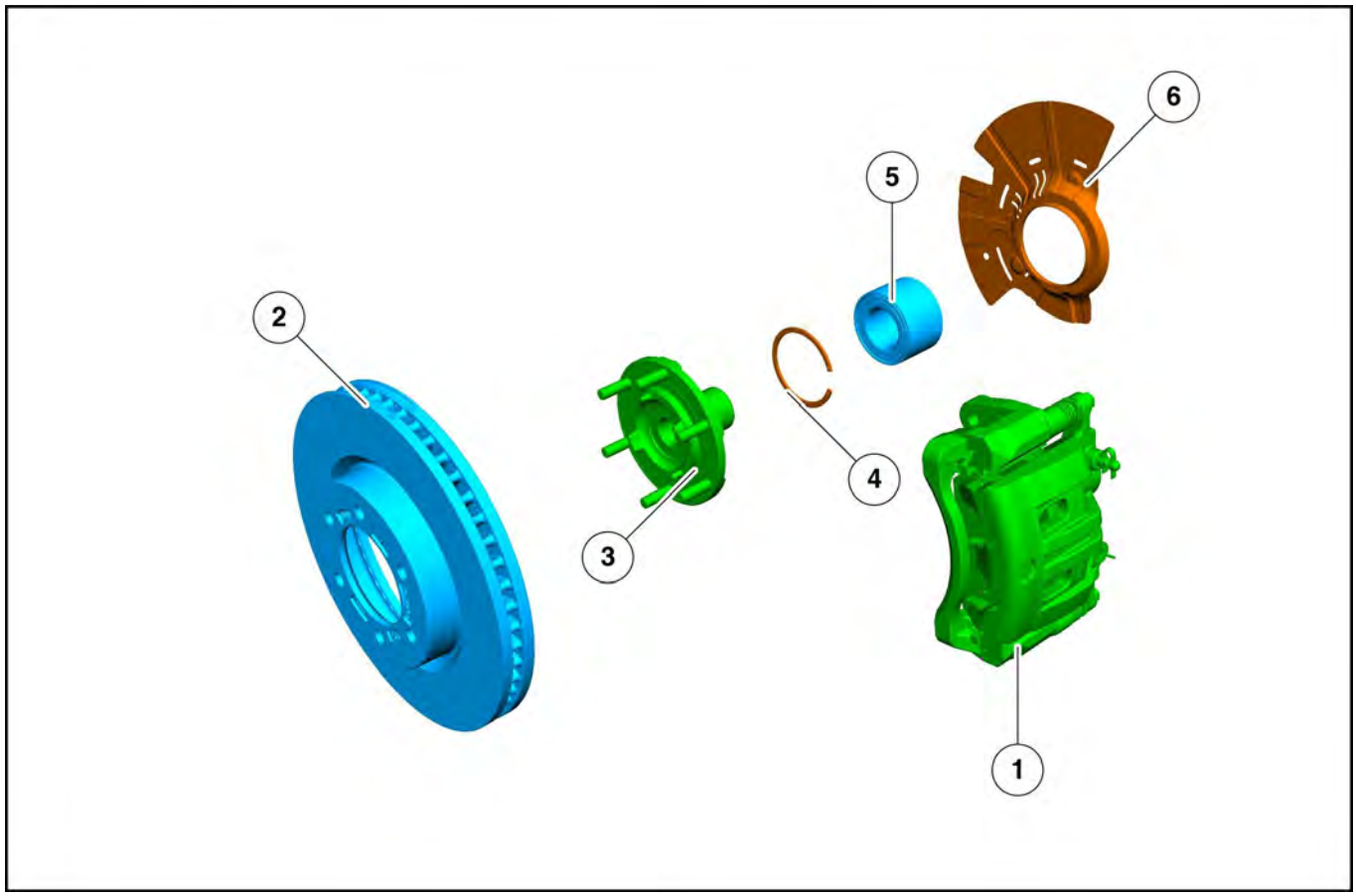
Electronic parking brake torque

Name	Nm	Remarks
Pin screw	22 ~ 32	Connection of caliper body and fixing frame
Caliper mounting bolt	105 ~ 115	Connection of mounting bracket and caliper assembly
MGU bolt	9 ~ 11	Connection of MUG motor unit
Oil inlet hollow bolt	35 ~ 45	Connection of caliper and brake hose
Bleed screw	5 ~ 8	Connection of exhaust hole

2.6.2 Operation Manual

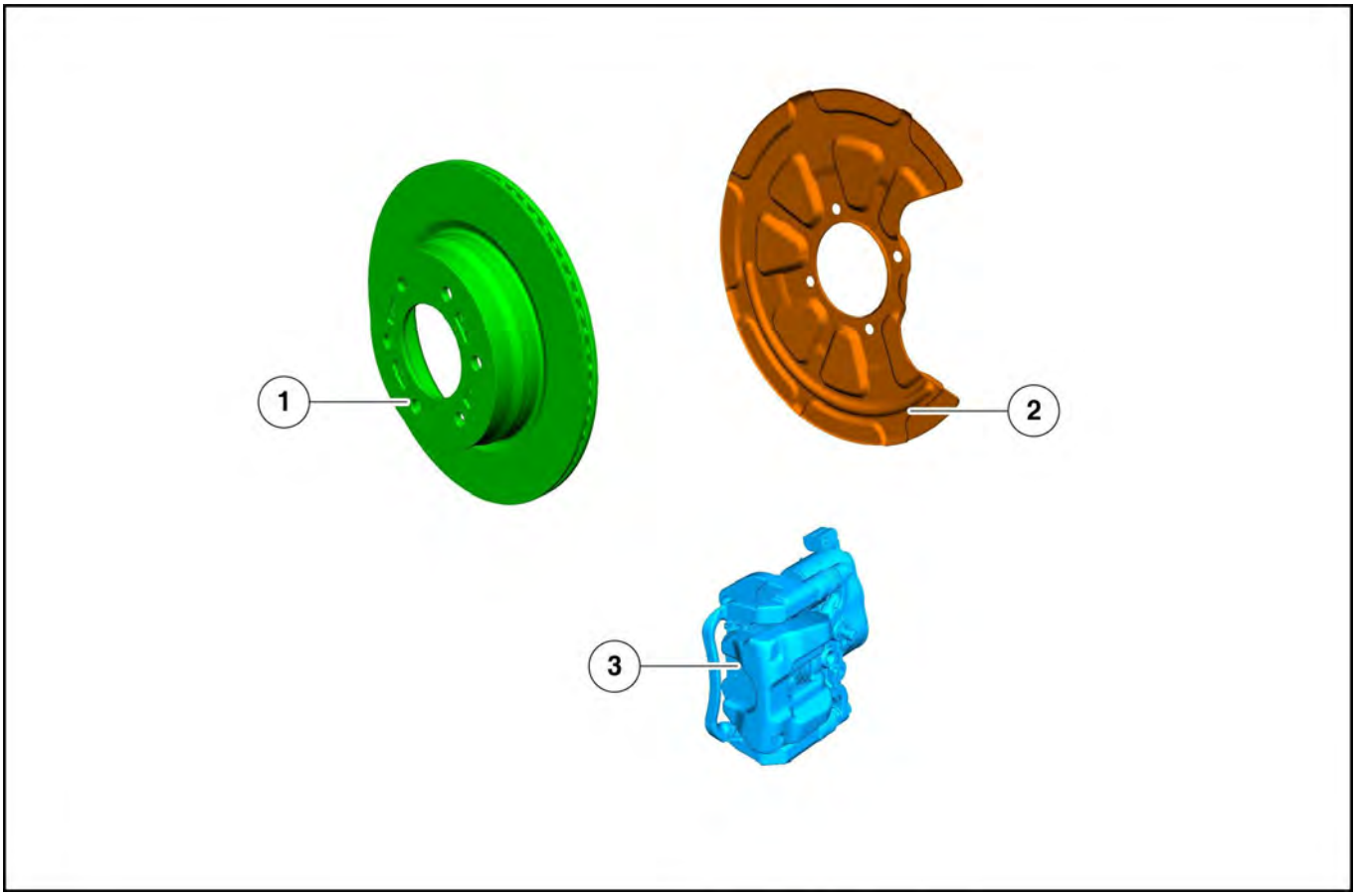
2.6.2.1 Exploded View of Front Disc Brake

Exploded view



Item	Description	Item	Description
1	Brake caliper	4	Retaining ring for wheel hub bearing
2	Front brake disc	5	Front wheel hub bearing
3	Front wheel hub	6	Left front brake disc dust shield

2.6.2.2 Electronic parking brake component diagram



Item	Description	Item	Description
1	Rear Brake Disc	3	Rear electronic brake caliper
2	Rear brake disc dust shield		

2.6.2.3 Overview

This vehicle is equipped with an EHB brake-by-wire system assembly. The electronic brake control module and brake pressure modulator valve assembly require separate maintenance. The brake pressure modulator valve assembly uses a 4-way configuration to independently control the hydraulic pressure applied to each wheel.

The hydraulic brake system includes the following components:

1. Hydraulic brake master cylinder reservoir: contains a supply of brake fluid for the hydraulic brake system.

2. EHB brake-by-wire system assembly: converts mechanical input force into hydraulic output pressure. The hydraulic output pressure is distributed from the EHB to the front and rear four brakes, thereby supplying fluid to the X-type wheel brake circuit.

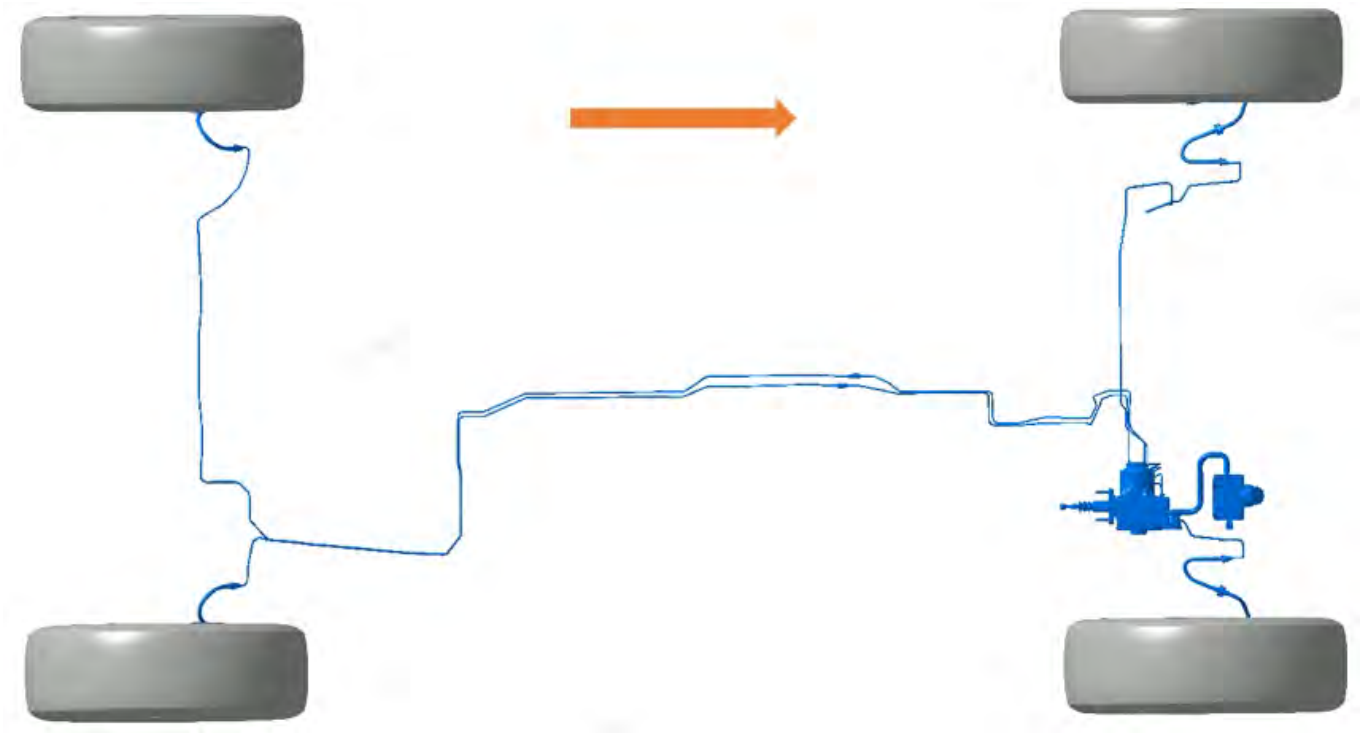
3. Service brake: disc brakes are used for the front wheels and rear wheels.

4. Parking brake: rear wheel electronic parking brake.

Hydraulic Brake System

Schematic Diagram

Layout of hydraulic pipes (Top View)



Note: All flexible brake hoses and brake steel pipes shall be free of excessive bending, twisting or stretching.

Note: The torque of the brake steel pipe joint is: 16±1 N·m

Note: Make sure that they don't interfere with other parts and components when turned clockwise and counterclockwise.

Note: Brake steel pipes and hoses are key safety parts and components. If any brake fluid leakage is found at any pipe joint, the joint needs to be loosened and retightened. If any part is found damaged, please replace it with a new one.

Note: Be careful not to spill any brake fluid on any paintwork; otherwise, the paintwork may be damaged. If the brake fluid is spilt on any paintwork on the vehicle body, clean it with clear water immediately.

Note: Before removing the brake steel pipes and hoses, cover their open ends to prevent dust from entering.

Note: Refill the brake fluid specified or authorised by Dongfeng Forthing. Do not mix different brake fluids.

Note: Do not reuse discharged brake fluid.

Description of EPB System

The EPB control system is integrated into the EHB:

1. The electronic control unit controls the electronic parking brake.

2. Parking actuator, which clamps the wheel brake disc and applies parking braking.

3. The indicator on the instrument panel indicates the working state of electronic parking brake.

   1. Electronic parking brake fault indicator (yellow). When the indicator illuminates, it indicates a fault in the electronic parking brake.

   2. Parking indicator (red). When the indicator illuminates, it indicates that the electronic parking brake is engaged and the vehicle is parked.

4. Parking switch. The P button can be pressed with a finger to control the clamping of the electronic parking brake.

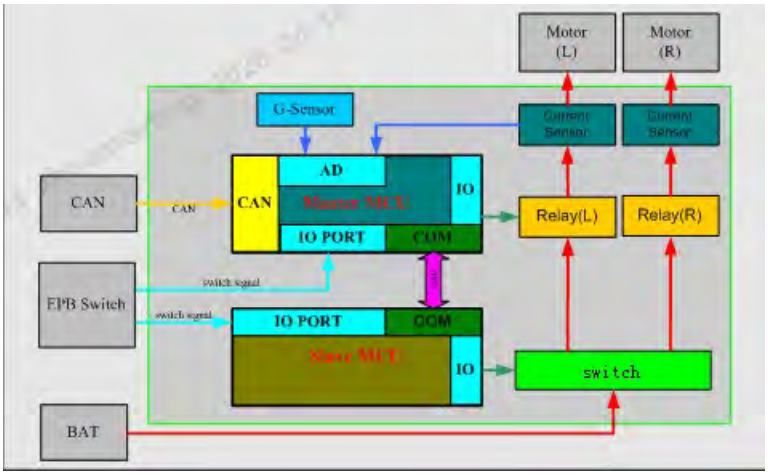
5. If the electronic parking fault light (yellow) illuminates during normal driving but goes off immediately, please do not worry. This may be caused by the road surface or improper operation where the instantaneous signal does not meet the system requirements, which will not affect the function and normal use of the EPB system.

Operation instructions of EPB functions

The EPB determines which function to execute based on the ignition signal, switch commands, and information from other vehicle nodes. Simultaneously, the EPB incorporates a fail-safe function. In the event of a fault (e.g., loss of information from certain other nodes), the EPB can also assess the vehicle state in real-time using specific algorithms, thereby ensuring the safety and reliability of the EPB system to the greatest extent possible. The necessary conditions and operation methods for realizing each function of EPB are shown in the following table:

Function name	Necessary conditions	Operation method
Manual parking	1. Vehicle stationary; 2. Ignition is in ON state; 3. Battery voltage is normal.	Press the column shift P switch\pull up the EPB switch to perform the EPB parking action.
Manual release	1. The vehicle is stationary; 2. The ignition is in the ON state; 3. The battery voltage is normal.	When the vehicle is stationary, press the brake pedal or accelerator pedal, shift into a non-P gear, and manually press the EPB switch to perform the EPB release action.
Ignition off automatic parking	1. The vehicle is stationary; 2. The ignition is in the ON state; 3. The battery voltage is normal.	When the vehicle is stationary and the ignition key is turned to the OFF position, the EPB will automatically perform the parking action without pulling up the EPB switch. Ignition off
prohibits automatic parking	1. The vehicle is stationary; 2. The ignition is in the ON state; 3. The battery voltage is normal. 4. The gear position is not P; it can	be entered directly through the flexible switch of the IVI trailer mode
. Automatic release	1. Vehicle stationary; 2. Engine running; 3. Vehicle in parking state; 4. Battery voltage normal. 1.	Close the driver's door and fasten the seat belt; 2. Engage power gear; 3. Depress the accelerator pedal to start, and EPB will automatically release the actuator; Note: The size of the accelerator pedal is related to the slope.
Dynamic braking	1. Vehicle speed is greater than 5km/h; 2. Battery voltage is normal; 3. Ignition is in the ON state.	When the vehicle speed is greater than 5km/h, pull up and hold the EPB switch, and the EPB will perform dynamic braking function.

Schematic diagram of EPB controller



2.6.2.4 Precautions

Precautions for brake system maintenance process

Warning! Dust on the front and rear brakes must be removed with a vacuum cleaner, as it may be harmful to human health. Never blow up dust with an air gun.

Warning! This vehicle uses DOT4 brake fluid.

Warning! Do not reuse the discharged brake fluid.

Warning! Do not spill or splash brake fluid on the paint surface of the vehicle body, as it will seriously damage the paint surface. If it splashes on the paint surface, wipe it off immediately and wash it with water.

Warning! When installing the brake pipeline, be sure to tighten it to the specified tightening torque.

Warning! When installing the brake pedal, be sure to tighten it according to the specified torque. If bleeding is involved in maintenance, check whether the brake pedal returns smoothly and whether the pedal height meets the requirements.

Warning! When cleaning brake calipers and other parts, be sure to clean them with new brake fluid.

Warning! Do not use mineral oil such as gasoline or light oil for cleaning. They will damage the rubber parts and cause abnormal operation.

Warning! Be sure to loosen/tighten the brake pipe oil pipe nut with an oil pipe nut wrench.

Warning! Tighten the oil pipe nuts of brake pipe to the specified torque with an oil pipe nut torque wrench.

Warning! Before working, turn the ignition switch to OFF position and disconnect the harness connector between ABS actuator and electrical unit (control unit) or the negative pole of battery.

Warning! After replacing parts, check for brake fluid leaks.

Warning! After repairing or replacing the brake disc and replacing the brake pad, or when the brake becomes soft after a short mileage, be sure to run-in the contact surface between the brake disc and the brake pad.

Warning! The Electronic Stability Program (ESP) system helps drivers maintain vehicle stability, but it cannot prevent accidents caused by sudden steering manoeuvres at high speeds or due to careless or dangerous driving. Please drive carefully; reduce vehicle speed and exercise extreme caution when driving and turning on slippery surfaces.

Warning! Do not modify the vehicle suspension. If suspension components such as shock absorber, strut, spring, stabiliser bar, bushing and wheel are not recommended by Dongfeng Forthing or have been seriously damaged, the ESP system may not work properly. In this situation, the vehicle manoeuvrability will be affected and the ESP warning light may turn on.

Warning! If the components related to braking, such as brake pad, brake disc and brake calliper, are not recommended by Dongfeng Forthing, or severely degraded, the ESP system may not be able to operate properly and the ESP warning light may illuminate.

Warning! Performing electrical welding, unplug the EHB connector before electrowelding and do not let the heat and electricity generated during electrowelding transmit to EHB.

Warning! Do not use any petroleum base liquid in the brake system, nor any vessels which were once used to contain such liquid before. Petroleum-based fluids will cause the swelling and deformation of rubber parts and components in hydraulic brake so that water might enter the system and reduce the boiling point of the brake fluid.

2.6.3 Diagnosis and testing

2.6.3.1 Common Faults and Troubleshooting Methods of Brake System

Common faults and troubleshooting methods

Fault Symptom	Possible causes	Troubleshooting Methods	Claim or not
Abnormal sound during braking	The brake caliper is improperly installed	Repair	No
	Brake caliper mounting bolt loose	Re-tighten	No
	Debris on the brake drum or shoe (brake disc or brake pad)	Clean	No
	There are foreign objects on the brake drum	Clean	No
	Contact surface adhered to brake pad	Replace	Yes
	Clearance between the brake caliper and the pad is too large.	Repair	No
	Uneven contact of pad	Repair	No
	Use of aftermarket or premium brake pads	Replace with original brake pads	No
	Use of aftermarket or premium brake disc assembly	Replace	No
	Sliding parts lack lubrication.	Apply lubricant	No
Steering wheel vibration when lightly applying the brakes while driving	Severe rusting of brake disc	Running-in with gentle braking during driving	No
	Excessive brake disc end-face runout	Replace	Yes
	The thickness of brake disc is excessively uneven.	Replace	Yes
Brake disc grooving	Foreign object between disc and pad	Clean	No
	Normal wear, without other accompanying problems such as abnormal sound or shaking	Explanation	No
Brake disc rusted	Parked for an extended period in rainy or humid weather	Derusting through gentle braking during driving and provide explanation	No
Uneven wear of brake disc or brake pad	Flatness and parallelism of the brake pad friction surface out of tolerance	Replace	Yes
	Misalignment of caliper jaw parallelism	Replace	Yes
Vehicle deviates when being braked.	The pressure difference between the left and right tyres is large.	Adjust	No
	Incomplete contact of brake pad	Wearing-in or repair	No
	There is grease or oil on the brake pad surface	Replace	No
	The brake drum is warped or worn unevenly.	Replace	Yes
	The wheel cylinder is incorrectly installed.	Repair	No

Fault Symptom	Possible causes		Troubleshooting Methods	Claim or not
	Automatic clearance adjusting mechanism fails.		Replace	Yes
	The fluid pressures of the right and left wheel cylinders are inconsistent.		Check the brake pipeline	No
Insufficient braking force	The brake fluid is insufficient or contaminated.		Add or replace brake fluid	No
	There is air in the brake system.		Bleed	No
	Contact of the brake pad and brake disc is improper.		Wearing-in or repair	No
	There is grease or oil on the brake pad surface		Replace	No
	The automatic adjusting device fails.		Repair	Yes
	Brake pad overheating		Repair	No
	Brake pipeline blocked		Replace	Yes
Excessive brake pedal travel	There is air in the brake system.		Bleed	No
	Fluid leaked from brake system	There is fluid leakage at the intake.	Replace gasket at fluid feeding pipe	No
		Fluid leakage at piston	Replace the rectangular sealing ring	Yes
		There is fluid leakage in the brake pipeline.	Refer to the manufacturer's User's Manual.	Yes
		There is air in the brake system.	Bleed	No
Brake drag	The parking brake is not fully released.		Release parking brake	No
	The parking brake is incorrectly adjusted.		Readjust	No
	Return spring of brake pedal has poor elasticity.		Replace the return spring.	Yes
	Poor returning of brake piston		Repair or replace	Yes
	Poor sliding of caliper		Check the guide pin and anchor pin	Yes
	Poor sliding of brake pad		Replace the self-fixed snap spring of brake pad	No
Poor performance of the parking brake system	The brake pad is worn.		Replace	Yes
	There is grease or oil on the brake pad surface		Replace	Yes
	Parking brake cable is stuck.		Replace	Yes
	The automatic adjusting device fails.		Repair	No

Fault Symptom	Possible causes	Troubleshooting Methods	Claim or not
	Parking brake travel is too large.	Adjust the travel of the parking brake lever or check the path of the parking brake cable.	No

2.6.3.2 Brake system inspection and confirmation

Inspection and confirmation

Note: Before diagnosis, make sure that the brake warning indicator works normally.

1. Confirm the problems raised by the customer, and make the corresponding checks. If necessary, carry out the road test with the customer.

2. Observe for obvious signs of mechanical damage.

3. Before the next check, solve the identified problem first.

4. If the cause cannot be confirmed from the appearance, confirm the symptoms first and then check according to the symptom table.

2.6.3.3 Brake System Appearance Checklist

Appearance Checklist

Mechanical
– Tyre pressure – Wheels and tyres – Brake lines – Brake disc – Brake pads – Brake caliper – EHB brake-by-wire system assembly – Brake master cylinder – EPB switch

2.6.3.4 Brake system-EPB controller assembly fault diagnosis

Diagnostic procedure

1	Drive the vehicle into the maintenance shop.	
2	Customer fault analysis inspection and symptom inspection	
3	Check the CAN communication system.	
Check whether the CAN communication system works normally with a diagnostic scanner.		
A	No CAN DTC output	Check the CAN communication circuit.
B	Output CAN DTC	Next
4	Check DTC and refer to the DTC list	
5	Check and confirm the fault	
6	Repair or replace	
7	Confirm the test	

A	Clear DTC, function is abnormal	Go back to Step 5
B	Clear DTC, function is normal	Next
C	Check DTC, output DTC	Go back to Step 4
D	Check DTC, no DTC output	Next
8	End	

2.6.3.5 Brake system-EPB controller DTC

DTC Vehicle Designation	DTC	DTC description
U007300	C07300	CAN BusOff error CAN Bus off
C110116	510116	IGN Line (Short to ground or open) Ignition circuit fault
C110017	510017	Communication Over Voltage System power supply overvoltage
C110016	510016	Communication Under Voltage System power supply undervoltage
C110060	510060	Voltage outof actuator spec range Abnormal actuator voltage
C11A418	51A418	Actuator mechanical fault Actuator mechanism fault (abnormal feedback current)
C11A477	51A477	Actuator Error or Incoherent Actuator mechanism fault (slope sliding and re-clamping timeout)
C11A07C	51A07C	Left Actuator fault (Operates for too long) Left actuator fault - operation timeout
C11A013	51A013	Left Actuator fault(Open) Left actuator fault - open-circuited
C11A011	51A011	Left Actuator fault (Control circuit fault) Left actuator fault - control circuit fault
C11A07E	51A07E	Left Actuator fault(Failure of Mosfet) Left actuator fault - MOS fault
C11A070	51A070	Left Actuator fault(Actuator Broken) Left actuator fault - mechanism damaged
C11A015	51A015	Left Actuator fault(Motor Short) Left actuator fault - short-circuited
C11A07D	51A07D	Right Actuator fault Right actuator fault - abnormal motor voltage

DTC Vehicle Designation	DTC	DTC description
C11A054	51A054	Right Motor Drive chip Failure Right motor drive chip fault
C113800	513800	Switch Broken Switch fault
C113861	513861	Switch Broken(Switch not stable) Switch fault - unstable status
C11352A	51352A	Switch Broken(Switch apply stuck) Switch fault - pull-up stuck
C11362A	51362A	Switch Broken(Switch release stuck) Switch fault - release stuck
C110860	510860	Switch Broken(Failure of line) Switch fault or circuit fault
C110862	510862	Switch Broken(Switch state not agree) Switch fault - inconsistent status
C116045	516045	ECU fault ECU(Failure of stack) Controller fault - stack
C116040	516040	ECU Hardware fault ECU(AD module) Controller fault - digital-to-analogue conversion
C116042	516042	ECU Hardware fault(EEPROM) Controller hardware fault - EEPROM
C116055	516055	ECU Hardware fault(Not configed) Controller fault - incorrect configuration
C116086	516086	ECU Hardware fault(Unexpected Power Down) Controller fault - unexpected power down
C116054	516054	ECU Hardware fault(Not calibrated correctly) Controller fault - uncalibrated
C11604C	51604C	ECU Hardware fault (Interprocessor Communication Error)
C116004	516004	ECU Hardware fault ECU(Sub) Controller fault - serial communication fault
C116046	516046	ECU Hardware fault(Flash/ROM) Controller hardware fault - main memory

DTC Vehicle Designation	DTC	DTC description
C116044	516044	ECU Hardware fault(RAM) Controller hardware fault - random memory
C11607C	51607C	ECU Hardware fault (Sub ECU control fault) Controller fault - auxiliary chip input and output control
C111329	511329	G Sensor (Signal Invalid) Acceleration sensor signal invalid.
C111396	511396	G Sensor (Self Test Fail) Acceleration sensor self-check failure.
U012100	C12100	Lost communication of ABS/ESP ABS-ESP node lost
U012200	C12200	Lost communication of VCM VCM node lost
U120000	D20000	Lost communication of SRS SRS node lost
U014000	C14000	Lost communication BCM BCM node lost
U014001	C14001	Lost communication PEPS PEPS node lost
U012000	C12000	Lost communication EPB EPB node lost
U012186	C12186	Invalid data from ABS/ESP ABS/ESP node signal invalid
U012286	C12286	Invalid data from VCM VCM node signal invalid
U120086	D20086	Invalid data from SRS SRS node signal invalid
U014186	C14186	Invalid data from BCM BCM node signal invalid
U014086	C14086	Invalid data from PEPS PEPS node signal invalid
U012086	C12086	Invalid data from EPB EPB node signal invalid

DTC Vehicle Designation	DTC	DTC description
C11D112	51D112	EPB status Lamp Line (Short to battery) Demand light - short-circuited to high-voltage
C11D114	51D114	EPB status Lamp Line (Short to ground or Open) EPB state light - open-circuited or short-circuited to ground

2.6.3.6 Tilt sensor signal abnormal (C121329, C121396)

Fault Name	G Sensor(Signal invalid/self test fail)
DTC	C121329, C121396
Fault status	1. The EPB fault indicator is on; 2. The automatic release function cannot be realised.
Possible causes	1. The EPB is not correctly fixed at the specified position; 2. EPB tilt sensor component failure or poor welding; 3. EPB tilt detection circuit failure.
Judgement criteria	The acceleration value calculated by EPB from the vehicle is inconsistent with that obtained from the tilt sensor.
Failed function	Automatic release function fails

Troubleshooting:

1. Check whether the EPB is correctly fixed at the specified position, and correct it if it is incorrect. Check whether the EPB circuit board is separated from the EPB housing, and replace the EPB if it is separated;

2. Read the current vehicle tilt information obtained inside the EPB with a diagnostic scanner, and check whether this tilt information matches the current vehicle's tilt status. If not, replace the EPB controller and test again.

3. Clear the DTC with a diagnostic scanner. Turn on the ignition switch again and read the DTC to check whether the fault recurs.

2.6.3.7 Brake System-Occasional Fault Maintenance

In electronic systems, transient poor contact problems may occur in electrical circuits and at places where input and output signals are present, leading to episodic failures. Sometimes the fault cause will disappear on its own, so it is not easy to identify the problem. In case of accidental faults, the faults can be simulated in the following manner to inspect whether the fault recurs.

S/N	Possible causes	Simulated Fault	Remarks
1	When vibration may be the main cause	Gently shake the EHB ECU connector up and down, left and right. Gently shake the EHB harness up and down, left and right. Gently shake the sensor up and down, left and right. Gently shake other moving parts (such as wheel bearings).	If the wire harness is twisted or broken because of being too taut, it must be replaced with a new one. When the vehicle is running, the wheel speed sensor harnesses will form a temporary open/short circuit as the suspension system moves up and down. Therefore, the vehicle driving test must be performed when the sensor harness is checked.
2	When temperature may be the main cause	Use a blower to heat the parts that are considered to be faulty, and use cold spray to check for cold welding.	
3	When excessively high power load may be the main cause	Turn on all switches of electrical appliances such as head lamp and wiper, so as to make the vehicle power supply work under high load.	

2.6.3.8 CAN bus failure (U007300)

Fault Name	CAN Bus error
DTC	U007300
Fault status	1. The EPB fault indicator is on; 2. In static state, the EPB can be manually released or clamped; 3. The automatic release and dynamic braking functions cannot be operated normally.
Possible causes	1. CAN line open circuit, short circuit; 2. CAN_H and CAN_L are connected reversely, or CAN_H/L is short-circuited to power supply or ground; 3. The whole CAN network failure; 4. ECU internal circuit fault
Judgment criteria	The CAN network monitoring module inside ECU detects a bus fault of the CAN bus.
Failed function	1. In static state, the EPB can respond to the manual release or clamping command (the function is limited at that time); 2. The automatic release and dynamic braking functions cannot be operated normally

Troubleshooting:

1. Connect the diagnostic scanner to OBD interface for diagnosis. If it cannot be connected to EPB, check whether the CAN bus connection is normal; if the CAN bus connection is normal, it indicates that the circuit of EPB controller CAN signal receiving/transmitting module is faulty. Replace the EPB ECU and test again.

2. If the diagnostic scanner can be connected to EPB normally, clear the DTC and then turn on the ignition switch for inspection again. If the DTC still exists, check and repair other electronic control units of the vehicle. After confirming normal CAN communication with other control units, recheck.

3. Clear the EPB DTC with a diagnostic scanner, turn on the ignition switch again and wait for 5s to read the DTC. Check whether the DTC will appear in the EPB again. If the DTC still exists, replace the EPB ECU and test again.

Note:

When the CAN cable of EPB or the vehicle CAN bus is faulty, in addition to "CAN bus off" prompt, EPB may also prompt other node timeout faults such as "VCU node timeout" and "ABS node timeout". In this case, maintenance personnel should not judge the node timeout fault as damage to VCU, ABS and other nodes, because EPB cannot receive information from these nodes due to the fault of CAN bus. Therefore, when "CAN bus off fault" and "node timeout fault" occur at the same time, maintenance personnel shall first check and repair the CAN bus

2.6.3.9 Switch fault (C123800, C123861, C12352A, C12362A, C120860, C120862)

Fault Name	Switch Broken
DTC	C123800, C123861, C12352A, C12362A, C120860, C120862
Fault status	1. The EPB fault indicator is on; 2. EPB does not respond to the switch command, and the EPB actuator cannot be clamped or released normally in static state.
Possible causes	1. The circuit connecting the EPB to the switch is short-circuited or open-circuited; 2. Internal circuit fault of the switch, etc. 3. EPB internal switch detection circuit failure; 4. The EPB switch is stuck.
Judgement criteria	The main and auxiliary single-chip microcomputers continuously detect the abnormal state of the switch multiple times.
Failed function	Release and parking cannot be achieved by operating the switch.

Troubleshooting:

1. Check whether the circuit connected to the switch is short-circuited or open-circuited, and replace the connecting wire if there is any fault in the circuit;

2. Check whether the connector on the connecting wire is correctly engaged with the switch. If not, reconnect it;

3. Pull up and press the switch several times, release the switch and wait for more than 3s to observe if the switch light flashes. If so, replace the switch;

4. Pull up the EPB switch, use the diagnostic scanner to read the current information inside the EPB and check whether the switch position obtained by the diagnostic scanner is the "parking position"; Press the EPB switch, use the diagnostic scanner to read the current information inside the EPB and check whether the switch position obtained by the diagnostic scanner is the "release position"; In addition, when not operating the EPB switch, obtain the position information of the switch with the diagnostic scanner to check whether it is at "natural position"; If the information of these three positions of the EPB switch is inconsistent with the actual operation, it indicates that there may be a fault inside the EPB switch and the EPB switch needs to be replaced.

5. Use the diagnostic scanner to clear the EPB DTC and turn on the ignition switch, operate the EPB switch repeatedly and then read the DTC. Check whether the DTC will appear in the EPB again. If the DTC still exists, the EPB internal switch detection circuit is damaged. Replace the ECU and test again.

2.6.3.10 Abnormal actuator voltage (C110060)

Fault Name	Actuator voltage out of range
DTC	C110060
Fault status	1. The EPB fault indicator is on; 2. The actuator mechanism cannot operate normally.
Possible causes	1. The actuator connecting wire is open-circuited; 2. The actuator internal motor connecting wire is open-circuited; 3. The actuator connecting wire is short-circuited; 4. The actuator internal motor connecting wire is short-circuited; 5. The circuit of EPB internal control motor is damaged.
Judgement criteria	When the EPB operates, the voltage at both ends of the actuator mechanism connecting wire is abnormal.
Failed function	EPB actuator cannot operate normally

Troubleshooting:

1. Check whether the actuator and caliper are installed correctly. If not, reinstall them and test again;

2. Check whether the connector and harness on the actuator are connected correctly. If not, reconnect the connector. In addition, check whether the clip on the connector is damaged. If it is damaged, replace the connector to prevent the fault from happening again.

3. Check whether the pin on the actuator connecting wire falls off from the plastic housing of the connector. If it falls off, the inside of the plastic housing may be damaged or the pin is directly pulled out of the plastic housing due to external force. In this case, replace the connector and the pin on the connecting wire.

4. Check the connecting harness of the actuator for open circuit or damage, and replace the harness if it is damaged. If the motor open circuit fault is caused by an open circuit in the connecting wire, it is also necessary to check whether there are sharp materials near the open circuit position of the connecting wire that can cut the connecting wire. If so, corrective measures need to be taken to prevent the fault from occurring again.

5. Check whether there is an open circuit between the two metal pins in the connector on the actuator (the metal pins are connected to both ends of the actuator motor through internal wires), and replace the actuator if there is an open circuit. At this time, also check whether the poor contact between the metal pin and the metal pin in the female connector is caused by other factors such as water ingress or corrosion. If so, replacement is required.

6. Check whether the actuator connecting wire is short-circuited. If it is short-circuited, replace the connecting wire; if the motor short circuit fault is caused by two connecting wires being cut by external sharp objects, timely investigate the cause of the short circuit while replacing the connecting wire to avoid the recurrence of the same fault.

7. In order to check whether it is caused by a short circuit of the motor connecting wire inside the actuator or a stuck motor due to mechanical problems, you can disconnect the actuator connector, then connect a fault-free actuator (to check whether the actuator is faulty), turn on the ignition again, operate the EPB switch to control the clamping/releasing of the actuator, and check whether the actuator can operate normally. If it can operate normally, it means that the original actuator is faulty. The actuator needs to be replaced.

8. If no problems are found in the above inspections, it indicates that the internal circuit of the EPB controller is damaged and the EPB controller needs to be replaced.

9. Clear the EPB DTC with a diagnostic scanner, then turn on the ignition switch and check whether the DTC will appear in the EPB again. Operate the EPB switch repeatedly for clamping and releasing to confirm that the fault has been completely eliminated.

2.6.3.11 Actuator mechanism fault (C12A418, C12A477)

Fault Name	Mechanical failure
DTC	P15B216, P15B301
Fault status	1. The EPB fault indicator is on; (C12A477 does not illuminate the fault indicator) 2. Actuator fails to operate.
Possible causes	1. Actuator mechanism internal fault; 2. Caliper mechanical structure fault.
Judgement criteria	1. The caliper's clamping time exceeds 3s without reaching the current corresponding to the set clamping force; 2. The minimum current of the motor during clamping is greater than a specific threshold current;
Failed function	EPB actuator cannot operate normally

Troubleshooting:

1. Replace actuators that do not operate normally.

2. Connect the diagnostic scanner to clear the DTC. Operate the EPB switch repeatedly for clamping and releasing, read the EPB DTC and check whether the fault still exists. If the DTC still exists, it indicates that the internal resistance of the connecting wire between the actuator and EPB controller is too large due to poor contact at the connection or oxidation of the contact surface, resulting in insufficient clamping current of the actuator. In this case, replace the connecting wire and connector, and then test again.

2.6.3.12 Indicator error (C11D112, C11D114)

Fault Name	EPB status Lamp Line
DTC	C11D112, C11D114
Fault status	1. The EPB fault indicator does not light up; 2. EPB button and dashboard indicator inconsistent with actual control
Possible causes	1. Switch light is short-circuited to the power supply 2. Open-circuited or short-circuited to GND

Judgement criteria	EPB button and dashboard indicator inconsistent with actual control
Failed function	No indicator prompt

Troubleshooting:

1. Check whether the switch indicator port is short-circuited to GND or open-circuited. If it is short-circuited to GND, replace the connecting wire. Check whether the connecting wire is in direct contact with the vehicle housing (short-circuited to GND) due to long-term cutting by a sharp object on the vehicle body. If so, it is necessary to rectify the sharp object or add an insulating housing around the affected connecting wire.

2. Check whether the EPB switch indicator port is short-circuited to the power supply. If the circuit fails, replace the connecting wire.

3. If there is no problem after the above two checks, clear the EPB DTC with a diagnostic scanner, operate the EPB switch to clamp and release, and check whether the DTC still exists. If the fault still exists, replace the ECU and test again.

4. Clear the EPB DTC with a diagnostic scanner, turn on the ignition switch again, operate the EPB switch repeatedly for clamping and releasing, read the DTC, and check whether the DTC appears in the EPB again.

2.6.3.13 Controller failure (C126045, C126040, C126042, C126054, C126055, C126086, C12604C, C126004, C126046, C126044, C12607C)

Fault Name	ECU Hardware fault
DTC	C126045, C126040, C126042, C126054, C126055, C126086, C12604C, C126004, C126046, C126044, C12607C
Fault status	1. The EPB fault indicator is on (C126086, C126054, C12604C and C126004 do not illuminate the fault indicator) 2. Read the DTC and it will show "controller failure".
Possible causes	1. The data stored in the main single-chip microcomputer of the EPB controller is wrong; 2. Auxiliary single-chip microcomputer fault.
Judgement criteria	1. Failed to operate on the EEPROM; 2. Communication failure between the main and auxiliary single-chip microcomputers; 3. Serial communication failed
Failed function	C126086, C126054, C12604C and C126004 do not affect the normal function of the EPB; other faults will cause abnormal function of the EPB.

Troubleshooting:

1. Clear the DTC with a diagnostic scanner, turn on the ignition switch again, operate the EPB switch for clamping and releasing, and check whether the function is normal. If the fault still exists, replace the EPB controller and check again.

2. Clear the DTC with a diagnostic scanner. Turn on the ignition switch again and read the DTC to check whether the fault recurs.

2.6.3.14 Brake System - DTC List (EHB)

The diagnosis in this manual requires technicians to have a certain skill level and diagnostic practical experience.

Refer to: Diagnosis Method (100-00 General Information, Description and Operation).

2.6.3.15 Brake System - Standard Flow Chart for Fault Diagnosis

Steps	Diagnosis action	Yes	No
1	1. Connect or mount, if possible, all the parts and components disconnected or dismantled previously; 2. Turn the key to the ON position without starting the engine or powering the vehicle up to high-voltage; 3. Connect the X431 diagnostic host to the vehicle's diagnostic interface via the diagnostic line and enable it to communicate with the ECU. Confirm whether the X431 diagnostic host can communicate with the ECU.	Go to Step 2	Go to Step 4
2	Are there any current or stored diagnostic trouble codes?	Go to Step 3	Go to Step 7
3	1. Record the current DTC and occurrence time; 2. Record the historical DTC and occurrence time; Please do not clear the DTC before the X431 diagnostic host records the necessary information.		
4	Can the X431 diagnostic host communicate with other modules (such as airbag, engine ECU and VCM) on the same data cable?	Go to Step 5	Go to Step 6
5	To "No communication with ECU" in the ECU fault diagram.		
6	Inspect the data link connector of the electrical diagnosis part.		

Steps	Diagnosis action	Yes	No
7	1. Remove the key. 2. Wait for 5 minutes and 10 seconds (or disconnect the battery power supply for 5S and then reconnect it). 3. Turn the key to the ON position, and observe the orange ABS warning light when the engine does not start or the vehicle is not powered up to high-voltage. 4. Do the ABS and brake warning lights illuminate briefly and then extinguish? (Bulb test)	Go to Step 8	Go to Step 9
8	The system functions normally		
9	Are there any lights still on?	Go to Step 10	Go to Step 11
10	Handle according to the current fault points recorded in Step 3, and restart the detection after troubleshooting (starting from Step 1).		
11	Check the circuit.		

2.6.3.16 Brake System - Troubleshooting without DTC

If the brake system has a fault, but the EHB has no DTC stored, this fault is called a fault without DTC. The fault without DTC is generally caused by basic brake system faults. For example:

1. Brake fluid leakage (possibly resulting in soft brake, brake pedal travel excessively large, or even braking failure).

Use of inferior brake fluid (which will corrode the brake pipeline and internal components of EHB brake-by-wire system, or even lead to brake failure in a serious condition).

2. Air in brake pipeline (possibly resulting in brake pedal too soft or even braking failure).

3. Brake pipeline blocked (possibly resulting in brake pedal too hard or even braking failure).

4. Brake disc excessive wear (possibly resulting in brake pedal too soft and brake pedal travel excessively large).

5. Brake pipeline connection error (may lead to decreased EHB performance, tail-flicking, longer braking distances, etc.). For the correct installation method, please refer to the identification near the oil hole on EHB brake-by-wire system; FL represents the front left wheel cylinder oil pipe; FR represents the front right wheel cylinder oil pipe; RL represents the rear left wheel cylinder oil pipe; RR represents the rear right wheel cylinder oil pipe).

Note:

● No power supply or abnormal interruption of EHB will cause ABS and ESP warning lights to stay on without DTC.

6. Troubleshooting recommendations: inspect the appropriate components for the malfunction phenomenon, and carry out troubleshooting according to the vehicle service manual.

2.6.3.17 Brake System - Precautions for Fault Diagnosis

The following listed in the table below are normal.

Symptom	Description
Inspection on system noise	After starting the engine or applying high voltage to the vehicle, a buzzing sound can be heard from the engine compartment when starting to drive, but this is caused by the EHB performing a system operation check and is normal.
EHB action sound	The sound emitted by the internal motor when the EHB hydraulic assembly operates. (Rattling) The sound emitted along with the vibration of the brake pedal. (scraping) When the EHB is activated, the noise coming from the vehicle chassis is due to the repeated application and release of the brakes. (Low deep noise: suspension, squeak: tyre)
EHB action (long braking distance)	The braking distance of the vehicle with an ABS system is longer than that without ABS on the snowy and gravelly pavements. Therefore, it is suggested that the users be careful when driving on such pavements and lower the speed, and not be too confident.

Note:

● Diagnostic test conditions vary with different DTCs.

● When inspecting the fault symptoms again after the elimination of diagnostic codes, it has to ensure that the inspection conditions in the “Description” column are met.

2.6.3.18 Ignition circuit fault (C110116)

Fault Name	IGN Line (Short to ground or Open)
DTC	C110116
Fault status	1. The EPB fault indicator is on; 2. Read the DTC, "EPB ignition status invalid" displayed.
Possible causes	1. The EPB IGN line is not correctly connected to the IGN line of the vehicle; 2. EPB internal circuit fault.
Judgement criteria	The vehicle ignition state obtained by EPB from the CAN bus is inconsistent with that obtained from the IGN line.
Failed function	EPB does not respond to external commands

Troubleshooting:

1. Check whether the IGN line of EPB is correctly connected to the IGN line of the vehicle. If not, make corrections;

2. Check whether the IGN line is open-circuited. If so, replace it.

3. Read the current information inside the EPB with a diagnostic scanner and check whether the ignition state flag of the EPB obtained by the diagnostic scanner is consistent with the actual ignition state of the vehicle. If not, it indicates that the ignition state detection circuit inside the EPB may be faulty. Replace the EPB and test again. Clear the fault with a diagnostic scanner and repeatedly test by turning the ignition on and off. If the fault still exists, it is confirmed that the internal circuit of EPB is damaged. Replace the EPB ECU and test again.

2.6.3.19 Brake System - Electro-Hydraulic Braking (EHB) Diagnosis and Testing

General equipment

Diagnostic scanner X431

Inspection and confirmation

1. Confirm problems that owners complain about and check accordingly.

2. Check the appearance for any obvious mechanical or electrical damage.

3. Before the next check, solve the identified problem first.

4. If the cause cannot be confirmed from the appearance, confirm the symptoms first and then check according to the symptom table.

Appearance Checklist

Mechanical	Electrical
– Wheel speed sensor – Tyre pressure – Tyre dimension – Tyre damage	– Fuse – Electronic connector – Harness

2.6.3.20 Motor fault (C12A07C, C12A013, C12A011, C12A07E, C12A070, C12A015, C12A07D, C12A054)

Fault Name	Actuator fault
DTC	C12A07C, C12A013, C12A011, C12A07E, C12A070, C12A015, C12A07D, C12A054
Fault status	1. The EPB fault indicator is on (C12A054 does not illuminate fault indicator); 2. The actuator cannot operate normally.

Possible causes	1. The actuator connecting wire is open-circuited; 2. The actuator internal motor connecting wire is open-circuited; 3. The actuator connecting wire is short-circuited; 4. The actuator internal motor connecting wire is short-circuited; 5. The internal motor of the actuator is stuck; 6. The actuator is not equipped with a brake pad or the brake pad is too thin, resulting in EPB braking time being too long but still unable to brake normally; 7. Internal mechanical fault of actuator; 8. The circuit of EPB internal control motor is damaged.
Judgement criteria	1. When the EPB is powered on for self-inspection, the voltage and current signals at both ends of the actuator connecting wire are abnormal; 2. When EPB operates, the voltage and current signals at both ends of the actuator connecting wire are abnormal.
Failed function	The actuator cannot operate normally in case of manual parking, manual release, automatic release, dynamic braking and automatic parking at ignition off.

Troubleshooting:

1. Check whether the actuator and caliper are installed correctly. If not, reinstall them and test again;

2. Check whether the connector and harness on the actuator are connected correctly. If not, reconnect the connector. In addition, check whether the clip on the connector is damaged. If it is damaged, replace the connector to prevent the fault from happening again.

3. Check whether the pin on the actuator connecting wire falls off from the plastic housing of the connector. If it falls off, the inside of the plastic housing may be damaged or the pin is directly pulled out of the plastic housing due to external force. In this case, replace the connector and the pin on the connecting wire.

4. Check the connecting harness of the actuator for open circuit or damage, and replace the harness if it is damaged. If the left motor open circuit fault is caused by an open circuit in the connecting wire, it is also necessary to check whether there are sharp materials near the open circuit position of connecting wire that can cut the connecting wire. If so, corrective measures need to be taken to prevent the fault from occurring again.

5. Check whether there is an open circuit between the two metal pins in the connector on the left actuator (the metal pins are connected to both ends of the actuator motor through internal wires), and replace the actuator if there is an open circuit. At this time, also check whether the poor contact between the metal pin and the metal pin in the female connector is caused by other factors such as water ingress or corrosion. If so, replacement is required.

6. Check whether the left actuator connecting wire is short-circuited. In case of short circuit, replace the connecting wire; if the left motor is short-circuited due to two connecting wires being cut by external sharp objects, it is necessary to timely investigate the cause of short circuit while replacing the connecting wire, so as to avoid the recurrence of the same fault.

7. In order to check whether it is caused by short circuit of the internal motor connecting wire of the left actuator or stuck motor due to mechanical problems, you can disconnect the connector of the left actuator, connect a fault-free actuator (to check whether the actuator is faulty), turn on the ignition again, operate the EPB switch to control the clamping/releasing of the actuator, and check whether the actuator can act normally. If it acts normally, it means that the original actuator is faulty. The actuator needs to be replaced.

8. If no problems are found in the above inspections, it indicates that the internal circuit of the EPB controller is damaged and the EPB controller needs to be replaced.

9. Clear the EPB DTC with a diagnostic scanner, then turn on the ignition switch and check whether the DTC will appear in the EPB again. Operate the EPB switch repeatedly for clamping and releasing to confirm that the fault has been completely eliminated.

2.6.3.21 Brake system - symptom table

Symptoms	Possible causes	Measures
Braking deviation	– Wheel alignment	– Check the brake pad. – Check the brake disc. – Check the wheel alignment.
	– Hub assembly	– Check the hub assembly, and replace it with a new one if necessary.
Brake warning light always on	– Brake fluid level	– Add brake fluid to the specified level, and check whether the brake pipe leaks.
	– Brake warning light circuit – Anti-lock brake system (ESP)	– Check the brake warning light. – Check the parking brake – Check the brake fluid level. – Check the brake fluid level sensor. – Check the brake fluid level sensor circuit.
Vibration during braking	– Inadequate lubrication of sliding parts	– Apply grease if necessary.
	– Foreign object or scratches on the contact surface of the front brake disc	– Install a new brake disc.
	– Wheel hub nuts are loose	– Tighten them or install new hub nuts.
Vibration during braking	– Hub assembly	– Check the hub assembly, and replace it if necessary.
When the brake pedal is depressed, the pedal moves down too fast	– Wheels and tyres are unbalanced	– Check the wheels and tyres, and carry out dynamic balance on the wheels if necessary.

Symptoms	Possible causes	Measures
	– Brake system leakage	– Check the brake pedal force. – Check the brake fluid level. – Check brake pedal height - pressurise the system – Check whether the brake system leaks.
	– Presence of air in the brake system	– Bleed the brake system. Refer to: Brake System Bleeding (206-00 Brake System-Overview, General Procedures).
	– Brake pads	– Check the brake pad, and install a new one if necessary. Refer to: Brake Pad (206-03 Front Disc Brake, Removal and Installation).
Slow pedal rebound	– Presence of air in the brake system	– Bleed the brake system. Refer to: Brake System Bleeding (206-00 Brake System-Overview, General Procedures).
	– EHB brake-by-wire system assembly	– Check the EHB brake-by-wire system assembly. – Check the actuation of the brake pedal. – Check whether the brake system leaks.
Low brake pedal or spongy feeling when depressing the pedal	– Presence of air in the brake system	– Bleed the brake system. Refer to: Brake System Bleeding (206-00 Brake System-Overview, General Procedures).
	– Brake pads	– Check the brake pads and shoes, and install new ones if necessary. Refer to: Brake Pad (206-03 Front Disc Brake, Removal and Installation).
Low brake pedal or spongy feeling when depressing the pedal	– Brake system	– Check if the brake pedal is spongy when depressing it – Check the brake travel reserve – Check the brake fluid level.
The brake locks up when the brake pedal is gently depressed	– Brake pads	– Test whether the brake locks up – Check the brake pad

Symptoms	Possible causes	Measures
Excessive/unfixed brake pedal travel	– Brake pads – Presence of air in the brake system	– Check the brake pad, and install a new one if necessary. Refer to: Brake Pad (206-03 Front Disc Brake, Removal and Installation). – Bleed the brake system. Refer to: Brake System Bleeding (206-00 Brake System-Overview, General Procedures).
Brake dragging	– EHB brake-by-wire system assembly – Parking brake is applied, or the mechanism is not working or over-adjusted. – Electronic handbrake control module	– Road test – Check the EHB brake-by-wire system assembly.
Excessive brake pedal force	– EHB brake-by-wire system assembly	– Check the EHB brake-by-wire system assembly, perform component testing, and replace it with a new one if necessary.
	– Brake pads	– Check the brake pad, and install a new one if necessary. Refer to: Brake Pad (206-03 Front Disc Brake, Removal and Installation).
Slow or incomplete return of brake pedal	– EHB brake-by-wire system assembly	– Check the return of the brake pedal. – Check whether the brake pedal is blocked.

2.6.3.22 System power supply undervoltage (C110016)

Fault Name	Battery Voltage is abnormal (under voltage)
DTC	C110016
Fault status	1. The EPB fault indicator is on; 2. EPB does not respond to the clamping and releasing actions of the actuator.
Possible causes	1. Battery voltage is too low or the battery is damaged; 2. The connecting wire is poorly connected to the positive/ negative pole of the battery; 3. EPB internal circuit fault.
Judgement criteria	The battery voltage is lower than the set threshold voltage for too long.
Failed function	The EPB cannot clamp or release the actuator normally.

Troubleshooting:

1. Check whether the battery voltage is too low. If the battery voltage is indeed too low, you need to charge the battery first and retest it after the voltage reaches the rated voltage of the battery. If the battery voltage still cannot reach the rated voltage after a long period of charging, it means that the battery has an internal fault and needs to be replaced.

2. If the battery voltage is normal, but the EPB still detects a "battery undervoltage" fault, check whether the EPB power supply connecting wire has poor contact with the positive/negative pole of the battery or the large area of oxidation on the contact surface causes excessive resistance at the connection. If the contact is poor, reconnection is required.

3. Use the diagnostic scanner to clear the EPB DTC, re-ignite, and read the DTC after waiting for a period of time. Check whether the DTC will appear again inside the EPB. If the DTC still exists, it means that the voltage detection circuit inside the EPB is damaged. Replace the ECU and test again.

2.6.3.23 System power supply overvoltage (C110017)

Fault Name	Battery Voltage is abnormal (over voltage)
DTC	C110017
Fault status	1. The EPB fault indicator is on; 2. Read the DTC with a diagnostic scanner, "battery overvoltage" displayed.
Possible causes	1. The external power supply voltage is too high or the battery is damaged; 2. Internal fault of EPB controller.
Judgement criteria	The battery voltage exceeds the set threshold voltage for a long time.
Failed function	The EPB may not be able to clamp or release the actuator normally.

Troubleshooting:

1. Measure the voltage of on-board battery and check whether the battery voltage is too high (greater than 16V). If it is too high, maintenance is required. If the battery voltage value is not within the rated voltage range due to an internal structural fault of the battery, the battery needs to be replaced to prevent damage to the EPB or other on-board ECUs.

2. If the battery voltage is normal, but the EPB still detects the "battery overvoltage" fault, it means that the internal voltage detection circuit of the EPB is faulty and the EPB controller needs to be replaced.

3. Use the diagnostic scanner to clear the EPB DTC, re-ignite, and read the DTC after waiting for a period of time. Check whether the DTC will appear inside the EPB again.

Note:

– When the EPB shows a "battery overvoltage" fault, although the EPB function may still be used normally, troubleshooting is still required immediately. This is mainly to prevent excessively high voltage from damaging the EPB actuator and controller.

2.6.3.24 Network node signal invalid (U012086, U012186, U012286, U120086, U014186, U014086)

Fault Name	Invalid Data Received From EPB/ABS/VCM/SRS/BCM/PEPS
DTC	U012086,U012186,U012286,U120086,U014186,U014086

Fault status	1. The EPB fault indicator is on; (U120086 and U014186 do not illuminate fault indicator) 2. Read the DTC with a diagnostic scanner 3. Loss of some functions of the EPB system
Possible causes	Signal status sent from node to CAN network is invalid
Judgement criteria	The invalid time of the message signal of any node reaches 1.6s
Failed function	EPB partially fails.

Troubleshooting:

1. Check whether the CAN message sent from the network node is invalid. If so, relevant controllers are required to correct it;

2. Clear the DTC with a diagnostic scanner, turn on the ignition switch again and read the DTC to check whether invalid node exists. If it still exists, it means that relevant controller has not passed correction and needs to be corrected continuously. If the fault occurs repeatedly after initial installation and cannot be eliminated, it is suspected that the EPB ECU does not correspond to this vehicle model. In this case, read the EPB identifier with a diagnostic scanner immediately to verify whether the faulty EPB corresponds to the vehicle model and avoid more installation of defective EPB.

2.6.3.25 Network node timeout fault (U012000, U012100, U012200, U120000, U014000, U014001)

Fault Name	Lost Communication With EPB/ABS/VCM/SRS/BCM/PEPS
DTC	U012000,U012100,U012200,U120000,U014000,U014001
Fault status	1. The EPB fault indicator is on; (U120000 and U014000 do not illuminate fault indicator) 2. Read the DTC with a diagnostic scanner 3. Loss of some functions of the EPB system
Possible causes	1. The node is disconnected from the CAN network; 2. The cycle of messages sent by the node to CAN network is incorrect; 3. CAN network fault or EPB internal circuit fault.
Judgement criteria	The message signal timeout of any node reaches the maximum time among 10 message cycles and 300 ms
Failed function	EPB partially fails.

Troubleshooting:

1. Check whether the CAN bus connecting line of network node is disconnected from the vehicle CAN network (e.g. VCU node disconnection). For specific nodes, it is necessary to first ensure that the CAN bus connecting line of the corresponding node is correctly connected;

2. Check whether the ECU of the faulty node is damaged or correctly installed. If the ECU is damaged or not correctly installed, it is necessary to carry out troubleshooting.

3. Check whether the message cycle of the node meets the requirements. If not, messages need to be sent according to a specific cycle.

4. Clear the DTC with a diagnostic scanner, turn on the ignition switch again and read the DTC to check whether the node timeout exists. If it still exists, it means that EPB has not received the message from the network node, which indicates that the internal circuit of EPB is faulty. Replace the EPB ECU and test again. If the fault occurs repeatedly after initial installation and cannot be eliminated, it is suspected that the EPB ECU does not correspond to this vehicle model. In this case, read the EPB identifier with a diagnostic scanner immediately to verify whether the faulty EPB corresponds to the vehicle model and avoid more installation of defective EPB.

2.6.3.26 Brake System - List of Parking Brake and Control Symptoms

Symptoms	Possible causes	Measures
Parking brake does not work	– Parking switch damaged – Left and right slave cylinder motors	– Check whether the parking switch is damaged. – Check whether the left and right slave cylinder motors are worn.

2.6.3.27 Brake System - Parking Brake and Control Diagnosis and Testing

Inspection and confirmation

1. Confirm problems that owners complain about and check accordingly.

2. Observe for obvious signs of mechanical or electrical damage.

3. Before the next check, solve the identified problem first.

4. If the cause cannot be determined by visual check, confirm the symptom first and then check according to the List of Symptoms.

Appearance Checklist

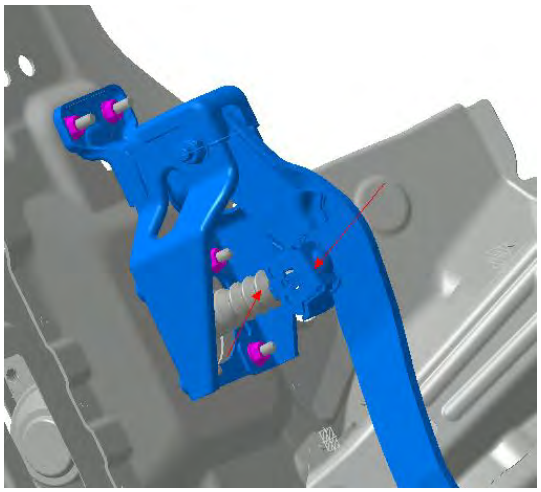
Electrical
– Electronic caliper motor harness – EPB switch – Left and right slave cylinder motors

2.6.4 Removal and installation

2.6.4.1 Brake pedal

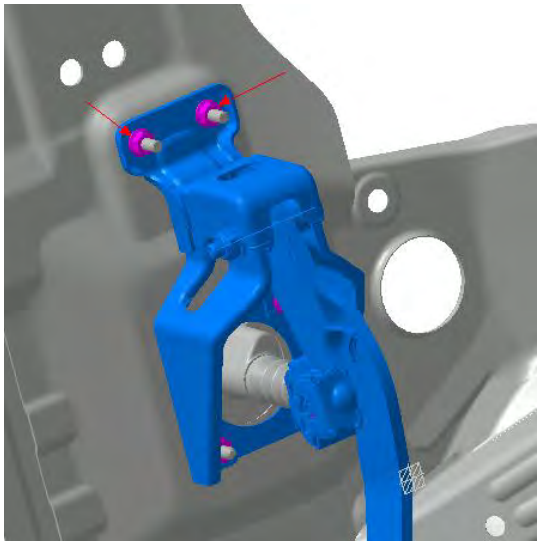
Removal

1. Use circlip pliers to disconnect the connection between the brake pedal and the booster.



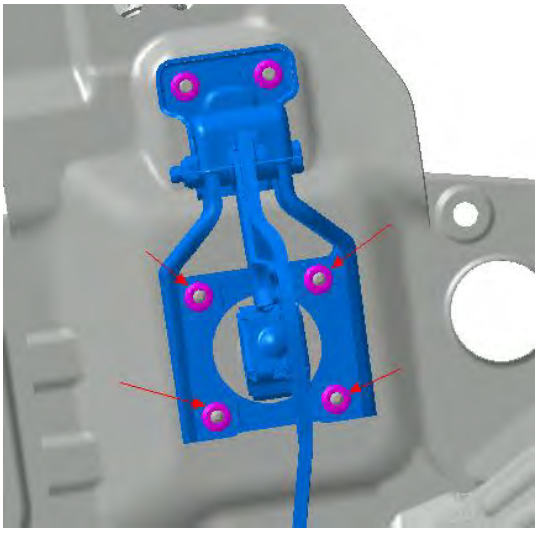
2. Remove the nuts (two) that fix the brake pedal to the body.

   Torque: 25 ± 4 Nm



3. Remove the nuts (4 pieces) connecting the brake pedal and the booster.

   Torque: 25 ± 4 Nm



4. Take out the brake pedal.

Installation

1. The installation order is the reverse of the removal order.

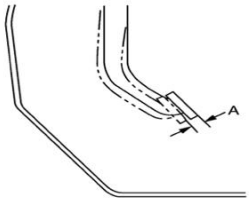
Post-installation inspection:

1. Depress the brake pedal and check the free stroke and clearance between the pedal and the floor.
2. Check the height between brake pedal and metal floor.

   Standard: 150.3 ± 8 mm

3. The free travel A of the brake pedal (the travel when the vehicle is turned off and the key is in the OFF position, and resistance (≤15 N) is felt when the brake pedal is depressed).

   Standard: 1 ~ 12 mm



2.6.4.2 Front brake caliper

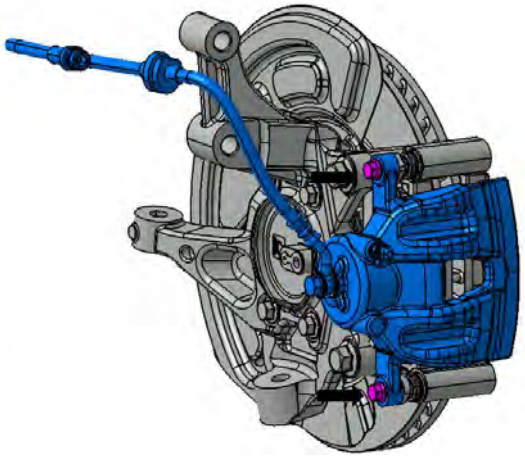
Removal

1. Remove the tyre. Refer to: Wheels.

2. Remove the hose joint bolts and copper gaskets.

3. Remove the connecting bolts (two) of the caliper, and take out the front caliper assembly.

Note: Do not let the caliper hang by the brake hose. Otherwise, the hose may be damaged.



Installation

1. The installation order is the reverse of the removal order.

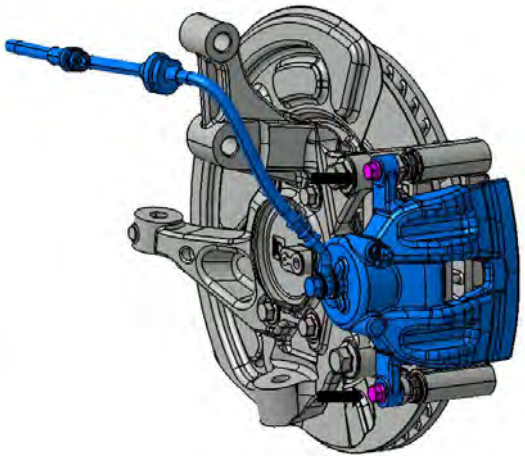
2. Perform the brake system bleeding. Refer to: Brake System Bleeding.

3. Install the wheels. Refer to: Wheel Assembly.

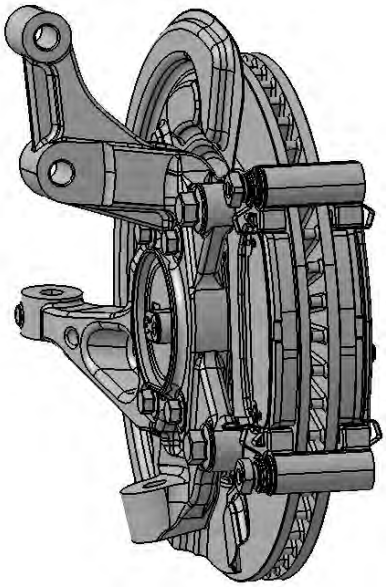
2.6.4.3 Front brake pad

Removal

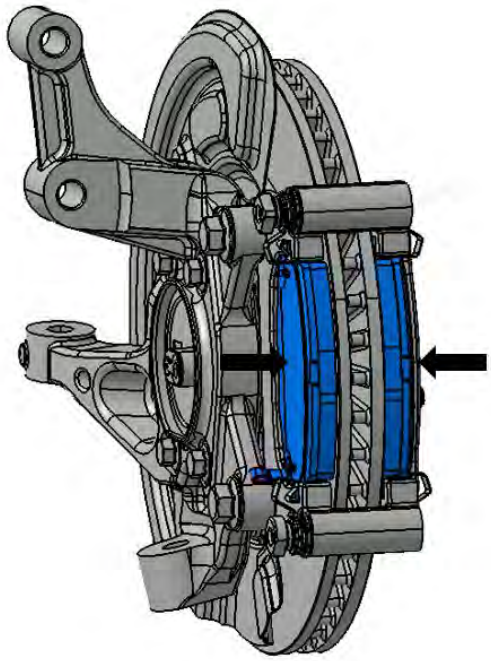
1. Remove the connecting bolts on the floating caliper.



2. Remove the caliper body.



3. Remove the worn brake pads.



Note: Do not damage the leaf spring when removing and installing the brake pad from the caliper body.

Note: The inner brake pad assembly is equipped with an alarm, while the outer brake pad assembly has no alarm. Do not install the inner and outer linings incorrectly when replacing the friction lining.

Note: Brake pads of left and right wheels must be replaced at the same time.

Installation

1. Loosen the bleed screw on the caliper body, push the piston back using a brake caliper return wrench, and then tighten the bleed screw.

   Torque: 10 ± 1 Nm

2. Assemble the new brake pad onto the leaf spring of the fixed frame.
3. Lubricate the two rubber sheaths on the caliper holder. Silicone-based grease shall be used.
4. Install the caliper body on the brake disc and the holder and make sure that the dust cover of the guide pin is well sealed. Install both caliper guides and tighten.

   Torque: 32.5 ± 2.5 Nm

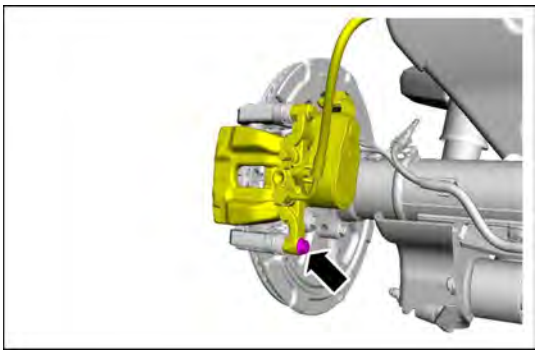
5. Depress the brake pedal firmly three times to automatically adjust the gap between the brake pad and the brake disc.
6. Perform the brake system bleeding. Refer to: Brake System Bleeding.
7. Install the wheels. Refer to: Wheel Assembly.
8. Check the hydraulic brake system for brake fluid leaks, and top up the brake fluid reservoir to the appropriate level.

2.6.4.4 Electronic parking brake caliper assembly

Removal

1. Keep the APB switch pressed, power off at the same time, confirm that the rear wheels can rotate, and disconnect the negative pole of the battery. Refer to: Disconnect the battery negative pole.
2. Raise and properly support the vehicle. Refer to: Lifting the vehicle.
3. Remove the wheel. Refer to: Wheel Assembly.
4. Remove the harness and brake hose connector bolts from the electronic parking brake caliper assembly.
5. Remove the caliper mounting bracket fixing bolts (two), and remove the electronic parking brake caliper assembly.

   Note: Do not let the caliper hang on the brake hose, otherwise it will damage the hose.



Installation

1. The installation order is the reverse of the removal order.

2.6.4.5 Brake pad of EPB caliper

Removal

1. Disconnect the brake from the vehicle.

   (1) Retract the electronic caliper worm. Enable the X-431 diagnostic scanner, enter the "EPB (EPB - Left)" interface, select "Special Functions", and repeatedly select the "Release Left Parking Brake" command as prompted to return the left electronic caliper worm to its initial position; then enter the "EPB (EPB - Right)" interface, select "Special Functions", and repeatedly select the "Release Right Parking Brake" command as prompted to return the right electronic caliper worm to its initial position.

   (2) Keep the APB switch pressed, shut down the engine (avoid triggering the electronic caliper to automatically clamp when the engine is shut down), and disconnect the negative terminal of the battery to power off the vehicle.

   (3) Unlock the harness connection and disconnect the MGU harness connector (there is no trace of brake fluid in the brake caliper before the MGU harness connector is disconnected). Method to retract the electronic caliper worm when no X-431 diagnostic scanner is available: Disconnect the negative battery terminal and disconnect the MGU harness plug. Remove the bolts connecting the caliper motor and the caliper bracket, and remove the caliper motor. Using a special tool, rotate the caliper piston to return the electronic caliper worm to its initial position. Reinstall the caliper motor.

   Warning: Brake fluid entering the MGU connector will cause failure of the MGU or parking brake. In principle, it is not allowed to retract the electronic caliper worm through

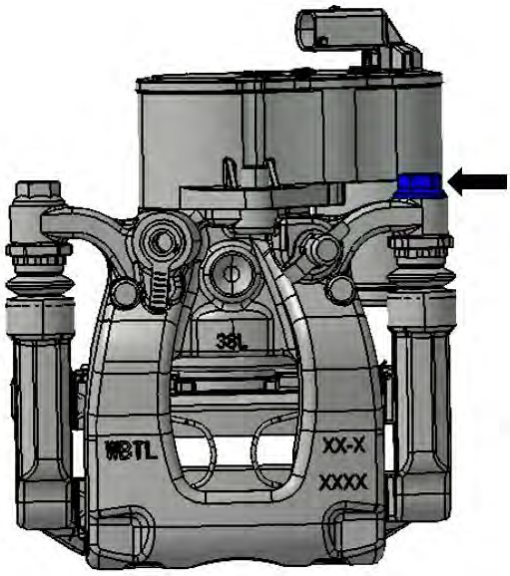
an external power supply. If an external power supply is used to retract the electronic caliper worm, the single operation power-on time shall not exceed 1s

2. Open the caliper.

Open the caliper by unscrewing or removing the pin screw shown in the right figure.

Note: Clean dust and dirt from the caliper before removal.

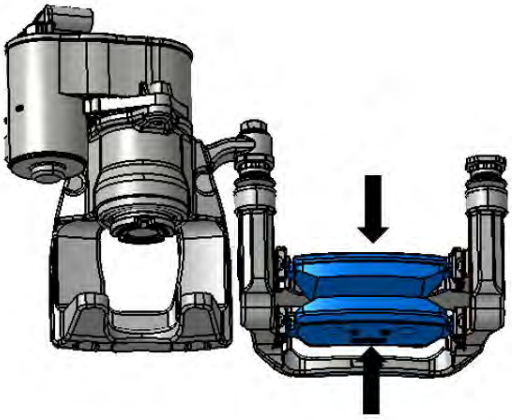
Warning: During rotation or removal of the EPB caliper body, do not remove or loosen the MGU unit on the EPB caliper body. If the brake hose is not disconnected from the EPB caliper body, do not suspend the EPB caliper body on the vehicle to avoid damaging the brake hose



3. Remove the worn brake pad assembly.

Remove the brake pad assembly from the bracket

Warning: Use tools with extreme care to avoid wearing or damaging the coating on the bracket ends



4. Operation of EPB caliper body.

To facilitate the installation of the new brake pad into the caliper, use a suitable tool (as shown) to properly retract the piston within the EPB caliper body, thereby increasing the assembly clearance for the new brake pad. The brake pad bracket (caliper bracket) may be cleaned during assembly.

Warning: Use only specialised tools and avoid contact with any brake components to prevent degradation.

5. Inspect and clean the brake disc.

   Check the wear thickness and surface scoring of the brake disc. Deep scratches or corrosion on the brake disc will increase overall vehicle drag. The brake disc must be cleaned or re-ground. If it exceeds the wear limit, the brake disc must be replaced.

   Before installing the new brake pad onto the caliper bracket, use a lint-free cloth to clean dust and other contaminants from the area around the brake disc.

   Wear thickness limit of brake disc: 10 mm

6. Replace the sliding spring.

Installation

The installation order is reverse to the removal order. Pay attention to the following points:

1. Connect the brake to the vehicle.

   Reconnect the harness to the MGU. A click sound indicates a successful connection. Gently pull to verify the connection. The harness connector is equipped with a locking mechanism and will not come loose.

2. EPB system calibration or self-inspection.

   Enable the "EPB adjustment system" through the EPB diagnostic tool. Alternatively, lock and unlock using the control button on the instrument panel.

3. Exhaust the brake system. Refer to: Brake system bleeding.

4. Check whether the hydraulic brake system is leaking brake fluid, and add the brake fluid in the brake fluid pot to the appropriate position.

2.6.4.6 Front brake disc

Removal

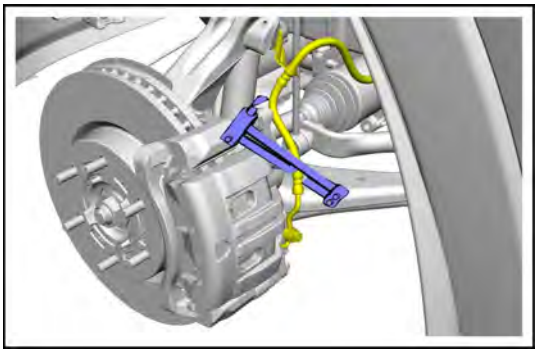
1. Lift and support the vehicle. Refer to: Lifting the vehicle.

2. Remove the wheels and tyres. Refer to: Wheel Assembly.

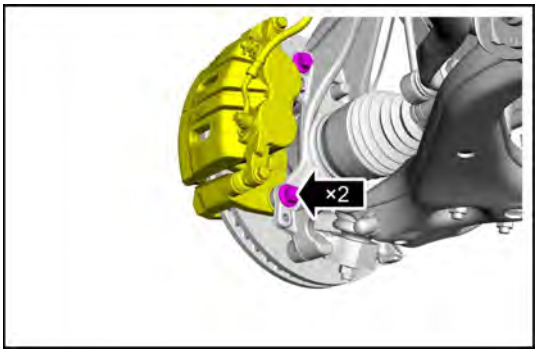
3. Clamp the brake hose with a proper brake hose clamp.

   General tool: Brake hose clamp

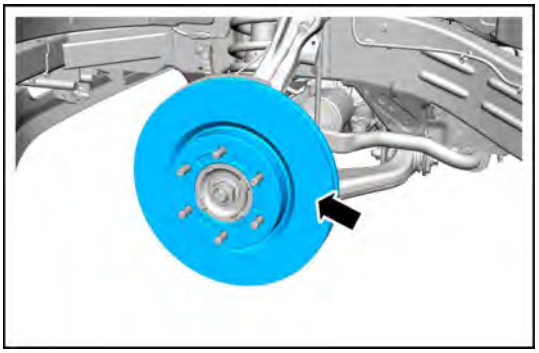
   Note: Seal the interface of hard brake pipe to avoid brake fluid leakage or dust entry.



4. Remove the fixing bolt of brake caliper bracket, and move aside the brake caliper.



5. Remove the brake disc.



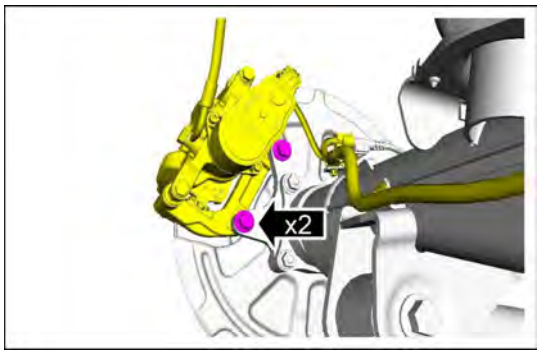
Installation

1. The installation order is the reverse of the removal order.
2. Check the brake fluid level in the brake fluid reservoir, and fill the brake fluid to the maximum scale if necessary.
3. Bleed the brake system. Refer to: Brake System Bleeding.

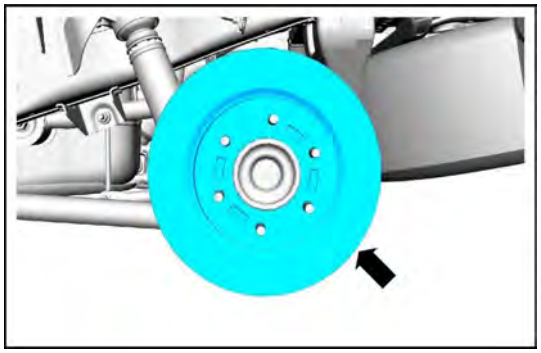
2.6.4.7 Rear brake disc

Removal

1. Release the hand brake.
2. Lift and support the vehicle. Refer to: Lifting the vehicle.
3. Remove the wheels and tyres. Refer to: Wheel Assembly.
4. Remove the brake caliper fixing bolts and move away the brake caliper.



5. Remove the rear brake disc.



Inspection after removal

Installation

1. The installation order is the reverse of the removal order.

2.6.5 General procedures

2.6.5.1 Bleeding of brake system

General Tools

Nylon tube, diagnostic scanner X431

Bleed

Warning: The brake fluid contains polyethylene glycol ether and polyethylene glycol. Avoid contact with the eyes. Wash your hands thoroughly after use. If the brake fluid comes into contact with your eyes, rinse them with running water for 15 minutes. If discomfort persists, seek medical attention immediately. If you swallowed accidentally, drink water and induce vomiting. Seek medical attention immediately. Failure to comply with these instructions may result in personal injury.

Note: If brake fluid splashes on the paint surface, the splashed area must be immediately rinsed with cold water.

Note: When bleeding, the brake fluid reservoir must be filled with new and clean brake fluid at all times.

Note: Please make sure that the vehicle is parked on a level surface.

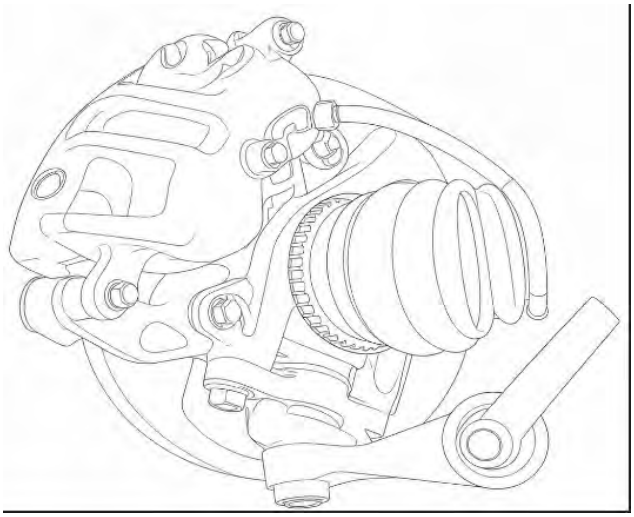
Note: The system consists of separate pipelines for the front and rear wheels, each of which can be connected independently.

Note: Pull up the parking brake before bleeding.

1. The vehicle is powered off and the negative pole of the battery is disconnected. Refer to: Disconnect the battery negative pole.

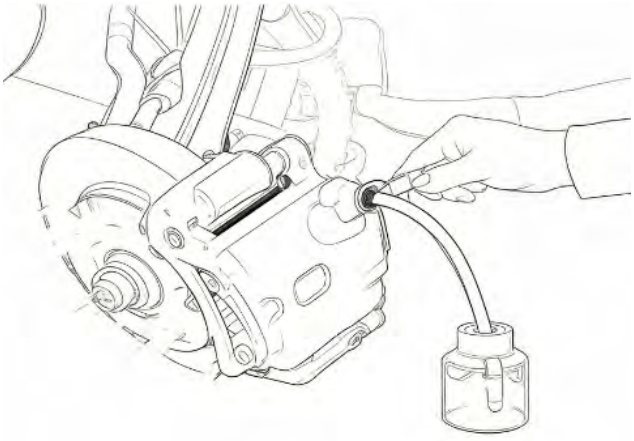
2. Bleed the four wheel end brakes of rear right, front left, rear left and front right respectively according to the following operation method.

   1. Connect a transparent nylon tube to the drain plug of the wheel cylinder and put the other end of the tube into a half-full brake fluid container.



2. Press the brake pedal to the bottom 4 or 5 times.

3. Hold the brake pedal down, loosen the bleed bolt to expel air from the brake pipeline, and then tighten it immediately.



4. Repeat steps 3 and 4 until there are no bubbles in the liquid.

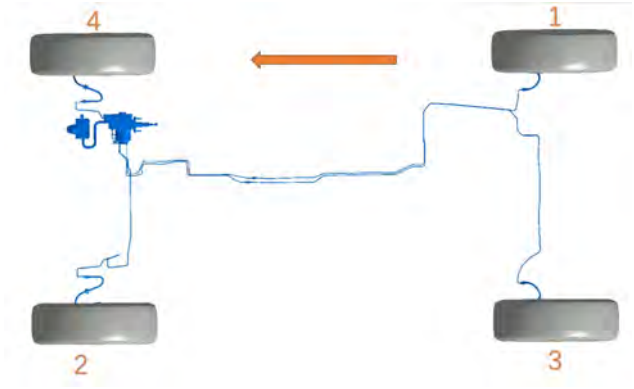
5. Tighten the bleed bolt. Torque: 9 ± 2 Nm

6. Bleed air from the bleed bolt of the brake hydraulic line as per the sequence (rear right - front left - rear left - front right).

Note: Pay attention to the fluid level in the brake fluid tank and add brake fluid timely.

Note: When bleeding air from dry EHB components (which contain no brake fluid), power off the vehicle, disconnect the power supply from the negative battery terminal, and perform manual air bleeding according to the steps above. After bleeding the air from all four brakes, connect the negative battery terminal, turn the vehicle ignition to ON, use the diagnostic scanner to access the special function of the EHB brake-by-wire system, enter the

manual bleeding mode, and bleed the air from inside the EHB according to the prompts.



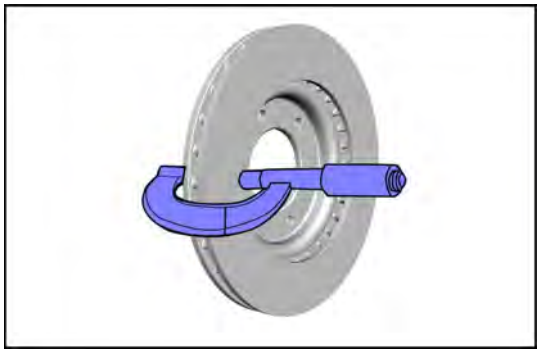
2.6.5.2 Brake Disc Thickness Check

General Tools

Micrometer

Inspection

1. Remove the wheel. Refer to: Wheels.
2. Remove the tyre. Refer to: Tyre.
3. Clean the friction surface of the brake disc with industrial alcohol or equivalent brake cleaning agent.
4. Measure and record the minimum thickness of 4 or more points evenly distributed along the circumference of the brake disc with a micrometer. Ensure that the measurement is only carried out in the contact area of the brake block lining, and the distance between the micrometer and the outer edge of the brake disc must be equal in each measurement. General tool: Micrometer



5. Trim the brake disc surface or replace the brake disc if the brake disc is thicker than the specified value.

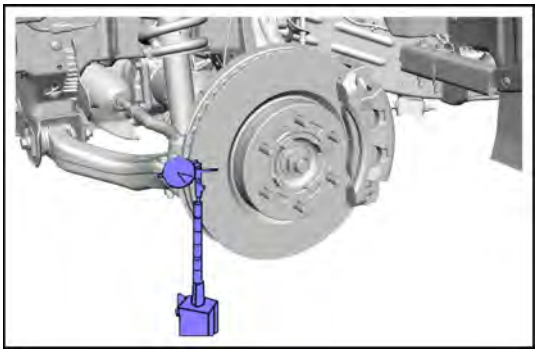
2.6.5.3 Brake Disc Runout Check

General Tools

Dial indicator
Dial gauge mounting bracket

Inspection

1. Remove the wheel. Refer to: Wheels.
2. Remove the tyre. Refer to: Tyre.
3. Install the dial gauge base and place the dial gauge measuring head with a certain pre-tightening force, so that it contacts with the friction surface of the brake disc and forms an angle of 90°.



4. Turn the brake disc slowly, and record the reading.

Note: If the measurement result exceeds the allowable range of runout, it is necessary to install a new brake disc and re-check the runout of the brake disc.

2.6.5.4 Brake System Leakage Check

Inspection

Note: Brake fluid is soluble in water, and the leakage traces of brake fluid may be washed away in rainy and snowy weather.

1. Depress the brake pedal several times, ensure that the pedal does not feel spongy, and bleed air from the brake system if necessary. Refer to: Brake system bleeding.
2. Check the brake fluid level.

Note: If the brake fluid level drops, but there is no obvious sign of leakage, check whether the end seal of the brake master cylinder body leaks.

2.6.5.5 Brake pad wear inspection

Inspection of front brake pad

1. Check the brake pad thickness through the inspection hole on the caliper body. If necessary, check with a scale.

Standard thickness: 9.5 mm

Wear limit thickness: 2.0 mm

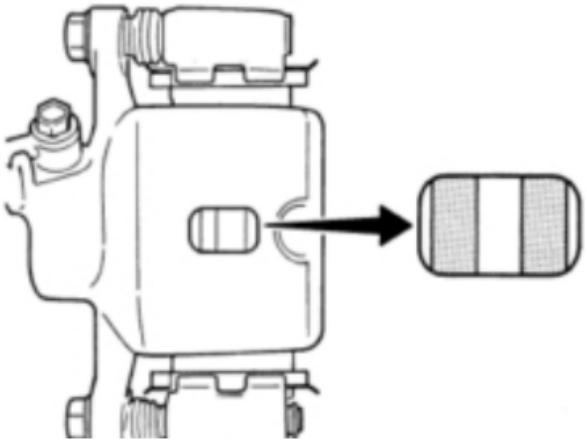
Warning: Clean the caliper and brake pad with a vacuum cleaner to minimize damage caused by particulates and other substances in the air.

Note: When removing the caliper body, do not depress the brake pedal, otherwise the piston will pop out.

Note: Do not remove the bolts on the torque member and brake hose unless the caliper component is to be removed or replaced. In such cases, ropes can be used to lift the caliper body to prevent the brake hoses from being stretched.

Note: Do not damage the piston dust cover.

Note: Make sure there is no brake fluid on the brake disc.



Inspection of rear brake pad

1. Check the brake pad thickness through the inspection hole on the caliper body. If necessary, check with a scale.

   Standard thickness: 9 mm

   Wear limit thickness: 2.0 mm

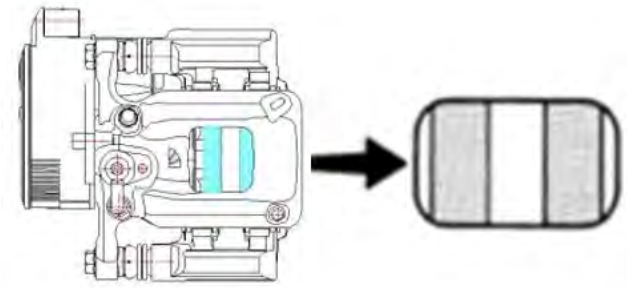
   Warning: Clean the caliper and brake pad with a vacuum cleaner to minimize damage caused by particulates and other substances in the air.

   Warning: When removing the caliper body, do not depress the brake pedal, otherwise the piston will pop out.

   Warning: Do not remove the bolts on the torque member and brake hose unless the caliper component is to be removed or replaced. In such cases, ropes can be used to lift the caliper body to prevent the brake hoses from being stretched.

   Warning: Do not damage the piston dust cover.

   Warning: Make sure there is no brake fluid on the brake disc.



2.7 Drive shaft

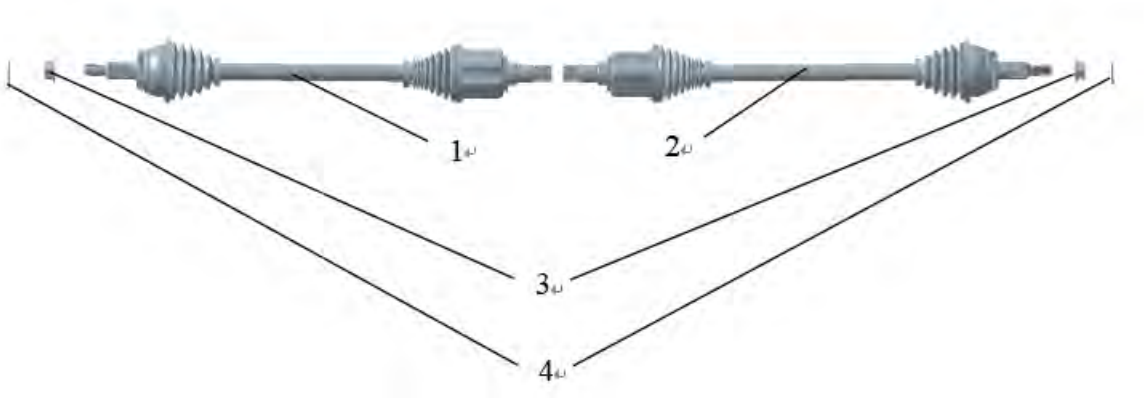
2.7.1 Specification

2.7.1.1 Torque specification

Name	Nm
Nut	295±15
All-metal Hex Flange Lock Nut	110±11Nm
Hex flange bolt	110±11Nm

2.7.2 Operation Manual

2.7.2.1 Drive shaft



Item	Description	Item	Description
1	Rear left drive axle assembly	3	Nut
2	Rear right drive axle assembly	4	开口销

2.7.2.2 Overview

Intermediate shaft

Contains three components:

1 Telescopic constant velocity universal joint (inner universal joint)

2 Centre-fixed constant velocity universal joint (outer universal joint)

3 Intermediate shaft

The intermediate shaft connects the telescopic constant velocity universal joint and the centre fixed constant velocity universal joint. The telescopic constant velocity universal joint is completely flexible. The telescopic constant velocity universal joint can be extended inward and outward. The centre-fixed constant velocity joint is flexible, but the centre-fixed constant velocity joint cannot be extended inward and outward.

Sheath (sealing cover) and clamp

Protect the internal parts of the centre-fixed constant velocity joint and telescopic constant velocity joint. The sheath (sealing cover) protects the grease from damage caused by the following reasons:

1 Hazardous environmental conditions (e.g. extreme ambient temperature or ozone gas)

2 Foreign object (e.g. dust or water)

The telescopic constant velocity universal joint can change the working angle and perform telescopic sliding movement, while the centre-fixed constant velocity joint can only change the working angle.

Note: Protect the sheath (sealing cover) against sharp tools and sharp edges of surrounding parts

Any damage to the sheath (sealing cover) or clamp will cause leakage. Leakage will cause water to leak into the telescopic constant velocity joint and the centre-fixed constant velocity joint. Leakage can also cause grease to escape from telescopic and centre-fixed constant velocity joints. Leakage may cause working noise of the front wheel drive axle and damage to internal components. The function of the clamp is to prevent leakage of telescopic constant velocity joints and centre-fixed constant velocity joints at the housing and intermediate shaft positions.

2.7.2.3 Precautions

Precautions during repair

1. Operate on a dust-free workbench whenever possible.
2. Please clean the outer surfaces of parts before disassembly and assembly.
3. Avoid contaminating parts and prevent foreign objects from entering during operation.
4. The disassembled parts must be carefully reassembled in the correct order. If the work is interrupted, cover the parts with a clean cover.
5. Use paper towels instead of fibre cloths to prevent lint from adhering to the parts.
6. After assembly, ensure the fasteners are checked for the specified torque.
7. Do not reuse the disposable parts and components.
8. Conduct a thorough inspection before repairing or replacing parts.

2.7.3 Diagnosis and testing

2.7.3.1 On-board inspection and maintenance

Check if the drive shaft and universal joint are loose or subjected to other damages.

Check if the dust cover is subjected to crack or other damages.

Caution: In case of drive shaft subjected to noise or vibration, please replace the drive shaft assembly.

Common troubleshooting diagnosis table

Fault symptom	Possible causes	Solutions
Vehicle deviation	Drive shaft steering knuckle wear	Replace
Vibration	Drive shaft wear, damage, or bending	Replace
	Clearance between drive shaft and hub spline	Replace
Abnormal and loud noise	Drive shaft wear, damage, or bending	Replace
	Drive shaft hub spline wear	Replace
	Loosening of drive shaft nut of front axle	Adjust or replace

2.7.3.2 Accurate Test A: Abnormal noise and loud noise

Accurate Test A: Abnormal noise and loud noise

Fault phenomenon fault triggering conditions

Fault symptom	Description	Fault Recovery Conditions
Abnormal and loud noise	Drive shaft wear, damage, or bending	Replace
	Drive shaft hub spline wear	Replace
	Loose lock nut of drive shaft	Adjust or replace

Possible causes

– Drive shaft wear, damage, or bending.

– Drive shaft hub spline wear.

– Loose lock nut of drive shaft.

Repair recommendations

– Replace the drive shaft parts.

– Replace the drive shaft parts.

– Adjust or replace the nut.

Visual inspection and inspection before diagnosis

– Check whether the drive shaft itself is loose or has other abnormal conditions.

– Check whether the drive shaft and hub unit are loose.

– Check whether the drive shaft lock nut is loose.

2.7.3.3 Accurate test A: vehicle deviation

Accurate test A: vehicle deviation

Fault phenomenon fault triggering conditions

Fault symptom	Description	Fault Recovery Conditions
Vehicle deviation	Drive shaft steering knuckle wear	Replace

Possible causes

– Drive shaft steering knuckle wear.

Repair recommendations

– Replace the drive shaft.

Visual inspection and inspection before diagnosis

– Check for looseness.

2.7.3.4 Accurate test A: vehicle vibration

Accurate test A: vehicle vibration

Fault phenomenon fault triggering conditions

Fault symptom	Description	Fault Recovery Conditions
Vibration	Drive shaft wear, damage, or bending	Replace
	Clearance between drive shaft and hub spline	Replace

Possible causes

– Drive shaft wear, damage, or bending.

– Clearance between drive shaft and hub spline.

Repair recommendations

– Replace the drive shaft parts.

– Replace the drive shaft or hub.

Visual inspection and inspection before diagnosis

– Check whether the drive shaft itself is loose or has other abnormal conditions.

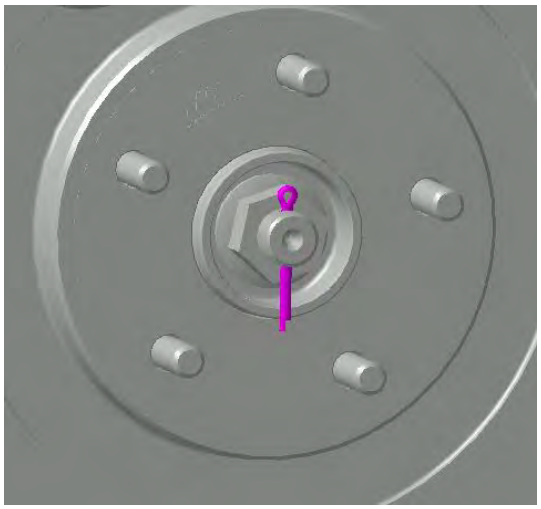
– Check whether the drive shaft and hub unit are loose.

2.7.4 Removal and installation

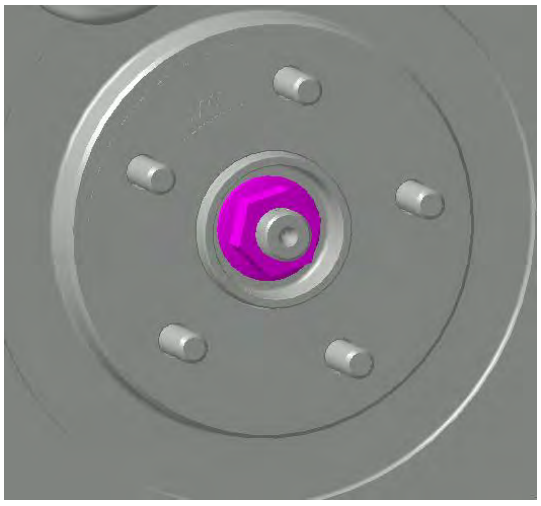
2.7.4.1 Drive shaft assembly

Removal

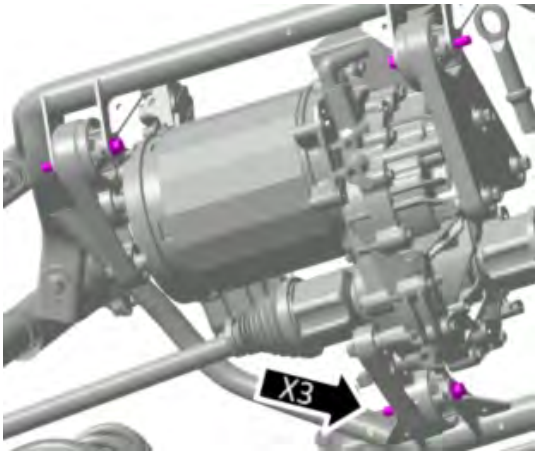
1. Lift and support the vehicle. Refer to: Lifting the vehicle.
2. Remove the rear tyres on both sides. Refer to: Wheels.
3. Remove the cotter pin.



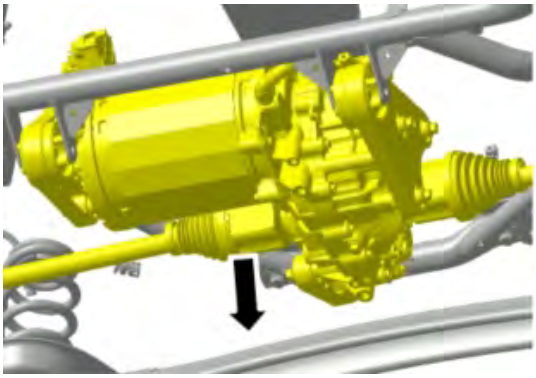
4. Remove the nut.



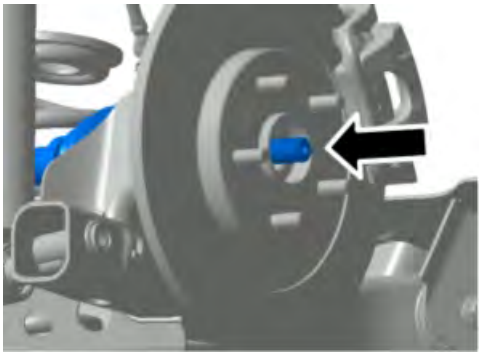
5. Utilising a lifting tool, first support the drive motor and then remove the suspension bolts.



6. Use a lifting tool to properly lower the drive motor.

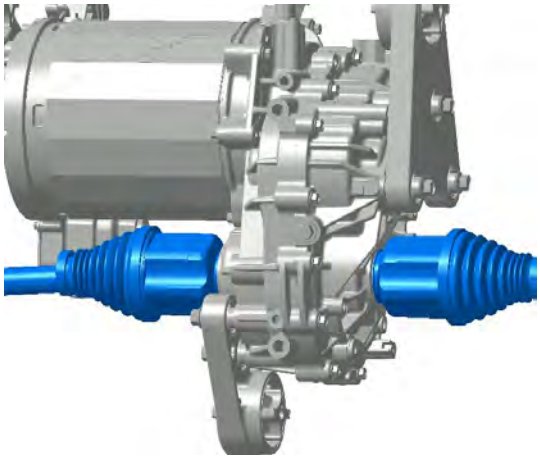


7. Use a suitable tool such as a rubber hammer or wooden block to tap the drive shaft head and remove the drive shaft from the hub bearing assembly.



8. Remove the drive shaft from the motor side.

   Note: When removing the drive shaft, avoid placing the drive shaft universal joint at an excessively large angle. Be careful not to overstretch the tripod universal joint to prevent the tripod from falling off the ball cage and damaging the tripod.



Inspection after removal

1. Rotate the universal joint and inspect if it can operate smoothly or is seriously loose.
2. Check if the dust cover is subjected to crack, damage and leakage of lubricating grease.
3. If any issues are found, please disassemble the drive shaft and replace the faulty parts.

Installation

The installation order is reverse to the removal order. Pay attention to the following points:

Note: When installing the drive shaft, if the motor side oil seal is damaged, it should be replaced with a new one.

Note: Please do not reuse the parts that cannot be used any more (such as cotter pin, clamp with ear and snap ring).

Note: When inserting the drive shaft into the motor side, avoid damaging the oil seal.

Note: Confirm that the snap ring on this side is fully engaged.

Note: Apply motor gear oil to the drive shaft spline.

Note: Before installing the drive shaft, make the opening of the snap ring face downward.

2.7.5 Removal and installation

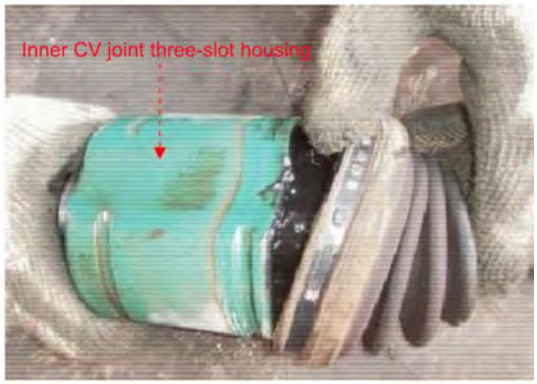
2.7.5.1 Disassembly and assembly of drive shaft assembly

Remove the inner ball cage

1. Remove the big clamp of inner CV joint (loosen it with special calipers).

2. Remove the small clamp of inner CV joint (loosen it with a special caliper).

3. Disengage the inner CV joint dust cover and remove the three-slot shell at inner CV joint end.



4. Remove the upper limit snap spring of shaft lever with an outer caliper.

5. Remove the tripod ball of inner CV joint.

6. Remove the tripod pin and three-groove housing

Remove the outer ball cage

1. Remove the big clamp of outer CV joint with a jaw vice.

2. Remove small clamp of outer CV joint with jaw vice.

3. Remove the outer CV joint dust cover.

4. Loosen the small end of the dust cover.

5. Turn and remove the dust cover.

6. Remove the outer CV joint and remove grease on the surface.

7. Tighten the intermediate shaft rod with a bench vice.

8. Knock and remove the outer CV joint.

9. Remove the outer CV joint.

10. Remove the dust cover.

11. Clean up the grease on the surface of shaft lever.

12. Remove the steel wire snap spring on the shaft lever.

Assemble the outer ball cage

1. Hook the open end of a new snap spring into the snap spring slot.

2. Press the snap spring into the groove with force.

3. Check whether there is any deformation and it should be able to rotate flexibly.

4. Fit a new small clamp.

5. Fit a new dust cover.

6. Loosely install the small clamp on the dust cover.

7. Add lubricating grease into the new outer CV joint.

8. Align the spline and insert the shaft rod into the outer CV joint.

9. Apply external force on the shaft lever to ensure that the outer CV joint is assembled in place.

10. Add lubricating grease (55-65g) into the dust cover.

11. Fit the dust cover into the outer CV joint.

12. Install the big and small clamps of outer CV joint.

13. Lock the big clamp with a jaw vice.

14. Lock the small clamp with a jaw vice.

Assemble the inner ball cage

1. Assemble a new small clamp.

2. Assemble a new inner CV joint dust cover.

3. Install a new tripod pin.

(1) Pay attention to the chamfer on the spline in the tripod ball. The chamfered end is the sleeving end. The assembling in the wrong end will bring about difficulty in assembling in subsequent steps.

(2) The end without chamfer of the spline in the tripod ball will be the upper end face upon assembling of the tripod ball, for blocking the limit snap spring.

(3) The end face specified by the tip is the chamfered side. The following are the key points of assembly.

Note: In the process of tripod ball press-fitting, it is strictly prohibited to knock on the tripod ball ring. The knocking force can only be applied to the blank wall thickness position. Otherwise, it will cause early failure of the new tripod ball.

Note: Be sure to press the new tripod ball in position.

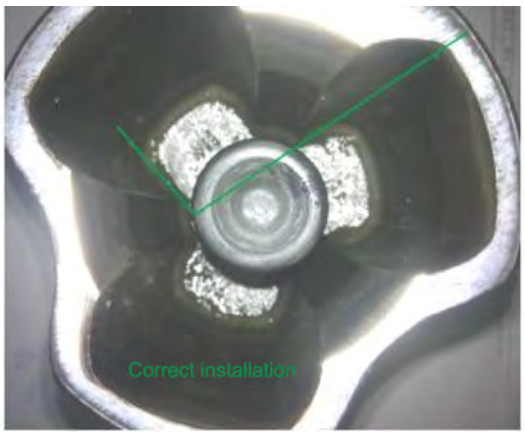
4. Assemble a new limit snap spring.

Note: The force applied to the caliper shall not be too large; otherwise, the snap spring will deform and fail.

5. After the new snap spring is installed in the limit groove, it shall be rotated to ensure that the snap spring is in place and rotates flexibly.

6. Press the spring (if any) into the hole of the three pin pot housing.

Note: Press the spring straight to the bottom without skew



7. Add an appropriate amount of yellow lubricating grease into the ball cage.

8. Assemble the dust cover and new three-slot housing.

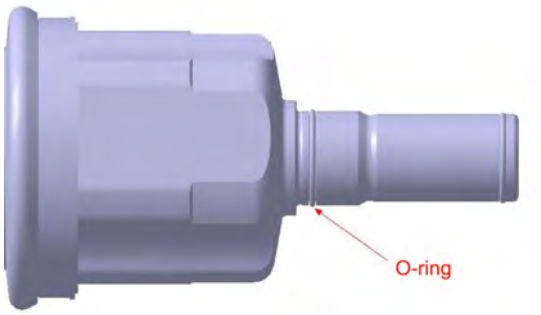
Note: During assembly, inject air into the dust cover to avoid damaging its surface.

9. Use special calipers to lock the new big clamp of the dust cover.

Note: During replacement, avoid bumping or damaging the dust cover, three-slot housing splines and grinding gear surfaces.

10. Use special calipers to lock the new small clamp of the dust cover.

Note: On the drive shaft with an O-ring on the inner ball cage, if the O-ring is damaged or broken and needs replacement, remove it by hand and replace it with a new one.



On-vehicle inspection and maintenance

Note: Check if the drive shaft and universal joint are loose or otherwise damaged.

Note: Check if the dust cover is cracked or otherwise damaged.

3.1 Safety and special operations

3.1.1 Safety and special operations

3.1.1.1 Important warnings for disconnecting low-voltage battery

Warning

1. Unless otherwise stated in the operating procedures, make sure that the vehicle is in the "OFF" mode and all electrical loads are turned off before starting the repair of any electrical component.
2. Disconnect the negative terminal of the low-voltage battery if the tool or equipment is easy to touch any exposed live electrical terminal during operation.
3. Violation against the above safety instructions may result in personal injury and vehicle damage.

Important warnings for road test

Warning: Perform a road test on the vehicle while ensuring safety and complying with all traffic regulations. Do not try any operation that may endanger the vehicle control.

Warning: Violation against the above safety instructions may result in personal injury and/or vehicle damage.

Guidance on troubleshooting of high-voltage electrical system

Troubleshooting of high-voltage electrical system at power-off

Caution: Situations requiring power-off of high-voltage electrical systems: Before repairing any components of the high-voltage electrical system, power off the system according to the following requirements, and power it on after repair, unless otherwise specified in the operating procedure.

Caution: All high-voltage system harnesses of the vehicle are orange. Before repairing any components of the high-voltage system, take protective measures according to the repair requirements of the high-voltage system, such as wearing insulating gloves, insulating shoes and goggles, laying insulating pads, and setting high voltage warning signs.

Caution: Repair operations on the high-voltage electrical system must be carried out by technicians with qualifications recognised by BYD and in compliance with local regulations.

Caution: Violation against these safety reminders may result in personal injury or vehicle damage.

Caution: High-voltage live line measurement must be carried out with one hand. For example, at least one probe end of the instrument used for measurement shall be equipped with an insulating alligator clip. During measurement, the alligator clip shall be clamped to one terminal of the positive and negative terminals of the circuit first, and then another probe shall be connected to the other terminal of the circuit for measurement. During measurement, only one hand can be used to hold the probe, and the other hand must not touch the vehicle.

Caution: Before operation, power off the high-voltage system. Firstly, power OFF the vehicle , disconnect the negative terminal of battery and the low-voltage service disconnect, wait for 5 min, and then disconnect the high-voltage bus led out from the power battery pack to ensure that the voltage between the disconnected high-voltage buses is within a safe voltage range (less than 60 VDC).

Caution: During operation, operators shall properly keep the removed high-voltage and low-voltage system wires, wrap them with special insulating rubber sleeves, and do not expose wire terminals to prevent electric shock or other accidents.

Power-off and power-on of high-voltage electrical system

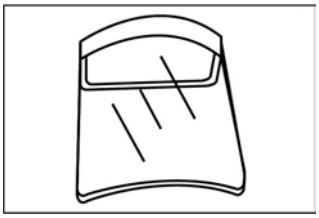
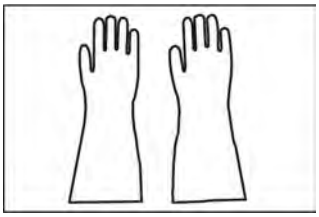
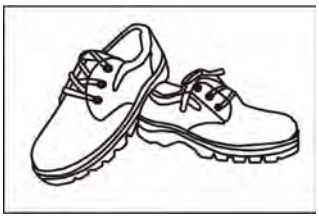
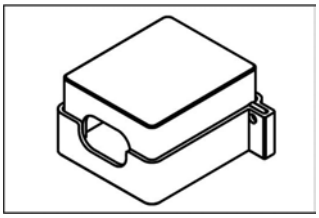
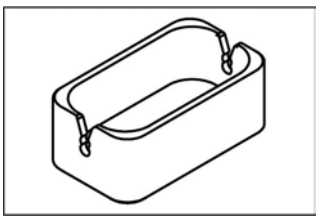
Caution: Situations requiring power-off of high-voltage electrical systems: Before repairing any components of the high-voltage electrical system, power off the system according to the following requirements, and power it on after repair, unless otherwise specified in the operating procedure.

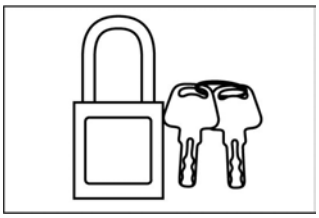
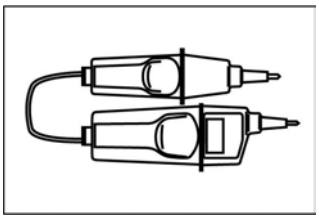
Caution: All high-voltage system harnesses of the vehicle are orange. Before repairing any components of the high-voltage system, take protective measures according to the repair requirements of the high-voltage system, such as wearing insulating gloves, insulating shoes and goggles, laying insulating pads, and setting high voltage warning signs.

Caution: Repair operations on the high-voltage electrical system must be carried out by technicians with qualifications recognised by BYD and in compliance with local regulations.

Caution: Violation against these safety reminders may result in personal injury or vehicle damage.

Personal protective equipment and tools

S/N	Picture	Name	Description
1		Protective mask	
2		Insulating gloves	Insulation voltage above 1000 V
3		Non-slip gloves	
4		Insulating shoes	Insulation voltage above 1000 V
5		Protective cover for high-voltage cable connector	For protecting the plug and preventing electric shock
6		Protective cover for high-voltage cable connector	For protecting the plug and preventing electric shock

S/N	Picture	Name	Description
7		Insulating lock	
8		Voltage tester	For checking voltage of high-voltage components

3.1.1.2 General knowledge of safety

Airbag

Due to high inflammability and explosibility, please observe the regulations of No Fireworks.

There is a gas generator inside, which contains a high-energy propellant. The propellant is completely sealed in the generator normally. Do not attempt to open it, otherwise an explosion may occur. After the propellant is ignited, it will be completely consumed in reaction and can produce high-temperature gas (up to 2500 °C). In case of rupture of the gas generator, wear full protective equipment (such as protective clothing, protective gloves and goggles) to dispose of spillage.

Used SRS shall be packed in plastic bags and disposed of according to local regulations. If the human body is in direct contact with the gas generator, wash it thoroughly with clean water and seek medical advice depending on the severity.

Precautions for operation of airbag:

1. Store the component in an upright position.

2. Keep the component dry.

3. When handling the component, place the protective cover side opposite to the human body.

4. Place the protective cover of the component upward.

5. Carefully check the component for damage.

6. When connecting the SRS, stand on the side of the component.

7. Calibrate and maintain all equipment.

8. Be sure to wash hands after handling a deployed SRS.

Don'ts for operation of SRS:

1. Do not store with highly flammable materials.

2. The storage temperature shall not exceed 80 °C.

3. Do not store upside down.

4. Do not open the housing.

5. Do not be exposed to naked flames or heat.

6. Do not place anything on the surface covering.

7. Do not use damaged SRS.

8. Do not touch the gas generator on fire for at least 10 min.

9. Do not use any electronic detector on its wiring harness.

Refrigerant

Due to high inflammability and explosibility, please observe the regulations of No Fireworks.

Direct contact between the refrigerant and skin may cause frostbite.

Follow the instructions provided by the manufacturer. Wear appropriate protective gloves and goggles during operation.

If the refrigerant comes into direct contact with skin or eyes, immediately flush the contaminated area with clean water. In case of contact with eyes, wash with appropriate cleaning solution. Do not wipe. Seek medical help if you feel unwell.

Don'ts for refrigerant operation:

1. Do not expose the refrigerant bottle to sunlight or place it in a heat source.

2. Do not place the refrigerant bottle upright. Keep the valve downward during filling.

3. Do not refrigerate the refrigerant bottle.

4. Do not drop the refrigerant bottle.

5. Do not discharge the refrigerant into the air.

6. Do not mix different refrigerants, such as R12 (Freon) and R134a.

Precautions for marking, packaging, transportation and storage of refrigerant:

1. The refrigerant container shall have firm and clear marks, including product name, trademark, manufacturer and its address, net content, batch number, product grade, standard number and "Keep away from sunlight" mark specified in GB 191.

2. It shall be packed in special steel cylinders. Reusable cylinders shall be coated in aluminium white, and non-reusable cylinders shall be coated in sky blue.

3. The filling coefficient shall not be greater than 1.02 kg/L during filling of the cylinder.

4. The reused cylinders shall be maintained in positive pressure after use.

5. During loading, unloading and transportation, safety helmets shall be worn to prevent impact, dragging, dropping and direct exposure. The cylinder shall be transported in accordance with relevant national or regional regulations.

6. It shall be stored in a cool and dry place, kept away from heat sources, and strictly prohibited from sunlight and rain.

Coolant

Common coolants include isopropanol, ethylene glycol and methanol, which are highly inflammable.

When the coolant is heated, vapour will be generated. In order to avoid inhalation and burns of vapour, the coolant shall cool down before operation.

The coolant will be absorbed through the skin, which is harmful if the human body absorbs too much. It is very dangerous to swallow the coolant. In case of swallowing, seek medical advice immediately.

Do not come into contact with any public articles, food or drinking water source.

Low-voltage battery acid

For models equipped with ordinary lead-acid batteries, the gas released during charging is flammable and explosive. Do not use naked flames or generate sparks near lead-acid batteries that are being charged or newly fully charged. During charging, ensure good ventilation.

Brake fluid

Splashing the brake fluid to the skin or eyes will cause slight irritation. Therefore, avoid contact with skin and eyes as much as possible.

It is corrosive to the body paint. Therefore, avoid dripping on the surfaces of the body and painted parts during operation, or wipe off the brake fluid on the painted surface as soon as possible.

Observe the followings for operation of the brake system:

1. For the brake pipeline joint with two fastening nuts, use two tools to loosen or tighten the nuts at the same time to prevent the brake pipeline from being deformed under stress.
2. Ensure that the brake hose is naturally bent without distortion and deformation.
3. Secure the brake pipe with fixing clips so that it does not come into contact with the positions with potential wear.
4. Keep the container for brake fluid clean.
5. Seal and store the brake fluid. Otherwise, it will absorb moisture in the air, resulting in decrease of the ignition point and failure, which is easy to cause danger during use.
6. Do not contaminate the brake fluid with mineral oil, or store unused brake fluid in a container that is filled with mineral oil.
7. Do not reuse the brake fluid discharged from the vehicle brake system.
8. Always use clean brake fluid or an acceptable substitute to clean hydraulic parts.
9. After disconnecting the brake pipeline, install a suitable end cap or plug immediately to prevent foreign matter from entering.
10. Use only brake pipeline joints with appropriate threads or vents.
11. When operating hydraulic parts, keep them absolutely clean.

Fuel

It includes gasoline and diesel. For fuel vehicles, gasoline is highly volatile and flammable, so exposure to the air shall be avoided, especially in confined spaces. The naked flame and heat shall be kept away from the fuel.

Kerosene

It is usually used as fuel for heating, solvent and detergent.

For inflammables, please observe the regulations of No Fireworks.

Swallowing will cause irritation to mouth and throat. This can be more dangerous if the liquid is inhaled into the lungs as a result of swallowing.

Contact with the skin will lead to dry skin and allergy or dermatitis. Slight discomfort may occur if it splashes into eyes.

Under normal conditions, it does not generate harmful vapours due to low volatility. Avoid exposure to high temperature. Avoid contact with the skin and eyes, and ensure good ventilation.

Lubricant and grease

Avoid prolonged or repeated contact of the body with the lubricant or grease. All lubricants and greases may be irritating to eyes and skin.

Used lubricating oil: Prolonged and repeated contact with mineral oil can result in loss of natural fat from the skin, causing dryness, irritation and dermatitis. In addition, used lubricating oil contains potentially harmful contaminants that may cause cancer. Appropriate skin protection methods and washing equipment must be provided.

The combustion of used lubricating oil in smaller heaters or boilers is limited to units permitted by the design. In case of doubt, contact the relevant local government agencies and manufacturers of licensed products.

Do not discharge lubricants and grease into the environment.

Acids and alkalis

Materials generally used for batteries and cleaning, such as corrosive sodium carbonate and sulfuric acid. Avoid splashing on the skin, eyes and clothing. Wear appropriate protective aprons, gloves and goggles. Do not inhale the spray.

It is irritating and corrosive to the skin, eyes, nose and throat, causing burns and destroying ordinary protective clothing.

When in use, ensure that the eye lotion, showers and soap are available for emergency treatment in case of contact.

There shall be danger signs in the storage place.

Solvent

Common solvents include acetone, petroleum spirit, toluene, xylene and trichloroethane. They are used for cleaning and dewaxing of materials, paints, plastics, resins and diluent.

Some solvents are highly flammable. Repeated or prolonged contact with the skin will degrease the skin and cause skin irritation and dermatitis. Some solvents may be absorbed through the skin, resulting in increased damage to human body. Splashing into the eyes may cause severe irritation and blindness. Short exposure to high concentrations of steam or fumes may cause irritation to eyes and throat, drowsiness, dizziness, headache, and in severe cases, loss of consciousness. Repeated or prolonged exposure to excessive but lower concentrations of steam or fumes may result in more serious human injuries. Choking the solvent into the lungs due to vomiting will have serious consequences. Avoid splashing on the skin, eyes and clothing. Wear protective gloves, goggles and protective clothing during operation. Ensure good ventilation during use, avoid inhalation of fumes, steam and spray, and keep the container tightly sealed. Do not use in a closed environment. When organic solvents such as paint, adhesive and coating are sprayed, use special ventilation equipment or personal respiratory protection equipment under poor ventilation. Do not heat or ignite the solvent unless specifically detailed by the manufacturer.

Adhesives and sealing materials

Due to high inflammability, please observe the regulations of No Fireworks. During use, pay attention to keeping the articles clean and tidy, such as covering seats with discardable paper. Use other containers with appropriate labels as far as possible, such as applicators and secondary containers.

Solvent adhesives/sealing materials

Follow the manufacturer's instructions for use. Refer to "Solvents" in this section for solvent instructions.

Aqueous adhesives/sealing materials

Polymeric emulsions and rubber latex materials may contain small amounts of volatile poisonous and harmful chemicals. Avoid contact with the skin and eyes during use, and pay attention to ventilation.

Hot melt adhesives

They are harmless in solid state. They may cause burns in melted state, or inhalation of poisonous fumes presents health hazards. Wear appropriate protective clothing and pay attention to ventilation during use. The heater shall have the temperature control function such as automatic cut-off.

Resin adhesives/sealing materials

Examples are epoxide and resin-based formaldehyde. Mixing shall be carried out in a well-ventilated place because harmful or poisonous volatile chemicals may be released. Direct contact of the skin with untreated resin and hardener will result in absorption of poisonous and harmful chemicals, causing allergy and dermatitis. Splashes may cause injury to eyes.

Anaerobic cyanoacrylate adhesives (super glue) and other acrylic adhesives

Most of them are irritating, which can cause allergy or injury to the skin and respiratory tract. Some of them are irritating to eyes. Follow the manufacturer's instructions for use to avoid contact with the skin and eyes.

Cyanoacrylate adhesives (super glue)

They shall not be in contact with the skin or eyes. If the skin or eye tissue is adhered, cover with a clean wet towel and seek medical advice immediately. Do not tear off the adhesion. Use in a well-ventilated area because vapour can irritate the nose and eyes.

For dual-combination systems, refer to "Resin adhesives/sealing materials" and "Isocyanate adhesives/sealing materials" in this section.

Isocyanate (polyurethane) adhesives/sealing materials

Personnel with asthma or respiratory sensitivity shall not handle or approach these materials to avoid allergic reactions. Prolonged exposure can cause eye and respiratory irritation. High concentration can affect the nervous system, such as sleepiness. Under extreme conditions, shock due to loss of consciousness may occur. Prolonged exposure to high concentrations of vapour can cause adverse health effects. Prolonged skin contact will lead to degreasing and cause skin allergies, and in some cases dermatitis. Splashes into the eyes can cause eye discomfort and may cause damage. Carry out spraying preferably at the exhaust vent, keep the vapour and mist droplets away from the area for breathing, and wear appropriate gloves, goggles and respiratory protection equipment.

Foam materials

They are generally used for noise insulation. The treated foam materials are used for seats and decorative cushions, which can enhance the comfort of stepping on the carpet and also provide protection for feet in case of collision. Persons who suffer from chronic respiratory disease, asthma, bronchial disease or allergies are not allowed to work in or near untreated materials. Their parts, vapour or spray can cause direct irritation or allergic reactions, and may even be poisonous or harmful. Do not inhale the vapour or spray of foam materials. Such materials must be used with good ventilation and respiratory protection. Remove the respirator after the vapour/ spray is completely eliminated, otherwise the vapour and spray will be inhaled into the human body. The combustion of foam materials will produce poisonous and harmful fumes. Do not smoke or use open flame or electrical equipment during foaming operation, but wait until the vapour completely disappears. Carry out thermal cutting of any foam material or specially treated foam material with good ventilation.

Chemical materials

Chemical materials such as solvents, sealing materials, adhesives, paints, resin foam materials, battery acid, high-voltage battery electrolyte, coolant, brake fluid, lubricating oil and grease must be stored and handled carefully. They may be poisonous, harmful, corrosive, irritating or highly flammable, producing harmful fume and dust.

Dos for operation of chemical materials:

1. Please carefully read and follow the hazard warnings and protection requirements on the material container label, attached instructions or other instructions. The data sheet of material health and safety can be obtained from the manufacturer.
2. Remove chemical materials from the skin and clothing immediately after contamination. Wash or discard seriously contaminated clothing.
3. Organize work practices, wear protective clothing to avoid contact with the skin and eyes, and avoid inhalation of vapour, mist, dust or fume, improper container labelling, and combustion and explosion hazards.
4. After handling chemical materials, wash hands before taking a break, eating, smoking, drinking or using toilets.
5. Keep the workplace clean, tidy and free of spillage.
6. Store chemical materials according to relevant national and local regulations.
7. Keep chemical materials out of the reach of children.

Don'ts for operation of chemical materials:

1. Do not mix chemical materials without the manufacturer's instructions. Some chemical materials will produce other poisonous and harmful chemical materials after mixing, thus releasing toxic fumes or becoming explosive.
2. Do not spray chemical materials, especially solvent-based materials, in closed space, such as when someone is in the vehicle.
3. Do not put chemical materials near heat sources or open flames unless directed by the manufacturer. Some materials are highly flammable, or may release poisonous or harmful fumes.

4. Do not leave the container open. The released fumes will accumulate to poisonous, harmful or explosive concentrations. Some fumes are heavier than the air and will accumulate in confined spaces, such as wells.

5. Do not put chemical materials into unmarked containers.

Anti-corrosion materials

Due to high inflammability and explosibility, please observe the regulations of No Fireworks. There are wide varieties of these materials, including solvents, resins or petroleum products, which must follow the manufacturer's instructions. Avoid contact with the skin and eyes. They shall only be sprayed in well-ventilated space, rather than confined space.

Fibre isolation materials

They are generally used for sound insulation. Fibre surfaces and cut edges can irritate the skin, which is usually a physical rather than chemical reaction. Take some measures, such as the use of gloves to avoid excessive contact with the skin.

Fluororubber

It is usually used to make parts such as O-ring, seal or cylinder gasket. Fluororubber is a fluoroelastomer, which is a kind of fluorinated synthetic rubber materials. It is very safe normally. However, in case of exposure to a temperature exceeding 400 °C , this material will not burn but will decompose, producing hydrofluoric acid and other substances. Hydrofluoric acid is very corrosive and can be directly absorbed into the human body by contact. O-rings, seals or gaskets exposed to high temperature will be charred or turn into black viscous substances. Do not touch them or their attached objects in any case. Make consultations firstly to determine if the affected O-ring, seal or gasket contains fluororubber or other fluoroelastomers. Take care in case of any uncertainty, because the raw materials of such parts are likely to be fluororubber or other fluoroelastomers. If the parts containing fluororubber or other fluoroelastomers have been exposed to high temperature, carefully clean the potentially affected areas before working. Always wear disposable protective plastic gloves for hazards, before disposing of decomposed fluororubber residues and cleaning the area at last, neutralise the acid with steel wool and lime water (containing sodium hydroxide), and wash the affected area with clean water. Carefully dispose of waste plastic gloves.

Soldering tin

Soldering tin is a mixture of metals with a melting point lower than that of structural metals (usually lead and tin). If a gas-air flame is used to heat the solder, the use of solder does not usually produce toxic lead gas. Do not use oxy-acetylene flame to heat solder, because the temperature is too high and lead gas is easily generated. If inhaled by the human body, it will cause poisoning. For use of any flame on the soldering tin surface covered with grease, some gases may be generated, and shall not be inhaled. Be careful when removing excess soldering tin to avoid inhaling fine lead dust. Use respiratory protective equipment if necessary. Collect spilled soldering tin and filings and remove immediately to avoid electrical short circuit and environmental pollution. After using the welding tongs, wash hands or clothes in contact with soldering tin to avoid lead intake by the body.

Dirt and dust

Powder, dirt or dust may be irritating, harmful or poisonous. Avoid inhaling powdery chemical materials, or dust caused by dryness and friction. In case of poor ventilation, wear protective equipment such as breathing mask. Since fine dust of combustibles may cause explosion, keep them away from naked flames or sparks.

Electric shock

Electric shock may result from electric leakage of high-voltage components, use of faulty components or incorrect operation of normal equipment. The orange cables on the vehicle are high-voltage cables, and the components labelled with "High Voltage" are high-voltage components. When the vehicle is in a high-voltage state or when such components are damaged, they are particularly dangerous. Do not touch them at will.

Precautions for electrical safety:

1. Ensure that the electrical equipment is well maintained and frequently tested. Mark faulty equipment and preferably remove.

2. Ensure that the wires, cables and connectors are not worn, kinked, cut, cracked or otherwise damaged.

3. Make sure that electrical equipment and cables do not come into contact with other liquids such as water and coolant.

4. Make sure that the electrical equipment is protected by the correctly rated fuse.

5. Do not misuse electrical equipment or use it in any wrong way. The consequences may be fatal.

6. Ensure that the cables of movable electrical equipment are not tangled or damaged, such as during the vehicle lifting.

7. Ensure that relevant staff have received basic first aid training.

In case of electric shock:

1. Turn off the power supply before touching the victim.

2. If the power supply cannot be turned off, push or drag the victim away from the power supply by using dry insulating materials.

3. If the victim gets into a coma after being away from the power supply, perform correct cardiopulmonary resuscitation immediately.

4. Seek medical advice as soon as possible.

For hybrid and pure electric vehicles, observe the following for operation of high-voltage system:

1. The components of high-voltage system must be maintained by qualified maintenance technicians. Improper maintenance may cause damage to personnel, vehicles or equipment.

2. The high-voltage system is subject to several hundreds of volts or more. During removal and installation of high-voltage components, wear protective articles at all times, such as insulating gloves and shoes.

3. Before repair, removal and installation of high-voltage components, deactivate the high-voltage power supply of the vehicle. Make sure that the negative cable of starter Fe battery has been disconnected, and leave the vehicle standing for more than 5 min.

4. If the maintenance area is close to high-voltage components, turn off the ignition switch/Start switch of the vehicle before maintenance, and leave the vehicle standing for more than 5 min.

5. Do not place the power battery pack near naked flames or heat it.

6. The power battery pack contains acid electrolyte to avoid contact with eyes, skin and clothing. In case of accident, rinse with clean water and seek medical advice immediately.

7. In case of severe collision or waterlogging, the power battery pack may be damaged or the vehicle cannot be driven from the flooded area. Cut off the power supply on the premise of ensuring the safety. Deactivate the high-voltage power supply of the vehicle as appropriate, and disconnect the negative cable of battery (lead-acid battery or starter Fe battery), and take rescue measures as required. Keep a safe distance from the vehicle, and place high-voltage warning signs around the vehicle.

Charging

Electromagnetic radiation will be generated when the vehicle is charged, and the people with cardiac pacemaker or AED shall not get close to the vehicle (including getting in the vehicle and loading/unloading articles in the boot). Ensure that the socket of the charging plug is dry before charging, and the charging connection is not wetted by rainwater or other liquids during charging.

Fire

Many materials related to vehicle maintenance are highly flammable. Some materials will produce poisonous or harmful gases after burning. For storage and disposal of flammable and explosive materials or solvents, strictly observe safety regulations, especially when approaching electrical equipment or performing welding operations. Provide corresponding fire extinguishers for use of welding or heating equipment.

In case of a fire in the vehicle, carry out the following operations provided it is safe to do so:

1. Turn off the ignition switch/Start switch of the vehicle, and look for a dry powder fire extinguisher nearby to put out the naked flame.

2. Immediately call the local rescue centre for rescue.

3. Deactivate the high-voltage power supply of the vehicle as appropriate, and disconnect the negative cable of battery (lead-acid battery or starter Fe battery).

4. If the fire is serious, keep away from the vehicle.

Fire extinguisher

For some highly diffusive gases, such as hydrogen and acetylene gas, it is difficult to dilute the gas in the whole space after using the dry powder fire extinguisher. Dry powder residues will be left in the precision instruments and meters. In these cases, dry powder fire extinguishers are not suitable. Follow the instructions on the fire extinguisher for use. Do not use the fire extinguisher improperly.

Noise

Some operations may generate high noise, so wear appropriate hearing protection equipment. Otherwise, it may cause damage to hearing.

General repair shop tools and equipment

It is important that all tools and equipment are well maintained and safety equipment is correctly equipped as specified. Do not use tools or equipment for purposes other than those as designed. Do not overload equipment such as cranes, jacks, axles and chassis or lifting ropes. Damage due to overload will not be immediately apparent and may cause fatal injury in the future use of the equipment. Do not use damaged or faulty tools or equipment, especially high-speed equipment such as grinders. A damaged grinder may disintegrate at any time, resulting in serious injury.

Wear goggles when using grinders, chisels or sand blasting equipment. Wear an appropriate breathing mask when using sand blasting equipment, handling asbestos-based materials or using spraying equipment. Ensure adequate ventilation to control dust, fumes and gases.

Suspended load

Do not use non-special equipment to lift the vehicle, so as to avoid injury caused by sliding of the vehicle. There is always a risk when the load is lifted or suspended. Do not work under a load without support or suspension or under a lifted load, such as a hoisted powertrain. Ensure that lifting equipment such as lifts, jacks, cranes, axle stands and slings are suitable for the type of work and that they are in good condition and properly maintained.

Warning signs for vehicles, equipment or places

There are warning labels on the surface of some vehicle parts, equipment surfaces and in the display area in some places. Do not remove these warning labels, and make sure that contents on their surfaces are legible and unobstructed. These warning labels are used to remind relevant personnel. If they cannot be seen, these warnings may be ignored, resulting in safety hazards.

Electrical safety

Hazardous current

1. AC above 25 V and DC above 60 V are dangerous.

2. The maximum allowable contact voltage in Germany (according to VDE standard) is 50 V AC and 120 V DC.

3. A current of about 5 mA flowing through the human body can be regarded as an "electrical accident". In this case, the person feels numb, but can still conduct away the current.

4. When the current of about 10 mA flows through the human body, it reaches the limit of conduction current. The human body starts to contract and cannot conduct the current anymore, and the current lasts longer accordingly.

5. Prolonged duration of 0 to 50 mA AC can cause respiratory arrest and ventricular fibrillation.

6. A current of about 80 mA flowing through the human body is considered "lethal".

7. AC voltage produces AC in the human body, which will cause the muscle tissue and heart to fibrillate.

8. The lower the frequency of AC voltage, the higher the risk.

9. AC will cause ventricular fibrillation, which will be fatal in case of no first aid.

Internal resistance of human body

For high current caused by high voltage, as the corresponding resistance in the human body is very low, and the blood in all blood vessels acts as a good conductor, different contact points in electrical accidents have different influences on human body accordingly. The skin resistance varies greatly (depending on skin hardness, humidity, conductivity, etc.). However, for voltages above 100 V, the skin resistance is almost 0 Ω! The skin may be completely punctured. For AC, it is fatal if the current stays in the heart for about 10-15 ms! (ventricular fibrillation).

Electrical accident

Electric shock and accident consequences

Electric shock effect: When the current is lower than the conduction limit, corresponding electric shock response will occur, which may easily cause injuries due to uncontrolled limbs and loss of balance.

Thermal effect: Burns, scorching and internal burns can occur at the current lead-in/lead-out points. As a result, the kidney is overloaded and even fatal injuries occur.

Chemical effect: Blood and cell sap become electrolytes and are electrolysed. Severe poisoning occurs consequently. The poisoning can only be noticed after several days, with serious injury.

Muscle stimulation effect: All body functions and muscle movements are controlled by the brain through electrical stimulation of the nervous system. In case of high current through the body, muscle twitch occurs and the brain cannot control the muscular tissue.

Thermal effect in case of static short circuit: The sudden heating of the tool can cause the material to melt, resulting in burns.

Sparks due to short circuit: The metal melts quickly, generating splashing sparks. The temperature of the splashing metal particles exceeds 5000 °C. It may cause burns and serious injury to eyes.

Arc generated when the live high-voltage line is connected or disconnected: Light radiation may cause electric ophthalmia.

First aid measures for electric shock accidents

The following first aid measures shall be taken to rescue the injured in an electrical accident:

1. Your own safety is the first priority. Do not touch any person who is still in contact with the power supply.

2. If possible, power off the electrical system immediately (turn off the ignition switch).

3. Use non-conductive objects (wooden boards, broom handles, etc.) to separate the injured or conductor from the power supply.

3.1.1.3 Battery safety

Risk identification

The power battery is at risk under the following conditions:

1. The wading depth of the vehicle reaches the sill height with no water inside the vehicle, and the wading time exceeds 30 min.

2. The high- and low-voltage connectors of the vehicle power battery are immersed in water.

3. The power battery of the vehicle is deformed, punctured and leaking liquid after collision.

Risk judgement

It is necessary to use a hand-held infrared thermal imager or an infrared thermometer to measure the highest temperature of the power battery at the first time when the risky vehicle is transported or enters the store. The measuring range of hand-held infrared thermal imager/infrared temperature tester must be -50 °C ~ 380 °C.

1. The temperature of the damaged part of the battery pack is 10°C higher than the ambient temperature or there is a significant temperature rise (2 °C/min) relative to the ambient temperature.

Caution: In this case, it is necessary to cool the battery pack by spraying a large amount of water until the temperature drops below the ambient temperature.

2. The battery tray is seriously deformed (the depression depth of the bearing area is more than 10 mm) and damaged.
3. The battery has been ablated by flame or baked for a long time (distance to flame > 10 cm, duration > 10 min).
4. The battery is ablated by flame with ablation marks and baked closely (distance to flame < 10 cm, duration > 3 min).
5. Electric leakage is reported after wading and the wading time exceeds 30 min.
6. The battery tray is damaged or leaks.

Caution: Any vehicle that meets any of the above conditions is considered a high-risk vehicle.

Risk handling

Transportation of risky vehicle

For vehicles that need to be transported to the store for maintenance, the risk level should be determined according to the risk identification content, and corresponding pre-transportation treatment should be carried out accordingly.

1. For risky vehicles, a hand-held infrared thermal imager or an infrared thermometer must be used to detect the highest temperature of the power battery. Vehicles with no abnormal temperature and not at high-risk level can be normally transported to the store for maintenance.
2. For vehicles with abnormal temperature or at high risk, the battery pack must be cooled by spraying a large amount of water. After fire extinguishing, it is necessary to continuously use water for cooling for more than 30 min until the temperature drops below the ambient temperature before transportation.
3. For batteries with abnormal temperature, the temperature should be measured every 5 min during transportation to determine whether cooling is required. For high-risk vehicles with no abnormal temperature, the temperature should be measured every 10 min during transportation to determine whether cooling is required.

Disposal of risky vehicles

After a risky vehicle arrives at the service centre, the risk level of the vehicle should be determined according to the risk identification content, and the vehicle shall be treated accordingly.

1. For risky vehicles, a hand-held infrared thermal imager or an infrared thermometer must be used to detect the highest temperature of the power battery. Vehicles with no abnormal temperature and not at high-risk level should be repaired normally according to the Service Manual, but the battery temperature must be detected every 1 h during the repair. If there is no abnormality for 12 h, it can be determined that the battery has no risk.
2. For vehicles with abnormal temperature or at high risk, the battery pack must be cooled by spraying a large amount of water until the temperature drops below the ambient temperature before the next step. The specific operation is as follows:

   1. If a vehicle with abnormal temperature arrives at the service centre, it should be cooled down (and the low-voltage power supply of the vehicle should be disconnected at the same time) to below the ambient temperature immediately before the next step.

   After a vehicle with abnormal temperature cools down or for a high-risk vehicle, it is necessary to remove the battery pack as soon as possible following the "Safe Repair" in Chapter III Safety. In addition, the power battery temperature must be monitored throughout the whole process. For abnormal temperature rise, a large amount of water shall be used for cooling.

   3. After being removed, the power battery should be moved to a safe area immediately to remove the sealing cover (cut the adhesive sealing cover directly with a knife, and please pay attention to avoid scratching personnel), and the connecting plates between all modules and BIC connectors should be disconnected quickly with electric insulating tools.

   4. All deformed and heating modules should be taken out separately and soaked in 3.6% salt water. During the soaking process, a large amount of hydrogen and oxygen will be generated by electrolysis, and the soaking place must be far away from fire sources and well-ventilated. Operators shall not wear any metal accessories to avoid sparks during operation, and

shall pay attention to avoid static electricity generation in dry environment. Water spraying method can be used to eliminate static electricity generation. After being placed in 3.6% salt water for 12 h, the module voltage is measured to be lower than 1/2 of the nominal voltage, and then the module is dried with an air gun before being moved to the high-risk battery storage area. All other modules are lifted out of the tray synchronously and dried with an air gun. After being put back into the tray, they are transferred to the high-risk battery storage area and discharged to 5% SOC by discharging equipment.

5. In case of water immersion, damage and heating of the sampling circuit, the side cover of each module shall be opened and all core sampling circuits shall be cut off (the part close to the core is cut off by 1 cm to prevent contact again). This operation is only applicable to batteries with centralised BMS using wires as sampling circuit. For batteries with distributed BMS using FPC sampling circuit, there is no need to cut off the sampling circuit.

6. Maintenance after battery disassembly. See Safe Repair.

Storage and transportation of high-risk batteries

Storage conditions

The storage area for high-risk batteries shall meet the following requirements:

1. The stored high-risk batteries must be discharged and dried, and the batteries with various risk modes shall be stored in different categories in the storage area, which are divided into Class A - accident, Class B - soaking in water, Class C - abnormal voltage collection, Class D - high temperature and Class E - electric leakage, and relevant information labelling (vehicle information, fault conditions, etc.) shall be done. Leaking batteries shall be stored after being packed with anti-corrosion and leakage prevention treatment. There shall be no other live products or metal debris in the storage site.
2. The storage site is a separate storage area for dangerous batteries, which shall be far away from the production area and provided with warning signs such as "High Voltage" and "WARNING". No other materials or personnel are allowed to approach the site. The site needs to be provided with basic monitoring facilities and be inspected regularly. After the power battery enters the storage area, if it needs to be returned to the manufacturer, the battery should be packed well, and the claim label information shall be accurate and firmly affixed to ensure the traceability of the battery return. It is forbidden to store the battery with other liquids, inflammables, explosives, and hazardous chemicals.
3. It is not allowed to stack batteries. Multi-layer shelves made of steel can be used (the bearing weight of each layer shall be greater than twice the battery limited storage weight, and the shelf shall be clearly marked with the limited bearing capacity). In addition, the batteries shall be placed horizontally rather than obliquely, inverted or in a sleeper position, and other objects shall not be piled up on the batteries to avoid damage to the batteries caused by compression.
4. The storage environment shall be kept ventilated and dry, and shall avoid direct sunlight, exposure to the sun or rain. Dust-proof, waterproof and anti-static protection measures shall be taken. The storage temperature of batteries shall be within -20 ° C - 40 °C and the humidity shall be within 5 - 90%.
5. The storage area shall be equipped with fire-fighting facilities such as smoke alarm, automatic sprinkler system and automatic smoke exhaust system (it should be equipped with an infrared temperature monitoring system at the same time to realise remote alarm in case of abnormal temperature).

Transportation conditions

The transportation of high-risk batteries shall meet the following requirements:

1. The high-risk batteries to be transported must be those that have been discharged and dried without abnormal temperature rise for 24 h.
2. Protective packaging (waterproof, moisture-proof, anti-static and anti-corrosion) shall be used for high-risk batteries to be transported.
3. Loading environment: The road shall be unobstructed, and direct sunlight shall be avoided within the scope of loading activities. Inflammables, explosives, and hazardous chemicals are not allowed. Water and other liquids shall be prevented from entering the battery. Outdoor loading shall be suspended in case of severe weather such as rain.

4. Requirements for handling equipment: Professional equipment and tools, such as electric forklifts, manual forklifts with suitable carrying capacity or other suitable equipment, shall be used to handle and place the power batteries, so as to avoid damage to the power batteries during handling.

5. Requirements for transport vehicles: High-risk batteries shall be transported in closed compartments to prevent water from entering the battery due to rain during transportation. The power battery needs to be transported separately. If other objects need to be loaded on the transport vehicle, it is forbidden to transport them together with liquids, inflammables, explosives and hazardous chemicals.

6. Loading process: When the power battery is handled with equipment, professionals shall operate the equipment and handle the battery gently; throwing, rolling and heavy pressure are strictly prohibited. The packaged power batteries shall be loaded from the warehouse. It is not allowed to stack them halfway or on transport vehicles, making the power batteries bear heavy pressure.

7. Land transportation: During transportation, squeezing and collision between batteries or between the battery and the transport vehicle body due to sudden braking shall be avoided; during transportation, the storage temperature of power batteries shall be at -20 °C~45 °C, the humidity shall be 5~95%, and the time shall be within 72 h. If it exceeds the time limit, special treatment shall be carried out to control the temperature and humidity and ensure that the products are not exposed to water or sunlight.

8. Sea and air transportation: Specialised packaging certified for hazardous materials must be used for sea and air transportation, and ordinary packaging is not allowed. Packages for air transportation shall meet MH/T1020-2009 standard and pass UN38.3 test. The ambient temperature around the power battery package box shall not exceed 45℃, and the product must be kept away from water or sunlight.

9. Handling of land transportation emergencies:

   1. If the power battery leaks, stop the transportation and contact BYD's relevant after-sales personnel for handling. If the electrolyte of the power battery splashes on the skin and eyes, please rinse it with plenty of clean water for more than 15 min immediately, and then go to hospital for medical treatment.

   2. When the power battery catches fire, please use a non-water based fire extinguisher to put out the fire. In case of a large fire, put out the fire with plenty of water and keep cooling for 30 min after putting out the fire.

   3. During transportation, if the battery package box is accidentally wetted by water, remove it immediately to prevent the wetted box from becoming a conductor and causing battery discharge or burning of battery terminals.

   4. In case of collision, severe squeezing and other situations during transportation of the power battery, stop transportation and continue after potential safety hazards are eliminated by professionals.

10. Requirements for unloading process: The unloading environment and equipment shall be consistent with those for loading. The unloading storage site shall be free of direct sunlight, and the distance from heat source shall not be less than 2 m; before unloading, check the power battery package box for damage on the transport vehicle. When unloading, pay attention to the height of the compartment to prevent the battery from being damaged due to collision with the compartment caused by excessive lifting of the forklift.

3.2 Electric drive axle

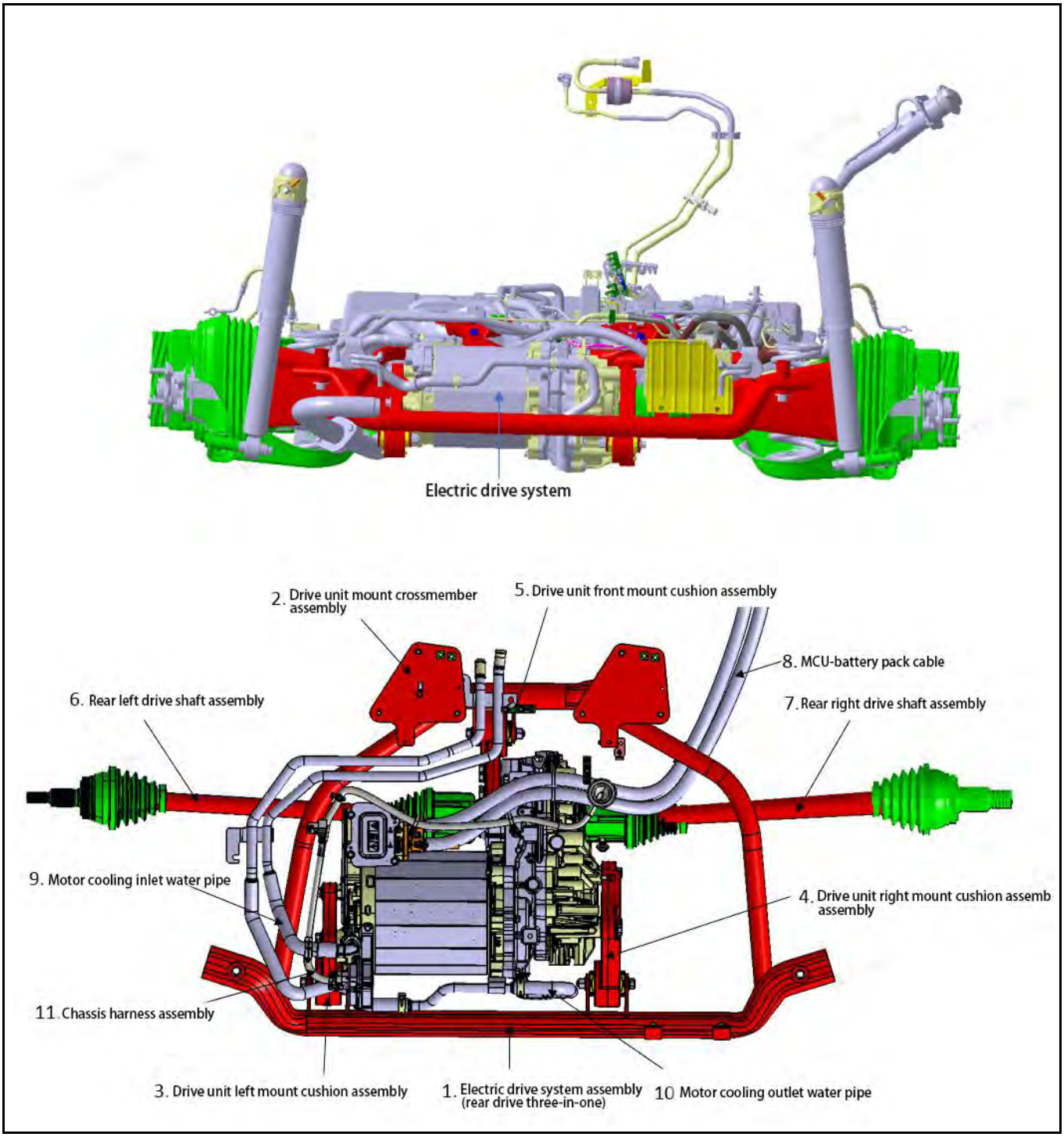
3.2.1 Specification

3.2.1.1 General specifications

Name/Name	Parameter Value
Continuous power (kW)	55kw
Peak power (kW)	120kw
Continuous torque (N·m)	105
Peak torque (Nm)	240
Continuous speed (rpm)	5029
Maximum working speed (rpm)	16000
Cooling mode	Water-cooled
Gear ratio	12.573
Lubricating oil volume	0.8L±0.1L
Lubricating oil type	Castrol BOT 384

3.2.2 Operation and Instructions

3.2.2.1 Electric drive axle



S/N	Part Name
1	Electric drive system assembly (rear drive three-in-one)
2	*Drive unit mount crossmember assembly
3	*Drive unit left mount cushion assembly
4	*Drive unit right mount cushion assembly
5	*Drive unit front mount cushion assembly
6	*Rear left drive shaft assembly

7	*Rear right drive shaft assembly
8	*MCU-battery pack cable
9	*Motor cooling inlet water pipe
10	*Motor cooling outlet water pipe
11	*Chassis harness assembly

Note: Components marked with "*" indicate components not composed of this electric drive system assembly.

3.2.2.2 Precautions

1. Before removing or installing the electric drive system assembly, be sure to read the relevant instructions and wear labor protection equipment to prevent irreversible consequences and losses.
2. Do not disassemble or reassemble the electric drive system assembly without permission. Do not replace the electric drive system assembly with one from another manufacturer or another model. Do not replace any parts of the original electric drive system assembly.
3. When removing and installing the electric drive system assembly, please remove the key and disconnect the 12V battery negative GND wire.
4. Before maintenance, make sure the electric drive axle assembly is reliably connected to GND.
5. Decomposition and disassembly of parts and components of the electric drive system assembly are prohibited during maintenance.
6. During maintenance, maintenance personnel must not touch the high-voltage part of the system directly with their hands to avoid personal danger.

3.2.3 Diagnosis and testing

3.2.3.1 DTC List of SX5G-2151010 E-drive system assembly (120kW)

DTC	DTC Meaning/Description DTC**Meaning/Description**	Detection and Condition **Fault detection conditions**
B330100	Overvoltage drop power of DC bus	Bus voltage exceeds 510V
B330200	DC bus overvoltage fault	Bus voltage exceeds 525V
B332400	Hardware overvoltage fault	Bus voltage exceeds 560V
B330300	Undervoltage drop power of DC bus	Bus voltage <220V
B330400	DC bus undervoltage fault	Bus voltage <200V
B333800	Three-phase overcurrent fault	The peak current exceeds 830A
B332600	Three-phase overcurrent detected by hardware	The peak current exceeds 890A
B330900	IGBT upper bridge arm fault	Hardware fault signal of IGBT driver chip
B331000	IGBT lower bridge arm fault	Hardware fault signal of IGBT driver chip
B337600	Driver board fault	Hardware fault signal of IGBT driver chip
B336000	Three-phase current unbalanced	No current in a phase
B335300	Current sensor zero drift fault	Current Hall 0 current sampling value deviation 110A
B335400	MCU torque offset out of range	VCM input torque exceeds maximum torque for 100 cycles
B335600	Resolver signal attenuation	Hardware fault of resolver decoding chip
B335700	Abnormal resolver signal tracking	Hardware fault of resolver decoding chip
B335800	Loss of resolver signal	Hardware fault of resolver decoding chip
B334400	Motor overspeed alarm	Discharge time exceeds 5 minutes
B334500	Motor overspeed power reduction	The resolver decoding chip has a hardware fault signal
B334600	Motor overspeed fault	The resolver decoding chip has a hardware fault signal
B333100	MCU sub-processor fault	VCU input torque exceeds the maximum torque
B333400	12V battery voltage out of range	The power supply voltage is less than 9V or greater than 17V
B333700	5V voltage out of range	5V voltage exceeds 5.6V or is less than 4.4V
B330600	IGBT overtemperature	NTC temperature exceeds 100°C

B330500	Over-temperature drop power of IGBT	NTC temperature exceeds 85°C
B331200	Abnormal IGBT temperature signal	The temperature exceeds 120°C
B337100	IGBT junction overtemperature	IGBT temperature exceeds 135°C
B337200	IGBT junction overtemperature power reduction	IGBT temperature exceeds 125°C
B333900	Power reduction due to motor temperature too high	Motor temperature exceeds 130°C
B334000	Motor overtemperature	Motor temperature exceeds 155°C
B334100	Drive motor temperature signal short-circuited to GND	Sampling value <0.066V
B334200	Drive motor temperature signal open-circuited	Sampling value 2.97V
B336100	Estop (emergency stop)	VCM sends ESTOP signal
B335000	Active discharging fault	The discharge time exceeds 3s
B335100	Passive discharge fault	Discharge time exceeds 2 minutes
U014000	Loss of communication with BCM	BCM message cannot be received for more than 10 times
U012200	VCM (vehicle control unit) communication lost	Signal lost for more than 100 ms
B336200	VCM verification failed	The check code is wrong for more than 10 times
B336300	VCM Frame Counter error	Message lost
U007300	CAN bus off	1. 1.5s after network wake-up 2. Battery voltage is normal (9V~16V) or 500ms after battery voltage abnormality is recovered 3.85 02 is not activated 4. It is judged that 3 faults are reported
U011100	Lost communication with BMS	When the 0x238 message has no signal for 10 consecutive signal cycles
B337700	Loss of communication with EHB	Conditions A, B and C are in OR relationship: ABS1 (0x200) message is lost for 10 cycles; APB1(0x163) message is lost for 10 cycles; ESP1 (0x153) message is lost for 10 cycles;

3.2.3.2 Fault diagnosis 10: MCU torque offset is out of range

Cause

Occurs when VCM input torque exceeds maximum torque

A. VCM torque command is abnormal;

B. Abnormal MCU torque processing;

Measures

A. Use a diagnostic scanner to check whether the VCM has CAN communication faults. If so, replace the VCM

B. If the MCU torque offset is out of range, an irreparable fault will occur inside the electric drive system assembly. Remove the electric drive system assembly (refer to Chapter 5) and return it to the factory for repair or replacement;

C. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.3 Fault diagnosis 11: Resolver signal attenuation

Cause

Occurs when the resolver signal of the electric drive system assembly is distorted

A. The motor resolver may be damaged

B. Internal fault of electric drive axle assembly

Measures

A. If there is a resolver signal attenuation fault, an irreparable fault will occur inside the electric drive axle assembly. Remove the electric drive system assembly (refer to Chapter 5) and return it to the factory for repair or replacement;

B. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.4 Fault diagnosis 12: Abnormal resolver signal tracking

Cause

Occurs when the resolver signal of the electric drive system assembly is distorted

A. The motor resolver may be damaged

B. Internal fault of electric drive system assembly

C. Abnormal resolver signal

Measures

A. If the resolver signal tracking is abnormal, an irreparable fault will occur inside the electric drive system assembly. Remove the electric drive axle assembly (refer to Chapter 5) and return it to the factory for repair or replacement;

B. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.5 Fault diagnosis 13: Motor overspeed alarm/motor overspeed power reduction/motor overspeed fault

Cause

Occurs when the motor speed is greater than the set value.

A. The assembly load is small, and the speed rises higher after the throttle is applied

B. Abnormal fault of motor body

C. Abnormal control due to abnormal state of MCU

Measures

A. Ask the driver if the driving speed exceeds 180 km/h or excessive sliding occurs. In this case, the normal protection logic is executed and it means that the electric drive axle assembly is normal.

B. For reasons B and C, the electric drive system assembly needs to be disassembled (refer to Chapter 5) and returned to the factory for repair or replacement;

C. After the fault is eliminated, when the vehicle stops and the accelerator pedal is not pressed, use a diagnostic scanner to read whether the data flow motor speed (Motor Speed) value is within the range of -10 ~ 10 rpm.

3.2.3.6 Fault diagnosis 14: Cause of MCU sub-processor failure

Cause

A. The sub-processor chip application is accidentally erased;

B. The sub-processor chip is seriously interfered with or damaged, resulting in abnormal operation;

Measures

A. If cause A occurs, refresh the programme. If the fault is eliminated, it can continue to be used. If the fault cannot be eliminated, disassemble the electric drive axle assembly (refer to Chapter 5) and return it to the factory for repair or replacement;

B. If cause B occurs, an irreparable fault has occurred inside the electric drive axle assembly; disassemble the electric drive axle assembly (refer to Chapter 5) and return it to the factory for repair or replacement;

C. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.7 Fault diagnosis 15: 12V battery voltage is out of range

Cause

Occurring when the low voltage of the connected low-voltage battery is greater than or less than the set value.

A. The low-voltage battery or DCDC may be abnormal;

B. Low-voltage cables and connectors may be damaged;

C. Internal fault of electric drive axle assembly;

Measures

A. Vehicle flameout (vehicle in LOCK state);

B. Check whether the data flow (Operating voltage value) of electric drive axle assembly is 0 V with a diagnostic scanner;

C. Open the vehicle bonnet to detect the low-voltage battery voltage. If the detected value exceeds the normal range, replace the low-voltage battery according to reason A;

D. Turn on the vehicle power supply and check the DCDC DTC. If there is any abnormality, replace the DCDC according to reason A;

E. After the vehicle is turned off, unplug the low-voltage connector at the electric drive axle assembly end and replace the low-voltage cable;

F. After replacing the cable, if the electric drive axle assembly still fails, disassemble it according to reason C (refer to Chapter 5) and return it to the factory for repair or replacement;

G. After the fault is eliminated, finally confirm whether the 12V power supply voltage (Operating voltage value) of the electric drive axle assembly diagnostic data flow is within the range of 9~16V.

3.2.3.8 Fault diagnosis 16: 5V voltage out of range

Cause

Occurs when the CPU power supply (5V) in the electric drive system assembly exceeds the set range

A. The supply voltage is out of range;

B. There is a fault in the 5V voltage regulator circuit;

Measures

A. Use the diagnostic scanner to check whether there is a 12V battery overvoltage/12V battery undervoltage fault. If there is, replace the battery or DCDC according to reason A;

B. In addition, the electric drive system assembly shall be disassembled according to reason B (refer to Chapter 5) and returned to the factory for repair or replacement.

3.2.3.9 Fault diagnosis 17: IGBT overtemperature power reduction/IGBT overtemperature fault

Cause

When the inferred IGBT temperature is greater than the set value.

A. Abnormal cooling system (pump, coolant channel, etc.)

B. Internal fault of electric drive axle assembly

Measures

A. Keep the vehicle in flameout state for 30 minutes. After restarting, use a diagnostic scanner to check whether the IGBT temperature value of E-drive assembly data flow is close to the actual coolant temperature; If it is, check the cooling system according to reason Confirm whether the coolant pump is operating incorrectly or whether there are foreign objects in the coolant pipe, and then repair the cooling system;

B. For others, disassemble the electric drive system assembly according to reason B (refer to Chapter 5) and return it to the factory for repair or replacement;

C. After the fault is removed, use a diagnostic scanner to check whether the IGBT temperature value of E-drive assembly data flow is close to the actual coolant temperature.

3.2.3.10 Fault diagnosis 18: IGBT temperature signal abnormal

Cause

A. The IGBT temperature sensor connector in the controller is abnormal;

B. Temperature sensor abnormal;

Measures

A. If the IGBT temperature signal is abnormal, remove the electric drive system assembly (refer to Chapter 5) and return it to the factory for repair or replacement;

B. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.11 Fault diagnosis 19: IGBT junction overtemperature power reduction/IGBT junction overtemperature

Cause

When the inferred IGBT temperature is greater than the set value.

A. Abnormal cooling system (pump, coolant channel, etc.)

B. Internal fault of electric drive axle assembly

Measures

A. Keep the vehicle in flameout state for 30 minutes. After restarting, use a diagnostic scanner to check whether the IGBT temperature value of electric drive axle assembly data flow is close to the actual coolant temperature. If it is, check the cooling system according to reason Confirm whether the coolant pump is operating incorrectly or whether there are foreign objects in the coolant pipe, and then repair the cooling system;

B. For others, disassemble the electric drive system assembly according to reason B (refer to Chapter 5) and return it to the factory for repair or replacement;

C. After the fault is removed, use a diagnostic scanner to check whether the IGBT temperature value of E-drive assembly data flow is close to the actual coolant temperature.

3.2.3.12 Fault diagnosis 1: DC bus overvoltage power reduction/DC bus overvoltage fault

Cause

Occurring when the high voltage connected to the high-voltage battery is greater than the set value.

A. Abnormal high voltage may occur in the battery pack;

B. The high-voltage detection circuit in the electric drive axle assembly may have a problem;

Measures

A. Check whether the battery pack is normal. Refer to the Service Manual "Battery Pack" for relevant content on abnormal battery packs;

B. When the vehicle is powered up to high voltage, use a diagnostic scanner to read whether the data flow input voltage value (High voltage) in the E-drive assembly diagnosis procedure is within the working range. If it is out of range, disassemble the electric drive axle assembly according to reason B (refer to Chapter 5) and return it to the factory for repair or replacement;

C. After the fault is removed, check whether the data flow input voltage value (High voltage) of E-drive assembly is 0V in LOCK state. After high-voltage power-on, finally confirm whether the data flow input voltage value (Highvoltage) of electric drive axle assembly is within 240~450 V.

3.2.3.13 Fault diagnosis 20: Motor overtemperature power reduction/motor overtemperature fault

Cause

Occurring when the motor temperature is greater than the set value.

A. The motor continues to run in a stalled state;

B. Abnormal cooling system (pump, coolant channel);

C. The motor temperature sensor may be damaged;

D. Internal fault of E-drive assembly;

Measures

A. Confirm with the driver whether the vehicle continues to run in a stalled state, because normal protection logic will be activated in this case, so the electric drive system assembly is normal;

B. Maintain the vehicle in a flameout state for 30 minutes. After restarting, use a diagnostic scanner to check whether the data flow motor temperature value (Motor Temperature) is close to the actual coolant temperature. If it is, check the cooling system according to reason Check whether the coolant pump is operating incorrectly or whether there are foreign objects in the coolant pipe, and then repair the cooling system;

C. For others, disassemble the electric drive system assembly according to reason D (refer to Chapter 5) and return it to the factory for repair or replacement of the electric drive system assembly;

D. After the fault is cleared, use a diagnostic scanner to check whether the motor temperature value of the electric drive system assembly data flow (Motor Temperature) is close to the actual coolant temperature.

3.2.3.14 Fault diagnosis 21: Drive motor temperature signal short-circuited to GND

Cause

Occurs when the motor temperature sensor is abnormal.

A. The motor temperature sensor may be damaged

B. The temperature sensor circuit in the electric drive axle assembly may be damaged

Measures

A. If the drive motor temperature signal short-circuited to GND occurs, an irreparable fault will occur inside the electric drive system assembly; disassemble the electric drive system assembly (refer to Chapter 5) and return it to the factory for repair or replacement of the electric drive axle assembly;

B. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.15 Fault diagnosis 22: Drive motor temperature signal open circuit

Cause

Occurs when the motor temperature sensor is abnormal.

A. The motor temperature sensor may be damaged

B. The temperature sensor circuit in the electric drive system assembly may be damaged

Measures

A. If a drive motor temperature signal open circuit fault occurs, an irreparable fault will occur inside the electric drive system assembly; disassemble the electric drive system assembly (refer to Chapter 5) and return it to the factory for repair or replacement of the electric drive system assembly;

B. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.16 Fault diagnosis 23: Active discharge fault

Cause

After the power battery is disconnected, the electric drive system assembly fails to discharge the supporting capacitor voltage to within 60V for more than 3s

A. Abnormal VCU discharging command;

B. The main circuit contactor is stuck;

C. Discharge timeout;

D. The motor speed exceeds 100Rpm during discharge;

E. The motor coil is abnormal;

F. Internal fault of electric drive axle assembly

Measures

A. Shut down the vehicle;

B. Use a diagnostic scanner to check whether the data flow (High voltage) value of the electric drive system assembly is 0V. If the voltage remains constant above 200V, it is determined that the battery pack relay is stuck. For relevant content about battery pack abnormalities, refer to the Service Manual "Battery Pack";

C. Use a diagnostic scanner to check whether the VCM has CAN communication faults. If so, replace the VCM;

D. For others, disassemble the electric drive system assembly according to reason F (refer to Chapter 5) and return it to the factory for repair or replacement of the electric drive system assembly;

E. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.17 Fault diagnosis 24: Passive discharge fault

Cause

After the power battery is disconnected, the electric drive system assembly fails to discharge the supporting capacitor voltage to within 60V for more than 2 min

A. The main circuit contactor is stuck;

B. Internal fault of electric drive axle assembly

Measures

A. Shut down the vehicle.

B. Use a diagnostic scanner to check whether the data flow (High voltage) value of the electric drive axle assembly is 0V. If the voltage remains constant above 200V, it is determined that the battery pack relay is stuck. For information related to battery pack abnormalities, refer to the Service Manual "Battery Pack";

C. For others, disassemble the electric drive system assembly according to reason B (refer to Chapter 5) and return it to the factory for repair or replacement;

D. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.18 Fault diagnosis 25: VCM (vehicle control mould) communication lost

Cause

A. Occurring when communication with VCM cannot be achieved for a certain period of time

B. Possibility of VCM fault

C. LVIO cable may be disconnected

D. The CAN communication circuit inside the electric drive system assembly is damaged

Measures

A. Check the VCM for CAN communication faults. In case of failure, replace the VCM for reason A;

B. Shut down the vehicle;

C. Use a diagnostic scanner to check whether the data flow (High voltage) value of the electric drive system assembly is 0 V;

D. Unplug the low-voltage connector and replace the low-voltage cable;

E. For others, disassemble the electric drive system assembly according to reason C (refer to Chapter 5) and return it to the factory for repair or replacement of the electric drive system assembly;

F. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.19 Fault diagnosis 26: VCMFrameCounter error

Cause

Occurring when VCM verification mismatch happens.

A. Possibility of VCM fault

B. The low-voltage harness may be broken

C. The internal circuit of the electric drive system assembly is damaged

Measures

A. Check whether the VCM has CAN-related faults. In case of failure, replace the VCM for reason A;

B. Shut down the vehicle;

C. Use a diagnostic scanner to check whether the data flow (High voltage) value of the electric drive system assembly is 0 V;

D. Unplug the low-voltage connector and replace the low-voltage harness;

E. For others, disassemble the electric drive system assembly according to reason C (refer to Chapter 5) and return it to the factory for repair or replacement of the electric drive system assembly;

F. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.20 Fault diagnosis 27: VCM verification failure

Cause

Occurring when VCM verification mismatch happens.

A. Possibility of VCM fault

B. The low-voltage harness may be broken

C. The internal circuit of electric drive axle assembly is damaged

Measures

A. Check whether the VCM has CAN-related faults. In case of failure, replace the VCM for reason A;

B. Shut down the vehicle;

C. Use a diagnostic scanner to check whether the data flow (High voltage) value of the electric drive system assembly is 0 V;

D. Unplug the low-voltage connector and replace the low-voltage harness;

E. For others, disassemble the electric drive system assembly according to reason C (refer to Chapter 5) and return it to the factory for repair or replacement of the electric drive system assembly;

F. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.21 Fault diagnosis 28: CAN bus shutdown

Cause

Occurring when the number of CAN errors detected by electric drive axle assembly is greater than the set value

A. VCM fault possibility;

B. Low-voltage cables may be damaged;

C. The low-voltage connector may be damaged;

D. CAN communication circuit fault inside the electric drive system assembly;

Measures

A. Check the VCM for CAN communication faults. In case of failure, replace the VCM for reason A;

B. Shut down the vehicle;

C. Use a diagnostic scanner to check whether the data flow input voltage (High voltage) of the electric drive axle assembly is 0 V;

D. Unplug the low-voltage connector and replace the low-voltage cable;

E. Disassemble the electric drive system assembly (refer to Chapter 5), and return it to the factory for repair or replacement of the electric drive system assembly;

F. After the fault is cleared, confirm whether normal communication can be achieved when the vehicle warning light is not on.

3.2.3.22 Fault diagnosis 29: loss of communication with BMS

Cause

Occurring when communication with BMS fails for a certain period of time

A. Possibility of BMS fault

B. Low-voltage cables may be disconnected

C. The CAN communication circuit inside the electric drive system assembly is damaged

Measures

A. Check the BMS for CAN communication fault. In case of failure, replace the BMS due to reason A;

B. Shut down the vehicle;

C. Use a diagnostic scanner to check whether the data flow (High voltage) value of the electric drive system assembly is 0 V;

D. Unplug the low-voltage connector and replace the low-voltage cable;

E. For others, disassemble the electric drive system assembly according to reason C (refer to Chapter 5) and return it to the factory for repair or replacement of the electric drive system assembly;

F. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.23 Fault diagnosis 2: Hardware overvoltage fault

Cause

Occurring when the high voltage connected to the high-voltage battery is greater than the set value.

A. Power battery overvoltage;

B. Bus voltage oscillation;

C. Abnormal voltage detection;

Measures

A. Check whether the battery pack is normal. Refer to the Service Manual "Battery Pack" for relevant information on abnormal battery packs;

B. When the vehicle is powered up to high voltage, use a diagnostic scanner to read whether the data flow input voltage value (High voltage) in the diagnosis procedure of electric drive axle assembly is within 240~450 V. If it exceeds the range, disassemble the electric drive axle assembly according to reason B (refer to Chapter 5) and return it to the factory for repair or replacement;

C. After the fault is eliminated, check whether the data flow input voltage value (High voltage) of the electric drive axle assembly is 0V in the LOCK state. After high-voltage power-on, finally confirm whether the data flow input voltage value (Highvoltage) of electric drive axle assembly is within 240~450 V.

3.2.3.24 Fault diagnosis 3: DC bus undervoltage drop power/DC bus undervoltage fault

Cause

Occurs when the high voltage of the connected high-voltage battery is less than the set value.

A. Abnormal high voltage may occur in the battery;

B. The high-voltage detection circuit in the electric drive axle assembly may have a problem;

Measures

A. Check whether the battery pack is normal. Refer to the Service Manual "Battery Pack" for relevant information on abnormal battery packs;

B. When the vehicle is powered up to high voltage, use a diagnostic scanner to read whether the data flow input voltage value (High voltage) in the diagnosis programme of electric drive axle assembly is within the working range. If it is out of range, disassemble the electric drive axle assembly according to reason B (refer to Chapter 5) and return it to the factory for repair or replacement;

C. After the fault is eliminated, check whether the data flow input voltage value (High voltage) of the electric drive axle assembly is 0V in the LOCK state. After high-voltage power-on, finally confirm whether the data flow input voltage value (Highvoltage) of electric drive axle assembly is within 240~450 V.

3.2.3.25 Fault diagnosis 4: Three-phase overcurrent/hardware detection three-phase overcurrent

Cause

Occurring when the motor 3-phase current is greater than the set value.

A. Overload operation;

B. Abnormal current detection;

C. Hall or detection circuit is disturbed or abnormal;

D. Hall offline or abnormal;

E. Abnormal resolver signal;

F. The controller hardware protection circuit is seriously disturbed;

Measures

A. If a three-phase overcurrent/hardware detection three-phase overcurrent fault occurs, an irreparable fault has occurred inside the electric drive system assembly; disassemble the electric drive axle assembly (refer to Chapter 5) and return it to the factory for repair or replacement;

B. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.26 Fault diagnosis 5. IGBT upper bridge arm fault

Cause

If the electric drive axle assembly has irreparable faults, it must be handed over to professional controller maintenance personnel for inspection and repair. Unauthorized repairs are not allowed. Occurring when an abnormality occurs in the electric drive axle assembly circuit connected to the IGBT:

A. IGBT hardware is damaged;

B. Abnormal drive upper axle chip;

C. The upper bridge drive power supply is abnormal;

D. The error signal is interfered with;

Measures

A. Use the UDS diagnostic scanner to clear the fault. After powering off, turn the key to IGN ON to confirm whether the fault recurs;

B. If there is no fault, it is an interference error signal;

C. If the fault recurs, it indicates that there is an irreparable fault in the electric drive system assembly. Remove the electric drive axle assembly (refer to Chapter 5) and return it to the factory for repair or replacement;

D. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.27 Fault diagnosis 6: IGBT lower bridge arm fault

Cause

If the electric drive system assembly has irreparable faults, it must be handed over to professional controller maintenance personnel for repair. Unauthorised repairs are not allowed. Occurring when an abnormality occurs in the electric drive axle assembly circuit connected to the IGBT:

A. IGBT hardware is damaged;

B. The drive lower bridge chip is abnormal;

C. The lower bridge drive power supply is abnormal;

D. The error signal is interfered with;

Measures

A. Use the UDS diagnostic scanner to clear the fault. After powering off, turn the key to IGN ON to confirm whether the fault recurs;

B. If there is no fault, it is an interference error signal;

C. If the fault recurs, it indicates that there is an irreparable fault in the electric drive system assembly. Remove the electric drive system assembly (refer to Chapter 5) and return it to the factory for repair or replacement;

D. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.28 Fault diagnosis 7: Drive board fault

Cause

If the electric drive axle assembly has irreparable faults, it must be handed over to professional controller maintenance personnel for inspection and repair. Unauthorized repairs are not allowed. Occurring when an abnormality occurs in the electric drive axle assembly circuit connected to the IGBT:

A. IGBT hardware is damaged;

B. Any chip of the drive axle is abnormal;

C. The drive power supply of the upper or lower bridge is abnormal;

D. The error pin level is seriously disturbed;

Measures

A. Use the UDS diagnostic scanner to clear the fault. After powering off, turn the key to IGN ON to confirm whether the fault recurs;

B. If there is no fault, it is an interference error signal;

C. If the fault recurs, it indicates that there is an irreparable fault in the electric drive system assembly. Remove the electric drive system assembly (refer to Chapter 5) and return it to the factory for repair or replacement;

D. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.29 Fault diagnosis 8: Three-phase current imbalance fault

Cause

Occurs when there is no current in a phase.

A. The three-phase circuit of the controller or motor is abnormal;

B. Abnormal current detection;

Measures

A. If a three-phase current imbalance fault occurs, an irreparable fault will occur inside the electric drive system assembly. Remove the electric drive system assembly (refer to Chapter 5) and return it to the factory for repair or replacement;

B. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.30 Fault diagnosis 9: Current sensor zero drift fault

Cause

A. Hall anomaly;

B. The current sampling circuit is abnormal;

C. The Hall harness is damaged or abnormal;

Measures

A. If the current sensor zero drift fault occurs, an irreparable fault will occur inside the electric drive system assembly. Remove the electric drive system assembly (refer to Chapter 5) and return it to the factory for repair or replacement;

B. After the fault is eliminated, confirm whether it can be driven normally when the vehicle warning light is not turned on.

3.2.3.31 Diagnosis and testing

Electric drive axle assembly

Inspection and confirmation

1.Confirm the issues raised by customers.

2. Perform a visual inspection of the vehicle to determine if there are obvious signs of electrical damage.

3. The found problems should be solved before performing the next inspection.

4. If the cause cannot be determined by appearance, confirm the symptom first and then check according to the symptom table.

3.2.3.32 Diagnosis and testing

Electric drive axle assembly

Appearance Checklist

Electrical
• Fuse
• Harness
• Junction box
• Switch
• Battery

3.2.3.33 Symptoms of Electric Drive Axle Assembly

Symptoms	Possible cause	Measures
DC bus overvoltage power reduction/ DC bus overvoltage fault	Occurring when the high voltage connected to the high-voltage battery is greater than the set value. Abnormal high voltage may occur in the battery pack; The high-voltage detection circuit in the electric drive axle assembly may have a problem;	Refer to: Battery (414-01 battery, bracket and cable, diagnosis and testing). Refer to: Wiper and Washer (501-16 Wiper and washer, diagnosis and testing).
DC bus overvoltage power reduction/ DC bus overvoltage fault	Occurring when the high voltage connected to the high-voltage battery is greater than the set value. Abnormal high voltage may occur in the battery pack; The high-voltage detection circuit in the electric drive axle assembly may have a problem;	1. Check whether the battery pack is normal. Read the "Battery Pack" diagnosis and testing in detail; 2. When the vehicle is powered up to high voltage, use a diagnostic scanner to read whether the data flow input voltage value (High voltage) in the diagnosis program of electric drive axle assembly is within 240~450 V. If it is out of range, disassemble the electric drive axle assembly according to reason B and return it to the factory for repair or replacement; 3. After the fault is eliminated, check whether the data flow input voltage value (High voltage) of the electric drive axle assembly is 0V in the LOCK state. After high-voltage power-on, finally confirm whether the input voltage value (High voltage) of electric drive axle assembly data flow is within 240~450 V.

Hardware overvoltage fault	Occurring when the high voltage connected to the high-voltage battery is greater than the set value. Power battery overvoltage; Bus voltage oscillation; Abnormal voltage detection;	1. Check whether the battery pack is normal. Refer to the diagnosis and test of Battery Pack for details; 2. When the vehicle is powered up to high voltage, use a diagnostic scanner to read whether the data flow input voltage value (High voltage) in the electric drive axle assembly diagnostic procedure is within 240~450 V. If it exceeds the range, disassemble the electric drive axle assembly according to reason B, return it to the factory for repair or replace it; 3. After the fault is eliminated, check whether the data flow input voltage value (High voltage) of the electric drive axle assembly is 0V in the LOCK state. After high-voltage power-on, finally confirm whether the data flow input voltage value (High voltage) of electric drive axle assembly is within 240~450 V.
DC bus undervoltage drop power/DC bus undervoltage fault	Occurs when the high voltage of the connected high-voltage battery is less than the set value. Abnormal high voltage may occur in the battery; The high-voltage detection circuit in the electric drive axle assembly may have a problem;	1. Check whether the battery pack is normal. Refer to the Service Manual "Battery Pack" for relevant information on abnormal battery packs; 2. When the vehicle is powered up to high voltage, use a diagnostic scanner to read whether the data flow input voltage value (High voltage) in the diagnosis program of electric drive axle assembly is within 240~450 V. If it is out of range, disassemble the electric drive axle assembly according to reason B (refer to Chapter 5) and return it to the factory for repair or replacement; 3. After the fault is eliminated, check whether the data flow input voltage value (High voltage) of the electric drive axle assembly is 0V in the LOCK state. After high-voltage power-on, finally confirm whether the data flow input voltage value (Highvoltage) of electric drive axle assembly is within 240~450

		V.
Three-phase overcurrent/hardware detection three-phase overcurrent	Occurring when the motor 3-phase current is greater than the set value. Overload operation; Abnormal current detection; Hall or detection circuit is disturbed or abnormal; Hall offline or abnormal; Abnormal resolver signal; The controller hardware protection circuit is seriously disturbed;	1. If a three-phase overcurrent/ hardware detection three-phase overcurrent fault occurs, an irreparable fault occurs inside the electric drive axle assembly; remove the electric drive axle assembly (refer to Disassembly and Installation of Electric Drive Axle Assembly), return it to the factory for repair or replace the electric drive axle assembly; 2. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.
IGBT upper bridge arm fault	If the electric drive axle assembly has irreparable faults, it must be handed over to professional controller maintenance personnel for inspection and repair. Unauthorized repairs are not allowed. Occurring when an abnormality occurs in the electric drive axle assembly circuit connected to the IGBT: IGBT hardware is damaged; Abnormal drive upper axle chip; The upper bridge drive power supply is abnormal; The error signal is interfered with;	1. Use the UDS diagnostic scanner to clear the fault. After powering off, re-power on to IGN ON to confirm whether the fault reappears; 2. If there is no fault, it is an interference error signal; 3. If the fault recurs, it indicates that there is an irreparable fault in the electric drive axle assembly. Remove the electric drive axle assembly (refer to "Removal and Installation of Electric Drive Axle Assembly"), return it to the factory for repair or replace it; 4. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.

IGBT lower bridge arm fault	If the electric drive axle assembly has irreparable faults, it must be handed over to professional controller maintenance personnel for inspection and repair. Unauthorized repairs are not allowed. Occurring when an abnormality occurs in the electric drive axle assembly circuit connected to the IGBT: IGBT hardware is damaged; The drive lower bridge chip is abnormal; The lower bridge drive power supply is abnormal; The error signal is interfered with;	1. Use the UDS diagnostic scanner to clear the fault. After powering off, re-power on to IGN ON to confirm whether the fault reappears; 2. If there is no fault, it is an interference error signal; 3. If the fault recurs, it indicates that there is an irreparable fault in the electric drive axle assembly. Remove the electric drive axle assembly (refer to "Removal and Installation of Electric Drive Axle Assembly"), return it to the factory for repair or replace it; 4. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.
Driver board fault	If the electric drive axle assembly has irreparable faults, it must be handed over to professional controller maintenance personnel for inspection and repair. Unauthorized repairs are not allowed. Occurring when an abnormality occurs in the electric drive axle assembly circuit connected to the IGBT: IGBT hardware is damaged; Any chip of the drive axle is abnormal; The drive power supply of the upper or lower bridge is abnormal; The error pin level is seriously disturbed;	1. Use the UDS diagnostic scanner to clear the fault. After powering off, re-power on to IGN ON to confirm whether the fault reappears; 2. If there is no fault, it is an interference error signal; 3. If the fault recurs, it indicates that there is an irreparable fault in the electric drive axle assembly. Remove the electric drive axle assembly (refer to "Removal and Installation of Electric Drive Axle Assembly"), return it to the factory for repair or replace it; 4. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.

Three-phase current imbalance fault	Occurs when there is no current in a phase. The three-phase circuit of the controller or motor is abnormal; Abnormal current detection;	1. If there is a three-phase current imbalance fault, an irreparable fault occurs inside the electric drive axle assembly; remove the electric drive axle assembly (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 2. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.
Current sensor zero drift fault	Hall anomaly; The current sampling circuit is abnormal; The Hall harness is damaged or abnormal;	1. If the current sensor zero drift fault occurs, an irreparable fault occurs inside the electric drive axle assembly; remove the electric drive axle assembly (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 2. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.
MCU torque offset out of range	Occurs when VCM input torque exceeds maximum torque VCM torque command is abnormal; Abnormal MCU torque processing;	1. Use a diagnostic scanner to check whether the VCM has CAN communication fault. If so, replace the VCM 2. If the MCU torque offset is out of range, an irreparable fault occurs inside the electric drive axle assembly; remove the electric drive axle assembly (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 3. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.

Resolver signal attenuation	Occurring when the resolver signal of electric drive axle assembly is distorted The motor resolver may be damaged Internal fault of electric drive axle assembly	1. If there is a resolver signal attenuation fault, an irreparable fault occurs inside the electric drive axle assembly; remove the electric drive axle assembly (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 2. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.
Abnormal resolver signal tracking	Occurring when the resolver signal of electric drive axle assembly is distorted The motor resolver may be damaged Internal fault of electric drive axle assembly Abnormal resolver signal	1. In case of abnormal resolver signal tracking, an irreparable fault occurs inside the electric drive axle assembly; remove the electric drive axle assembly (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 2. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.

Motor overspeed alarm/motor overspeed power reduction/motor overspeed fault	Occurs when the motor speed is greater than the set value. The assembly load is small, and the speed rises higher after the throttle is applied Abnormal fault of motor body Abnormal control due to abnormal state of MCU	1. Ask the driver whether the driving speed exceeds 180 km/h or excessive sliding occurs. In this case, the normal protection logic is executed and it means that the electric drive axle assembly is normal. 2. For reasons B and C, the electric drive axle assembly needs to be disassembled (refer to the disassembly and installation of the electric drive axle assembly), returned to the factory for repair or replaced; 3. After the fault is eliminated, when the vehicle stops and the accelerator pedal is not pressed, use a diagnostic scanner to read whether the data flow motor speed (Motor Speed) value is within the range of -10 ~ 10 rpm.
MCU sub-processor fault	The sub-processor chip application is accidentally erased; The sub-processor chip is seriously interfered with or damaged, resulting in abnormal operation;	1. If cause A occurs, rewrite the program. If the fault is eliminated, it can continue to be used. If the fault cannot be eliminated, disassemble the electric drive axle assembly (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 2. If cause B occurs, an irreparable fault has occurred inside the electric drive axle assembly; disassemble the electric drive axle assembly (refer to Chapter 5) and return it to the factory for repair or replacement; 3. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.

12V battery voltage out of range	Occurring when the low voltage of the connected low-voltage battery is greater than or less than the set value. The low-voltage battery or DCDC may be abnormal; Low-voltage cables and connectors may be damaged; Internal fault of electric drive axle assembly;	1. The vehicle is shut down (the whole vehicle is in LOCK state); 2. Check whether the data flow (Operating voltage value) of electric drive axle assembly is 0 V with a diagnostic scanner; 3. Open the vehicle bonnet to detect the low-voltage battery voltage. If the detected value exceeds the normal range, replace the low-voltage battery according to reason A; 4. Turn on the vehicle power supply and check the DCDC DTC. If there is any abnormality, replace the DCDC according to reason A; 5. After the vehicle is turned off, unplug the low-voltage connector at the electric drive axle assembly end and replace the low-voltage cable; 6. After the cable is replaced, if the electric drive axle assembly still fails, disassemble it according to reason C (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace it; 7. After the fault is eliminated, finally confirm whether the 12V power supply voltage (Operating voltage value) of the electric drive axle assembly diagnostic data flow is within the range of 9~16V.
5V voltage out of range	Occurring when the CPU power supply (5V) in the electric drive axle assembly exceeds the set range The supply voltage is out of range; There is a fault in the 5V voltage regulator circuit;	1. Use the diagnostic scanner to check whether there is a 12V battery overvoltage /12V battery undervoltage fault. If there is, replace the battery or DCDC according to reason A; 2. In addition, disassemble the electric drive axle assembly according to reason B (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly;

IGBT overtemperature power reduction/ IGBT overtemperature fault	When the inferred IGBT temperature is greater than the set value. Abnormal cooling system (pump, coolant channel, etc.) Internal fault of electric drive axle assembly	1. After the vehicle has been turned off for 30 minutes, restart it and use a diagnostic scanner to check whether the IGBT temperature value of the electric drive axle assembly data flow is close to the actual coolant temperature. If it is, check the cooling system according to reason Confirm whether the coolant pump is operating incorrectly or whether there are foreign objects in the coolant pipe, and then repair the cooling system; 2. For others, disassemble the electric drive axle assembly according to reason B (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 3. After the fault is eliminated, use a diagnostic scanner to check whether the IGBT temperature value of the electric drive axle assembly data flow is close to the actual coolant temperature.
Abnormal IGBT temperature signal	The IGBT temperature sensor connector in the controller is abnormal; Temperature sensor abnormal;	1. In case of abnormal IGBT temperature signal, disassemble the electric drive axle assembly (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace it; 2. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.

Power reduction due to IGBT junction overtemperature/IGBT junction overtemperature	When the inferred IGBT temperature is greater than the set value. Abnormal cooling system (pump, coolant channel, etc.) Internal fault of electric drive axle assembly	1. After the vehicle has been turned off for 30 minutes, restart it and use a diagnostic scanner to check whether the IGBT temperature value of the electric drive axle assembly data flow is close to the actual coolant temperature. If it is, check the cooling system according to reason Confirm whether the coolant pump is operating incorrectly or whether there are foreign objects in the coolant pipe, and then repair the cooling system; 2. For others, disassemble the electric drive axle assembly according to reason B (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 3. After the fault is eliminated, use a diagnostic scanner to check whether the IGBT temperature value of the electric drive axle assembly data flow is close to the actual coolant temperature.
Motor overtemperature power reduction/motor overtemperature fault	Occurring when the motor temperature is greater than the set value. The motor continues to run in a stalled state; Abnormal cooling system (pump, coolant channel); The motor temperature sensor may be damaged; Internal fault of electric drive axle assembly;	1. Confirm with the driver whether the vehicle continues to run in a stalled state, because in this case the normal protection logic will be activated, so the electric drive axle assembly is normal; 2. After the vehicle has been turned off for 30 minutes, restart it and use a diagnostic scanner to check whether the data flow motor temperature value (Motor Temperature) is close to the actual coolant temperature. If it is, check the cooling system according to reason Check whether the coolant pump is operating incorrectly or whether there are foreign objects in the coolant pipe, and then repair the cooling system; 3. For others, disassemble the electric drive axle assembly according to reason D (refer to the disassembly and

		installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 4. After the fault is eliminated, use a diagnostic scanner to check whether the motor temperature value (Motor Temperature) of the electric drive axle assembly data flow is close to the actual coolant temperature.
Drive motor temperature signal short-circuited to GND	Occurs when the motor temperature sensor is abnormal. The motor temperature sensor may be damaged The temperature sensor circuit in the electric drive axle assembly may be damaged	1. If the drive motor temperature signal is short-circuited to GND, an irreparable fault occurs inside the electric drive axle assembly; remove the electric drive axle assembly (refer to Disassembly and Installation of Electric Drive Axle Assembly), return it to the factory for repair or replace the electric drive axle assembly; 2. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.
Drive motor temperature signal open-circuited	Occurs when the motor temperature sensor is abnormal. The motor temperature sensor may be damaged The temperature sensor circuit in the electric drive axle assembly may be damaged	1. If the drive motor temperature signal is open-circuited, an irreparable fault occurs inside the electric drive axle assembly; remove the electric drive axle assembly (refer to Disassembly and Installation of Electric Drive Axle Assembly), return it to the factory for repair or replace the electric drive axle assembly; 2. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.

Active discharging fault	After the power battery is disconnected, the electric drive axle assembly fails to discharge the supporting capacitor voltage to within the 60V range for more than 3s. Abnormal VCU discharging command; The main circuit contactor is stuck; Discharge timeout; The motor speed exceeds 100Rpm during discharge; The motor coil is abnormal; Internal fault of electric drive axle assembly	1. Shut down the vehicle; 2. Use a diagnostic scanner to check whether the data flow (High voltage) value of the electric drive axle assembly is 0V. If the voltage remains constant above 200V, the battery pack relay is determined to be stuck. Refer to Service Manual Battery Pack for relevant contents about abnormal battery pack; 3. Use a diagnostic scanner to check whether the VCM has CAN communication failure. If so, replace the VCM; 4. For others, disassemble the electric drive axle assembly according to reason F (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 5. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.
Passive discharge fault	After the power battery is disconnected, the electric drive axle assembly fails to discharge the supporting capacitor voltage to within the 60V range for more than 2 min. The main circuit contactor is stuck; Internal fault of electric drive axle assembly	1. Shut down the vehicle. 2. Use a diagnostic scanner to check whether the data flow (High voltage) value of the electric drive axle assembly is 0V. If the voltage remains constant above 200V, the battery pack relay is determined to be stuck. Refer to Service Manual Battery Pack for relevant contents about abnormal battery pack; 3. For others, disassemble the electric drive axle assembly according to reason B (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 4. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light

		is off.
VCM (vehicle control unit) communication lost	Occurring when communication with VCM cannot be achieved for a certain period of time Possibility of VCM fault LVIO cable may be disconnected The CAN communication circuit inside the electric drive axle assembly is damaged	1. Check whether the VCM has CAN communication failure. In case of failure, replace the VCM for reason A; 2. Shut down the vehicle; 3. Check whether the data flow (High voltage) value of electric drive axle assembly is 0 V with a diagnostic scanner; 4. Pull out the low-voltage connector and replace the low-voltage cable; 5. For others, disassemble the electric drive axle assembly according to reason C (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 6. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.

VCM Frame Counter error	Occurring when VCM verification mismatch happens. Possibility of VCM fault The low-voltage harness may be broken The internal circuit of electric drive axle assembly is damaged	1. Check whether the VCM has CAN-related faults. In case of failure, replace the VCM for reason A; 2. Shut down the vehicle; 3. Check whether the data flow (High voltage) value of electric drive axle assembly is 0 V with a diagnostic scanner; 4. Pull out the low-voltage connector and replace the low-voltage harness; 5. For others, disassemble the electric drive axle assembly according to reason C (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 6. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.
VCM verification failed	Occurring when VCM verification mismatch happens. Possibility of VCM fault The low-voltage harness may be broken The internal circuit of electric drive axle assembly is damaged	1. Check whether the VCM has CAN-related faults. In case of failure, replace the VCM for reason A; 2. Shut down the vehicle; 3. Check whether the data flow (High voltage) value of electric drive axle assembly is 0 V with a diagnostic scanner; 4. Pull out the low-voltage connector and replace the low-voltage harness; 5. For others, disassemble the electric drive axle assembly according to reason C (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 6. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.

CAN bus off	Occurring when the number of CAN errors detected by electric drive axle assembly is greater than the set value VCM fault possibility; Low-voltage cables may be damaged; The low-voltage connector may be damaged; The CAN communication circuit inside the electric drive axle assembly is faulty;	1. Check whether the VCM has CAN communication failure. In case of failure, replace the VCM for reason A; 2. Shut down the vehicle; 3. Use a diagnostic scanner to check whether the data flow input voltage (High voltage) of electric drive axle assembly is 0 V; 4. Pull out the low-voltage connector and replace the low-voltage cable; 5. Remove the electric drive axle assembly (refer to "Removal and Installation of Electric Drive Axle Assembly"), and return it to the factory for repair or replacement; 6. After the fault is eliminated, confirm whether normal communication can be achieved when the vehicle warning light is not turned on.
Lost communication with BMS	Occurring when communication with BMS fails for a certain period of time Possibility of BMS fault Low-voltage cables may be disconnected The CAN communication circuit inside the electric drive axle assembly is damaged	1. Check whether the BMS has CAN communication fault. In case of failure, replace the BMS due to reason A; 2. Shut down the vehicle; 3. Check whether the data flow (High voltage) value of electric drive axle assembly is 0 V with a diagnostic scanner; 4. Pull out the low-voltage connector and replace the low-voltage cable; 5. For others, disassemble the electric drive axle assembly according to reason C (refer to the disassembly and installation of the electric drive axle assembly), return it to the factory for repair or replace the electric drive axle assembly; 6. After the fault is eliminated, confirm whether the vehicle can be driven normally when the vehicle warning light is off.

3.2.4 Removal and installation

3.2.4.1 Electric drive system assembly (rear drive three-in-one)

Caution: Before starting any disassembly or repair work, drain the coolant from the electric drive axle assembly to prevent coolant from leaking and contaminating the work area, which could affect the disassembly and repair work.

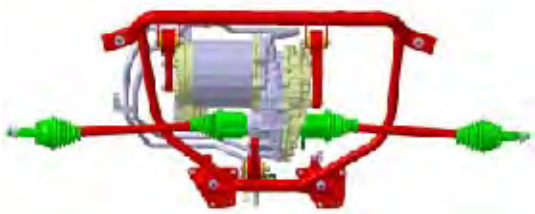
Caution: Before removing the electric drive system assembly from the vehicle, open the oil drain bolt to discharge all lubricating oil in it. Tighten the oil drain bolt on the housing with a tightening torque of 40±5 Nm to prevent foreign objects from falling into the box during removal.

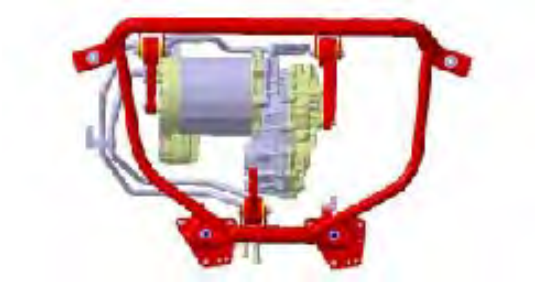
Caution: The electric drive system assembly in the vehicle state is fixed on the motor mount crossmember assembly, and the electric drive system assembly is connected to the drive shaft. There are also rear axle assemblies, hubs, tyres, etc. around it. Therefore, to remove the electric drive axle assembly, you must also remove all related systems in the engine compartment.

Caution: The electric drive system assembly itself as an assembly does not need to be taken apart internally during maintenance. Therefore, the removal process of the electric drive system assembly mainly involves separating the electric drive axle assembly from the vehicle.

Removal

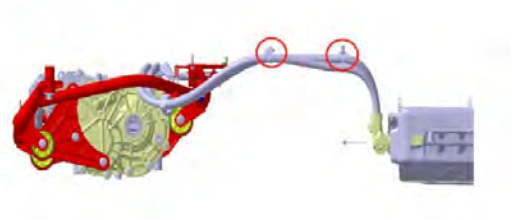
1. Lift and support the vehicle. Refer to: Lifting the vehicle.
2. Remove the rear tyres on both sides. Refer to: Wheels.
3. Remove the Drive shaft assembly.Refer to: Drive shaft assembly.
4. Remove the drive shafts on the left and right sides of the electric drive system assembly.



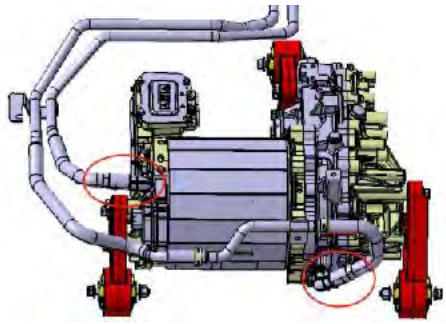


5. Pull out the quick connector of two-phase harness from the power battery pack assembly interface, and loosen 2 fixing clips of the harness.

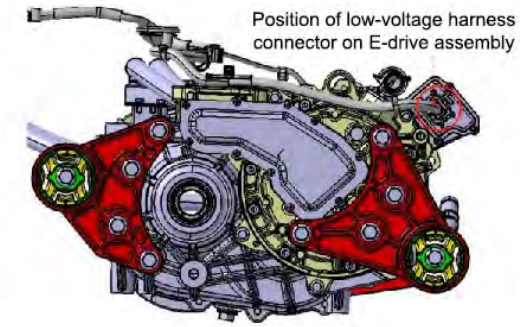
   Caution: When removing the harness, be sure to wear insulating gloves to avoid the risk of high-voltage electric shock.



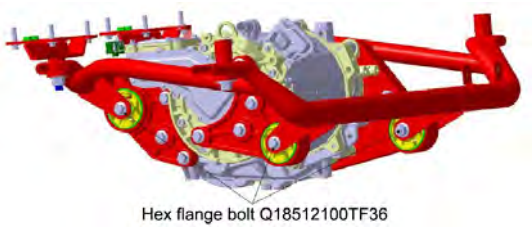
6. Remove the coolant pipe interface.



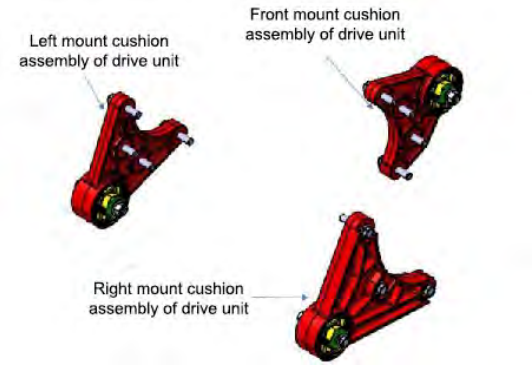
7. Separate and pull out the chassis harness assembly connector from the low-voltage connector on the electric drive axle assembly.



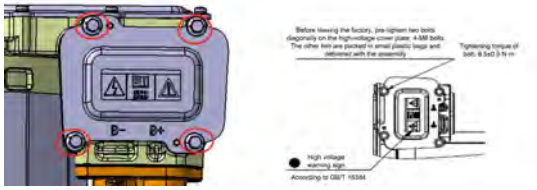
8. Place a special liftable tooling flatbed truck under the electric drive system assembly, adjust its height to a position that can support the assembly combination, loosen and remove 3 hex flange bolts fastening the mount assembly, slowly lower the flatbed truck, disassemble the motor mount crossmember assembly from the engine compartment and transfer it to the assembly operation area.



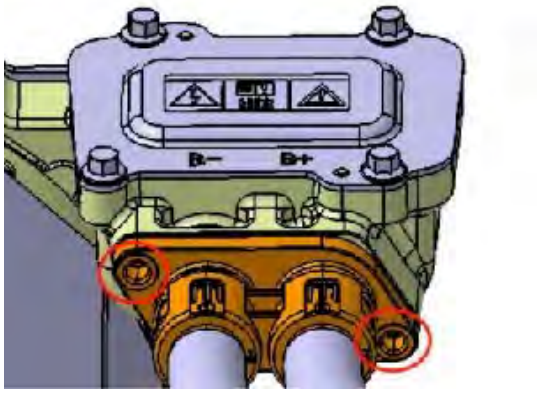
9. Remove the drive unit left mount cushion assembly, drive unit right mount cushion assembly, drive unit rear mount cushion assembly and other components respectively.



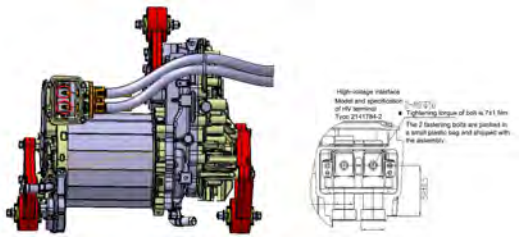
10. Align the fixing holes of the junction box cover plate and loosen the 4 M6 fixing bolts (tightening torque 9.5±0.5Nm) on the junction box cover plate.



11. Loosen the 2 M6 fixing bolts of the harness connector (tightening torque 9.5±0.5Nm).



12. Unscrew 2 M8 bolts (tightening torque 7±1Nm) and pull the copper nose of the two-phase harness connector out of the junction box.



Installation

1. The installation steps of the electric drive system assembly are in reverse order of disassembly. For the tightening torque of fastening bolts and nuts for each component, refer to the instructions in the Service Manual for the relevant system.
2. In order to facilitate the filling of lubricating oil for E-drive assembly, it is necessary to complete the filling before assembling the E-drive assembly on the body. Please fill Castrol BOT384 lubricating oil with a filling amount of 0.8 ±0.1L. After filling, tighten the filler plug with a tightening torque of 40±5Nm.

Caution: When unscrewing the oil filler plug, keep the surface clean. After tightening the oil filler plug, wipe the drain plug, oil filler plug, and their surroundings to make it easier to check for oil leaks during later use.

Test

1. Connect the vehicle to the power supply and check for any warning messages.
2. After starting the vehicle, check for any warning messages.
3. With the vehicle on the lift, start it, shift into D gear and check whether the wheels rotate forward.
4. With the vehicle on the lift, start it, shift into R gear and check whether the wheels rotate in reverse.
5. Check for coolant leaks.

3.3 Powertrain mount

3.3.1 Specification

3.3.1.1 Torque specification

Powertrain mount system

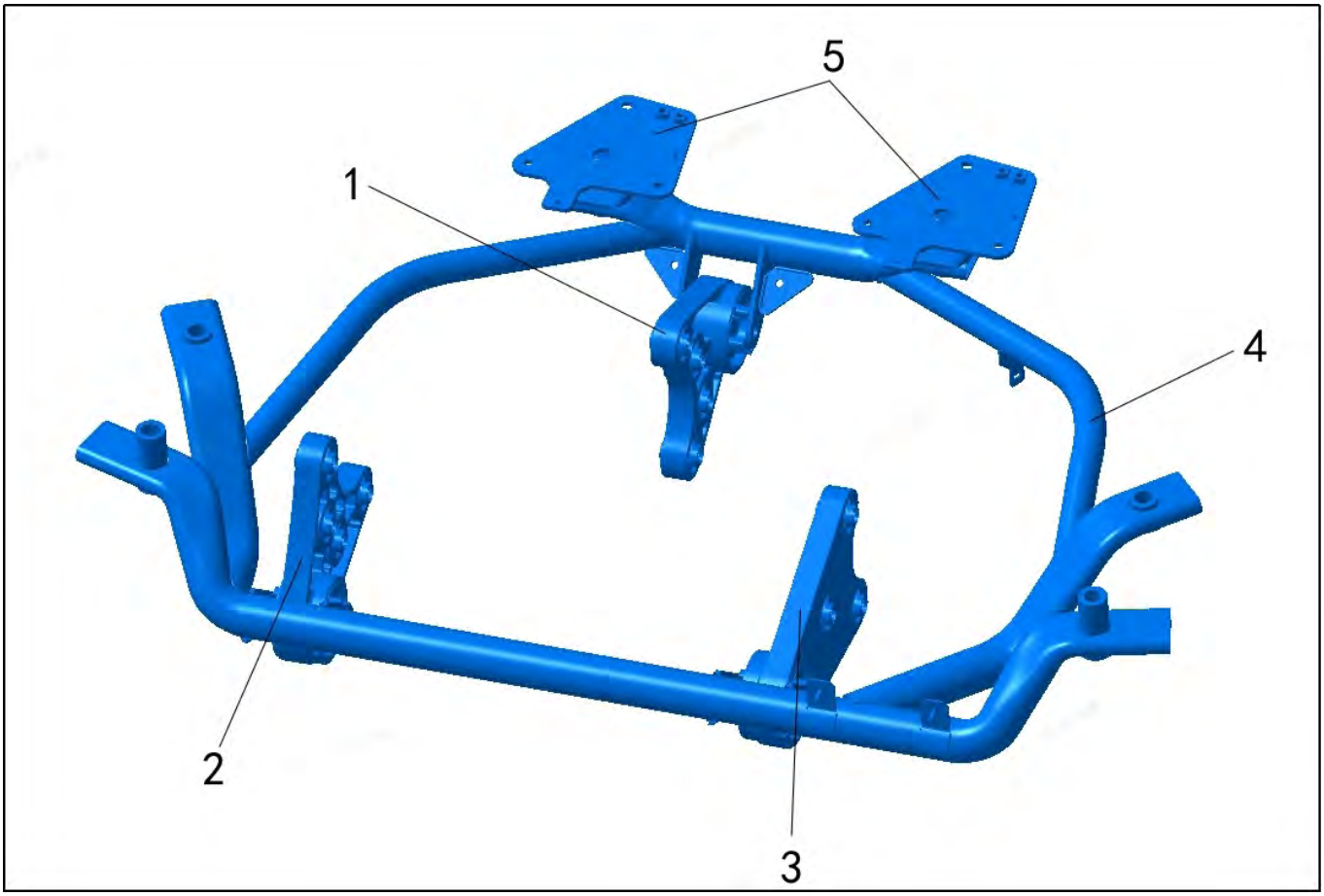
Symbol	Standard part No.	Standard part name	Application	Specification
1	Q1841050TF38	Hex flange bolt	4	55±5Nm
2	Q1861035TF38	Hex flange bolt	4	55±5Nm
3	Q33112T13F38*1.5	All-metal hex flange lock nut	1	110±11Nm
4	Q1851250TF38	Hex flange bolt	3	90±9Nm
5	Q1861250TF38*1.25	Hex flange bolt	1	110±11Nm
6	Q32312T13F36	Hex flange bolt	2	110±11Nm
7	Q1841050TF38	Hex flange bolt	3	55±5Nm
8	Q1851280TF38	Hex flange bolt	1	110±11Nm
9	Q33112T13F38	All-metal hex flange lock nut	1	110±11Nm
10	Q1851045TF38	Hex flange bolt	3	55±5Nm
11	Q33112T13F38	All-metal hex flange lock nut	1	110±11Nm
12	Q1851290TF38	Hex flange bolt	1	110±11N*m

Drive unit mount system

Symbol	Standard part No.	Standard part name	Application	Specification
1	LQ1841270TF62	Hex flange bolt	4	110±11Nm
2	Q33112T13F38	All-metal hex flange lock nut	1	Match with 4
3	Q18512100TF36	Hex flange bolt	1	110±11Nm
4	Q18512100TF36	Hex flange bolt	1	110±11Nm
5	LQ1841270TF62	Hex flange bolt	3	110±11Nm
6	Q33112T13F38	All-metal hex flange lock nut	1	Match with 5
7	LQ1841270TF62	Hex flange bolt	4	110±11Nm
8	Q33112T13F38	All-metal hex flange lock nut	1	Match with 12
9	Q18512100TF36	Hex flange bolt	1	110±11Nm
10	Q1840830TF62	Hex flange bolt	6	25±3Nm
11	SX5G-2810946	Hex flange bolt	2	145±15Nm
12	Q1841260TF36	Hex flange bolt	2	110±11Nm
13	SX5G-2810871	Special nut	2	110±11Nm

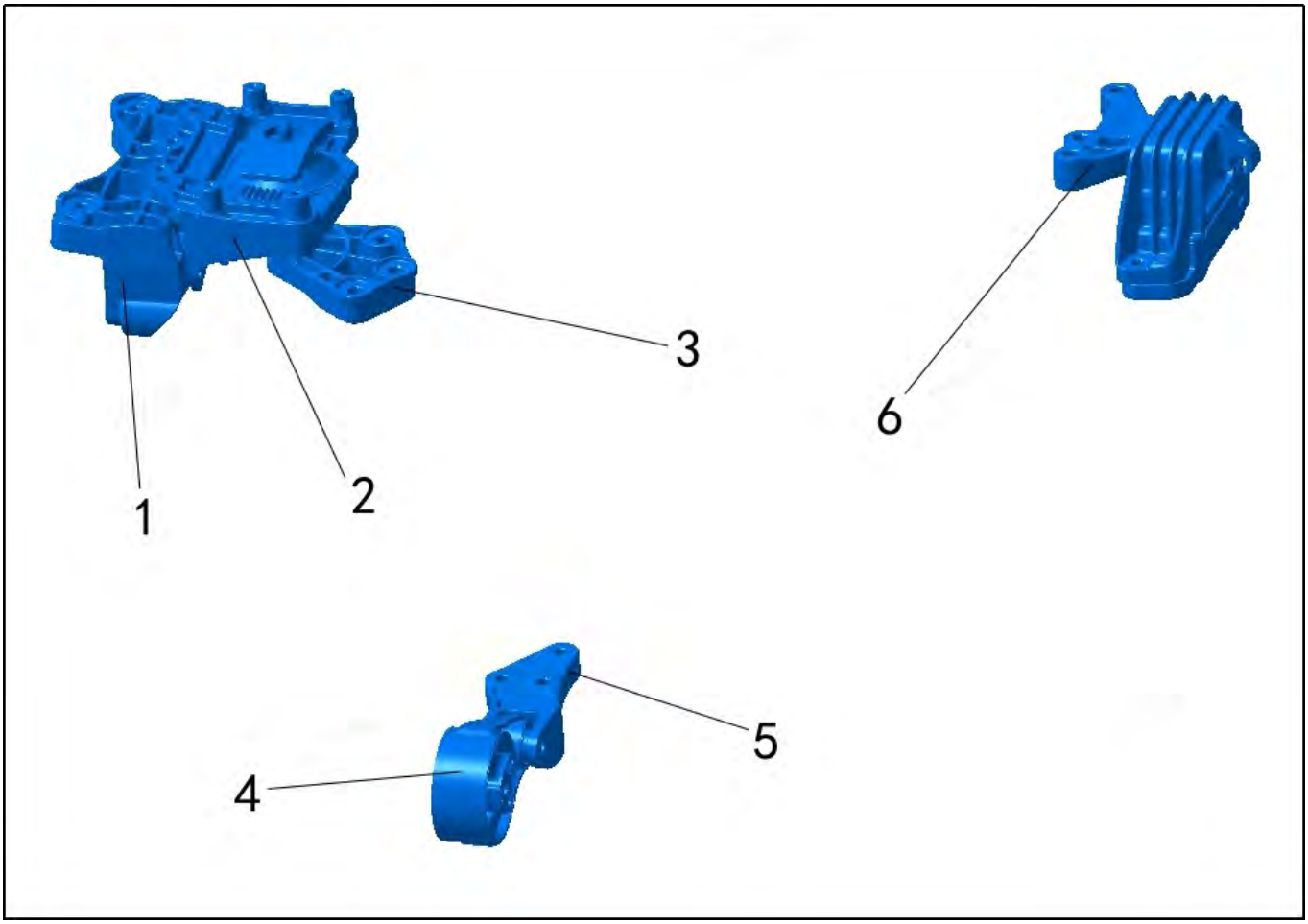
3.3.2 Instructions and operations

3.3.2.1 Drive motor mount system



Item	Description	Item	Description
1.	Front mount cushion of drive unit	4.	Drive unit mount crossmember welding assembly
2.	Left mount cushion of drive unit	5.	Drive unit mount crossmember transition bracket
3.	Right mount cushion of drive unit		

3.3.2.2 Powertrain mount system



Item	Description	Item	Description
1.	Left mount transition bracket of powertrain	4.	Rear mount cushion assembly of powertrain
2.	Powertrain left mount cushion assembly	5.	Powertrain rear mount bracket
3.	Powertrain left mount bracket assembly	6.	Powertrain right mount cushion assembly

3.3.2.3 Overview

The powertrain mount system is a key component in the car. It plays a role in two-way vibration isolation between the powertrain and the frame. It not only reduces the transmission of powertrain vibration and howling to the vehicle, but also attenuates the vibration caused by road excitation.

3.3.3 Removal and installation

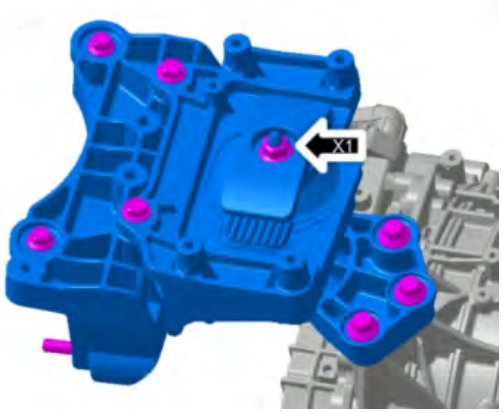
3.3.3.1 Left mount cushion assembly and left mount bracket (powertrain mounting system)

Removal

Caution: The removal steps in this process may contain details of the installation steps. In order to ensure safety, before performing this step, install the wire rope of the crane on the lifting lug of the powertrain assembly, or use jacking equipment to support the bottom of the powertrain assembly to prevent it from falling.

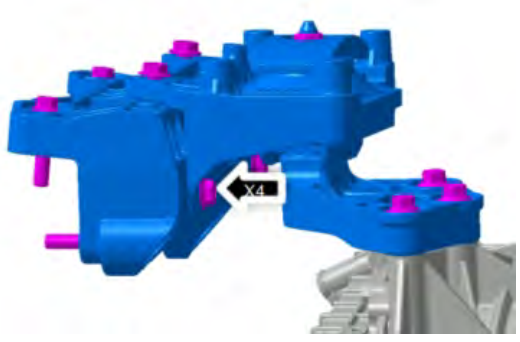
1. Use a torque wrench to remove the fixing nuts of the powertrain left mount cushion assembly and the powertrain left mount bracket.

   Torque: 110±11 Nm



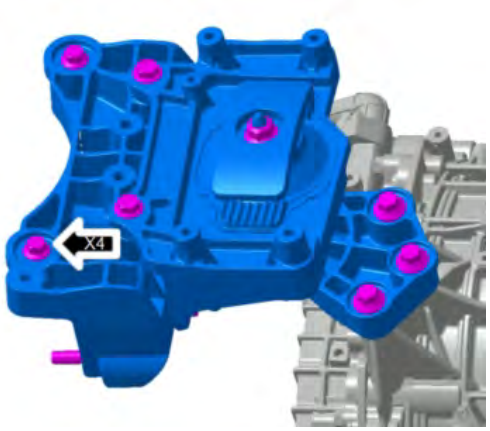
2. Use a torque wrench to remove the fixing bolts of the powertrain left mount cushion assembly and the powertrain left mount transition bracket, and remove the powertrain left mount cushion assembly.

   Torque: 55±5 Nm



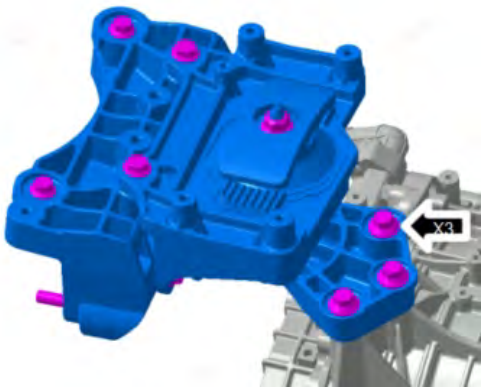
3. Use a torque wrench to remove the fixing bolts between the powertrain left mount transition bracket and the body longitudinal beam, and remove the powertrain left mount transition bracket.

   Torque: 55±5 Nm



4. Use a torque wrench to remove the fixing bolts of the powertrain left mount bracket and the powertrain assembly, and remove the powertrain left mount bracket.

   Torque: 90±9Nm



Installation

1. The installation order is the reverse of the removal order.

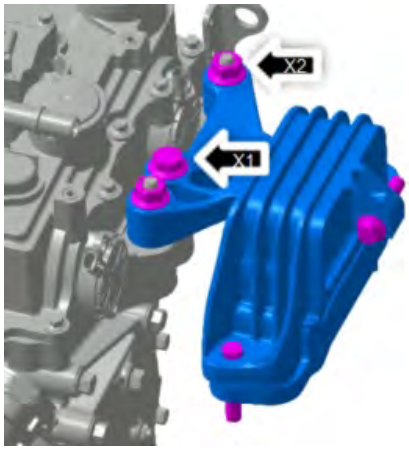
3.3.3.2 Right mount cushion assembly (powertrain mount system)

Removal

Caution: The removal steps in this process may contain details of the installation steps. In order to ensure safety, before performing this step, install the wire rope of the crane on the lifting lug of the powertrain assembly, or use jacking equipment to support the bottom of the powertrain assembly to prevent it from falling.

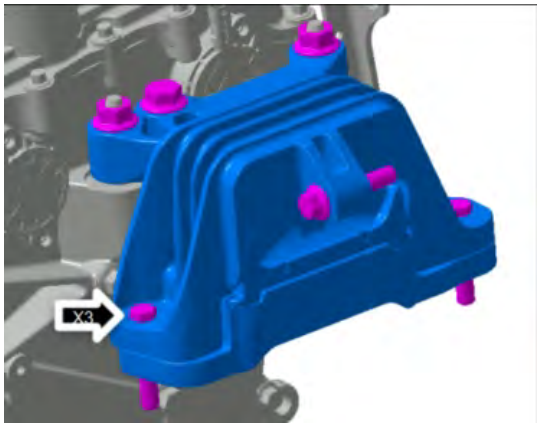
1. Use a torque wrench to remove the fixing bolts and nuts of the powertrain right mount cushion assembly and the powertrain.

   Torque: 110±11 Nm



2. Use a torque wrench to remove the bolts fixing the powertrain right mount cushion assembly and the body longitudinal beam, and remove the powertrain right mount cushion assembly.

   Torque: 55±5 Nm



Installation

1. The installation order is the reverse of the removal order.

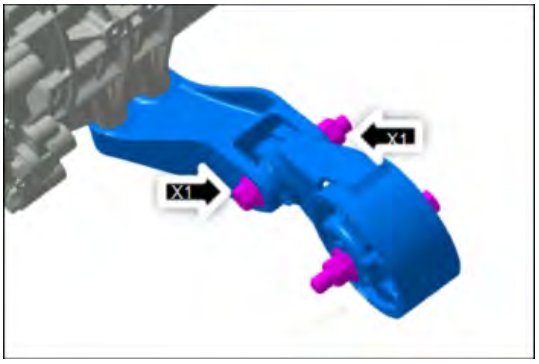
3.3.3.3 Rear suspension cushion assembly and rear suspension bracket (powertrain suspension system)

Removal

Caution: The removal steps in this process may contain details of the installation steps. In order to ensure safety, before performing this step, install the wire rope of the crane on the lifting lug of the powertrain assembly, or use jacking equipment to support the bottom of the powertrain assembly to prevent it from falling.

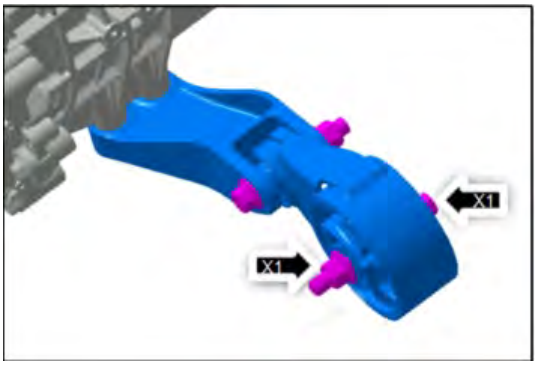
1. Use a torque wrench to remove the fixing bolts and nuts of the powertrain rear suspension cushion assembly and the powertrain rear suspension bracket assembly.

   Torque: 110±11 Nm



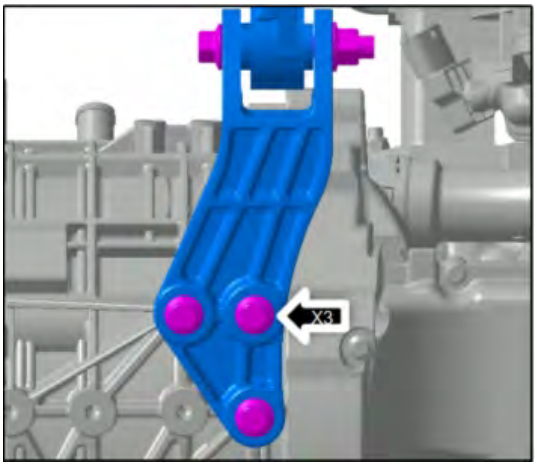
2. Use a torque wrench to remove the fixing bolts of the powertrain rear suspension cushion assembly and the front subframe, and remove the powertrain rear suspension cushion assembly.

   Torque: 110±11 Nm



3. Use a torque wrench to remove the fixing bolts of the powertrain rear suspension bracket assembly and the powertrain assembly, and remove the powertrain rear suspension bracket assembly.

   Torque: 55±5 Nm



Installation

1. The installation order is the reverse of the removal order.

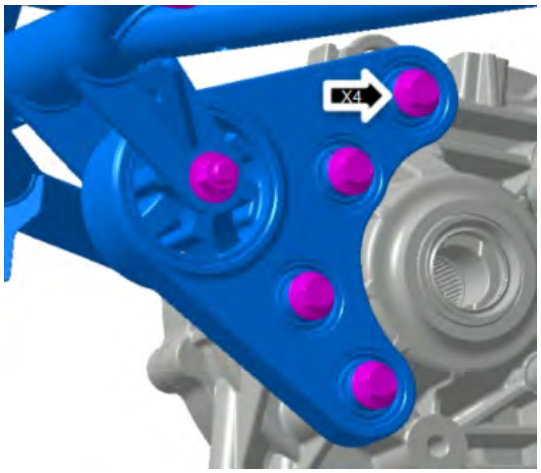
3.3.3.4 Front mount cushion assembly (drive unit mount system)

Removal

Caution: The removal steps in this process may contain details of the installation steps. In order to ensure safety, before performing this step, install the wire rope of the crane on the lifting lug of the powertrain assembly, or use jacking equipment to support the bottom of the powertrain assembly to prevent it from falling.

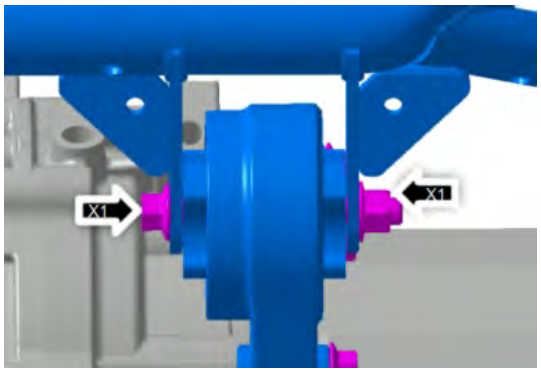
1. Use a torque wrench to remove the fixing bolts between the drive unit front mount cushion assembly and the drive motor.

   Torque: 110±11 Nm



2. Use a torque wrench to remove the fixing bolts and nuts of the drive unit front mount cushion assembly and the drive unit mount crossmember welding assembly, and remove the drive unit front mount cushion assembly.

   Torque: 110±11 Nm



Installation

1. The installation order is the reverse of the removal order.

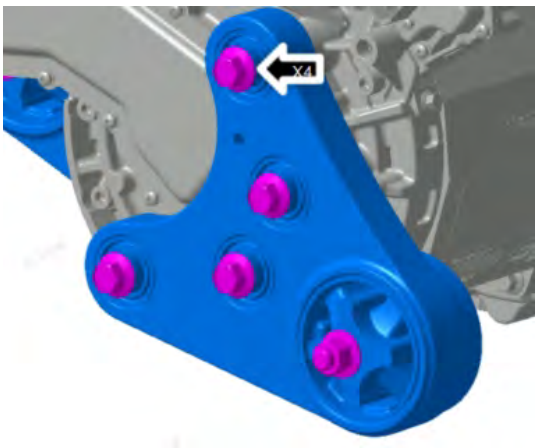
3.3.3.5 Left mount cushion assembly (drive unit mount system)

Removal

Caution: The removal steps in this process may contain details of the installation steps . In order to ensure safety, before performing this step, install the wire rope of the crane on the lifting lug of the powertrain assembly, or use jacking equipment to support the bottom of the powertrain assembly to prevent it from falling.

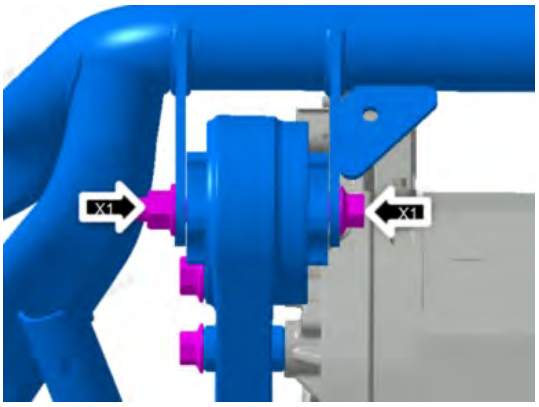
1. Remove the fixing bolt between the drive unit left mount cushion assembly and the drive motor with a torque wrench.

   Torque: 110±11 Nm



2. Use a torque wrench to remove the fixing bolts and nuts of the drive unit left mount cushion assembly and the drive unit mount crossmember welding assembly, and remove the drive unit left mount cushion assembly.

   Torque: 110±11 Nm



Installation

1. The installation order is the reverse of the removal order.

3.3.3.6 Right mount cushion assembly (drive unit mount system)

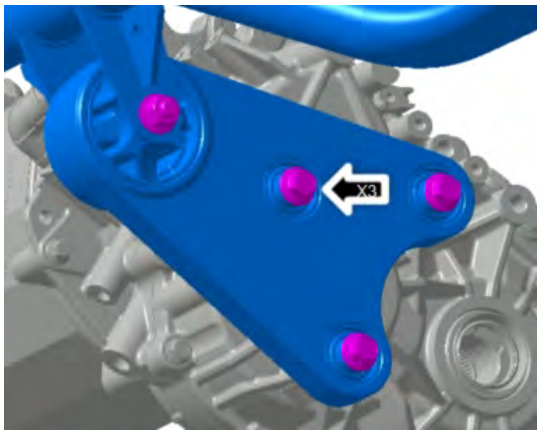
Removal

Caution: The removal steps in this process may contain details of the installation steps. In order to ensure safety, before performing this step, install the wire rope of the crane

on the lifting lug of the powertrain assembly, or use jacking equipment to support the bottom of the powertrain assembly to prevent it from falling.

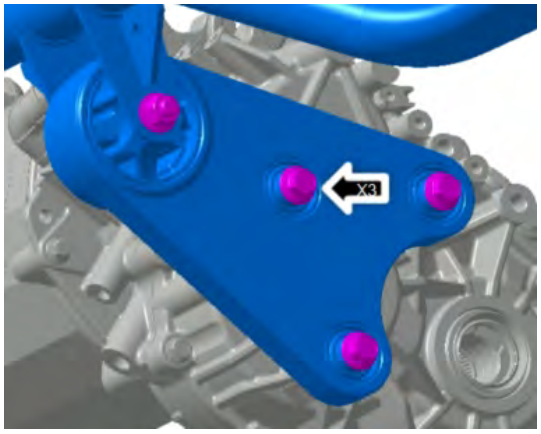
1. Remove the fixing bolt between drive unit right mount cushion assembly and drive motor with a torque wrench.

   Torque: 110±11 Nm



2. Use a torque wrench to remove the fixing bolts and nuts of the drive unit right mount cushion assembly and the drive unit mount crossmember welding assembly, and remove the drive unit right mount cushion assembly.

   Torque: 110±11 Nm



Installation

1. The installation order is the reverse of the removal order.

3.3.3.7 Mount crossmember welding assembly and transition bracket (drive unit mount system)

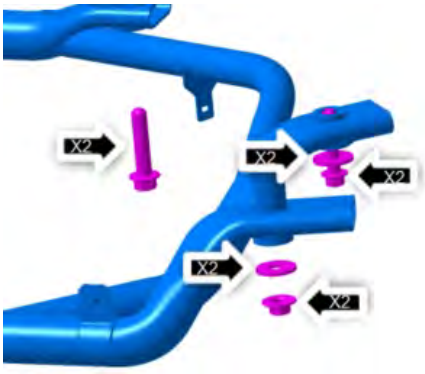
Removal

Caution: The removal steps in this process may contain details of the installation steps. In order to ensure safety, before performing this step, install the wire rope of the crane on the lifting lug of the powertrain assembly, or use jacking equipment to support the bottom of the powertrain assembly to prevent it from falling.

1. Use a torque wrench to remove the fixing bolts, nuts and large washers of the drive unit mount crossmember welding assembly and the body. Remove the fixing bolts of the drive unit mount crossmember welding assembly and the drive unit mount crossmember transition bracket, and remove the drive unit mount crossmember welding assembly.

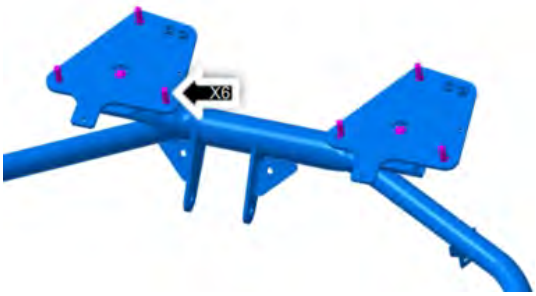
   Bolt torque: 110±11Nm

   Nut torque: 145±15Nm



2. Use a torque wrench to remove the fixing bolts between the drive unit mount crossmember transition bracket and the body, and remove the drive unit mount crossmember transition bracket.

   Torque: 25±3 Nm



Installation

1. The installation order is the reverse of the removal order.

3.4 Engine fuel and evaporation system

3.4.1 Specification

3.4.1.1 General specifications

Name	Specification
Operating voltage	8 ~ 15V
Rated operating voltage	13.5
System pressure	410±10Pa
Flow rate	85 L/h (rated operating voltage)
Allowable operating temperature range	-40℃~+80℃
Radio disturbance characteristics	Level 2 limit (GB 18655)

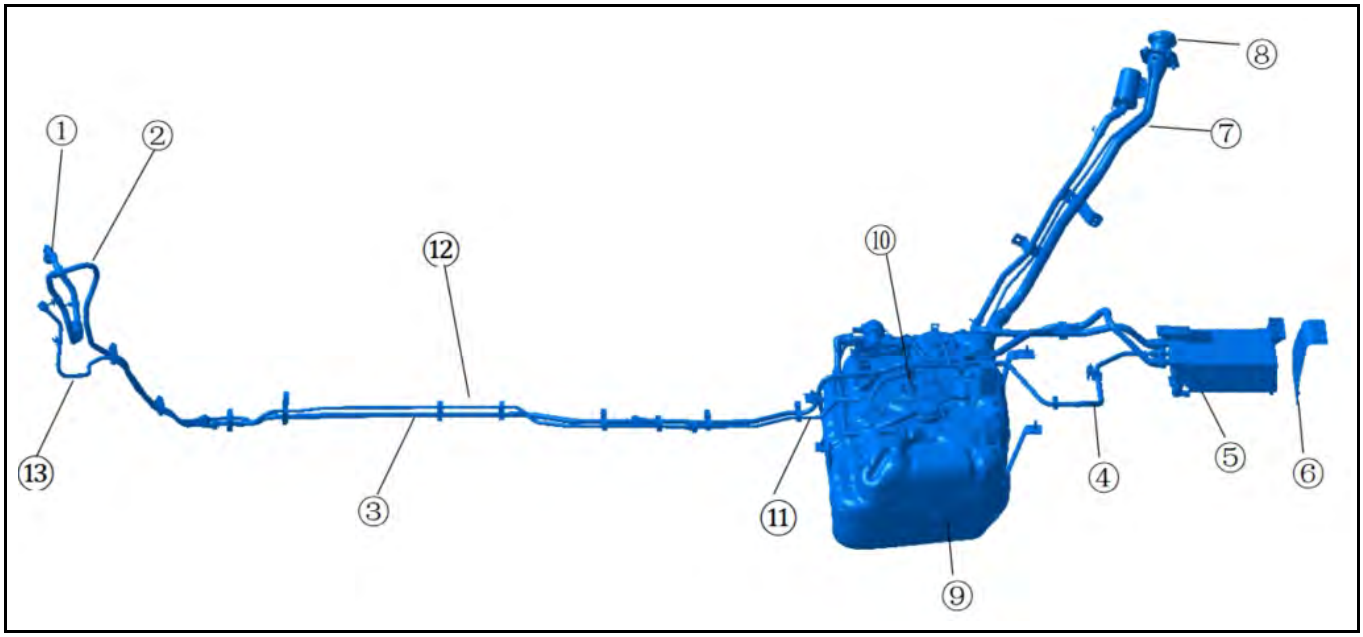
Necessary materials for maintenance

S/N	Name	Use for	Specification & Model
1	Silica gel	Oil pump	Beijing Tonsan 1596G, Loctite 5699 or equivalent
2	Silica gel	Oil pan	Beijing Tonsan 1596G, Loctite 5699 or equivalent
3	Silica gel	Camshaft position sensor bracket	Beijing Tonsan 1596Fa, Loctite 5699 or equivalent
4	Silica gel	Rear oil seal housing of crankshaft	Beijing Tonsan 1596Fa, Loctite 5699 or equivalent
5	Sealant	Oil pressure sensor	Beijing Tonsan 1243 or equivalent
6	Sealant	Water drain screw plug	Beijing Tonsan 1243 or equivalent
7	Sealant	Stud (for installation of knock sensor)	Beijing Tonsan 1243 or equivalent
8	Sealant	Coolant temperature sensor	Beijing Tonsan 1243 or equivalent
9	Sealant	Double end bolt (on cylinder head)	Beijing Tonsan 1271 or equivalent
10	Sealant	Spark plug guide sleeve	Beijing Tonsan 1662 or equivalent
11	Sealant	Bowl-shaped expansion plug of cylinder block/cylinder head	Beijing Tonsan 1662 or equivalent
12	Sealant	Connecting pipe nozzle	Beijing Tonsan 1662 or equivalent

3.4.2 Instructions and operations

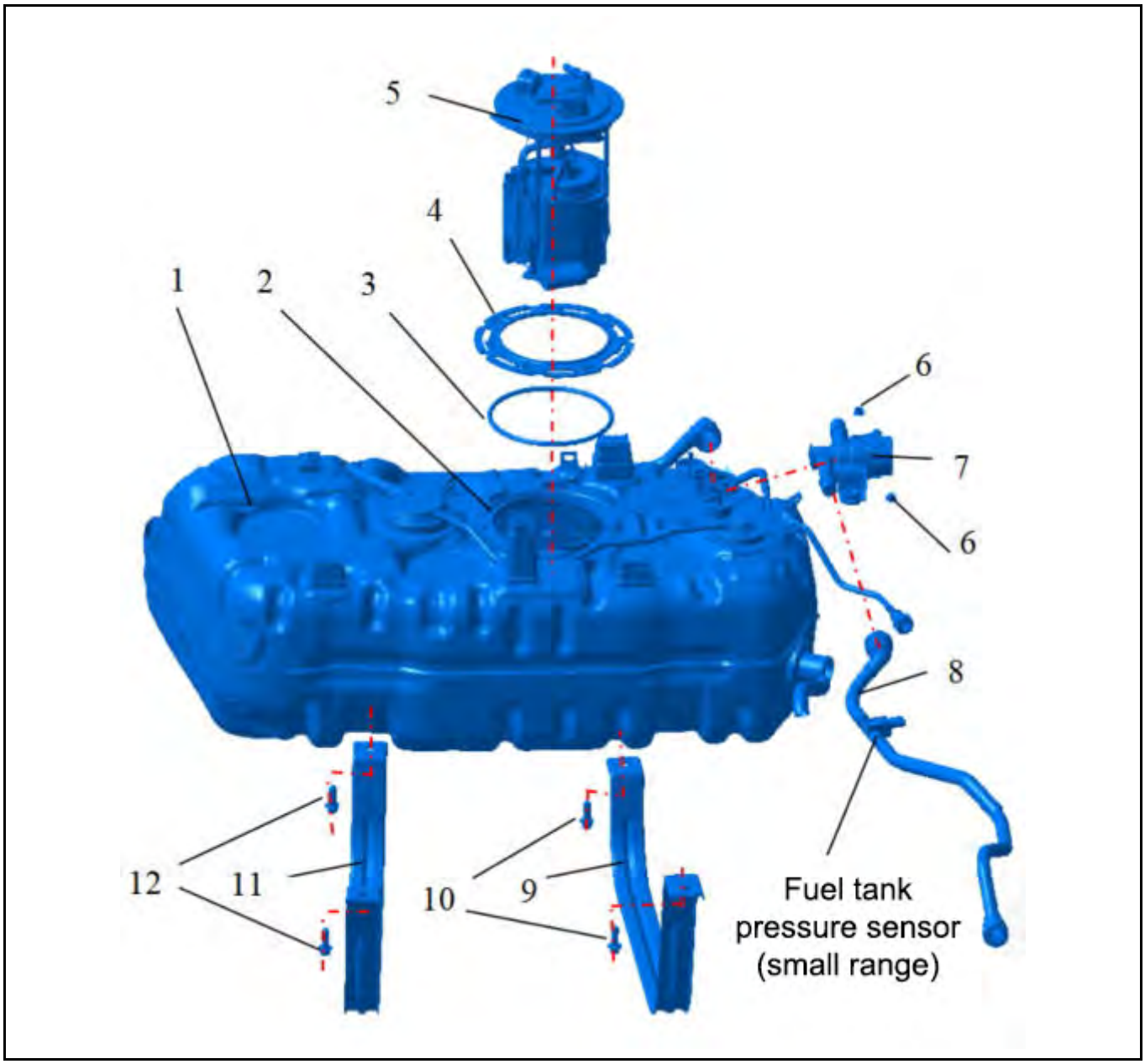
3.4.2.1 Engine fuel and evaporation system

Fuel system



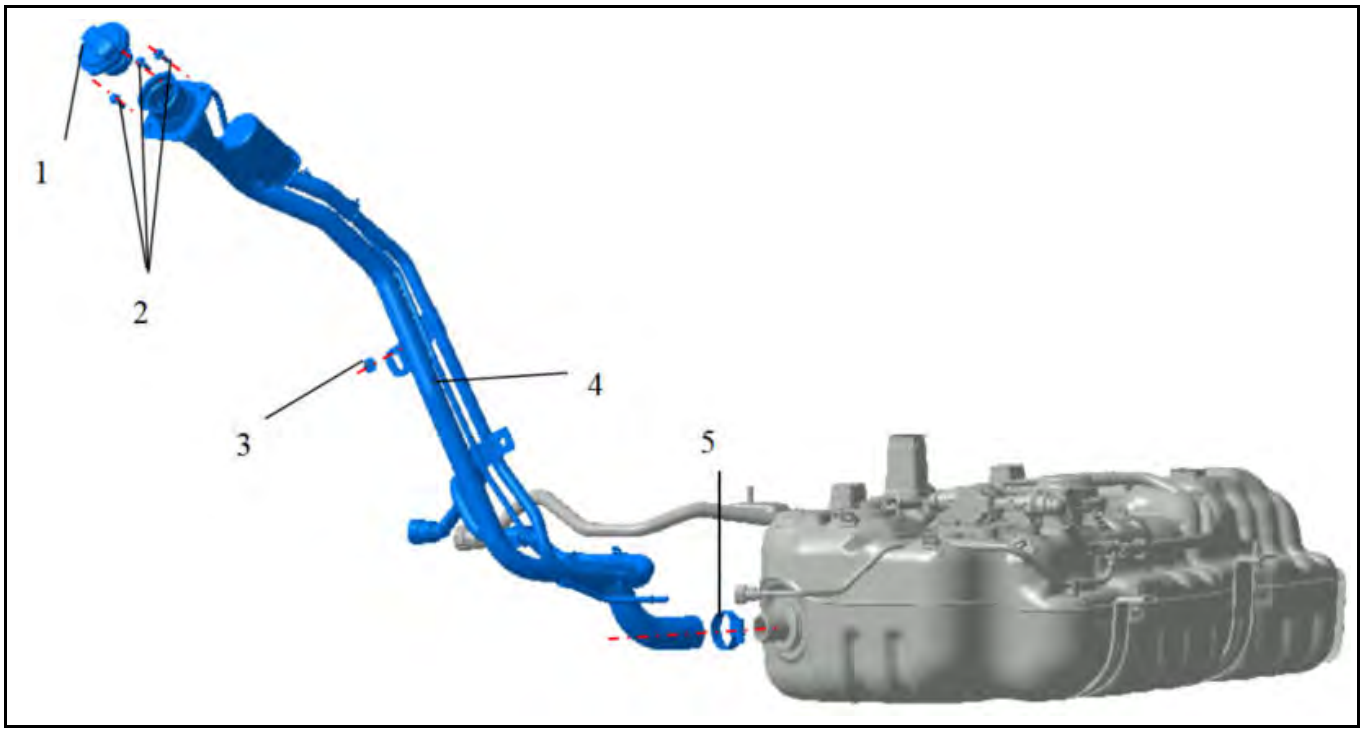
Item	Description	Item	Description
1.	Carbon canister desorption tube IV	8.	Refuelling screw cap assembly
2.	Carbon canister desorption tube III	9.	Fuel tank assembly
3.	Carbon canister desorption tube II	10.	Fuel pump assembly
4.	Carbon canister desorption tube I	11.	Oil inlet pipe I
5.	Carbon canister assembly	12.	Fuel inlet pipe II
6.	Carbon canister heat shield	13.	Fuel inlet pipe III
7.	Refuelling pipe assembly		

Exploded view-1



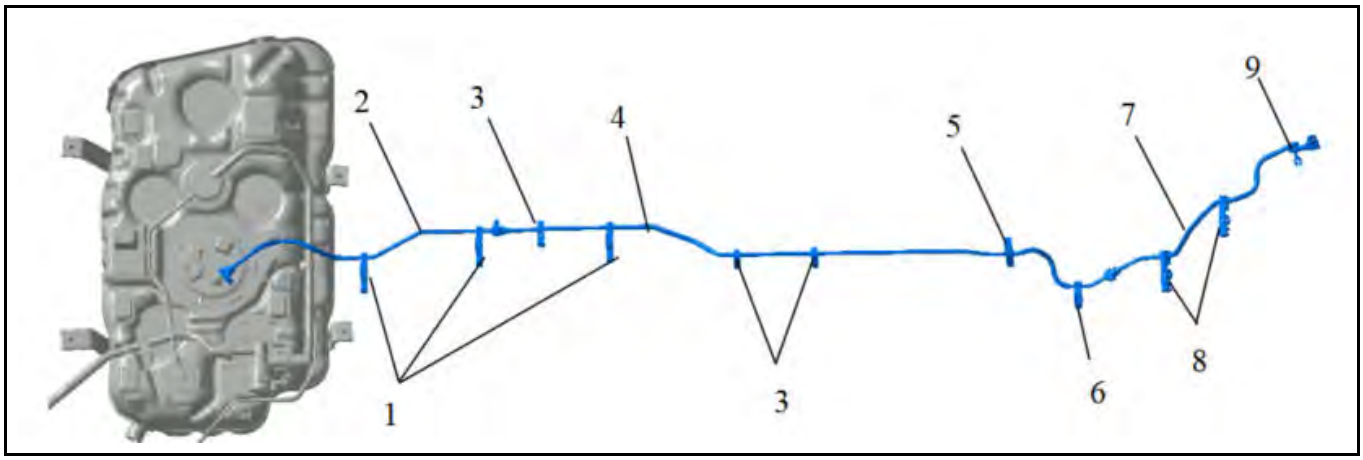
Item	Description	Item	Description
1	Fuel tank assembly	7	FTIV valve (Fuel tank isolation valve)
2	Chuck in fuel tank	8	Adsorption tube assembly (Sensor-carbon canister)
3	O-ring	9	Fuel tank strap (right)
4	Fuel pump mounting pressure plate	10	Hex flange bolt
5	Fuel pump assembly	11	Fuel tank strap (left)
6	Hex flange bolt	12	Hex flange bolt

Exploded view-2



Item	Description	Item	Description
1.	Filler cap	4.	Metal refuelling pipe
2.	Hex bolt, spring washer, and flat washer assembling unit	5.	Wormdrive hose hoop
3.	Nut		

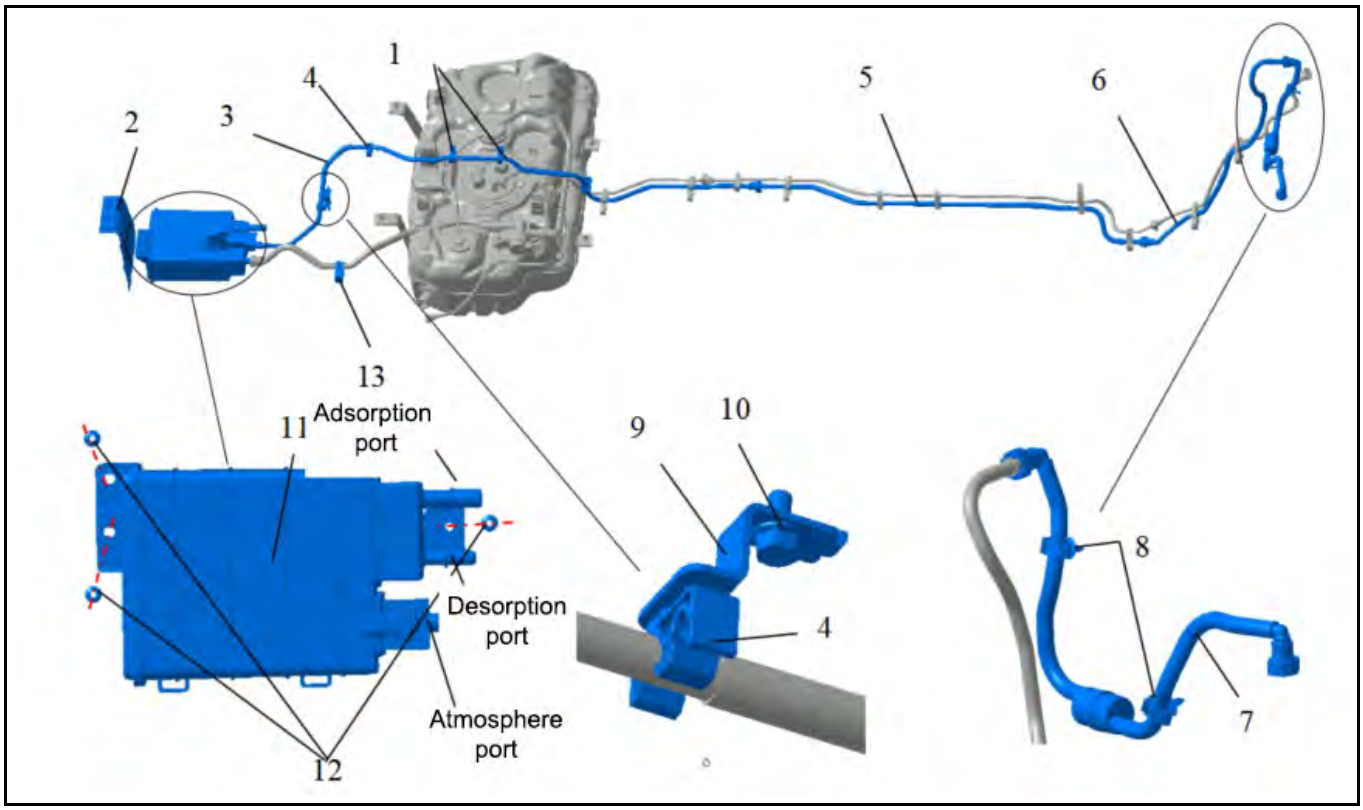
Exploded view-3



Item	Description	Item	Description
18.	Four-hole pipe clamp I	23.	Four-hole pipe clamp
19.	Oil delivery nylon pipe assembly (oil pump-pipe clamp)	24.	Fuel inlet nylon pipe assembly (pipe clamp – fuel rail)
20.	Two-hole clamp I	25.	Four-hole pipe clamp II

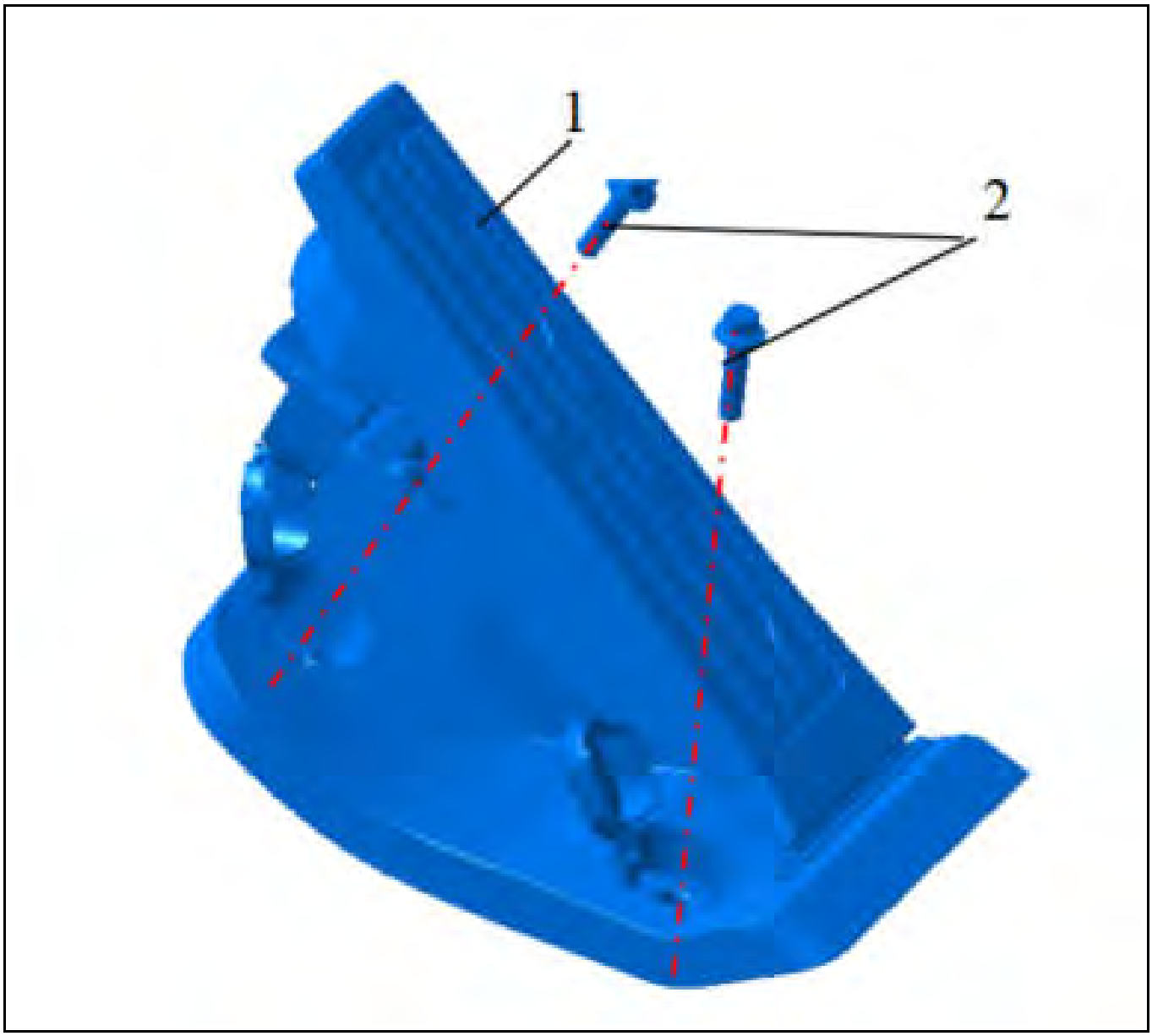
Item	Description	Item	Description
21.	Oil delivery nylon pipe assembly (pipe clamp-pipe clamp)	26.	Cable tie pipe clamp
22.	Five-hole pipe clamp		

Exploded view-3



Item	Description	Item	Description
1.	Two-hole clamp I	8.	Single-pipe clamp
2.	Carbon canister heat shield	9.	Evaporator pipe bracket
3.	Fuel vapour pipe I (carbon canister - pipe clamp)	10.	Hex flange bolt
4.	Double pipe clamp II	11.	Activated carbon canister assembly
5.	Fuel vapour pipe II (pipe clamp-pipe clamp)	12.	Hex flange nut
6.	Fuel vapour pipe III (pipe clamp-pipe clamp)	13.	Double pipe clamp III
7.	Fuel vapour pipe IV (pipe clamp-pipe clamp)		

Exploded view-4



Item	Description
1.	Electronic accelerator pedal assembly
2.	Hex flange bolt

3.4.2.2 Precautions

1. **Caution:**When removing and installing the fuel tank, be sure to follow the fuel tank removal and installation steps and precautions (see the fuel tank removal and installation steps for details).
2. **Caution:**When removing and installing the fuel pump, be sure to follow the fuel pump removal and installation steps and precautions (see the fuel pump removal and installation steps for details).
3. **Caution:**When removing and installing the refuelling pipe, be sure to follow the refuelling pipe removal and installation steps and precautions (refer to the refuelling pipe removal and installation steps for details).
4. **Caution:**When removing and installing the fuel filler cap, be sure to follow the fuel filler cap removal and installation steps and precautions (for details, refer to the fuel filler cap removal and installation steps).

5. **Caution:**When removing and installing the fuel pipe, be sure to follow the fuel pipe removal and installation steps and precautions (see the fuel pipe removal and installation steps for details).

Repair precautions

When replacing any parts of the fuel system, be sure to follow the regulations below.

1. **Caution:** Place a "Caution: Flammable" sign in the workshop.
2. **Caution:**Be sure to work in a well-ventilated area, and the operation workshop must be equipped with CO2 fire extinguishers.
3. **Caution:** Do not smoke when repairing the fuel system. No smoking in working area.
4. **Caution:**Keep the discharged fuel in an explosion-proof container and cover it. Put the container in safe area.
5. **Caution:**All heat sources, open flames or sparks should be eliminated. It is recommended to use gloves and safety goggles to protect the eyes.

3.4.3 Diagnosis and testing

3.4.3.1 Engine Fuel and Evaporation System-Fault Diagnosis

– If a fuel system leak greater than 1mm is reported, it is necessary to check the fuel system parts and components (refuelling pipe, fuel tank, carbon canister, fuel vapour pipe, etc.), especially whether there are loose joints between parts and components. If no leakage is found during the inspection, the fuel supply system airtightness tester is required to check the tightness of the fuel system:

– Remove the rubber hose at the air port of the carbon canister, apply pressure from the air port of the carbon canister ① to check the fuel system leakage, and the leakage reading shall be < 0.2 mm equivalent hole. If there is substantial leakage, check the pipeline and connection. If there is no leakage, proceed to the next step.

– Connect the carbon canister isolation valve ② with a 12V power supply, pass pressure from the refuelling port ③ or other locations, and check the leakage of the fuel system. If the leakage is large, the carbon canister should be replaced. If there is no leakage, the system status should be normal, and the vehicle can run the fuel evaporation on-board diagnosis again. After confirming that the ECU diagnosis is correct, the fuel tank pressure sensor needs to be replaced.

– If it is often difficult to find the leakage point of pipeline and each connection part, it is recommended to use smoke leakage method to find the leakage point. If there is no fuel supply system airtightness tester, please contact a professional maintenance station.

– When the fuel tank pressure sensor DTC is reported, if the pressure sensor needs to be replaced, the pressure sensor and the pipeline connected to it must be replaced simultaneously. It is not allowed to remove the sensor separately for replacement to avoid leakage due to poor sealing.

– When the carbon canister shut-off valve (CVS valve) DTC is reported, if the carbon canister shut-off valve needs to be replaced, the carbon canister assembly must be replaced simultaneously. It is not allowed to disassemble and replace the carbon canister shut-off valve separately to avoid leakage due to poor sealing.

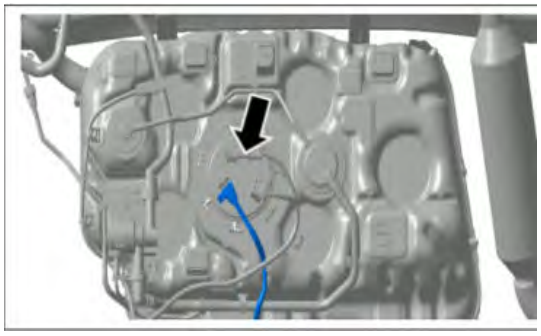
– If the carbon canister is replaced, check whether the carbon canister shut-off valve (CVS valve) works normally after assembly. Simple judgment method: The CVS valve harness is disconnected, and the valve body terminals are connected to 12V DC as shown in the positive and negative terminals in Fig. below. After connection, when you hear a "click" sound in the valve body, it means that the CVS valve can be closed normally; if there is no "click" sound in the valve body after connecting to the power supply, it means that the valve body cannot be closed normally and the sample needs to be replaced.

3.4.4 Removal and installation

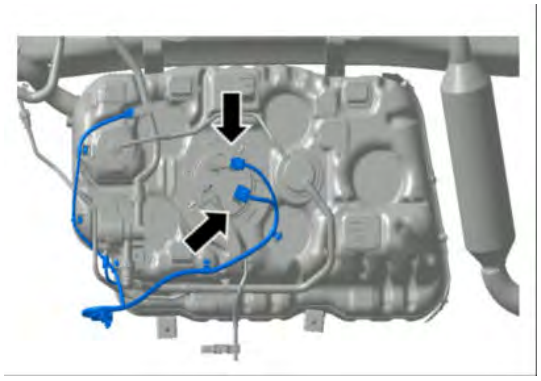
3.4.4.1 Fuel pump with fuel sensor assembly

Removal

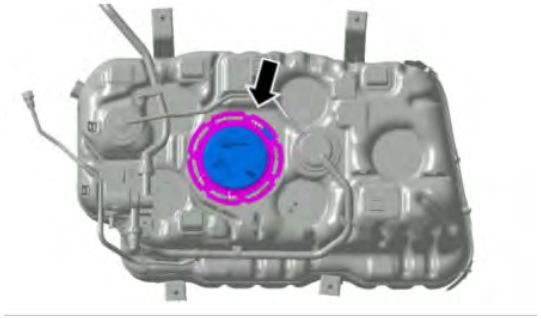
1. Release the fuel pressure. Refer to: Release the fuel pressure.
2. Remove the fuel tank. Refer to: Fuel tank assembly.
3. Disconnect the quick connector connecting the fuel pipeline and the oil pump.



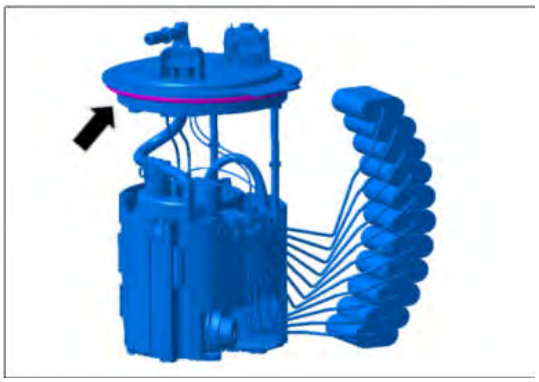
4. Disengage the quick connector connecting the harness and oil pump.



5. Use a tool to remove the fixing hoop of the oil pump with fuel sensor, and take off the oil pump with fuel sensor.



6. Remove the sealing ring of fuel pump with fuel sensor.



Installation

1. The installation order is the reverse of the removal order.

Inspection after installation

1. On-vehicle inspection to troubleshoot faults in the fuel pump power supply fuse, control circuit, and fuel pump relay.
2. Turn on the ignition switch without starting the engine. The fuel pump should produce an operating sound for about 3 seconds. Listen carefully to the operation sound of the fuel pump; you can also check the oil hose for pressure by hand. If the engine cannot be started or if there is excessive noise after start-up, the fuel pump should be removed and inspected.

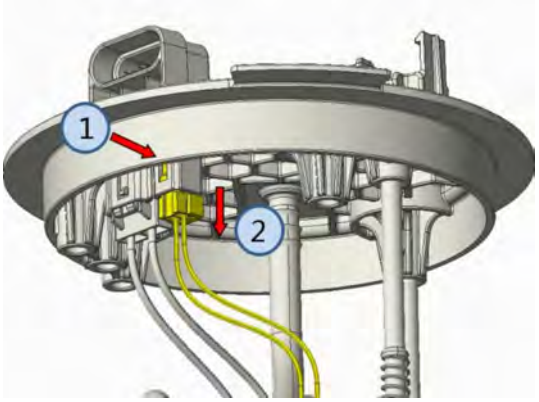
3.4.4.2 Oil level sensor

Removal

1. Remove the sensor assembly harness connector.

   (1) Press the spring tongue of harness connector inward.

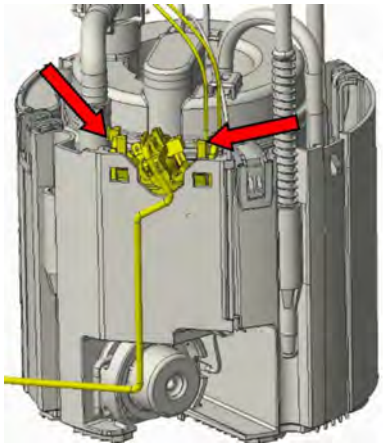
   (2) While pressing the spring tongue, pull down the harness in the direction of arrow.

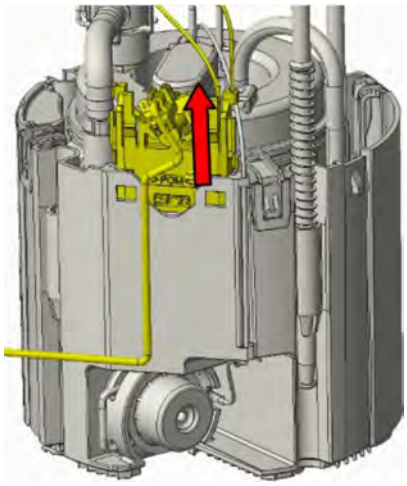


2. Remove the sensor set.

   1 Press the sensor snap point inward.

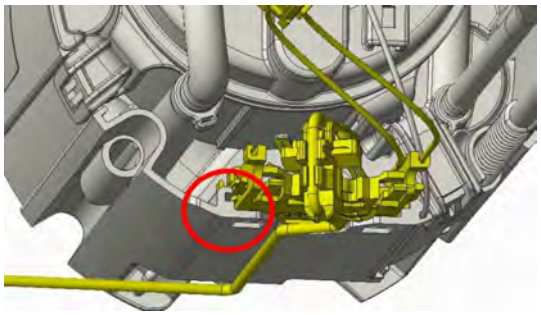
   2 Press the snap point and pull up the sensor assembly to take it out.



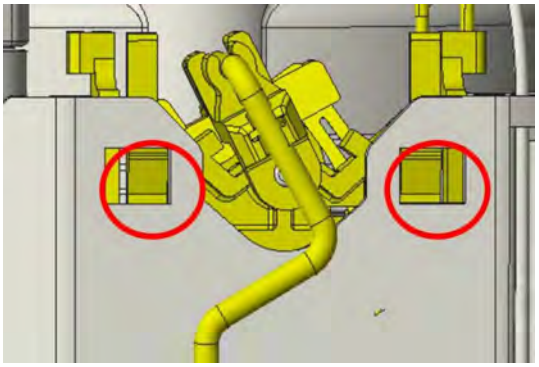


Installation

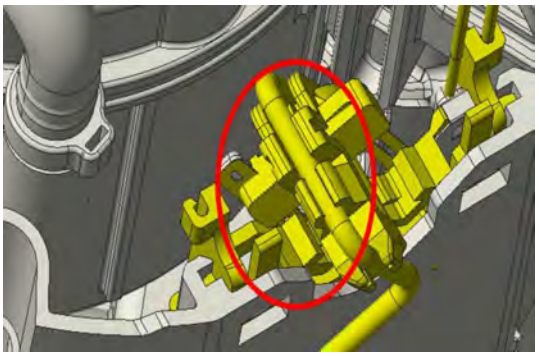
1. Caution shall be taken to install the guide structure of the sensor assembly in the guide groove of the oil storage barrel.



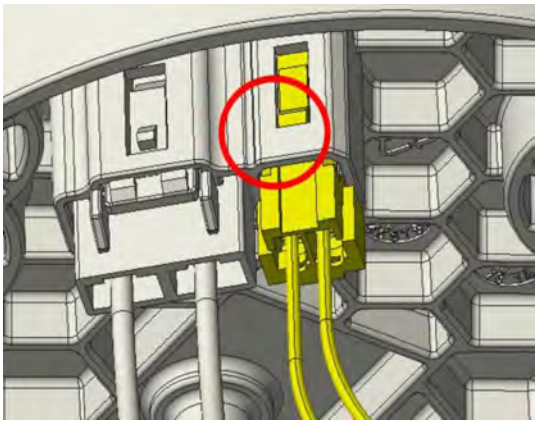
2. Check whether the sensor buckle is buckled into the buckling point of the oil storage barrel.



3. Check whether the floating rod is completely installed on the sensor rocker arm.

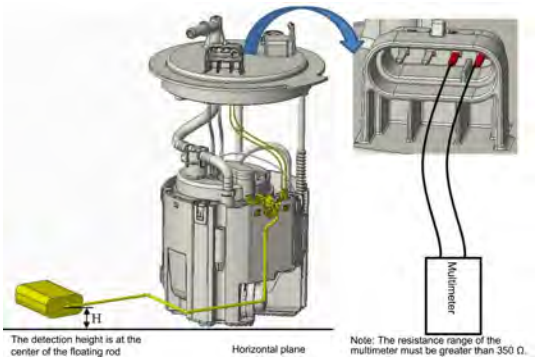


4. Check whether the harness connector is completely buckled into the flange fixing point.



5. After assembly, test according to the requirements of resistance height relationship.

Detection of the relationship between resistance value and instrument height display



Oil level indication	E end	E point	Alarm point	1/8 point	Alarm release	2/8 point	3/8 point	4/8 point	5/8 point	6/8 point	7/8 point	8/8 point	F end
Resistance (Ω)	350±3	327.4±3	293.5±3	273.9±3	234.7±2	218.7±2	186.7±2	152.7±2	128.7±2	102.7±2	72.7±2	55.6±2	30±2
Liquid level (mm)	15.6±2	24.1±4	34.5±4	41.6±4	56.3±4	63.9±4	79.2±4	98.7±4	114.4±4	133.9±4	156.6±4	167.6±4	185.7±2

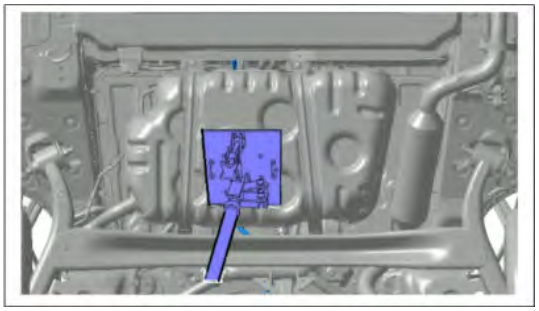
3.4.4.3 Fuel tank assembly

Removal

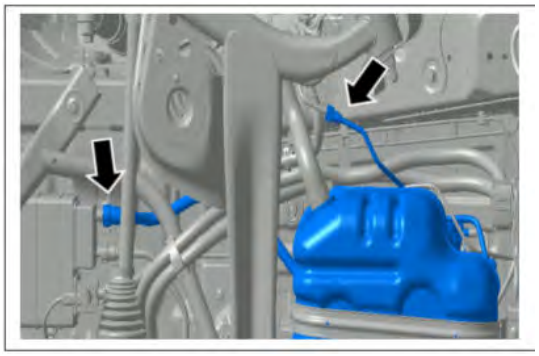
1. Release the fuel pressure. Refer to: Release the fuel pressure.
2. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
3. Drain the fuel tank Refer to: Draining of Fuel Tank.
4. Lift the vehicle . Refer to: Lifting the vehicle.
5. Use a flat jack to support the fuel tank.

   General tools: flat jack

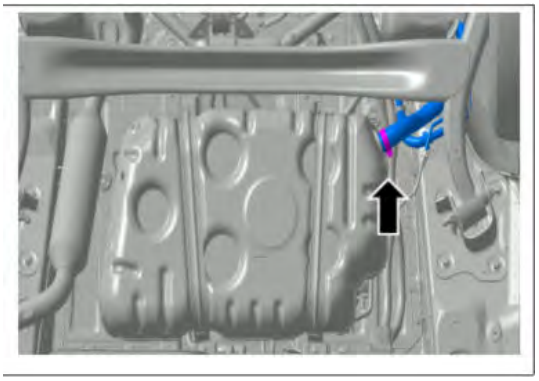
   Caution: Use proper packaging materials to avoid any damage to the bottom of fuel tank.



6. Disengage the quick connectors of carbon canister and circulating pipe.

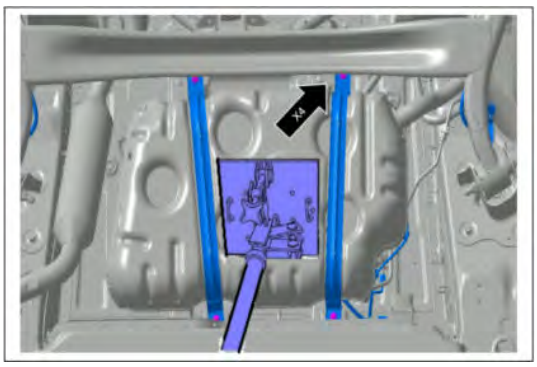


7. Remove the clamp and disengage the fuel filling hose.



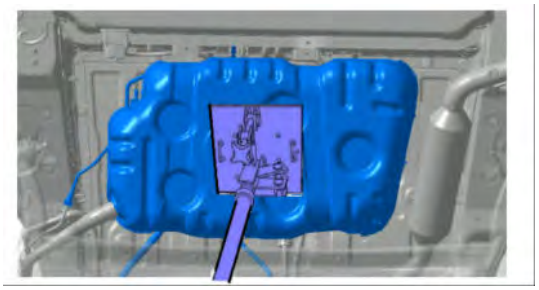
8. Remove the fuel tank rear mounting strap fixing bolts, and take off the fuel tank mounting strap.

   Torque: 24±2Nm

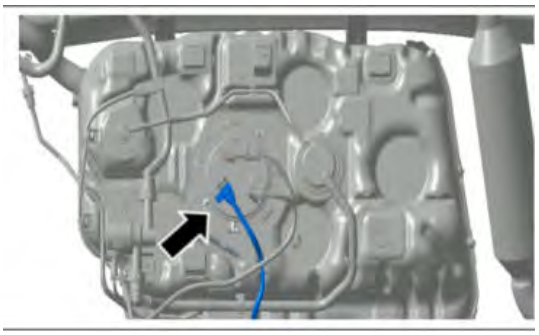


9. Slightly lower the flat jack

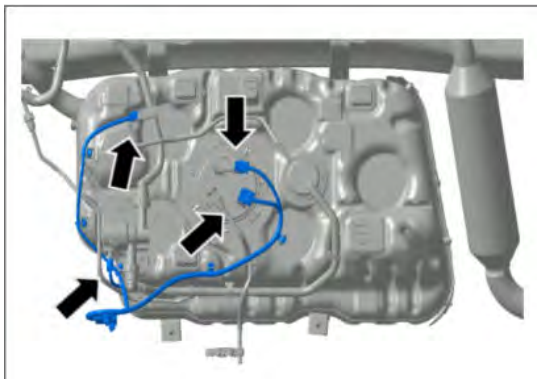
   Caution: When it is lowered to disconnect the fuel tank connection pipeline and harness, fix the flat jack.



10. Disengage the oil inlet pipe joint.



11. Disconnect the harness connector.



12. Slowly lower the jack to remove the fuel tank assembly.

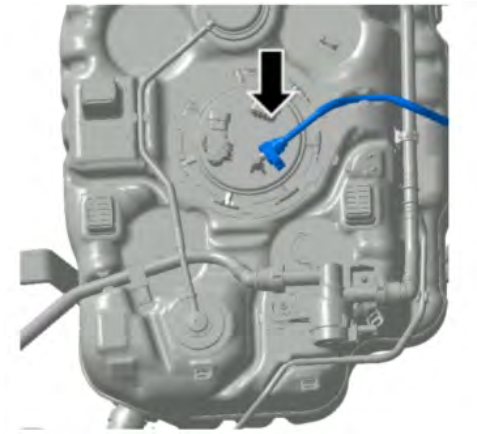
Installation

1. The installation order is the reverse of the removal order.

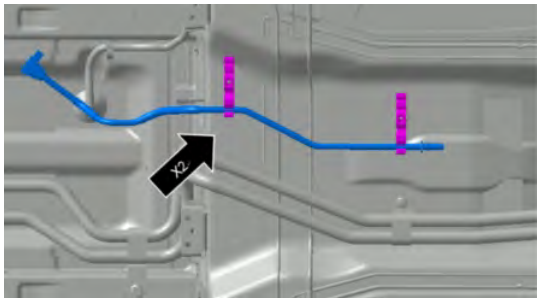
3.4.4.4 Fuel inlet tube I

Removal

1. Release the fuel pressure. Refer to: Release the fuel pressure.
2. Lift the vehicle. Refer to: Lifting the vehicle.
3. Remove the battery pack. Refer to: Power battery pack..
4. Detach the oil inlet pipe I from the oil pump assembly.



5. Detach the oil inlet pipe I from the pipe clamp.



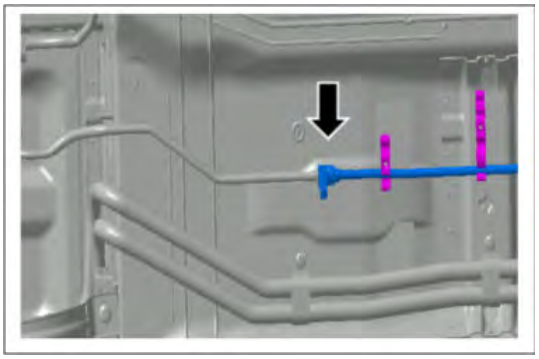
Installation

1. The installation order is the reverse of the removal order.

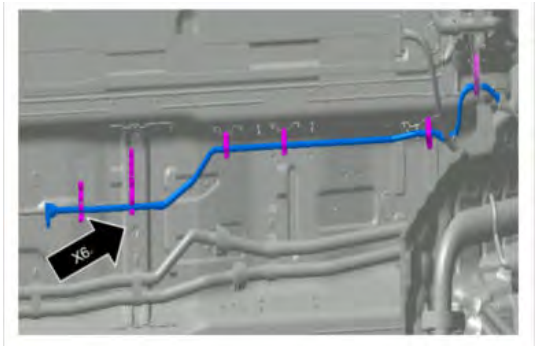
3.4.4.5 Fuel inlet pipe II

Removal

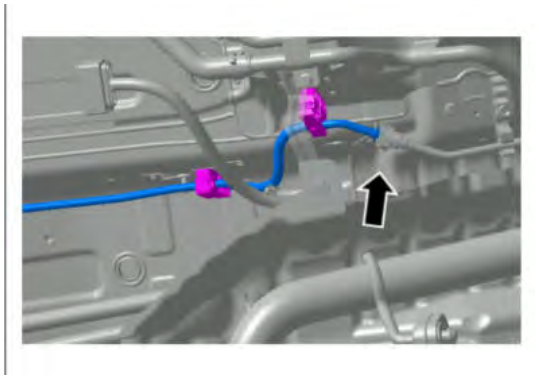
1. Release the fuel pressure. Refer to: Release the fuel pressure.
2. Lift the vehicle. Refer to: Lifting the vehicle.
3. Remove the battery pack. Refer to: Power battery pack.
4. Detach the oil inlet pipe I from the oil inlet pipe II.



5. Disengage the oil inlet pipe II from the pipe clamp.



6. Disconnect the oil inlet pipe II from the oil inlet pipe III and remove the oil inlet pipe II.



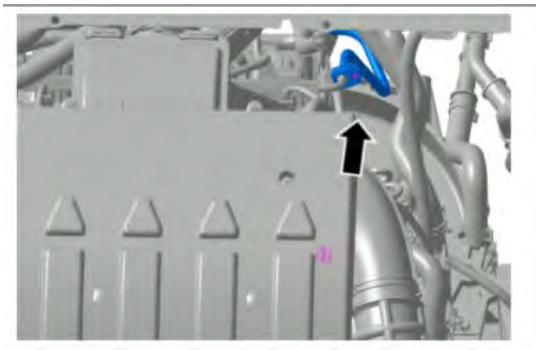
Installation

1. The installation order is the reverse of the removal order.

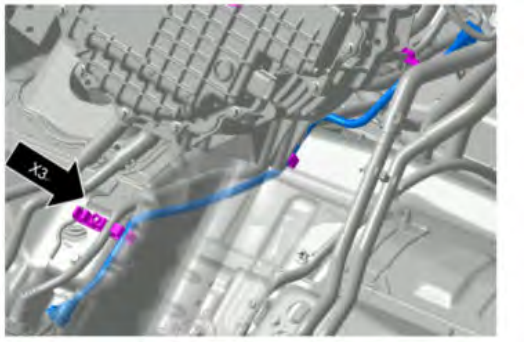
3.4.4.6 Oil inlet pipe III

Removal

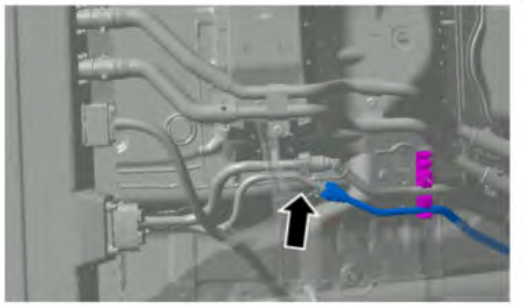
1. Release the fuel pressure. Refer to: Release the fuel pressure.
2. Detach the fuel inlet pipe III from the fuel rail.



3. Lift the vehicle. Refer to: Lifting the vehicle.
4. Disengage the oil inlet pipe III from the pipe clamp.



5. Disconnect the oil inlet pipe III from the oil inlet pipe II, and remove the oil inlet pipe III.



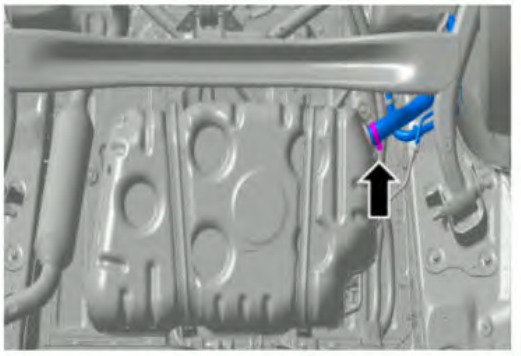
Installation

1. The installation order is the reverse of the removal order.

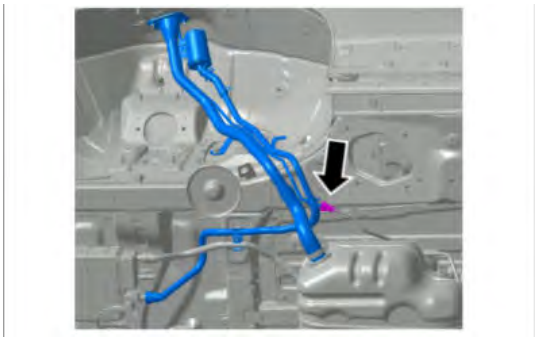
3.4.4.7 Refuelling pipe

Removal

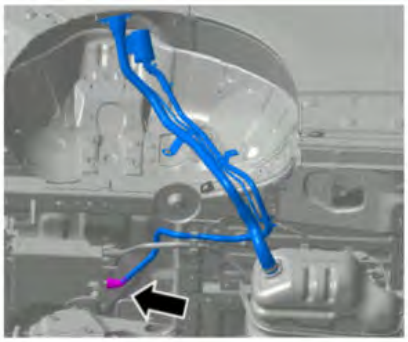
1. Lift the vehicle. Refer to: Lifting the vehicle.
2. Remove the fixing clamp of the fuel tank refuelling hose, and disconnect the fuel tank refuelling hose from the fuel tank.



3. Disconnect the connection between the refuelling pipe circulation pipe and the fuel tank circulation pipe.

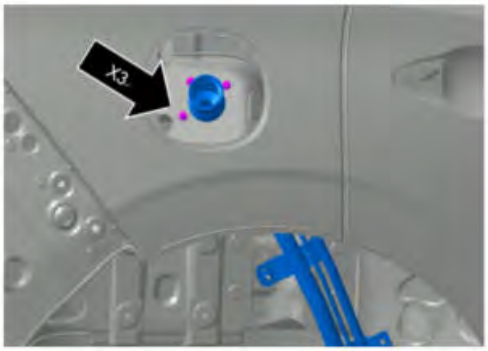


4. Disconnect the connection between the refuelling pipe to the atmosphere pipe and the carbon canister.



5. Lower the vehicle.
6. Remove the rear left tyre.Refer to: Wheel Assembly.
7. Remove the rear left wheel guard. Refer to: Wheel guard.
8. Open the fuel tank refuelling port cover plate and remove the fuel filler cap.

9. Remove the bolts on the refuelling pipe flange.



10. Remove the nut on the refuelling pipe bracket and remove the refuelling pipe.

Installation

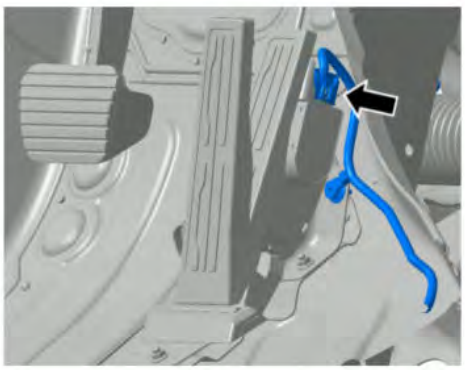
1. The installation order is the reverse of the removal order.

3.4.4.8 Accelerator pedal assembly

Removal

1. Disconnect the battery negative cable. Refer to: Disconnect the battery negative teminal.

2. Remove the accelerator pedal sensor harness connector.



3. Remove the fixing bolts of the accelerator pedal assembly, and remove the accelerator pedal assembly.

Torque: 8±1Nm

Installation

1. The installation order is the reverse of the removal order.

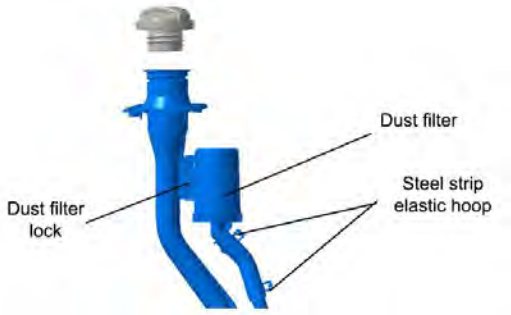
3.4.4.9 Dust filter

Removal

a. Remove the rear right tyre. Refer to: Wheel assembly.

b. Remove the rear right wheel mudguard. Refer to: Mudguard.

c. Disassemble the locking structure of the dust filter and the refuelling main pipe.



d. Remove the elastic hoop at the connection between the dust filter and the rubber hose, and pull out the dust filter to complete the disassembly.

Installation

a. When installing a new dust filter, first assemble the dust filter and rubber hose, lock them with hoops, and then clamp the dust filter into the locking structure.

3.4.5 General procedures

3.4.5.1 Draining of Fuel Tank

General Tools

Fuel saver

Warning: Do not smoke or carry a lit cigarette or any type of open flame when operating fuel-related components or working near them. There is always a risk of flammable mixtures that could ignite. Failure to observe above operating instructions can result in serious personal injury.

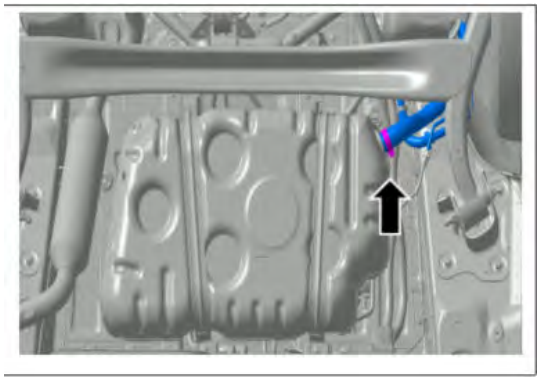
Warning: When operating on or near fuel-related parts, it is strictly prohibited to carry personal electronic devices such as mobile phones or any type of audio equipment. There is always a risk of flammable mixtures that could ignite. Failure to observe above operating instructions can result in serious personal injury.

Warning: Slowly remove the fuel tank cap. The fuel system may be under pressure. Before completely removing the fuel tank cap, if it is venting vapor or you hear a hissing sound, wait until it stops completely. Otherwise, fuel may be sprayed out. Failure to observe above operating instructions can result in serious personal injury.

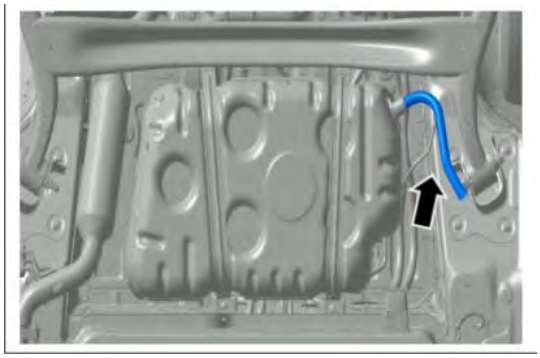
1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.

2. Lift the vehicle. Refer to: Lifting the vehicle.

3. Remove the clamp and disengage the fuel filling hose.

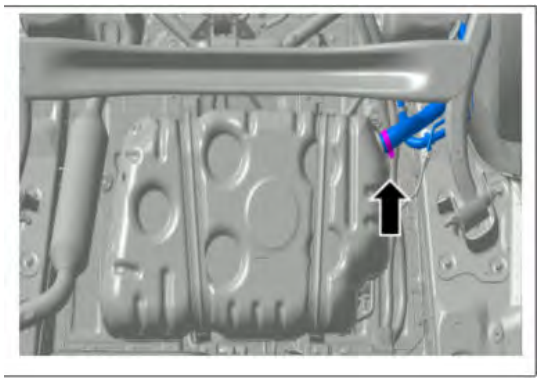


4. Insert the fuel tank drain hose into the fuel tank to drain the fuel.



5. Install the fuel filling hose and tighten the clamp.

Caution: Make sure that the clamps are installed and removed in the same direction.



3.4.5.2 Fuel system pressure release

Warning: Do not smoke or carry a lit cigarette or any type of open flame when operating fuel-related components or working near them. There is always a risk of flammable mixtures that could ignite. Failure to observe above operating instructions can result in serious personal injury.

Warning: Before working or disconnecting the fuel pipeline or fuel system components, reduce the pressure of the fuel system to prevent accidental spraying of fuel. Even if the engine is not working, the fuel in the fuel system is still under high pressure. Failure to do so may result in serious personal injury.

Warning: When operating on or near fuel-related parts, it is strictly prohibited to carry personal electronic devices such as mobile phones or any type of audio equipment. There is always a risk of flammable mixtures that could ignite. Failure to observe above operating instructions can result in serious personal injury.

Warning: When performing fuel-related operations, please be sure to follow the fuel operation precautions and be prepared to prevent fuel spillage. Hot components or other ignition sources on the vehicle may ignite spilled fuel. Failure to observe above operating instructions can result in serious personal injury.

1. Remove the oil pump control module relay xxx.

2. Start and run the engine at idle speed until it stops.

3. After the engine is turned off, start the engine for about 5 seconds to ensure that the fuel rail pressure has been released.

4. Turn the ignition switch to the OFF position.

5. After the fuel system repair is completed, install relay xxx (fuel pump relay) on the fuse box.

   Caution: Turn the ignition key circularly and wait for 3 seconds to pressurise the fuel system. It may be necessary to cycle the ignition key several times to pressurise the fuel system. Check for leakage before starting the engine.

6. Start the vehicle and check whether there is leakage in the fuel system.

3.4.5.3 Quick release joint

Disconnection

Warning: Never smoke or carry open flames when repairing or approaching any fuel-related components. There are often highly flammable gases here, which may cause fires. Failure to follow these instructions may result in personal injury.

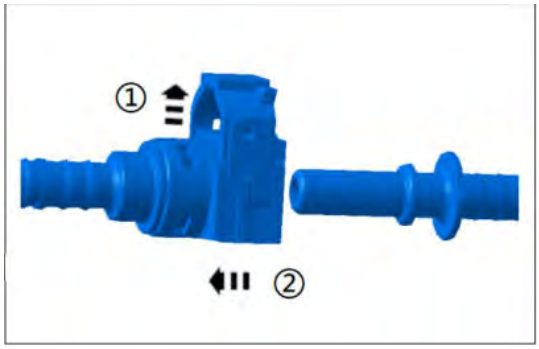
Caution: The petrol injection device is manufactured based on the very precise tolerance and clearance. As a result, the working environment shall be absolutely clean during operation of these parts. Be sure to block all openings.

Caution: Do not use tools or force to disconnect the quick-release connector.

1. Disconnect the fuel pipe quick connector.

   1 Use a straight screwdriver to lift the quick connector clip

   2 Disconnect the quick-release joint of oil inlet pipe



Connect

The connection order is the opposite of the disconnection order, and pay attention to the following matters:

1. **Caution:** When connecting the quick-release connector, make sure that the clip at ① is pressed. Check whether the quick-release connector cannot be separated when the clip is pressed. Nonconformance to these operation instructions may cause fuel leakage.
2. **Caution:** Confirm that the quick-plug connector is not polluted and check the O-shaped oil seal for any damage. Install a new O-shaped oil seal if necessary.

3.5 Cooling system

3.5.1 Specification

3.5.1.1 General specifications

Coolant

Item	Quantity	Concentration (%)
High-quality ethylene glycol antifreeze coolant	11-13L	50

Maintenance Data and Specifications

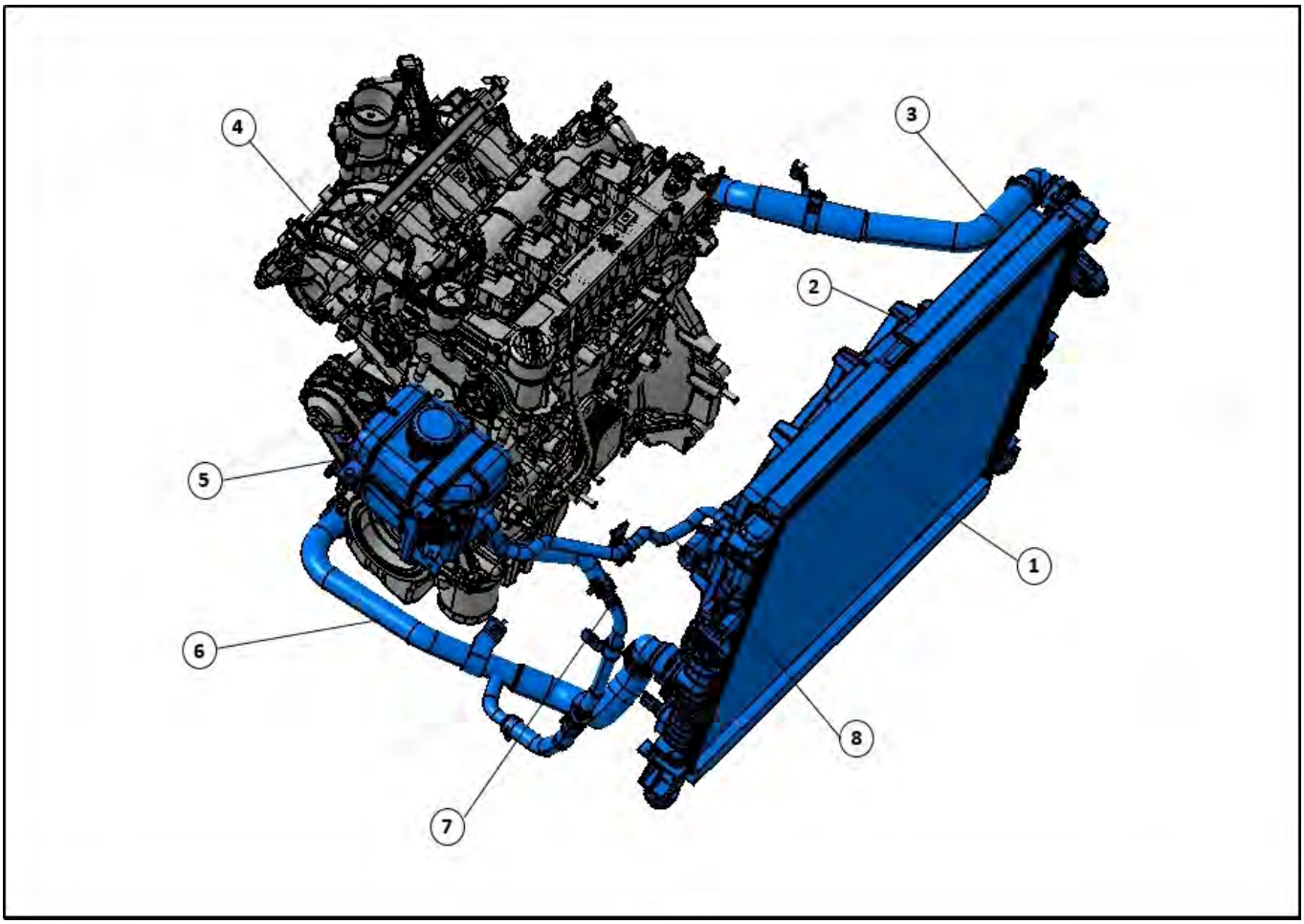
Coolant capacity of engine circulating water cooling loop	
Circulating coolant capacity of engine (the capacity in the fluid reservoir is at MAX)	9L
Coolant capacity of fluid reservoir (capacity in fluid reservoir at MAX.)	
Coolant capacity of **DCDC+** controller cooling circulation loop	
Coolant capacity of battery circulation (capacity in the fluid reservoir at MAX).	6L
Coolant capacity of fluid reservoir (capacity in fluid reservoir at MAX.)	
Battery re-circulation loop coolant capacity	
Coolant capacity of battery circulation (capacity in the fluid reservoir at MAX).	6L
Coolant capacity of fluid reservoir (capacity in fluid reservoir at MAX.)	

Caution: The coolant on the vehicle is insulating type. Do not replace or mix it with other brands of coolant; otherwise, it may cause danger.

3.5.2 Instructions and operations

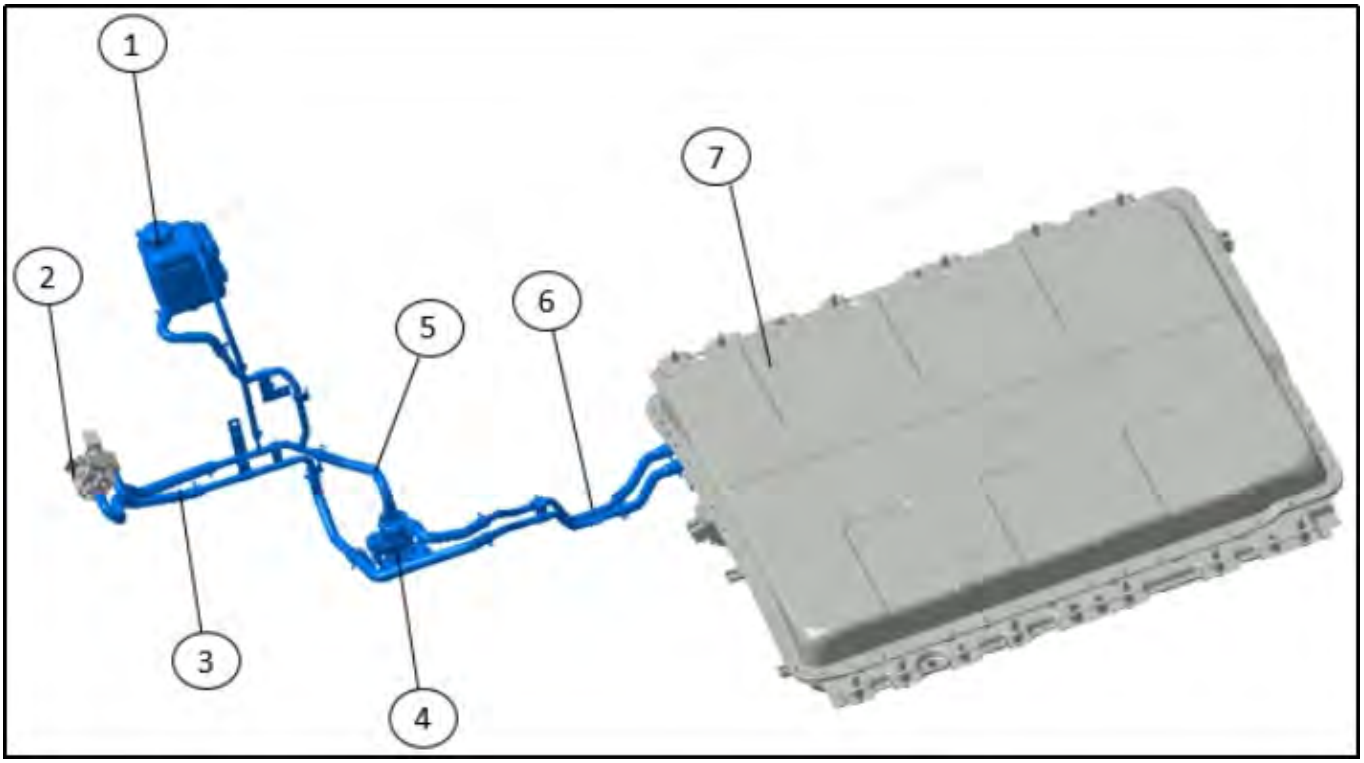
3.5.2.1 Cooling system

Engine cooling system



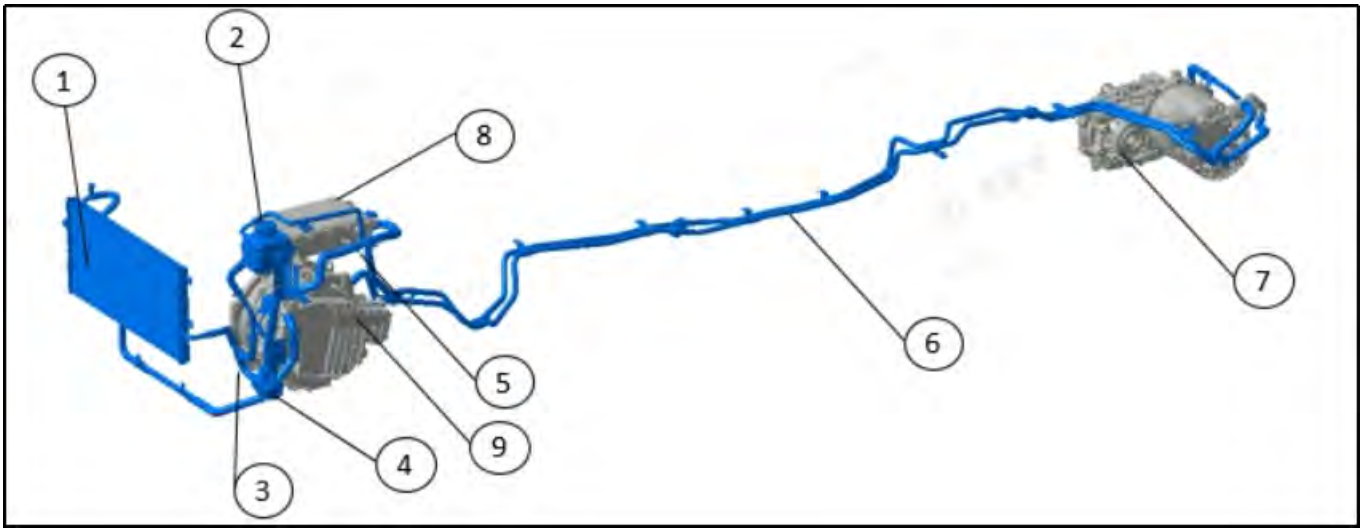
Item	Description	Item	Description
1	Radiator assembly	5	Expansion tank assembly I
2	Electronic fan assembly	6	Engine coolant inlet pipe assembly
3	Engine coolant outlet pipe	7	Engine coolant supply pipe
4	Engine assembly	8	Expansion tank degassing pipe

Battery pack cooling system



Item	Description	Item	Description
1	Expansion tank assembly II	5	Coolant pump inlet pipe I
2	Chiller	6	Battery pack coolant pipe assembly
3	Chiller coolant pipe assembly	7	Battery pack assembly
4	Electronic coolant pump assembly I		

Motor cooling



Item	Description	Item	Description
1	Low-temperature radiator assembly	6	Motor coolant pipe assembly
2	Expansion tank assembly III	7	Drive motor
3	Coolant pipe I	8	Two-in-one
4	Electronic coolant pump assembly II	9	GCU
5	Coolant pipe II		

3.5.2.2 Overview

The cooling system of the SX5GREEV EX01 model consists of three circulation systems, namely engine cooling + warm air circuit, DCDC+ controller cooling circulation circuit and battery cooling circulation circuit. Among them, the engine circulating water cooling circuit, DCDC+ controller cooling circulation circuit and battery cooling circulation circuit all use coolant for circulation cooling.

Engine circulating water cooling circuit

The engine circulation loop is mainly used to cool the engine and provide heat source for the warm air loop. If the engine circuit or heating circuit components have been replaced after sales, it is necessary to vacuum and add coolant. If there is no vacuum equipment, you can first use the diagnostic scanner to open the four-way reversing valve. The specific operation is as follows: You can use the diagnostic scanner to open the four-way valve for vacuum filling. The specific operation of opening the four-way valve with a diagnostic scanner is as follows: Turn on the diagnostic scanner → Special for Dongfeng Forthing → New Energy Model → Leiting REEV model → system selection → AC (A/C System - Futailong) → action test → four-way valve position → 100%; then add coolant, then start the engine and run it for about 20 minutes. When the coolant level in the expansion tank does not drop and remains between the MAX-MIN lines, and warm air blows out after turning on the heating function, it means that the filling is completed.

DCDC+ controller cooling circulation loop

The DCDC+ controller cooling circulation circuit is mainly used to cool the motor controller and DCDC. If the components of this circuit are replaced after sales, vacuuming and coolant filling are required to ensure that the air is exhausted cleanly. If there is no vacuum pumping equipment, enter the diagnostic scanner and select SX5G REEV model. Enter HCU system and action test command. Select "Duty Cycle of Electronic Coolant Pump of Drive Motor Controller", input data "90", run for about 20 minutes. When the coolant level in the expansion tank does not drop and remains between MAX-MIN lines, filling is completed, and stop the command "Duty Cycle of Electronic Coolant Pump of Drive Motor Controller".

Battery coolant circulation circuit

The battery circulation circuit is mainly used to cool the battery pack. For after-sales replacement of components in this circuit, it is necessary to vacuumise and fill coolant to ensure clean air discharge. If there is no vacuum pumping equipment, it is necessary to enter the diagnostic scanner and select SX5G REEV model. Enter HCU system and action test command. Select the name of "Duty Cycle of Electronic Coolant Pump in Battery Pack Circuit", input data "90" and run for about 20 minutes. When the coolant level in the expansion tank does not drop and remains between MAX-MIN lines, filling is completed. Stop the command "Duty cycle of electronic coolant pump in battery pack circuit".

3.5.3 Diagnosis and testing

3.5.3.1 Cooling System - Troubleshooting Table

Troubleshooting table

	Fault mode	Symptoms	Inspection Items	
Fault of parts and components of cooling system	Poor heat dissipation	Coolant pump fault	Electronic coolant pump	The liquid in the expansion tank does not flow
		Coolant temperature sensor fault	—	Abnormal temperature alarm
		Damaged cooling fin	Blocked by dust or paper scraps	Poor air circulation
			Mechanical damage	Damaged cooling fin
		Radiator coolant pipe blockage	Excessive foreign objects (rust, dirt, sand, etc.)	Coolant circulation failure
		Cooling fan fault	Fan assembly	Fan damage
		Chiller fault	Chiller	The compressor fails to refrigerate
	Insufficient system coolant	Pipeline coolant leakage	Coolant water hose	Loose clamp
				Hose rupture
			Coolant pump	Poor sealing
			Radiator	Damage, aging or poor installation of O-ring
				Radiator water tank breakage
				Radiator core breakage
			Expansion tank	Expansion tank breakage
Fault of parts and components other than the cooling system	—	Motor overload	Abnormal driving	Prolonged high-speed driving
				Ultra-high speed driving
			Transmission system fault	—
			Wheels and tyres of incorrect specifications are installed	
			Brake retardation	
	—	Battery overload	Abnormal driving	Long-time driving with heavy load

	Fault mode	Symptoms	Inspection Items	
	Poor air circulation	Bumper air vent blocked	—	—
		Radiator grille blocked	Installation of bonnet	
			Blocked by mud or paper scraps	
		Blocked radiator	—	
		Condenser blocked	Poor air circulation	
	Communication fault	The system is unresponsive	VCM	Communication fault

3.5.4 Removal and installation

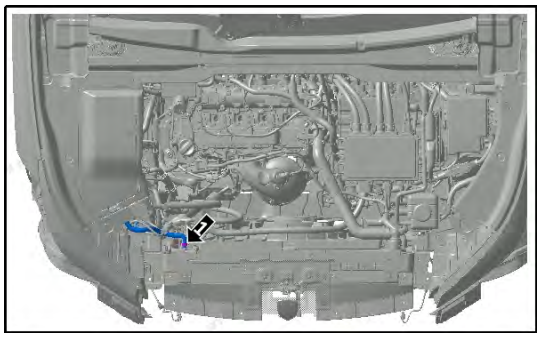
3.5.4.1 Radiator

General-purpose equipment

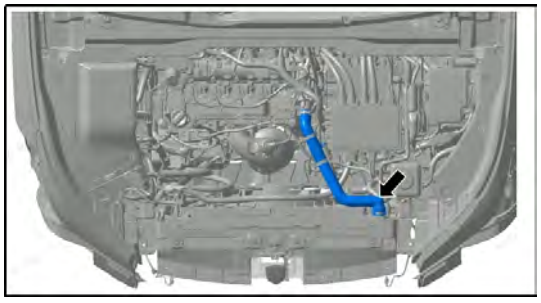
Coolant Hose Clamp Removal / Installation Tool

Removal

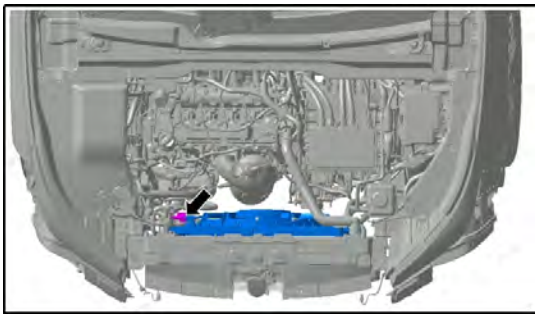
1. Drain the cooling system. Refer to: Coolant discharge.
2. Remove the engine compartment cover plate. Refer to: Engine compartment cover plate.
3. Remove the intake air filter. Refer to: Intake air filter.
4. Remove the front bumper. Refer to: Front bumper system.
5. Remove the front anti-collision beam. Refer to: Front anti-collision beam assembly.
6. Remove the horn and high-voltage harness. Refer to: Horn.
7. Remove the single-lug stepless clamp and loosen the expansion tank water supply pipe 1



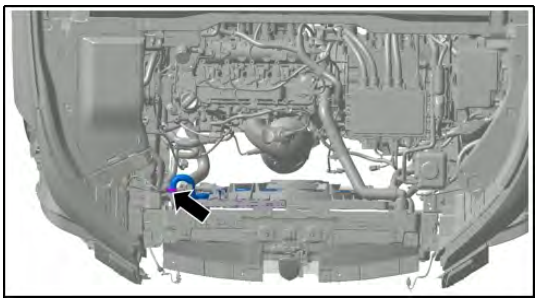
8. Loosen the engine water outlet at the radiator end.



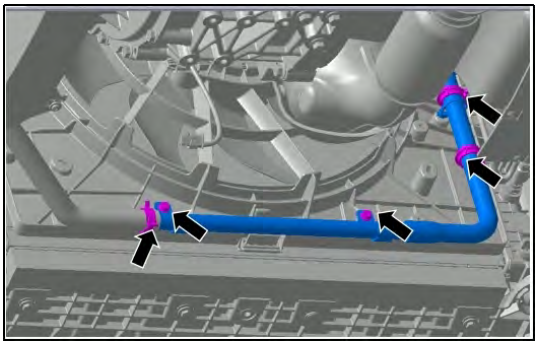
9. Remove the A/C high/low pressure pipe. Refer to: A/C pipeline.
10. Unplug the harness connector of the Electronic fan.



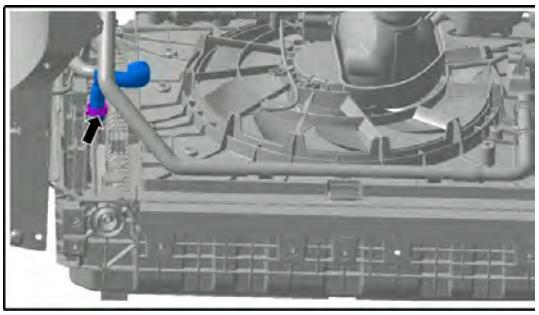
11. Remove the clamp and loosen the low-temperature radiator coolant pipe.



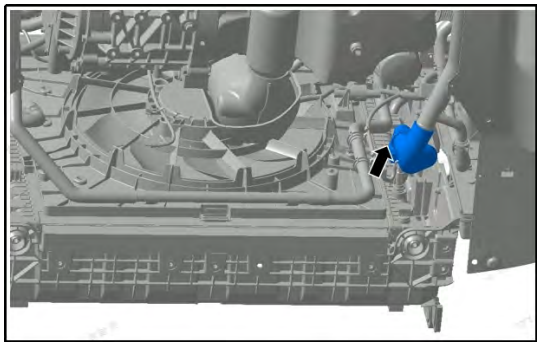
12. Remove the harness clips, bolts and clamps, and loosen the low-temperature radiator coolant pipe.



13. Remove the clamp and loosen the low-temperature radiator coolant pipe II.



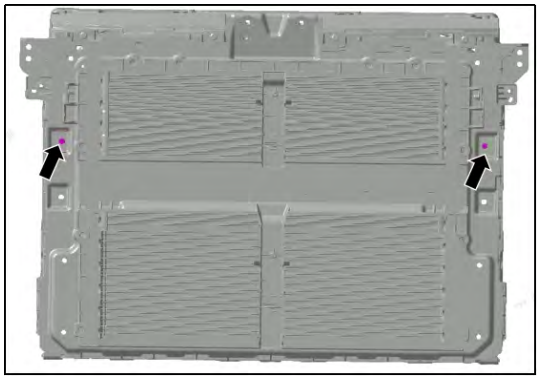
14. Loosen the interface between engine water inlet pipe and radiator.



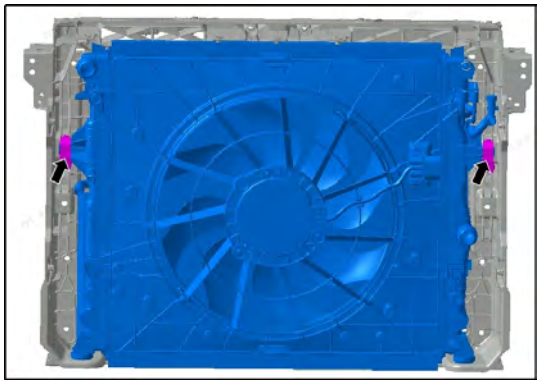
15. Remove the coolant temperature sensor. Refer to: Water temperature sensor.

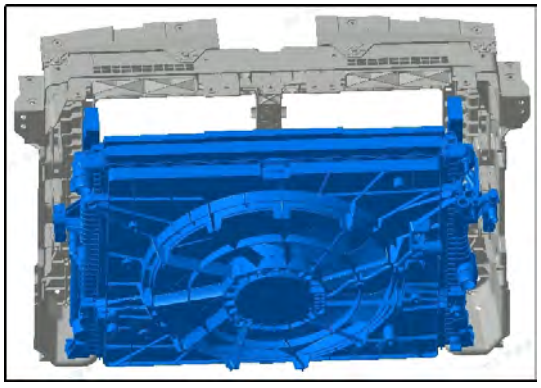
16. Remove the front frame module assembly. Refer to: Front-end framework system.

17. Remove the two fixing bolts on the front assembly module.

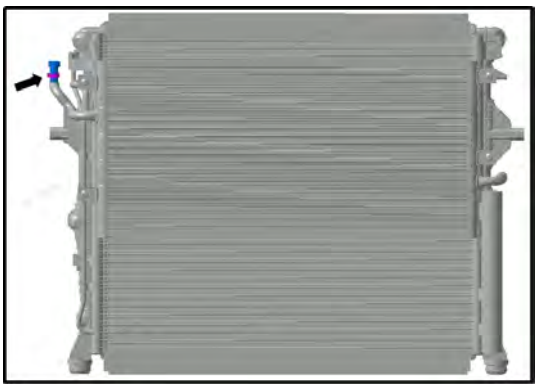


18. Loosen the left and right mount modules and remove the cooling module from the front frame.

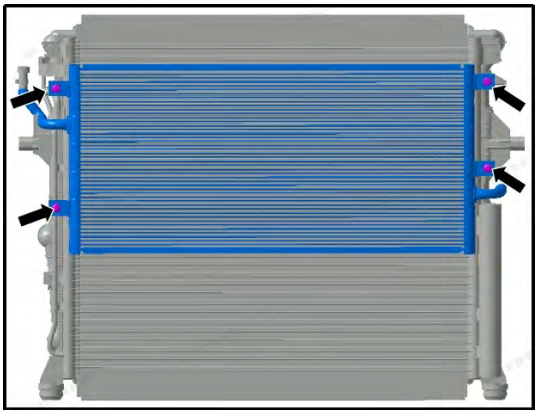




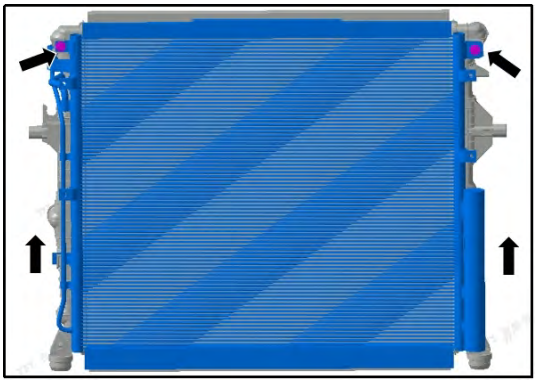
19. Remove the clamp and remove the water pipe plug on the low-temperature radiator.



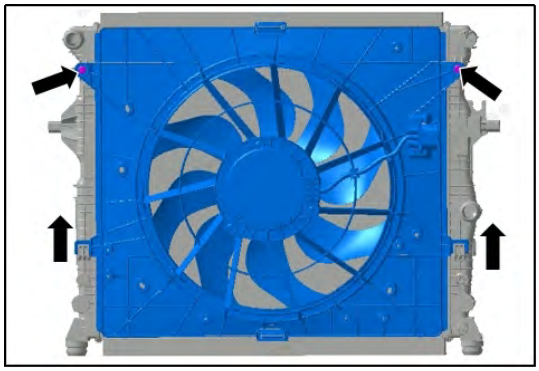
20. Remove the 4 bolts and remove the low-temperature radiator.



21. Remove the two bolts and lift them up to remove the condenser.



22. Remove the fixing bolts, lift up in the direction of the arrow, and remove the electronic fan assembly.



Installation

1. The installation order is the reverse of the removal order.

3.5.4.2 Electronic coolant pump assembly I

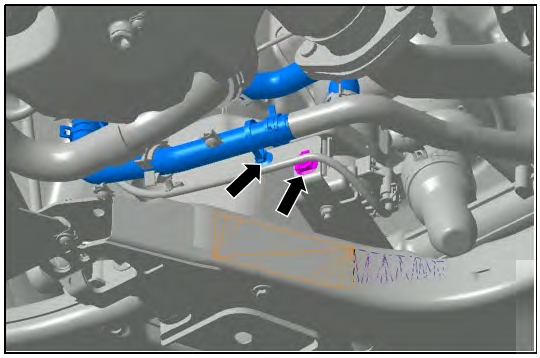
General-purpose equipment

Coolant Hose Clamp Removal / Installation Tool

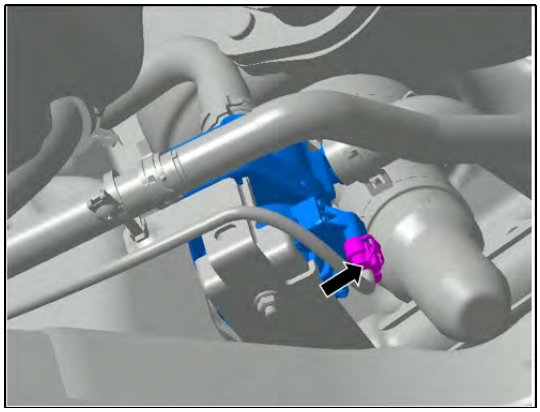
Removal

Caution: This removal procedure may contain some installation details.

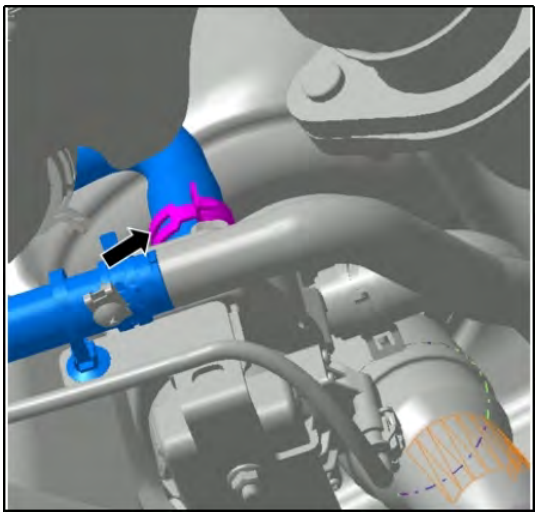
1. Drain the cooling system. Refer to: Coolant discharge.
2. Loosen the clips of chiller coolant pipe and harness.



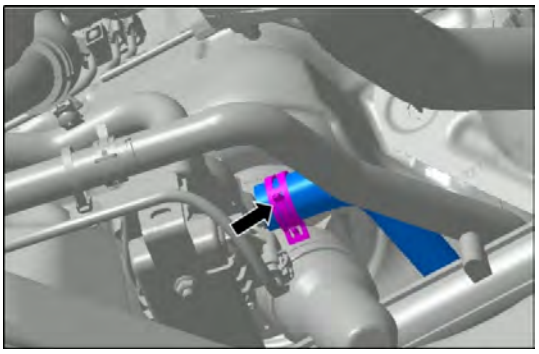
3. Loosen the coolant pump harness connector on the coolant pump.



4. Remove the hoop connecting the chiller coolant pipe assembly and the electronic coolant pump inlet, and loosen the coolant pipe interface connected to the coolant pump.



5. Remove the hoop connecting the battery pack coolant pipe assembly and the electronic coolant pump outlet, and loosen the coolant pipe interface connected to the coolant pump.



6. Lift the coolant pump upward to complete the disassembly of the coolant pump assembly 2.

Installation

1. The installation order is the reverse of the removal order.

3.5.4.3 Electronic coolant pump assembly II

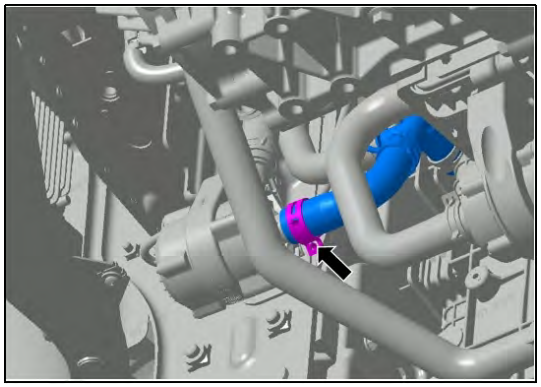
General-purpose equipment

Coolant Hose Clamp Removal / Installation Tool

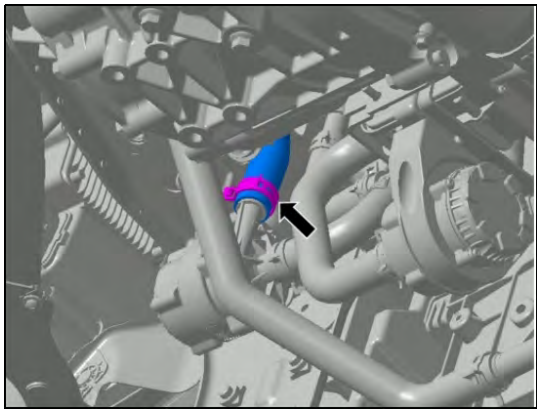
Removal

Caution: This removal procedure may contain some installation details.

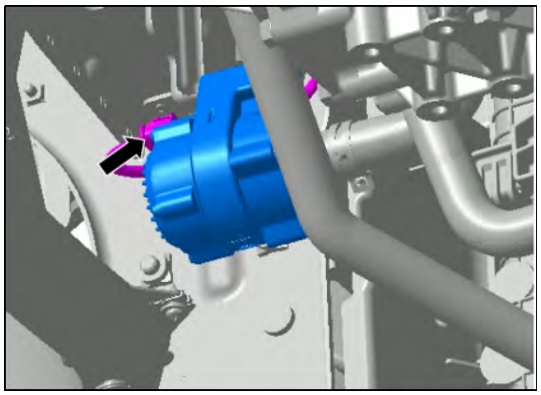
1. Drain the cooling system. Refer to: Coolant discharge.
2. Remove the hoop, and loosen the coolant pipe interface at the water inlet of coolant pipe I and electronic coolant pump assembly II.



3. Remove the hoop, and loosen the coolant pipe interface between coolant pipe II and water outlet of electronic coolant pump assembly II.



4. 1. Unplug the coolant pump harness connector on the coolant pump.



5. Pull the coolant pump out of the mounting bracket.

Installation

1. The installation order is the reverse of the removal order.

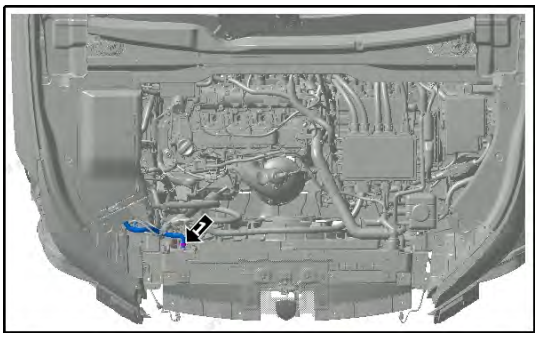
3.5.4.4 Cooling fan

General-purpose equipment

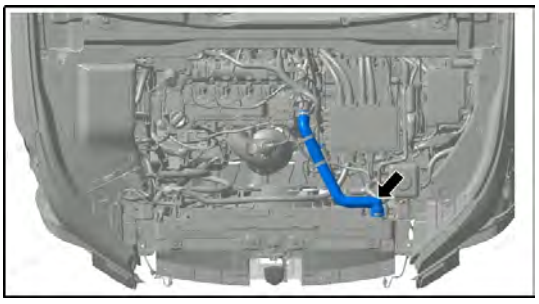
Coolant Hose Clamp Removal / Installation Tool

Removal

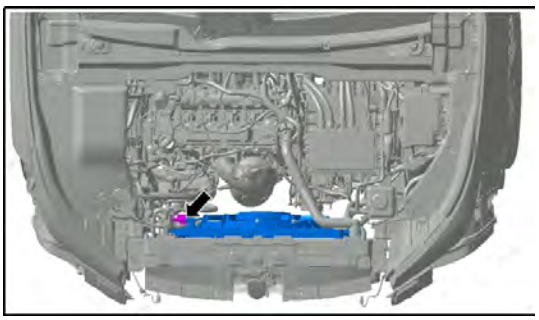
1. Drain the cooling system. Refer to: Coolant discharge.
2. Remove the engine compartment cover plate. Refer to: Engine compartment cover plate.
3. Remove the intake air filter. Refer to: Intake air filter.
4. Remove the front bumper. Refer to: Front bumper system.
5. Remove the front anti-collision beam. Refer to: Front anti-collision beam assembly.
6. Remove the horn and high-voltage harness. Refer to: Horn.
7. Remove the single-lug stepless clamp and loosen the expansion tank water supply pipe 1



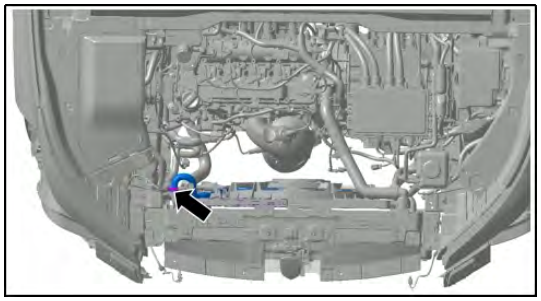
8. Loosen the engine water outlet at the radiator end.



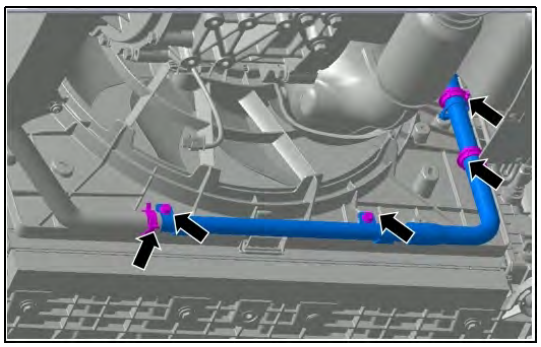
9. Remove the A/C high/low pressure pipe. Refer to: A/C pipeline.
10. Unplug the harness connector of the Electronic fan.



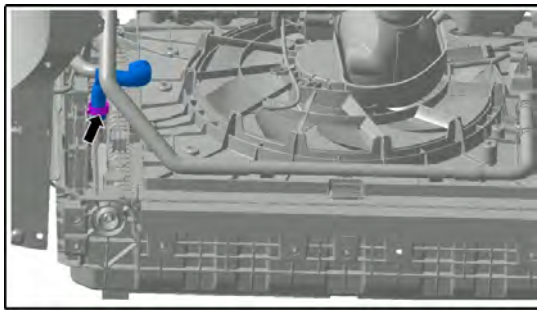
11. Remove the clamp and loosen the low-temperature radiator coolant pipe.



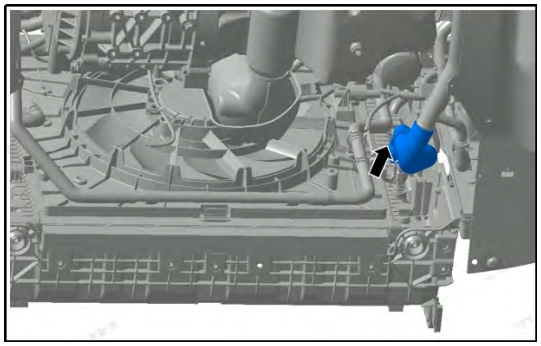
12. Remove the harness clips, bolts and clamps, and loosen the low-temperature radiator coolant pipe.



13. Remove the clamp and loosen the low-temperature radiator coolant pipe II.



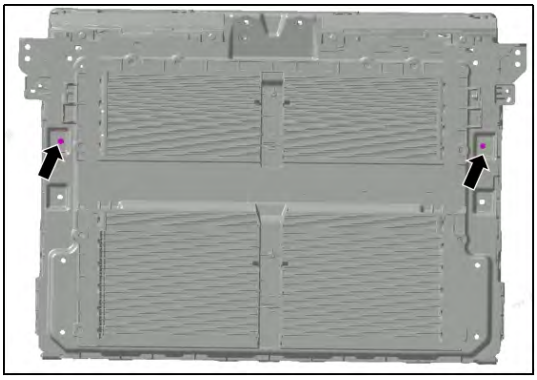
14. Loosen the interface between engine water inlet pipe and radiator.



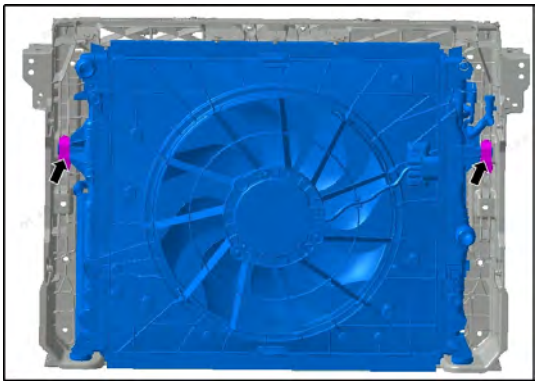
15. Remove the coolant temperature sensor. Refer to: Water temperature sensor.

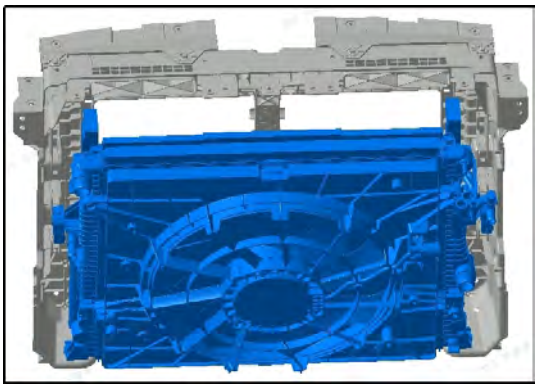
16. Remove the front frame module assembly. Refer to: Front-end framework system.

17. Remove the two fixing bolts on the front assembly module.

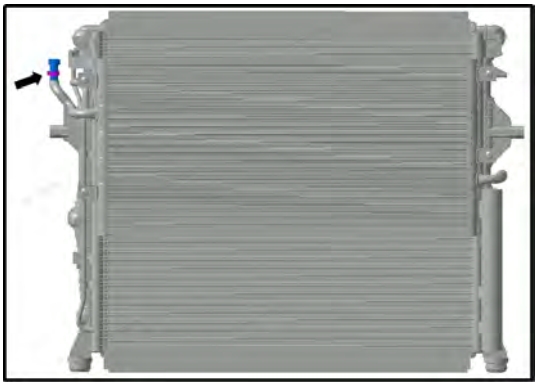


18. Loosen the left and right mount modules and remove the cooling module from the front frame.

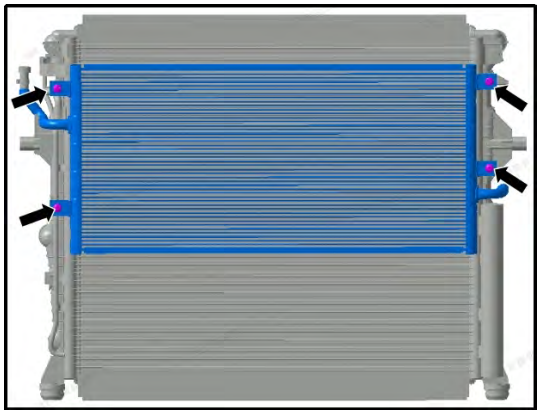




19. Remove the clamp and remove the water pipe plug on the low-temperature radiator.

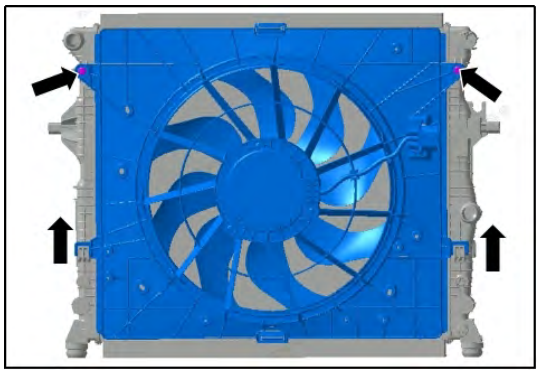


20. Remove the 4 bolts and remove the low-temperature radiator.



21. Remove the two bolts and lift them up to remove the condenser.

22. Remove the fixing bolt, lift it up in the direction of arrow and take out the cooling fan assembly.



Installation

1. The installation order is the reverse of the removal order.

3.5.4.5 Water outlet and water pipe

Removal

Caution: Please do insulation protection before performing this step.

1. Remove the rubber hose at the bottom of the radiator to drain the coolant. Refer to: Refer to: Discharge of coolant

   Caution: This step is performed only after the vehicle has cooled down.

2. Loosen the clamp and remove the hose to be removed.

Inspection after removal

Check whether the coolant water hose has any crack, damage or aging, and replace it if necessary.

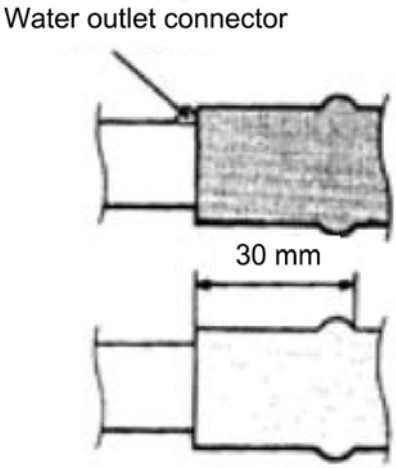
Installation

1. The installation order is reverse to the removal order. Pay attention to the following points

Caution: Insert each hose firmly, and fit the clamps, preventing the clamps clipping the lug boss of water pipe.

Caution: If there is no boss, the insertion depth is as shown in the Fig.

Caution: Apply neutral detergent to the O-ring while inserting the water pipe and heating pipe into the water pipe joint.



Inspection after installation

Start and run the vehicle. Visually inspect the system for coolant leaks.

3.5.4.6 Expansion tank

Removal

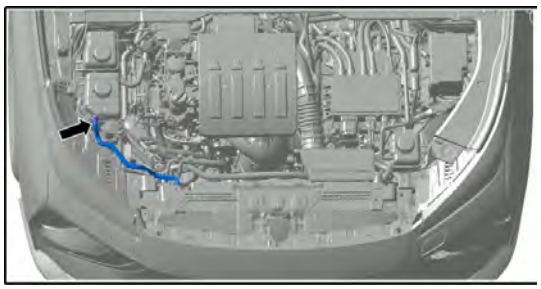
Caution: The coolant is toxic. If it is fatal to ingest the coolant by mistake, seek medical protection immediately.

Caution: When the coolant is heated, it will emit vapour. Avoid inhaling such vapour.

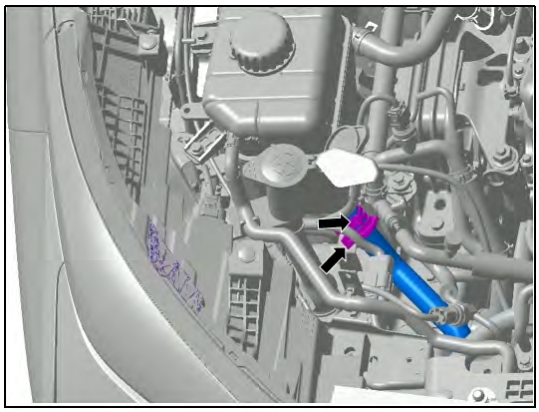
Caution: This removal procedure may contain some installation details.

1. Cooling system draining. Refer to: Coolant discharge
2. Remove the engine compartment cover plate. Refer to: Engine compartment cover plate.

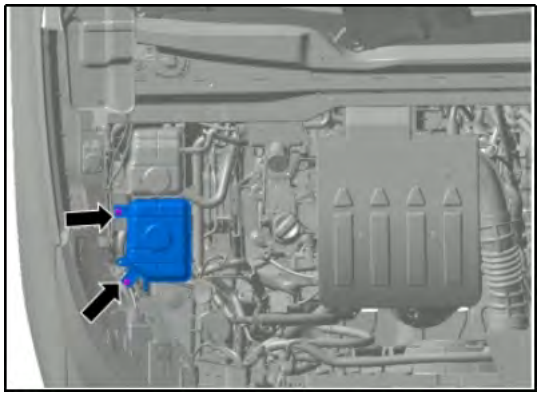
3. Remove the fastening hoop and loosen the radiator degassing pipe.



4. Remove the harness plug-in and hoop on the expansion tank water supply pipe.



5. Remove the fixing bolts on the expansion tank.



6. Remove the lower mounting cushion of expansion tank.

Installation

1. The installation order is the reverse of the removal order.

3.5.4.7 Expansion tank assembly II

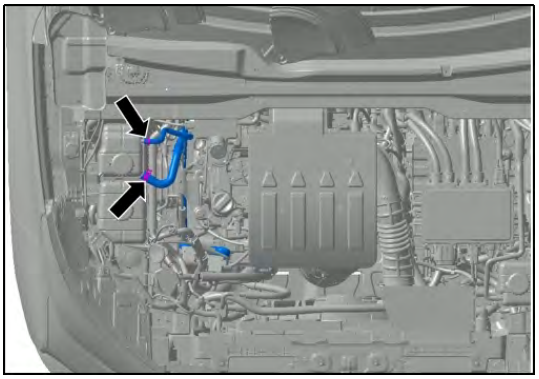
General-purpose equipment

Coolant Hose Clamp Removal / Installation Tool

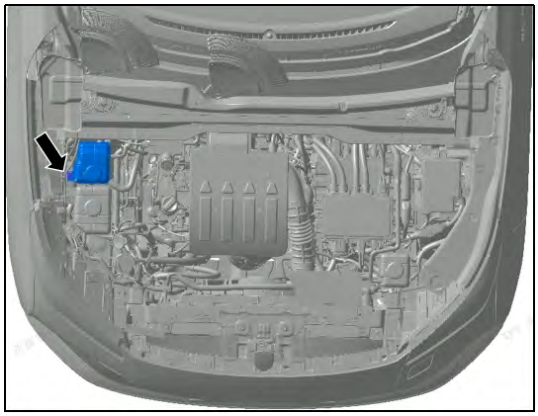
Removal

Caution: This removal procedure may contain some installation details.

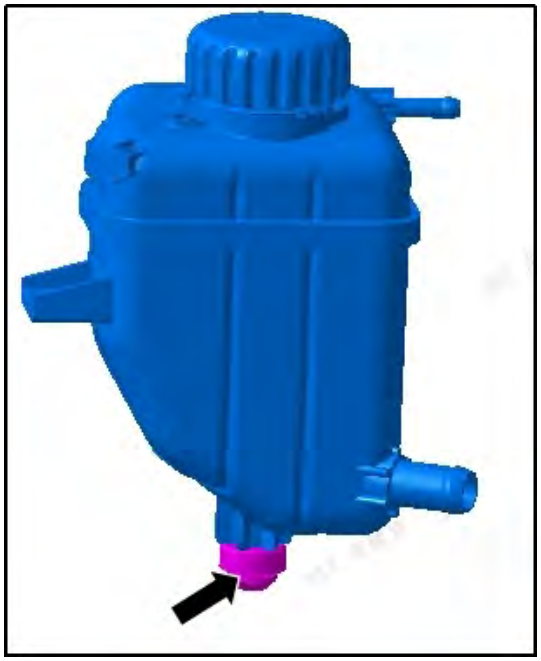
1. Drain the cooling system. Refer to: Coolant discharge.
2. Remove the engine compartment cover plate. Refer to: Engine compartment cover plate.
3. Remove the hoop and loosen the two connections between the chiller coolant pipe and the expansion tank.



4. Remove the bolts and then remove the expansion tank assembly II.



5. Remove the mounting cushion under the expansion tank.



Installation

1. The installation order is the reverse of the removal order.

3.5.4.8 Expansion tank assembly III

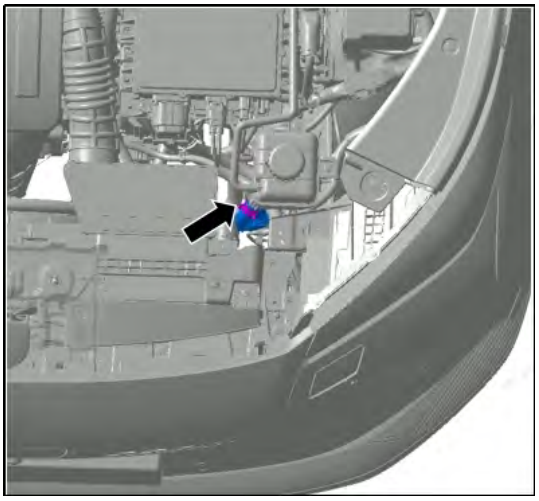
General-purpose equipment

Coolant Hose Clamp Removal / Installation Tool

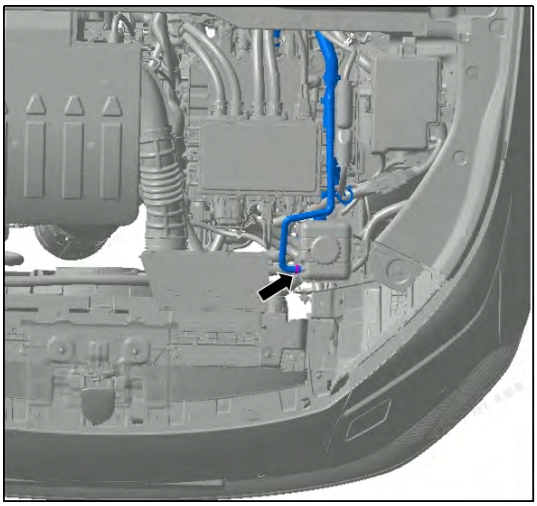
Removal

Caution: This removal procedure may contain some installation details.

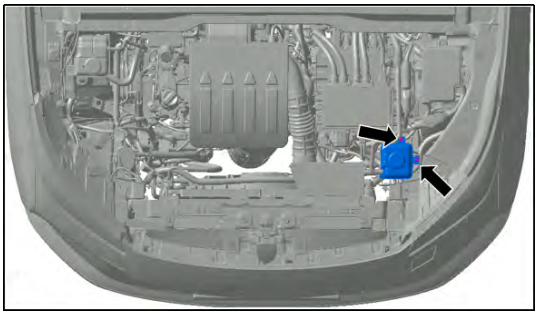
1. Drain the cooling system. Refer to: Coolant discharge.
2. Remove the engine compartment cover plate. Refer to: Engine compartment cover plate.
3. Remove the hoop and loosen the water pipe interface between the coolant pipe 1 and the expansion tank water supply port.



4. Remove the hoop and loosen the water pipe interface between the coolant pipe 2 and the expansion tank degassing port.



5. Remove the bolts and remove the expansion tank assembly 3.



Installation

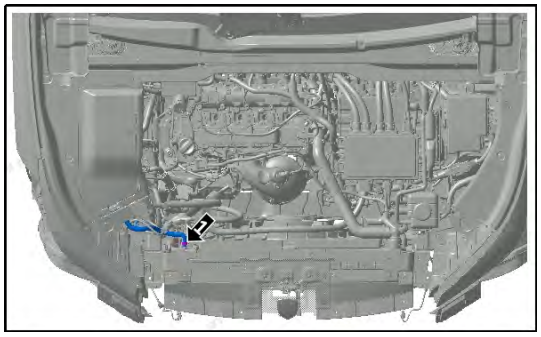
1. The installation order is the reverse of the removal order.

3.5.4.9 Low-temperature radiator

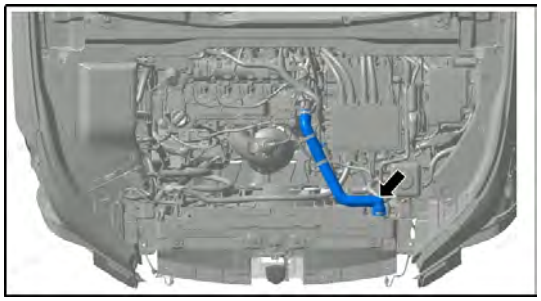
Caution: This removal procedure may contain some installation details.

Removal

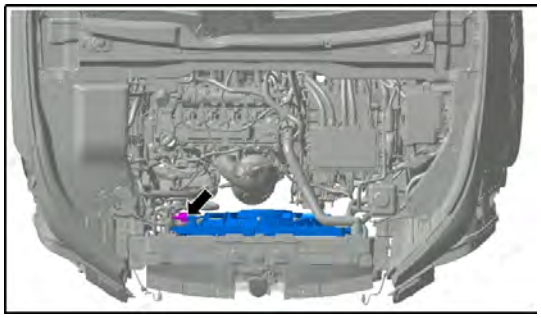
1. Drain the cooling system. Refer to: Coolant discharge.
2. Remove the engine compartment cover plate. Refer to: Engine compartment cover plate.
3. Remove the intake air filter. Refer to: Intake air filter.
4. Remove the front bumper. Refer to: Front bumper system.
5. Remove the front anti-collision beam. Refer to: Front anti-collision beam assembly.
6. Remove the horn and high-voltage harness. Refer to: Horn.
7. Remove the single-lug stepless clamp and loosen the expansion tank water supply pipe 1



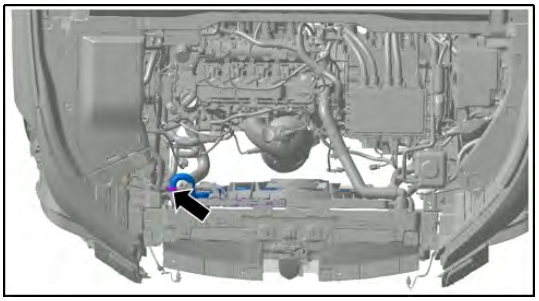
8. Loosen the engine water outlet at the radiator end.



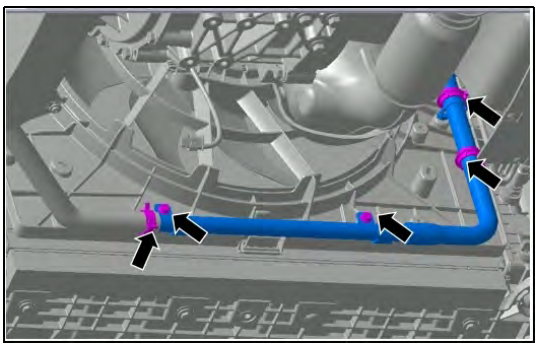
9. Remove the A/C high/low pressure pipe. Refer to: A/C pipeline.
10. Unplug the harness connector of the Electronic fan.



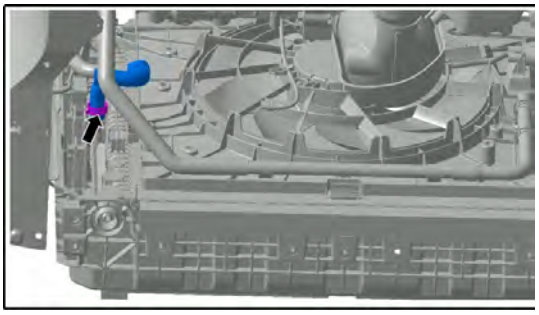
11. Remove the clamp and loosen the low-temperature radiator coolant pipe.



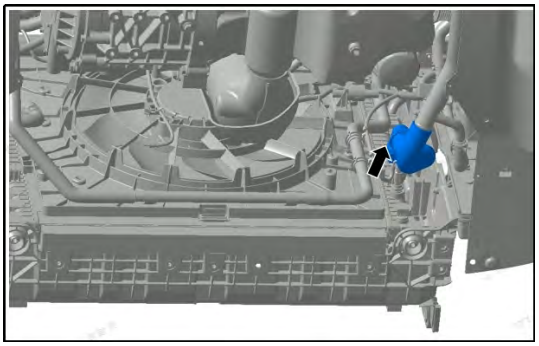
12. Remove the harness clips, bolts and clamps, and loosen the low-temperature radiator coolant pipe.



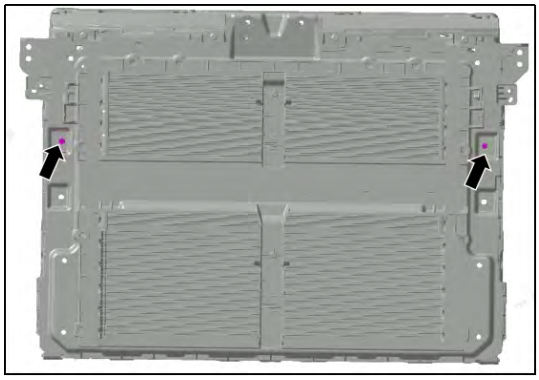
13. Remove the clamp and loosen the low-temperature radiator coolant pipe II.



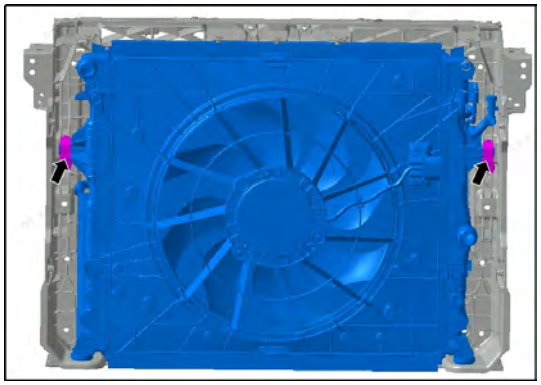
14. Loosen the interface between engine water inlet pipe and radiator.

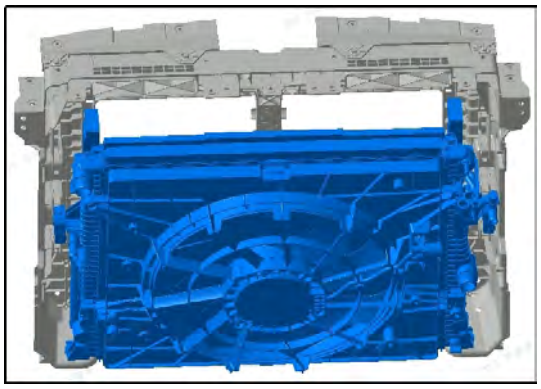


15. Remove the coolant temperature sensor. Refer to: Water temperature sensor.
16. Remove the front frame module assembly. Refer to: Front-end framework system.
17. Remove the two fixing bolts on the front assembly module.

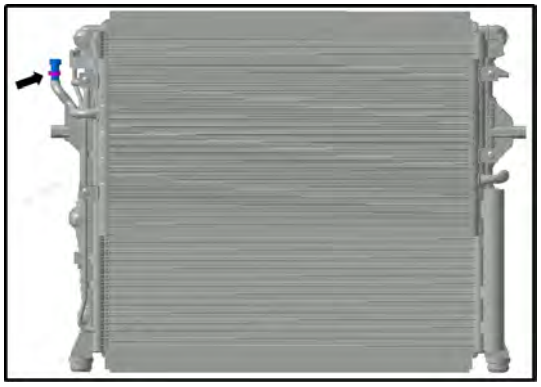


18. Loosen the left and right mount modules and remove the cooling module from the front frame.

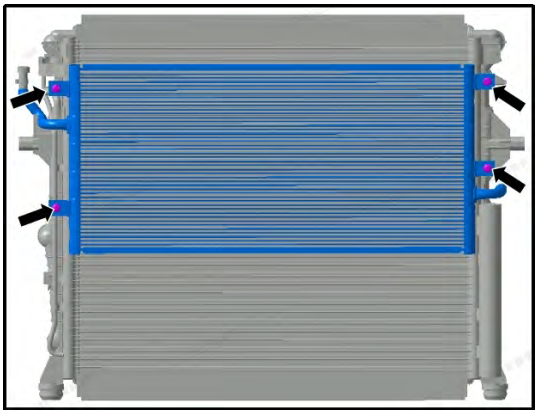




19. Remove the clamp and remove the water pipe plug on the low-temperature radiator.



20. Remove the 4 bolts and remove the low-temperature radiator.



Installation

1. The installation order is the reverse of the removal order.

3.5.5 General procedures

3.5.5.1 Draining, Filling and Bleeding of Cooling System

Draining

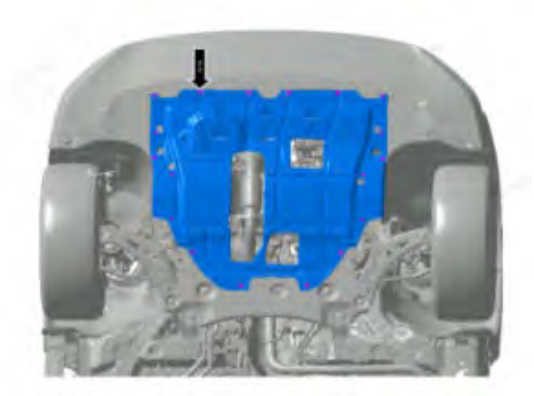
Warning: While releasing system pressure, cover the radiator port with a piece of thick cloth to prevent the coolant from boiling out. Violation of the instructions may cause personal injuries.

Warning: When the cooling system is overheated, do not open the radiator cap to prevent scalding due to the spilled steam.

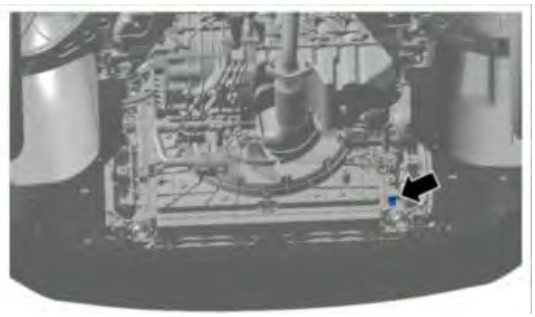
1. Open the coolant filler cover plate.

2. Remove the engine expansion tank cap.

3. Lift the vehicle. Refer to: Lifting the vehicle.
4. Fix the container to collect coolant.
5. Remove the fasteners of the engine lower shield and remove the engine lower shield.



6. Remove the radiator water discharging switch.



Caution: Recycle and dispose the old coolant in a centralised manner, waiting for scrapping or recycling.

Caution: Do not discharge old coolant into the sewer pipe to protect the environment.

7. Drain the coolant into a suitable container.
8. Install the radiator water discharging switch.
9. Lower the vehicle.

Filling and Bleeding

1. Drain the coolant into a suitable container.
2. Install the radiator water discharging switch.
3. Lower the vehicle.
4. When the vehicle is powered off (not in Ready state), fill coolant with specified concentration.
5. Install the radiator cap.
6. The A/C refrigeration is in the off position, ensuring that the heater temperature control has been set to the maximum position.
7. Start the engine and idle for 3 minutes, increase the engine speed to 1500~2500RPM/min.
8. Continue to run the engine at a speed of 1500~2500RPM/min until the cooling fan runs and maintains it for 3 minutes.
9. Run the engine at idle speed until the cooling fan stops rotating.

10. Turn off the engine and cool it down for 30 minutes.
11. Check the cooling system for leakage. Open the coolant expansion tank cover and fill the coolant to the "MAX" position if necessary.

3.6 Engine Intake and Exhaust System

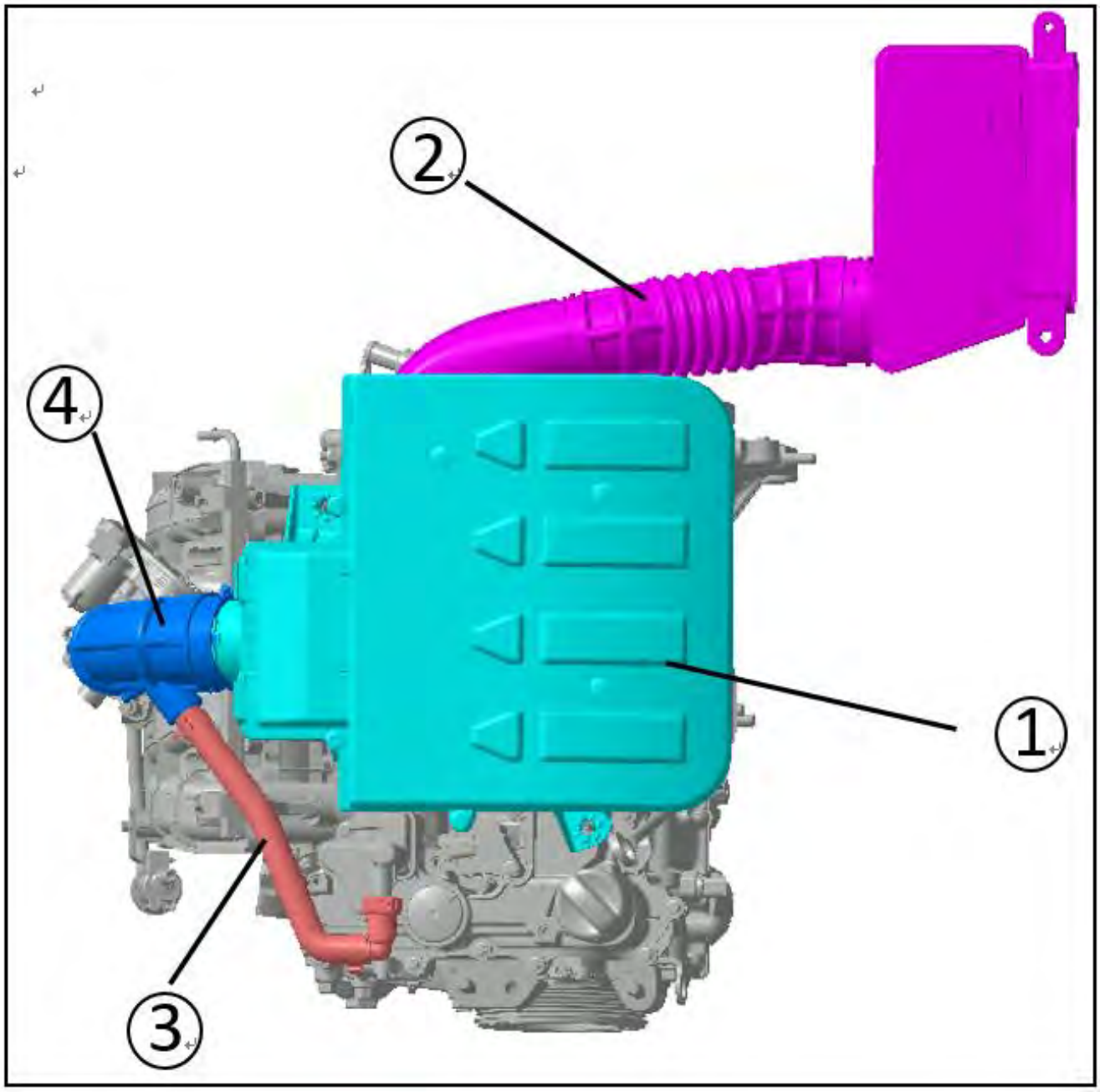
3.6.1 Specification

3.6.1.1 Torque specification

Name	Nm
Rear silencer fixing nut	45±5
Connecting nut between GPF assembly and exhaust front pipe	45±5
Heat shield fixing bolt	10±2
Heat shield fixing nut	10±2
Middle-row exhaust pipe fixing nut	45±5
Front flange lock nut of catalytic converter assembly	23±2
Connecting nut between catalytic converter assembly and engine cylinder block	45±5

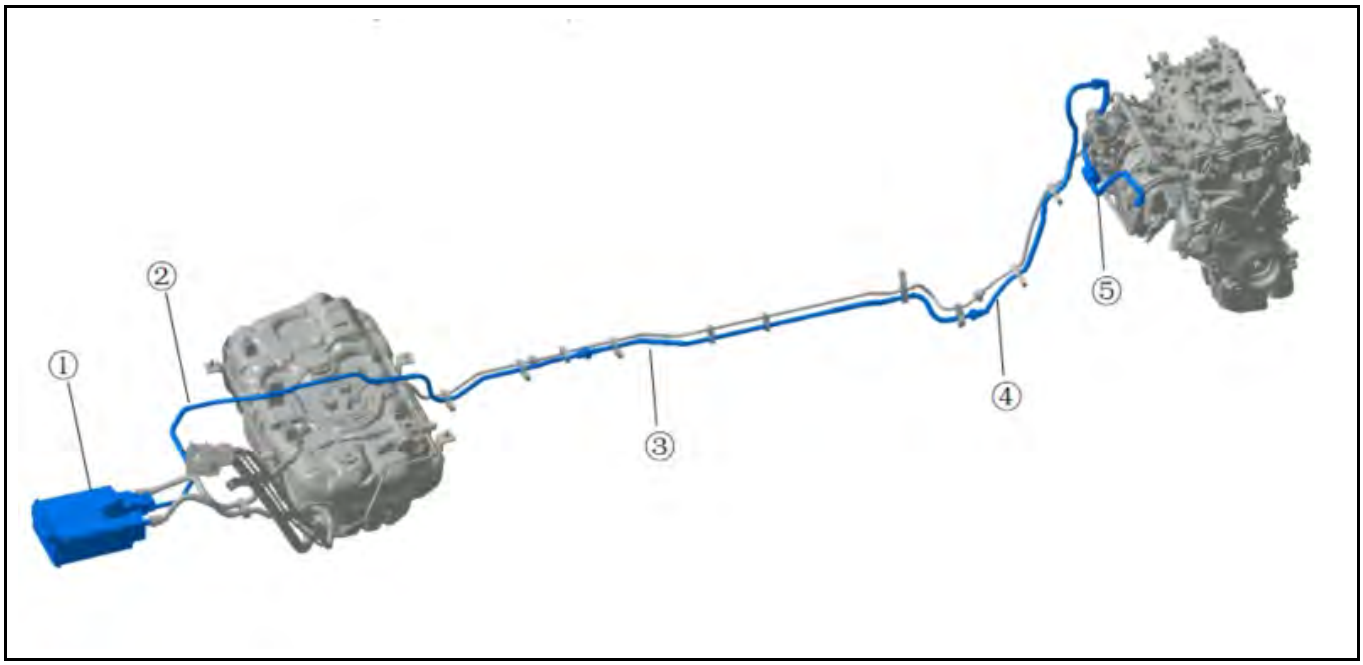
3.6.2 Instructions and operations

3.6.2.1 Air intake system



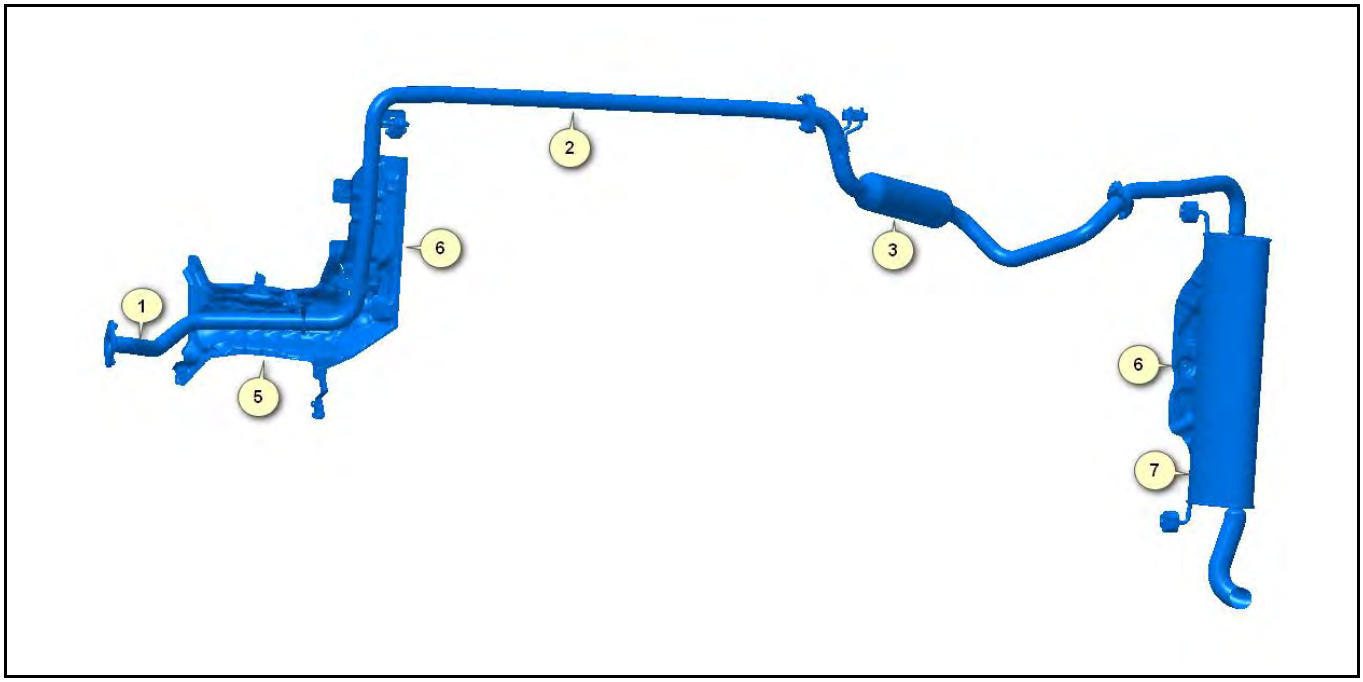
Item	Description	Item	Description
1	Air filter	3	Crankcase ventilation pipe
2	Air filter inlet pipe	4	Air filter air outlet pipe

3.6.2.2 Carbon canister pipeline



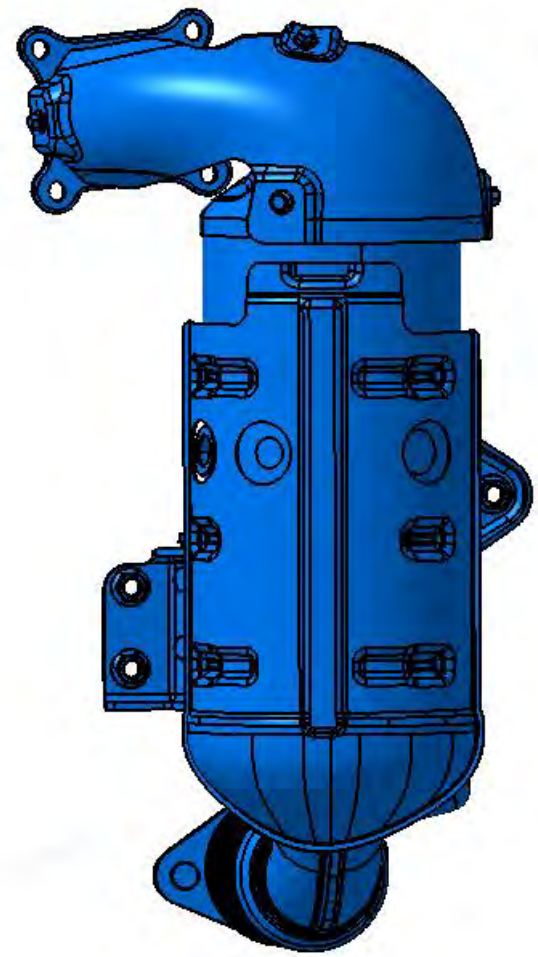
Item	Description	Item	Description
1	Carbon canister assembly	4	Carbon canister desorption tube III
2	Carbon canister desorption tube I	5	Carbon canister desorption tube IV
3	Carbon canister desorption tube II		

3.6.2.3 Exhaust pipe



Item	Description	Item	Description
1	Front-section exhaust pipe	5	Front heat shield
2	Middle-section exhaust pipe	6	Battery pack heat shield
3	Front exhaust silencer	7	Rear heat shield
4	Rear exhaust silencer		

3.6.2.4 Catalytic converter assembly



Item	Description
1	Catalytic converter assembly

3.6.2.5 Overview

Air intake system

Caution: When the intake system components are removed, please cover the open airway opening to prevent dust and debris from entering. It is important to prevent foreign objects from entering the system. Even small particles of debris may cause damage to the engine. Before installation or reassembly, all parts should be checked and cleaned as needed.

The engine intake system mainly consists of the following components:

1. Air filter: Filter particulate impurities in the air and provide clean air to the engine.

2. Air filter air inlet pipe: guides the air in the environment to flow into the air filter.

3. Air filter air outlet pipe: guides the air filtered by the air filter to flow to the throttle.

4. Crankcase ventilation pipe: connects the air filter air outlet pipe to the engine crankcase, provides clean air to the crankcase or recovers the oil and gas from the crankcase.

The working process of the intake system: After the air enters the air filter to filter out impurities in the air, it enters the throttle through the pipeline, and then enters the intake manifold through the throttle to control the intake flow, and finally reaches the engine.

Exhaust system

The main function of the three-way catalytic converter is to treat CO, THC, NOx, PN and other emission pollutants through catalytic reaction. The front and rear oxygen sensors are 4-wire switch oxygen sensors, which are used to detect the concentration of the mixed gas and the catalytic reaction performance of the three-way catalytic converter respectively. At the same time, two silencers are installed to reduce engine exhaust noise.

3.6.2.6 Precautions

Caution: Due to the high exhaust temperature, when parking without turning off the engine, make sure there are no flammable materials behind the vehicle to prevent a fire.

Caution: Do not place any part of your body near the exhaust outlet while the engine is running.

Caution: When the engine has just been turned off, the exhaust pipe will still be very hot. Please take proper protective measures before any maintenance or inspection to avoid burns from high temperatures.

Caution: When the engine is just shut off, the exhaust pipe is still at a high temperature, causing the bolts to expand from the heat and making the nuts difficult to remove. Attempting to disassemble at high temperatures can also cause thread damage. Wait for the exhaust pipe to cool before removing the fastening nuts.

3.6.3 Diagnosis and testing

3.6.3.1 Fault Diagnosis

After the engine is started, if the exhaust noise is obviously abnormal, check whether the exhaust pipe at the sound source is damaged or broken;

When the engine is started, it is normal for there to be water droplets or water flow in the exhaust.

The end cover of the rear-stage silencer is equipped with a drainage hole for drainage, and the cylinder and end cover of the rear-stage silencer adopt an undercutting process. There is a certain gap. The moisture in the exhaust gas condenses in the silencer and seeps out along the gap. This is a normal phenomenon and does not mean that the cylinder is damaged;

It is normal for the exhaust pipe to change colour under high temperature conditions and does not affect its use;

3.6.3.2 Fault Diagnosis

After the engine is started, if the exhaust noise is obviously abnormal, check whether the exhaust pipe at the sound source is damaged or broken;

When the engine is started, it is normal for there to be water droplets or water flow in the exhaust.

The end cover of the rear-stage silencer is equipped with a drainage hole for drainage, and the cylinder and end cover of the rear-stage silencer adopt an undercutting process. There is a certain gap. The moisture in the exhaust gas condenses in the silencer and seeps out along the gap. This is a normal phenomenon and does not mean that the cylinder is damaged;

It is normal for the exhaust pipe to change colour under high temperature conditions and does not affect its use;

3.6.3.3 Symptom Table

Symptoms	Possible cause	Measures
– Exhaust system leakage	– Misaligned or incorrectly installed exhaust system parts	– Tighten exhaust system parts to the specified torque Refer to: **Specifications (309-00A exhaust system,** technical specifications**).** – Ensure that the exhaust pipe hanger is placed properly and remains unloose
	– Seal or gasket leakage	– Replace the leaking seal or gasket
	– Deformation of joint surface at exhaust pipe connection	– Repair or replace the affected parts
	– Catalytic converter with GPF assembly, silencer with tail pipe assembly	– Replace the leaking component

3.6.3.4 Diagnosis and testing

Intake air distribution and filtration

Working principle

The intake system mainly removes particulate impurities in the air filter through the air filter to provide clean air for engine operation. At the same time, the oil and gas discharged from the crankcase are recovered for secondary combustion to avoid direct discharge into the environment and environmental pollution.

Inspection and confirmation

1. Confirm problems that owners complain about and check accordingly.
2. Observe for obvious signs of mechanical damage.
3. Before the next check, solve the identified problem first.
4. If the cause cannot be determined by visual check, confirm the symptom firstly and then check according to the List of Symptoms.

3.6.3.5 Diagnosis and testing

Appearance Checklist

Mechanical
– Air filter element and housing – Air filter outlet pipe – Air filter air inlet pipe – Crankcase ventilation pipe

3.6.3.6 Symptom Table

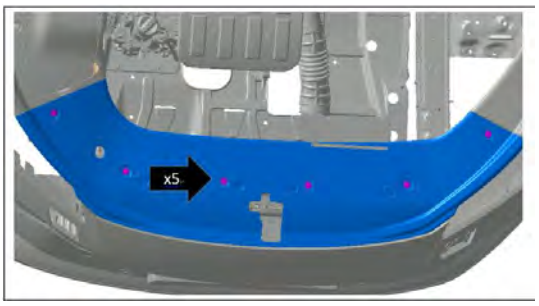
Symptoms	Possible cause	Measures
Power/performance loss	– The air filter component is blocked or damaged	– Install a new air filter component. Test whether the system works normally.
	– Loosen the connection or damage the air intake hose and duct	– Tighten the hose clamp. Check and repair the damage if necessary.
Excessive oil consumption	– The air filter component is blocked or damaged	– Install a new air filter component. Test whether the system works normally.
	– Damaged or shrunken air inlet pipe hoses and ducts	– Tighten the hose clamp. Check and repair the damage if necessary.
Excessive noise	– Loosen the connection or damage the air intake hose and duct	– Repair or install new pipes as required.
The engine has a lot of smoke (black/ blue/white)	– Blockage of air filter component	– Install a new air filter component. Test whether the system works normally.
	– Crankshaft ventilation pipe blocked or damaged	– Visually inspect the crankcase ventilation system. Repair or replace it if necessary.

3.6.4 Removal and installation

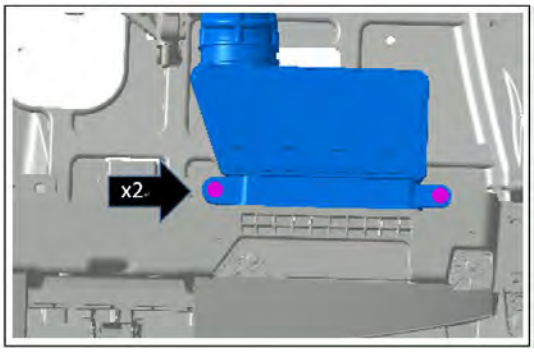
3.6.4.1 Air filter and air filter air inlet pipe

Removal

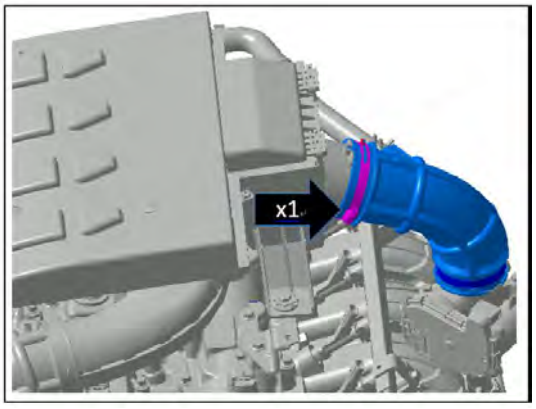
1. Remove the clip connecting the engine compartment cover plate to the body, and disengage the engine compartment cover plate.



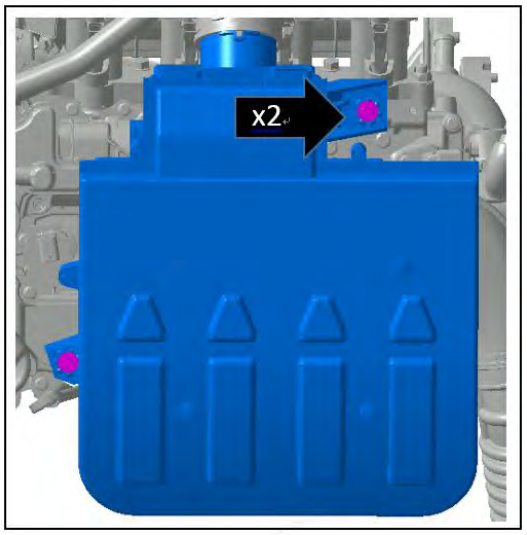
2. Remove the fixing bolts of the air filter air inlet pipe and disengage the air inlet pipe.



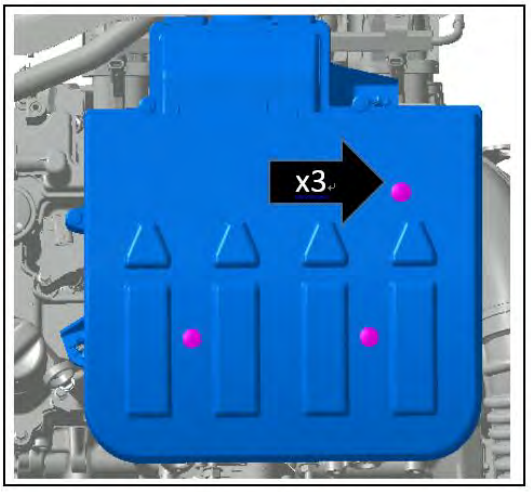
3. Remove the fixing clamp of air filter air outlet pipe, and disengage the air outlet pipe.



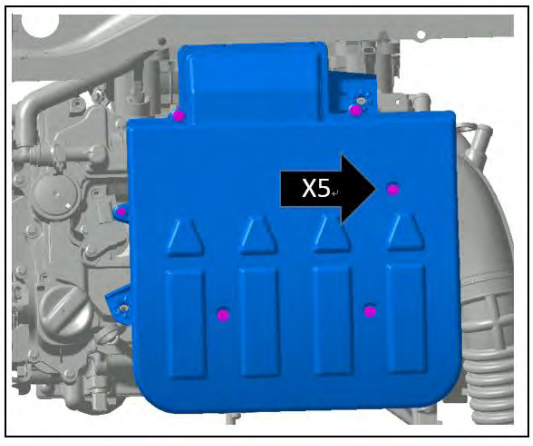
4. Remove the fixing bolts of the air filter assembly and pull out the air filter assembly upward.



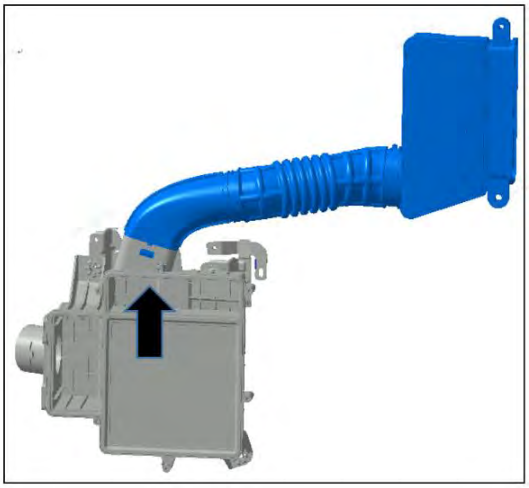
5. Remove the air filter rubber plug.



6. Remove the fixing screws of the air filter upper housing, and remove the air filter upper housing.



7. Press the limit clip connecting the air filter air inlet pipe and the air filter inlet to remove the air filter assembly.



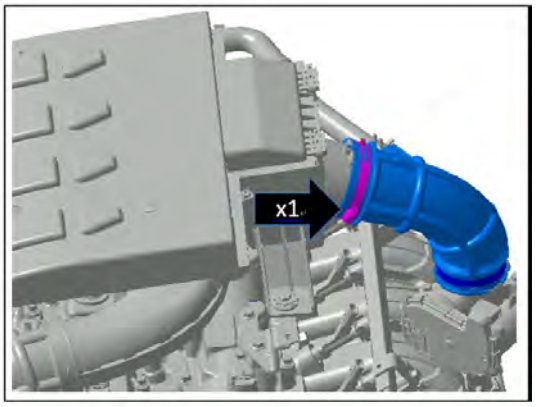
Installation

1. The installation order is reverse to the removal order.

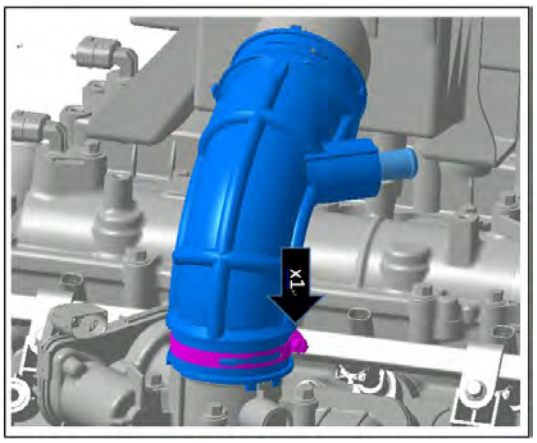
3.6.4.2 Air filter air outlet pipe

Removal

1. Remove the connecting hoop between air filter and air filter outlet pipe.



2. Remove the connecting hoop between air filter outlet pipe and engine.



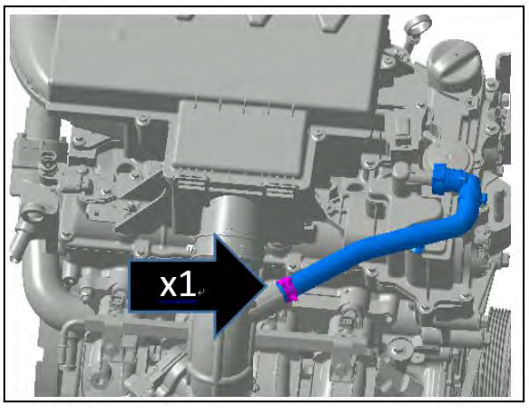
Installation

1. The installation order is reverse to the removal order.

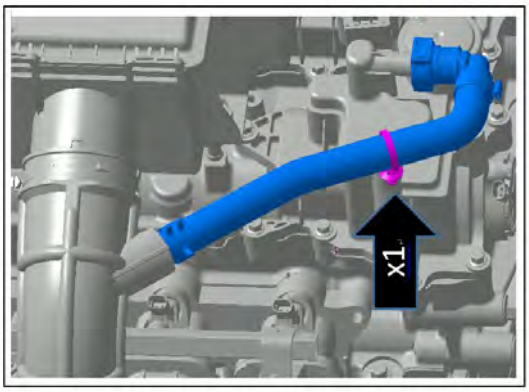
3.6.4.3 Crankcase ventilation pipe

Removal

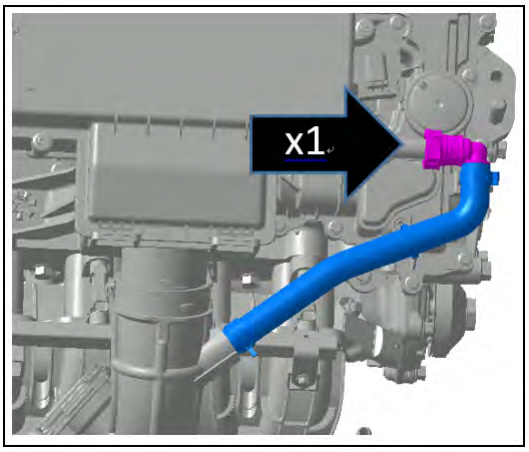
1. Remove the connecting clamp of crankcase ventilation pipe.



2. Remove the fixing clip connecting crankcase ventilation pipe to engine.



3. Remove the quick connector connecting the crankcase ventilation pipe to the engine.



Installation

1. The installation order is reverse to the removal order.

3.6.4.4 Catalytic converter assembly

Removal

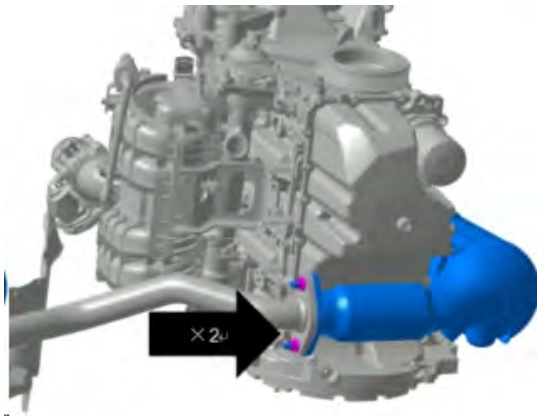
Caution: The temperature of the exhaust system is very high during normal operation. The exhaust system can only be repaired after it has cooled down.

Caution: The exhaust gas contains carbon monoxide, which is harmful to the human body and can cause death in severe cases. If there is a leak in the exhaust system, it needs to be repaired immediately. Do not start the engine in an enclosed area. Violation of the above operations may cause personal injury .

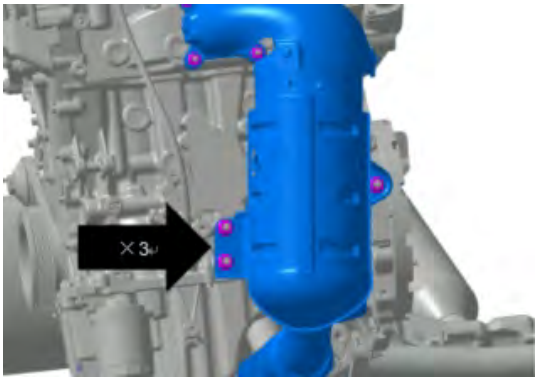
Caution: Do not use oil or grease lubricants on the rubber suspension of the exhaust system. Because these substances can cause rubber deterioration, resulting in the separation of the rubber barrier from the bracket during vehicle driving.

1. Loosen the front and rear oxygen sensor electrical connectors, lift and support the vehicle. Refer to: Lifting the vehicle. Torque: 45±5 Nm
2. Remove the connecting nut between the front exhaust pipe and the rear flange of the catalytic converter assembly. Torque: 45±5 Nm

   Caution: Discard the old gasket and replace it with a new one during installation.

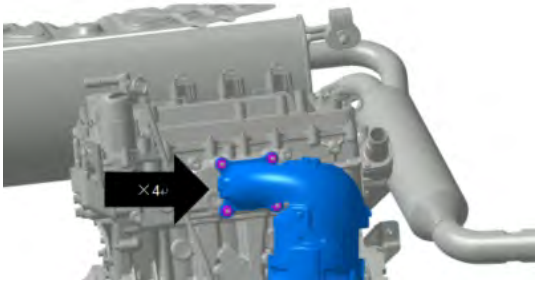


3. Lower the vehicle.
4. Remove the locking nut between the catalytic converter assembly and the engine cylinder block. Torque: 45±5 Nm



5. Remove the lock nut between the front flange of the catalytic converter assembly and the outlet flange of the engine exhaust manifold. Torque: 23±2Nm

   Caution: Discard the old gasket and replace it with a new one during installation.



6. Take out the catalytic converter assembly.

3.6.4.5 Front-section exhaust pipe

Removal

Caution: The temperature of the exhaust system is very high during normal operation. The exhaust system can only be repaired and other operations after it is cooled.

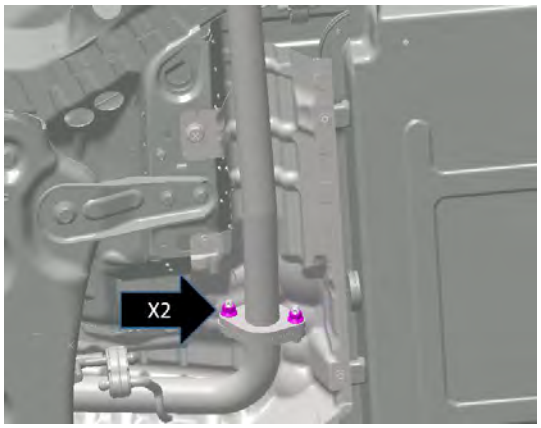
Caution: The exhaust gas contains carbon monoxide, which is harmful to the human body and can cause death in severe cases. If there is a leak in the exhaust system, it needs to be repaired immediately. Do not start the engine in an enclosed area. Violation of the above operations may cause personal injury.

Caution: Do not use oil or grease lubricants on the rubber suspension of the exhaust system. Because these substances can cause rubber deterioration, resulting in the separation of the rubber isolator from the bracket during vehicle driving.

1. Lift and support the vehicle. Refer to: Lifting the vehicle.
2. Remove the connecting nut between the front exhaust pipe and the middle-section exhaust pipe.

   Caution: Discard the old gasket and replace it with a new one during installation.

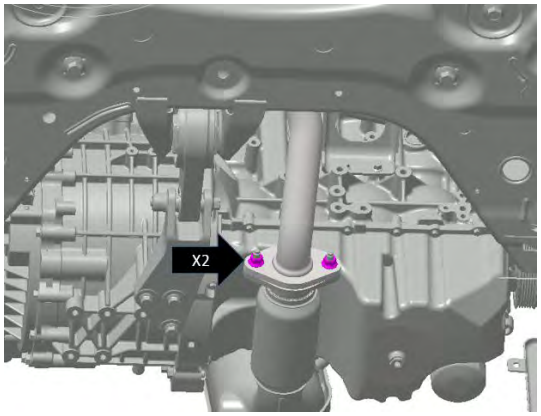
Torque: 45±5 Nm



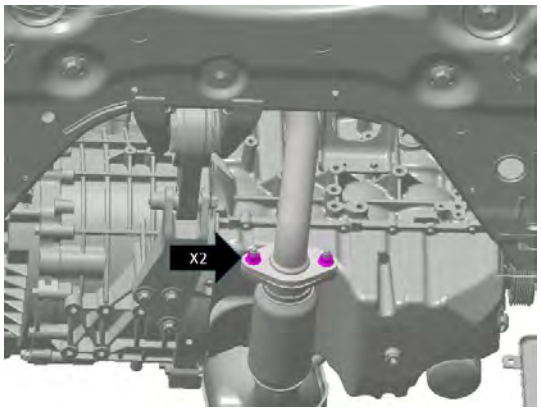
3. Remove the connecting nut between the front exhaust pipe and the catalytic converter assembly.

   Caution: Discard the old gasket and replace it with a new one during installation.

   Torque: 45±5 Nm



4. Disconnect the rubber lifting lug of the front silencer assembly from the front exhaust silencer, and remove the front exhaust pipe.



Installation

1. The installation order is the reverse of the removal order.

3.6.4.6 Middle-section exhaust pipe

Removal

Caution: The temperature of the exhaust system is very high during normal operation. The exhaust system can only be repaired and other operations after it is cooled.

Caution: The exhaust gas contains carbon monoxide, which is harmful to the human body and can cause death in severe cases. If there is a leak in the exhaust system, it needs to be repaired immediately. Do not start the engine in an enclosed area. Violation of the above operations may cause personal injury.

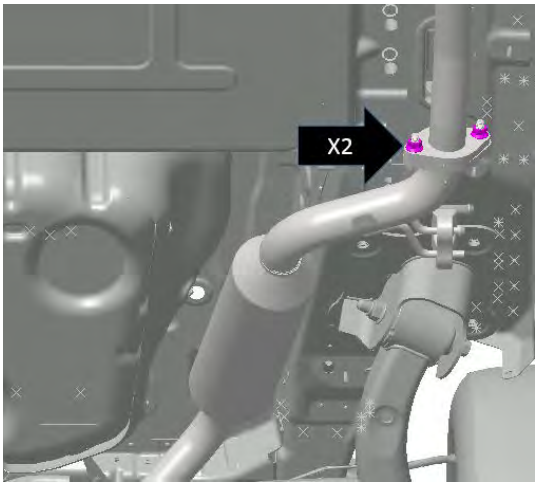
Caution: Do not use oil or grease lubricants on the rubber suspension of the exhaust system. Because these substances can cause rubber deterioration, resulting in the separation of the rubber isolator from the bracket during vehicle driving.

1. Lift and support the vehicle. Refer to: Lifting the vehicle.

2. Remove the connecting nut between the front exhaust silencer and the middle-section exhaust pipe.

   Caution: Discard the old gasket and replace it with a new one during installation.

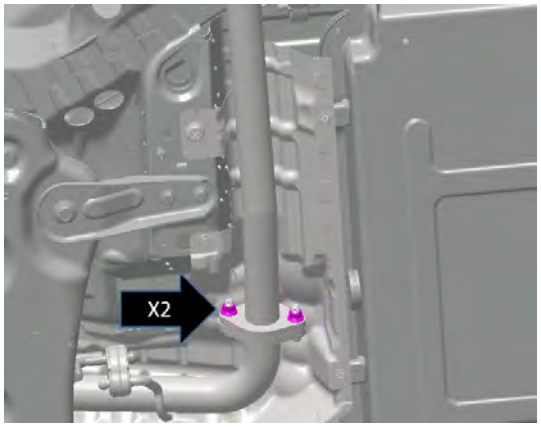
   Torque: 45±5 Nm



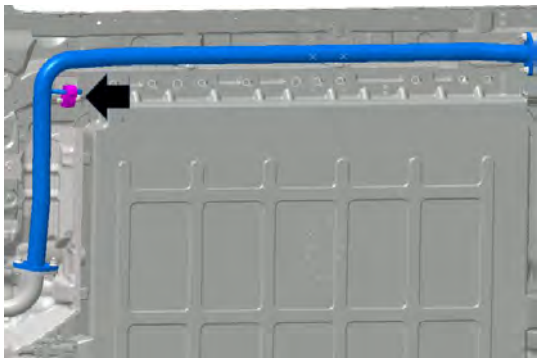
3. Remove the connecting nut between the front exhaust pipe and the middle-section exhaust pipe.

   Caution: Discard the old gasket and replace it with a new one during installation.

   Torque: 45±5 Nm



4. Disconnect the rubber lifting lug of the front silencer assembly from the middle-section exhaust pipe, and remove the middle-section exhaust pipe.



Installation

1. The installation order is the reverse of the removal order.

3.6.4.7 Front exhaust silencer

Removal

Caution: The temperature of the exhaust system is very high during normal operation. The exhaust system can only be repaired and other operations after it is cooled.

Caution: The exhaust gas contains carbon monoxide, which is harmful to the human body and can cause death in severe cases. If there is a leak in the exhaust system, it needs to be repaired immediately. Do not start the engine in an enclosed area. Violation of the above operations may cause personal injury.

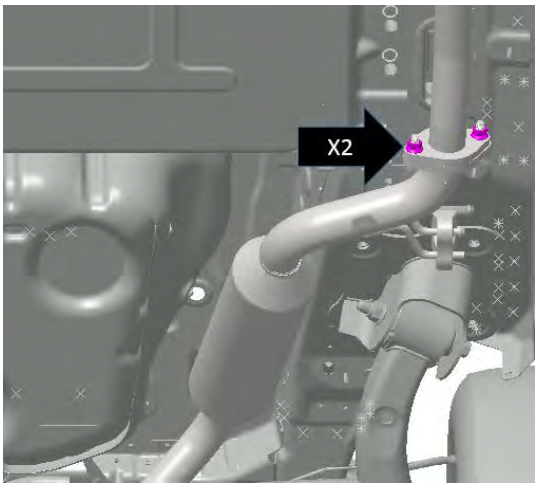
Caution: Do not use oil or grease lubricants on the rubber suspension of the exhaust system. Because these substances can cause rubber deterioration, resulting in the separation of the rubber isolator from the bracket during vehicle driving.

1. Lift and support the vehicle. Refer to: Lifting the vehicle.

2. Remove the connecting nut between the front exhaust silencer and the middle-section exhaust pipe.

Caution: Discard the old gasket and replace it with a new one during installation.

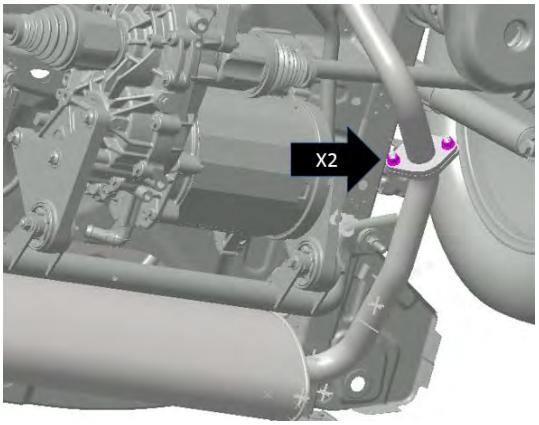
Torque: 45±5 Nm



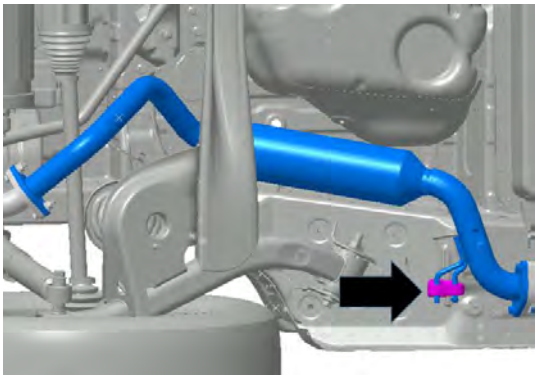
3. Remove the connecting nut between the front exhaust silencer and the rear exhaust silencer.

Caution: Discard the old gasket and replace it with a new one during installation.

Torque: 45±5 Nm



4. Disconnect the rubber lifting lug of the front silencer assembly from the front exhaust silencer, and remove the front exhaust silencer.



Installation

1. The installation order is the reverse of the removal order.

3.6.4.8 Rear exhaust silencer

Removal

Caution: The temperature of the exhaust system is very high during normal operation. Repair and other operations can be carried out only after the exhaust system cools down.

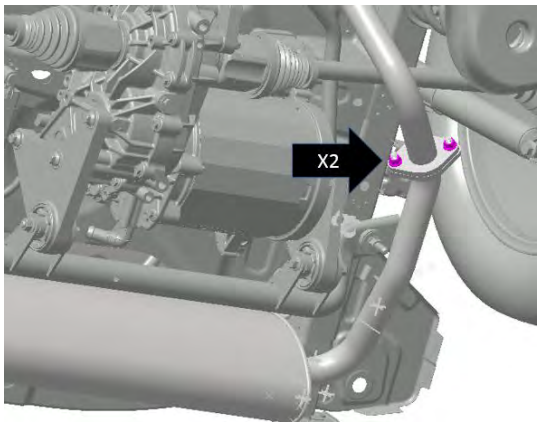
Caution: The exhaust gas contains carbon monoxide, which is harmful to the human body and can cause death in severe cases. If there is a leak in the exhaust system, it needs to be repaired immediately. Do not start the engine in an enclosed area. Violation of the above operations may cause personal injury.

Caution: Do not use oil or grease lubricants on the rubber suspension of the exhaust system. Because these substances can cause rubber deterioration, resulting in the separation of the rubber isolator from the bracket during vehicle driving.

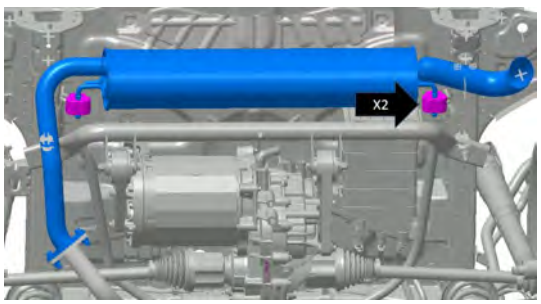
1. Lift and support the vehicle. Refer to: Lifting the vehicle.
2. Remove the connecting nut between rear exhaust silencer and front silencer

   Caution: Discard the old gasket and replace it with a new one during installation.

   Torque: 45±5 Nm



3. Remove the connection between the rear exhaust silencer and the rear rubber hanger, and remove the rear exhaust silencer.



Installation

1. The installation order is the reverse of the removal order.

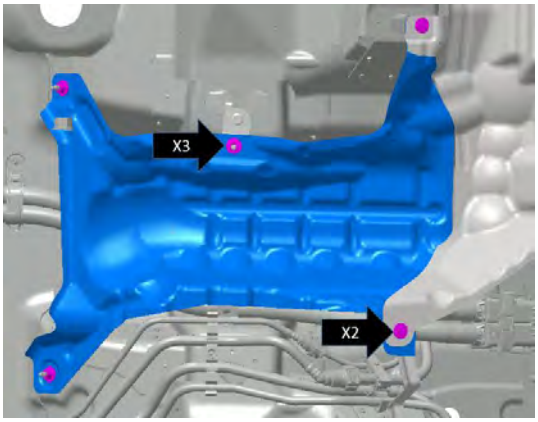
3.6.4.9 Front heat shield

Removal

Caution: The heat shield is an aluminium stamping part, which is easy to deform during transportation and assembly. It should be adjusted according to the actual situation during assembly to avoid deformation of the heat shield. Do not hold the area near the heat shield assembly hole by hand.

1. Remove the connecting nut between the front heat shield and the body, and remove the front heat shield.

   Torque: 10±2Nm



Installation

1. The installation order is the reverse of the removal order.

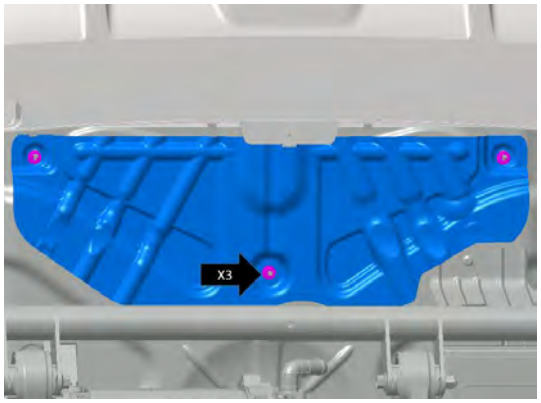
3.6.4.10 Rear heat shield

Removal

Caution: The heat shield is an aluminium stamping part, which is easy to deform during transportation and assembly. It should be adjusted according to the actual situation during assembly to avoid deformation of the heat shield. Do not hold the area near the heat shield assembly hole by hand.

1. Remove the rear heat shield and body connecting nut, and remove the rear heat shield.

   Torque: 10±2Nm



Installation

1. The installation order is the reverse of the removal order.

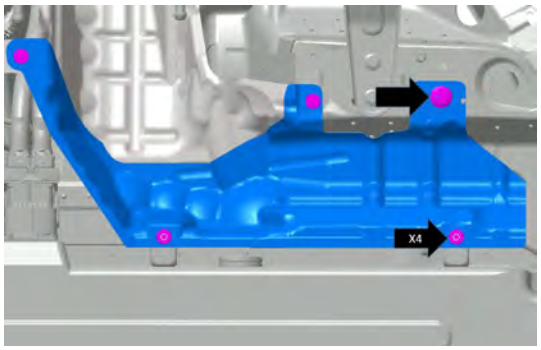
3.6.4.11 Battery pack heat shield

Removal

Caution: The heat shield is an aluminium stamping part, which is easy to deform during transportation and assembly. It should be adjusted according to the actual situation during assembly to avoid deformation of the heat shield. Do not hold the area near the heat shield assembly hole by hand.

1. Remove the connecting nut between battery pack heat shield and body, and take off the battery pack heat shield.

   Torque: 10±2Nm (M6); 70±5Nm (M12)



Installation

1. The installation order is the reverse of the removal order.

3.6.4.12 Carbon canister

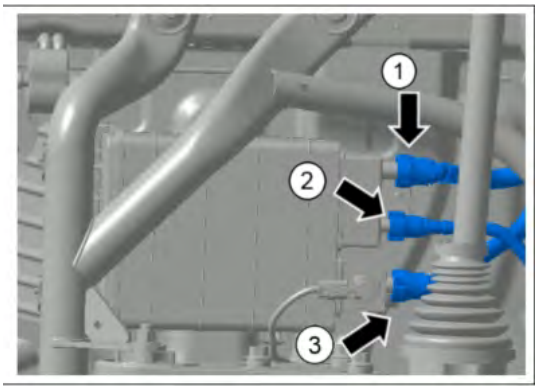
Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Lift the vehicle. Refer to: Lifting the vehicle.
3. Remove the carbon canister connecting pipeline.

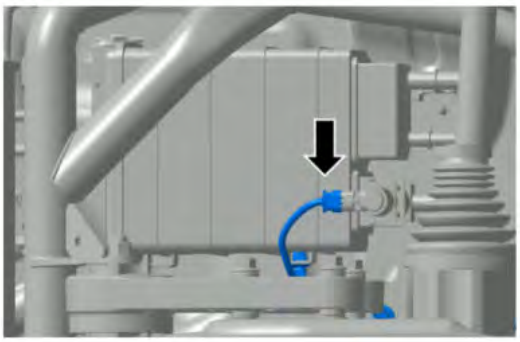
   1 Disconnect the carbon canister adsorption tube

   2. Disconnect the carbon canister desorption tube I

   3. Disconnect the carbon canister to atmosphere pipe

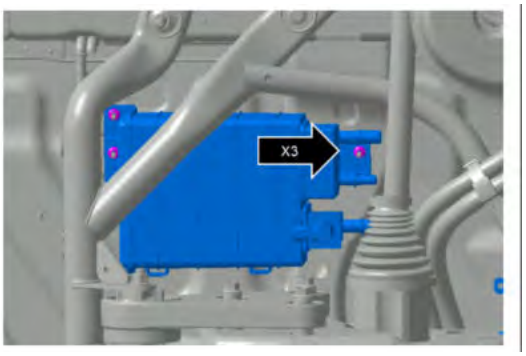


4. Disconnect the carbon canister harness connector.



5. Remove the fixing nut of carbon canister assembly, and take off the carbon canister assembly.

   Torque: 8±1Nm



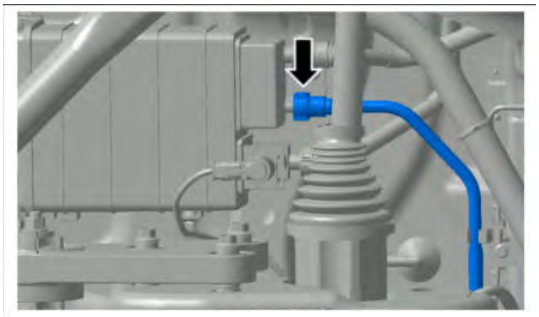
Installation

1. The installation order is the reverse of the removal order.

3.6.4.13 Carbon canister desorption tube I

Removal

1. Lift and support the vehicle. Refer to: Lifting the vehicle.
2. Remove the quick connector connecting the carbon canister desorption tube I and the carbon canister assembly.



3. Support the fuel tank assembly with a flat jack.
4. Remove the fixing nut of fuel tank strap.

   Torque: 24±2Nm

5. Remove the battery pack. Refer to: Power battery pack.
6. Remove the carbon canister desorption tube I from the fixed tube clamp.

7. Remove the quick connector connecting carbon canister desorption tube I and carbon canister desorption tube II, and remove the carbon canister desorption tube I. .

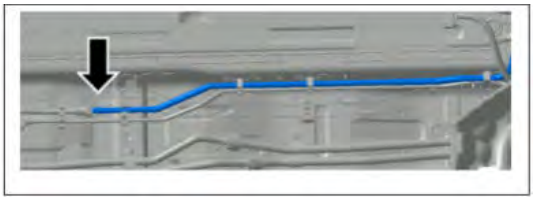
Installation

1. The installation order is the reverse of the removal order.

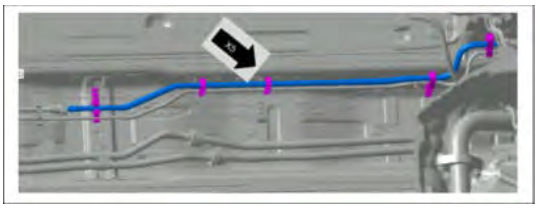
3.6.4.14 Carbon canister desorption tube II

Removal

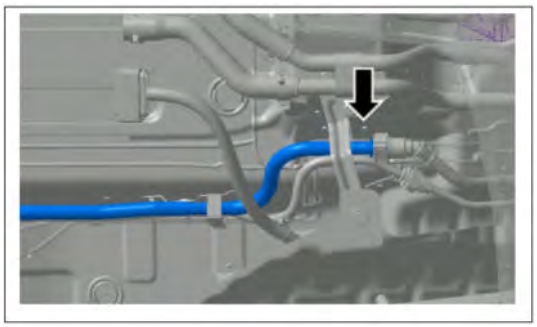
1. Lift and support the vehicle. Refer to: Lifting the vehicle.
2. Remove the battery pack. Refer to: Power battery pack.
3. Remove the quick connector connecting carbon canister desorption tube I and carbon canister desorption tube II.



4. Remove the carbon canister desorption tube II from the fixed tube clamp.



5. The carbon canister desorption tube II and the carbon canister desorption tube III are connected with quick connectors.



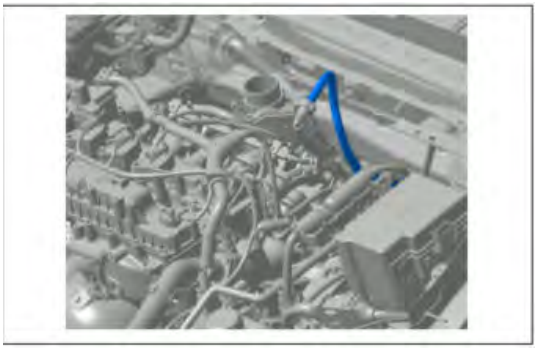
Installation

1. The installation order is the reverse of the removal order.

3.6.4.15 Carbon canister desorption III

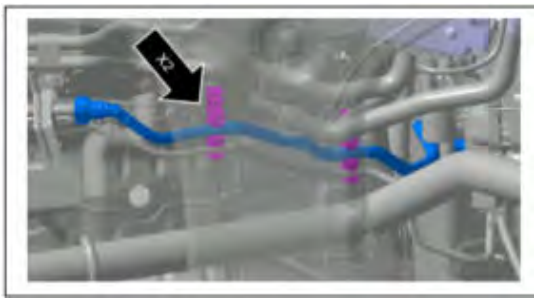
Removal

1. Lift and support the vehicle. Refer to: Lifting the vehicle.
2. The carbon canister desorption tube III and the carbon canister desorption tube IV are connected to a quick connector.



3. Remove the quick connector connecting carbon canister desorption tube II and carbon canister desorption tube III.

4. Take out the carbon canister desorption tube III from the fixed pipe clamp, and remove the carbon canister desorption tube III.



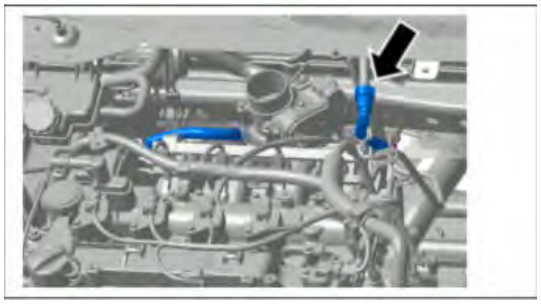
Installation

1. The installation order is the reverse of the removal order.

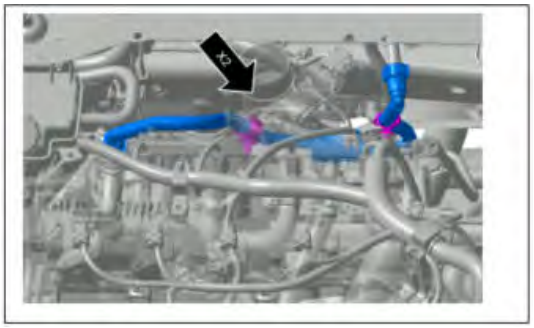
3.6.4.16 Carbon canister desorption IV

Removal

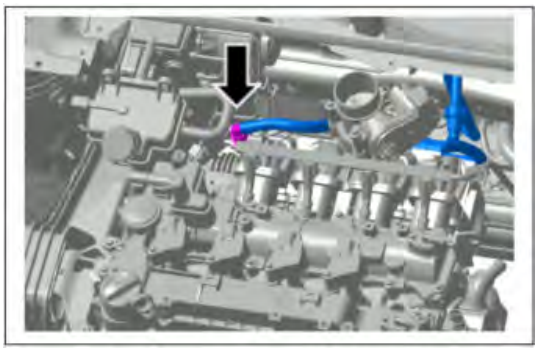
1. Remove the air filter and its air inlet pipe. Refer to: Air filter assembly.
2. Remove the quick connector connecting carbon canister desorption tube IV and carbon canister desorption tube III.



3. Remove the carbon canister desorption tube III from the fixed tube clamp.



4. Connect the carbon canister desorption tube IV to the carbon canister solenoid valve with a quick connector, and remove the carbon canister desorption tube IV.



Installation

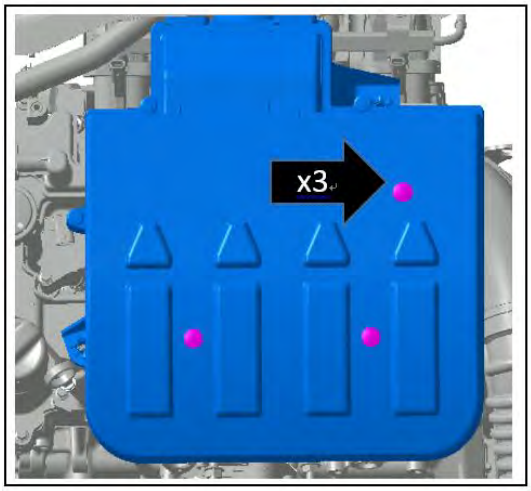
1. The installation order is the reverse of the removal order.

3.6.5 General procedures

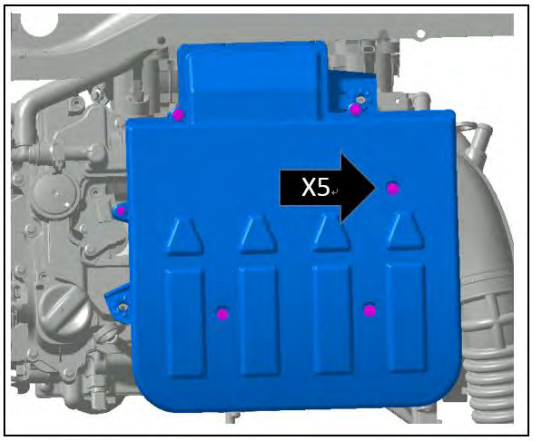
3.6.5.1 Replacement of air filter element

Removal

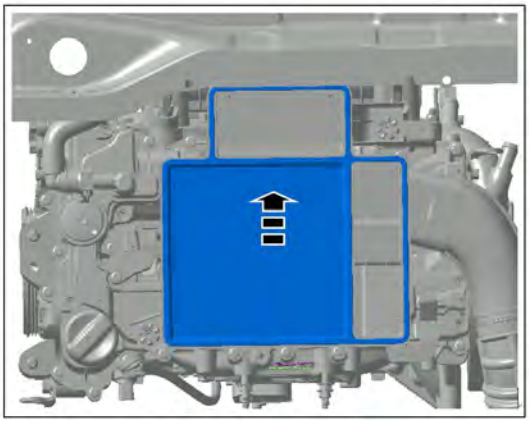
1. Remove the air filter rubber plug.



2. Remove the fixing screws of the air filter upper housing, and remove the air filter upper housing.



3. Take out the filter element.



Installation

1. The installation order is reverse to the removal order.

3.7 Vehicle control system

3.7.1 Specification

3.7.1.1 General specifications

Electronic Controller Unit (HECU)

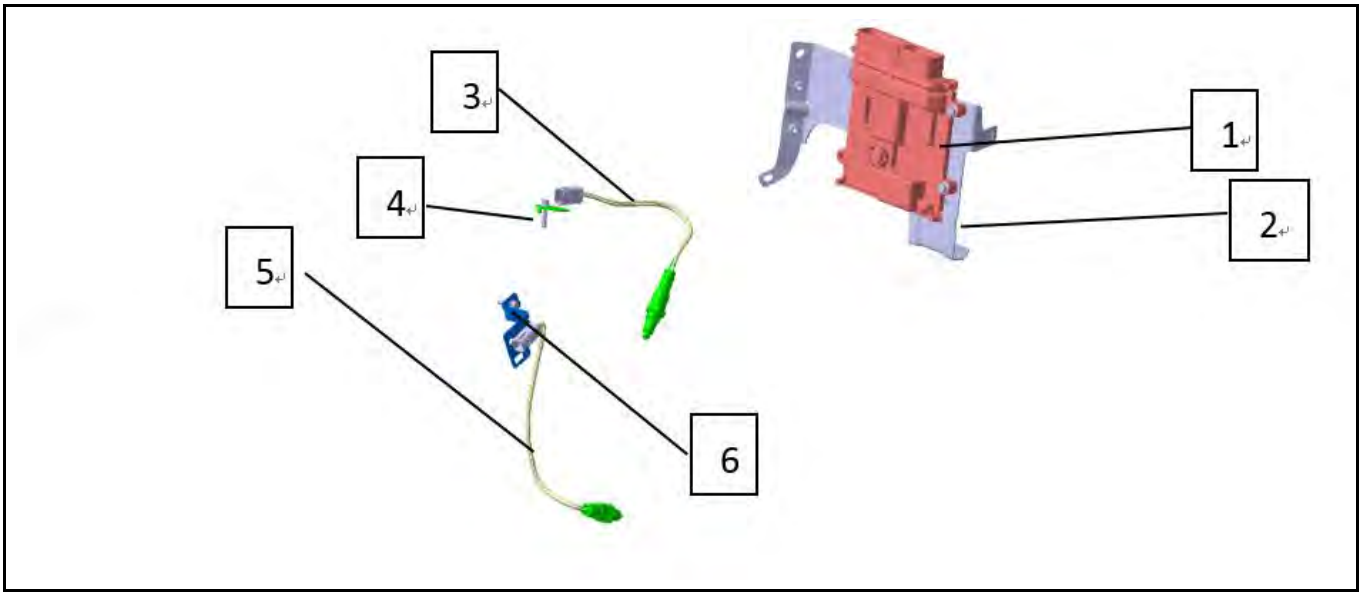
Name	Specification
Rated voltage	9-16V
Operating temperature	-40℃~105℃
Storage temperature	-40℃~125℃

3.7.1.2 Torque specification

Name	Nm
Fixing bolt of hybrid controller HECU	8±2
Front oxygen sensor	50±10
Rear oxygen sensor	50±10

3.7.2 Instructions and operations

3.7.2.1 Vehicle control system



S/N	Name
1	Hybrid electric control unit (HECU)
2	Hybrid controller bracket
3	Front oxygen sensor
4	Oxygen sensor fixing bracket
5	Rear oxygen sensor
6	Heated oxygen sensor bracket

3.7.2.2 Overview

System Architecture

The LECGD21 vehicle control system includes the functions of engine ECU and VCM HCU (hereinafter referred to as hybrid controller HECU), which is mainly responsible for controlling the engine (range extender) to run at the set torque speed for power generation control, controlling the vehicle's high-voltage power on and off, charging and discharging, torque output, gear shifting, cruise control, sliding energy recovery and other functions to ensure that the vehicle can drive normally. The schematic diagram of the vehicle control system is as follows:

System Schematic Diagram

Working principle of front oxygen sensor

The LDS-Y08A front oxygen sensor incorporates a ceramic element and a micro pump for oxygen ion transport. The pump provides the electrode on the side contacting exhaust with sufficient oxygen, so as to maintain a constant voltage, about 450 mV, on both sides. The electronic controller converts the power consumption of the pump into an excess air coefficient. The output current is almost in a linear relationship with λ, and λ=0.65 to infinity. Therefore, it is also known as a linear oxygen sensor. It can not only determine whether λ is greater than or less than 1, but also measure the specific λ value in lean or rich areas. Therefore, the excess air coefficient within a large scope (i.e., wideband) can be measured, and continuous control from λ<1 to λ>1 can be achieved.

Working principle of rear oxygen sensor

The sensing element of the oxygen sensor is a ceramic tube with pores. The outer side of the tube wall is surrounded by engine exhaust and the inner side is open to atmosphere. The sensing ceramic tube wall is a solid electrolyte with an electrically heated

tube inside. The oxygen sensor works by converting the difference of oxygen ion concentration inside and outside the sensing ceramic tube into a voltage signal output. When the temperature of the sensing ceramic tube reaches 350°C, it has the characteristics of a solid electrolyte. Due to its special material, oxygen ions can freely pass through the ceramic tube. It is by this characteristic that the concentration difference is converted into a potential difference, thereby forming an electrical signal output. If the gas mixture is relatively rich, the concentration difference of oxygen ionic is comparatively large and the potential difference is comparatively high. In this case, a great amount of oxygen ion moves from the inside of the tube to the outside, and the output voltage is comparatively high (close to 800 mV-1,000 mV). If the mixture is comparatively lean, the concentration difference of oxygen ionic is comparatively small and the potential difference is comparatively low. In this case, only a small amount of oxygen ion moves from the inside of the tube to the outside, and the output voltage is comparatively low (close to 100 mV). The signal voltage suddenly changes near the theoretical equivalent air-fuel ratio (λ=1.). The oxygen sensor LSF4 is a flat-plate ZrO2 two-state sensor with an integrated heater, λ=1 (Nernst principle).

In the on-board diagnostics (OBD) system, it is used not only for the binary closed-loop control of engines at λ=1, but also as a sensor for monitoring catalytic converters.

3.7.2.3 Precautions

Precautions

1. **Caution:** Be sure to use a 12V battery.
2. **Caution:** Do not disconnect the battery cable when the vehicle is powered up to high voltage.
3. **Caution:** Before connecting or disconnecting the HECU harness connector, the vehicle needs to turn off the high voltage and disconnect the battery GND cable, otherwise the HECU may be damaged.
4. **Caution:** Before removing parts and components, turn off the high voltage of the vehicle and then disconnect the battery GND cable.
5. **Caution:** Do not disassemble the hybrid controller HECU.
6. **Caution:** Only use a digital multimeter to inspect the electronic fuel injection (EFI) system.
7. **Caution: Please use authentic parts and components for maintenance; otherwise, the EFI system may not operate properly.**
8. **Caution:** During maintenance, only unleaded petrol can be used.
9. **Caution: Please follow the specified maintenance and diagnostic procedures for maintenance work.**
10. **Caution: Do not disassemble the parts and components of the EFI system during maintenance.**
11. **Caution:** During maintenance, handle electronic components (ECU, sensors, etc.) with great care and do not let them fall to the ground.
12. **Caution: Develop an awareness of environmental protection and effectively handle any waste generated during maintenance.**

Precautions during repair

1. **Caution:** Do not remove any parts and components or connectors of the EFI system from their mounting locations to avoid damage or prevent foreign objects such as water, oil or dirt from entering the connectors, affecting normal operation of the EFI system.
2. **Caution:** When disconnecting and connecting the connector, be sure to turn off the high-voltage first and then disconnect the battery, otherwise it will damage the electrical components.
3. **Caution:** During simulation of thermal state under fault condition or other maintenance which may cause rise in temperature, never allow the ECU temperature to exceed 80°C.
4. **Caution:** The fuel supply pressure of the EFI system is high and all fuel pipes are high-pressure resistant fuel pipes. Even though the engine is not running, relatively high fuel pressure is maintained in fuel pipes. Therefore, caution shall be exercised

not to remove fuel pipes during maintenance. When it is necessary to maintain the fuel system, the pressure relief shall be performed for the fuel system before removal of fuel pipes. The pressure relief method is as follows: remove the fuel pump relay, start and idle the engine until the engine stalls automatically. The removal of fuel pipes and the replacement of fuel filters shall be conducted by professional maintenance personnel in a well-ventilated place.

5. **Caution:** When removing the electric fuel pump from the fuel tank, do not supply power to the pump to avoid sparks and fire.
6. **Caution:** The fuel pump must not be tested for operation in a dry state or in water; otherwise, its service life will be shortened. In addition, the positive and negative terminals of the fuel pump must be connected correctly (otherwise, there may be safety risks).
7. **Caution:** When inspecting the ignition system, carry out the spark jumping test only when necessary. Before performing the test, disconnect the fuel injector connector; otherwise, a large amount of unburned petrol may enter the exhaust pipe and damage the three-way catalytic converter.
8. **Caution:** Because the adjustment of idle running is completely carried out by the EFI system, manual adjustment is not necessary.
9. **Caution:** Be sure to connect the positive and negative terminals of the battery correctly. Otherwise, electronic components may be damaged. In this system, a negative GND is used.
10. **Caution:** Do not remove the battery cable when the engine is running.
11. **Caution:** Before carrying out electrical welding on a vehicle, remove the positive and negative cables of the battery and ECU.
12. **Caution:** Do not detect the input/output electrical signals of parts and components by piercing the wire insulation.

3.7.3 Diagnosis and testing

3.7.3.1 HECU fault diagnosis

HECU fault diagnosis

Fault Symptom
Unable to apply high voltage, limit power, automatically disconnect high voltage, etc.

Possible cause

1. HECU internal components are burnt due to electric overload of external device, which results in a failure of such components;

2. Circuit board corrosion caused by water ingress into HECU.

Caution

– Do not remove HECU freely during maintenance

– Before maintenance, the high voltage must be turned off first (the high voltage can be forced to turn off by pressing and holding the double flash light switch for 10 seconds. After the high voltage is forced to turn off, you need to lock the car door once and then power it on before it can be restored)

– Please remove the battery connector before removing HECU

– The HECU must be removed before any electric welding operations, and caution should be taken during its storage once removed

– It is forbidden to add any circuit on HECU connecting wire

3.7.3.2 Front oxygen sensor fault diagnosis

Vehicle control system

Fault Symptom
Poor idling, poor acceleration, excessive exhaust gas, excessive fuel consumption, Ready engine fault light is always on, etc.

Possible cause

1. Moisture entering the sensor, sudden change of temperature, and breakage of probe;

2. Oxygen sensor "poisoning". (Pb, S, Br, Si)

Caution

– During maintenance, it is prohibited to use cleaning fluid, oily liquid or volatile solid on oxygen sensor.

3.7.3.3 Rear oxygen sensor fault diagnosis

Vehicle control system

Fault Symptom
Poor idling, poor acceleration, excessive exhaust gas, excessive fuel consumption, Ready engine fault light is always on, etc.

Possible cause

1. Moisture entering the sensor, sudden change of temperature, and breakage of probe;

2. Oxygen sensor "poisoning". (Pb, S, Br, Si)

Caution

– During maintenance, it is prohibited to use cleaning fluid, oily liquid or volatile solid on oxygen sensor.

3.7.3.4 P000A00: Intake VCP phase response lag

Diagnose possible causes

A. Intake camshaft body fault;

B. Intake VVT adjustment device problem;

C. Engine oil problem;

D. HECU control system problem;

Maintenance and diagnosis method

A. Check whether the intake VVT is aged or damaged and replace it;

B. Check whether the supporting solenoid valve (OCV) and variable camshaft phase adjuster of intake VVT system are normal, and replace them.

C. Check whether the oil is too dirty and replace it if necessary.

D. Replace the HECU;

3.7.3.5 P000B00: Exhaust VCP phase response lag;

Diagnose possible causes

A. Exhaust camshaft body fault;

B. Exhaust VVT adjustment device problem;

C. Engine oil problem;

D. HECU control system problem;

Maintenance and diagnosis method

A. Check whether the exhaust VVT is aged or damaged and replace it;

B. Check whether the supporting solenoid valve (OCV) and variable camshaft phase adjuster of exhaust VVT system are normal, and replace them.

C. Check whether the oil is too dirty and replace it if necessary.

D. Replace the HECU;

3.7.3.6 P001100; P001200: Intake VCP cam tooth learning value deviation out of range; intake VCP camshaft phase error is large

Diagnose possible causes

A. Intake camshaft body fault;

B. Installation problem of intake camshaft body;

Maintenance and diagnosis method

A. Check whether the intake VVT is worn or missing teeth and replace the intake VVT;

B. Check the installation accuracy and position rationality;

3.7.3.7 P001400; P001500: Exhaust VCP cam tooth learning value deviation out of range; exhaust VCP camshaft phase error is large

Diagnose possible causes

A. Exhaust camshaft body fault;

B. Installation problem of exhaust camshaft body;

Maintenance and diagnosis method

A. Check whether the exhaust VVT is worn or missing teeth and replace the exhaust VVT;

B. Check the installation accuracy and position rationality.

3.7.3.8 P003000; P003100; P003200: Front oxygen sensor heating control circuit open-circuited; front oxygen sensor heating control circuit short-circuited to low voltage; front oxygen sensor heating control circuit short-circuited to high voltage

Diagnose possible causes

A. Front oxygen heating sensor fault;

B. The front oxygen heating sensor heating harness is faulty;

Maintenance and diagnosis method

A. Check the front oxygen sensor and replace it;

B. Check whether the heating connection of front oxygen heating sensor is normal;

3.7.3.9 P003613; P003711; P003812: Rear oxygen sensor heating circuit open-circuited; rear oxygen sensor heating circuit short-circuited to low voltage; rear oxygen sensor heating circuit short-circuited to high voltage

Diagnose possible causes

A. Rear oxygen sensor fault;

B. Rear oxygen sensor harness fault;

C. The rear oxygen sensor voltage is faulty;

D. HECU body problem;

Maintenance and diagnosis method

A. Check the rear oxygen sensor and replace it;

B. Check whether the rear oxygen sensor harness connection is normal;

C. Use a multimeter to measure whether the voltage of the rear oxygen sensor pin is normal;

D. Replace the HECU;

3.7.3.10 P007500; P007600; P007700; P007800; P008000; P007900: Intake VVT1 valve control circuit open-circuited; The intake VVT1 valve control circuit is short-circuited to low voltage; The intake VVT1 valve control circuit is short-circuited to high voltage; The exhaust VVT2 valve control circuit is open-circuited; The exhaust VVT2 valve control circuit is short-circuited to high voltage; Exhaust VVT2 valve control circuit short-circuited to low voltage

Diagnose possible causes

A. VVT problems;

B. VVT harness fault;

Maintenance and diagnosis method

A. Check VVT and replace it;

B. Check whether the VVT line connection is normal;

3.7.3.11 P009800; P009700: Intake temperature sensor circuit high voltage; intake temperature sensor circuit low voltage

Diagnose possible causes

A. Intake temperature sensor fault;

B. Harness fault;

Maintenance and diagnosis method

A. Check the intake temperature sensor and replace it;

B. Check the harness;

3.7.3.12 P009900: Intake temperature sensor signal jumps

Diagnose possible causes

A. Intake temperature sensor fault;

B. HECU problem;

Maintenance and diagnosis method

A. Check the intake temperature sensor and replace it;

B. Replace the HECU;

3.7.3.13 P010900: Intake pressure sensor signal jumps

Diagnose possible causes

A. Intake temperature sensor fault;

B. HECU body problem;

Maintenance and diagnosis method

A. Check the intake temperature sensor and replace it;

B. Replace the HECU;

3.7.3.14 P011700; P011800: Engine coolant temperature sensor circuit low voltage; engine coolant temperature sensor circuit high voltage or open-circuited

Diagnose possible causes

A. Coolant temperature sensor fault;

B. Coolant temperature sensor harness fault;

C. HECU body problem;

Maintenance and diagnosis method

A. Check the coolant temperature sensor and replace it;

B. Check whether the harness connection of coolant temperature sensor is normal;

C. Replace the HECU;

3.7.3.15 P011900; P021700; P218600: Water temperature sensor signal jumps; engine coolant is too high (shutdown required); fan water temperature sensor signal jumps

Diagnose possible causes

A. faulty coolant temperature sensor;

B. HECU fault;

C. Harness fault;

Maintenance and diagnosis method

A. Replace the sensor;

B. Replace the HECU;

C. Check the harness;

3.7.3.16 P012200; P012300; P022200; P022300: Electronic throttle position sensor 1# line low voltage; electronic throttle position sensor 1# line high voltage; electronic throttle position sensor 2# line low voltage; electronic throttle position sensor 2# line high voltage

Diagnose possible causes

A. Throttle sensor fault;

B. Throttle sensor harness fault;

C. HECU body problem;

Maintenance and diagnosis method

A. Check the throttle sensor and replace it;

B. Check whether the throttle sensor harness connection is normal;

C. Replace the HECU;

3.7.3.17 P012800: Thermostat normally open fault

Diagnose possible causes

A. The water tank temperature sensor and coolant temperature sensor are faulty;

B. The harness of the water tank temperature sensor and coolant temperature sensor is faulty;

C. Vehicle data version problem;

D. Thermostat body fault;

Maintenance and diagnosis method

A. Check the water tank temperature sensor and coolant temperature sensor and replace them;

B. Check whether the water tank temperature sensor and coolant temperature sensor are connected normally;

C. Update to the latest data version of the vehicle;

D. The thermostat is stuck in the open position and cannot be closed. Replace the thermostat;

3.7.3.18 P013000; P005312; P219500; P01347C; P01337C: Front oxygen sensor signal line open-circuited; front oxygen sensor heating internal resistance too high; front oxygen sensor

signal too lean when accelerating enrichment; front oxygen sensor response conversion times too few; front oxygen sensor response too slow

Diagnose possible causes

A. Front oxygen sensor fault;

B. Front oxygen sensor harness fault;

C. HECU body problem;

Maintenance and diagnosis method

A. Check the front oxygen sensor and replace it;

B. Check whether the front oxygen sensor harness connection is normal;

C. Replace the HECU;

3.7.3.19 P013100; P013200: Front oxygen sensor voltage is low; front oxygen sensor voltage is high;

Diagnose possible causes

A. Front oxygen sensor fault;

B. Front oxygen sensor harness fault;

C. Front oxygen sensor voltage problem;

D. HECU body problem;

Maintenance and diagnosis method

A. Check the front oxygen sensor and replace it;

B. Check whether the front oxygen sensor harness connection is normal;

C. Use a multimeter to measure whether the voltage of the front oxygen sensor pin is normal;

D. Replace the HECU;

3.7.3.20 P013711; P013812; P014000; P2A017C; P013A7C; P005400: Rear oxygen sensor voltage low; rear oxygen sensor voltage high; rear oxygen sensor circuit fault; downstream oxygen sensor deceleration fuel cut-off response too slow (first window); downstream oxygen sensor deceleration fuel cut-off response too slow (second window); rear oxygen heating internal resistance too high

Diagnose possible causes

A. Rear oxygen sensor fault;

B. Rear oxygen sensor harness fault;

C. HECU body problem;

Maintenance and diagnosis method

A. Check the rear oxygen sensor and replace it;

B. Check whether the rear oxygen sensor harness connection is normal;

C. Replace the HECU;

3.7.3.21 P017100; P017200: Fuel too lean fault; fuel too rich fault

Diagnose possible causes

A. Fuel injector and its harness fault;
B. Ignition coil and ignition coil harness fault;
C. Spark plug fault
D. Throttle fault
E. Oxygen sensor fault;

Maintenance and diagnosis method

A. Check the fuel injector and its harness, and replace them;
B. Check the ignition coil and its harness, and replace them;
C. Check the spark plug and replace it;
D. Check the throttle and clean or replace it;
E. Check the oxygen sensor;

3.7.3.22 P020100; P026100; P026200; P020200; P026400; P026500; P020300; P026700; P026800; P020400; P027000; P027100: Cylinder 1 fuel injector control circuit open-circuited; Cylinder 1 fuel injector control circuit short-circuited to low voltage; Cylinder 1 fuel injector control circuit short-circuited to high voltage; Cylinder 2 fuel injector control circuit open-circuited; Cylinder 2 fuel injector control circuit short-circuited to low voltage; Cylinder 2 fuel injector control circuit short-circuited to high voltage; Cylinder 3 fuel injector control circuit open-circuited; Cylinder 3 fuel injector control circuit short-circuited to low voltage; Cylinder 3 fuel injector control circuit short-circuited to high voltage; Cylinder 4 fuel injector control circuit open-circuited; Cylinder 4 fuel injector control circuit short-circuited to low voltage; Cylinder 4 fuel injector control circuit short-circuited to high voltage

Diagnose possible causes

A. The fuel injector body of corresponding cylinder is faulty;
B. The fuel injector harness of corresponding cylinder is faulty;
C. HECU body problem;

Maintenance and diagnosis method

A. Check the corresponding cylinder fuel injector and replace it;
B. Check whether the fuel injector harness of corresponding cylinder is connected normally;
C. Replace the HECU;

3.7.3.23 P030000: Multi-cylinder misfire

Diagnose possible causes

A. Fuel injector and its harness fault;
B. Ignition coil and ignition coil harness fault;
C. Spark plug fault

Maintenance and diagnosis method

A. Check the fuel injector and its harness, and replace them;
B. Check the ignition coil and its harness, and replace them;
C. Check the spark plug and replace it;

3.7.3.24 P030100; P030200; P030300; P030400: misfire in cylinder I, cylinder II, cylinder III and cylinder IV

Diagnose possible causes

A. The corresponding cylinder fuel injector and the harness of the cylinder fuel injector are faulty;
B. The corresponding cylinder ignition coil and the harness of the cylinder ignition coil are faulty;
C. The spark plug of corresponding cylinder is faulty;

Maintenance and diagnosis method

A. Check the fuel injector and its harness, and replace them;
B. Check the ignition coil and its harness, and replace them;
C. Check the spark plug and replace it;

3.7.3.25 P031500: 58-tooth gear error not learnt

Diagnose possible causes

A. 58-tooth tooth signal not learnt;

Maintenance and diagnosis method

A. It can be driven on the road, and the gear signal learning can be completed in about 10 minutes after the engine is started;

3.7.3.26 P032500; P032400: Knock sensor fault; knock sensor knock energy is too high

Diagnose possible causes

A. Knock sensor fault;
B. Knock sensor harness fault;
C. HECU body problem;
D. Knock sensor installation problem;

Maintenance and diagnosis method

A. Check the knock sensor and replace it;
B. Check whether the knock sensor harness connection is normal;
C. Replace the HECU;
D. Check the knock sensor fixing bolts and reinstall them;

3.7.3.27 P033500: No signal from the crankshaft position sensor circuit

Diagnose possible causes

A. Crankshaft sensor fault;
B. Crankshaft sensor harness fault;
C. HECU body problem;
D. Crankshaft position sensor installation problem;

Maintenance and diagnosis method

A. Check the crankshaft sensor and replace it;
B. Check whether the crankshaft sensor harness connection is normal;
C. Replace the HECU;
D. Check the fixing bolts at crankshaft position and reinstall them;

3.7.3.28 P033600: Crankshaft position sensor circuit signal interference

Diagnose possible causes

A. Crankshaft sensor fault;
B. Crankshaft body fault;
C. Crankshaft position sensor installation problem;

Maintenance and diagnosis method

A. Check the crankshaft sensor and replace it;
B. Check whether the crankshaft body is damaged and whether the number of teeth is normal; replace the crankshaft;
C. Check the fixing bolts at crankshaft position and reinstall them;

3.7.3.29 P034000; P03411C; P034500: Intake camshaft position sensor signal lost; intake camshaft position sensor signal unreasonable; exhaust camshaft position sensor signal lost

Diagnose possible causes

A. Exhaust camshaft sensor fault;
B. Exhaust camshaft sensor harness fault;
C. Camshaft position sensor installation problem;

Maintenance and diagnosis method

A. Check the exhaust camshaft sensor and replace it;
B. Check whether the exhaust camshaft sensor harness connection is normal;
C. Check the camshaft position fixing bolts and reinstall them;

3.7.3.30 P034600: The exhaust camshaft position sensor signal is unreasonable

Diagnose possible causes

A. Exhaust camshaft sensor fault;
B. HECU body problem;
C. Camshaft position sensor installation problem;

Maintenance and diagnosis method

A. Check the exhaust camshaft sensor and replace it;
B. Replace the HECU;
C. Check the camshaft position fixing bolts and reinstall them;

3.7.3.31 P035100; P230000; P230100; P035200; P230300; P230400; P035300; P230600; P230700; P035400; P230900; P231000: Cylinder 1 ignition control circuit open-circuited; Cylinder 1 ignition control circuit short-circuited to low voltage; Cylinder 1 ignition control circuit short-circuited to high voltage; Cylinder 2 ignition control circuit open-circuited; Cylinder 2

ignition control circuit short-circuited to low voltage; Cylinder 2 ignition control circuit short-circuited to high voltage; Cylinder 3 ignition control circuit open-circuited; Cylinder 3 ignition control circuit short-circuited to low voltage; Cylinder 3 ignition control circuit short-circuited to high voltage; Cylinder 4 ignition control circuit open-circuited; Cylinder 4 ignition control circuit short-circuited to low voltage; Cylinder 4 ignition control circuit short-circuited to high voltage

Diagnose possible causes

A. The corresponding cylinder ignition coil body is faulty;
B. Ignition coil harness fault of corresponding cylinder;
C. HECU body problem;

Maintenance and diagnosis method

A. Check the ignition coil of the corresponding cylinder and replace it;
B. Check whether the corresponding cylinder ignition coil harness connection is normal;
C. Replace the HECU;

3.7.3.32 P042000: Low conversion efficiency of catalytic converter

Possible fault causes

A. Front oxygen sensor fault;
B. Rear oxygen sensor fault;
C. Fault of catalytic converter-related components;

Maintenance and diagnosis method

A. Check the front oxygen sensor and replace it;
B. Check the rear oxygen sensor and replace it;
C. Check whether there is exhaust leakage near the exhaust pipe or exhaust manifold, catalyst box failure, engine coolant temperature (ECT) sensor fault, engine misfire or timing retardation, too dirty oil, oxygen sensor fault, and fuel system pressure is too high;

3.7.3.33 P044400; P045800; P045900: Carbon canister solenoid valve control circuit open-circuited; carbon canister solenoid valve control circuit short-circuited to low voltage; carbon canister solenoid valve control circuit short-circuited to high voltage

Possible fault causes

A. Carbon canister solenoid valve fault;
B. Carbon canister solenoid valve harness fault;

Maintenance and diagnosis method

A. Check the carbon canister solenoid valve and replace it;
B. Check whether the carbon canister solenoid valve harness connection is normal;

3.7.3.34 P044700; P049800; P049900: Carbon canister ventilation valve control circuit open-circuited; carbon canister ventilation valve control circuit short-circuited to low voltage; carbon canister ventilation valve control circuit short-circuited to high voltage

Possible fault causes

A. Carbon canister ventilation valve fault;
B. Carbon canister ventilation valve harness fault;

Maintenance and diagnosis method

A. Check the carbon canister ventilation valve and replace it;
B. Check whether the carbon canister ventilation valve harness connection is normal;

3.7.3.35 P045100: Fuel evaporation system pipeline pressure sensor signal jumps

Diagnose possible causes

A. Pipeline pressure sensor fault;
B. HECU body problem;
C. Pipeline pressure sensor harness fault;

Maintenance and diagnosis method

A. Check the pipeline pressure sensor and replace the fuel tank pressure sensor;
B. Replace the HECU;
C. Check whether the harness connection of pipeline pressure sensor is normal;

3.7.3.36 P045200; P045300: Fuel evaporation pipeline pressure sensor circuit low voltage; fuel evaporation pipeline pressure sensor circuit high voltage

Diagnose possible causes

A. Pipeline pressure sensor fault;
B. Pipeline pressure sensor harness fault;

Maintenance and diagnosis method

A. Check the pipeline pressure sensor and replace the fuel tank pressure sensor;
B. Check whether the harness connection of pipeline pressure sensor is normal;

3.7.3.37 P04612A; P046200; P046300: Fuel position sensor #1 signal stuck; fuel position sensor #1 line low voltage; fuel position sensor #1 line high voltage

Possible fault causes

A. Data version problem;
B. CAN signal is abnormal;

Maintenance and diagnosis method

A. Check whether the vehicle data is of a new version;
B. Check whether the CAN signal is normal;

3.7.3.38 P049600: Carbon canister solenoid valve stuck in open position

Diagnose possible causes

A. Data version problem;
B. Fuel tank pressure sensor harness fault;
C. Carbon canister solenoid valve fault;

Maintenance and diagnosis method

A. Check whether the vehicle data is of a new version;

B. Check whether the fuel tank pressure sensor harness connection is normal; when powered on and not started, the fuel tank pressure should be ±200pa;

C. Check the carbon canister solenoid valve; replace the carbon canister solenoid valve;

3.7.3.39 P04AB00; P04AC00; P04AD00: Fuel tank isolation valve control circuit open-circuited; fuel tank isolation valve control circuit short-circuited to low voltage; fuel tank isolation valve control circuit short-circuited to high voltage

Possible fault causes

A. Fuel tank shut-off valve harness fault;

B. ECU pin harness connection problem;

Maintenance and diagnosis method

A. Check whether the fuel tank shut-off valve harness connection is normal;

B. Check whether the ECU connection harness is normal.

3.7.3.40 P04AE00; P04AF00: Oil-gas isolation valve FTIV stuck in the open position; oil-gas isolation valve FTIV stuck in the closed position

Diagnose possible causes

A. Data version problem;

B. Fuel tank pressure sensor harness fault;

C. Fuel tank shut-off valve fault;

Maintenance and diagnosis method

A. Check whether the vehicle data is of a new version;

B. Check whether the fuel tank pressure sensor harness connection is normal; when powered on and not started, the fuel tank pressure should be ±200pa;

C. Check the fuel tank shut-off valve; replace the fuel tank shut-off valve;

3.7.3.41 P050B00: Cold start emission reduction strategy monitoring ignition efficiency low fault

Diagnose possible causes

A. Data version problem;

B. Throttle, fuel injector, ignition coil, front oxygen sensor, spark plug and other problems;

Maintenance and diagnosis method

A. Check whether the vehicle data is of a new version;

B. Check whether the throttle, fuel injector, ignition coil, front oxygen sensor, and spark plug are normal and replace the corresponding parts;

3.7.3.42 P052300; P052200: Oil pressure sensor circuit high voltage; oil pressure sensor circuit low voltage

Diagnose possible causes

A. Oil pressure sensor fault;

B. Harness fault;

Maintenance and diagnosis method

A. Check the intake temperature sensor and replace it;

B. Check the harness;

3.7.3.43 P056200: Battery voltage low

Diagnose possible causes

A. Charging system fault;

B. The ECM connection to the charging system line is open-circuited or the pins are in poor contact, the contact resistance is large, etc., and the engine harness has a poor GND connection;

C. Electric leakage or damage of battery;

Maintenance and diagnosis method

A. Start the engine and use a multimeter to check whether the voltage between the positive and negative terminals of the battery is too low;

B. Check whether the ECM is connected to the charging system and the relay input line is open-circuited or the pin contact is poor, the contact resistance is large, and the engine harness has a poor GND connection;

C. Electric leakage or damage of battery;

3.7.3.44 P056300: Battery voltage high

Diagnose possible causes

A. The engine harness has a poor GND connection;

B. Charging system fault;

Maintenance and diagnosis method

A. Check whether the engine harness has a poor GND connection;

B. Check whether there is a charging system fault;

3.7.3.45 P062700: Oil pump relay control circuit open-circuited

Diagnose possible causes

A. The relay or ECM connector is not firmly connected or has poor contact;

B. The fuel pump relay control circuit is open;

C. The corresponding oil pump control circuit and pin at the ECM end are broken;

D. Relay fault;

Maintenance and diagnosis method

A. Check whether the relay and ECM connector are loosely connected or have poor contact;

B. Check whether the control circuit of the fuel pump relay is open-circuited;

C. Check whether the replacement line and pin between the fuel pump relay and ECM are broken;

D. Replace the relay;

3.7.3.46 P062800; P062900: Oil pump relay control circuit short-circuited to low voltage; oil pump relay control circuit short-circuited to high voltage

Diagnose possible causes

A. The fuel pump relay control circuit is short-circuited to GND;

B. The corresponding oil pump control circuit and pin at the ECM end are short-circuited to GND;

C. Relay fault;

Maintenance and diagnosis method

A. Check whether the control circuit of the fuel pump relay is short-circuited to GND;

B. Check whether the circuit and pin between the fuel pump relay and ECM are short-circuited to GND;

C. Replace the relay;

3.7.3.47 P068500: Main relay circuit fault

Diagnose possible causes

A. Main relay control circuit short-circuited to power supply;

B. The corresponding main relay control circuit and pin at the ECM end are short-circuited to the power supply;

C. Relay fault;

Maintenance and diagnosis method

A. Check whether the main relay control circuit is short-circuited to power supply;

B. Check whether the lines and pins between the main relay and ECM are short-circuited to the power supply;

C. Replace the relay;

3.7.3.48 P111600; P011500; P011600: Engine water temperature is too high at start-up; engine coolant temperature sensor signal clamped; water temperature sensor signal stuck

Diagnose possible causes

A. Coolant temperature sensor fault;

B. HECU body problem;

Maintenance and diagnosis method

A. Check the coolant temperature sensor and replace it;

B. Replace the HECU;

3.7.3.49 P122506: PEPS immobiliser not learnt;

Possible fault causes

A. Hecu has not conducted PIN and SK learning;

Maintenance and diagnosis method

A. Re-match the immobiliser with a diagnostic scanner;

3.7.3.50 P130000; P130100; P130200; P130300; P130400: single-cylinder or multi-cylinder misfire (catalytic converter damage type misfire); cylinder 1 catalytic converter damage type

misfire; cylinder 2 catalytic converter damage type misfire; cylinder 3 catalytic converter damage type misfire; cylinder 4 catalytic converter damage type misfire;

Diagnose possible problems

A. Incorrect learning of ECM tooth training;

B. The crankshaft position sensor is installed incorrectly;

C. Ignition system fault (spark plug, ignition coil, ECM end and ignition coil control circuit and related connectors are not connected properly, etc.);

D. Fuel supply system fault (incorrect fuel pressure, fuel injector leakage, blockage, damage, etc., ECM end and fuel injector control line and related connectors are not connected properly, etc.);

E. The air intake system leaks and the exhaust system is blocked;

F. The vehicle uses poor oil, insufficient maintenance (engine oil is not replaced as required, etc.), and serious carbon deposits;

G. Engine mechanical problems (incorrect ignition timing, incorrect valve timing, 58X gear processing and installation problems, valve leakage, abnormal VVT operation, internal damage of engine cylinder block, etc.);

Maintenance and diagnosis method

A. Re-do the gear signal learning (it can be driven on the road, and the gear signal learning can be completed in about 10 minutes after the engine is started);

B. Connect the diagnostic instrument, read and save the DTC, start the vehicle and read the engine data flow, observe whether there is a system-controlled cylinder disconnection and fuel injection phenomenon when a misfire occurs. If so, follow the steps below to focus on the ignition, fuel injection, mechanical and related harness aspects of the corresponding cylinder;

C. Whether the crankshaft position sensor is installed incorrectly;

D. Check whether there is any fault in the ignition system (spark plugs, ignition coil, ECM end and ignition coil control circuit and related connectors are not connected properly, etc.);

E. Check whether there is any fault in the fuel supply system (incorrect fuel pressure, leakage, blockage, damage of fuel injector, etc., loose connection between ECM terminal and fuel injector control circuit and related connectors, etc.);

F. Whether there is air leakage in the intake system or blockage in the exhaust system;

G. Whether the vehicle uses poor oil quality, insufficient maintenance (engine oil is not replaced as required, etc.), and has serious carbon deposits;

H. Engine mechanical problems (incorrect ignition timing, incorrect valve timing, 58X gear processing and installation problems, valve leakage, abnormal VVT operation, internal damage of engine cylinder block, etc.);

3.7.3.51 P140600; P0A7B00; P0CA100; P140700; P26C800: GCU requests to turn on MIL light; BMS requests to turn on MIL light; MCU requests to turn on MIL light; OBC requests to turn on MIL light; EHB requests to turn on MIL light

Diagnose possible problems

A. GCU, BMS, MCU, OBC and EHB have OBD faults;

Maintenance and diagnosis method

A. Use a diagnostic scanner to read the DTCs of GCU, BMS, MCU, OBC, and EHB respectively, find out the cause of the fault, and then solve the relevant system faults according to the fault analysis method of each system.

3.7.3.52 P152100: Oil pressure sensor signal jump fault

Diagnose possible problems

A. Oil pressure sensor fault;

B. HECU problem;

Maintenance and diagnosis method

A. Check the intake temperature sensor and replace it;

B. Replace the HECU;

3.7.3.53 P160300; P060100: MCU clock fault diagnosis flag obtained from the bottom layer; ECM read-only memory check error

Diagnose possible problems

A. Abnormal internal circuit of engine control unit;

Maintenance and diagnosis method

A. Replace with a new HECU;

3.7.3.54 P1E0000; P1E1100: VCM supply voltage fault

Possible fault causes

A. DC-DC charging fault;

Maintenance and diagnosis method

A. Check DCDC;

3.7.3.55 P1E0100: VCM supply voltage fault

Possible fault causes

A. DC-DC charging fault;

B. DCDC cannot be turned on due to insufficient power of high-voltage battery pack;

Maintenance and diagnosis method

A. Check DCDC and high-voltage circuit;

3.7.3.56 P1E0200: EEPROM fault

Possible fault causes

A. EEPROM is damaged;

Maintenance and diagnosis method

A. Check and replace the HECU controller;

3.7.3.57 P1E0320; P1E0300: High-voltage interlock fault (HECU); High-voltage interlock fault (vehicle)

Possible fault causes

A. Looseness or open circuit of high-voltage connector;

Maintenance and diagnosis method

A. Check the high-voltage connector or harness;

3.7.3.58 P1E0420, P1E0430, P1E0440 and P1E0450: High-voltage power-on BMS timeout fault; High-voltage MCU timeout fault; High-voltage OBC timeout fault; gear request error

Possible fault causes

A. BMS, MCU, OBC and gear shifter do not meet the corresponding status;

Maintenance and diagnosis method

A. Read the DTCs of BMS, MCU, OBC and gear shifter, and handle them according to the troubleshooting scheme for BMS, drive motor, OBC and gear shifter;

3.7.3.59 P1E0600; P1E0700; P1E0800; P1E0900; P1E1A00: throttle 1 sensor power supply fault; throttle 2 sensor power supply fault; throttle pedal 1 opening input out of range fault; accelerator pedal 2 opening input out of range fault; Excessive difference between throttle pedals 1 and 2 openings

Possible fault causes

A. The throttle sensor is short-circuited or open-circuited;

Maintenance and diagnosis method

A. Check the accelerator pedal sensor and harness;

3.7.3.60 P1E2020; P1E2030; P1E2040: Cruise control signal error; Cruise button stuck; Noisy cruise switch diagnosis

Possible fault causes

A. Cruise control button fault or harness problem;

Maintenance and diagnosis method

A. Check the cruise control module and harness;

3.7.3.61 P1E2110; P1E2120; P1E2100; P1E2200; P1E2300; P1E2130; P1E2140; P1E2150; P1E2510; P1E2520; P1E2500; P1E2600; P1E2700; P1E2530; P1E2540; P1E2550: Drive coolant pump/line short-circuited to power supply; Drive coolant pump open-circuited fault; Drive coolant pump idling fault; Drive coolant pump stalling fault; Drive coolant pump overtemperature fault; Drive coolant pump short-circuited to ground fault; Drive coolant pump stall fault; Drive coolant pump crash fault; Battery pack coolant pump/line short-circuited to power supply; Battery pack coolant pump open-circuited fault; Battery pack coolant pump idling fault; Battery pack coolant pump stalling fault; Battery pack coolant pump overtemperature fault; Battery pack coolant pump short-circuited to ground fault; Battery pack coolant pump stall fault; Battery pack coolant pump crash fault;

Possible fault causes

A. The drive current is too high or the circuit is short-circuited;
B. Circuit open-circuited;
C. There is no water in the coolant pump circuit;
D. The coolant pump is abnormal;
E. The load is too large or the coolant pump is abnormal;
F. Coolant pump short-circuited to ground;
G. Coolant pump speed too low;
H. The coolant pump crashes;

Maintenance and diagnosis method

A. Check whether the external circuit is short-circuited; whether the external load is abnormal;
B. Check the external circuit first or replace the electronic fan;
C. Check the water circuit first, or replace the drive coolant pump;
D. Check the external circuit first, or replace the drive coolant pump;

3.7.3.62 P1E2800: Electronic fan short-circuited to power supply

Diagnose possible causes

A. The drive current is too high or the circuit is short-circuited;

Maintenance and diagnosis method

A. Check whether the external line is short-circuited; whether the external load is abnormal.

3.7.3.63 P1E2900: Electronic fan open-circuited fault

Diagnose possible causes

A. Circuit open-circuited

Maintenance and diagnosis method

A. Check the external circuit first or replace the electronic fan.

3.7.3.64 P1E2A00: Collision protection (collision fault record)

Possible fault causes

A. Collision or sensor fault;

Maintenance and diagnosis method

A. Check the collision sensor;

3.7.3.65 P1E3000: Electronic fan stalling fault

Diagnose possible causes

A. The fan is abnormal or blocked by foreign objects.

Maintenance and diagnosis method

A. Check whether the electronic fan is blocked by foreign objects;
B. Replace the electronic fan.

3.7.3.66 P1E3100: Electronic fan internal fault

Diagnose possible causes

A. Fan is abnormal.

Maintenance and diagnosis method

A. Replace the electronic fan.

3.7.3.67 P1E3200: Electronic fan overcurrent fault

Diagnose possible causes

A. Fan is abnormal.

Maintenance and diagnosis method

A. Replace the electronic fan.

3.7.3.68 P1E3300: Electronic fan short-circuited to ground fault

Diagnose possible causes

A. Fan is abnormal.

Maintenance and diagnosis method

A. Replace the electronic fan.

3.7.3.69 P1E3600; P1E3400; P1E3700; P1E3800; P1E3500; P1E3900: Electronic fan high-speed relay channel short-circuited to power supply; Electronic fan high-speed relay channel short-circuited to GND; Electronic fan high-speed relay control line open-circuited fault; Electronic fan low-speed relay channel short-circuited to power supply; Electronic fan low-speed relay channel short-circuited to GND; Electronic fan low-speed relay control line open-circuited fault;

Possible fault causes

A. The harness of high-speed electronic fan relay is abnormal;

B. The harness of low-speed electronic fan relay is abnormal;

Maintenance and diagnosis method

A. Check the control harness of high-speed electronic fan relay;

B. Check the control harness of low-speed electronic fan relay;

3.7.3.70 P1E4000; P1E4010; P1E4020: Fast charging relay channel short-circuited to power supply; fast charging relay channel short-circuited to GND; fast charging relay channel open-circuited fault

Possible fault causes

A. The harness of fast charging relay is abnormal;

Maintenance and diagnosis method

A. Check the control harness of fast charging relay;

3.7.3.71 P1E4030: Fast charging relay adhesion detection

Possible fault causes

A. Fast charging relay stuck;

Maintenance and diagnosis method

A. Replace the fast-charge relay;

3.7.3.72 P1E4040; P1E4050: Fast charging port overtemperature fault; slow charging port overtemperature fault

Possible fault causes

A. The temperature signals sent by BMS and OBC are abnormal;

Maintenance and diagnosis method

A. Read OBC and BMS DTCs and handle them according to the OBC and BMS fault maintenance plan;

3.7.3.73 P1E4700: The number of engine start failures exceeds the limit fault

Possible fault causes

A. Engine fault, no fuel, or generator fault;

Maintenance and diagnosis method

A. Check whether there is fuel on the fuel gauge;

B. Check whether the generator and engine report faults;

3.7.3.74 P1E4910; P1E4920; P1E4930; P1E4940; P1E4970; P1E4980; P1E4990: Drive motor fault; DCDC fault; BMS fault; electric power-assisted brake system fault; OBC fault; AC fault

Possible fault causes

A. Fault of drive motor, generator, DCDC, BMS, electric power-assisted brake system, OBC and AC;

Maintenance and diagnosis method

A. Read the DTCs of MCU, GCU, DCDC, BMS, EHB, OBC and AC, and handle them according to the troubleshooting scheme for drive motor, generator, DCDC, BMS, EHB, OBC and AC;

3.7.3.75 P210000: Electronic throttle control deviation exceeds the limit

Diagnose possible problems

A. Electronic throttle motor circuit fault;

B. Electronic throttle valve plate body fault;

Maintenance and diagnosis method

A. Check whether the electronic throttle motor harness is normal;

B. Check whether the electronic throttle valve plate is normal;

3.7.3.76 P210800; P217600; P210900; P216300: Slow response of electronic throttle; ETC reset fault; ETC Off reset fault; ETC On reset fault

Diagnose possible problems

A. Data version problem;

B. Electronic throttle body fault;

Maintenance and diagnosis method

A. Check whether the vehicle data version is up to date;

B. Check whether the electronic throttle is normal and replace the throttle body;

3.7.3.77 P213500: Faults correlative to electronic throttle position sensor 1# and 2# circuit

Diagnose possible problems

A. Throttle sensor fault;

B. Throttle body fault;

Maintenance and diagnosis method

A. Check the throttle sensor and replace it;

B. Check whether the throttle body is normal; replace the throttle body;

3.7.3.78 P218400; P218500: Cooling fan end coolant temperature sensor circuit low voltage; cooling fan end coolant temperature sensor circuit high voltage

Diagnose possible problems

A. Coolant temperature sensor fault at cooling fan end;

B. Coolant temperature sensor harness fault at cooling fan end;

Maintenance and diagnosis method

A. Check the cooling fan end coolant temperature sensor and replace it;

B. Check whether the harness connection of coolant temperature sensor at cooling fan end is normal;

3.7.3.79 P242200; P044200; P045500: Ventilation solenoid valve stuck in the closed position; slight fuel tank leakage; large fuel evaporation system leakage/carbon canister solenoid valve blockage/desorption pipeline disconnection

Diagnose possible problems

A. Data version problem;

B. Fuel tank pressure sensor harness fault;

C. Fuel tank cap and fuel tank system pipeline problems;

D. Carbon canister solenoid valve fault;

Maintenance and diagnosis method

A. Check whether the vehicle data is of a new version;

B. Check whether the fuel tank pressure sensor harness connection is normal; when powered on and not started, the fuel tank pressure should be ±200pa;

C. Check whether the vehicle's fuel tank cap and fuel tank system pipeline are damaged or poorly sealed;

D. Check the carbon canister solenoid valve; replace the carbon canister solenoid valve;

3.7.3.80 P24D800; P24D700: Fuel evaporation system fuel tank pressure sensor circuit high voltage; fuel evaporation system fuel tank pressure sensor circuit low voltage

Possible fault causes

A. Fuel tank pressure sensor fault;

B. Fuel tank pressure sensor harness fault;

Maintenance and diagnosis method

A. Check the fuel tank pressure sensor and replace it;

B. Check whether the harness connection of fuel tank pressure sensor is normal;

3.7.3.81 P24D900: Fuel evaporation system fuel tank pressure sensor signal jumps

Possible fault causes

A. Fuel tank pressure sensor fault;

B. HECU body problem;

Maintenance and diagnosis method

A. Check the fuel tank pressure sensor and replace it;

B. Replace the HECU;

3.7.3.82 P310500; P010700; P010800: Intake pressure sensor signal stuck when the engine is started; intake manifold pressure sensor circuit low voltage; intake manifold pressure sensor circuit high voltage

Diagnose possible problems

A. Intake pressure sensor fault;

B. Intake pressure sensor harness fault;

C. HECU body problem;

Maintenance and diagnosis method

A. Check the intake pressure sensor and replace it;

B. Check whether the harness connection of intake pressure sensor is normal (short-circuited to low voltage or open-circuited);

C. Replace the HECU;

3.7.3.83 U007300; U007500: CAN bus fault

Possible fault causes

A. EV-CAN line short-circuited;

B. SF-CAN line short-circuited;

Maintenance and diagnosis method

A. Check the CAN network harness and the CAN interface of parts and components;

3.7.3.84 U011083; U011084; U011085; U011086; U011087; U011090; U011093; U011094; U011096; U011098: Error in checksum with MCU; Error in checksum with GCU; Error in checksum with DCDC; Error in checksum with OBC; Error in checksum with GSM; Error in checksum with PEPS; Error in checksum with Tbox; Error in checksum with ABS/ESP/EHB; Error in checksum with ACC; Error in checksum with SRS;

Possible fault causes

A. MCU signal, GCU signal, DCDC signal, OBC signal, GSM signal, PEPS signal, TBOX signal, ABS signal, DAS signal and SRS signal are sent incorrectly;

Maintenance and diagnosis method

A. Read DTCs of MCU, GCU, DCDC, OBC, gear shifter, PEPS, TBOX, ABS, DAS, SRS and handle them according to the fault maintenance plan for drive motor, generator, DCDC, OBC, gear shifter, PEPS, TBOX, ABS/DAS, SRS;

3.7.3.85 U011099: Electronic immobiliser authentication failed

Possible fault causes

A. Electronic immobiliser authentication error;

B. HECU or PEPS does not match the vehicle;

Maintenance and diagnosis method

A. Re-match the electronic immobiliser of HECU and PEPS;

3.7.3.86 U011100; U011000; U012000; U029800; U019B00; U010300; U016400; U014001; U015500; U015600; U100200; U012100; U012820; U010400; U120000: loss of communication with BMS; loss of communication with MCU; loss of communication with GCU; loss of communication with CDU; loss of communication with GSM; loss of communication with AC; loss of communication with PEPS; loss of communication with IC; loss of communication with ICE; loss of communication with TBOX; loss of communication with ABS/ESP/EHB; loss of communication with EPB; loss of communication with ACC; loss of communication with SRS

Possible fault causes

A. The CAN network line is open-circuited;

Maintenance and diagnosis method

A. Check the CAN network harness and the CAN interface of parts and components;

3.7.3.87 U016700: PEPS immobiliser authentication does not respond

Possible fault causes

A. Circuit fault;

B. Hardware fault;

Maintenance and diagnosis method

A. Re-learn and match;

B. No matching is performed after replacing the new HECU or PEPS;

3.7.3.88 B301510; B301530; B301520: Reversing relay short-circuited to power supply; reversing relay short-circuited to ground fault; reversing relay open-circuited fault

Possible fault causes

A. Abnormal reversing relay harness;

Maintenance and diagnosis method

A. Check the reversing relay control harness;

3.7.3.89 B301610; B301620; B301630: M/C relay short-circuited to power supply; M/C relay channel short-circuited to ground fault; M/C relay channel open-circuited fault

Possible fault causes

A. Abnormal M/C relay harness;

Maintenance and diagnosis method

A. Check the M/C relay control harness;

3.7.3.90 B302B30; B302B20; B302B40: GCU wake-up channel short-circuited to power supply; GCU wake-up channel short-circuited to GND; GCU wake-up channel open-circuited fault

Possible fault causes

A. Abnormal GCU wake-up harness;

Maintenance and diagnosis method

A. Check the GCU wake-up low-voltage harness;

3.7.3.91 B302F40; B302F50; B302F30: MCU wake-up channel short-circuited to power supply; MCU wake-up channel short-circuited to ground fault; MCU wake-up channel open-circuited fault

Possible fault causes

A. The MCU wake-up harness is abnormal;

Maintenance and diagnosis method

A. Check the MCU wake-up low-voltage harness;

3.7.3.92 B303010: Rechargeable energy storage system mismatch

Possible fault causes

A. (1) BMS fault, CAN bus fault;

Maintenance and diagnosis method

A. Read the BMS DTC and handle it according to the BMS fault maintenance plan;

B. Check the power CAN harness;

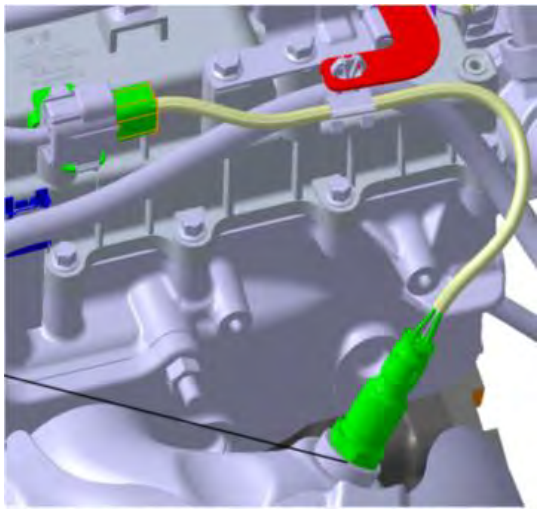
3.7.4 Removal and installation

3.7.4.1 Front oxygen sensor

Removal

1. Disconnect the battery negative cable.
2. Disconnect the front sensor connector.
3. Disengage the fixing clip of the front oxygen sensor.
4. Remove the front oxygen sensor.

   Torque: 50±10Nm



Installation

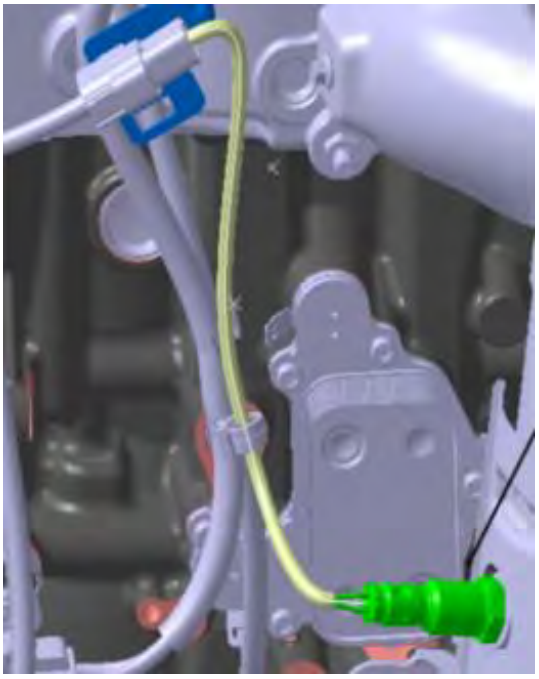
The installation order is the reverse of the removal order.

3.7.4.2 Post oxygen sensor

Removal

1. Disconnect the battery negative cable.
2. Disconnect the post sensor connector.
3. Disengage the fixing clip of the post oxygen sensor.
4. Remove the post oxygen sensor.

   扭矩：50±10Nm



Installation

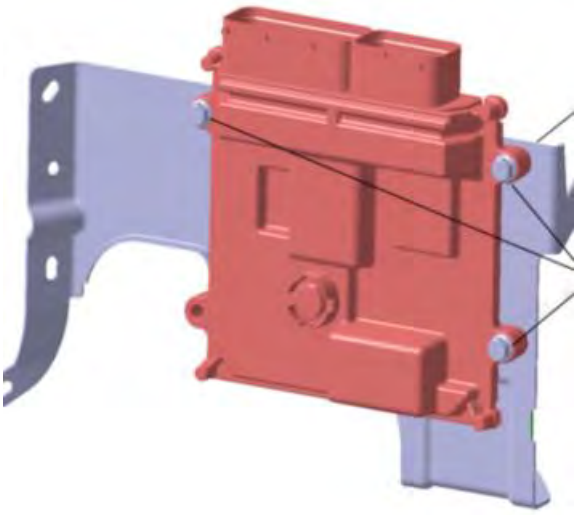
The installation order is the reverse of the removal order.

3.7.4.3 HECU

Removal

1. Disconnect the battery negative cable.
2. Disconnect the HECU connector.
3. Remove HECU mounting bolts.

   Torque:8±2Nm



Installation

The installation order is the reverse of the removal order.

3.8 Engine

3.8.1 Specification

3.8.1.1 General specifications

Item		Standard value	Limit value
Camshaft			
Camshaft height (mm)	Air intake	35.08	34.58
	Bleeding	34.26	33.76
Cylinder head and valve			
Flatness of cylinder gasket surface (mm)		0.03	0.2
Grinding limit of the lower surface of the cylinder head (including grinding of the upper surface of the cylinder block) limit) value mm)		-	0.2
Total height of cylinder head (mm)		132	-
Valve edge thickness (mm)	Intake valve	1.0	0.5
	Exhaust valve	1.5	1.0
Clearance between valve stem and valve guide (mm)	Air intake	0.02 ~ 0.05	0.10
	Bleeding	0.03 ~ 0.06	0.15
Valve stem protrusion amount (mm)	Intake valve	46.1	46.6
	Exhaust valve	46.2	46.7
Total valve length (mm)	Intake valve	106.35	105.85
	Exhaust valve	106.85	106.35
Valve spring free height (mm) (intake and exhaust valves)		54.8	53.8
Valve seat contact width (mm)		0.9 ~ 1.3	Intake: 0.5~1.8 Exhaust: 0.8~2.0
Valve seat ring cone angle	Intake/Exhaust	90 °(0 ° , -0.5 °)	-
Valve spring verticality		Below 2°	Below 4°
Total length of valve guide (mm)	Air intake	48	-
	Bleeding	55	-
Valve guide protrusion amount (mm)		22.7 ~ 23.3	-
Outer diameter of valve stem (mm)	Air intake	5.17±0.007	-
	Bleeding	5.16±0.007	-
Oil pump and oil sump			
Oil pump gear tip clearance (mm)		0.06 ~ 0.18	-
Clearance between outer rotor and pump housing (mm)		0.1 ~ 0.181	-
Clearance between rotor and pump cover (mm)		0.040 ~ 0.095	-
Clearance between inner rotor and pump housing (mm)		0.03 ~ 0.065	-
Piston and connecting rod			
Piston ring side clearance (mm)	First ring	0.03 ~ 0.07	0.1
	Second ring	0.02 ~ 0.06	0.1

Piston ring end clearance (mm)	First ring	0.12 ~ 0.24	0.8
	Second ring	0.30 ~ 0.45	0.8
	Oil ring	0.20 ~ 0.50	1.0
Piston pin outer diameter (mm)		18.0	-
Pressing load of piston pin (at room temperature) N		4900 ~ 14700	-
Clearance of crankshaft pin (connecting rod journal clearance) (mm)		0.02 ~ 0.04	0.1
Connecting rod large end side clearance (mm)		0.10 ~ 0.25	0.4
Crankshaft and cylinder block			
Crankshaft axial clearance (mm)		0.05 - 0.18	0.25
Deformation of upper part of cylinder block		0.05	0.1
Diameter of crankshaft main journal (mm)		48.0	-
Connecting rod journal diameter (mm)		42.0	-
Crankshaft main journal clearance (mm)		0.02 ~ 0.04	0.1
Flatness of upper surface of cylinder block (mm)		Below 0.05	-
Grinding limit of upper surface of cylinder block (including grinding amount of lower surface of cylinder head) (mm)		-	0.2
Total cylinder block height (mm)		256	-
Cylinder block cylindricity (mm)		0.01	-
Inner diameter of cylinder block (mm)		75.5	-
Clearance between piston and cylinder block (mm)		0.02 ~ 0.04	-

Specifications of engine

Model		4F15N
Total displacement (mL)		1.498
Bore diameter × stroke mm		72×92
Compression ratio		14.5
Combustion chamber		Ridge type
Number of cylinders		4
Number of valves	Air intake	8
	Bleeding	8
Roller rocker arm		16
Hydraulic lash adjuster		16
Fuel injection type		Airway injection
Ignition system		Electronic control 4 coils
Generator		/
Starter		/

3.8.1.2 Torque specification

Item	Nm
Generator and ignition system	

Coolant pump belt pulley bolt	7 ~ 11
Generator bracket bolt (generator side)	20 ~ 25
Generator bracket bolt (coolant pump side)	20 ~ 25
Engine oil dipstick bolt	19 ~ 28
Spark plug	20 ~ 30
Generator nut	34 ~ 54
Ignition coil	8 ~ 12
Bolt of camshaft position sensor	7.8 ~ 9.8
Bolt of camshaft position sensor bracket	12 ~ 15
Flange bolt (for front end of crankshaft)	176 ~ 186
Timing belt and rocker arm chamber cover	
Bolt of rocker arm chamber cover	6 ~ 8
Mounting bolt of timing belt upper cover	10 ~ 12
Mounting bolt of timing belt lower cover	10 ~ 12
Mounting bolt of timing belt rear left cover	10 ~ 12
Mounting bolt of timing belt rear right cover	10 ~ 12
Mounting bolt of timing belt tension pulley	42 ~ 54
Tensioner arm mounting bolt	42 ~ 54
Automatic tensioner mounting bolt	20 ~ 26
Mounting nut and bolt (M10) of right engine bracket	30 ~ 42
Idler bolt	34 ~ 54
Exhaust camshaft timing gear bolt	78 ~ 98
VVT mounting bolt	42 ~ 54
VVT plug cap	18 ~ 24
Fuel control system	
Mounting bolt of carbon canister solenoid valve bracket	8 ~ 10
Mounting bolt of throttle body assembly	12 ~ 15
Mounting bolt of oil rail assembly	10 ~ 13
Coolant pump and water inlet pipe	
Coolant inlet pipe connector	17 ~ 26
Coolant temperature sensor	19.6 ~ 39.2
Thermostat housing bolt	19 ~ 28
Water inlet pipe bolt	20 ~ 27
coolant pump bolt (M8×30)	12 ~ 15
Coolant pump bolt (M8×50)	20 ~ 27
Coolant pipe assembly	10 ~ 12
Interface with vehicle	
Installation torque of bolts and nuts for right engine bracket	52 ~ 62
Intake manifold and exhaust manifold	

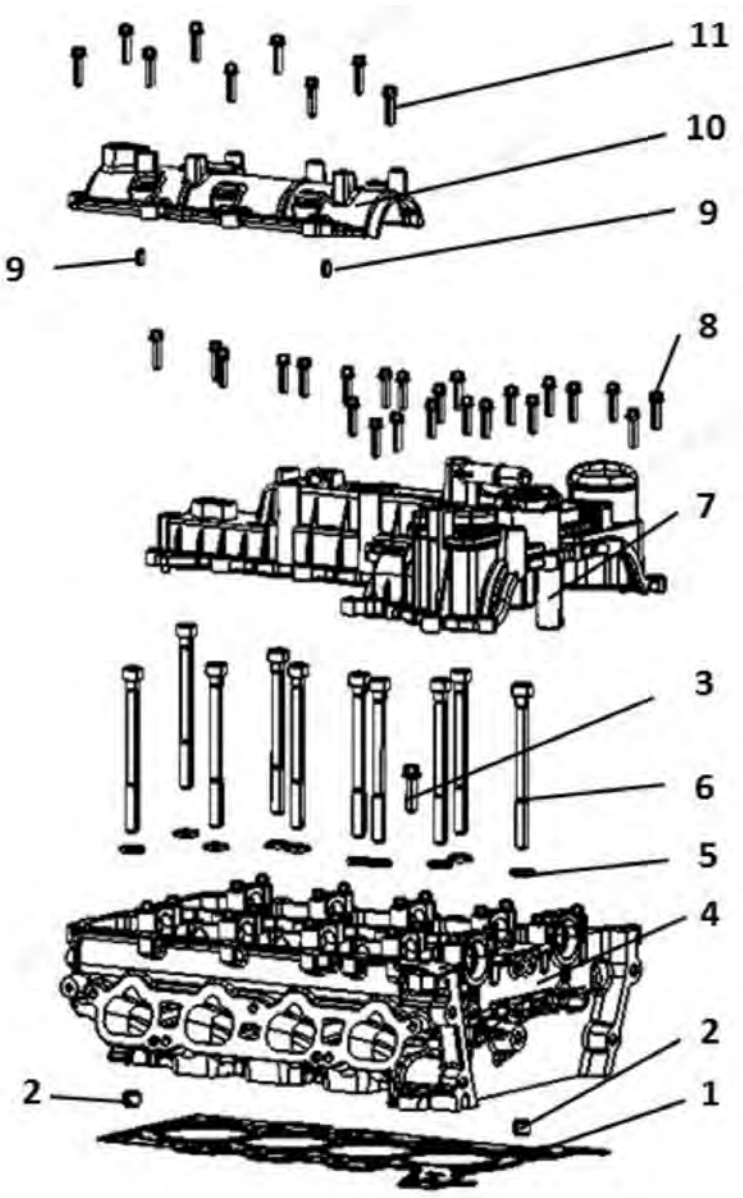
Bolt of intake manifold support (M8)	15 ~ 22
Intake manifold support bolt (M10)	30 ~ 42
Bolt gasket assembly and nut (for fixing intake manifold)	19 ~ 28
Exhaust manifold mounting flange nut (8)	26 ~ 32
Exhaust manifold mounting flange nut (10)	44 ~ 54
Exhaust heat shield bolt	8 ~ 12
Turbocharger assembly	54 ~ 64
Oil pipe bolt gasket assembly (M6)	10 ~ 12
Eye bolt (M10)	16 ~ 20
Turbocharger bracket (M8)	20 ~ 27
Turbocharger bracket (M10)	43 ~ 55
Bolt of intake manifold support (M8)	15 ~ 22
Intake manifold support bolt (M10)	30 ~ 42
Rocker arm and camshaft	
OCV valve mounting bolt	10 ~ 12
Eye bolt (M12)	27 ~ 33
Eye bolt (M16)	39 ~ 44
Bolts of tooth-shaped plate of camshaft position sensor	17 ~ 26
Camshaft cover (M8)	19 ~ 23
Camshaft cover (M6)	10 ~ 12
Cylinder head and valve	
Cylinder head bolt	20±2Nm→180°+4°→completely loosened→20±2 Nm→90° +4° →90°+4°
Oil pump and oil sump	
Installation of suction filter	15 ~ 22
Oil pressure sensor	8 ~ 12
Oil drain plug	34 ~ 44
Oil pan bolt (M6)	6 ~ 8
Oil pan bolt (M8)	22 ~ 25
Engine oil cooler bolt	25 ~ 29
Engine oil filter	12 ~ 16 Note ①
Oil pump bolt	12 ~ 15
Oil baffle plate bolt	8 ~ 10
Piston and connecting rod	
Connecting rod nut	16.7±2.0Nm, 90° to 94°
Crankshaft and cylinder block	
Upper baffle plate bolt	8 ~ 12
Lower baffle plate bolt	8 ~ 12
Rear oil seal housing bolt	10 ~ 12

Bearing cap bolt	34.3±2.0Nm,30°+4°
Installation of knock sensor	15 ~ 25

Note ①: Check whether the torque of engine oil cooler bolts is within the limit range each time the engine oil filter is replaced.

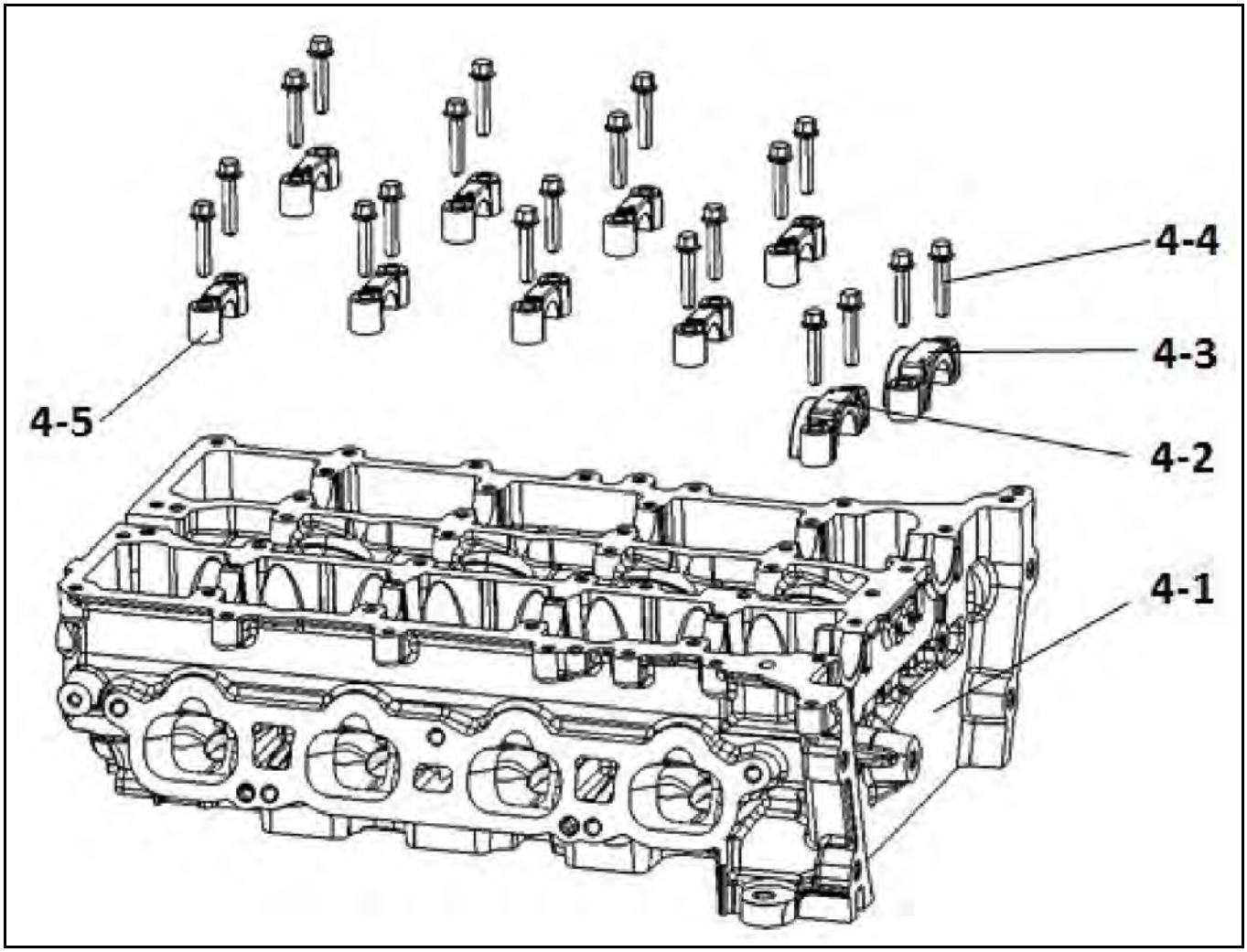
3.8.2 Instructions and operations

3.8.2.1 Exploded view of cylinder head system



Mark	Name	Tightening Methods	Remarks
1	Cylinder head gasket	/	
2	Cylinder head locating pin	/	
3	Hex flange bolt	24±2Nm	
4	Cylinder head with accessories assembly	/	
5	Cylinder head bolt gasket	/	
6	Cylinder head bolt	1. Tighten all to 60±5 Nm	Fastening the cylinder head with accessories assembly
		2. Reverse loosening 360° ±5°	
		3. Tighten all to 35±5 Nm	

Mark	Name	Tightening Methods	Remarks
		4. Tighten by 180°±5°	
7	Oil-gas separator assembly	/	
8	Hex flange bolt	10±2Nm	Fasten the oil-gas separator assembly
9	Cylindrical pin	/	
10	Cylinder head cover assembly	/	
11	Hex flange bolt	11±1Nm	Tighten the cylinder head cover assembly
12	Phase sensor	/	
13	Hex flange bolt	10±2Nm	Fasten the phase sensor

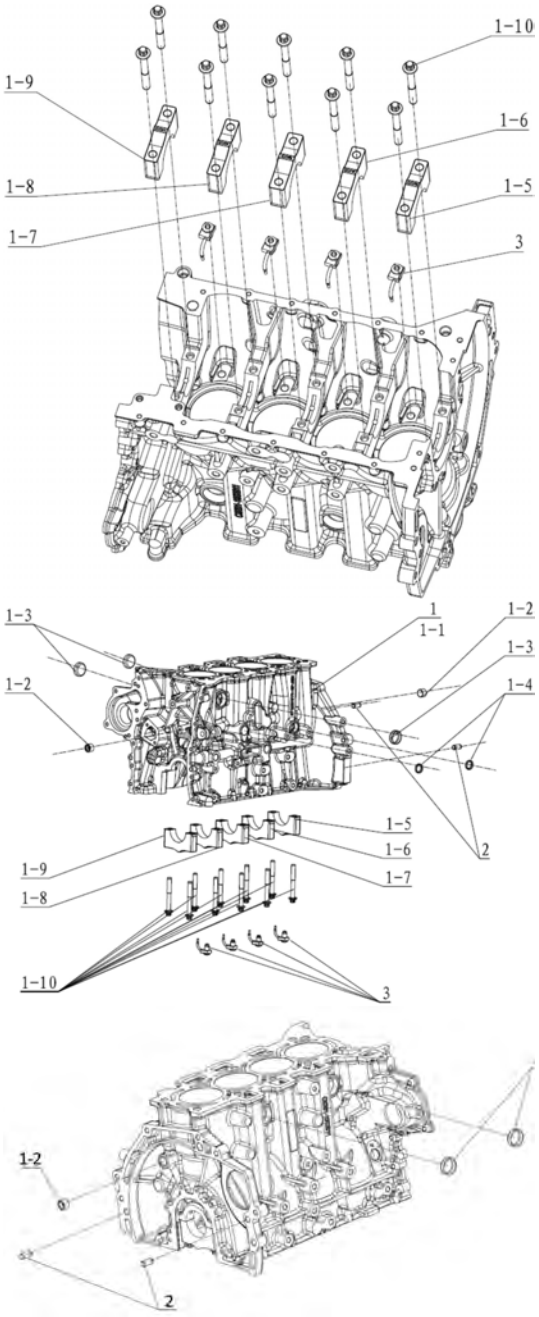


Mark	Name	Tightening Methods	Remarks
4-1	Finished cylinder head	/	
4-2	Camshaft cover - A	/	

Mark	Name	Tightening Methods	Remarks
4-3	Exhaust camshaft cover - A	/	
4-4	Hex flange bolt	5 Nm pre-tightening, with a final tightening torque of 11±1 Nm	M6×30; Quantity: 20; Fasten the camshaft cover
4-5	Camshaft cover - B	/	Quantity: 8

3.8.2.2 Cylinder block system

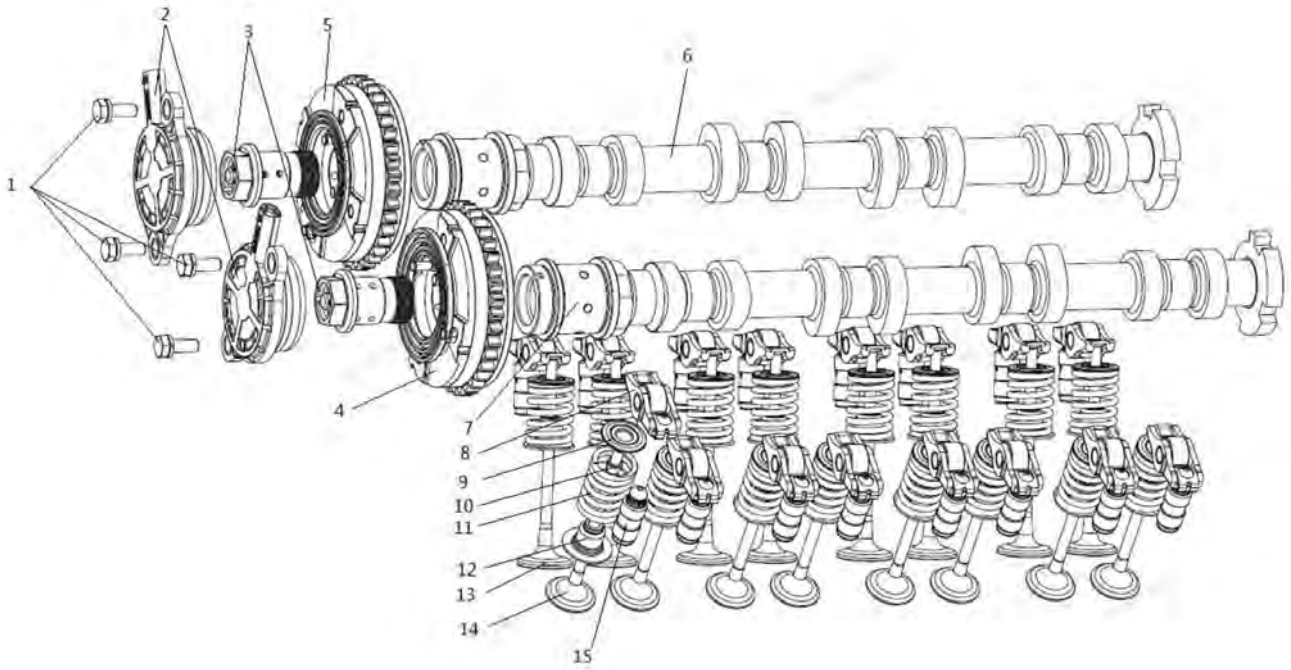
Exploded view of cylinder block system parts



Mark	Name	Tightening torque	Remarks
1	Cylinder block assembly	/	

1-1	Finished cylinder block	/	
1-2	Hex conical plug	Tighten with a torque of 25±5 Nm	Apply Loctite 262 or a sealant with equivalent performance. Coat 3 mm from the small end of the hex socket conical plug; after assembly, the hex socket conical plug should protrude by±2 mm.
1-3	Bowl plug	/	
1-4	Bowl plug	/	
1-5	Finished product of main bearing cap - E	/	The part is marked with "5"
1-6	Finished product of main bearing cap - D	/	The part is marked with "4"
1-7	Finished product of main bearing cap - C	/	The part is marked with "3"
1-8	Finished product of main bearing cap - B	/	The part is marked with "2"
1-9	Finished product of main bearing cap - A	/	Mark "1" on the part
1-10	Main bearing cap bolt	1. Tighten all with a torque of 52±5 Nm; 2. Tighten all at an angle of 60° ± 5°.	M9×1.25×73.5
2	Cylindrical pin	/	For the transmission positioning, the protrusion should be 7 mm after assembly.
3	Piston cooling nozzle	Torque to 30±3 Nm.	The nozzle body should fit the locating surface (Fig. **2-2, Fig. 2-3)**

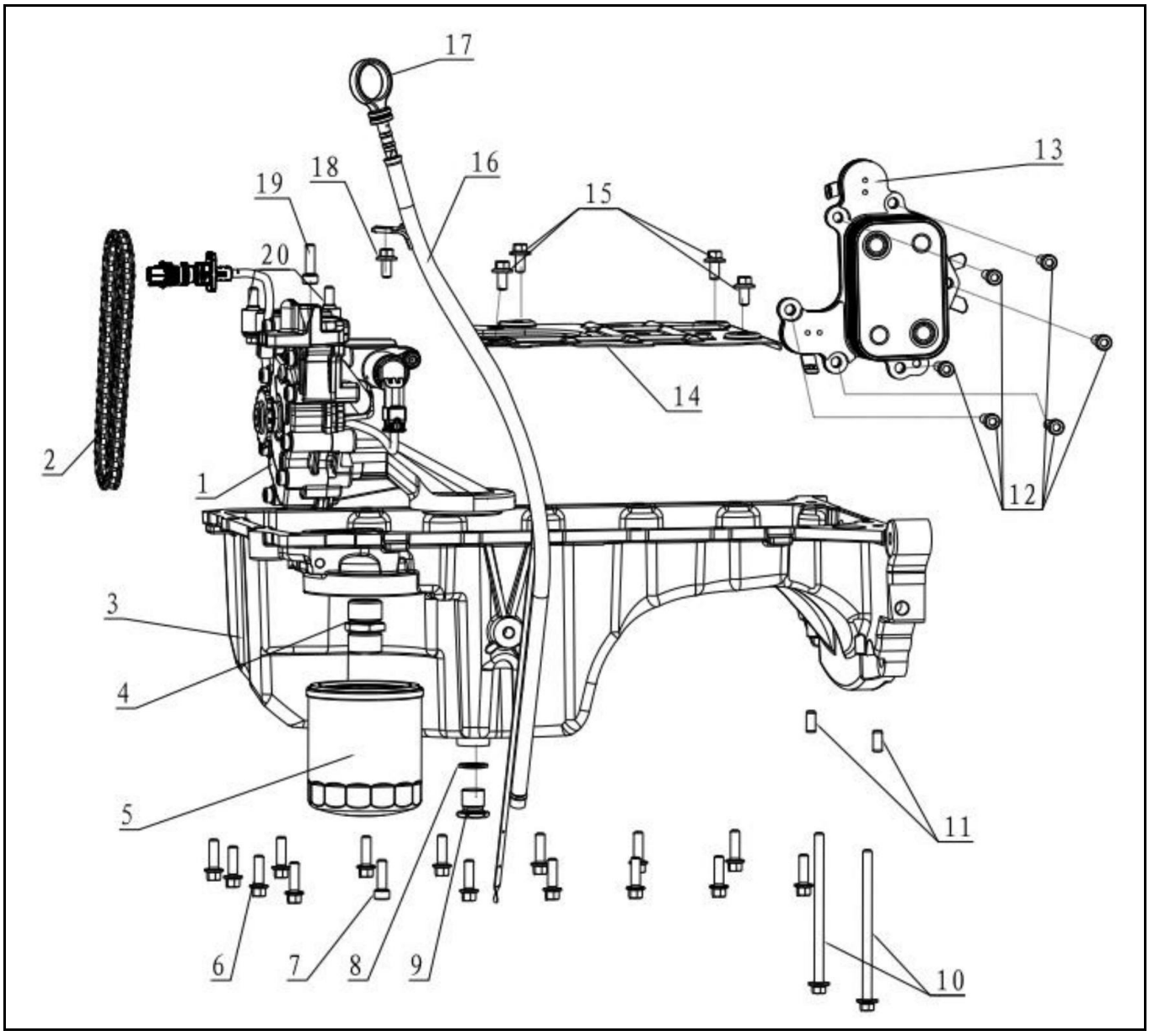
3.8.2.3 Valve System



S/N	Parts and components name	Tightening torque	Remarks
1	Hex bolt and spring washer assembling unit	10±2Nm	
2	CENTRAL ELECTROMAGNET	/	
3	Central engine oil control valve	1, 48±2Nm; 2, 26°±2°.	
4	Variable phase exhaust camshaft gear	/	
5	Variable phase intake camshaft gear	/	
6	Intake camshaft assembly	/	
7	Exhaust camshaft assembly	/	
8	Roller rocker arm	/	
9	Valve spring seat	/	
10	Valve collet	/	
11	Valve spring	/	
12	Valve oil seal	/	
13	Intake valve	/	
14	Exhaust valve	/	

S/N	Parts and components name	Tightening torque	Remarks
15	Hydraulic lash adjuster	/	
16	Sealing ring of central electromagnet	/	Secondary components of the central electromagnet

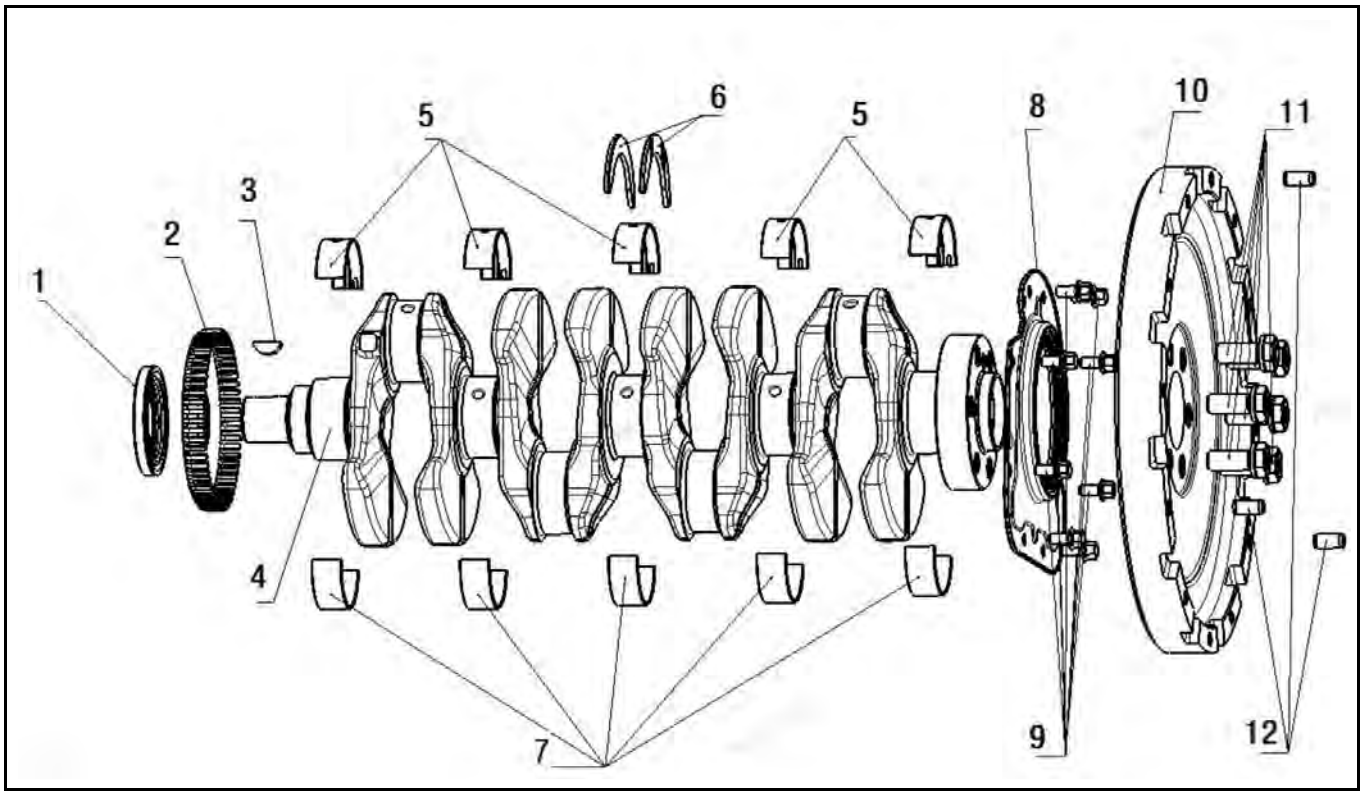
3.8.2.4 Lubrication System



Mark	Name	Tightening Methods	Remarks
1	Oil pump	/	
2	Oil pump drive chain	/	
3	Oil pan	/	
4	Oil filter joint	Tighten with a torque of 35 ±3Nm	M22

Mark	Name	Tightening Methods	Remarks
5	Engine oil filter	Pre-tighten to a torque of 18 ±1Nm, then tighten to a torque of 30±2 Nm	
6	Hex flange bolt	Tighten with a torque of 10 ±2Nm	M6×20
7	Hex socket head cap screw	Tighten with a torque of 10 ±2Nm	M6×20
8	Automatic centring seal ring	/	
9	Oil drain plug	Tighten with a torque of 17 ±3Nm	M14
10	Hex flange bolt	Tighten with a torque of 10 ±2Nm	M6×100
11	Cylindrical pin	/	
12	Hex socket head cap screw	1. Pre-tighten 8±1Nm 2. Final tighten 10±1Nm	
13	Oil Cooler Assembly	/	
14	Anti-emulsification plate	/	
15	Hex flange bolt	Tighten with a torque of 10 ±2Nm	
16	Oil dipstick upper guide pipe assembly	/	
17	Oil dipstick assembly	/	
18	Hex flange bolt	Tighten with a torque of 10 ±2Nm	M6×12
19	Hex socket head cap screw	Tighten with a torque of 10 ±2Nm	M6
20	Hex flange bolt	Tighten with a torque of 10 ±2Nm	M6

3.8.2.5 Crankshaft flywheel module

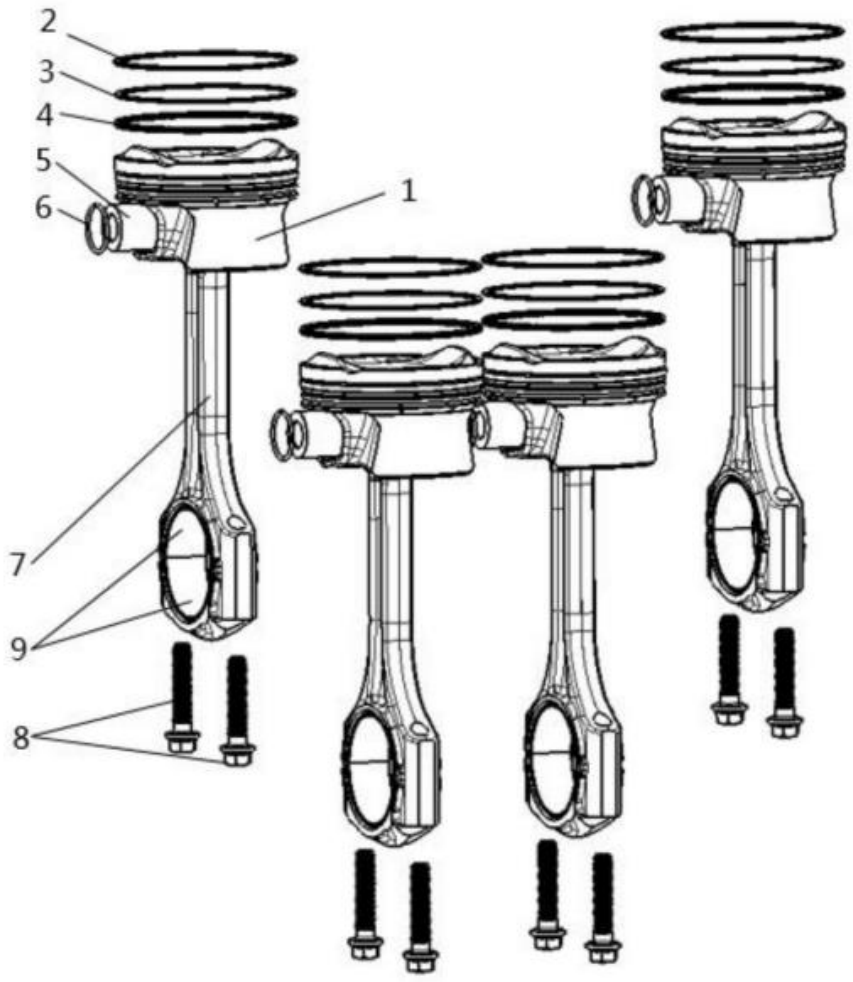


Caution: Observe the tightening sequence in (*) below.

Mark	Name	Tightening Methods	Remarks
1	Crankshaft front oil seal	/	
2	Speed signal disc	/	
3	Ordinary woodruff key	/	
4	Crankshaft	/	
5	Main bearing upper shell	/	Colours are categorised into 5 groups.
6	Crankshaft thrust plate	/	
7	Main bearing lower shell	/	Colours are categorised into 5 groups.
8	Crankshaft rear oil seal assembly	/	
9	Hex flange bolt (*)	Tighten with a torque of 10 ±2Nm	M6×12
10	Flywheel assembly	/	

Mark	Name	Tightening Methods	Remarks
11	Flywheel bolt (*)	Step-by-step cross tightening: 1) Tighten all to 50±5Nm; 2) Reverse loosening 180° ±5° 3) Tighten all to 50±5Nm; 4) Fully tighten at 50°±5°.	
12	Cylindrical pin		

3.8.2.6 Piston Connecting Rod Module

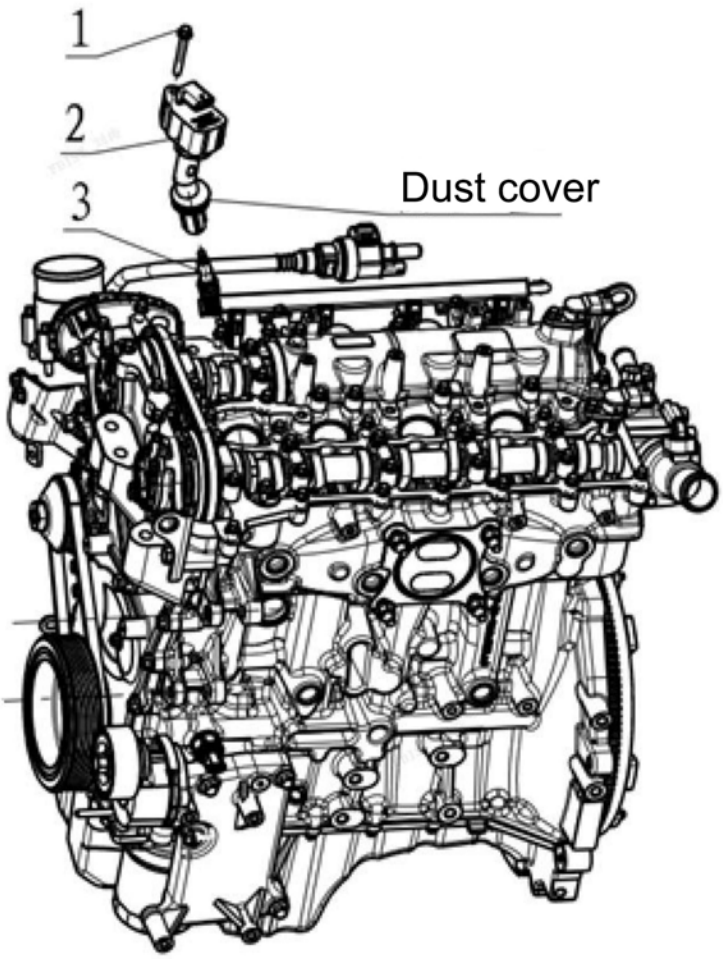


Mark	Name
1	Piston
2	Piston ring 1
3	Piston ring 2
4	Piston ring 3
5	Piston pin
6	SNAP SPRING, PISTON PIN

Mark	Name
7	Connecting rod assembly
8	Connecting rod bolt
9	Connecting rod bearing bush

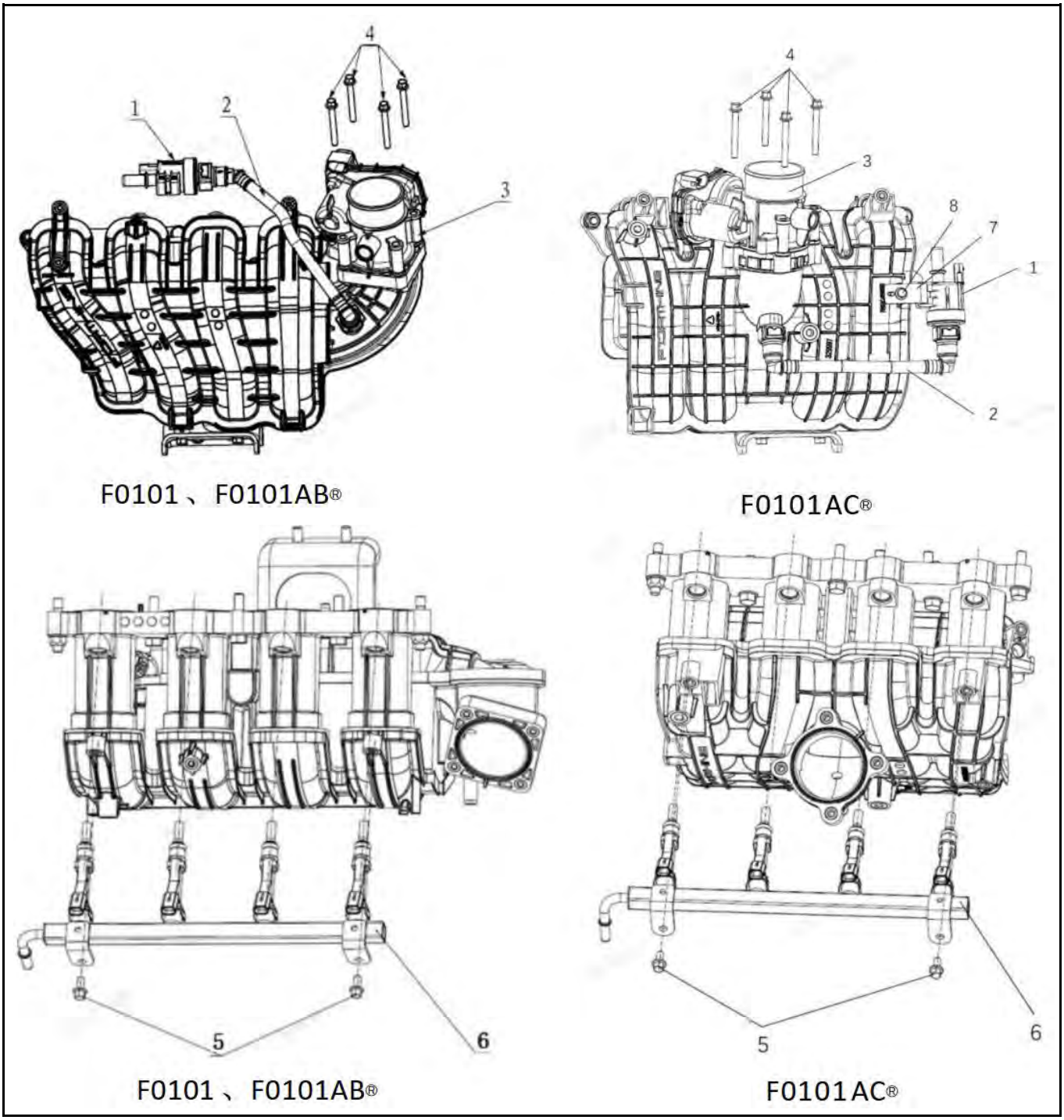
3.8.2.7 Electrical system

Ignition system



Mark	Name
1	Hex flange bolt (for securing ignition coil)
2	Ignition coil
3	Spark plug

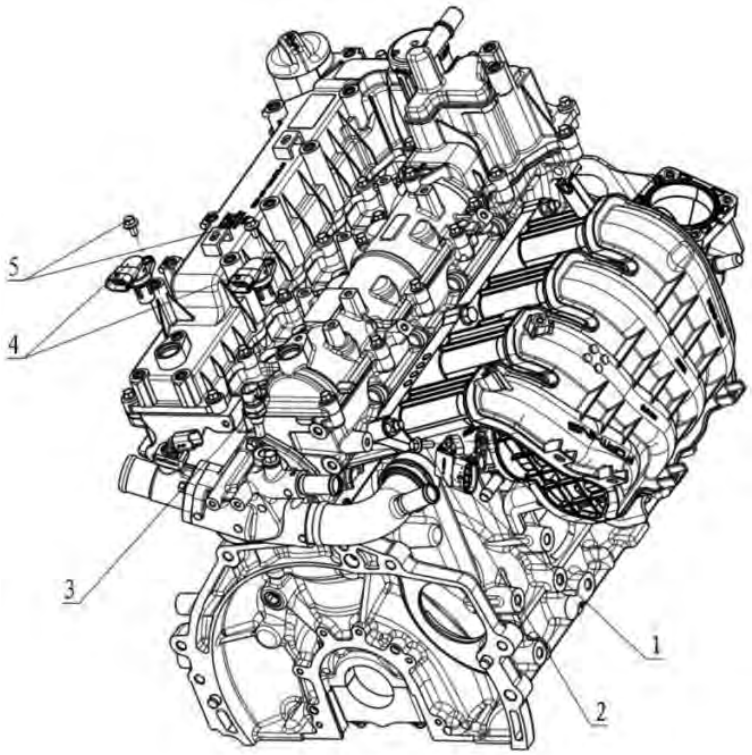
Evaporation recovery pipe assembly, throttle body, fuel rail injector assembly



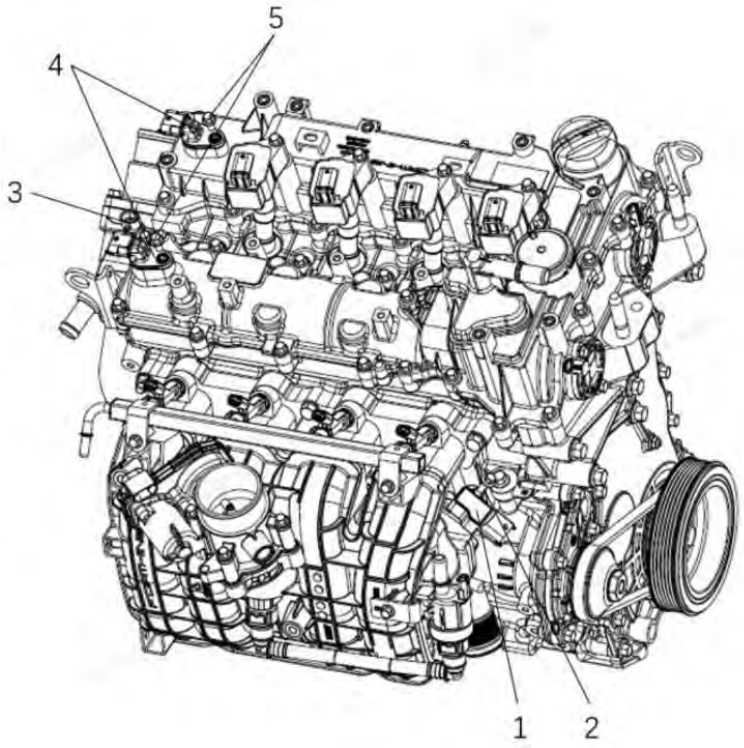
Mark	Name
1	Carbon canister control valve
2	Evaporation recovery pipe
3	Throttle body
4	Hex flange bolt (throttle body)
5	Hex flange bolt (fuel rail injector assembly)
6	Fuel rail fuel injector assembly

Mark	Name
7	Carbon canister control valve bracket
8	Hex flange bolt (carbon canister control valve bracket)

Sensor system



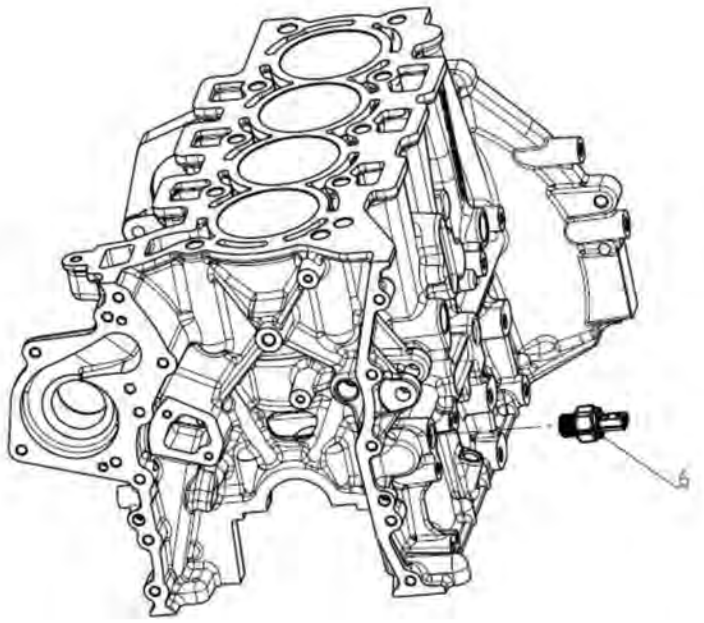
F0101、F0101AB®

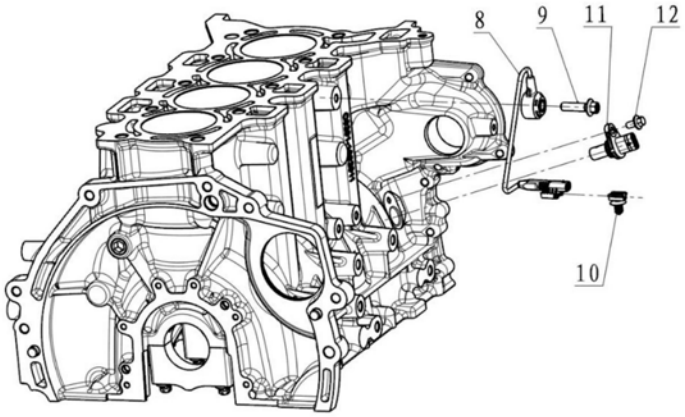


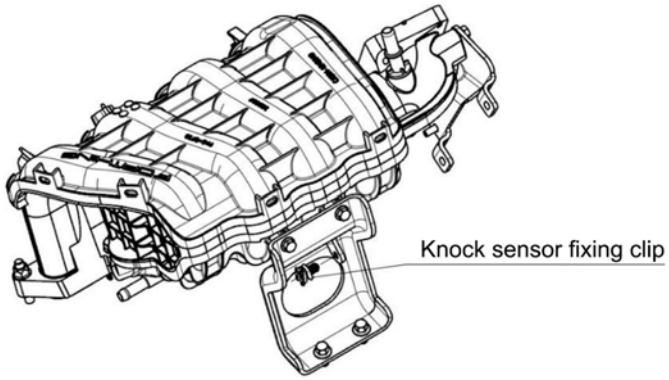
F0101AC®

Mark	Name
1	MAT and MAP sensors
2	Hex flange bolt (intake air temperature and pressure sensor)
2	Hex flange bolt (intake air temperature and pressure sensor)
3	Coolant temperature sensor
4	Phase sensor
5	Hex flange bolt (phase sensor)

Sensor system



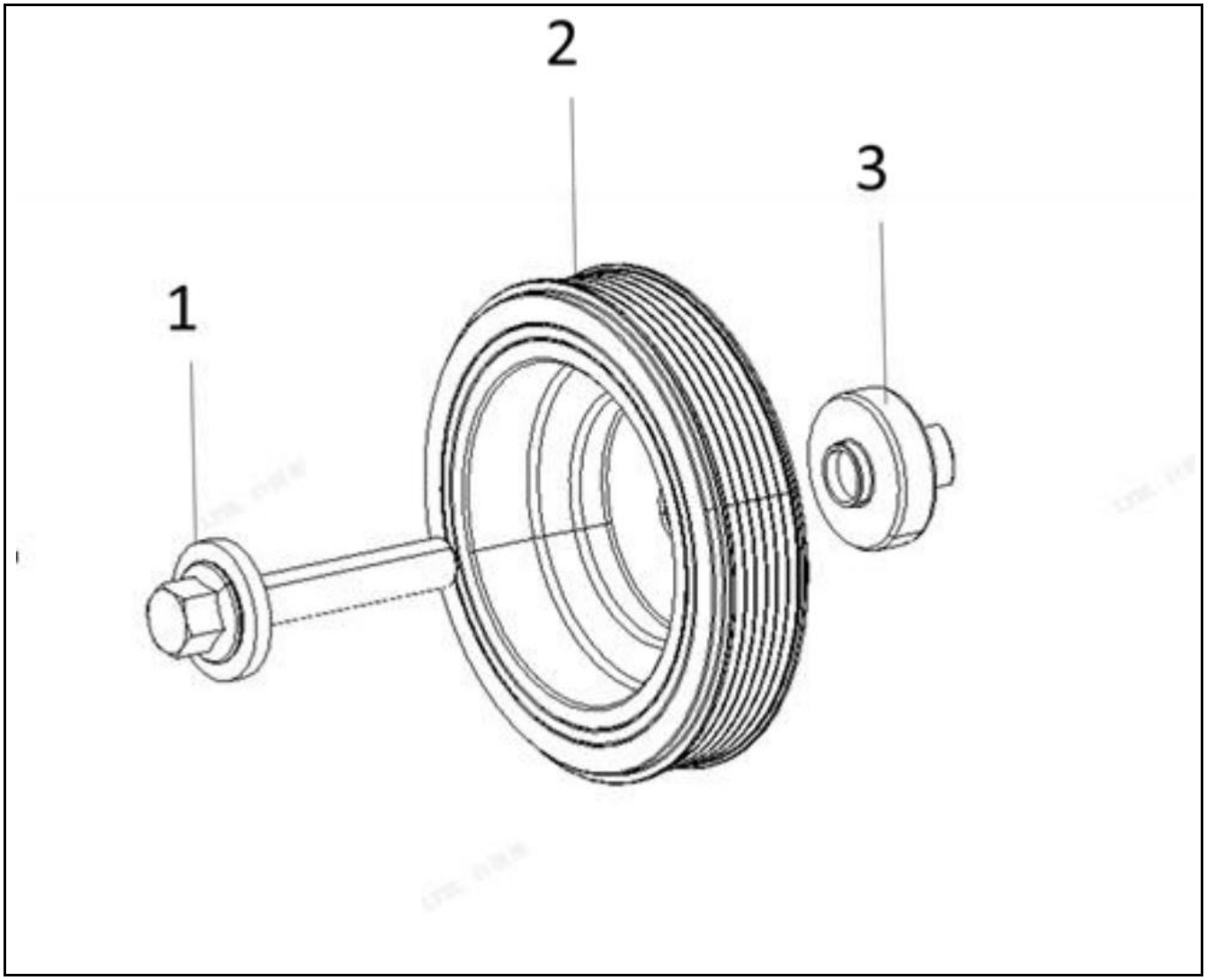




Mark	Name
6	Oil pressure sensor
8	Knock sensor
9	Hex flange bolt (knock sensor)
10	Knock sensor fixing clip

Mark	Name
11	Speed sensor
12	Hex flange bolt (speed sensor)

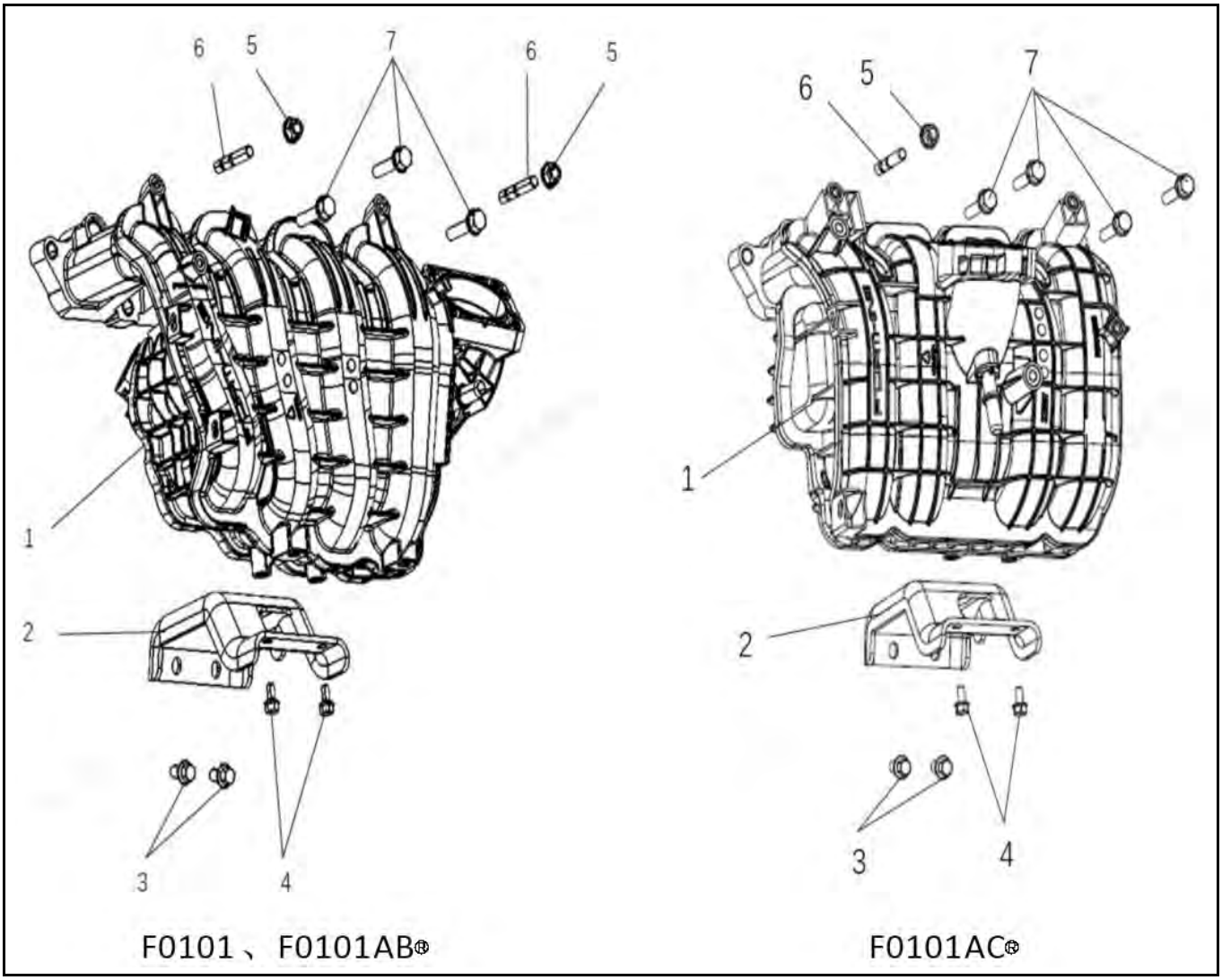
3.8.2.8 Exploded View of Accessory Wheel System Parts



Mark	Name	Tightening Methods
1	Crankshaft damper belt pulley bolt®	M14 ×72 1. Pre-tighten to 65±10Nm; 2. Reverse loosening 180°±5° 3. Tighten 130±5Nm again, and finally tighten 120°±5°.
2	Crankshaft damper belt pulley	/
3	Crankshaft damper belt pulley hub	/

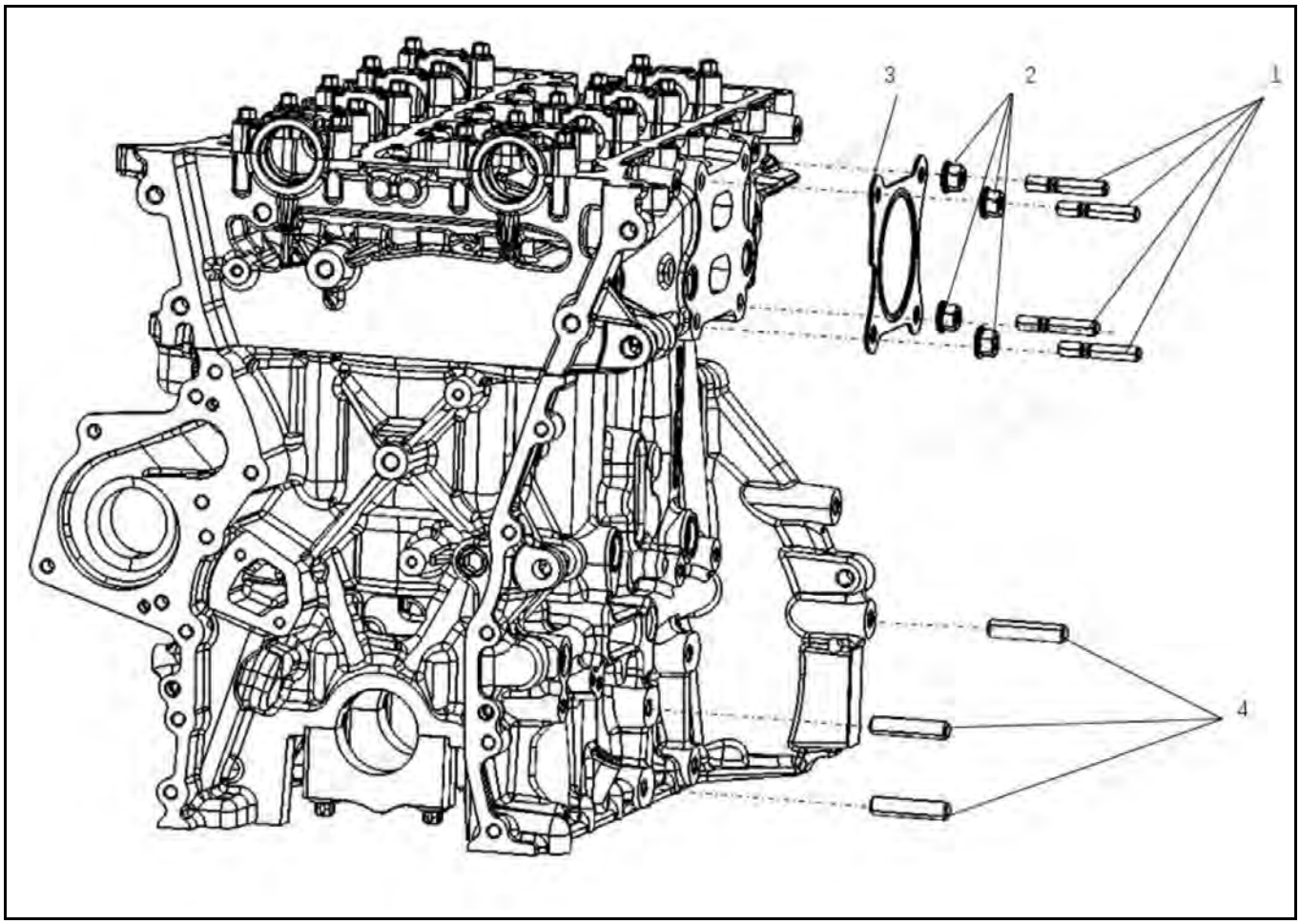
3.8.2.9 Intake and Exhaust System

Intake manifold assembly



Mark	Name	Tightening Methods	Remarks
1	Intake manifold assembly	/	/
2	Intake manifold bracket - A	/	/
3	Hex flange bolt	24±2 Nm	M8×16
4	Hex flange bolt	1. Pre-tighten to 5 Nm 2. Final tightening: 10±2 N·m	M6×12
5	Full hex metal flange lock nut	24±2 Nm	M8
6	Double-end stud	6.5±1.6 Nm	M8×35
7	Hex flange bolt - enlarged series	24±2 Nm	M8×35

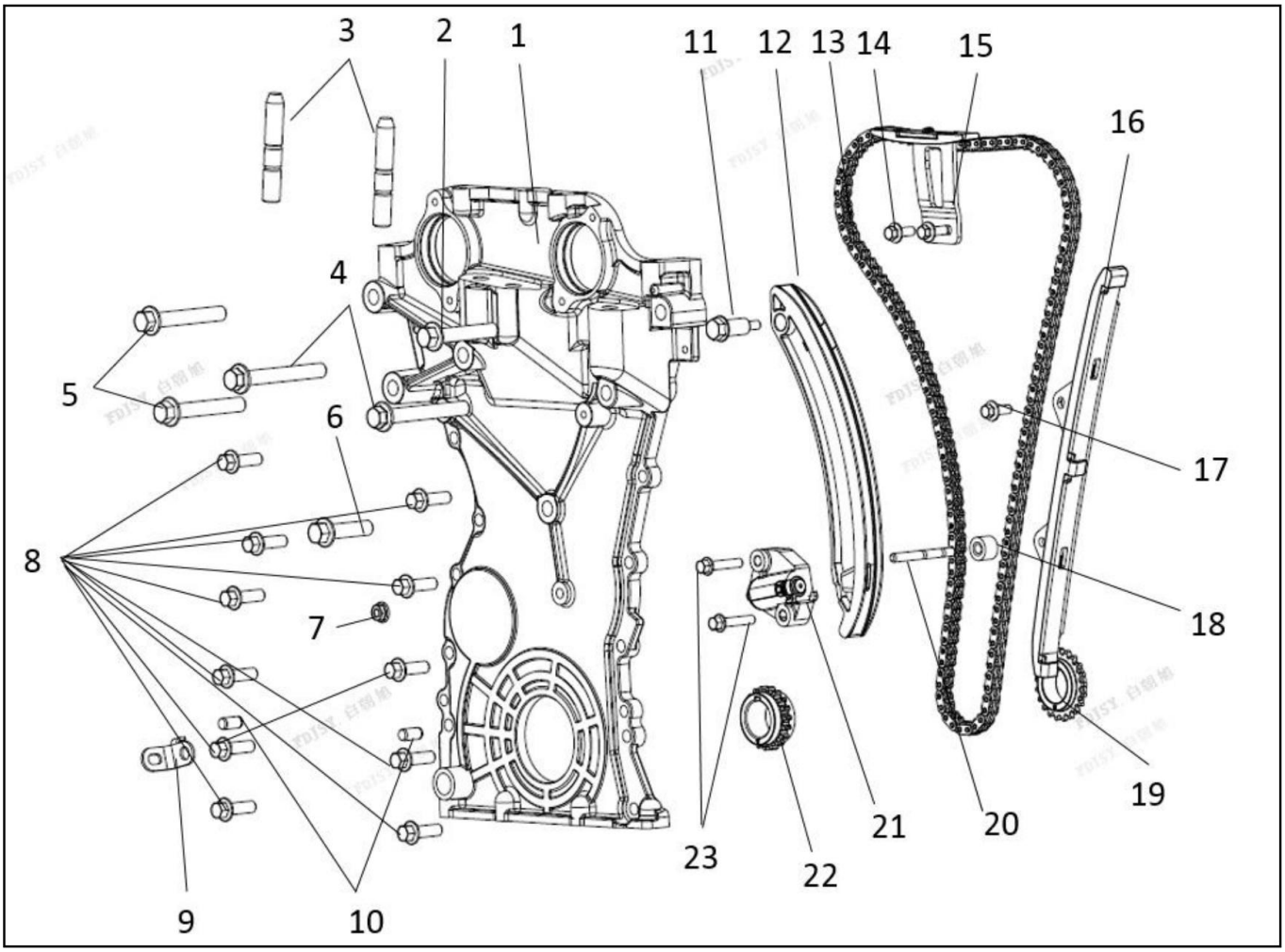
Exhaust system



Mark	Name	Tightening Methods	Remarks
1	Double-end stud	6.5±1.6 Nm	M8×32
3	Lock nut	/	M8
2	Exhaust manifold sealing gasket	/	/
4	Double-end stud	9±2 Nm	M10 × 45 (only for F0101AB engine)

3.8.2.10 Timing system

Exploded view of timing system parts:



Mark	Name	Remarks
1	Timing gear chamber housing	/
2	Hex flange bolt	M10×55, tighten with 35±5Nm
3	Double-end stud	Apply Loctite thread locker to the mating surface between the bolt and the screw hole, then tighten to 30±5 Nm.
4	Hex flange bolt	M10×75, tighten with 35±5Nm
5	Hex flange bolt	M10×65, tighten with 35±5Nm
6	Hex flange bolt	M10×40, tighten with 35±5Nm
7	Hex flange nut	Tighten with 10±2Nm
8	Hex flange bolt	M8×25, tighten with 10±2Nm
9	Engine harness bracket A	/
10	Cylindrical pin	/
11	Bolt - timing chain tension plate	M6, tighten with 10±2Nm
12	Timing chain tension plate	/
13	Timing chain	/
14	Hex flange bolt-timing chain upper guide plate	M6×16, tighten with 10±2Nm

15	Timing chain upper guide plate	/
16	Timing chain guide rail	/
17	Hex flange bolt-timing chain guide plate	M6×16, tighten with 10±2Nm
18	Sleeve	/
19	Engine oil pump drive gear	/
20	Double-end stud	M6, tighten with 5±1Nm
21	Timing tensioner	/
22	Crankshaft timing gear	/
23	Hex flange bolt	M6×20, tighten with 10±2Nm

3.8.2.11 Overview

Sealing

Joint surface	Adhesive application position	Sealant application width (mm)	Sealant grade
Installation surface of oil pan, cylinder block, and timing gear chamber housing	Oil pan mounting surface	Ø3±0.5	Loctite 5900
Intersection of timing gear chamber housing with cylinder block, cylinder head, and cylinder gasket	Upper and lower surfaces at the intersection of cylinder gasket and timing gear chamber housing	Ø3±0.5	
Contact surface between timing gear chamber housing and sleeve	Inner surface of timing gear chamber housing	Ø3±0.5	
Mounting surface of cylinder head and cylinder head cover assembly	Lower surface of cylinder head cover assembly	Ø3±0.5	
Intersection of semicircular surface of cylinder head cover with cylinder head and sealing ring of oil-gas separator	Intersection between the semicircular surface of cylinder head cover and the top surface of the cylinder head	Ø3	
Intersection of oil-gas separator, cylinder head, and timing gear chamber housing	Intersection between cylinder head top surface and timing gear chamber housing	Ø3	
Intersection of timing gear housing chamber with cylinder block and cylinder head	Intersection of timing gear housing chamber with cylinder block and cylinder head	Fully cover the timing gear The shell chamber is connected to the cylinder block and cylinder head Gap at junction	

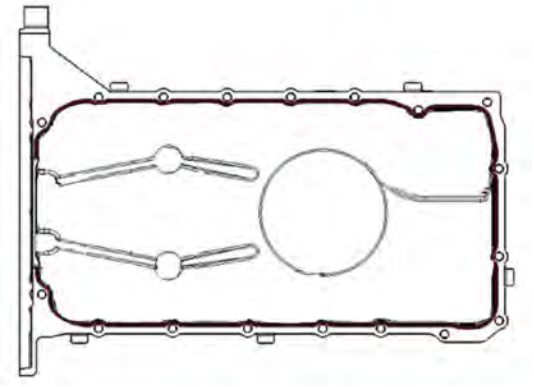
Joint surface	Adhesive application position	Sealant application width (mm)	Sealant grade
Intersection between cylinder block and oil pan	Intersection between the cylinder block and the oil pan (mounting surface of the crankshaft rear oil seal assembly)	Cover the sealing surface of the crankshaft rear oil seal assembly	

Sealant

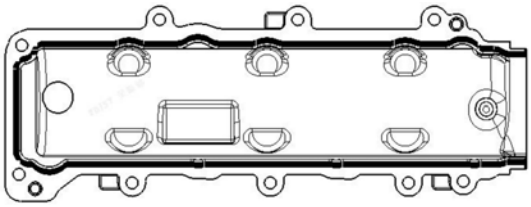
Sealant is used in many parts of the engine. To ensure that the sealant is completely suitable, special attention shall be paid when using the sealant. Bead size, continuity, and location are of utmost importance. If the application amount is too small, it will cause leakage. Excessive application will cause blockage or narrowing of the oil circuit. To prevent leakage at the joint surface, ensure a correct, continuous bead of sealant with an even application.

Schematic diagram of sealant

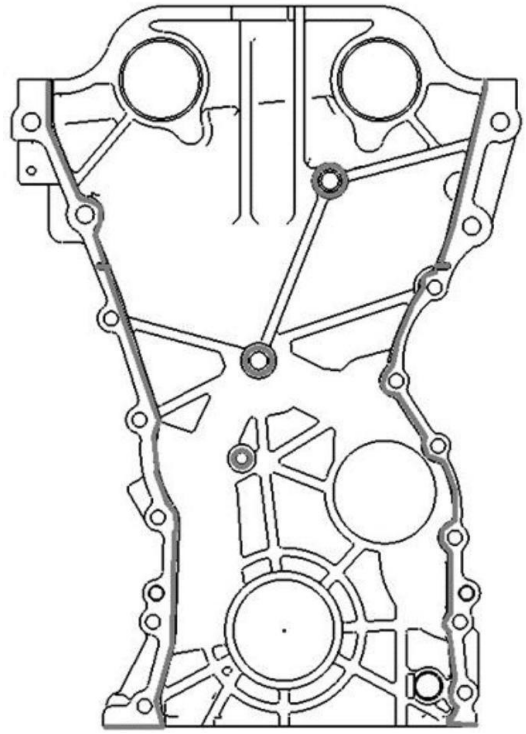
Sealant application on the sealing surface of the oil pan



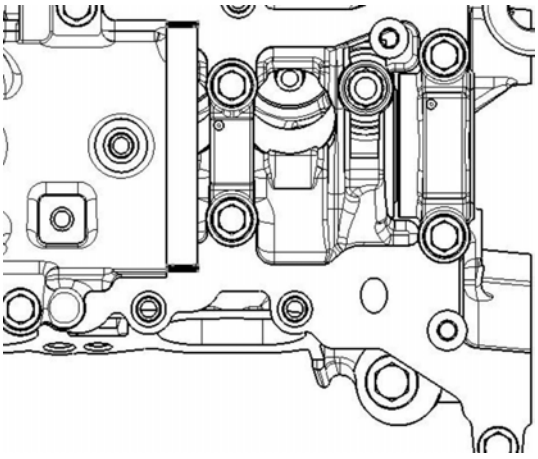
Sealant application on the lower surface of the cylinder head cover assembly



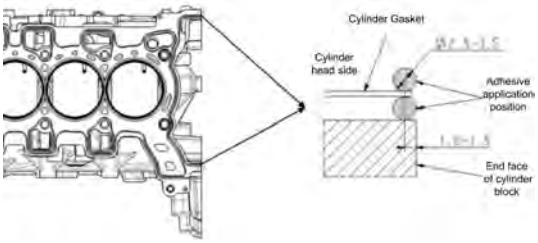
Sealant application on the sealing surface of the timing gear housing



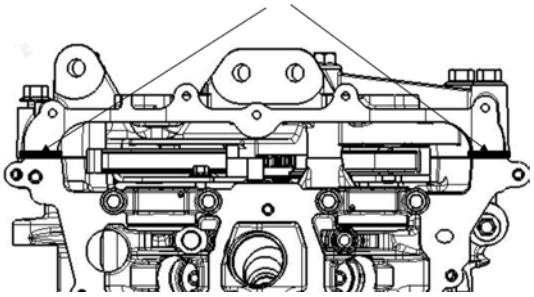
Sealant application at the intersection of the semicircular surface of the cylinder head cover and the top surface of the cylinder head



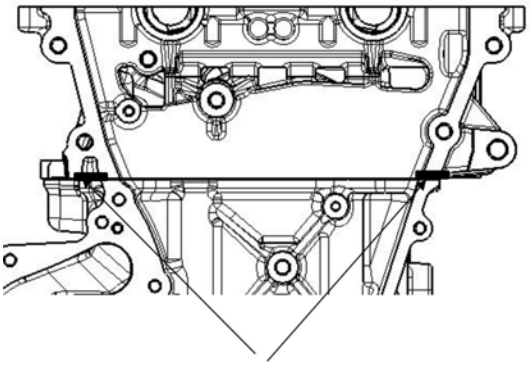
Sealant application at the intersection of the cylinder head, cylinder block, gasket, and timing gear chamber housing



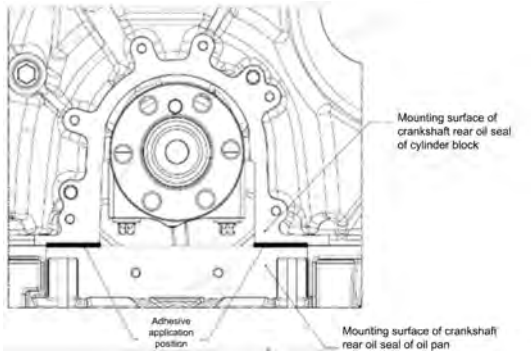
Sealant application at the intersection of the oil-gas separator, cylinder head, and timing gear chamber housing



Sealant application at the intersection of the cylinder block, cylinder head, and timing gear chamber housing



Applying sealant to the joint between cylinder block and oil pan



Removal

Generally, components assembled with sealant can be disassembled easily. For certain specific parts, gently tap them with a wooden or rubber mallet, or similar tools, to break the sealant on the joint surfaces. Alternatively, use a flat, smooth, and thin sealant scraper to carefully insert it into the bonding surfaces. Be cautious not to damage the surfaces.

Cleaning of sealing surface

Thoroughly remove all debris from the sealing surface with a sealant scraper or specialised cleaning brush. Ensure the sealing surface is flat and smooth, free from oil stains and foreign objects. Remove any sealant from the threaded holes.

Application essentials

Apply sealant in a continuous bead with no gaps. Surround the threaded hole completely with continuous beaded sealant. The sealant that has not yet hardened can be wiped off. Install in the specified position when the sealant is wet (within 3 minutes). When installing parts, take caution not to stick the sealant to unnecessary places. During the adequate curing time (approximately 2 hours), do not oil or wet the sections applied with sealant, or start the engine. When applying sealant, follow the procedures described above.

3.8.2.12 Precautions

1. **Precautions for draining engine coolant**

Caution: Drain the engine coolant after the engine cools down.

2. **Precautions for disassembling and decomposition**

Caution: Please use special service tools when required. Always pay attention to work safety, and do not operate forcefully or in violation of the instructions.

Caution: Take special care not to damage the mating and sliding surfaces

Caution: Seal the opening of the engine system by using tape or equivalent material, if necessary, to prevent the entrance of foreign objects.

Caution: Systematically identify and sort out removed parts for ease of troubleshooting and reassembly.

Caution: The basic principle for loosening bolts and nuts: loosen the outermost one first, then the one at its diagonal position, and so on. If a loosening order is specified, proceed as per the specified order.

3. **Precautions for checking, repairing and replacing**

Caution: Conduct a thorough inspection of the original parts and components before repair or replacement.

Caution: Check the newly replaced parts and components in the same manner as above to ensure their qualification.

4. **Precautions for assembly and installation**

Caution: Tighten the nut and bolt by using torque wrench.

Caution: The basic principle for tightening bolts and nuts: tighten the middle one in multiple steps with the same tightness, and then tighten the ones at the inner and outer diagonal positions. If a tightening order is specified, proceed as per the specified order.

Caution: Replace with a new gasket, oil seal or O-ring.

Caution: Thoroughly flush, clean and blow-dry each part and component. Carefully check if the engine oil or the engine coolant pipeline is blocked.

Caution: Ensure not to damage the sliding or mating surfaces, and completely remove any foreign objects such as cloth fibres or dust. Before assembly, lubricate the sliding surfaces with engine oil.

Caution: When refilling after draining the engine coolant, first release the air in the pipe (by opening the bleed valve on the water outlet housing to let the air out).

Caution: After the repair, start the engine and increase the engine speed to check for any leaks in the engine coolant, fuel, engine oil, and exhaust.

Caution: Parts that need to be tightened at a fixed angle

Finally tighten the following engine parts and components by using an angle wrench:

Cylinder head bolt

Main bearing cap bolt

Flywheel bolt

Connecting rod cap bolt

Crankshaft belt pulley bolt

Central engine oil control valve

※ For the above-mentioned parts that are finally tightened with an angle wrench, pre-tightening steps should be adopted during the tightening process. Do not perform final tightening according to the torque value.

Warning: After disassembling parts, be sure to seal the openings of parts such as intake manifold, exhaust manifold, coolant pump inlet and outlet pipes, cylinder bores and cylinder head airways to prevent foreign object from entering!

Warning: Before reassembling parts, be sure to ensure that there are no foreign objects or dirt in the cavities of parts such as intake manifolds, exhaust manifolds, coolant pump inlet and outlet pipes, cylinder bores and cylinder head airways!

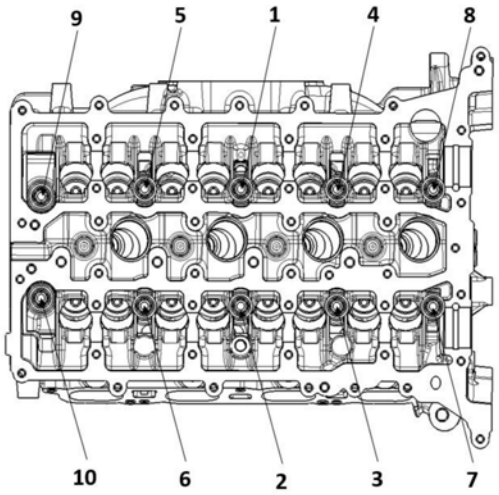
3.8.3 Removal and installation

3.8.3.1 Cylinder Head System

Precautions for removal and installation

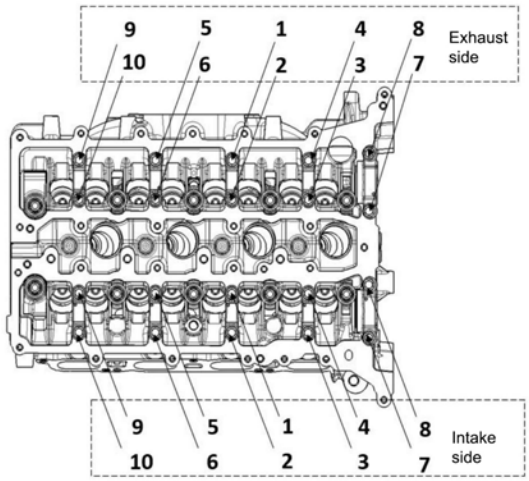
Cylinder head installation

1. Ensure that the cylinder head bolt gasket, cylinder head gasket, and cylinder head locating pin are properly installed.
2. Check the threads and flange surfaces of the cylinder head bolts for any foreign objects. If present, use an air gun to clear them before using the bolts.
3. When tightening the cylinder head bolts, install them in the order shown in the Fig. below.



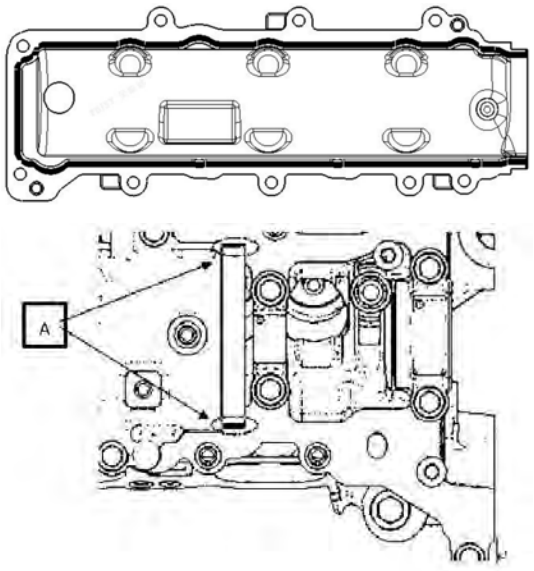
Installation of camshaft cover

1. Check if the camshaft is installed correctly. Special note: Do not install the intake camshaft and exhaust camshaft in reverse.
2. When tightening the intake camshaft and exhaust camshaft cover, the order shown in the figure below must be followed.

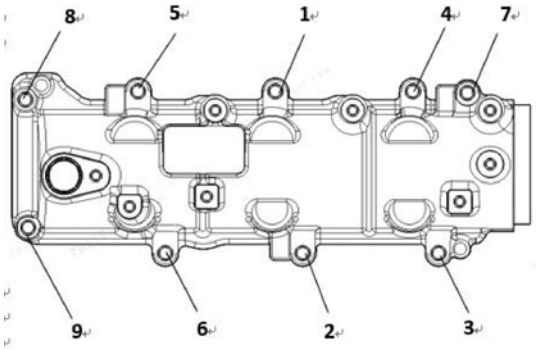


Installation of Cylinder Head Cover Assembly

1. Check and remove any residual old sealant and other debris from the cylinder head cover assembly.
2. Check whether the sealant is correctly applied in place. The application position is shown in the following schematic diagram. (Pay special caution to the arrow pointing at A, a total of 2 places) Ensure glue is applied inside.

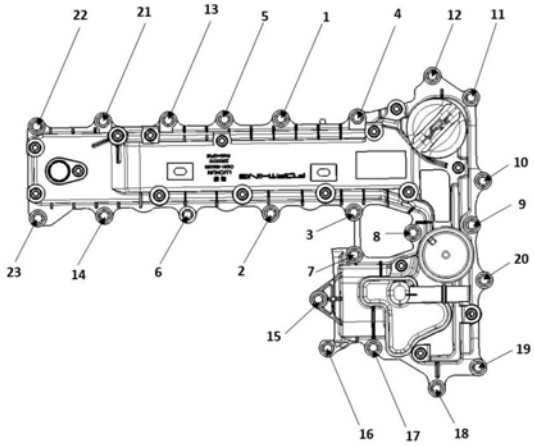


3. Tighten the fastening bolts of the cylinder head cover assembly in the order shown in the figure.



Installation of oil-gas separator assembly

1. Check and remove any debris from the oil-gas separator assembly.
2. Check the sealing rubber ring to ensure it is properly seated inside the groove.
3. When independently replacing or disassembling the oil-gas separator assembly, clean all sealing surfaces thoroughly, removing any residual sealant, oil, water, or other foreign objects from the sealant application surfaces. Refer to the "Sealant Application Schematic Diagram of Cylinder Head Cover Assembly."
4. Tighten the fastening bolts of the cylinder head cover assembly in the order shown in the figure.

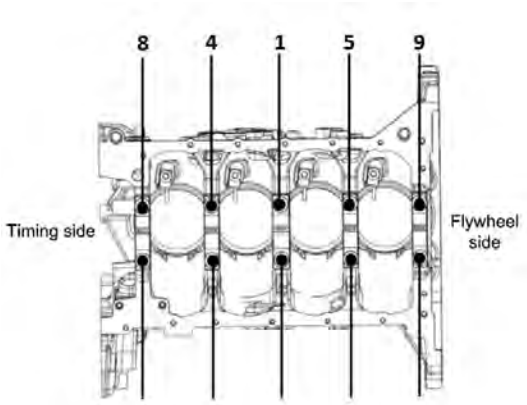


1. **Caution:** After disassembling the parts and components, be sure to block the openings of each part of the system to prevent foreign objects from entering!
2. **Caution:** Before reassembling parts and components, thoroughly check the original parts and components and make sure that there are no foreign objects, dirt, etc. in the cavities of each part of the system!

3.8.3.2 Cylinder block system

Assembly requirements for main bearing cap/main bearing cap bolt

1. Tighten the main bearing cap bolts in order from 1 to 10 as illustrated below.



2. All arrows on the main bearing cap must point towards the timing side.
3. Main bearing caps are finished products labelled A to E, starting from the timing side.

1. **Caution:** After disassembling the parts and components, be sure to block the openings of each part of the system to prevent foreign objects from entering!
2. **Caution:** Before reassembling parts and components, thoroughly check the original parts and components and make sure that there are no foreign objects, dirt, etc. in the cavities of each part of the system!

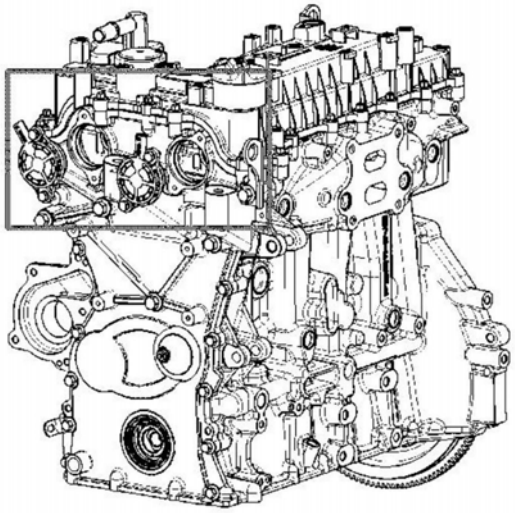
3.8.3.3 Valve System

Precautions for removal and installation

Removal and Installation of Central Electromagnet

Removal

Loosen the M6×16 bolts using a wrench and remove the central electromagnet.



Installation

The central electromagnet is mounted with M6×16 bolts and should be tightened to a torque of 10±2 Nm.

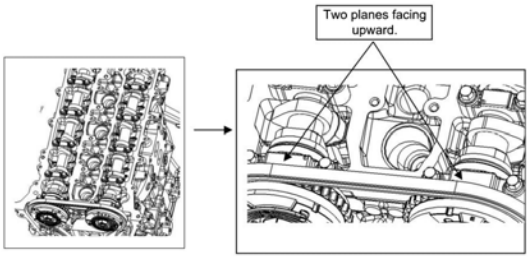
Caution: Regardless of whether the central electromagnet sealing ring is damaged, a new one must be installed during assembly.

Caution: After replacing the sealing ring, install the central electromagnet into the mounting hole in the timing gear chamber housing and secure it with bolts.

Removal and Installation of Camshaft

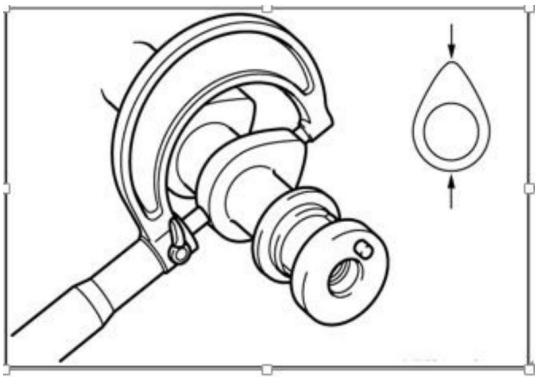
Before disassembly, check each cam lobe for abnormal wear.

Schematic Diagram of Camshaft Assembly



Camshaft height measurement

Measure the cam height. Replace the camshaft if the measured value exceeds the limit.

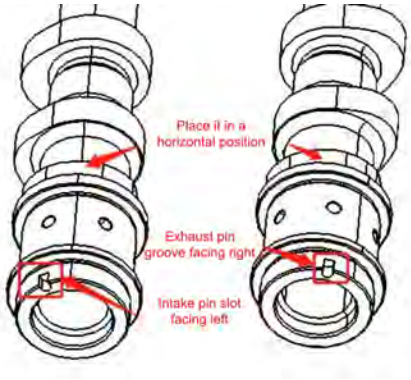


Standard value: intake: 37.60mm; exhaust: 36.93mm.

Limit value: intake: 37.55 mm; exhaust: 36.88mm.

Installation

1. Before installing the camshaft, check whether it is for intake or exhaust. The part number is the best identifier. In the assembly position, the intake and exhaust cams can also be distinguished by pin grooves.



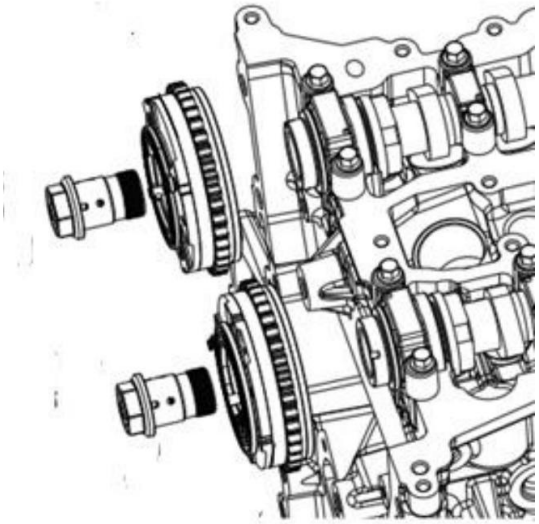
2. When installing the camshaft, apply a small amount of clean engine oil to each bearing and cam lobe.

Removal and installation of variable phase intake and exhaust camshaft gears and central oil control valve

Key Points for Installation

1. Ensure the pin on the variable phase intake/exhaust camshaft gear is aligned with the pin slot on the camshaft.
2. Tighten the central oil control valve with a wrench, tightening torque: 48±2Nm+ 26° ±2°.

   Caution: The central oil control valve should not be reused.



S/N	Parts and components name	Remarks
1	Intake camshaft assembly	Apply engine oil to the journal and cam surface before installation
2	Exhaust camshaft assembly	

Removal of valve spring, oil seal, etc.

1. Remove the valve collet using a universal locking plate removal tool, then take out the valve spring retainer, valve spring, and valve.
2. Use a general tool, the valve oil seal remover, to clamp and extract the valve oil seal.

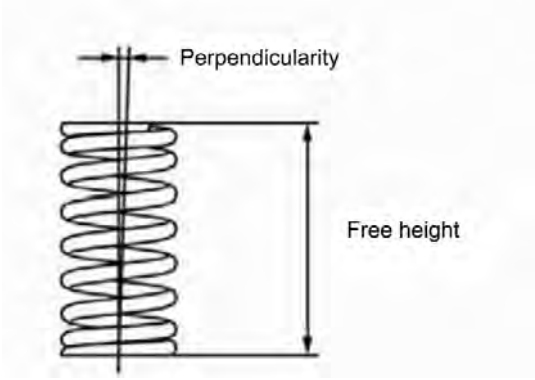
   Note: For the convenience of reinstallation, valves, springs and other removed parts should be placed in order and marked.

Inspection of valve

Finish the valve seat with tool if the seat surface is not even or discontinuous.

Inspection of valve spring

1. Measure the free height of the valve spring. If the measured value is less than the limit, replace with a new spring. Standard value: 39.5mm, limit value: 38.5mm.
2. Measure the squareness of valve spring. If the measured value exceeds the limit, replace it with a new spring. Standard value: less than 2°. Limit value: 4°.



Installation of valve oil seal

1. Apply the engine oil to the valve oil seal.

   Caution: Valve oil seals should not be reused. Proper installation is crucial to preventing engine oil leakage into the combustion chamber.
2. Use a universal tool or your hand to push the new valve oil seal into the valve guide.
3. Ensure the oil seal is fully seated at the bottom.

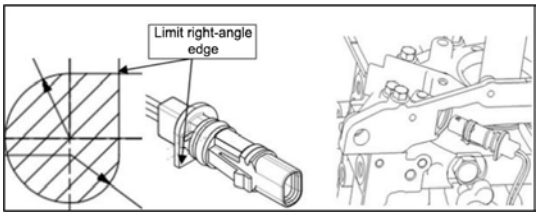
Caution: After disassembling the parts and components, be sure to block the openings of each part of the system to prevent foreign objects from entering!

Caution: Before reassembling parts and components, thoroughly check the original parts and components and make sure that there are no foreign objects, dirt, etc. in the cavities of each part of the system!

3.8.3.4 Lubrication System

Precautions for removal and installation

Schematic Diagram for Installation Limit of Oil Pump Solenoid Valve

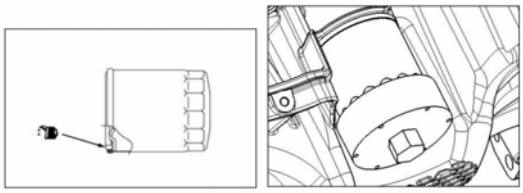


Installation of oil pump

1. Before installation, apply a small amount of oil to the timing gear chamber housing hole or the connector sealing ring.
2. During installation, note that the limiting edge should be consistent with the hole of the timing gear chamber housing.

Installation of oil filter

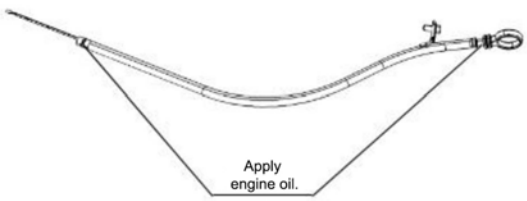
Schematic Diagram of Oil Filter Installation



1. Clean the filter mounting surface on the oil pan.
2. Apply engine oil to the oil filter gasket.
3. **Caution:** Tighten the oil filter with a filter wrench. Manual tightening cannot reach the specified torque and is prone to oil leakage. Screw in the oil filter until the O-ring contacts the mounting surface. Use a wrench to pre-tighten the filter to a torque of 18±1Nm, then tighten it to a torque of 30±2 Nm.

Installation of oil dipstick upper guide tube and oil dipstick assembly

Schematic Diagram of Oil Application Position on Oil Dipstick



Before installing the oil dipstick upper guide tube and oil dipstick assembly, it is necessary to lubricate the sealing rings

of the oil dipstick assembly and the oil dipstick upper guide tube with engine oil.

Precautions for oil filling

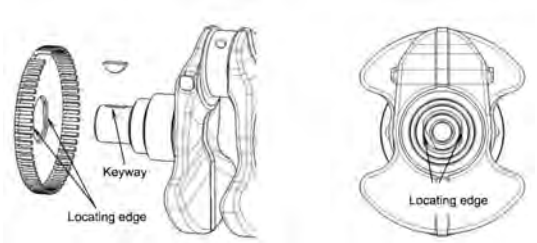
The oil grade is SP 5W-30. The initial fill volume is 4.3±0.1L, the maintenance fill volume (oil filter replacement) is 4±0.1L, and the maintenance fill volume (oil filter not replaced) is 3.8 ±0.1L.

1. **Caution:** After disassembling the parts and components, be sure to block the openings of each part of the system to prevent foreign objects from entering!
2. **Caution:** Before reassembling parts and components, thoroughly check the original parts and components and make sure that there are no foreign objects, dirt, etc. in the cavities of each part of the system!

3.8.3.5 Moving parts system

Precautions for removal and installation

Schematic Diagram for Installation and Positioning of Signal Disk

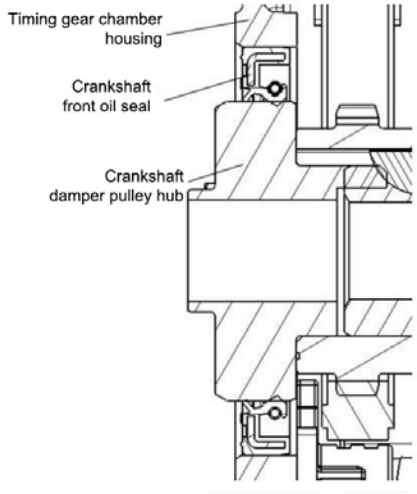


Speed signal disc and woodruff key

1. Sleeve the crankshaft signal panel onto the crankshaft in the direction shown in the figure (Caution: The locating edge of the inner hole of the crankshaft signal panel shall fit with that on the crankshaft).
2. Install the woodruff key into the crankshaft keyway as illustrated.

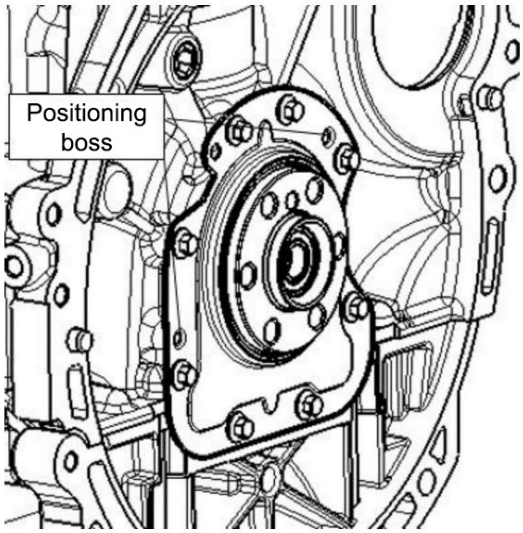
Crankshaft front oil seal

1. Before installing the crankshaft front oil seal, pre-apply engine oil to the lip.
2. Using a special tool, press the crankshaft front oil seal into the space between the timing gear chamber housing and the crankshaft damper belt pulley hub. Ensure the distance from the oil seal to the end face of the timing gear chamber housing is 1 to 1.2 mm, with the end face's maximum runout not exceeding 0.3 mm.



Crankshaft rear oil seal assembly

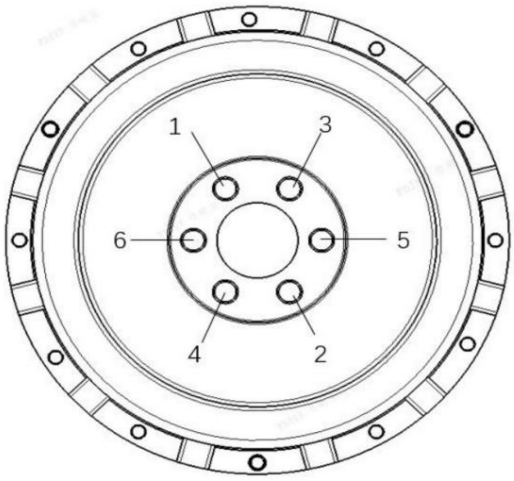
1. Prior to press-fitting the crankshaft rear oil seal (integrated into the crankshaft rear oil seal assembly), pre-apply engine oil to the seal lip.
2. Use special tools to press-fit the crankshaft rear oil seal assembly onto the crankshaft. During the pressing process, pay attention to aligning the two positioning protrusions on the crankshaft rear oil seal assembly with the corresponding locating holes of the cylinder block, as shown in Figure 6-4, until the crankshaft rear oil seal assembly fits the rear end face of the cylinder block/oil pan.



3. Tighten the 8 mounting bolts of the crankshaft rear oil seal assembly crosswise with a torque of 10±2Nm.

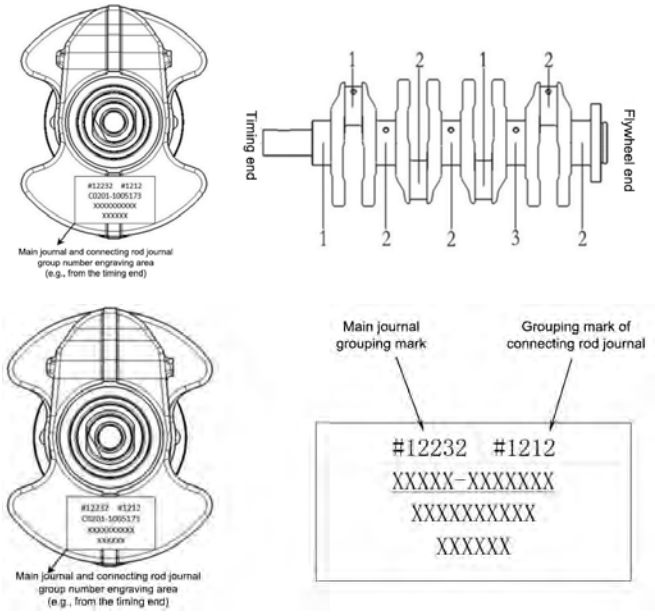
Flywheel assembly

1. Fix the flywheel assembly with tooling.
2. Tighten the 6 flywheel bolts crosswise in the order of 1 to 6 in the figure. The flywheel bolts are tightened as follows:



1. Tighten all with a torque of 50±5 Nm.
2. Reverse loosen 180° ± 5.
3. Tighten all bolts with a torque of 50±5 Nm.
4. Fully tighten at 50°±5°.

Note: When installing the flywheel bolts, the threaded holes for installing the flywheel bolts on the crankshaft must be clean and free of foreign object, water stains and oil stains.



Crankshaft main journal group

Dimension grouping		Grouping mark
Φ45	⩽-0.003	1
	>-0.009	
Φ45	⩽-0.009	2
	>-0.015	
Φ45	⩽-0.015	3
	⩾-0.021	

Cylinder block main bearing hole grouping

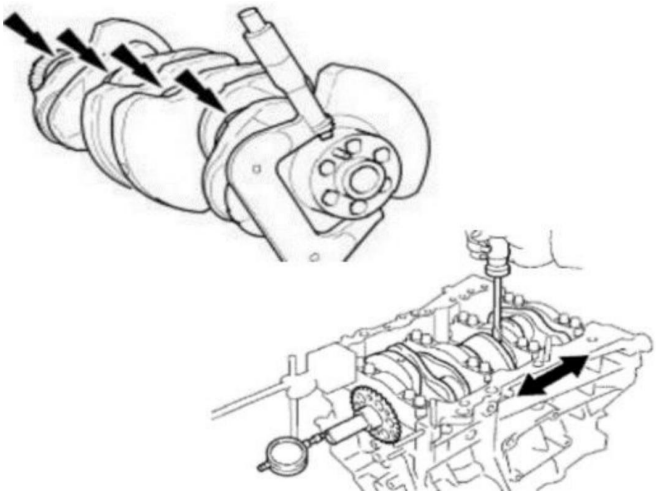
Main shaft hole diameter group	
Diameter D	Grouping mark
Φ48.600⩽D<Φ48.606	1
Φ48.606⩽D<Φ48.612	2
Φ48.612⩽D⩽Φ48.618	3

Grouping and colour information of shaft upper and lower bushes.

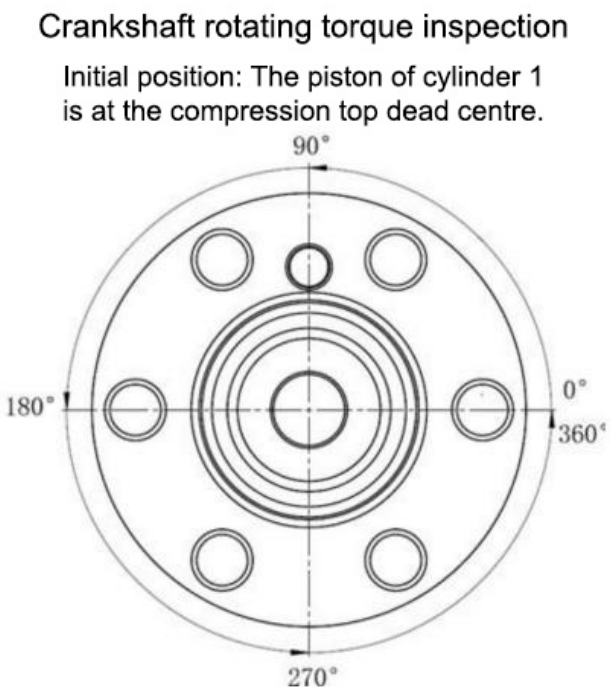
S/N	Colour	Central wall thickness E	Part No.
5	Black	1.793±0.002	C0101-1005177T-5
4	Red	1.796±0.002	C0101-1005177T-4
3	Green	1.799±0.002	C0101-1005177T-3
2	Yellow	1.802±0.002	C0101-1005177T-2
1	Blue	1.805±0.002	C0101-1005177T-1

Caution: The identification colour shown in the figure is used to differentiate the grouping of upper and lower bushes on each main shaft.

Before assembling the upper and lower main bearing shells, engine oil must be applied to the alloy surface, but no engine oil is allowed on the steel backing layer of the bearing shell.



Installation of crankshaft

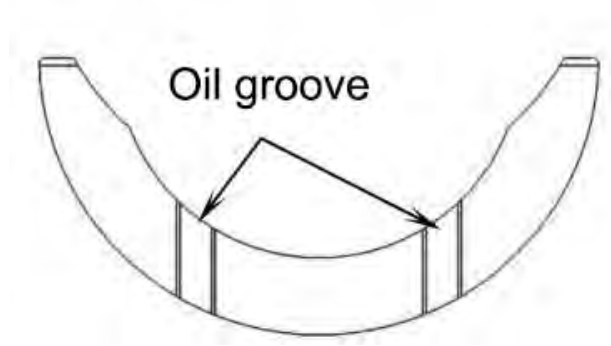


1. The axial clearance of the crankshaft is 0.1-0.3 mm.
2. Crankshaft rotating torque: ≤ 5 Nm.
3. After assembling the piston connecting rod, the rotating torque of the crankshaft is as shown in the table below.

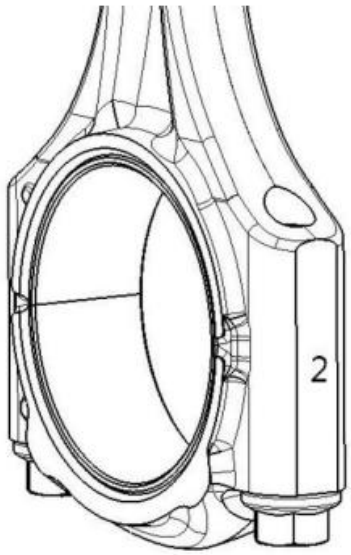
Angle	Rotating torque
0-90 °	0.5 ~ 6Nm
90 °-180 °	4 ~ 14Nm
180 °-270 °	0.5 ~ 6Nm
270 °-360 °	4 ~ 14Nm

Installation of thrust plate

1. Install the thrust bearing washer on the 3rd bearing of the cylinder block (counting from the timing end).
2. Apply engine oil to both sides before assembly, ensuring that the oil groove on the crankshaft thrust plate is facing the crank arm.

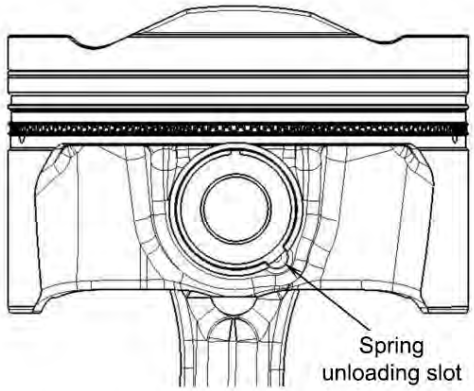


Precautions for removal and installation



Removal of connecting rod cap

On the side of the connecting rod big end, mark it with the corresponding cylinder number for correct reinstallation.



Use a flat-head screwdriver to remove the piston pin circlip via the relief slot. During removal, cover the piston pin hole with a protective sleeve to prevent injury from the flying circlip.

Installation of piston pin circlip

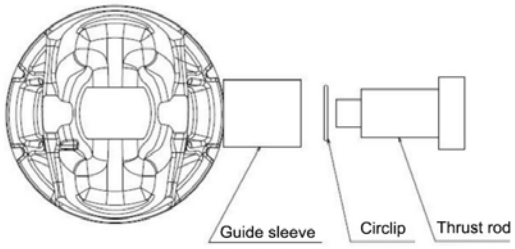
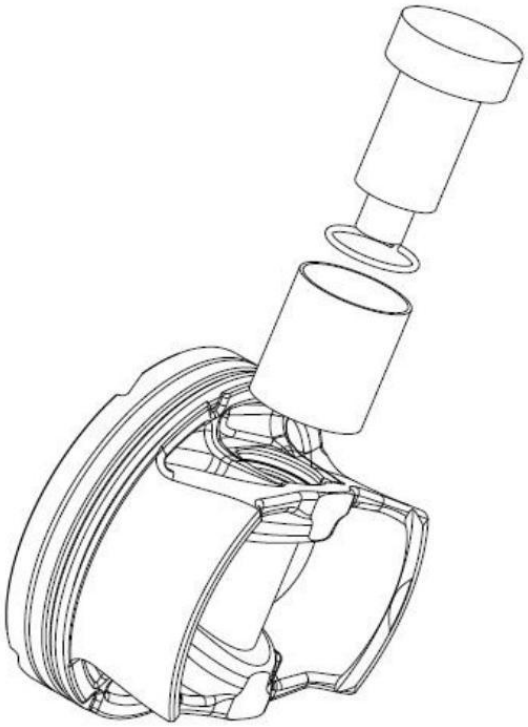
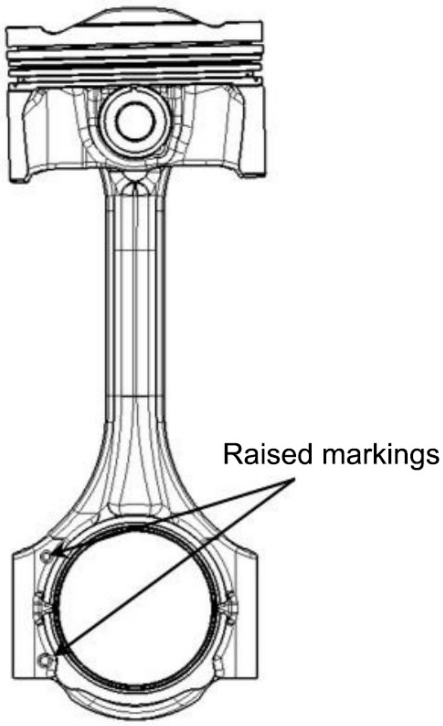


Fig. (6-16) Schematic diagram of piston pin retaining spring installation



Insert the circlip into the guide sleeve. Use a push rod to drive the circlip to the bottom of the sleeve. Then, align the push rod head with the piston pin hole and forcefully press the circlip into the circlip groove.

Installation of connecting rod assembly



1. Ensure the convex mark on the connecting rod faces the timing side during installation.

Piston ring 3 installation

1. Install the piston three-ring liner into the piston ring groove; then install the piston three-ring upper scraper and piston three-ring lower scraper.

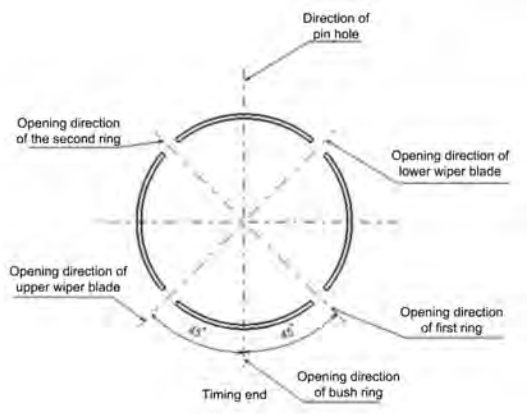
   Caution: 1 Do not use a ring expander when installing the scraper; otherwise, it is easy to damage the scraper.

   Caution: 2 First, insert one end of the scraper into the piston groove, and then press the scraper into place with your fingers.

   Caution:3 The upper and lower scraper openings of the piston ring 3 are staggered by about 180°, and the lining ring and the scraper opening need to be staggered by about 45°.

2. Fit the scraper to the piston and check if it moves flexibly in both directions. When installing the oil scraper ring (third ring) with the twist orientation perpendicular to the plane of the piston ring, ensure that the twist angle does not exceed ±45° from the plane of the piston ring in its free state.

   Schematic Diagram of Piston Ring Angle



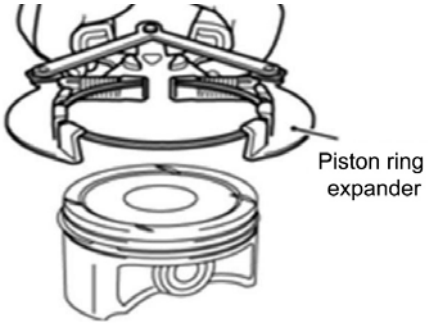
Installation of piston rings 1 and 2

1. Use a piston ring expander to install the first and second piston rings. The permissible free opening size after expansion must not exceed 25 mm. The identification marks on the piston rings must face upwards. Do not twist

the first and second rings in a manner perpendicular to the plane of the piston ring.

2. The openings of the first and second rings are staggered by about 180°, and the scraper openings on the first and third rings are staggered by about 90°. The opening position of the piston ring should not be in the direction of the main and auxiliary thrust surfaces.

3. All piston rings must remain free from permanent deformation during installation.

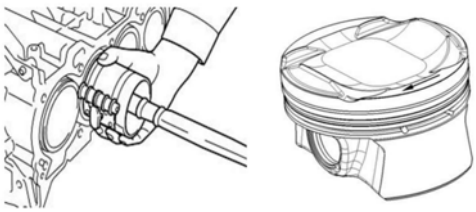


Installation of piston and connecting rod assembly

1. Apply the engine oil to the surroundings of the piston and piston ring.

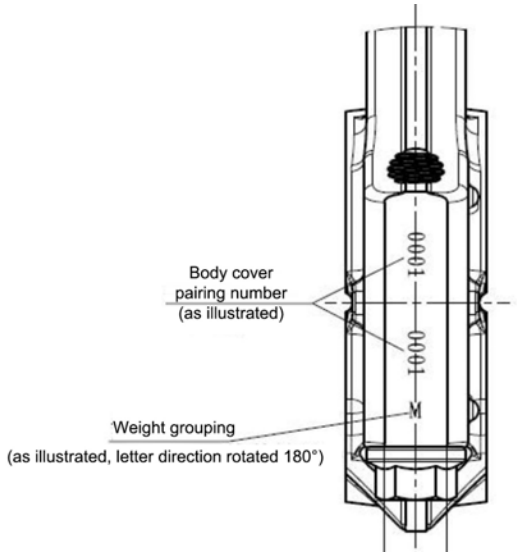
2. Insert the piston and connecting rod assembly into the cylinder bore, ensuring that the forward mark at the top of the piston faces the timing end.

3. Use a piston ring compression tool to secure the piston ring and install the piston and connecting rod assembly into the cylinder block. Ensure that all three piston rings are properly seated in the ring grooves during installation.



Caution: 1 Do not knock the piston and connecting rod assembly violently; otherwise, it is easy to damage the piston ring.

Caution: 2 The maximum mass of the 4 connecting rod assemblies of the same engine shall not exceed 3g.



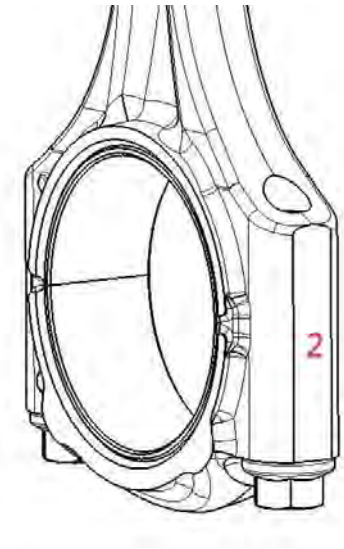
See the following table for mass grouping information of connecting rod assembly:

Group		Mass of connecting rod big end, m(g)			
		254 ≤ m ≤ 258	258 < m ≤ 262	262 < m ≤ 266	266 < m ≤ 270
Total weight of connecting rod, M(g)	414 ≤ M ≤ 417	3	9	H	P
	417 < M ≤ 420	4	A	J	Q
	420 < M ≤ 423	5	C	K	T
	423 < M ≤ 426	6	D	L	U
	426 < M ≤ 429	7	E	M	V
	429 < M ≤ 432	8	F	N	Y

Installation of connecting rod cap

1. Install the correct connecting rod cap on the corresponding connecting rod according to the marks made during disassembly.

Schematic Diagram of Connecting Rod Cap Mark



Installation of connecting rod cap bolt

1. Apply the engine oil to the thread part and the nut supporting surface.

2. Tightening method:

Tighten to 25±2 Nm in sequence.

Reverse loosening 180°±5°

Tighten to 20±2 Nm.

Final tightening at 90°±4°

Caution: After disassembling the parts and components, be sure to block the openings of each part of the system to prevent foreign objects from entering!

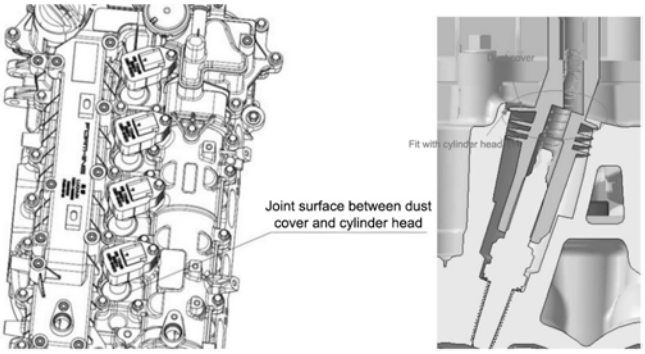
Caution: Before reassembling parts and components, thoroughly check the original parts and components and make sure that there are no foreign objects, dirt, etc. in the cavities of each part of the system!

3.8.3.6 Electrical system

Ignition system

Before tightening the ignition coil fixing bolts, the dust cover must be pressed into place. (The dust cover and the cylinder head must fit completely, evenly without warping or bending, and the dust cover will completely cover the hole without gaps.)

Schematic Diagram for installation of ignition coil:



Sensor system

1. Before installing the intake temperature and pressure sensor 1, its sealing ring surface must be evenly coated with lubricating oil.
2. Before installing the speed sensor 11 sealing ring, its surface must be evenly coated with lubricating oil.
3. Before installing the phase sensor 4 sealing ring, its surface needs to be evenly coated with lubricating oil.

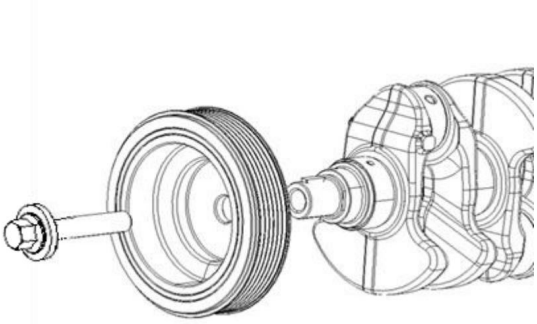
Caution: After disassembling the parts and components, be sure to block the openings of each part of the system to prevent foreign objects from entering.

Caution: Before reassembling parts and components, thoroughly check the original parts and components and make sure that there are no foreign objects, dirt, etc. in the cavities of each part and component of the system.

3.8.3.7 Accessory system

Removal

Schematic diagram for removal of crankshaft damping pulley:



Connect and fix the flywheel to the cylinder block with a flywheel pin, and then remove the crankshaft damper belt pulley bolt.

Installation

1. Clean the crankshaft threaded hole, crankshaft damping belt pulley and its bolts. The water stains, oil stains, etc. of these parts must be cleaned and ensured to be dry before installation to avoid loosening of the bolts.
2. Install the crankshaft damping belt pulley.
3. Secure the flywheel to the engine block like the removal process. Tighten the crankshaft damper belt pulley bolt to the specified torque.

Coolant pump drive belt

Removal

Remove the crankshaft damper belt pulley to extract the belt.

Caution: After disassembling the parts and components, be sure to block the openings of each part of the system to prevent foreign objects from entering.

Installation

Caution: Before reassembling parts and components, thoroughly check the original parts and components and make sure that there are no foreign objects, dirt, etc. in the cavities of each part and component of the system.

1. Loop the belt over the crankshaft damper belt pulley and utilize the auxiliary tool to install the coolant pump drive belt.
2. Rotate the crankshaft damper belt pulley and guide the belt into the coolant pump belt pulley groove until it is fully engaged.

3.8.3.8 Intake and Exhaust System

Intake manifold assembly

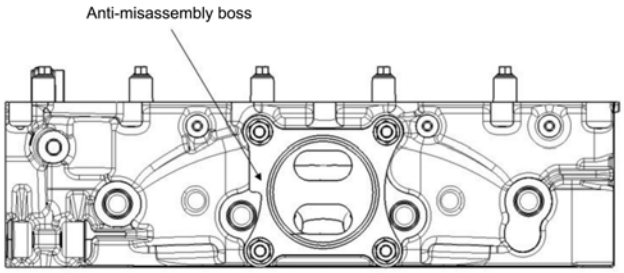
1. Prior to assembling the intake manifold assembly, check whether the sealing ring at the cylinder head flange and the sealing ring at the throttle are fixed firmly. The sealing rings are not allowed to have defects such as cracks or gaps.
2. Tightening sequence:

   (1) Tighten the mounting bolts (nuts) of the intake manifold assembly in a cross-tightening manner from the middle to both sides.

   (2) Tighten the intake manifold bracket-A and fixing bolts in a cross-tightening manner.

Exhaust system

Schematic diagram of gasket installation status:



1. Tighten all the studs on the cylinder head first, and then install the exhaust manifold gasket.
2. Tighten the lock nuts in a cross-tightening manner.
3. The correct installation status of the gasket is shown in the figure (10-3), and the anti-misinstallation boss is located on the left side of the installation surface.
4. The exhaust manifold gasket, studs, and lock nuts are all disposable parts and are not allowed to be reused.

Caution: The exhaust system is a high-temperature part. Do not disassemble it when the engine is hot to prevent burns.

Caution: After disassembling the parts and components, be sure to block the openings of each part of the system to prevent foreign objects from entering.

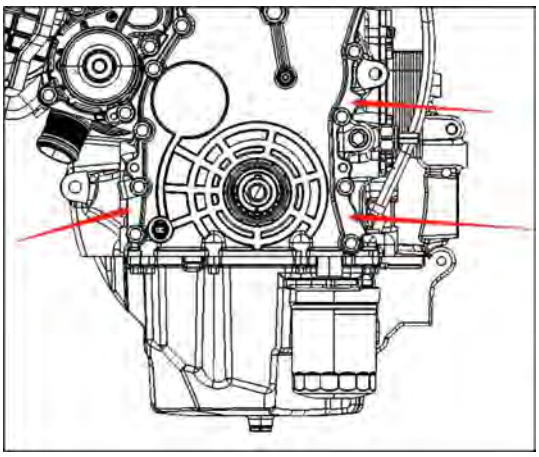
Caution: Before reassembling parts and components, thoroughly check the original parts and components and make sure that there are no foreign objects, dirt, etc. in the cavities of each part and component of the system.

3.8.3.9 Timing gear chamber housing

Removal

Due to the adhesion of sealant, after removing the bolts, it is necessary to use a crowbar to pry up the housing at the pry point position of the timing gear chamber housing and remove it.

Pry point of timing gear chamber housing:



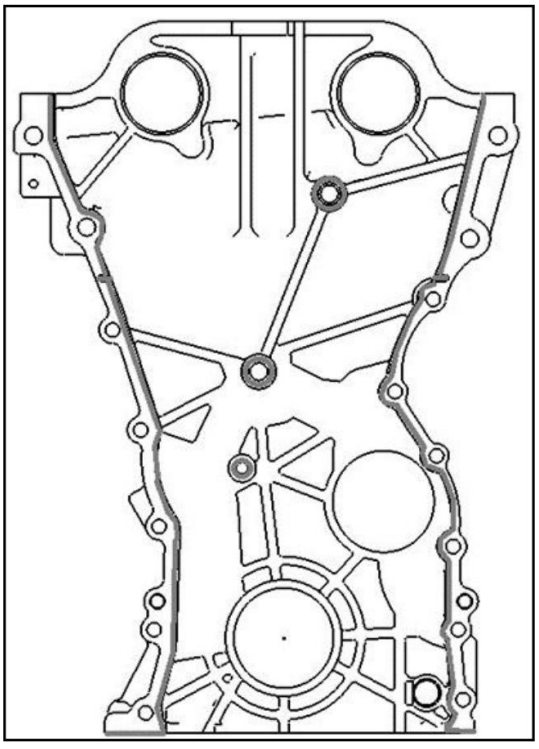
Caution: After disassembling the parts and components, be sure to block the openings of each part of the system to prevent foreign objects from entering.

Installation

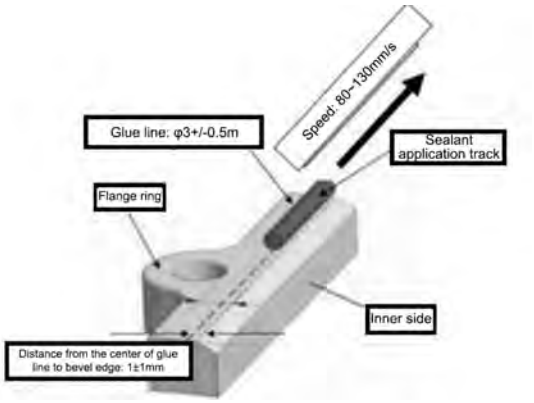
Caution: Before reassembling parts and components, thoroughly check the original parts and components and make sure that there are no foreign objects, dirt, etc. in the cavities of each part and component of the system.

1. Apply sealant to the housing sealing tape.

   Schematic Diagram of gluing the timing gear chamber housing:



Provisions on gluing:



2. Align the housing with the positioning pins and the double-headed studs of the timing chain guide rail on the cylinder block, and tighten the installation.

3. Tighten the bolt to specified torque.

Inspection of timing gear chamber housing

1. The diameter specification of the glue line is ø3.0±0.5mm.

2. In the sealed flange surface area, the distance from the centre of the glue line to the bevel edge is 1±1mm.

3. Ensure the sealant line is applied continuously around pin holes and bolt holes.

4. The surface for sealant application must be kept clean, dry, and free of oil.

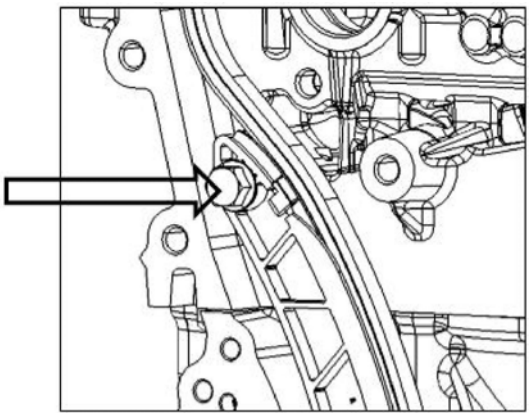
5. Assembly must be completed within the specified time after applying sealant.

3.8.3.10 Timing chain

Removal

Use a wrench to loosen the timing chain tensioning plate fastening bolts and remove the timing chain.

Removal of timing chain:



Installation

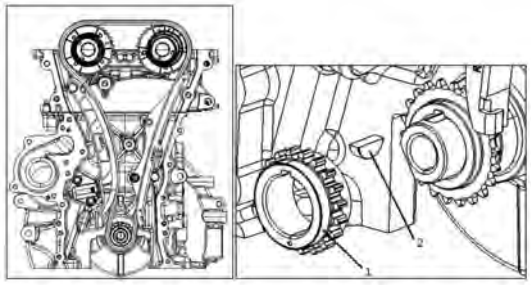
1. Install the timing tensioner, tightening the bolts according to the torque specifications.

2. Install the timing chain guide rail on the front face of the cylinder block and tighten the bolts to the specified torque.

3. Install the timing chain tensioning plate on the front end face of the cylinder head and tighten the bolts to the specified torque.

4. Install the oil pump drive gear-crankshaft end first, and then install the crankshaft timing gear. Note: Before installing the timing chain, check whether the woodruff key (2) for crankshaft timing gear (1) exists.

   Schematic Diagram of Timing Chain Installation:



5. Install the timing chain in the following order:

   1 Timing chain tension plate.

   2 Intake camshaft gear.

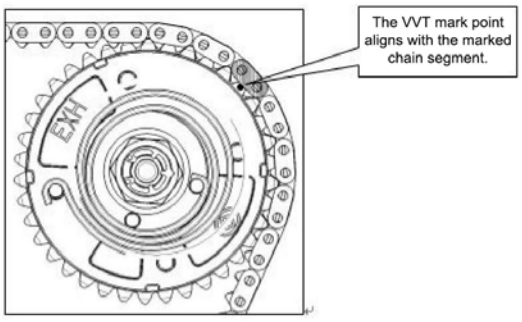
   3 Exhaust camshaft belt pulley.

   4 Timing chain guide rail.

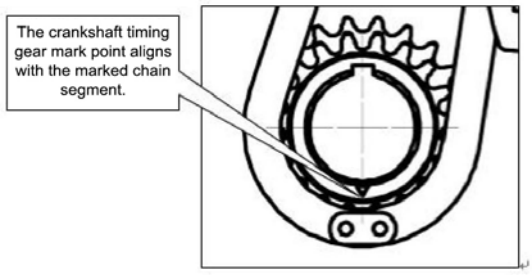
   5 Crankshaft timing gear.

Caution: After checking that the mark of the timing chain corresponds to the mark point of the VVT gear and the crankshaft timing gear, pull out the pin of the timing tensioner.

Corresponding diagram for correct installation and calibration of timing chain:



Corresponding diagram for correct installation and calibration of timing chain:



Inspection of timing chain

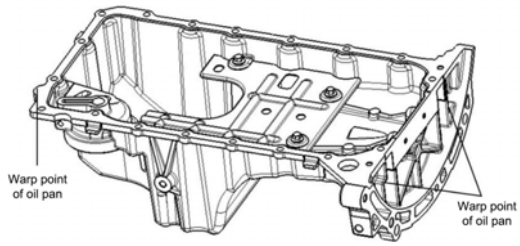
When assembling the crankshaft timing gear, the end face with the timing mark hole must face outward to avoid incorrect installation. The oil pump drive gear's crankshaft end, with the part number engraving facing outward, should be closely aligned with the crankshaft timing gear.

The crankshaft timing gear marking point corresponds to the chain marking plate, and the VVT marking point corresponds to the chain marking plate. (The colour of the chain marker link differs from the other chain links.)

3.8.3.11 Oil pan

Removal

1. Remove the fixing bolt of oil pan.
2. Use a rubber mallet to tap the oil pan prying point to remove the oil pan.

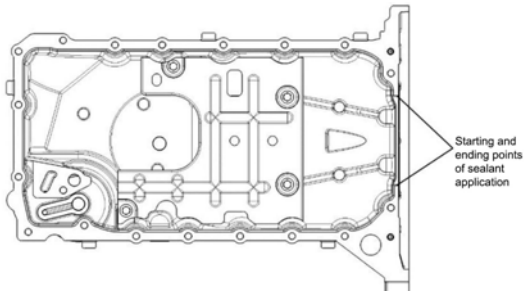


Installation

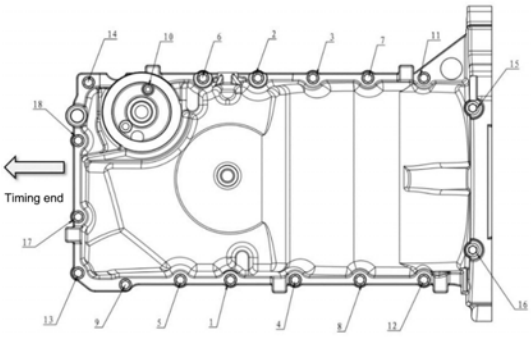
1. Clear the residual sealant from the cylinder block, timing gear chamber housing, and oil pan.

   Caution: Complete the installation of oil sump within 3 minutes after applying liquid sealant.

2. As shown in the figure, apply a continuous beaded liquid sealant of Φ3 ± 0.5 mm on the oil pan.



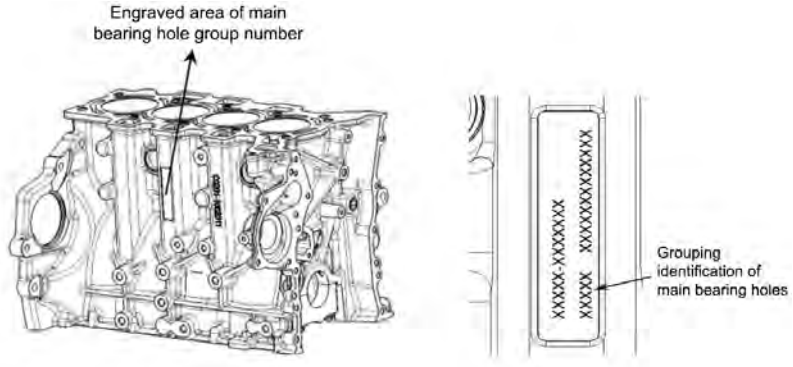
3. Tighten the bolts to the specified torque in the order shown in the diagram.



3.8.3.12 Bearing bush

Installation of upper and lower bearing bushes of the main shaft

1. According to the main bearing hole grouping of the cylinder block (grouping mark starts from the timing end) and the main journal grouping on the crankshaft (grouping mark starts from the timing end), check the tile matching table to obtain the assembly information of the main shaft upper and lower bearings.



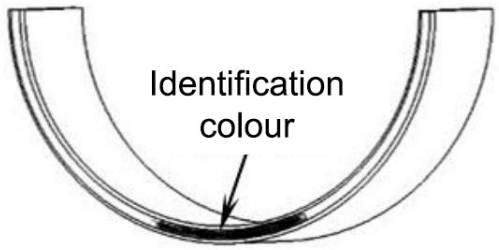
2. Install the upper and lower bearing bushes of the main shaft according to the bearing bush selection table below.

			Crankshaft main journal dimension grouping					
			3		2		1	
			Φ44.979≤D≤Φ44.985		Φ44.985 < D≤Φ44.991		Φ44.991 < D≤Φ44.997	
Size grouping of cylinder block main bearing hole	1	Φ48.600≤-D<Φ48.606	Green	1.799 ±0.002 0.013-0.033	Red	1.796 ±0.002 0.013-0.033	Black	1.793 ±0.002 0.013-0.033
	2	Φ48.606≤-D<Φ48.612	Yellow	1.802 ±0.002 0.013-0.033	Green	1.799 ±0.002 0.013-0.033	Red	1.796 ±0.002 0.013-0.033
	3	Φ48.612≤-D<Φ48.618	Blue	1.805 ±0.002 0.013-0.033	Yellow	1.802 ±0.002 0.013-0.033	Green	1.799 ±0.002 0.013-0.033

Installation of connecting rod bearing

1. When installing the connecting rod bearing bush, ensure it aligns with the corresponding connecting rod from the disassembly stage.

2. If either the connecting rod or its bearing bush needs replacement with new parts, choose the proper connecting rod bearing bush from the bearing bush selection table. Refer to the table shown below:

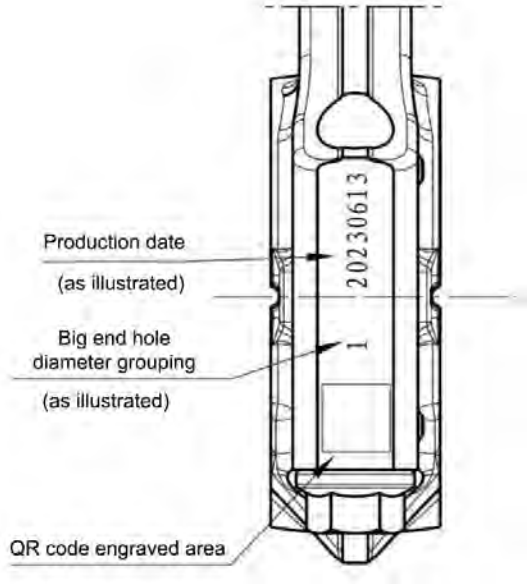


Matching list for connecting rod bearing								
			Crankshaft connecting rod journal dimension grouping					
			3		**2**		**1**	
			Φ41.979≤D≤Φ41.985		Φ41.985 < D≤Φ41.991		Φ41.991 < D≤Φ41.997	
Dimension grouping of connecting rod big end hole	1	Φ48.005≤-D≤Φ48.01-1	Blue	1.497 ±0.002 0.022-0.042	Yellow	1.494 ±0.002 0.022-0.042	Green	1.491 ±0.002 0.022-0.042
	2	Φ48.011 < D≤Φ48.01-7	Red	1.5±0.002 0.022-0.042	Blue	1.497 ±0.002 0.022-0.042	Yellow	1.494 ±0.002 0.022-0.042

Grouping of crankshaft connecting rod journal:

Diameter grouping of connecting rod journal		
Dimension grouping		Grouping mark
Φ42	⩽−0.003	1
	>−0.009	
Φ42	⩽−0.009	2
	>−0.015	
Φ42	⩽−0.015	3
	⩾−0.021	

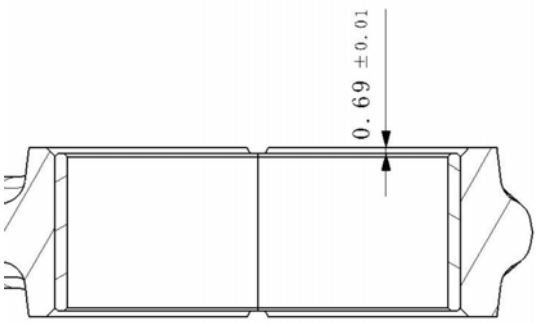
Schematic Diagram of Connecting Rod Big End Hole Mark



Connecting rod big end hole grouping:

Big end hole diameter D	
Big end hole diameter grouping	Mark
45.005⩽D⩽45.011	1
45.011<D⩽45.017	2

Schematic Diagram of Distance between Connecting Rod Bearing Bush and Edge



3. The connecting rod bearing has no positioning lip. After assembly, the distance from the edge of the connecting rod is required to be: 0.69±0.01 mm.

3.9 Charging and distribution system

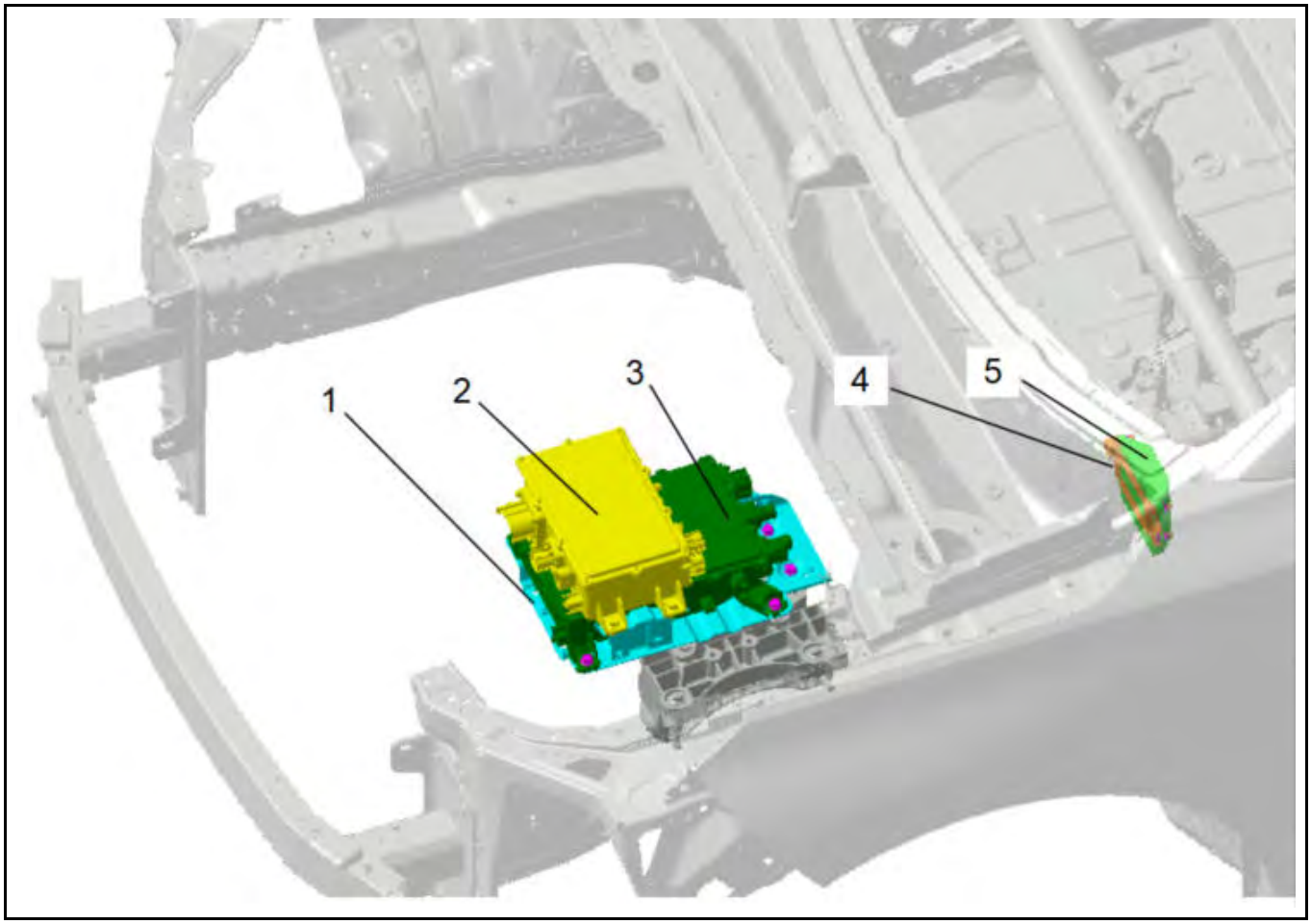
3.9.1 Specification

3.9.1.1 Torque specification

Name	Fastener category	Specification	Tightening torque N·m
Fixing bolt of high-voltage power distribution box	Hex flange bolt	M8X20	22±2
Fixing nut of high-voltage power distribution box	Hex flange nut	M8	22±2
High-voltage power distribution box upper cover plate screw	Cross recessed hex bolt with indentation, spring washer, and flat washer assembling unit	M4X10	2.4±1
BAT connector screw	Cross recessed hex bolt with indentation, spring washer, and flat washer assembling unit	M6X18	8±1
Copper bar screw of BAT connector	Cross recessed hex bolt with indentation, spring washer, and flat washer assembling unit	M6X16	8±1
GCU connector screw	Cross recessed hex bolt with indentation, spring washer, and flat washer assembling unit	M6X18	8±1
Copper bar screw of GCU connector	Cross recessed hex bolt with indentation, spring washer, and flat washer assembling unit	M6X16	8±1
Fixing bolt of two-in-one power supply module	Hex flange bolt	M8X20	22±2
Fixing nut of two-in-one power supply module	Hex flange nut	M6	8±1
Fixing bolt of two-in-one power supply mounting bracket	Hex flange bolt	M8X20	22±2
EVCC bracket fixing nut			10±1
Fixing nut of communication protocol converter	Hex nut and conical spring washer assembling unit	M6	8±1
EVCC bracket fixing nut	Hex nut and conical spring washer assembling unit	M6	8±1

3.9.2 Instructions and operations

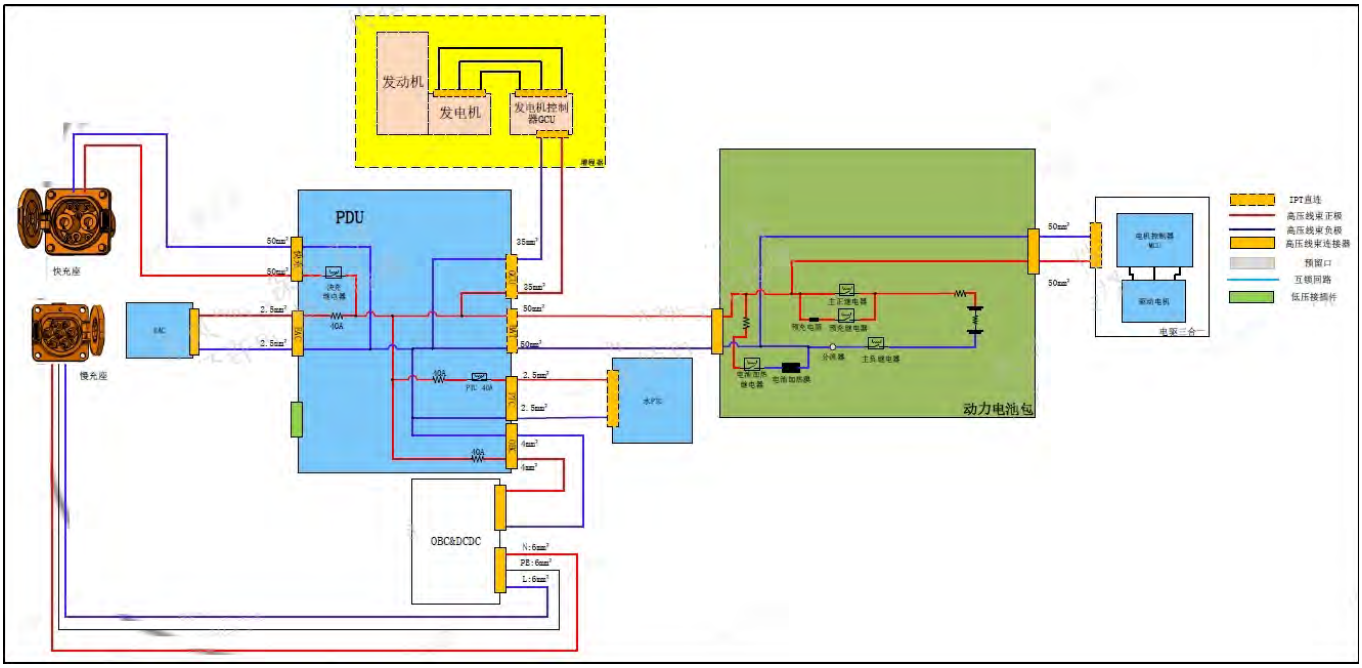
3.9.2.1 Charging and distribution system



Item	Description	Item	Description
1	Power supply two-in-one mounting bracket	4	EVCC bracket
2	PDU	5	Communication protocol converter
3	Power supply two-in-one module		

3.9.2.2 Overview

Vehicle high-voltage distribution diagram



Component function description

The two-in-one power supply module is fixedly installed on the electric vehicle and consists of two parts: on-board charger OBC and DCDC. The charger converts the electric energy of the public power grid into DC required by the on-board energy storage device and charges the on-board energy storage device. The DCDC converter is a device that converts high-voltage battery power to low-voltage battery power. The PDU part includes battery interface, GCU interface, PTC interface, EAC interface and two-in-one interface, as well as low-voltage signal interface. The two-in-one power supply module assembly has a CAN communication function for information interaction with the BMS, etc., and the baud rate is 500kbps. The power supply two-in-one module assembly is a high-voltage component and should have protection functions such as overvoltage, undervoltage, and short circuit.

3.9.2.3 Precautions

Precautions for removal of charging and distribution system

(Including power supply two-in-one module (OBC, DCDC) and high-voltage power distribution box)

1. **Caution:** When disassembling the two-in-one and high-voltage power distribution box, it is necessary to confirm that the connection between the parts and the battery has been disconnected to ensure that the high voltage is cut off.

Precautions for refreshing the power supply two-in-one module

1. When performing two-in-one software refresh work, ensure that the low voltage power supply of the parts is normal (9~16V). Do not cut off the power supply during the update process. Make sure the key is in the OFF position (high voltage disconnected).

3.9.3 Diagnosis and testing

3.9.3.1 Charging and distribution system-DCDC module DTC diagnosis and maintenance

DTC	Fault description	Repair recommendations
B21E17	Input over-voltage software protection	Check whether the input voltage is between 200V and 450V. If the input voltage is normal and the fault cannot be eliminated, it is recommended to replace the CDU
B22016	Input under-voltage software protection	
C12200	VCM control message lost	Check whether the VCM component communication is normal
B22416	DCDC module A drive part overtemperature	1. Check whether the vehicle cooling system works normally. 2. Check whether the CDU is overheated. If so, let it cool for a period of time. After cooling, the DCDC is still abnormal. It is recommended to replace the CDU.
B22A4B	DCDC module MOS overtemperature high	
B22317	Output over-voltage software protection	1. Check whether the low-voltage battery voltage is between 9-16V. 2. If the low-voltage battery is abnormal, try to replace it for test.
B22516	Output under-voltage software protection	
B22719	Output over-current software protection	Check whether the output terminal is short-circuited.
B20916	The internal 12V voltage is less than 9V	1. Disconnect the low-voltage battery and try to charge it 2. If the fault still exists, replace the machine
B20A17	Internal 12V voltage exceeds 15V	
B20C87	Module SCI communication error	
E20D00	Network management limp	
B22800	Input voltage comparator fault protection	
B22801	Synchronous rectification drive fault protection	
B22802	Power supply fault protection of pre-drive chip	
B22803	Hardware output current reverse protection	
B22804	Hardware transient output current overcurrent protection	
B22805	Hardware transient output voltage overvoltage protection	
B22806	Internal auxiliary power supply undervoltage fault protection	

DTC	Fault description	Repair recommendations
B22807	Hardware protection redundancy protection	
B22789	Hardware fault	
B22808	Output current failure	
C07300	通信关闭	Check whether the circuit is normal
B21B17	External low-voltage power supply input overvoltage	1. Disconnect the low-voltage battery and try to charge it 2. If the fault still exists, replace the machine 3. Check whether the battery voltage is normal
B21C16	External low-voltage power supply input undervoltage	
Others		Disconnect the low-voltage battery and then connect it. If the fault cannot be eliminated, it is recommended to replace the CDU

3.9.3.2 Charging and Distribution System-DCDC Module Troubleshooting Process

User self-inspection process

If the DCDC module does not work properly, please follow the self-inspection steps below to troubleshoot. If the DCDC module still does not work properly, please take it to a 4S shop for further inspection.

4S Store Repair Process

The following procedure is for 4S shop repair staff.

3.9.3.3 Charging and Distribution System-Troubleshooting Process for Charger Module

When the vehicle cannot be charged as a whole, first ensure that 1. the voltage of the vehicle's 12V battery is between (9~15V) and 2. there are no other faults in the vehicle.

User self-inspection process

4S Store Repair Process

The following procedure is for 4S shop repair staff.

3.9.3.4 Charging and distribution system-charging module DTC diagnosis and maintenance

DTC	Fault description	Repair recommendations
B20613	AC input interruption	Check whether the external AC input voltage is between 85V-265V. If the external voltage is normal, replace the charging plug for testing If it still does not recover, replace the CDU
B20816	AC input undervoltage	
B20417	AC input overvoltage	
B20119	AC input overcurrent	
B21B17	Low-voltage input over-voltage	Check whether the low-voltage battery voltage is between 9-16V. If the low-voltage battery is abnormal, try to replace it for test.
B21C16	Low-voltage input under-voltage	

DTC	Fault description	Repair recommendations
C11100	BMS communication lost	Check whether the communication of BMS components is normal
C10000	Loss of communication with HECU	Check whether the communication of HECU components is normal
C07300	Bus-off error	Check whether the system CAN bus is normal
B21219	Output hardware overcurrent protection	Check whether there is a short circuit at the output end. If not and the fault cannot be eliminated, it is recommended to replace the CDU
B21417	High voltage output over-voltage protection	Check whether the pre-charge relay or main relay is abnormal. If not and the fault cannot be eliminated, it is recommended to replace the CDU. If replacing the CDU still does not solve the problem, it is recommended to replace the pre-charge relay or main relay.
B20F4B	LLC MOS tube over-temperature protection	Measure whether the charger is overheated. If so, let it cool for a period of time. After cooling, the CDU is still abnormal. It is recommended to replace the CDU.
B2074B	PFC MOS tube over-temperature protection	
B20017	PFC output overvoltage	1. Disconnect the low-voltage battery and try to charge it 2. If the fault still exists, it is recommended to replace the CDU
B20093	PFC startup failed	
B20C87	OBC hardware fault	
B21516	High-voltage output undervoltage	
Others		If the fault cannot be eliminated, it is recommended to replace the CDU

3.9.3.5 Charging and distribution system-fault diagnosis and maintenance of high-voltage power distribution box

Use the system schematic diagram to check the circuit, fuse, and relay, identify the faulty part, and repair or replace the fuse, etc.

Caution:

– This work should be done by professionals at 4S shops. If it cannot be repaired, replace the whole assembly.

Fuse

1. PTC: It is necessary to open the cover for measurement. The measurement method is to use the ohm range/buzzer range of a multimeter, connect the red test lead to the positive terminal (positive copper bar) of the battery, and the black test lead to the side from the PTC fuse to the relay direction. If the resistance value is less than 0.5 ohms/the buzzer keeps ringing, it is normal; otherwise, the fuse fails.

2. OBC: It is necessary to open the cover for measurement. The measurement method is to use the ohm range/buzzer range of a multimeter, connect the red test lead to the positive terminal (positive copper bar) of the battery, and the black test lead to the other side of the OBC fuse. If the resistance value is less than 0.5 ohms/the buzzer keeps ringing, it is normal; otherwise, the fuse fails.

3. EAC: It is necessary to open the cover for measurement. The measurement method is to use the ohm range/buzzer range of the multimeter, connect the red test lead to the positive terminal (positive copper bar) of the battery, and the black test lead to the other side of the EAC. If the resistance value is less than 0.5 ohms/the buzzer keeps ringing, it is normal; otherwise, the fuse fails.

Relay

Pay special attention to maintenance and confirm that the vehicle is powered off from high voltage.

1. Fast charging relay detection: Open the cover for detection, use the multimeter buzzer gear, touch the test lead to both ends of the relay, the buzzer does not respond, the low-voltage connector 7+/9-pin is connected to the 12V power supply, there is a click sound, the test lead touches the two ends of the relay again, the buzzer keeps ringing, and any point does not meet the requirements, it indicates a fault.

2. PTC relay: Open the cover for inspection, use the multimeter buzzer gear, touch the test lead to both ends of the relay, the buzzer does not respond, the low-voltage connector 12+/6-pin is connected to the 12V power supply, there is a click sound, the test lead touches both ends of the relay again, the buzzer keeps ringing, and any point does not meet the requirements, it indicates a fault.

Microswitch

Open the cover for inspection, remove the microswitch connector, manually press the microswitch pressure rod, adjust the multimeter to the buzzer gear, touch the probe to the connector terminal, and the buzzer will sound for a long time. Release the microswitch pressure rod, and the buzzer will not respond. Otherwise, it is a fault.

Sintering detection module

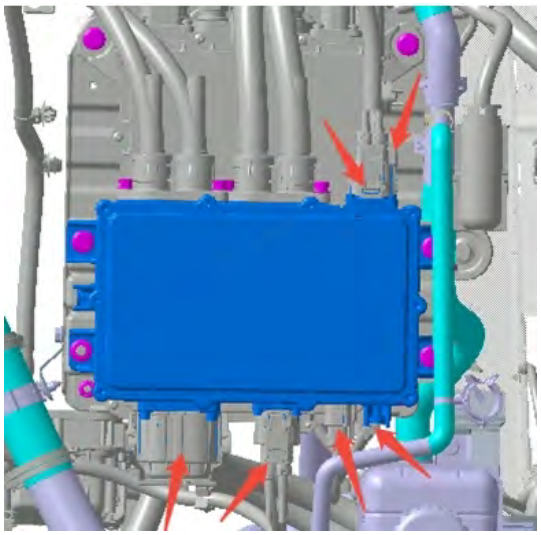
The HECU message status can be read by the diagnostic scanner to determine whether the sintering detection module is faulty.

3.9.4 Removal and installation

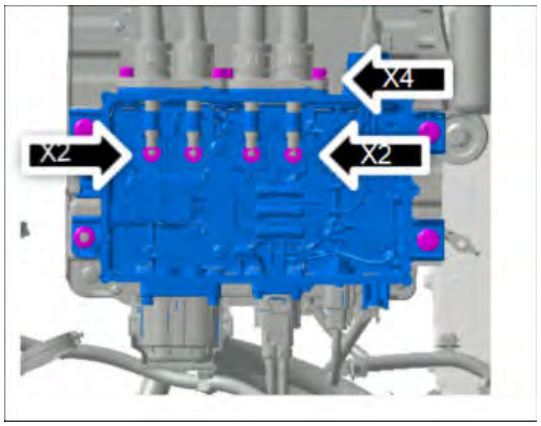
3.9.4.1 PDU

Caution: When removing the on-board power supply system, ensure the vehicle is in a high-voltage off state and disconnect the battery negative cable. Refer to: Disconnect the battery negative terminal.

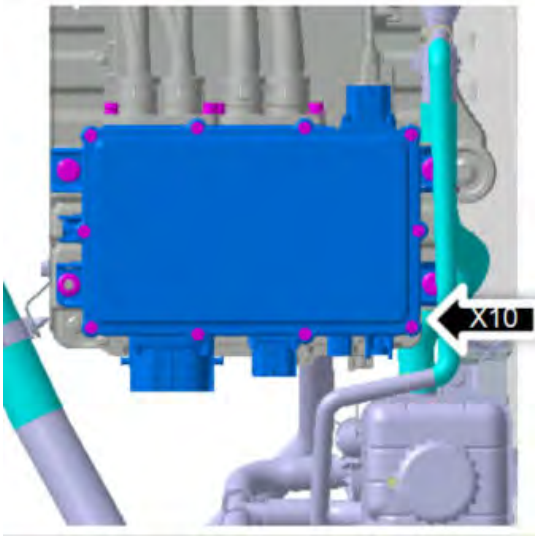
1. Remove the cable quick connector connected to the high-voltage power distribution box, and disconnect the cables between the high-voltage cables and the high-voltage power distribution box.



2. Remove the 4 M6*18 fastening screws of BAT and GCU connectors with an electric screwdriver. Remove the 2 M6*18 fastening screws of BAT connector copper bar and the 2 M6*18 fastening screws of GCU connector copper bar with an electric screwdriver. Remove the BAT and GCU cables.



3. Remove the 10 M4X10 fastening screws on the high-voltage power distribution box upper cover plate with an electric screwdriver.



Installation

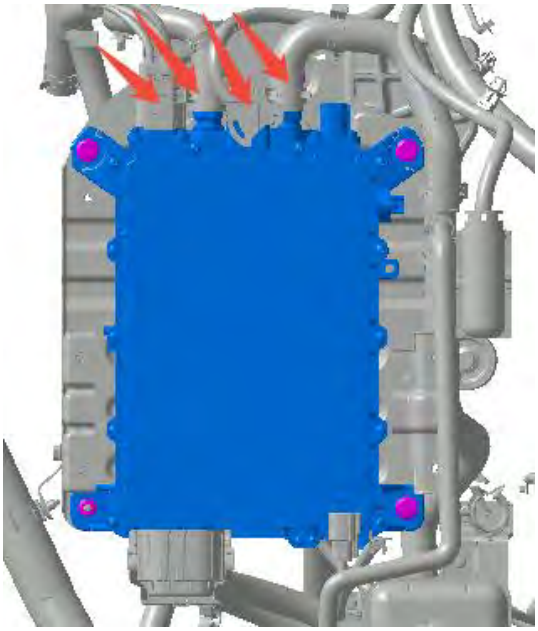
1. The installation order is the reverse of the removal order.

3.9.4.2 Power supply two-in-one module

Caution: When removing the on-board power supply system, make sure that the vehicle's high voltage is deactivated and disconnect the negative battery cable.

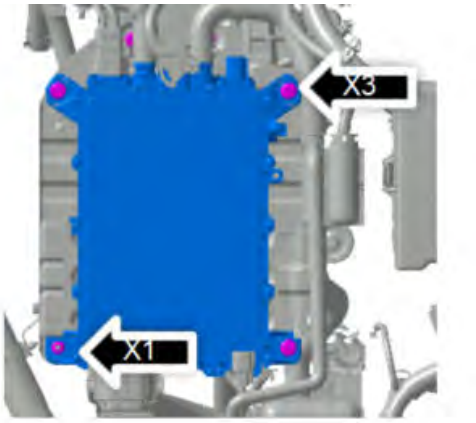
Removal

1. Remove the harness connected to the two-in-one power supply module (Refer to: Two-in-one-PDU harness assembly).
2. Remove the coolant pipe connected to the two-in-one power supply module (Refer to: Water outlet and water pipe removal and installation).

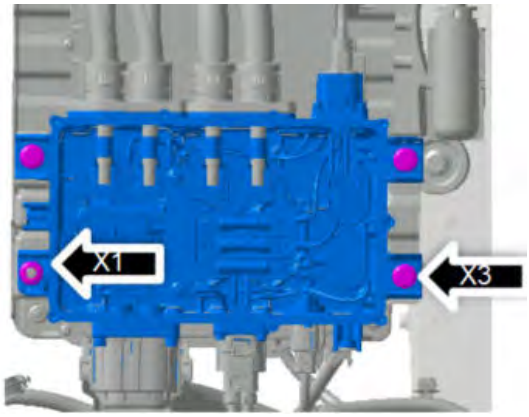


3. Remove 3 M8X20 fastening bolts and 1 M8 fastening nut of the two-in-one power supply module with an electric

screwdriver, and remove the two-in-one power supply module.



4. Use an electric screwdriver to remove the 3 M8X20 fastening bolts and 1 M8 fastening nut of the high-voltage power distribution box mounting bolts, and remove the high-voltage power distribution box.



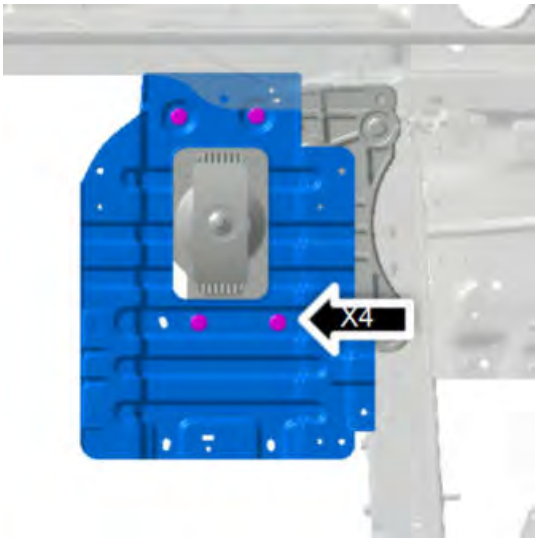
Installation

1. The installation order is the reverse of the removal order.

3.9.4.3 Power supply two-in-one mounting bracket

Removal

1. Remove the 4 M8X20 fixing bolts of the two-in-one power supply mounting bracket and remove the two-in-one power supply mounting bracket.



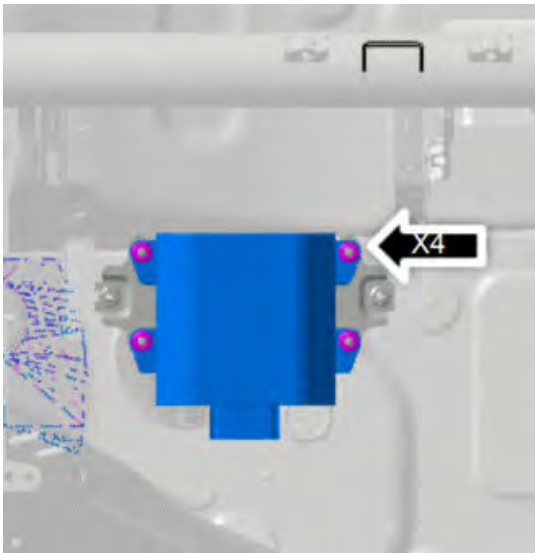
Installation

1. The installation order is the reverse of the removal order.

3.9.4.4 Communication protocol converter and EVCC bracket

Removal

1. Remove the 4 M6 mounting nuts of the communication protocol converter and remove the communication protocol converter.



2. Remove the 2 M6 fastening nuts of EVCC bracket with an electric screwdriver, and remove the EVCC bracket.

Installation

1. The installation order is the reverse of the removal order.

3.10 Generator two-in-one assembly

3.10.1 Specification

3.10.1.1 General specifications

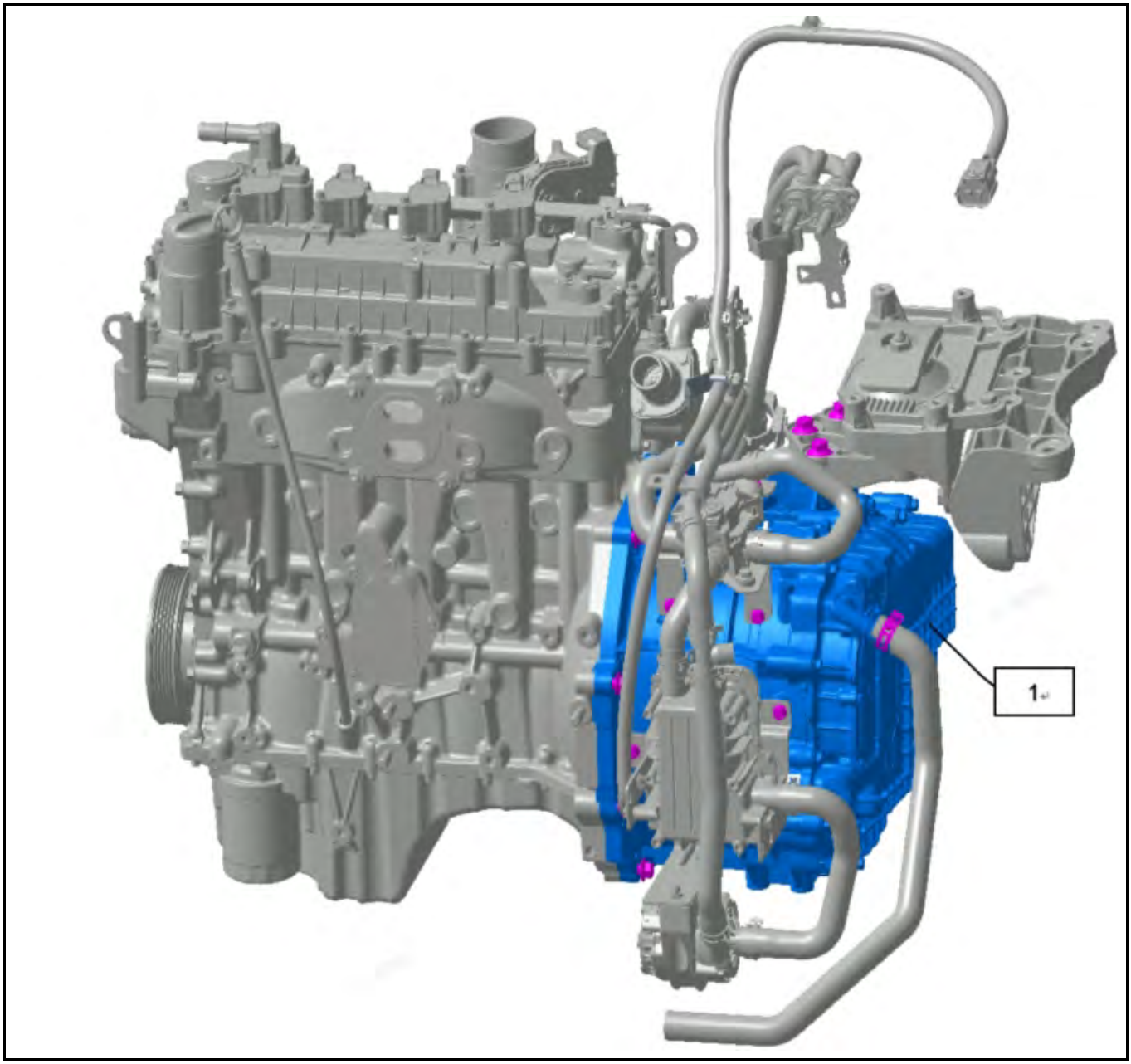
Name	Description
Maximum speed of generator	6000rpm
Operating voltage range	200-450V
Rated power	50 kW
Rated torque	120 Nm
Peak power	60kW
Peak torque	140Nm

3.10.1.2 Torque specification

Name	Nm
Generator fixing bolt 1	70±3
Generator fixing bolt 2	33±3

3.10.2 Instructions and operations

3.10.2.1 Generator two-in-one assembly



Item	Description
1	Generator two-in-one assembly

3.10.2.2 Overview

The extended-range generator system mainly consists of the generator, motor controller and related circuits. All these components are electrically connected. When the VCU sends torque and speed requests to the motor controller, it supplies power to the generator to drive the engine to run. When the engine is stable, the generator relies on the kinetic energy of the engine to generate electricity, enters the power generation condition, charges the battery pack or directly supplies driving power to the drive motor.

Extended-range generator

The extended-range generator is a permanent magnet synchronous motor, the rotor is a permanent magnet, and the stator is a coil winding distributed on the armature, which is excited by the winding magnetic field coil. The torque and speed are controlled

by the motor controller. The battery pack relay connects the circuit from the battery pack to the generator. After the rotor rotates, it drives the engine to rotate together through the torsion reduction mechanism. The generator rotates, and the engine rotates together because the spline is engaged with the engine torque reduction ring gear. After the engine is started, it drives the generator to rotate and converts the kinetic energy of the engine into electric energy.

Generator Working Principle

1. Cutting motion of permanent magnet synchronous generator: The prime mover drives the rotor to rotate (mechanical energy is input into the motor), and the permanent magnetic field with alternating polarities rotates together with the shaft and sequentially cuts each phase winding of the stator (equivalent to the conductor of the winding cutting the permanent magnetic field in reverse).
2. Generation of alternating potential of permanent magnet synchronous generator: Due to the relative cutting movement between the armature winding and the main magnetic field, a three-phase symmetrical alternating potential with periodic changes in size and direction will be induced in the armature winding. AC power supply can be provided through the lead wire.

3.10.3 Diagnosis and testing

3.10.3.1 Generator-Common Troubleshooting Methods

Common Fault Handling Methods

S/N	Issue description	Cause Analysis	Handling Method
1	Unable to wake up	1. Poor contact of low-voltage harness connector 2. Power supply undervoltage 3. Software version error 4. Hardware fault	1. Unplug and plug the low-voltage connector again to ensure that it is well connected. 2. Check whether the low-voltage battery voltage is greater than 9V 3. Check the software version and update the flashing software to the correct version 4. Return to the factory for repair
2	Communication exception	1. Poor contact of low-voltage harness connector 2. Vehicle EMC interference 3. Hardware fault	1. Unplug and plug the low-voltage connector again to ensure that it is well connected. 2. Check the vehicle wiring 3. Return to the factory for repair
3	Program cannot be burned	1. Software version error 2. Hardware fault	1. Check the software version and update the flashing software to the correct version 2. Return to the factory for repair
4	Failure to apply high voltage	1. Software version error 2. Hardware fault	1. Check the software version and update the flashing software to the correct version 2. Return to the factory for repair
5	Generator resolver fault	1. Poor contact of generator resolver connector 2. Hardware fault	1. Re-plug the generator resolver connector to ensure that it is well connected 2. Return to the factory for repair

S/N	Issue description	Cause Analysis	Handling Method
6	Generator resolver fault	1. Poor contact of generator resolver connector 2. Hardware fault	Return it to the factory for repair
8	Other issues that cannot be judged	/	Contact professionals for consultation

3.10.3.2 Generator-DTC Corresponding Information and Maintenance Suggestions

Corresponding information of DTC and maintenance suggestions

DTC	Definition of DTC	Possible cause	Repair recommendations
B1A0045	12V power overvoltage alarm (12V power supply overvoltage alarm)	1. Abnormal DCDC output 2. GCU power supply voltage sampling circuit fault	Check whether DCDC is abnormal. When DCDC works, measure whether the low voltage state is stable
B1A0046	12V power undervoltage alarm (12V power supply undervoltage alarm)	1. Battery undervoltage or large voltage fluctuation 2. GCU low-voltage power supply harness has poor contact or pin withdrawal and falling off 3. GCU power supply voltage sampling circuit fault	1. Check whether the battery voltage is abnormal 2. Check the status of GCU power supply harness
B1A0027	The 5V low-voltage power supply to the control board error (Control board 5V low-voltage power supply fault)	1. GCU internal power supply module fault 2. GCU internal voltage sampling circuit fault	1. Check the GCU hardware power supply circuit
U007300	CAN busoff error (CAN bus off)	1. Poor bus communication quality 2. CAN signal interference 3. Open-circuited and short-circuited CAN lines	1. Check bus hardware, harness, or EMC.
U010000	Miss communication with HECU (HECU node loss fault)	1. Poor bus communication quality 2. CAN signal interference 3. Open-circuited and short-circuited CAN lines	Check the abnormal communication ECU, bus terminal resistance, CAN line status, power supply status, EMC, etc.
B1A0043	HECU Message check error (HECU message verification fault)	1. Poor bus communication quality 2. CAN signal interference 3. Open-circuited and short-circuited CAN lines	Check the abnormal communication ECU, bus terminal resistance, CAN line status, power supply status, EMC, etc.

DTC	Definition of DTC	Possible cause	Repair recommendations
U011100	Miss communication with BMS (BMS node loss fault)	1. Poor bus communication quality 2. CAN signal interference 3. Open-circuited and short-circuited CAN lines	Check the abnormal communication ECU, bus terminal resistance, CAN line status, power supply status, EMC, etc.
B1A0014	IGBT overtemperature alarm (controller IGBT overtemperature alarm)	1. The coolant pump does not work or the water flow is insufficient 2. The coolant temperature is too high (the fan does not work) 3. The accuracy of temperature sampling fault becomes poor	Inspection of cooling system
B1A0021	IGBT overtemperature error (controller IGBT overtemperature fault)	1. The coolant pump does not work or the water flow is insufficient 2. The coolant temperature is too high (the fan does not work) 3. The accuracy of temperature sampling fault becomes poor	Check whether the coolant circulates normally, whether the coolant is sufficient and whether the flow rate reaches the standard
B1A0011	Motor stator overtemperature alarm (motor stator overtemperature alarm)	1. The coolant pump does not work or the water flow is insufficient 2. The coolant temperature is too high (the fan does not work) 3. The accuracy of temperature sampling fault becomes poor	Inspection of cooling system
B1A0018	Motor stator overtemperature error (motor stator overtemperature fault)	1. The coolant pump does not work or the water flow is insufficient 2. The coolant temperature is too high (the fan does not work) 3. The accuracy of temperature sampling fault becomes poor	Check whether the coolant circulates normally, whether the coolant is sufficient and whether the flow rate reaches the standard
B1A0016	Bus undervoltage alarm (Bus undervoltage alarm)	1. Low voltage of high-voltage battery pack 2. Faulty high-voltage relay or fuse 3. High-voltage connector falling off or faulty 4. Hardware sampling circuit fault	Check the battery voltage, high-voltage connector status, high-voltage fuse and relay status. If all are normal, replace GCU

DTC	Definition of DTC	Possible cause	Repair recommendations
B1A0023	Bus undervoltage error (Bus undervoltage fault)	1. Low voltage of high-voltage battery pack 2. Faulty high-voltage relay or fuse 3. High-voltage connector falling off or faulty 4. Hardware sampling circuit fault	Check the battery voltage, high-voltage connector status, high-voltage fuse and relay status. If all are normal, replace GCU
B1A0015	Bus software overvoltage alarm (high-voltage bus software overvoltage alarm)	1. Low voltage of high-voltage battery pack 2. Faulty high-voltage relay or fuse 3. High-voltage connector falling off or faulty 4. Hardware sampling circuit fault	Check the battery voltage, high-voltage connector status, high-voltage fuse and relay status. If all are normal, replace GCU
B1A0049	Bus software overvoltage error (high-voltage bus software overvoltage fault)	1. High voltage of high-voltage battery pack 2. Hardware sampling circuit fault	Inspect the power battery
B1A0036	Bus hardware overvoltage error (high-voltage bus hardware overvoltage fault)	1. High voltage of high-voltage battery pack 2. Hardware sampling circuit fault	Inspect the power battery
B1A0009	IGBT temperature sample error (IGBT temperature sampling circuit fault)	1. IGBT module temperature sampling circuit is short-circuited or open-circuited 2. IGBT module temperature sensor body fault	Replace the IGBT or control board
B1A0005	Motor stator temperature sample error (stator temperature sampling circuit fault)	1. Stator temperature sampling circuit fault 2. Stator temperature sensor body fault	Replace the motor temperature sensor or control panel
B1A0029	Current sensor zero drift error (current sensor zero drift fault)	1. Phase current sampling circuit is short-circuited or open-circuited 2. Current sensor body fault	1. Check the current sensor or control board 2. Replace GCU
B1A0048	Bus voltage sample error (bus voltage sampling circuit fault)	Bus Voltage Sampling Circuit Fault	Replace GCU.
B1A0055	V-phase current sensor error (V-phase current sensor fault)	1. MCU or motor insulation fault 2. Current sensor fault 3. Poor contact of high-voltage line terminals	1. Measure insulation impedance 2. Current sensor

DTC	Definition of DTC	Possible cause	Repair recommendations
B1A0056	W-phase current sensor error (W-phase current sensor fault)	1. MCU or motor insulation fault 2. Current sensor fault 3. Poor contact of high-voltage line terminals	1. Measure insulation impedance 2. Current sensor
B1A0010	Motor overspeed alarm (motor overspeed alarm)	Resolver sampling circuit fault or HECU given target torque error	Check the speed sensor
B1A0017	Motor overspeed error (motor overspeed fault)	Resolver sampling circuit fault or HECU given target torque error	Check the speed sensor
B1A0047	Motor reverse overspeed alarm (Motor reverse overspeed alarm)	1. The resolver harness is loose (the motor end connector has a high probability of loosening) 2. The coaxiality deviation of the resolver installation is large, and the motor rotor and shaft are loose 3. Circuit hardware fault	Check the resolver resistance value, resolver harness, control panel, motor rotor and shaft interference fit status
B1A0028	Software overcurrent on the AC side error (AC side software overcurrent fault)	1. MCU or motor insulation fault 2. Current sensor fault 2. Resolver signal fault or excessive zero position deviation; 3. Drive module fault or internal signal interference 4. Poor contact of high-voltage line terminals	1. Measure insulation impedance 2. Check the three-phase power line connection 3. Check MCU drive circuit and current sensor 4. Check resolver 5. Re-identify initial position angle 6. Adjust current loop parameters
B1A0050	V-phase Hardware overcurrent of the AC error (AC side V-phase hardware overcurrent fault)	1. MCU or motor insulation fault 2. Current sensor fault 2. Resolver signal fault or excessive zero position deviation 3. Drive module fault or internal signal interference 4. Poor contact of high-voltage line terminals	1. Measure insulation impedance 2. Check the three-phase power line connection 3. Check MCU drive circuit and current sensor 4. Check resolver 5. Re-identify initial position angle 6. Adjust current loop parameters

DTC	Definition of DTC	Possible cause	Repair recommendations
B1A0051	W-phase Hardware overcurrent of the AC error (AC side W-phase hardware overcurrent fault)	1. MCU or motor insulation fault 2. Current sensor fault 2. Resolver signal fault or excessive zero position deviation 3. Drive module fault or internal signal interference 4. Poor contact of high-voltage line terminals	1. Measure insulation impedance 2. Check the three-phase power line connection 3. Check MCU drive circuit and current sensor 4. Check resolver 5. Re-identify initial position angle 6. Adjust current loop parameters
B1A0035	Position sensor signal error (resolver signal fault)	1. The resolver harness is loose (the motor end connector has a high probability of loosening) 2. The coaxiality deviation of the resolver installation is large, and the motor rotor and shaft are loose 3. Circuit hardware fault	Check the resolver resistance value, resolver harness, control panel, motor rotor and shaft interference fit status
B1A0032	Power supply to the position sensor error (Position sensor power supply fault (resolver excitation power supply fault))	1. There is a problem with the resolver hardware circuit 2. There is a problem with the resolver harness	1. Check whether the resolver harness is connected incorrectly
B1A0033	Amplitude exceedance fault of resolver sine-cosine signal (Resolver sine-cosine signal amplitude exceedance fault)	1. The resolver harness is loose (the motor end connector has a high probability of loosening) 2. The coaxiality deviation of the resolver installation is large, and the motor rotor and shaft are loose 3. Circuit hardware fault	Check the resolver resistance value, resolver harness, control panel, motor rotor and shaft interference fit status
B1A0034	Resolver sine-cosine signal sum of squares fault (Resolver sine-cosine signal sum of squares fault)	1. The resolver harness is loose (the motor end connector has a high probability of loosening) 2. The coaxiality deviation of the resolver installation is large, and the motor rotor and shaft are loose 3. Circuit hardware fault	Check the resolver resistance value, resolver harness, control panel, motor rotor and shaft interference fit status

DTC	Definition of DTC	Possible cause	Repair recommendations
B1A0057	GCU memory check error, incorrect data, or CRC error (GCU memory check error, incorrect data, or CRC error)	1. Hardware fault occurs when the microprocessor reads and writes memory	Check GCU hardware
B1A0058	The ROM/RAM/EEPROM error (ROM/RAM/EEPROM error fault)	1. Hardware fault occurs when the microprocessor reads and writes memory	Check GCU hardware
B1A0059	Zero Angle missing error (zero position angle loss error)	1. Hardware fault occurs when the microprocessor reads and writes memory	Check GCU hardware
B1A0001	The active discharge times out (active discharge timeout fault)	1. High-voltage relay adhesion 2. Motor controller fault	Check the command logic, main relay status or replace the controller
B1A0060	The 5V low-voltage power supply to the driver board error (Driver board 5V low-voltage power supply fault)	1. GCU internal power supply module fault 2. GCU internal voltage sampling circuit fault	1. Check the GCU hardware power supply circuit
B1A0038	The IGBT driver error (IGBT drive fault)	1. IGBT desaturation 2. Drive 15V undervoltage	1. Replace IGBT module
B1A0056	Phase U current sensor fault	1. Hardware fault of phase current sensor	1. Check the controller 2. Replace the generator
B1A0057	Phase V current sensor fault	1. Hardware fault of phase current sensor	1. Check the controller 2. Replace the generator
B1A0058	Phase W current sensor fault	1. Hardware fault of phase current sensor	1. Check the controller 2. Replace the generator
B1A0059	V-phase current sensor zero drift fault	1. Hardware fault of phase current sensor	1. Check the controller 2. Replace the generator
B1A0060	W-phase current sensor zero drift fault	1. Hardware fault of phase current sensor	1. Check the controller 2. Replace the generator
B1A0061	Flux weakening fault	1. Flux weakening failure	1. Check the status of generator system 2. Replace the generator
B1A0065	Three-phase current vector sum fault	1. Three-phase current vector sum fault	1. Check the controller status 2. Replace the generator
B1A0066	Torque monitoring fault	1. The requested torque deviates greatly from the estimated torque	1. Check the status of generator system 2. Replace the generator

DTC	Definition of DTC	Possible cause	Repair recommendations
B1A0002	Passive discharge fault	1. Passive discharge timeout 2. The discharge resistor is damaged	1. Check the controller status 2. Replace the generator
B1A0053	KL15 signal abnormal fault	1. Abnormal HECU power supply 2. Abnormal power supply of low-voltage harness	1. Check the controller status 2. Replace the generator

3.10.3.3 Inspection and confirmation of extended-range generator system

Inspection and confirmation

1. Confirm problems that owners complain about and check accordingly.

2. Observe for obvious signs of mechanical or electrical damage.

3. Before the next check, solve the identified problem first.

4. If a clear cause of the fault for the reported problem is seen or found, perform repair before proceeding to the next step (if possible).

5. If the cause of the fault is not very clear, confirm the fault phenomenon first and refer to the troubleshooting table.

6. If the cause cannot be determined by visual check, confirm the symptom firstly and then check according to the List of Symptoms.

3.10.3.4 Appearance Checklist of Range Extended Generator System

Appearance Checklist

Mechanical
– Fuse – Wiring – Power supply connector – Battery – Generator

3.10.3.5 List of Symptoms of Range Extender Generator System

Symptoms	Possible cause	Measures
Generator control unit cannot be woken up	1. Poor contact of low-voltage harness connector 2. Power supply undervoltage 3. Software version error 4. Hardware fault	1. Unplug and plug the low-voltage connector again to ensure that it is well connected. 2. Check whether the low-voltage battery voltage is greater than 9V 3. Check the software version and update the flashing software to the correct version 4. Return to the factory for repair
Controller communication is abnormal	1. Poor contact of low-voltage harness connector 2. Vehicle EMC interference 3. Hardware fault	1. Unplug and plug the low-voltage connector again to ensure that it is well connected. 2. Check the vehicle wiring 3. Return to the factory for repair
Program cannot be burned	1. Software version error 2. Hardware fault	1. Check the software version and update the flashing software to the correct version 2. Return to the factory for repair
Failure to apply high voltage	1. Software version error 2. Hardware fault	1. Check the software version and update the flashing software to the correct version 2. Return to the factory for repair
Generator resolver fault	1. Poor contact of generator resolver connector 2. Hardware fault	1. Re-plug the generator resolver connector to ensure that it is well connected 2. Return to the factory for repair
Other issues that cannot be judged	/	Contact professionals for consultation

3.10.3.6 Corresponding information and maintenance suggestions for the DTC of the extended-range generator system

DTC	Definition of DTC	Possible cause	Repair recommendations
B1A0045	12V power overvoltage alarm (12V power supply overvoltage alarm)	1. Abnormal DCDC output 2. Fault of GCU power supply voltage sampling circuit	Check whether DCDC is abnormal. When DCDC works, measure whether the low voltage state is stable
B1A0046	12V power undervoltage alarm (12V power supply undervoltage alarm)	1. Battery undervoltage or large voltage fluctuation 2. GCU low-voltage power supply harness has poor contact or pin withdrawal and falling off 3. GCU power supply voltage sampling circuit fault	1. Check whether the battery voltage is abnormal 2. Check the status of GCU power supply harness
B1A0027	The 5V low-voltage power supply to the control board error (Control board 5V low-voltage power supply fault)	1. GCU internal power supply module fault 2. Fault of GCU internal voltage sampling circuit	1. Check the GCU hardware power supply circuit
U007300	CAN busoff error (CAN bus off)	1. Poor bus communication quality 2. CAN signal interference 3. Open-circuited and short-circuited CAN line	1. Check bus hardware, harness, or EMC.
U010000	Miss communication with HECU (HECU node loss fault)	1. Poor bus communication quality 2. CAN signal interference 3. CAN line open-circuited and short-circuited	Check the abnormal communication ECU, bus terminal resistance, CAN line status, power supply status, EMC, etc.
B1A0043	HECU Message check error (HECU message verification fault)	1. Poor bus communication quality 2. CAN signal interference 3. CAN line open-circuited and short-circuited	Check the abnormal communication ECU, bus terminal resistance, CAN line status, power supply status, EMC, etc.
U011100	Miss communication with BMS (BMS node loss fault)	1. Poor bus communication quality 2. CAN signal interference 3. Open-circuited and short-circuited CAN line	Check the abnormal communication ECU, bus terminal resistance, CAN line status, power supply status, EMC, etc.

DTC	Definition of DTC	Possible cause	Repair recommendations
B1A0014	IGBT overtemperature alarm (controller IGBT overtemperature alarm)	1. The coolant pump does not work or the water flow is insufficient 2. The coolant temperature is too high (the fan does not work) 3. The accuracy of temperature sampling fault becomes poor	Inspection of cooling system
B1A0021	IGBT overtemperature error (controller IGBT overtemperature fault)	1. The coolant pump does not work or the coolant flow is insufficient 2. The coolant temperature is too high (the fan does not work) 3. The accuracy of temperature sampling fault becomes poor	Check whether the coolant circulates normally, whether the coolant is sufficient and whether the flow rate reaches the standard
B1A0011	Motor stator overtemperature alarm (motor stator overtemperature alarm)	1. The coolant pump does not work or the coolant flow is insufficient 2. The coolant temperature is too high (the fan does not work) 3. The accuracy of temperature sampling fault becomes poor	Inspection of cooling system
B1A0018	Motor stator overtemperature error (motor stator overtemperature fault)	1. The coolant pump does not work or the coolant flow is insufficient 2. The coolant temperature is too high (the fan does not work) 3. The accuracy of temperature sampling fault becomes poor	Check whether the coolant circulates normally, whether the coolant is sufficient and whether the flow rate reaches the standard

DTC	Definition of DTC	Possible cause	Repair recommendations
B1A0016	Bus undervoltage alarm (Bus undervoltage alarm)	1. Low voltage of high-voltage battery pack 2. Fault of high-voltage relay or fuse 3. High-voltage connector falls off or fails 4. Hardware sampling circuit fault	Check the battery voltage, high-voltage connector status, high-voltage fuse and relay status. If all are normal, replace GCU
B1A0023	Bus undervoltage error (Bus undervoltage fault)	1. Low voltage of high-voltage battery pack 2. Fault of high-voltage relay or fuse 3. High-voltage connector falls off or fails 4. Hardware sampling circuit fault	Check the battery voltage, high-voltage connector status, high-voltage fuse and relay status. If all are normal, replace GCU
B1A0015	Bus software overvoltage alarm (high-voltage bus software overvoltage alarm)	1. Low voltage of high-voltage battery pack 2. Fault of high-voltage relay or fuse 3. High-voltage connector falls off or fails 4. Hardware sampling circuit fault	Check the battery voltage, high-voltage connector status, high-voltage fuse and relay status. If all are normal, replace GCU
B1A0049	Bus software overvoltage error (high-voltage bus software overvoltage fault)	1. High voltage of high-voltage battery pack 2. Hardware sampling circuit fault	Inspect the power battery
B1A0036	Bus hardware overvoltage error (high-voltage bus hardware overvoltage fault)	1. High voltage of high-voltage battery pack 2. Hardware sampling circuit fault	Inspect the power battery
B1A0009	IGBT temperature sample error (IGBT temperature sampling circuit fault)	1. IGBT module temperature sampling circuit is short-circuited or open-circuited 2. Fault of IGBT module temperature sensor body	Replace the IGBT or control board
B1A0005	Motor stator temperature sample error (stator temperature sampling circuit fault)	1. Fault of stator temperature sampling circuit 2. Fault of stator temperature sensor body	Replace the motor temperature sensor or control panel

DTC	Definition of DTC	Possible cause	Repair recommendations
B1A0029	Current sensor zero drift error (current sensor zero drift fault)	1. The phase current sampling circuit is short-circuited or open-circuited 2. Current sensor body fault	1. Check the current sensor or control panel 2. Replace GCU.
B1A0048	Bus voltage sample error (bus voltage sampling circuit fault)	Bus Voltage Sampling Circuit Fault	Replace GCU.
B1A0055	V-phase current sensor error (V-phase current sensor fault)	1. MCU or motor insulation fault 2. Current sensor fault 3. Poor contact of high-voltage wire terminals	1. Measure the insulation impedance 2. Current sensor
B1A0056	W-phase current sensor error (W-phase current sensor fault)	1. MCU or motor insulation fault 2. Current sensor fault 3. Poor contact of high-voltage wire terminals	1. Measure the insulation impedance 2. Current sensor
B1A0010	Motor overspeed alarm (motor overspeed alarm)	Resolver sampling circuit fault or HECU given target torque error	Check the speed sensor
B1A0017	Motor overspeed error (motor overspeed fault)	Resolver sampling circuit fault or HECU given target torque error	Check the speed sensor
B1A0047	Motor reverse overspeed alarm (Motor reverse overspeed alarm)	1. The resolver harness is loose (the motor end connector has a high probability of loosening) 2. The coaxiality deviation of the resolver installation is large, and the motor rotor and shaft are loose 3. Circuit hardware fault	Check the resolver resistance value, resolver harness, control panel, motor rotor and shaft interference fit status

DTC	Definition of DTC	Possible cause	Repair recommendations
B1A0028	Software overcurrent on the AC side error (AC side software overcurrent fault)	1. MCU or motor insulation fault 2. Current sensor fault 2. The resolver signal fails or the zero position deviation is too large; 3. The drive module fails or the internal signal interferes 4. Poor contact of high-voltage wire terminal	1. Measurement of insulation impedance 2. Check the connection of three-phase power line 3. Check the MCU drive circuit and current sensor 4. Check the resolver 5. Re-identify the initial position angle 6. Adjust the current loop parameters
B1A0050	V-phase Hardware overcurrent of the AC error (AC side V-phase hardware overcurrent fault)	1. MCU or motor insulation fault 2. Current sensor fault 2. The resolver signal fails or the zero position deviation is too large 3. The drive module fails or the internal signal interferes 4. Poor contact of high-voltage wire terminal	1. Measurement of insulation impedance 2. Check the connection of three-phase power line 3. Check the MCU drive circuit and current sensor 4. Check the resolver 5. Re-identify the initial position angle 6. Adjust the current loop parameters
B1A0051	W-phase Hardware overcurrent of the AC error (AC side W-phase hardware overcurrent fault)	1. MCU or motor insulation fault 2. Current sensor fault 2. The resolver signal fails or the zero position deviation is too large 3. The drive module fails or the internal signal interferes 4. Poor contact of high-voltage wire terminal	1. Measurement of insulation impedance 2. Check the connection of three-phase power line 3. Check the MCU drive circuit and current sensor 4. Check the resolver 5. Re-identify the initial position angle 6. Adjust the current loop parameters
B1A0035	Position sensor signal error (resolver signal fault)	1. The resolver harness is loose (the motor end connector has a high probability of loosening) 2. The coaxiality deviation of the resolver installation is large, and the motor rotor and shaft are loose 3. Circuit hardware fault	Check the resolver resistance value, resolver harness, control panel, motor rotor and shaft interference fit status

DTC	Definition of DTC	Possible cause	Repair recommendations
B1A0032	Power supply to the position sensor error (Position sensor power supply fault (resolver excitation power supply fault))	1. There is a problem with the resolver hardware circuit 2. There is a problem with the resolver harness	1. Check whether the resolver harness is connected incorrectly
B1A0033	Amplitude exceedance fault of resolver sine-cosine signal (Resolver sine-cosine signal amplitude exceedance fault)	1. The resolver harness is loose (the motor end connector has a high probability of loosening) 2. The coaxiality deviation of the resolver installation is large, and the motor rotor and shaft are loose 3. Circuit hardware fault	Check the resolver resistance value, resolver harness, control panel, motor rotor and shaft interference fit status
B1A0034	Resolver sine-cosine signal sum of squares fault (Resolver sine-cosine signal sum of squares fault)	1. The resolver harness is loose (the motor end connector has a high probability of loosening) 2. The coaxiality deviation of the resolver installation is large, and the motor rotor and shaft are loose 3. Circuit hardware fault	Check the resolver resistance value, resolver harness, control panel, motor rotor and shaft interference fit status
B1A0057	GCU memory check error, incorrect data, or CRC error (GCU memory check error, incorrect data, or CRC error)	1. Hardware fault occurs when the microprocessor reads and writes memory	Check GCU hardware
B1A0058	The ROM/RAM/EEPROM error (ROM/RAM/EEPROM error fault)	1. Hardware fault occurs when the microprocessor reads and writes memory	Check GCU hardware
B1A0059	Zero Angle missing error (zero position angle loss error)	1. Hardware fault occurs when the microprocessor reads and writes memory	Check GCU hardware
B1A0001	The active discharge times out (active discharge timeout fault)	1. High-voltage relay stuck 2. Motor controller fault	Check the command logic, main relay status or replace the controller
B1A0060	The 5V low-voltage power supply to the driver board error (Driver board 5V low-voltage power supply fault)	1. GCU internal power supply module fault 2. Fault of GCU internal voltage sampling circuit	1. Check the GCU hardware power supply circuit
B1A0038	The IGBT driver error (IGBT drive fault)	1. IGBT desaturation 2. Drive 15V undervoltage	1. Replace IGBT module

DTC	Definition of DTC	Possible cause	Repair recommendations
B1A0056	Phase U current sensor fault	1. Hardware fault of phase current sensor	1. Check the controller 2. Replace the generator
B1A0057	Phase V current sensor fault	1. Hardware fault of phase current sensor	1. Check the controller 2. Replace the generator
B1A0058	Phase W current sensor fault	1. Hardware fault of phase current sensor	1. Check the controller 2. Replace the generator
B1A0059	V-phase current sensor zero drift fault	1. Hardware fault of phase current sensor	1. Check the controller 2. Replace the generator
B1A0060	W-phase current sensor zero drift fault	1. Hardware fault of phase current sensor	1. Check the controller 2. Replace the generator
B1A0061	Flux weakening fault	1. Flux weakening failure	1. Check the status of generator system 2. Replace the generator
B1A0065	Three-phase current vector sum fault	1. Three-phase current vector sum fault	1. Check the controller status 2. Replace the generator
B1A0066	Torque monitoring fault	1. The requested torque deviates greatly from the estimated torque	1. Check the status of generator system 2. Replace the generator
B1A0002	Passive discharge fault	1. Passive discharge timeout 2. The discharge resistor is damaged	1. Check the controller status 2. Replace the generator
B1A0053	KL15 signal abnormal fault	1. Abnormal HECU power supply 2. Abnormal power supply of low-voltage harness	1. Check the controller status 2. Replace the generator

3.10.3.7 Accurate Test BB: B1A0001

Accurate Test BB: B1A0001

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0001	The active discharge times out (active discharge timeout fault)	• 1. The bus voltage is greater than 60V after 3s or the speed during discharge is greater than 500rpm	• Automatically restore to the initialisation state after 250ms

Possible cause

– 1. High-voltage relay stuck

– 2. Motor controller fault

Repair recommendations

– Check the command logic, main relay status or replace the controller

3.10.3.8 Accurate Test BB: B1A0002

Accurate Test BB: B1A0002

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0002	Passive discharge fault	• 1) 85 service is not activated 2) Passive discharge time is greater than the threshold value of 3min	•Power on and off again

Possible cause

– 1. Passive discharge timeout

2. The discharge resistor is damaged.

Repair recommendations

– 1. Check the controller status
2. Replace the generator

3.10.3.9 Accurate Test BB: B1A0005

Accurate Test BB: B1A0005

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0005	Motor stator temperature sample error (stator temperature sampling circuit fault)	• 1. The motor temperature sampling value is less than the effective lower limit 30 (12-bit ADC) for 100ms 2. Or the sampling value is ≥4060 and the phase current is greater than 35A for 5min 3. Or the sampling value is ≥4060 and the phase current is greater than 70A for 5s	• 1. When the sampling value of motor stator temperature sensor is greater than 30 (AD value), the fault will be recovered. (Short circuit) 2. When the sampling value of motor stator temperature sensor is less than 4060 (AD value), the fault will be recovered. (Disconnection)

Possible cause

– 1. Fault of stator temperature sampling circuit

– 2. Fault of stator temperature sensor body

Repair recommendations

– Replace the motor temperature sensor or control panel

3.10.3.10 Accurate Test BB: B1A0009

Accurate Test BB: B1A0009

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0009	IGBT temperature sample error (IGBT temperature sampling circuit fault)	• The temperature sampling value of any IGBT module exceeds the maximum effective temperature sampling upper limit 3280 (12-bit ADC) or is less than the minimum effective temperature lower limit 133 (12-bit ADC) for 50ms	• The IGBT module temperature sampling value is between 133 and 3280

Possible cause

– 1. IGBT module temperature sampling circuit is short-circuited or open-circuited

– 2. Fault of IGBT module temperature sensor body

Repair recommendations

– Replace the IGBT or control board

3.10.3.11 Accurate Test BB: B1A0010

Accurate Test BB: B1A0010

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0010	Motor overspeed alarm (motor overspeed alarm)	• 1. No resolver fault 2. No motor overspeed fault 3. The motor speed is greater than 5600rpm for 20ms	• 1. No resolver fault 2. No motor overspeed fault 3. The motor speed is less than 5100rpm for 20ms

Possible cause

– Resolver sampling circuit fault or HECU given target torque error

Repair recommendations

– Check the speed sensor

3.10.3.12 Accurate Test BB: B1A0011

Accurate Test BB: B1A0011

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0011	Motor stator overtemperature alarm (motor stator overtemperature alarm)	• 1. There is no corresponding stator temperature sampling circuit fault 2. No motor overtemperature fault 3. The value collected by any circuit of the motor stator temperature is ≥140°C	• 1. There is a fault in the corresponding stator temperature sampling circuit 2. Or there is a motor overtemperature fault 3. Or the collected value of any circuit of motor stator temperature is ≤135°C

Possible cause

– 1. The coolant pump does not work or the coolant flow is insufficient

– 2. The coolant temperature is too high (the fan does not work)

– 3. The accuracy of temperature sampling fault becomes poor

Repair recommendations

– Inspection of cooling system

3.10.3.13 Accurate Test BB: B1A0014

Accurate Test BB: B1A0014

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0014	IGBT overtemperature alarm (controller IGBT overtemperature alarm)	• 1. There is no corresponding IGBT temperature sampling circuit fault 2. No IGBT overtemperature fault 3. The collected value of any circuit of IGBT temperature (U/V/W) is ≥85°C	• 1. There is an IGBT temperature sampling circuit fault 2. Or there is an IGBT overtemperature fault 3. Or the three-way acquisition values of IGBT temperature (U/V/W) are all ≤80°C

Possible cause

– 1. The coolant pump does not work or the coolant flow is insufficient

– 2. The coolant temperature is too high (the fan does not work)

– 3. The accuracy of temperature sampling fault becomes poor

Repair recommendations

– Inspection of cooling system

3.10.3.14 Accurate Test BB: B1A0015

Accurate Test BB: B1A0015

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0015	Bus software overvoltage alarm (high-voltage bus software overvoltage alarm)	• 1. No voltage sampling circuit fault 2. Bus voltage > 462V and < 482V for 100ms	• 1. Bus overvoltage fault 2、Or BMS main contactor disconnected 3. Or the bus voltage value is <450V for 100ms

Possible cause

– 1. Low voltage of high-voltage battery pack

– 2. Fault of high-voltage relay or fuse

– 3. High-voltage connector falls off or fails

– 4. Hardware sampling circuit fault

Repair recommendations

– Check the battery voltage, high-voltage connector status, high-voltage fuse and relay status. If all are normal, replace GCU

3.10.3.15 Accurate Test BB: B1A0016

Accurate Test BB: B1A0016

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0016	Bus undervoltage alarm (bus undervoltage alarm)	• 1. No bus undervoltage fault 2. BMS main contactor is closed 3. GCU is in the open tube state 4. The bus voltage value is <200V for 100ms	• 1. Bus undervoltage fault 2、Or BMS main contactor disconnected 3. Or the bus voltage value is greater than 210V for 100ms

Possible cause

– 1. Low voltage of high-voltage battery pack

– 2. Fault of high-voltage relay or fuse

– 3. High-voltage connector falls off or fails

– 4. Hardware sampling circuit fault

Repair recommendations

– Check the battery voltage, high-voltage connector status, high-voltage fuse and relay status. If all are normal, replace GCU

3.10.3.16 Accurate Test BB: B1A0017

Accurate Test BB: B1A0017

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0017	Motor overspeed error (motor overspeed fault)	• 1. No resolver fault 2. The motor speed is greater than 6200rpm for 20ms	• 1. No resolver fault 2. The motor speed is less than 5100rpm for 20ms

Possible cause

– Resolver sampling circuit fault or HECU given target torque error

Repair recommendations

– Check the speed sensor

3.10.3.17 Accurate Test BB: B1A0018

Accurate Test BB: B1A0018

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0018	Motor stator overtemperature error (motor stator overtemperature fault)	• 1. There is no corresponding stator temperature sampling circuit fault 2. The collected value of any circuit of motor stator temperature is greater than 150°C	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. The coolant pump does not work or the coolant flow is insufficient

– 2. The coolant temperature is too high (the fan does not work)

– 3. The accuracy of temperature sampling fault becomes poor

Repair recommendations

– Check whether the coolant circulates normally, whether the coolant is sufficient and whether the flow rate reaches the standard

3.10.3.18 Accurate Test BB: B1A0021

Accurate Test BB: B1A0021

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0021	IGBT overtemperature error (controller IGBT overtemperature fault)	• 1. There is no corresponding IGBT temperature sampling circuit fault 2. The acquisition value of any circuit of IGBT temperature (U/V/W) is set to be greater than 95°C	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. The coolant pump does not work or the coolant flow is insufficient

– 2. The coolant temperature is too high (the fan does not work)

– 3. The accuracy of temperature sampling fault becomes poor

Repair recommendations

– Check whether the coolant circulates normally, whether the coolant is sufficient and whether the flow rate reaches the standard

3.10.3.19 Accurate Test BB: B1A0023

Accurate Test BB: B1A0023

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0023	Bus undervoltage error (bus undervoltage fault)	• 1. BMS main contactor is energised 2. GCU is in the open tube state 3. The bus voltage value is less than 180V for 100ms	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. Low voltage of high-voltage battery pack

– 2. Fault of high-voltage relay or fuse

– 3. High-voltage connector falls off or fails

– 4. Hardware sampling circuit fault

Repair recommendations

– Check the battery voltage, high-voltage connector status, high-voltage fuse and relay status. If all are normal, replace GCU

3.10.3.20 Accurate Test BB: B1A0027

Accurate Test BB: B1A0027

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0027	The 5V low-voltage power supply to the control board error (control board 5V low-voltage power supply fault)	• The sampling value of the control board power supply voltage is higher than 5.2V or lower than 4.8V for 100ms	•KL15 power off and then power on to clear the fault

Possible cause

– 1. GCU internal power supply module fault

– 2. Fault of GCU internal voltage sampling circuit

Repair recommendations

– 1. Check the GCU hardware power supply circuit

3.10.3.21 Accurate Test BB: B1A0028

Accurate Test BB: B1A0028

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0028	Software overcurrent on the AC side error (AC side software overcurrent fault)	• 1. The phase current of the motor controller is >345A, and the duration is 1 PWM cycle	•KL15 power off and then power on to clear the fault

Possible cause

– •1. MCU or motor insulation fault

2. Current sensor fault

2. The resolver signal fails or the zero position deviation is too large;

3. The drive module fails or the internal signal interferes

4. Poor contact of high-voltage wire terminal

.

Repair recommendations

– 1. Measurement of insulation impedance

2. Check the connection of three-phase power line

3.10.3.22 Accurate Test BB: B1A0029

Accurate Test BB: B1A0029

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0029	Current sensor zero drift error (current sensor zero drift fault)	• During power-on self-inspection (zero drift diagnosis is performed after sampling 200 times to calculate the average value), any phase current zero drift value ≥ zero drift upper limit (2144) or ≤ zero drift lower limit (1952)	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. The phase current sampling circuit is short-circuited or open-circuited

– 2. Current sensor body fault

Repair recommendations

– 1. Check the current sensor or control panel

– 2. Replace GCU.

3.10.3.23 Accurate Test BB: B1A0032

Accurate Test BB: B1A0032

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0032	Power supply to the position sensor error (position sensor power supply fault (resolver excitation power supply fault))	• 1. The power supply voltage is within ±3% for 100ms	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. There is a problem with the resolver hardware circuit

– 2. There is a problem with the resolver harness

Repair recommendations

– 1. Check whether the resolver harness is connected incorrectly

3.10.3.24 Accurate Test BB: B1A0033

Accurate Test BB: B1A0033

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0033	Amplitude exceedance fault of resolver sine-cosine signal	• 1. No position sensor power supply fault 2. Sin sampling value ≥ 4090 3. COS sampling value ≥ 4090 4. Last for 400ms	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. The resolver harness is loose (the motor end connector has a high probability of loosening)

– 2. The coaxiality deviation of the resolver installation is large, and the motor rotor and shaft are loose

– 3. Circuit hardware fault

Repair recommendations

– Check the resolver resistance value, resolver harness, control panel, motor rotor and shaft interference fit status

3.10.3.25 Accurate Test BB: B1A0034

Accurate Test BB: B1A0034

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0034	Resolver sine-cosine signal sum of squares fault	• 1. No position sensor power supply fault 2. The sum of Sin squared + Cos squared is ≥1.5 or ≤0.5 3. Last for 400ms	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. The resolver harness is loose (the motor end connector has a high probability of loosening)

– 2. The coaxiality deviation of the resolver installation is large, and the motor rotor and shaft are loose

– 3. Circuit hardware fault

Repair recommendations

– Check the resolver resistance value, resolver harness, control panel, motor rotor and shaft interference fit status

3.10.3.26 Accurate Test BB: B1A0035

Accurate Test BB: B1A0035

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0035	Position sensor signal error (resolver signal fault)	• The fault is triggered if any of the following conditions are met and lasts for 400ms: 1. Sin sampling value ≥ 4090 2. COS sampling value ≥ 4090 3. The sum of Sin squared + Cos squared is ≥1.5 or ≤0.5 4. Abnormal resolver excitation power supply	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. The resolver harness is loose (the motor end connector has a high probability of loosening)

– 2. The coaxiality deviation of the resolver installation is large, and the motor rotor and shaft are loose

– 3. Circuit hardware fault

Repair recommendations

– Check the resolver resistance value, resolver harness, control panel, motor rotor and shaft interference fit status

3.10.3.27 Accurate Test BB: B1A0036

Accurate Test BB: B1A0036

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0036	Bus hardware overvoltage error (high-voltage bus hardware overvoltage fault)	• 1. No voltage sampling circuit fault 2. Bus voltage 492V	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. High voltage of high-voltage battery pack

– 2. Hardware sampling circuit fault

Repair recommendations

– Inspect the power battery

3.10.3.28 Accurate Test BB: B1A0038

Accurate Test BB: B1A0038

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0038	The IGBT driver error (IGBT drive fault)	• 1. When the upper or lower bridge IGBT is short-circuited or the drive power supply is abnormal (≥5.4V or ≤4.8V), the software reads the IO port level status through hardware detection	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. IGBT desaturation

– 2. Drive 15V undervoltage

Repair recommendations

– 1. Replace IGBT module

3.10.3.29 Accurate Test BB: B1A0043

Accurate Test BB: B1A0043

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0043	HECU Message check error (HECU message check fault)	• 1. The rollingcount of the HECU key message (0x131) does not increase in a cyclic sequence from 0 to 15, and there are 10 consecutive errors. In the middle, the fault count is restarted normally; 2. Checksum verification errors reach 10 consecutive times, and the fault counting is restarted normally once in between	• HECU key message (0x131) is restored immediately after receiving the correct rollingcount or Checksum

Possible cause

– 1. Poor bus communication quality

– 2. CAN signal interference

– 3. CAN line open-circuited and short-circuited

Repair recommendations

– Check the abnormal communication ECU, bus terminal resistance, CAN line status, power supply status, EMC, etc.

3.10.3.30 Accurate Test BB: B1A0045

Accurate Test BB: B1A0045

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0045	12V power supply overvoltage alarm (12V power supply overvoltage alarm)	• 1. GCU power supply voltage > 16.5V for 300ms	• 1. power supply voltage ≤16V for 100ms

Possible cause

– DCDC output is abnormal

– GCU power supply voltage sampling circuit fault

Repair recommendations

– Check whether DCDC is abnormal. When DCDC works, measure whether the low voltage state is stable

3.10.3.31 Accurate Test BB: B1A0046

Accurate Test BB: B1A0046

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0046	12V power supply undervoltage alarm (12V power supply undervoltage alarm)	• 1. GCU power supply voltage ≤8V for 300ms	• 1. power supply voltage ≥ 9V for 100ms

Possible cause

– 1. Battery undervoltage or large voltage fluctuation

– 2. GCU low-voltage power supply harness has poor contact or pin withdrawal/falling off

– 3. GCU power supply voltage sampling circuit fault

Repair recommendations

– 1. Check whether the battery voltage is abnormal.

– 2. Check the status of GCU power supply harness

3.10.3.32 Accurate Test BB: B1A0047

Accurate Test BB: B1A0047

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0047	Motor reverse overspeed alarm (motor reverse overspeed alarm)	• The motor speed is less than -500rpm for 40ms	• Motor speed ≥ 0 for 6s

Possible cause

– 1. The resolver harness is loose (the motor end connector has a high probability of loosening)

– 2. The coaxiality deviation of the resolver installation is large, and the motor rotor and shaft are loose

– 3. Circuit hardware fault

Repair recommendations

– Check the resolver resistance value, resolver harness, control panel, motor rotor and shaft interference fit status

3.10.3.33 Accurate Test BB: B1A0048

Accurate Test BB: B1A0048

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0048	Bus voltage sample error (bus voltage sampling circuit fault)	• The bus voltage sampling value is greater than 3939 (12-bit ADC) for 10ms	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– Bus Voltage Sampling Circuit Fault

Repair recommendations

– Replace GCU.

3.10.3.34 Accurate Test BB: B1A0050

Accurate Test BB: B1A0050

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0050	V-phase Hardware overcurrent of the AC error (AC side V-phase hardware overcurrent fault)	• 1. Motor controller phase current 360A, immediate response	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. MCU or motor insulation fault
– 2. Current sensor fault
– 2. The resolver signal fails or the zero position deviation is too large
– 3. The drive module fails or the internal signal interferes
– 4. Poor contact of high-voltage wire terminal

Repair recommendations

– 1. Measurement of insulation impedance
– 2. Check the connection of three-phase power line
– 3. Check the MCU drive circuit and current sensor
– 4. Check the resolver
– 5. Re-identify the initial position angle
– 6. Adjust the current loop parameters

3.10.3.35 Accurate Test BB: B1A0053

Accurate Test BB: B1A0053

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0053	KL15 signal abnormal fault	• 1) 85 service is not activated 2) KL15 power failure, bus voltage greater than threshold 200V or motor speed greater than threshold 30rpm or motor torque greater than threshold 3Nm or high-voltage relay closed for 1s	• 1) KL15 loses power and the bus voltage is lower than the threshold 200V and the speed is lower than the threshold 30rpm and the torque is lower than the threshold 3Nm and the high-voltage relay disconnection duration exceeds 120ms

Possible cause

– 1. Abnormal HECU power supply

– 2. Abnormal power supply of low-voltage harness

Repair recommendations

– 1. Check the controller status

– 2. Replace the generator

3.10.3.36 Accurate Test BB: B1A0055

Accurate Test BB: B1A0055

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0055	V-phase current sensor error (V-phase current sensor fault)	• 1. No control board 5V low-voltage power supply fault 2. No 5V low-voltage power supply fault of the driver board 3. Current sensor sampling threshold 4000 or <100 for 10ms	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. MCU or motor insulation fault

– 2. Current sensor fault

– 3. Poor contact of high-voltage wire terminals

Repair recommendations

– 1. Measure the insulation impedance

2. Current sensor

3.10.3.37 Accurate Test BB: B1A0056

Accurate Test BB: B1A0056

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0056	W-phase current sensor error (W-phase current sensor fault)	• 1. No control board 5V low-voltage power supply fault 2. No 5V low-voltage power supply fault of the driver board 3. Current sensor sampling threshold 4000 or <100 for 10ms	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. MCU or motor insulation fault

2. Current sensor fault

3. Poor contact of high-voltage wire terminals.

Repair recommendations

– 1. Measure the insulation impedance

2. Current sensor.

3.10.3.38 Accurate Test BB: B1A0057

Accurate Test BB: B1A0057

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0057	Phase V current sensor fault	• 1) V-phase sensor sampling voltage <0.2V 2) V-phase sensor sampling voltage >4.8V Duration exceeds 0.1s Any of the above conditions can be met and 85 service is not activated	• 1) 0.2V ≤ V-phase sensor sampling voltage ≤ 4.8V for more than 120ms 2) Motor speed <100rpm 3) Torque <3Nm and above conditions must be met

Possible cause

– 1. Hardware fault of phase current sensor.

Repair recommendations

– 1. Check the controller

2. Replace the generator.

3.10.3.39 Accurate Test BB: B1A0058

Accurate Test BB: B1A0058

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0058	The ROM/RAM/EEPROM error (ROM/RAM/EEPROM fault)	• Chip hardware fault during initialisation or power-off storage; write, read, and erase operations fail due to hardware fault.	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. Hardware fault occurs when the microprocessor reads and writes memory.

Repair recommendations

– Check the GCU hardware.

3.10.3.40 Accurate Test BB: B1A0059

Accurate Test BB: B1A0059

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0059	Zero Angle missing error (Zero angle loss error)	• 1. Check whether the zero position angle reading is abnormal	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. Hardware fault occurs when the microprocessor reads and writes memory.

Repair recommendations

– Check the GCU hardware.

3.10.3.41 Accurate Test BB: B1A0060

Accurate Test BB: B1A0060

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0060	The 5V low-voltage power supply to the driver board error (5V Low-voltage power supply fault of driver board)	• 1. The power supply voltage of the driver board is less than 4.8V or greater than 5.4V for 100ms	• 1. KL15 is powered off and then on to clear the fault

Possible cause

– 1. GCU internal power supply module fault

2. The internal voltage sampling circuit of GCU is faulty.

Repair recommendations

– 1. Check the GCU hardware power supply circuit

3.10.3.42 Accurate Test BB: B1A0061

Accurate Test BB: B1A0061

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0061	Flux weakening fault	• 1) 85 service is not activated 2) The voltage utilisation rate is greater than 1.15 for 0.5s.	• 1) Voltage utilisation is lower than 1.15 for 1s 2) Motor speed <100rpm 3) Torque <3Nm All of the above conditions need to be met

Possible cause

– 1. Flux weakening failure

Repair recommendations

– 1. Check the status of generator system

– 2. Replace the generator

3.10.3.43 Accurate Test BB: B1A0065

Accurate Test BB: B1A0065

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0065	Three-phase current vector sum fault	• 1) 85 service is not activated 2) The three-phase current vector sum is greater than the threshold of 60A for 0.3s	• The three-phase current vector sum is less than the threshold of 60A for 0.1s

Possible cause

– 1. Three-phase current vector sum fault

Repair recommendations

– 1. Check the controller status

– 2. Replace the generator

3.10.3.44 Accurate Test BB: B1A0066

Accurate Test BB: B1A0066

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1A0066	Torque monitoring fault	• 1) 85 service is not activated 2) The deviation between the output torque and the reference torque is greater than the threshold (less than 100Nm, the threshold is 8Nm; more than 100Nm, the threshold is 8% of the reference torque) for 2s	• The deviation between the output torque and the reference torque is less than the threshold for 1s

Possible cause

– 1. The requested torque deviates greatly from the estimated torque

Repair recommendations

– 1. Check the status of generator system

– 2. Replace the generator

3.10.3.45 Accurate Test BB: U007300

Accurate Test BB: U007300

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U007300	CAN busoff error (CAN bus off)	• Enter BUSOFF fault for 3 consecutive times	1. The fault is cleared with a delay of 500ms after the bus is turned on from off

Possible cause

– 1. Poor bus communication quality

– 2. CAN signal interference

– 3. CAN line open-circuited and short-circuited

Repair recommendations

– 1. Check bus hardware, harness, or EMC.

3.10.3.46 Accurate test BB: U010000

Accurate test BB: U010000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U010000	Miss communication with HECU (HECU node loss fault)	• 1. Not in busoff status 2. After the busoff state is restored, it exceeds 1s 3. HECU key message (0x131) is not detected for more than 10 message cycles (100ms).	• Recover immediately after receiving a frame of HECU key message (0x131) normally

Possible cause

– 1. Poor bus communication quality

– 2. CAN signal interference

– 3. CAN line open-circuited and short-circuited

Repair recommendations

– Check the abnormal communication ECU, bus terminal resistance, CAN line status, power supply status, EMC, etc.

3.10.3.47 Accurate test BB: U011100

Accurate test BB: U011100

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U011100	Miss communication with BMS (BMS node loss fault)	• 1. Not in busoff status 2. After the busoff state is restored, it exceeds 1s 3. No message is received in 10 consecutive message cycles (Monitoring message: BMS10= 0x238, 20ms)	•Recover immediately after normally receiving a frame of BMS key message (0x238)

Possible cause

– 1. Poor bus communication quality

– 2. CAN signal interference

– 3. CAN line open-circuited and short-circuited

Repair recommendations

– Check the abnormal communication ECU, bus terminal resistance, CAN line status, power supply status, EMC, etc.

3.10.4 Removal and installation

3.10.4.1 Extended-range generator

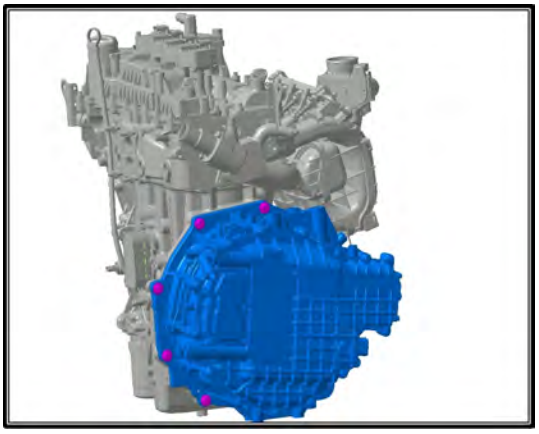
Removal

Caution: The negative of the battery should be disconnected before disassembling the extended-range generator, otherwise it will cause serious personal injury.

Caution: This removal procedure may contain some installation details.

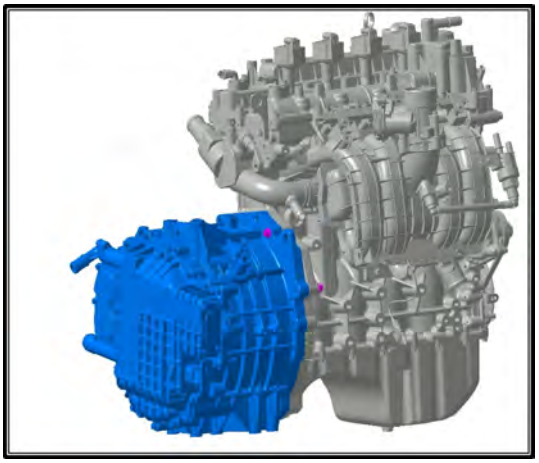
1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the high-voltage power distribution box. Refer to: High-voltage power distribution box.
3. Remove the two-in-one power supply module. Refer to: Power supply two-in-one module.
4. Remove the two-in-one power supply mounting bracket. Refer to: Power supply two-in-one mounting bracket.
5. Remove the communication protocol converter and EVCC bracket. Refer to: Communication protocol converter and EVCC bracket.
6. Remove the A/C system.
7. Remove the cooling system.
8. Lift the vehicle. Refer to: Lifting the vehicle.
9. Remove the left mount cushion assembly and the left mount bracket (powertrain mount system). Refer to: Left mount cushion assembly and left mount bracket (powertrain mount system).
10. Remove the right mount cushion assembly (powertrain mount system). Refer to: Right mount cushion assembly (powertrain mount system).
11. Remove the rear mount cushion assembly and rear mount bracket (powertrain mount system). Refer to: Rear mount cushion assembly and rear mount bracket (powertrain mount system).
12. Remove the high-voltage harness.
13. Remove the fixing nut of generator assembly.

    Torque: 70±3Nm



14. Remove the fixing nuts of the generator assembly, and remove the extended-range generator two-in-one assembly.

    Torque: 33±3Nm



Installation

1. The installation order is the reverse of the removal order.

3.11 Traction battery

3.11.1 Specification

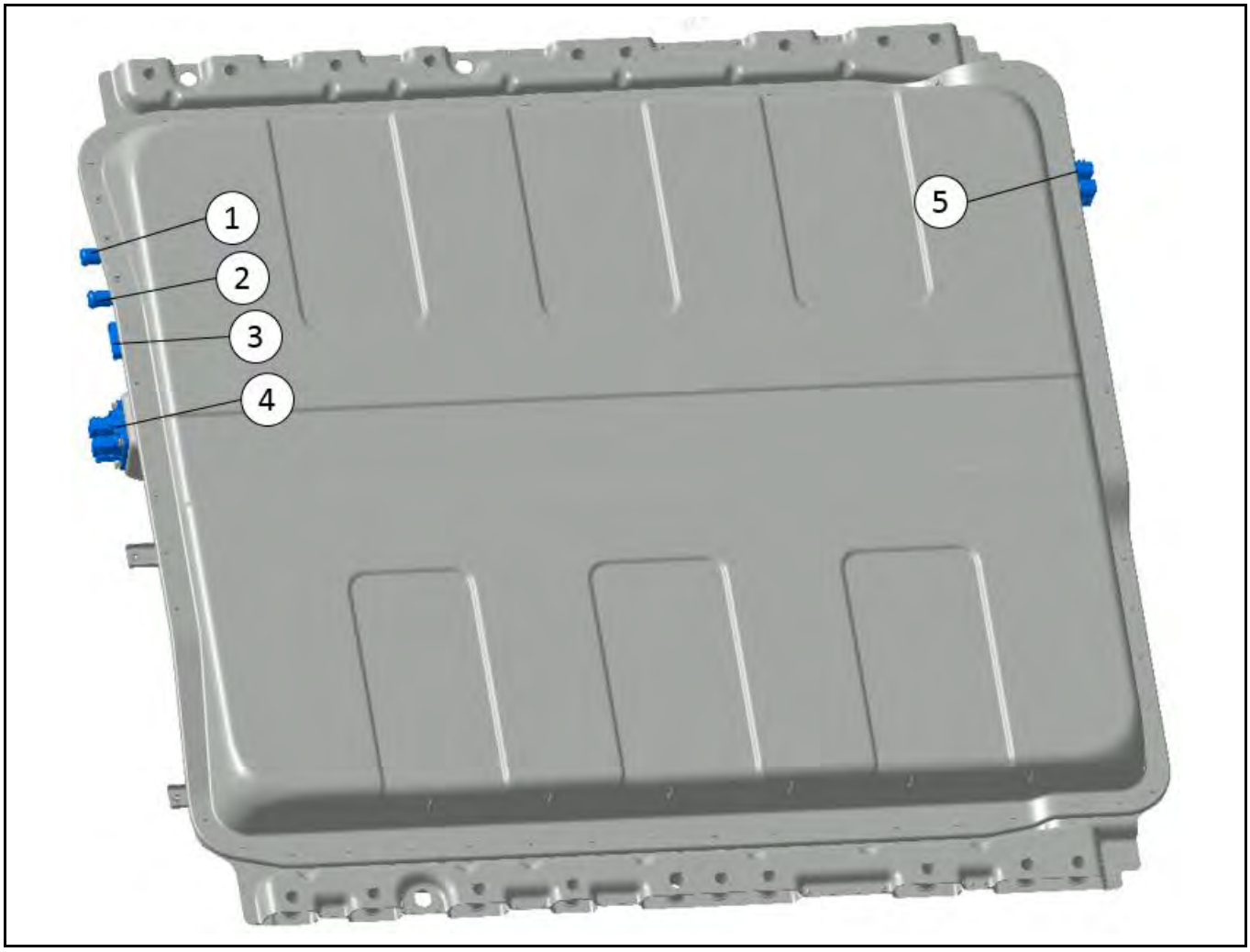
3.11.1.1 Torque specification

Name	Torque
Torque of mounting bolt between battery pack and body	69±7Nm

3.11.2 Instructions and operations

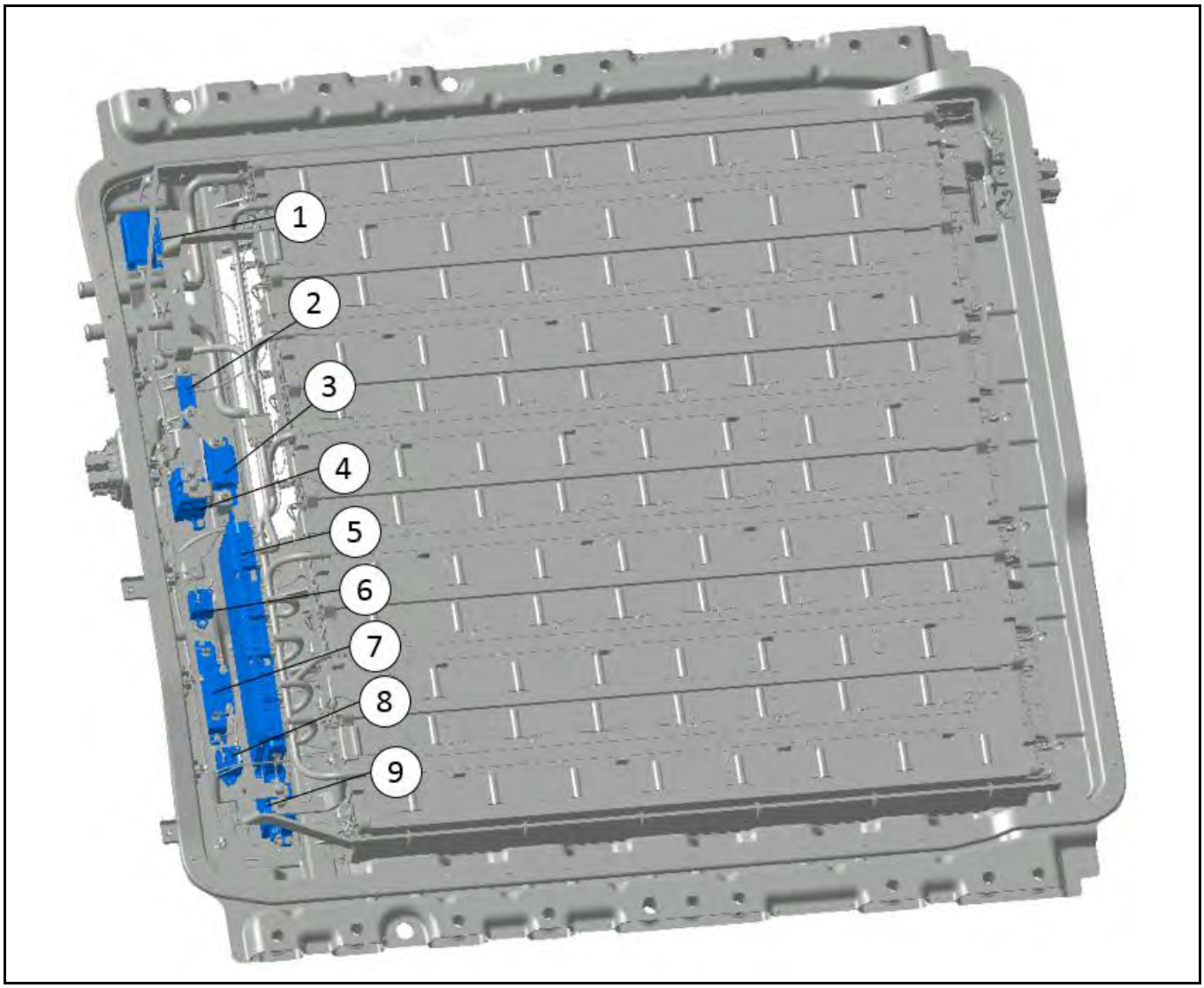
3.11.2.1 External Exploded View of Power Battery

External Interface of Power Battery Pack



Item	Description
1	Coolant inlet
2	Coolant outlet
3	Low-voltage connector
4	To PDU
5	To drive motor

Internal electrical components of the power battery pack



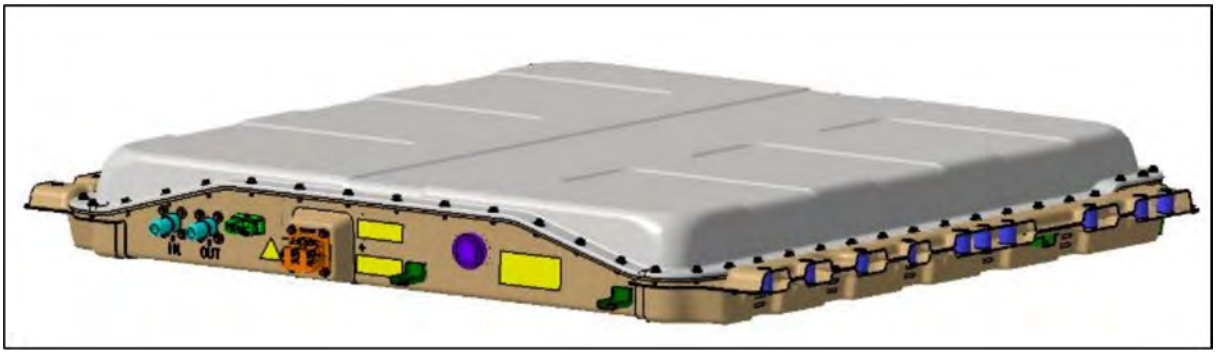
Item	Description	Item	Description
1	Smoke sensor	6	Heating relay
2	Current sensor	7	Pre-charging resistor
3	Main fuse	8	Pre-charging relay
4	Main positive relay	9	Main negative relay
5	BMS mainboard		

3.11.2.2 Overview

Power battery pack specifications

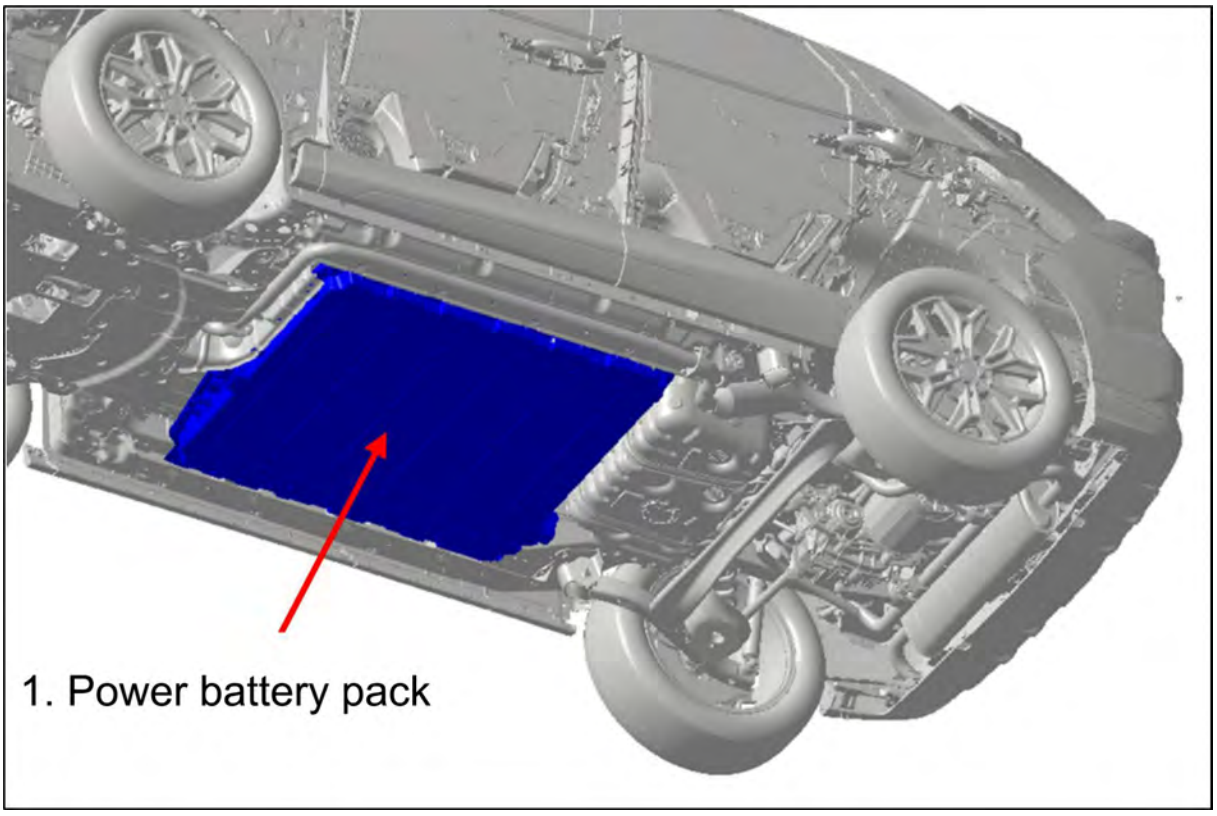
Rated voltage	307V
Insulation resistance	20MΩ

External View



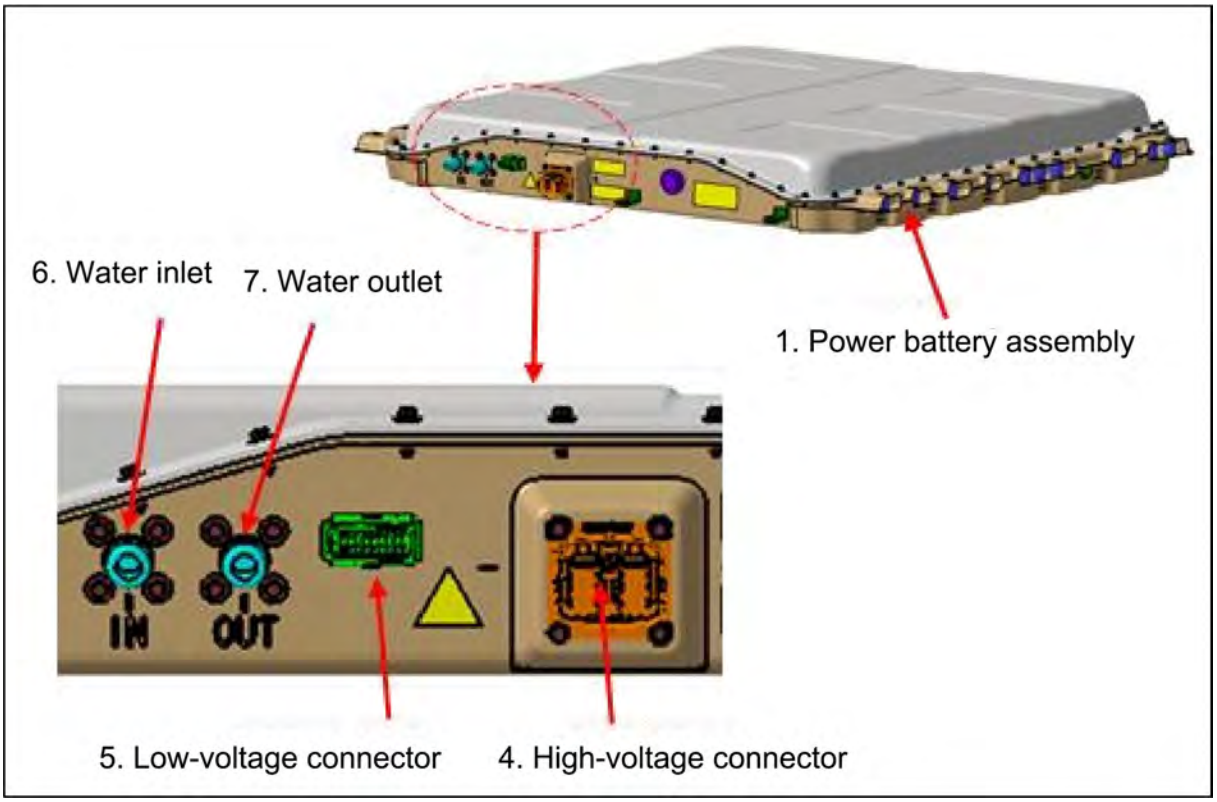
Installation position

The power battery assembly is installed at the bottom of the vehicle.

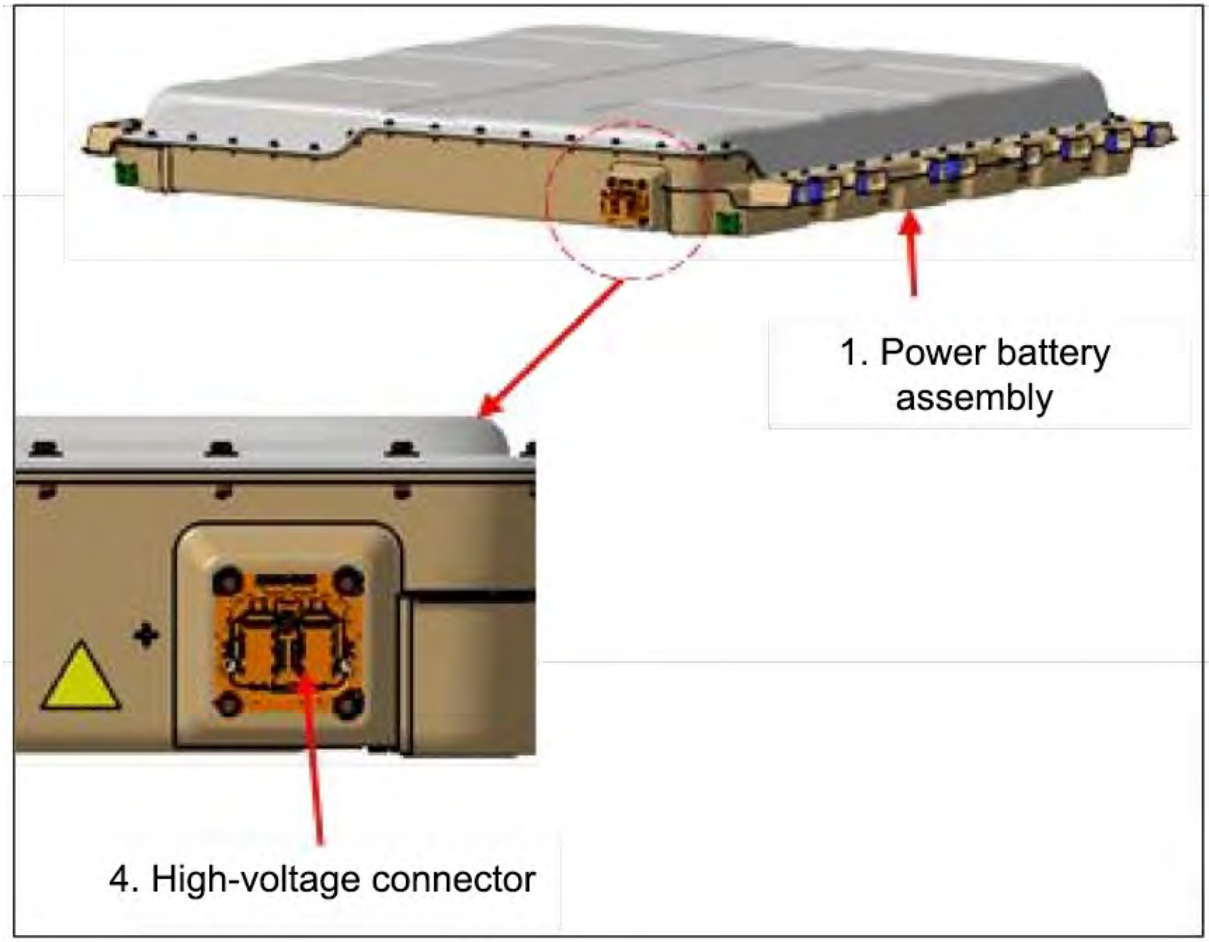


Interface position

Enlarged view of front end plate



Enlarged rear view



3.11.2.3 Precautions

Repair precautions

1. **Caution:** To prevent high-voltage electric shock, maintenance personnel must wear protective equipment.
2. **Caution:** When the power battery assembly needs to be disassembled for maintenance

   1 Turn the key to OFF position;

   2 Disconnect the negative terminal of the 12V battery in the engine compartment.
3. **Caution:** During removal, movement and storage of the power battery assembly, it is necessary to protect the water outlet, water inlet, low voltage interface, high voltage interface and other parts of the battery pack to prevent foreign objects from entering and bumping.
4. **Caution:** Do not touch exposed copper sheets and other parts and components of the power battery connector.
5. **Caution:** For the handling of a water-damaged vehicle, refer to Special precautions — handling of water-damaged vehicles for details.
6. **Caution:**The removed power battery assembly must be stored in a ventilated, dry and clean indoor environment with an ambient temperature of 10°C~28°C to avoid impact, sunlight and rain; stacking is not allowed.

Special precautions

Water-damaged vehicles

1. **Caution:** There is a risk of electric leakage and spontaneous combustion in the submerged vehicle. Non-professionals should not carry out any repairs on submerged vehicles. Contact a professional immediately to tow the vehicle out of the flooded area and place it in an open space. Keep the surrounding area within 2 metres clear of any objects to avoid safety or property losses caused by fire or explosion. At the same time, place fire extinguishers, insulation protection devices, and other equipment. Set up a warning zone, keep the area clear, and wait for professional maintenance personnel to handle the situation. Non-professionals are strictly prohibited from approaching.
2. **Caution:**Inspect and repair other system parts and components of the vehicle only after battery pack professional personnel have removed the battery pack.

Handling of vehicles with relay adhesion fault

1. **Caution:**If the main positive and negative relays inside the battery pack are stuck at the same time, after-sales personnel must wear insulation protective equipment throughout the entire maintenance stage as required for after-sales maintenance, to ensure high-voltage safety.
2. Once the battery pack with adhered main positive and negative relays is removed from the vehicle, notify professional personnel for maintenance and replacement.
3. Battery pack repair of undercharge replenishment must be conducted only after the supplier has assessed the battery pack's condition and confirmed it is safe for continuous use, followed by recharging using special equipment.

3.11.3 Diagnosis and testing

3.11.3.1 Power Battery Pack System-Diagnosis and Testing

Battery management system (BMS)

General Tools

Diagnostic scanner

Fault confirmation and clearing method

1	Drive the vehicle into the workshop	
2	Analyze the fault reported by the customer	
3	Read the DTC	
	DTC detected	Go to Step 4
	No DTC	Go to Step 5
4	Comprehensive diagnosis	
5	Perform adjustment, repair or replacement	
6	Perform confirmation test	
7	Clear the DTC	
8	End	

3.11.3.2 Power Battery Pack System-Code List (BMS)

The diagnosis in this manual requires technicians to have a certain skill level and diagnostic practical experience.

DTC	Description	Refer to
B340000	Abnormal management system of battery cell and power battery pack	Accurate Test A: B340000
B34001F	Abnormal power battery pack management system	Accurate Test B: B34001F
B340020	Abnormal main positive relay, power battery pack management system and harness in battery pack	Accurate Test C: B340020
B340025	Abnormal main negative relay, power battery pack management system and harness in battery pack	Accurate Test D: B340025
B340026	Abnormal pre-charging relay, power battery pack management system and harness in battery pack	Accurate Test E: B340026
B340005	Main positive relay, main negative relay, pre-charging relay, vehicle high-voltage wire, motor controller, power output module, A/C compressor, heating PTC and DCDC are abnormal	Accurate Test F: B340005

B34001D	Vehicle high-voltage wire, motor controller, power output module, A/C compressor, heating PTC and DCDC are abnormal	Accurate Test G: B34001D
B34001E	Abnormal charging pile and current sensor	Accurate Test H: B34001E
B340027	Abnormal motor controller, motor, power output module, DCDC, A/C compressor and heating PTC	Accurate Test I: B340027
B340028	Abnormal lead-acid battery, DCDC and BMS system	Accurate Test J: B340028
B340029	Abnormal lead-acid battery, DCDC and BMS system	Accurate Test K: B340029
B340009	Abnormal power battery pack management system	Accurate Test L: B340009
B34000A	VCM abnormal	Accurate Test M: B34000A
B34000B	VCM abnormal	Accurate Test N: B34000B
B34000C	VCM abnormal	Accurate Test O: B34000C
B34000D	VCM abnormal	Accurate Test P: B34000D
B34000E	Charging pile abnormality	Accurate Test Q: B34000E
B34000F	Charging pile abnormality	Accurate Test R: B34000F
B340010	OBC abnormal	Accurate Test S: B340010
B340011	VCM abnormal	Accurate Test T: B340011
B340031	Abnormal battery pack heating PTC	Accurate Test U: B340031
B340014	Abnormal A/C compressor, battery pack coolant pipeline and A/C solenoid valve	Accurate Test V: B340014
B340015	Abnormal fast charging port base, harness, fast charging pile and power battery pack management system	Accurate Test W: B340015
U240001	Abnormal harness, T-BOX and power battery pack management system	Accurate Test X: U240001
U240002	Abnormal harness, charging pile and power battery pack management system	Accurate Test Y: U240002
U240003	Internal harness of the power battery pack and power battery pack management system are abnormal	Accurate Test Z: U240003
U029800	Abnormal DCDC, power battery pack management system	Accurate Test AA: U029800
U011000	Abnormal MCU, power battery pack management system	Accurate Test AB: U011000

U019B00	Abnormal OBC, power battery pack management system	Accurate Test AC: U019B00
B340016	Abnormal water inlet temperature sensor, water inlet temperature acquisition line and power battery pack management system	Accurate Test AD: B340016
B340017	Abnormal water inlet temperature sensor, water inlet temperature acquisition line and power battery pack management system	Accurate Test AE: B340017
B340018	Abnormal water inlet temperature sensor, heater PTC, A/C compressor and power battery pack management system	Accurate Test AF: B340018
B340019	Abnormal water inlet temperature sensor, heater PTC, A/C compressor and power battery pack management system	Accurate Test AG: B340019
B34001A	Abnormal water outlet temperature sensor, water outlet temperature acquisition line and power battery pack management system	Accurate Test AH: B34001A
B34001B	Abnormal water outlet temperature sensor, water outlet temperature acquisition line and power battery pack management system	Accurate Test AI: B34001B
B34001C	Abnormal water outlet temperature sensor, heater PTC, A/C compressor and power battery pack management system	Accurate Test AJ: B34001C
B340100	Abnormal power battery pack and power battery pack management system	Accurate Test AK: B340100
B340130	Abnormal power battery pack and power battery pack management system	Accurate Test AL: B340130
B340102	Abnormal power battery pack and power battery pack management system	Accurate Test AM: B340102
B340103	Abnormal power battery pack and power battery pack management system	Accurate Test AN: B340103

B340104	power battery pack and power battery pack management system	Accurate Test AO: B340104
B340105	Abnormalities of MSD and power battery pack management system	Accurate Test AP: B340105
B340106	Abnormal power battery pack management system, motor, EHB and VCM	Accurate Test AQ: B340106
B340107	Abnormal external electrical equipment and current sensor	Accurate Test AR: B340107
B340109	Abnormal power battery pack management system, motor, EHB, VCM and current sensor	Accurate Test AS: B340109
B34010A	Abnormal external electrical equipment, current sensor and power battery pack management system	Accurate Test AT: B34010A
B34010B	Power battery pack, MCU, air compressor, power output module, battery pack heater, high-voltage harness, and power battery pack management system are abnormal	Accurate Test AU: B34010B
B34010C	Power battery pack, MCU, air compressor, power output module, battery pack heater, high-voltage harness, and power battery pack management system are abnormal	Accurate Test AV: B34010C
B34010E	Abnormal power battery pack, slave control of power battery pack management system and acquisition harness in the battery pack	Accurate Test AW: B34010E
B340110	Abnormal module temperature sensor, acquisition harness in battery pack and power battery pack	Accurate Test AX: B340110
B340112	Abnormal power battery pack, air compressor, A/C solenoid valve, coolant pipeline, battery heater PTC, module temperature sensor and power battery pack management system	Accurate Test BA: B340112
B340114	Abnormal main negative relay, power battery pack management system	Accurate Test BB: B340114
B340117	Abnormal high-voltage connector of battery pack, power battery pack management system and internal harness of battery pack	Accurate Test BC: B340117

B340119	Abnormal power battery pack and power battery pack management system	Accurate Test BD: B340119
B34011A	Abnormal power battery pack and power battery pack management system	Accurate Test BE: B34011A
B34011C	Abnormal power battery pack and power battery pack management system	Accurate Test BF: B34011C
B34011D	Abnormal power battery pack and power battery pack management system	Accurate Test BG: B34011D
B34011F	Power battery pack, MCU, air compressor, power output module, battery pack heater, high-voltage harness, and power battery pack management system are abnormal	Accurate Test BH: B34011F
B340120	Power battery pack, MCU, air compressor, power output module, battery pack heater, high-voltage harness, and power battery pack management system are abnormal	Accurate Test BI: B340120
B340121	Abnormal slave control of power battery pack management system, abnormal cell acquisition line and slave control acquisition line of power battery pack management system	Accurate Test BJ: B340121
B340123	Abnormal power battery pack cell, slave control of power battery pack management system	Accurate Test BK: B340123
B340124	Abnormal power battery pack module, power battery pack management system slave control and power battery pack management system slave control acquisition line	Accurate Test BL: B340124
B340125	Abnormal power battery pack module, power battery pack management system slave control and power battery pack management system slave control acquisition line	Accurate Test BM: B340125
B34012C	Abnormal power battery pack management system, motor, EHB, VCM and current sensor	Accurate Test BN: B34012C

B34012D	Abnormal external electrical equipment, current sensor and power battery pack management system	Accurate Test BO: B34012D
U240010	Abnormal slave control of power battery pack management system	Accurate Test BP: U240010
U240012	Abnormal VCM, instrument harness assembly and power battery pack management system	Accurate Test BQ: U240012
U240013	Abnormal slave control of power battery pack management system and internal harness of power battery pack	Accurate Test BR: U240013
B340200	Abnormal power battery pack and power battery pack management system	Accurate Test BS: B340200
B340219	Abnormal power battery pack and power battery pack management system	Accurate Test BT: B340219
B340136	Lead-acid battery abnormal	Accurate Test BU: B340136
B340203	Abnormal power battery pack and power battery pack management system	Accurate Test BV: B340203
B340204	Abnormal power battery pack and power battery pack management system	Accurate Test BW: B340204
B340205	Abnormal module temperature sensor, acquisition harness in battery pack and power battery pack	Accurate Test BX: B340205
B340206	Abnormal module temperature sensor, acquisition harness in battery pack and power battery pack	Accurate Test BY: B340206
B340208	Abnormal power battery pack management system, motor, EHB and VCM	Accurate Test BZ: B340208
B340209	Abnormal external electrical equipment and current sensor	Accurate Test CA: B340209
B34020B	Power battery pack, MCU, air compressor, power output module, battery pack heater, high-voltage harness, and power battery pack management system are abnormal	Accurate Test CB: B34020B

B34020C	Power battery pack, MCU, air compressor, power output module, battery pack heater, high-voltage harness, and power battery pack management system are abnormal	Accurate Test CC: B34020C
B34020D	Abnormal slave control of power battery pack management system, abnormal cell acquisition line and slave control acquisition line of power battery pack management system	Accurate Test CD: B34020D
B34020F	Abnormal power battery pack cell, slave control of power battery pack management system	Accurate Test CE: B34020F
B340210	Abnormal power battery pack module, power battery pack management system slave control and power battery pack management system slave control acquisition line	Accurate Test CF: B340210
B340211	Abnormal power battery pack module, power battery pack management system slave control and power battery pack management system slave control acquisition line	Accurate Test CG: B340211
U01220	Abnormal VCM, instrument harness assembly and power battery pack management system	Accurate Test CH: U01220
U007300	The harness where EV CAN_H and CAN_L are located, and the power battery pack management system are abnormal	Accurate Test CI: U007300
U240021	Abnormal power battery pack management system	Accurate Test CJ: U240021
B34021E	Battery pack main positive relay stuck	Accurate Test CK: B34021E
B340300	Abnormal power battery pack	Accurate Test CL: B340300
B340301	Collision fault	Accurate Test CM: B340301
B340304	Abnormal power battery pack	Accurate Test CN: B40304
B340305	Abnormal power battery pack	Accurate Test CO: B40305

3.11.3.3 Accurate Test AA: U029800

Accurate Test AA: U029800

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U029800	Communication with DCDC lost	BMS cannot receive DCDC CAN signal	DCDC communication recovery

Possible cause

– Problems with the CAN line cause communication disconnection or DCDC failure.

– Internal CAN communication circuit fault of the BMS.

Repair recommendations

– Detect whether DCDC in EV_CAN sends a CAN signal through CAN communication equipment. If the equipment detects a DCDC CAN signal, it is judged that the CAN communication circuit inside the BMS has a fault, replace the BMS;

– If the equipment cannot detect DCDC CAN signal, it can be judged that communication disconnection or DCDC fault is caused by CAN bus problem. Please check the status of CAN bus (instrument harness assembly) and DCDC (if the diagnostic scanner fails to enter DCDC diagnosis interface, it can be preliminarily judged that DCDC is abnormal).

3.11.3.4 Accurate Test AB: U011000

Accurate Test AB: U011000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U011000	MCU communication lost	BMS cannot receive MCU CAN signal	MCU communication recovery

Possible cause

– Communication disconnection or MCU fault caused by CAN bus problem.

– Internal CAN communication circuit fault of the BMS.

Repair recommendations

– Contact the battery manufacturer to replace the battery management system (BMS) or communication harness in the battery.

3.11.3.5 Accurate Test AC: U019B00

Accurate Test AC: U019B00

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U019B00	OBC communication lost	BMS master control cannot receive OBC CAN signal	OBC communication recovery

Possible cause

– Communication disconnection or OBC fault caused by CAN bus problem

– Internal CAN communication circuit fault of the BMS.

Repair recommendations

– Contact the battery manufacturer to replace the battery management system (BMS) or communication harness in the battery.

3.11.3.6 Accurate Test AD: B340016

Accurate Test AD: B340016

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340016	Water inlet temperature acquisition line open-circuited fault	Water inlet temperature acquisition line open-circuited	Normal water inlet temperature acquisition line

Possible cause

– Poor contact of water inlet temperature sensor.

– Disconnection of water inlet temperature acquisition line.

– Water inlet temperature acquisition circuit fault.

Repair recommendations

– Re-plug the water inlet temperature sensor to connect it properly.

– Check whether the pins from the water inlet temperature sensor to the battery pack connector are conductive. If not, replace the harness.

– If it is not caused by the above reasons, contact the battery factory to check whether the water inlet temperature acquisition circuit of the BMS is abnormal.

3.11.3.7 Accurate Test AE: B340017

Accurate Test AE: B340017

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340017	Water inlet temperature acquisition line short-circuited fault	Water inlet temperature acquisition line short-circuited	Normal water inlet temperature acquisition line

Possible cause

– Poor contact of water inlet temperature sensor.

– Water inlet temperature acquisition line short-circuited.

– Water inlet temperature acquisition circuit fault.

Repair recommendations

– Re-plug the water inlet temperature sensor to connect it properly.

– Check whether the pins of the connector from the water inlet temperature sensor to the battery pack are short-circuited to the body ground; if so, replace the harness.

– If it is not caused by the above, contact the battery factory to check whether the water inlet temperature acquisition circuit of the BMS is abnormal.

3.11.3.8 Accurate Test AF: B340018

Accurate Test AF: B340018

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340018	Water inlet temperature out of range fault	Water inlet temperature out of range	Water inlet temperature returns to normal

Possible cause

– The water inlet temperature is too high (>125°C) or too low (<-40°C).

– The water inlet temperature sensor is damaged.

– Water inlet temperature acquisition circuit fault.

Repair recommendations

– Check whether the water temperature at the battery pack inlet is abnormally high (>125°C) or low (<-40°C). If so, check whether the heater PTC and A/C compressor are damaged.

– Replace the original water inlet temperature sensor with a normal one (the water outlet temperature sensor without reported fault can be used). If no fault is reported at this time, it indicates that the water inlet temperature sensor is damaged and needs to be replaced.

– If it is not caused by the above reasons, contact the battery factory to check whether the water inlet temperature acquisition circuit of the BMS is abnormal.

3.11.3.9 Accurate Test AG: B340019

Accurate Test AG: B340019

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340019	Water inlet temperature too high fault	Water inlet temperature too high	Water inlet temperature returns to normal

Possible cause

– The water inlet temperature is too high (≥70°C).

– The water inlet temperature sensor is damaged.

– Water inlet temperature acquisition circuit fault.

Repair recommendations

– Check whether the water temperature at the inlet of the battery pack is abnormally high (≥70°C), and if so, check whether the heater PTC is damaged.

– Replace the original water inlet temperature sensor with a normal one (the water outlet temperature sensor without reported fault can be used). If no fault is reported at this time, it indicates that the water inlet temperature sensor is damaged and needs to be replaced.

– If it is not caused by the above reasons, contact the battery factory to check whether the water inlet temperature acquisition circuit of the BMS is abnormal.

3.11.3.10 Accurate Test AH: B34001A

Accurate Test AH: B34001A

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34001A	Water outlet temperature acquisition line open-circuited fault	Water outlet temperature acquisition line open-circuited	Normal water outlet temperature acquisition line

Possible cause

– Poor contact of water outlet temperature sensor.

– Disconnection of water outlet temperature acquisition line.

– Water outlet temperature acquisition circuit fault.

Repair recommendations

– Re-plug the water outlet temperature sensor to connect it properly.

– Check whether the pins from the water outlet temperature sensor to the battery pack connector are conductive. If not, replace the harness.

– If it is not caused by the above reasons, contact the battery factory to check whether the water outlet temperature acquisition circuit of the BMS is abnormal.

3.11.3.11 Accurate Test AI: B34001B

Accurate Test AI: B34001B

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34001B	Water outlet temperature acquisition line short-circuited fault	Water outlet temperature acquisition line short-circuited	Normal water outlet temperature acquisition line

Possible cause

– Poor contact of water outlet temperature sensor.

– Water outlet temperature acquisition line short-circuited.

– Water outlet temperature acquisition circuit fault.

Repair recommendations

– Re-plug the water outlet temperature sensor to connect it properly.

– Check whether the pins of the connector from the water outlet temperature sensor to the battery pack are short-circuited to the body GND; if so, replace the harness.

– If it is not caused by the above reasons, contact the battery factory to check whether the water outlet temperature acquisition circuit of the BMS is abnormal.

3.11.3.12 Accurate Test AJ: B34001C

Accurate Test AJ: B34001C

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34001C	Water outlet temperature out of range fault	Water outlet temperature out of range	The water outlet temperature value is normal

Possible cause

– The water outlet temperature is too high (>125°C) or too low (<-40°C).

– The water outlet temperature sensor is damaged.

– Water outlet temperature acquisition circuit fault.

Repair recommendations

– Check whether the water temperature at the battery pack water outlet is abnormally high (>125°C) or low (<-40°C). If so, check whether the heater PTC and A/C compressor are damaged.

– Replace the original water outlet temperature sensor with a normal one (the water inlet temperature sensor without reported fault can be used). If no fault is reported at this time, it indicates that the water outlet temperature sensor is damaged and needs to be replaced.

– If it is not caused by the above reasons, contact the battery factory to check whether the water outlet temperature acquisition circuit of the BMS is abnormal.

3.11.3.13 Accurate Test AK: B340100

Accurate Test AK: B340100

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340100	Cell voltage level 1 too high	Cell voltage is detected to exceed the normal operating voltage range.	Cell voltage returns to normal

Possible cause

– The battery pack is overcharged, causing the cell voltage to exceed 3.66V.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Discharge the vehicle to 90% SOC. If the fault disappears, it is battery pack overcharge; if the fault still exists after discharging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.14 Accurate Test AK: B340110

Accurate Test AX: B340110

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340110	Cell temperature level 1 too high	The cell temperature is detected to be too high, exceeding a certain range	Cell temperature returns to normal

Possible cause

– The temperature sensor installed in the cell module fails.

– Fault of temperature sensor detection circuit inside the BMS.

– Battery pack overtemperature

Repair recommendations

– Stop the vehicle, keep the driving high-voltage state, let it stand for 30 minutes under the premise that the coolant is sufficient and the cooling system can work normally, and then check whether the fault disappears. If the fault disappears, it means that the actual temperature of the battery pack is too high. After the fault disappears, the vehicle can be used normally, which is caused by the excessive temperature of the battery pack;

– If this fault occurs frequently in the future, please check whether the battery pack cooling system is effective and whether the coolant leaks.

– If the fault still exists, contact the battery manufacturer for on-site inspection and maintenance.

3.11.3.15 Accurate Test AL: B340130

Accurate Test AL: B340130

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340130	Cell voltage level 1 too low	Cell voltage is detected to exceed the normal operating voltage range.	Cell voltage returns to normal

Possible cause

– Over-discharge of battery pack.

– Cell fault.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Charge the vehicle to 10% SOC. If the fault disappears, it is battery pack over-discharge; if the fault still exists after charging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.16 Accurate Test AM: B340102

Accurate Test AM: B340102

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340102	Cell voltage level 1 difference too large	The voltage deviation between the cells is detected to exceed a certain range.	Cell voltage difference is normal

Possible cause

– Over-discharge of cells.

– The internal resistance of the cell increases.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Charge with a small current and then discharge. Repeat several times, let it stand for 30 minutes, and check again whether the fault still exists.

– The fault disappears, and it is determined that the battery cell is over-discharged and can be used normally.

– If the fault still exists, contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.17 Accurate Test AN: B340103

Accurate Test AN: B340103

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340103	Battery pack level 1 overvoltage	The battery pack voltage is detected to be higher than the operating voltage.	Cell voltage returns to normal

Possible cause

– Overcharge of battery pack.

– Fault of battery pack voltage detection circuit inside the BMS.

Repair recommendations

– Drive the vehicle to consume the power to 50%, if the voltage recovers to normal and the fault disappears, it is determined as battery overcharge, and the vehicle can be used normally; if the fault still occurs frequently after recovery, contact the battery pack manufacturer to replace the BMS on site; if the fault never disappears, proceed to step 2.

– With the vehicle in high-voltage READY state, use a diagnostic scanner to close the quick charge positive relay, wear insulating gloves and measure the voltage between the positive and negative terminals of the vehicle's fast charging port with a multimeter to confirm the actual battery pack voltage.

– If the battery pack voltage measured by the multimeter differs from the voltage displayed by the diagnostic scanner by more than 5V, the BMS is abnormal. Please contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.18 Accurate Test AO: B340104

Accurate Test AO: B340104

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340104	Battery pack level 1 undervoltage	The battery pack voltage is detected to be lower than the operating voltage.	The battery pack voltage returns to normal

Possible cause

– Over-discharge of battery pack.

– Fault of battery pack voltage detection circuit inside the BMS.

Repair recommendations

– Drive the vehicle and charge the power to 50%. If the voltage recovers to normal and the fault disappears, it is determined as battery pack over-discharge, and the vehicle can be used normally; if the fault still occurs frequently after recovery, contact the battery pack manufacturer to replace the BMS on site; if the fault never disappears, proceed to step 2.

– With the vehicle in high-voltage READY state, use a diagnostic scanner to close the quick charge positive relay, wear insulating gloves and measure the voltage between the positive and negative terminals of the vehicle's fast charging port with a multimeter to confirm the actual battery pack voltage.

– If the battery pack voltage measured by the multimeter differs from the voltage displayed by the diagnostic scanner by more than 5V, it is because the BMS is abnormal. Please contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.19 Accurate Test AP: B340105

Accurate Test AP: B340105

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340105	Abnormal total voltage of battery pack	Abnormal total voltage of battery pack	The battery pack voltage returns to normal

Possible cause

– Abnormal total voltage acquisition of battery pack.

Repair recommendations

– If the total voltage acquisition of the BMS is abnormal, it is necessary to contact the battery manufacturer to replace the BMS.

3.11.3.20 Accurate Test AQ: B340106

Accurate Test AQ: B340106

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340106	Feedback current level 1 too high	Fault of too high battery pack charging current is detected	Battery pack charging current is normal

Possible cause

– Excessive charging current during vehicle energy recovery.

– The current sensor installed in the battery pack fails.

Repair recommendations

– Check whether the motor, EHB and VCM are faulty, resulting in excessive current during energy recovery.

– If there is no abnormality in the motor, EHB, and VCM, it is determined that the current sensor is abnormal. You need to contact the battery manufacturer to replace the current sensor.

3.11.3.21 Accurate Test AR: B340107

Accurate Test AR: B340107

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340107	Instantaneous discharge current level 1 too high	Too high discharging current of battery pack is detected	Battery pack discharge current is normal

Possible cause

– Excessive discharging current

– The current sensor installed in the battery pack fails.

Repair recommendations

– Stop the vehicle, turn off all electrical equipment and power off from high voltage. After the vehicle goes into sleep mode, restart the vehicle to a high-voltage state without turning on electrical equipment (A/C and external equipment). If the fault disappears, it is determined that the discharging current of the vehicle is too large. Please confirm whether the vehicle is equipped with other electrical equipment resulting in excessive power consumption. It is not allowed to install additional high-voltage electrical equipment. The vehicle can be used normally after the fault disappears.

– If this fault still occurs frequently in the future, or the fault does not disappear, the current sensor is faulty and the battery manufacturer needs to be contacted to replace the current sensor.

3.11.3.22 Accurate Test AS: B340109

Accurate Test AS: B340109

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340109	Feedback power of battery pack too high	Battery pack energy recovery too high	Battery pack energy recovery returns to normal

Possible cause

– Excessive charging power during vehicle energy recovery.

– The current sensor installed in the battery pack fails.

– Abnormal total voltage acquisition of battery pack.

Repair recommendations

– Check whether the motor, EHB and VCM are faulty, resulting in excessive power during energy recovery.

– If there is no abnormality in the motor, EHB and VCM, contact the battery manufacturer to check the current sensor and the battery pack management system on site.

3.11.3.23 Accurate Test AT: B34010A

Accurate Test AT: B34010A

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34010A	Excessive discharging power of battery pack	Excessive discharging power of battery pack	The discharging power of battery pack returns to normal

Possible cause

– Excessive discharging power of battery pack.

– The current sensor installed inside the high-voltage distribution box is faulty.

– Abnormal total voltage acquisition of battery pack.

Repair recommendations

– Stop the vehicle, turn off all electrical equipment, power off from high voltage. After the vehicle goes into sleep mode, restart the vehicle to a high voltage state without turning on electrical equipment (A/C and external equipment), if the fault disappears, it is determined that the discharging current of the vehicle is too large, please confirm whether the vehicle is equipped with other electrical equipment resulting in excessive power consumption. It is not allowed to install additional high-voltage electrical equipment. The vehicle can be used normally after the fault disappears.

– If this fault occurs frequently in subsequent uses or does not disappear, contact the battery manufacturer to check the current sensor and battery pack management system on site.

3.11.3.24 Accurate Test AU: B34010B

Accurate Test AU: B34010B

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34010B	Positive insulation resistance level 1 leakage	The insulation resistance between high-voltage (+) and body GND is too low.	Insulation returns to normal

Possible cause

– Low vehicle insulation

– Low battery pack insulation

– Fault of insulation resistance detection circuit of the BMS.

Repair recommendations

– Disconnect the high-voltage harness connecting the battery pack to the vehicle, and measure the insulation resistance of the vehicle's positive pole with a megohmmeter. If the detected insulation resistance value is less than 300KΩ (less than 100KΩ during quick charge), it is determined that the insulation of the whole vehicle is low, please detect which high-voltage device of the vehicle fails according to the insulation resistance detection step in the technical requirements for assembling of OBC/MCU/A/C compressor/battery pack heater/high-voltage harness, and replace the faulty part after identifying.

– If the measured normal insulation resistance value is large enough (>500KΩ, fast charging >150KΩ), it can be determined that the battery pack has low insulation or the BMS is abnormal. In this case, contact the battery manufacturer for on-site inspection and maintenance.

3.11.3.25 Accurate Test AV: B34010C

Accurate Test AV: B34010C

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34010C	Negative insulation resistance level 1 leakage	Excessively low insulation resistance is detected between high-voltage (-) and body GND.	Insulation returns to normal

Possible cause

– Low vehicle insulation

– Low battery pack insulation

– Fault of insulation resistance detection circuit of the BMS.

Repair recommendations

– Disconnect the high-voltage harness connecting the battery pack to the vehicle, and measure the insulation resistance of the vehicle's positive pole with a megohmmeter. If the detected insulation resistance value is less than 300KΩ (less than 100KΩ during quick charge), it is determined that the insulation of the whole vehicle is low, please detect which high-voltage device of the vehicle fails according to the insulation resistance detection step in the technical requirements for assembling of OBC/MCU/A/C compressor/battery pack heater/high-voltage harness, and replace the faulty part after identifying.

– If the measured normal insulation resistance value is large enough (>500KΩ, fast charging >150KΩ), it can be determined that the battery pack has low insulation or the BMS is abnormal. In this case, contact the battery manufacturer for on-site inspection and maintenance.

3.11.3.26 Accurate Test AW: B34010E

Accurate Test AW: B34010E

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34010E	SOC too low	The battery pack SOC is detected to be too low.	SOC returns to normal

Possible cause

– Overdischarging of battery pack

– Abnormal voltage of slave control acquisition cell

– Battery pack fault

Repair recommendations

– Charge for a period of time to increase the battery pack SOC to 50%. If the fault disappears, it is determined that the battery pack is over-discharged. After the fault disappears, the vehicle can be used normally. If this fault occurs frequently, remove the battery pack and contact the battery manufacturer for on-site inspection and maintenance.

– If the fault remains, remove the battery pack and use a multimeter to measure the voltage between the high-voltage positive and negative terminals. Confirm the actual battery pack voltage.

– If the voltage is abnormal (the difference between the measured voltage and the total voltage reported by BMS is more than 5V), it can be determined that the battery pack fault or the cell voltage acquisition is abnormal. In this case, contact the battery manufacturer for on-site inspection and maintenance.

3.11.3.27 Accurate Test A: B340000

Accurate Test A: B340000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340000	SOC jump	Excessive SOC jump	No SOC jump

Possible cause

– Poor cell consistency

– Abnormal BMS

Repair recommendations

– After the vehicle has been powered off and left stationary for 1h, power it on, read the maximum and minimum cell voltages of the battery pack with a diagnostic scanner, and judge whether the difference between them is ≥ 200mv, if so, it means that the cell consistency becomes poor, and contact the battery manufacturer for maintenance; if not, please give feedback to the vehicle factory for further troubleshooting.

3.11.3.28 Accurate Test BA: B340112

Accurate Test BA: B340112

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340112	Cell level 1 temperature difference too large	Excessive temperature difference between battery cells is detected	Cell temperature difference returns to normal

Possible cause

– The temperature sensor installed in the cell module fails.

– Fault of temperature sensor detection circuit inside the BMS.

– The actual temperature difference of the battery pack cell is large.

Repair recommendations

– Under room temperature, park the vehicle for 24 hours in a sleep state. After 24 hours, restart the vehicle. If the fault disappears and the vehicle can be used normally, it is determined that there is an excessive actual temperature difference between battery cells. The possible causes are as follows:

– ①Coolant leakage, resulting in insufficient coolant which leads to poor cooling effect;

– ② The cooler solenoid valve is abnormal, and the coolant in the passenger compartment cooling circuit leaks into the battery pack cooling circuit. At this time, the coolant pump of the battery pack cooling circuit is not driven, and the coolant cannot cool the upper modules of the battery pack, which results in a large temperature difference between the upper modules and the lower modules of the battery pack, thus the cell temperature difference warning is reported.

– If the fault still exists, contact the battery manufacturer for on-site inspection and maintenance.

3.11.3.29 Accurate Test BB: B340114

Accurate Test BB: B340114

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340114	Negative contactor adhesion	Negative relay adhesion	No negative relay adhesion

Possible cause

– Main negative relay high-voltage contact adhesion

– BMS fault

Repair recommendations

– Shut down the vehicle, wear insulating gloves and pull out the high-voltage connector of battery pack.

– Power on the vehicle, close the main positive relay with a diagnostic scanner (if the positive pole contactor adhesion and negative pole contactor adhesion exist at the same time, there is no need to use a diagnostic scanner), and then measure the voltage between the positive pole and negative pole of the battery pack with a multimeter. If the detected voltage is > 300V, the main negative relay is adhered. In this case, contact the battery manufacturer to replace the main negative relay on site.

– If there is no adhesion in the main negative relay, the BMS detection is abnormal. In this case, contact the battery manufacturer for inspection, maintenance and replacement of the BMS on site.

3.11.3.30 Accurate Test BC: B340117

Accurate Test BC: B340117

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340117	High-voltage interlocking disconnection fault at high-voltage connector	Battery pack high-voltage interlock disconnected	Battery pack high-voltage interlock connected

Possible cause

– Battery pack high-voltage connector fault

– Interlock circuit fault of high-voltage connector unit in BMS

Repair recommendations

– Replace the high-voltage connector of the battery pack, and restart the vehicle after it sleeps. If the fault disappears, it is determined that the high-voltage connector of the battery pack fails; if the fault does not disappear, the cause of the fault is a fault in the interlocking circuit of the high-voltage connector in the BMS. Contact the battery pack factory to go to the site for maintenance (suspected faulty parts in the battery pack: BMS harness assembly, BMS main control board).

3.11.3.31 Accurate Test BD: B340119

Accurate Test BD: B340119

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340119	Cell voltage level-2 too high	Cell voltage is detected to exceed the normal operating voltage range.	The cell voltage returns to normal

Possible cause

– The battery pack is overcharged, and the cell voltage exceeds 3.70V.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Discharge the vehicle to 90% SOC. If the fault disappears, the battery pack is overcharged; if the fault still exists after discharging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.32 Accurate Test BE: B34011A

Accurate Test BE: B34011A

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34011A	Cell voltage level-2 too low	Cell voltage is detected to be below the normal operating voltage range.	The cell voltage returns to normal

Possible cause

– Over-discharge of battery pack.

– Cell fault.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Charge the vehicle to 10% SOC. If the fault disappears, it is battery pack over-discharge; if the fault still exists after charging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.33 Accurate Test BF: B34011C

Accurate Test BF: B34011C

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34011C	Battery pack level 2 overvoltage	The battery pack voltage is detected to be higher than the operating voltage.	The battery pack voltage returns to normal

Possible cause

– Overcharge of battery pack.

– Battery pack fault

– Fault of battery pack voltage detection circuit inside the BMS.

Repair recommendations

– Drive the vehicle to consume the power to 50%, if the voltage recovers to normal and the fault disappears, it is determined as battery pack overcharge, and the vehicle can be used normally; if the fault still occurs frequently after recovery, contact the battery pack manufacturer to replace the BMS on site; if the fault never disappears, proceed to step 2.

– With the vehicle in high-voltage READY state, use a diagnostic scanner to close the quick charge positive relay, wear insulating gloves and measure the voltage between the positive and negative terminals of the vehicle's fast charging port with a multimeter to confirm the actual battery pack voltage.

– If the difference between the battery pack voltage measured by a multimeter and the voltage displayed on the instrument is more than 5V, the battery pack is faulty, please contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.34 Accurate Test BG: B34011D

Accurate Test BG: B34011D

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34011D	Battery pack level 2 undervoltage	The battery pack voltage is detected to be lower than the operating voltage.	The battery pack voltage returns to normal

Possible cause

– Over-discharge of battery pack.

– Battery pack fault

– Fault of battery pack voltage detection circuit inside the BMS.

Repair recommendations

– Drive the vehicle and charge the power to 50%. If the voltage recovers to normal and the fault disappears, it is determined as battery pack over-discharge, and the vehicle can be used normally; if the fault still occurs frequently after recovery, contact the battery pack manufacturer to replace the BMS on site; if the fault never disappears, proceed to step 2.

– With the vehicle in high-voltage READY state, use a diagnostic scanner to close the quick charge positive relay, wear insulating gloves and measure the voltage between the positive and negative terminals of the vehicle's fast charging port with a multimeter to confirm the actual battery pack voltage.

– If the difference between the battery pack voltage measured by a multimeter and the voltage displayed on the instrument is more than 5V, the battery pack is faulty, please contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.35 Accurate Test BH: B34011F

Accurate Test BH: B34011F

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34011F	Positive insulation resistance level 2 leakage	The insulation resistance between high-voltage (+) and body GND is too low.	Insulation returns to normal

Possible cause

– Low vehicle insulation

– Low battery pack insulation

– Fault of insulation resistance detection circuit of the BMS.

Repair recommendations

– Disconnect the high-voltage harness connecting the battery pack to the vehicle, and measure the insulation resistance of the vehicle's positive pole with a megohmmeter. If the detected insulation resistance value is less than 250KΩ (less than 60kΩ during quick charge), it is determined that the insulation of the vehicle is low, please detect which high-voltage device of the vehicle fails according to the insulation resistance detection step in the technical requirements for assembling of OBC/MCU/A/C compressor/battery pack heater/high-voltage harness, and replace the faulty parts and components after identifying.

– If the normal insulation resistance value measured is large enough (>500KΩ, >80kΩ during fast charging), it is determined that the battery pack insulation is low or the BMS is abnormal. In this case, contact the battery manufacturer to go to the site for inspection and repair.

3.11.3.36 Accurate Test BI: B340120

Accurate Test BI: B340120

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340120	Negative insulation resistance level 2 leakage	The insulation resistance between high-voltage (-) and body GND is too low.	Insulation returns to normal

Possible cause

– Low vehicle insulation

– Low battery pack insulation

– Fault of insulation resistance detection circuit of the BMS.

Repair recommendations

– Disconnect the high-voltage harness connecting the battery pack to the vehicle, and measure the insulation resistance of the vehicle's negative pole with a megohmmeter. If the detected insulation resistance value is less than 250 KΩ (less than 60 kΩ during quick charge), it is determined that the vehicle insulation is low. Please detect which high-voltage device of the vehicle fails according to the insulation resistance detection step in the technical requirements for assembling of OBC/MCU/A/C compressor/battery pack heater/high-voltage harness, and replace the faulty parts and components after identifying.

– If the normal insulation resistance value measured is large enough (>500KΩ, >80kΩ during fast charging), it is determined that the battery pack insulation is low or the BMS is abnormal. In this case, contact the battery manufacturer to go to the site for inspection and repair.

3.11.3.37 Accurate Test BJ: B340121

Accurate Test BJ: B340121

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340121	Slave control voltage acquisition line open-circuited	Slave control voltage acquisition line open-circuited	Slave control voltage acquisition line normal

Possible cause

– Poor connection of slave control acquisition harness.

– Open circuit of cell voltage acquisition line.

– Fault of slave control voltage acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

3.11.3.38 Accurate Test BK: B340123

Accurate Test BK: B340123

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340123	Slave control voltage value out of range	Slave control voltage value out of range	Slave control voltage returns to normal

Possible cause

– Cell voltage out of range, < 1V or > 4.5V.

– Fault of slave control voltage acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

3.11.3.39 Accurate Test BL: B340124

Accurate Test BL: B340124

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340124	Slave control temperature acquisition line open-circuited	Slave control temperature acquisition line open-circuited	Slave control temperature acquisition line normal

Possible cause

– Poor contact of the temperature sensor on the module.

– Open circuit of module temperature acquisition line.

– Fault of slave control temperature acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

3.11.3.40 Accurate Test BM: B340125

Accurate Test BM: B340125

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340125	Slave control temperature acquisition line short-circuited	Slave controller temperature acquisition line short-circuited	Slave control temperature acquisition line normal

Possible cause

– Poor contact of the temperature sensor on the module.

– Short circuit of module temperature acquisition line.

– Fault of slave control temperature acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

3.11.3.41 Accurate Test BN: B34012C

Accurate Test BN: B34012C

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34012C	Feedback current level-2 too high	Too high charging current of battery pack is detected	Battery pack charging current is normal

Possible cause

– Excessive charging current during vehicle energy recovery.

– The current sensor installed in the battery pack fails.

Repair recommendations

– Check whether the motor, EHB and VCM are faulty, resulting in excessive current during energy recovery.

– If there is no abnormality in the motor, EHB, and VCM, it is determined that the current sensor is faulty. Please contact the battery manufacturer to repair and replace the current sensor.

3.11.3.42 Accurate Test BO: B34012D

Accurate Test BO: B34012D

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34012D	Instantaneous discharge current level 2 too high	Fault of too high battery pack discharging current is detected.	Battery pack discharge current is normal

Possible cause

– The discharging current of battery pack is too high.

– The current sensor installed in the battery pack fails.

Repair recommendations

– Stop the vehicle, turn off all electrical equipment, power off from high voltage. After the vehicle goes into sleep mode, restart the vehicle to a high voltage state without turning on electrical equipment (A/C and external equipment), if the fault disappears, it is determined that the discharging current of the vehicle is too large, please confirm whether the vehicle is equipped with other electrical equipment resulting in excessive power consumption. It is not allowed to install additional high-voltage electrical equipment. The vehicle can be used normally after the fault disappears.

– If this fault still occurs frequently in the future, or the fault has not disappeared, it is determined to be a current sensor fault. Please contact the battery manufacturer for repair and replacement of the current sensor.

3.11.3.43 Accurate Test BP: U240010

Accurate Test BP: U240010

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U240010	Loss of communication with high-voltage acquisition module	BMS high-voltage module communication lost	BMS high-voltage module resumes communication

Possible cause

– BMS high-voltage module communication lost

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

3.11.3.44 Accurate Test BQ: U240012

Accurate Test BQ: U240012

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U240012	VCM communication lost	BMS cannot receive VCM CAN signal	BMS receives VCM CAN signal

Possible cause

– Communication disconnection or VCM fault caused by CAN bus problem.

– Internal CAN communication circuit fault of the BMS.

Repair recommendations

– Detect whether VCM in EV_CAN sends a CAN signal through CAN communication equipment. If the equipment detects a VCM CAN signal, it is judged that the CAN communication circuit inside the BMS fails and the BMS shall be replaced.

– If the equipment fails to detect the VCM CAN signal, it is judged that communication disconnection or VCM fault is caused by the CAN bus problem. Please check the communication CAN bus (instrument harness assembly) between VCM and BMS and the status of VCM (if the diagnostic scanner cannot enter the VCM diagnosis interface, it can be preliminarily judged that VCM is abnormal).

3.11.3.45 Accurate Test BR: U240013

Accurate Test BR: U240013

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U240013	BMS cannot receive the CAN signal from the slave controller.	BMS cannot receive the CAN signal from the slave controller.	BMS receives CAN signal from slave controller

Possible cause

– Disconnection of CAN bus leads to communication disconnection.

– Slave controller fault of battery pack management system.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

3.11.3.46 Accurate Test BS: B340200

Accurate Test BS: B340200

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340200	Cell voltage level-2 too high	Cell voltage is detected to exceed the normal operating voltage range.	Cell voltage returns to normal

Possible cause

– The battery pack is overcharged, and the cell voltage exceeds 3.74V.

– Cell fault.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Discharge the vehicle to 90% SOC. If the fault disappears, the battery pack is overcharged; if the fault still exists after discharging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.47 Accurate Test BT: B340219

Accurate Test BT: B340219

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340219	Cell voltage level-2 too low	Cell voltage is detected to be below the normal operating voltage range.	The cell voltage returns to normal

Possible cause

– Over-discharge of battery pack.

– Cell fault.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Charge the vehicle to 10% SOC. If the fault disappears, it is battery pack over-discharge; if the fault still exists after charging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.48 Accurate Test BU: B340136

Accurate Test BU: B340136

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340136	Lead-acid battery undervoltage - LV2	BMS detects that the lead-acid battery voltage is too low	The lead-acid battery voltage returns to normal

Possible cause

– Lead-acid battery undervoltage.

– The battery voltage detection circuit of the BMS fails.

Repair recommendations

– After the vehicle is powered off from high voltage, use a multimeter to detect the lead-acid battery voltage. If it is lower than 11V, it is determined as lead-acid battery undervoltage; if not, it is determined that the BMS is abnormal, and the battery manufacturer should be contacted for on-site inspection and repair.

3.11.3.49 Accurate Test BV: B340203

Accurate Test BV: B340203

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340203	Battery pack level 2 overvoltage	The battery pack voltage is detected to be higher than the operating voltage.	The battery pack voltage returns to normal

Possible cause

– Overcharge of battery pack.

– Fault of battery pack voltage detection circuit inside the BMS.

Repair recommendations

– Drive the vehicle to consume the power to 50%, if the voltage recovers to normal and the fault disappears, it is determined as battery pack overcharge, and the vehicle can be used normally; if the fault still occurs frequently after recovery, contact the battery pack manufacturer to replace the BMS on site; if the fault never disappears, proceed to step 2.

– With the vehicle in high-voltage READY state, use a diagnostic scanner to close the quick charge positive relay, wear insulating gloves and measure the voltage between the positive and negative terminals of the vehicle’s fast charging port with a multimeter to confirm the actual battery pack voltage.

– If the difference between the battery pack voltage measured by a multimeter and the voltage displayed on the instrument is more than 5V, the BMS is abnormal, please contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.50 Accurate Test BW: B340204

Accurate Test BW: B340204

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340204	Battery pack level 2 undervoltage	The battery pack voltage is detected to be lower than the operating voltage.	The battery pack voltage returns to normal

Possible cause

– Over-discharge of battery pack.

– Fault of battery pack voltage detection circuit inside the BMS.

Repair recommendations

– Drive the vehicle and charge the power to 50%. If the voltage recovers to normal and the fault disappears, it is determined as battery pack over-discharge, and the vehicle can be used normally; if the fault still occurs frequently after recovery, contact the battery pack manufacturer to replace the BMS on site; if the fault never disappears, proceed to step 2.

– When the vehicle is in an high-voltage READY state, close the quick charge positive relay with a diagnostic scanner, wear insulating gloves, measure the voltage between the positive pole and negative pole of the vehicle's fast charging port with a multimeter, and confirm the actual battery pack voltage;

– If the difference between the battery pack voltage measured by a multimeter and the voltage displayed on the instrument is more than 5V, the BMS is abnormal, please contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.51 Accurate Test BX: B340205

Accurate Test BX: B340205

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340205	Cell temperature level-2 too high	The cell temperature is detected to be too high, exceeding a certain range	Cell temperature is normal

Possible cause

– The temperature sensor installed in the cell module fails.

– Fault of temperature sensor detection circuit inside the BMS.

– Battery pack overtemperature

Repair recommendations

– Stop the vehicle, drive it in a high-voltage state, let it stand for 30 minutes under the premise that the coolant is sufficient and the cooling system can work normally, and then check whether the fault disappears. If the fault disappears, it means that the actual temperature of the battery pack is too high. After the fault disappears, the vehicle can be used normally, which is caused by the excessive temperature of the battery pack.

– If this fault occurs frequently in the future, please check whether the battery pack cooling system is effective and whether the coolant leaks.

– If the fault still exists, contact the battery manufacturer for on-site inspection and maintenance.

3.11.3.52 Accurate Test BY: B340206

Accurate Test BY: B340206

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340206	Cell temperature level-2 too low	Cell temperature is detected to be too low, exceeding a certain range.	Cell temperature is normal

Possible cause

– Battery heater PTC fault.

– The temperature sensor installed in the cell module fails.

– Fault of temperature sensor detection circuit inside the BMS.

Repair recommendations

– Stop the vehicle in a high-voltage READY state. When there is sufficient coolant, check whether the battery heater PTC works normally. If not, replace the battery heater PTC, and then check whether the fault disappears. If the fault disappears, it is caused by the battery heater PTC failure, and the vehicle can be used normally later; If there is no abnormality in the heater and the fault does not disappear, contact the battery manufacturer for inspection and maintenance on-site.

3.11.3.53 Accurate Test BZ: B340208

Accurate Test BZ: B340208

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340208	Feedback current level-2 too high	Too high charging current of battery pack is detected	Battery pack charging current is normal

Possible cause

– Excessive charging current during vehicle energy recovery.

– The current sensor installed in the battery pack fails.

Repair recommendations

– Check whether the motor, EHB and VCM are faulty, resulting in excessive current during energy recovery.

– If there is no abnormality in the motor, EHB, and VCM, it is determined that the cause is a current sensor fault. Contact the battery manufacturer to replace the current sensor on site.

3.11.3.54 Accurate Test B: B34001F

Accurate Test B: B34001F

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34001F	SOH degradation	Battery capacity attenuation	Battery capacity returns to normal

Possible cause

– Battery capacity attenuation

Repair recommendations

– Handle according to warranty terms.

3.11.3.55 Accurate Test CA: B340209

Accurate Test CA: B340209

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340209	Instantaneous discharge current level 2 too high	Too high discharging current of battery pack is detected	Battery pack discharge current is normal

Possible cause

– Excessive discharging current

– The current sensor installed in the battery pack fails.

Repair recommendations

– Stop the vehicle, turn off all electrical equipment, power off from high voltage. After the vehicle goes into sleep mode, restart the vehicle to a high voltage state without turning on electrical equipment (A/C and external equipment), if the fault disappears, it is determined that the discharging current of the vehicle is too large, please confirm whether the vehicle is equipped with other electrical equipment resulting in excessive power consumption. It is not allowed to install additional high-voltage electrical equipment. The vehicle can be used normally after the fault disappears.

– If this fault still occurs frequently in the future, or the fault does not disappear, it is determined to be a current sensor fault. In this case, contact the battery manufacturer to check and replace the current sensor on site.

3.11.3.56 Accurate Test CB: B34020B

Accurate Test CB: B34020B

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34020B	Positive insulation resistance level 2 leakage	The insulation resistance between high-voltage (+) and body GND is too low.	Insulation returns to normal

Possible cause

– Low vehicle insulation

– Low battery pack insulation

– Fault of insulation resistance detection circuit of the BMS.

Repair recommendations

– Disconnect the high-voltage harness connecting the battery pack to the vehicle, and measure the insulation resistance of the vehicle's positive pole with a megohmmeter. If the detected insulation resistance value is less than 250KΩ (less than 60kΩ during quick charge), it is determined that the vehicle insulation is low. Please detect which high-voltage device of the vehicle fails according to the insulation resistance detection step in the technical requirements for assembling of OBC/MCU/A/C compressor/battery pack heater/high-voltage harness, and replace the faulty parts and components after identifying.

– If the measured normal insulation resistance value is large enough (>500KΩ, fast charging >80KΩ), it can be determined that the battery pack has low insulation or the BMS is abnormal. In this case, contact the battery manufacturer for on-site inspection and maintenance.

3.11.3.57 Accurate Test CC: B34020C

Accurate Test CC: B34020C

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34020C	Negative insulation resistance level 2 leakage	Excessively low insulation resistance is detected between high-voltage (-) and body GND.	Insulation returns to normal

Possible cause

– Low vehicle insulation

– Low battery pack insulation

– Fault of insulation resistance detection circuit of the BMS.

Repair recommendations

– Disconnect the high-voltage harness connecting the battery pack to the vehicle, and measure the insulation resistance of the vehicle's negative pole with a megohmmeter. If the detected insulation resistance value is less than 250KΩ (less than 60kΩ during quick charge), it is determined that the insulation of the vehicle is low, please detect which high-voltage device of the vehicle fails according to the insulation resistance detection step in the technical requirements for assembling of OBC/ MCU/A/C compressor/battery pack heater/high-voltage harness, and replace the faulty parts and components after identifying.

– If the measured normal insulation resistance value is large enough (>500KΩ, fast charging >80KΩ), it can be determined that the battery pack has low insulation or the BMS is abnormal. In this case, contact the battery manufacturer for on-site inspection and maintenance.

3.11.3.58 Accurate Test CD: B34020D

Accurate Test CD: B34020D

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34020D	Slave control voltage acquisition line open-circuited	Slave control voltage acquisition line open-circuited	Slave control voltage acquisition line normal

Possible cause

– Poor connection of slave control acquisition harness.

– Open circuit of cell voltage acquisition line.

– Fault of slave control voltage acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

3.11.3.59 Accurate Test CE: B34020F

Accurate Test CE: B34020F

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34020F	Slave control voltage value out of range	Slave control voltage value out of range	Slave control voltage value range is normal

Possible cause

– Cell voltage out of range, < 1V or > 4.5V.

– Fault of slave control voltage acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

3.11.3.60 Accurate Test CF: B340210

Accurate Test CF: B340210

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340210	Slave control temperature acquisition line open-circuited	Slave control temperature acquisition line open-circuited	Slave control temperature acquisition line normal

Possible cause

– Poor contact of the temperature sensor on the module.

– Open circuit of module temperature acquisition line.

– Fault of slave control temperature acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

3.11.3.61 Accurate Test CG: B340211

Accurate Test CG: B340211

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340211	Slave control temperature acquisition line short-circuited	Slave controller temperature acquisition line short-circuited	Slave control temperature acquisition line normal

Possible cause

– Poor contact of the temperature sensor on the module.

– Short circuit of module temperature acquisition line.

– Fault of slave control temperature acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

3.11.3.62 Accurate Test CH: U01220

Accurate Test CH: U01220

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U01220	VCM communication lost	BMS cannot receive VCM CAN signal	BMS receives VCM CAN signal

Possible cause

– Communication disconnection or VCM fault caused by CAN bus problem.

– Internal CAN communication circuit fault of the BMS.

Repair recommendations

– Detect whether VCM in EV_CAN sends a CAN signal through CAN communication equipment. If the equipment detects a VCM CAN signal, it is judged that the CAN communication circuit inside the BMS fails and the BMS shall be replaced.

– If the equipment fails to detect the VCM CAN signal, it is judged that communication disconnection or VCM fault is caused by the CAN bus problem. Please check the communication CAN bus (instrument harness assembly) between VCM and BMS and the status of VCM (if the diagnostic scanner cannot enter the VCM diagnosis interface, it can be preliminarily judged that VCM is abnormal).

3.11.3.63 Accurate Test CI: U007300

Accurate Test CI: U007300

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U007300	EVCAN BusOff fault	BMS cannot receive all signals on EV CAN.	BMS receives all EV CAN signals

Possible cause

– Communication disconnection or CAN_H and CAN_L short-circuited to each other due to CAN bus issues.

– The current sensor in the CAN communication circuit inside the BMS is faulty.

Repair recommendations

– Detect whether the EV_CAN sends a CAN signal through CAN communication equipment. If the equipment detects an EV CAN signal, it is judged that the CAN communication circuit inside the BMS has a fault and the BMS shall be replaced.

– If the equipment fails to detect the EV CAN signal, it is judged that there is a CAN line problem, causing a communication disconnection or EV CAN_H and EV CAN_L are short-circuited with each other. Please check whether the communication CAN line between EV CAN and BMS has an open or short-circuited fault.

3.11.3.64 Accurate Test CJ: U240021

Accurate Test CJ: U240021

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U240021	Loss of communication with high-voltage acquisition module	BMS high-voltage module communication lost	BMS high-voltage module communication is normal

Possible cause

– BMS high-voltage module communication lost

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance and replacement of the BMS master control.

3.11.3.65 Accurate Test CK: B34021E

Accurate Test CK: B34021E

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34021E	Main positive relay stuck fault	The main positive relay in the battery pack is detected to be stuck	The main positive relay of the battery pack is not stuck

Possible cause

– Main positive relay high-voltage contact adhesion.

– BMS fault

Repair recommendations

– Shut down the vehicle, wear insulating gloves and pull out the high-voltage connector of battery pack.

– Power on the vehicle, close the main negative relay with a diagnostic scanner (if the positive pole contactor adhesion and negative pole contactor adhesion exist at the same time, there is no need to use a diagnostic scanner), and then measure the voltage between the positive pole and negative pole of the battery pack with a multimeter. If the detected voltage is > 300V, the main positive relay is adhered. In this case, contact the battery manufacturer to replace the main positive relay on site.

– If there is no adhesion in the main positive relay, the BMS detection is abnormal. In this case, contact the battery manufacturer for inspection, maintenance and replacement of the BMS on site.

3.11.3.66 Accurate Test CL: B340300

Accurate Test CL: B340300

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340300	Thermal runaway fault	Thermal runaway	Unrecoverable, manual clear

Possible cause

– Battery overheating.

– The battery is severely extruded or impacted.

Repair recommendations

– Directly move the vehicle to an open area for isolation, and notify professionals to handle it.

3.11.3.67 Accurate Test CM: B340301

Accurate Test CM: B340301

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340301	The collision signal is valid	The fault diagnosis occurs when the BMS receives collision signals as airbag operation is detected.	Sleep power-off

Possible cause

– The vehicle has a collision fault.

Repair recommendations

– 1) Confirm whether the vehicle has a collision. If yes, check whether the appearance and function of the battery pack are normal, and contact the battery manufacturer for status evaluation.

– 2) If no collision has occurred, check to confirm whether the airbag has returned to normal. Once normal, use the diagnostic scanner to clear the current fault in the BMS. After clearing, the system can be restarted and used as normal.

3.11.3.68 Accurate Test CN: B40304

Accurate Test CN: B40304

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B40304	Autonomous high-voltage power-off fault due to cell overvoltage	Cell voltage is detected to exceed the normal operating voltage range.	The cell voltage returns to normal

Possible cause

– Cell fault.

– The battery pack is overcharged, and the cell voltage exceeds 3.76V.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Discharge the vehicle to SOC 90%, if the fault disappears, it is cell fault; if the fault still exists after discharging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.69 Accurate Test CO: B40305

Accurate Test CO: B40305

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B40305	Autonomous high-voltage power-off fault due to cell undervoltage	Cell voltage is detected to be below the normal operating voltage range.	The cell voltage returns to normal

Possible cause

– Cell fault

– The battery pack is over-discharged, and the cell voltage is lower than 2.1V.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Charge the vehicle to SOC 10%, if the fault disappears, it is cell fault; if the fault still exists after charging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

3.11.3.70 Accurate Test C: B340020

Accurate Test C: B340020

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340020	Main positive relay cannot close fault	Main positive relay cannot close	The main positive relay closes normally

Possible cause

– Main positive relay fault.

– BMS fault

– Poor contact of harness inside the battery pack.

Repair recommendations

– After recording all current and historical faults, turn the key off to shut down the vehicle, disconnect the negative terminal of the lead-acid battery (small battery) for 10s and then reconnect it, and try turning the key on to high-voltage mode.

– If the fault cannot be cleared after several attempts of Step 1, please contact the battery pack manufacturer for on-site troubleshooting and maintenance.

3.11.3.71 Accurate Test D: B340025

Accurate Test D: B340025

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340025	Main negative relay cannot close	Main negative relay cannot close	The main negative relay closes normally

Possible cause

– Main negative relay fault

– BMS fault

– Poor contact of harness inside the battery pack.

Repair recommendations

– After recording all current and historical faults, turn the key off to shut down the vehicle, disconnect the negative terminal of the lead-acid battery (small battery) for 10s and then reconnect it, and try turning the key on to high-voltage mode.

– If the fault cannot be cleared after several attempts of Step 1, please contact the battery pack manufacturer for on-site troubleshooting and maintenance.

3.11.3.72 Accurate Test E: B340026

Accurate Test E: B340026

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340026	Pre-charge relay cannot close	Pre-charge relay cannot close	The pre-charge relay closes normally

Possible cause

– Pre-charge relay fault

– BMS fault

– Poor contact of harness inside the battery pack.

Repair recommendations

– After recording all current and historical faults, turn the key off to shut down the vehicle, disconnect the negative terminal of the lead-acid battery (small battery) for 10s and then reconnect it, and try turning the key on to high-voltage mode.

– If the fault cannot be cleared after several attempts of Step 1, please contact the battery pack manufacturer for on-site troubleshooting and maintenance.

3.11.3.73 Accurate Test F: B340005

Accurate Test F: B340005

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340005	Pre-charging failure	Relay fails to close	The relay closes normally

Possible cause

– Pre-charge relay cannot close

– Main positive relay cannot close

– Main negative relay cannot close

– Abnormal vehicle capacitor circuit

Repair recommendations

– If the current fault includes not only the pre-charging failure, but also the B340020 main positive relay cannot be attracted, the B340025 main negative relay cannot be attracted, or the B340026 pre-charging relay cannot be attracted, first check them according to step 1 of the corresponding fault measures. If the current fault does not include any of the above 3 types of inability to attract faults, it means that the vehicle capacitor circuit is abnormal.

– If the capacitor circuit of the vehicle is abnormal, it is necessary to check whether there are abnormal startup, short circuit, poor contact and abnormal discharge in high-voltage parts such as high-voltage wires, A/C compressor, motor and heating PTC of the vehicle.

3.11.3.74 Accurate Test G: B34001D

Accurate Test G: B34001D

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34001D	Pre-charging overcurrent	Pre-charging overcurrent	Pre-charge current is normal

Possible cause

– On-load discharge occurs during the pre-charging of vehicle powered up to high-voltage.

Repair recommendations

– Check the high-voltage components such as the vehicle's high-voltage wire, motor, A/C compressor and heating PTC for abnormal startup, short circuit, poor contact or abnormal discharge.

3.11.3.75 Accurate Test H: B34001E

Accurate Test H: B34001E

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34001E	Charging current overcurrent fault	Charging overcurrent	Pull out the plug for recovery

Possible cause

– Abnormal charging pile: During charging, the current entering the battery pack is greater than the requested current of the battery pack.

– The current sensor detection is abnormal.

Repair recommendations

– Compare the requested current of the battery with the output current of the charging pile. If the output current of the charging pile is continuously greater than the requested current of the battery pack, the charging pile is abnormal.

– If the output current of the charging pile is not continuously greater than the requested current of the battery pack, it indicates that the current sensor in the battery pack is abnormal. Contact the battery pack manufacturer for maintenance or replacement.

3.11.3.76 Accurate Test I: B340027

Accurate Test I: B340027

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340027	Overcurrent fault when main relay is disconnected	Power-off overcurrent	Sleep and wake-up

Possible cause

– When the vehicle is powered off from high voltage, high-voltage components such as the motor, A/C compressor and heating PTC still work, and the current on the high-voltage circuit is > 5A.

Repair recommendations

– Check if high-voltage components such as the motor, A/C compressor and heating PTC work abnormally, and replace any abnormal components.

3.11.3.77 Accurate Test J: B340028

Accurate Test J: B340028

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340028	Lead-acid battery overvoltage	Vehicle lead-acid battery overvoltage	Lead-acid battery voltage normal

Possible cause

– Overcharge of lead-acid battery caused by abnormal DCDC.

– Fault of voltage detection circuit inside the BMS.

Repair recommendations

– Open the engine bonnet in front of the vehicle, and check the voltage of the lead-acid battery when the vehicle is powered off from high voltage.

– If the lead-acid battery voltage is above 16V when the vehicle is in high-voltage power-off mode, check whether the battery is damaged according to the battery's technical standards. If it is damaged, replace it. If not, adjust it to within (12V,14V) for use. If the battery voltage only goes over 16V when the vehicle is in high-voltage power-on mode, check whether the DC/DC converter is faulty.

– If the lead-acid battery voltage is within 10~15V under both high and low voltage conditions, it is determined that the BMS is abnormal and the battery pack factory should be contacted for inspection and repair.

3.11.3.78 Accurate Test K: B340029

Accurate Test K: B340029

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340029	Lead-acid battery undervoltage	Lead-acid battery undervoltage	The lead-acid battery voltage is normal

Possible cause

– Over-discharge of lead-acid battery caused by abnormal DCDC.

– Fault of voltage detection circuit inside the BMS.

Repair recommendations

– Open the engine bonnet in front of the vehicle, and check the voltage of the lead-acid battery when the vehicle is powered off from high voltage.

– If the lead-acid battery voltage is lower than 9V when the vehicle is in high-voltage power-off mode, check whether the battery is damaged according to its technical standards. Replace the battery if it is damaged. If not, charge the battery to within (12V,14V) for use. If the battery voltage drops below 9V only when the vehicle is in high-voltage power-on mode, check whether the DCDC converter is faulty.

– If the lead-acid battery voltage is within 10~15V under both high and low voltage conditions, it is determined that the BMS is abnormal and the battery pack factory should be contacted for inspection and repair.

3.11.3.79 Accurate Test L: B340009

Accurate Test L: B340009

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340009	EEPROM abnormal fault	Central memory (CPU) error in the BMS	Normal storage

Possible cause

– The central memory (CPU) in the BMS has an error, resulting in the loss of some stored information. It can be judged that the cause is inside the BMS.

Repair recommendations

– After the vehicle is restarted after being powered off to sleep, if this fault is historical, no handling is required. If it is a current fault, contact the battery pack manufacturer for inspection and maintenance.

3.11.3.80 Accurate Test M: B34000A

Accurate Test M: B34000A

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34000A	DC charging - Charging termination fault due to incorrect VCM signal at parameter configuration phase	DC charging - Charging termination due to incorrect VCM signal at parameter configuration phase	Pull out the plug for recovery

Possible cause

– In the fast charging parameter configuration phase, VCM sends a signal indicating that charging is not allowed or the vehicle is in a non-charging state

Repair recommendations

– Reproduce the fault, check the current fault of the VCM controller, and solve the fault that stops charging under the charging plug state.

3.11.3.81 Accurate Test N: B34000B

Accurate Test N: B34000B

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34000B	DC charging - VCM charging request termination fault at parameter configuration phase	DC charging - VCM charging request termination at parameter configuration phase	Pull out the plug for recovery

Possible cause

– In the fast charging parameter configuration phase, VCM sends a fast charging stop request signal.

Repair recommendations

– Reproduce the fault, check the current fault of the VCM controller, and solve the fault that stops charging under the charging plug state.

3.11.3.82 Accurate Test O: B34000C

Accurate Test O: B34000C

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34000C	Charging termination due to VCM signal change in DC charging phase	Charging termination due to VCM signal change in DC charging phase	Pull out the plug for recovery

Possible cause

– In the fast charging phase, VCM sends a signal indicating that charging is not allowed or the vehicle is in a non-charging state.

Repair recommendations

– Reproduce the fault, check the current fault of the VCM controller, and solve the fault that stops charging under the charging plug state.

3.11.3.83 Accurate Test P: B34000D

Accurate Test P: B34000D

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34000D	DC charging - VCM charging request termination fault in charging phase	DC charging - VCM charging request termination fault in charging phase	Pull out the plug for recovery

Possible cause

– In the fast charging phase, VCM sends a fast charging stop request signal.

Repair recommendations

– Reproduce the fault, check the current fault of the VCM controller, and solve the fault that stops charging under the charging plug state.

3.11.3.84 Accurate Test Q: B34000E

Accurate Test Q: B34000E

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34000E	DC charging - Charging pile sending signal timeout fault	DC charging - Charging pile sending signal timeout	Pull out the plug for recovery

Possible cause

– In the fast charging phase, the charging pile does not send the corresponding interactive signal to BMS on time, and BMS reports a timeout fault.

Repair recommendations

– Pull out the charging plug to recharge or change a charging pile.

3.11.3.85 Accurate Test R: B34000F

Accurate Test R: B34000F

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34000F	DC charging - charging termination request fault due to charging pile fault	DC charging - charging termination request due to charging pile fault	Pull out the plug for recovery

Possible cause

– In the fast charging stage, the charging pile sends a charging stop request to BMS due to a fault.

Repair recommendations

– Pull out the charging plug to recharge or change a charging pile.

3.11.3.86 Accurate Test S: B340010

Accurate Test S: B340010

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340010	AC charging - Charging termination fault caused by OBC signal	AC charging - Charging termination fault caused by OBC signal	Pull out the plug for recovery

Possible cause

– During the slow charging process, the OBC status is abnormal charging or CP status.

Repair recommendations

– Reproduce the fault, and check the cause of OBC abnormality when the charging plug is inserted.

3.11.3.87 Accurate Test T: B340011

Accurate Test T: B340011

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340011	AC charging - Charging termination fault caused by VCM signal	AC charging - Charging termination fault caused by VCM signal	Pull out the plug for recovery

Possible cause

– During slow charging, VCM sends a signal indicating that charging is not allowed, the vehicle is in a non-charging state, or a request to stop charging.

Repair recommendations

– Reproduce the fault, check the current fault of the VCM controller, and solve the fault that stops charging under the charging plug state.

3.11.3.88 Accurate Test U: B340031

Accurate Test U: B340031

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340031	Charging termination fault due to low battery pack temperature and no heating during charging	Charging termination due to low battery pack temperature and no heating during charging	Pull out the plug for recovery

Possible cause

– During low temperature charging at -20°C, the battery pack heating PTC is not started

Repair recommendations

– Check if the battery pack heating PTC is faulty.

3.11.3.89 Accurate Test V: B340014

Accurate Test V: B340014

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340014	Cooling not started	Battery overheating, cooling not started	Battery cooling is normal

Possible cause

– The battery is at high temperature, and the cooling of battery pack is not started.

Repair recommendations

– Check whether the battery pack cooling circuit (A/C compressor, battery pack cooling pipeline and A/C solenoid valve) is faulty.

3.11.3.90 Accurate Test W: B340015

Accurate Test W: B340015

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340015	Abnormal CC2 state fault detected by BMS	Abnormal CC2 state detected by BMS	Pull out the plug for recovery

Possible cause

– Abnormal resistance of fast charging port base

– Abnormal vehicle CC2 signal line

– Abnormal resistance of fast charging plug of charging pile

– Abnormal BMS

Repair recommendations

– Use a multimeter to detect whether the resistance between vehicle CC1, CC2 and PE is 1000±30 Ω respectively. If the resistance is abnormal, replace the fast charging port base.

– Check whether pin 18 of the low-voltage connector of the battery pack to the charging port base CC2 is connected. If it is abnormal, replace the harness.

– Detect whether the resistance between the fast charging plug CC1 and the PE of the charging pile is 1000±30 Ω with a multimeter. If the resistance is abnormal, please contact the charging pile manufacturer for maintenance.

– If the above reasons are eliminated and charging still fails after being replaced with a normal charging pile, contact the battery factory to check whether the battery pack BMS is abnormal.

3.11.3.91 Accurate Test X: U240001

Accurate Test X: U240001

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U240001	CANBusOff fault with the network connection to T-BOX	Connect to T-BOX network CAN Bus Off	CAN bus returns to normal

Possible cause

– CAN short circuit between pins 16 and 17 of the low-voltage connector of the battery pack.

– Abnormal terminal resistance between pins 16 and 17 of the low-voltage connector of the battery pack.

– Abnormal terminal resistance between pins 16 and 17 of the low-voltage connector of the battery pack corresponding to the T-BOX.

Repair recommendations

– Check the abnormal point of wiring between T-CAN H and T-CAN L pins of battery pack low-voltage connector, and replace the harness.

– Check whether the resistance between T-CAN H and T-CAN L pins of battery pack low-voltage connector is 120Ω. If not, contact the battery manufacturer to replace BMS

– Check whether the terminal resistance between the T-CAN H and T-CAN L pins of the battery pack low-voltage connector corresponding to the T-BOX is 120Ω. If not, contact the T-BOX manufacturer to replace the T-BOX.

3.11.3.92 Accurate Test Y: U240002

Accurate Test Y: U240002

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U240002	Fast charging CAN Bus Off fault	Fast charging CANBusOff	CAN bus returns to normal

Possible cause

– There is a CAN short circuit between the fast charging CAN H and Fast charging CAN L pins of the battery pack low-voltage connector.

– The terminal resistance between the fast charging CAN H and fast charging CAN L pins of the battery pack low-voltage connector is abnormal.

– Abnormal terminal resistance of the charging pile

Repair recommendations

– Check the abnormal point of the connection between the fast charging CAN H and fast charging CAN L pins of the battery pack low-voltage connector, and replace the harness.

– Check whether the resistance between the fast charging CAN H and fast charging CAN L pins of the battery pack low-voltage connector is 120Ω. If not, contact the battery manufacturer to replace the BMS.

– Check whether the terminal resistors of charging piles S+ and S- are abnormal. If so, contact the charging pile manufacturer for maintenance.

3.11.3.93 Accurate Test Z: U240003

Accurate Test Z: U240003

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U240003	Internal CAN Bus Off fault	Internal CAN Bus Off	CAN bus returns to normal

Possible cause

– CAN between slave control and master control in the battery pack is short-circuited.

Repair recommendations

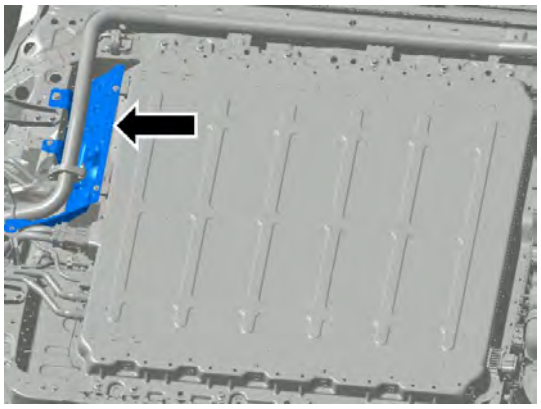
– Contact the battery manufacturer to replace the battery management system (BMS) or communication harness in the battery.

3.11.4 Removal and installation

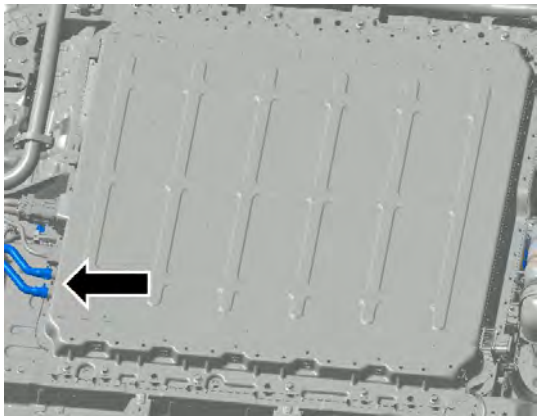
3.11.4.1 Power battery pack

Removal

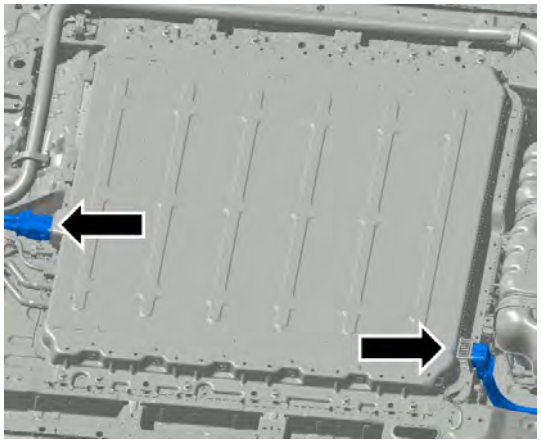
1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the exhaust heat shield at the front of the power battery pack.



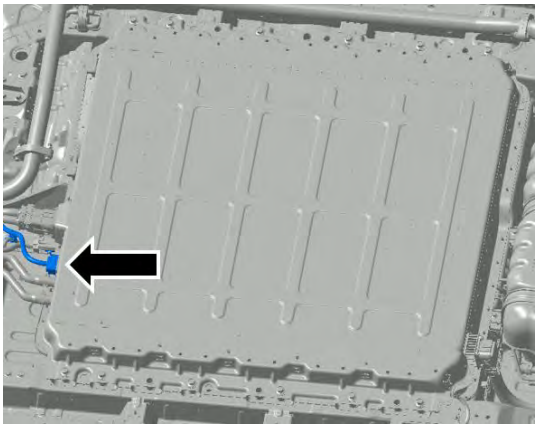
3. Disconnect the coolant pipe of the power battery pack.



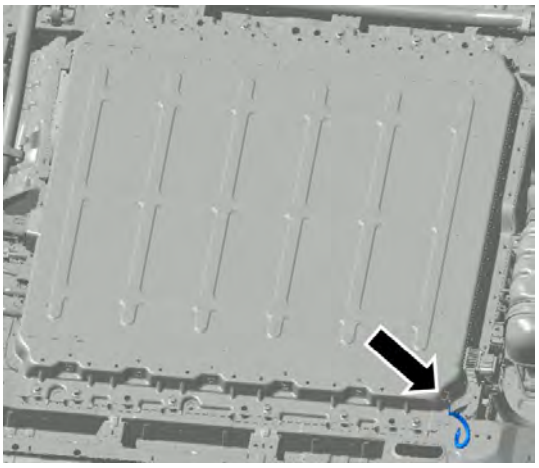
4. Disconnect the front and rear high-voltage cable connectors of the power battery pack.



5. Disconnect the low-voltage harness connector of the power battery pack.



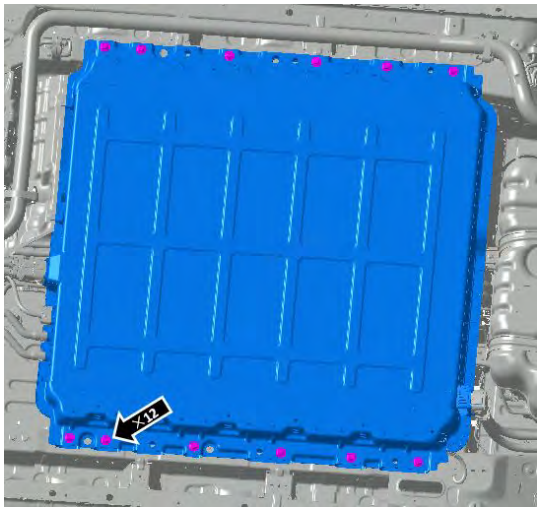
6. Disconnect the front and rear high-voltage connectors of the power battery pack.

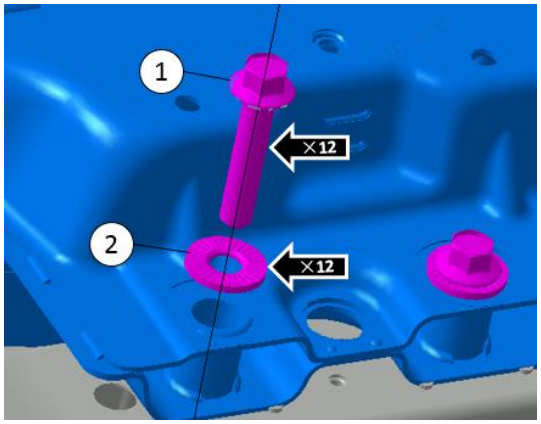


7. Place the lift truck directly under the power battery pack, and lift the power battery pack with a lifting platform.

   Caution: The lifting platform can properly lift the power battery pack. Do not over-lift it to cause damage to the power battery pack structure or cause the vehicle to fall.

8. Remove the mounting bolts of the power battery pack.





1. The installation order is the reverse of the removal order.

9. Lower the power battery pack assembly to a safe height.

10. Install the coolant interface dust cover and high-voltage connector protective cover.

Installation

4.1 Low-voltage harness

4.1.1 Specification

4.1.1.1 Torque specification

Name	Nm
Fixing bolt of battery pack GND harness	7±1
Drive motor GND harness fixing bolt	7±1
Fixing bolt of generator GND harness	7±1
GND bolt of engine compartment harness	7±1
Fixing nut of distribution box	7±1

4.1.2 Diagnosis and testing

4.1.2.1 Diagnosis and testing

Low-voltage harness

Inspection and confirmation

1. Confirm the problems raised by the customer and make corresponding inspections.
2. Visually inspect for obvious signs of mechanical or electrical damage and obvious signs of collision deformation.
3. Check the system circuits which are easy to be seen or can be seen.
4. If an obvious burnt smell or overheated components are found during the inspection, first determine whether they have been damaged.
5. If the problem observed or raised is obvious and the cause has been found, the cause must be corrected before proceeding to the next step.
6. If the visual inspection passes, confirm the fault and refer to the fault symptoms table.

4.1.2.2 Diagnosis and testing

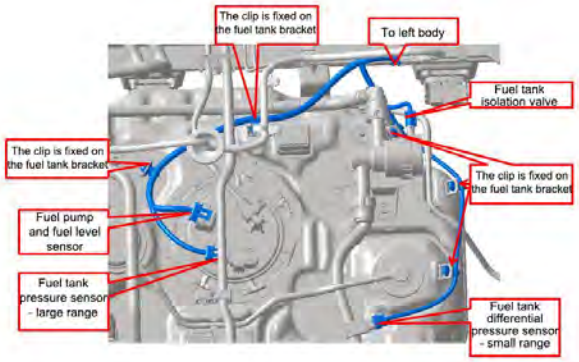
Appearance Checklist

Electrical
– Fuse – Circuit – Power supply connector – Relay – Harness connector – Battery

4.1.3 Removal and installation

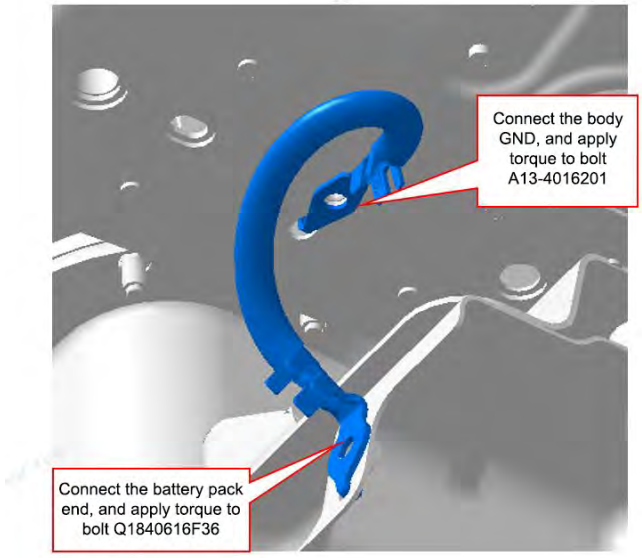
4.1.3.1 Chassis harness

Removal and installation



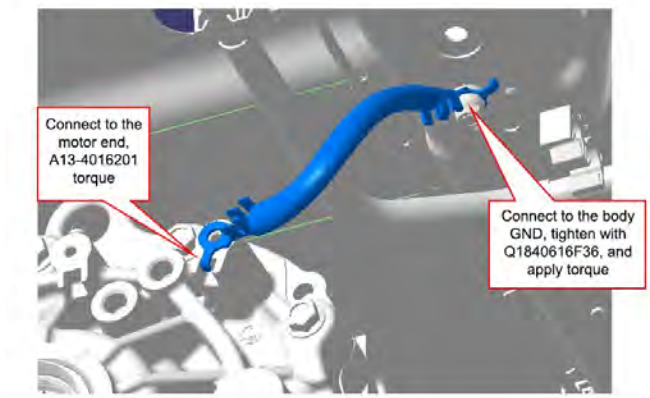
4.1.3.2 Battery pack GND harness

Removal and installation



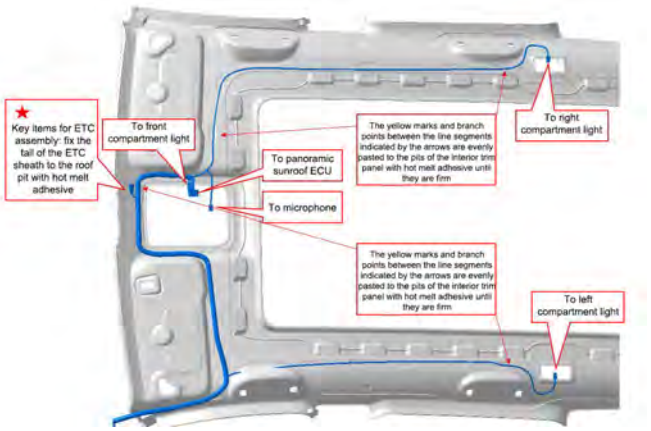
4.1.3.3 Motor GND wire harness

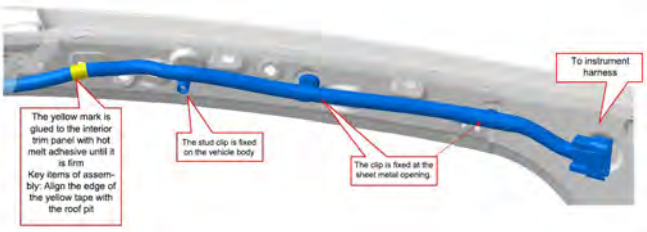
Removal and installation



4.1.3.4 Roof harness-sunroof

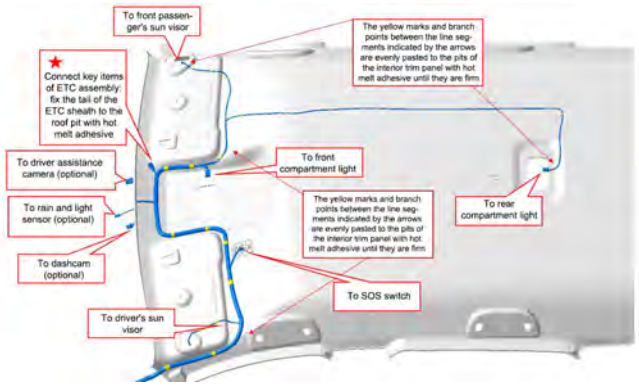
Removal and installation

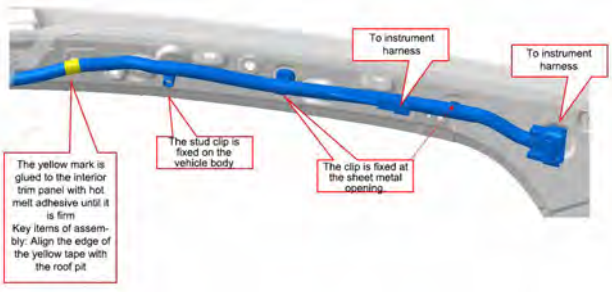




4.1.3.5 Roof harness-without sunroof

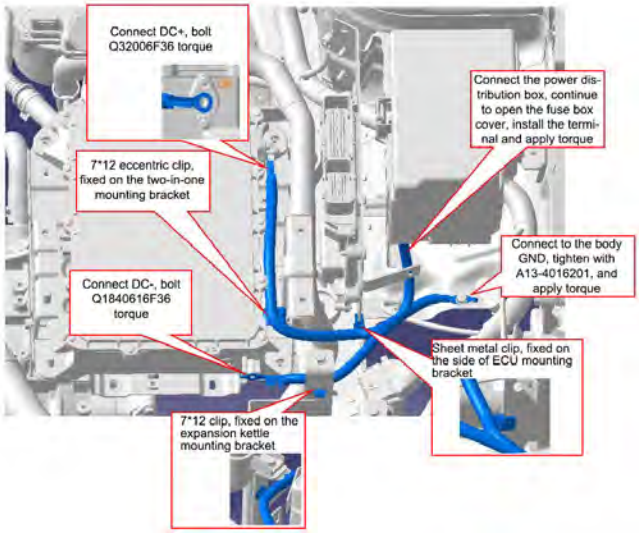
Removal and installation





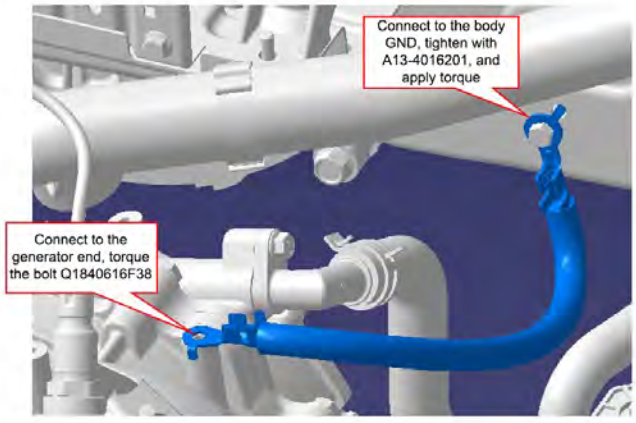
4.1.3.6 Two-in-one harness

Removal and installation



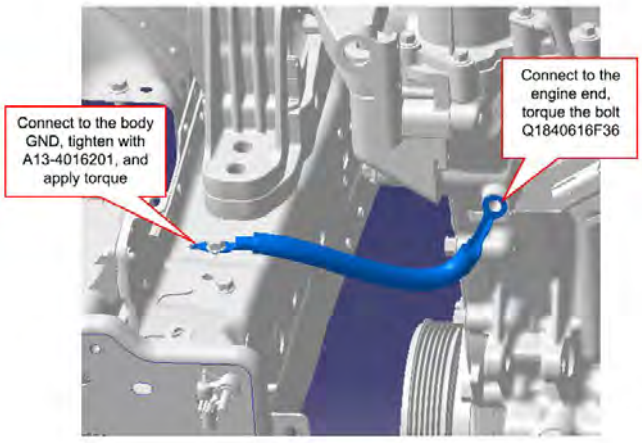
4.1.3.7 Generator GND harness

Removal and installation



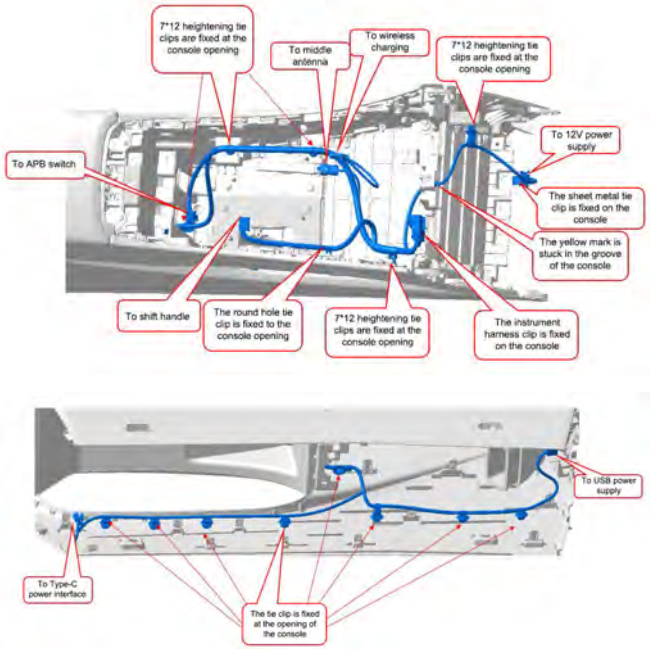
4.1.3.8 Engine GND harness

Removal and installation



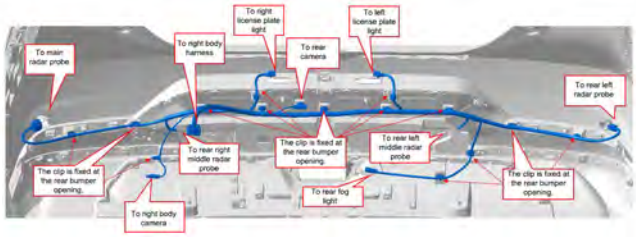
4.1.3.9 Console harness

Removal and installation



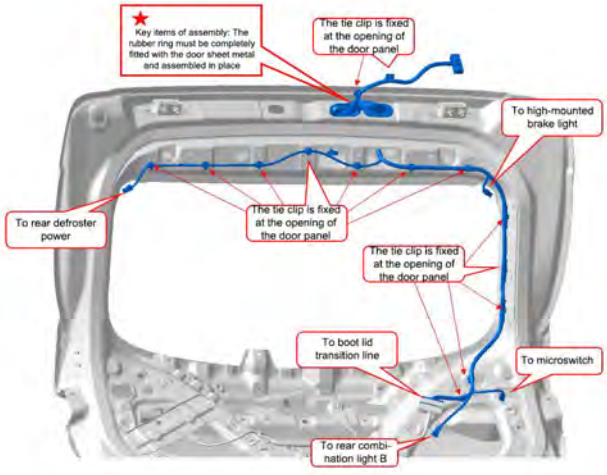
4.1.3.10 Rear bumper harness

Removal and installation



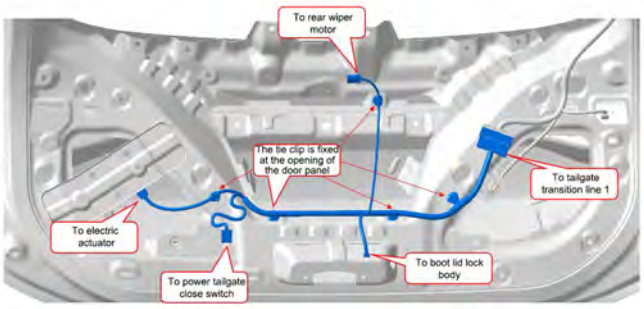
4.1.3.11 Boot lid transition line 1

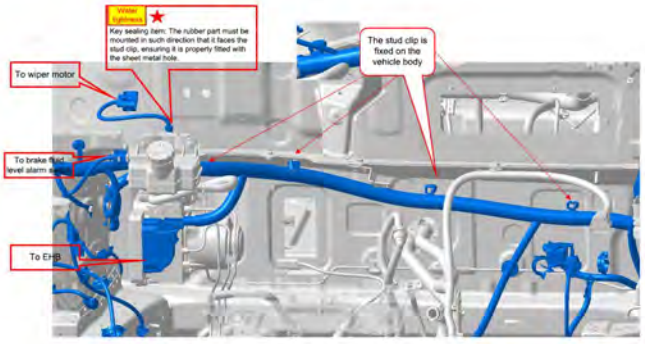
Removal and installation



4.1.3.12 Boot lid transition line 2

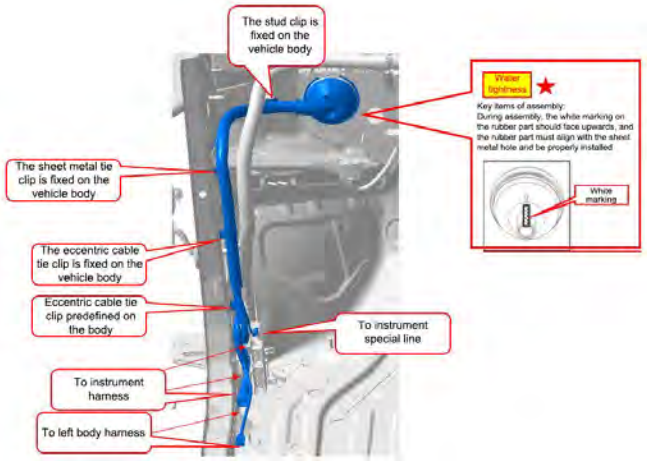
Removal and installation

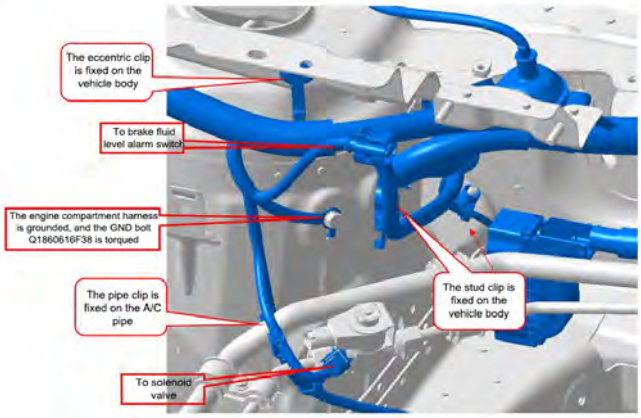


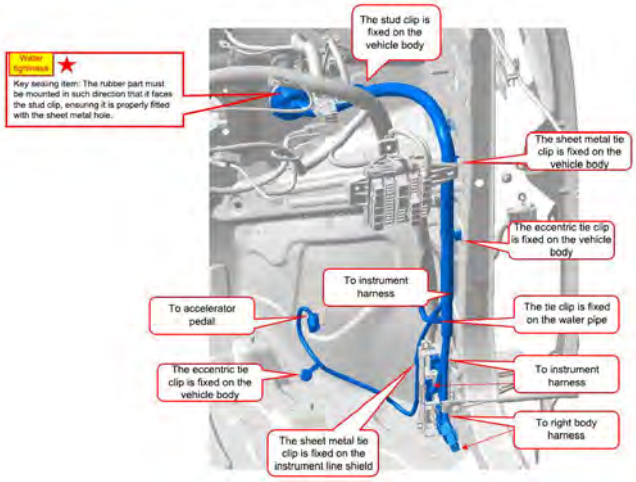


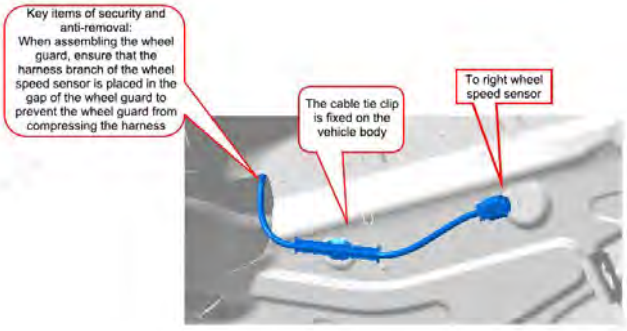
4.1.3.13 Engine compartment harness

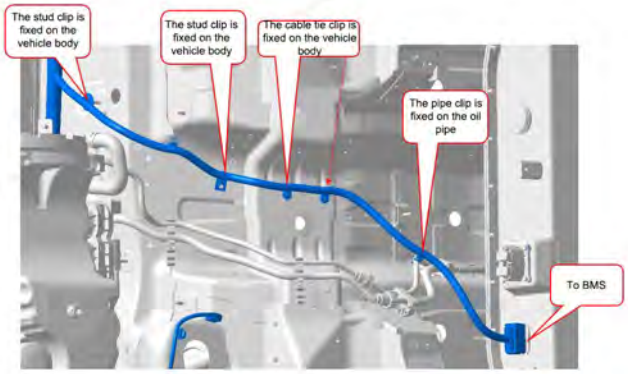
Removal and installation

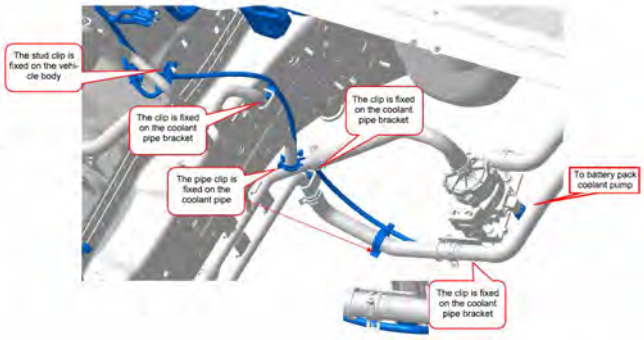


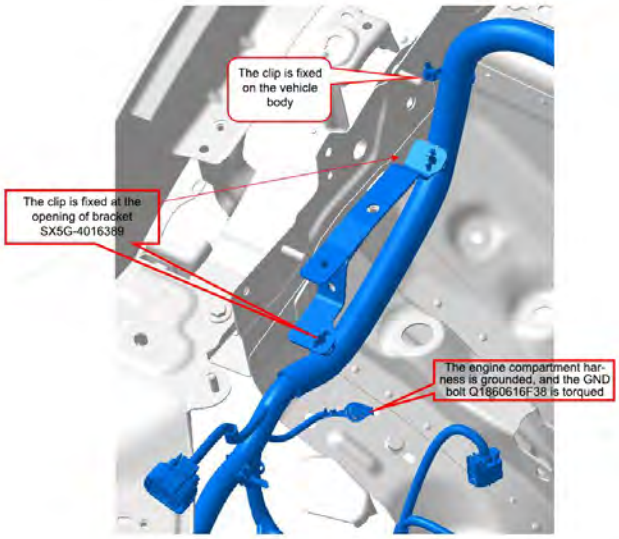


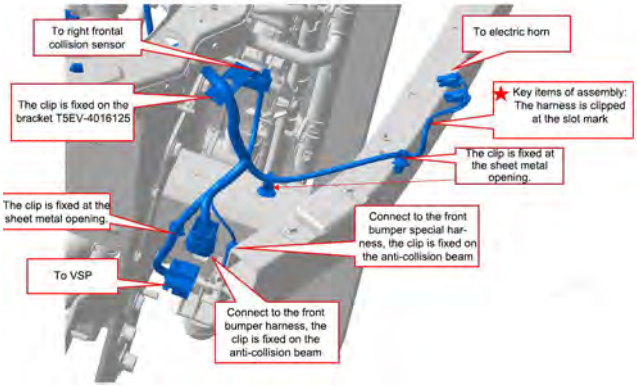


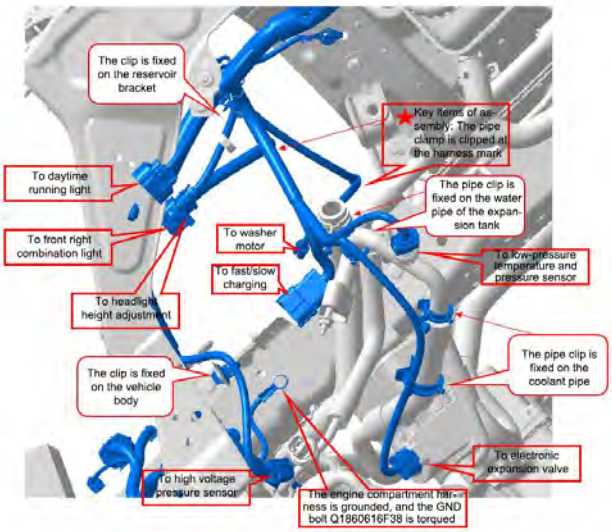


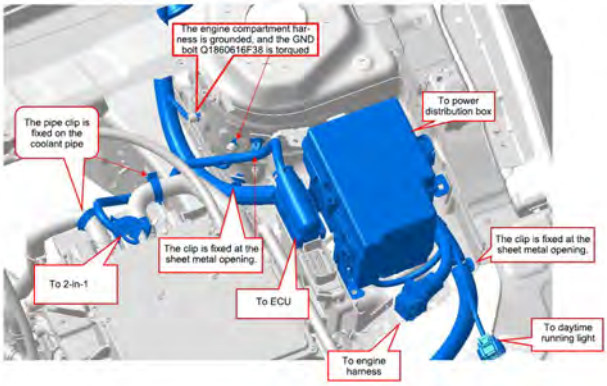


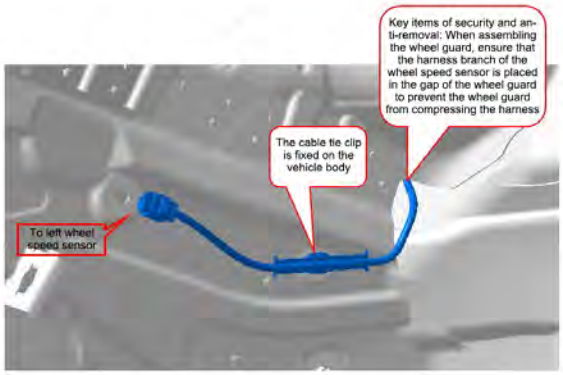


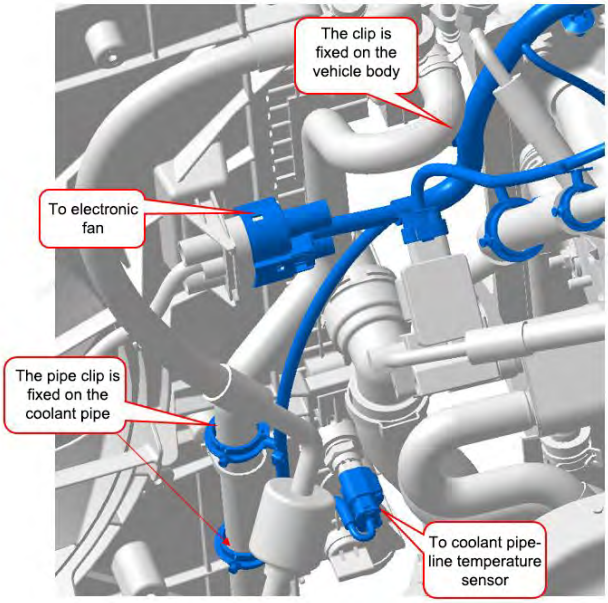

The clip is fixed on the vehicle body
The clip is fixed at the opening of bracket SX5G-4016369
The engine compartment harness is grounded, and the GND bolt Q1860616F38 is torqued

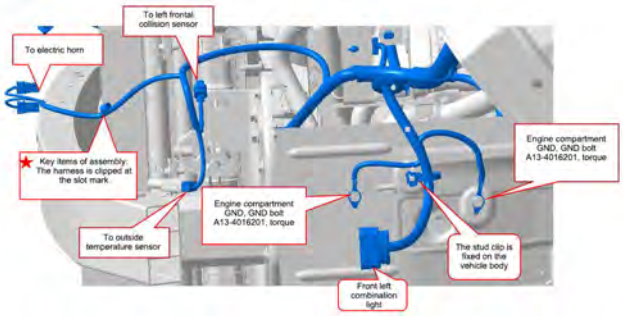

To right frontal collision sensor
To electric horn
The clip is fixed on the bracket T5EV-4016125
Key items of assembly: The harness is clipped at the slot mark
The clip is fixed at the sheet metal opening.
The clip is fixed at the sheet metal opening.
Connect to the front bumper special harness, the clip is fixed on the anti-collision beam
To VSP
Connect to the front bumper harness, the clip is fixed on the anti-collision beam

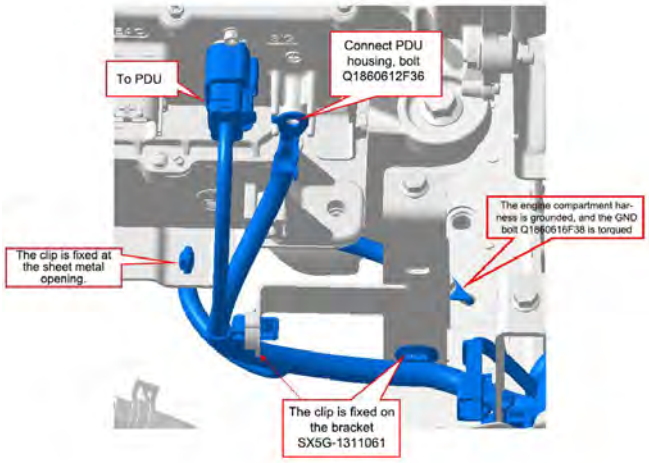

The clip is fixed on the reservoir bracket
Key items of assembly: The pipe clamp is clipped at the harness mark
To daytime running light
The pipe clip is fixed on the water pipe of the expansion tank
To front right combination light
To washer motor
To low-pressure temperature and pressure sensor
To fast/slow charging
To headlight height adjustment
The pipe clip is fixed on the coolant pipe
The clip is fixed on the vehicle body
To electronic expansion valve
To high voltage pressure sensor
The engine compartment harness is grounded, and the GND bolt Q1860616F38 is torqued

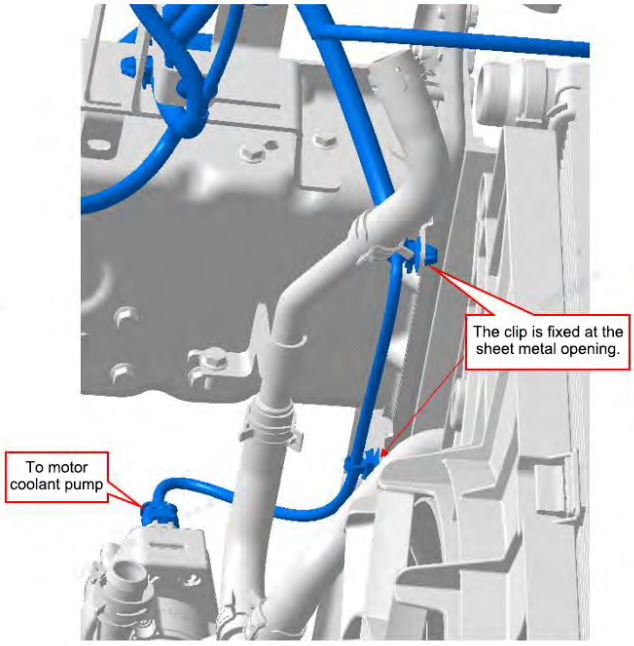

The engine compartment harness is grounded, and the GND bolt Q1860616F38 is torqued
To power distribution box
The pipe clip is fixed on the coolant pipe
The clip is fixed at the sheet metal opening.
The clip is fixed at the sheet metal opening.
To 2-in-1
To ECU
To daytime running light
To engine harness


Key items of security and anti-removal: When assembling the wheel guard, ensure that the harness branch of the wheel speed sensor is placed in the gap of the wheel guard to prevent the wheel guard from compressing the harness
The cable tie clip is fixed on the vehicle body
To left wheel speed sensor


The clip is fixed on the vehicle body
To electronic fan
The pipe clip is fixed on the coolant pipe
To coolant pipeline temperature sensor

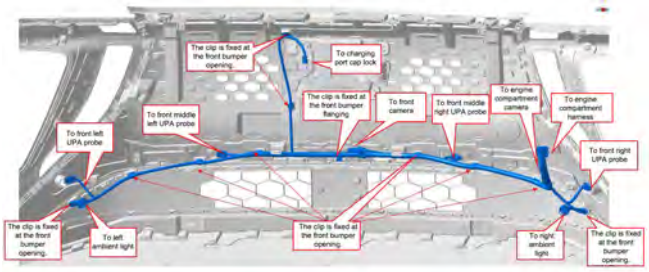

To left frontal collision sensor
To electric horn
Key items of assembly: The harness is clipped at the slot mark
Engine compartment GND, GND bolt A13-4016201, torque
Engine compartment GND, GND bolt A13-4016201, torque
To outside temperature sensor
The stud clip is fixed on the vehicle body
Front left combination light





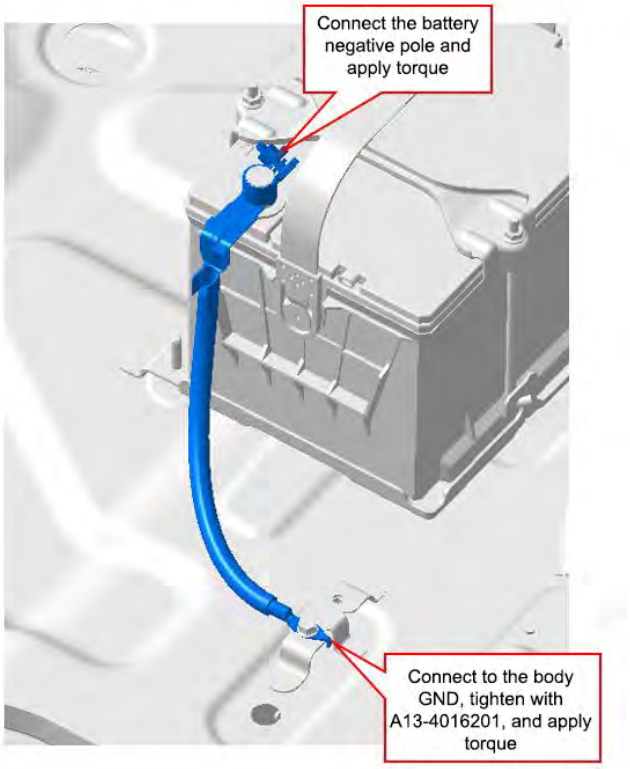
4.1.3.14 Front bumper harness

Removal and installation



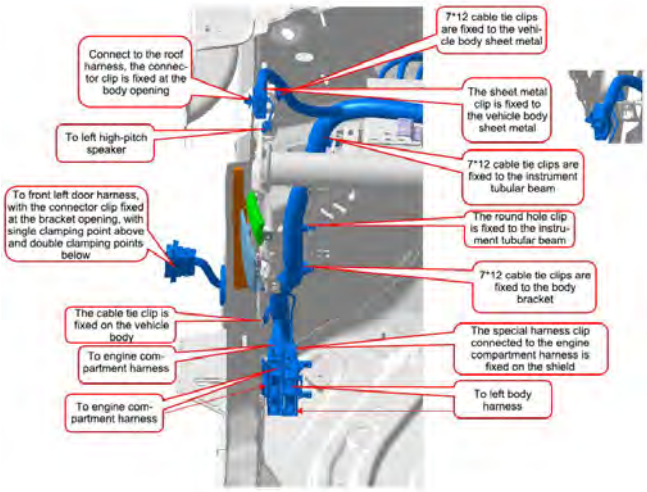
4.1.3.15 Battery negative harness

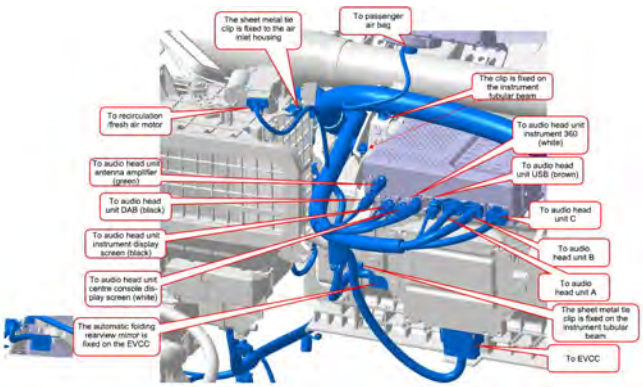
Removal and installation

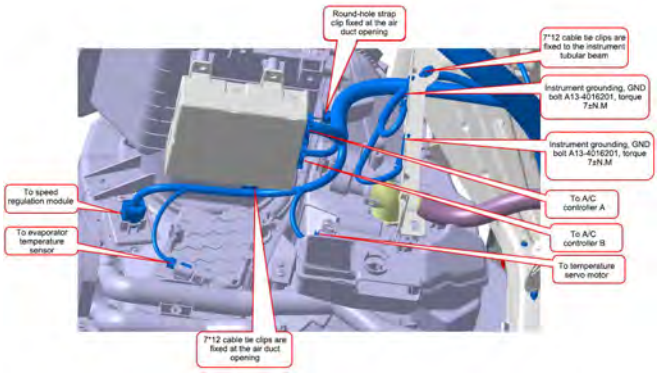


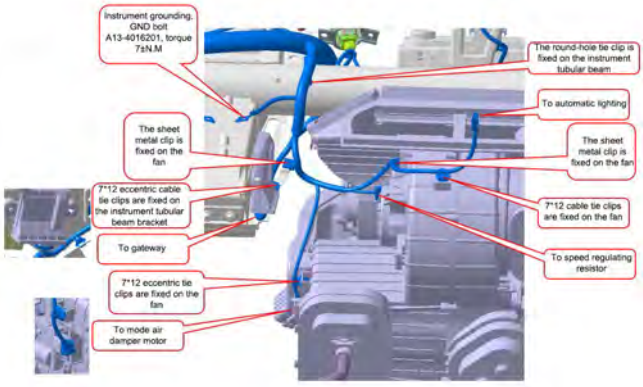
4.1.3.16 Instrument harness

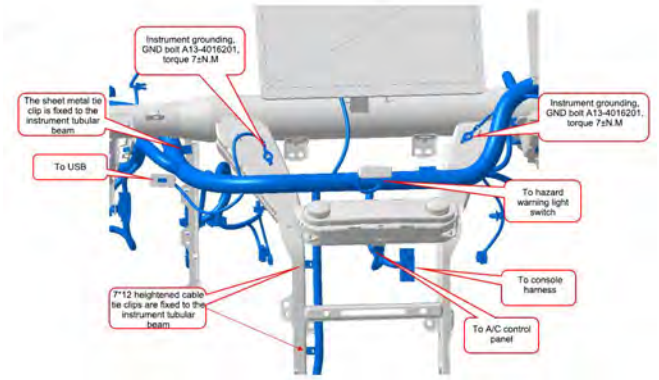
Removal and installation

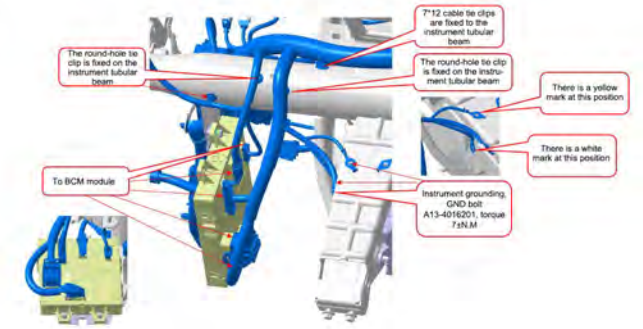


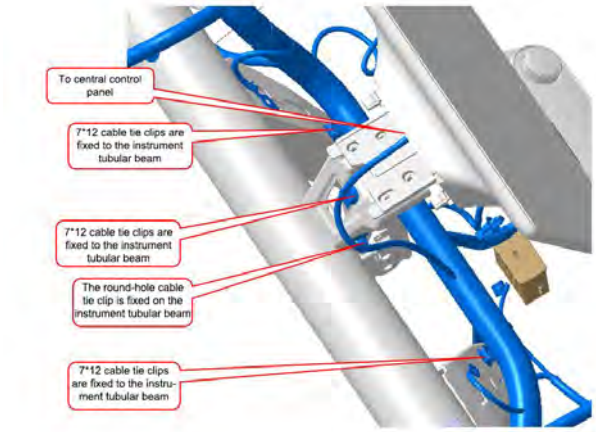


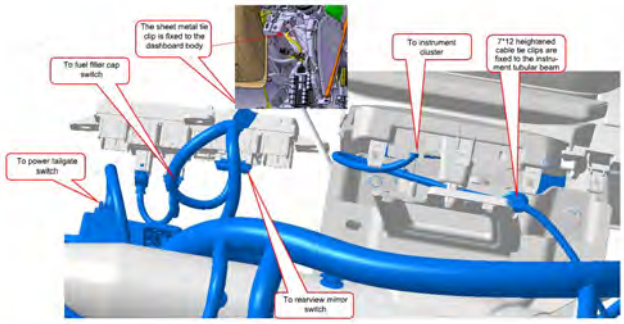

Round-hole strap clip fixed at the air duct opening
7*12 cable tie clips are fixed to the instrument tubular beam
Instrument grounding, GND bolt A13-4016201, torque 7±N.M
Instrument grounding, GND bolt A13-4016201, torque 7±N.M
To speed regulation module
To evaporator temperature sensor
To A/C controller A
To A/C controller B
To temperature servo motor
7*12 cable tie clips are fixed at the air duct opening

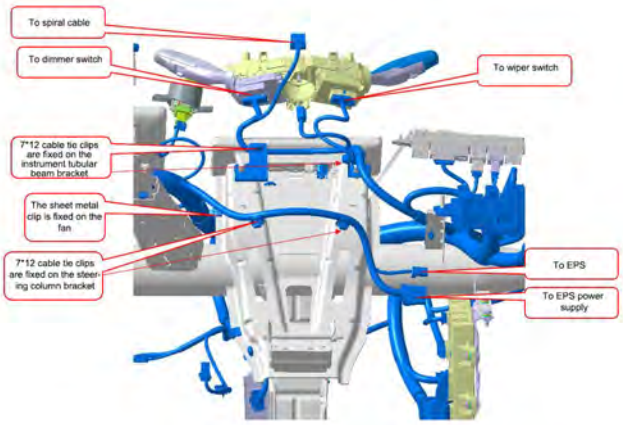

Instrument grounding, GND bolt A13-4016201, torque 7±N.M
The round-hole tie clip is fixed on the instrument tubular beam
To automatic lighting
The sheet metal clip is fixed on the fan
The sheet metal clip is fixed on the fan
7*12 eccentric cable tie clips are fixed on the instrument tubular beam bracket
7*12 cable tie clips are fixed on the fan
To gateway
To speed regulating resistor
7*12 eccentric tie clips are fixed on the fan
To mode air damper motor

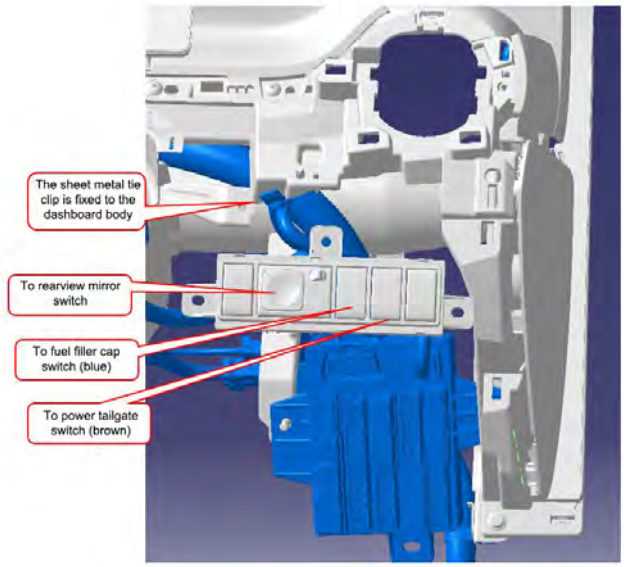

Instrument grounding, GND bolt A13-4016201, torque 7±N.M
The sheet metal tie clip is fixed to the instrument tubular beam
Instrument grounding, GND bolt A13-4016201, torque 7±N.M
To USB
To hazard warning light switch
To console harness
7*12 heightened cable tie clips are fixed to the instrument tubular beam
To A/C control panel

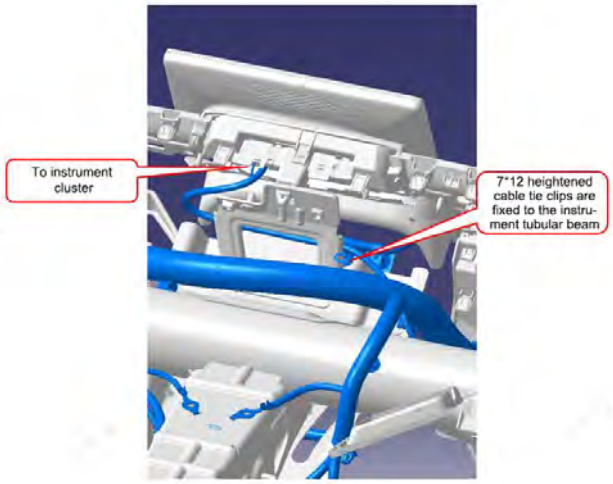

7*12 cable tie clips are fixed to the instrument tubular beam
The round-hole tie clip is fixed on the instrument tubular beam
The round-hole tie clip is fixed on the instrument tubular beam
There is a yellow mark at this position
There is a white mark at this position
To BCM module
Instrument grounding, GND bolt A13-4016201, torque 7±N.M

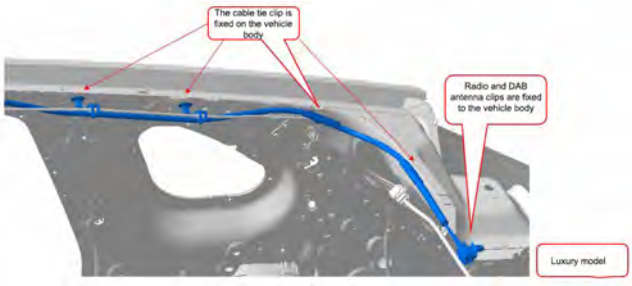

To central control panel
7*12 cable tie clips are fixed to the instrument tubular beam
7*12 cable tie clips are fixed to the instrument tubular beam
The round-hole cable tie clip is fixed on the instrument tubular beam
7*12 cable tie clips are fixed to the instrument tubular beam

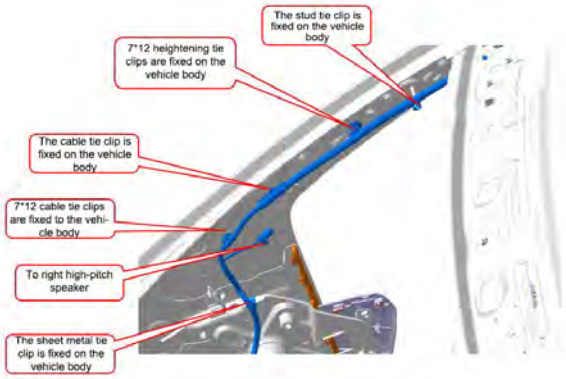

The sheet metal tie clip is fixed to the dashboard body
To fuel filler cap switch
To instrument cluster
7*12 heightened cable tie clips are fixed to the instrument tubular beam
To power tailgate switch
To rearview mirror switch

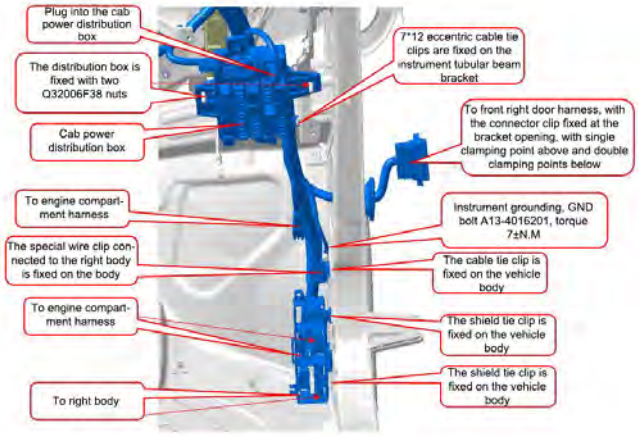

To spiral cable
To dimmer switch
To wiper switch
7*12 cable tie clips are fixed on the instrument tubular beam bracket
The sheet metal clip is fixed on the fan
7*12 cable tie clips are fixed on the steering column bracket
To EPS
To EPS power supply

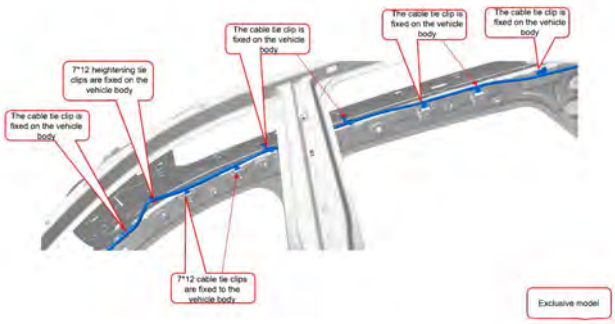

The sheet metal tie clip is fixed to the dashboard body
To rearview mirror switch
To fuel filler cap switch (blue)
To power tailgate switch (brown)

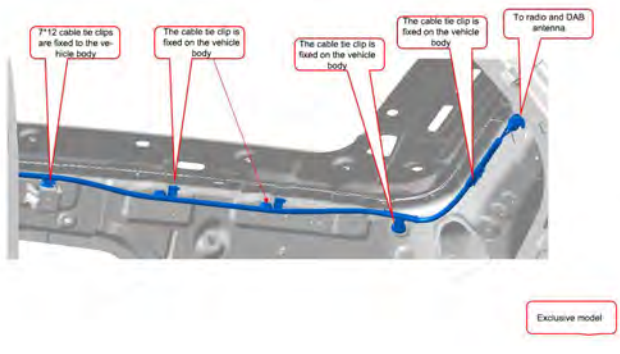






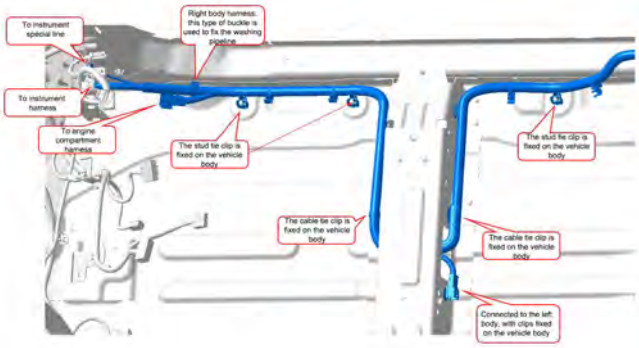


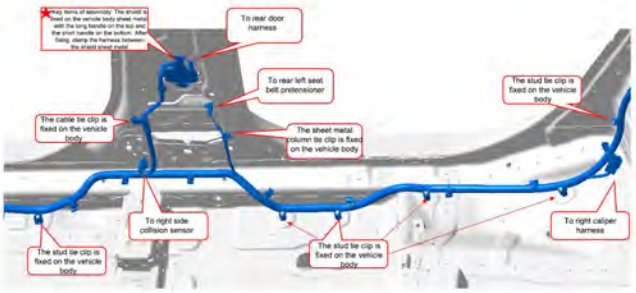


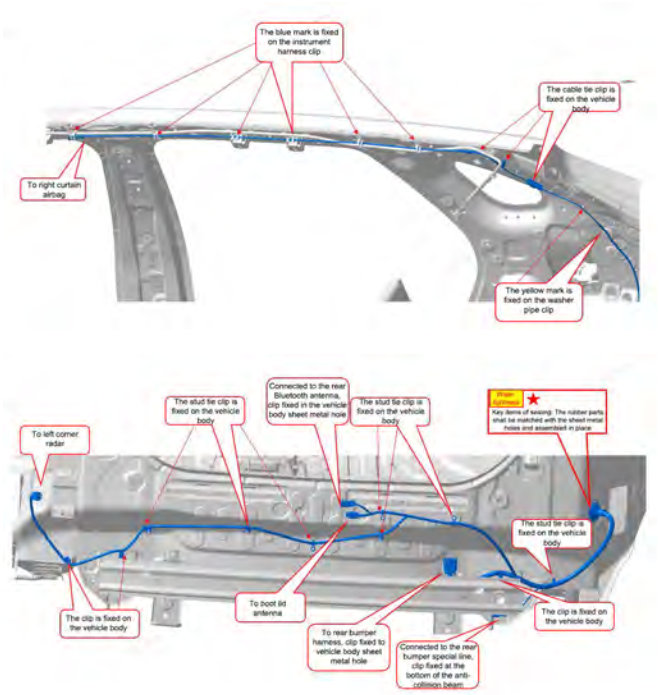


4.1.3.17 Right body harness

Removal and installation

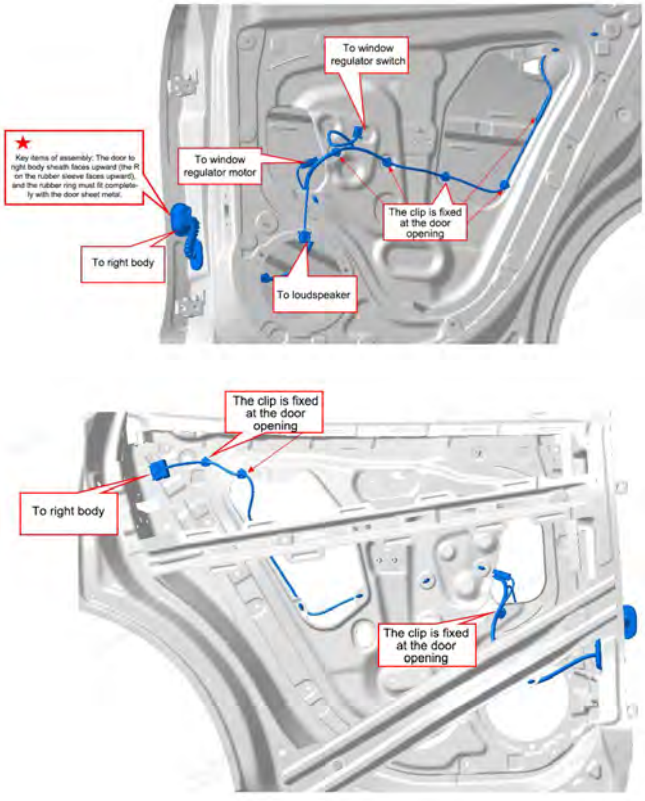






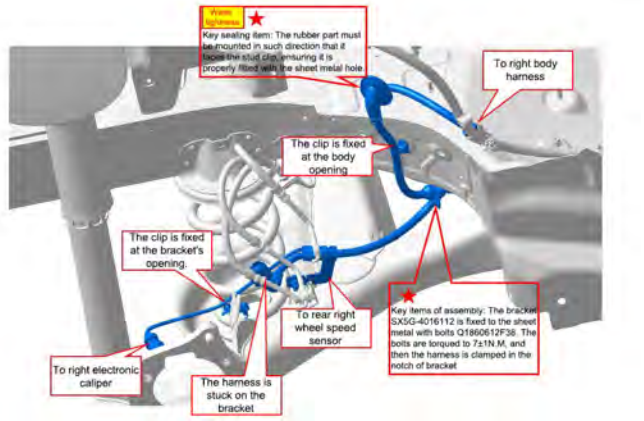
4.1.3.18 Rear right door harness

Removal and installation



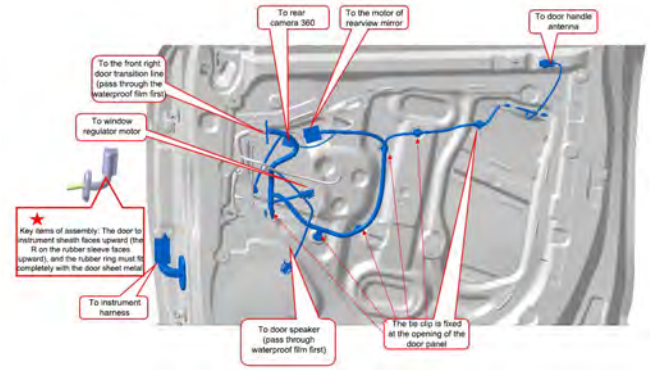
4.1.3.19 Right caliper harness

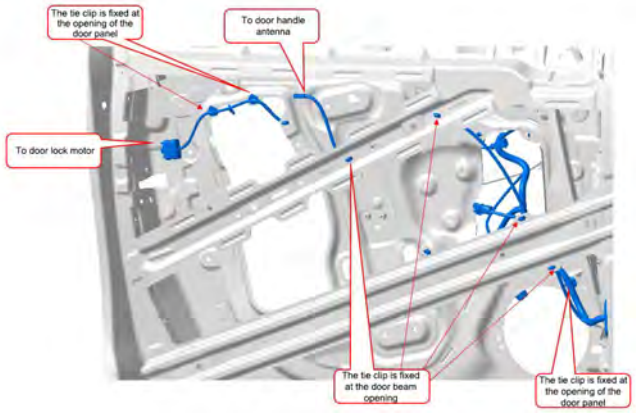
Removal and installation



4.1.3.20 Front right door harness

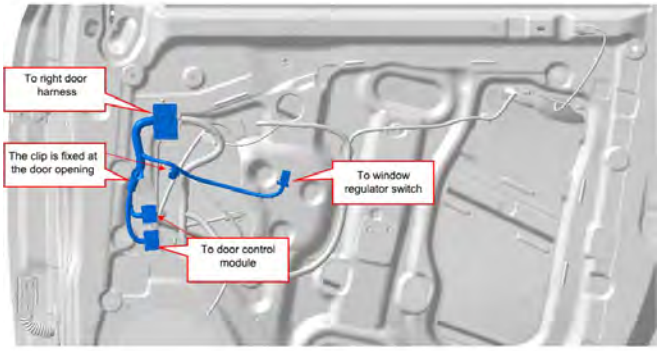
Removal and installation





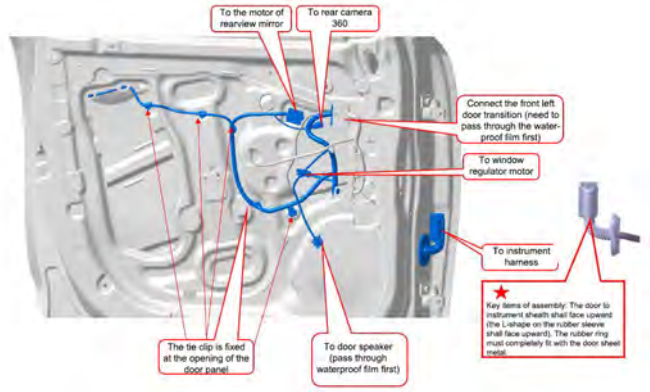
4.1.3.21 Front right door control transition line

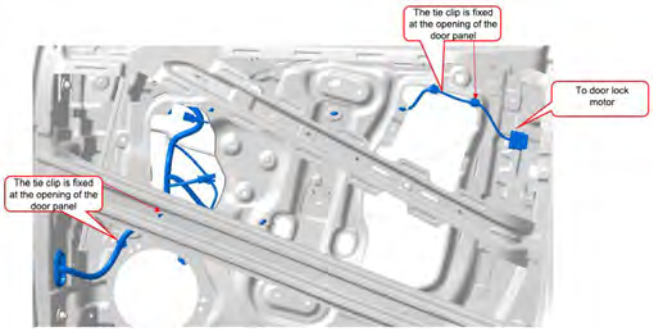
Removal and installation

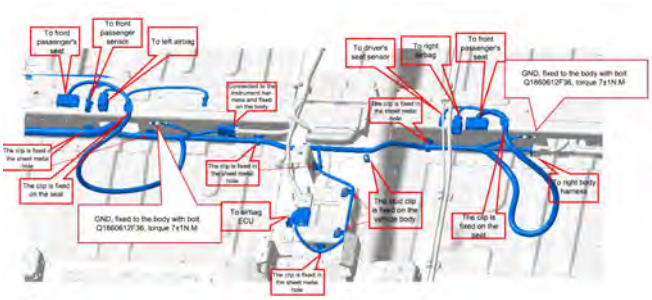


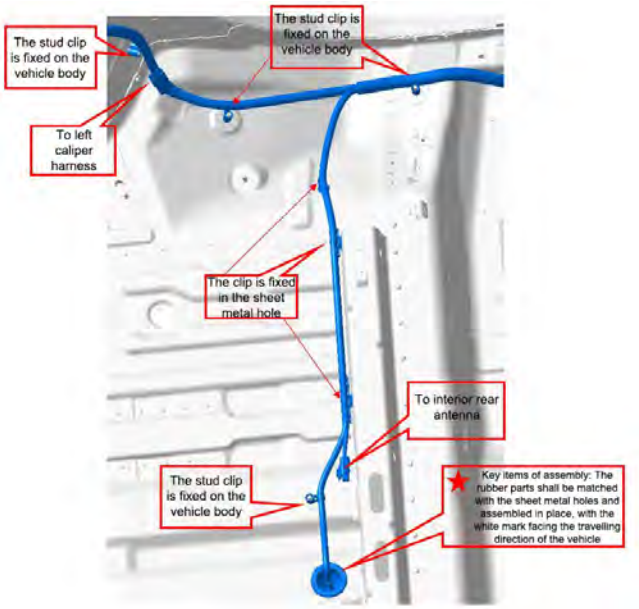
4.1.3.22 Left door harness

Removal and installation



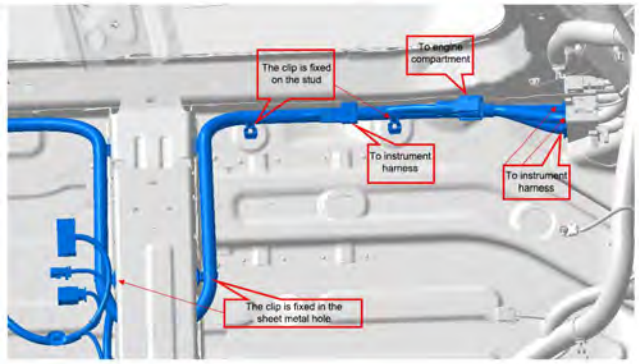


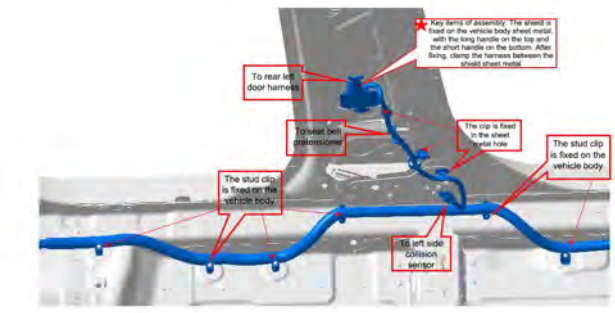


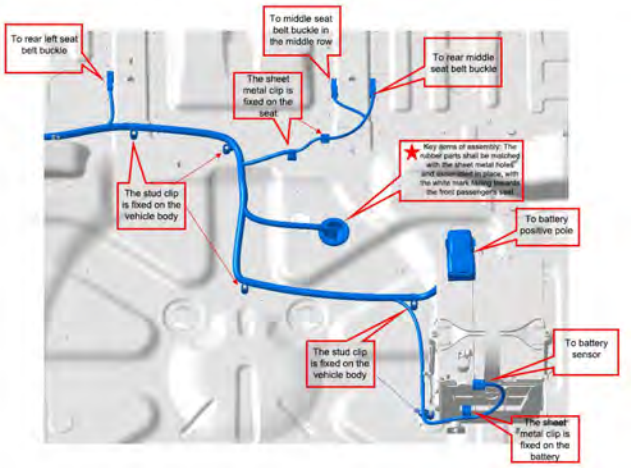


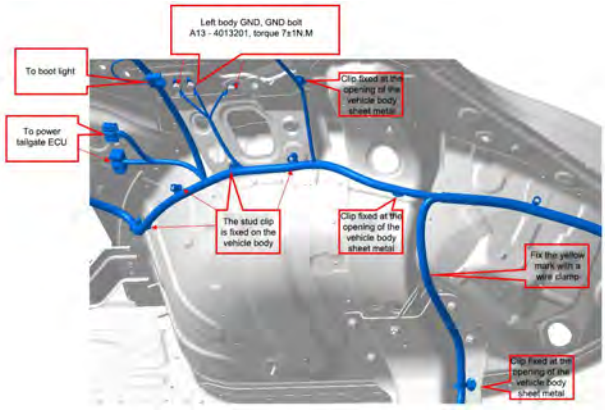
4.1.3.23 Left body harness

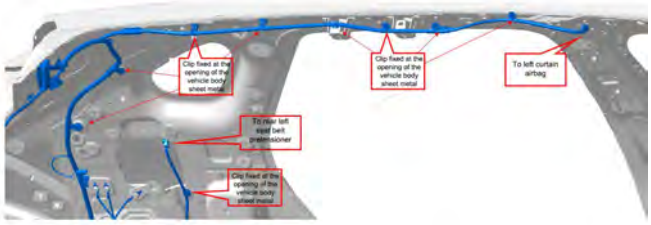
Removal and installation

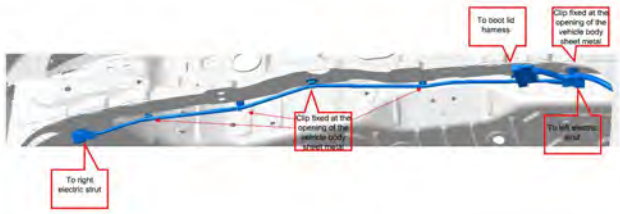


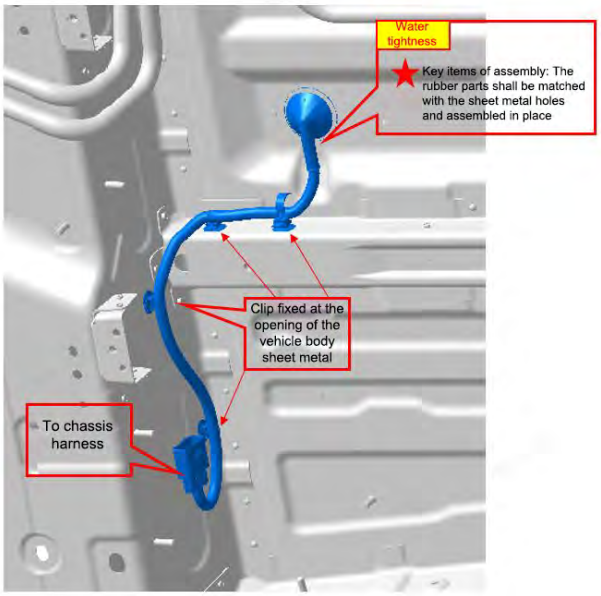


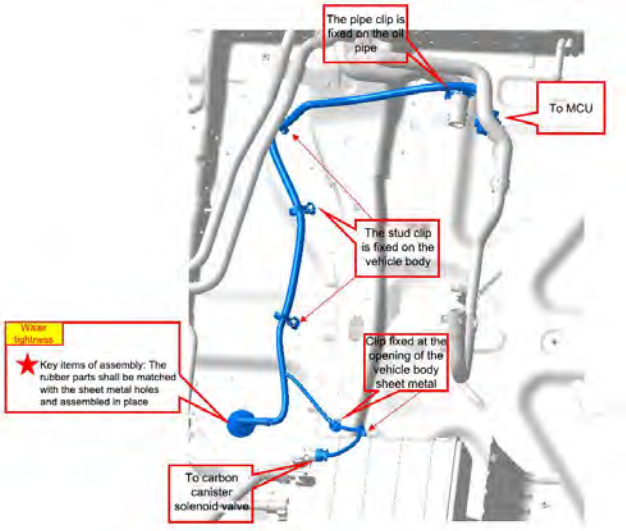






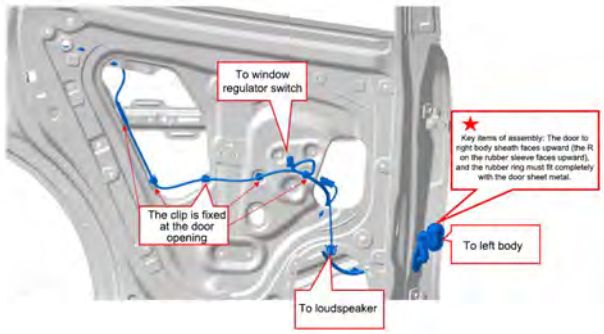


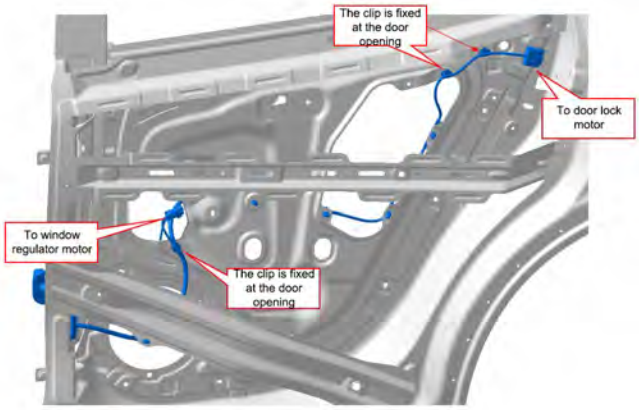




4.1.3.24 Rear left door harness

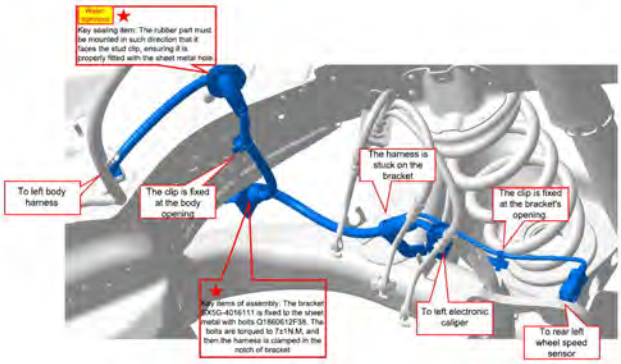
Removal and installation





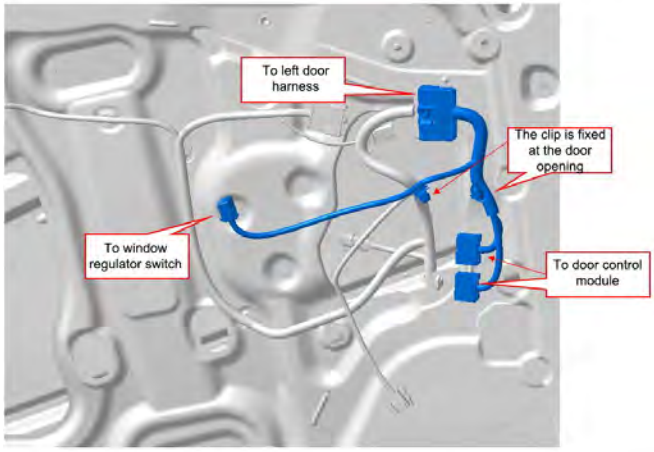
4.1.3.25 Left caliper harness

Removal and installation



4.1.3.26 Left door control transition line

Removal and installation

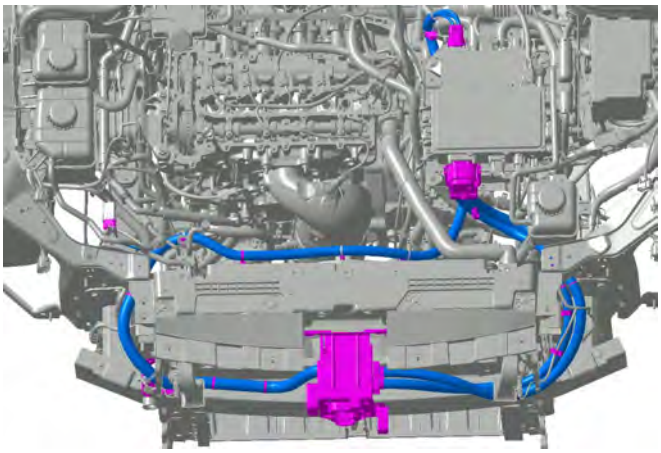


4.2 High-voltage harness

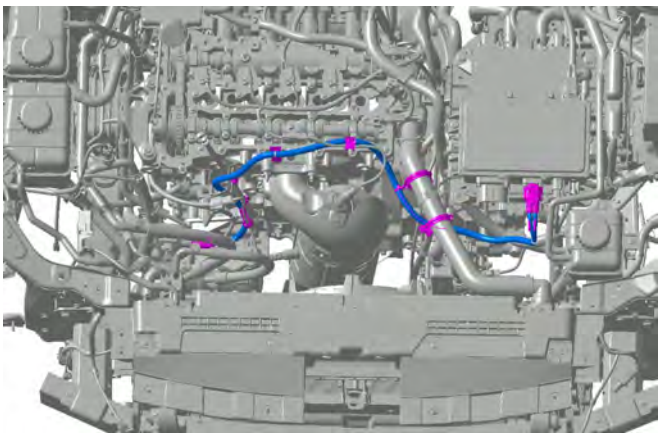
4.2.1 Instructions and operations

4.2.1.1 High-voltage harness

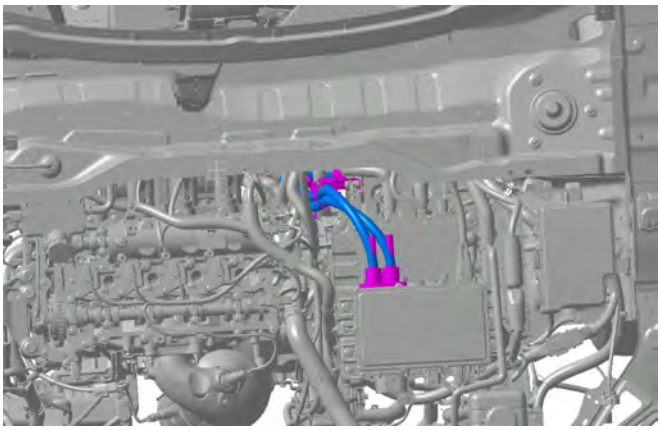
Fast/slow charging harness



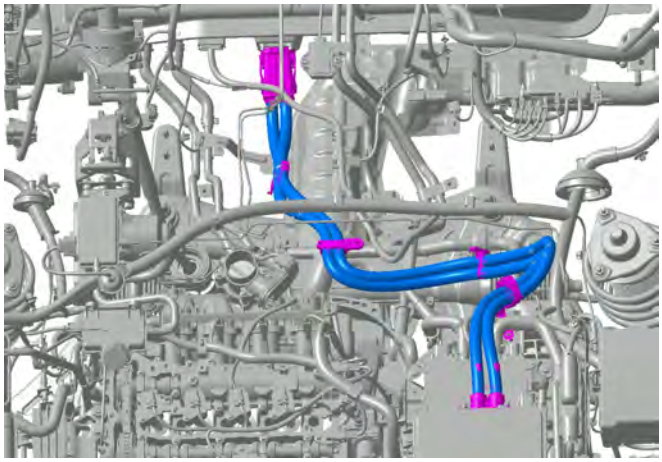
Compressor-PDU harness assembly



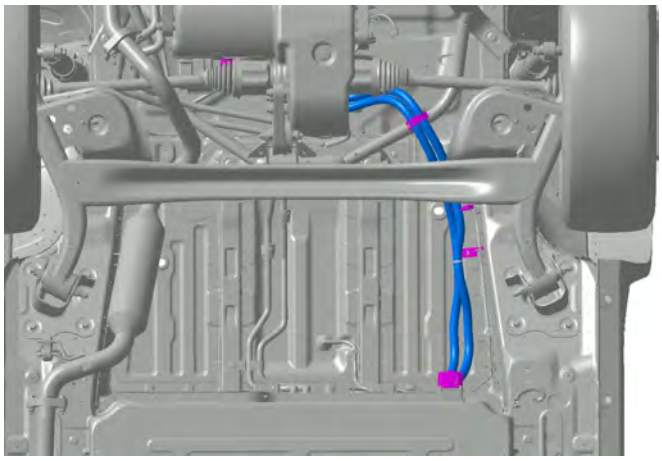
PDU-GCU harness assembly



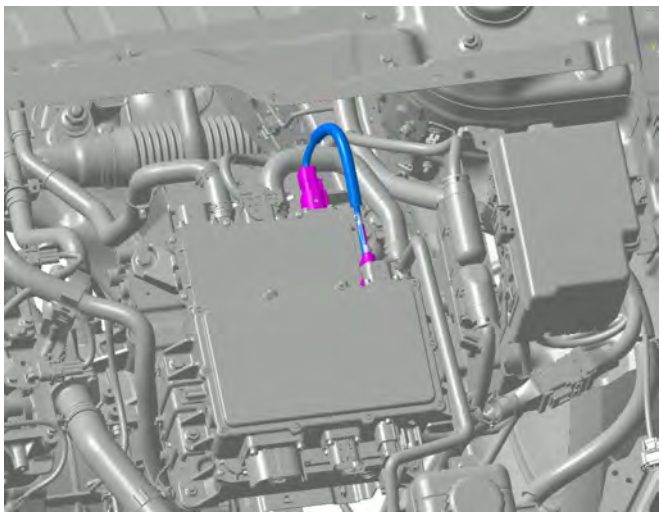
Battery pack-PDU harness assembly



Battery pack-MCU harness assembly



Two-in-one-PDU harness assembly



4.2.2 Diagnosis and testing

4.2.2.1 Diagnosis and testing

Inspection and confirmation

1. Confirm the problems raised by the customer and make corresponding inspections.
2. Visually check whether there is obvious mechanical or electrical damage, collision and deformation.
3. Check the system circuits which are easy to be seen or can be seen.
4. If an obvious burnt smell or overheated components are found during the inspection, first determine whether they have been damaged.
5. If the problem observed or raised is obvious and the cause has been found, the cause must be corrected before proceeding to the next step.
6. If the visual inspection passes, confirm the fault and refer to the fault symptoms table.

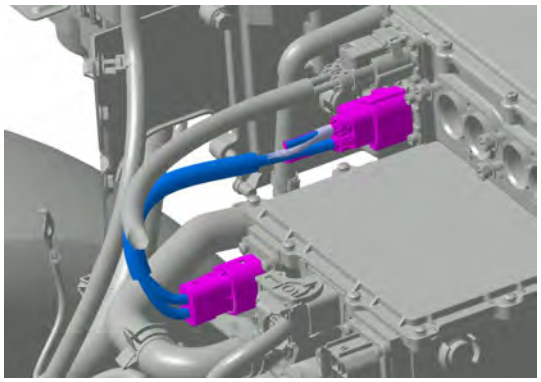
4.2.3 Removal and installation

4.2.3.1 Two-in-one-PDU harness assembly

Removal

1. Disconnect the negative battery cable.

2. Disconnect the PDU and two-in-one connector.



Installation

1. The installation order is the reverse of the removal order.

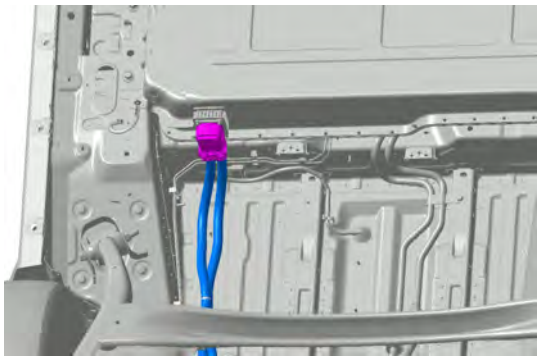
4.2.3.2 Battery pack-MCU harness assembly

Removal

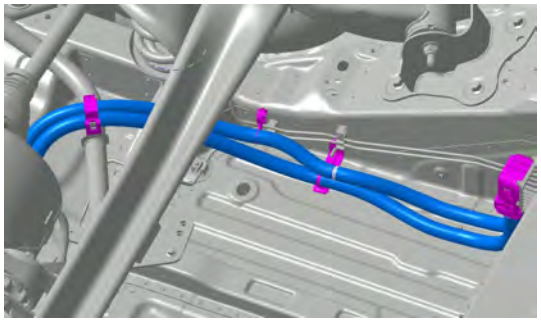
1. Disconnect the negative battery cable.

2. Lift the vehicle.

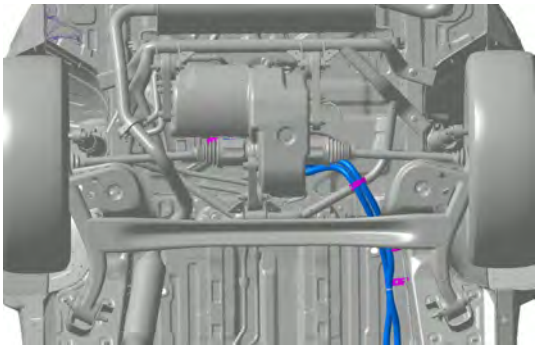
3. Disconnect the battery pack connector.



4. Remove the harness fixing clip.

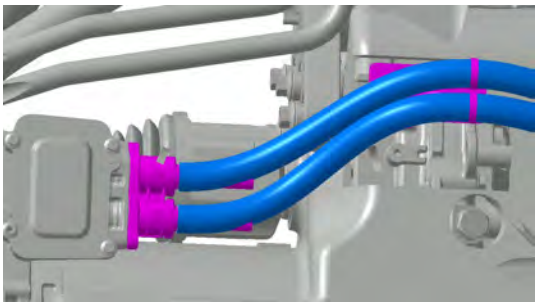


5. Remove the rear suspension.



6. Remove the MCU connector bolts and clips.

   torque:9.5±0.5Nm



Installation

1. The installation order is the reverse of the removal order.

4.2.3.3 PDU-GCU harness assembly

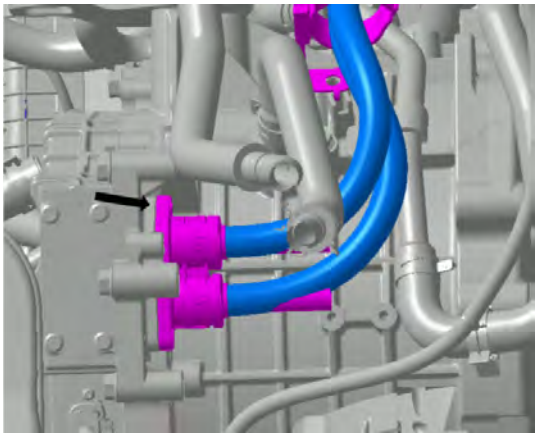
Removal

1. Disconnect the negative battery cable.

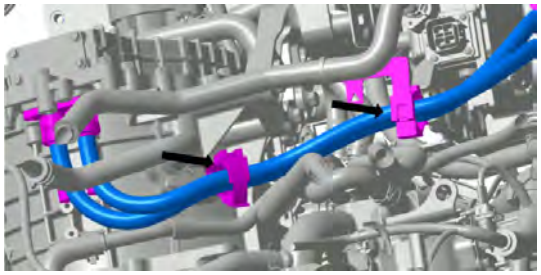
2. Lift the vehicle.

3. Remove the fixing bolts of GCU connector.

   torque:9.5±0.5Nm

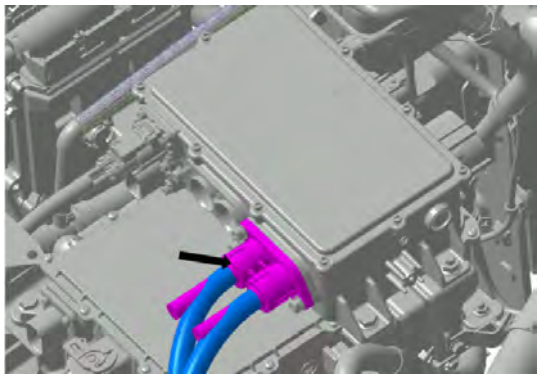


4. Remove the harness fixing clip.



5. Remove the fixing bolts of PDU connector.

torque:7±1Nm



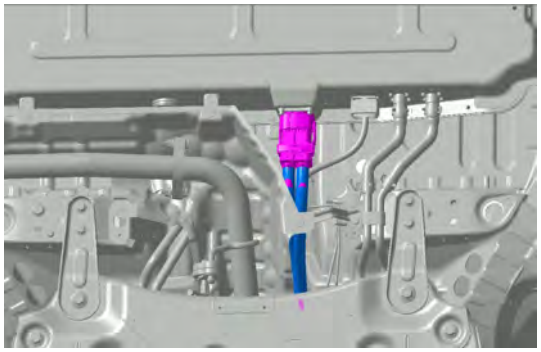
Installation

1. The installation order is the reverse of the removal order.

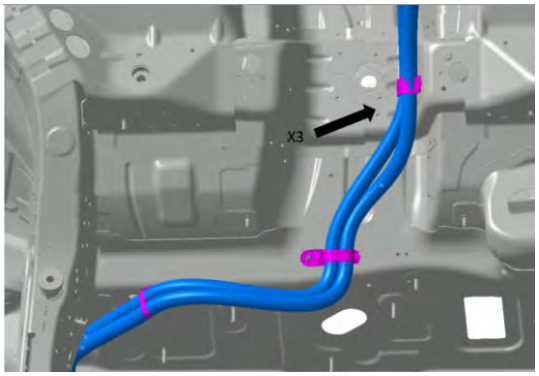
4.2.3.4 Battery pack-PDU harness assembly

Removal

1. Disconnect the negative battery cable.
2. Lift the vehicle.
3. Disconnect the connector connected to the battery.

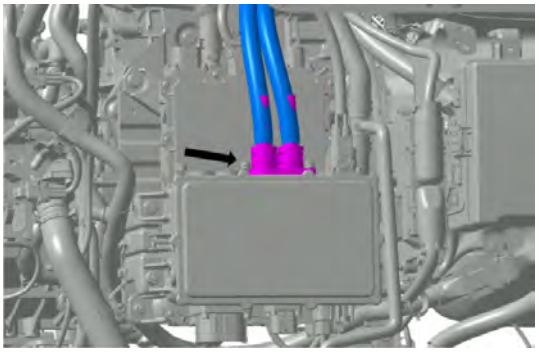


4. Remove the harness fixing bolts.

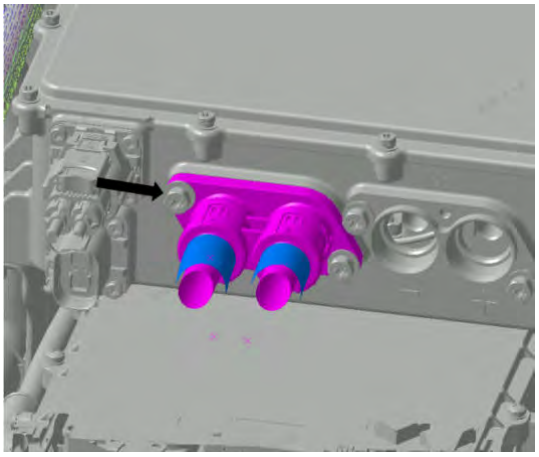


5. Remove the fixing bolts of power distribution box.

torque:7±1Nm



6. Remove the fixing bolts of PDU connector.



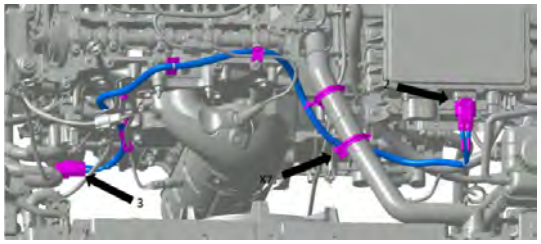
Installation

1. The installation order is the reverse of the removal order.

4.2.3.5 Compressor-PDU harness assembly

Removal

1. Disconnect the negative battery cable.
2. Disconnect the connector connecting the AC harness to the power distribution box.
3. Disconnect the connector connecting the AC harness to the compressor.
4. Remove the fixing clip of AC harness.



Installation

1. The installation order is the reverse of the removal order.

4.3 Battery

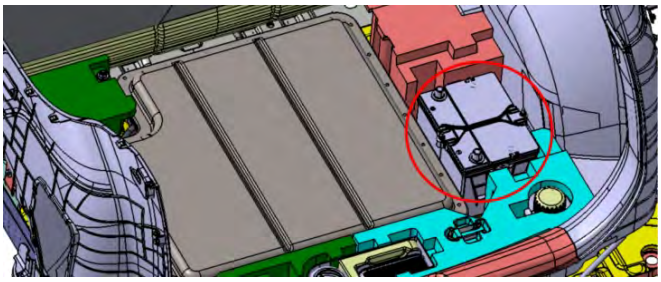
4.3.1 Specification

4.3.1.1 Torque specification

Name	Nm
Battery sensor and battery connection pile head	6±1.5

4.3.2 Instructions and operations

4.3.2.1 Battery



4.3.2.2 Overview

Function introduction

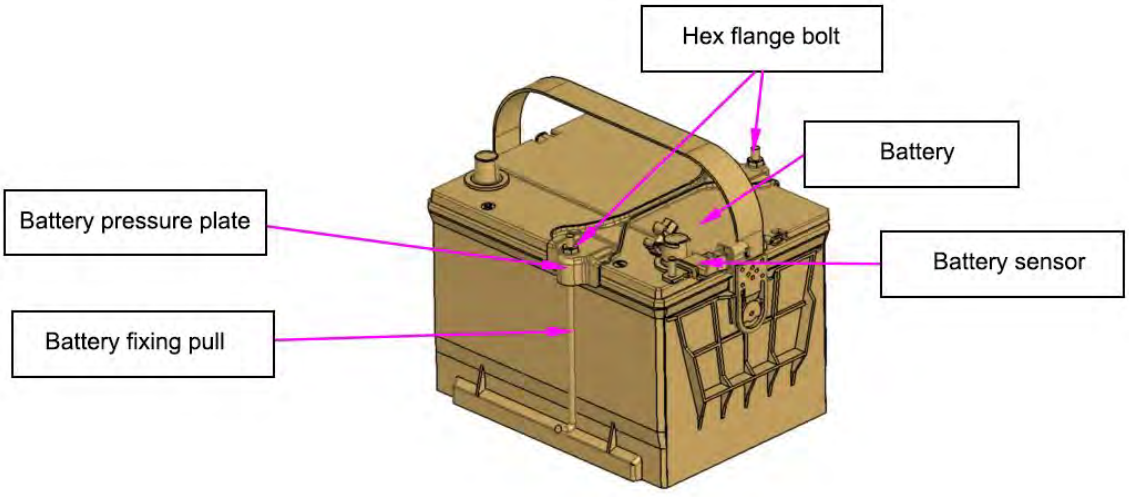
The main function of the battery is to supply power to the starter and ignition system when the engine starts, supply power to the electrical system of the vehicle when the alternator fails and does not work, and maintain the current consumption of each controller storage, memory and other modules when the vehicle is stationary.

The battery module consists of the parts listed in the following table:

S/N	Part Name	Quantity
1	Hex flange nut	2
2	Battery pressure plate	1
3	Battery fixing pull rod	2
4	Battery	1
5	Battery sensor	1

Composition Diagram of Battery Module

The battery module consists of the parts shown in Fig. 1 below:



4.3.2.3 Precautions

Precautions

1. **Caution:** Be sure to use a 12V battery.

2. **Caution:** Do not disconnect the battery cable when the engine is running.

3. **Caution:** Before connecting or disconnecting the engine ECU harness connector, turn the ignition switch to the OFF position and disconnect the GND cable of the battery. If not, the engine ECU may be damaged because the ECU voltage is still 12 V even when the ignition switch is at the "OFF" position.
4. **Caution:** Before disassembling parts and components, turn the ignition switch to the OFF position, and then disconnect the battery GND cable.
5. **Caution:** Do not disassemble the engine ECU.
6. **Caution:** Only use a digital multimeter to inspect the electronic fuel injection (EFI) system.
7. **Caution: Please use authentic parts and components for maintenance; otherwise, the EFI system may not operate properly.**
8. **Caution:** During maintenance, only unleaded petrol can be used.
9. **Caution: Please follow the specified maintenance and diagnostic procedures for maintenance work.**
10. **Caution: Do not disassemble the parts and components of the EFI system during maintenance.**
11. **Caution:** During maintenance, handle electronic components (ECU, sensors, etc.) with great care and do not let them fall to the ground.
12. **Caution: Develop an awareness of environmental protection and effectively handle any waste generated during maintenance.**

Precautions for battery maintenance process

1. **Caution:**Before removing the battery, turn off all electrical appliances of the vehicle.
2. **Caution:**When removing the battery, the negative terminal should be disconnected first; during reassembly, the positive terminal should be connected first.
3. **Caution:**When disassembling and assembling the battery, the tilt angle of the battery shall not be greater than 45°.
4. **Caution:**Prevent the battery's positive and negative terminals from short circuiting during removal.

4.3.3 Diagnosis and testing

4.3.3.1 Fault Diagnosis

Common battery faults and countermeasures

S/N	Fault Symptom	Fault analysis	Handling measures
1	The battery cannot work due to unstable voltage	Open circuit within the battery	Scrap the battery and replace it with a new one
	The reading is 0A and 0V during a load test.		
	When the charging voltage is 16V, the charging current is 0A		
2	The open-circuit voltage of the battery is about 10.5V, or decreases progressively by multiples of 2.1V.	Short circuit within the battery	Scrap the battery and replace it with a new one
3	Obvious acid mist, accompanied with pungent smell, leaks from the vent hole during charging.	Sulfation of the battery plates due to serious voltage insufficiency of the battery.	Slow charging with a low current (less than 4A) can partially restore capacity, but it should be replaced as soon as possible.
	During the discharge test, the battery voltage drops rapidly and falls to about 6V within 10 seconds.		
	The voltage and temperature of the battery, when charged, increase quickly.		
4	If the open-circuit voltage of the battery is 10.5V~12.2V, the current and voltage reduce quickly during a load discharge.	Failure to timely compensate electricity after a deep discharge of the battery.	The performance can be restored by replenishing electric energy. Note that the charging current is about one-sixth of the capacity and it takes about 10 hours to charge.
5	White or light yellow powders appear around the battery terminals.	The battery terminals are contaminated and corroded.	It can be used normally and, when necessary, cleaned with hot water or alkaline water and applied with Vaseline.

Caution:

– The negative harness should be removed when the battery is charged separately, i.e. no-load charging is required;

– The normal charging current is about one-sixth of the capacity. Excessive charging current will affect the charging efficiency and the battery's lifespan.

– The new battery must be checked before installation to ensure its open-circuited voltage is no less than 12.6V; otherwise, it needs recharging.

– Conditions for determining full charge.

– Measure the voltage of the battery terminals 15 minutes after stopping the charge (battery in open-circuited state, not connected to any load). The voltage must not be less than 12.8V and should not drop below 12.6V within 12 hours.

4.3.3.2 Diagnosis and testing

Power battery pack assembly

Special tools

Diagnostic scanner

Operating principle

European On-Board Diagnostics (EOBD)

EOBD is a diagnostic system integrated with the engine control module (ECM). The system continuously monitors emission parts of the vehicle. The system includes a fault indicator (MIL), which illuminates to alert the driver when there is a problem affecting emissions or causing a system fault. The data stored in the DTC memory module can be read by a universal diagnostic scanner.

EOBD calibration: including fault diagnosis process and method. Specifically, the content of fault diagnosis includes sensor fault, circuit fault, software fault, engine fault, etc.

5. Fault diagnosis process: including fault detection, analysis and diagnosis, fault prediction and safety protection.

6. Fault diagnosis method: Directly detect faults through various physical and chemical phenomena that accompany the fault. For example, abnormal signals output by water temperature, air temperature, intake manifold pressure sensor, etc. are detected. Use the symptoms corresponding to the fault to detect the fault. For example, if the speed signal fluctuates regularly under steady-state conditions, the fault of the fuel injector can be detected.

Inspection and confirmation

1. Confirm the issues raised by the customers and perform the appropriate inspections and road tests.

2. Check the appearance for obvious signs of mechanical or electrical damage.

Appearance Checklist

Mechanical	Electrical
– Sensor – Actuators	– Fuse – Wiring – Electrical connection

1. Solve the found problems before performing the next inspection.

2. If the cause cannot be determined by appearance, confirm the symptom first and then check according to the symptom table.

4.3.3.3 DTC table (EMS__G)

The diagnosis in this manual requires technicians to have a certain skill level and diagnostic practical experience.

Refer to: Diagnosis method (100-00 General information, description and operation).

DTC	Description	Operation
B340000	SOC jump	Refer to Battery Pack Troubleshooting - Accurate Test: B340000.dita
B34001F	SOH degradation	Refer to Battery Pack Troubleshooting - Accurate Test: B34001F.dita
B340020	Main positive relay cannot close	Refer to Battery Pack Troubleshooting - Accurate Test: B340020.dita
B340025	Main negative relay cannot close	Refer to Battery Pack Troubleshooting - Accurate Test: B340025.dita
B340026	Pre-charge relay cannot close	Refer to Battery Pack Troubleshooting - Accurate Test: B340026.dita
B340005	Pre-charging failure	Refer to Battery Pack Troubleshooting - Accurate Test: B340005.dita
B34001D	Pre-charging overcurrent	Refer to Battery Pack Troubleshooting - Accurate Test: B34001D.dita
B34001E	Charging current overcurrent fault	Refer to Battery Pack Troubleshooting - Accurate Test: B34001E.dita
B340027	Overcurrent fault when main relay is disconnected	Refer to Battery Pack Troubleshooting - Accurate Test: B340027.dita
B340028	Lead-acid battery overvoltage	Refer to Battery Pack Troubleshooting - Accurate Test: B340028.dita
B340029	Lead-acid battery undervoltage	Refer to Battery Pack Troubleshooting - Accurate Test: B340029.dita
B340009	Abnormal EEPROM	Refer to Battery Pack Troubleshooting - Accurate Test: B340009.dita
B34000A	DC charging - Charging termination due to incorrect VCM signal at parameter configuration phase	Refer to Battery Pack Troubleshooting - Accurate Test: B34000A.dita
B34000B	DC charging - VCM charging request termination at parameter configuration phase	Refer to Battery Pack Troubleshooting - Accurate Test: B34000B.dita
B34000C	DC charging - Charging termination due to VCM signal change in the charging phase	Refer to Battery Pack Troubleshooting - Accurate Test: B34000C.dita
B34000D	DC charging - VCM charging request termination fault in charging phase	Refer to Battery Pack Troubleshooting - Accurate Test: B34000D.dita
B34000E	DC charging - Charging pile sending signal timeout	Refer to Battery Pack Troubleshooting - Accurate Test: B34000E.dita

DTC	Description	Operation
B34000F	DC charging - charging termination request due to charging pile fault	Refer to Battery Pack Troubleshooting - Accurate Test: B34000F.dita
B340010	AC charging - Charging termination fault caused by OBC signal	Refer to Battery Pack Troubleshooting - Accurate Test: B340010.dita
B340011	AC charging - Charging termination fault caused by VCM signal	Refer to Battery Pack Troubleshooting - Accurate Test: B340011.dita
B340030	The heating relay cannot be attracted	Refer to Battery Pack Troubleshooting - Accurate Test: B340030.dita
B340031	Charging termination due to low battery pack temperature and no heating during charging	Refer to Battery Pack Troubleshooting - Accurate Test: B340031.dita
B340014	Cooling not started	Refer to Battery Pack Troubleshooting - Accurate Test: B340014.dita
B340015	Abnormal CC2 state detected by BMS	Refer to Battery Pack Troubleshooting - Accurate Test: B340015.dita
U240001	CANBusOff fault with the network connection to T-BOX	Refer to Battery Pack Troubleshooting - Accurate Test: U240001.dita
U240002	Fast charging CAN Bus Off fault	Refer to Battery Pack Troubleshooting - Accurate Test: U240002.dita
U240003	Internal CAN Bus Off fault	Refer to Battery Pack Troubleshooting - Accurate Test: U240003.dita
U029800	Communication with DCDC lost	Refer to Battery Pack Troubleshooting - Accurate Test: U029800.dita
U011000	MCU communication lost	Refer to Battery Pack Troubleshooting - Accurate Test: U011000.dita
U019B00	Loss of communication with OBC	Refer to Battery Pack Troubleshooting - Accurate Test: U019B00.dita
B340016	Water inlet temperature acquisition line open-circuited fault	Refer to Battery Pack Troubleshooting - Accurate Test: B340016.dita
B340017	Water inlet temperature acquisition line short-circuited fault	Refer to Battery Pack Troubleshooting - Accurate Test: B340017.dita
B340018	Water inlet temperature value range fault	Refer to Battery Pack Troubleshooting - Accurate Test: B340018.dita
B340019	Water inlet temperature too high	Refer to Battery Pack Troubleshooting - Accurate Test: B340019.dita
B34001A	Water outlet temperature acquisition line open-circuited fault	Refer to Battery Pack Troubleshooting - Accurate Test: B34001A.dita
B34001B	Water outlet temperature acquisition line short-circuited fault	Refer to Battery Pack Troubleshooting - Accurate Test: B34001B.dita
B34001C	Water outlet temperature value range fault	Refer to Battery Pack Troubleshooting - Accurate Test: B34001C.dita

DTC	Description	Operation
B340035	Smoke sensor self-inspection fault	Refer to Battery Pack Troubleshooting - Accurate Test: B340035.dita
B340036	Battery pack fast charging port copper bar temperature acquisition line open circuit fault	Refer to Battery Pack Troubleshooting - Accurate Test: B340036.dita
B340037	Battery pack fast charging port copper bar temperature acquisition line short circuit fault	Refer to Battery Pack Troubleshooting - Accurate Test: B340037.dita
B340038	Open circuit fault of vehicle fast charging port seat temperature acquisition line	Refer to Battery Pack Troubleshooting - Accurate Test: B340038.dita
B340039	Short circuit fault of vehicle fast charging port seat temperature acquisition line	Refer to Battery Pack Troubleshooting - Accurate Test: B340039.dita
B34003A	Abnormal heating component fault	Refer to Battery Pack Troubleshooting - Accurate Test: B34003A.dita
B34003E	DC charging-electronic lock not locked when power-on is requested	Refer to Battery Pack Troubleshooting - Accurate Test: B34003E.dita
B34003F	DC charging-electronic lock not locked in the charging stage	Refer to Battery Pack Troubleshooting - Accurate Test: B34003F.dita
B340100	Cell voltage level 1 too high	Refer to Battery Pack Troubleshooting - Accurate Test: B340100.dita
B340130	Cell voltage level 1 too low	Refer to Battery Pack Troubleshooting - Accurate Test: B340130.dita
B340102	Cell voltage level 1 difference too large	Refer to Battery Pack Troubleshooting - Accurate Test: B340102.dita
B340103	Battery pack level 1 overvoltage	Refer to Battery Pack Troubleshooting - Accurate Test: B340103.dita
B340104	Battery pack level 1 undervoltage	Refer to Battery Pack Troubleshooting - Accurate Test: B340104.dita
B340105	Abnormal total voltage of battery pack	Refer to Battery Pack Troubleshooting - Accurate Test: B340105.dita
B340106	Feedback current level 1 too high	Refer to Battery Pack Troubleshooting - Accurate Test: B340106.dita
B340107	Instantaneous discharge current level 1 too high	Refer to Battery Pack Troubleshooting - Accurate Test: B340107.dita
B340108	Continuous discharge current level 1 too high	Refer to Battery Pack Troubleshooting - Accurate Test: B340108.dita
B340109	Feedback power of battery pack too high	Refer to Battery Pack Troubleshooting - Accurate Test: B340109.dita

DTC	Description	Operation
B34010A	Excessive discharging power of battery pack	Refer to Battery Pack Troubleshooting - Accurate Test: B34010A.dita
B34010B	Positive insulation resistance level 1 leakage	Refer to Battery Pack Troubleshooting - Accurate Test: B34010B.dita
B34010C	Negative insulation resistance level 1 leakage	Refer to Battery Pack Troubleshooting - Accurate Test: B34010C.dita
B34010D	SOC too high	Refer to Battery Pack Troubleshooting - Accurate Test: B34010D.dita
B34010E	SOC too low	Refer to Battery Pack Troubleshooting - Accurate Test: B34010E.dita
B34010F	Equalisation circuit open-circuited	Refer to Battery Pack Troubleshooting - Accurate Test: B34010F.dita
B340110	Cell temperature level 1 too high	Refer to Battery Pack Troubleshooting - Accurate Test: B340110.dita
B340111	Cell temperature level-1 too low	Refer to Battery Pack Troubleshooting - Accurate Test: B340111.dita
B340112	Cell level 1 temperature difference too large	Refer to Battery Pack Troubleshooting - Accurate Test: B340112.dita
B340113	Positive/pre-charging relay adhesion	Refer to Battery Pack Troubleshooting - Accurate Test: B340113.dita
B340114	Negative contactor adhesion	Refer to Battery Pack Troubleshooting - Accurate Test: B340114.dita
B34012F	Heating relay adhesion fault	Refer to Battery Pack Troubleshooting - Accurate Test: B34012F.dita
B340115	High-voltage interlocking disconnection fault at vehicle end	Refer to Battery Pack Troubleshooting - Accurate Test: B340115.dita
B340116	High-voltage interlock disconnection fault inside battery pack	Refer to Battery Pack Troubleshooting - Accurate Test: B340116.dita
B340117	High-voltage interlocking disconnection fault at high-voltage connector	Refer to Battery Pack Troubleshooting - Accurate Test: B340117.dita
B340118	High-voltage interlock disconnection fault at MSD position	Refer to Battery Pack Troubleshooting - Accurate Test: B340118.dita
B340119	Cell voltage level-2 too high	Refer to Battery Pack Troubleshooting - Accurate Test: B340119.dita
B34011A	Cell voltage level-2 too low	Refer to Battery Pack Troubleshooting - Accurate Test: B34011A.dita
B34011B	Excessive cell voltage level 2 differential pressure	Refer to Battery Pack Troubleshooting - Accurate Test: B34011B.dita
B34011C	Battery pack level 2 overvoltage	Refer to Battery Pack Troubleshooting - Accurate Test: B34011C.dita

DTC	Description	Operation
B34011D	Battery pack level 2 undervoltage	Refer to Battery Pack Troubleshooting - Accurate Test: B34011D.dita
B34011E	Excessive cell level 2 temperature difference	Refer to Battery Pack Troubleshooting - Accurate Test: B34011E.dita
B34011F	Positive insulation resistance level 2 leakage	Refer to Battery Pack Troubleshooting - Accurate Test: B34011F.dita
B340120	Negative insulation resistance level 2 leakage	Refer to Battery Pack Troubleshooting - Accurate Test: B340120.dita
B340121	Slave control voltage acquisition line open-circuited	Refer to Battery Pack Troubleshooting - Accurate Test: B340121.dita
B340122	Slave control voltage acquisition line short-circuit fault	Refer to Battery Pack Troubleshooting - Accurate Test: B340122.dita
B340123	Slave control voltage range fault	Refer to Battery Pack Troubleshooting - Accurate Test: B340123.dita
B340124	Slave control temperature acquisition line open-circuited	Refer to Battery Pack Troubleshooting - Accurate Test: B340124.dita
B340125	Slave control temperature acquisition line short-circuited	Refer to Battery Pack Troubleshooting - Accurate Test: B340125.dita
B340126	Slave control temperature value range fault	Refer to Battery Pack Troubleshooting - Accurate Test: B340126.dita
B340127	Current sensor open-circuited	Refer to Battery Pack Troubleshooting - Accurate Test: B340127.dita
B340128	Current sensor short-circuited	Refer to Battery Pack Troubleshooting - Accurate Test: B340128.dita
B340129	Current sensor error	Refer to Battery Pack Troubleshooting - Accurate Test: B340129.dita
B34012A	Current value out of range	Refer to Battery Pack Troubleshooting - Accurate Test: B34012A.dita
B34012B	Equalisation circuit short-circuited	Refer to Battery Pack Troubleshooting - Accurate Test: B34012B.dita
B34012C	Feedback current level-2 too high	Refer to Battery Pack Troubleshooting - Accurate Test: B34012C.dita
B34012D	Instantaneous discharge current level 2 too high	Refer to Battery Pack Troubleshooting - Accurate Test: B34012D.dita
B34012E	Slave control power-on AFE (sampling analogue front end) self-inspection fault	Refer to Battery Pack Troubleshooting - Accurate Test: B34012E.dita
U240014	Daisy chain communication lost	Refer to Battery Pack Troubleshooting - Accurate Test: U240014.dita
U240010	Loss of communication with high-voltage acquisition module	Refer to Battery Pack Troubleshooting - Accurate Test: U240010.dita

DTC	Description	Operation
U240011	Current sensor communication loss	Refer to Battery Pack Troubleshooting - Accurate Test: U240011.dita
U240012	VCM communication lost	Refer to Battery Pack Troubleshooting - Accurate Test: U240012.dita
U240013	Loss of communication with Slave control	Refer to Battery Pack Troubleshooting - Accurate Test: U240013.dita
B340200	Cell voltage level-2 too high	Refer to Battery Pack Troubleshooting - Accurate Test: B340200.dita
B340219	Cell voltage level-2 too low	Refer to Battery Pack Troubleshooting - Accurate Test: B340219.dita
B340202	Excessive cell voltage level 2 differential pressure	Refer to Battery Pack Troubleshooting - Accurate Test: B340202.dita
B340203	Battery pack level 2 overvoltage	Refer to Battery Pack Troubleshooting - Accurate Test: B340203.dita
B340204	Battery pack level 2 undervoltage	Refer to Battery Pack Troubleshooting - Accurate Test: B340204.dita
B340205	Cell temperature level-2 too high	Refer to Battery Pack Troubleshooting - Accurate Test: B340205.dita
B340206	Cell temperature level-2 too low	Refer to Battery Pack Troubleshooting - Accurate Test: B340206.dita
B340207	Excessive cell level 2 temperature difference	Refer to Battery Pack Troubleshooting - Accurate Test: B340207.dita
B340208	Feedback current level-2 too high	Refer to Battery Pack Troubleshooting - Accurate Test: B340208.dita
B340209	Instantaneous discharge current level 2 too high	Refer to Battery Pack Troubleshooting - Accurate Test: B340209.dita
B34020A	Continuous discharge current level 2 too high	Refer to Battery Pack Troubleshooting - Accurate Test: B34020A.dita
B34020B	Positive insulation resistance level 2 leakage	Refer to Battery Pack Troubleshooting - Accurate Test: B34020B.dita
B34020C	Negative insulation resistance level 2 leakage	Refer to Battery Pack Troubleshooting - Accurate Test: B34020C.dita
B34020D	Slave control voltage acquisition line open-circuited	Refer to Battery Pack Troubleshooting - Accurate Test: B34020D.dita
B34020F	Slave control voltage range fault	Refer to Battery Pack Troubleshooting - Accurate Test: B34020F.dita
B340210	Slave control temperature acquisition line open-circuited	Refer to Battery Pack Troubleshooting - Accurate Test: B340210.dita
B340211	Slave control temperature acquisition line short-circuited	Refer to Battery Pack Troubleshooting - Accurate Test: B340211.dita

DTC	Description	Operation
B340212	Slave control temperature value range fault	Refer to Battery Pack Troubleshooting - Accurate Test: B340212.dita
B340215	Current sensor error	Refer to Battery Pack Troubleshooting - Accurate Test: B340215.dita
B340216	Current value out of range	Refer to Battery Pack Troubleshooting - Accurate Test: B340216.dita
B340217	Equalisation circuit short-circuited	Refer to Battery Pack Troubleshooting - Accurate Test: B340217.dita
B340218	Slave control power-on AFE (sampling analogue front end) self-inspection fault	Refer to Battery Pack Troubleshooting - Accurate Test: B340218.dita
U240023	Daisy chain communication lost	Refer to Battery Pack Troubleshooting - Accurate Test: U240023.dita
U012200	VCM communication lost	Refer to Battery Pack Troubleshooting - Accurate Test: U012200.dita
U007300	EVCANBusOff fault	Refer to Battery Pack Troubleshooting - Accurate Test: U007300.dita
U240020	Current sensor communication loss	Refer to Battery Pack Troubleshooting - Accurate Test: U240020.dita
U240021	Loss of communication with high-voltage acquisition module	Refer to Battery Pack Troubleshooting - Accurate Test: U240021.dita
U240022	Loss of communication with Slave control	Refer to Battery Pack Troubleshooting - Accurate Test: U240022.dita
B34021E	Main positive relay stuck fault	Refer to Battery Pack Troubleshooting - Accurate Test: B34021E.dita
B340300	Thermal runaway fault	Refer to Battery Pack Troubleshooting - Accurate Test: B340300.dita
B340301	The collision signal is valid	Refer to Battery Pack Troubleshooting - Accurate Test: B340301.dita
B340302	BMS emergency power-off (CAN signal)	Refer to Battery Pack Troubleshooting - Accurate Test: B340302.dita
B340303	BMS emergency power-off (hardwire signal)	Refer to Battery Pack Troubleshooting - Accurate Test: B340303.dita
B340305	Autonomous high-voltage power-off fault due to cell undervoltage	Refer to Battery Pack Troubleshooting - Accurate Test: B340305.dita
B340304	Autonomous high-voltage power-off fault due to cell overvoltage	Refer to Battery Pack Troubleshooting - Accurate Test: B340304.dita

4.3.3.4 Accurate Test: B340000

Accurate Test: B340000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340000	SOC jump	SOC jump value > 5% within 1S	Within 1S, SOC jump value ≤ 2%

Possible cause

– Poor cell consistency.

Repair recommendations

– After the vehicle has been powered off and left stationary for 1h, power it on, read the maximum and minimum cell voltages of the battery pack with a diagnostic scanner, and judge whether the difference between them is ≥ 200mv, if so, it means that the cell consistency becomes poor, and contact the battery manufacturer for maintenance; if not, please give feedback to the vehicle factory for further troubleshooting.

4.3.3.5 Accurate Test: B340005

Accurate Test: B340005

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340005	Pre-charging failure	After the main negative and pre-charging relays are closed, |"B+B-"-"P1+P-"| > 20V within 500ms or after the main positive is closed, |"B+B-"-"P1+P-"| > 10V within 200ms;	The high-voltage state is cleared after no fault is detected or the high voltage is successfully applied

Possible cause

– Pre-charge relay cannot close

– Main positive relay cannot close

– Main negative relay cannot close

– Abnormal vehicle capacitor circuit

Repair recommendations

– If the current fault includes not only the pre-charging failure, but also the B340020 main positive relay cannot be attracted, the B340025 main negative relay cannot be attracted, or the B340026 pre-charging relay cannot be attracted, first check them according to step 1 of the corresponding fault measures. If the current fault does not include any of the above 3 types of inability to attract faults, it means that the vehicle capacitor circuit is abnormal.

– If the capacitor circuit of the vehicle is abnormal, it is necessary to check whether there are abnormal startup, short circuit, poor contact and abnormal discharge in high-voltage parts such as high-voltage wires, motor controller, power output module, DCDC, A/C compressor and heating PTC of the vehicle.

4.3.3.6 Accurate Test: B34000A

Accurate Test: B34000A

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34000A	DC charging - Charging termination due to incorrect VCM signal at parameter configuration phase	DC charging-parameter configuration phase VCM_ ChargerAllow = 0 or VCM_ ChgPraOnReqMode=0	After the charging plug is pulled out for recovery or it is detected that the fault maturity conditions are not met

Possible cause

– In the quick charge parameter configuration phase, VCM sends a signal indicating that charging is not allowed or the vehicle is in a non-charging state.

Repair recommendations

– Reproduce the fault, check the current fault of the VCM controller, and solve the fault that stops charging under the charging plug state.

4.3.3.7 Accurate Test: B34000B

Accurate Test: B34000B

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34000B	DC charging - VCM charging request termination at parameter configuration phase	In the DC charging-fast charging interaction parameter configuration phase, BMS_ChargingStop= 0x0 is satisfied, and VCM_ ChargingStopRequest = 1 occurs	After the charging plug is pulled out for recovery or it is detected that the fault maturity conditions are not met

Possible cause

– In the quick charge parameter configuration phase, VCM sends a quick charge stop request signal.

Repair recommendations

– Reproduce the fault, check the current fault of the VCM controller, and solve the fault that stops charging under the charging plug state.

4.3.3.8 Accurate Test: B34000C

Accurate Test: B34000C

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34000C	DC charging - Charging termination due to VCM signal change in the charging phase	In the DC charging-fast charging interactive charging stage, BMS_ChargingStop= 0x0 is met and VCM3_RQ_ PRA_OnOff=0x0 occurs	After the charging plug is pulled out for recovery or it is detected that the fault maturity conditions are not met

Possible cause

– In the fast charging phase, VCM sends a signal indicating that charging is not allowed or the vehicle is in a non-charging state.

Repair recommendations

– Reproduce the fault, check the current fault of the VCM controller, and solve the fault that stops charging under the charging plug state.

4.3.3.9 Accurate Test: B34000D

Accurate Test: B34000D

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34000D	DC charging - VCM charging request termination fault in charging phase	In the DC charging-fast charging interactive charging stage, after high-voltage power-on is completed, BMS10_Status_PRA=0x2 and BMS_ChargingStop=0x0 are met, but VCM_ ChargingStopRequest == 0x1 occurs	After the charging plug is pulled out for recovery or it is detected that the fault maturity conditions are not met

Possible cause

– In the fast charging phase, VCM sends a fast charging stop request signal.

Repair recommendations

– Reproduce the fault, check the current fault of the VCM controller, and solve the fault that stops charging under the charging plug state.

4.3.3.10 Accurate Test: B34000E

Accurate Test: B34000E

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34000E	DC charging - Charging pile sending signal timeout	"Fast charging state:	DC charging - Charging pile sending signal timeout

Possible cause

– In the quick charge phase, the charging pile does not send the corresponding interactive signal to BMS on time, and BMS reports a timeout fault.

Repair recommendations

– Pull out the charging plug to recharge or change a charging pile.

4.3.3.11 Accurate Test: B34000F

Accurate Test: B34000F

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34000F	DC charging - charging termination request due to charging pile fault	"After entering the fast charging process, the charging pile actively sends a CST message to request to stop charging, and the message content is:	DC charging - charging termination request due to charging pile fault

Possible cause

– In the fast charging stage, the charging pile sends a charging stop request to BMS due to a fault.

Repair recommendations

– Pull out the charging plug to recharge or change a charging pile.

4.3.3.12 Accurate Test: B340010

Accurate Test: B340010

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340010	AC charging - Charging termination fault caused by OBC signal	During slow charging, if BMS_BatteryChargeStatus= 0x1 and BMS_ ChargingStop=0x0 are met, OBC_Status = Charger Fault will be reported.	After the charging plug is pulled out for recovery or it is detected that the fault maturity conditions are not met

Possible cause

– During the slow charging process, the OBC status is abnormal charging or CP status.

Repair recommendations

– Reproduce the fault, and check the cause of OBC abnormality when the charging plug is inserted.

4.3.3.13 Accurate Test: B340011

Accurate Test: B340011

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340011	AC charging - Charging termination fault caused by VCM signal	"During the slow charging process, when BMS_ BatteryChargeStatus= 0x1&BMS_ChargingStop= 0x0 are met, and BMS_ ChargingStop=0x0 is met,	AC charging - Charging termination fault caused by VCM signal

Possible cause

– During slow charging, VCM sends a signal indicating that charging is not allowed, the vehicle is in a non-charging state, or a request to stop charging.

Repair recommendations

– Reproduce the fault, check the current fault of the VCM controller, and solve the fault that stops charging under the charging plug state.

4.3.3.14 Accurate Test: B340015

Accurate Test: B340015

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340015	Abnormal CC2 state detected by BMS	The resistance value of CC2 is: 0Ω≤R < 750Ω or 1250Ω < R < 10KΩ	After detecting that the fault maturity conditions are not met, store DTC and clear the current fault, or pull out the charging plug for recovery

Possible cause

– Abnormal resistance of fast charging port base

– Abnormal vehicle CC2 signal line

– Abnormal resistance of fast charging plug of charging pile

– Abnormal BMS

Repair recommendations

– Use a multimeter to detect whether the resistance between vehicle CC1, CC2 and PE is 1000±30 Ω respectively. If the resistance is abnormal, replace the fast charging port base.

– Check whether pin 13 of the low-voltage connector of the battery pack to the charging port base CC2 is connected. If it is abnormal, replace the harness.

– Detect whether the resistance between the fast charging plug CC1 and the PE of the charging pile is 1000 ± 30Ω with a multimeter. If the resistance is abnormal, contact the charging pile manufacturer for maintenance.

– Eliminate the abnormal resistance of the fast charging port seat and the abnormal CC2 signal line of the vehicle. If it still fails to charge after being replaced with a normal charging pile, contact the battery factory to check whether the battery pack BMS is abnormal.

4.3.3.15 Accurate Test: B340016

Accurate Test: B340016

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340016	Water inlet temperature acquisition line open-circuited fault	Check for Inlet Temperature open wires between ADCs of MCU and the NTC	After detecting that the fault maturity conditions are not met, store DTC and clear the current fault.

Possible cause

– Poor contact of water inlet temperature sensor.

– Disconnection of water inlet temperature acquisition line.

– Water inlet temperature acquisition circuit fault.

Repair recommendations

– Re-plug the water inlet temperature sensor to connect it properly.

– Check whether the water inlet temperature sensor to BMS connector is conductive. If not, replace the harness.

– After troubleshooting the causes of poor contact of the water inlet temperature sensor and disconnection of the water inlet temperature acquisition line, contact the battery factory to check whether there is any abnormality in the water inlet temperature acquisition circuit of the BMS.

4.3.3.16 Accurate Test: B340017

Accurate Test: B340017

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340017	Water inlet temperature acquisition line short-circuited fault	Check for Inlet Temperature short wires between ADCs of MCU and the NTC	After detecting that the fault maturity conditions are not met, store DTC and clear the current fault.

Possible cause

– Poor contact of water inlet temperature sensor.

– Water inlet temperature acquisition line short-circuited.

– Water inlet temperature acquisition circuit fault.

Repair recommendations

– Re-plug the water inlet temperature sensor to connect it properly.

– Check whether the connector between the water inlet temperature sensor and BMS is short-circuited to the body ground. If so, replace the harness.

– After troubleshooting the causes of poor contact of the water inlet temperature sensor and short circuit of the water inlet temperature acquisition line, contact the battery factory to check whether there is any abnormality in the water inlet temperature acquisition circuit of the BMS.

4.3.3.17 Accurate Test: B340019

Accurate Test: B340019

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340019	Water inlet temperature too high	Water inlet temperature ≥ 70° C	Water inlet temperature < 55° C

Possible cause

– The water inlet temperature is too high (≥70°C).

– The water inlet temperature sensor is damaged.

– Water inlet temperature acquisition circuit fault.

Repair recommendations

– Check whether the water temperature at the inlet of the battery pack is abnormally high (≥70°C), and if so, check whether the heater PTC is damaged.

– Replace the original water inlet temperature sensor with a normal one (the water outlet temperature sensor without reported fault can be used). If no fault is reported at this time, it indicates that the water inlet temperature sensor is damaged and needs to be replaced.

– After troubleshooting the causes of excessive water inlet temperature and damage to the water inlet temperature sensor, contact the battery factory to check whether the water inlet temperature acquisition circuit of the battery management system BMS is abnormal.

4.3.3.18 Accurate Test: B34001A

Accurate Test: B34001A

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34001A	Water outlet temperature acquisition line open-circuited fault	Check for Outlet Temperature open wires between ADCs of MCU and the NTC	After detecting that the fault maturity conditions are not met, store DTC and clear the current fault.

Possible cause

– Poor contact of water outlet temperature sensor.

– Disconnection of water outlet temperature acquisition line.

– Water outlet temperature acquisition circuit fault.

Repair recommendations

– Re-plug the water outlet temperature sensor to connect it properly.

– Check whether the water outlet temperature sensor to BMS connector is conductive. If not, replace the harness.

– After troubleshooting the causes of poor contact of the water outlet temperature sensor and disconnection of the water outlet temperature acquisition line, contact the battery factory to check whether there is any abnormality in the water outlet temperature acquisition circuit of the battery management system BMS.

4.3.3.19 Accurate Test: B34001B

Accurate Test: B34001B

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34001B	Water outlet temperature acquisition line short-circuited fault	Check for Outlet Temperature short wires between ADCs of MCU and the NTC	After detecting that the fault maturity conditions are not met, store DTC and clear the current fault.

Possible cause

– Poor contact of water outlet temperature sensor.

– Water outlet temperature acquisition line short-circuited.

– Water outlet temperature acquisition circuit fault.

Repair recommendations

– Re-plug the water outlet temperature sensor to connect it properly.

– Check whether the connector between water outlet temperature sensor and BMS is short-circuited to body. If so, replace the harness.

– After troubleshooting the causes of poor contact of the water outlet temperature sensor and short circuit of the water outlet temperature acquisition line, contact the battery factory to check whether the water outlet temperature acquisition circuit of the battery management system BMS is abnormal.

4.3.3.20 Accurate Test: B34001D

Accurate Test: B34001D

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34001D	Pre-charging overcurrent	BMS_BatteryCurrent<-0.3* ("B+B-"/"Pre-R") (ratio of the inner high voltage to the pre-charge resistor resistance) BMS_BatteryCurrent: positive for charging and negative for discharging, only considering the discharge current	Restore after the next successful pre-charging

Possible cause

– On-load discharge occurs during the pre-charging of vehicle powered up to high-voltage.

Repair recommendations

– Check all high-voltage parts of the vehicle, such as the high-voltage wire, motor controller, power output module, DCDC, A/C compressor, and heating PTC, for abnormal startup, short circuit, poor contacts, or abnormal discharge.

4.3.3.21 Accurate Test: B34001E

Accurate Test: B34001E

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34001E	Charging current overcurrent fault	During AC charging or DC charging: 1. Overcurrent protection conditions: below 0°C, the current flowing into the battery pack is greater than the allowable current flowing into the battery pack + 1A, and after 10s, stop charging 2. Overcurrent protection conditions: above 0°C, the current flowing into the battery pack is greater than the allowable current flowing into the battery pack + 5A, and after 10s, stop charging. If any of the conditions 1~2 are met, end charging and report the fault	After the charging plug is pulled out or it is detected that the fault maturity conditions are not met, DTC will be stored and the current fault will be cleared.

Possible cause

– Abnormal charging pile: During charging, the current entering the battery pack is greater than the requested current of the battery pack.

– The Hall sensor (shunt) detects abnormality.

Repair recommendations

– Compare the requested current of the battery with the output current of the charging pile. If the output current of the charging pile is continuously greater than the requested current of the battery pack, the charging pile is abnormal.

– If the output current of the charging pile is not continuously greater than the requested current of the battery pack, it indicates that the Hall sensor (shunt) in the battery pack is abnormal. Consider replacing the Hall sensor (shunt).

4.3.3.22 Accurate Test: B34001F

Accurate Test: B34001F

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34001F	SOH degradation	SOH < 80%	SOH >= 80%

Possible cause

– Battery capacity attenuation

Repair recommendations

– Handle according to warranty terms.

4.3.3.23 Accurate Test: B340020

Accurate Test: B340020

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340020	Main positive relay cannot close	After successful pre-charging, close the main positive relay and disconnect the pre-charging relay to meet ("B+B-" – "P1+P-" > 20v) and the absolute value of bus current is ≤1A	The high-voltage state is cleared after no fault is detected or the high voltage is successfully applied

Possible cause

– Main positive relay fault.

– BMS fault

– Poor contact of harness inside the battery pack.

Repair recommendations

– After recording all current and historical faults, turn the key off to shut down the vehicle, disconnect the negative terminal of the lead-acid battery (small battery) for 10s and then reconnect it, and try turning the key on to high-voltage mode.

– If the fault cannot be cleared after several attempts of Step 1, please contact the battery pack manufacturer for on-site troubleshooting and maintenance.

4.3.3.24 Accurate Test: B340025

Accurate Test: B340025

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340025	Main negative relay cannot close	After the pre-charging timeout fails, ("B+B-" – "B+P-" >= 30v) is met and the absolute value of bus current is ≤1A. After driving the main negative relay, it is judged that the AD threshold is greater than 500 and the bus current insulation value is ≤1A Note: Total voltage: 224V; AD value when the main negative relay is not closed: 974.848, and AD value when it is closed: 61.44; total voltage: 408.8V; AD value when the main negative relay is not closed: 1777.664, and AD value when it is closed: 83.5584	The high-voltage state is cleared after no fault is detected or the high voltage is successfully applied

Possible cause

– Main negative relay fault

– BMS fault

– Poor contact of harness inside the battery pack.

Repair recommendations

– After recording all current and historical faults, turn the key off to shut down the vehicle, disconnect the negative terminal of the lead-acid battery (small battery) for 10s and then reconnect it, and try turning the key on to high-voltage mode.

– If the fault cannot be cleared after several attempts of Step 1, please contact the battery pack manufacturer for on-site troubleshooting and maintenance.

4.3.3.25 Accurate Test: B340026

Accurate Test: B340026

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340026	Pre-charge relay cannot close	After the pre-charging timeout fails, ("B+B-" – "P1 +B-" >= 30v) is met and the absolute value of bus current ≤ 1A	The high-voltage state is cleared after no fault is detected or the high voltage is successfully applied

Possible cause

– Pre-charge relay fault

– BMS fault

– Poor contact of harness inside the battery pack.

Repair recommendations

– After recording all current and historical faults, turn the key off to shut down the vehicle, disconnect the negative terminal of the lead-acid battery (small battery) for 10s and then reconnect it, and try turning the key on to high-voltage mode.

– If the fault cannot be cleared after several attempts of Step 1, please contact the battery pack manufacturer for on-site troubleshooting and maintenance.

4.3.3.26 Accurate Test: B340027

Accurate Test: B340027

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340027	Overcurrent fault when main relay is disconnected	The absolute value of current is greater than 5A within 1000ms after receiving the power-off request	Power-on command received again or BMS powered off in sleep mode

Possible cause

– When the vehicle is powered off from high voltage, high-voltage parts and components such as the motor controller, motor, power output module, DCDC, A/C compressor and heating PTC still work, and the current on the high-voltage circuit is > 5A.

Repair recommendations

– Check whether the high-voltage parts and components such as the motor controller, motor, power output module, DCDC, A/C compressor and heating PTC work abnormally, and replace the abnormal parts and components.

4.3.3.27 Accurate Test: B340028

Accurate Test: B340028

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340028	Lead-acid battery overvoltage	BMS PowerV > 16V	BMS PowerV ≤ 14V

Possible cause

– Lead-acid battery overcharge caused by DC/DC converter malfunction.

– Fault of voltage detection circuit inside the BMS.

Repair recommendations

– Open the engine bonnet in front of the vehicle, and check the voltage of the lead-acid battery when the vehicle is powered off from high voltage.

– If the lead-acid battery voltage is above 16V when the vehicle is in high-voltage power-off mode, check whether the battery is damaged according to the battery's technical standards. If it is damaged, replace it. If not, adjust it to within (12V,14V) for use. If the battery voltage only goes over 16V when the vehicle is in high-voltage power-on mode, check whether the DC/DC converter is faulty.

– If the lead-acid battery voltage is within 10~15V under both high and low voltage conditions, it is determined that there is a circuit fault in the internal detection voltage of the BMS and the battery pack needs to be repaired.

4.3.3.28 Accurate Test: B340029

Accurate Test: B340029

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340029	Lead-acid battery undervoltage	BMS PowerV < 9V	BMS PowerV ≥ 10V

Possible cause

– Lead-acid battery over-discharge caused by DC/DC converter malfunction.

– Fault of voltage detection circuit inside the BMS.

Repair recommendations

– Open the engine bonnet in front of the vehicle, and check the voltage of the lead-acid battery when the vehicle is powered off from high voltage.

– If the lead-acid battery voltage is lower than 9V when the vehicle is in high-voltage power-off mode, check whether the battery is damaged according to its technical standards. Replace the battery if it is damaged. If not, charge the battery to within (12V,14V) for use. If the battery voltage drops below 9V only when the vehicle is in high-voltage power-on mode, check whether the DCDC converter is faulty.

– If the lead-acid battery voltage is within 10~15V under both high and low voltage conditions, it is determined that there is a circuit fault in the internal detection voltage of the BMS and the battery pack needs to be repaired.

4.3.3.29 Accurate Test: B340030

Accurate Test: B340030

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340030	The heating relay cannot be attracted	When the heating is closed under high-voltage, the difference between the heating acquisition voltage and the internal pressure is greater than 20V	No fault is detected during BMS sleep power-off or heating

Possible cause

– Heating relay fault.

– BMS fault

– Poor contact of harness inside the battery pack.

Repair recommendations

– After recording all current and historical faults, turn the key off to shut down the vehicle, disconnect the negative terminal of the lead-acid battery (small battery) for 10s and then reconnect it, and try turning the key on to high-voltage mode.

– If the fault cannot be cleared after several attempts of Step 1, please contact the battery pack manufacturer for on-site troubleshooting and maintenance.

4.3.3.30 Accurate Test: B340035

Accurate Test: B340035

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340035	Smoke sensor self-inspection fault	The smoke self-inspection fault signal is set or the smoke signal cannot be received for a period of time	Release if the confirmation conditions are not met

Possible cause

– The smoke sensor is in poor contact.

– The acquisition line is open-circuited.

– BMS system fault.

Repair recommendations

– Contact the battery factory for maintenance and inspection.

4.3.3.31 Accurate Test: B340038

Accurate Test: B340038

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340038	Open circuit fault of vehicle fast charging port seat temperature acquisition line	Detection during fast charging; Check for any open wires between ADCs of LTC and the cells	After detecting that the fault maturity conditions are not met, store DTC and clear the current fault.

Possible cause

– The fast charging port base temperature sensor is in poor contact.

– The temperature acquisition line of the fast charging port seat is disconnected.

– The temperature acquisition circuit of fast charging port base is faulty.

Repair recommendations

– Plug and unplug the connector of fast charging port socket again.

– Check whether the fast charging port seat temperature sensor is conductive to the battery pack connector (pins 8 and 9). If not, replace the harness.

– After troubleshooting the causes of poor contact of the fast charging port seat temperature sensor and disconnection of the fast charging port seat temperature acquisition line, contact the battery factory to check whether there is any abnormality in the fast charging port temperature sensor acquisition circuit of the BMS BMS.

4.3.3.32 Accurate Test: B340039

Accurate Test: B340039

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340039	Short circuit fault of vehicle fast charging port seat temperature acquisition line	Detection during fast charging; Check for any short wires between ADCs of LTC and the cells	After detecting that the fault maturity conditions are not met, store DTC and clear the current fault.

Possible cause

– Fault of Quick Charging Port Temperature Sensor.

– The temperature acquisition line of the fast charging port seat is short-circuited.

– The temperature acquisition circuit of fast charging port base is faulty.

Repair recommendations

– Plug and unplug the connector of fast charging port socket again.

– Check whether the fast charging port seat temperature sensor is conductive to the battery pack connector (pins 8 and 9). If not, replace the harness.

– After troubleshooting the fast charging port seat temperature sensor fault and the short circuit fault of the fast charging port seat temperature acquisition line, contact the battery factory to check whether the fast charging port temperature sensor acquisition circuit of the BMS BMS is abnormal.

4.3.3.33 Accurate Test: B34003A

Accurate Test: B34003A

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34003A	Abnormal heating component fault	After the heating relay is energised, 60 minutes later, Tmin temperature rise ≤3°C	After detecting that the fault maturity conditions are not met or powering off, store DTC and clear the current fault.

Possible cause

– Poor contact of heating film.

– The heating film connecting wire is disconnected.

– Heating fuse open-circuited.

Repair recommendations

– Contact the battery factory to check the heating film of the battery pack.

4.3.3.34 Accurate Test: B340100

Accurate Test: B340100

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340100	Cell voltage level 1 too high	Ucell,max > 3.66V	Ucell,max ≤3.65V

Possible cause

– The battery pack is overcharged, causing the cell voltage to exceed 3.66V.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Discharge the vehicle to 90% SOC. If the fault disappears, the battery pack is overcharged; if the fault still exists after discharging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

4.3.3.35 Accurate Test: B340102

Accurate Test: B340102

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340102	Cell voltage level 1 difference too large	15℃ ≤ Tmin ,Ucell,max-Ucell,min ≥ 0.80V	Ucell,max - Ucell,min ≤ 0.30V

Possible cause

– Over-discharge of cells.

– The internal resistance of the cell increases.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Charge with a small current and then discharge, repeat several times, leave it stationary for 30 minutes, and check again whether the fault still exists; if the fault disappears, it is determined to be cause ①, and can be used normally; if the fault does not disappear, contact the battery pack manufacturer for on-site inspection and maintenance.

4.3.3.36 Accurate Test: B340103

Accurate Test: B340103

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340103	Battery pack level 1 overvoltage	Uit ≥ (3.650* CellNum) V (Uit is the cumulative total voltage of the module BMS_ SumVoltage)	Uit < (3.6 * CellNum) V (Uit is the cumulative total voltage of the module BMS_ SumVoltage)

Possible cause

– Overcharge of battery pack.

– Fault of battery pack voltage detection circuit inside the BMS.

Repair recommendations

– Drive the vehicle to consume the power to 50%, if the voltage recovers to normal and the fault disappears, it is determined as battery pack overcharge, the vehicle can be used normally, if the fault still occurs frequently after recovery, contact the battery pack manufacturer to replace the BMS on site; if the fault never disappears, proceed to the next step.

– With the vehicle in high-voltage READY state, use a diagnostic scanner to close the quick charge positive relay, wear insulating gloves and measure the voltage between the positive and negative terminals of the vehicle's fast charging port with a multimeter to confirm the actual battery pack voltage.

– If the battery pack voltage measured by the multimeter differs from the voltage displayed by the instrument by more than 5V, it is a circuit fault in the BMS that detects the battery pack voltage. Please contact the battery pack manufacturer for on-site inspection and repair.

4.3.3.37 Accurate Test: B340104

Accurate Test: B340104

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340104	Battery pack level 1 undervoltage	①Uit ≤ (2.40 * CellNum) V (20°C<T) ②Uit ≤ (2.05 * CellNum) V(T≤20°C) (Uit is the module's cumulative total voltage BMS_SumVoltage)	Uit > (2.35*CellNum)V (Uit is the cumulative total voltage of the module BMS_ SumVoltage)

Possible cause

– Over-discharge of battery pack.

– Fault of battery pack voltage detection circuit inside the BMS.

Repair recommendations

– Drive the vehicle and charge the power to 50%. If the voltage recovers to normal and the fault disappears, it is determined as battery pack over-discharge, and the vehicle can be used normally; if the fault still occurs frequently after recovery, contact the battery pack manufacturer to replace the BMS on site; if the fault never disappears, proceed to the next step.

– With the vehicle in high-voltage READY state, use a diagnostic scanner to close the quick charge positive relay, wear insulating gloves and measure the voltage between the positive and negative terminals of the vehicle's fast charging port with a multimeter to confirm the actual battery pack voltage.

– If the battery pack voltage measured by the multimeter differs from the voltage read by the diagnostic scanner by more than 5V, it is a circuit fault in the BMS that detects the battery pack voltage. Please contact the battery pack manufacturer for on-site inspection and repair.

4.3.3.38 Accurate Test: B340105

Accurate Test: B340105

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340105	Abnormal total voltage of battery pack	ABS (CellTotalVoltage-BatteryVoltage) ≥ 50V && ABS (PackI) < 5A	ABS(CellTotalVoltage-BatteryVoltage) ≤ 25V

Possible cause

Under the low current condition, the difference between the total voltage acquisition value of the battery pack and the sum of cell voltages is greater than 35V.

– Abnormal voltage acquisition of battery pack cell

– Abnormal total voltage acquisition of battery pack.

Repair recommendations

– Contact the battery pack manufacturer to replace the module or slave control or internal harness of the battery pack.

– Contact the battery pack manufacturer to replace the BMS or internal harness.

4.3.3.39 Accurate Test: B340106

Accurate Test: B340106

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340106	Feedback current level 1 too high	Current > 360A	Current < 300A

Possible cause

– Excessive charging current during vehicle energy recovery.

– The current sensor installed in the high-voltage power distribution box (BDU) of the battery pack is faulty.

Repair recommendations

– Stop the vehicle, turn off all electrical equipment and power off from high voltage. After the vehicle goes into sleep mode, restart the vehicle to a high-voltage state without turning on electrical equipment (A/C and external equipment). If the fault disappears, it is determined that the discharging current of the vehicle is too large. Please confirm whether the vehicle is equipped with other electrical equipment resulting in excessive power consumption. It is not allowed to install additional high-voltage electrical equipment. The vehicle can be used normally after the fault disappears.

– If this fault still occurs frequently in the future, or the fault does not disappear, it is determined that the current sensor is faulty and the battery manufacturer needs to be contacted to replace the current sensor.

4.3.3.40 Accurate Test: B340107

Accurate Test: B340107

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340107	Instantaneous discharge current level 1 too high	Current > 540A	Instantaneous discharge current level 1 too high

Possible cause

– Excessive discharging current

– The current sensor installed in the high-voltage power distribution box (BDU) of the battery pack is faulty.

Repair recommendations

– Stop the vehicle, turn off all electrical equipment and power off from high voltage. After the vehicle goes into sleep mode, restart the vehicle to a high-voltage state without turning on electrical equipment (A/C and external equipment). If the fault disappears, it is determined that the discharging current of the vehicle is too large. Please confirm whether the vehicle is equipped with other electrical equipment resulting in excessive power consumption. It is not allowed to install additional high-voltage electrical equipment. The vehicle can be used normally after the fault disappears.

– If this fault still occurs frequently in the future, or the fault does not disappear, it is determined that the current sensor is faulty and the battery manufacturer needs to be contacted to replace the current sensor.

4.3.3.41 Accurate Test: B340109

Accurate Test: B340109

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340109	Feedback power of battery pack too high	(PackV*PackI) > 1.05*Available Charge Power && PackI > 1A && Available Charge Power > 2kw && Except Charging Mode	(PackV*PackI) ≤ Available Charge Power

Possible cause

– Excessive charging power during vehicle energy recovery.

– The current sensor installed in the high-voltage power distribution box (BDU) of the battery pack is faulty.

– Abnormal total voltage acquisition of battery pack.

Repair recommendations

– Check whether the motor, EHB and VCM are faulty, resulting in excessive power during energy recovery.

– If there is no abnormality in the motor, EHB and VCM, contact the battery manufacturer to check the current sensor and the battery pack management system on site.

4.3.3.42 Accurate Test: B34010A

Accurate Test: B34010A

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34010A	Excessive discharging power of battery pack	(PackV*PackI) >1.05 *Available Discharge Power && PackI < -1A && Available Discharge Power > 2kw	(PackV*PackI) ≤ Available Discharge Power

Possible cause

– Excessive discharging power of battery pack.

– The current sensor installed inside the high-voltage distribution box is faulty.

– Abnormal total voltage acquisition of battery pack.

Repair recommendations

– Stop the vehicle, turn off all electrical equipment, power off from high voltage. After the vehicle goes into sleep mode, restart the vehicle to a high voltage state without turning on electrical equipment (A/C and external equipment), if the fault disappears, it is determined that the discharging current of the vehicle is too large, please confirm whether the vehicle is equipped with other electrical equipment resulting in excessive power consumption. It is not allowed to install additional high-voltage electrical equipment. The vehicle can be used normally after the fault disappears.

– If this fault occurs frequently in subsequent uses or does not disappear, contact the battery manufacturer to check the current sensor and battery pack management system on site.

4.3.3.43 Accurate Test: B34010B

Accurate Test: B34010B

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34010B	Positive insulation resistance level 1 leakage	Negative Isolation resistance Low voltage, driving, slow charging①.<700Ω/V Fast charging②.<500Ω/V	Positive Isolation resistance Low voltage, driving, slow charging ① > 1000Ω/V Fast charging ②: > 600Ω/V

Possible cause

The insulation resistance between high-voltage (+) and body GND is too low.

– Low vehicle insulation

– Low battery pack insulation

– Low battery pack insulation

Repair recommendations

– Disconnect the high-voltage harness connecting the battery pack to the vehicle, and measure the insulation resistance of the vehicle's positive pole with a megohmmeter. If the detected insulation resistance value is less than 300 KΩ, it can be determined as cause ①. Please detect which high-voltage device of the vehicle fails according to the insulation resistance detection step in the technical requirements for assembling of OBC/MCU/A/C compressor/battery pack heater/high-voltage harness, and replace the faulty parts and components after identifying.

– If the normal insulation resistance value measured in the previous step is large enough (>300KΩ), it is determined that the cause is low battery pack insulation or low battery pack insulation. Contact the battery manufacturer to go to the site for inspection and repair.

4.3.3.44 Accurate Test: B34010C

Accurate Test: B34010C

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34010C	Negative insulation resistance level 1 leakage	Negative Isolation resistance Low voltage, driving, slow charging ①.<700Ω/V fast charging ②.< 500Ω / V	Positive Isolation resistance Low voltage, driving, slow charging ① > 1000Ω/V Fast charging ②: > 600Ω/V

Possible cause

The insulation resistance between high-voltage (-) and body GND is too low.

– Low vehicle insulation

– Low battery pack insulation

– Fault of insulation resistance detection circuit of the BMS.

Repair recommendations

– Disconnect the high-voltage harness connecting the battery pack to the vehicle, and measure the insulation resistance of the vehicle's negative pole with a megohmmeter. If the detected insulation resistance value is less than 300 KΩ, it can be determined as cause ①. Please detect which high-voltage device of the vehicle fails according to the insulation resistance detection step in the technical requirements for assembling of OBC/MCU/A/C compressor/battery pack heater/high-voltage harness, and replace the faulty parts and components after identifying.

– If the normal insulation resistance value measured in the previous step is large enough (>300KΩ), it is determined that the cause is low battery pack insulation or low battery pack insulation. Contact the battery manufacturer to go to the site for inspection and repair.

4.3.3.45 Accurate Test: B34010D

Accurate Test: B34010D

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34010D	SOC too high	SOC ≥TBD (because the usable range is 3%-100%)	SOC <TBD (because the usable range is 3%-100%)

Possible cause

– Overcharging of battery pack.

– Abnormal voltage of slave control acquisition cell

– Battery pack fault

Repair recommendations

– Start the vehicle and drive for some time to drop the battery pack SOC to 50%. If the fault disappears, it is determined as cause ①. After the fault disappears, the vehicle can be used normally. If this fault occurs frequently, contact the battery manufacturer for on-site inspection and maintenance.

– If the fault remains, remove the battery pack and use a multimeter to measure the voltage between the high-voltage positive and negative terminals. Confirm the actual battery pack voltage.

– If the voltage is abnormal (the difference between the measured voltage and the total voltage reported by BMS is more than 5V), it is determined that the cause is abnormal cell voltage collected from the slave control or battery pack fault. Contact the battery manufacturer for on-site inspection and maintenance.

4.3.3.46 Accurate Test: B34010E

Accurate Test: B34010E

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34010E	SOC too low	VCM_OnePedalMode≠0x1 and BMS_SOC ≤ 2.5%	VCM_OnePedalMode=0x1 or BMS_SOC ≥ 3%

Possible cause

– Overdischarging of battery pack

– Abnormal voltage of slave control acquisition cell

– Battery pack fault

Repair recommendations

– Charge for a period of time to allow the battery pack SOC to rise to 50%. If the fault disappears, it is determined that the battery pack is over-discharged. After the fault disappears, the vehicle can be used normally. If this fault occurs frequently, remove the battery pack and contact the battery pack manufacturer for on-site inspection and maintenance.

– If the fault does not disappear and the vehicle is in the high-voltage READY state, use a diagnostic scanner to close the quick charge positive relay, wear insulating gloves, and measure the voltage between the positive and negative terminals of the vehicle's fast charging port with a multimeter to confirm the actual battery pack voltage. If the voltage is abnormal (the difference between the measured voltage and the total voltage reported by BMS is more than 5V), it is determined that the cause is abnormal cell voltage collected from the slave control or battery pack fault. Contact the battery pack manufacturer to go to the site for inspection and maintenance.

4.3.3.47 Accurate Test: B340110

Accurate Test: B340110

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340110	Cell temperature level 1 too high	TCell,max > 50℃	TCell,max ≤ 48℃

Possible cause

– The temperature sensor installed in the cell module fails.

– Fault of temperature sensor detection circuit inside the BMS.

– Battery pack overtemperature

Repair recommendations

– Stop the vehicle in a high-voltage service state, leave it stationary for 30 min on the premise that the coolant is sufficient and the cooling system can work normally, and then check whether the fault disappears. If the fault disappears, the actual temperature of the battery pack is too high. After the fault disappears, the vehicle can be used normally, and the reason is that the battery pack temperature is too high; If this fault occurs frequently in subsequent uses, please check whether the battery pack cooling system is effective and whether coolant leaks; If the fault never disappears, contact the battery manufacturer for on-site inspection and maintenance.

4.3.3.48 Accurate Test: B340112

Accurate Test: B340112

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340112	Cell level 1 temperature difference too large	TCell,max - TCell,min ≥ 25℃	TCell,max - TCell,min ≤ 17℃

Possible cause

It is detected that the temperature difference between cells is too large, ≥ 25°C.

– The temperature sensor installed in the cell module fails.

– Fault of temperature sensor detection circuit inside the BMS.

– The actual temperature difference of the battery pack cell is large.

Repair recommendations

– Under room temperature, park the vehicle for 24 hours in a sleep state. After 24 hours, restart the vehicle. If the fault disappears and the vehicle can be used normally, it is determined that there is an excessive actual temperature difference between battery cells. The possible causes are as follows:

– Coolant leakage, resulting in insufficient coolant which leads to poor cooling effect.

– The cooler solenoid valve is abnormal, and the coolant in the passenger compartment cooling circuit leaks into the battery pack cooling circuit. At this time, the battery pack cooling circuit coolant pump is not driven, the coolant cannot flow, and all modules are cooled. The temperature difference between the modules is large, and then the battery cell temperature difference warning is reported.

– If the fault still exists, contact the battery pack manufacturer for on-site inspection and maintenance.

4.3.3.49 Accurate Test: B340114

Accurate Test: B340114

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340114	Negative contactor adhesion	After the main positive adhesion detection is completed first, the main negative adhesion detection shall be carried out. Main negative adhesion detection: AD threshold ≤500 Note: The total voltage is 224V, and the unclosed AD value of the main negative relay is 974.848; the closed AD value is 61.44; the total voltage is 408.8V; the unclosed AD value of the main negative relay is 1777.664; the closed AD value is 83.5584	BMS sleep power-off

Possible cause

– Main negative relay high-voltage contact adhesion

– BMS fault

Repair recommendations

– Turn off the vehicle, wear insulating gloves and unplug the high-voltage connectors connecting the battery pack to the PDU.

– Power on the vehicle, use a diagnostic scanner to close the main positive relay (if positive contactor adhesion and negative contactor adhesion coexist, no diagnostic scanner is needed), and then measure the voltage between the positive and negative terminals of the battery pack with a multimeter. If the detected voltage is > 192V, the main negative relay is adhered; contact the battery manufacturer to replace the main negative relay on site.

– If there is no adhesion in the main negative relay, the BMS detection is abnormal. In this case, contact the battery manufacturer for inspection, maintenance and replacement of the BMS on site.

4.3.3.50 Accurate Test: B340115

Accurate Test: B340115

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340115	High-voltage interlocking disconnection fault at vehicle end	The high-voltage interlock signal is cleared (the collected level signal is 0). Note: It is used to diagnose the high-voltage interlock of battery pack high-voltage connector.	After detecting that the fault maturity conditions are not met, store DTC and clear the current fault.

Possible cause

– Battery pack low-voltage connector fault.

– The interlock circuit fault of the high-voltage connector in the BMS (refer to 6.2 for the schematic diagram).

– PDU high-voltage interlock circuit fault.

– Harness high-voltage interlock circuit fault.

Repair recommendations

– Use a multimeter to check whether the high-voltage interlock circuit at the harness end is conductive. If it is conductive, it is a battery pack end high-voltage interlock fault, and then proceed to the next step.

– Contact the battery pack factory for on-site maintenance (suspected faulty parts in the battery pack: BMS harness assembly, BMS main control board).

4.3.3.51 Accurate Test: B340117

Accurate Test: B340117

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340117	High-voltage interlocking disconnection fault at high-voltage connector	The high-voltage interlock signal is cleared (the collected level signal is 0). Note: It is used to diagnose the high-voltage interlock at the vehicle end and is detected by low-voltage connector wiring.	After detecting that the fault maturity conditions are not met, store DTC and clear the current fault.

Possible cause

– Battery pack high-voltage connector fault

– Interlock circuit fault of high-voltage connector unit in BMS

Repair recommendations

– Replace the high-voltage connector of the battery pack, and restart the vehicle after it sleeps. If the fault disappears, it is determined that the high-voltage connector of the battery pack fails; if the fault does not disappear, the cause of the fault is a fault in the interlocking circuit of the high-voltage connector in the BMS. Contact the battery pack factory to go to the site for maintenance (suspected faulty parts in the battery pack: BMS harness assembly, BMS main control board).

4.3.3.52 Accurate Test: B340119

Accurate Test: B340119

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340119	Cell voltage level-2 too high	Ucell,max ≥ 3.67	Ucell,max < 3.66

Possible cause

– The battery pack is overcharged, causing the cell voltage to exceed 3.67V.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Discharge the vehicle to 90% SOC. If the fault disappears, the battery pack is overcharged; if the fault still exists after discharging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

4.3.3.53 Accurate Test: B34011A

Accurate Test: B34011A

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34011A	Cell voltage level-2 too low	① Ucell,min ≤ 2.15V(20℃ < T) ; ② Ucell,min ≤ 1.95V (T≤20℃);	① Ucell,min > 2.3V(20℃ < T) ; ② Ucell,min > 2.1V (T≤20℃);

Possible cause

– Over-discharge of battery pack.

– Cell fault.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Charge the vehicle to 10% SOC. If the fault disappears, it is battery pack over-discharge; if the fault still exists after charging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

4.3.3.54 Accurate Test: B34011C

Accurate Test: B34011C

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34011C	Battery pack level 2 overvoltage	Uit ≥ (3.66 * CellNum) V (Uit is the module cumulative total voltage BMS_ SumVoltage)	Uit < (3.63* CellNum) V (Uit is the module cumulative total voltage BMS_ SumVoltage)

Possible cause

– Overcharge of battery pack.

– Battery pack fault

– Fault of battery pack voltage detection circuit inside the BMS.

Repair recommendations

– Drive the vehicle to consume the power to 50%, if the voltage recovers to normal and the fault disappears, it is determined as battery pack overcharge, the vehicle can be used normally, if the fault still occurs frequently after recovery, contact the battery pack manufacturer to replace the BMS on site; if the fault never disappears, proceed to the next step.

– With the vehicle in high-voltage READY state, use a diagnostic scanner to close the quick charge positive relay, wear insulating gloves and measure the voltage between the positive and negative terminals of the vehicle's fast charging port with a multimeter to confirm the actual battery pack voltage.

– If the battery pack voltage measured by the multimeter differs from the voltage displayed by the instrument by more than 5V, the reason is a circuit fault in the BMS that detects the battery pack voltage or a battery pack fault. Please contact the battery pack manufacturer for on-site inspection and maintenance.

4.3.3.55 Accurate Test: B34011D

Accurate Test: B34011D

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34011D	Battery pack level 2 undervoltage	Uit ≤ (2.25 * CellNum) V(20° C < T) Uit ≤ (2.0 * CellNum) V (T ≤ 20°C); (Uit is the module cumulative total voltage BMS_SumVoltage)	Uit > (2.25 * CellNum) V(20° C < T) Uit > (2.15 * CellNum) V(T ≤ 20°C); (Uit is the module cumulative total voltage BMS_SumVoltage)

Possible cause

– Over-discharge of battery pack.

– Battery pack fault

– Fault of battery pack voltage detection circuit inside the BMS.

Repair recommendations

– Drive the vehicle and charge the power to 50%. If the voltage recovers to normal and the fault disappears, it is determined as battery pack over-discharge, and the vehicle can be used normally; if the fault still occurs frequently after recovery, contact the battery pack manufacturer to replace the BMS on site; if the fault never disappears, proceed to the next step.

– With the vehicle in high-voltage READY state, use a diagnostic scanner to close the quick charge positive relay, wear insulating gloves and measure the voltage between the positive and negative terminals of the vehicle's fast charging port with a multimeter to confirm the actual battery pack voltage.

– If the battery pack voltage measured by the multimeter differs from the voltage displayed by the instrument by more than 5V, the reason is a circuit fault in the BMS that detects the battery pack voltage or a battery pack fault. Please contact the battery pack manufacturer for on-site inspection and maintenance.

4.3.3.56 Accurate Test: B34011F

Accurate Test: B34011F

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34011F	Positive insulation resistance level 2 leakage	Negative Isolation resistance < 600Ω / V	Negative Isolation resistance > 1000Ω / V

Possible cause

The insulation resistance between high-voltage (+) and body GND is too low.

– Low vehicle insulation

– Low battery pack insulation

– Fault of insulation resistance detection circuit of the BMS.

Repair recommendations

– Disconnect the high-voltage harness connecting the battery pack to the vehicle, and measure the insulation resistance of the vehicle's positive pole with a megohmmeter. If the detected insulation resistance value is less than 250KΩ, it is determined that the insulation of the whole vehicle is low, please query which high-voltage device of the vehicle has a fault according to the insulation resistance detection step in the technical requirements for assembly of OBC/MCU/A/C compressor/battery pack heater/high-voltage harness, and replace the parts and components after identifying the faulty parts.

– If the normal insulation resistance value measured in the previous step is large enough (>250KΩ), it is determined that the cause is a fault in the insulation resistance detection circuit of the BMS or low insulation of the battery pack. In this case, contact the battery manufacturer to go to the site for inspection and repair.

4.3.3.57 Accurate Test: B340120

Accurate Test: B340120

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340120	Negative insulation resistance level 2 leakage	Negative Isolation resistance < 600Ω / V	Negative Isolation resistance > 1000Ω / V

Possible cause

The insulation resistance between high-voltage (-) and body GND is too low.

– Low vehicle insulation

– Low battery pack insulation

– Fault of insulation resistance detection circuit of the BMS.

Repair recommendations

– Disconnect the high-voltage harness connecting the battery pack to the vehicle, and use a megohmmeter to measure the negative insulation resistance of the whole vehicle. If the detected insulation resistance value is less than 250KΩ, it is determined that the cause is low insulation of the whole vehicle. Please follow the insulation resistance detection steps in the OBC/MCU/A/C Compressor/Battery Pack Heater/High-voltage Harness Assembly Technical Conditions to find out which high-voltage device of the vehicle has failed, and replace the parts and components after clarifying the faulty part.

– If the normal insulation resistance value measured in the previous step is large enough (>250KΩ), it is determined that the cause is a fault in the insulation resistance detection circuit of the BMS or low insulation of the battery pack. In this case, contact the battery manufacturer to go to the site for inspection and repair.

4.3.3.58 Accurate Test: B340121

Accurate Test: B340121

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340121	Slave control voltage acquisition line open-circuited	Check for any open wires between ADCs of LTC and the cells	After detecting that the fault maturity conditions are not met, store DTC and clear the current fault.

Possible cause

– Poor connection of slave control acquisition harness.

– Open circuit of cell voltage acquisition line.

– Fault of slave control voltage acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

4.3.3.59 Accurate Test: B340123

Accurate Test: B340123

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340123	Slave control voltage range fault	"Cell Voltage out of range Check	Slave control voltage range fault

Possible cause

– Cell voltage out of range, < 1V or > 4.5V.

– Fault of slave control voltage acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

4.3.3.60 Accurate Test: B340124

Accurate Test: B340124

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340124	Slave control temperature acquisition line open-circuited	Check for any open wires between ADCs of LTC and the cells	After detecting that the fault maturity conditions are not met, store DTC and clear the current fault.

Possible cause

– Poor contact of the temperature sensor on the module.

– Open circuit of module temperature acquisition line.

– Fault of slave control temperature acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

4.3.3.61 Accurate Test: B340125

Accurate Test: B340125

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340125	Slave control temperature acquisition line short-circuited	Check for any short wires between ADCs of LTC and the cells	After detecting that the fault maturity conditions are not met, store DTC and clear the current fault.

Possible cause

– Poor contact of the temperature sensor on the module.

– Short circuit of module temperature acquisition line.

– Fault of slave control temperature acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

4.3.3.62 Accurate Test: B34012C

Accurate Test: B34012C

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34012C	Feedback current level-2 too high	Current > 410A	Feedback current level-2 too high

Possible cause

– Excessive charging current during vehicle energy recovery.

– The current sensor installed in the high-voltage power distribution box (BDU) of the battery pack is faulty.

Repair recommendations

– Check whether the motor, EHB and VCM are faulty, resulting in excessive current during energy recovery.

– If there is no abnormality in the motor, EHB, and VCM, it is determined that the current sensor is faulty. Please contact the battery manufacturer to repair and replace the current sensor.

4.3.3.63 Accurate Test: B34012D

Accurate Test: B34012D

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34012D	Instantaneous discharge current level 2 too high	Current > 560A	Current < 460A

Possible cause

– Excessive discharging current

– The current sensor installed in the high-voltage power distribution box (BDU) of the battery pack is faulty.

Repair recommendations

– Stop the vehicle, turn off all electrical equipment, power off from high voltage. After the vehicle goes into sleep mode, restart the vehicle to a high voltage state without turning on electrical equipment (A/C and external equipment), if the fault disappears, it is determined that the discharging current of the vehicle is too large, please confirm whether the vehicle is equipped with other electrical equipment resulting in excessive power consumption. It is not allowed to install additional high-voltage electrical equipment. The vehicle can be used normally after the fault disappears.

– If this fault still occurs frequently in the future, or the fault has not disappeared, it is determined to be a current sensor fault. Please contact the battery manufacturer for repair and replacement of the current sensor.

4.3.3.64 Accurate Test: B34012F

Accurate Test: B34012F

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34012F	Heating relay adhesion fault	Under high-voltage status, when the heating is not closed, it is detected that the difference between the heating acquisition voltage and the internal pressure is less than 20	Clear when there is no fault or BMS sleeps and powers off

Possible cause

– The high-voltage contact of the heating relay is stuck.

– BMS fault

Repair recommendations

– Contact the battery manufacturer for on-site inspection and maintenance.

4.3.3.65 Accurate Test: B340130

Accurate Test: B340130

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340130	Cell voltage level 1 too low	① Ucell,min ≤ 2.3V(20℃ < T) ; ② Ucell,min ≤2.0V (T≤20℃);	① Ucell,min > 2.5V(20℃ < T) ; ② Ucell,min > 2.3V (T≤20℃);

Possible cause

– Over-discharge of battery pack.

– Cell fault.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Charge the vehicle to 10% SOC. If the fault disappears, it is battery pack over-discharge; if the fault still exists after charging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

4.3.3.66 Accurate Test: B340200

Accurate Test: B340200

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340200	Cell voltage level-2 too high	Ucell,max ≥ 3.67V	(IGN ON signal changes from 12V voltage to 0V or IGN ON signal changes from 0V voltage to 12V or CC/CC2 signal changes from connected to disconnected or CC/CC2 signal changes from disconnected to connected) && Store DTC and clear the current fault after detecting that the fault maturity conditions are not met;

Possible cause

– The battery pack is overcharged, causing the cell voltage to exceed 3.63V.

– Cell fault.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Discharge the vehicle to 90% SOC. If the fault disappears, the battery pack is overcharged; if the fault still exists after discharging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

4.3.3.67 Accurate Test: B340203

Accurate Test: B340203

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340203	Battery pack level 2 overvoltage	Uit ≥ (3.66* CellNum) V (Uit is the cumulative total voltage of the module BMS_ SumVoltage)	(The current fault is cleared after the IGN ON signal changes from 12V (the voltage of the IGN ON signal changes from 12V to 0V or the voltage of the IGN ON signal changes from 0V to 12V) && it is detected that Uit < (3.68* CellNum) V is met. The voltage becomes 0V or the IGN ON signal changes from 0V to 12V or the CC/CC2 signal changes from connected to disconnected or the CC/CC2 signal changes from disconnected to connected) && After detecting that the fault maturity conditions are not met, store DTC and clear the current fault;

Possible cause

– Overcharge of battery pack.

– Fault of battery pack voltage detection circuit inside the BMS.

Repair recommendations

– Drive the vehicle to consume the power to 50%, if the voltage recovers to normal and the fault disappears, it is determined as battery pack overcharge, the vehicle can be used normally, if the fault still occurs frequently after recovery, contact the battery pack manufacturer to replace the BMS on site; if the fault never disappears, proceed to the next step.

– With the vehicle in high-voltage READY state, use a diagnostic scanner to close the quick charge positive relay, wear insulating gloves and measure the voltage between the positive and negative terminals of the vehicle's fast charging port with a multimeter to confirm the actual battery pack voltage.

– If the battery pack voltage measured by the multimeter differs from the voltage displayed by the instrument by more than 5V, the cause is a circuit fault in the BMS that detects the battery pack voltage. Please contact the battery pack manufacturer for on-site inspection and repair.

4.3.3.68 Accurate Test: B340204

Accurate Test: B340204

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340204	Battery pack level 2 undervoltage	Uit ≤ (2.25 * CellNum) V(20° C < T) Uit ≤ (2.0 * CellNum) V (T ≤ 20°C); (Uit is the module cumulative total voltage BMS_SumVoltage)	(IGN ON signal changes from 12V voltage to 0V or IGN ON signal changes from 0V voltage to 12V or CC/CC2 signal changes from connected to disconnected or CC/CC2 signal changes from disconnected to connected) && Store DTC and clear the current fault after detecting that the fault maturity conditions are not met;

Possible cause

– Over-discharge of battery pack.

– Fault of battery pack voltage detection circuit inside the BMS.

Repair recommendations

– Drive the vehicle and charge the power to 50%. If the voltage recovers to normal and the fault disappears, it is determined as battery pack over-discharge, and the vehicle can be used normally; if the fault still occurs frequently after recovery, contact the battery pack manufacturer to replace the BMS on site; if the fault never disappears, proceed to the next step.

– With the vehicle in high-voltage READY state, use a diagnostic scanner to close the quick charge positive relay, wear insulating gloves and measure the voltage between the positive and negative terminals of the vehicle's fast charging port with a multimeter to confirm the actual battery pack voltage.

– If the battery pack voltage measured by the multimeter differs from the voltage displayed by the instrument by more than 5V, it is a circuit fault in the BMS that detects the battery pack voltage. Please contact the battery pack manufacturer for on-site inspection and repair.

4.3.3.69 Accurate Test: B340205

Accurate Test: B340205

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340205	Cell temperature level-2 too high	TCell,max > 60℃	(IGN ON signal changes from 12V voltage to 0V or IGN ON signal changes from 0V voltage to 12V or CC/CC2 signal changes from connected to disconnected or CC/CC2 signal changes from disconnected to connected) && Store DTC and clear the current fault after detecting that the fault maturity conditions are not met;

Possible cause

– The temperature sensor installed in the cell module fails.

– Fault of temperature sensor detection circuit inside the BMS.

– Battery pack overtemperature

Repair recommendations

– Stop the vehicle in a high-voltage service state, leave it stationary for 30 min on the premise that the coolant is sufficient and the cooling system can work normally, and then check whether the fault disappears. If the fault disappears, the actual temperature of the battery pack is too high. After the fault disappears, the vehicle can be used normally, and the reason is that the battery pack temperature is too high; If this fault occurs frequently in subsequent uses, please check whether the battery pack cooling system is effective and whether coolant leaks; If the fault never disappears, contact the battery manufacturer for on-site inspection and maintenance.

4.3.3.70 Accurate Test: B340206

Accurate Test: B340206

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340206	Cell temperature level-2 too low	1. 2. Fast charging: TCell,min < -30°C Note: During slow charging, the battery pack can be heated in pure heating mode, so this fault is degraded during slow charging	(IGN ON signal changes from 12V voltage to 0V or IGN ON signal changes from 0V voltage to 12V or CC/CC2 signal changes from connected to disconnected or CC/CC2 signal changes from disconnected to connected) && Store DTC and clear the current fault after detecting that the fault maturity conditions are not met;

Possible cause

– Battery heater PTC fault.

– The temperature sensor installed in the cell module fails.

– Fault of temperature sensor detection circuit inside the BMS.

Repair recommendations

– Stop the vehicle and keep it in a high-voltage READY state. When there is sufficient coolant, check whether the battery heater PTC can work normally. If not, replace the battery heater PTC, and then detect whether the fault disappears. If the fault disappears, it is caused by the battery heater PTC fault. The vehicle can be used normally later; If there is no abnormality in the heater and the fault has not disappeared, contact the battery manufacturer to go to the site for inspection and maintenance.

4.3.3.71 Accurate Test: B340208

Accurate Test: B340208

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340208	Feedback current level-2 too high	Current > 410A	Feedback current level-2 too high

Possible cause

– Excessive charging current during vehicle energy recovery.

– The current sensor installed in the high-voltage power distribution box (BDU) of the battery pack is faulty.

Repair recommendations

– Check whether the motor, EHB and VCM are faulty, resulting in excessive current during energy recovery.

– If there is no abnormality in the motor, EHB, and VCM, it is determined that the current sensor is faulty. In this case, contact the battery manufacturer to check and replace the current sensor on site.

4.3.3.72 Accurate Test: B340209

Accurate Test: B340209

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340209	Instantaneous discharge current level 2 too high	Current > 560A	Instantaneous discharge current level 2 too high

Possible cause

– Excessive discharging current

– The current sensor installed in the high-voltage power distribution box (BDU) of the battery pack is faulty.

Repair recommendations

– Stop the vehicle, turn off all electrical equipment, power off from high voltage. After the vehicle goes into sleep mode, restart the vehicle to a high voltage state without turning on electrical equipment (A/C and external equipment), if the fault disappears, it is determined that the discharging current of the vehicle is too large, please confirm whether the vehicle is equipped with other electrical equipment resulting in excessive power consumption. It is not allowed to install additional high-voltage electrical equipment. The vehicle can be used normally after the fault disappears.

– If this fault still occurs frequently in the future, or the fault does not disappear, it is determined to be a current sensor fault. In this case, contact the battery manufacturer to check and replace the current sensor on site.

4.3.3.73 Accurate Test: B34020B

Accurate Test: B34020B

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34020B	Positive insulation resistance level 2 leakage	Negative Isolation resistance low-voltage, driving, slow charging condition 1. < 600Ω/V Fast charging condition 2. < 120Ω/V	(IGN ON signal changes from 12V to 0V or IGN ON signal changes from 0V to 12V or CC/CC2 signal changes from connected to disconnected or CC/CC2 signal changes from disconnected to connected) && Negative Isolation resistance (low-voltage, driving and slow charging condition 1: > 1000Ω / V; fast charging condition 2: 160Ω / V)

Possible cause

– Low vehicle insulation

– Low battery pack insulation

– Fault of insulation resistance detection circuit of the BMS.

Repair recommendations

– Disconnect the high-voltage harness connecting the battery pack to the vehicle, and measure the insulation resistance of the vehicle's positive pole with a megohmmeter. If the detected insulation resistance value is less than 250KΩ, it is determined that the insulation of the whole vehicle is low, please query which high-voltage device of the vehicle has a fault according to the insulation resistance detection step in the technical requirements for assembly of OBC/MCU/A/C compressor/battery pack heater/high-voltage harness, and replace the parts and components after identifying the faulty parts.

– If the normal insulation resistance value measured in the previous step is large enough (250KΩ), it is determined that the insulation resistance detection circuit of the BMS is faulty or the battery pack insulation is low. In this case, contact the battery manufacturer to go to the site for inspection and maintenance.

4.3.3.74 Accurate Test: B34020C

Accurate Test: B34020C

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34020C	Negative insulation resistance level 2 leakage	Negative Isolation resistance low-voltage, driving, slow charging condition 1. < 600Ω/V Fast charging condition 2. < 120Ω/V	(IGN ON signal changes from 12V to 0V or IGN ON signal changes from 0V to 12V or CC/CC2 signal changes from connected to disconnected or CC/CC2 signal changes from disconnected to connected) && Negative Isolation resistance (low-voltage, driving and slow charging condition 1: > 1000Ω / V; fast charging condition 2: 160Ω / V)

Possible cause

– Low vehicle insulation;

– Low battery pack insulation;

– Fault of insulation resistance detection circuit of the BMS.

Maintenance

– Disconnect the high-voltage harness connecting the battery pack to the vehicle, and use a megohmmeter to measure the negative insulation resistance of the whole vehicle. If the detected insulation resistance value is less than 250KΩ, it is determined that the cause is low insulation of the whole vehicle. Please follow the insulation resistance detection steps in the OBC/MCU/A/C compressor/battery pack heater/high-voltage harness assembly technical conditions to find out which high-voltage device of the vehicle is faulty, and replace the parts and components after clarifying the faulty part;

– If the normal insulation resistance value measured in the previous step is large enough (250KΩ), it is determined that the insulation resistance detection circuit of the BMS is faulty or the battery pack insulation is low. In this case, contact the battery manufacturer to go to the site for inspection and maintenance.

4.3.3.75 Accurate Test: B34020D

Accurate Test: B34020D

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34020D	Slave control voltage acquisition line open-circuited	Check for any open wires between ADCs of LTC and the cells	(IGN ON signal changes from 12V voltage to 0V or IGN ON signal changes from 0V voltage to 12V or CC/CC2 signal changes from connected to disconnected or CC/CC2 signal changes from disconnected to connected) && Store DTC and clear the current fault after detecting that the fault maturity conditions are not met;

Possible cause

– Poor connection of slave control acquisition harness.

– Open circuit of cell voltage acquisition line.

– Fault of slave control voltage acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

4.3.3.76 Accurate Test: B34020F

Accurate Test: B34020F

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34020F	Slave control voltage range fault	Cell Voltage out of range Check - Invalid range : < 1.0V or > 4.5V	(IGN ON signal changes from 12V voltage to 0V or IGN ON signal changes from 0V voltage to 12V or CC/CC2 signal changes from connected to disconnected or CC/CC2 signal changes from disconnected to connected) && Store DTC and clear the current fault after detecting that the fault maturity conditions are not met;

Possible cause

– Cell voltage out of range, < 1V or > 4.5V.

– Fault of slave control voltage acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

4.3.3.77 Accurate Test: B340210

Accurate Test: B340210

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340210	Slave control temperature acquisition line open-circuited	Check for any open wires between ADCs of LTC and the cells	(IGN ON signal changes from 12V voltage to 0V or IGN ON signal changes from 0V voltage to 12V or CC/CC2 signal changes from connected to disconnected or CC/CC2 signal changes from disconnected to connected) && Store DTC and clear the current fault after detecting that the fault maturity conditions are not met;

Possible cause

– Poor contact of the temperature sensor on the module.

– Short circuit of module temperature acquisition line.

– Fault of slave control temperature acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

4.3.3.78 Accurate Test: B340211

Accurate Test: B340211

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340211	Slave control temperature acquisition line short-circuited	Check for any short wires between ADCs of LTC and the cells	(IGN ON signal changes from 12V voltage to 0V or IGN ON signal changes from 0V voltage to 12V or CC/CC2 signal changes from connected to disconnected or CC/CC2 signal changes from disconnected to connected) && Store DTC and clear the current fault after detecting that the fault maturity conditions are not met;

Possible cause

– Poor contact of the temperature sensor on the module.

– Short circuit of module temperature acquisition line.

– Fault of slave control temperature acquisition circuit.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

4.3.3.79 Accurate Test: B340219

Accurate Test: B340219

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340219	Cell voltage level-2 too low	① Ucell,min ≤ 2.15V(20℃ < T) ; ② Ucell,min ≤ 1.95V (T≤20℃);	(IGN ON signal changes from 12V voltage to 0V or IGN ON signal changes from 0V voltage to 12V or CC/CC2 signal changes from connected to disconnected or CC/CC2 signal changes from disconnected to connected) && Store DTC and clear the current fault after detecting that the fault maturity conditions are not met;

Possible cause

– Over-discharge of battery pack.

– Cell fault.

– Fault of cell voltage detection circuit inside the BMS.

Repair recommendations

– Charge the vehicle to 10% SOC. If the fault disappears, it is battery pack over-discharge; if the fault still exists after charging or often occurs in subsequent uses after the fault disappears, contact the battery pack manufacturer for on-site inspection and maintenance.

4.3.3.80 Accurate Test: B34021E

Accurate Test: B34021E

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B34021E	Main positive relay stuck fault	① BMS triggers detection from sleep to wake-up, and satisfies (|"BpBn"–"PpBn"| <= 10v) && ("BpBn" >= 200v && "BpBn" <= 500v) for 500ms, forming a fault; ②a. In the discharge state, the main positive relay changes from closed to open; b. In the charging state, the main positive relay changes from closed to open and CC2 changes from connected to disconnected, triggering detection. If (|"BpBn"–"PpBn"| <= 10v) && ("BpBn" >= 200v && "BpBn" <= 500v) lasts for 4s, a fault will be formed. Note: ① and ② are trigger-type tests, both of which only test 1 time	BMS sleep power-off

Possible cause

– Main positive relay high-voltage contact adhesion.

– BMS fault

Repair recommendations

– Turn off the vehicle, wear insulating gloves and unplug the high-voltage connectors connecting the battery pack to the PDU.

– Power on the vehicle, use a diagnostic scanner to close the main negative relay (if positive contactor adhesion and negative contactor adhesion coexist, no diagnostic scanner is needed), and then measure the voltage between the positive and negative terminals of the battery pack with a multimeter. If the detected voltage is > 192V, the main positive relay is adhered; contact the battery manufacturer to replace the main positive relay on site.

– If there is no adhesion in the main positive relay, the BMS detection is abnormal. In this case, contact the battery manufacturer for inspection, maintenance and replacement of the BMS on site.

4.3.3.81 Accurate Test: B340300

Accurate Test: B340300

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340300	Thermal runaway fault	a. The cell voltage drops by 1.5V within 5s; b. The temperature rise of the cell is greater than 20°C within 60S from the abnormal voltage. After condition a is met, start condition b judgment. If condition b is met, output the thermal event alarm signal. c. Two temperature sensors are > 75°C at the same time d. After the maximum temperature is ≥ 65°C, if the temperature is abnormal (invalid value/over upper limit/under lower limit) or slave control communication loss meets c or d, output the thermal runaway event alarm signal Newly added (refer to national standard): e. Maximum temperature ≥ 65° C f. Temperature rise rate ≥ 1°C/s, lasting for 3S meets e and f, output thermal runaway event alarm signal g. Smoke concentration in the pack exceeds 3000ug/m3 for 10S meets g, output thermal runaway time alarm signal	Unrecoverable, manual clear

Possible cause

– Battery overheating.

– The battery is severely extruded or impacted.

Repair recommendations

– Directly move the vehicle to an open area for isolation, and notify professionals to handle it.

4.3.3.82 Accurate Test: B340301

Accurate Test: B340301

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340301	The collision signal is valid	Crash_Output_Sts == 0x1: deployed crash	BMS sleep power-off

Possible cause

– The fault diagnosis occurs when the BMS receives collision signals as airbag operation is detected.

Repair recommendations

– Confirm whether the vehicle has a collision. If yes, check whether the appearance and function of the battery pack are normal, and contact the battery manufacturer for status evaluation.

– If there is no collision, check and confirm whether the airbag returns to normal. After it returns to normal, use a diagnostic scanner to clear the current fault in the BMS. It can be used normally after restarting.

4.3.3.83 Accurate Test: B340304

Accurate Test: B340304

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340304	Autonomous high-voltage power-off fault due to cell overvoltage	Ucell,max ≥ 3.8V	BMS sleep power-off

Possible cause

– Vehicle overcharge.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance and replacement of the BMS master control.

4.3.3.84 Accurate Test: B340305

Accurate Test: B340305

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B340305	Autonomous high-voltage power-off fault due to cell undervoltage	The fault of "cell voltage level 2 too low - LV4" is formed, and the following conditions are met: ① Ucell,min ≤ 2.1V (T > 20°C); ② Ucell,min ≤ 1.8V (T ≤ 20°C)	BMS sleep power-off

Possible cause

– Vehicle over-discharge.

– The battery is stored for a long time.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance and replacement of the BMS master control.

4.3.3.85 Accurate Test: U007300

Accurate Test: U007300

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U007300	EVCANBusOff fault	After power-on, BMS detects that the EV CAN transceiver continuously reports CAN Bus Off for 3 times (see QLQB C-178-2014 Specification for CAN Communication of On-board Communication Platform for Passenger Cars for details).	CAN bus returns to normal

Possible cause

– Communication disconnection or CAN_H and CAN_L short-circuited to each other due to CAN bus issues.

– Internal CAN communication circuit fault of the BMS.

Repair recommendations

– Detect whether the EV_CAN sends a CAN signal through CAN communication equipment. If the equipment detects an EV CAN signal, it is judged that the CAN communication circuit inside the BMS has a fault and the BMS shall be replaced.

– If the equipment fails to detect the EV CAN signal, it is judged that the CAN line problem causes communication disconnection or EV CAN_H and EV CAN_L are short-circuited to each other. Please check whether the communication CAN line between EV CAN and BMS has an open or short circuit fault.

4.3.3.86 Accurate Test: U011000

Accurate Test: U011000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U011000	MCU communication lost	MCU data Lost (During Discharging Mode) - CANID: 0x141 (the message has not been received for 10 consecutive cycles) Remarks: The diagnosis is enabled 1.5S after wake-up and in the discharging state.	1 frame of message received normally - CANID: 0x141

Possible cause

– Communication disconnection or MCU fault caused by CAN bus problem.

– Internal CAN communication circuit fault of the BMS.

Repair recommendations

– Under high-voltage status, detect whether the MCU in EV_CAN sends a CAN signal through CAN communication equipment. If the equipment detects an MCU CAN signal, it is judged that the CAN communication circuit inside the BMS has a fault, replace the BMS.

– If the equipment cannot detect MCU CAN signal, it can be judged that communication disconnection or MCU fault is caused by CAN bus problem. Please check the status of CAN bus (instrument harness assembly and instrument harness assembly) and MCU (if the diagnostic scanner fails to enter MCU diagnosis interface, it can be preliminarily judged that MCU is abnormal).

4.3.3.87 Accurate Test: U012200

Accurate Test: U012200

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U012200	VCM communication lost	Enabling condition 1: When KL15 (IGN ON) is on, VCM 0x216 is not received for 100ms. Enabling conditions 2 and 3: VCM 0x216 is not received for 100ms (the message has not been received in 10 consecutive cycles).	1 frame of message received normally - CANID: 0x216

Possible cause

– Communication disconnection or VCM fault caused by CAN bus problem.

– Internal CAN communication circuit fault of the BMS.

Repair recommendations

– Detect whether VCM in EV_CAN sends a CAN signal through CAN communication equipment. If the equipment detects a VCM CAN signal, it is judged that the CAN communication circuit inside the BMS fails and the BMS shall be replaced.

– If the equipment fails to detect the VCM CAN signal, it is judged that communication disconnection or VCM fault is caused by the CAN bus problem. Please check the communication CAN bus (instrument harness assembly) between VCM and BMS and the status of VCM (if the diagnostic scanner cannot enter the VCM diagnosis interface, it can be preliminarily judged that VCM is abnormal).

4.3.3.88 Accurate Test: U019B00

Accurate Test: U019B00

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U019B00	Loss of communication with OBC	OBC data Lost during AC Charging - CANID: 0x268 (no message received in 10 consecutive cycles) Remarks: The diagnosis is enabled 1.5S after wake-up and in the charging state	1 frame of message received normally - CANID: 0x268

Possible cause

– The CAN line problem causes communication disconnection or power output module (OBC) fault.

– The main control CAN communication circuit fault of the BMS.

Repair recommendations

– Detect whether OBC in EV_CAN sends a CAN signal through CAN communication equipment. If the equipment detects an OBC CAN signal, it is judged that the CAN communication circuit inside the BMS has a fault, replace the BMS.

– If the equipment fails to detect the OBC CAN signal, it is judged that the CAN line problem causes communication disconnection or OBC fault. Please check the CAN line (instrument harness assembly, instrument harness assembly) and OBC status (if the diagnostic scanner cannot access the OBC diagnostic interface, the OBC can be initially judged as abnormal).

4.3.3.89 Accurate Test: U029800

Accurate Test: U029800

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U029800	Communication with DCDC lost	Enabling condition 1: DCDC data Lost - CANID when KL15 (IGN ON) is on: 0x148 (No message received in 10 consecutive cycles) Enabling conditions 2 and 3: DCDC data Lost - CANID: 0x148 (No message received in 10 consecutive cycles). Remarks: Start diagnosis 1.5s after wake-up	1 frame of message received normally - CANID: 0x148

Possible cause

– Problems with the CAN line cause communication disconnection or DCDC failure.

– Internal CAN communication circuit fault of the BMS.

Repair recommendations

– Detect whether DCDC in EV_CAN sends a CAN signal through CAN communication equipment. If the equipment detects a DCDC CAN signal, it is judged that the CAN communication circuit inside the BMS has a fault, replace the BMS.

– If the equipment cannot detect DCDC CAN signal, it can be judged that communication disconnection or DCDC fault is caused by CAN bus problem. Please check the status of CAN bus (instrument harness assembly) and DCDC (if the diagnostic scanner fails to enter DCDC diagnosis interface, it can be preliminarily judged that DCDC is abnormal).

4.3.3.90 Accurate Test: U240010

Accurate Test: U240010

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U240010	Loss of communication with high-voltage acquisition module	Internal HVCU Uart data Lost AFE communication fault	1 frame of high-voltage board reply message received normally

Possible cause

– BMS high-voltage module communication lost

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

4.3.3.91 Accurate Test: U240012

Accurate Test: U240012

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U240012	VCM communication lost	VCM CANID 0x216 message is not received for 100ms. CANID: 0x216 10 frames of messages are lost (the message has not been received in 10 consecutive cycles) Remarks: Start diagnosis 1.5S after wake-up	1 frame of message received normally - CANID: 0x216

Possible cause

– Communication disconnection or VCM fault caused by CAN bus problem.

– Internal CAN communication circuit fault of the BMS.

Repair recommendations

– Detect whether VCM in EV_CAN sends a CAN signal through CAN communication equipment. If the equipment detects a VCM CAN signal, it is judged that the CAN communication circuit inside the BMS fails and the BMS shall be replaced.

– If the equipment fails to detect the VCM CAN signal, it is judged that communication disconnection or VCM fault is caused by the CAN bus problem. Please check the communication CAN bus (instrument harness assembly) between VCM and BMS and the status of VCM (if the diagnostic scanner cannot enter the VCM diagnosis interface, it can be preliminarily judged that VCM is abnormal).

4.3.3.92 Accurate Test: U240013

Accurate Test: U240013

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U240013	Loss of communication with Slave control	① It is detected that the AFE acquisition task has not been called for 3s; ② The data collected by AFE1 is detected to be the same as the previous data and lasts for 30 seconds; ③ The data collected by AFE2 is detected to be the same as the previous data and lasts for 30 seconds; ④ The data collected by AFE3 is detected to be the same as the previous data and lasts for 30 seconds; ⑤ The data collected by AFE4 is detected to be the same as the previous data and lasts for 30 seconds; ⑥ The data collected by AFE5 is detected to be the same as the previous data and lasts for 30 seconds; ⑦ Detect that the data collected by AFE6 is the same as the previous data and lasts for 30s; ⑧ The data collected by AFE7 is detected to be the same as the previous data and lasts for 30 seconds; ⑨ The data collected by AFE8 is detected to be the same as the previous data and lasts for 30 seconds; If any of the above conditions is met, report the slave control communication loss fault	Trigger condition ①: If it is detected that 1 AFE acquisition task has been called, the fault will be cleared; Triggering condition ②: If it is detected that the data collected by AFE1 for 1 time are inconsistent with the previous moment, the fault will be removed; Triggering condition ③: If it is detected that the data collected by AFE2 for 1 time are inconsistent with the previous moment, the fault will be removed; Triggering condition ④: If it is detected that the data collected by AFE3 for 1 time are inconsistent with the previous moment, the fault will be removed; Triggering condition ⑤: If it is detected that the data collected by AFE4 for 1 time are inconsistent with the previous moment, the fault will be removed; Triggering condition ⑥: If it is detected that the data collected by AFE5 for 1 time are inconsistent with the previous moment, the fault will be removed; Triggering condition ⑦: If it is detected that the data collected by AFE6 for 1 time are inconsistent with the previous moment, the fault will be removed; Trigger condition ⑧: If it is detected that the data collected by AFE7 for 1 time are inconsistent with the

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
			previous moment, the fault will be removed; Trigger condition ⑨: If it is detected that the data collected by AFE8 for 1 time are inconsistent with the previous moment, the fault will be removed;

Possible cause

– Disconnection of CAN bus leads to communication disconnection.

– Slave controller fault of battery pack management system.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance.

4.3.3.93 Accurate Test: U240020

Accurate Test: U240020

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U240020	Current sensor communication loss	If the current sensor does not receive valid data for 3 consecutive frames or has no data update for more than 2 times the communication cycle, and after troubleshooting short-term interference, it is determined that the current sensor communication is lost.	Receive valid, correct and no-timeout current sensor data for multiple consecutive frames, and the fault will be cleared after it remains stable.

Possible cause

– Abnormal harness and connection.

– Current sensor body fault.

– Controller fault.

– Environmental interference.

Repair recommendations

– If this fault occurs, please contact the battery manufacturer for maintenance and replacement of the BMS master control.

4.3.3.94 Accurate Test: U240021

Accurate Test: U240021

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U240021	Loss of communication with high-voltage acquisition module	Internal HVCU Uart data Lost AFE communication fault	(IGN ON signal changes from 12V voltage to 0V or IGN ON signal changes from 0V voltage to 12V or CC/CC2 signal changes from connected to disconnected or CC/CC2 signal changes from disconnected to connected) && Store DTC and clear the current fault after detecting that the fault maturity conditions are not met;

Possible cause

– BMS high-voltage module communication lost

Repair recommendations

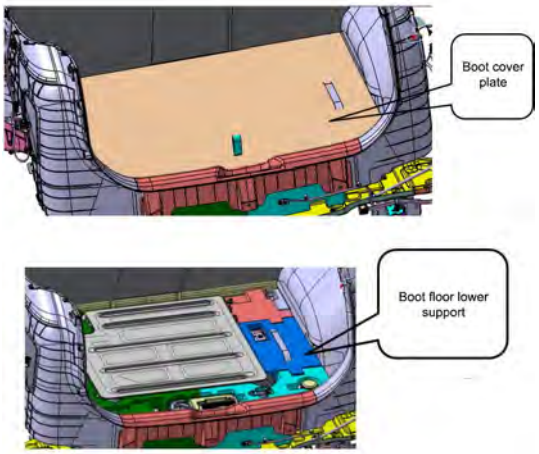
– If this fault occurs, please contact the battery manufacturer for maintenance and replacement of the BMS master control.

4.3.4 Removal and installation

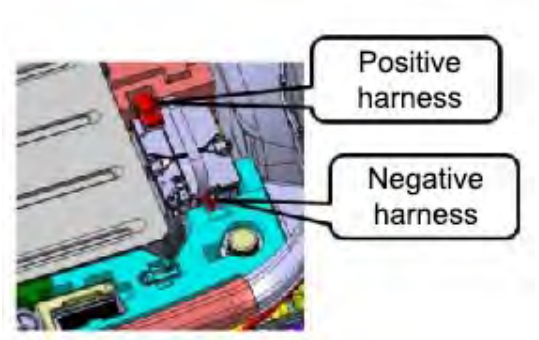
4.3.4.1 Battery

Removal

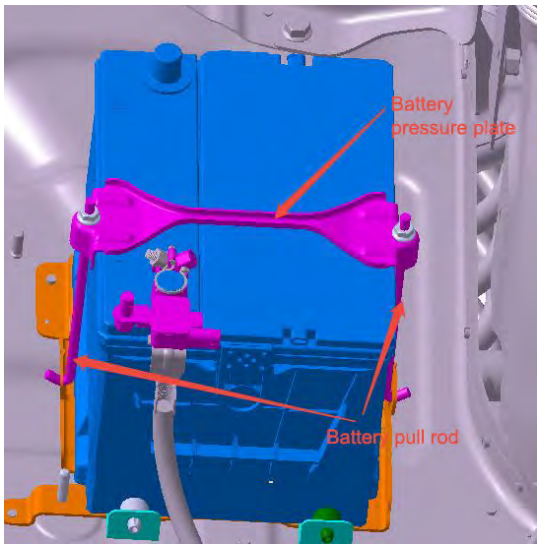
1. Remove the trunk cover plate and the floor lower support of the trunk.



2. Loosen the fixing bolts of battery negative pole terminal and positive pole terminal harness, remove the negative pole harness first, and then remove the positive pole harness.



3. Loosen the pull rod fixing nut, and remove the battery pressure plate.



4. After lifting the battery 200mm higher than the battery pack, move the battery out of the trunk.

Installation

The installation order is reverse to the removal order. Pay attention to the following points

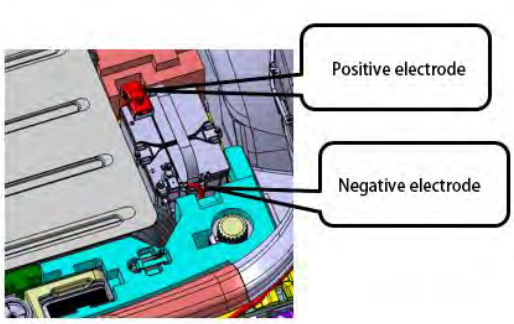
1. **Caution:** Before removing the battery, turn off all electrical appliances of the vehicle.
2. **Caution:**When removing the battery, the negative terminal should be disconnected first; during reassembly, the positive terminal should be connected first.
3. **Caution:**When disassembling and assembling the battery, the inclination angle of the battery should not be greater than 45°.
4. **Caution:**Prevent the battery's positive and negative terminals from short circuiting during removal.

4.3.5 General procedures

4.3.5.1 Disconnect the negative terminal of the battery.

Disconnect

1. Turn off all electrical equipment and the vehicle power supply is in the OFF position.
2. Loosen the negative terminal of the battery and remove the battery sensor and negative harness first.



3. Wrap the negative cable clamp with a suitable insulation sleeve to prevent the negative cable clamp from contacting the body.

   Caution: Confirm that the ignition switch is at "OFF" position.

Connect

1. Connect the negative battery cable and tighten the terminal connecting the battery sensor to the battery with a torque of 4.5-7.5 Nm.

4.4 Independent gateway controller

4.4.1 Specification

4.4.1.1 Precautions

Precautions during repair

1. The gateway is not a waterproof part; caution should be taken to keep it dry.

2. Before removing the independent gateway controller, disconnect it from the harness.

3. During removal of the gateway, take care not to damage the shells of parts and components and the internal circuit board.

4.4.2 Diagnosis and testing

4.4.2.1 Independent Gateway-Fault Diagnosis

	Symptoms		Inspection Items	
	Routing not activated	Vehicle cannot start	Is the gateway power supply connected?	—
		All instrument fault lights are illuminated, and signal loss is reported.	—	

After the gateway is upgraded, it is necessary to clear the DTC of the vehicle.

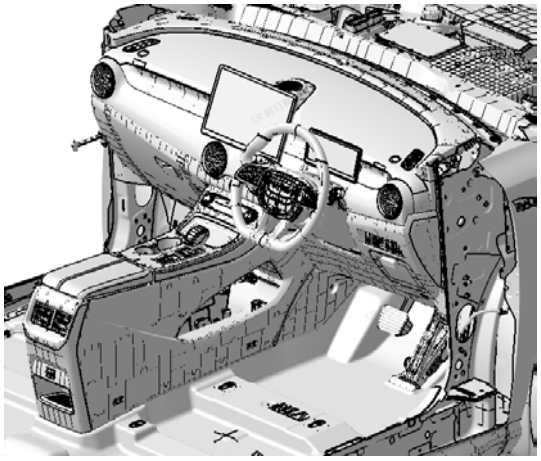
4.4.3 Removal and installation

4.4.3.1 Independent gateway controller

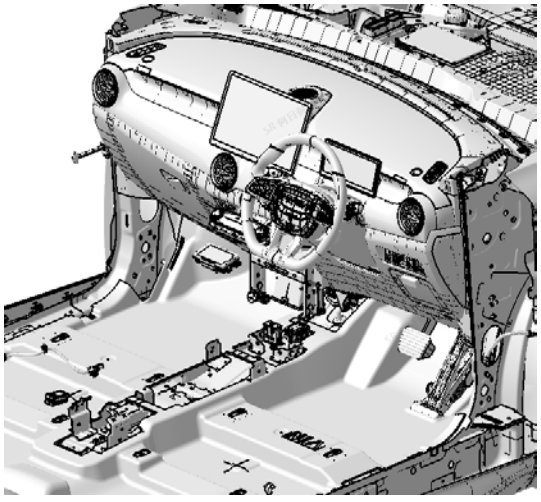
Caution: The gateway controller is arranged under the steering wheel at the driver's seat. Use M6 bolts to fix the water pipe bracket 2 on the tubular beam bracket, and then use M6 bolts to fix the independent gateway on the fixing holes of the tubular beam bracket and the water pipe bracket 2. If a ratchet wrench is used for blind operation, the following steps are not necessary.

Removal

1. Remove the end cover plate first.

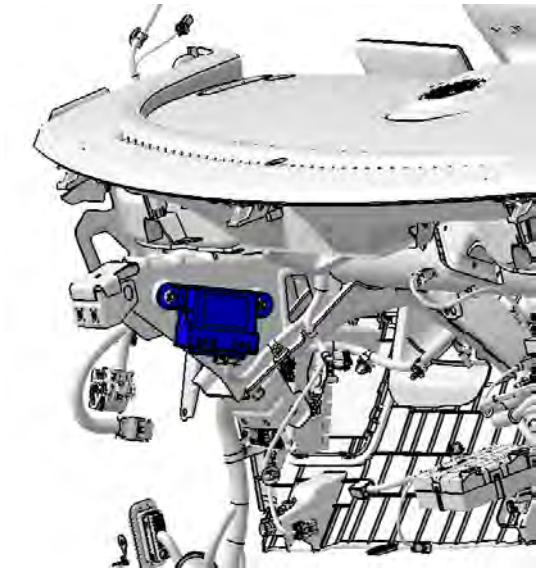


2. Then remove the knee bolster.

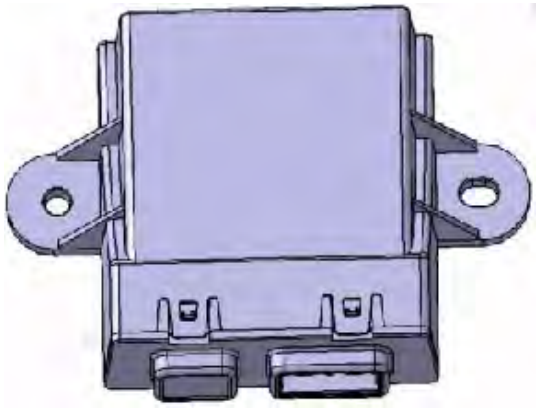


3. Remove the BCM and move it away in the direction of the arrow to increase the operating space (this step can be skipped during blind operation).

4. Use an electric screwdriver (or ratchet wrench) for removal.



5. Remove the gateway.



Inspection after removal

1. Check whether the gateway housing has cracks, damage, or ageing, and whether the connector pins are bent. Replace them if necessary.

Installation

1. The installation order is reverse to the removal order.

Inspection after installation

1. After installation is complete, power on and start the vehicle. Observe whether the instrument reports a node loss fault, and check if the vehicle can be started. If the instrument displays normally, does not report a node loss

fault, and the vehicle starts successfully, it indicates the gateway is operating normally.

4.5 MmWave radar

4.5.1 Specification

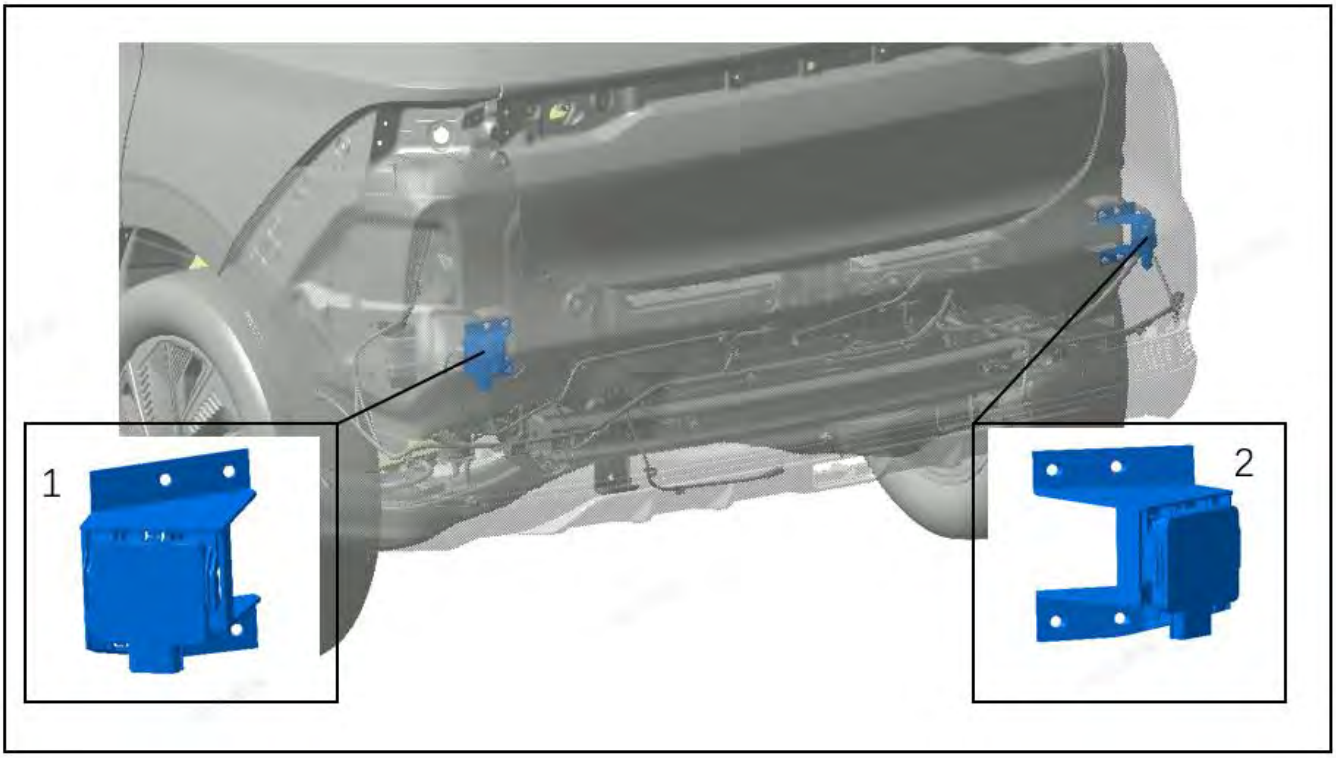
4.5.1.1 General specifications

Front mmWave radar

Item	Specification
Rated voltage	DC 12V
Voltage range	DC 9.0V ~ DC 16V
Static current	≤0.1mA
Operating temperature	-40℃~+85℃
Detection range	Horizontal 150 °, vertical 15 °
Maximum detection distance	120m
Angle accuracy	±0.5 °
Relative vehicle speed operating range	-60 ~ +60m/s
Velocity accuracy	±0.05m/s
Detection range resolution	0.2m
Horizontal angle resolution	6 °
IP rating	IP67

4.5.2 Instructions and operations

4.5.2.1 Corner mmWave radar



Item	Description
1	Corner mmWave radar (rear left)
2	Corner mmWave radar (rear right)

4.5.2.2 Overview

The mmWave radar system consists of 2 radars fixed on the rear bumper, with the left side as the main radar and the right side as the auxiliary radar. The following functions can be realised: Door Opening Warning (DOW), Rear Cross Traffic Alert (RCTA), Lane Change Assist (LCA) and Rear Collision Warning (RCW).

Precautions:

1. Under the following special circumstances, the system functions may not work normally or there is no early warning.

   1 Under severe weather conditions, such as rainstorm and heavy snow.

   2 Sand and dust pavement, grass pavement, etc.

   3 Ice or mud adheres to the rear bumper, and the radar is blocked.

   4 When driving continuously up and down steep slopes, such as mountain roads, rough roads, slopes on the road, etc.

   5 When a row of vehicles approach and there is only a small gap between the vehicles.

   6 Turn sharply or make a U-turn, and drive on very wide or narrow roads.

   7 When the vehicle overtakes the adjacent vehicle and the relative speed > 20km/h, there is no risk by default and no alarm will be given.

2. Under the following special circumstances, the false positive and negative rate of the system may increase.

   1 When a vehicle in the third lane is close to the SV and rapidly changes lane and overtakes the SV in adjacent lane.

   2 Small targets such as pedestrians may be missed.

3 Especially when the vehicle is running parallel to a long vehicle (such as a truck), the alarm may be interrupted, and there is only a short distance between the vehicle and the guardrail, wall, tunnel, etc.

4.5.3 Diagnosis and testing

4.5.3.1 Inspection and confirmation of ADAS (corner radar)

ADAS (corner radar)

Inspection and confirmation

1. Confirm the problems raised by the customers and perform the appropriate checks and tests.

2. Check the appearance for obvious traces of mechanical and electrical damage.

3. Before the next check, solve the identified problem first.

4. If the cause cannot be determined by visual check, confirm the symptom firstly and then check according to the List of Symptoms.

4.5.3.2 DTC List of ADAS (Corner Radar)

DTC	Fault description	Operation
U300317	Battery Voltage Too High	Go to Accurate Test **A: U300317**
U300316	Battery Voltage Tool low	Go to Accurate Test **B: U300316**
U007300	CAN Controller Bus-off (Body CAN)	Go to Accurate Test **C: U007300**
U300316	NM Limphome DTC	Go to Accurate Test **D: U300316**1
U014000	Lost communication with BCM (BCM node lost)	Go to Accurate Test **E: U014000**
U010100	Lost communication with VCM (VCM node lost)	Go to Accurate Test **F: U010100**
U012100	Lost communication with ABS1 (ABS node lost)	Go to Accurate Test **G: U012100**
U012600	Lost communication with SAS1 (EPS node lost)	Go to Accurate Test **H: U012600**
U100100	Lost communicaiton with private-can	**Go to Accurate Test** I: U100100
B1B9C78	EOL Calibration is not done	**Go to Accurate Test** J: B1B9C78
B1B9881	parameter(L)failure Abnormal lateral distance of end-of-line calibration simulator/corner reflector	**Go to Accurate Test** K: B1B9881
B1B9681	parameter(R)failure Abnormal longitudinal distance of end-of-line calibration simulator/corner reflector	**Go to Accurate Test** L: B1B9681

4.5.3.3 Accurate Test A: U300317

Accurate Test A: U300317

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U300317	High voltage fault	The power supply voltage is above 16.5V for 1000ms	The power supply voltage is below 16V for 1000ms

Possible cause

– Power supply overvoltage.

Repair recommendations

Check the connection of generator and battery

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.5.3.4 Accurate Test B: U300316

Accurate Test B: U300316

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U300316	Low voltage fault	The power supply voltage is below 9V for 1000ms	The power supply voltage is above 9.5V for 1000ms

Possible cause

Power supply undervoltage

Repair recommendations

Check the connection of generator and battery

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.5.3.5 Accurate Test C: U007300

Accurate Test C: U007300

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U007300	CAN bus off (body CAN)	The ECU's transmission error counter has accumulated to more than 255, and a DTC is recorded after three consecutive times	First, execute the fast recovery mode for up to 5 consecutive times. If there are still errors, switch to the slow recovery mode. Slow recovery shall be performed continuously until the Bus Off fault is recovered.

Possible cause

– Network fault

Repair recommendations

– Check CAN bus

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.5.3.6 Accurate Test D: U220D00

Accurate Test D: U220D00

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U220D00	Network management LimpHome fault	After keeping the limp home state tLimphomeLog for 2000ms, record the diagnostic DTC	CAN network deactivates limphome status

Possible cause

Network fault

Repair recommendations

– Check CAN bus

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.5.3.7 Accurate Test E: U014000

Accurate Test E: U014000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U014000	BCM node lost	The message has not been received for 10 consecutive cycles. (Monitoring message: BCM1=0x180, message cycle 100ms)	1 frame of this message received

Possible cause

Network fault

Repair recommendations

– Check the BCM bus connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.5.3.8 Accurate Test F: U010100

Accurate Test F: U010100

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U010100	VCM node lost	No VCM3/TCU2 message has been received for 10 consecutive message cycles. (Monitoring message: VCM3= 0x216, message cycle 10ms; TCU2=0x10, message cycle 10ms)	Any 1 frame of VCM3/ TCU2 message received

Possible cause

Network fault

Repair recommendations

– Check the BCM bus connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.5.3.9 Accurate Test G: U012100

Accurate Test G: U012100

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U012100	ABS node lost	The message has not been received for 10 consecutive message cycles. (Monitoring message: ABS1=0x200, message cycle 20ms)	1 frame of this message received

Possible cause

– Network fault

Repair recommendations

– Check the ESP bus connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.5.3.10 Accurate Test H: U012600

Accurate Test H: U012600

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U012600	EPS node lost	The message has not been received for 10 consecutive cycles. (Monitoring message: SAS1=0xC2, message cycle 10ms)	1 frame of this message received

Possible cause

– Network fault

Repair recommendations

– Check SAS bus connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.5.3.11 Accurate Test I: U100100

Accurate Test I: U100100

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U100100	Auxiliary radar lost	Private CAN1, auxiliary radar status message 0x443 is not received for more than 500ms (10*cycles)	Successfully received 0x443 message for 500ms

Possible cause

– Network fault

Repair recommendations

– Check the harness and auxiliary radar

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.5.3.12 Accurate Test J: B1B9C78

Accurate Test J: B1B9C78

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1B9C78	Radar offline calibration not completed	At least one of the left and right radars) has not completed offline calibration, KL15 is valid	(Both left and right radars must meet the requirements) End-of-line calibration completed

Possible cause

– Offline fault

Repair recommendations

– Re-perform offline calibration

4.5.3.13 Accurate Test K: B1B9881

Accurate Test K: B1B9881

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1B9881	Abnormal lateral distance of offline calibration simulator/corner reflector	Parameter exception (exceeding 0x000A~0x001E 1m~3m)	Parameter is normal (1m <= Parameter <= 3m)

Possible cause

Offline calibration not written

Repair recommendations

– Re-perform offline calibration

4.5.3.14 Accurate Test L: B1B9681

Accurate Test L: B1B9681

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B1B9681	Abnormal longitudinal distance of offline calibration simulator/corner reflector	Parameter exception (exceeding 0x0014~0x0032 2m~5m)	Parameter is normal (2m <= Parameter <= 5m)

Possible cause

Offline calibration not written

Repair recommendations

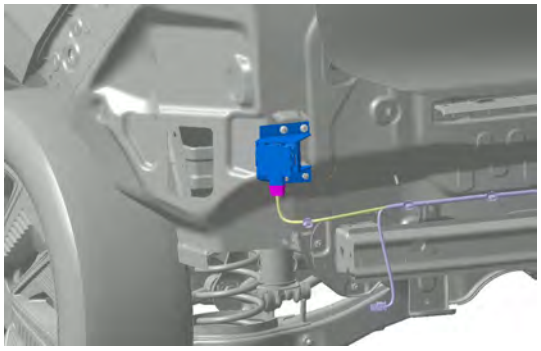
– Re-perform offline calibration

4.5.4 Removal and installation

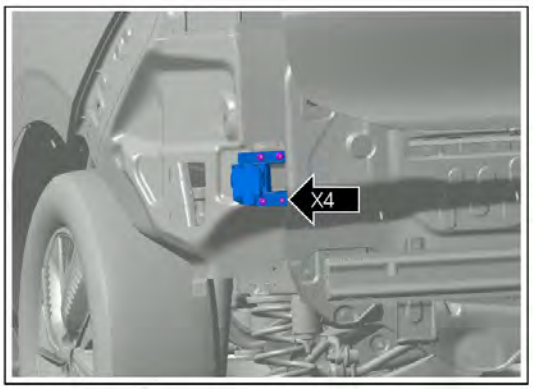
4.5.4.1 Corner mmWave radar

Removal

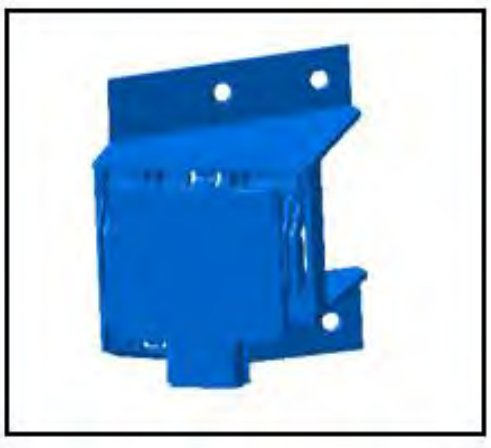
1. Disconnect the negative battery cable.Refer to: Disconnect negative battery cable.
2. Remove the rear bumper.Refer to: Removal and installation of rear bumper
3. After removing the rear bumper, disconnect the corner mmWave radar harness connector first.



4. Remove the corner radar fixing bolts fixed to the rear body.



5. Take out the corner mmWave radar.



Installation

1. The installation order is the reverse of the removal order.

4.6 Fin antenna, loudspeaker, microphone and VSP

4.6.1 Specification

4.6.1.1 Torque specification

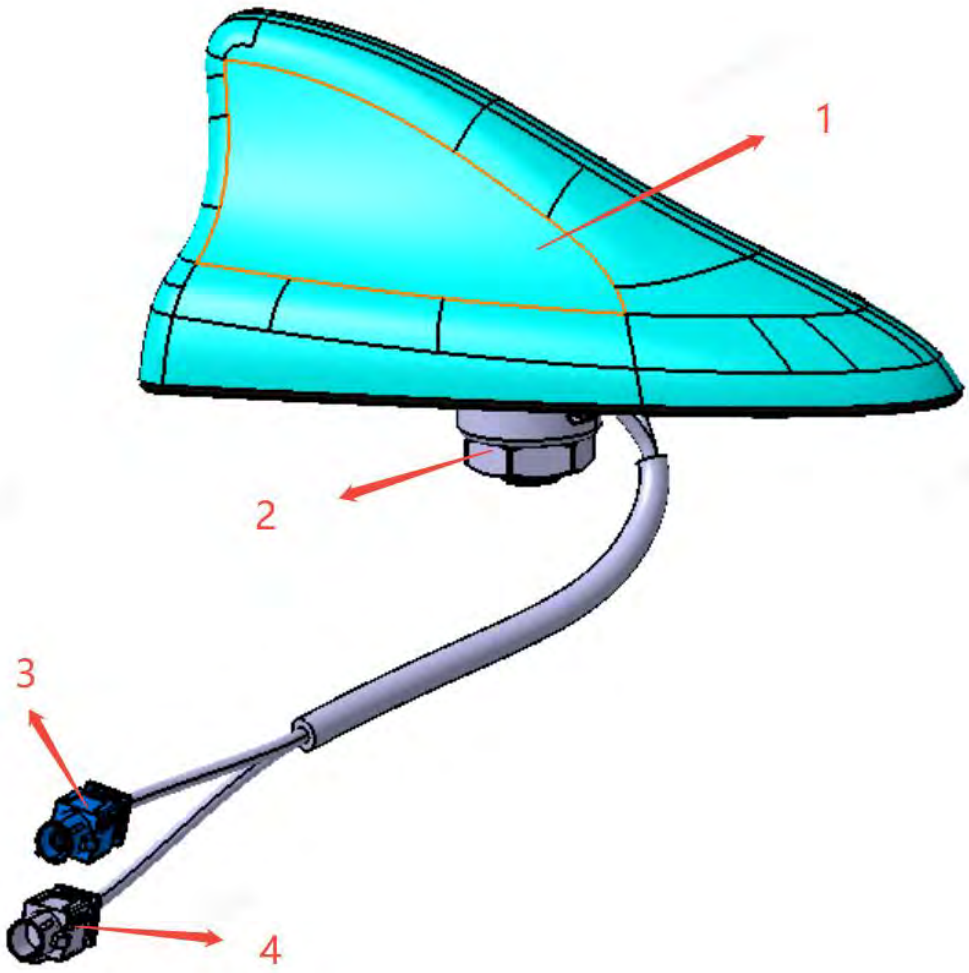
Name	Torque
Assembled nut of fin antenna assembly body	7±1Nm

4.6.2 Instructions and operations

4.6.2.1 Component Locating Diagram

Shark fin antenna

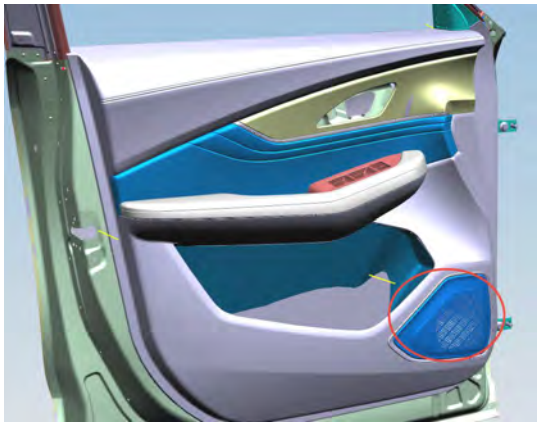
Instructions and operations



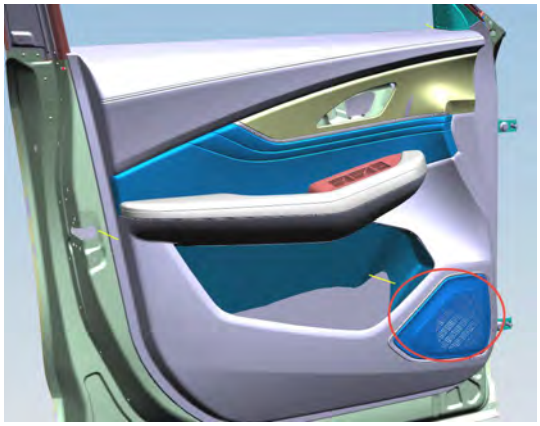
Item	Description
1	Fin antenna body
2	Combination nut
3	DAB connector
4	Radio socket

Speaker

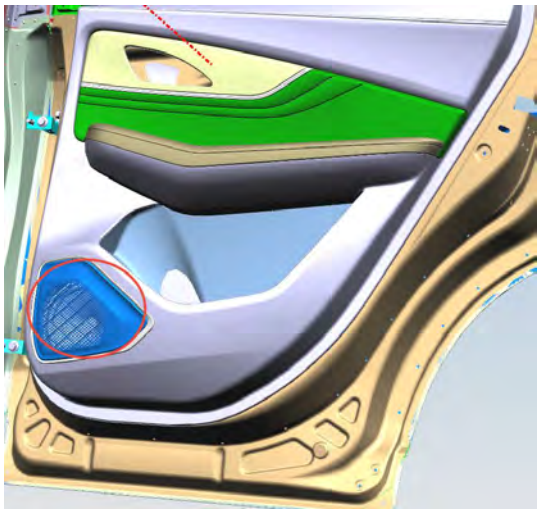
Instructions and operations



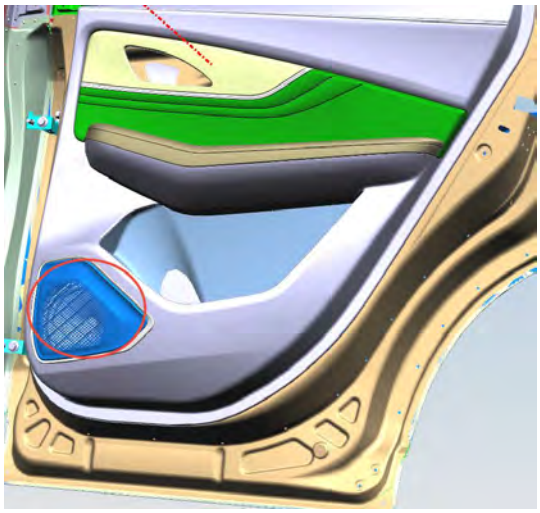
1 Front left door speaker (mid-range speaker)



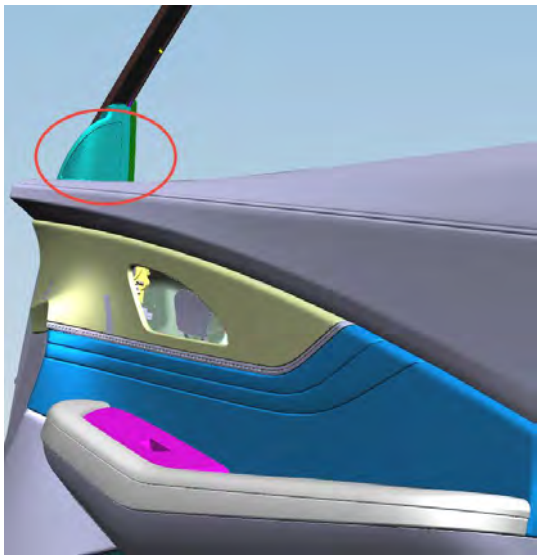
2 Front right door speaker (mid-range speaker)



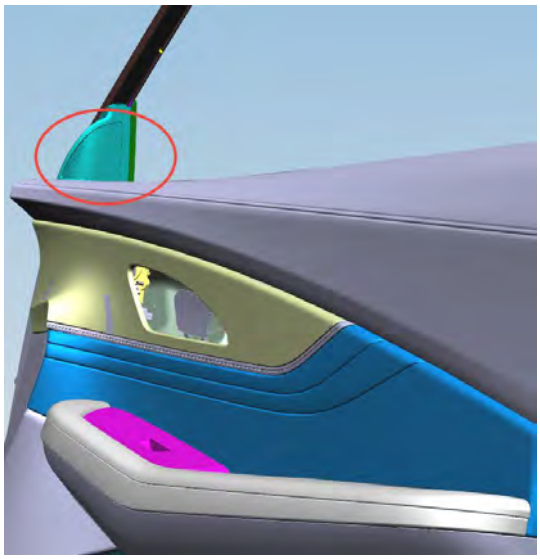
3 Rear left door speaker (full-range speaker)



4 Rear right door speaker (full-range speaker)



5 Left A-pillar speaker (high pitch)



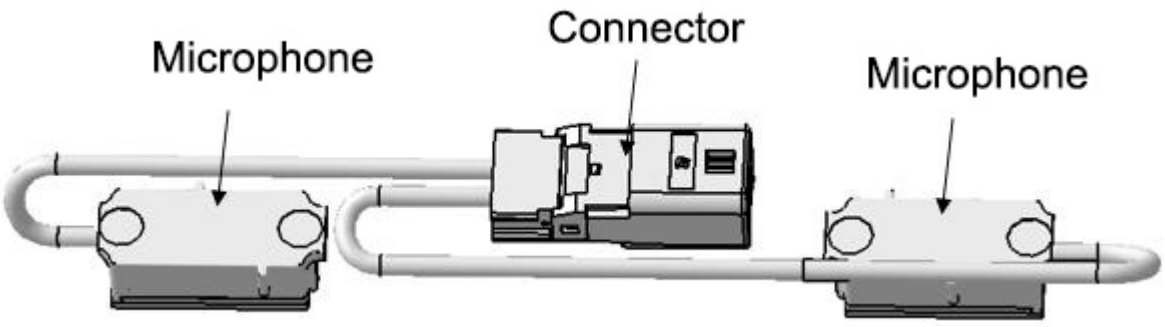
6 Right A-pillar speaker (high pitch)

Item	Description
1	Front left door speaker (mid-range speaker)
2	Front right door speaker (mid-range speaker)

Item	Description
3	Rear left door speaker (full-range speaker)
4	Rear right door speaker (full-range speaker)
5	Front left A-pillar speaker (high-pitch speaker)
6	Front right A-pillar speaker (high-pitch speaker)

Microphone

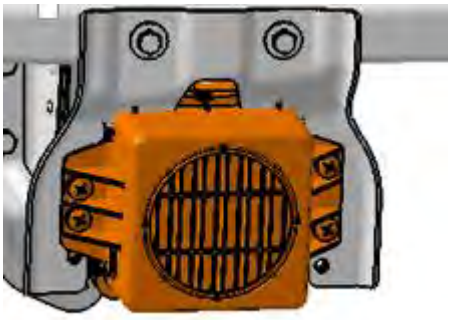
Instructions and operations



Item	Description
1	Microphone body
2	Connector

Pedestrian approaching vehicle sound warning system

Instructions and operations



Item	Description
1	Pedestrian approaching vehicle sound warning system assembly
2	Pedestrian approaching vehicle sound warning assembly bracket

4.6.2.2 Overview

Shark fin antenna

System overview

Fin antenna body:

The fin antenna body integrates radio and DAB functions to reduce wind resistance and wind noise, requiring the roof to be centred and sealed reliably.

Combination nut:

Connect the roof cover assembly to the fin antenna body, and ensure that the connection is reliable without looseness or slipping.

DAB connector:

The DAB socket is a special electrical connection port for on-board digital audio broadcasting signals, which is used to realise the radio frequency signal transmission between the DAB antenna and the main unit, power amplifier and other audio and video modules.

Radio socket:

The radio socket is the connection port between the on-board FM/AM radio antenna and the audio and video main unit to achieve stable transmission of broadcast signals.

Speaker

System overview

The on-board audio system consists of 6 speakers, which constitute the vehicle audio playback unit, realise multi-channel and high-fidelity sound restoration in the car, and provide a high-quality auditory experience for drivers and passengers.

Front left door speaker (mid-range speaker):

Responsible for the restoration of mid-band audio signals, mainly presenting core sounds such as human voice and instrument mid-frequency. It is arranged on the front left door to improve the fullness of the front left sound field.

Front right door speaker (mid-range speaker):

It is responsible for the output of mid-band audio signals, forming the front stereo mid-frequency foundation with the front left door mid-range speaker to ensure the sound layering and balance.

Rear left door speaker (full-range speaker):

Covering the full-band audio signal, taking into account high and low bass playback, it is arranged on the rear left door to expand the coverage of the sound field on the left side of the rear row.

Rear right door speaker (full-range speaker):

Realise full-band sound playback, cooperate with the rear left full-range speaker to build the overall sound field of the rear row and improve the auditory experience of the rear row.

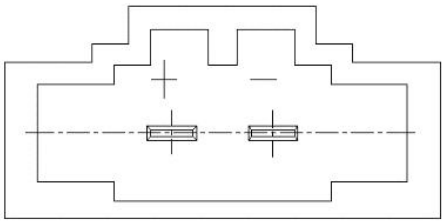
Front left A-pillar speaker (high-pitch speaker):

Dedicated to high-frequency audio signal restoration, presenting delicate treble details, arranged on the front left A-pillar, optimising the directivity and transparency of the front row treble.

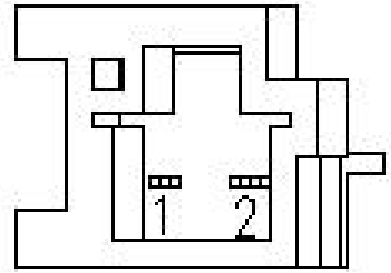
Front right A-pillar tweeter (high-pitch speaker):

Responsible for high-frequency sound output, paired with the front left A-pillar high-pitch speaker to form a clear and bright high-pitched sound field in the front row and enhance the sense of sound space.

Mid-range/Full-range Speaker Pin Description



Description of high-pitch speaker pins



S/N	Function
1	Negative
2	Positive

Microphone

System overview

This on-board analogue dual microphone system consists of an analogue microphone body and a microphone plug-in. Its core function is to collect in-vehicle voice commands, call voice and environmental sound, and provide audio input support for voice recognition and on-board call functions.

Simulated microphone body:

It is responsible for collecting the sound field, environmental noise and voice signals in the car, converting the sound signals into electrical signal output. It is the core pickup component of on-board voice interaction, active noise reduction and audio detection to ensure the accuracy of voice recognition and the quality of audio acquisition.

Microphone connector:

It is responsible for simulating the electrical connection and signal transmission between the microphone body, on-board harness and main unit controller to realise stable transmission of power supply and audio signals. At the same time, it plays a role in mechanical fixation, anti-loosening, waterproof and dustproof to ensure long-term reliable operation of the microphone.

Pedestrian approaching vehicle sound warning system

System overview

The pedestrian approaching vehicle sound warning system (hereinafter referred to as VSP) consists of a pedestrian approaching vehicle sound warning system assembly (hereinafter referred to as the body) and a pedestrian approaching vehicle sound warning assembly bracket (hereinafter referred to as the bracket). Its core function is to make sounds during low-speed driving, making up for the safety shortcoming of new energy vehicles being quiet.

Pedestrian approaching vehicle sound warning system assembly:

It is responsible for electroacoustic conversion, adopts automotive-grade full-frequency sound unit design, has no built-in PCB, driver chip and energy storage element, restores preset warning sound effects such as low-speed driving, reversing, starting, etc., and is driven by the IVI.

Pedestrian approaching vehicle sound warning assembly bracket:

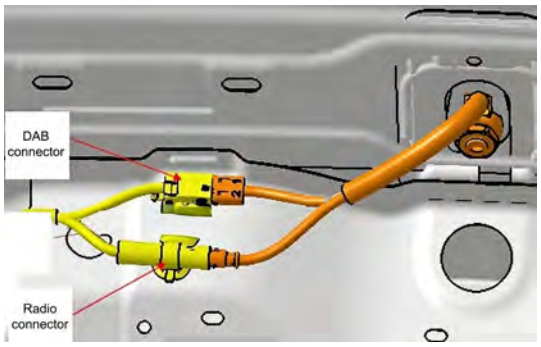
Responsible for connecting the pedestrian approaching vehicle sound warning system assembly and the anti-collision beam.

4.6.3 Removal and installation

4.6.3.1 Fin antenna assembly

Removal

1. Disconnect the fixing clip between the antenna transition line and the body sheet metal hole, and disconnect the fin antenna from the antenna transition line.



2. Loosen the mounting studs on the combination nut and the fin antenna assembly body.

   Torque: 7±1Nm

3. Carefully pull out the fin antenna assembly leads one by one from the roof cover sheet metal mounting holes and remove the fin antenna assembly.

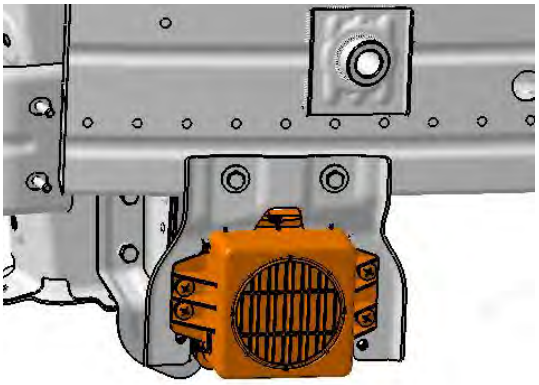
Installation

1. The installation order is the reverse of the removal order.

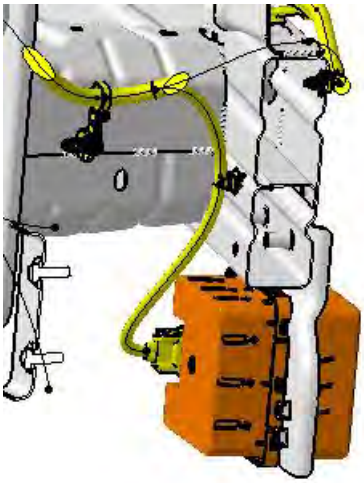
4.6.3.2 Pedestrian approaching audible warning system

Removal

1. Remove the fixing bolts of VSP.



2. Disconnect the VSP harness and remove the VSP.



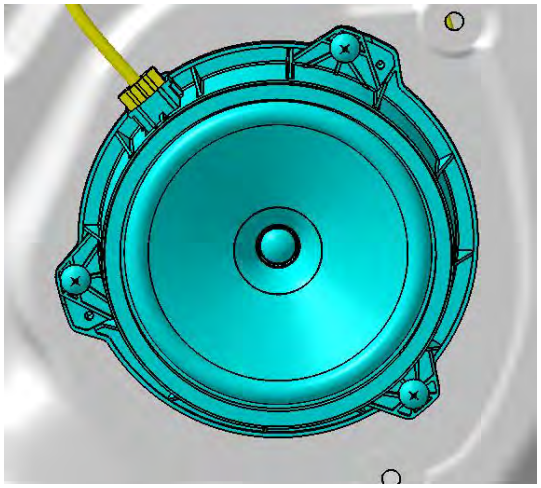
Installation

1. The installation order is the reverse of the removal order.

4.6.3.3 Door speaker

Removal

1. Remove the front door shield. Refer to: Front door shield.
2. Remove the fixing screws of the door speaker and interior trim panel, and disconnect the connector between the door speaker and body harness.



3. Remove the door speaker.

Installation

1. The installation order is reverse to the removal order. Pay attention to the following points

Caution: Insert the square plastic nut into the corresponding installation point of the sheet metal, requiring the installation surface to fit and the speaker to be installed and fixed firmly.

Caution: After the speaker is assembled in place, install the shield and other interior parts.

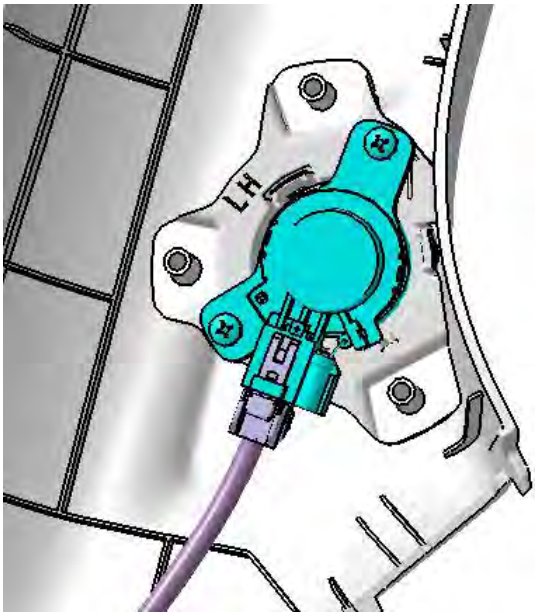
4.6.3.4 High-pitch speaker

Removal

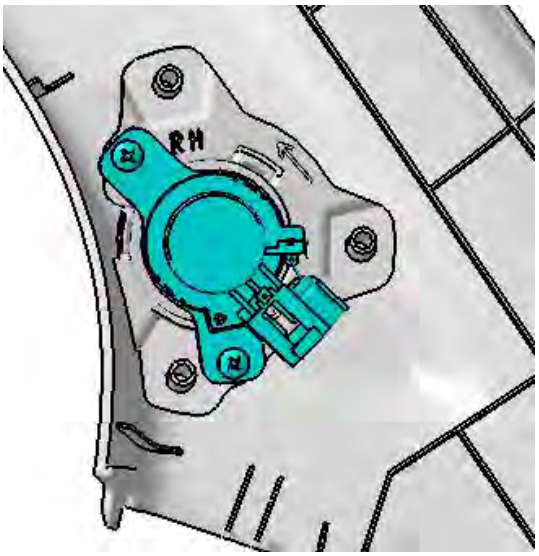
Caution: This removal and installation procedure takes the left side as an example. For removal and installation of the right side, please refer to the left side.

1. Remove the A-pillar shield. Refer to: Left a-pillar upper shield.

2. Remove the self-tapping screws that fix the high-pitch speaker.



3. Disconnect the high-pitch speaker and instrument panel harness connector.



4. Remove the high-pitch speaker.

Installation

1. The installation order is reverse to the removal order. Pay attention to the following points

Caution: Use two self-tapping screws to install the speaker on the A-pillar shield. The installation surface must fit and the speaker must be firmly installed; when installing, the connector should face downwards.

Caution: After connecting the instrument panel harness to the high-pitch speaker, clamp the A-pillar shield.

4.7 Horn

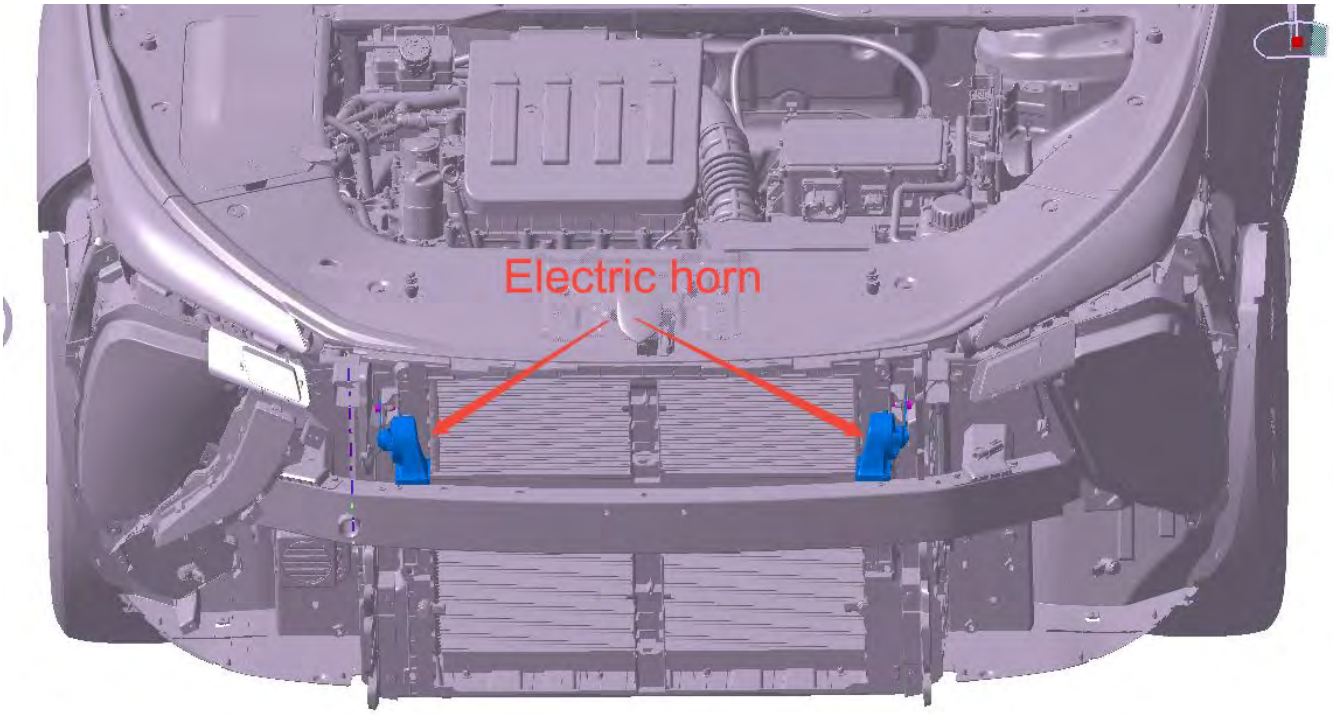
4.7.1 Specification

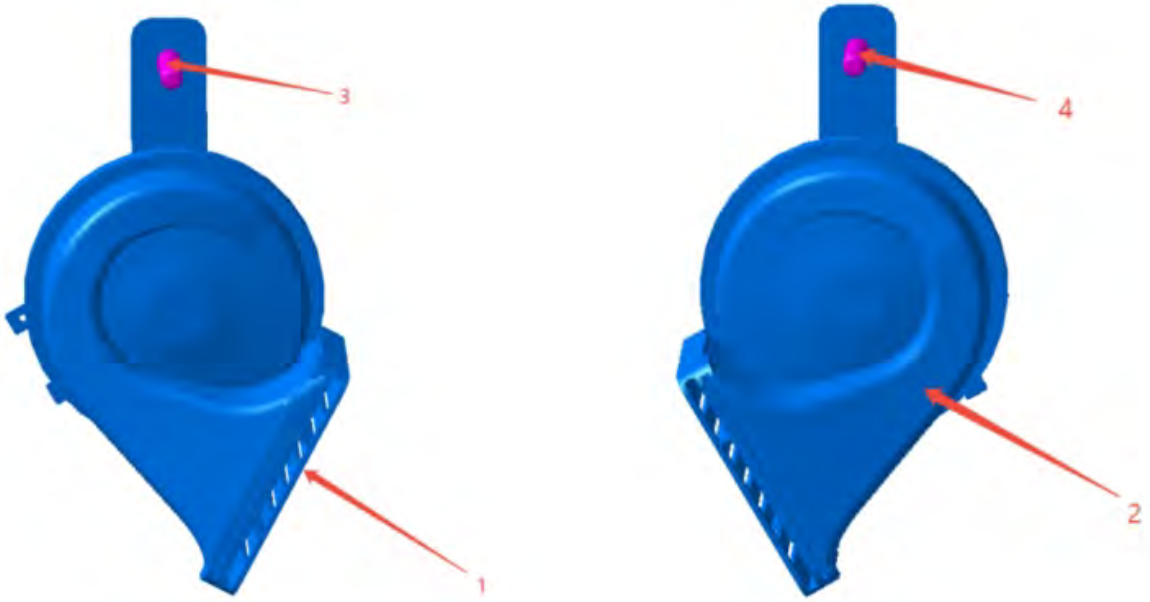
4.7.1.1 General specifications

Model	Operating voltage (V)	Operating current (A)	Sound level (dB(A))	Fundamental frequency (Hz)
Snail electric horn (high-pitch)	9	≤4.0	Normal sound	510±35
	13		105-118	
	15		Normal sound	
Snail electric horn (low-pitch)	9	≤4.0	Normal sound	420±35
	13		105-118	
	15		Normal sound	

4.7.2 Operation Manual

4.7.2.1 Horn





Item	Description	Item	Description
1	Snail electric horn (high-pitch)	3	Hex bolt, spring washer, and flat washer assembling unit
2	Snail electric horn (low-pitch)	4	Hex bolt, spring washer, and flat washer assembling unit

4.7.2.2 Precautions

Precautions

1. Be sure to use **12** V battery.
2. Do not disconnect the battery cable when the engine is running.
3. Before connecting or disconnecting the engine **ECU** harness connector, turn the ignition switch to the **OFF** position and disconnect the GND cable of the battery. Failure to do so may damage the engine **ECU**, because even if the ignition switch is turned to the **OFF** position, the **ECU** still has **12** V voltage.
4. Before removing parts and components, turn the ignition switch to the **OFF** position, and then disconnect the battery GND cable.
5. Do not disassemble the engine **ECU**.
6. Only a digital multimeter is allowed to be used to check the EFI system.
7. Always use genuine parts and components for maintenance; otherwise, the EFI system may not be able to work properly.
8. During maintenance, use unleaded petrol only.
9. Please follow the specified maintenance and diagnostic procedures for maintenance work.
10. Do not disassemble or remove parts and components of the EFI system during maintenance.
11. During maintenance, take all electronic components (such as ECUs and sensors) carefully and never let them fall to the ground.
12. Establish environment protection awareness and effectively dispose of waste produced during maintenance.

Precautions during repair

1. Before maintenance, please disconnect the start battery negative terminal to avoid the harness being short-circuited during disassembly, which may result in fuse blowout or even fire, and avoid personal injury.
2. When removing and installing the USB power interface, 12V on-board power supply and wireless charging, please arrange professionals to operate to avoid appearance scratches caused by improper operation.
3. Please do not insert cigarette lighters of other brands into the cigarette lighter base.

4.7.3 Diagnostic tests

4.7.3.1 Fault Diagnosis

Hoarse sound of electric horn

Steps	Measures	Yes	No
1	Check if there is water ingress in the electric horn. If so, drain out any water inside.		
2	If the horn still sounds hoarse after draining, replace the electric horn directly.		

4.7.3.2 Fault Diagnosis

The electric horn does not sound

Steps	Measures	Yes	No
1	Check whether the electric horn circuit is functioning normally according to the harness principle.		
2	If the line path is functional, please confirm whether the electric horn sounds normally according to the inspection steps. If not, please replace the electric horn directly.		

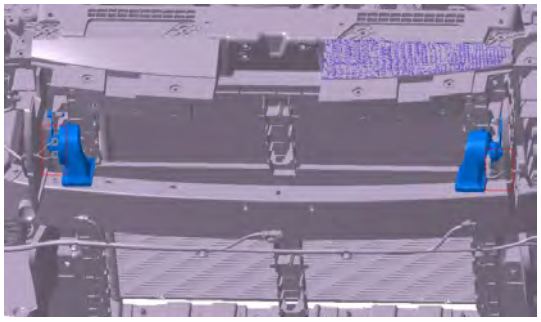
4.7.4 Removal and installation

4.7.4.1 Horn

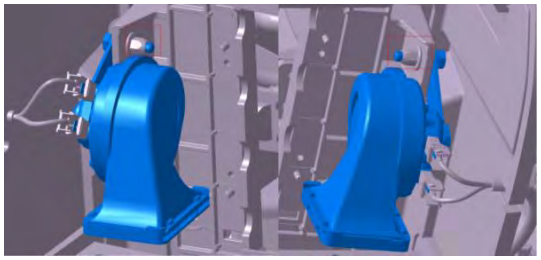
Removal

1. Remove the front bumper assembly.Refer to: Front bumper assembly.

2. Disconnect the horn harness.



3. Remove the horn fixing bolts and take down the horn.



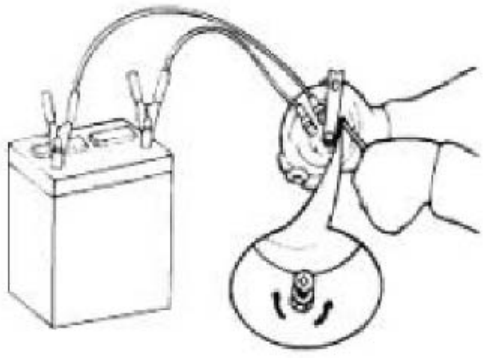
Installation

1. The disassembly sequence is reverse to the installation sequence.

Test

1. Test the horn through connection to the voltage terminal 1 and GND terminal 2 of the battery.

2. The horn should make a sound. If not, replace it.



3. Sound the horn and adjust the horn by rotating the adjusting screw to provide appropriate sound quality.

Caution: After the adjustment, apply a small amount of glue around the screw to avoid looseness.

4.8 Car Power and Wireless Charging

4.8.1 Specification

4.8.1.1 General specifications

12V on-board power supply assembly

Item	Specification
Rated voltage	DC 12V
Voltage range	DC 9.0V ~ DC 16V
Rated current	10A

USB Power Supply Interface

Item	Type-C power supply interface specifications	Type-A power supply interface specifications
Rated voltage	DC 12V	DC 12V
Voltage range	DC 9.0V ~ DC 16V	DC 9.0V ~ DC 16V
Output voltage	5V/9V/12V	5V/9V
Rated current	MAX 5A	MAX 2.4A
Operating temperature	-40℃~ 85℃	-40℃~ 85℃
Storage temperature	-40℃~ 90℃	-40℃ ~ 90℃

Wireless charging assembly

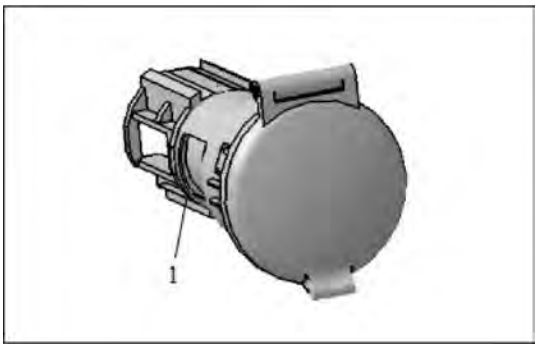
Item	15W specification	50W specification
Rated voltage	DC 12V	DC 12V
Voltage range	DC 9.0V ~ DC 16V	DC 9.0V ~ DC 16V
Output voltage	5V	5V/9V/12V
Rated current	3A (maximum)	5A (maximum)
Operating frequency	125±5%KHz	127KHz
Standby current	≤110mA	≤100mA
Operating temperature	-40℃~ 85℃	-40℃~ 85℃
Storage temperature	-40℃~ 90℃	-40℃ ~ 90℃

4.8.2 Instructions and operations

4.8.2.1 Part location diagram

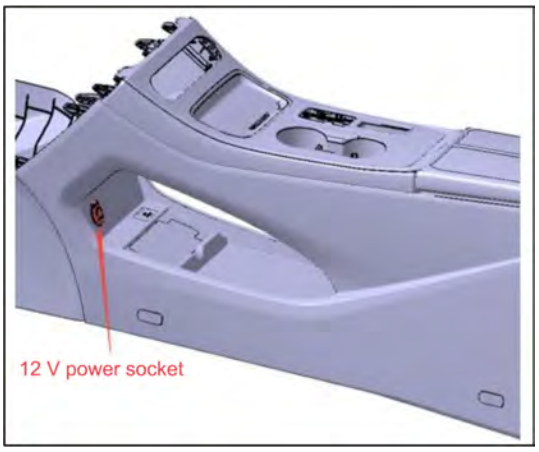
12V on-board power supply assembly

Part drawing



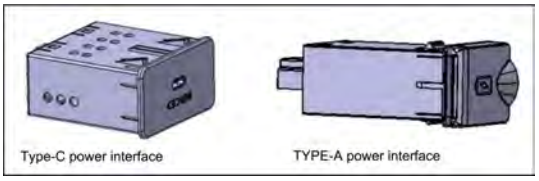
Part location diagram

The 12V on-board power supply assembly is located below the front end of the auxiliary dashboard and below the rear cover of the auxiliary dashboard.



USB Power Supply Interface

Part drawing

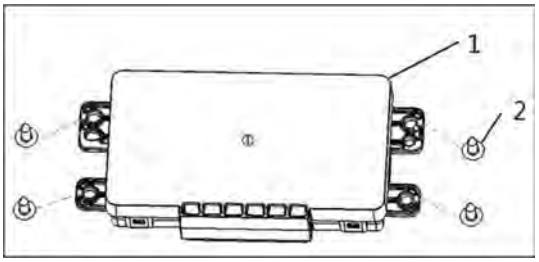


Part location diagram

The TYPE-C power supply interface is located at the front lower part of the auxiliary dashboard penetration, and the TYPE-A power supply interface is located on the rear end cover of the auxiliary dashboard.

Wireless charging assembly

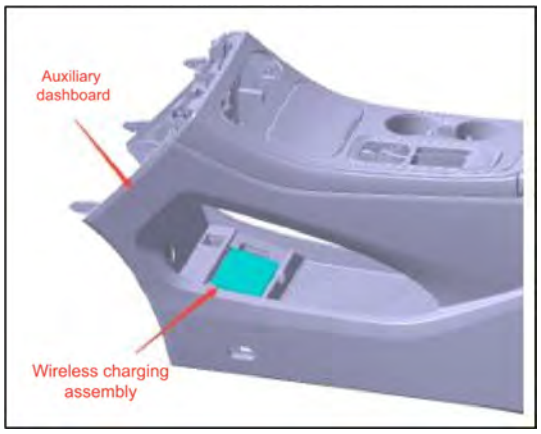
Part drawing



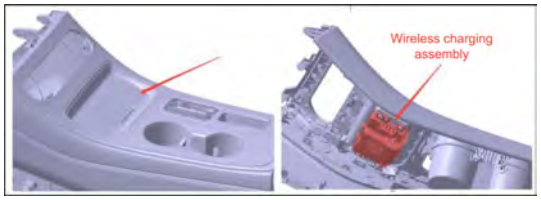
S/N	Name	S/N	Name
1	Wireless charging assembly	2	Cross recessed truss head self-tapping screw

Part location diagram

1. The 15W wireless charging assembly is installed at the through-hole of the auxiliary dashboard, at the lower body of the auxiliary dashboard frame, and fixed by screws.



2. The 50W wireless charging assembly is placed on the upper trim panel of the console.



4.8.2.2 Precautions

Precautions during repair

1. Before maintenance, please disconnect the start battery negative terminal to avoid the harness being short-circuited during disassembly, which may result in fuse blowout or even fire, and avoid personal injury.
2. When removing and installing the USB power interface, 12V on-board power supply and wireless charging, please arrange professionals to operate to avoid appearance scratches caused by improper operation.
3. Please do not insert cigarette lighters of other brands into the cigarette lighter base.

4.8.3 Diagnosis and testing

4.8.3.1 On-board Power Supply System - Diagnosis and Testing

On-board power supply system

Inspection and confirmation

1. Confirm the problem proposed by customers.
2. Check the vehicle visually for obvious signs of electrical damage.
3. Read the system DTC through the diagnostic scanner.
4. Address problems found before next inspection.
5. If the cause cannot be confirmed from the appearance, confirm the symptoms first and then check according to the symptom table.

4.8.3.2 On-board Power Supply System - Diagnosis and Testing

Appearance Checklist

Mechanical
– Fuse – Harness – Junction box – Switch – Battery

4.8.3.3 Charging and distribution system-fault diagnosis and maintenance of high-voltage power distribution box

Use the system schematic diagram to check the circuit, fuse, and relay, identify the faulty part, and repair or replace the fuse, etc.

Caution:

– This work should be done by professionals at 4S shops. If it cannot be repaired, replace the whole assembly.

Fuse

1. PTC: It is necessary to open the cover for measurement. The measurement method is to use the ohm range/buzzer range of a multimeter, connect the red test lead to the positive terminal (positive copper bar) of the battery, and the black test lead to the side from the PTC fuse to the relay direction. If the resistance value is less than 0.5 ohms/the buzzer keeps ringing, it is normal; otherwise, the fuse fails.
2. OBC: It is necessary to open the cover for measurement. The measurement method is to use the ohm range/buzzer range of a multimeter, connect the red test lead to the positive terminal (positive copper bar) of the battery, and the black test lead to the other side of the OBC fuse. If the resistance value is less than 0.5 ohms/the buzzer keeps ringing, it is normal; otherwise, the fuse fails.
3. EAC: It is necessary to open the cover for measurement. The measurement method is to use the ohm range/buzzer range of the multimeter, connect the red test lead to the positive terminal (positive copper bar) of the battery, and the black test lead to the other side of the EAC. If the resistance value is less than 0.5 ohms/the buzzer keeps ringing, it is normal; otherwise, the fuse fails.

Relay

Pay special attention to maintenance and confirm that the vehicle is powered off from high voltage.

1. Fast charging relay detection: Open the cover for detection, use the multimeter buzzer gear, touch the test lead to both ends of the relay, the buzzer does not respond, the low-voltage connector 7+/9-pin is connected to the 12V power supply, there is a click sound, the test lead touches the two ends of the relay again, the buzzer keeps ringing, and any point does not meet the requirements, it indicates a fault.

2. PTC relay: Open the cover for inspection, use the multimeter buzzer gear, touch the test lead to both ends of the relay, the buzzer does not respond, the low-voltage connector 12+/6-pin is connected to the 12V power supply, there is a click sound, the test lead touches both ends of the relay again, the buzzer keeps ringing, and any point does not meet the requirements, it indicates a fault.

Microswitch

Open the cover for inspection, remove the microswitch connector, manually press the microswitch pressure rod, adjust the multimeter to the buzzer gear, touch the probe to the connector terminal, and the buzzer will sound for a long time. Release the microswitch pressure rod, and the buzzer will not respond. Otherwise, it is a fault.

Sintering detection module

The HECU message status can be read by the diagnostic scanner to determine whether the sintering detection module is faulty.

4.8.3.4 On-board Power Supply System - DTC Diagnosis

DTC	Fault description	Repair recommendations
B20816	AC undervoltage	1. Check whether the external AC input voltage is between 85V and 265V 2. If the external voltage is normal, replace the charging plug for testing If it still does not recover, replace the PDM
B20417	AC overvoltage	
B2A519	Hardware overcurrent	
B21B17	System overvoltage	1. Check whether the low-voltage battery voltage is between 9V and 16V 2.If the low-voltage battery is abnormal, try to replace it for test
B21C16	System undervoltage	
C11100	BMS communication lost	Check whether the communication of BMS components is normal
C12200	VCM communication lost	Check whether the VCM component communication is normal
B26C87	PFC control command lost	1. Disconnect the low-voltage battery and try to restart 2. If the fault still exists, it is recommended to replace PDM
B21F08/ B21C09	Loss of communication between MCU and OBC DSP	
B22416	Coolant overtemperature	1. Check whether the rated power is exceeded 2. Check whether the fan and coolant pump are normal 3. Check whether the coolant is too little

DTC	Fault description	Repair recommendations
B24538	AC frequency too high/AC frequency too low	Check if the CP signal of the charging plug is normal, or whether the CP detection function is normal.
B28D13	Difference between DCDC output voltage and battery supply voltage	Check whether the DCDC output terminal is reliably connected to the low-voltage battery
B2A316	Input undervoltage	1. Check whether the high-voltage cable is well connected and whether the connector is damaged 2. Check whether the battery pack is normal 3. If the cable connection is good, the battery pack is normal, and the fault cannot be recovered, replace the two-in-one power supply module
B2B316	Input software undervoltage at HV side	
B29116	Interlink undervoltage	
B29117	Interlink overvoltage	
B2A217	Input hardware overvoltage	
B2B117	Input software overvoltage	
B2B519	Input hardware overcurrent	
B2BE4B	DCDC overtemperature	1. Check whether the vehicle cooling system works normally. 2. Measure whether the power supply two-in-one module is overheated. If so, let it cool for a period of time. After cooling, DCDC is still abnormal. It is recommended to replace the two-in-one power supply module.
B2BD4B	HV overtemperature	
B2B917	Output software overvoltage	1. Check whether the low-voltage battery voltage is between 9 and 16V. 2. If the low-voltage battery is abnormal, try to replace it for test.
B2AB17	Output hardware overvoltage	
B2AD16	Output undervoltage	
B2B119	Output hardware overcurrent	Check whether the output terminal is short-circuited.
B2BF19	Output software overcurrent	

DTC	Fault description	Repair recommendations
B29304	Verification failed	1. Check whether the vehicle CAN network signal is normal. 2. Check whether the CAN communication low-voltage harness is properly connected. 3. Check whether the communication circuit is normal.
B21E08	Loss of communication between MCU and LDC DSP	
C07300	CAN bus off	1. Check whether the vehicle CAN network signal is normal. 2. Check whether the CAN communication low-voltage harness is properly connected. 3. Check whether the communication circuit is normal.
Others	/	It is recommended to restart (disconnect the negative pole of the battery, wait for one minute and then reconnect it) to see if the fault exists. If it still exists, contact the manufacturer. It is recommended to replace the two-in-one power supply module

4.8.3.5 Fault Diagnosis

伪主题: 未找到 DITA 主题 \"file:/_ATI_Not_Found_/开关 电源附件系统-故障诊断.dita\"。

4.8.3.6 Symptom Table

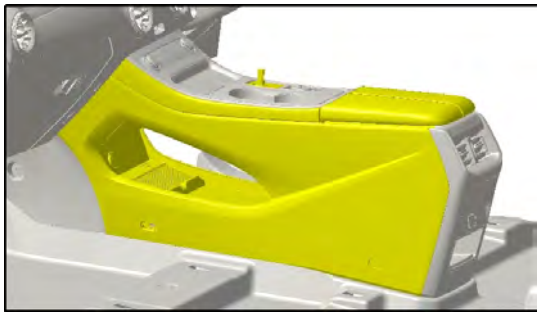
伪主题: 未找到 DITA 主题 \"file:/_ATI_Not_Found_/开关 电源附件系统-症状表.dita\"。

4.8.4 Removal and installation

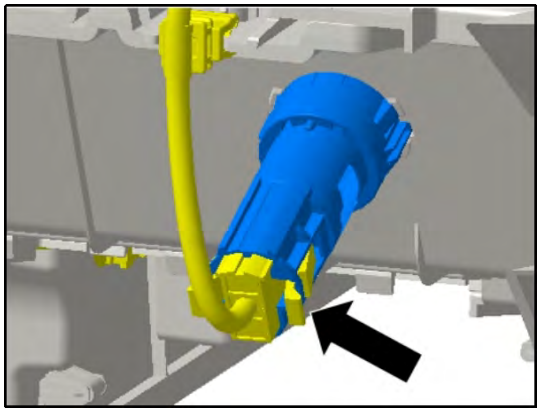
4.8.4.1 12V power supply interface

Removal

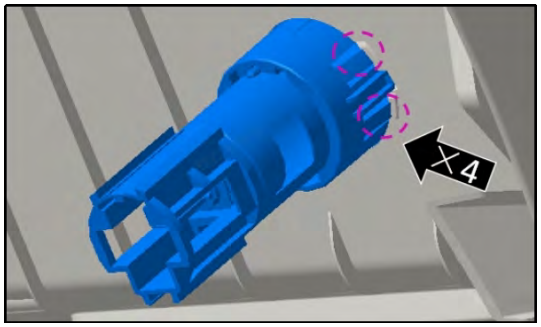
1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Remove the auxiliary dashboard body.



3. Disconnect the harness connector from the 12V power supply interface.



4. Hold the fixed clip structure of the 12V power supply interface and push out the 12V power supply interface.



5. Remove the 12V power supply interface.

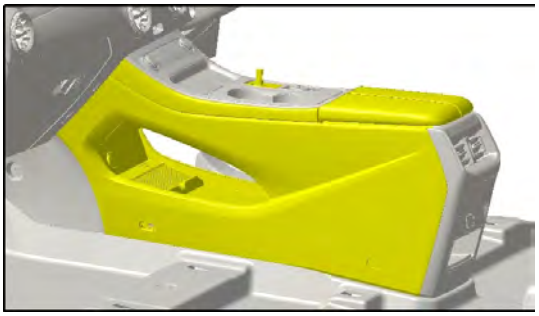
Installation

1. The installation order is the reverse of the removal order.

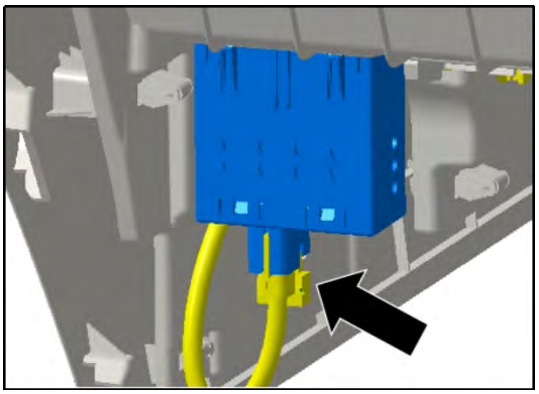
4.8.4.2 Front Type-C power supply interface

Removal

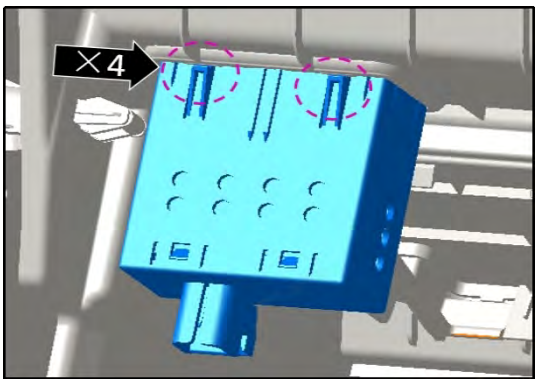
1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Remove the auxiliary dashboard body.



3. Disconnect the harness connector from the Type-C power supply interface.



4. Hold the clip structure on the Type-C power supply interface and push the Type-C power supply interface outward.



5. Remove the Type-C power supply interface.

Installation

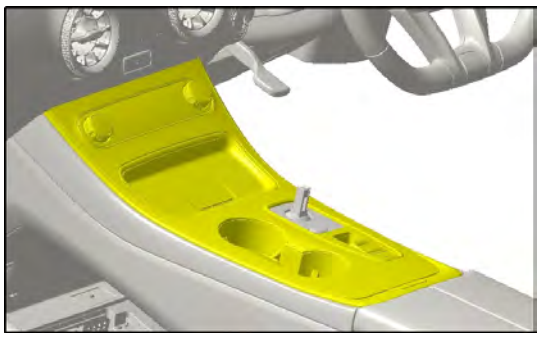
1. The installation order is the reverse of the removal order.

4.8.4.3 Wireless charging module

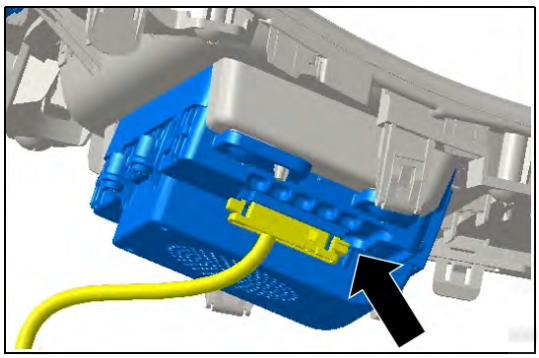
Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal

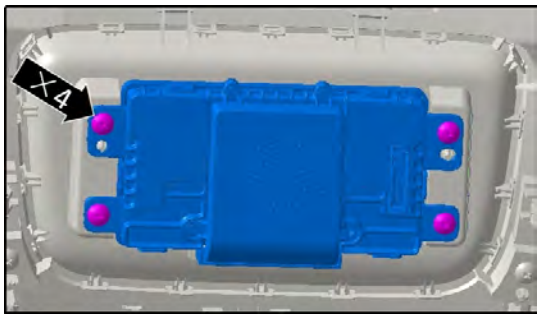
2. Remove the auxiliary dashboard upper trim panel assembly.



3. Disconnect the harness plug from the wireless charging module.



4. Remove the connecting screws between the wireless charging module and the upper trim panel of the auxiliary dashboard.



5. Remove the wireless charging module.

Installation

The installation order is the reverse of the removal order.

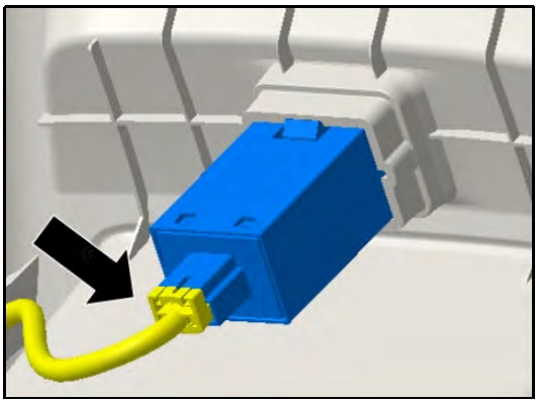
4.8.4.4 Rear USB power supply interface

Removal

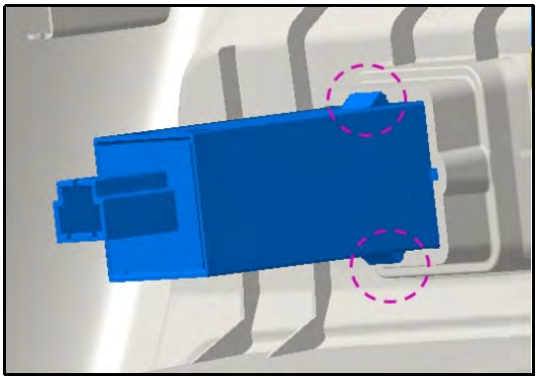
1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal

2. Remove the auxiliary dashboard rear end cover assembly.

3. Disconnect the harness connector from the USB power supply interface.



4. Hold the clip structure on the USB power supply interface and push the USB power supply interface outward.



5. Take out the USB power supply interface.

Installation

1. The installation order is the reverse of the removal order.

4.9 Advanced Driver Assistance System

4.9.1 Specification

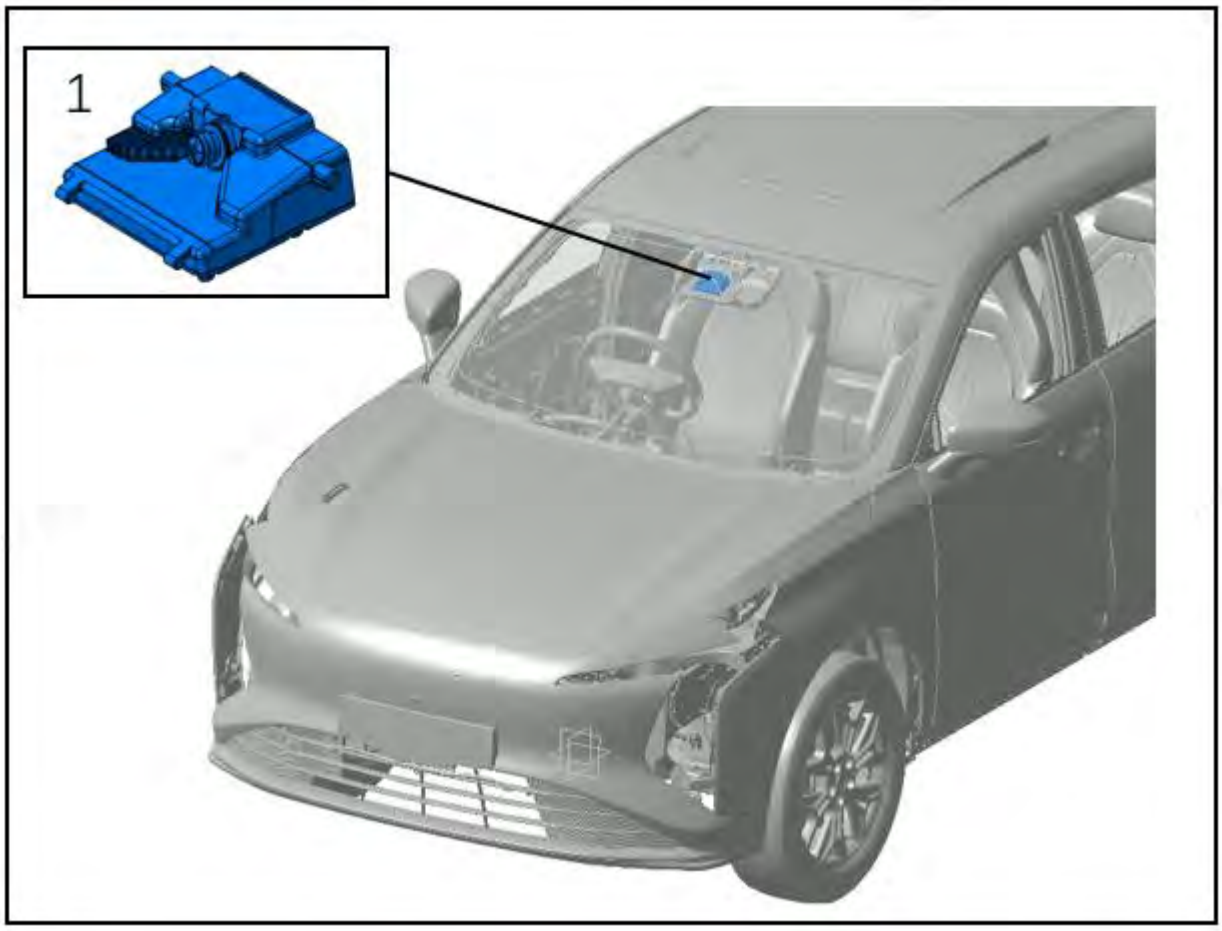
4.9.1.1 General specifications

Item	Specification
Rated voltage	DC 12V
Voltage range	DC 9.0V ~ DC 16V
Power consumption	≤4.5W
Operating temperature	-40℃~+85℃
Storage temperature	-40℃~+95℃

4.9.2 Instructions and operations

4.9.2.1 Component Locating Diagram

ADAS



Item	Description
1	Driver assistance multi-function camera

4.9.2.2 Overview

1. The automotive advanced assistance system consists of a driving assistance multi-function camera integrated with a control chip. The sensor and the control unit are designed as one. The camera captures the road information ahead and identifies vehicles, pedestrians, lane lines, traffic speed limit signs and front vehicle light information, and sends the target information to the internal control unit. The internal control unit interacts with the whole vehicle through the CAN network and sends an alarm signal to the vehicle instrument to warn the driver; Send out acceleration and deceleration signals of the driving vehicle and steering wheel torque signals to control the longitudinal and lateral driving positions of the vehicle.

2. When the vehicle is ignited, the camera will be initialised. After the initialisation is completed, it will be powered on and enter the working state. After the effective conditions of each function are met, each function works independently.

3. The driver assistance system consists of a driving assistance multi-function camera integrated with a control chip. The sensor and the control unit are designed as one. The camera captures the road information ahead and identifies vehicles, pedestrians, lane lines, traffic speed limit signs and front vehicle light information, and sends the target information to the internal control unit. The internal control unit interacts with the whole vehicle through the CAN network and sends an alarm signal to the vehicle instrument to warn the driver; Send out acceleration and deceleration signals of the driving vehicle and steering wheel torque signals to control the longitudinal and lateral driving positions of the vehicle. The following functions can be realised: Automatic Emergency Braking (AEB), Forward Collision Warning (FCW), Adaptive Cruise Control (ACC), Lane

Keeping Assist (LKA), Lane Departure Warning (LDW), Traffic Sign Recognition (TSR) and Intelligent High Beam Control (IHC).

Function introduction

Function Name	Function description
Forward collision assist	Forward collision assist includes forward collision warning (FCW) and automatic emergency braking (AEB). During driving, it provides alarm prompts and auxiliary braking for the driver when there is a risk of collision in front of the vehicle; The automatic emergency braking (AEB) function is used to automatically perform braking action when the vehicle is about to collide with a vehicle running in the same direction ahead, so as to remind the driver and avoid or reduce injuries caused by collision (including car-to-car and car-to-person emergency braking).
Lane departure assist	Lane Departure Assist (LDA) includes deviation correction and departure warning. During driving, it provides steering assistance and alarm prompts to the driver when the vehicle unconsciously deviates from the lane.
Adaptive cruise control (ACC)	Adaptive cruise control (ACC) includes cruise control, fixed-distance following, and vehicle-following start-stop. The vehicle can run at the cruise speed set by the driver, or follow the front vehicle to run, stop or start according to the cruising distance set by the driver.
Advanced cruise control system (SCC)	Advanced cruise control system (SCC) adds lateral control function on the basis of realizing longitudinal control of constant speed cruise, fixed distance cruise and vehicle-following start-stop to keep the vehicle running within the lane line.
Intelligent High Beam Control (IHC)	During driving, the vehicle automatically switches between high and low beams according to the driving environment.
Traffic sign recognition	When the vehicle is running, it identifies road traffic signs and displays them on the instrument interface, providing visual prompts when speeding.

Component description

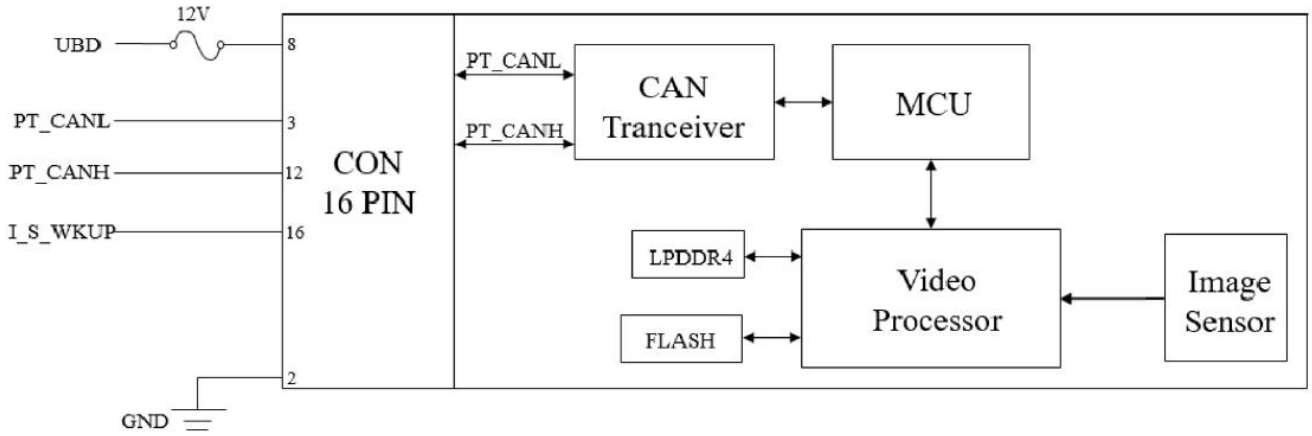
Driver Assistance Multi-Purpose Camera (ADAS):

1. The driver assistance multi-function camera is installed on the plastic bracket in the middle of the front windscreen, and is combined with the dashcam and rain light sensor in the shield of the interior rearview mirror.
2. The driver assistance multi-function camera controls the longitudinal and lateral driving position of the vehicle by capturing the road information ahead and identifying vehicles, pedestrians, lane lines and other information, processing the target information, sending an alarm signal to the vehicle instrument to warn the driver or sending acceleration and deceleration signals and steering wheel torque signals to drive the vehicle.

3. The driver assistance multi-function camera is an unrepairable parts and components and shall not be disassembled for repair. When it is judged as an ADAS fault, only parts replacement is permitted.

System Schematic Diagram

Schematic diagram of external wiring of advanced driver assistance system:



4.9.2.3 Precautions

Precautions

1. The purpose of this system is to remind and assist the driver through its functions when the vehicle is running, so as to improve the active safety of the vehicle. It does not exempt the driver from his duty of care. Therefore, the driver should not be over-dependent on the system and must be careful. The manufacturer is not responsible for accidents caused by the driver's negligence.
2. The road environment, light, weather and dirt on the front windscreen of the camera during driving may cause the sensor performance to degrade or even fail. When the system fails, it will remind the driver and require the driver to be ready to take over driving at any time.
3. After replacing the camera, camera bracket or windscreen, it is necessary to re-calibrate the camera; otherwise, the sensor performance may be degraded due to the deviation of camera position, affecting the function effect.
4. The advanced driver assistance function is only applicable to normal hard-surface roads. It may cause performance degradation or even failure on roads with accumulated water, ice and snow, potholes and large slopes.

Precautions during repair

1. Be sure to disassemble and repair the driver assistance multi-function camera when the vehicle is turned off.
2. Only digital multimeters and passive test lights are allowed to check the advanced driver assistance system (ADAS).
3. Please use authentic parts and components for maintenance; otherwise, the ADAS may not operate properly.
4. Please follow the specified maintenance and diagnostic procedures for maintenance work.
5. Do not disassemble or remove parts and components of the ADAS during maintenance.
6. During maintenance, take all electronic components (such as ECUs and sensors) carefully and never let them fall to the ground.
7. Establish environment protection awareness and effectively dispose of waste produced during maintenance.

4.9.3 Diagnosis and testing

4.9.3.1 DTC List of ADAS (Driver Assistance Multi-function Camera)

S/N	DTC	Fault description	Operation
1	B235117	Battery Voltage High	Go to Accurate Test 1: B235117
2	B235216	Battery Voltage Low	Go to Accurate Test 2: B235216
3	U0073 00	Control Module Communication Bus Off (CAN Bus Off)	Go to Accurate Test 3: U0073 00
4	U120000	Lost Communication With SRS (SRS Node Offline)	Go to Accurate Test 4: U120000
5	U012100	Lost Communication With EHB (EHB Node Offline)	Go to Accurate Test 5: U012100
6	U013100	Lost Communication With EPS (EPS Node Offline)	Go to Accurate Test 6: U013100
7	U014000	Lost Communication With BCM (BCM Node Offline)	Go to Accurate Test 7: U014000
8	U012200	Lost Communication With HCU (HCU Node Offline)	Go to Accurate Test 8: U012200
9	U010000	Lost Communication With EMS (EMS Node Offline)	Go to Accurate Test 9: U010000
10	U015500	Lost Communication With IC (IC Node Offline)	Go to Accurate Test 10: U015500
11	U015600	Lost Communication With ICE (ICE Node Offline)	Go to Accurate Test 11: U015600
12	U016400	Lost Communication With AC (AC Node Offline)	Go to Accurate Test 12: U016400
13	U014001	Lost Communication With PEPS (PEPS Node Offline)	Go to Accurate Test 13: U014001
14	U012820	Lost Communication With EPB_R (EPB_R Node Offline)	Go to Accurate Test 14: U012820
15	B2365 96	ADAS Internal Faults	Go to Accurate Test 15: B2365 96
16	B2361 4B	Image Process Unit temperature high	Go to Accurate Test 16: B2361 4B
17	B2362 97	ADAS Camera View Blocked	Go to Accurate Test 17: B2362 97
18	B2363 46	ADAS calibration failure	Go to Accurate Test 18: B2363 46

19	B2364 57	ADAS software mismatch	Go to Accurate Test 19: B2364 57
20	U012083	DTC_CHKSM_Error_from_ABS	Go to Accurate Test 20: U012083
21	U012183	DTC_CHKSM_Error_from_EPS	Go to Accurate Test 21: U012183
22	U012283	DTC_CHKSM_Error_from_ESP	Go to Accurate Test 22: U012283
23	U012383	DTC_CHKSM_Error_from_ICE	Go to Accurate Test 23: U012383
24	U012483	DTC_CHKSM_Error_from_PEPS	Go to Accurate Test 24: U012483
25	U012583	DTC_CHKSM_Error_from_SAS	Go to Accurate Test 25: U012583
26	U012082	DTC_RC_Error_from_ABS	Go to Accurate Test 26: U012082
27	U012182	DTC_RC_Error_from_EPS	Go to Accurate Test 27: U012182
28	U012282	DTC_RC_Error_from_ESP	Go to Accurate Test 28: U012282
29	U012382	DTC_RC_Error_from_ICE	Go to Accurate Test 29: U012382
30	U012582	DTC_RC_Error_from_SAS	Go to Accurate Test 30: U012582
31	U012682	DTC_RC_Error_from_SRS	Go to Accurate Test 31: U012682

4.9.3.2 Appearance Checklist

Appearance Checklist

Electrical
• Fuse • Harness • Plug • Corner mmWave radar

4.9.3.3 Diagnosis of common faults

ADAS (corner radar)

Diagnosis of common faults

FAQs	Possible cause	Troubleshooting method
The instrument displays "Side Assist Driving System Fault"	1. Radar damaged	Replace the radar.
	2. Open circuit of radar harness	Check the harness for continuity, and replace it if any fault is found
Missing and false alarm of radar	Damaged or dirty rear bumper	Check the rear bumper and repair it.

	Radar fault	Replace the radar.
	Radar bracket skew due to collision	Check whether the radar is installed horizontally and whether the radar surface is perpendicular to the ground.

4.9.3.4 Adaptive calibration

ADAS (corner radar)

Adaptive calibration

mmWave radar is fixed inside the front and rear bumpers. In case of deformation of the radar bracket due to vehicle collision, adaptive calibration shall be carried out to make the radar performance reach a stable and reliable state. If the radar installation angle is out of tolerance by more than 5° due to serious deformation, please correct the bracket and then calibrate it.

Calibration method of rear corner mmWave radar: connect the diagnostic scanner, select the corresponding model, and select RJ_RARAR→special function→after-sales adaptive calibration. When starting the vehicle, please drive on a straight road. There are stationary targets such as green belts, street lights or guardrails on both sides of the calibrated road. The speed should be kept between 30 and 70 km/h as much as possible, and the total calibration time is generally not more than 5 minutes.

4.9.3.5 Advanced Driver Assistance System-Fault Diagnosis

System not working

Specific manifestation: Under the conditions of meeting the function activation, the function cannot be activated and triggered normally.

Fault cause: The advanced driver assistance system does not work.

Repair method: Inspect if the DC+12V power supply between Pin 3 and Pin 12 of the driving assist multi-function camera is delivered to the controller, and verify if the wake-up signal at Pin 6 is the standard 12V; if the power supply is normal, replace the controller.

Function temporarily unavailable

Specific performance: When the function is in operation, the instrument cluster reminds the driver that the function is temporarily unavailable.

Fault cause: The sensor function is temporarily unavailable due to temporary weakening (affected by strong light, rain and snow, occlusion, etc.).

Repair method: No repair is needed; the system will self-recover. Try to clean the lens transmission area on the outer surface of the windscreen and restart the vehicle.

Camera obstructed

Specific performance: The instrument cluster reminds the driver that the camera is blocked.

Fault cause: The camera is seriously blocked.

Repair method: Clean the lens transmission area on the outer surface of the windscreen.

Camera calibration fault

Specific manifestation: After replacing a new camera, it prompts that the camera is faulty.

Fault cause: The camera is not calibrated.

Maintenance method: Re-perform the camera calibration action.

Maintenance

– If an abnormal alarm occurs during self-inspection, please have the system inspected and repaired at a professional service centre as soon as possible.

– Please keep the front windscreen surface within the camera's field of view clean. If there is mud or dust on the windscreen surface, please use the wiper to wipe it clean or wash the vehicle.

4.9.3.6 Advanced Driver Assistance System-Fault Diagnosis

Maintenance

●When an abnormal alarm occurs during system self-inspection, please have the system inspected and repaired at a professional service centre as soon as possible.

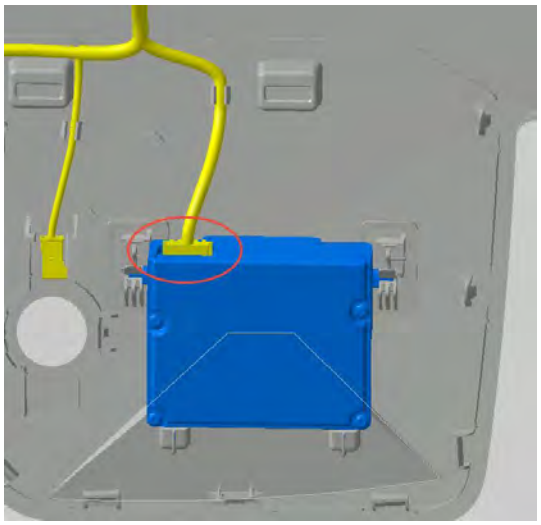
●Please keep the front windscreen surface within the camera's field of view clean. If there is mud or dust on the windscreen surface, please use the wiper to wipe it clean or wash the vehicle.

4.9.4 Removal and installation

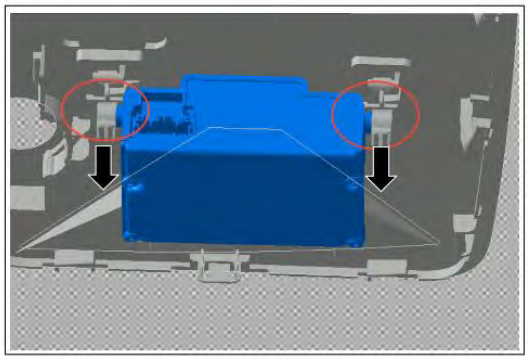
4.9.4.1 Driver assistance multi-function camera

Removal

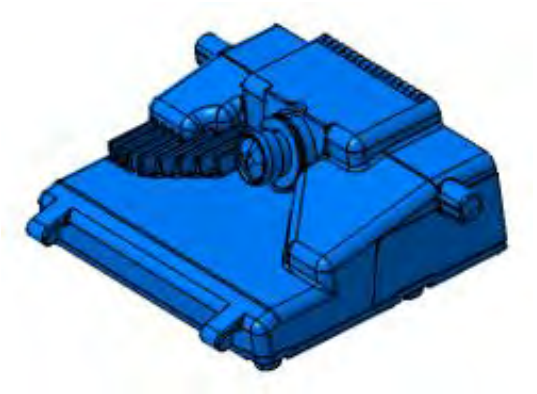
1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the interior rearview mirror cover plate.
3. After removing the interior rearview mirror cover plate, disconnect the driver assistance multi-function camera harness connector first.



4. Pull out the driver assistance multi-function camera in the direction of the arrow.



5. Remove the driver assistance multi-function camera.



Installation

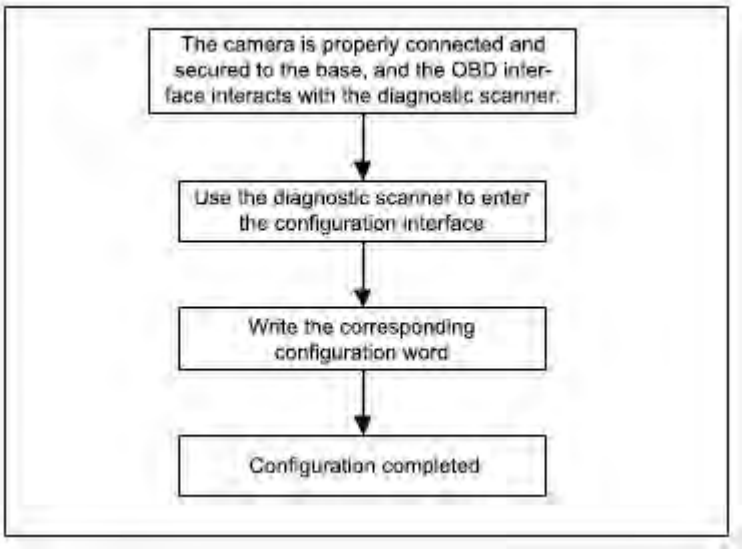
The installation order is the reverse of the removal order.

4.9.5 General procedures

4.9.5.1 Configuration writing process of the driving assist multi-functional camera

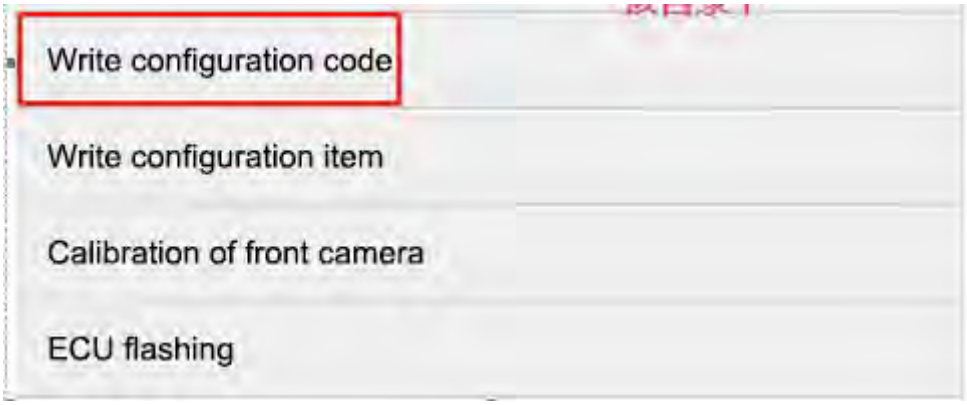
When the camera needs to be reinstalled due to slipping, damage, etc., it must be rewritten and configured. It can be recalibrated by portable diagnostic scanner (X431 diagnostic scanner, the same below).

The operation steps of portable diagnostic scanner are described as follows:

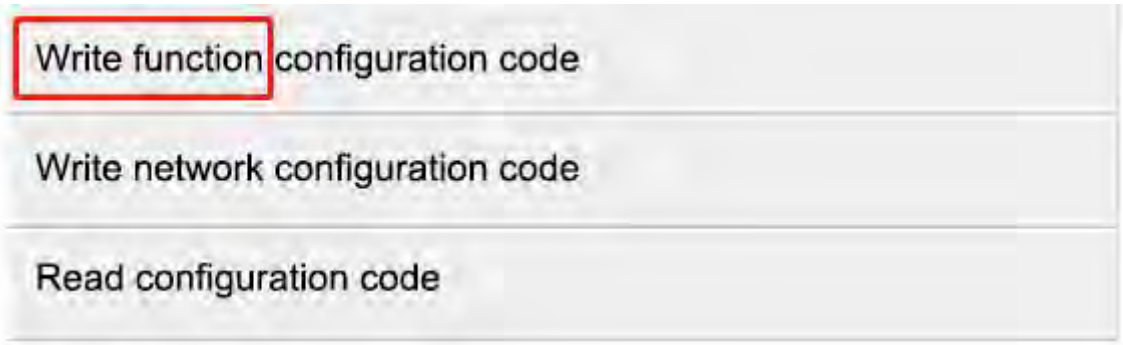


Calibrate on ordinary roads according to the requirements of the above flow chart.

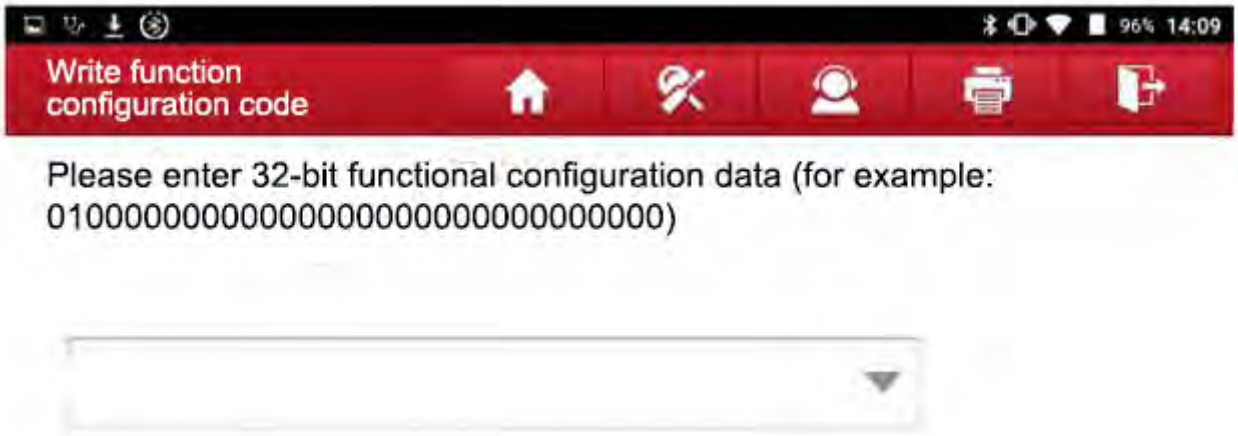
1. Enter the Leiting diagnostic system page and tap "Write configuration code".



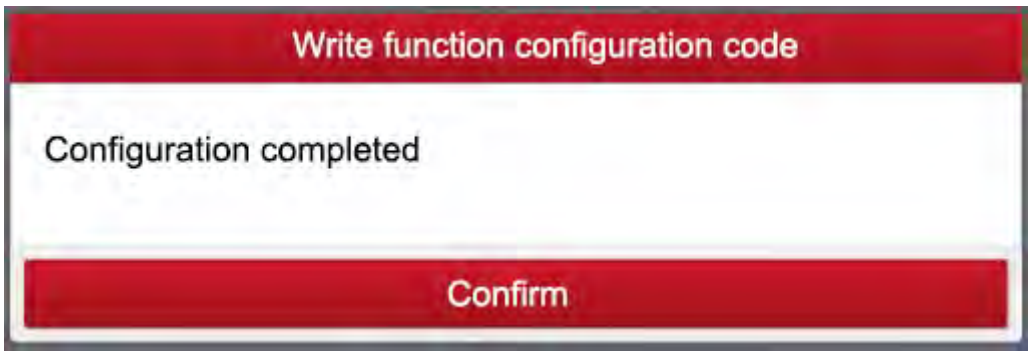
2. Write function configuration code.



3. Enter configuration word: 00000000000000000000000000001F9.



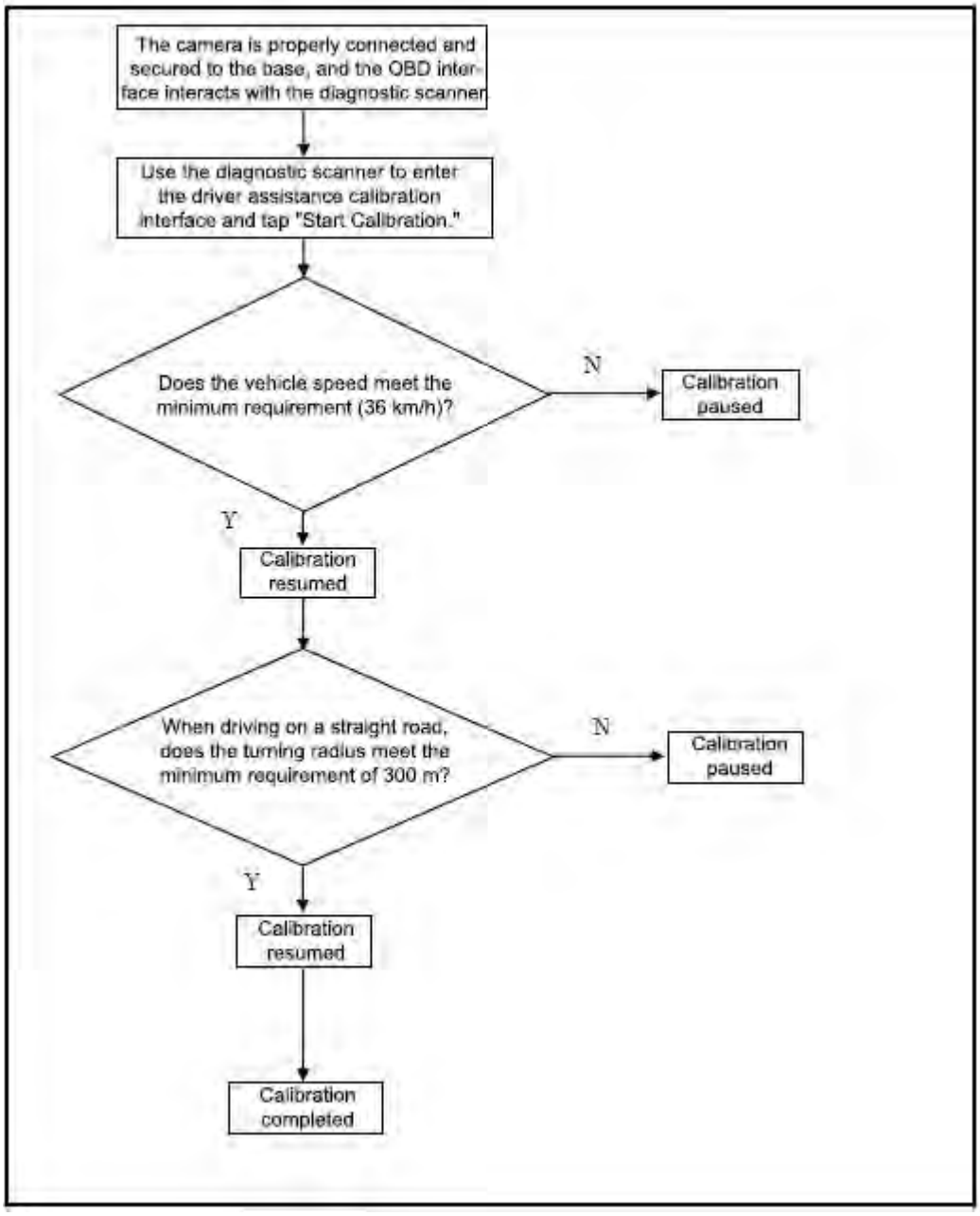
4. The following pop-up window will be displayed when the write configuration is completed.



Calibration process of the driving assist multi-functional camera

When the camera needs to be reinstalled due to falling, damage, or other reasons, it must be recalibrated. It can be recalibrated by portable diagnostic scanner (X431 diagnostic scanner, the same below).

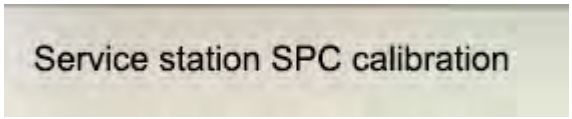
The operation steps of portable diagnostic scanner are described as follows:



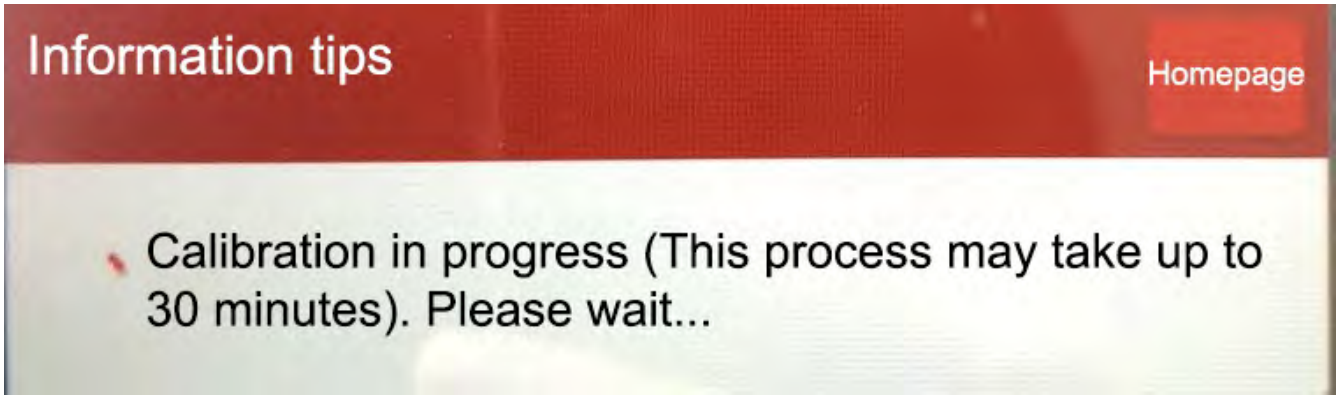
Calibrate on ordinary roads according to the requirements of the above flow chart.

1. Enter the Leiting REEV diagnosis system page.

2. Tap "Service Station SPC Calibration".

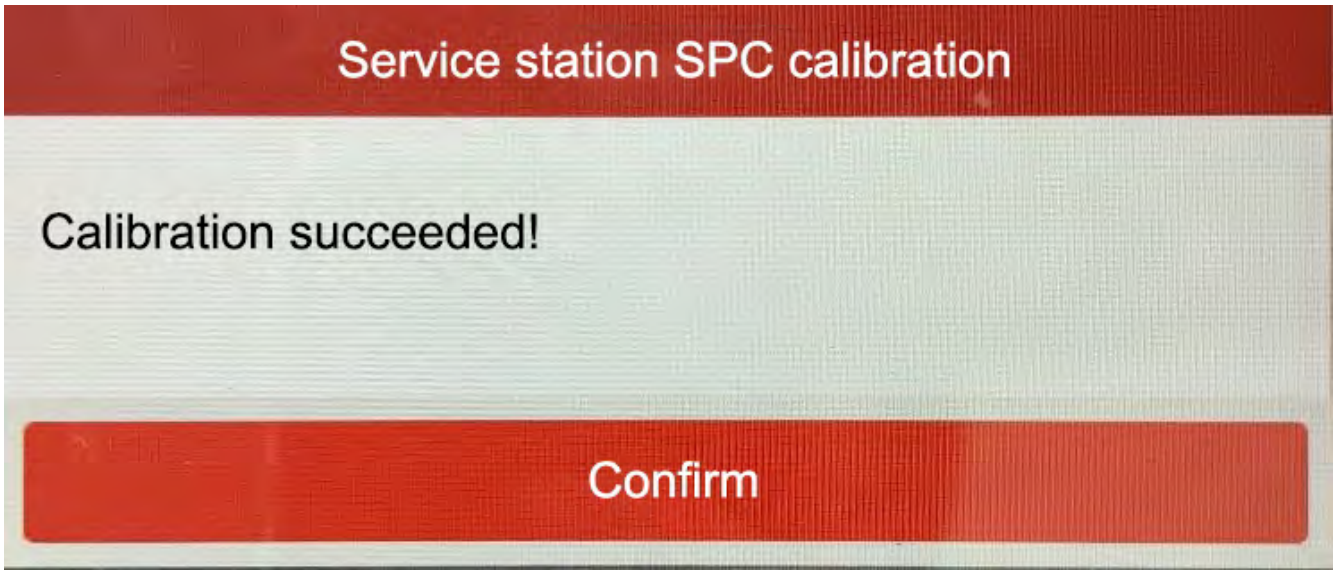


3. When the vehicle speed exceeds 36 km/h and the vehicle is on a straight road, the following pop-up will appear.



4. If the requirements in item 3 are not met, the following pop-up window will appear.

5. The following pop-up window will be displayed when the calibration is completed.



If the calibration procedure reports the following errors, they must be handled as appropriate:

1. "initialisation not completed", check the circuit and recalibrate.

2. "Field of view out of calibration range", check whether the camera installation position is correct and recalibrate.

3. "Roll angle out of range", check whether the camera installation position, angle and vehicle posture are correct, and recalibrate.

The following situations will cause the calibration speed to slow down or fail:

1. Roads with poor lighting conditions at night.

2. Poor camera vision, such as in heavy rain and snowy days.

3. The lane line is blurred or blocked.

4.10 Parking assist system

4.10.1 Specification

4.10.1.1 General specifications

Reversing radar system

Hostless radar main sensor

Item	Specification
Rated voltage	DC 12V
Voltage range	DC 9V ~ 16V
Input frequency	55.5±2KHZ
Operating temperature	-30℃~+80℃
Storage temperature	-40℃~+85℃
Maximum detection distance	60±10cm (PVC pipe with a diameter of 75mm)

UPA sensor

Item	Specification
Input voltage	7 ~ 9V
Operating temperature	-30℃~+80℃
Storage temperature	-40℃~+85℃
Detection distance	Both sides: 60±10cm, middle part: 150±10cm (PVC pipe with a diameter of 75mm)
Input frequency	55.5±2KHZ

Rear view camera system

Reversing camera (SD)

Item	Specification
Rated voltage	DC 12V
Voltage range	DC 9.0V ~ DC 16V
Operating Current	<120mA
Operating temperature	-40℃~+85℃
Storage temperature	-40℃~+90℃
Signal output	CVBS
Horizontal field of view	122 ° ±5 °
Vertical field of view	95 ° ±5 °
Effective pixel	640(H)x480(V)
Frame rate	30fps

Panoramic view system

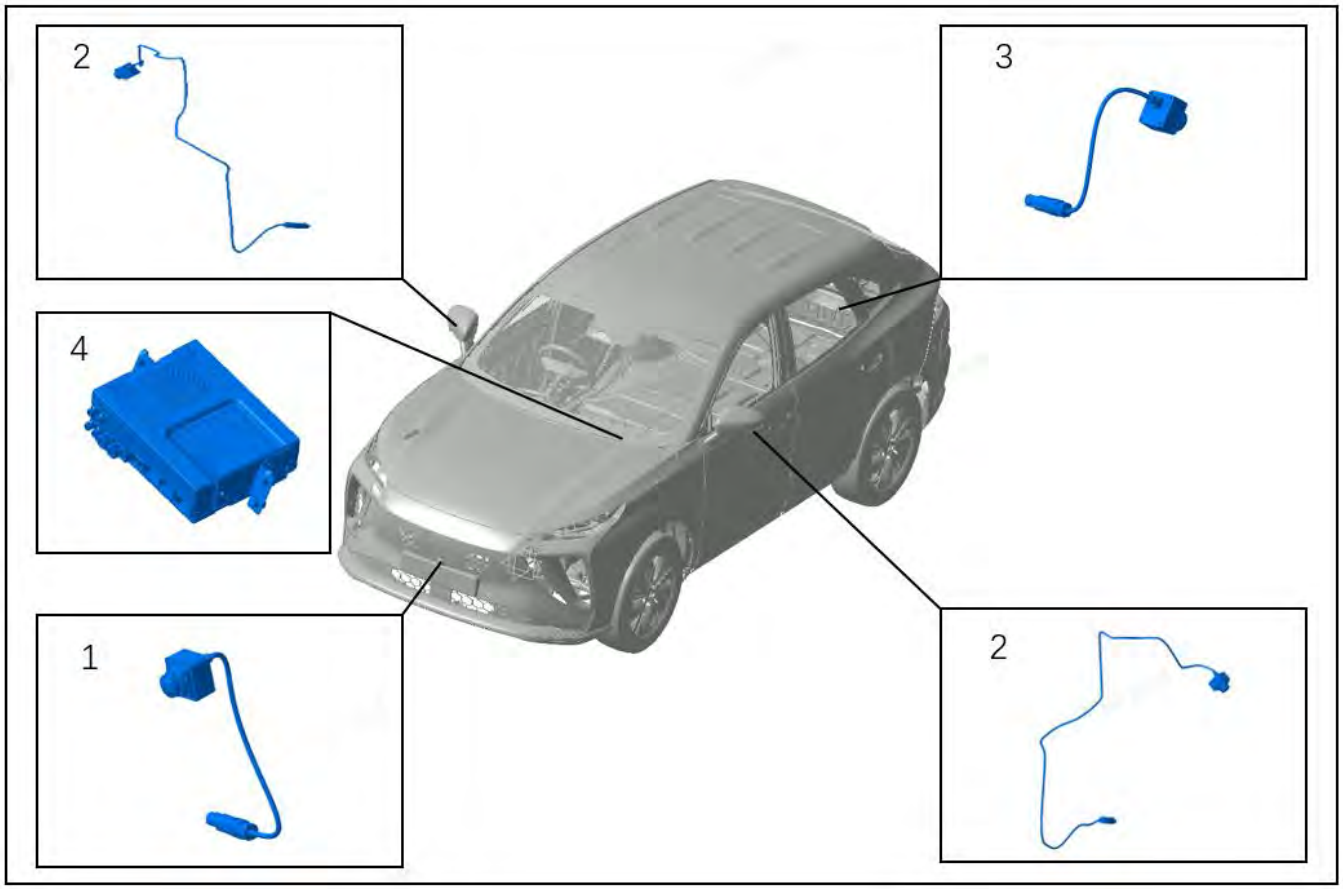
AVM camera

Item	Specification
Voltage range	DC7 ~ 13V
Operating Current	<200mA
Operating temperature	-40℃~+85℃
Storage temperature	-40℃~+95℃
Signal format	YUV422 BT601
Display frame rate	30fps
Horizontal field of view	196 ° ±5 °
Vertical field of view	147 ° ±5 °

4.10.2 Instructions and operations

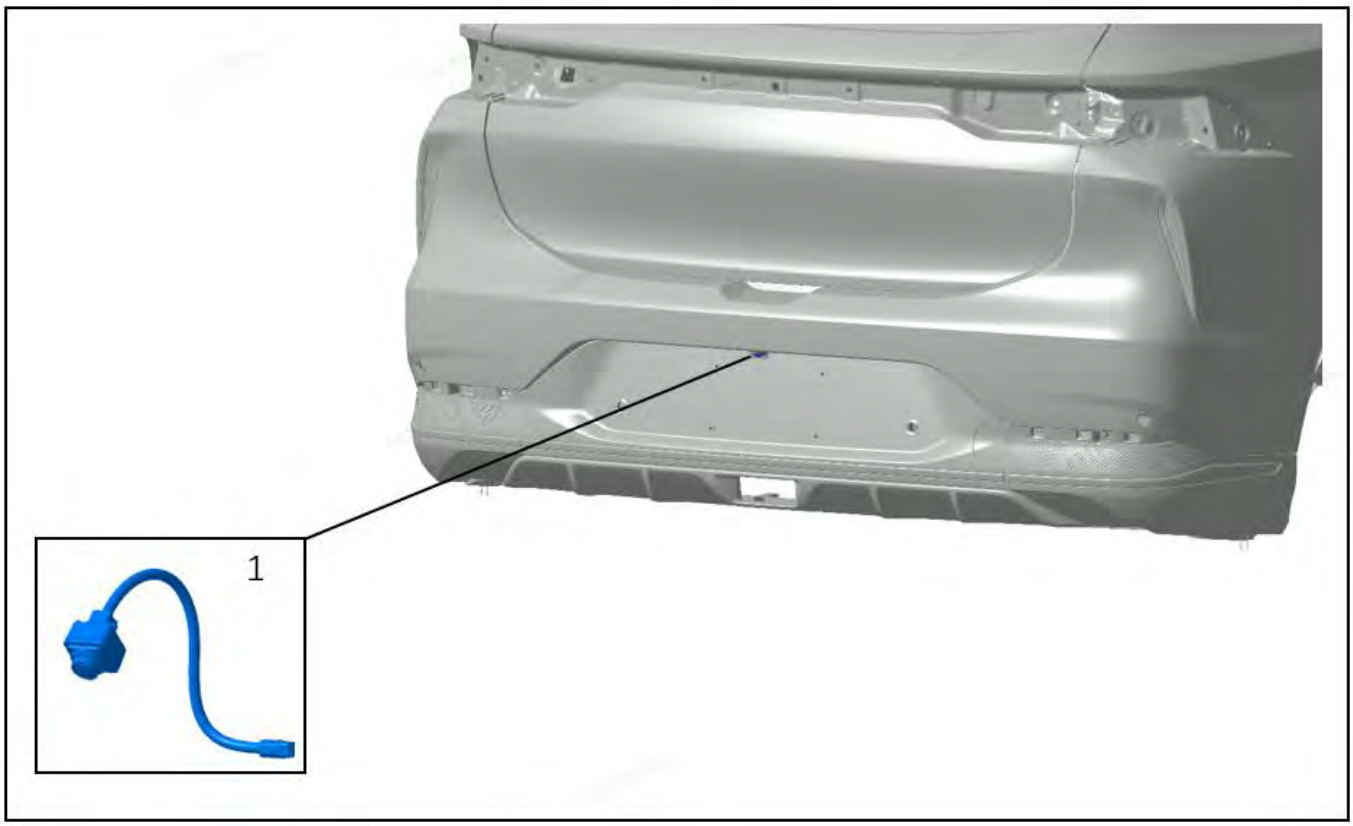
4.10.2.1 Component Locating Diagram

Parking assist system



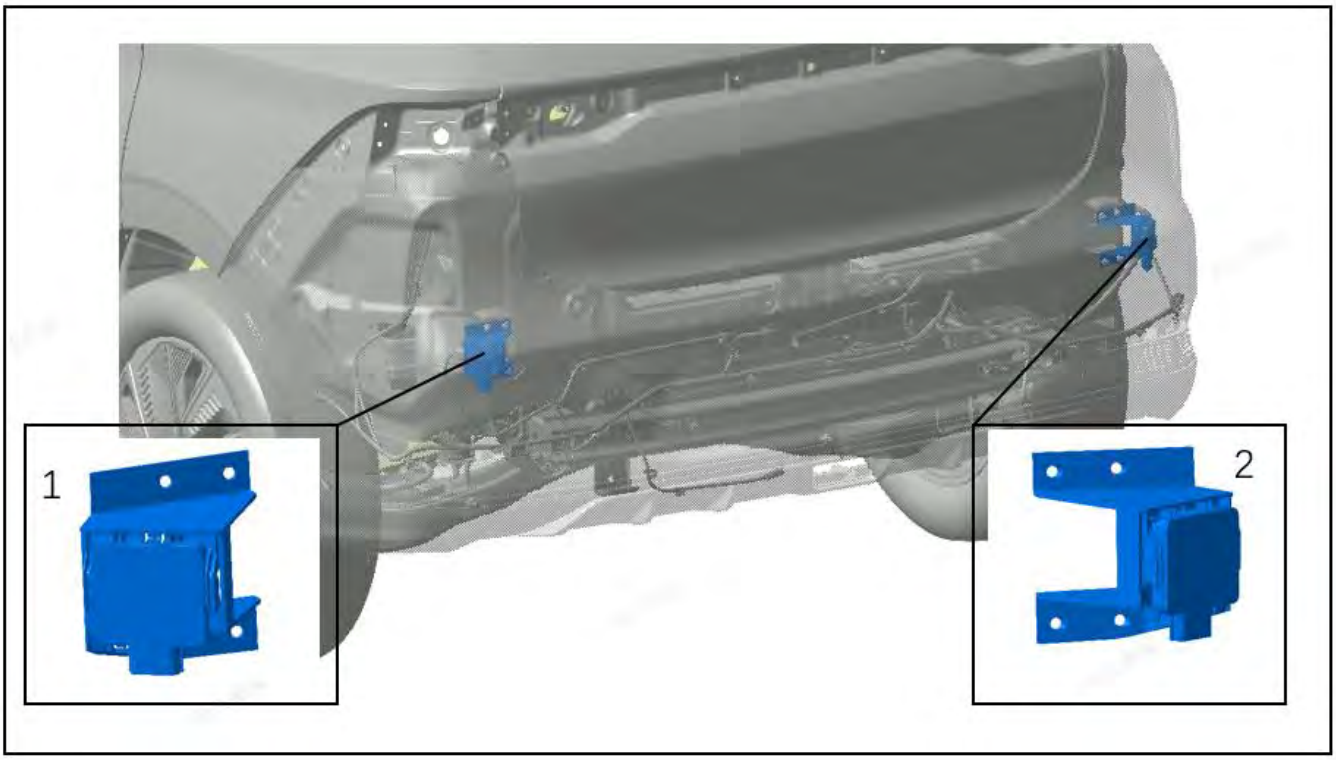
Item	Description
1	Front camera
2	Side-view camera
3	Rear camera
4	Audio module

Parking assist system



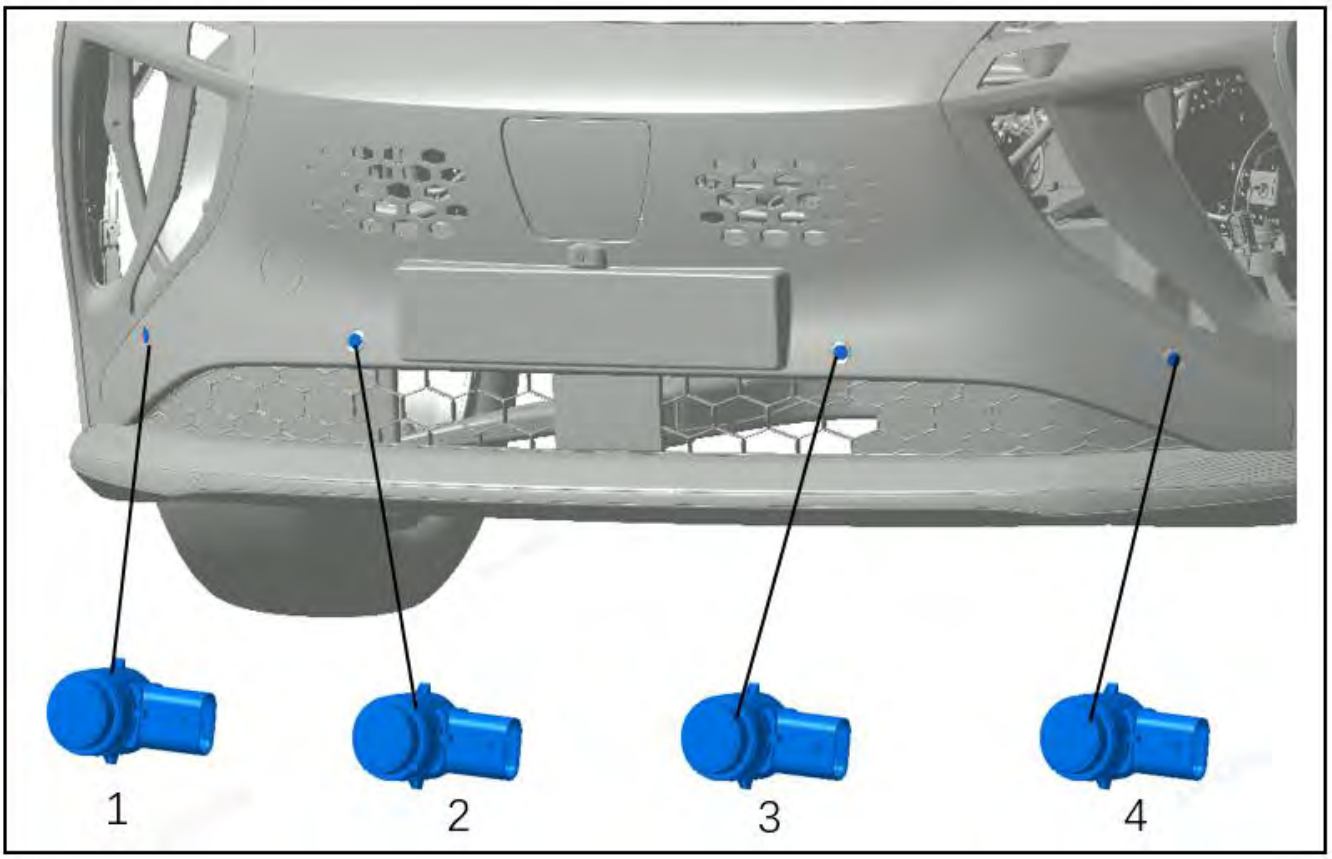
Item	Description
1	Rear view camera

Rear corner mmWave radar



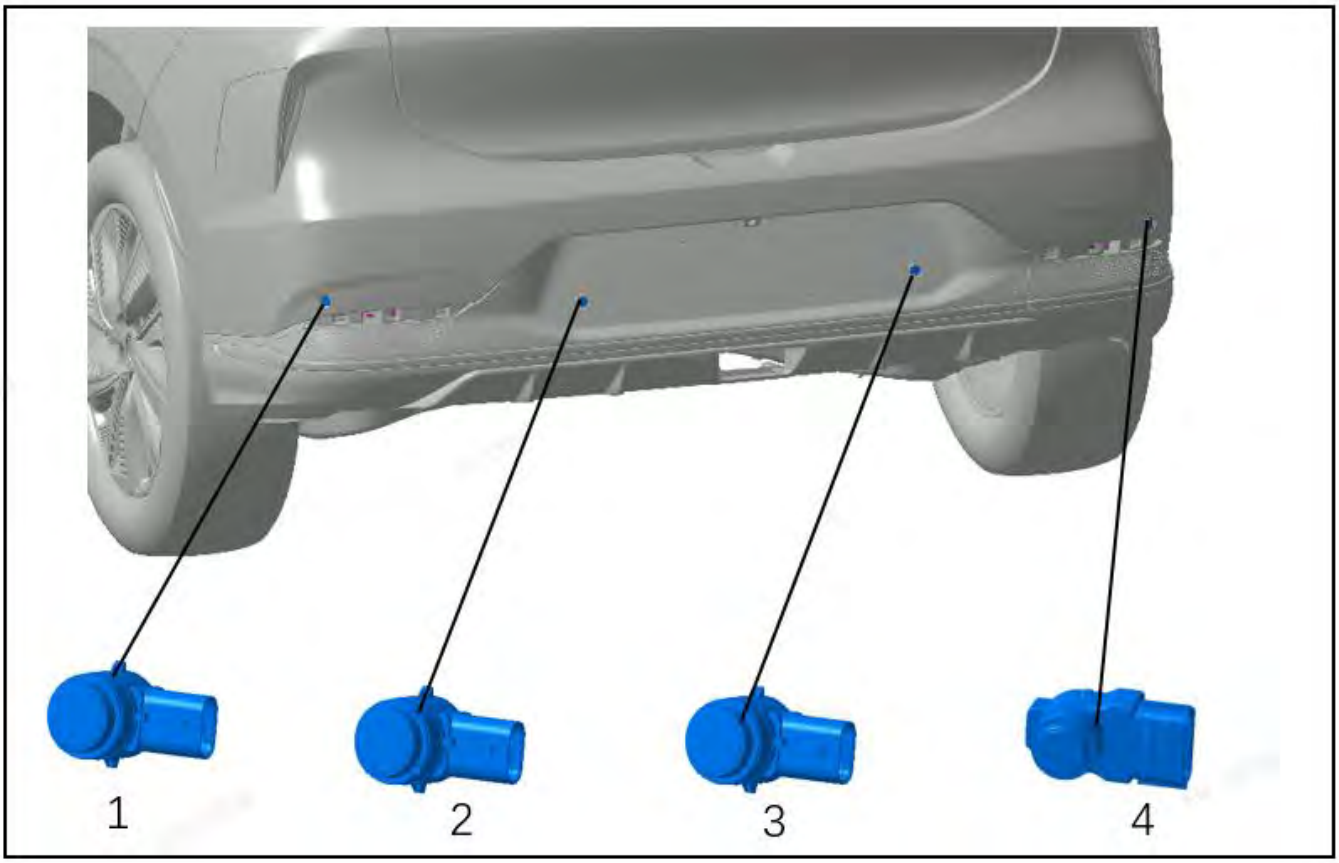
Item	Description
1	Corner mmWave radar (rear left)
2	Corner mmWave radar (rear right)

Front parking radar



Item	Description
1	Front parking sensor F2
2	Front parking sensor F3
3	Front parking sensor F4
4	Front parking sensor F5

Rear reversing radar



Item	Description
1	Reversing radar sensor R2
2	Reversing radar sensor R3
3	Reversing radar sensor R4
4	Reversing radar sensor R5

4.10.2.2 Overview

Reversing radar system

The reversing radar function is mainly composed of a hostless radar main sensor and three or seven slave sensors. The main sensor contains a built-in microcomputer processing chip that can command the slave sensor to send out detection signals. After these signals are reflected by an obstacle, the main sensor instructs the slave sensor to receive the reflected signals. The main sensor analyses and calculates the data, and promptly transmits the obstacle distance and warning information via the CAN bus to the audio head unit or instrument cluster. The instrument cluster then controls the internal buzzer to emit different tones, alerting the driver to how far the vehicle is from the obstacle. When the car is reversing, the reversing radar receives information such as gear position and handbrake status via the CAN bus to determine whether the reversing radar should be activated. For example, in an automatic transmission vehicle, when the gear is in the R position, the reversing radar function becomes active to alert the driver about obstacles behind the vehicle.

Precautions:

Caution: The system is an auxiliary tool that senses the obstacles in a short distance via an ultrasonic sensor to help the driver to determine the distance from the obstacles when the vehicle is in reverse gear, without exempting the driver from the duty of care. Therefore, the driver should not be over-dependent on the system and must be careful. The manufacturer is not responsible for accidents caused by the driver's negligence.

Caution: Keep driving at a speed below 5 km/h during reversing.

Caution: Physical characteristics, position, angle, size and materials of the object or complicated background may lead to detection range narrowing down, failure to actuate or working by mistake. All these are normal aspects, not because of the system itself.

Caution: When the vehicle is reversing uphill or downhill, false alarm may occur to remind you to be more careful.

Caution: The following unfavourable sites or obstacles may be undetectable or cannot be well detected:

1 Wire mesh, small objects such as ropes.

2 Driving in the grass or on rough roads.

3 Materials such as cotton or those whose surfaces easily absorb sound waves.

4 Foreign objects on the detector surface.

5 Ultrasonic noise, metallic sounds, and high-pressure gas emission noises at the same frequency (55.5KHz).

6 Non-standard radio communication equipment installed in the vehicle: Using these devices will interfere with the system's functions (excluding mobile phones and audio systems).

Rear view camera system

The reversing image system mainly consists of a reversing camera (SD). The camera is powered by the audio head unit and displays video.

Precautions:

Caution: This system features a 1-megapixel SD camera with limited image clarity. Maintenance personnel must be able to assess the camera's condition. For customer complaints about insufficient clarity, if the camera is functioning properly, maintenance personnel should provide a proper explanation.

Caution: Due to the limited range of the camera, it cannot guarantee that all obstacles behind the vehicle will be displayed. When reversing, the driver must carefully assess the surrounding environment.

Caution: The camera operates similarly to the human eye, with limited visibility in conditions such as dusk, night, dawn, snow, rain, and fog. This product is intended primarily to assist drivers; the driver remains fully responsible for keeping a safe distance from all obstacles at all times.

Caution: A dirty camera will affect the use of the system. Please clean it up in time.

Panoramic view system

The panoramic surround view system (hereinafter referred to as AVM) consists of 4 cameras and 1 main unit. The main unit is responsible for supplying power to the cameras, receiving and processing the video input from the cameras, receiving external input signals for logical analysis, and outputting the processed video to the audio system for display. The system collects images from 4 cameras positioned around the body, processes and stitches them together for display. The system functions when the vehicle speed is below 30KM/h and can be activated by shifting to the reverse gear, using the left or right turn signals, or pressing the AVM switch. Once the display is activated, you can use the audio system touchscreen to switch between 2D view, 3D view, front and rear wide-angle views, wheel view, 3D surround view, and the settings interface.

Precautions:

Caution: Failure to follow the instructions may lead to death or serious injury.

Caution: The panoramic view system is not used to reduce the driver's attention.

Caution: Excessive reliance on the panoramic view system may cause major accidents.

Caution: Please use it after correctly understanding its functions.

Caution: Please note that excessive rain or fog may prevent obstacles from being visible on the display.

Caution: Due to the characteristics of the camera and environmental factors, there may be differences between the displayed image and the actual situation around the vehicle body. For those unfamiliar with the system, please use it with extra caution during the initial period.

Caution: Suggestions for preventing faults or damage to this product are provided.

Caution: The handling method of abnormal situations is recorded.

Caution: This system captures images of the external environment via an image sensor when the vehicle is reversing or turning. It is an auxiliary tool to help the driver make judgments, but does not relieve the driver from maintaining safety awareness. Therefore, the driver should not be over-dependent on the system and must be careful. The manufacturer is not responsible for the accidents due to the driver's negligence.

Caution: Keep driving at a speed below 5 km/h during reversing.

Caution: Due to physical characteristics such as the position, angle, size, material of objects, or complex backgrounds, differences in the field of view may occur. This does not indicate a system malfunction.

Caution: When reversing uphill or downhill, visual perception errors may occur. Please be especially careful in these situations.

Caution: The following unfavourable sites or obstacles may hinder detection or result in poor visibility:

1 Wire mesh, small objects such as ropes.

2 Driving in the grass or on rough roads.

3 Three-dimensional obstacles may be partially unobservable or appear distorted.

4 Foreign objects exist on the camera surface.

5 The camera lens is scratched or damaged.

4.10.2.3 Precautions

Precautions during repair

1. Before maintenance, please disconnect the start battery negative terminal to avoid the harness being short-circuited during disassembly, which may result in fuse blowout or even fire, and avoid personal injury.
2. Have professionals perform the operation to avoid scratches on the exterior caused by improper handling.
3. Please arrange for professionals to operate it. When removing the ADC, take caution to protect surrounding components to avoid damage caused by improper handling.

4.10.3 Diagnosis and testing

4.10.3.1 General tools for parking assist system (reversing radar)

General tools for parking assist system

General Tools

Digital multimeter

4.10.3.2 Appearance inspection form of parking assist system (reversing radar)

Parking assist system

Appearance Checklist

Electrical
• Fuse • Circuit • Reversing radar sensor

4.10.3.3 Parking Assist System (Reversing Radar) Symptom Table

Symptoms	Possible cause	Measures
No alarm in meeting of obstacles during reversing	• Circuit.	• Check the radar main unit fuse. • Check the lines between the left reversing radar sensor, the right reversing radar sensor and the radar main unit harness connector. • Check the GND circuits of the left and right reversing radar sensors.
	• Reversing main radar sensor.	• Check the reversing radar sensor.
	• Reversing radar sensor	• Check the reversing radar sensor.
	• Reverse gear disabled.	• Check the power supply circuit of the main reversing radar sensor. • Check the GND circuit of the reversing main radar sensor.
Buzzer alarm with no obstacles during reversing	• Reversing main radar sensor.	• Reversing main radar sensor. Refer to Main Reversing Radar Sensor (Parking Assist System, Removal and Installation)
	• There is foreign object on sensor.	• Remove foreign objects.
	• Sensor incorrectly installed.	• Re-install the reversing radar sensor. Refer to Main Reversing Radar Sensor (Parking Assist System, Removal and Installation)
Inaccurate warning of distance to obstacles during reversing	• Obstacles are sound-absorbing materials. Such as: sponge, foam, etc.	• Sensor characteristics, no returning sound wave.
	• The obstacle is too small.	• The sensor cannot detect.
	• Poor contact of sensor connector.	• Check the sensor connection connector.

	• Dirt or foreign matter on the sensor surface.	• Keep the sensor surface clean and wipe off dirt on the surface.
	• Sensor.	• Replace the reversing radar sensor. Refer to Main Reversing Radar Sensor (Parking Assist System, Removal and Installation)

4.10.3.4 Diagnosis and testing of parking assist system (reversing image)

Inspection and confirmation

1. Confirm the problems raised by customers and carry out corresponding inspections and tests.
2. Check the appearance for obvious signs of mechanical and electrical damage.
3. Resolve the problems found before performing the next step of inspection.
4. If the cause cannot be determined from the appearance, confirm the symptoms first, and then check according to the symptom table.

4.10.3.5 Diagnosis and testing of parking assist system (reversing image)

Appearance Checklist

Electrical
• Fuse
• Harness
• Plug
• Reversing camera

4.10.3.6 Diagnosis and testing of parking assist system (panoramic image)

Inspection and confirmation

1. Confirm the problems raised by customers and carry out corresponding inspections and tests.
2. Check the appearance for obvious signs of mechanical and electrical damage.
3. Resolve the problems found before performing the next step of inspection.
4. If the cause cannot be determined from the appearance, confirm the symptoms first, and then check according to the symptom table.

4.10.3.7 Diagnosis and testing of parking assist system (panoramic image)

Appearance Checklist

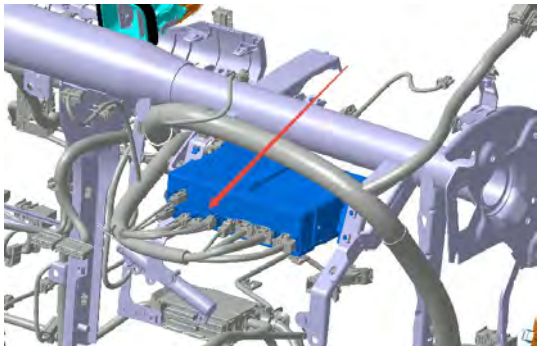
Electrical
• Fuse
• Harness loose or corroded
• Audio module
• Front camera
• Side-view camera
• Rear camera

4.10.4 Removal and installation

4.10.4.1 AVM control module

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the dashboard assembly. Refer to: Dashboard.
3. Remove the AVM control module



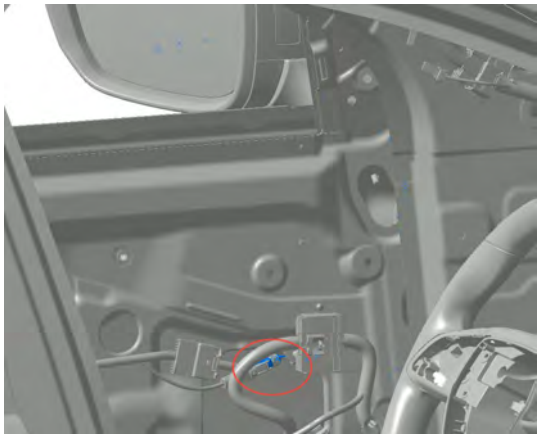
Installation

1. The installation order is the reverse of the removal order.

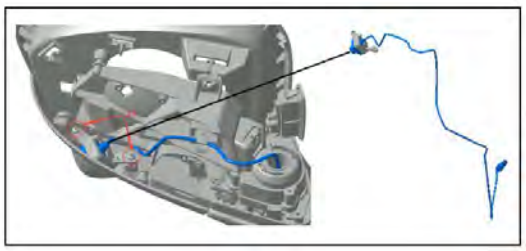
4.10.4.2 AVM side view camera

Removal

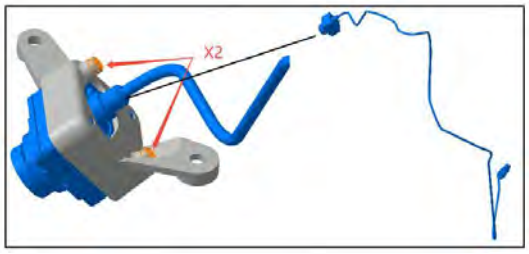
1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the front left and right door shields. Refer to: Front door shield.
3. Disconnect the AVM side-view camera harness connector.



4. Remove the left and right exterior rearview mirrors. Refer to: Exterior rearview mirror assembly.
5. Remove the fixing screws of the side-view camera, and then take out the side-view camera.



6. Remove the camera fixing bracket.



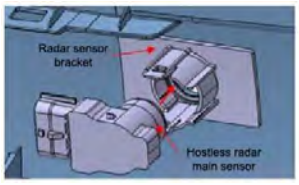
Installation

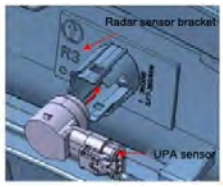
The installation order is the reverse of the removal order.

4.10.4.3 Reversing radar system

Removal

1. When removing the radar sensor from the inside of the bumper, first remove the sensors from the sensor bracket in sequence. During removal, ensure that the sensors are not stuck or loose, and are smoothly separated from the bracket. Do not forcibly pull or damage the parts.





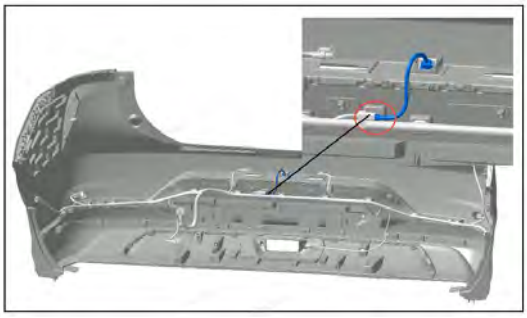
Installation

1. The installation order is the reverse of the removal order.

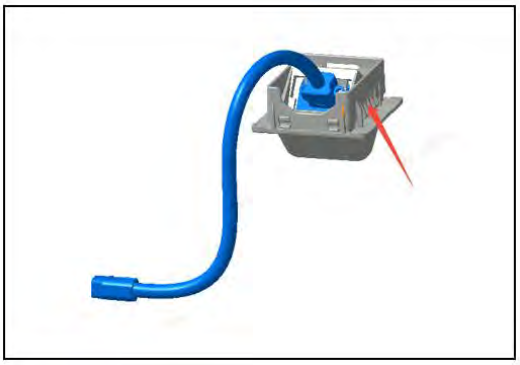
4.10.4.4 Rear view camera

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the rear bumper. Refer to: Rear bumper assembly.
3. Disconnect the reversing camera harness connector.



4. Press the camera bracket clip on the rear bumper and remove the camera.



5. Remove the reversing image camera fixing bracket, and take off the reversing image camera.

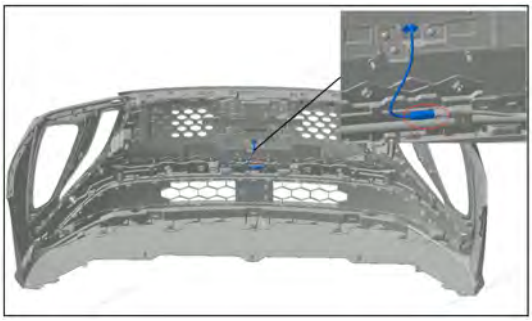
Installation

1. The installation order is the reverse of the removal order.

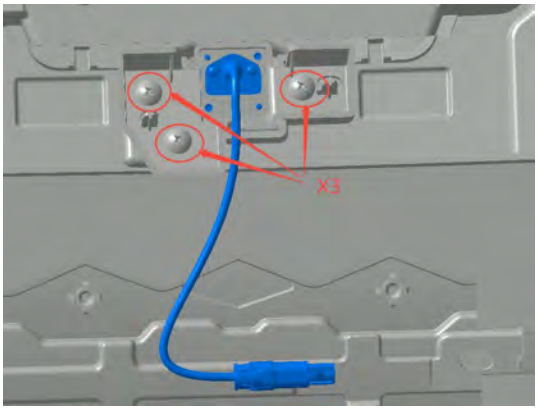
4.10.4.5 Front camera

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the front bumper assembly. Refer to: Front bumper assembly.
3. Disconnect the AVM front camera harness connector.



4. Remove the fixing screws of the front camera, and then take out the front camera.



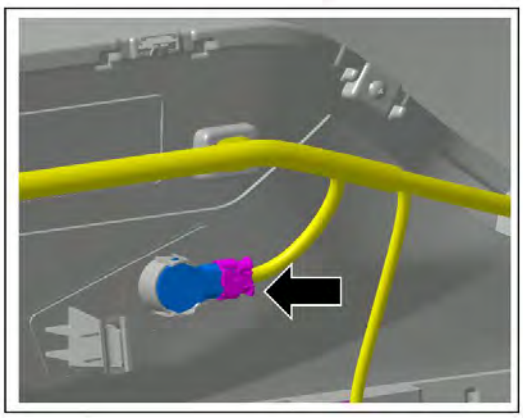
Installation

The installation order is the reverse of the removal order.

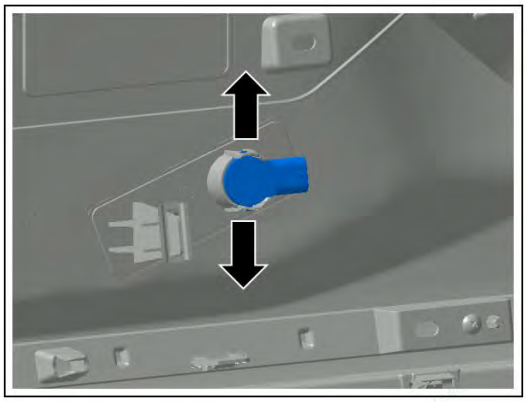
4.10.4.6 Hostless radar main sensor and UPA sensor

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Lift the vehicle. Refer to: Lifting the vehicle.
3. Remove the rear bumper assembly. Refer to: Rear bumper assembly.
4. Disconnect the sensor harness connector.



5. Remove the sensor bracket and take down the radar sensor.



Installation

1. The installation order is the reverse of the removal order.

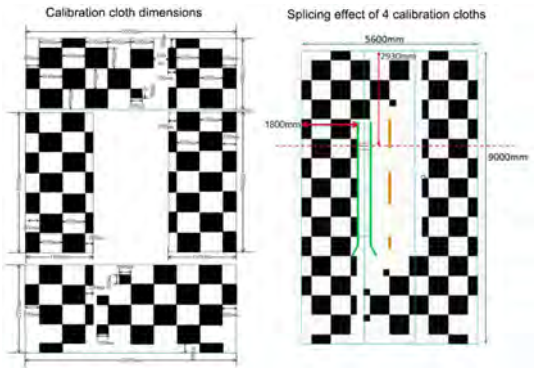
4.10.5 General procedures

4.10.5.1 After-sales calibration

S/N	Calibration tools	Remarks
1	Calibration cloth*4	This is a required item. Refer to the figure below for the pattern dimensions.

Calibration cloth fabrication

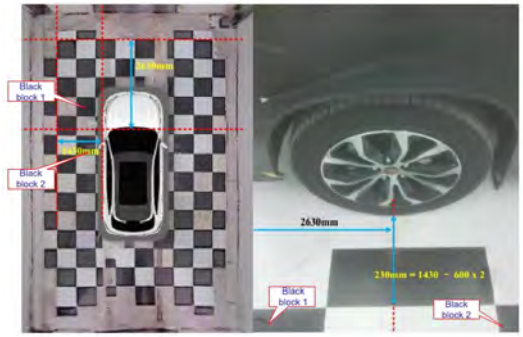
The calibration cloth is divided into four sections: front, rear, left, and right. The dimensions are shown in Fig. 3. The 4S store is responsible for providing the calibration cloth. The material should not be overly reflective (soft fabric is recommended). The 4S store can contact an advertising banner production company to make the calibration cloth according to the dimensions provided in Fig. 6.



Vehicle placement

Drive the vehicle to a cement floor with good flatness (caution: calibration cannot be performed on the ground with pits or slopes, preferably an indoor site), and then spread four pieces of calibration cloth around the vehicle.

Caution: Adjust the placement of the calibration cloths: The lighting at the placement site should be moderate; calibration cloths must not have wrinkles, must not be skewed, and all calibration cloths should be aligned.



Vehicle placement requirements: As shown in the figure, use the front left wheel as the positioning benchmark. After the vehicle is parked stably, first align the left calibration cloth with the front left wheel (the operator shall calculate the corresponding distance based on the data given in the figure above), and then align the front, rear, and right calibration cloths. Note that each calibration cloth shall be parallel to the body and not tilted to one side.

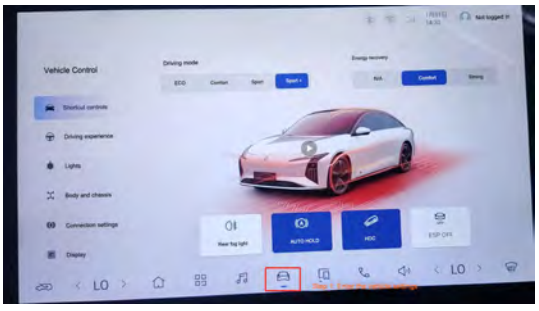
Note: The right side of Fig. 4 shows the pattern of the in-plant calibration pattern. Match black block 1 on the right with black block 1 on the left, and black block 2 on the right with red block 2 on the black edge.

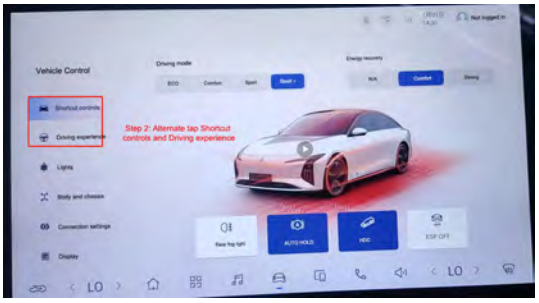
Calibration method

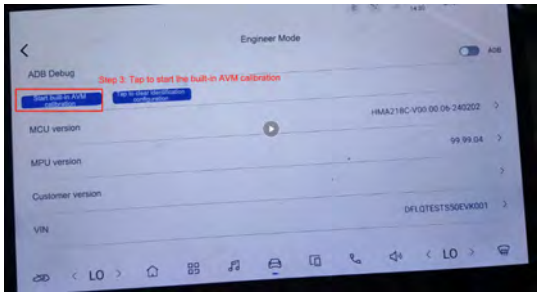
Due to differences caused by camera or main unit replacement, every vehicle coming off the production line needs to undergo production line or after-sales calibration to correct and optimise the stitched image effect.

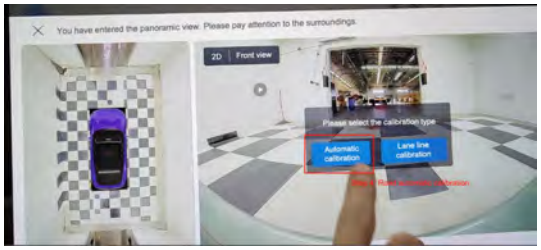
Automatic calibration

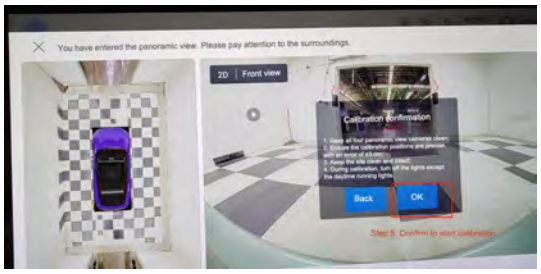
1. After driving the vehicle to the designated position, turn the ignition switch to the ON position and then enter the engineering mode of the audio system: Tap the "Vehicle" icon on the main interface to enter the setting interface. Alternately and quickly tap the two buttons "Quick Control"-"Driving Experience" for 6 cycles to enter the main unit engineering mode. Tap the calibration button to enter the calibration interface. Select "Start Built-in AVM Calibration" according to the vehicle configuration. After selecting the configuration, select "Automatic Calibration" to enter the AVM calibration interface. The operation steps are shown in the Fig. below:



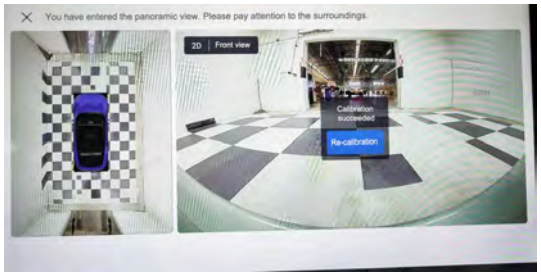




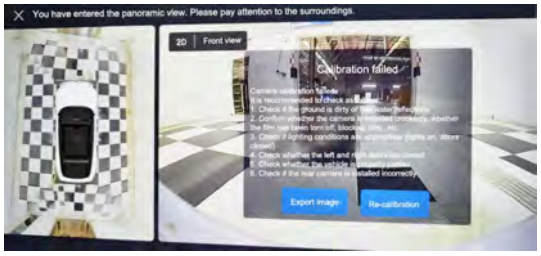




2. The system completes the automatic identification of the image and pops up the automatic calibration results. If the calibration is successful, the interface is as follows, and the panoramic stitching effect on the left-hand side should be normal.



3. If automatic calibration fails, the system will pop up a "Calibration failed, whether to recalibrate" dialog box. In this case, automatic calibration can be performed again. If automatic calibration is unsuccessful multiple times, please check the camera assembly and for dirt, or deactivate the automatic calibration and then enter calibration again.



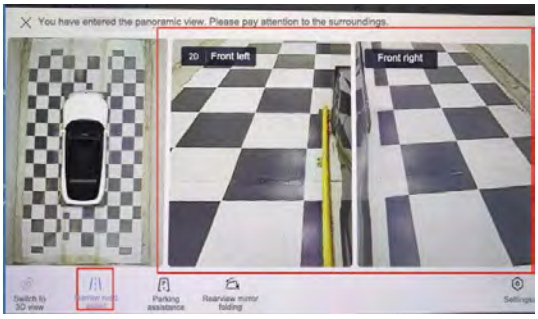
Confirmation of calibration effect

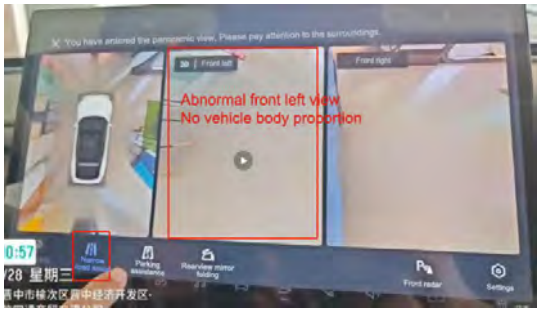
1. Confirmation of panorama stitching effect

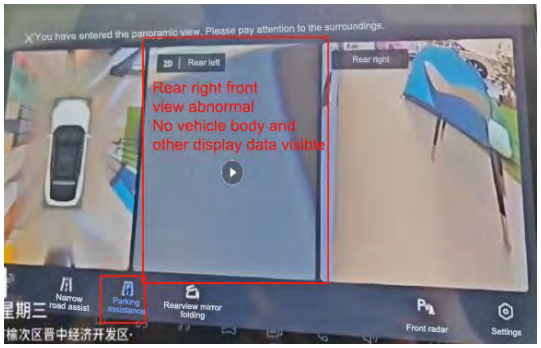
After successful calibration, check the panoramic mosaic image. The blocks in the panoramic image are spliced normally without obvious misalignment; if there is obvious splicing dislocation (as shown in Fig. 7 of the panoramic image stitching effect), it needs to be calibrated again.

2. Confirmation of panoramic view

After calibration is complete, deactivate the calibration node and use the soft button to enter the 360° panoramic interface to confirm the "narrow lane assist" and "parking assist" views. For vehicles with abnormal views (as shown in Fig. 9, such as no valid data or incorrect body proportion), recalibration is required (you may retry calibration or adjust the calibration mat and calibrate again). After completing calibration, reconfirm the views. If they display normally, the vehicle can proceed to the next process.







Note: There is no need to restart the system after calibration.

Common problems and handling methods

FAQs	Troubleshooting steps
Automatic calibration frequently fails	1. Check if the ground is dirty or has water reflections 2. Confirm whether the camera is misaligned, the protective film has been removed, or whether the camera is blocked or dirty, or if there is water on the ground causing reflections. 3. Check if lighting conditions are appropriate (lights on, doors closed) 4. Check whether the left and right doors are closed 5. Check whether the vehicle is properly parked 6. Check if the rear camera is installed incorrectly
No Camera Image	1. Check if the camera is installed incorrectly. 2. Check if the harness is not connected properly. 3. If the screen is black or blue, please contact technical personnel for troubleshooting
Touch screen not responding	1. Check the harness problem 2. If there is no problem with the harness, then contact technical personnel for troubleshooting

4.11 Audio system

4.11.1 Specification

4.11.1.1 General specifications

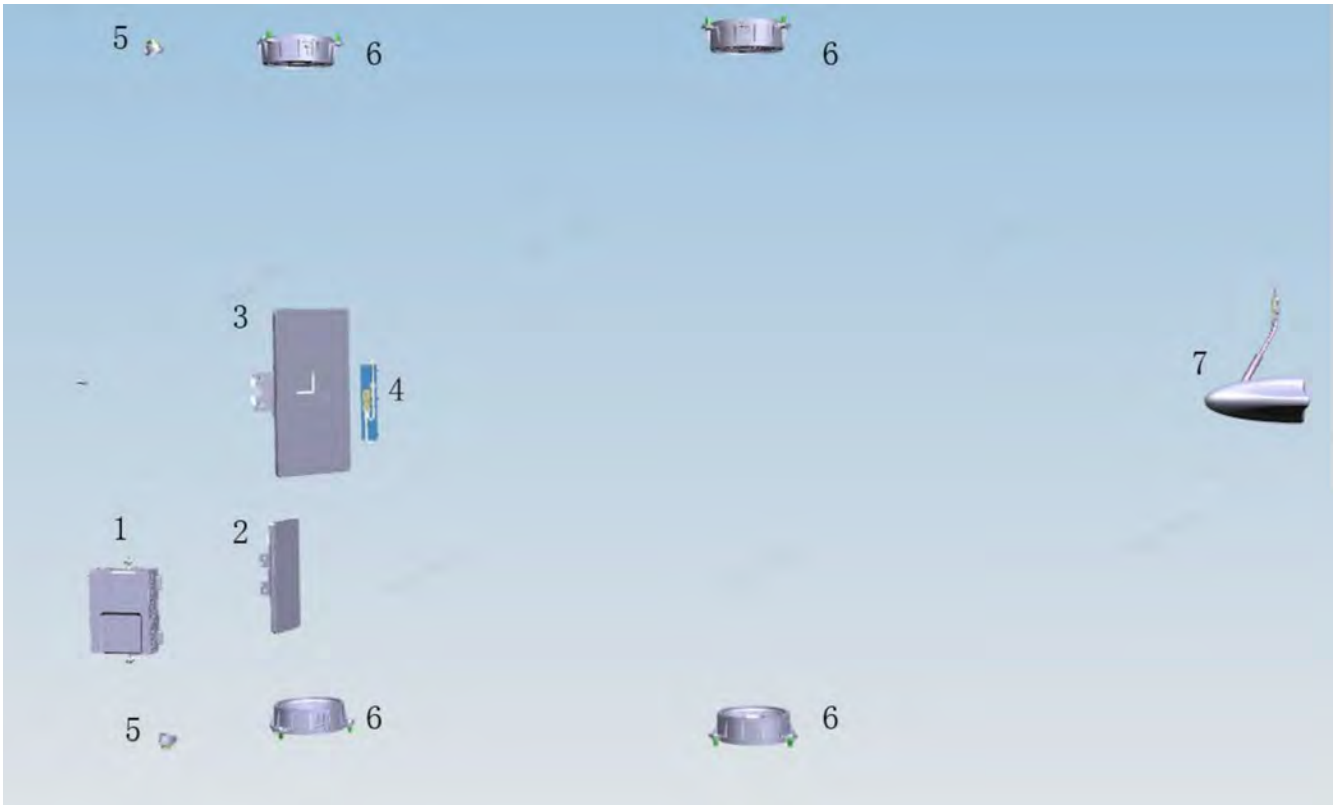
S/N	Part Name	Rated voltage	Rated current	Maximum power
1	Audio control unit assembly	9~16V	<20A	

4.11.1.2 Torque specification

Symbol	Name	Standard part No.	Standard part name	Quantity	Torque
1	Fixing bolt of main unit	Q1460612F38	Hex bolt, spring washer, and flat washer assembling unit	4	8-10N*m

4.11.2 Instructions and operations

4.11.2.1 Audio system



S/N	Part Name	S/N	Part Name
1	Audio control unit assembly	5	High-pitch speaker assembly
2	Instrument display assembly	6	Mid-range/full-range speaker assembly
3	Centre control display screen assembly	7	Fin antenna assembly
4	Microphone assembly		

4.11.2.2 Overview

The audio control unit assembly can realise functions such as radio, multimedia, Bluetooth phone and reversing assistance.

Radio function:

1. AM/FM/DAB local radio can be realised.
2. The function realisation involves the centre control display screen, audio control unit assembly, speaker and antenna assembly.
3. The AM/FM/DAB radio station receives the local radio signal through the fin antenna assembly, and finally inputs it to the audio control unit assembly for processing. The audio control unit assembly outputs sound signals to each speaker.

Multimedia function:

1. USB music, video and Bluetooth music functions can be realised.
2. The function realisation involves the centre control display screen, audio control unit assembly and speaker.

3. Bluetooth music receives music information through the Bluetooth antenna integrated in the audio control unit, and USB music and video are transmitted to the audio control unit assembly through the USB interface for processing. The audio control unit assembly outputs sound signals to each speaker.

Bluetooth phone function:

1. The call function can be realised through the in-vehicle Bluetooth, microphone and speakers.
2. The function realisation involves the centre control display screen, audio control unit assembly, speaker and microphone assembly.
3. The mobile phone connects to the audio control unit using the Bluetooth function, allowing the in-vehicle microphone to replace the mobile phone microphone and the in-vehicle speakers to replace the mobile phone receiver, thus enabling hands-free calls within the vehicle.

Reversing assist:

1. Realise reversing image display, reversing auxiliary line display and radar visualisation display functions.
2. The function realisation involves the centre console display screen, audio control unit assembly, radar system, and reversing camera.

Other functions:

1. Realise the functions of IVI system settings and vehicle settings.
2. The function realisation involves the centre control display screen, audio control unit assembly and controller corresponding to vehicle setting functions.
3. Set the IVI system functions such as volume, screen brightness and language through the centre control display screen; set the vehicle functions such as headlight height, seat control (if equipped) and A/C control through the centre control display screen.

4.11.2.3 Precautions

Precautions during repair

1. Before repairing the audio control unit assembly, speaker, antenna assembly and microphone assembly, please disconnect the negative pole of 12V battery to avoid short circuiting and other uncontrollable risks during maintenance.
2. The audio control unit uses 12V voltage. Do not connect the unit to a power supply exceeding 16V or lower than 9V.
3. Do not disassemble the audio control unit assembly, speakers, antenna assembly, or microphone assembly, as this may result in damage.
4. When disassembling the audio control unit assembly, speaker, antenna assembly or microphone assembly, wrap the tools with a soft cloth to prevent damaging the dashboard and other interior trim parts.
5. During maintenance, please protect the system parts and components. Especially, the centre control display shall not be scratched and the dust screen of microphone assembly shall not be damaged.
6. Please use genuine parts and components for maintenance operations.
7. Please follow the specified maintenance and diagnostic procedures for maintenance work.
8. After replacing the audio control unit assembly, please perform VIN code and configuration writing as required by the Service Manual.
9. After replacing the audio control unit assembly, please confirm whether the software version is the latest. If not, update it with a USB flash disk.
10. Establish environment protection awareness and effectively dispose of waste produced during maintenance.

Overview

The audio system can realise radio + Bluetooth + reversing camera + USB and other functions.

4.11.3 Diagnosis and testing

4.11.3.1 VSP Inspection and Confirmation Symptom Table

Symptoms	Possible Cause	Measures
0-30km/h, no warning sound when reversing	– VSP damaged – The IVI has no output drive signal	– VSP replacement – Read the DTC with a diagnostic scanner and troubleshoot IVI problems
Low sound of VSP	– Magnetic steel demagnetisation – Blockage of protective mesh – Insufficient IVI output power	– VSP replacement – Clear the abnormalities of protective mesh – Check the built-in power amplifier of IVI
Abnormal sound during driving	– Interference with the surrounding area due to bracket deformation – Untightened bolts	– Replace the bracket – Tighten the bolts
VSP has noise	– Water enters the socket on rainy days, and the waterproof ring ages and fails	– Replace the waterproof ring

4.11.3.2 VSP inspection and confirmation diagnosis and testing

VSP inspection and confirmation

1. VSP appearance inspection

Check whether the VSP housing is deformed, scratched, or faded, whether the connector sealant has fallen off, and whether the terminal is oxidized.

2. VSP bracket

Check whether the VSP bracket has changes and burrs.

4.11.3.3 Antenna Inspection and Confirmation Symptom Table

Symptoms	Possible Cause	Measures
No signal at all, no station can be found	– Antenna failure – Poor power supply	– Replacement of fin antenna assembly – Replace the harness.
Loud noise, weak station loss	– Oxidation of joints – Shielding layer damage	– Clean the terminal, apply conductive paste and re-tighten it – Replace the harness.
FM/AM/DAB signals are intermittent, and the door opening signal is interrupted due to bumps	– Looseness of combination nut – Poor connection of connector	– Tighten the combination nut to standard torque – Reconnect the connector and perform a shaking test

4.11.3.4 Antenna inspection and confirmation diagnosis and testing

Antenna inspection and confirmation

1. Confirm the problems raised by the customers and perform the appropriate checks and tests.

2. Check the appearance for obvious traces of mechanical and electrical damage.

3. If the cause cannot be confirmed by appearance, confirm the signal reception symptoms again, and then check the antenna housing, harness, and connector according to the symptoms.

Appearance Checklist

Mechanical	Mechanical
– DAB connector – Radio socket	– Combination nut – Harness – Housing

4.11.3.5 Symptom Table for Speaker Inspection and Confirmation

Symptoms	Possible Cause	Measures
Speaker silent station	– Speaker connector not plugged in tightly/pin withdrawn – Speaker body damaged	– Reconnect and confirm locking – Replace the damaged speaker
Speaker noise/cracking	– Speaker diaphragm damage/ foreign object ingress – Loose speaker installation	– Clean up foreign objects and check the appearance of speaker – Re-tighten and install
The speaker on one side does not sound	– Poor contact of connector on one side – Single-sided speaker fault	– Check the corresponding side connector and harness – Replace the faulty speaker
Low/abnormal sound	– Wrong speaker model/installed in the wrong position – IVI output abnormal	– Check the speaker specification and installation position – Check the working status of IVI

4.11.3.6 Speaker inspection and confirmation diagnosis and testing

Speaker inspection and confirmation

1. Visual inspection of speaker

Check that the front left and front right door mid-range speakers, the rear left and rear right door full-range speakers, and the front left and front right A-pillar high-pitch speakers are intact in appearance, without damage, deformation, stains, looseness, firm installation, accurate positioning, and no risk of interference and abnormal sound.

2. Inspection of speaker harness and connector

Check that the harnesses of each speaker are arranged neatly and fixed reliably, without extrusion, pulling, wear or aging; the connectors are plugged in place and locked effectively, the terminals have no pin withdrawal, no rust or poor contact, and ensure stable and reliable electrical connections.

3. Confirmation of speaker function

Play the audio signal through the main unit/power amplifier, and conduct sound tests on the front left and front right mid-range speakers, the rear left and rear right door full-range speakers, and the front left and front right high-pitch speakers in turn to confirm that each speaker functions normally, without noise, cracking, silence, or howling, the left and right channels are balanced, and the sound field is normal.

4. Confirmation of assembly consistency

Confirm that the model, specification and installation position of the speaker are consistent with the design requirements, meet the technical specifications for loading, and meet the use requirements of the vehicle audio system.

4.11.3.7 Microphone Inspection and Confirmation Symptom Table

Symptoms	Possible Cause	Measures
No sound input for both microphones	– Loss of microphone power supply – The connector is not firmly connected	– Use a multimeter to measure the power supply voltage to see if it is 8 ±0.8V – Check the abnormal channel harness and replace the microphone
Low Bluetooth call sound	– Pickup hole blocked – Poor contact of harness	– Clean up foreign objects in the pickup hole – Re-tighten and install

4.11.3.8 Microphone inspection and confirmation diagnosis and testing

Microphone inspection and confirmation

1. Visual inspection of microphone

Check whether the microphone pickup hole is blocked, including dust, water stains, and glue debris.

2. Inspection of microphone harness and connector

Check whether the microphone harness connectors are fixed and reliable, and whether there is oxidation.

4.11.3.9 General tools for car audio

General Tools

Digital multimeter
X431 diagnostic scanner

4.11.3.10 Inspection and confirmation of car audio

Inspection and confirmation

1. Confirm the problems reflected by customers.

2. Visually check for obvious mechanical or electrical damage.

3. Before further testing, eliminate the obvious faults found in visual inspection and check whether the system works normally .

4. If the fault still exists after visual inspection, please check the faults according to the List of Symptoms based on the fault phenomena .

4.11.3.11 Appearance Checklist of On-board Audio

Appearance Checklist

Mechanical	Electrical
• Multimedia display screen • Antenna • Speaker	• Fuse • Harness • Plug • Antenna

4.11.3.12 Symptom table of RHD vehicle audio devices for SX5GEV and REEV

Symptoms	Possible cause	Measures
Audio control unit does not work	L Fuse L Circuit L Audio control unit	L Check the fuse of audio control unit L Check the harness connector of the audio control unit L Replace the audio control unit
Radio reception is poor or no station can be found	L Poor external environmental signal L Antenna and signal line L Antenna assembly	L Use in an environment with good signal L Repair antenna and signal line L Replace the antenna assembly. Refer to the section on removal and installation of antenna
The multimedia display screen is black	L Circuit L Multimedia display screen L Audio control unit	L Check the circuit from display screen to audio control unit L Replace the display screen Refer to the section on removal and installation of display screen L Test whether the IVI system is operating normally
No sound output	L Circuit L Speaker L Audio control unit	L Check the circuit from each speaker to the audio control unit L Replace the speaker L Test whether the IVI system is operating normally
UBS identification failure or abnormal USB reading	l This USB device is not supported. L USB interface harness fault	L Replace USB devices of different brands for testing l Replace or repair USB interface harness.
Bluetooth connection failure	L Bluetooth is connected to other devices l The Bluetooth device is time out when searched by phone.	l Disconnect the device and try again. l Use the phone to search for Bluetooth device again.

4.11.3.13 DTC list (HQA)

DTC	Fault description	Operation
U007300	CAN bus-off fault	T-BOX Accurate Test A: U007300
U220D00	Network management enters limp home state	T-BOX Accurate Test B: U220D00
U1B0000	LIN1 communication error	T-BOX Accurate Test C: U1B0000
U1B0001	LIN2 communication error	T-BOX Accurate Test D: U1B0001
U007301	Lost communication with the vehicle	T-BOX Accurate Test E: U007301
U012700	Loss of communication with TPMS	T-BOX Accurate Test F: U012700
U015900	Lost communication with PDC	T-BOX Accurate Test G: U015900

DTC	Fault description	Operation
U012100	Lost communication with ABS	T-BOX Accurate Test H: U012100
U100700	Lost communication with AGS	T-BOX Accurate Test I: U100700
U010100	Lost communication with TCU	T-BOX Accurate Test J: U010100
U100900	Lost communication with DAS	T-BOX Accurate Test K: U100900
U010000	Lost communication with Engine	T-BOX Accurate Test L: U010000
U016400	Lost communication with AC	T-BOX Accurate Test M: U016400
U120000	Loss of communication with SRS	T-BOX Accurate Test N: U120000
U013100	Lost communication with EPS	T-BOX Accurate Test O: U013100
U010FE2	Lost communication with SVA	T-BOX Accurate Test P: U010FE2
U023000	Lost communication with PLG	T-BOX Accurate Test Q: U023000
U014001	Loss of communication with PEPS	T-BOX Accurate Test R: U014001
U014000	Loss of communication with BCM	T-BOX Accurate Test S: U014000
U014200	Loss of communication between CAN and APA	T-BOX Accurate Test T: U014200
U100800	Loss of communication between CAN and AQS	T-BOX Accurate Test U: U100800
U019800	Lost communication between CAN and SBM	T-BOX Accurate Test V: U019800
B200000	CPU temperature error	T-BOX Accurate Test W: B200000
U1B0617	Supply overvoltage	T-BOX Accurate Test X: U1B0617
U1B0616	Supply undervoltage	T-BOX Accurate Test Y: U1B0616
B200001	MIC input voltage error	T-BOX Accurate Test Z: B200001
B200002	Radio antenna error	T-BOX Accurate Test AA: B200002
B200100	Low fuel input resistance (Note: The input resistance here is the input resistance determined by the instrument fuel gauge strategy)	T-BOX Accurate Test AB: B200100
B200101	High fuel input resistance (Note: The input resistance here is the input resistance determined by the instrument fuel gauge strategy)	T-BOX Accurate Test AC: B200101
B200102	Invalid input signal of steering control button (lower than normal value)	T-BOX Accurate Test AD: B200102
B200103	Invalid input signal of steering control button (higher than normal value)	T-BOX Accurate Test AE: B200103
B200104	A2B communication fault	T-BOX Accurate Test AF: B200104
B200105	DVR input voltage fault	T-BOX Accurate Test AG: B200105
B200106	DVR LVDS fault	T-BOX Accurate Test AH: B200106
B200200	Screen high voltage event	T-BOX Accurate Test AI: B200200
B200201	Screen low voltage event	T-BOX Accurate Test AJ: B200201

DTC	Fault description	Operation
B200202	The screen does not receive the backlight value for 10 consecutive seconds	T-BOX Accurate Test AK: B200202
B200203	The screen does not receive the backlight switch command for 10 consecutive seconds	T-BOX Accurate Test AL: B200203
B200204	Display TFT fault	T-BOX Accurate Test AM: B200204
B200205	Failure in touching	T-BOX Accurate Test AN: B200205
B200206	Display screen temperature too high	T-BOX Accurate Test AO: B200206
B200207	Backlight failure	T-BOX Accurate Test AP: B200207
B200208	Display LVDS1 output fault	T-BOX Accurate Test AQ: B200208
B200209	I2C communication failure (crc check failed)	T-BOX Accurate Test AR: B200209

4.11.3.14 Accurate Test A: U007300

Accurate Test A: U007300

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U007300	CAN bus-off fault	• Network management detected an error, • 1. Start detection 500ms after the battery voltage recovers from abnormality to normal (9V~16V); • 2. Stop testing immediately after the battery voltage is less than 9V or greater than 16V; • 3. When the BUS is OFF for 3 consecutive times.	• Network management directly confirms that there is no BUSOFF

Possible cause

– Network interference.

Repair recommendations

– Check whether the network is interfered and short-circuited

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.15 Accurate Test AA: B200002

Accurate Test AA: B200002

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200002	Radio antenna fault	• 1. short-circuited or current limit: 2.4V < Vsense < 2.65V; • Thermal shutdown: 2.7V < Vsense < 3V; • 3. Short/reverse current output to battery: 3.05 V < Vsense < 3.3 V	• 0.3V≤ Vsense ≤ 2.4V, t>500ms

Possible cause

– Device turned on

– Equipment short-circuited to ground wire

– Equipment short-circuited to battery

– Hot shutdown mechanism

Repair recommendations

– Open area. Poor reception/interference may be caused by one of the following:

– a. The radio station is further away;

– b. Severe weather conditions;

– c. Purchase window film in the automotive parts market;

– d. There are high-rise buildings, mountains or high-voltage lines nearby

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.16 Accurate Test AB: B200100

Accurate Test AB: B200100

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200100	Low fuel input resistance	• Fuel input resistance <2 ± 1Ω	• Fuel input resistance ≥2 ± 1Ω

Possible cause

– Fuel sensor fault or circuit fault

Repair recommendations

– Check the fuel sensor and related lines

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.17 Accurate Test AC: B200101

Accurate Test AC: B200101

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200101	High fuel input resistance	• Fuel input resistance > 400 ± 5Ω	• Fuel input resistance ≤400 ± 5Ω

Possible cause

– Fuel sensor fault or circuit fault

Repair recommendations

– Check the fuel sensor and related lines

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.18 Accurate Test AD: B200102

Accurate Test AD: B200102

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200102	Invalid input signal of steering control button (lower than normal value)	• Low input resistance of steering control button • Input resistance of steering control button <1K ± 5Ω	• Input resistance of steering control button ≥4K± 5Ω

Possible cause

– Steering control button fault or circuit fault

Repair recommendations

– Check the steering control buttons and related circuits

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.19 Accurate Test AE: B200103

Accurate Test AE: B200103

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200103	Invalid input signal of steering control button (higher than normal value)	• High input resistance of steering control button • Input resistance of steering control button >170K ± 5Ω	• Input resistance of steering control button ≤160K ± 5Ω

Possible cause

– Steering control button fault or circuit fault

Repair recommendations

– Check the steering control buttons and related circuits

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.20 Accurate Test AF: B200104

Accurate Test AF: B200104

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200104	A2B communication fault	• 1. No response for 5 consecutive times during the A2B discovery phase • 2. Detect errors under normal working conditions	• A2B enters normal working state again, t>=3 seconds

Possible cause

– Connection error

– EMC issues

– Slave node fault

Repair recommendations

– Checking devices

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.21 Accurate Test AG: B200105

Accurate Test AG: B200105

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200105	DVR input voltage fault	• Short-circuited or current limiting: voltage <0.7V	• Voltage ≥ 0.7Vt>500ms

Possible cause

– Equipment short-circuited to GND

Repair recommendations

– Checking devices

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.22 Accurate Test AH: B200106

Accurate Test AH: B200106

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200106	DVR LVDS fault	• LVDS BIST count (fault) >10, t>2s)	• LVDS BIST count (normal) >10, t>2s

Possible cause

– Hardware anomaly

– DVR LVDS not plugged in

– Abnormal DVR LVDS interface power supply

Repair recommendations

– Checking devices

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.23 Accurate Test AI: B200200

Accurate Test AI: B200200

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200200	Screen high voltage event	• Voltage exceeds 16.5V	• Voltage returns to normal

Possible cause

– Abnormal voltage

Repair recommendations

– Check the battery.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.24 Accurate Test AJ: B200201

Accurate Test AJ: B200201

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200201	Screen low voltage event	• Voltage is lower than 8V	• Voltage returns to normal

Possible cause

– Abnormal voltage

Repair recommendations

– Check the battery.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.25 Accurate Test AK: B200202

Accurate Test AK: B200202

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200202	The screen does not receive the backlight value for 10 consecutive seconds	• Timeout in receiving commands	• Receive backlight commands

Possible cause

– Communication fault

Repair recommendations

– Check HU or coaxial cable

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.26 Accurate Test AL: B200203

Accurate Test AL: B200203

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200203	The screen does not receive the backlight switch command for 10 consecutive seconds	• Timeout in receiving commands	• Receive backlight commands

Possible cause

– Communication fault

Repair recommendations

– Check HU or coaxial cable

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.27 Accurate Test AM: B200204

Accurate Test AM: B200204

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200204	Display TFT fault	• TFT Pin fault output	• TFT Pin output is normal

Possible cause

– Hardware fault

Repair recommendations

– Check the hardware

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.28 Accurate Test AN: B200205

Accurate Test AN: B200205

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200205	Failure in touching	• Communication fault • Data received from TP	• Communications return to normal

Possible cause

– Hardware fault

– Communication fault

Repair recommendations

– Check TP

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.29 Accurate Test AO: B200206

Accurate Test AO: B200206

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200206	Display screen temperature too high	• Temperature exceeds the limit	• Temperature returns to normal

Possible cause

– Backlight value too high

– NTC fault

Repair recommendations

– Reduce the backlight value

– Check the hardware

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.30 Accurate Test AP: B200207

Accurate Test AP: B200207

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200207	Backlight failure	• Backlight fault output	• The output of the backlight fault pin is normal

Possible cause

– Hardware fault

Repair recommendations

– Check the hardware

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.31 Accurate Test AQ: B200208

Accurate Test AQ: B200208

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200208	Display LVDS1 output fault	• LVDS BIST count (fault) > 10, t>2s	• LVDS BIST count (normal) >10, t>2s

Possible cause

– Hardware fault

– Display screen not plugged in

– Abnormal screen power supply

Repair recommendations

– Checking devices

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.32 Accurate Test AR: B200209

Accurate Test AR: B200209

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200209	I2C communication failure (crc check failed)	• Communication with I2C is interrupted for 10 cycles	• I2C communication is normal

Possible cause

– Hardware fault

– Display screen not plugged in

– Abnormal screen power supply

Repair recommendations

– Checking devices

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.33 Accurate Test B: U220D00

Accurate Test B: U220D00

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U220D00	Network management enters limp home state	• Sending error or receiving error exceeds the limit value. • 1. Start detection 500ms after the battery voltage recovers from abnormality to normal (9V~16V); • 2. Stop testing immediately after the battery voltage is less than 9V or greater than 16V; • 3. Maintain the limp home state in network management for 2s.	• No fault for 40 consecutive ignition cycles

Possible cause

– CAN network connection lost

Repair recommendations

– Check whether the joint is loose

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.34 Accurate Test C: U1B0000

Accurate Test C: U1B0000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U1B0000	LIN1 communication error	• No response received from the slave node for more than 5 booking cycles	• Any LIN slave response received

Possible cause

– Loss of LIN network connection

Repair recommendations

– Check whether the joint is loose

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.35 Accurate Test D: U1B0001

Accurate Test D: U1B0001

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U1B0001	LIN2 communication error	• No response received from the slave node for more than 5 booking cycles	• Any LIN slave response received

Possible cause

– Loss of LIN network connection

Repair recommendations

– Check whether the joint is loose

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.36 Accurate Test E: U007301

Accurate Test E: U007301

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U007301	Lost communication with the vehicle	• Failure to receive any signal from the vehicle for 5 consecutive seconds	• Receive any signal from the vehicle again

Possible cause

– CAN network connection lost

Repair recommendations

– Check whether the joint is loose

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.37 Accurate Test F: U012700

Accurate Test F: U012700

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U012700	Loss of communication with TPMS	• TPMS node message cannot be received for 5 consecutive seconds	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check whether the joint is loose

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.38 Accurate Test G: U015900

Accurate Test G: U015900

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U015900	Lost communication with PDC	• PDC node message cannot be received for 1s continuously	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.39 Accurate Test H: U012100

Accurate Test H: U012100

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U012100	Lost communication with ABS	• ABS node message cannot be received for 200ms continuously	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.40 Accurate Test I: U100700

Accurate Test I: U100700

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U100700	Lost communication with AGS	• AGS node message cannot be received for 5 consecutive seconds	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.41 Accurate Test J: U010100

Accurate Test J: U010100

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U010100	Lost communication with TCU	• TCU node message cannot be received for 100ms continuously	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.42 Accurate Test K: U100900

Accurate Test K: U100900

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U100900	Lost communication with DAS	• No DAS node message is received for consecutive 500ms	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.43 Accurate Test L: U010000

Accurate Test L: U010000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U010000	Lost communication with Engine	• Engine node message cannot be received for 100ms continuously	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.44 Accurate Test M: U016400

Accurate Test M: U016400

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U016400	Lost communication with AC	• AC node message cannot be received for 1s continuously	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.45 Accurate Test N: U120000

Accurate Test N: U120000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U120000	Loss of communication with SRS	• No SRS node message is received for 5 consecutive seconds	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.46 Accurate Test O: U013100

Accurate Test O: U013100

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U013100	Lost communication with EPS	• EPS node message cannot be received for 100 consecutive seconds	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.47 Accurate Test P: U010FE2

Accurate Test P: U010FE2

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U010FE2	Lost communication with SVA	• SVA node message cannot be received for 2 consecutive seconds	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.48 Accurate Test Q: U023000

Accurate Test Q: U023000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U023000	Lost communication with PLG	• PLG node message cannot be received for 2 consecutive seconds	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.49 Accurate Test R: U014001

Accurate Test R: U014001

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U014001	Loss of communication with PEPS	• No PEPS node message is received for 1s continuously	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.50 Accurate Test S: U014000

Accurate Test S: U014000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U014000	Loss of communication with BCM	• BCM node message cannot be received for 1s continuously	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.51 Accurate Test T: U014200

Accurate Test T: U014200

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U014200	Loss of communication between CAN and APA	• APA node message cannot be received for 1s continuously	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.52 Accurate Test U: U100800

Accurate Test U: U100800

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U100800	Loss of communication between CAN and AQS	• AQS node message cannot be received for 2 consecutive seconds	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.53 Accurate Test V: U019800

Accurate Test V: U019800

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U019800	Lost communication between CAN and SBM	• SBM node message cannot be received for 2 consecutive seconds	• Node message received again

Possible cause

– CAN network connection lost

Repair recommendations

– Check the power supply and CAN connection

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.54 Accurate Test W: B200000

Accurate Test W: B200000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and fault triggering conditions

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200000	CPU temperature error	• CPU Temp>= TH, t> 500ms (TH = 110℃)	• CPU Temp <= TH-10, t< 500ms(TH= 110℃)

Possible causes

- Poor condition of heat sink
- Overheating of surrounding equipment
- Abnormal power consumption of CPU
- HU temperature too high

Repair recommendations

- Check the main unit.

Visual inspection and inspection before diagnosis

- Check whether there is a damaged harness
- Check whether there is a loose or damaged connector

4.11.3.55 Accurate Test X: U1B0617

Accurate Test X: U1B0617

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U1B0617	Supply overvoltage	• Voltage out of range for 1s, voltage above 16V	• 14H service clears DTC information • No fault for 40 consecutive ignition cycles

Possible cause

- Battery voltage too high

Repair recommendations

- Check battery voltage.

Visual inspection and inspection before diagnosis

- Check whether there is a damaged harness
- Check whether there is a loose or damaged connector

4.11.3.56 Accurate Test Y: U1B0616

Accurate Test Y: U1B0616

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U1B0616	Power supply voltage too low	• Voltage out of range for 1s, voltage below 9V	• Voltage greater than 9V and less than 16V, restored within 1 second

Possible cause

– Battery voltage too low

Repair recommendations

– Check battery voltage.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.57 Accurate Test Z: B200001

Accurate Test Z: B200001

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B200001	MIC input voltage error	• 1. short-circuited or current limit: 2.4V < Vsense < 2.65V; • Thermal shutdown: 2.7V < Vsense < 3V; • 3. Short/reverse current output to battery: 3.05 V < Vsense < 3.3 V	• Vsense ≤ 2.4V, t>500ms

Possible cause

– Hot shutdown mechanism

– Equipment short-circuited to ground wire

– Equipment short-circuited to battery

Repair recommendations

– Check the main unit.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness

– Check whether there is a loose or damaged connector

4.11.3.58 Audio System-Fault Diagnosis

VIN update

During maintenance, if the audio head unit is replaced, the X431 diagnostic scanner must be used to write the VIN code into the replaced audio head unit system.

Write configuration update

During maintenance, if the audio head unit is replaced, the X431 diagnostic scanner must be used to write configuration information into the replaced audio head unit system to ensure correct function recognition. Write configuration includes module function configuration and module network configuration.

1. Module function configuration: before replacement, use the X431 diagnostic scanner to read and record the module function configuration information, then write this information into the replaced audio head unit system according to the recorded data. If the IVI cannot read the write configuration information before replacement, please refer to a vehicle of the same model and configuration for the configuration data, or contact the after-sales service department to obtain it.

2. Network configuration information: Use the X431 diagnostic scanner to rewrite the network configuration information for the replaced audio head unit. The network configuration information code consists of 32 hexadecimal digits. The configuration information is as follows:

Item	Coding
Network configuration code	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

4.11.3.59 Fault Diagnosis

Diagnostic Questionnaire 4-1-DTC List

DTC	Fault description	Possible cause	Repair recommendations
U007300	Bus off indicated by network management when BUSOFF for 3 consecutive times	CAN disconnected network interference	Check the CAN connection for network interference and short circuit
U220D00	Be in NMLimpHome state for more than TlimphomeLog (2s). Keep the limp home state in network management for 2s	CAN disconnected	Check the CAN connection for looseness
U1B0000	Not receive slave node response,t>5*Schedule cycle	LIN disconnected	Check the CAN connection for looseness
U1B0001	Not receive slave node response,t>5*Schedule cycle	LIN disconnected	Check the CAN connection for looseness
U007301	Failure to receive any vehicle signal for 5 consecutive seconds	CAN disconnected	Check the CAN connection for looseness
U012700	The 0x3E0 node message cannot be received for 5 consecutive seconds	CAN disconnected	Check power supply Check the CAN connection
U015900	The 0x260 node message cannot be received for 1s continuously	CAN disconnected	Check power supply Check the CAN connection

DTC	Fault description	Possible cause	Repair recommendations
U012100	0x200 node message cannot be received for consecutive 200ms	CAN disconnected	Check power supply Check the CAN connection
U100700	The 0x522 node message cannot be received for 5 consecutive seconds	CAN disconnected	Check power supply Check the CAN connection
U010100	No 0x010 node message is received for consecutive 100ms	CAN disconnected	Check power supply Check the CAN connection
U100900	No 0x270 node message is received for consecutive 500ms	CAN disconnected	Check power supply Check the CAN connection
U010000	No 0x210 node message is received for consecutive 100ms	CAN disconnected	Check power supply Check the CAN connection
U016400	The 0x190 node message cannot be received for 1s continuously	CAN disconnected	Check power supply Check the CAN connection
U120000	The 0x31C node message cannot be received for 5 consecutive seconds	CAN disconnected	Check power supply Check the CAN connection
U013100	No 0xC4 node message is received for consecutive 100s	CAN disconnected	Check power supply Check the CAN connection
U010FE2	The 0x386 node message cannot be received for 2 consecutive seconds	CAN disconnected	Check power supply Check the CAN connection
U023000	The 0x525 node message cannot be received for 2 consecutive seconds	CAN disconnected	Check power supply Check the CAN connection
U014001	The 0x170 node message cannot be received for 1s continuously	CAN disconnected	Check power supply Check the CAN connection
U014000	The 0x180 node message cannot be received for 1s continuously	CAN disconnected	Check power supply Check the CAN connection
U014200	The 0x37A node message cannot be received for 1s continuously	CAN disconnected	Check power supply Check the CAN connection
U100800	The 0x528 node message cannot be received for 2 consecutive seconds	CAN disconnected	Check power supply Check the CAN connection

DTC	Fault description	Possible cause	Repair recommendations
U019800	The 0x55B node message cannot be received for 2 consecutive seconds	CAN disconnected	Check power supply Check the CAN connection
B200000	CPU Temp>= TH, t> 500ms (TH = 110℃)	1. Heat sink is badly ; 2. The surrounding devices are too hot; 3. CPU power consumption is abnormal; 4. HU temperature is too high;	Check Device
U1B0617	Voltage is out of range 1S, Voltage >16V	Battery voltage too high	Check power supply
U1B0616	Voltage is out of range 1S, Voltage < 9V	Battery voltage too low	Check power supply
B200001	1.Short circuit or current limit: 2.4V < Vsense < 2.65V; 2.Thermal shutdown: 2.7V < Vsense < 3V; 3.Output short-to-battery/ Reverse Current: 3.05V < Vsense < 3.3V;	1.Thermal shutdown: 2.Device is shorted to ground; 3.Device is shorted to battery;	Check Device
B200002	1.Short circuit or current limit: 2.4V < Vsense < 2.65V; 2.open circuit : Vsense < 0.3V; 3.Thermal shutdown: 2.7V < Vsense < 3V; 4.Output short-to-battery/ Reverse Current: 3.05V < Vsense < 3.3V;	1.Device is open; 2.Device is shorted to ground; 3.Device is shorted to battery; 4.Thermal shutdown:	1. Check battery status; 2. Check whether the antenna plugs are loose or defective; 3. Check the radio reception in the open area.Bad reception/interference can be caused by one of the following situations: a. Radio stations are further away; b. Poor weather conditions; c. Car parts market purchase window film; d. There are tall buildings, high mountains or high pressure lines nearby ;

DTC	Fault description	Possible cause	Repair recommendations
B200100	Fuel input Res <2 ± 1Ω Fuel input resistance <2 ± 1Ω (Note: The input resistance here is the input resistance determined by the instrument fuel gauge strategy)	Fuel sensor failure or circuit fault	Check fuel sensor and related circuits
B200101	Fuel input Res >400 ± 5Ω Fuel input resistance >400 ± 5Ω (Note: The input resistance here is the input resistance determined by the instrument fuel gauge strategy)	Fuel sensor failure or circuit fault	Check fuel sensor and related circuits
B200102	The input resistance of steering control button is low. The input resistance of steering control button is <1K ± 5Ω	Wheelkey Res failure Steering control button fault or circuit fault	Check wheelkey. Check the steering control buttons and related lines
B200103	High input resistance of steering control button. The input resistance of steering control button is >170K ± 5Ω	Wheelkey Res failure Steering control button fault or circuit fault	Check wheelkey. Check the steering control buttons and related lines
B200104	This fault only occurs in high-end vehicles 1. A2B no response in discovery phase continuous 5 times (A2B has no response for 5 consecutive times during the discovery phase) 2. Detect errors when in normal work state	1. Connection Error 2. EMC issue 3. Slave node malfunction	Check Device
B200105	Short circuit or current limit: Voltage < 0.7V;	1. Device is short-circuited to GND;	Check Device
B200106	LVDS BIST Count (Fault)>10, t>2s (LVDS BIST Count (fault)>10, t>2s)	1. Hardware is abnormal; (Hardware abnormality;) 2. DVR LVDS is not inserted; (DVR LVDS is not inserted;) 3. DVR LVDS interface power supply abnormal; (Abnormal power supply of DVR LVDS interface)	Check Device

DTC	Fault description	Possible cause	Repair recommendations
B200200	The voltage exceeds 16.5V (voltage exceeds 16.5V)	Abnormal voltage (abnormal voltage)	Check the battery
B200201	The voltage is below 8V (voltage is lower than 8V)	Abnormal voltage (abnormal voltage)	Check the battery
B200202	Receiving command timeout (receiving command timeout)	Communication fault (communication fault)	Check the HU or the coaxial cable
B200203	Receiving command timeout (receiving command timeout)	Communication fault (communication fault)	Check the HU or the coaxial cable
B200204	TFT Pin fault output (TFT Pin fault output)	Hardware fault (hardware fault)	Check hardware
B200205	Communication fault (communication fault)	1. Communication fault (communication fault) 2. Hardware fault (hardware fault)	Check TP
B200206	The temperature exceeds the limit (temperature exceeds the limit)	1. The backlight value is too high (backlight value is too high) 2. The NTC fault (NTC fault)	1. Lower the backlight value (lower the backlight value) 2. Check hardware (check hardware)
B200207	Backlight fault output (backlight fault output)	Hardware fault (hardware fault)	Check hardware
B200208	LVDS BIST Count (Fault)>10, t>2s (LVDS BIST Count (fault)>10, t>2s)	1. Hardware is abnormal; (hardware fault) 2. Display is not inserted; (display not inserted) 3. Display interface power supply abnormal; (screen power supply abnormality)	Check Device
B200209	Lost communication with I2C for 10 cycles (Communication with I2C lost for 10 cycles)	1. Hardware is abnormal; (hardware fault) 2. Display is not inserted; (display not inserted) 3. Display interface power supply abnormal; (screen power supply abnormality)	Check Device
B20020A	Short circuit or current limit: Voltage < 0.7V;	1. Device is short-circuited to GND;	Check Device

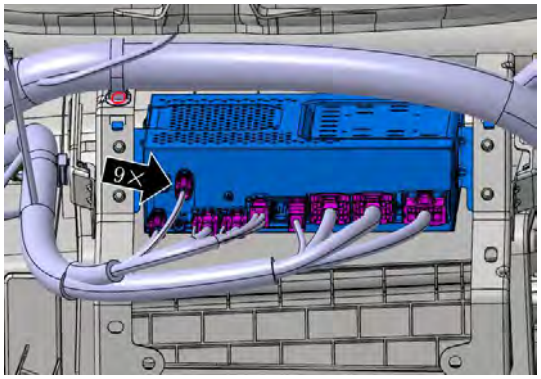
DTC	Fault description	Possible cause	Repair recommendations
B20020B	DMS Count (Fault)>10, t>2s (DMS Count (fault)>10, t>2s)	1. Hardware is abnormal; (Hardware abnormality;) 2. DMS is not inserted; (DMS not inserted;) 3. DMS interface power supply abnormal; (Abnormal DMS interface power supply)	Check Device
B20020C	Short circuit or current limit: Voltage < 0.7V;	1. Device is short-circuited to GND;	Check Device
B20020D	OMS Count (Fault)>10, t>2s (OMS Count (fault)>10, t>2s)	1. Hardware is abnormal; (Hardware abnormality;) 2. OMS is not inserted; (OMS not inserted;) 3. OMS interface power supply abnormal; (OMS interface power supply abnormal)	Check Device

4.11.4 Removal and installation

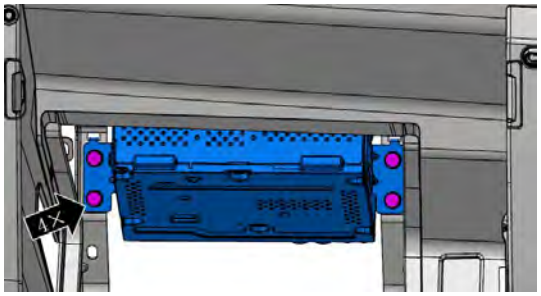
4.11.4.1 Audio control unit

Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Remove the glove box assembly.Refer to: Glove box assembly.
3. Remove the glove box repair cover plate.
4. Disconnect the harness connector of audio control unit assembly.



5. Remove the fixing bolts of the audio control unit assembly.



6. Remove the audio control unit assembly.

Installation

The installation order is the reverse of the removal order.

4.12 SRS

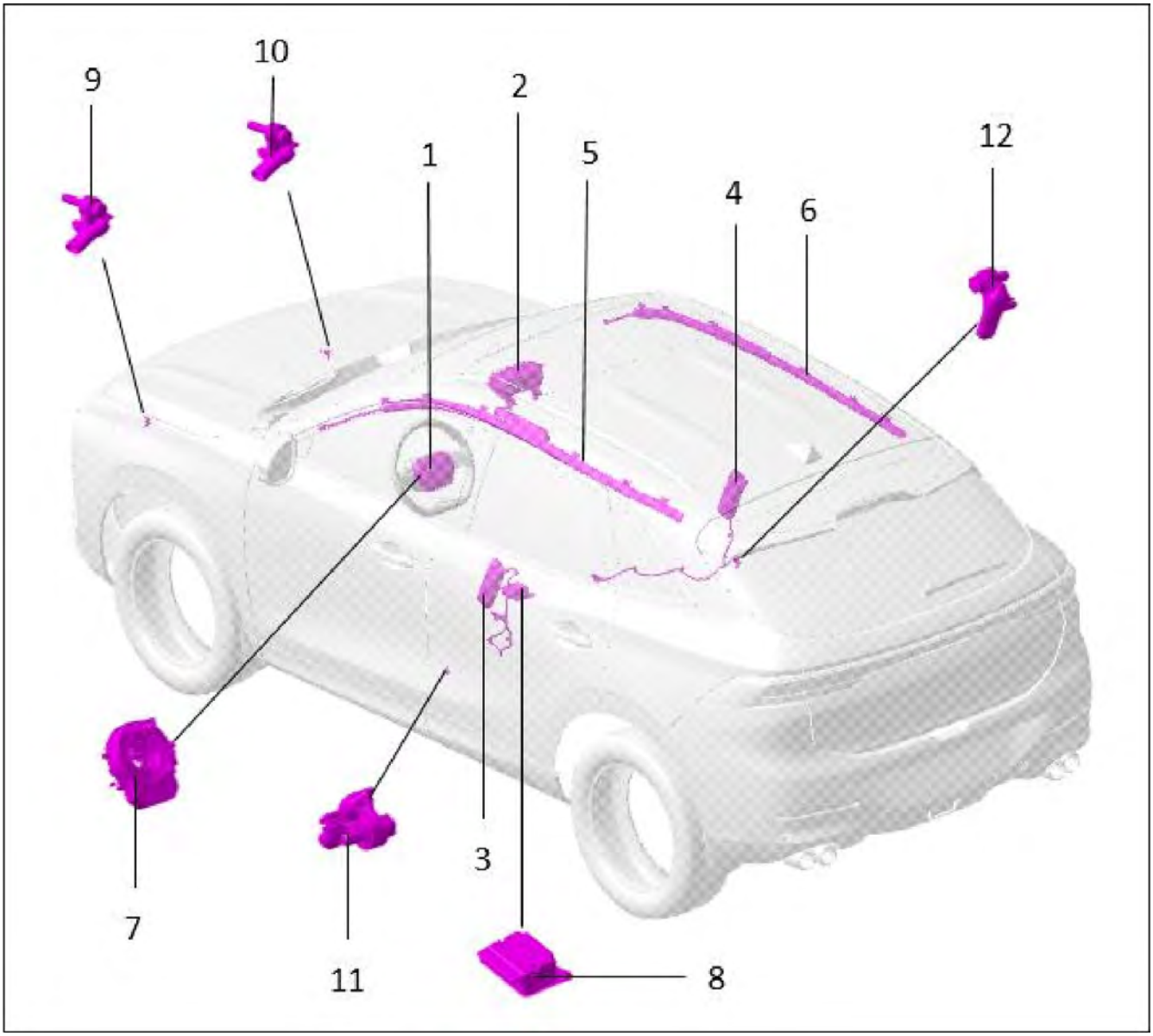
4.12.1 Specification

4.12.1.1 General specifications

Item	Specification
Rated voltage	DC 12V
Input voltage	DC 9.V ~ DC 16V
Operating Current	≤300mA
Static current	≤1mA
Operating temperature	-30℃ ~ +80℃
Storage temperature	-40℃ ~ +90℃

4.12.2 Instructions and operations

4.12.2.1 SRS



S/N	Name	S/N	Name
1	Driver frontal airbag assembly	2	Passenger frontal airbag assembly
3	Driver seat side airbag assembly	4	Passenger seat side airbag assembly
5	Left side curtain airbag assembly	6	Right side curtain airbag assembly
7	Spiral cable assembly	8	SRS ECU assembly
9	Driver front collision sensor assembly	10	Passenger front collision sensor assembly
11	Driver side impact sensor assembly	12	Passenger side collision sensor assembly

4.12.2.2 Overview

To improve safety, the SRS is provided as a standard configuration. SRS improves collision safety through restraining passengers when front collision with large impact occurs.

The SRS consists of the driver's airbag assembly, front passenger airbag assembly, collision sensors, airbag electronic control unit (SRS-ECU), airbag warning light, airbag harness, and clock spring.

1. Driver side SRS assembly is located at the centre of steering wheel, within which there is a folding air bag and an inflator.
2. Passenger side airbag assembly is located on the Instrument panel right ahead of front passenger.
3. Collision sensors are divided into front collision sensor and side collision sensor. The front impact sensor is located behind the bumper, and the side collision sensor is located below the B-pillar.
4. The airbag control unit (SRS-ECU) and its mounting bracket are located on the front floor below the instrument panel. This control unit (SRS-ECU).
5. The SRS warning indicator light on the instrument cluster indicates the SRS operating condition.
6. Clock spring is at the lower end of steering wheel and above the fixed multi-function switch.

Only maintenance personnel trained and authorised can check and repair SRS parts and components or the surrounding parts. Before checking and repairing, maintenance personnel shall carefully read this manual.

Special caution should be paid during repair to avoid injury to maintenance personnel or driver due to error detonation and deploying of SRS caused by misoperation.

In the following cases, the airbag does not detonate:

1. If the vehicle is rear-ended or involved in similar collisions, the airbags will not deploy.
2. When the relative speed between the vehicle and a rigid collision object ahead in the vehicle running direction is less than 15km/h, the airbag does not deploy.
3. When vehicle is subjected to rollover around longitudinal axis, airbag does not detonate.
4. When vehicle is in normal running, braking or running on unsmooth road, airbag does not detonate.
5. When the vehicle is subjected to collision from such deformable and movable objects (eg. road sign, sandpile, snowdrift, ice block, highway guard bars, etc.) that cannot reach the condition to detonate airbag, the airbag does not detonate.

Working principle

The system mainly includes: driver airbag components, front passenger airbag components, front collision sensor, side collision sensor, clock spring, harness assembly and controller (ECU) assembly. When the vehicle ignition switch is turned to the ON position, the SRS is activated, and the ECU performs a self-inspection according to a preset programme. If the indicator remains on for about 6 seconds and then turns off, it signifies that the self-inspection has passed and the system is normal. Afterward, the ECU enters monitoring mode. If the indicator flashes intermittently or remains on, it indicates a failed self-inspection and system abnormality. During normal driving (including on various road surfaces and under interference conditions), the ECU does not issue an ignition command, and the airbag is not deployed. When the vehicle experiences a severe frontal or side collision, the crash sensor receives and transmits the impact signal to the ECU. The ECU then sends a timely ignition command to trigger the airbag assembly, deploying the airbag to absorb part of the collision energy affecting the vehicle occupants, thereby mitigating potential injuries and providing protection.

Ignition circuit description of SRS

S/N	Configuration programme name	Description
1	DAB+PAB (2 circuits)	DAB—Driver Frontal SRS PAB—Passenger Frontal SRS FSAB—Front Seat Side Airbag RSAB—Front Seat Side Airbag CAB - side curtain airbag B1TFD - front left retractor seat belt B1TFP—Front right retractor seat belt B2TFD—Front left end plate seat belt B2TFP - front right end seat belt B1TR—Rear Retractor Seat Belt UFS—Front Impact Sensor PAS - side collision sensor
2	DAB+PAB+UFS+PAS (2 circuits)	
3	DAB+PAB+B1TFD+B1TFP+UFS+PAS (4 circuits)	
4	DAB + PAB + B1TFD + B2TFD + B1TFP + B1TR + FSAB + RSAB + CAB + UFS + PAS (13 circuits)	
5	DAB + PAB + B1TFD + B2TFD + B1TFP + B2TFP + B1TR + FSAB + RSAB + CA B + UFS + PAS (14 circuits)	

4.12.2.3 Precautions

Precautions

1. Be sure to use **12** V battery.
2. Do not disconnect the battery cable when the engine is running.
3. Before connecting or disconnecting the engine **ECU** harness connector, turn the ignition switch to the **OFF** position and disconnect the GND cable of the battery. Failure to do so may damage the engine **ECU**, because even if the ignition switch is turned to the **OFF** position, the **ECU** still has **12** V voltage.
4. Before removing parts and components, turn the ignition switch to the **OFF** position, and then disconnect the battery GND cable.
5. Do not disassemble the engine **ECU**.
6. Only a digital multimeter is allowed to be used to check the EFI system.
7. Always use genuine parts and components for maintenance; otherwise, the EFI system may not be able to work properly.
8. During maintenance, use unleaded petrol only.
9. Please follow the specified maintenance and diagnostic procedures for maintenance work.
10. Do not disassemble or remove parts and components of the EFI system during maintenance.
11. During maintenance, take all electronic components (such as ECUs and sensors) carefully and never let them fall to the ground.
12. Establish environment protection awareness and effectively dispose of waste produced during maintenance.

Precautions during repair

1. Simultaneous use of the SRS and seat belt helps reduce the risk or severity of injury to the driver and front passenger in the event of a vehicle collision.

CAUTION

1. To avoid increasing risks of injury or death caused by **SRS** faults, all maintenance operations shall be conducted in the authorised service centre of Dongfeng Forthing Lingzhi Exclusive Shop.
2. Improper maintenance, including improper removal and installation of the SRS, may cause malfunctions in the system, resulting in personal injury or death accidents.
3. Do not use electrical test equipment to test any circuit of the **SRS** except for operations described in this manual.

1. Personnel for disassembling, assembling or maintaining SRS shall be subject to professional training.

2. When steering wheel is removed for vehicle maintenance, the steering wheel shall be straightened, clock spring assembly can thus be locked in right position. Otherwise it will damage the clock spring assembly.

3 Extremely dangerous! Rear-facing child seats are not permitted on the front seats.

4. Before the product is properly assembled in vehicle, non-professional personnel shall not energise the vehicle to avoid personal injury or death caused by accidents.

5. Fasten the seat belt when driving, and use the airbag together with the seat belt to achieve the best protective effect in accidents. Do not mistake that it is unnecessary to tighten seat belt with the aid of SRS.

6. The technical parameters of ECU and SRS components match each other, so they shall be used with each other. ECU or SRS components of other brands shall not be used with the ECU or SRS components of this SRS product.

7. After the power supply is turned on, if the airbag indicator is always on or off, it indicates that there is a fault in the split-type vehicle airbag system. This fault indicates that the ECU itself is damaged or the ECU is not connected to the power supply (or the harness is open-circuited).

8. Power supply voltage faults can be repaired by the vehicle owner, but other faults shall be repaired at an authorised service centre.

9. Removal or repair is prohibited at unauthorised service centres.

10 In case of a fault alarm, repair must be carried out. If the vehicle is not repaired and use continues, you are responsible for any loss caused by a frontal collision. When repairing the vehicle (especially when using electric welding), be sure to turn off the ignition switch and set it to the 1st gear. Ideally, disconnect the positive battery terminal completely.

11 When repairing vehicle, special tools shall be used to disassemble SRS assembly. After airbag detonation, SRS components and clock spring shall be replaced completely, and the controller (ECU) shall be maintained in the authorised service centre for reuse.

12 SRS assembly is beyond repair and shall be replaced in case of fault.

13. When airbag components are being disassembled or transported, the trim cover should be facing upward. Airbag components must not be stacked to prevent accidents caused by accidental deployment.

14. SRS components shall be stored in a place with a temperature lower than 93°C, Relative Humidity (RH) $\leq$ 75%, and free from disturbance from electric field.

15. Using a pointer-type multimeter to measure the resistance of an SRS electric igniter is strictly prohibited. Otherwise, it may result in unintentional airbag deployment.

16 Extremely dangerous! Do not disassemble the SRS components or its internal gas generator!

17. The controller must not be connected to AC power or to DC power exceeding 20 volts to prevent damage.

18. Statement: In the event of any of the following collision accidents, this product cannot guarantee to reduce injuries to the driver and front passenger.

4.12.3 Removal and installation

4.12.3.1 Driver seat airbag assembly

Removal

1. Turn the steering wheel from the 3 o'clock, 6 o'clock and 9 o'clock positions to the uppermost position (close to the 12 o'clock direction of the dashboard) respectively, and use a straight screwdriver to push open the SRS module clamping steel wires one by one from the bottom of the lower shield of the steering wheel.
2. Slightly pull out the driver seat SRS components and release the connector between such components and the clock spring.

   Caution: When disconnecting the clock spring connector of the SRS module, do not apply too much force.
3. Take out the driver seat SRS components and place the trim cover side upward.

Installation

The installation order is the reverse of the removal order.

4.12.3.2 Front passenger SRS components

Removal

1. Remove the glove box. Refer to: Glove box assembly.
2. Remove SRS fixed bolt.
3. Remove the lower instrument panel body. Refer to: Dashboard.
4. Slightly pull out SRS components and release connector between such components and airbag harness.

   Caution: When disconnecting the clock spring connector of the SRS module, do not apply too much force.
5. Take out the front passenger seat SRS components and place the trim cover side upward.

Installation

The installation order is the reverse of the removal order.

4.12.3.3 Side SRS component

Removal

1. If the side airbag is assembled in the seat, the entire seat needs to be replaced.
2. If the side airbag is assembled inside the B-pillar, remove it according to the following steps:

   Remove the B-pillar shield. Refer to: B-pillar upper shield.

   Disconnect the connector with the airbag harness.

   Remove the side airbag screw.

Installation

The installation order is the reverse of the removal order.

4.12.3.4 Clock cable

Caution: Clock spring (coil spring) is composed of 2 current-carrying coils and is connected between steering column and steering wheel. When unfolding circuit is constantly connected with a charger module, the steering wheel is allowed to rotate. Steering wheel shall be properly assembled in steering column and clock spring shall be in neutral position. Otherwise it will cause cable disconnection and other faults.

Removal

1. After removing driver SRS components, use special tools to remove the steering wheel.
2. Remove the steering column shield.
3. Release the connector between the clock spring and the airbag harness.
4. Use a crosshead screwdriver to remove the tapping screw of the clock spring and remove the clock spring.

Installation

1. The installation order is reverse to the removal order.

4.12.3.5 Airbag harness

Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal.
2. Disconnect the connectors between the SRS harness and the SRS-ECU, driver SRS component, and front passenger SRS components (the next operation must be performed after disconnecting the negative battery cable from the battery for 3 minutes).
3. Remove the dashboard body. Refer to: Dashboard.
4. Remove the SRS harness.

Installation

The installation order is the reverse of the removal order.

4.12.3.6 Airbag controller (SRS-ECU)

Caution: Airbag controller (SRS-ECU) of this vehicle type only has driver seat airbag ignition circuit and front passenger seat airbag ignition circuit (without front pretensioner seat belt circuit).

Caution: Once a fault occurs, the SRS-ECU must not be repaired and should be replaced only with an SRS-ECU specifically matched to this vehicle model.

Removal

1. Remove the gear control panel lower plate component, carpet and auxiliary dashboard glove box respectively.
2. Disconnect SRS-ECU from the airbag harness (it must be carried out 3 minutes after the negative wire of the battery is disconnected on the battery), loosen SRS-ECU fixing nuts and take down SRS-ECU.

Installation

1. The installation order is the reverse of the removal order.

Test

After assembling all SRS components, connect the negative wire of the battery, turn on the ignition switch (at ON position), observe whether the SRS warning light is normal. If it is normal, replacement work is done; if not, use a diagnostic scanner to diagnose and remove faults according to diagnostic results.

4.12.3.7 Frontal collision sensor

Removal

1. Open the engine cover plate.
2. Disconnect the connector with the airbag harness.
3. Remove the sensor bolt.

Installation

1. The installation order is the reverse of the removal order.

4.12.3.8 Side collision sensor

Removal

1. Remove the B-pillar shield. Refer to: B-pillar upper shield.
2. Disconnect the connector with the airbag harness.
3. Remove the sensor bolt.

Installation

1. The installation order is the reverse of the removal order.

4.13 Electric seat

4.13.1 Specification

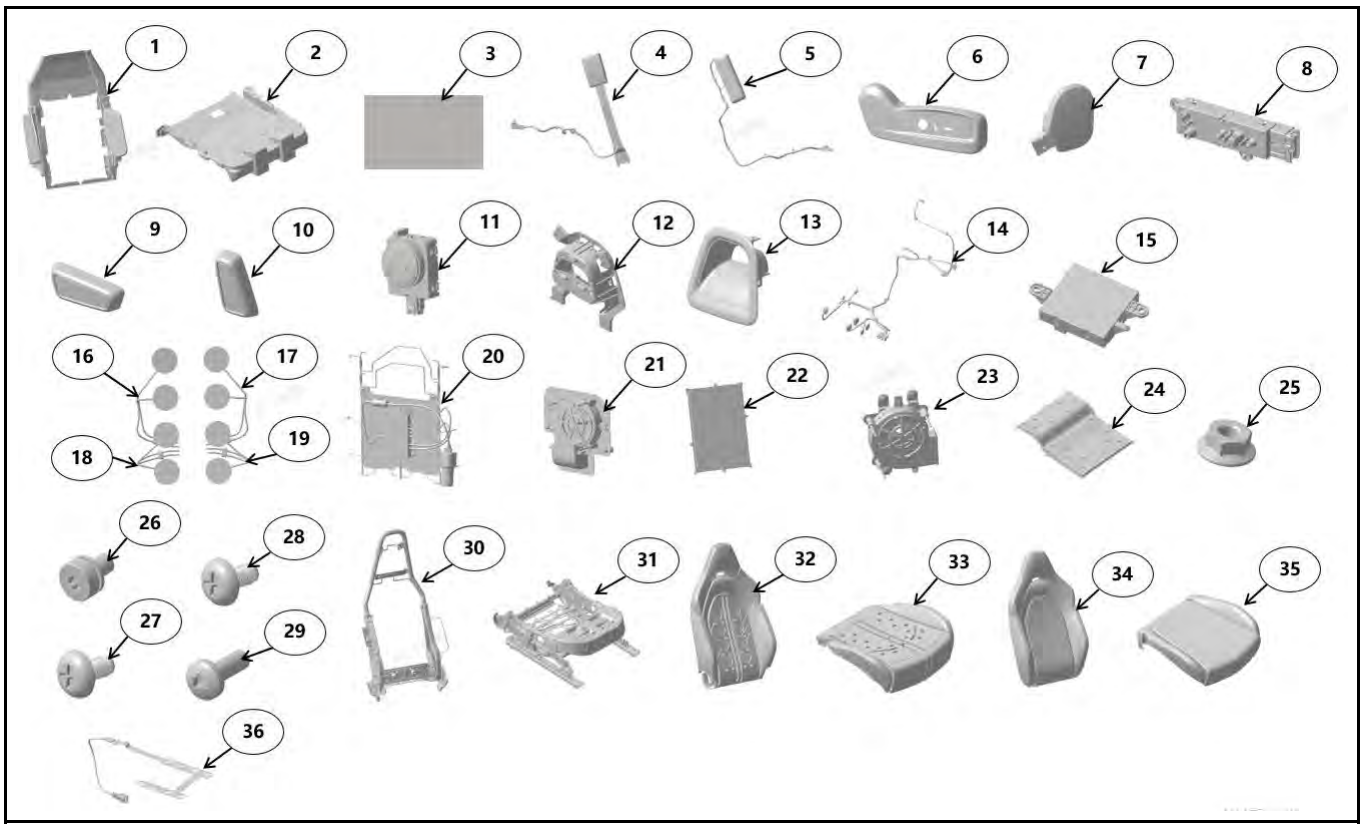
4.13.1.1 Torque specification

Name	Nm
Connecting bolt (M10) between front seat assembly and body floor	45±5Nm
Connecting bolt between front seat belt buckle and seat frame	45±5Nm
Connecting bolt (M8) between fixed backrest of rear seat and body	23±3Nm
Connecting bolt (M10) between rear seat and hinge plate on both sides of body	45±5Nm
Connecting bolt (M10) between central hinge bracket of rear seat and body bottom plate	45±5Nm
Connecting bolt (M10) between central hinge bracket of rear seat and seat backrest	45±5Nm

4.13.2 Instructions and operations

4.13.2.1 Electric seat

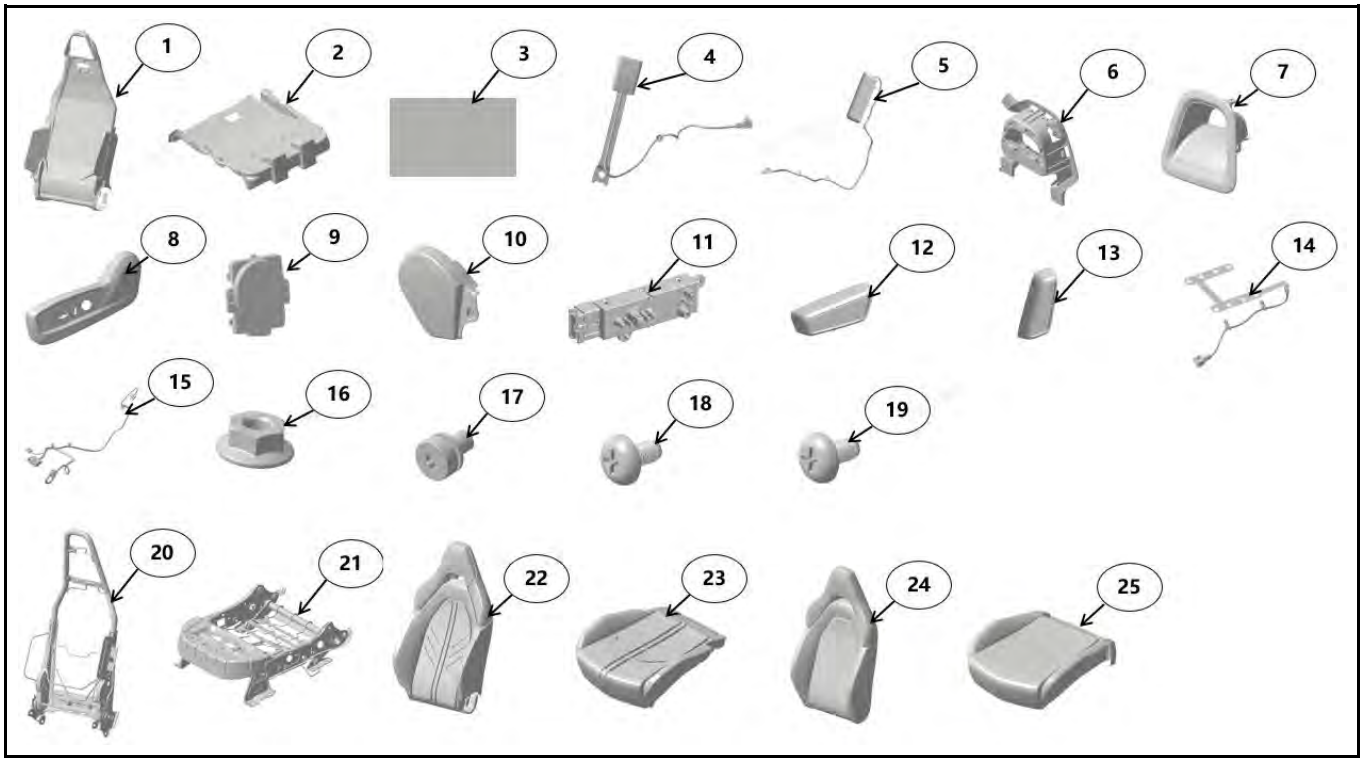
Front seats



S/N	Name	Quantity	S/N	Name	Quantity
1	LV2 front-row backrest silencing cloth	1	21	Backrest vent fan	3
2	Front-row seat cushion silencing cloth	1	22	Backrest ventilation airbag	2
3	Non-woven fabric (with adhesive backing)	2	23	Ventilation fan of seat cushion	1
4	Buckle assembly – driver seat belt	1	24	Ventilation airbag of seat cushion	1
5	Driver seat side SRS module	1	25	Hex flange nut with serrated bearing surface	2
6	Driver's seat outer trim cover (electric)	1	26	Hex lobular socket cylindrical head spring washer assembling bolt	4

S/N	Name	Quantity	S/N	Name	Quantity
7	Driver's seat inner trim cover (electric)	1	27	Cross recessed truss head self-tapping screw	6
8	Driver's seat adjustment button component	1	28	Cross recessed truss head self-tapping screw	2
9	Driver's seat slide rail/height adjustment button	1	29	Torx bolt	2
10	Driver seat backrest adjustment button	1	30	Driver seat backrest frame assembly	1
11	Backrest lumbar support massage adjustment switch box	1	31	Driver's seat cushion frame assembly	1
12	Neck trim lining base	1	32	Driver's backrest foam assembly LV2	1
13	Neck trim lining	1	33	Driver's seat cushion foam assembly LV2	1
14	Electric driver's seat harness assembly	1	34	Driver's seat backrest cover assembly	1
15	Seat controller ECU	1	35	Driver's seat cushion cover assembly	1
16	Upper left massage airbag	1	36	Seat belt reminder sensor **(if any)**	1
17	Right upper massage airbag	8			
18	Left lower massage airbag	1			
19	Right lower massage airbag	8			
20	Backrest massage lumbar support assembly	2			

Front passenger seat (electric adjustment) exploded view

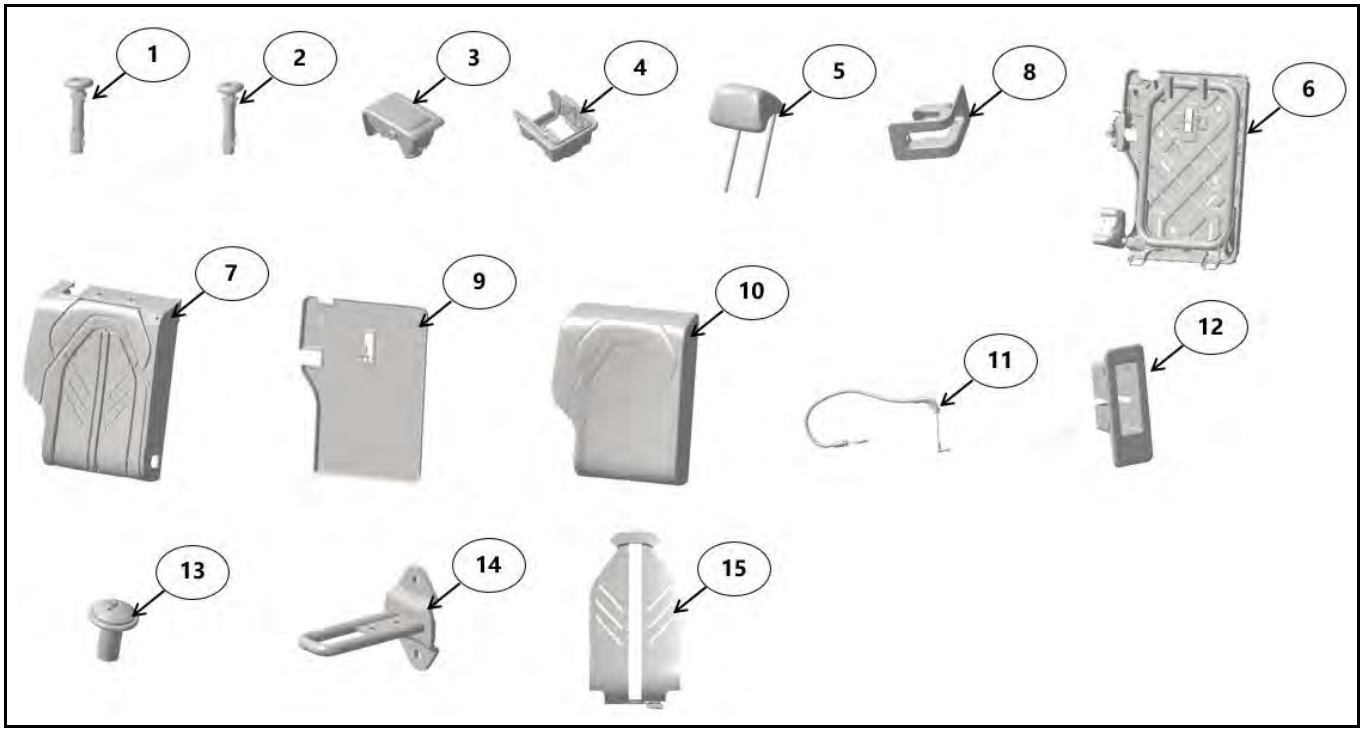


S/N	Name	Quantity	S/N	Name	Quantity
1	LV2 front-row backrest silencing cloth	1	16	Hex flange nut with serrated bearing surface	2
2	Front-row seat cushion silencing cloth	1	17	Hex lobular socket cylindrical head spring washer assembling bolt	4
3	Non-woven fabric (with adhesive backing)	2	18	Cross recessed truss head self-tapping screw	6
4	Buckle assembly – front passenger seat belt	1	19	Cross recessed truss head self-tapping screw	2
5	Front passenger seat side SRS module	1	20	Front passenger seat backrest frame assembly	1
6	Neck trim lining base	1	21	Front passenger seat cushion frame assembly	1
7	Neck trim lining	1	22	Front passenger's seat backrest foam assembly LV2	1

S/N	Name	Quantity	S/N	Name	Quantity
8	Front passenger's seat outer trim cover (electric)	1	23	Front passenger's seat cushion foam assembly LV2	1
9	Front passenger seat outer trim cover plug cap	1	24	Front passenger seat backrest cover assembly	1
10	Front passenger's seat inner trim cover (electric	1	25	Front passenger seat cushion cover assembly	1
11	Front passenger seat switch component	1			
12	Front passenger seat slide rail adjustment button	1			
13	Front passenger seat backrest adjustment button	1			
14	Seat belt reminder sensor	1			
15	Electric front passenger's seat harness assembly	1			

Rear seat

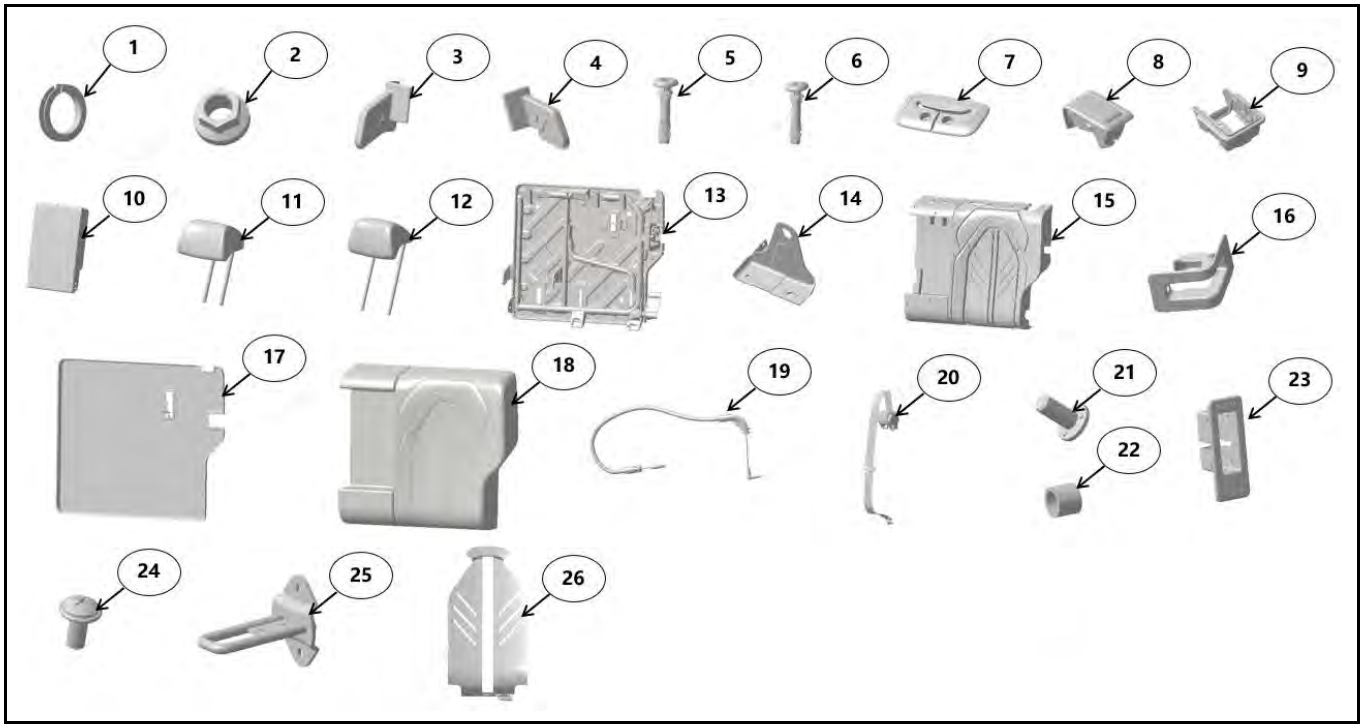
40% split rear seat backrest exploded view



S/N	Name	Quantity	S/N	Name	Quantity
1	Locking end of headrest guide sleeve	1	11	40%-portion rear seat backrest unlocking cable	1
2	Headrest guide sleeve free end	1	12	ISOFIX cover	1
3	Second-row backrest unlock mechanism assembly	1	13	Type C cross recessed pan head tapping screw	2
4	Second-row backrest unlock mechanism base	1	14	Backrest lock rod assembling unit	1
5	Rear seat side headrest assembly	1	15	Rear seat backrest heating pad **(if any)**	1
6	Five-seat second-row 40%-portion backrest frame assembly	1			
7	40% rear seat backrest foam assembly	1			

S/N	Name	Quantity	S/N	Name	Quantity
8	Rear 40%-portion backrest lock trim cover	1			
9	40%-portion rear seat backrest molded carpet	1			
10	40%-portion backrest cover assembly, imitation leather	1			

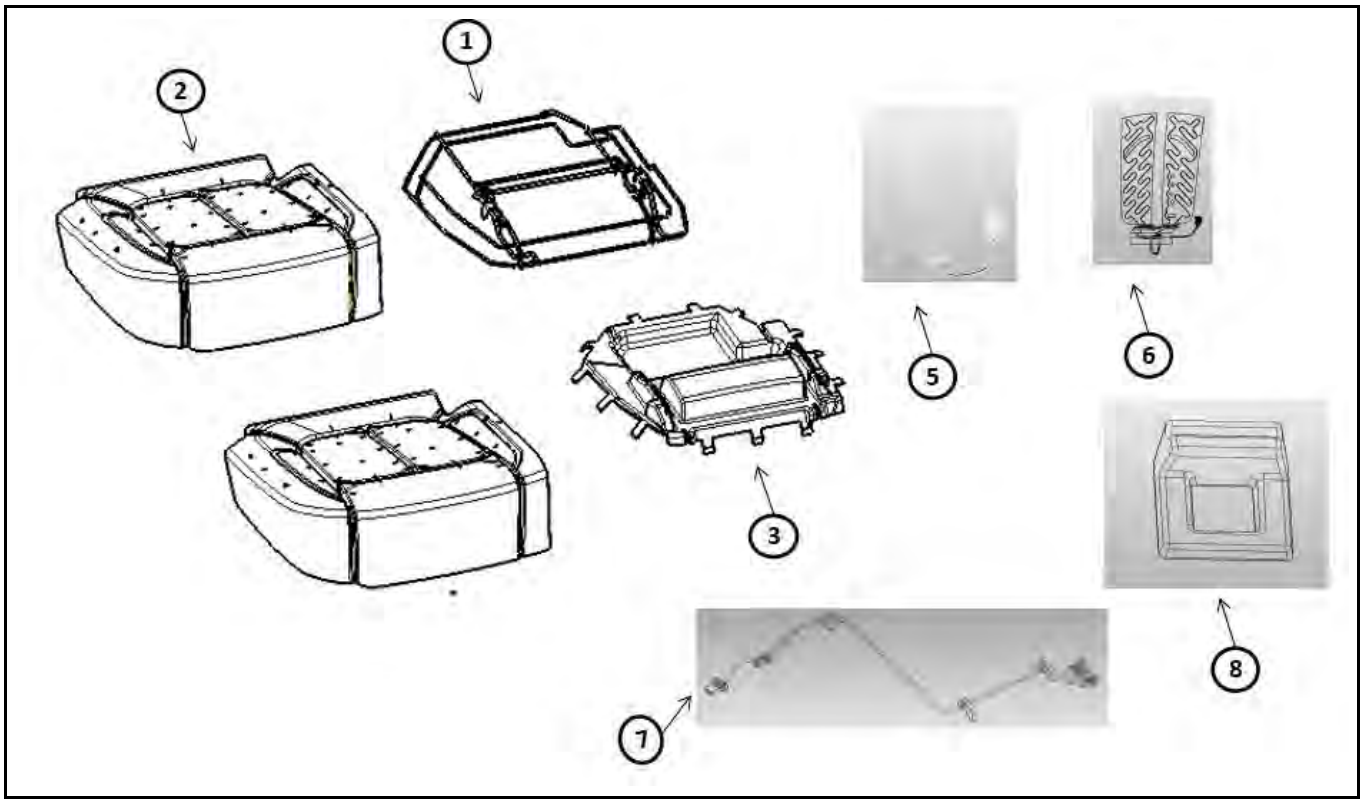
Exploded view of 60% split rear seat backrest



S/N	Name	Quantity	S/N	Name	Quantity
1	Hinge shaft sleeve	1	16	Rear 60%-portion backrest lock trim cover	1
2	7/16 connecting nut environmentally friendly Dacromet	1	17	60%-portion rear seat backrest molded carpet assembly	1
3	Second-row armrest cover inner side	1	18	60%-portion backrest cover assembly, imitation leather	1

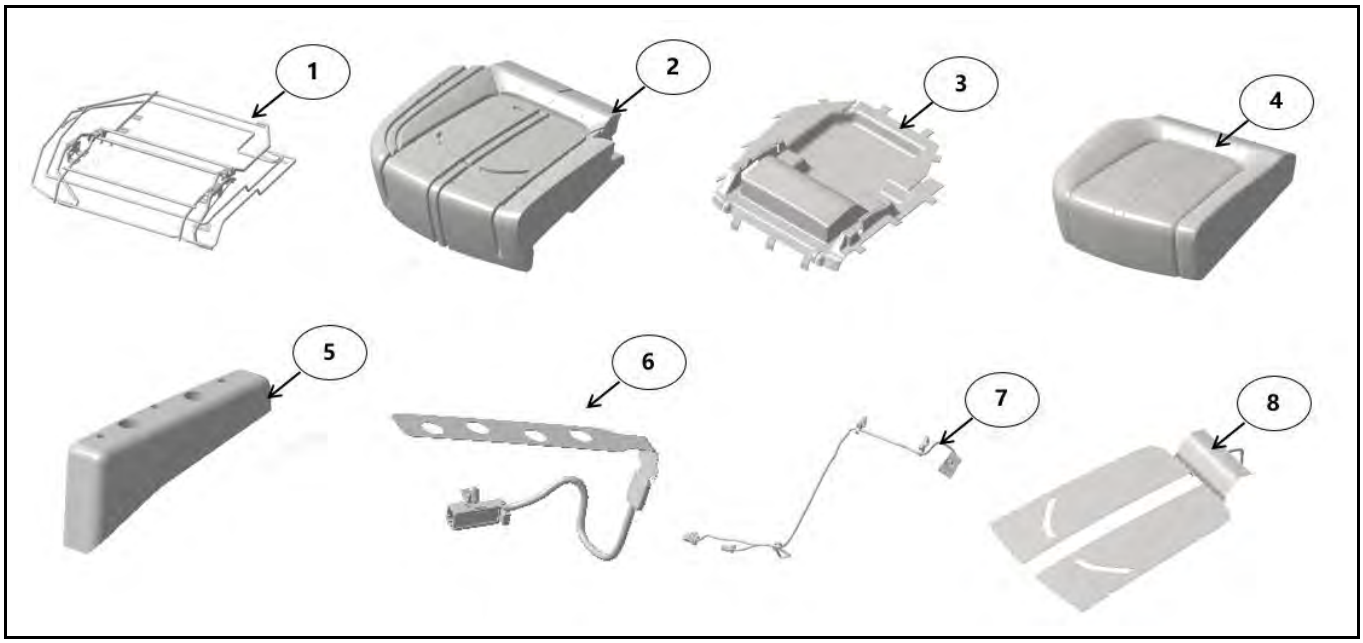
S/N	Name	Quantity	S/N	Name	Quantity
4	Second-row armrest cover outer side	1	19	40%-portion rear seat backrest unlocking cable	1
5	Locking end of headrest guide sleeve	2	20	60% rear seats without screw retractor assembly	1
6	Headrest guide sleeve free end	2	21	Hex socket step bolt M6*10	1
7	Second-row seat belt guide cover	1	22	60%-portion seat pivot shaft sleeve	1
8	Second-row backrest unlock mechanism assembly	1	23	ISOFIX cover	1
9	Second-row backrest unlock mechanism base	1	24	Type C cross recessed pan head tapping screw	4
10	Handrail assembly imitation leather	1	25	Backrest lock rod assembling unit	1
11	Rear middle seat headrest assembly, imitation leather	1	26	Rear seat backrest heating pad **(if any)**	1
12	Rear side headrest assembly, imitation leather	1			
13	Five-seat second-row 60%-portion backrest frame	1			
14	Five-seat second row middle mounting bracket assembly	1			
15	60% rear seat backrest foam assembly	1			

Exploded view of 40% split rear seat cushion



S/N	Name	Quantity	S/N	Name	Quantity
1	Five-seat second-row 40%-portion seat cushion frame	1	6	Rear seat cushion heating pad **(if any)**	1
2	40% rear seat cushion foam assembly	1			
3	40%-portion rear seat cushion molded carpet	1			
4	40% seat cushion cover assembly, genuine leather, EV	1			
5	Rear seat cushion EPP	1			

Exploded view of 60% rear seat cushion



S/N	Name	Quantity	S/N	Name	Quantity
1	Five-seat second-row 60%-portion seat cushion frame assembly	1	6	Rear 40%-portion SBR	1
2	60% rear seat cushion foam assembly	1	7	Rear 60%-portion middle SBR	1
3	60%-portion rear seat cushion molded carpet	1	8	Rear 60%-portion harness assembly-SBR	1
4	60% seat cushion cover assembly orange imitation leather EV	1	9	Rear seat cushion heating pad **(if any)**	1
5	Rear seat cushion EPP	1	10		

4.13.2.2 Precautions

Precautions during repair

1. Protect the disassembled parts and components with a cloth during disassembling and assembling.

2. Turn the ignition switch to OFF, disconnect the battery negative terminal, and wait for 3 minutes or more before repair.

3. The operation must be carried out on the side of the seat-side SRS module, and never from the front.

4. Never use pneumatic or electric tools for repairs.

5. Before removing the seat, operate the regulator handle to lower the seat to the lowest position.

6. Check the installation positions of harness connectors and harness retaining clips before performing the operation.

7. Never insert foreign objects such as a screwdriver into the side airbag module connector. (Prevent accidental activation caused by static electricity)

4.13.3 Diagnosis and testing

4.13.3.1 Electric Seat-Fault Diagnosis

5.1 Abnormal noise fault troubleshooting

5.1.1 Seat noise

Exercise special caution regarding the position of seats and the articles thereon when isolating the noise arising therefrom. These conditions shall reappear when confirming and isolating the noise sources.

5.1.2 Causes of seat noise include:

1. Noise caused by clearance between headrest rod and mounting hole.
2. Noise caused by squeak between seat cushion and seat frame, rocking and friction of slide rails and rocking of adjuster.
3. Noise due to the clearance in the lock mechanisms of the rear seats.
4. Noise caused by friction between the seat and surrounding interior trims.

Such noise can be isolated by shifting or pressing any suspicious element when the noise reappears. Most faults can be eliminated by placing the element again or using polyurethane adhesive tapes on the contact area.

4.13.3.2 Electric Seat-Fault Diagnosis

5.2 Troubleshooting other faults

Condition	Possible Cause	Correction
Drop of front & rear adjuster control rods	– The springs thereof are unable to return back. – The seat front & rear adjuster control rods are twisted or broken.	– Lubricate the return springs with special lubricating oil or replace. – Repair or replace the control rods.
Self-locking failure of front-back adjuster	– The front & rear adjuster control rods are bent. – The latch return springs thereof are fractured. – The lock is adhered to the adjuster.	– Repair or replace the control rods. – Mount new latch return springs – Lubricate the lock latch pivot with special lubricant.
It is hard to move the seat forward and backward.	– The new front & rear seat adjusters have not been run in (in need of 20 running-ins). – The front & rear seat adjusters have not been well lubricated. – The adjuster is not smooth due to bent or damaged rails.	– Shift the seat between the foremost to the rearmost ends for several times to make the rails slide smoothly. – Lubricate the front & rear seat adjuster rails with specialised vehicle lubricating oil or equivalent products. – Replace the seat.

4.13.3.3 Fault Diagnosis

5.2 Troubleshooting other faults

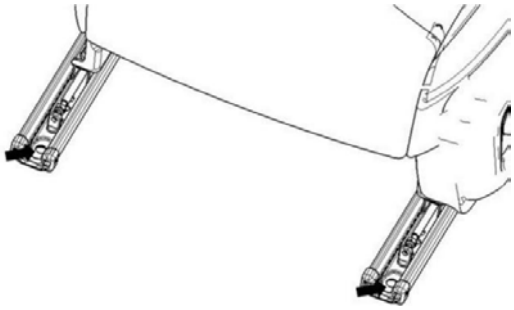
Condition	Possible Cause	Correction
Drop of front & rear adjuster control rods	– The springs thereof are unable to return back. – The seat front & rear adjuster control rods are twisted or broken.	– Lubricate the return springs with special lubricating oil or replace. – Repair or replace the control rods.
Self-locking failure of front-back adjuster	– The front & rear adjuster control rods are bent. – The latch return springs thereof are fractured. – The lock is adhered to the adjuster.	– Repair or replace the control rods. – Mount new latch return springs – Lubricate the lock latch pivot with special lubricant.
It is hard to move the seat forward and backward.	– The new front & rear seat adjusters have not been run in (in need of 20 running-ins). – The front & rear seat adjusters have not been well lubricated. – The adjuster is not smooth due to bent or damaged rails.	– Shift the seat between the foremost to the rearmost ends for several times to make the rails slide smoothly. – Lubricate the front & rear seat adjuster rails with specialised vehicle lubricating oil or equivalent products. – Replace the seat.

4.13.4 Removal and installation

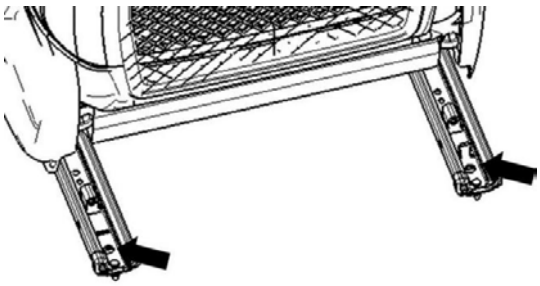
4.13.4.1 Front seats

Removal

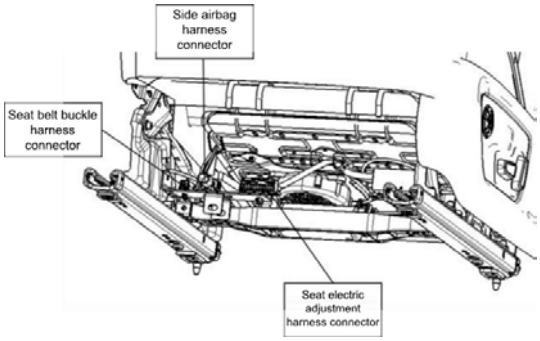
1. Pull up the seat forward/backward adjustment pull rod (move the electric seat forward/backward adjustment switch) to make the seat move backward to the backmost position, and remove two fixing bolts at the front end of the seat.



2. Pull up the seat forward/backward adjustment pull rod (move the electric seat forward/backward adjustment switch) to make the seat move foremost, and remove two fixing bolts at the rear end of the seat.



3. Disconnect the harness connector between body and seat.



4. Lift the seat out of the vehicle.

Installation

1. Install in the reverse order of disassembly and pay attention to the following matters:

Caution: Make sure that the inner and outer locks of the slide are at the same position before assembling.

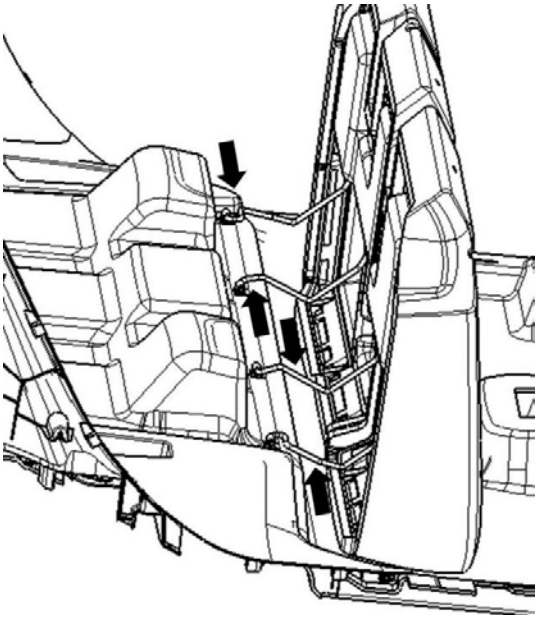
Note: Make sure that the slide rail fixing pin is placed in the hole of the floor.

Caution: Use a torque wrench to apply torque to the four bolts of the seat.

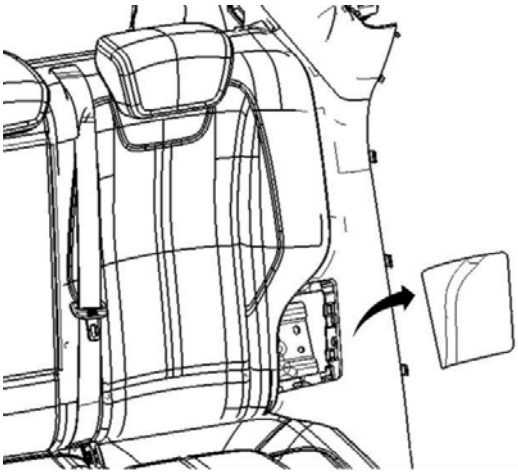
4.13.4.2 Rear 40%/60%-portion seat

Removal

1. Seat cushion removal: Fold the 40%/60%-portion seat cushion forward and place it on the body floor. Forcefully push the seat cushion overturn steel wire out of the body mounting bracket.

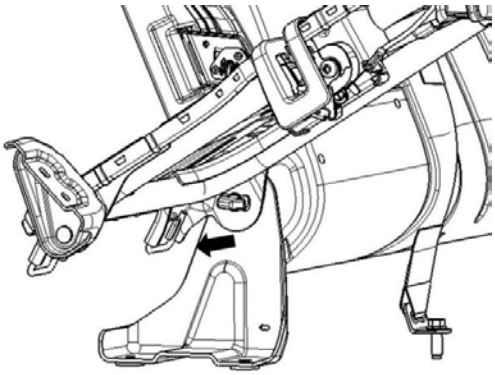


2. Backrest removal: Open the plastic covers on both side walls of the body and then remove the nuts.

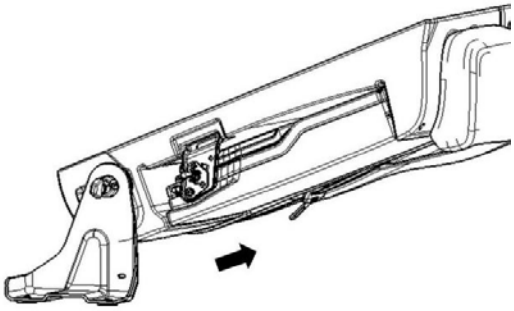


3. Remove the 40%-portion backrest; the maintenance personnel shall face the seat backrest and operate the unlocking device at the shoulder of the 40%-portion backrest upper end to unlock the backrest. Fold the 40%-portion backrest forward (make the angle of the pin hole consistent with that of the pin shaft), pull out the backrest

obliquely, pay attention to the outer rotating bracket to separate its mounting hole from the corresponding bolt, gradually pull out the backrest and adjust the backrest angle, and separate the inner pin hole of the backrest from the 60%-portion backrest pin shaft.



4. Remove the 60%-portion backrest; the maintenance personnel shall face the seat backrest and operate the unlocking device at the upper shoulder of the 60%-portion backrest to unlock the backrest. Fold the 60%-portion backrest forward (make the angle of pin hole consistent with that of pin shaft), pull out the backrest obliquely, pay attention to the outer rotating bracket to separate its mounting hole from the corresponding bolt, gradually pull out the backrest and adjust the backrest angle, and disengage the inner pin of the backrest from the hole of the middle hinge bracket of the backrest.



Installation

1. Install in the reverse order of disassembly and pay attention to the following matters:

Caution: When assembling the backrest, turn up the backrest and try to lock the backrest with the lock lever. Repeat the "unlocking-locking" operation. If it is not smooth, loosen the fastening bolt of the lock lever and adjust the threaded rod upwards and downwards.

Caution: Use a torque wrench to apply torque to the seat fixing nut.

4.14 Rearview mirror

4.14.1 Specification

4.14.1.1 Torque specification

Name	Nm
Fixing nut of exterior rearview mirror assembly	8

4.14.2 Instructions and operations

4.14.2.1 Component Locating Diagram

Item	Part Name	Instruction for mounting positions
1	Left rearview mirror assembly	On the door
2	Right rearview mirror assembly	On the door
3	Interior rearview mirror assembly (manual dimming)	On the front windscreen

4.14.2.2 Precautions

Precautions

1. **Caution:** Be sure to use a 12V battery.
2. **Caution:** Do not disconnect the battery cable when the engine is running.
3. **Caution:** Before connecting or disconnecting the engine ECU harness connector, turn the ignition switch to the OFF position and disconnect the GND cable of the battery. If not, the engine ECU may be damaged because the ECU voltage is still 12 V even when the ignition switch is at the "OFF" position.
4. **Caution:** Before disassembling parts and components, turn the ignition switch to the OFF position, and then disconnect the battery GND cable.
5. **Caution:** Do not disassemble the engine ECU.
6. **Caution:** Only use a digital multimeter to inspect the electronic fuel injection (EFI) system.
7. **Caution: Please use authentic parts and components for maintenance; otherwise, the EFI system may not operate properly.**
8. **Caution:** During maintenance, only unleaded petrol can be used.
9. **Caution: Please follow the specified maintenance and diagnostic procedures for maintenance work.**
10. **Caution: Do not disassemble the parts and components of the EFI system during maintenance.**

11. **Caution:** During maintenance, handle electronic components (ECU, sensors, etc.) with great care and do not let them fall to the ground.

12. **Caution: Develop an awareness of environmental protection and effectively handle any waste generated during maintenance.**

4.14.3 Removal and installation

4.14.3.1 Exterior rearview mirror assembly

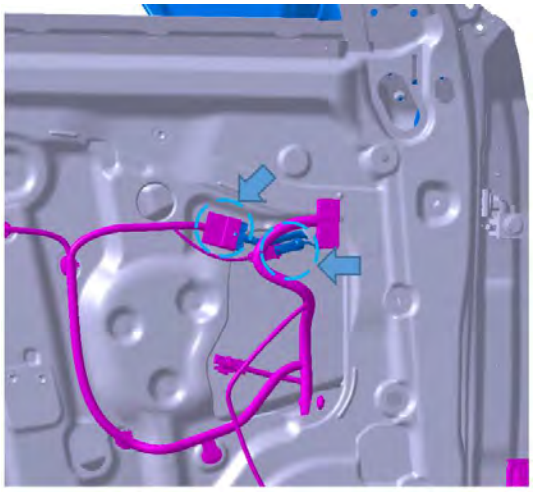
Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal

2. Remove the front door shield.

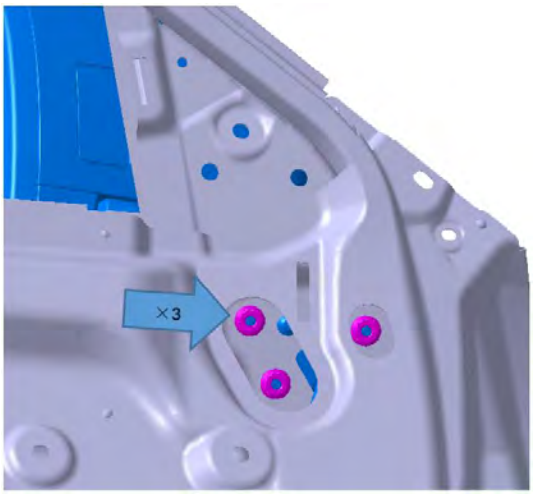
3. Remove the door waterproof film.

4. Remove the exterior rearview mirror harness connector and camera harness connector from the door harness.



5. Use a socket wrench to remove the 3 exterior rearview mirror nuts.

   Torque: 8 N·m



6. Take out the exterior rearview mirror.

Installation

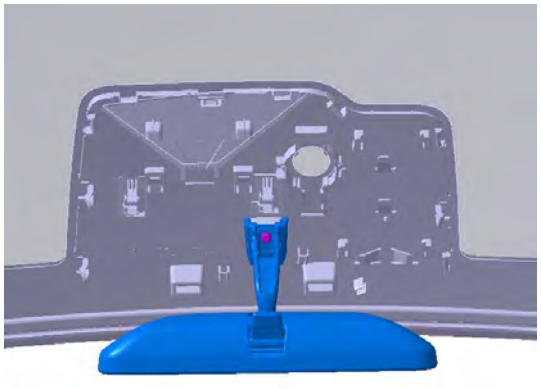
1. The installation order is reverse to the removal order.

4.14.3.2 Interior rearview mirror assembly

Removal

1. Remove the interior rearview mirror cover plate.

2. Loosen the interior rearview mirror screws with a T20 Allen wrench.



3. Remove the interior rearview mirror.

Installation

1. The installation order is reverse to the removal order.

4.14.4 Removal and installation

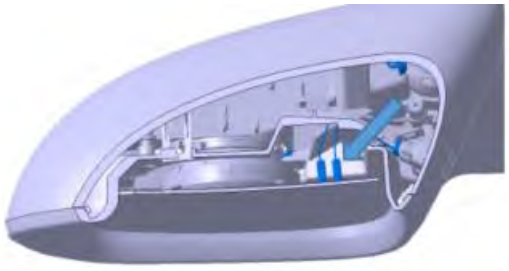
4.14.4.1 Exterior rearview mirror component

Mirror glass assembly removal

1. Press and hold the lens assembly at a to turn the lens at b outward to the maximum.

2. Insert a straight screwdriver between the regulator and the mirror assembly to pry up and separate the mirror glass assembly from the regulator.

3. Disconnect the harness connector of heating plate on the mirror glass assembly.



4. Remove the mirror assembly.

   Caution: Before disassembly, wrap the b area with protective tape to prevent tools from scratching the housing.

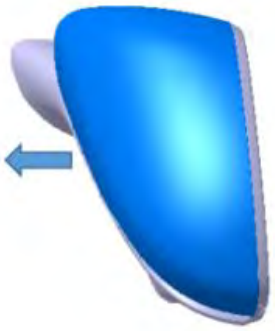
Installation

1. The installation order is reverse to the removal order.

Removal of trim cover

1. Use a straight screwdriver to pick up the four pawls of the trim cover (the pawls at a-d, d are hidden behind the mirror ring).

2. Hold the outer edge of the trim cover by hand and apply force in the arrow direction until the pawl is detached from the mirror body assembly.
3. Remove the trim cover in the direction of arrow.

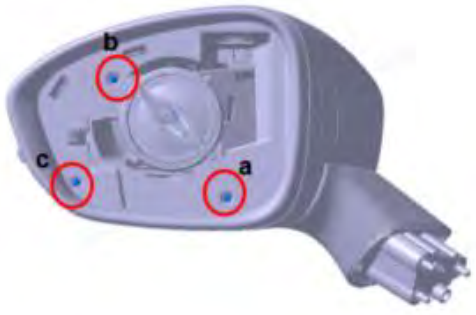


Installation

1. The installation order is reverse to the removal order.

Removal of mirror ring

1. Use a cross-head screwdriver to remove the 3 screws (a/b/c) of the mirror ring.



2. Use a straight screwdriver to pick up the 3 pawls in the ring and remove the mirror ring; remove the trim cover along the D direction.

Installation

1. The installation order is reverse to the removal order.

Removal of turn signal

1. Remove the two screws of the turn signal using a cross-head screwdriver.

2. Hold the first and last positions of the turn signal with your fingers and remove the turn signal in the direction of the arrow. (The turn signal will slightly interfere with the lower mirror housing during this process).

3. Disconnect the harness connector and remove the turn signal.

Installation

1. The installation order is reverse to the removal order.

4.15 Power sunroof

4.15.1 Specification

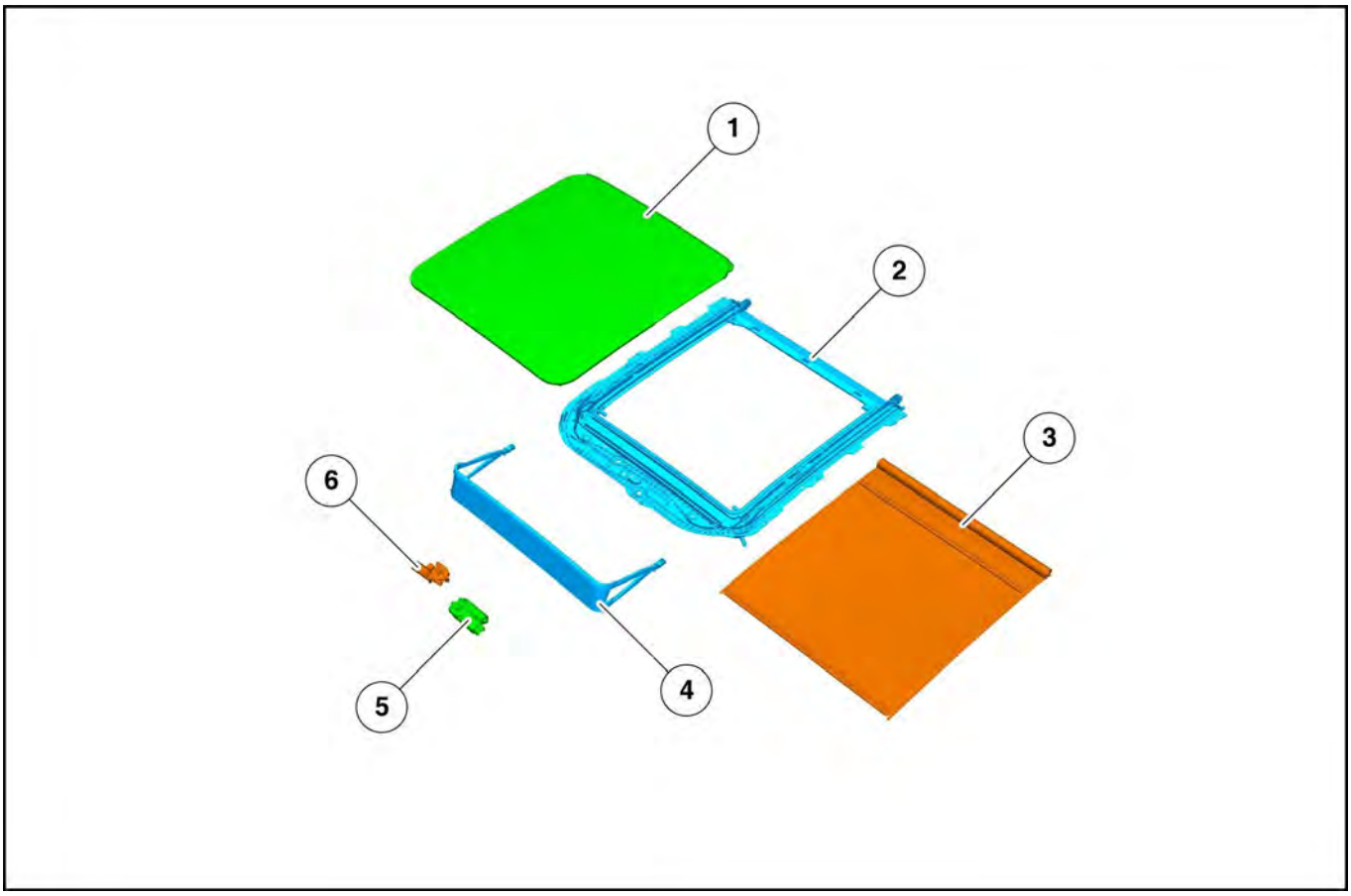
4.15.1.1 Torque specification

Name	Nm
Fixing bolt of sunroof assembly	7.0±0.7
Fixing screw of sunroof motor	Torque: 3±12.5%Nm
Sun visor motor fixing screw	Torque: 3±12.5%Nm

4.15.2 Instructions and operations

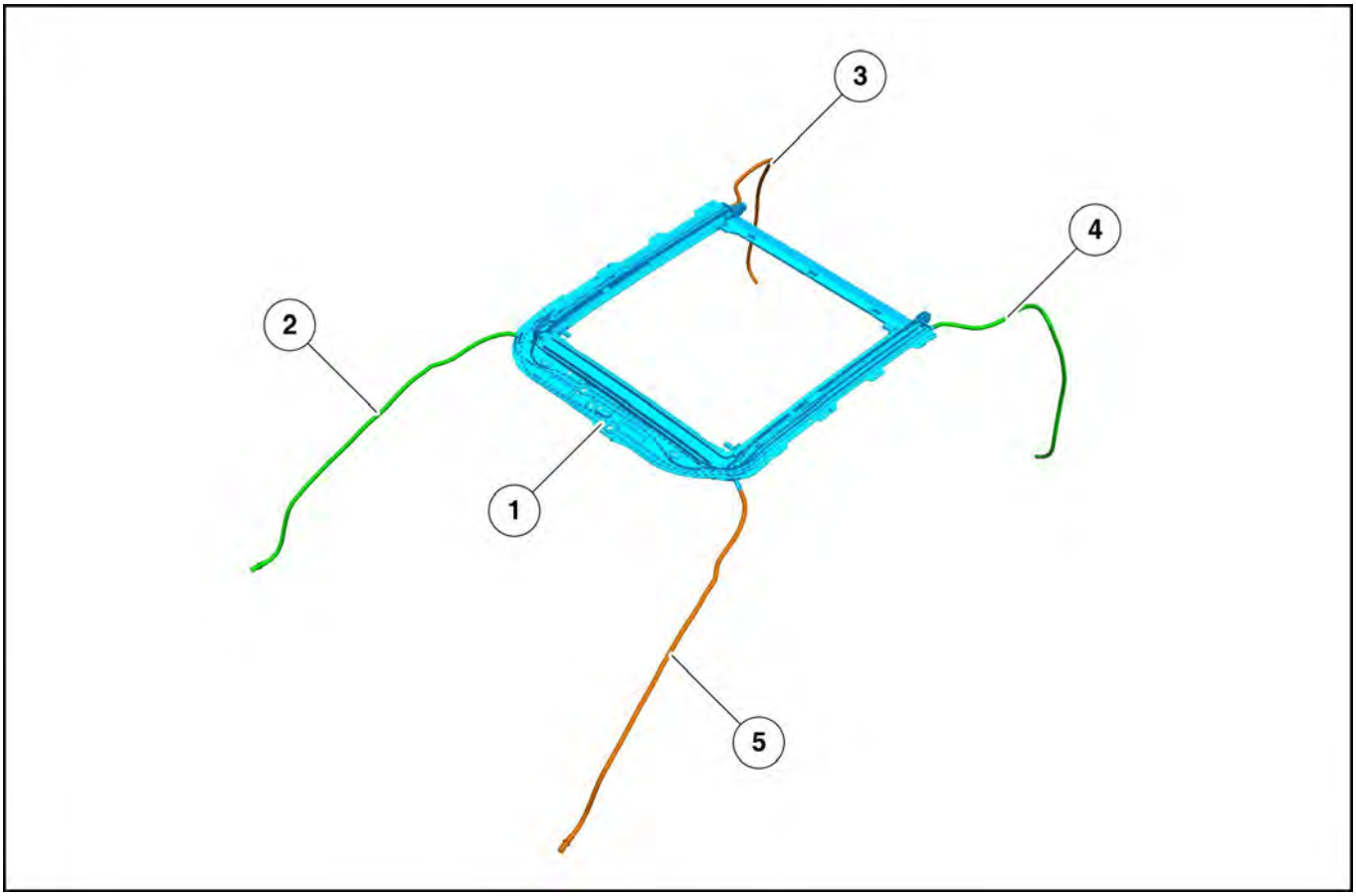
4.15.2.1 Exploded view

Sunroof system



Item	Description	Item	Description
1	Sunroof glass assembly	4	air deflector assembly
2	Sunroof frame assembly	5	Sunroof motor
3	Sun visor	6	Sun visor motor

Sunroof frame assembly



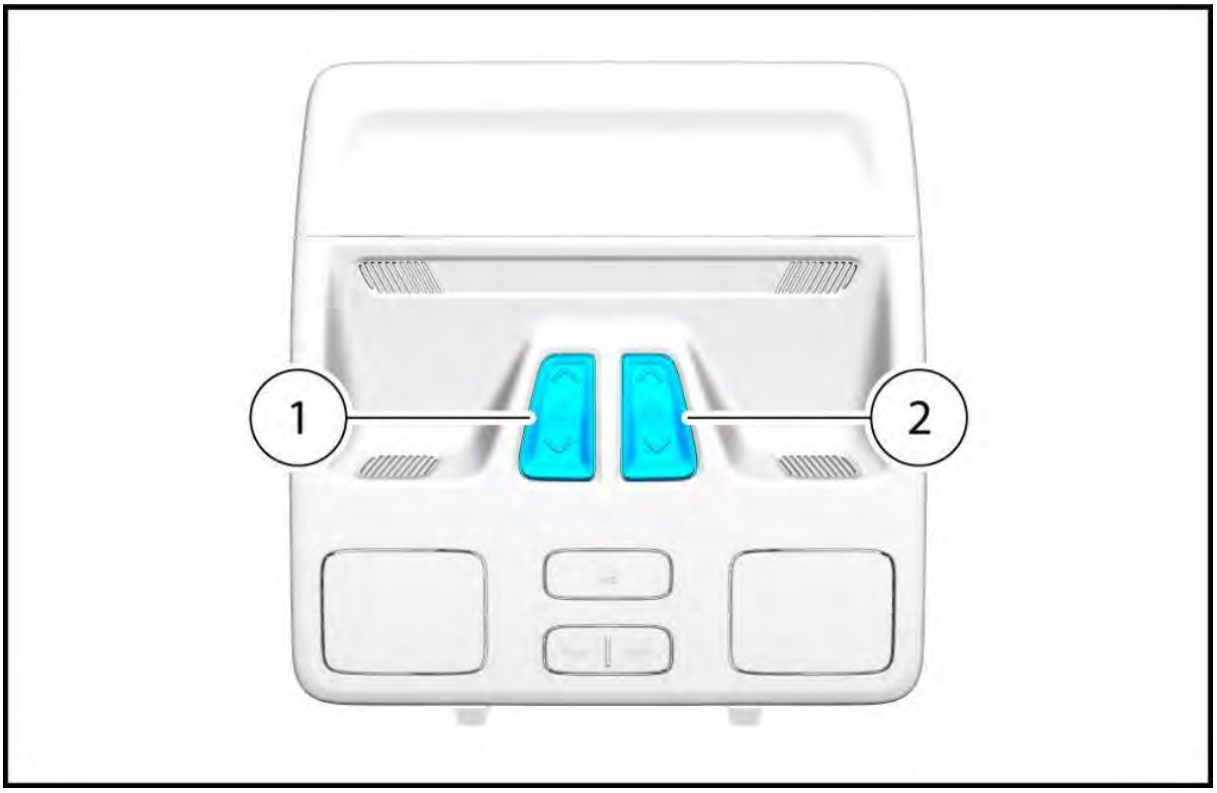
Item	Description	Item	Description
1	Sunroof frame assembly	4	Sunroof rear left water pipe
2	Front right water pipe of sunroof	5	Front left water pipe of sunroof
3	Right rear water pipe of sunroof		

4.15.2.2 Overview

Sliding sunroof (if equipped)

Warning: It is strictly forbidden to leave children alone in the car; it is strictly forbidden to let children play with the sunroof. Failure to observe the instructions may cause personal injury.

Warning: Before closing the sunroof, make sure there are no obstacles in its operating area and that children and pets are not near the open sunroof.



The sliding sunroof switch is located on the overhead control panel.

1 sliding sunroof switch

2 Sliding glass roof switch

The sunroof switch and the glass roof switch can only work when the one-button start switch is in the "ON" mode.

When the sunshade is closed, you can also turn the sunroof switch directly to the rear of the car. The sunshade will be opened first and then the sunroof will open. When the sunroof sunshade and sunroof glass are open, turn the sunroof sunshade switch toward the front of the car, and the sunroof glass will close together with the sunshade.

The sunroof sunshade can only be opened or closed when the panoramic sunroof glass is closed.

Sunroof sunshade opening/closing

Open the sunroof sunshade

1. When the sunroof sunshade is closed, turn the sunroof sunshade switch to the rear of the car and the sunroof sunshade will open automatically. If you need to stop opening during the opening process, just turn on the sunroof sunshade switch again.
2. Press and hold the sunroof sunshade switch toward the rear of the vehicle, and the sunroof sunshade will be opened manually. Release the switch, and the sunroof sunshade will stop opening.

Close the sunroof sunshade

Press the sunroof sunshade switch toward the front of the car, and the sunroof sunshade will automatically close. If you need to stop closing during the closing process, just turn on the sunroof sunshade switch again. Press and hold the sunroof sunshade switch toward the front of the vehicle, and the sunroof sunshade will be manually closed. Release the switch and the sunroof sunshade will stop closing.

Open or close the sunroof and glass roof

Tilt up and open

When the sliding sunroof and glass roof are closed, turn the sliding sunroof and glass roof switch toward the front of the car, and the sliding sunroof and glass roof will automatically tilt up and open. If you need to stop opening during the opening process, just turn the switch again.

Press and hold the sliding sunroof switch and glass roof switch toward the front of the vehicle to manually control the tilting opening. Release the switch, and the sunroof and glass roof will stop tilting.

Tilt closed

When the sliding sunroof and glass roof are tilted open, press it toward the rear of the car to close the tilt. If you need to stop closing during the closing process, just flip the tilt switch again.

Press and hold the tilting switch towards the rear of the vehicle to manually control the tilting to close. Release the switch and the tilting closing action will stop.

Slide opening

When the sliding sunroof is closed, turn the tilt switch toward the rear of the car, and the sliding sunroof A and glass roof B will slide open. If you need to stop opening during the opening process, turn the sunroof and glass roof switches again.

When the sliding sunroof is closed, press and hold the rocker switch toward the rear of the vehicle, and the sliding sunroof will be manually controlled to slide open. Release the switch and the opening action will stop.

Slide closing

When the sunroof is fully or partially open, press the sliding sunroof switch and the glass roof switch toward the front of the car, and the sliding sunroof will automatically slide closed. If you need to stop closing during the closing process, just turn on the sunroof switch again.

When the sunroof is fully or partially open, press and hold the sliding sunroof switch and glass roof switch toward the front of the car. The sliding sunroof will automatically slide closed. Release the switch and the sunroof closing action will stop.

Sunroof and sunshade anti-pinch function

During the process of automatically closing the sunroof or sunshade, if an obstacle is encountered, the automatic anti-pinch function of the sunroof or sunshade will open the sunroof or sunshade for a distance.

Panoramic Sunroof Initialisation

When the battery cable is disconnected or some faults are detected, and the panoramic sunroof and sunshade cannot work properly, follow the steps below to initialise the panoramic sunroof:

Start the engine, close the panoramic sunroof and sunroof sunshade, press and hold the panoramic sunroof switch or sunroof sunshade switch in the forward direction of the vehicle for more than 7 seconds (do not release the button at this time, otherwise the initialisation will fail). After completion, the initialisation of the sunroof and sunshade is completed. You can confirm whether their functions are normal by operating the sunroof and sunshade switches.

Sensor window closing setting (if equipped)

Set the opening and disabling of the sensor window through the "Vehicle settings"-"Body settings"-"Doors and Windows"-"Sensor Window" menu in the Ford intelligent IVI system (see "Ford Intelligent IVI System User Manual") or ask an authorised dealer to perform this operation for you.

Inductive window closing (if equipped)

The inductive window closing function is enabled by default. When the Start switch is in "ON" mode, click "Sensor Window Closing" in Ford intelligent IVI system to turn off or on this function.

When the sensor window closing function is turned on, 10 to 15 minutes after the Start switch is in the "OFF" mode, the vehicle enters a low power consumption state and the sensor window closing function takes effect: when rainfall is sensed, the doors, windows and panoramic sunroof will automatically close; when no rainfall is sensed for more than 12 hours, the timeout window closing will be started, and the doors, windows and panoramic sunroof will also automatically close.

Sensor window closing

Caution: If it is likely to rain 10 to 15 minutes after leaving the car, please close the windows and sunroof in time to avoid property loss.

4.15.3 Diagnosis and testing

4.15.3.1 Inspection and confirmation

Sunroof system

Inspection and confirmation

1. Confirm problems raised by customers.

2. Visually inspect for obvious signs of mechanical or electrical damage.

Caution: Confirm the correct position of the harness connector.

3. When performing accurate testing and inspection, always check for any disconnections, loose joints or improperly installed components, modules and electrical connectors.

4. If an obvious cause of an observed fault is found, it must be corrected (if possible) before proceeding to the next step.

5. If the fault still exists after visual inspection, please check the faults according to the List of Symptoms as per the fault phenomena.

4.15.3.2 Visual inspection list

Sunroof system

Visual inspection list

Mechanical Parts	Electrical part
• Sunroof slide rail	• Fuse and relay • Harness • Electric connector

4.15.3.3 Symptom Table

Sunroof system

Symptoms	Possible cause	Measures
Sunroof does not work	• Fuse	• Check the fuse relay. • Check the line for open circuit or poor contact fault. • Replace the sunroof switch . • Replace the sunroof motor .
	• Sunroof switch	
	• Sunroof motor	
	• Circuit	
Sunroof cannot be closed	• Sunroof switch	• Check the fuse relay. • Check the line for open circuit or poor contact fault. • Replace the sunroof switch .
	• Sunroof motor stuck	• Replace the sunroof motor .
	• Circuit	• Repair the faulty circuit.
	• Sunroof frame	• Replace the sunroof assembly .
Sunroof motor abnormal	• Sunroof motor	• Replace the sunroof motor .
	• Sunroof frame	• Replace the sunroof assembly .

4.15.4 Removal and installation

4.15.4.1 Sunroof assembly

Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Remove the roof interior trim assembly. Refer to: Roof interior trim assembly.
3. Disconnect the four water pipes of sunroof.

4. Remove the left fixing bolt of sunroof assembly.

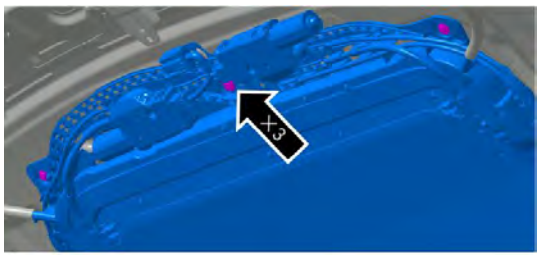
   Torque: 7±0.7Nm

5. Remove the right fixing bolt of sunroof assembly.

   Torque: 7±0.7Nm

6. Remove the fixing bolts on the front side of the sunroof assembly, and remove the sunroof assembly.

   Torque: 7±0.7Nm



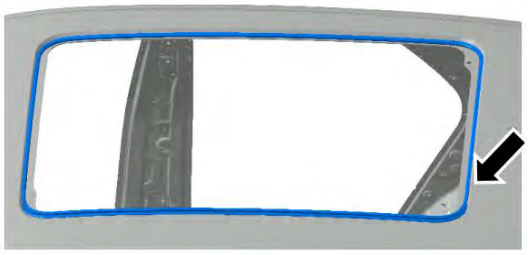
Installation

1. The installation order is reverse to the removal order.
2. Perform the sunroof initialisation procedure.

4.15.4.2 Sunroof assembly sealing strip

Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Remove the roof interior trim assembly. Refer to: Roof interior trim assembly.
3. Remove the sunroof assembly. Refer to: Sunroof assembly.
4. Remove the sunroof assembly sealing strip.



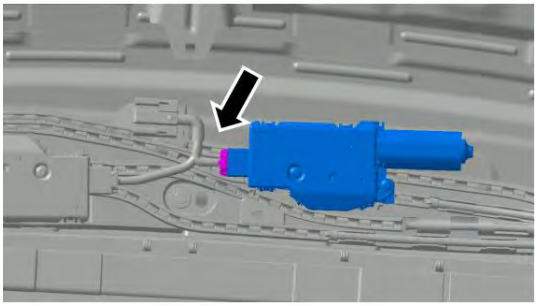
Installation

1. The installation order is reverse to the removal order.
2. Perform the sunroof initialisation procedure.

4.15.4.3 Sunroof motor assembly

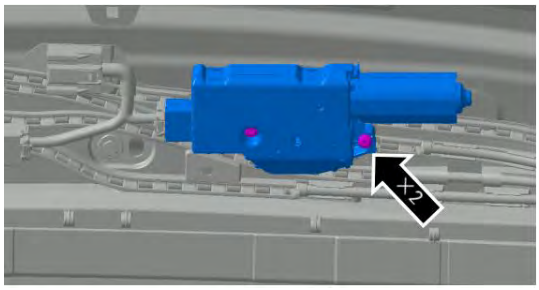
Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the roof interior trim assembly. Refer to: Roof interior trim assembly.
3. Disconnect the harness connector of sunroof motor.



4. Remove the fixing screws of sunroof motor, and take off the sunroof motor assembly.

   Torque: 3±12.5%Nm



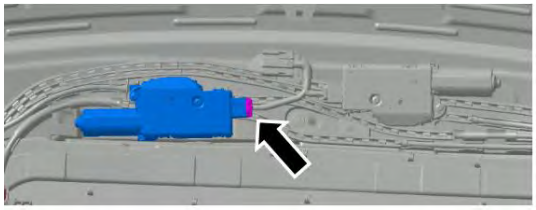
Installation

The installation order is reverse to the removal order.

4.15.4.4 Sun visor motor assembly

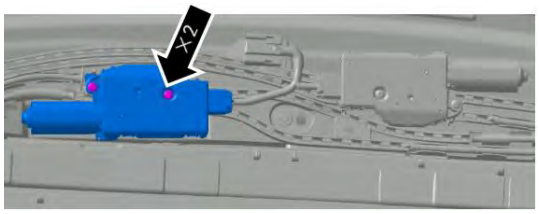
Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the roof interior trim assembly. Refer to: Roof interior trim assembly.
3. Disconnect the sun visor motor harness connector.



4. Remove the fixing screws of sun visor motor, and remove the sun visor motor.

   Torque: 3±12.5%Nm



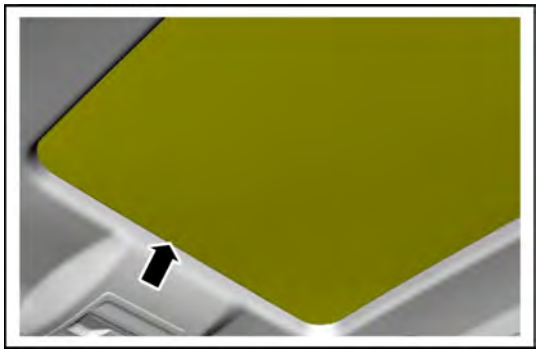
Installation

1. The installation order is reverse to the removal order.

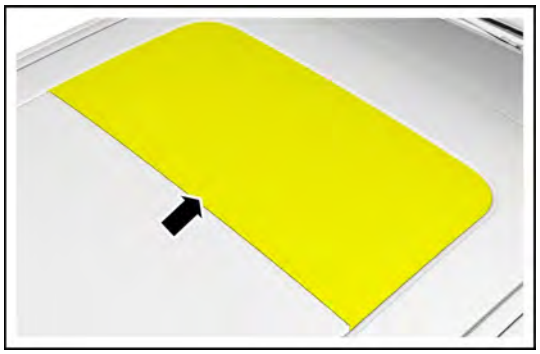
4.15.4.5 Sunroof glass

Removal

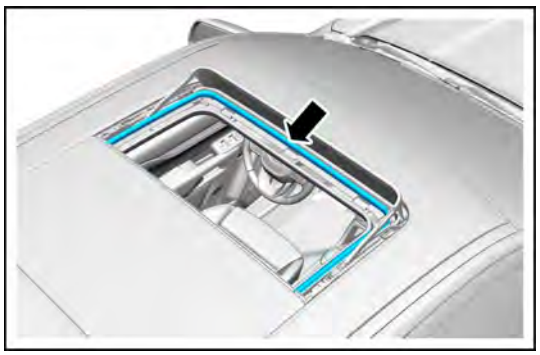
1. Fully open the sunshade.



2. Fully open the sunroof glass.

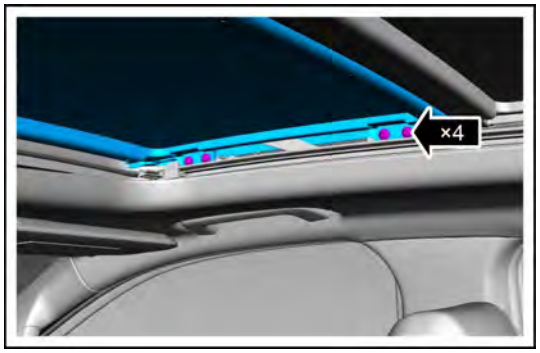


3. Remove the sunroof glass sealing strip.



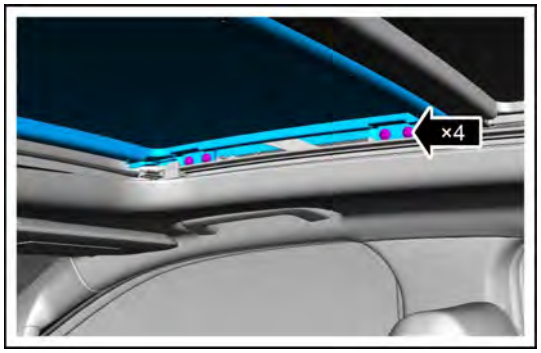
4. Remove the right fixing bolt of sunroof glass.

   Torque: 7±0.7Nm



5. Remove the left fixing bolt of sunroof glass, and take off the sunroof glass.

   Torque: 7±0.7Nm



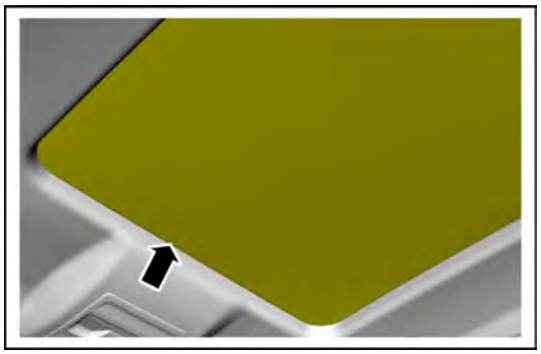
Installation

1. The installation order is reverse to the removal order.

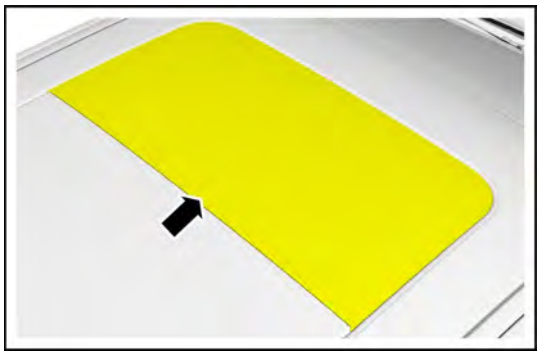
4.15.4.6 Sunroof fixed glass

Removal

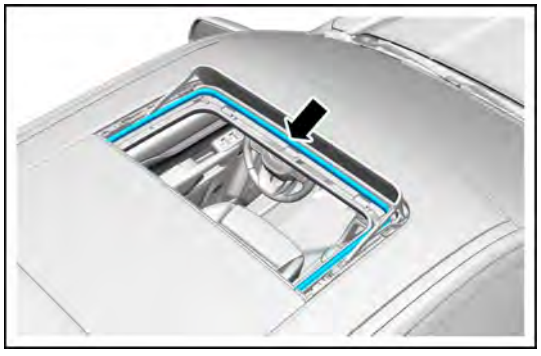
1. Fully open the sunshade.



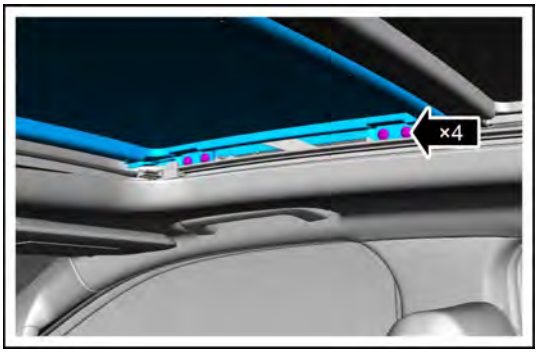
2. Fully open the sunroof glass.



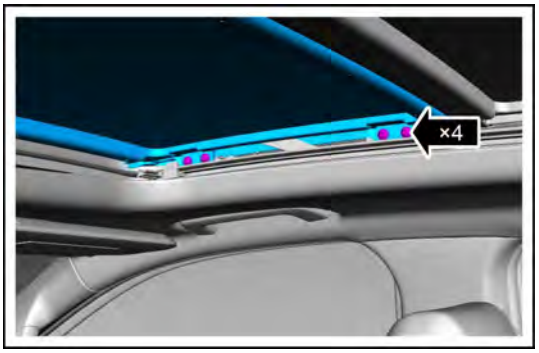
3. Remove the sunroof glass sealing strip.



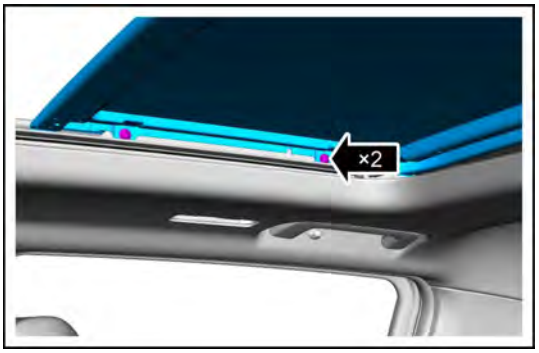
4. Remove the right fixing bolt of sunroof glass.



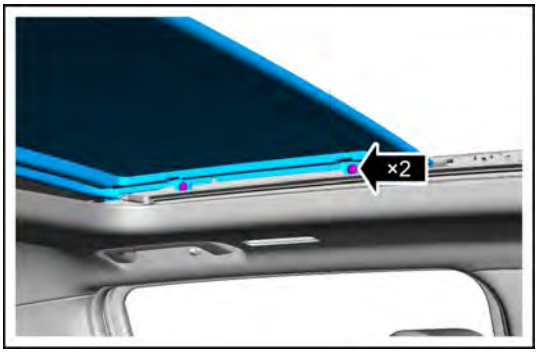
5. Remove the left fixing bolt of sunroof glass, and take off the sunroof glass.



6. Remove the right fixing bolt of sunroof fixed glass.



7. Remove the left fixing bolt of sunroof fixed glass, and take off the sunroof fixed glass.



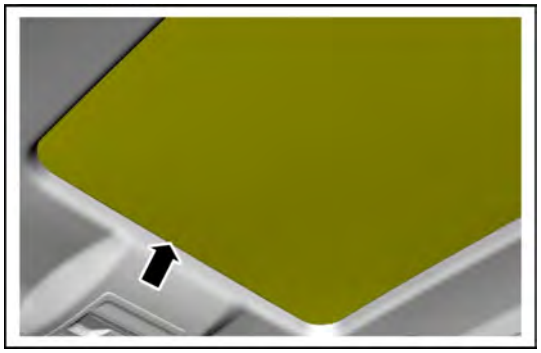
Installation

1. The installation order is reverse to the removal order.

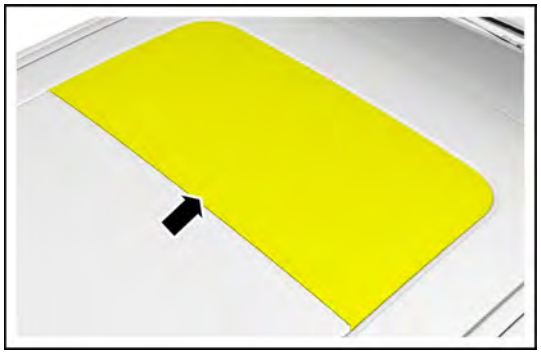
4.15.4.7 Sunroof glass sealing strip

Removal

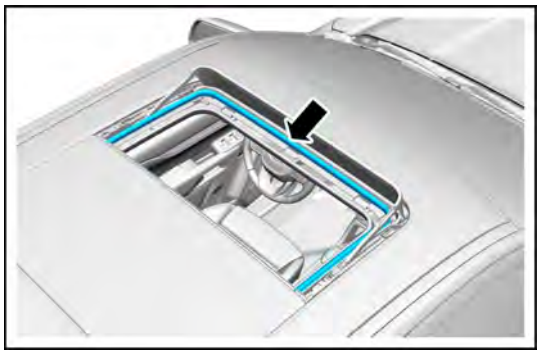
1. Fully open the sunshade.



2. Fully open the sunroof glass.



3. Remove the sunroof glass sealing strip.



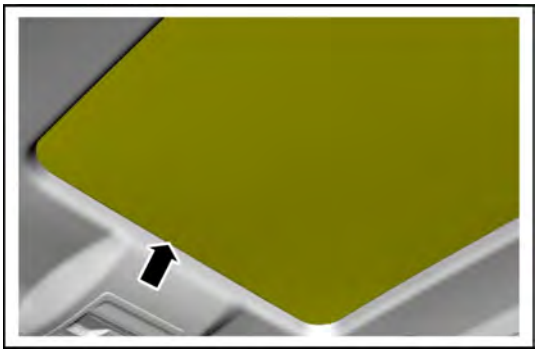
Installation

1. The installation order is reverse to the removal order.

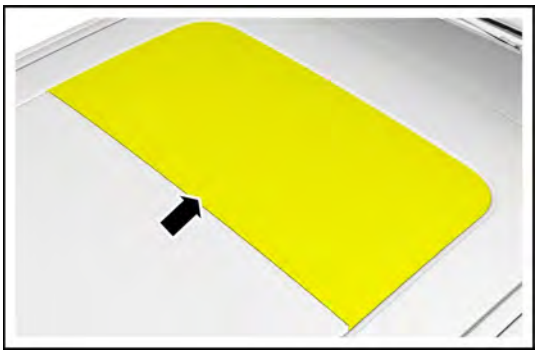
4.15.4.8 air deflector assembly

Removal

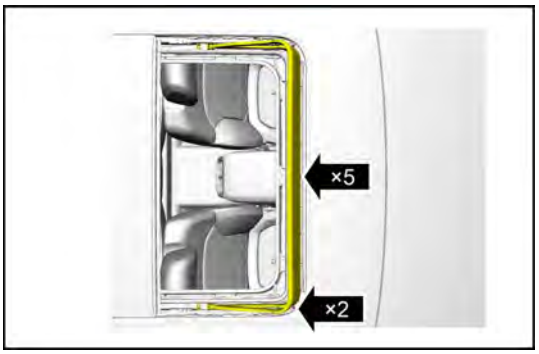
1. Fully open the sunshade.



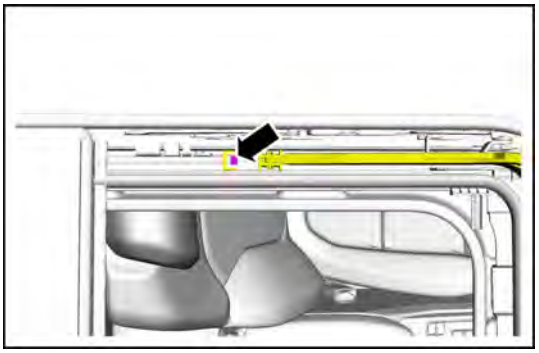
2. Fully open the sunroof glass.



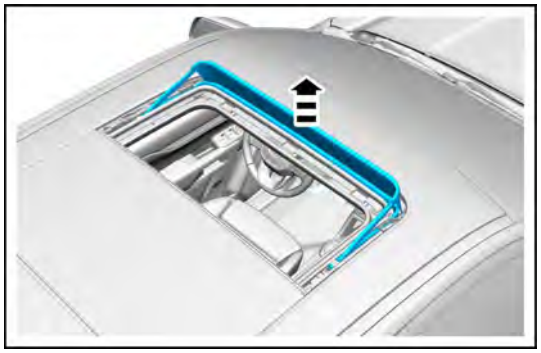
3. Disengage the fixing clips connecting the wind deflector assembly and the sunroof frame.



4. Remove the fixing clips of the wind deflector assembly.



5. Remove the wind deflector assembly.



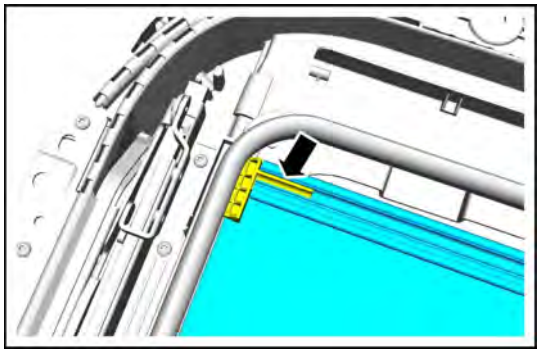
Installation

1. The installation order is reverse to the removal order.

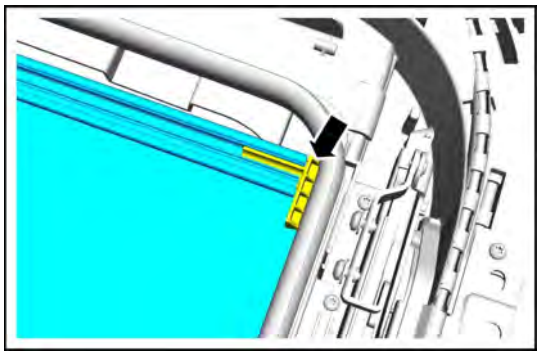
4.15.4.9 Sun visor

Removal

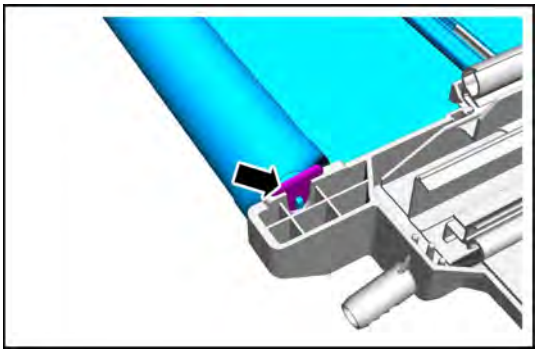
1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Remove the roof interior trim assembly. Refer to: Roof interior trim assembly.
3. Remove the sunroof assembly. Refer to: Sunroof assembly.
4. Remove the left fixing clip of sun visor.



5. Remove the right fixing clip of sun visor.



6. Remove the fixing clips of sun visor, and then take out the sunroof sun visor.



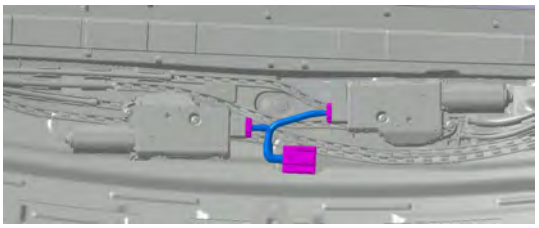
Installation

1. The installation order is the reverse of the removal order.

4.15.4.10 Sunroof harness

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the front roof light assembly.
3. Remove the sun visors on both sides. Refer to: Sun visor.
4. Remove the front passenger's roof armrest. Refer to: Roof armrest.
5. Remove the A-pillar interior trim panels on both sides. Refer to: A-pillar upper shield.
6. Disconnect the sunroof harness connector and remove the sunroof harness.



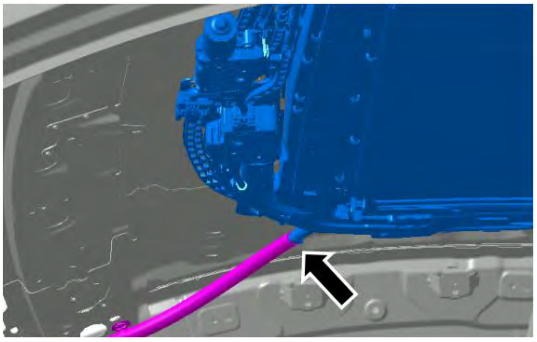
Installation

1. The installation order is the reverse of the removal order.

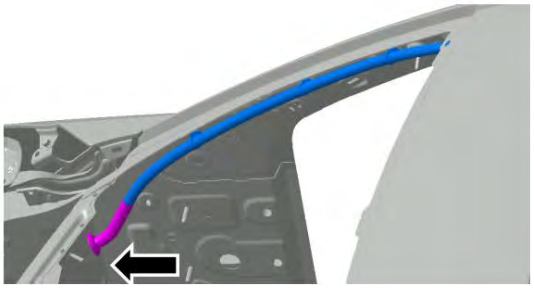
4.15.4.11 Front water pipe, sunroof

Removal

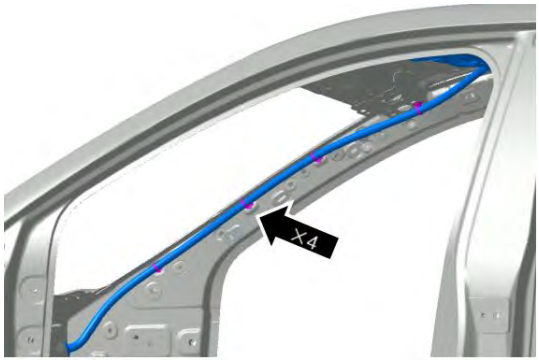
1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the roof interior trim assembly. Refer to: Roof interior trim assembly.
3. Remove the sunroof assembly. Refer to: Sunroof assembly.
4. Remove the A-pillar trim panel. Refer to: A-pillar upper shield..
5. Detach the sunroof front water pipe from the sunroof.



6. Detach the sunroof front water pipe from the body end.



7. Remove the sunroof front water pipe clip, and then take out the sunroof front water pipe.



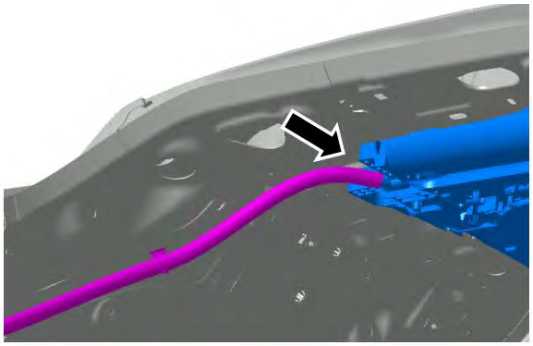
Installation

The installation order is the reverse of the removal order.

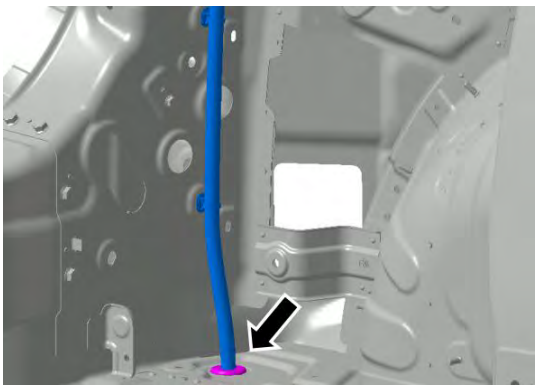
4.15.4.12 Rear water pipe, sunroof

Removal

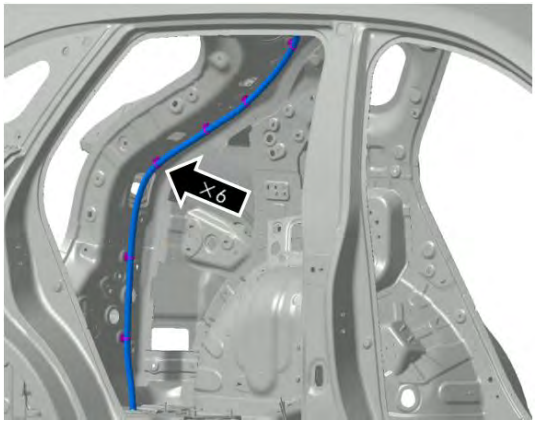
1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the roof interior trim assembly. Refer to: Roof interior trim assembly.
3. Detach the sunroof rear water pipe from the sunroof.



4. Detach the sunroof rear water pipe from the body end.



5. Remove the sunroof rear water pipe clip, and then take out the sunroof rear water pipe.



Installation

1. The installation order is the reverse of the removal order.

4.15.5 General procedures

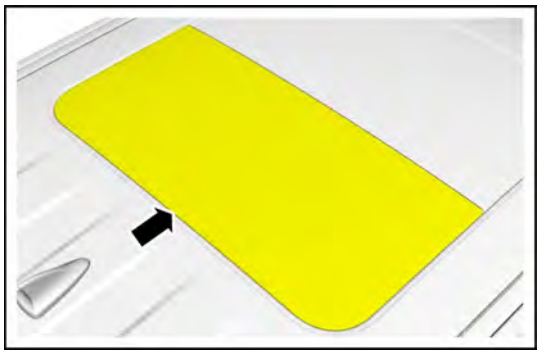
4.15.5.1 General procedures

Sunroof glass flushness adjustment

1. Loosen the fixing bolts on both sides.

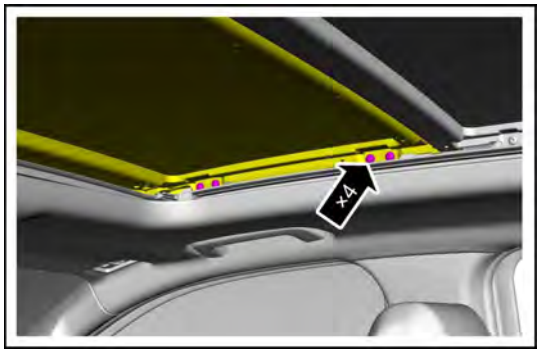
2. Push the rear edge of the sunroof glass up and down to ensure its correct positioning (-1±1.5mm).

   Caution: Ensure that there is no gap between the glass circumference and the roof cover sheet metal.



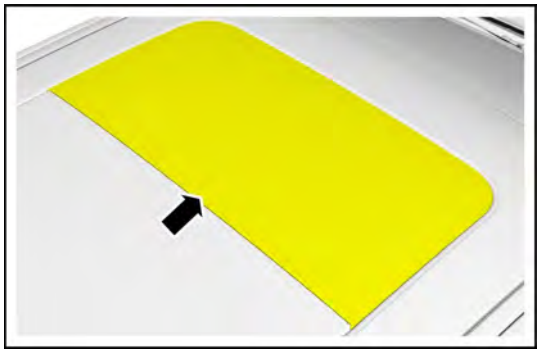
3. Tighten the fixing bolts on both sides.

4. Loosen the fixing bolts on both sides.

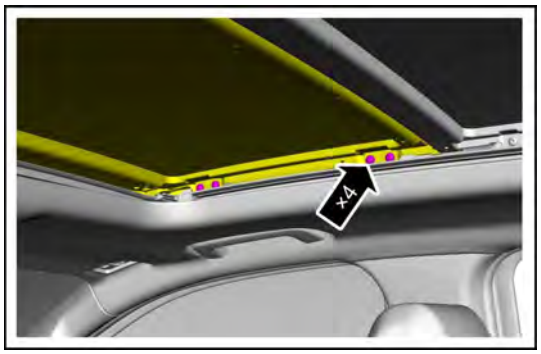


5. Push the rear edge of the sunroof glass up and down to ensure its correct positioning (-1±1.5mm).

   Caution: Ensure that there is no gap between the glass circumference and the roof cover sheet metal.



6. Tighten the fixing bolts on both sides.



7. Operate the sunroof and check whether the positioning of the sunroof glass is accurate.

Timing adjustment

1. Sunroof calibration. Refer to: Sunroof glass.
2. Remove the sun visor. Refer to: Sun Visor.
3. Remove the roof sunroof panel sliding glass motor. Refer to: Sunroof motor assembly.

   Caution: Before installing the motor for proper cable timing, both roof panel glass drive cable units must be fully forward and in both the left and right main guide rail assemblies.

4. Install the roof sunroof panel sliding glass and shield motor. Refer to: Sunroof motor assembly.
5. Installation of sun visor. Refer to: Sun Visor.
6. Mount the sunroof glass. Refer to: Sunroof glass.
7. Initialise the roof sunroof panel. Refer to: Sunroof initialisation.
8.

Sunroof initialisation

1. Press the sunroof Slide Close button to close the sunroof to the tilted position.
2. Release the switch and press it again for more than 10S.
3. The sunroof glass stalls and stops at the mechanical stop point in closing direction.
4. Release the switch and press it again within 5 seconds.
5. After 3 seconds, the sunroof will begin to perform self-learning actions for opening and closing windows, and finally stop at the tilting position after completion.

The above steps are applicable to forced initialisation when the position is not offset or lagging behind synchronisation.

1. Short press the sunroof Slide Close button to trigger the anti-pinch retraction of the sunroof.
2. During the anti-pinch retraction process of the sunroof, press and hold the Slide Close button for more than 10S.
3. The sunroof glass stalls and stops at the mechanical stop point in closing direction.
4. Release the switch and press it again within 5 seconds.
5. After 3 seconds, the sunroof will begin to perform self-learning actions for opening and closing windows, and finally stop at the tilting position after completion.

The above steps are applicable to forced initialisation in the case of position advance synchronisation.

4.16 Power window

4.16.1 Specification

4.16.1.1 General specifications

Name	Specification
Rated voltage	12V
Input voltage	9V~16V
Operating Current	<60A
Static current	<0.5mA
Operating temperature	-40℃~+85℃
Storage temperature	-40℃~+85℃

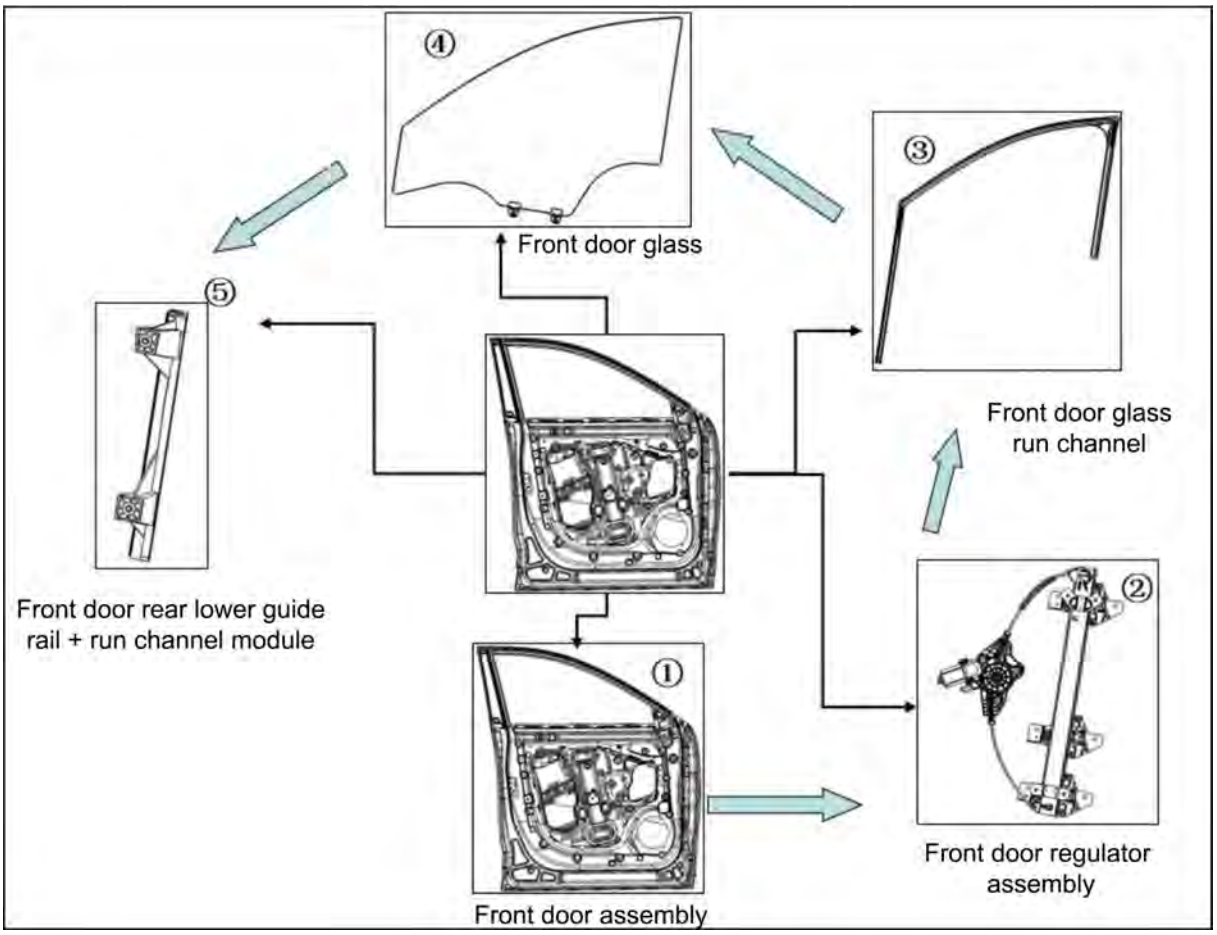
4.16.1.2 Torque specification

Name	Nm
Rear door glass rear lower guide rail fixing bolt	Torque: 9±1 Nm
Fixing bolt of rear door triangle block	Torque: 9±1 Nm

4.16.2 Instructions and operations

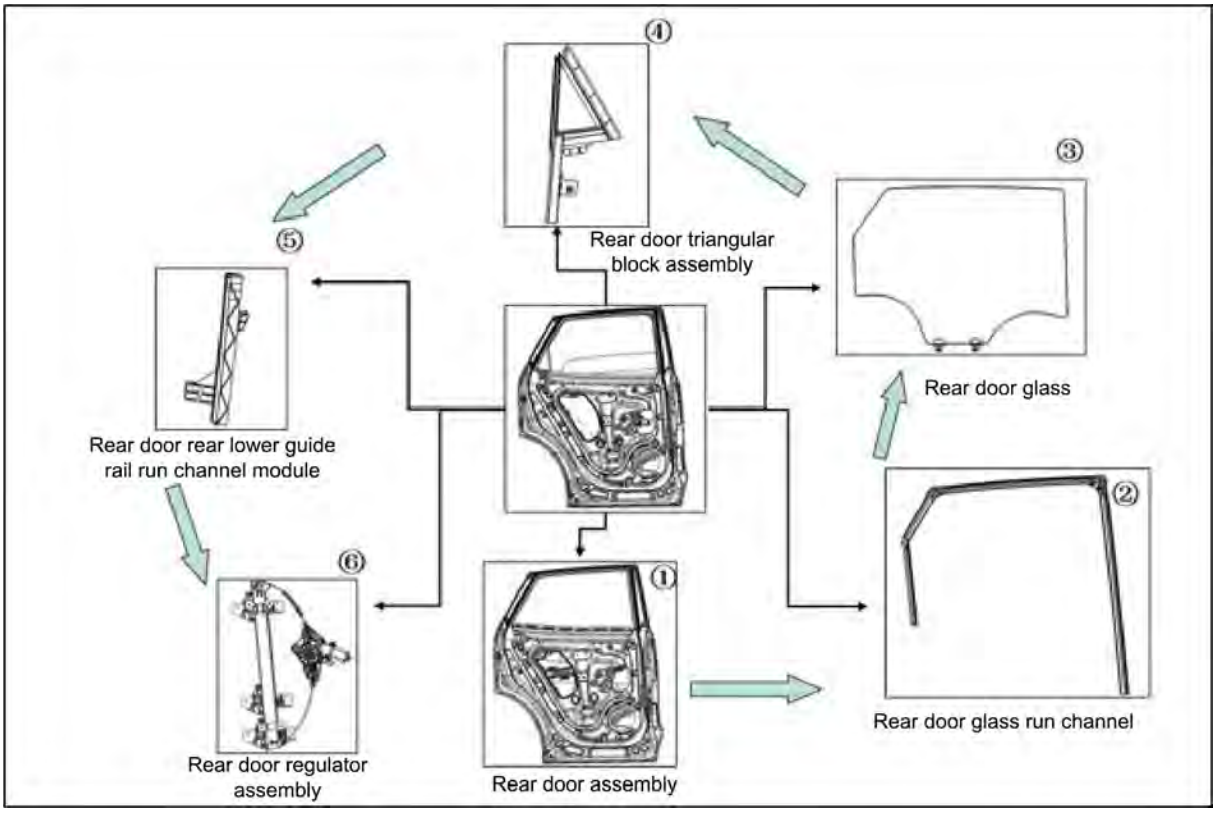
4.16.2.1 Power window

Exploded View of Front Door Window and Regulator



Item	Description	Item	Description
1.	Front door assembly	4.	Front door glass
2.	Front door window regulator	5.	Front door rear lower guide rail assembly + run channel module
3.	Front door glass run channel		

Exploded View of Rear Door Window and Regulator



Item	Description	Item	Description
1.	Rear door assembly	4.	Rear door triangle block
2.	Rear door glass run channel	5.	Rear door rear lower guide rail assembly + run channel module
3.	Rear door glass	6.	Rear door window regulator

4.16.2.2 Precautions

Precautions

1. **Caution:** Be sure to use a 12V battery.
2. **Caution:** Do not disconnect the battery cable when the engine is running.
3. **Caution:** Before connecting or disconnecting the engine ECU harness connector, turn the ignition switch to the OFF position and disconnect the GND cable of the battery. If not, the engine ECU may be damaged because the ECU voltage is still 12 V even when the ignition switch is at the "OFF" position.
4. **Caution:** Before disassembling parts and components, turn the ignition switch to the OFF position, and then disconnect the battery GND cable.
5. **Caution:** Do not disassemble the engine ECU.
6. **Caution:** Only use a digital multimeter to inspect the electronic fuel injection (EFI) system.
7. **Caution: Please use authentic parts and components for maintenance; otherwise, the EFI system may not operate properly.**
8. **Caution:** During maintenance, only unleaded petrol can be used.
9. **Caution: Please follow the specified maintenance and diagnostic procedures for maintenance work.**
10. **Caution: Do not disassemble the parts and components of the EFI system during maintenance.**

11. **Caution:** During maintenance, handle electronic components (ECU, sensors, etc.) with great care and do not let them fall to the ground.

12. **Caution: Develop an awareness of environmental protection and effectively handle any waste generated during maintenance.**

Precautions during repair

1. **Caution:** Do not use any part of human body to test the anti-pinch function, so as to avoid pinching.

4.16.3 Diagnosis and testing

4.16.3.1 Power Window-Basic Detection and Diagnosis Process

Fault diagnosis process of window anti-pinch controller

4.16.3.2 Power Window-Troubleshooting and Maintenance

Window anti-pinch DTC list

DTC display code	DTC name	Fault conditions	Possible cause	Repairrecommendatio-ns
B230000	Battery overvoltage	The voltage is detected to be greater than 16V for 100ms at a cycle of 1ms;	Battery fault	Check the battery voltage.
B230100	Battery undervoltage	The voltage is detected to be less than 9V for 100ms at a cycle of 1ms;	Battery failure	Check the battery voltage.
B230400	Passenger side front right window up button short-circuited	The effective duration of the button is detected to be greater than 30s at a cycle of 10ms;	Button switch fault	Replacement of button switch
B230500	Passenger side rear left window up button short-circuited	The effective duration of the button is detected to be greater than 30s at a cycle of 10ms;	Button switch fault	Replacement of button switch
B230600	Passenger side rear right window up button short-circuited	The effective duration of the button is detected to be greater than 30s at a cycle of 10ms;	Button switch fault	Replacement of button switch
B230700	Passenger side front right window down button short-circuited	The effective duration of the button is detected to be greater than 30s at a cycle of 10ms;	Button switch fault	Replacement of button switch
B230800	Passenger side rear left window down button short-circuited	The effective duration of the button is detected to be greater than 30s at a cycle of 10ms;	Button switch fault	Replacement of button switch

DTC display code	DTC name	Fault conditions	Possible cause	Repairrecommendatio-ns
B230900	Passenger side rear right window down button short-circuited	The effective duration of the button is detected to be greater than 30s at a cycle of 10ms;	Button switch fault	Replacement of button switch
B231000	Front left door motor output undercurrent	When the motor is in action, detect the motor output current at a 1ms cycle. If the motor output current is less than 0.5A and lasts for 60MS;	Window motor harness disconnected/fuse blown	Check the window motor harness/fuse
B231100	Front right door motor output undercurrent	When the motor is in action, detect the motor output current at a 1ms cycle. If the motor output current is less than 0.5A and lasts for 60MS;	Window motor harness disconnected/fuse blown	Check the window motor harness/fuse
B231200	Rear left door motor output undercurrent	When the motor is in action, detect the motor output current at a 1ms cycle. If the motor output current is less than 0.5A and lasts for 60MS;	Window motor harness disconnected/fuse blown	Check the window motor harness/fuse
B231300	Rear right door motor output undercurrent	When the motor is in action, detect the motor output current at a 1ms cycle. If the motor output current is less than 0.5A and lasts for 60MS;	Window motor harness disconnected/fuse blown	Check the window motor harness/fuse
B231400	Front left door motor output overcurrent	When the motor is in operation, detect the motor output current at a 1ms cycle. If the motor output current is greater than 25A and lasts for 20MS;	Window motor harness short-circuited	Check the window motor harness

DTC display code	DTC name	Fault conditions	Possible cause	Repairrecommendations
B231500	Front right door motor output overcurrent	When the motor is in operation, detect the motor output current at a 1ms cycle. If the motor output current is greater than 25A and lasts for 20MS;	Window motor harness short-circuited	Check the window motor harness
B231600	Rear left door motor output overcurrent	When the motor is in operation, detect the motor output current at a 1ms cycle. If the motor output current is greater than 25A and lasts for 20MS;	Window motor harness short-circuited	Check the window motor harness
B231700	Rear right door motor output overcurrent	When the motor is in operation, detect the motor output current at a 1ms cycle. If the motor output current is greater than 25A and lasts for 20MS;	Window motor harness short-circuited	Check the window motor harness
B231800	Left window fuse disconnected	In the ON gear state, the left window power supply voltage is detected to be 0V in a cycle of 1ms and lasts for 100ms;	Left window power supply fuse blown	Replacement of fuse
B231900	Right window fuse disconnected	In the ON gear state, the right window power supply voltage is detected to be 0V in a cycle of 1ms and lasts for 100ms;	Left window power supply fuse blown	Replacement of fuse
B232000	Excessive resistance of front left window	The motor working current is greater than 50% of the stall current and the resistance changes within 100ms during the window rising process.	Detect window system status	Replace seal strip/ regulator

DTC display code	DTC name	Fault conditions	Possible cause	Repairrecommendations
B232100	Excessive resistance of front right window	The motor working current is greater than 50% of the stall current and the resistance changes within 100ms during the window rising process.	Detect window system status	Replace seal strip/ regulator
B232200	Excessive resistance of rear left window	The motor working current is greater than 50% of the stall current and the resistance changes within 100ms during the window rising process.	Detect window system status	Replace seal strip/ regulator
B232300	Excessive resistance of rear right window	The motor working current is greater than 50% of the stall current and the resistance changes within 100ms during the window rising process.	Detect window system status	Replace seal strip/ regulator
B232400	Internal controller fault (reserved fault)	Reserved	No	
B232500	Front left motor position signal error	After the window self-learning is successful, when the top is blocked, the window position deviates by 20MM from the window during the window self-learning;	Motor fault.	Replace the motor
B232600	Front right motor position signal error	After the window self-learning is successful, when the top is blocked, the window position deviates by 20MM from the window during the window self-learning;	Motor fault.	Replace the motor

DTC display code	DTC name	Fault conditions	Possible cause	Repairrecommendations
B232700	Rear left motor position signal error	After the window self-learning is successful, when the top is blocked, the window position deviates by 20MM from the window during the window self-learning;	Motor fault.	Replace the motor
B232800	Rear right motor position signal error	After the window self-learning is successful, when the top is blocked, the window position deviates by 20MM from the window during the window self-learning;	Motor fault.	Replace the motor
UO14000	Lost communication with BCM	In the ON gear state, BCM1 message loss is detected at a cycle of 100ms and lasts for 1S	BCM1 fault	Replace BCM/1 and detect CAN bus
U007300	Controller BUSOFF fault	Detect the BUSOFF fault at a cycle of 10ms. After three consecutive BUSOFF faults are detected	CAN bus fault	Inspect the CAN bus
U220D00	The controller network management enters the LimpHome state for more than 2s	In the ON gear state, the bus signal is detected at a cycle of 5ms, and the controller network management enters the LimpHome state for more than 2s	CAN bus fault	Inspect the CAN bus
UO14001	Loss of communication with PEPS1 controller	In the ON gear state, the PEPS1 message is detected to be lost at a cycle of 100ms for 1S	PEPS1 fault	Replace PEPS1/detect CAN bus
U100200	Loss of communication with TBOX1 controller	In the ON gear state, TBOX1 message loss is detected at a cycle of 500ms for 5S	TBOX1 fault	Replace TBOX1 and detect CAN bus

DTC display code	DTC name	Fault conditions	Possible cause	Repairrecommendations
UO30100	DDSMLIN bus network fault status	In the ON gear state, detect DDSMLIN messages at a cycle of 100ms. When DDSM_ Status_LIN is 1 in the DDSMLIN message	DDSM fault	Replace DDSM/detect LIN bus
UO30200	Central door lock unlocking/locking switch fault status	In the ON gear state, detect DDSMLIN message at a cycle of 100ms. DDSM_ Status_CCSwt_ LockUnlock position in the DDSMLIN message is 3	DDSM fault	Replace DDSM/detect LIN bus
UO30300	Front left window control switch fault status	In the ON gear state, detect the DDSMLIN message at a cycle of 100ms. The DDSM_ Status_ FLWindowCtrlSwt position in the DDSMLIN message is 5	DDSM fault	Replace DDSM/detect LIN bus
UO30400	Front right window control switch fault status	In the ON gear state, detect the DDSMLIN message at a cycle of 100ms. The DDSM_ Status_ FRWindowCtrlSwt position in the DDSMLIN message is 5	DDSM fault	Replace DDSM/detect LIN bus
UO30500	Rear left window control switch fault status	In the ON gear state, detect DDSMLIN message at a cycle of 100ms. DDSM_ Status_ RLWindowCtrlSwt position in the DDSMLIN message is 5	DDSM fault	Replace DDSM/detect LIN bus

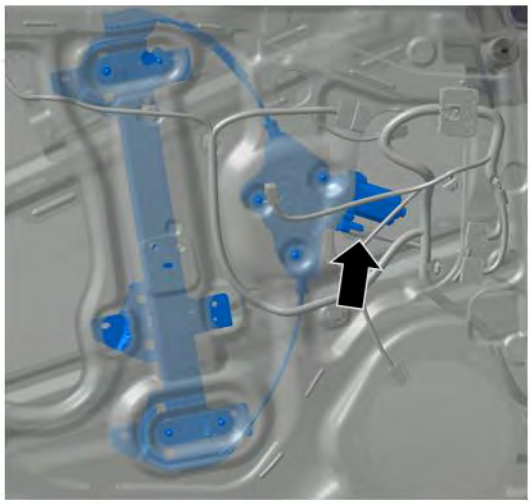
DTC display code	DTC name	Fault conditions	Possible cause	Repairrecommendatio-ns
UO30600	Rear right window control switch fault status	In the ON gear state, detect the DDSMLIN message at a cycle of 100ms. The DDSM_ Status_ RRWindowCtrlSwt position in the DDSMLIN message is 5	DDSM fault	Replace DDSM/detect LIN bus
UO30700	SHM system fault status	In the ON gear state, the SHM message is detected at a cycle of 100ms. When the SHM_REP_Error in the SHM message is 1	SHM fault	Replace SHM/detect LIN bus
UO30800	SHMLIN bus network fault status	In the ON gear state, the SHM message is detected at a cycle of 100ms. When the SHM_Status_LIN in the SHM message is 1	SHM fault	Replace SHM/detect LIN bus
UO17500	Loss of communication with DDSM controller	In the ON gear state, DDSM message loss is detected at a cycle of 100ms and lasts for 1S	DDSM fault	Replace DDSM/detect LIN bus
UO24500	Loss of communication with SHM controller	In the ON gear state, the SHM message is detected to be lost at a cycle of 100ms for 1S	SHM fault	Replace SHM/detect LIN bus

4.16.4 Removal and installation

4.16.4.1 Front door window regulator assembly

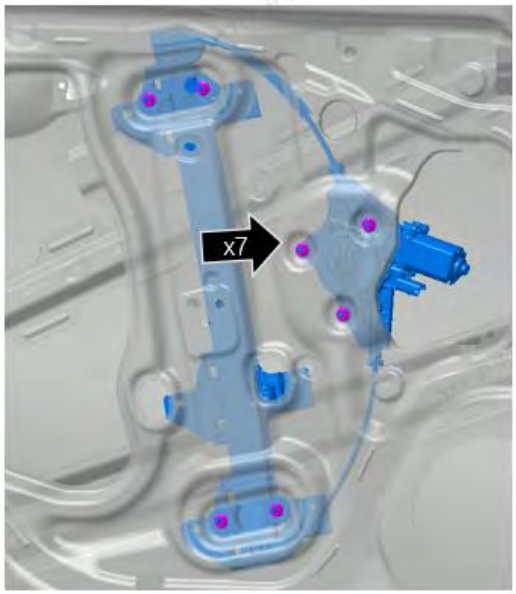
Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the front door interior trim panel. Refer to: Front door shield.
3. Remove the front door waterproof film.
4. Remove the front door glass assembly. Refer to: Front door glass.
5. Disconnect the harness connector of front door window regulator.



6. Remove the fixing bolts and nuts of the front door window regulator assembly, and then take out the front door window regulator assembly.

   Nut torque: 9±1Nm



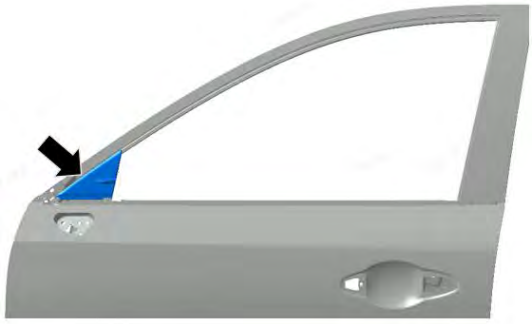
Installation

The installation order is the reverse of the removal order.

4.16.4.2 Front door triangle block

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the front door interior trim panel. Refer to: Front door shield.
3. Remove the front door windowsill outer seal strip.
4. Remove the front door triangle block.



Installation

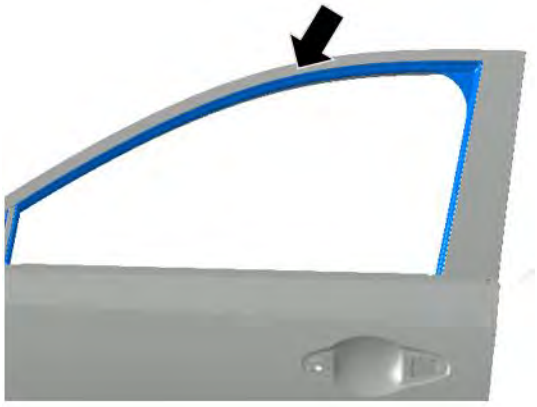
The installation order is the reverse of the removal order.

4.16.4.3 Front door glass run channel

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the front door interior trim panel. Refer to: Front door shield.

3. Remove the front door glass assembly. Refer to: Front door glass.
4. Remove the front door triangle block. Refer to: Front door triangle block.
5. Remove the glass run and take it down.



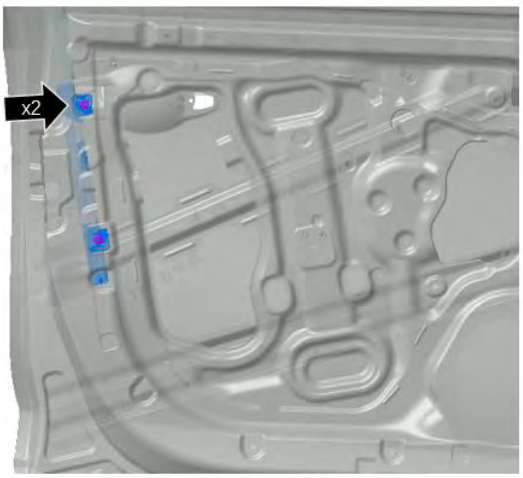
Installation

The installation order is the reverse of the removal order.

4.16.4.4 Rear lower guide rail of front door glass

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the front door interior trim panel. Refer to: Front door shield.
3. Remove the front door waterproof film.
4. Remove the fixing bolts at the lower end of the glass rear guide rail, and remove the lower section component of the glass rear guide rail.



Installation

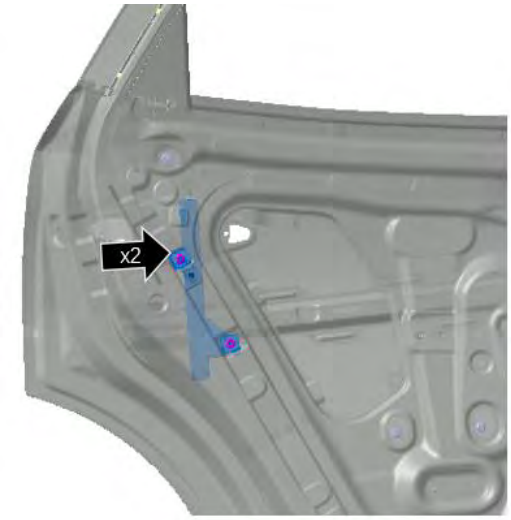
1. The installation order is the reverse of the removal order.

4.16.4.5 Rear lower guide rail of rear door glass

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the rear door interior trim panel. Refer to: Rear door shield.
3. Remove the rear door waterproof film.
4. Remove the fixing bolts at the lower end of the glass rear guide rail, and remove the rear door glass rear lower guide rail.

   Torque: 9±1 Nm



Installation

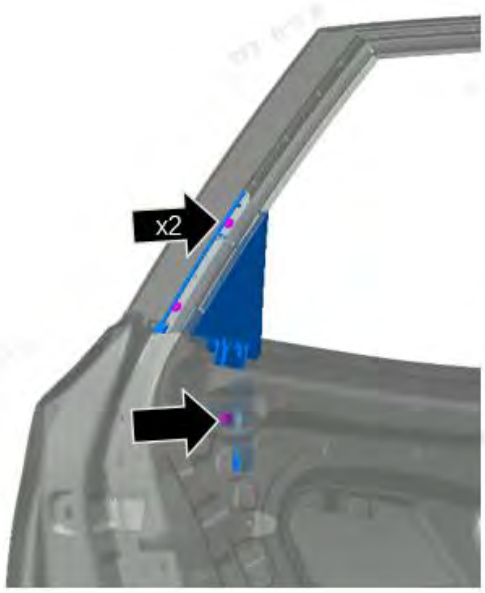
The installation order is the reverse of the removal order.

4.16.4.6 Rear door triangle block

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the rear door interior trim panel. Refer to: Rear door shield.
3. Remove the rear door waterproof film.
4. Remove the rear door glass run channel.Refer to: Rear door glass run channel.
5. Remove the rear door triangle block fixing bolts and screws, and remove the rear door triangle block.

   Torque: 9±1 Nm



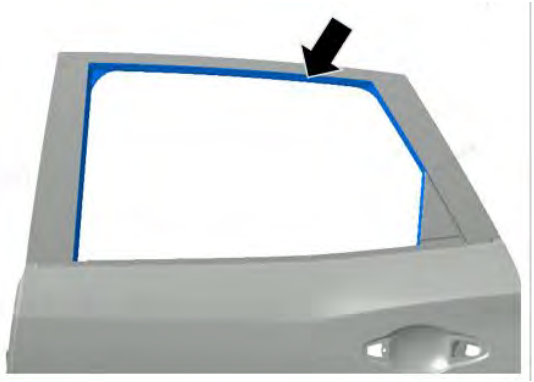
Installation

The installation order is the reverse of the removal order.

4.16.4.7 Rear door glass run channel

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the rear door interior trim panel. Refer to: Rear door shield.
3. Remove the rear door waterproof film.
4. Remove the rear door glass. Refer to: Rear door glass assembly.
5. Remove the glass run and take it down.



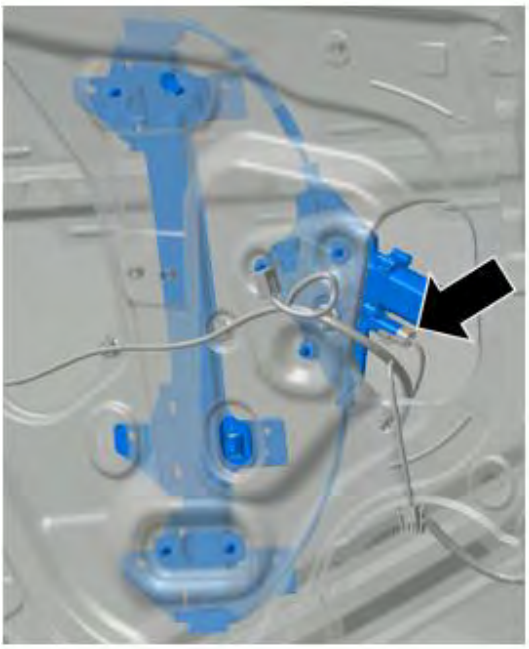
Installation

1. The installation order is the reverse of the removal order.

4.16.4.8 Rear Door Window Glass Regulator Assembly

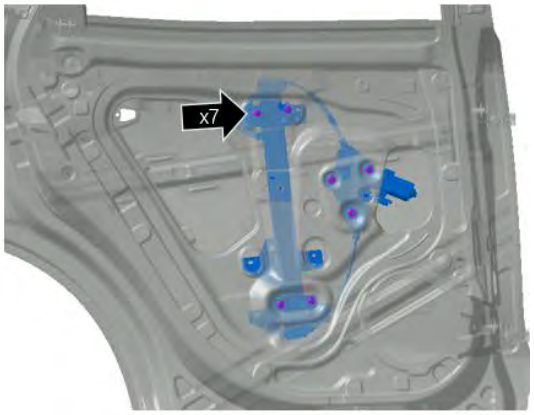
Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the rear door interior trim panel. Refer to: Rear door shield.
3. Remove the rear door waterproof film.
4. Remove the rear door glass. Refer to: Rear door glass assembly.
5. Disconnect the rear door regulator harness connector.



6. Remove the window regulator fixing bolts and nuts, and remove the rear door window regulator.

   Bolt torque: 9±1Nm



Installation

1. The installation order is the reverse of the removal order.

4.17 BCM system

4.17.1 Specification

4.17.1.1 General specifications

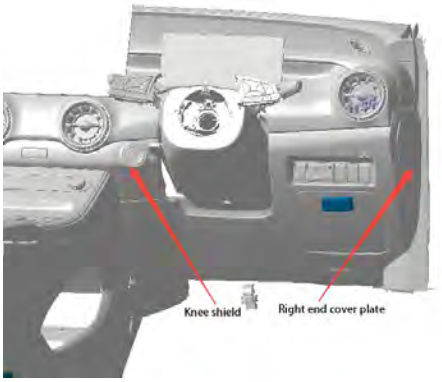
Name	Specification
Rated voltage	DC12V
Input voltage	DC9.0V ~ DC16V
Operating Current	≤300mA
Static current	≤4mA
Operating temperature	-40℃~+85℃
Storage temperature	-40℃~+95℃
High-frequency communication rate	433.92M Hz

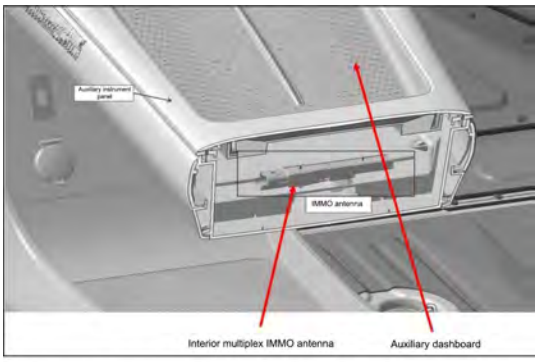
4.17.2 Instructions and operations

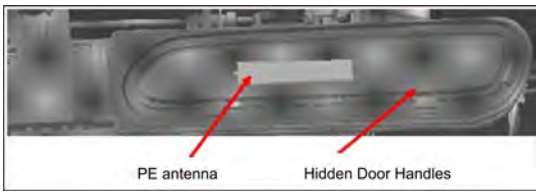
4.17.2.1 BCM system

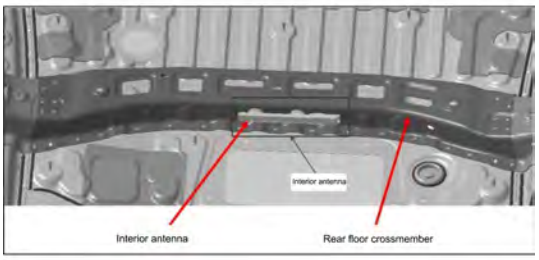
Part location diagram

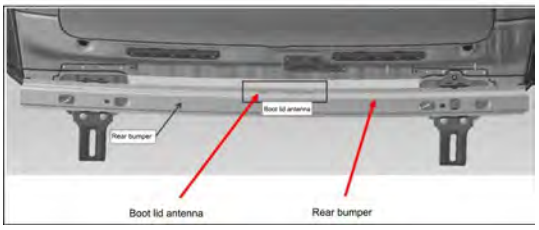
The BCM is located on the tubular beam at the driver's side and close to the power distribution box in the cab. The specific location is as follows.











4.17.2.2 Precautions

Precautions during repair

When the BCM body controller is replaced and repaired, it is necessary to use a diagnostic scanner to diagnose and write configuration for the newly installed BCM.

1. **Caution:** BCM configuration information can be obtained by querying VIN code in the configuration information inquiry path of dealer management system (DMS).
2. **Caution:** Turn the vehicle power supply to ON position, wait for more than 10s, and successfully write the obtained configuration data into BCM through diagnostic scanner.
3. **Caution:** immobiliser matching and other operations can only be performed on BCM after the configuration is written.

Precautions for TPMS maintenance process

1. **Caution:** When reading the sensor ID and data, please keep the tool as close to the tyre valve as possible because of wireless communication transmission between the tool and the tyre pressure sensor. If it doesn't trigger successfully once, try again. If the triggering fails for several times, please check whether any sensor is not installed on the tyre or replace the sensor.
2. **Caution:** If only the valve is replaced and the original vehicle sensor is still used, there is no need to re-match.
3. **Caution:** As long as the tyre pressure sensor is not replaced and the original tyre pressure sensor is not damaged due to installation or removal of tyre, there is no need to re-match the tyre pressure sensor.
4. **Caution:** When the vehicle is stationary, the tyre pressure sensor does not send data to the outside, but only sends data when the vehicle is running. Therefore, after deflation or inflation of tyres, if you want to update the tyre pressure data, drive the vehicle at a speed above 30 km/h and keep it for 1 minute before the tyre pressure and temperature data will be updated on the instrument panel.
5. **Caution:** After the vehicle tyre position is changed, the tyre pressure sensor position changes and needs to be re-matched. The tyre pressure system includes wireless communication transmission characteristics. Therefore, the tyre pressure system is easily interfered by electromagnetic radiation, and electronic products installed privately after sales (such as CDs, DVDs, dashcams, etc.) are prone to electromagnetic radiation. Therefore, when there is a problem with the tyre pressure system, it is necessary to check whether it is due to the installed electronics.

4.17.3 Diagnosis and testing

4.17.3.1 BCM System-DTC List

DTC	DTC description	Code reporting conditions
B100116	BCM Voltage Low	Battery voltage < 9v for 400ms
B100117	BCM Voltage High	Battery voltage > 16v for 400ms
B100112	Interior light low-side output short-circuited to the power supply	After starting (120ms), the load is detected to exceed the threshold value (i.e. 1.5 times the maximum current) for more than 500ms
B104111	Left turn signal short-circuited to GND	After starting (170ms), the load is detected to exceed the threshold value (10A) for more than 130ms150ms
B104113	Left turn signal open-circuited	After starting (170ms), the load is detected to be too small and exceeds 150ms
B104211	Right turn signal short-circuited to GND	After starting (170ms), the load is detected to exceed the threshold value (10A) for more than 130ms150ms
B104213	Right turn signal open-circuited	After starting (170ms), the load is detected to be too small and exceeds 150ms
B107011	Daytime running light short-circuited to GND	After starting (120ms), the load is detected to exceed the threshold value (i.e. 1.5 times the maximum current) (6.3A) for more than 500ms: AD: 285
B105311	Rear fog light short-circuited to GND	After starting (120ms), the load is detected to exceed the threshold value (i.e. 1.5 times the maximum current) (6.3A) for more than 500ms; AD: 285
B105112	Front fog light relay control terminal short-circuited to power supply	The chip self-diagnoses a short circuit for more than 500ms
B103112	Low beam relay control terminal short-circuited to power supply	The chip self-diagnoses a short circuit for more than 500ms
B103212	High beam relay control terminal short-circuited to power supply	The chip self-diagnoses a short circuit for more than 500ms
B101411	Power-saving light short-circuited to GND	After starting (120ms), the load is detected to exceed the threshold value (i.e. 1.5 times the maximum current) (6.3A) and exceeds 500msAD:285

DTC	DTC description	Code reporting conditions
B101111	Position light and licence plate light short-circuited to GND	After starting (120ms), the load is detected to exceed the threshold value (i.e. 1.5 times the maximum current) (10.5A) for more than 500ms AD: 470 (280)
B101712	Rear defroster relay control terminal short-circuited to power supply	The chip self-diagnoses a short circuit for more than 500ms
B101012	Horn relay control terminal short-circuited to power supply	The chip self-diagnoses a short circuit for more than 500ms
B101512	Window hardwire enable signal short-circuited to power supply	The chip self-diagnoses a short circuit for more than 500ms
U007300	Body CAN Bus Off	The BCAN bus error count has accumulated to 255, and 5 fast recoveries and 3 slow recoveries have failed
U110188	Power CAN Bus Off	The PCAN bus error count has accumulated to 255, and 5 fast recoveries and 3 slow recoveries have failed
U012100	Lost Communication with ABS	No ABS1 (0x200) message received in 10 message cycles
U010000	Lost Communication with EMS	Engine1 (0x212 or 0x13a) message is not received in 10 message cycles
U015500	Lost Communication with IC	No IC1 (0x149) message received in 10 message cycles
B106111	Brake light short-circuited to GND	After starting (120ms), the load is detected to exceed the threshold value (i.e. 1.5 times the maximum current) (6.3A) for more than 500ms AD: 285
B106211	High-mounted brake light short-circuited to GND	After starting (120ms), the load is detected to exceed the threshold value (i.e. 1.5 times the maximum current) (6.3A) for more than 500ms AD: 836
B150129	Key Authentication Failure	The key authentication is failed
B150251	Invalid key information	All key information is "0x00" or "0xFF"
B150351	Invalid PIN	All PIN codes are "0x00" or "0xFF"
B150451	SK invalid	SK code is all "0x00" or "0xFF"
B150555	IMMO unlock	1 of VIN, PIN and SK is invalid
B150687	ECM initiating authentication timeout	No challenge message sent by ECU is received within 2s
B150662	Immobiliser authentication failed	BCM and ECM authentication failed

DTC	DTC description	Code reporting conditions
U1F0211	LIN2 channel short-circuited to GND	The chip self-diagnoses a short circuit for more than 1000ms
U1F0201	LIN2 slave node fault	LIN2 receives RLS message: RLS_ Fault_Rain=1 or RLS_Fault_Light=1 or RLS_REP_Error=1
U1F1287	Rain/light sensor LIN message timeout	Message not received in 1000 ms (ID: 0x23)
U1F0411	LIN3 channel short-circuited to GND	The chip self-diagnoses a short circuit for more than 1000ms
B1305 55	Standard pressure value not configured	The read wrong standard pressure configuration data is 0xFF
B1307 54	Transmitter not learnt	Read sensor ID as 0xFFFFFFFF
B1301 16	Front left wheel transmitter battery low	Battery low fault sign received from FL sensor
B1302 16	Front right wheel transmitter battery low	Battery low fault sign received from FR sensor
B1303 16	Rear left wheel transmitter battery low	Battery low fault sign received from RL sensor
B1304 16	Rear right wheel transmitter battery low	Battery low fault sign received from RR sensor
B1301 31	Front left wheel transmitter lost	No FL sensor information received within 10 minutes
B1302 31	Transmitter for the front right wheel is lost	No FR sensor information received within 10 minutes
B1303 31	Transmitter for the rear left wheel is lost	No RL sensor information received within 10 minutes
B1304 31	Transmitter for the rear right wheel is lost	No RR sensor information received within 10 minutes
B130132	Front left wheel sensor fault alarm	Received sensor failure fault flag from FL sensor
B130232	Front right wheel sensor fault alarm	Received sensor failure fault flag from FR sensor
B130332	Rear left wheel sensor fault alarm	Received sensor failure fault flag from RL sensor
B130432	Rear right wheel sensor fault alarm	The sensor failure fault flag sent by the RR sensor is received
U220D00	BCM enters the network Limphome state	BCM enters the network Limphome state
U1EE100	ESCL locking failed	BCM receives a frame of ESCL_ LockSwitchFailure = 0x01
U1EE101	ESCL unlocking failed	BCM receives a frame of ESCL_ UnlockSwitchFailure = 0x01

DTC	DTC description	Code reporting conditions
U1EE103	Abnormal ESCL lock enabling power supply	BCM receives a frame of ESCL_ LockEnableBatteryFailure = 0x01
U1EE106	ESCL motor power supply abnormal	BCM receives a frame of ESCL_ MotorEnableBatteryFailure = 0x01
U1EE107	ESCL failed to read and write ROM/ RAM	BCM receives a frame of ESCL_ RamRomFailure = 0x01
U1EE108	ESCL unlocking feedback state inconsistency	After ESCL unlocking is completed, the feedback state of LIN bus and hardwire is inconsistent
U1EE109	ESCL state query failed	BCM inquired about ESCL status for 3 times without receiving a reply
B12E071	Start switch fault	Certain SSB switch is valid for more than 20s or the other SSB switch is not triggered during 4 consecutive pressing periods of certain SSB switch.
B12E313	The load end of the ACC output relay is open-circuited or short-circuited to GND	The ACC relay control terminal is normal for more than 510ms and the ACC feedback terminal is still detected as invalid
B12E311	ACC output relay load terminal short-circuited to power supply	The ACC relay control terminal has no output for more than 510ms and the ACC feedback terminal is still detected as valid
B140913	ACC relay control terminal open-circuited	The detected load is too small for more than 500ms
B140911	ACC relay control terminal short-circuited to GND	After starting (120ms), the load is detected to exceed the threshold value (i.e. 1.5 times the maximum current) (2A) for more than 500ms
B12E413	The load end of the IGN1 output relay is open-circuited or short-circuited to GND	IGN1 relay control terminal is normal for more than 510ms and ACC feedback terminal is still detected as invalid
B12E411	IGN1 output relay load terminal short-circuited to power supply	The IGN1 relay control terminal has no output for more than 510 ms and the ACC feedback terminal is still detected as valid
B141913	IGN1 relay control terminal open-circuited	The detected load is too small for more than 500ms
B141911	IGN1 relay control terminal short-circuited to GND	After starting (120ms), the load is detected to exceed the threshold value (i.e. 1.5 times the maximum current) (2A) for more than 500ms

DTC	DTC description	Code reporting conditions
B12E513	The load end of the IGN2 output relay is open-circuited or short-circuited to GND	IGN2 relay control terminal is normal for more than 510ms and ACC feedback terminal is still detected as invalid
B12E511	IGN2 output relay load terminal short-circuited to power supply	The IGN2 relay control terminal has no output for more than 510 ms and the ACC feedback terminal is still detected as valid
B142913	IGN2 relay control terminal open-circuited	The detected load is too small for more than 500ms
B142911	IGN2 relay control terminal short-circuited to GND	After starting (120ms), the load is detected to exceed the threshold value (i.e. 1.5 times the maximum current) (2A) for more than 500ms
B120113	Front left door low-frequency antenna fault	Chip self-diagnosis
B120313	Interior low-frequency antenna 1 fault	Chip self-diagnosis
B120413	Interior low-frequency antenna 2 fault	Chip self-diagnosis
B120613	Boot lid low-frequency antenna fault	Chip self-diagnosis
B122113	Interior low-frequency antenna 3 short-circuited	Chip self-diagnosis
B122313	Front right door low-frequency antenna fault	Chip self-diagnosis
B141E11	Start switch backlight short-circuited to GND	After starting (120ms), the load is detected to exceed the threshold value (i.e. 1.5 times the maximum current) (4.2A) for more than 500ms
B140B12	Yellow indicator short-circuited to power supply	Chip self-short-circuited for more than 500 ms
B140D12	Green indicator short-circuited to power supply	Chip self-short-circuited for more than 500 ms
B141611	Left door handle switch short-circuited to GND	The button is pressed for more than 20s
B141B11	Boot switch short-circuited to GND	The button is pressed for more than 20s
U010100	TCU communication lost	No corresponding message received in 10 consecutive cycles: automatic transmission models did not receive (0x10, 0x418, 0x216) FWD improvement platform EVs, VCM3 (0x13D) messages not received;
B104113	Left turn signal open-circuited (LED)	Left turn signal LED feedback signal reports open-circuited feedback is valid

DTC	DTC description	Code reporting conditions
B104213	Right turn signal open-circuited (LED)	Right turn signal LED feedback signal reports open-circuited feedback is valid
B104513	Brake sensor power supply line short-circuited	After starting (120ms), the load is detected to exceed the threshold value (i.e. 1.5 times the maximum current) (4.2A) for more than 500ms
B102001	Power-on reset has occurred in the past 40 ignition cycles	BCM power-on process
B102002	Hardware reset (RESET)	Hardware reset of BCM
B102003	Software reset	BCM has a software reset (watchdog)

4.17.3.2 Fault Diagnosis

No response from the main unit

Steps	Measures	Yes	No
1	Measure if each input voltage of BCM is 12 V	Replace the main unit	Go to Step 2
2	Check whether the unit has power supply	Go to Step 3	
3	Check whether the fuse is damaged	Replacement of fuse	Go to Step 4
4	Check whether the battery is charged	Go to Step 5	Charge the battery
5	The harness and connector are of poor contact, and please check and repair		

4.17.3.3 Fault Diagnosis

No output at any gears of front/rear wiper, while other functions of the main parts are normal

Steps	Measures	Yes	No
1	Read the DTC with diagnostic scanner	If the homing signal has not been received for several times, wiper lock-rotor protection is provided. Check the wiper motor and harness	No DTC Go to Step 2
2	Check if the wiper acts via the action test of diagnostic scanner	Go to Step 3	Check the wiper motor, wiper power supply and output

Steps	Measures	Yes	No
3	Check the input signal by using the data flow reading function of diagnostic scanner	Go to Step 4	If there is no change in the data flow, inspect the BCM's wiper power supply, multi-function switch, and harness
4	Replace the BCM		

4.17.3.4 Fault Diagnosis

Other functions of the main parts are normal with fault in locking while pressing down the switch of centre control lock

Steps	Measures	Yes	No
1	Whether all the four doors are fully closed	Go to Step 2	Close the four doors fully
2	Whether the centre control lock switch is damaged	Replacement of centre control lock switch	Go to Step 3
3	Whether the door light switch is damaged	Replace the door light switch	Go to Step 4
4	Whether the harness is short-circuited	Repair or replace the harness (including the connector)	Go to Step 5
5	Read the DTC information of BCM with a diagnostic scanner and handle the fault based on the information.		

4.17.3.5 Fault Diagnosis

Only one high beam or low beam does not work

Steps	Measures	Yes	No
1	Check whether the bulb is intact.	Go to Step 2	Replace the bulb
2	Check whether the fuse is intact	Go to Step 3	Replacement of fuse
3	Check whether relevant harnesses and connectors work normally according to the schematic diagram.		

4.17.3.6 Fault Diagnosis

Reversing light does not work

Steps	Measures	Yes	No
1	Check whether the fuse is intact.	Go to Step 3	Go to Step 2
2	Replace the damaged fuse. Is the reversing light intact?		Go to Step 3

Steps	Measures	Yes	No
3	Check the connector between instrument panel and rear body harness. Is the measured voltage normal?	Go to Step 4	Go to Step 6
4	Please check the reversing lights and their connectors to the harness to ensure that there is no problem.	Go to Step 5	Go to Step 10
5	Check the rear body harness from the connector to the reversing light.		
6	Separate the connector of the reversing light switch and measure whether the voltage of the pin is normal.	Go to Step 8	Go to Step 7
7	Please check the instrument panel harness from the fuse to the reversing light switch.		
8	Check the instrument panel harness from the connector of the reversing light switch to the connector to ensure that there is no problem.	Go to Step 9	
9	Check the reversing light and its connector to the harness.	Go to Step 10	
10	Check the GND points of the rear body harness to ensure that it is well grounded.		

4.17.3.7 Fault Diagnosis

Front or rear washer does not work

Steps	Measures	Yes	No
1	Read the DTC information with diagnostic scanner and shoot the trouble based on the information.	Shoot the trouble based on the DTC	No DTC Go to Step 2
2	Check if the scrubber acts via the action test of diagnostic scanner	Go to Step 3	Check the scrubber motor, power supply and output

Steps	Measures	Yes	No
3	Check the input signal by using the data flow reading function of diagnostic scanner	Go to Step 4	If there is no change in the data flow, inspect the BCM's wiper power supply, multi-function switch, and harness
4	Replace the BCM		

4.17.3.8 Fault Diagnosis

Front or rear wiper does not work in some gears

Steps	Measures	Yes	No
1	Read the DTC information with diagnostic scanner and shoot the trouble based on the information.	Shoot the trouble based on the DTC	No DTC Go to Step 2
2	Check if there is any corresponding change in the data flow by using the data flow reading function of diagnostic scanner and turning the multi-function switch to the fault position	Go to Step 3	Check the multi-function switch and harness
3	Check the wiper output harness and fuse of BCM.		

4.17.3.9 Fault Diagnosis

The front fog light does not work (the front fog light can be turned on only when the position light is turned on)

Steps	Measures	Yes	No
1	Turn the light switch to position and turn the fog light switch knob to position. Check whether the front fog light indicator on the instrument is on.	Go to Step 2	Go to Step 4
2	Check whether the front fog light fuse is intact	Go to Step 3	Replacement of fuse
3	Check whether the front fog light relay is intact.	Go to Step 4	Replace the relay
4	Perform fault diagnosis according to Section 7.3 of BCM.		

4.17.3.10 Fault Diagnosis

Only the high beam does not work

Steps	Measures	Yes	No
1	Turn the light switch to position to turn the high/low beam switch to the high beam position. Check whether the high beam indicator on the instrument is on.	Go to Step 2	Go to Step 4
2	Check whether the high beam fuse is intact	Go to Step 3	Replacement of fuse
3	Check whether the high beam relay is intact.	Go to Step 4	Replace the relay
4	Perform fault diagnosis according to Section 7.3 of BCM.		

4.17.3.11 Fault Diagnosis

The rear fog light cannot be turned on (the rear fog light can be turned on only when the low beam is turned on)

Steps	Measures	Yes	No
1	Turn the light switch to position and turn the fog light switch knob to position. Check whether the rear fog light indicator on the instrument is on.	Go to Step 2	Go to Step 4
2	Check whether the rear fog light fuse is intact	Go to Step 3	Replacement of fuse
3	Check whether the rear fog light relay is intact.	Go to Step 4	Replace the relay
4	Perform fault diagnosis according to Section 7.3 of BCM.		

4.17.3.12 Fault Diagnosis

Start button fault

Steps	Measures	Yes	No
1	Pull and insert the Start/Stop button again to observe whether it is normal.		Go to Step 2
2	Read and clear the DTC to confirm whether it can be cleared.		Go to Step 3

Steps	Measures	Yes	No
3	Check whether the harness related to start/stop button, fuse and power supply of start/stop button are normal	Go to Step 4	Replace the harness and fuse
4	Replace the start/stop button.		

4.17.3.13 Fault Diagnosis

All the brake lights and high-mount brake lights do not work

Steps	Measures	Yes	No
1	Turn the ignition switch to the ON position and check whether the fuse is in good condition or not.	Go to Step 3	Go to Step 2
2	Replace the fuse. Is it still damaged after replacement?	Go to Step 5	Go to Step 3
3	Measure the voltage at the fuse to see if the voltage is normal.	Go to Step 5	Go to Step 4
4	Please check the instrument panel harness.		
5	Separate the brake switch connector and check the brake switch to ensure that there is no problem with the brake switch , measure whether the voltage is normal.	Go to Step 7	Go to Step 6
6	Check the instrument panel harness from the brake switch to the fuse.		
7	Check the connector between the instrument panel and the rear body harness to make sure there is no problem.	Go to Step 8	
8	Please check the rear body harness from connector to brake light.	Go to Step 9	

Steps	Measures	Yes	No
9	Please check the brake light and its connector to the harness.	Go to Step 10	
10	Please check the GND points of the rear body harness to make sure it is well grounded.		

4.17.3.14 Fault Diagnosis

Locking failure when operating the remote key

Steps	Measures	Yes	No
1	Whether all the four doors are closed	Go to Step 2	Close the four doors fully
2	Whether the door light is damaged	Replace the door light switch	Go to Step 3
3	Whether the line is short-circuited	Repair or replace the harness	Go to Step 4
4	Read the DTC information of BCM with a diagnostic scanner and handle the fault based on the information.		

4.17.3.15 Fault Diagnosis

When the headlight height adjustment switch is rotated, the height of one low beam does not change (low beams work normally)

Steps	Measures	Yes	No
1	Turn the light switch to position, unplug the harness connector of the faulty side headlight height adjustment motor, and use a voltmeter to measure whether the voltage between pins 1 and 3 is 12V.	Go to Step 2	Go to Step 4
2	Rotate the headlight height adjustment switch, and use a voltmeter to measure whether there is any change in voltage between pins 1 and 2 of harness connector of headlight height adjustment motor.	Go to Step 5	Go to Step 3

Steps	Measures	Yes	No
4	Check the harness between the headlight height adjustment switch and the headlight height adjustment motor according to the harness diagram to ensure that there is no problem with the harness	Go to Step 2	
5	Replace the headlight height adjustment motor.	Go to Step 6	
6	Turn the height adjustment switch to mode 0 and recalibrate the low beam height		

4.17.3.16 Fault Diagnosis

The height of all low beams does not change when the headlight height adjustment switch is rotated (low beams work normally)

Steps	Measures	Yes	No
1	Turn the light switch to position, unplug the harness connector of left and right headlight height adjustment motors, and use a voltmeter to measure whether the voltage between pins 1 and 3 is 12V.	Go to Step 2	Go to Step 4
2	Rotate the headlight height adjustment switch, and use a voltmeter to measure whether there is any change in voltage between pins 1 and 2 of harness connector of headlight height adjustment motor.	Go to Step 5	Go to Step 3
3	Remove the headlight height adjustment switch and use a voltmeter to measure whether the voltage between pins 1 and 4 of the harness connector is 12V	Go to Step 7	Go to Step 4

Steps	Measures	Yes	No
4	Check the harness between the headlight height adjustment switch and the headlight height adjustment motor according to the harness diagram to ensure that there is no problem with the harness	Go to Step 2	
5	Connect the height adjustment motor harness on one side and rotate the headlight height adjustment switch to see if there is any change in the height of the low beam	Go to Step 6	Go to Step 7
6	Connect the height adjustment motor harness on the other side and rotate the headlight height adjustment switch to see if there is any change in the height of the low beam		Go to Step 7
7	Replace the headlight height adjustment switch and check if the fault is eliminated.		Go to Step 2
8	Replace the headlight height adjustment motor on this side	Go to Step 9	
9	Turn the height adjustment switch to mode 0 and recalibrate the low beam height		

4.17.3.17 Fault Diagnosis

Failure to start fault

Steps	Measures	Yes	No
1	Check whether the battery power supply is above 12V	Go to Step 2	Replace or charge the vehicle battery.
2	Check whether the power supply can be switched	Go to Step 3	Go to Step 4

Steps	Measures	Yes	No
3	Check whether the immobiliser test is passed (turn to ON position and observe whether the immobiliser indicator lights up).	Go to Step 5	Go to Step 6
4	Press the start button and observe as follows: Is there a prompt on the instrument that the key cannot be found? If so, try to put the key flat in the cup holder and press the start switch again. If possible, please replace the key battery. If not, please re-match the key. If there is no prompt on the instrument, check the start button fuse and circuit, including re-plugging the start button, checking the line continuity, and checking the antenna fault in the car. If none of the above can be solved, replace the BCM unit.		
5	In the OFF gear, shift to P/N gear, and step on the brake. Does the indicator turn green?	Go to Step 7	Go to Step 8

Steps	Measures	Yes	No
6	If the immobiliser light flashes: Check whether the CAN bus and gateway are normal (read DTCs of BCM, independent gateway and EMS respectively) If there is no problem with bus communication, the immobiliser needs to be re-matched If the above steps do not work, replace the engine EMS or ECM unit		
7	In the OFF gear, shift to P/N gear, step on the brake, press the start button, and the starter is dragged, but it fails to start successfully. The battery needs to be replaced or charged.	Go to Step 9	Go to Step 10
8	Check the brake signal Check the start button itself, related circuits and fuses		
9	Replacement of battery		
10	Check the brake signal Check the start button itself, related circuits and fuses		

4.17.3.18 Fault Diagnosis

Unable to remotely control

Steps	Measures	Yes	No
1	Check if the indicator is on when pressing the remote key	Go to Step 2	Replace the battery
2	Whether the remote key battery is above 2.8V	Go to Step 3	Replace the battery
3	Whether the ignition switch is at ON	Go to Step 4	Replace the remote key
4	Pull the remote control key out		

Steps	Measures	Yes	No
5	After re-learning, check whether the remote control function is restored	Go to Step 6	Replace the remote key
6	The remote control function is restored and continues to be used		

Note:

– Refer to Remote Key – Lock Body Pairing & Learning Methods for specific supporting learning methods.

4.17.3.19 Fault Diagnosis

Roof light does not work

Steps	Measures	Yes	No
1	Check whether the filament of roof light bulb is blown. Is a blowout found?	Go to Step 4	Go to Step 2
2	Check whether the fuse is blown.	Go to Step 5	Go to Step 3
3	Use test lights to connect the two terminals of the contact switch (front left, front right, rear left, rear right) and the terminal of the Illuminating light switch respectively. Check whether the test light is on?	Go to Step 6	Go to Step 7
4	Replace the bulb		
5	Replacement of fuse		
6	Replace the touch switch or light switch		
7	Repair the circuit with poor contact.		

4.17.3.20 Fault Diagnosis

The low beam does not work, and the high beam works normally

Steps	Measures	Yes	No
1	Turn the light switch to position and check whether the low beam fuse is intact.	Go to Step 3	Go to Step 2
2	Please replace the damaged fuse. Is the fault eliminated after replacement?	Successful	Go to Step 3

Steps	Measures	Yes	No
3	Check whether the high beam relay is intact.	Go to Step 5	Go to Step 4
4	Please replace the damaged relay. Is the fault eliminated after replacement?	Successful	Go to Step 5
5	Perform fault diagnosis according to Section 7.3 of BCM.		

4.17.3.21 Fault Diagnosis

Remote control without unlocking and locking

Steps	Measures	Yes	No
1	First, make sure that the five doors are closed		
2	Check whether the indicator on the key flashes.	Go to Step 3	Replace the key
3	Use a diagnostic scanner to read if BCM has bus-related faults	Check whether the CAN bus is normal	Go to Step 4
4	Check whether the door lock, BCM and harness are intact	Go to Step 5	Replace the harness or door lock
5	Replace the BCM		

4.17.3.22 Fault Diagnosis

Distance for remote control is too close

Steps	Measures	Yes	No
1	Whether the indicator of the remote key is too dim	Insufficient voltage, replace the battery	Go to Step 2
2	Test whether the voltage of the battery is above 2.8V	Go to Step 3	Replace the battery
3	Whether the components on the PCB are touched while replacing the battery	The frequency for remote control is offset, and please send to the maintenance centre	Go to Step 4
4	Whether the remote key is damp	The frequency for remote control is offset, and please send to the maintenance centre	Go to Step 5
5	Replace the remote key and check if the remote control distance is normal	The original remote key is faulty, replace the remote key	Go to Step 6
6	Replace the BCM		

Note:

– Refer to "Matching of remote control key" for detailed methods.

– Precise components are equipped inside the remote key, so please handle it carefully while replacing the battery. Do not touch or collide with the components inside the PCB, otherwise the remote control distance may be shortened or the remote control may be invalid.

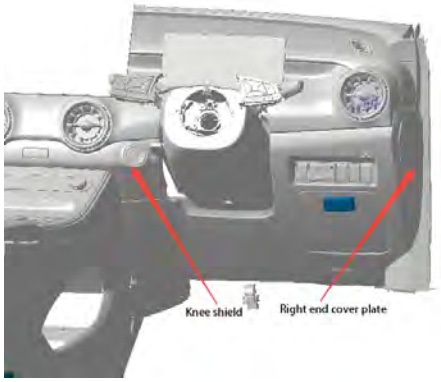
– Please use the battery of the same specifications and models while replacing, or otherwise the remote key may be damaged.

4.17.4 Removal and installation

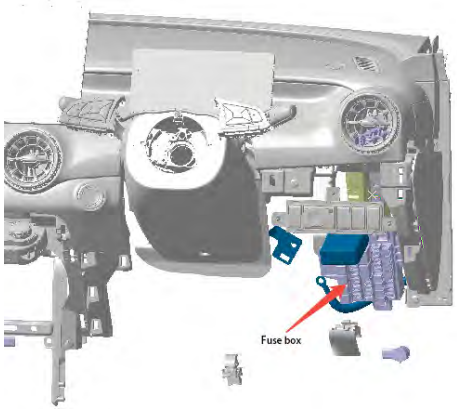
4.17.4.1 BCM

Removal

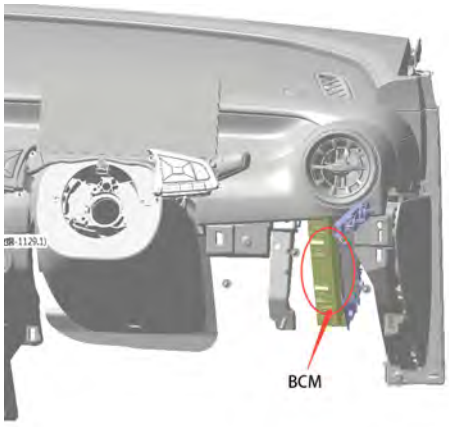
1. Remove the right end cover and right lower shield of the dashboard. Loosen the power distribution box to expose BCM.



2. Remove the dashboard driver's seat storage box and knee pad cover plate assembly.



3. Remove the fuse box bolts, loosen the fuse box, and then use a sleeve to remove the BCM mounting bracket and take out the BCM.



Installation

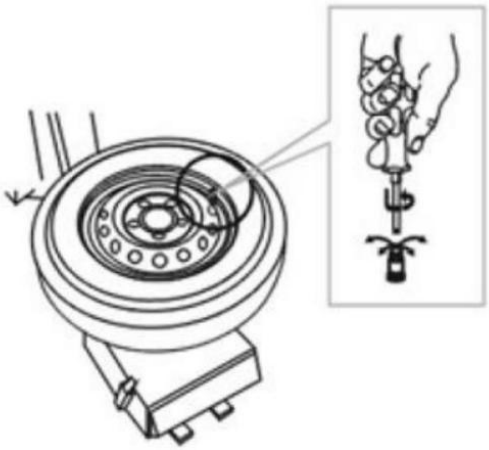
The installation order is reverse to the removal order. Pay attention to the following points

Caution: For all models with an rain-sensing wiper function, the vehicle battery must be connected after the dashboard harness (especially BCM rain light sensor) is installed properly to ensure that BCM can correctly identify the wiper control type. If it is detected that the induction wiper function fails, please unplug the battery and wait for 5S before powering on again to test the induction wiper function.

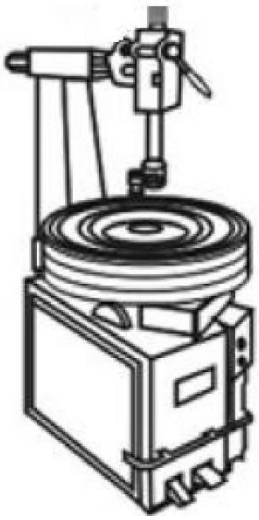
4.17.4.2 Tyre pressure monitoring sensor

Removal

1. Deflate the tyre.

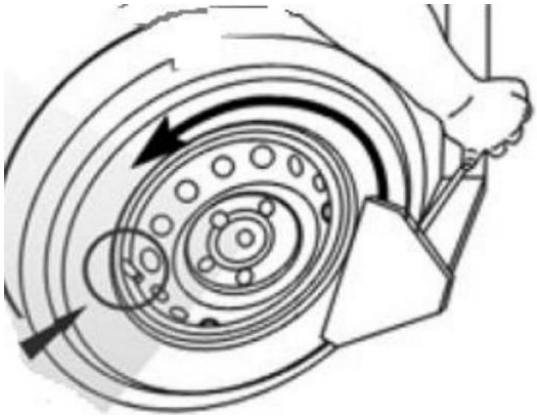


2. Use tyre removal equipment to separate the tyre from the rim. During the disassembly process, be careful to avoid tools and equipment scratching or squeezing the tyre pressure sensor.



3. Use a crowbar to pry the tyre off the rim as per the method for removing the tyre. During removal, take care not to

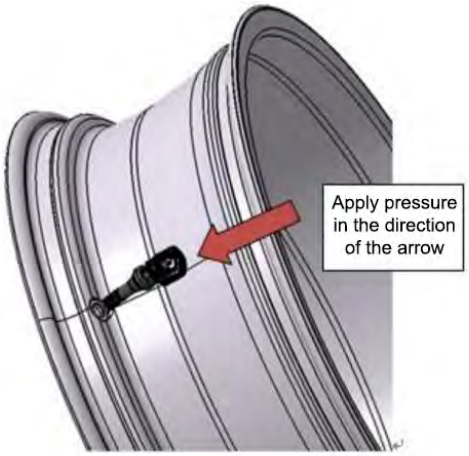
scratch or squeeze the tyre pressure sensor with the removal tool and inside of the tyre.



4. After removing the tyre, it is also necessary to check whether the tyre pressure sensor is damaged. If there is no obvious damage on the appearance, it means that the tyre pressure sensor is intact. If cracks or damage are obviously seen on the appearance of the tyre pressure sensor, the tyre pressure sensor needs to be replaced.

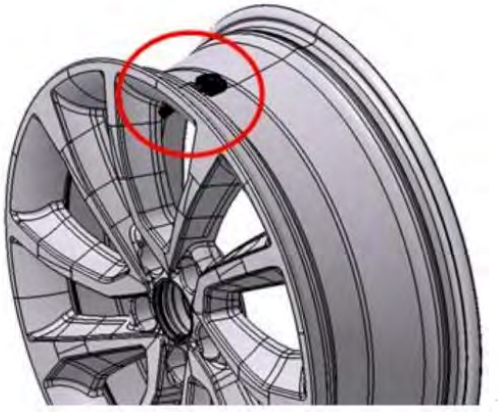
Installation

1. Pass the valve stem of the tyre pressure monitoring sensor through the rim valve mounting hole, and apply pressure to fix the tyre pressure monitoring sensor tightly on the rim valve mounting hole.



2. After complete assembly.

Assembly renderings

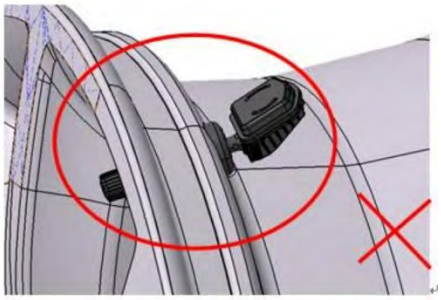


Partial Enlarged Rendering

Caution: Do not install the sensor in a wrong direction, otherwise it will cause damage or failure of the sensor.

Caution: Wrong assembly direction.

Enlarged rendering of wrong installation direction



Caution: Assemble the tyre into the rim. Pay attention to protect the tyre pressure sensor during assembly, and it is strictly prohibited to squeeze or pry the tyre pressure sensor with the assembly tool.

4.18 A/C system

4.18.1 Specification

4.18.1.1 General specifications

Material specifications

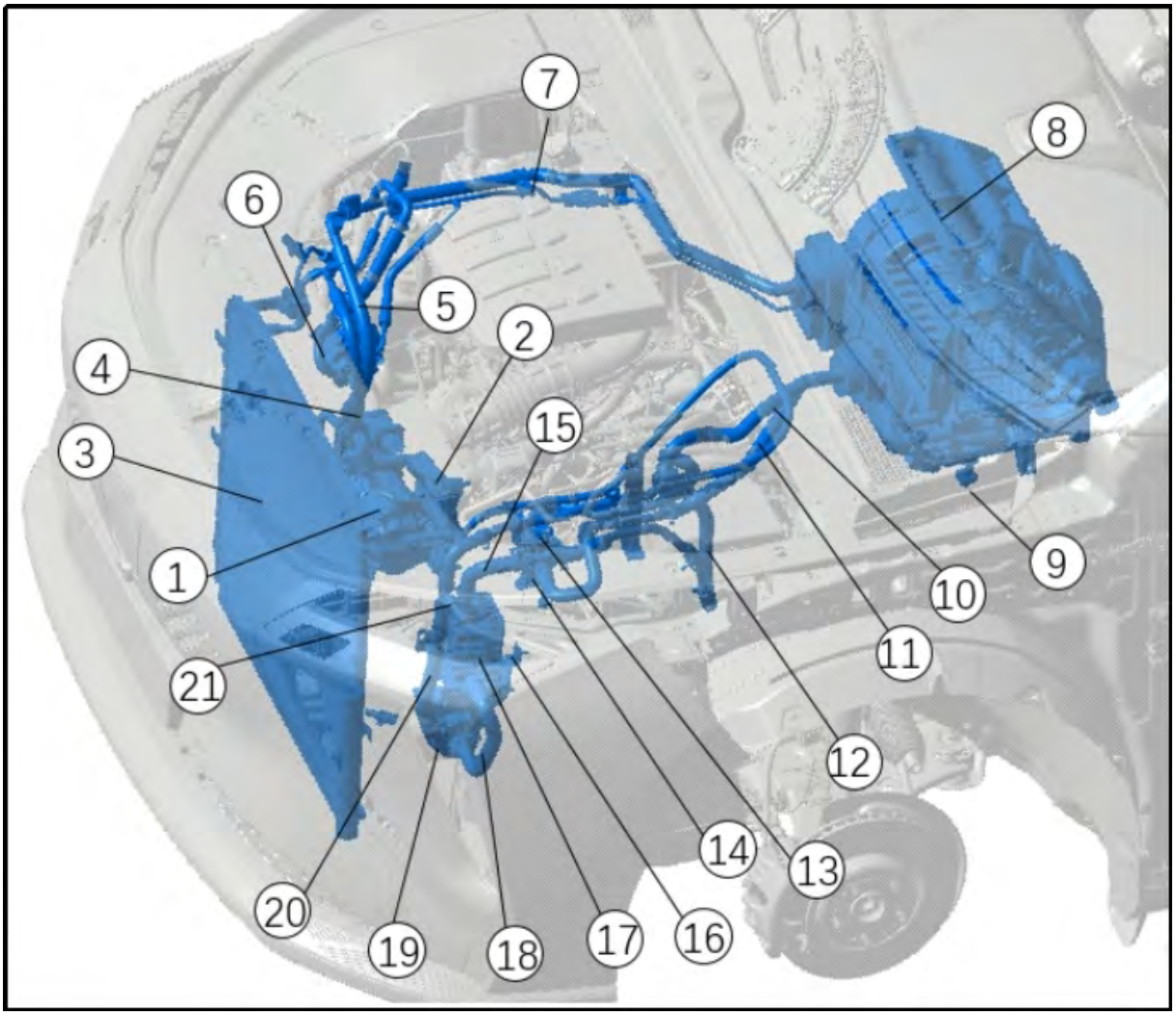
Name	Specification	Capacity
Refrigerant	R-134a(HFC-134a)	560±20g

4.18.1.2 Torque specification

Name	Nm
A/C compressor fixing bolt	24±3
A/C compressor bracket fixing bolt	24±3
Fixing bolts and nuts of other components of the A/C system	8±2

4.18.2 Instructions and operations

4.18.2.1 A/C system

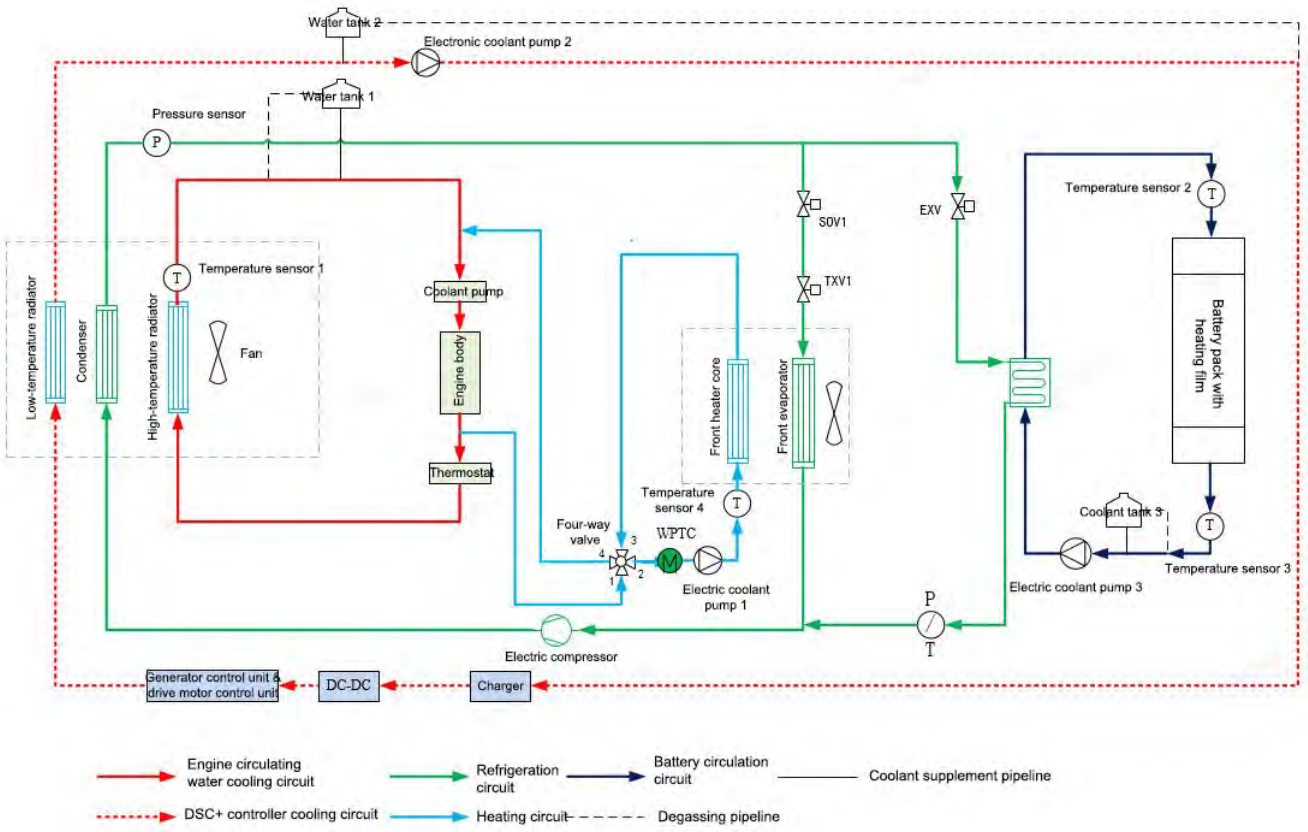


Item	Description	Item	Description
1.	Electric compressor assembly	12.	Four-way valve water inlet and outlet pipe assembly
2.	Compressor bracket	13.	Four-way coolant valve
3.	Condenser assembly	14	Four-way coolant valve bracket
4.	Compressor exhaust pipe assembly	15.	PTC coolant inlet pipe
5.	Compressor suction pipe assembly	16.	PTC heater bracket
6.	Chiller	17.	PTC heater assembly
7.	High/low pressure pipe assembly	18.	PTC coolant outlet pipe
8.	HVAC assembly	19.	Electric coolant pump assembly

Item	Description	Item	Description
9.	Drainage sealing ring	20.	Heater coolant pump inlet pipe
10.	A/C coolant outlet pipe	21.	Coolant temperature sensor
11.	A/C coolant inlet pipe		

4.18.2.2 Overview

Refrigeration Principle of A/C System



Refrigeration Principle

The purpose of refrigeration is achieved by absorbing heat when the refrigerant changes from liquid state to gas state

Compression process

The compressor intakes the low-temperature and low-pressure gas at the outlet of the evaporator, compresses it into high-temperature and high-pressure gas and then delivers it to the condenser.

Cooling Process (Heat Release)

The high-temperature and high-pressure gas enters the condenser for heat exchange with the air, and the cooling fan blows the heat into the atmosphere to cool the refrigerant into liquid.

Throttling process

The high-temperature and high-pressure liquid refrigerant is throttled and depressurised by the expansion valve, and drained from the expansion device in the form of mist (fine droplets).

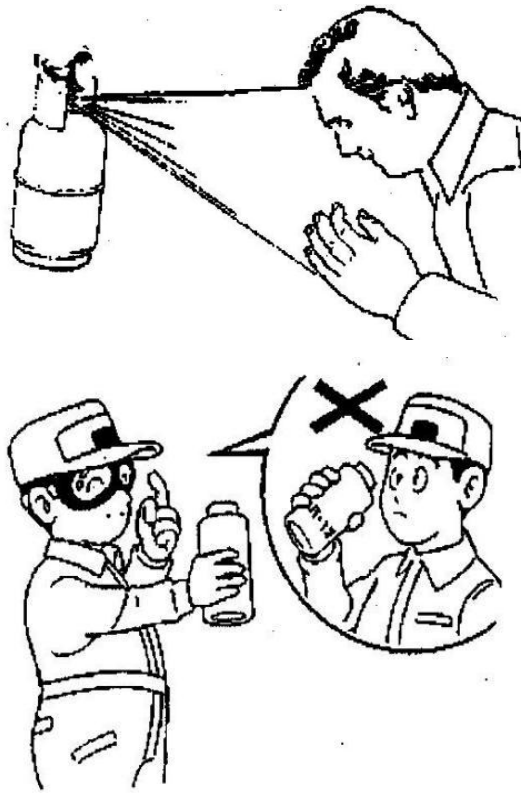
Evaporation Process (Heat Absorption)

The mist refrigerant liquid cooled and depressurised via the expansion valve enters the evaporator and evaporates into gas, which absorbs the surrounding heat in this process and reduces the temperature inside the vehicle.

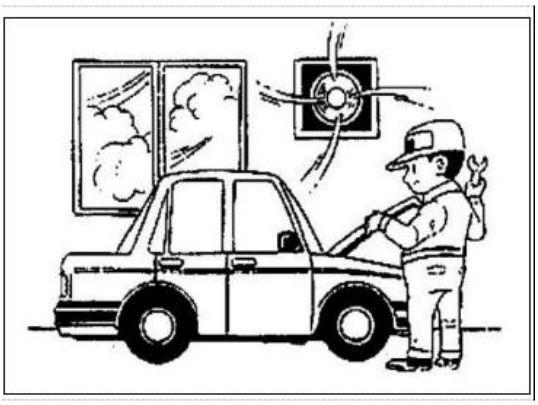
4.18.2.3 Precautions

Refrigerant precautions

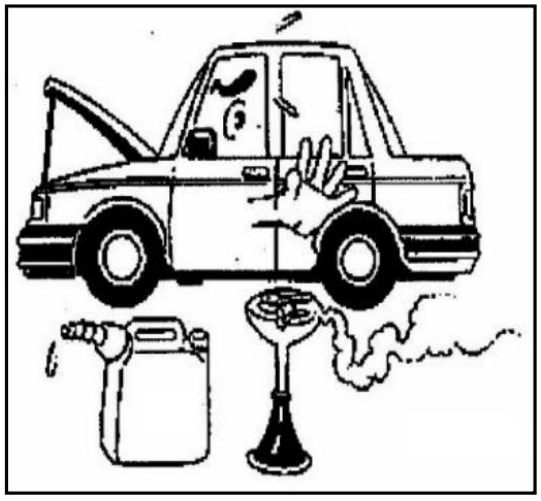
1. The refrigerant has a low freezing point and strong volatility, so gloves and glasses must be worn to prevent frostbite and blindness caused by skin contact.
2. If the refrigerant is sprayed into eyes or in contact with skin, flush the affected part with clean water and receive treatment from ophthalmology department and dermatology department.
3. Do not rub the eye with hands or a handkerchief.



4. The refrigerant operating site must be easy to ventilate. Although the refrigerant liquid is harmless, too much refrigerant liquid discharged in a closed space will cause oxygen deficit. Emissions allowance :1,000ppm (4184mg/㎥). If excessively discharged, it may lead to abnormalities or allergies in the heart and cardiovascular system, immune system, respiratory system, or cause skin diseases.



5. During refrigerant operation, there shall be no foreign objects such as moisture and dust in the surrounding environment. If these foreign objects flow into the A/C system, it will damage the system.
6. A gas leak detector should be prepared. Harmful gas will be generated when HFC-134a refrigerant contacts with the spark of sensor, which is harmful to human body.
7. HFC-134a shall be used as the refrigerant. If other refrigerant liquid are used, the system components will be adversely affected.
8. HFC-134a refrigerant is incompatible with R-12 refrigerant, and even a very small amount cannot be mixed.
9. When operating the refrigerant, there shall be no kindling or ignitable articles around the vehicle. Exposure of the refrigerant tank to heat sources will cause an explosion. R134a container is under high pressure and cannot be placed in a high-temperature environment. The storage temperature shall not exceed 52°C.
10. If the temperature is lower than 16 °C (61 °F) and the A/C refrigerant pressure is 345 kPa (3.45 bar, 3.52 kg/cm2, 50 psi) or less, no leakage may be detected.
11. Clean the place where refrigerant inspection is to be carried out, and check for refrigerant leakage with an electronic leak detector probe along all surfaces of pipe connections and A/C system components.
12. When a leak is found, continue the inspection. Always continue to check for other leaks along all pipe connections and A/C system components.
13. When a leak is detected, clean the leak area with compressed air and check again.

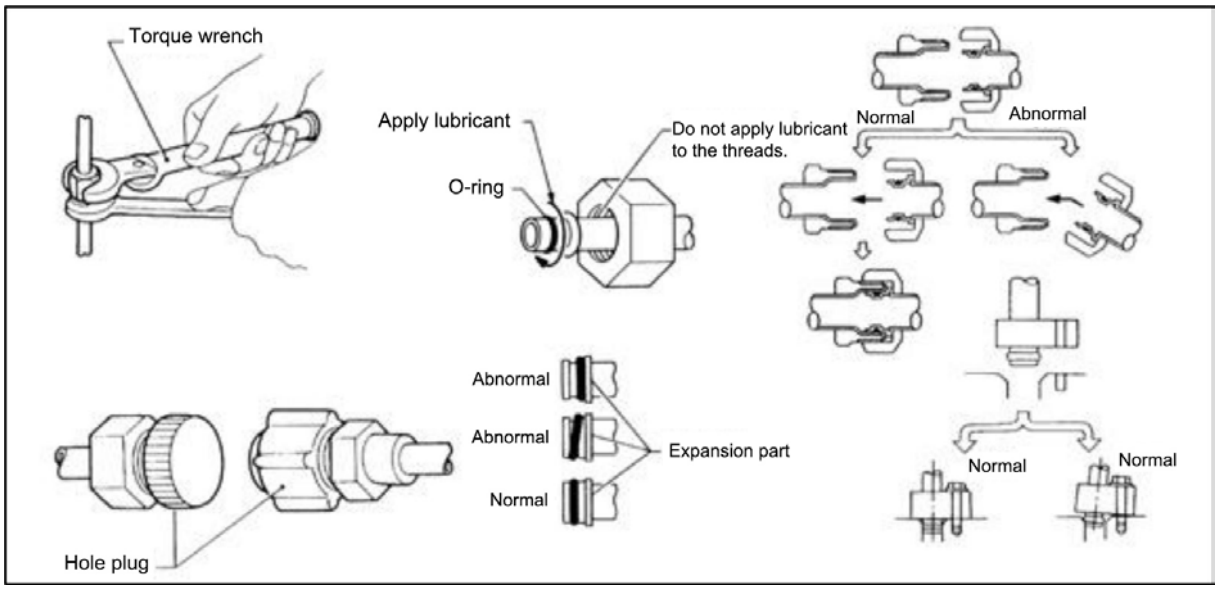


Precautions for removal and installation of A/C

1. A/C components are generally provided with dust covers to prevent the entry of waste water, dust, or moisture. The dust cover should be removed before operation and sealed after operation.

2. The influence of moisture on the A/C is extremely bad, so operation in rainy days shall be avoided as much as possible.

3. When the A/C system is reinstalled after disassembly, the O-ring sealing ring must be replaced and special refrigerant oil for compressor lubrication shall be applied to the O-ring sealing ring. When assembling the flanged connection part, push the male and female ends of the pipeline gently to fit in place (a click sound is heard), and then connect the nut and bolt.



4. When assembling the A/C system with a torque above or below the specified value, refrigerant leakage may occur. Therefore, operate according to the specified torque.

Thread Specification	Recommended tightening torque (N·m)	Remarks
M5	5±1	
M6	8±2	
M8	24±3	
M10X1.25	45±5	

5. The A/C system cannot be separated before the refrigerant is completely recycled. If the refrigerant and refrigeration oil are separated before recycling, they will be discharged under the influence of system pressure, polluting the surrounding environment.

6. Operate the refrigerant recovery/recycling/charging equipment to extract air from the refrigerant system for 25 minutes or more.

7. If parts are replaced, vacuum for 15 minutes or more and check the air tightness of the refrigerating system for 15 minutes or more.

8. When replacing the following A/C components, add compressor refrigerant oil to the A/C system.

Refrigerant operation	30 cc
Replace the condenser	50 cc
Replace the evaporator	50 cc
Replace the pipeline	30 cc

9. After filling the A/C system with the specified amount of refrigerant, check whether the A/C system works normally.

4.18.3 Diagnosis and testing

4.18.3.1 A/C System - PTC Heater Fault Diagnosis

Connect the diagnostic scanner and inquire specific faults according to the following table.

DTC Display DTC display	DTC (Hex) DTC (HEX)	DTC Meaning/Description DTC meaning/description	Remarks
B190C00	990C00	PTC error (PTC fault)	PTC heater

4.18.3.2 A/C System - Fault diagnosis of recirculation/fresh air servo motor

DTC Display DTC display	DTC (Hex) DTC (HEX)	DTC Meaning/Description DTC meaning/description	Remarks
B190216	990216	cyc motor short cut to ground or open load Circulation motor short-circuited to GND or open-circuited	Non-heat pump
B190217	990217	cyc motor short cut to power Circulation motor short-circuited to power supply fault	

4.18.3.3 A/C System - Condenser Fault Diagnosis

When the condenser has a fault, replace it.

Fault Symptom	Fault Form	Fault causes	Diagnosis Method	Repair methods
Poor heat dissipation of the condenser	The refrigeration effect of the A/C is reduced.	Accumulation of dust and foreign objects between the fins.	Visually check whether there is a large amount of dirt and dust adhering to the condenser surface.	Rinse the condenser surface directly with clean water.
Leakage	The A/C fails to refrigerate.	Aged sealing ring at the condenser interface.	Check the A/C inlet and outlet for oil stains or air leaks.	1. Remove the condenser interface piping and replace the sealing ring. 2. Refill the refrigerant and start A/C

4.18.3.4 A/C System - Compressor fault diagnosis

Connect the diagnostic scanner and inquire specific faults according to the following table.

DTC Display DTC display	DTC (Hex) DTC (HEX)	DTC Meaning/Description DTC meaning/description
B100A01	900A01	Compressor high voltage interlocking fault
B100C16	900C16	Compressor high voltage undervoltage

DTC Display DTC display	DTC (Hex) DTC (HEX)	DTC Meaning/Description DTC meaning/description
B100D17	900D17	Compressor high voltage overvoltage
B100E19	900E19	Compressor overcurrent
B100F49	900F49	Compressor control circuit fault
B101096	901096	Compressor IPM hardware fault
B101198	901198	Compressor IPM overtemperature
B101287	901287	Lost communication between compressor and ECC

Leakage inspection

1. Visual inspection: check for oil stains. Although this phenomenon cannot definitively be attributed to refrigerant leakage, it is considered an indicator of potential refrigerant leakage. The oil stains shall be cleaned up and then check the leakage point as follows.
2. Soap bubble inspection: Apply the solution to each joint surface and check whether there are bubbles caused by leakage.
3. Service station electronic leak detector: Determine whether the leak detector responds to R134a refrigerant; the leakage rate of any part of the compressor shall not be higher than 14g/y. Determine whether each suspected leakage is a true refrigerant leak rather than a small accumulation of refrigerant in a recess.
4. Leak detection dye: Manufacturers do not recommend using leak detection dye, as its chemical composition may be corrosive to lubricating oil and sealing rubber, potentially affecting lubrication, refrigeration, and sealing.

Factors causing refrigerant leakage and oil leakage

1. Leakage at the interfaces of various components of the A/C system.
2. The rubber O-ring at the interface is damaged or aged.
3. Loose nuts between connected interfaces.
4. Damage to the condenser, evaporator, and various pipelines. **Caution:** – I When checking the A/C system for leakage, check the interfaces of the components of the A/C system first, and then check the compressor after ensuring that there is no leakage at the interfaces of components

Unfavourable factors affecting the compressor

1. Poor lubrication caused by insufficient refrigerant (insufficient refrigerant charging or refrigerant leakage). The refrigerant oil circulates in the A/C system together with the refrigerant and is sprayed on the moving parts of the compressor in the form of mist, thus playing a lubricating role. When the refrigerant is insufficient, the amount of oil flowing into the compressor decreases, which may lead to insufficient lubrication and high suction temperature of the compressor, thus causing friction between moving parts and generating a large amount of heat. **Caution:** – When the compressor performance is reduced, check the amount of refrigerant and fill it – The A/C shall be started regularly (once every two weeks) in winter when it is not in use. Check refrigerant leakage at idle speed
2. Liquid refrigerant inflow causes hydraulic impact of the compressor. – Where too much refrigerant is charged, the liquid not evaporated will enter the compressor and cause hydraulic impact under the high pressure generated. At this time, the motion load of the compressor increases, which easily causes damage to the compressor – After the compressor is installed, the lubricating oil that flows in and washes over the moving parts may not provide lubrication before the refrigeration oil begins to circulate, which can lead to damage to the compressor
3. Poor lubrication due to clogged refrigerant lines. Before injecting the refrigerant, inadequate vacuuming can leave residual moisture in the system, causing the expansion valve to ice up. This can instantaneously block the system, leading to the compressor operating in a dry state without lubrication. **Caution:** – After recovering the refrigerant from a vehicle with moisture ingress, the system must be fully evacuated (for more than 30 minutes) to remove the moisture from within the system
4. Phase separation and movement of compressor refrigerant oil. During the long-term transportation and storage of R134a, the refrigerant and refrigeration oil may separate due to variations in ambient temperature. This can result in the movement of refrigeration oil, leading to a situation where only the refrigerant enters the compressor during the initial operation of the A/C system, which causes insufficient lubrication. Caution: – After the onset of winter, when initially starting the A/C, it is recommended to run the A/C at idle speed for 5 minutes first

4.18.3.5 A/C System - Fault diagnosis of four-way coolant valve

Connect the diagnostic scanner and inquire specific faults according to the following table.

DTC Display DTC display	DTC (Hex) DTC (HEX)	DTC Meaning/Description DTC meaning/description	Remarks
B190C00	990C00	error (Fault)	Four-way coolant valve

4.18.3.6 A/C System - External temperature sensor fault diagnosis

Connect the diagnostic scanner and inquire specific faults according to the following table.

DTC Display DTC display	DTC (Hex) DTC (HEX)	DTC Meaning/Description DTC meaning/description
B190514	990514	Outside temperatrue sensor short cut to ground (Outside temperature sensor short-circuited to GND)
B190515	990515	Outside temperatrue sensor short cut to power or open load (Outside temperature sensor short-circuited to power supply or open-circuited)

4.18.3.7 A/C System - Left temperature servo motor fault diagnosis

DTC Display DTC display	DTC (Hex) DTC (HEX)	DTC Meaning/Description DTC meaning/description	Remarks
B190014	990014	Left side temperature door motor short cut to ground or open load (Left temperature motor short-circuited to GND or open-circuited)	Non-heat pump
B190015	990015	Left side temperature door motor short cut to power (Left temperature motor short-circuited to power supply)	

4.18.3.8 A/C System - Fault Diagnosis

Connect the diagnostic scanner and inquire specific faults according to the following table.

DTC Display DTC display	DTC (Hex) DTC (Hexadecimal)	DTC Meaning/ Description DTC meaning/ description	Primary component	Secondary component
U300616	F00616	Battery Voltage too Low (Battery undervoltage)	Controller	
U300617	F00617	Battery Voltage too High (Battery overvoltage)		
U007300	C07300	CAN busoff error (CAN bus off)		

DTC Display DTC display	DTC (Hex) DTC (Hexadecimal)	DTC Meaning/ Description DTC meaning/ description	Primary component	Secondary component
U220D00	E20D00	CAN NM limphome error (Network management limp home)		
U015500	C15500	Miss communication with ICU(0X149 ,10ms) (IC1 node lost)		
U014000	C14000	Miss communication with BCM（0X180，100ms） (BCM node lost)		
U012100	C12100	Miss communication with ABS (0X200,20ms) (Miss communication with ABS)		
U010000	C10000	Miss communication with Engine5(0X608 ,100ms) (Miss communication with Engine)		
U100800	D00800	Miss communication with AQS (0X528 ,200ms) (Miss communication with AQS)		
U100200	D00200	Miss communication with SBM（0X526，100ms） (SBM node lost)		
U100300	D00300	Miss communication with APM (0X520 ,200ms) (Miss communication with APM)		

DTC Display DTC display	DTC (Hex) DTC (Hexadecimal)	DTC Meaning/ Description DTC meaning/ description	Primary component	Secondary component
U100400	D00400	Miss communication with ICE (0X391 ,100ms) (0X3B0 ,100ms) (0X591, 500ms) (Miss communication with AQS)		
U110400	D10400	Miss communication with PEPS (0X170 ,100ms) (PEPS node lost)		
U100500	D00500	Miss communication with TBOX (0X4E5 ,500ms) (Miss communication with TBOX)		
U100600	D00600	Miss communication with BMS (0X362 ,100ms) (0X363 ,100ms) (0X364 ,100ms) (0X26F ,100ms) (0X26E ,100ms) (BMS node lost)		
U100700	D00700	Miss communication with BMS (0X58F ,1000ms) (Miss communication with BMS)		
U100900	D00900	Miss communication with DCDC (0X148 ,100ms) (Miss communication with DCDC)		
U100A00	D00A00	Miss communication with VCM （0X390 ，100ms ） (VCM node lost)		

DTC Display DTC display	DTC (Hex) DTC (Hexadecimal)	DTC Meaning/ Description DTC meaning/ description	Primary component	Secondary component
U100B00	D00B00	Miss communication with VCM (0X212 ,10ms) (0X216 ,10ms) (Miss communication with VCM)		
U100C00	D00C00	Miss communication with VCM (0X3A0 ,200ms) (0X4E0 ,200ms) (Miss communication with VCM)		
U100D00	D00D00	Miss communication with HCU (0X131 ,10ms) (0X51E ,200ms) (Miss communication with HCU)		
U100E00	D00E00	Miss communication with MCU (0X240 ,50ms) (Miss communication with MCU)		
U100F00	D00F00	Miss communication with OBC（0X268，100ms） (Miss communication with OBC)		
U120000	D20000	Miss communication with SRS (0X31C ,500ms) (Miss communication with SRS)		
U101100	D01100	Miss communication with BCM LIN(0X11 ,100ms) (0X24 ,100ms) (BCM LIN node lost)		

DTC Display DTC display	DTC (Hex) DTC (Hexadecimal)	DTC Meaning/ Description DTC meaning/ description	Primary component	Secondary component
U101200	D01200	Miss communication with AC LIN(0X03 ,100ms) (0X04 ,100ms) (0X13 ,100ms) (AC LIN node lost)		
B190013	990013	Blower open circuit (Blower open-circuited fault)	HVAC	Blower
B190014	990014	Left side temperature door motor short cut to ground or open load (Left temperature motor short-circuited to GND or open-circuited)		Temperature damper motor
B190015	990015	Left side temperature door motor short cut to power (Left temperature motor short-circuited to power supply)		
B190214	990214	Air distribution motor short cut to ground or open load (Mode motor short-circuited to GND or open-circuited)		Mode damper motor
B190215	990215	Air distribution motor short cut to power (Mode motor short-circuited to power supply)		
B190216	990216	cyc motor short cut to ground or open load (Recirculation motor short-circuited to GND or open-circuited)		Recirculation/fresh air damper motor

DTC Display DTC display	DTC (Hex) DTC (Hexadecimal)	DTC Meaning/ Description DTC meaning/ description	Primary component	Secondary component
B190217	990217	cyc motor short cut to power (Recirculation motor short-circuited to power supply)		
B190414	990414	Evaporator temperatrue sensor short cut to ground (Evaporator sensor short-circuited to GND)		Evaporator temperature sensor
B190415	990415	Evaporator temperatrue sensor short cut to power or open load (Evaporator sensor short-circuited to power supply or open-circuited)		
B190514	990514	Outside temperatrue sensor short cut to ground (Outside temperature sensor short-circuited to GND)	Exterior temperature sensor	
B190515	990515	Outside temperatrue sensor short cut to power or open load (Outside temperature sensor short-circuited to power supply or open-circuited)		
B190714	990714	P sensor short cut to ground or open load (Pressure sensor short-circuited to GND or open-circuited)	Pressure sensor	

DTC Display DTC display	DTC (Hex) DTC (Hexadecimal)	DTC Meaning/ Description DTC meaning/ description	Primary component	Secondary component
B190715	990715	P sensor short cut to power (Pressure sensor short-circuited to power supply)		
B190A00	990A00	Electric compressor error (Electric compressor fault)	Compressor	
B190C00	990C00	PTC error (PTC fault)	PTC	

4.18.3.9 A/C System - Mode servo motor fault diagnosis

DTC Display DTC display	DTC (Hex) DTC (HEX)	DTC Meaning/Description DTC meaning/description	Remarks
B190214	990214	Air distribution motor short cut to ground or open load (Mode motor short-circuited to GND or open-circuited)	Non-heat pump
B190215	990215	Air distribution motor short cut to power (Mode motor short-circuited to power supply)	

4.18.3.10 A/C System - Chiller Fault Diagnosis

Fault Symptom	Fault Form	Fault causes	Diagnosis Method	Repair methods
Poor heat exchange of chiller	Battery pack water temperature alarm.	Leakage of coolant interface at the water chiller or leakage of chiller body.	Check the coolant pipe joint or body at the chiller for obvious leakage traces	Check and locate the leak, and then reassemble or replace the parts and components causing leakage. After that, evacuate the system and charge it with coolant. Finally, start the battery cooling system and check if the fault has been resolved
Poor heat exchange of chiller	Battery pack water temperature alarm	The electromagnetic expansion valve is damaged	Visually check the harness of the electromagnetic expansion valve connector for any damage. If none is found, connect an external electrical signal to check whether the electromagnetic expansion valve engages properly	Replace the electromagnetic expansion valve, evacuate the system, and charge it with refrigerant. Then, start the compressor and check if the fault has been resolved
Refrigerant leakage	A/C not cooling or battery pack water temperature alarm	Leakage of refrigerant interface at the chiller or leakage of water chiller body.	Check the refrigerant inlet and outlet ports or the chiller for any oil stain or leaks.	Replace the leaking parts and components, evacuate the system, and charge it with refrigerant. Then, start the compressor and check if the fault has been resolved

4.18.3.11 A/C System - Electric Coolant Pump Fault Diagnosis

Connect the diagnostic scanner and inquire specific faults according to the following table.

DTC Display DTC display	DTC (Hex) DTC (HEX)	DTC Meaning/Description DTC meaning/description	Remarks
B190C00	990C00	error (Fault)	Electric coolant pump

4.18.3.12 A/C System - Fault diagnosis of HVAC assembly

DTC Display DTC display	DTC (Hex) DTC (HEX)	DTC Meaning/Description DTC meaning/description	Remarks
B190013	990013	Blower open circuit (Blower open-circuited fault)	Blower
B190014	990014	Left side temperature door motor short cut to ground or open load (Left temperature motor short-circuited to GND or open-circuited)	Temperature damper motor
B190015	990015	Left side temperature door motor short cut to power (Left temperature motor short-circuited to power supply)	
B190214	990214	Air distribution motor short cut to ground or open load (Mode motor short-circuited to GND or open-circuited)	Mode damper motor
B190215	990215	Air distribution motor short cut to power (Mode motor short-circuited to power supply)	
B190216	990216	cyc motor short cut to ground or open load Circulation motor short-circuited to GND or open-circuited	Recirculation/fresh air damper motor
B190217	990217	cyc motor short cut to power Circulation motor short-circuited to power supply fault	
B190414	990414	Evaporator temperatrue sensor short cut to ground (Evaporator sensor short-circuited to GND)	Evaporator temperature sensor
B190415	990415	Evaporator temperatrue sensor short cut to power or open load (Evaporator sensor short-circuited to power supply or open-circuited)	

4.18.3.13 A/C System - Fault Diagnosis of A/C Pipeline

1. Connect the diagnostic scanner and inquire specific faults according to the following table.

DTC Display DTC display	DTC (Hex) DTC (HEX)	DTC Meaning/Description DTC meaning/description	Remarks
B190714	990714	P sensor short cut to ground or open load (Pressure sensor short-circuited to GND or open-circuited)	Pressure sensor
B190715	990715	P sensor short cut to power (Pressure sensor short-circuited to power supply)	

2. If there is no obvious fault in the pressure sensor, check for other causes according to the following table.

Fault Symptom	Fault Form	Fault causes	Diagnosis Method	Repair methods
Refrigerant leakage	A/C not cooling or battery pack water temperature alarm	Refrigerant leakage at each interface of the A/C pipeline or leakage of the pipeline body.	Check whether there is oil stain or air leakage at each interface of the A/C pipeline and the pipeline body	Check and locate the leak, and then reassemble or replace the parts and components causing leakage. After that, evacuate the system and charge it with refrigerant. Finally, start the compressor and check if the fault has been resolved
Solenoid valve does not work	A/C fails to cool.	The electromagnetic expansion valve is damaged	Visually check the harness of the solenoid valve connector for any damage. If none is found, connect an external electrical signal to check whether the solenoid valve engages properly	Replace the solenoid valve, evacuate the system, and charge it with refrigerant. Then, start the compressor and check if the fault has been resolved

4.18.3.14 A/C System - Evaporator temperature sensor fault diagnosis

DTC Display DTC display	DTC (Hex) DTC (HEX)	DTC Meaning/Description DTC meaning/description	Remarks
B190414	990414	Evaporator temperatrue sensor short cut to ground (Evaporator sensor short-circuited to GND)	
B190415	990415	Evaporator temperatrue sensor short cut to power or open load (Evaporator sensor short-circuited to power supply or open-circuited)	

4.18.3.15 A/C System - Defrosting Fault Diagnosis

No air is blown out from the defrosting air vent

1. Check the blower and mode damper for faults according to the A/C HVAC fault diagnosis.
2. Check the defrosting air duct for faults according to the dashboard fault diagnosis.

No warm air is blown out from the defrosting air vent

1. Check the damper for faults according to the A/C HVAC fault diagnosis.
2. Diagnose and check the faults according to PTC, PDU and A/C controller.

4.18.3.16 A/C System - Fault Diagnosis of Blower Assembly

Fault Symptom	Fault Form	Fault causes	Diagnosis Method	Repair methods
Blower does not work	Blower gear adjustment fails	The speed regulation module is damaged	Determine whether the blower is normal through fault diagnosis or external power supply. If it is normal, check whether the speed regulation module is damaged	Replace the regulation module and check whether the fault has been resolved

4.18.3.17 A/C System - Blower Assembly Fault Diagnosis DTC

DTC Display DTC display	DTC (Hex) DTC (HEX)	DTC Meaning/Description DTC meaning/description	Remarks
B190013	990013	Blower open circuit (Blower open-circuited fault)	Non-heat pump

4.18.3.18 General Tools

Control Assembly

General Tools

Digital multimeter

4.18.3.19 Inspection and confirmation

Control Assembly

Inspection and confirmation

1. Check the problems reported by customers.

2. Visually check for obvious A/C system faults and mechanical or electrical damage.

3. Before further testing, eliminate the obvious faults found in visual inspection and check whether the system works normally.

4. If the fault still exists after visual inspection, please check the faults according to the List of Symptoms as per the fault phenomena.

4.18.3.20 Appearance Checklist

Control Assembly

Appearance Checklist

Mechanical	Electrical
– Recirculation/Fresh air damper – Cooling/heating damper – Mode damper	– Fuse – Harness – Connector – Blower and speed regulation module – Recirculation/fresh air damper motor – Cooling/heating damper motor – Mode damper motor – Recirculation/fresh air damper motor – A/C control module

4.18.3.21 DTC List (FACM)

The diagnosis in this manual requires technicians to have a certain skill level and diagnostic practical experience.

Refer to: Diagnosis method (100-00 General information, description and operation).

DTC	Description	Operation
U300616	Battery undervoltage	A/C System - Accurate Test A: U300616.dita
U300617	Battery overvoltage	A/C System - Accurate Test B: U300617.dita
U007300	CAN bus off	A/C System - Accurate Test C: U007300.dita
U220D00	Network management limp home	A/C System - Accurate Test D: U220D00.dita
U015500	Loss of communication with IC node (0x149)	A/C System - Accurate Test E: U015500.dita
U014000	Loss of communication with BCM node (0x180)	A/C System - Accurate Test F: U014000.dita
U012100	Loss of communication with ABS node (0x200)	A/C System - Accurate Test G: U012100.dita

DTC	Description	Operation
U010000	Loss of communication with Engine Node (0x608)	A/C System - Accurate Test H: U010000.dita
U019800	Loss of communication with SBM node (0x526)	A/C System - Accurate Test I: U019800.dita
U100400	Loss of communication with APM node (0x520)	A/C System - Accurate Test J: U100400.dita
U015600	Loss of communication with ICE node (0x3B0)	A/C System - Accurate Test K: U015600.dita
U014001	Loss of communication with PEPS node (0x170)	A/C System - Accurate Test L: U014001.dita
U100200	Loss of communication with TBOX node (0x4E5)	A/C System - Accurate Test M: U100200.dita
U011100	Loss of communication with BMS node (0x362)	A/C System - Accurate Test N: U011100.dita
U029800	Loss of communication with DCDC node (0x148)	A/C System - Accurate Test 0: U029800.dita
U012200	Loss of communication with VCM node (0x216)	A/C System - Accurate Test P: U012200.dita
U011000	Loss of communication with MCU node (0x240)	A/C System - Accurate Test Q: U011000.dita
U019B00	Loss of communication with OBC node (0x268)	A/C System - Accurate Test R: U019B00.dita
U120000	Loss of communication with SRS node (0x31C)	A/C System - Accurate Test S: U120000.dita
U101100	Loss of communication with BCM LIN node (0x11, 0x24)	A/C System - Accurate Test T: U101100.dita
U101200	Loss of communication with AC LIN node (0x03, 0x04, 0x13)	A/C System - Accurate Test U: U101200.dita
B190013	Blower open circuit fault	A/C System - Accurate Test V: B190013.dita
B190014	Left side temperature door motor short-circuited to GND or open-circuited	A/C System - Accurate Test W: B190014.dita
B190015	Left temperature motor short-circuited to power supply	A/C System - Accurate Test X: B190015.dita
B190214	Mode motor short-circuited to GND or open-circuited	A/C System - Accurate Test Y: B190214.dita
B190215	Mode motor short-circuited to power supply	A/C System - Accurate Test Z: B190215.dita
B190216	Circulation motor short-circuited to GND or open-circuited	A/C System - Accurate Test AA: B190216.dita

DTC	Description	Operation
B190217	Circulation motor short-circuited to power supply fault	A/C System - Accurate Test AB: B190217.dita
B190414	Evaporator sensor short-circuited to GND	A/C System - Accurate Test AC: B190414.dita
B190415	Evaporator sensor short-circuited to power supply or open-circuited fault	A/C System - Accurate Test AD: B190415.dita
B190514	External temperature sensor short-circuited to GND fault	A/C System - Accurate Test AE: B190514.dita
B190515	Outside temperature sensor short-circuited to power supply or open-circuited	A/C System - Accurate Test AF: B190515.dita
B190714	Pressure (high pressure) sensor short-circuited to GND or open-circuited fault	A/C System - Accurate Test AG: B190714.dita
B190715	Pressure (high pressure) sensor short-circuited to power supply	A/C System - Accurate Test AH: B190715.dita
B190814	PT sensor temperature side short-circuited to GND	A/C System - Accurate Test AI: B190814.dita
B190815	PT sensor temperature side is short-circuited to power supply or open-circuited	A/C System - Accurate Test AJ: B190815.dita
B190914	PT sensor pressure side short-circuited to GND or open-circuited	A/C System - Accurate Test AK: B190914.dita
B190915	PT sensor pressure side short-circuited to power supply	A/C System - Accurate Test AL: B190915.dita
B190A00	Electric compressor fault	A/C System - Accurate Test AM: B190A00.dita
B190B00	Electronic expansion valve (EXV3) fault	A/C System - Accurate Test AN: B190B00.dita
B190C00	PTC fault	A/C System - Accurate Test AO: B190C00.dita

4.18.3.22 Symptom Table

Symptoms	Possible cause	Measures
Abnormal operation of mode damper	– Mode damper servo motor – Mode damper – A/C control box – Harness	– Appearance inspection – Check the fuse. – Check the power supply circuit of A/C control box – Check the GND of the A/C control box – Check the circuit from A/C control box to mode actuator – Check the mode actuator

Recirculation/Fresh air damper not working properly	– Recirculation/Fresh air damper servo motor – A/C control module – Mode damper – Harness	– Appearance inspection – Check the fuse. – Check the power supply circuit of A/C control box – Check the GND of A/C control box/ A/C control panel – Check the circuit from A/C control box to recirculation/fresh air actuator – Check the recirculation/fresh air actuator
Abnormal operation of cooling/heating damper	– A/C control module – Cooling/heating damper servo motor – Cooling/heating damper – Harness	– Appearance inspection – Check the fuse. – Check the power supply circuit of A/C control box – Check the GND of the A/C control box – Check the circuit from A/C control box to left temperature actuator – Check the left temperature actuator.

4.18.3.23 Accurate test

Accurate Test: AA: B190216

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190216	Circulation control motor short-circuited to GND or open-circuited fault	– It is detected that the feedback voltage of circulation control motor is less than 0.3V for 2s.	– The feedback voltage value of the circulation motor is detected to be ≥0.3V for 4 seconds

Possible cause

– Circulation control motor actuator circuit fault

Repair recommendations

– Check the circulation damper actuator circuit.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.24 Accurate test

Accurate Test: AB: B190217

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190217	Circulation motor short-circuited to power supply fault	– It is detected that the feedback voltage of circulation control motor is greater than 4.7V for 2s.	– The feedback voltage value of the circulation motor is detected to be ≤4.7V for 4 seconds

Possible cause

– Circulation control motor actuator circuit fault

Repair recommendations

– Check the circulation damper actuator circuit.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.25 Accurate test

Accurate Test: AC: B190414

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190414	Evaporator temperature sensor short-circuited to GND fault	– The evaporator temperature sensor feedback voltage value is detected to be less than 0.3V for 2 seconds	– The evaporator temperature sensor feedback voltage value is detected to be ≥0.3V for 4 seconds

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.26 Accurate test

Accurate Test: AD: B190415

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190415	Evaporator temperature sensor short-circuited to power supply or open-circuited fault	– The evaporator temperature sensor feedback voltage value is detected to be greater than 4.7V for 2 seconds	– The evaporator temperature sensor feedback voltage value is detected to be ≤4.7V for 4 seconds

Possible cause

– Sensor fault.

– Abnormal harness.

Repair recommendations

– Replace the sensor.

– Check the harness.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.27 Accurate test

Accurate Test: AE: B190514

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190514	External temperature sensor short-circuited to GND fault	– The external temperature sensor feedback voltage value is detected to be less than 0.3V for 2 seconds	– The feedback voltage value of the external temperature sensor is detected to be ≥0.3V for 4 seconds

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.28 Accurate test

Accurate Test: AF: B190515

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190515	Outside temperature sensor short-circuited to power supply or open-circuited	– The feedback voltage value of the external temperature sensor is detected to be greater than 4.7V for 2 seconds	– The feedback voltage value of the external temperature sensor is detected to be ≤4.7V for 4 seconds

Possible cause

– Sensor fault.

– Abnormal harness.

Repair recommendations

– Replace the sensor.

– Check the harness.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.29 Accurate test

Accurate Test: AG: B190714

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190714	Pressure sensor (high-voltage) short-circuited to GND or open-circuited	– The pressure sensor feedback voltage value is detected to be less than 0.3V for 2 seconds	– The pressure sensor feedback voltage value is detected to be ≥0.3V for 4 seconds

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.30 Accurate test

Accurate Test: AH: B190715

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190715	Pressure sensor (high-voltage) short-circuited to power supply	– The pressure sensor feedback voltage value is detected to be greater than 4.7V for 2s.	– The pressure sensor feedback voltage value is detected to be ≤4.7V for 4 seconds

Possible cause

– Sensor fault.

– Abnormal harness.

Repair recommendations

– Replace the sensor.

– Check the harness.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.31 Accurate test

Accurate Test: AI: B190814

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190814	PT sensor temperature side short-circuited to GND	– It is detected that the feedback voltage at PT sensor temperature side is less than 0.3V for 2s.	– The feedback voltage value of the PT sensor temperature side is detected to be ≥0.3V for 4 seconds

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.32 Accurate test

Accurate Test: AJ: B190815

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190815	PT sensor temperature side is short-circuited to power supply or open-circuited	– PT sensor temperature side feedback voltage greater than 4.7V detected for 2 seconds	– PT sensor temperature side feedback voltage ≤4.7V detected for 4 seconds

Possible cause

– Sensor fault.

– Abnormal harness.

Repair recommendations

– Replace the sensor.

– Check the harness.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.33 Accurate test

Accurate Test: AK: B190914

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190914	PT sensor pressure side short-circuited to GND or open-circuited	– It is detected that the feedback voltage value on pressure side of PT sensor is less than 0.3V for 2s.	– The feedback voltage value of the PT sensor pressure side is detected to be ≥0.3V for 4 seconds

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.34 Accurate test

Accurate Test: AL: B190915

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190915	PT sensor pressure side short-circuited to power supply	– PT sensor pressure side feedback voltage greater than 4.7V detected for 2 seconds	– The feedback voltage value of the PT sensor pressure side is detected to be ≤4.7V for 4 seconds

Possible cause

– Sensor fault.

– Abnormal harness.

Repair recommendations

– Replace the sensor.

– Check the harness.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.35 Accurate test

Accurate Test: AM: B190A00

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190A00	Electric compressor fault	– The electric compressor sends an error message for 2s	– The electric compressor sends normal status information for 4 seconds

Possible cause

– Compressor fault (high and low pressure overvoltage or undervoltage, compressor overheating, overload, overtemperature, overcurrent, etc.).

– Abnormal harness.

Repair recommendations

– Record AC LIN messages, clarify the cause of compressor fault and then confirm whether to replace the compressor.

– Check the harness.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.36 Accurate test

Accurate Test: AN: B190B00

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190B00	Electronic expansion valve (EXV3) fault	– Electronic expansion valve sends error message for 2s	– The electronic expansion valve sends normal status information for 4 seconds

Possible cause

– Electronic expansion valve fault (overvoltage, undervoltage, abnormal temperature, etc.).

– Abnormal harness.

Repair recommendations

– Record AC LIN message, clarify the cause of electronic expansion valve fault and then confirm whether to replace it; check harness.

– Check the harness.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.37 Accurate test

Accurate Test: AO: B190C00

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190C00	PTC fault	– PTC sends an error message for 2 seconds	– PTC sends normal status information for 4 seconds

Possible cause

– PTC fault (high and low-voltage/pressure overvoltage or undervoltage, PTC overheating, overload, overtemperature, overcurrent, etc.).

– Abnormal harness.

Repair recommendations

– Extract AC LIN message, clarify the cause of PTC fault and then confirm whether to replace PTC.

– Check the harness.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.38 Accurate test

Accurate Test: A: U300616

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U300616	Battery undervoltage	– The battery voltage is lower than 9V for more than 1.5 seconds	– The battery voltage is between 9V-16V for more than 1.5 seconds

Possible cause

– Battery voltage is low.

Repair recommendations

– Check the power supply of battery.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.39 Accurate test

Accurate Test: B: U300617

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U300617	Battery overvoltage	– The battery voltage is higher than 16V for more than 1.5 seconds	– The battery voltage is between 9V-16V for more than 1.5 seconds

Possible cause

– High battery voltage.

Repair recommendations

– Check the power supply of battery.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.40 Accurate test

Accurate Test: C: U007300

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U007300	CAN bus off	– There are 3 consecutive BUSOFF faults (faults of node loss, message loss and data invalidity should not be reported again when BUSOFF DTC is reported).	– The CAN bus resumes normal communication and sends 5 frames of messages continuously and normally

Possible cause

– CAN high and CAN low are short-circuited.

Repair recommendations

– Detect network connection.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.41 Accurate test

Accurate Test: D: U220D00

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U220D00	Network management limp home	– The continuous time of entering limp home exceeds 2 seconds	– CAN network management enters the normal ring construction process

Repair recommendations

– Detect network connection.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.42 Accurate test

Accurate Test: E: U015500

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U015500	Loss of communication with IC node (0x149)	– Message from IC node cannot be received for more than 1s	– The message sent by the IC node is successfully received

Possible cause

– IC node fault.

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.43 Accurate test

Accurate Test: F: U014000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U014000	Loss of communication with BCM node (0x180)	– Message from BCM node cannot be received for more than 1s	– The message sent by the BCM node is successfully received

Possible cause

– BCM node fault

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.44 Accurate test

Accurate Test: G: U012100

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U012100	Loss of communication with ABS node (0x200)	– The message from the ABS node cannot be received for more than 200ms	– The message sent by the ABS node is successfully received

Possible cause

– ABS node fault

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.45 Accurate test

Accurate Test: H: U010000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U010000	Loss of communication with Engine Node (0x608)	– Engine node message cannot be received for more than 1s	– Message sent by Engine node received successfully

Possible cause

– Engine node fault.

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.46 Accurate test

Accurate Test: I: U019800

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U019800	Loss of communication with SBM node (0x526)	– The message from the SBM node cannot be received for more than 1s	– The message sent by the SBM node is successfully received

Possible cause

– SBM node fault.

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.47 Accurate test

Accurate Test: J: U100400

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U100400	Loss of communication with APM node (0x520)	– The message from the SBM node cannot be received for more than 2s	– The message sent by the SBM node is successfully received

Possible cause

– APM node fault.

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.48 Accurate test

Accurate Test: K: U015600

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U015600	Loss of communication with ICE node (0x3B0)	– Message from ICE node cannot be received for more than 1s	– The message sent by the ICE node is successfully received

Possible cause

– ICE node fault.

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.49 Accurate test

Accurate Test: L: U014001

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U014001	Loss of communication with PEPS node (0x170)	– The message from the PEPS node cannot be received for more than 1s	– The message sent by the PEPS node is successfully received

Possible cause

– PEPS node fault

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.50 Accurate test

Accurate Test: M: U100200

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U100200	Loss of communication with TBOX node (0x4E5)	– Message from TBOX node cannot be received for more than 5s	– The message sent by TBOX node is successfully received

Possible cause

– TBOX node fault.

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.51 Accurate test

Accurate Test: N: U011100

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U011100	Loss of communication with BMS node (0x362)	– Message from BMS node cannot be received for more than 1s	– The message sent by the BMS node is successfully received

Possible cause

– BMS node fault

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.52 Accurate test

Accurate Test: O: U029800

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U029800	Loss of communication with DCDC node (0x362)	– Message from DCDC node cannot be received for more than 1s	– Message sent by DCDC node received successfully

Possible cause

– DCDC node fault

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.53 Accurate test

Accurate Test: P: U012200

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U012200	Loss of communication with VCM node (0x216)	– Message from VCM node cannot be received for more than 1s	– The message sent by the VCM node is successfully received

Possible cause

– VCM node fault.

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.54 Accurate test

Accurate Test: Q: U011000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U011000	Loss of communication with MCU node (0x240)	– Message from MCU node cannot be received for more than 500 ms	– The message sent by the MCU node is successfully received

Possible cause

– MCU node fault.

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.55 Accurate test

Accurate Test: R: U019B00

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U019B00	Loss of communication with OBC node (0x268)	– Message from OBC node cannot be received for more than 1s	– Message sent by OBC node received successfully

Possible cause

– OBC node fault.

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.56 Accurate test

Accurate Test: S: U120000

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U120000	Loss of communication with SRS node (0x31C)	– The message from the SRS node cannot be received for more than 5s	– The message sent by the SRS node is successfully received

Possible cause

– SRS node fault

Repair recommendations

– Check the CAN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.57 Accurate test

Accurate Test: T: U101100

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U101100	Loss of communication with BCM LIN node (0x11, 0x24)	– Message from BCM LIN node cannot be received for more than 1s	– The message sent by the BCM LIN node is successfully received

Possible cause

– BCM LIN node fault

Repair recommendations

– Check the LIN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.58 Accurate test

Accurate Test: U: U101200

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
U101200	Loss of communication with AC LIN node (0x03, 0x04, 0x13)	– Message from AC LIN node cannot be received for more than 1s	– Message sent by AC LIN node received successfully

Possible cause

– AC LIN node fault

Repair recommendations

– Check the LIN circuit.

– Check the module.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.59 Accurate test

Accurate Test: V: B190013

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190013	Blower open circuit fault	– When the blower is not in gear 0, it is detected that the blower feedback voltage value is less than 1V for 3 seconds	– When the blower is not in gear 0, it is detected that the blower feedback voltage value is ≥1V for 6 seconds

Repair recommendations

– Check the line.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.60 Accurate test

Accurate Test: W: B190014

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190014	Left side temperature door motor short-circuited to GND or open-circuited	– The left temperature motor feedback voltage value is detected to be less than 0.3V for 2 seconds	– The left temperature motor feedback voltage value is detected to be ≥0.3V for 4 seconds

Possible cause

– Circuit fault of motor actuator.

Repair recommendations

– Check the left temperature damper actuator circuit.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.61 Accurate test

Accurate Test: X: B190015

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190015	Left temperature motor short-circuited to power supply	– The left temperature motor feedback voltage value is detected to be greater than 4.7V for 2 seconds	– The left temperature motor feedback voltage value ≤4.7V is detected for 4 seconds

Possible cause

– Left temperature motor actuator circuit fault

Repair recommendations

– Check the left temperature damper actuator circuit.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.62 Accurate test

Accurate Test: Y: B190214

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190214	Mode control motor short-circuited to GND or open-circuited	– The mode motor feedback voltage value is detected to be less than 0.3V for 2 seconds	– The mode motor feedback voltage value is detected to be ≥0.3V for 4 seconds

Possible cause

– Mode motor actuator circuit fault

Repair recommendations

– Check the mode damper actuator circuit.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

– Check whether there is a loose or damaged connector.

4.18.3.63 Accurate test

Accurate Test: Z: B190215

Refer to the Circuit Diagram Manual for system diagrams, schematic diagrams, and connector information.

DTC and Fault Triggering Condition

DTC	Description	Fault triggering conditions	Fault Recovery Conditions
B190215	Mode motor short-circuited to power supply	– Mode motor feedback voltage greater than 4.7V detected for 2s	– Mode motor feedback voltage ≤4.7V detected for 4 seconds

Possible cause

– Mode motor actuator circuit fault

Repair recommendations

– Check the mode damper actuator circuit.

Visual inspection and inspection before diagnosis

– Check whether there is a damaged harness.

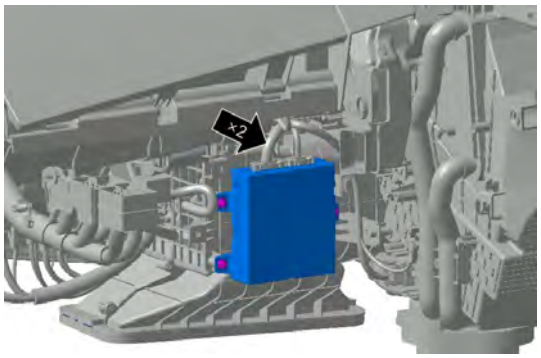
– Check whether there is a loose or damaged connector.

4.18.4 Removal and installation

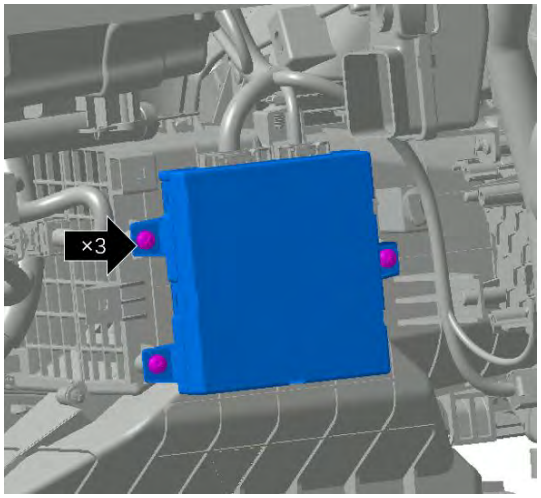
4.18.4.1 A/C control box

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Disconnect the two harness connectors of A/C control box (the A/C control box is arranged below the dashboard in the front left cab).



3. Remove the fixing screws of A/C control box.



4. Remove the A/C control box.

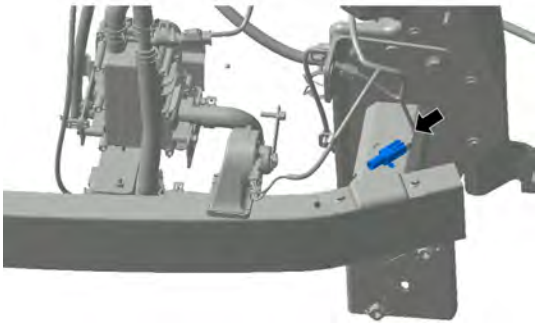
Installation

1. The installation order is the reverse of the removal order.

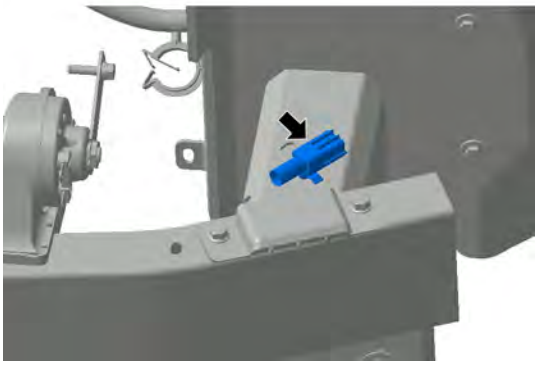
4.18.4.2 Exterior temperature sensor

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the front bumper assembly. Refer to: Front bumper assembly.
3. Disconnect the harness connector of interior temperature sensor.



4. Remove the exterior temperature sensor from the upper part of anti-collision beam and take it out.



Installation

1. The installation order is the reverse of the removal order.

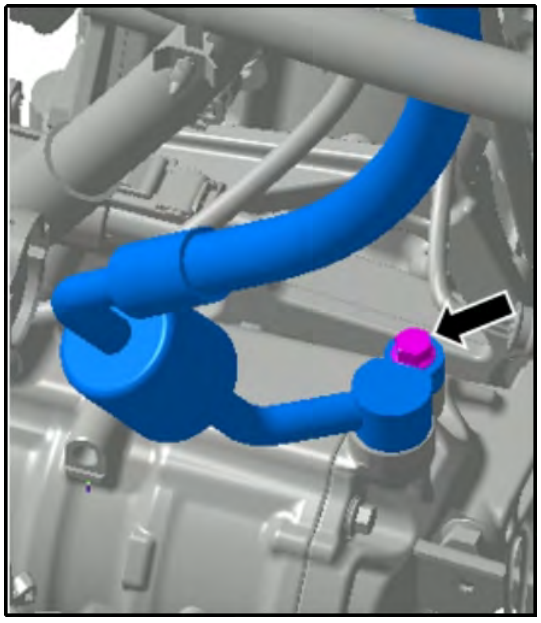
4.18.4.3 Electric compressor assembly

Material

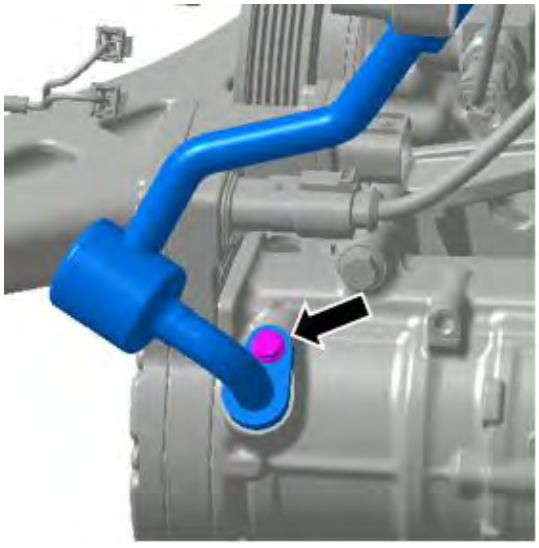
Name	Specification
Refrigerant	R-134a(HFC-134a)

Removal

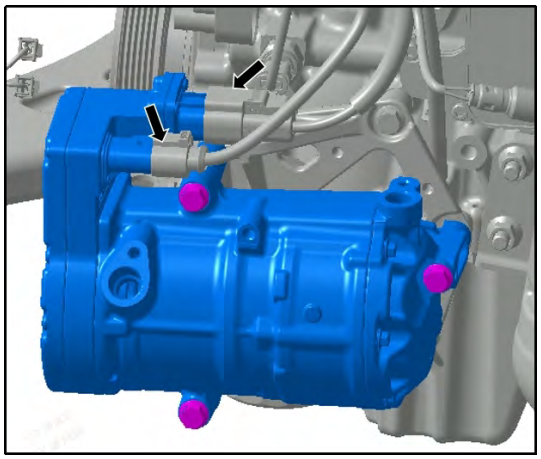
1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Discharge the A/C refrigerant. Refer to: Recovery, discharge and filling of A/C system.
3. Remove the cooling module assembly.
4. Lift the vehicle. Refer to: Lifting the vehicle.
5. Remove the fixing bolts connecting the compressor exhaust pipe to the electric compressor assembly, and disengage the compressor exhaust pipe from the electric compressor. Torque: 8±2 Nm



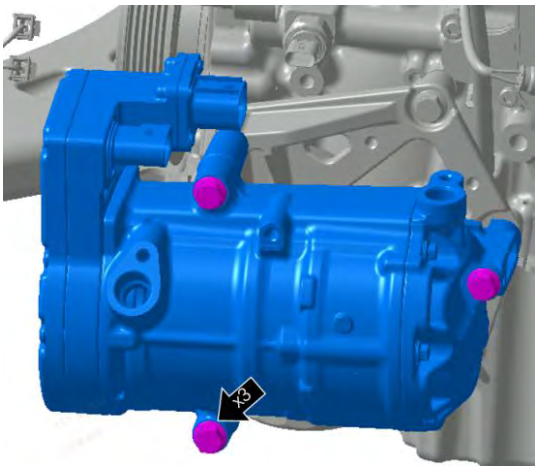
6. Remove the fixing bolts connecting the electric compressor suction pipe assembly to the electric compressor, and disengage the compressor exhaust pipe from the electric compressor. Torque: 8±2 Nm



7. Disconnect the electric compressor harness connector.



8. Remove the electric compressor assembly fixing bolts, and take down the electric compressor assembly. Torque: 24±3 Nm



Caution: After removing the A/C pipeline, cover or wrap the compressor suction and exhaust pipe ends and the compressor end interface with suitable materials (such as vinyl tape) to prevent moisture or impurities from entering.

Installation

1. The installation order is the reverse of the removal order.
2. Fill refrigerant. Refer to: Recovery, discharge and filling of A/C system.

4.18.4.4 Compressor suction pipe assembly

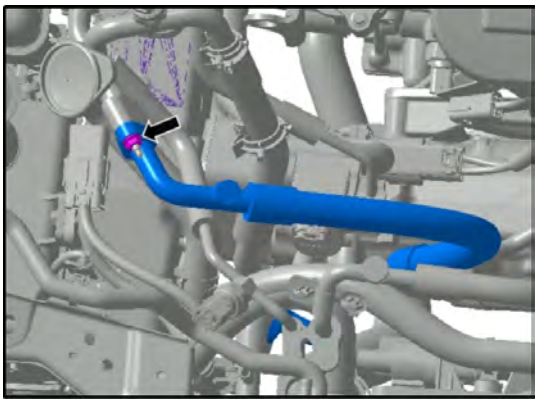
Material

Name	Specification
Refrigerant	R-134a(HFC-134a)

Removal

1. Discharge the A/C refrigerant. Refer to: Recovery, discharge and filling of A/C system.
2. Remove the fixing nuts of compressor suction pipe and high/low pressure pipe assembly.

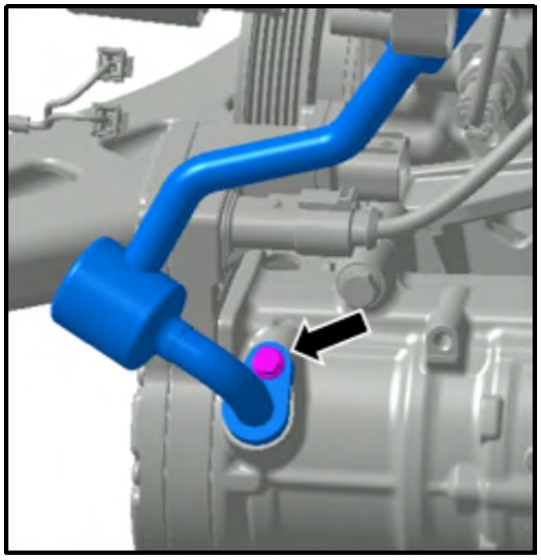
   Torque: 8±2 Nm



3. Remove the cooling module assembly. Refer to: Cooling module removal.

4. Remove the fixing bolts between compressor suction pipe and compressor.

   Torque: 8±2 Nm



5. Remove the compressor exhaust pipe assembly.

Installation

1. The installation order is the reverse of the removal order.

2. Fill refrigerant. Refer to: Recovery, discharge and filling of A/C system.

4.18.4.5 Compressor exhaust pipe assembly

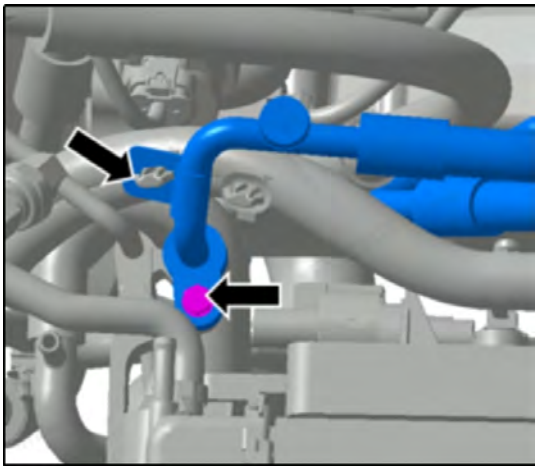
Material

Name	Specification
Refrigerant	R-134a(HFC-134a)

Removal

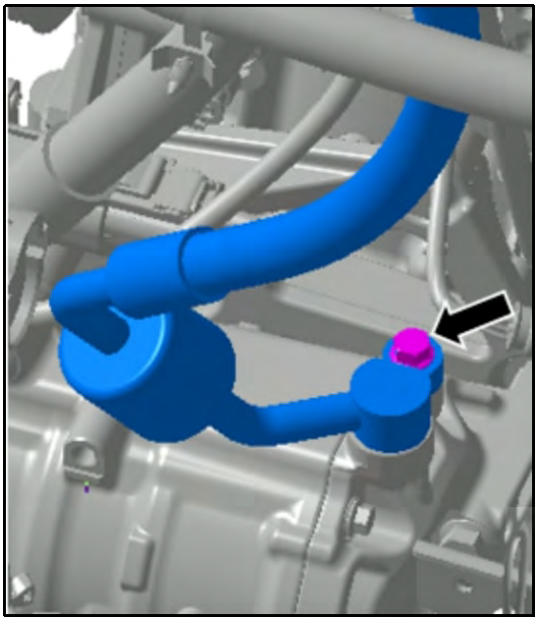
1. Discharge the A/C refrigerant. Refer to: Recovery, discharge and filling of A/C system.

2. Unplug the clip of the high-voltage harness, then pull the high-voltage harness aside, and then remove the fixing bolts connecting the compressor exhaust pipe assembly to the condenser. Torque: 8±2 Nm



3. Remove the cooling module assembly.

4. Remove the fixing bolts of the compressor exhaust pipe to the electric compressor connecting pipe. Torque: 8±2 Nm



5. Remove the compressor exhaust pipe.

Installation

1. The installation order is the reverse of the removal order.

2. Fill refrigerant. Refer to: Recovery, discharge and filling of A/C system.

4.18.4.6 Condenser

Removal

1. Drain the cooling system.

2. Remove the engine compartment cover plate. Refer to: Engine compartment cover plate.

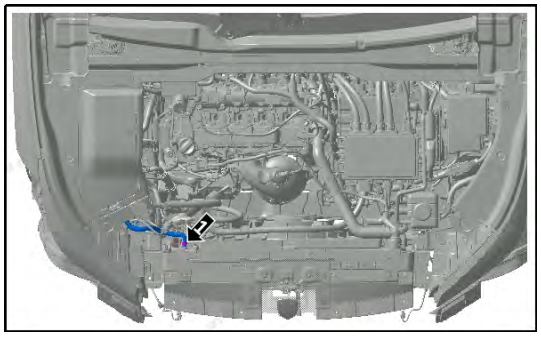
3. Remove the intake air filter. Refer to: Intake air filter.

4. Remove the front bumper. Refer to: Front bumper system.

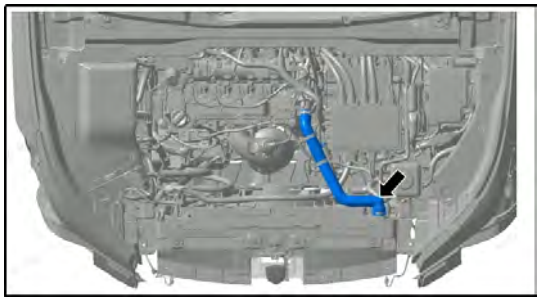
5. Remove the front anti-collision beam. Refer to: Front anti-collision beam assembly.

6. Remove the horn and high-voltage harness. Refer to: Horn.

7. Remove the single-lug stepless clamp and loosen the expansion tank water supply pipe 1

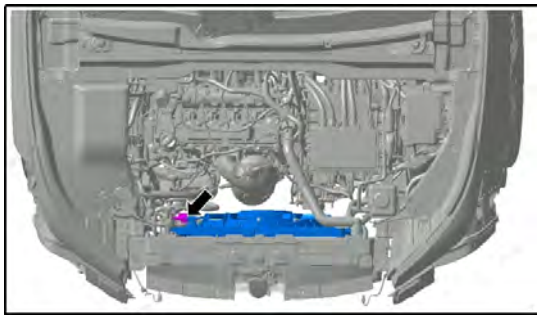


8. Loosen the engine water outlet at the radiator end.

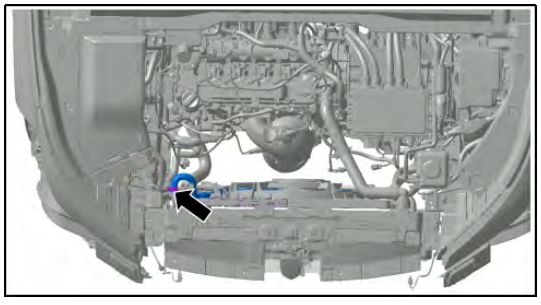


9. Remove the A/C high/low pressure pipe. Refer to: A/C pipeline.

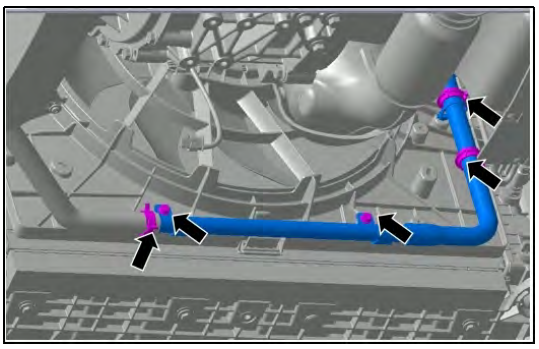
10. Unplug the harness connector of the Electronic fan.



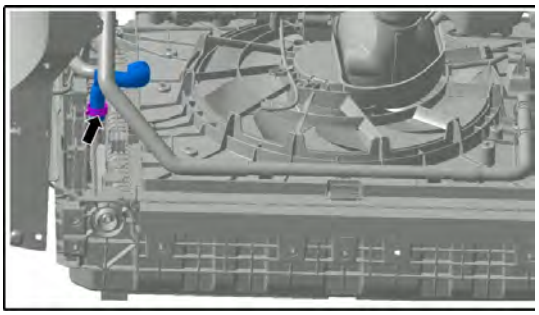
11. Remove the clamp and loosen the low-temperature radiator coolant pipe.



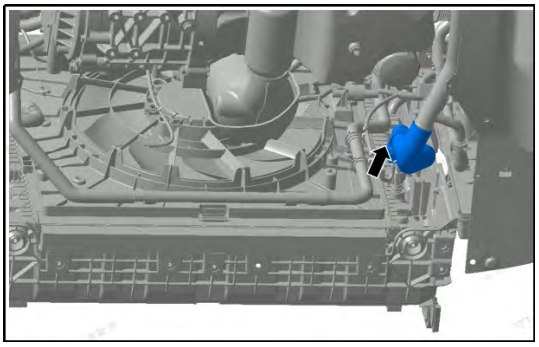
12. Remove the harness clips, bolts and clamps, and loosen the low-temperature radiator coolant pipe.



13. Remove the clamp and loosen the low-temperature radiator coolant pipe II.



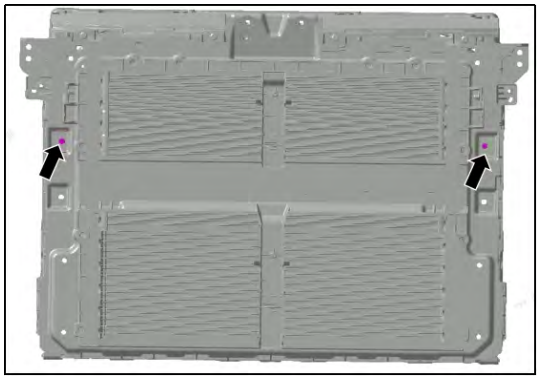
14. Loosen the interface between engine water inlet pipe and radiator.



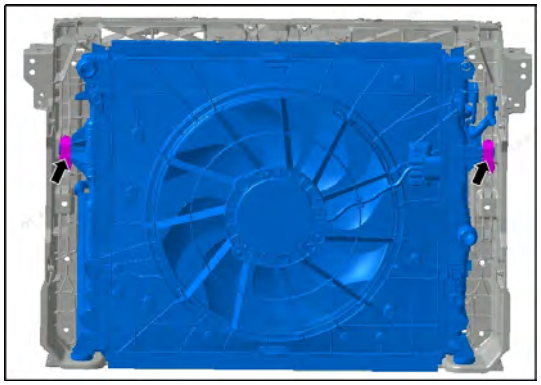
15. Remove the coolant temperature sensor. Refer to: Water temperature sensor.

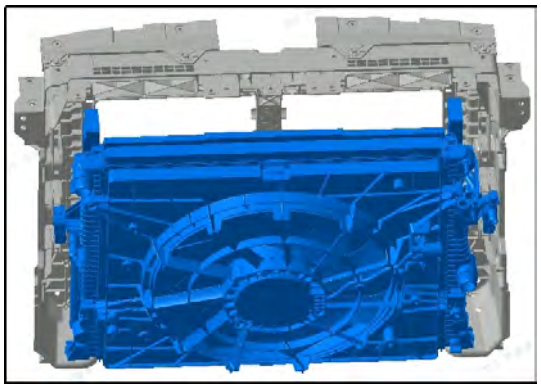
16. Remove the front frame module assembly. Refer to: Front-end framework system.

17. Remove the two fixing bolts on the front assembly module.



18. Loosen the left and right mount modules and remove the cooling module from the front frame.





19. Remove the condenser.

Installation

1. The installation order is the reverse of the removal order.

4.18.4.7 High/low pressure pipe assembly

Material

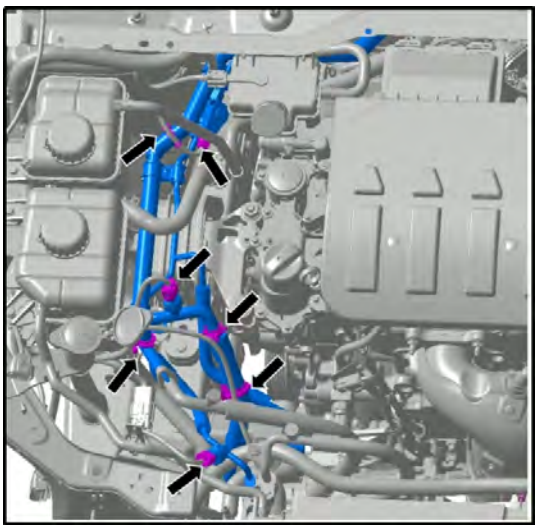
Name	Specification
Refrigerant	R-134a(HFC-134a)

Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal

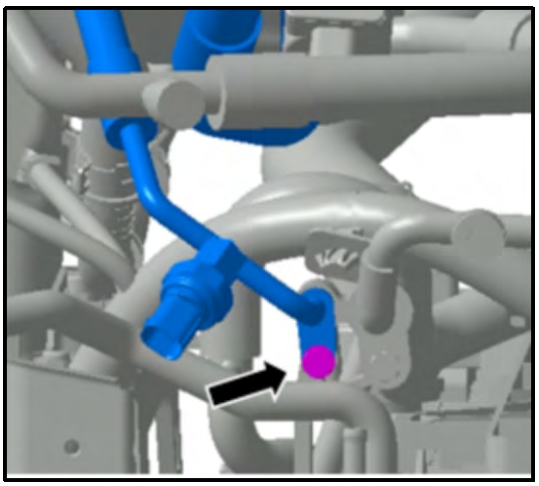
2. Discharge the A/C refrigerant. Refer to: Recovery, discharge and filling of A/C system.

3. Unplug the connecting clip and connector between the low-voltage harness and the high/low pressure pipe assembly, and then turn the high-voltage harness aside.



4. Remove the fixing bolts between high/low pressure pipes and condenser.

   Torque: 8±2 Nm



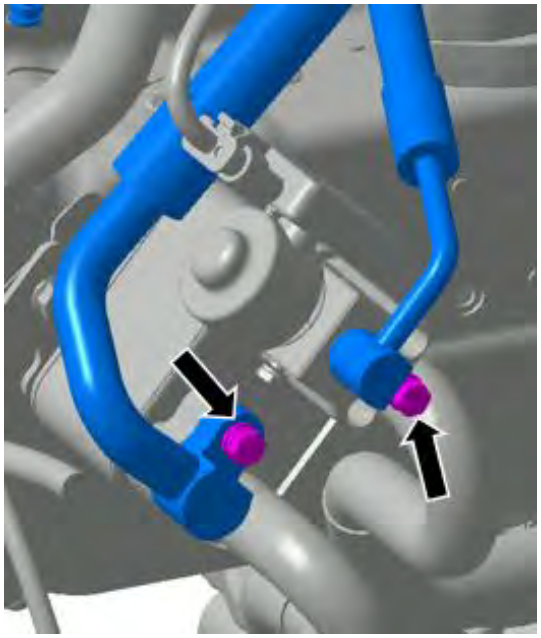
5. Remove the cooling module assembly.

6. Remove the compressor exhaust pipe assembly. Refer to: Compressor exhaust pipe assembly.

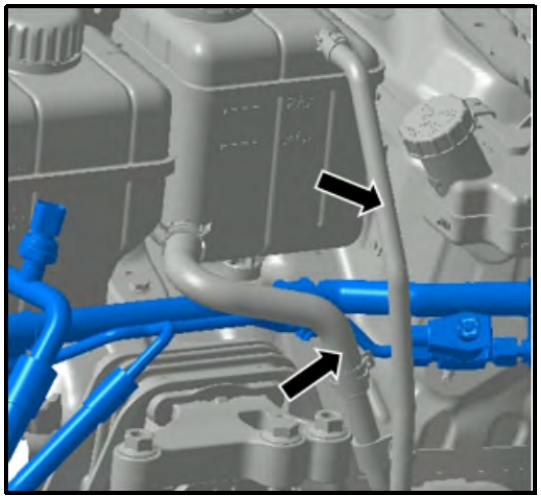
7. Remove the compressor suction pipe assembly. Refer to: Compressor suction pipe assembly.

8. Remove the fixing bolts of high/low pressure pipes and chiller.

   Torque: 8±2 Nm



9. Remove the chiller inlet pipe assembly. Refer to: Chiller water inlet pipe assembly.

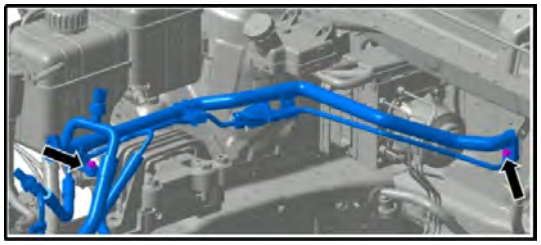


10. Remove the air intake system.

11. Remove the engine.

12. Remove the fixing bolts between the high/low pressure pipe assembly and the expansion tank bracket, and remove the fixing bolts between the high/low pressure pipes and the A/C box.

    Torque: 8±2 Nm



Installation

1. The installation order is the reverse of the removal order.

2. Fill refrigerant. Refer to: Recovery, discharge and filling of A/C system. Refer to: Recovery, discharge and filling of A/C system.

4.18.4.8 A/C coolant inlet pipe

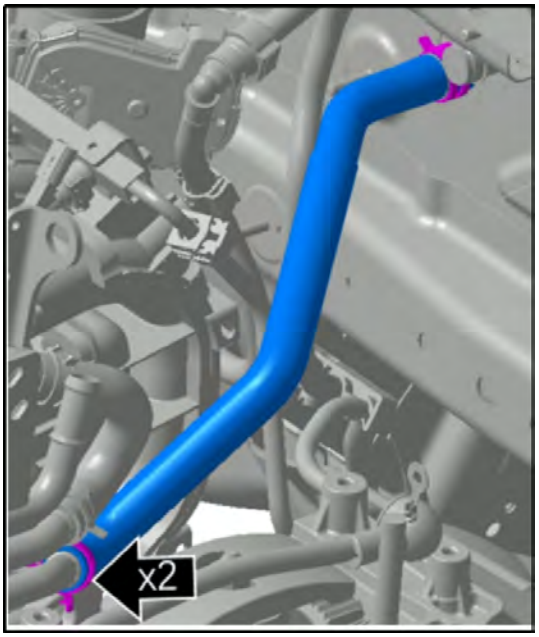
Removal

1. Drain the coolant.

2. Remove the PTC heater assembly. Refer to: PTC heater assembly.

3. Remove the A/C water outlet pipe. Refer to: A/C water outlet pipe.

4. Remove the fixing hoop of A/C water inlet pipe, A/C unit and four-way valve inlet/outlet pipe assembly.



5. Remove the A/C water inlet pipe.

Installation

1. The installation order is the reverse of the removal order.

2. Fill the coolant. Refer to: Recovery, discharge and filling of A/C system.

4.18.4.9 A/C coolant outlet pipe

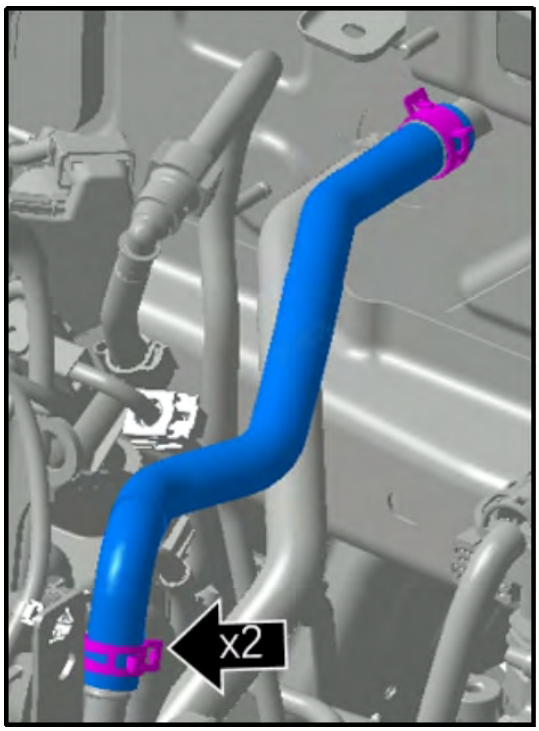
Removal

1. Drain the coolant. Refer to: Recovery, discharge and filling of A/C system.

2. Remove the air filter system.

3. Remove the on-board charging module system.

4. Remove the fixing hoop of A/C water outlet pipe, A/C unit and four-way valve inlet/outlet pipe assembly.



5. Remove the A/C water outlet pipe.

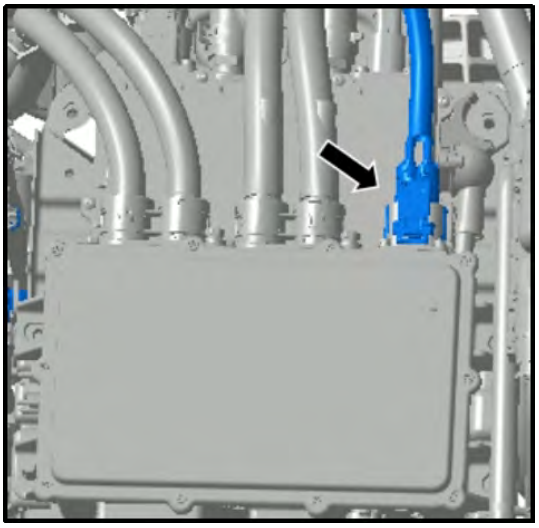
Installation

1. The installation order is the reverse of the removal order.
2. Fill the coolant. Refer to: Recovery, discharge and filling of A/C system.

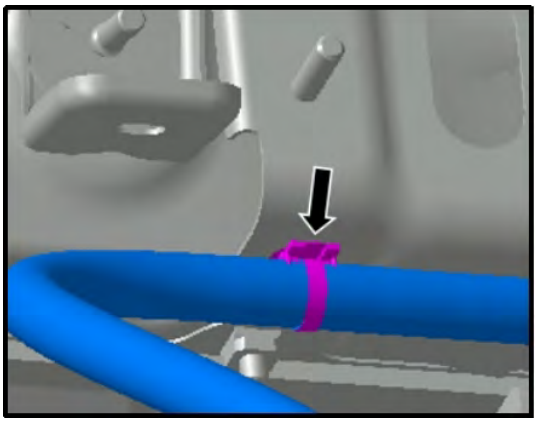
4.18.4.10 PTC heater assembly

Removal

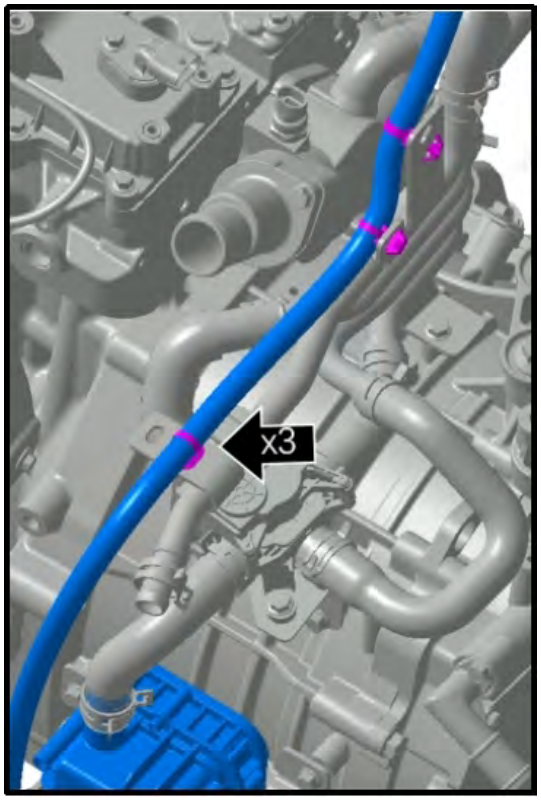
1. Drain the coolant. Refer to: Recovery, discharge and filling of A/C system.
2. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
3. Remove the connector between PTC heater assembly and on-board charging module.



4. Unplug the clip between the low-voltage harness of the PTC heater assembly and the body bracket.

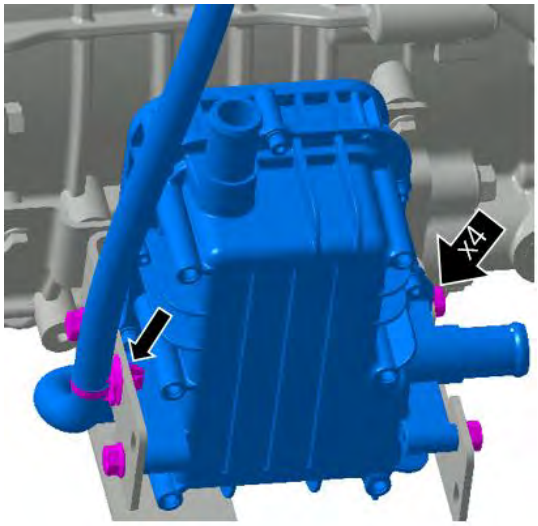


5. Remove the PTC water outlet pipe. Refer to: PTC water outlet pipe.
6. Remove the heater coolant pump inlet pipe. Refer to: Heater water pump inlet pipe.
7. Remove the air filter. Refer to: Air filter.
8. Remove the on-board charging module.
9. Remove the High Voltage harness module and the Low-voltage harness module.
10. Remove the clip between PTC heater assembly harness and A/C water pipe assembly I.



11. Remove the clips and fixing bolts between PTC heater assembly harness and PTC heater bracket.

    Torque: 8±2 Nm



12. Remove the PTC heater assembly.

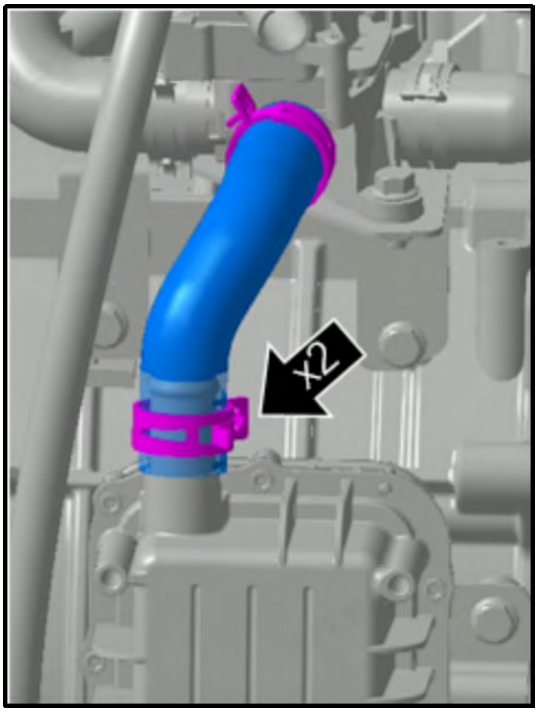
Installation

1. The installation order is the reverse of the removal order.
2. Fill coolant. Refer to: Recovery, discharge and filling of A/C system. Refer to: Recovery, discharge and filling of A/C system.

4.18.4.11 PTC coolant inlet pipe

Removal

1. Drain the coolant. Refer to: Recovery, discharge and filling of A/C system.
2. Remove the cooling module assembly.
3. Remove the fixing hoop of PTC water inlet pipe, PTC heater assembly and four-way coolant valve.



4. Remove the PTC water inlet pipe.

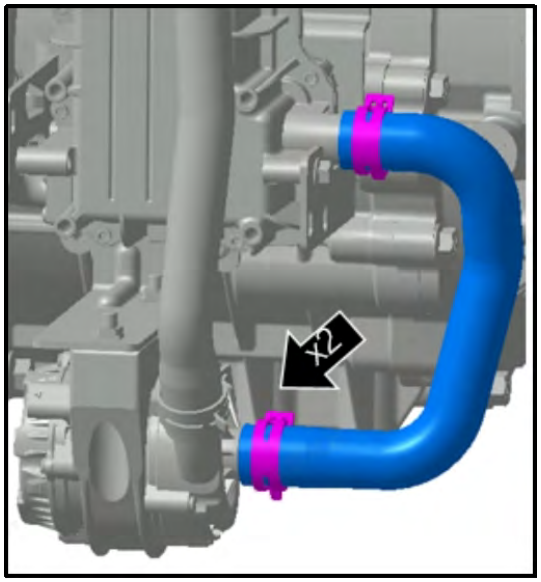
Installation

1. The installation order is the reverse of the removal order.
2. Fill the coolant. Refer to: Recovery, discharge and filling of A/C system.

4.18.4.12 PTC coolant outlet pipe

Removal

1. Drain the coolant. Refer to: Recovery, discharge and filling of A/C system.
2. Remove the cooling module assembly.
3. Remove the motor coolant pump inlet hose assembly.
4. Remove the low-temperature radiator water outlet pipe assembly.
5. Remove the fixing hoop between PTC water outlet pipe and coolant pump/PTC heater assembly.



6. Remove the PTC water outlet pipe.

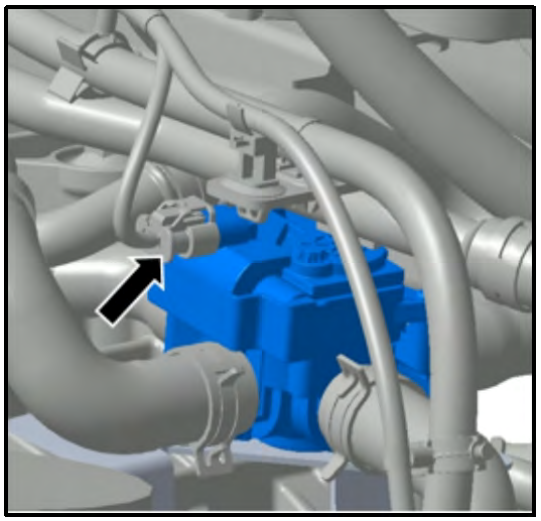
Installation

1. The installation order is the reverse of the removal order.
2. Fill the coolant. Refer to: Recovery, discharge and filling of A/C system.

4.18.4.13 Four-way coolant valve

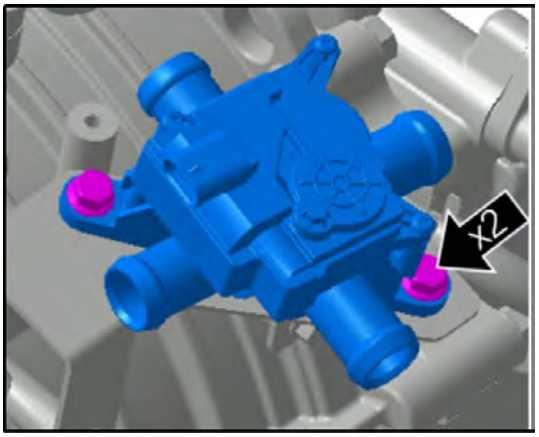
Removal

1. Drain the coolant. Refer to: Recovery, discharge and filling of A/C system.
2. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
3. Remove the air filter system.
4. Remove the cooling system.
5. Remove the connector between the four-way coolant valve and the low-voltage harness.



6. Remove the four-way valve inlet and outlet pipe assembly. Refer to: Four-way valve inlet and outlet pipe assembly.
7. Remove the PTC water inlet pipe. Refer to: PTC water inlet pipe.
8. Remove the fixing bolts of the four-way coolant valve and four-way coolant valve bracket.

   Torque: 8±2 Nm



9. Remove the four-way coolant valve.

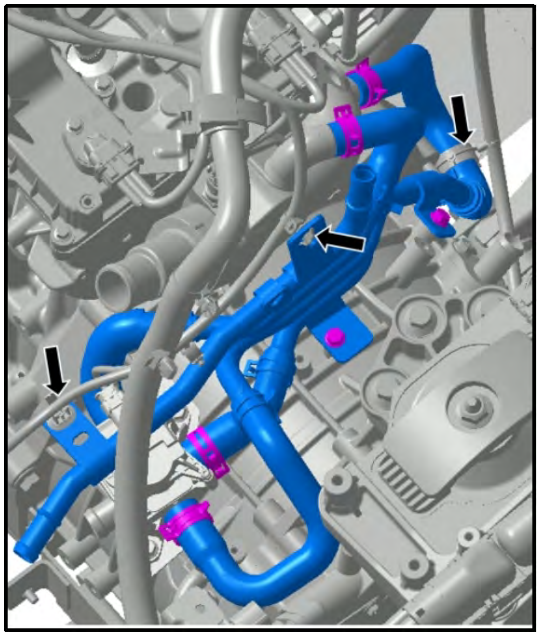
Installation

1. The installation order is the reverse of the removal order.
2. Fill the coolant. Refer to: Recovery, discharge and filling of A/C system.

4.18.4.14 Four-way valve water inlet and outlet pipe assembly

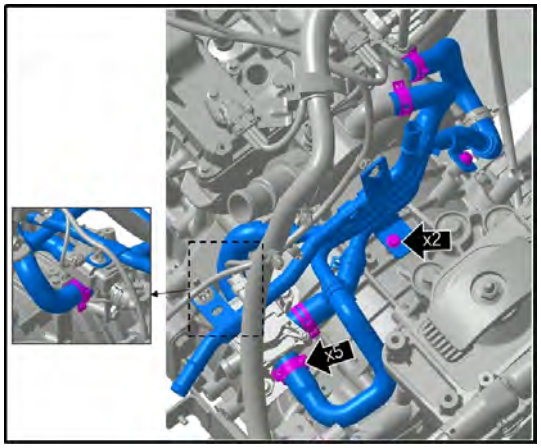
Removal

1. Drain the coolant. Refer to: Recovery, discharge and filling of A/C system
2. Remove the PTC heater assembly. Refer to: PTC heater assembly.
3. Remove the A/C water outlet pipe. Refer to: A/C water outlet pipe.
4. Remove the A/C water inlet pipe. Refer to: A/C water inlet pipe.
5. Remove the clip between the four-way valve inlet/outlet pipe assembly and harness.



6. Remove the fixing hoop between the four-way valve inlet and outlet pipe assembly and the four-way water valve, the fixing hoop with the engine, and the fixing bolts with the generator two-in-one assembly.

   Torque: 8±2Nm



7. Remove the four-way valve inlet and outlet pipe assembly.

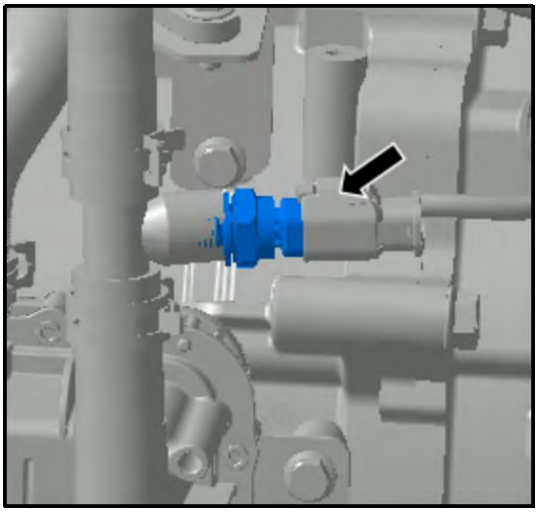
Installation

1. The installation order is the reverse of the removal order.
2. Fill the coolant. Refer to: Recovery, discharge and filling of A/C system.

4.18.4.15 Coolant temperature sensor

Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Remove the connector between water temperature sensor and harness.



3. Take out the coolant temperature sensor.

Installation

1. The installation order is the reverse of the removal order.

4.18.4.16 Heater coolant pump inlet pipe

Removal

1. Remove the coolant temperature sensor. Refer to: Water temperature sensor.
2. Drain the coolant. Refer to: Recovery, discharge and filling of A/C system
3. Remove the fixing hoop between heater coolant pump inlet pipe and coolant pump/A/C water pipe assembly I.

4. Remove the heater coolant pump inlet pipe.

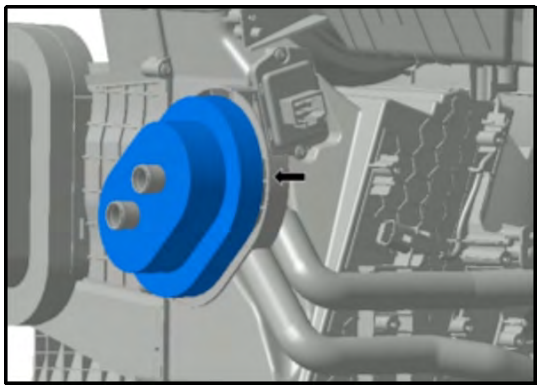
Installation

1. The installation order is the reverse of the removal order.
2. Fill coolant.

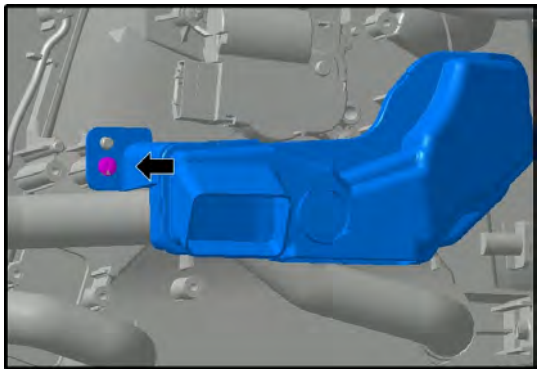
4.18.4.17 Heater core

Removal

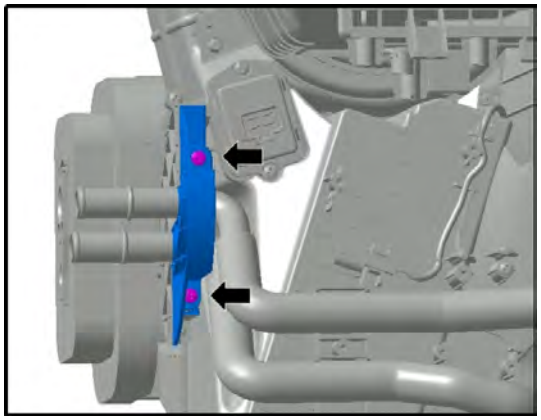
1. Remove the electric A/C HVAC assembly. Refer to: A/C HVAC assembly.
2. Remove the sponge pads fixing the heater core inlet and outlet pipes.



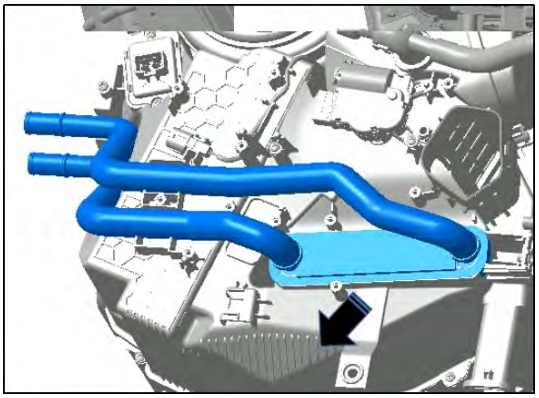
3. Remove the fixing screws of the left air-to-footwell air duct, and then take down the left air-to-footwell air duct.



4. Remove the fixing screws of heater core pipeline pressure plate.



5. Take out the heater core.



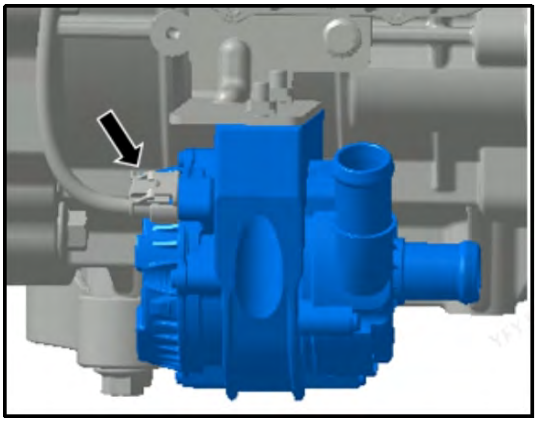
Installation

1. The installation order is the reverse of the removal order.
2. Fill the coolant. Refer to: Recovery, discharge and filling of A/C system.

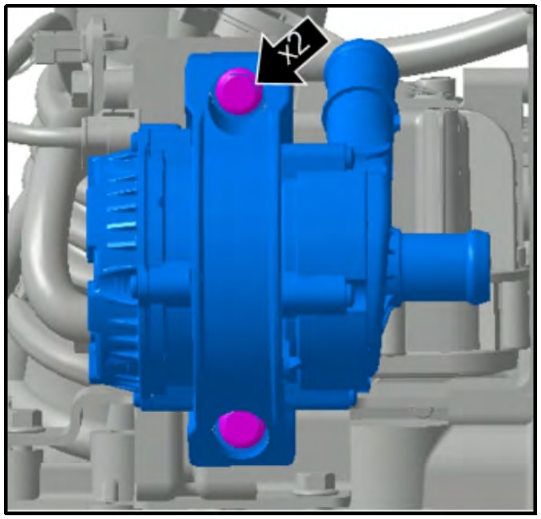
4.18.4.18 Electric coolant pump assembly

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Drain the coolant. Refer to: Recovery, discharge and filling of A/C system.
3. Remove the PTC water outlet pipe. Refer to: PTC water outlet pipe.
4. Remove the heater coolant pump inlet pipe. Refer to: Heater coolant pump inlet pipe.
5. Remove the connector between electric coolant pump and harness.



6. Lift the vehicle. Refer to: Lifting the vehicle.
7. Remove the fixing bolts of electric coolant pump and PTC heater bracket.



8. Remove the electric coolant pump.

Installation

1. The installation order is the reverse of the removal order.
2. Fill coolant. Refer to: Recovery, discharge and filling of A/C system.

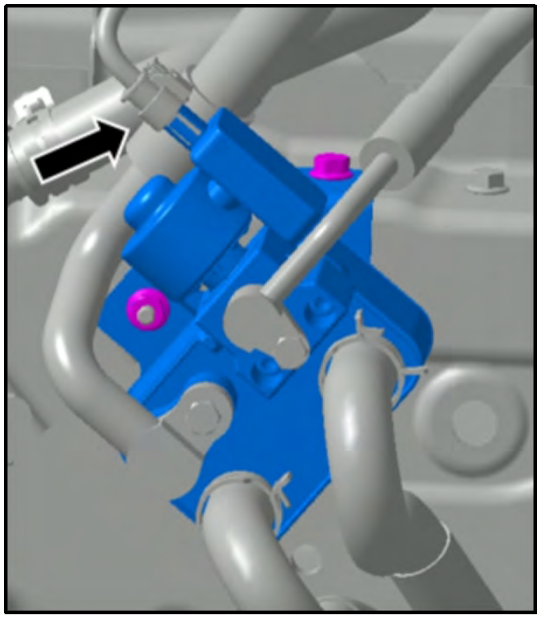
4.18.4.19 Chiller

Material

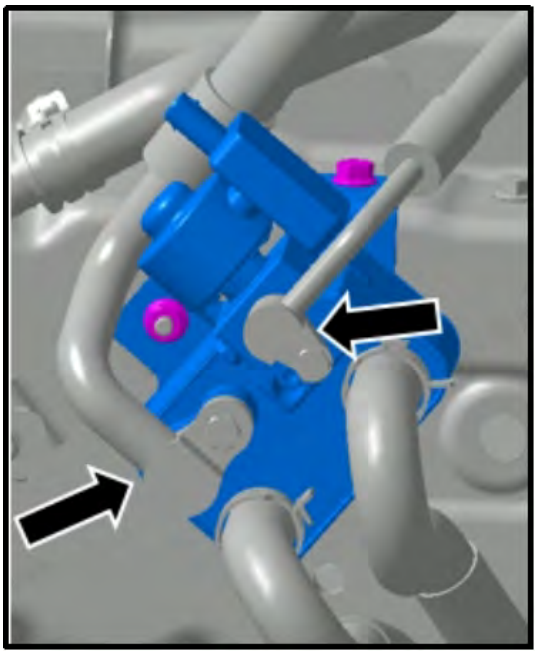
Name	Specification
Refrigerant	R-134a(HFC-134a)

Removal

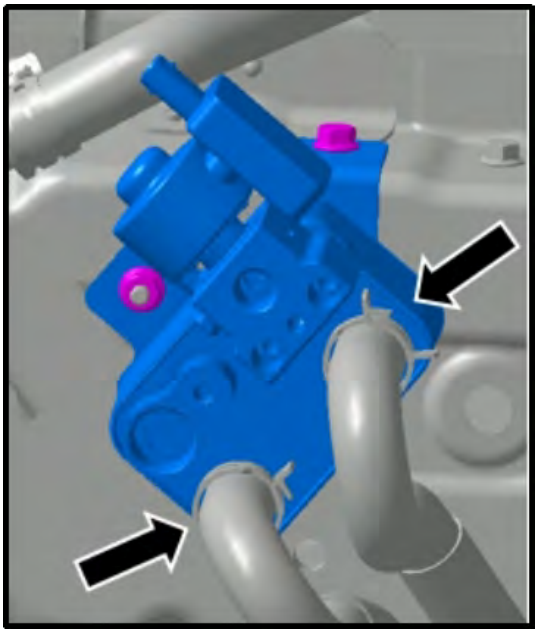
1. Disconnect the battery negative cable Refer to: Disconnecting battery negative terminal.
2. Remove the Low-voltage/pressure connector of the chiller.



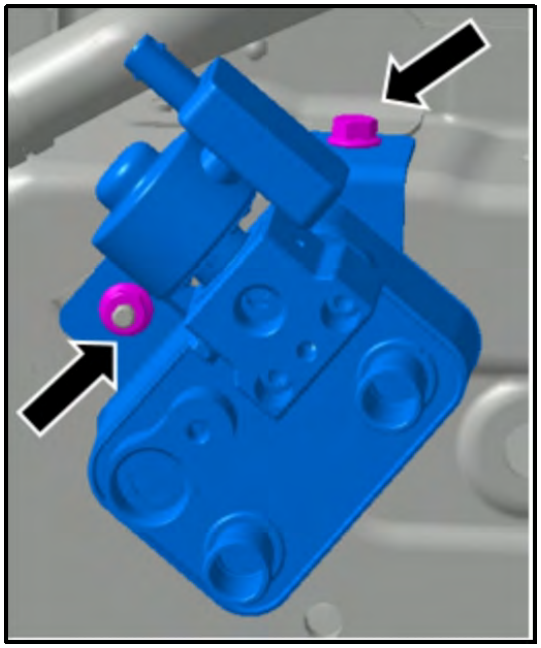
3. Drain coolant and A/C refrigerant. Refer to: Recovery, discharge and filling of A/C system
4. Remove the high/low pressure pipe assembly. Refer to: High/low pressure pipe assembly.



5. Remove the chiller water inlet pipe. Refer to: Chiller water inlet pipe.



6. Remove the fixing bolts and fixing nuts between the chiller and the body. Torque: 8±2 Nm



7. Remove the chiller.

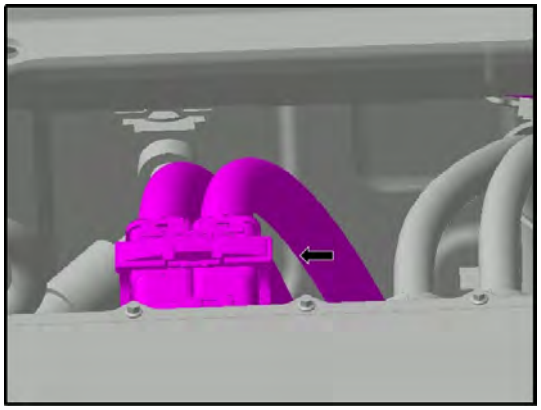
Installation

1. The installation order is the reverse of the removal order.
2. Fill refrigerant and coolant. Refer to: Recovery, discharge and filling of A/C system

4.18.4.20 Electric A/C HVAC assembly

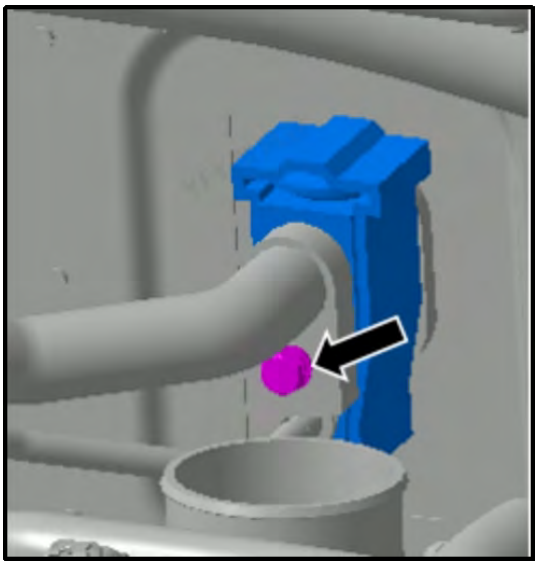
Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Drain the coolant. Refer to: Coolant discharge
3. Discharge the A/C refrigerant. Refer to: Recovery, discharge and filling of A/C system.
4. Disconnect the high-voltage power distribution box connector.

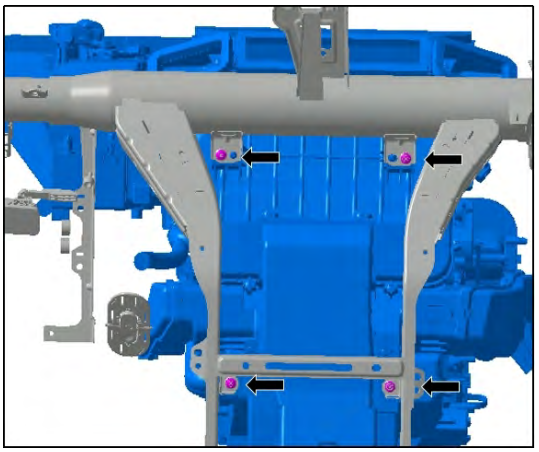


5. Remove the air filter system.
6. Remove the fixing bolts of high/low pressure pipe assembly, and disconnect the high/low pressure pipe assembly.

   Torque: 8±2 Nm



7. Remove the A/C water outlet pipe. Refer to: A/C outlet pipe.
8. Remove the A/C water inlet pipe. Refer to: A/C water inlet pipe.
9. Remove the dashboard assembly. Refer to: Instrument panel assembly.
10. Remove the upper trim panel assembly.
11. Remove the lower trim panel assembly.
12. Remove the fixing bolts of HVAC assembly, and remove the HVAC assembly.



Installation

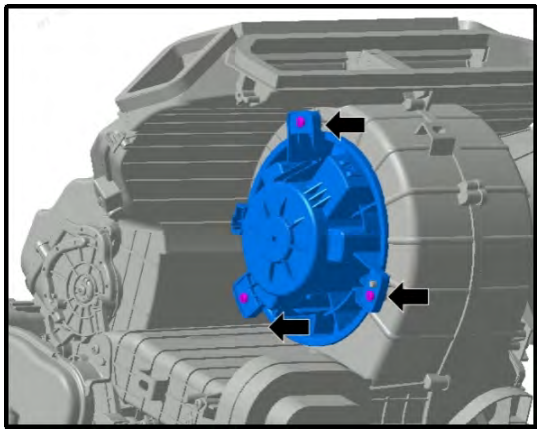
1. The installation order is the reverse of the removal order.
2. Add refrigerant. Refer to: Recovery, discharge and filling of A/C system.

3. Fill coolant. Refer to: Coolant discharge

4.18.4.21 Blower

Removal

1. Remove the electric A/C HVAC assembly. Refer to: A/C HVAC assembly.
2. Remove the fixing screws of the blower, and then take out the blower.



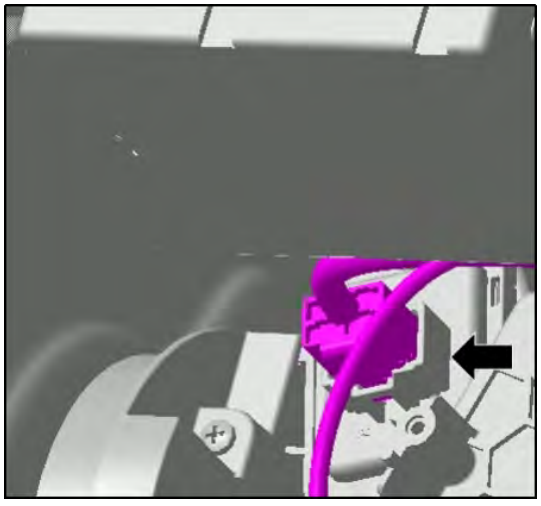
Installation

The installation order is the reverse of the removal order.

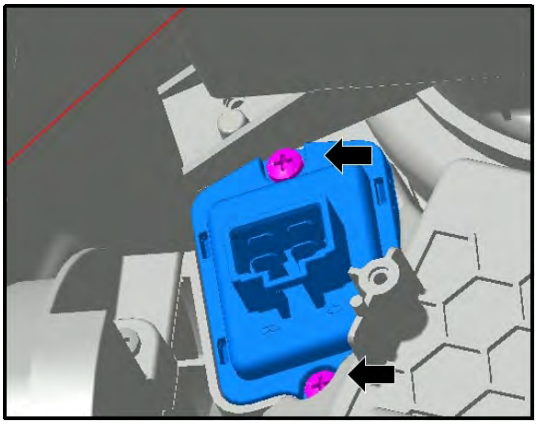
4.18.4.22 Speed regulation module

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Disconnect the harness connector of speed regulation module.



3. Remove the fixing screws of the speed regulation module, and take down the speed regulation module .



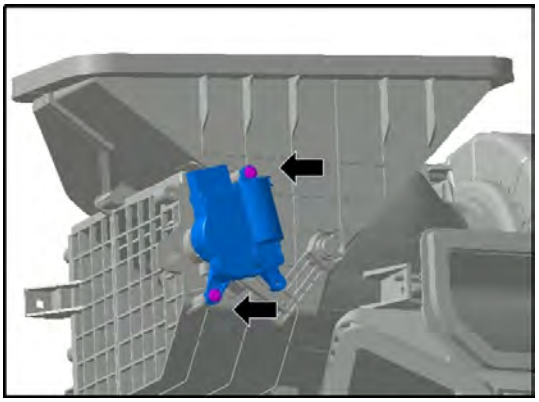
Installation

The installation order is the reverse of the removal order.

4.18.4.23 Internal/external actuator

Removal

1. Remove the electric A/C HVAC assembly. Refer to: A/C HVAC assembly.
2. Remove the fixing screws of the internal and external air actuators, and remove the internal and external air actuators.



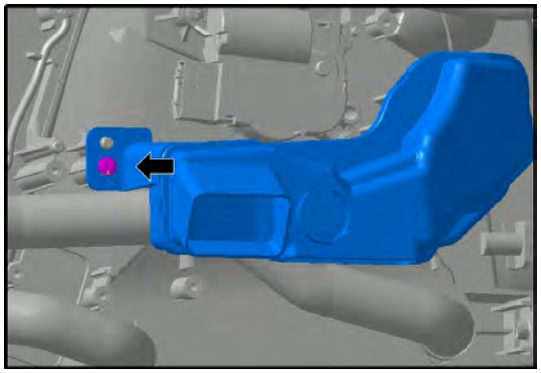
Installation

The installation order is the reverse of the removal order.

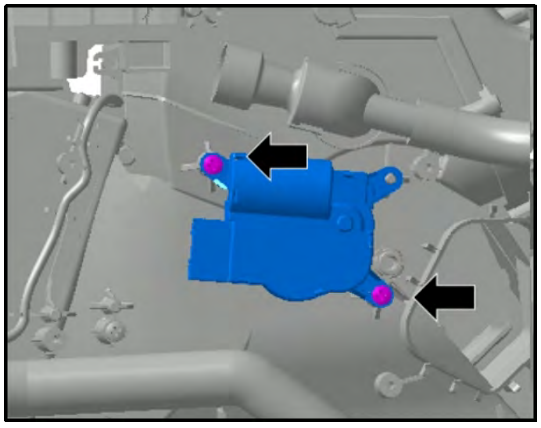
4.18.4.24 Temperature actuator

Removal

1. Remove the electric A/C HVAC assembly. Refer to: A/C HVAC assembly.
2. Remove the fixing screws of the left air-to-footwell air duct, and then take down the left air-to-footwell air duct.



3. Remove the fixing screws of temperature actuator, and take down the temperature actuator.



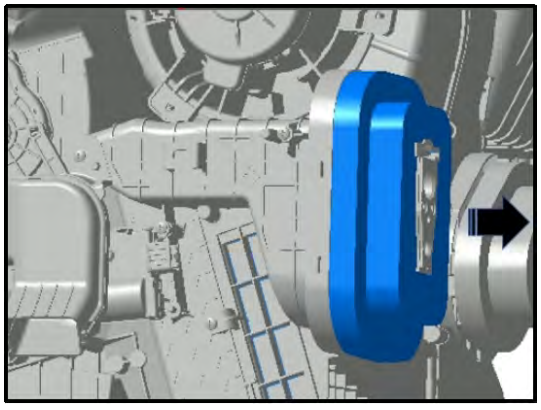
Installation

The installation order is the reverse of the removal order.

4.18.4.25 Expansion valve

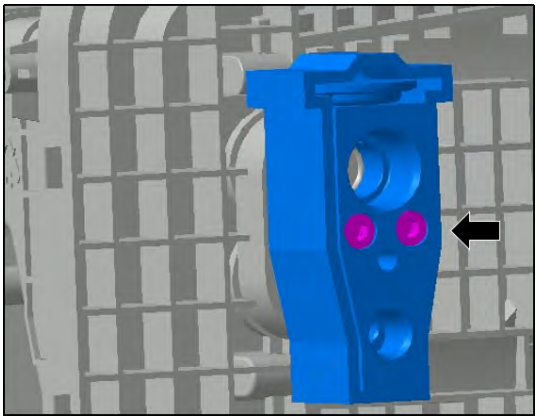
Removal

1. Remove the electric A/C HVAC assembly. Refer to: A/C HVAC assembly.
2. Remove the expansion valve fixing sponge pad.



3. Remove the hex socket head fixing bolts of expansion valve, and take down the expansion valve.

   Torque: 8±2 Nm



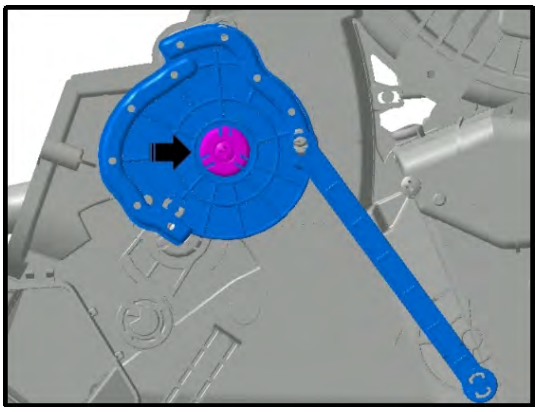
Installation

The installation order is the reverse of the removal order.

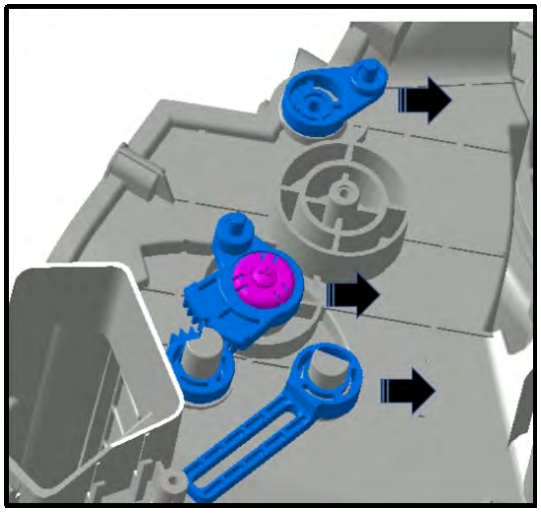
4.18.4.26 Evaporator core body

Removal

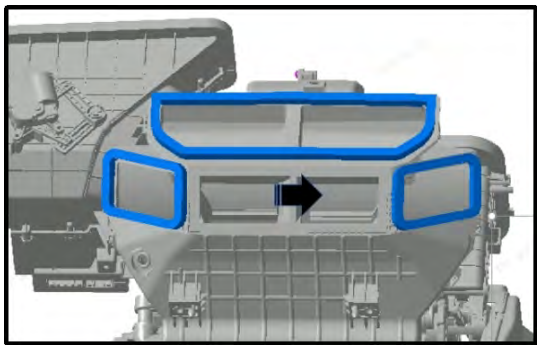
1. Remove the electric A/C HVAC assembly. Refer to: A/C HVAC assembly.
2. Remove the expansion valve. Refer to: Expansion valve.
3. Remove the mode actuator.
4. Remove the mode panel fixing screws, and remove the mode panel and its connecting rod mechanism.



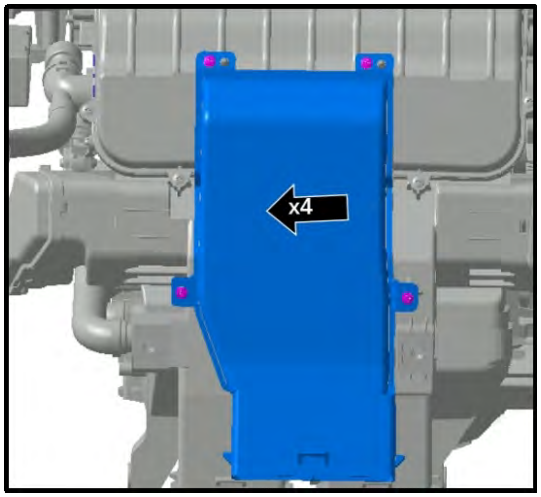
5. Remove the mode damper linkage.



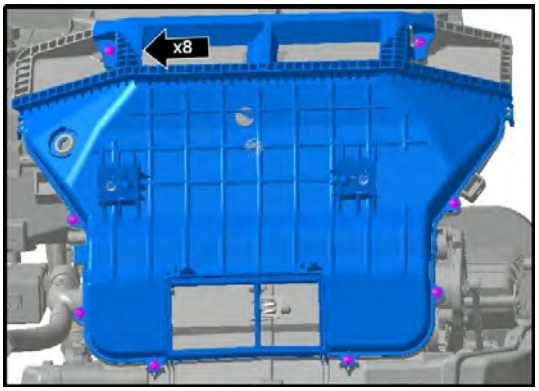
6. Remove the sealing sponge of air-to-face and defrosting air vent.



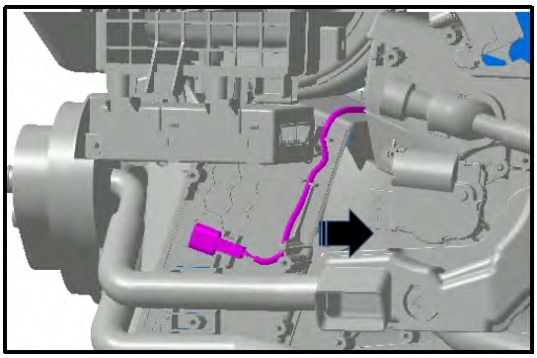
7. Remove the fixing screws of rear air-to-face air vent cover plate.



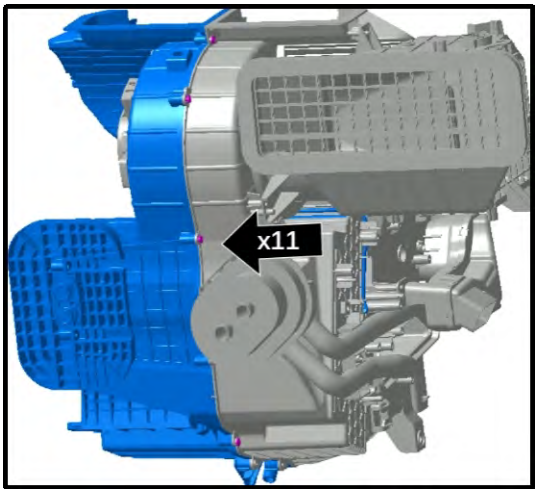
8. Remove the fixing screws of air-to-face air vent cover plate, and remove the air-to-face air vent cover plate.



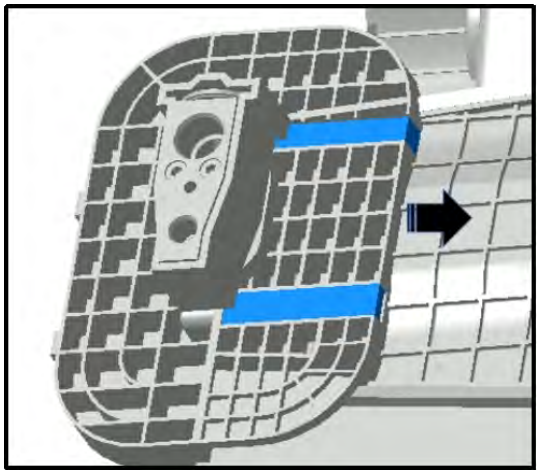
9. Loosen the evaporator sensor outgoing harness.



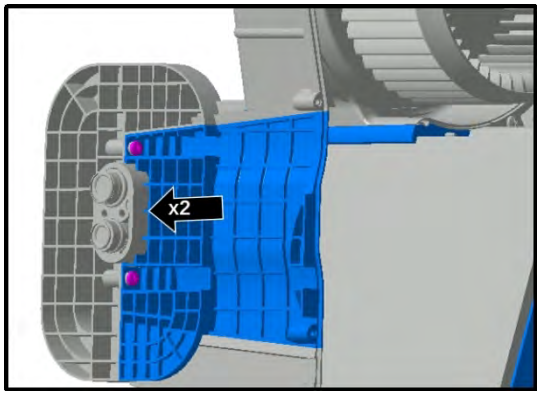
10. Remove the fixing screws of the left and right housings of the A/C box to divide the A/C box into two halves.



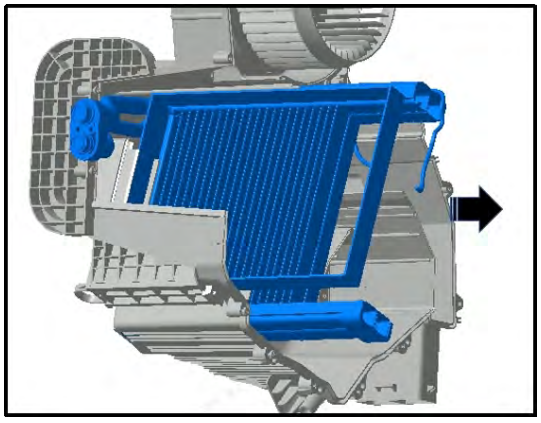
11. Remove the filling sponge block of expansion valve cover plate.



12. Remove the fixing screws of expansion valve cover plate, and take off the expansion valve cover plate.



13. Remove the evaporator core.



Installation

The installation order is the reverse of the removal order.

4.18.4.27 Evaporator temperature sensor

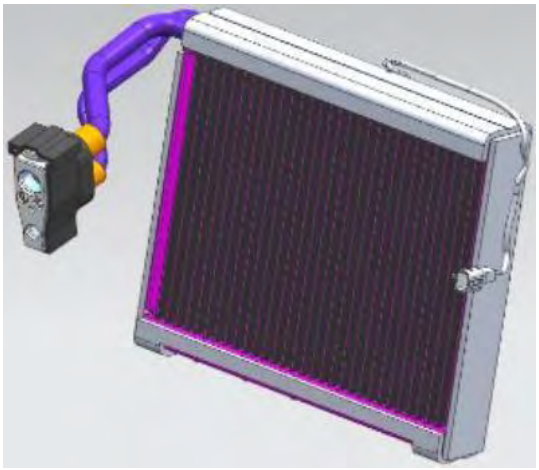
Removal

1. Remove the HVAC assembly. Refer to: HVAC assembly.
2. Remove the A/C unit right housing and remove the evaporator core from the HVAC assembly.
3. Remove the evaporator sensor.

Pay attention to the following matters:

Caution: During removal, protect the HVAC assembly housing from damage.

Caution: During removal, protect the flat tube of evaporator core from damage.



Installation

The installation order is reverse to the removal order. Pay attention to the following points

Caution: During assembly, pay attention to protect the flat tube of evaporator core from damage.

Caution: During assembly, pay attention to check whether the housing is tightly attached in place and whether there are impurities such as bolts and sponges left inside the housing.

Caution: The plug cap or adhesive tape can only be removed during connection to keep clean.

Caution: When reconnecting the A/C pipeline, replace it with a new O-ring, and then apply compressor oil (**PAG56**) to the joint and sealing ring.

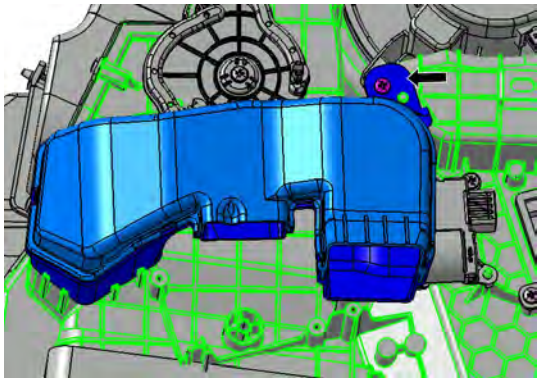
Caution: Check for leaks when filling refrigerant.

Caution: After assembly, power on and check whether the cooling, heating, air volume, temperature, mode and other dampers of the HVAC assembly work normally.

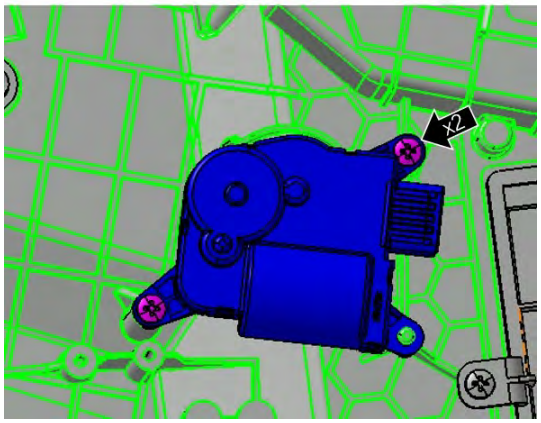
4.18.4.28 Mode servo motor

Removal

1. Remove the HVAC assembly. Refer to: HVAC assembly.
2. Remove the tapping screw of right air-to-footwell duct and take down the right air-to-footwell duct.



3. Remove 2 self-tapping screws from the mode servo motor and remove it.



Installation

The installation order is reverse to the removal order. Pay attention to the following points

Caution: The plug cap or adhesive tape can only be removed during connection to keep clean.

Caution: When reconnecting the A/C pipeline, replace with a new O-ring and then apply compressor oil (**PAG56**) to the joint and sealing ring.

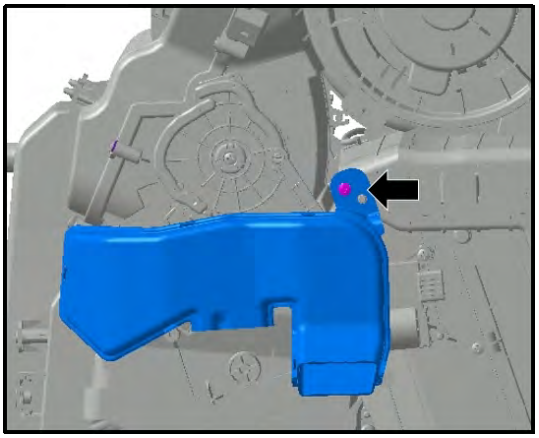
Caution: Check for leaks when filling refrigerant.

Caution: Check for leaks when filling coolant.

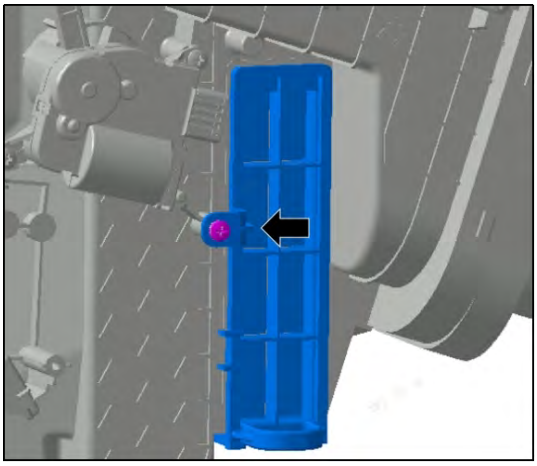
4.18.4.29 A/C filter screen

Removal

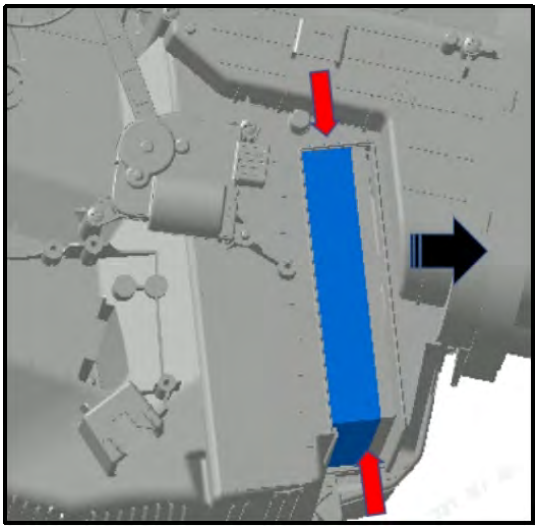
1. Remove the electric A/C HVAC assembly. Refer to: A/C HVAC assembly.
2. Remove the right air-to-footwell air duct fixing screw and remove the right air-to-footwell air duct.



3. Remove the fixing screws of A/C filter screen cover plate, and take off the A/C filter screen cover plate.



4. Pinch the A/C filter up and down, and take out the A/C filter.



Installation

The installation order is the reverse of the removal order.

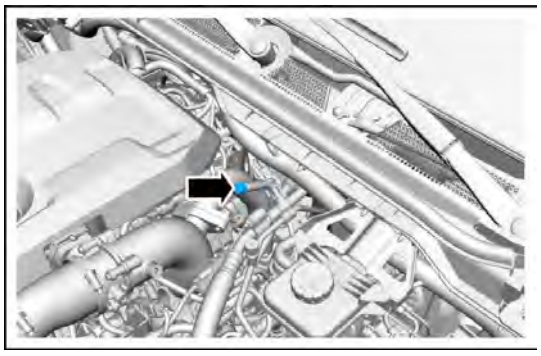
4.18.5 General procedures

4.18.5.1 Recovery, discharge and filling of the A/C system

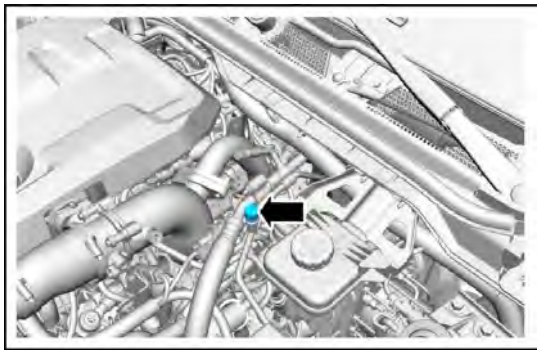
Caution: The refrigerant identification equipment must be used before the system is evacuated. Otherwise, the maintenance equipment will also be contaminated. All contaminated A/C refrigerant must be disposed of as hazardous waste.

Caution: Follow the manufacturer's instructions when performing maintenance.

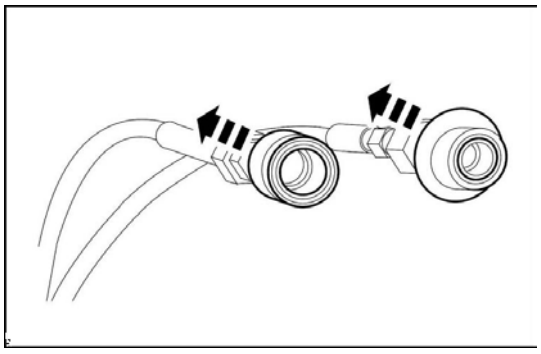
1. Remove the protective cover of low-pressure A/C filling port.



2. Remove the protective cover of the high-pressure A/C filling port.



3. Pull back the quick-fit connection on the maintenance equipment tube.



Warning: Do not let the refrigerant directly enter the air under any conditions when discharging the refrigerant.

Caution: The inner diameter of the high-pressure side is smaller, and the inner diameter of the low-pressure side is larger.

Caution: When removing the A/C system parts, calculate the amount of refrigerant remaining in them.

4. Evacuate the A/C system through the low-pressure port according to the maintenance equipment manufacturer's instructions.

Caution: The A/C system must be refilled after being evacuated for about 30 min so as to ensure correct operation.

Caution: If the open system is exposed to moisture for a long time, replace the battery/dryer and extend the evacuation time to 2~3h. Evacuate the A/C system in accordance with the maintenance equipment manufacturer's guidelines.

5. Evacuate the A/C system in accordance with the maintenance equipment manufacturer's guidelines.

Caution: If the A/C system is evacuated before evacuation of refrigerant, some refrigerant will remain in the compressor refrigerant. This residual refrigerant may evaporate, causing a slight pressure increase during leakage detection. The A/C system will not cause leakage when the pressure increase does not exceed 20 mbar.

6. Check for leaks by closing the manual valve on the gauge, turning off the vacuum pump of the maintenance equipment and observing the low pressure gauge.

Caution: This step can only be carried out if the pressure increases by more than 20 mbar.

7. A leak detector is used to locate any leakage in the A/C refrigeration line.

8. Fill refrigerant into the A/C system.

Caution: Fill the A/C system with gas only through a low pressure connection.

Caution: The A/C system must be evacuated before filling.

Caution: Depending on the maintenance equipment (with or without a heatable filler cylinder), the A/C system can be filled with liquid through the high-pressure port or gas through the low-pressure port.

Caution: The filling amount is marked on a label in the compartment.

9. Fill the A/C system with liquid through a high-pressure connection.

10. Cut-off valve

1 Open the shut-off valve on the high pressure side

2 Turn on the maintenance equipment to "Fill" mode and fill a certain amount of liquid refrigerant (R134a) into the system.

11. Fill the A/C system with gas through a low pressure connection.

12. Low-pressure valve

1 Open the cut-off valve on the LP side.

2 Turn on the maintenance equipment to "Fill" mode and fill a certain amount of gas refrigerant into the system.

3 Fill residual refrigerant with the A/C system turned on. For this purpose, run at a speed of 1200-1500 rpm. Set the A/C system to the most forced cooling and fresh air mode. Set the blower to its maximum setting. Fill the residual amount of specified filling volume.

Caution: Do not disconnect the high-pressure hose when the A/C is turned on.

13. Disconnect the maintenance equipment.

14. Close the valve.

1 Close the cut-off valve.

2 Turn off the maintenance equipment.

3 Disconnect the maintenance equipment connecting pipe from the A/C system filling connector.

4 Screw the protective cover onto the filling port.

Treatment of Contaminated Refrigerant

Caution: For contamination of any refrigerant that does not match the R134a refrigerant, it can only be handled by equipment designed to collect and store contaminated refrigerant, thus avoiding filling on other vehicles.

1. Refrigerant identification equipment is used to check the A/C system for presence of any contaminated refrigerant.

2. Advise the customer of additional costs arising from system repairs due to contamination.

3. Remove contaminated refrigerant.

5.1 Lights

5.1.1 Specification

5.1.1.1 General specifications

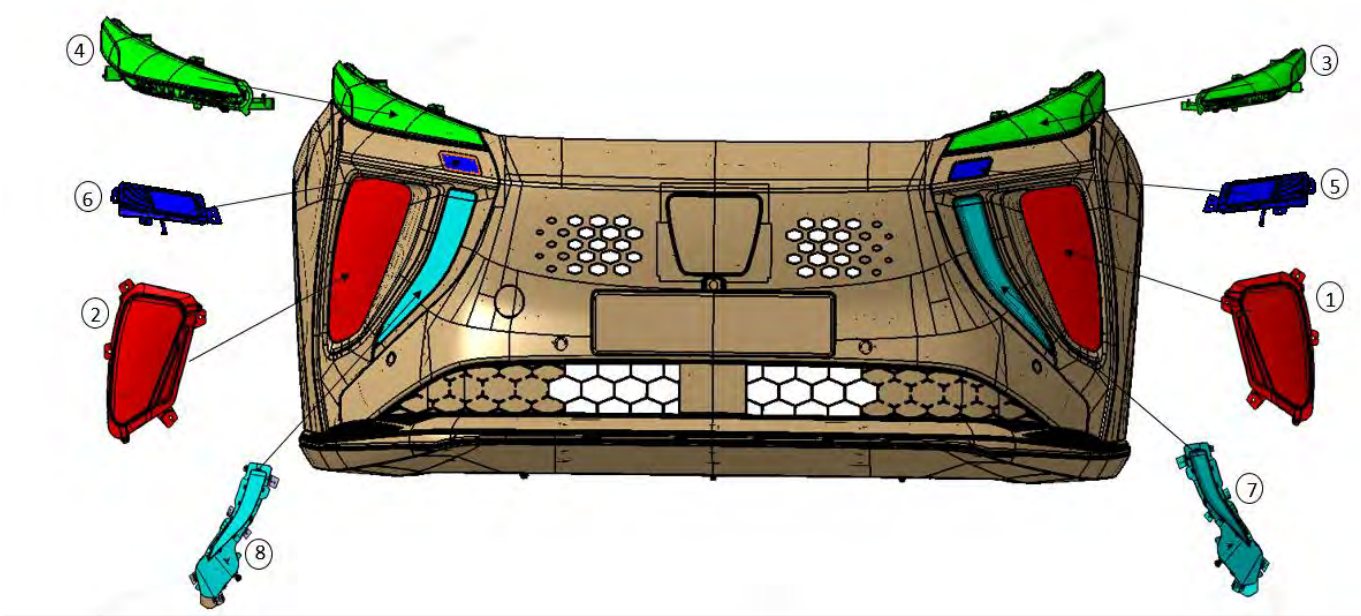
Name	Power/Nr.	Specification
Headlight		
Low beam	28W	LED
High beam	19W	LED
Daytime running light		
Front turn signal	8.5W	LED
Front position light	1.5W	LED
Daytime running light	13W	LED
Rear combination light		
Rear turn signal	7.77W	LED
Rear brake light	3.85W	LED
Rear position light	11W	LED
Reversing light	3.3W	LED
High-mount brake light		
High-mount brake light	1.8W	LED
Licence plate light		
Licence plate light	1.35W	LED
Rear fog light		
Rear fog light	21w	Bulb
Boot light		
Boot light	0.5W	LED

5.1.1.2 Torque specification

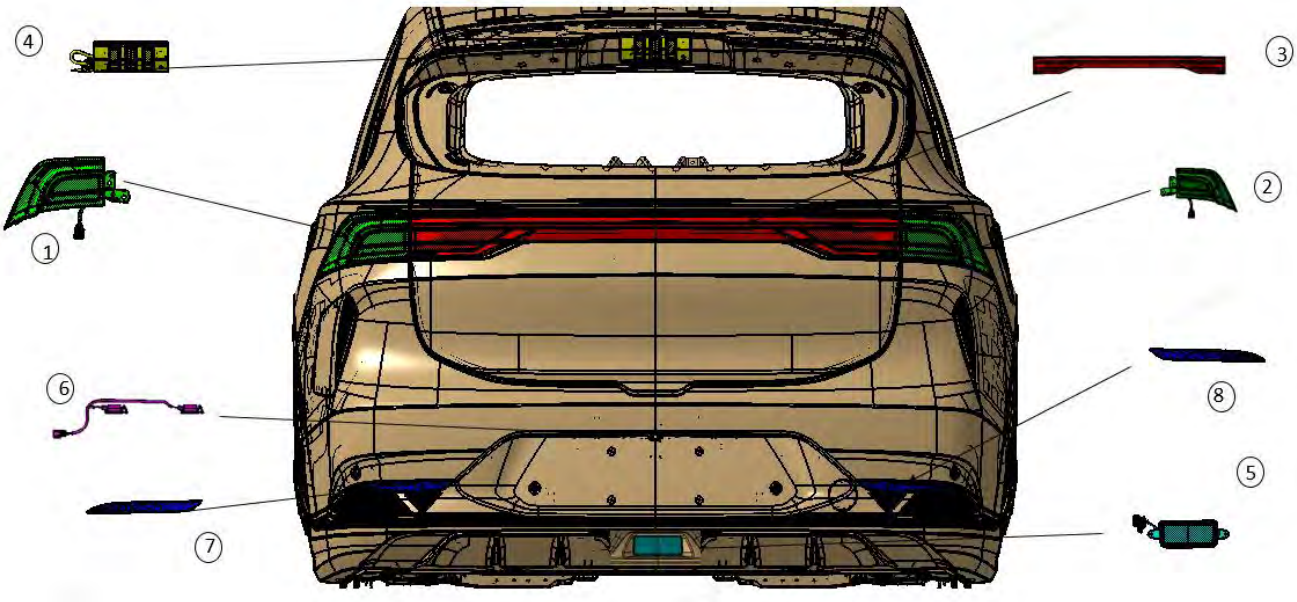
Name	Nm
Fixing bolt of front combination light	5±2
Rear combination light fixing bolt	5±2
Clearance light screw	1.1±0.2

5.1.2 Instructions and operations

5.1.2.1 Component Locating Diagram of Combination Light



Item	Description
1	Front left combination light assembly
2	Front right combination light assembly
3	Left daytime running light assembly
4	Right daytime running light assembly
5	Front bumper upper left trim assembly
6	Front bumper upper right trim assembly
7	Front bumper lower left trim assembly
8	Front bumper lower right trim assembly



Item	Description
1	Rear left combination light assembly A
2	Rear right combination light assembly A
3	Rear combination light assembly B
4	High-mount brake light assembly
5	Rear fog light assembly
6	Licence plate light assembly
7	Rear left retro-reflector
8	Rear right retro-reflector

5.1.3 Diagnosis and testing

5.1.3.1 Exterior light inspection and confirmation

Interior lighting

General Tools

Digital multimeter

Inspection and confirmation

1. Check the problems reported by customers.
2. Visually check for obvious electrical damage.
3. Before further testing, eliminate the obvious faults found in visual inspection and check whether the system works normally.
4. If the fault still exists after visual inspection, use a diagnostic scanner for diagnosis and correct all displayed faults according to the fault description displayed. Check whether the system works normally.

5.1.3.2 External Lighting Appearance Checklist

Appearance Checklist

Electrical
– Fuse – Harness – Harness connector – Instrument fuse box – Bulb – Switch – BCM – Instrument cluster

5.1.3.3 Exterior Lighting Symptom Table

Symptoms	Possible cause	Measures
Low beam light not working	– Fuse	– Appearance inspection – Check the fuse of low beam.
	– Circuit	– Check the BCM circuit – Check the low beam circuit
	– Light multi-function switch	– Check the low beam circuit – Check the multi-function switch
	– Bulb	– Check the low beam drive relay

Symptoms	Possible cause	Measures
The low beam is always on.	– BCM – Light multi-function switch – Bulb	– Appearance inspection – Check the fuse of low beam. – Check the low beam relay ER02 – Check the low beam circuit – Check the grounding circuit of headlight – Check the multi-function switch – Check the low beam drive relay
Failure of high beam	– Fuse – Circuit – Light multi-function switch – Bulb	– Remove the high beam relay – Check the control circuit of the high beam relay.
The high beam is always on.	– Fuse – Circuit – Light multi-function switch – Bulb	– Appearance inspection – Check the fuse of the front fog light – Check the front fog light circuit – Check the GND circuit of front fog light – Check the BCM circuit – Check the light combination switch
Failure of front fog light	– Fuse – Circuit – Light multi-function switch – Bulb	– Check the light combination switch
Front fog light always ON	– Fuse – Circuit – Light multi-function switch – Bulb	– Appearance inspection – Check the fuse of the rear fog light – Check the rear fog light circuit – Check the rear fog light grounding circuit – Check the BCM circuit – Check the light combination switch
The rear fog light does not illuminate.	– Fuse – Circuit – Light multi-function switch – Bulb	– Check the light combination switch

Symptoms	Possible cause	Measures
Rear fog light always ON	– Fuse – Circuit – Light multi-function switch – Bulb	– Appearance inspection – Check the fuse of the position light – Check the position light circuit – Check the position light GND circuit – Check the BCM circuit – Check the light combination switch
Failure of position light	– Fuse – Circuit – Light multi-function switch – Bulb	– Check the light combination switch
Position light always ON	– Fuse – Circuit – Light multi-function switch – Bulb	– Appearance inspection – Check the fuse. – Check the BCM circuit – Check the power supply circuit of brake switch – Check the brake light switch circuit. – Check the power supply circuit of brake light – Check the brake light GND – Check the brake light.
Failure of brake light	– Fuse – Circuit – Bulb – Brake light switch	– Check the light combination switch
The brake light is always on.	– Fuse – Circuit – Bulb – Brake light switch	– Appearance inspection – Check the front turn signal circuit – Check the grounding circuit of the front turn signal light. – Check the light combination switch
Front left/right turn signal light not working	– Fuse – Circuit – Bulb – Light multi-function switch	– Appearance inspection – Check the corner light circuit – Check the left/right rearview mirror turn signal GND circuit

Symptoms	Possible cause	Measures
Left/right rearview mirror turn signal does not work	– Fuse – Circuit – Bulb – Light multi-function switch – Flasher relay	– Appearance inspection – Check the rear turn signal circuit – Check the rear turn signal GND circuit.
Rear left/right turn signal light not working	– Fuse – Circuit – Bulb – Light multi-function switch	– Appearance inspection – Check the reversing light fuse – Check the reversing light switch fuse. – Check the reversing light switch circuit. – Check the reversing light switch – Check the reversing light switch circuit. – Check the reversing light circuit – Check the rear reversing light circuit GND
Reversing light does not work (MT)	– Fuse – Circuit – Bulb – Reversing light switch	– Check the reversing light control harness
The reversing light is always on.	– Fuse – Circuit – Bulb – Reversing light switch	– Appearance inspection – Observe the rear left position light – Check the licence plate light circuit – Check the GND circuit of licence plate light
Licence plate light does not work	– Fuse – Circuit – Bulb – Light multi-function switch	– Fault Confirmation – Check the line connecting the dashboard switch to BCM – Check the dashboard switch connection BCM line BCM line – Check the dashboard switch
Hazard warning light not working	– Fuse – Circuit – Bulb – Warning switch	– Fault Confirmation – Check the dashboard switch

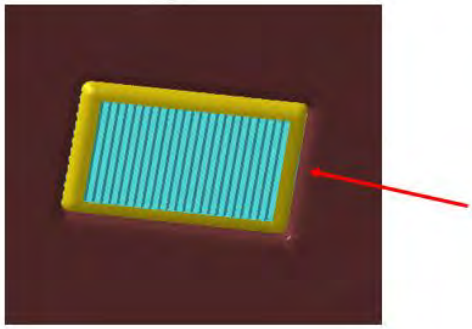
Symptoms	Possible cause	Measures
The light soft switch (centre control display screen) does not work	– Centre control screen	– Fault Confirmation – Appearance inspection – Check the line between the centre control display screen and the audio head unit – Check the communication line between the audio head unit and BCM – Check the light circuit
	– Audio head unit	
	– BCM	
	– Circuit	
	– Bulb	

5.1.4 Removal and installation

5.1.4.1 Boot light

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Use a crowbar to lift one end of the trunk light.



3. Unplug the trunk light harness.

Installation

1. The installation order is the reverse of the removal order.

5.1.4.2 Side compartment light

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Pry up one end of the side compartment light with a crowbar.

3. Unplug the side compartment light harness.

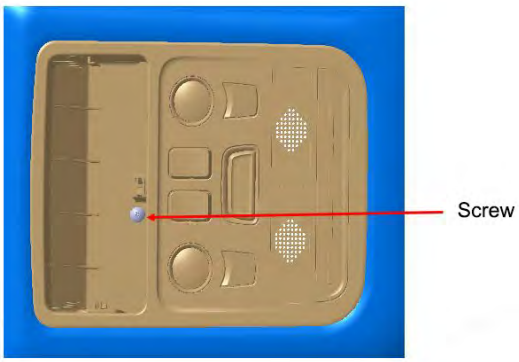
Installation

1. The installation order is the reverse of the removal order.

5.1.4.3 Interior light

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Open the interior roof light glasses case and unscrew the interior dome light mounting screws.



3. Use a crowbar to lift one end of the front interior light, then pull the interior light down from top to bottom and remove the front interior light.

4. Unplug the interior roof light connector.

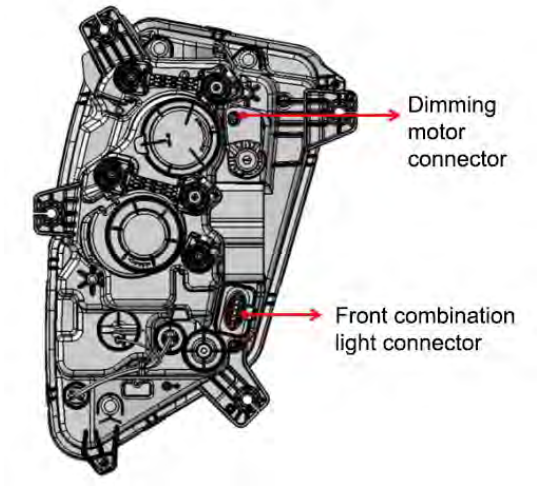
Installation

1. The installation order is the reverse of the removal order.

5.1.4.4 Front combination light

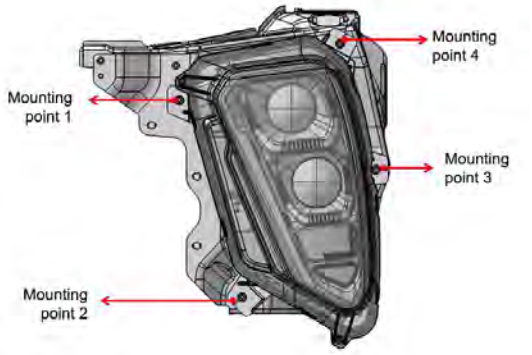
Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the front bumper assembly. Refer to: Front bumper assembly.
3. Unplug the harness connector connected to the front combination light.



4. Remove the mounting bolts of front combination headlight.

   Torque: 5±2Nm



5. Remove the front combination light.

Installation

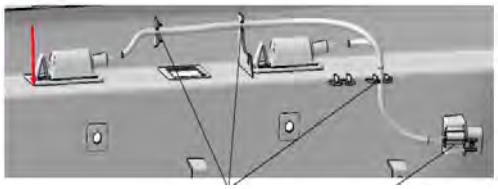
1. The installation order is the reverse of the removal order.

5.1.4.5 High-mount brake light

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Open the vehicle boot lid.
3. Remove the boot lid upper shield. Refer to: Boot lid upper shield.
4. Remove the high-mounted brake light mounting nut.

   Torque: 5±2Nm



5. Unplug the high-mounted brake harness connector and remove the high-mounted brake light.

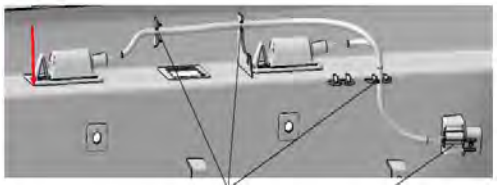
Installation

1. The installation order is the reverse of the removal order.

5.1.4.6 Licence plate light

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Use a crowbar to pry off the licence plate light in the direction of the red arrow



Installation

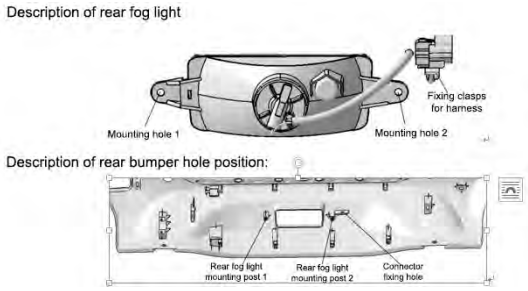
1. Connect the rear licence plate light harness; pass the licence plate light through the rear bumper, and clamp the licence plate light upward to the rear bumper from the other side.

5.1.4.7 Rear fog light

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the rear bumper. Refer to: Rear bumper assembly.
3. Remove the mounting screws on the rear fog light.

   Torque: 1±0.2 Nm



4. Unplug the rear fog light harness connector and remove the rear fog light.

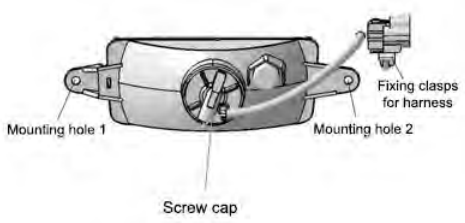
Installation

1. The installation order is the reverse of the removal order.

5.1.4.8 Rear fog light bulb

Removal

1. Rotate the rear fog light cap counterclockwise to remove the bulb. After replacing the bulb, tighten the cap clockwise.



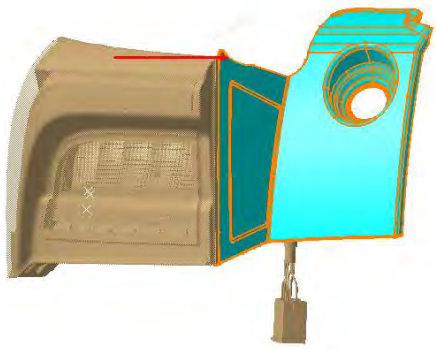
Installation

1. The installation order is the reverse of the removal order.

5.1.4.9 Rear combination light A

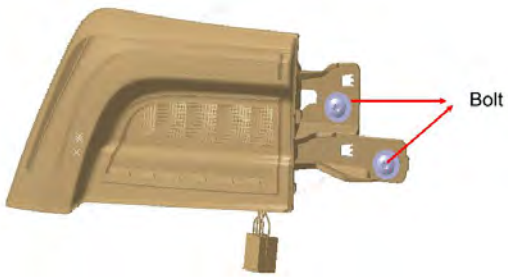
Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Open the boot lid of vehicle
3. Apply force in the direction of the arrow to pry off the rear combination light A shield.

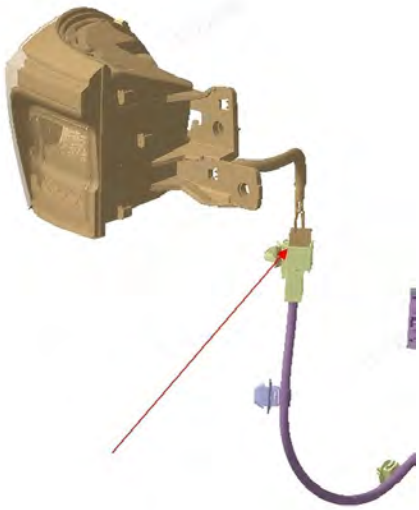


4. Remove the rear combination light mounting bolts

   Torque: 5±2Nm



5. Remove the shield of the light repair access hole with a crowbar.
6. Disconnect the rear combination light connector.



7. Tap the side of the rear combination light hard toward the rear of the car until the rear combination light comes loose, then remove the rear combination light.

Installation

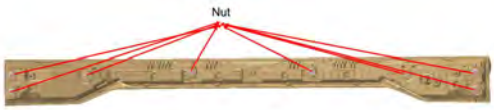
1. The installation order is the reverse of the removal order.

5.1.4.10 Rear combination light B

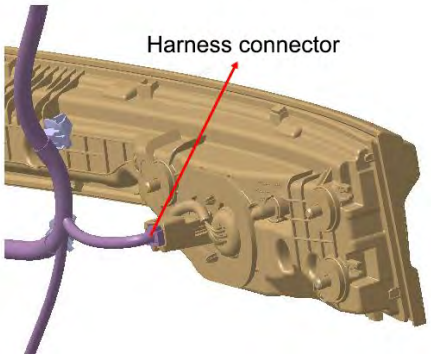
Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Open the vehicle boot lid.
3. Remove the boot lid lower shield assembly. Refer to: Boot lid lower shield assembly.
4. Remove the rear combination light mounting nut.

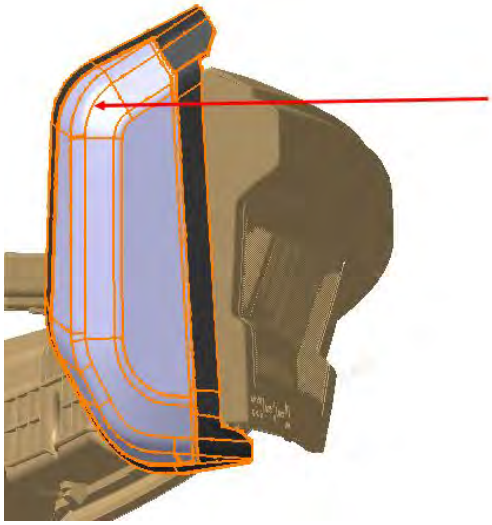
   Torque: 5±2Nm



5. Unplug the connector of rear combination light B.



6. Remove the rear combination light B shield and apply force in the direction of the arrow.



7. Take out the rear combination light B.

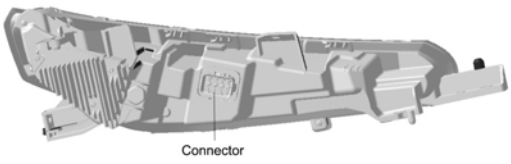
Installation

1. The installation order is the reverse of the removal order.

5.1.4.11 Daytime running light assembly

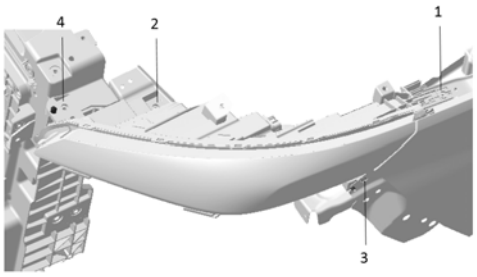
Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the front bumper assembly. Refer to: Front bumper assembly.
3. Disconnect the harness connector from the daytime running light assembly.



4. Remove the mounting bolts of daytime running light.

   Torque: 5±2Nm



5. Remove the daytime running light assembly.

Installation

1. The installation order is the reverse of the removal order.

5.2 Wiper and washer

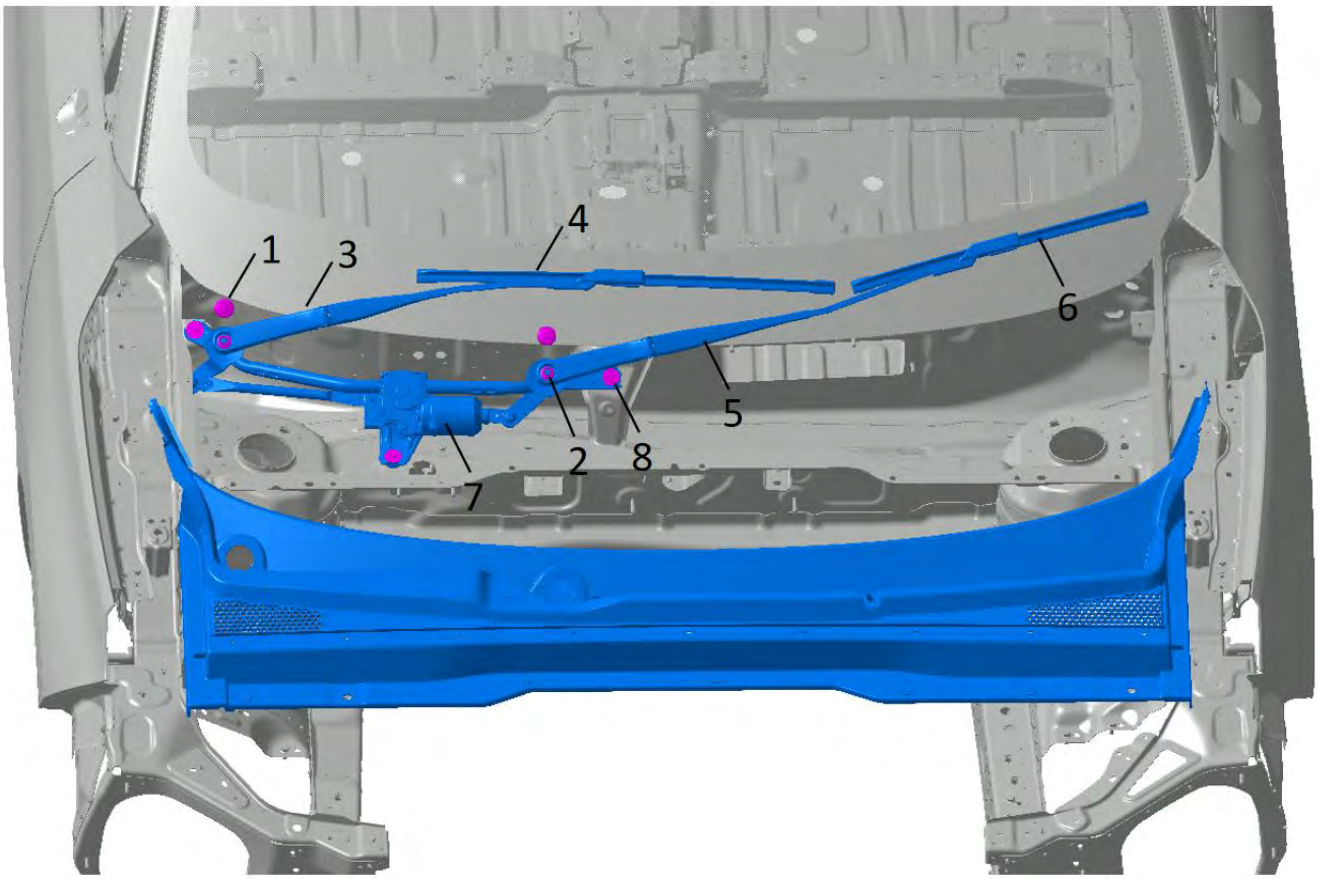
5.2.1 Specification

5.2.1.1 Torque specification

Name	Nm
Front wiper arm fastening nut	22±2
Fixing bolt of front wiper connecting rod mechanism assembly	9±1
Rear wiper nut	22±2
Rear wiper motor mounting bolt	9±1
Washer bolt	9±1

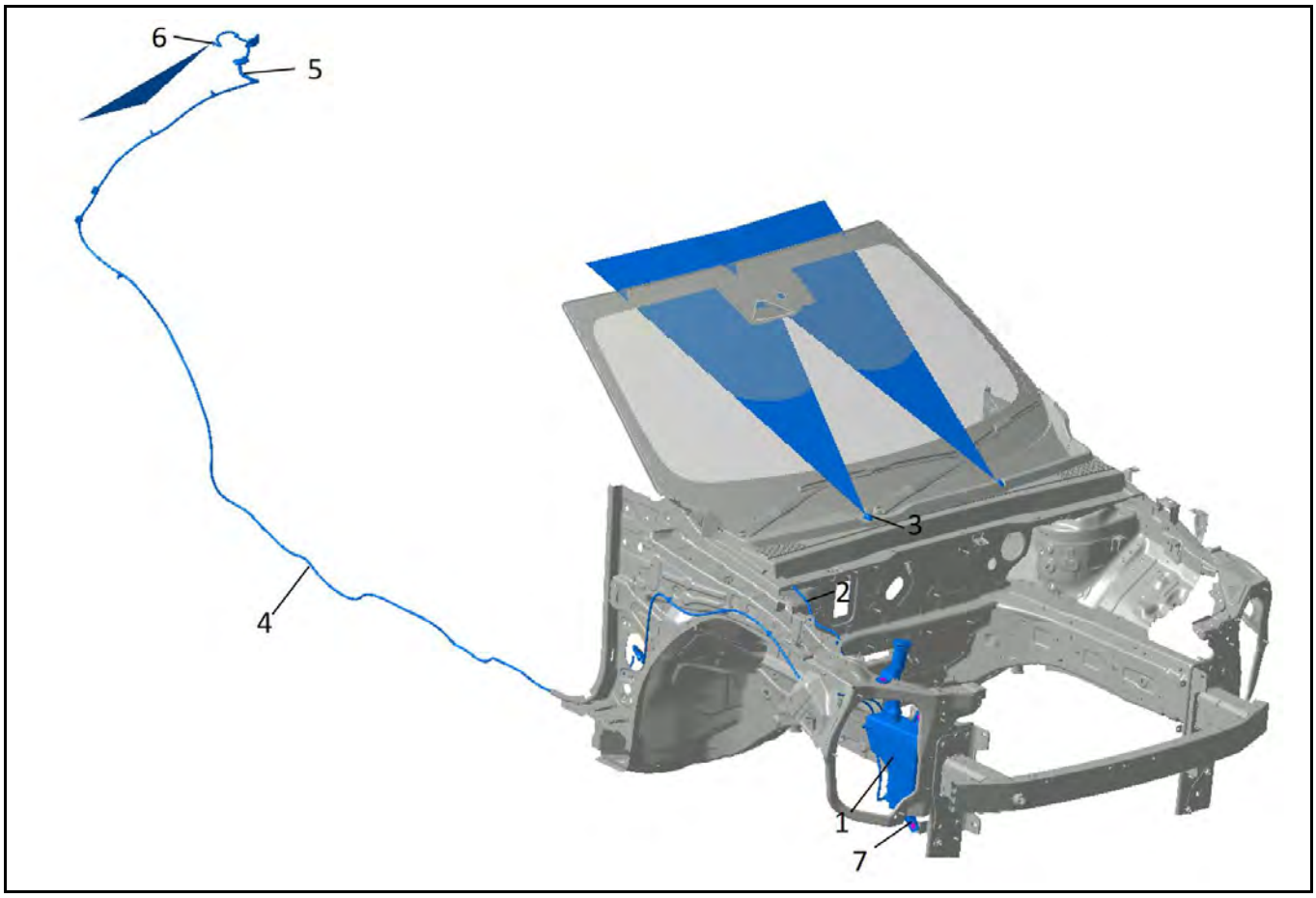
5.2.2 Instructions and operations

5.2.2.1 Wiper system component locating diagram



S/N	Name	S/N	Name
1	Wiper arm trim cover	2	Wiper arm fastening nut
3	Main wiper arm assembly	4	Main wiper blade assembly
5	Auxiliary wiper arm assembly	6	Auxiliary wiper blade assembly
7	Link mechanism assembly of front wiper	8	Hexagon head bolt

5.2.2.2 Washing System Component Locating Diagram (REEV)



S/N	Name
1	Washer assembly - two-way pump
2	Front washer spray pipe assembly
3	Front nozzle of washer
4	Rear spray pipe 1 of washer
5	Rear spray pipe 2 of washer
6	Washer rear nozzle assembly
7	Hex assembling bolt

5.2.3 Diagnosis and testing

5.2.3.1 Wiper and washer

Inspection and confirmation

1. Confirm the problems reported by the customer and perform corresponding inspections.

2. Observe for obvious signs of mechanical or electrical damage.

3. Resolve the problems found before performing the next step of inspection.

4. If the cause cannot be confirmed from the appearance, confirm the symptoms first, and then check according to the symptom table.

Appearance Checklist

Mechanical	Electrical
• Wiper blade	• Fuse
• Wiper arm shaft	• Circuit
• Washer reservoir	• Wiper multi-function switch
• Hose	• Front wiper motor
• Nozzle	• Front washer motor

5.2.3.2 Diagnosis and testing

Wiper and washer

Appearance Checklist

Mechanical	Electrical
• Wiper blade	• Fuse
• Wiper arm shaft	• Circuit
• Washer reservoir	• Wiper multi-function switch
• Hose	• Front wiper motor
• Nozzle	• Front washer motor

5.2.3.3 Symptom Table

Wiper and washer system

Symptoms	Possible cause	Measures
Failure of wiper to work	• Fuse	• Check the BCM fuse
	• Circuit	• Check the wiper multi-function switch
	• Wiper motor	• Check the GND of the wiper motor harness connector
	• Wiper switch	• Check the wiper multi-function switch
Wiper keeps working	• Circuit	• Check the cab harness wiper switch circuit
	• Wiper motor	• Check the front wiper motor circuit
	• Wiper switch	• Check the wiper multi-function switch.
Inoperative wiper in low gear	• Circuit	• Check the front wiper motor harness connector

	• Wiper motor	• Check the harness between the front wiper motor connector (low-speed end) to BCM
	• Wiper switch	• Check the wiper multi-function switch
Inoperative wiper in high gear	• Circuit	• Check the front wiper motor harness connector
	• Wiper motor	• Check the harness between the front wiper motor wiring connector (high-speed end) and BCM
	• Wiper switch	• Check the wiper multi-function switch
Inoperative wiper in intermittent gear	• Circuit	• Check the instrument harness wiper multi-function switch circuit
	• Wiper motor	
	• Wiper switch	• Check the wiper switch
Failure of wiper to return to its original position	• Circuit	• Check the return signal line of the front wiper motor in the front cabin harness
	• Wiper motor	• Check the instrument harness wiper multi-function switch circuit
	• Wiper switch	• Check the wiper switch
	• Wiper mechanism not installed in place	• Re-install the wiper mechanism. Refer to Wiper Motor with Connecting Rod Mechanism Assembly (501-16 Wiper and Washer, Removal and Installation).
Washer not working	• Circuit	• Check the power supply voltage of front washer motor • Check the instrument harness wiper multi-function switch circuit
	• Washer motor	• Check the capacity of washer fluid
	• Wiper switch	• Check the wiper switch

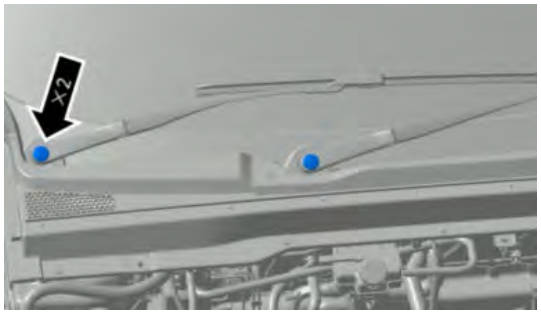
5.2.4 Removal and installation

5.2.4.1 Front Wiper Arm

Removal

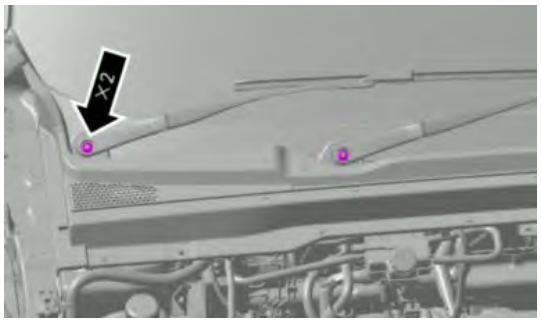
Caution: When disassembling and assembling the wiper arm, pay attention to the mounting point on the glass.

1. Turn on wiper maintenance mode.
2. Remove the front wiper mounting nut cap.



3. Remove the front wiper mounting nut.

   Torque: 22±2Nm



4. Remove the front wiper arm.

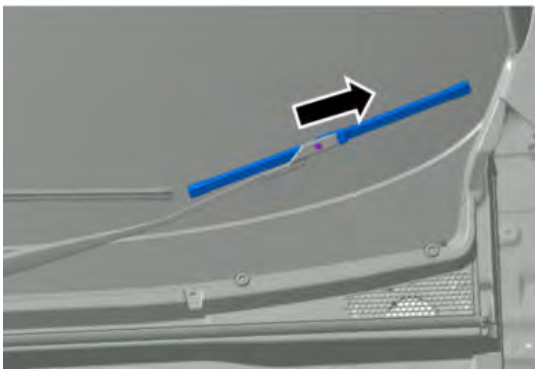
Installation

1. The installation order is the reverse of the removal order.

5.2.4.2 Wiper Blade

Removal

1. Turn on wiper maintenance mode.
2. Press the release lock pin, and then push the wiper blade in the direction of arrow to remove it.



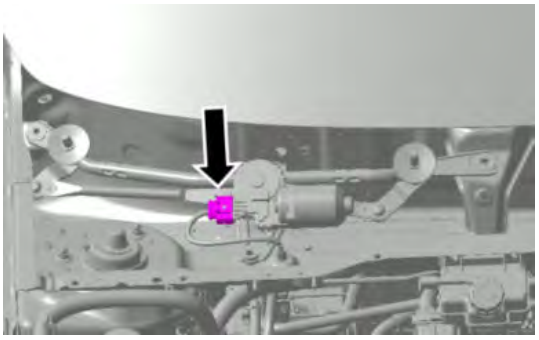
Installation

1. The installation order is the reverse of the removal order.

5.2.4.3 Wiper motor with connecting rod mechanism assembly

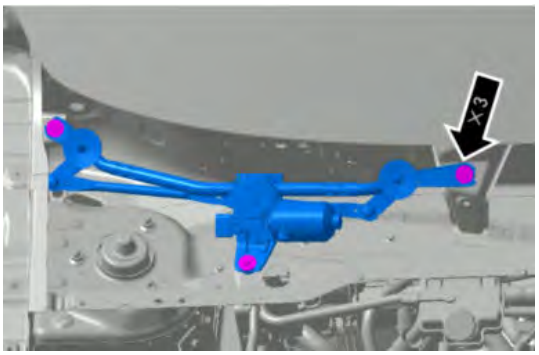
Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the front wiper arm. Refer to: Front wiper arm.
3. Remove the wiper cover plate. Refer to: Wiper cover plate.
4. Disconnect the harness connector of wiper motor with linkage assembly.



5. Remove the fixing bolt of the wiper motor with connecting rod mechanism assembly.

   Torque: 9±1 Nm



6. Remove the wiper motor with connecting rod mechanism assembly.

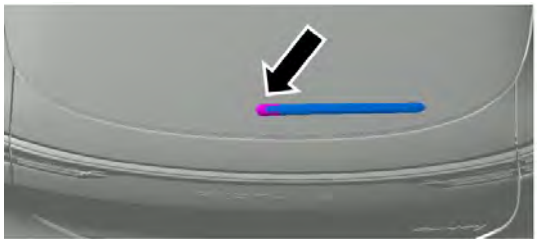
Installation

1. The installation order is the reverse of the removal order.

5.2.4.4 Rear wiper arm and blade

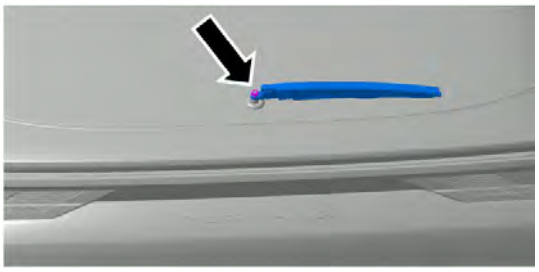
Removal

1. Remove the bolt cover of the rear wiper arm and blade.



2. Remove the rear wiper mounting nut, and remove the rear wiper arm and blade.

   Torque: 22±2Nm



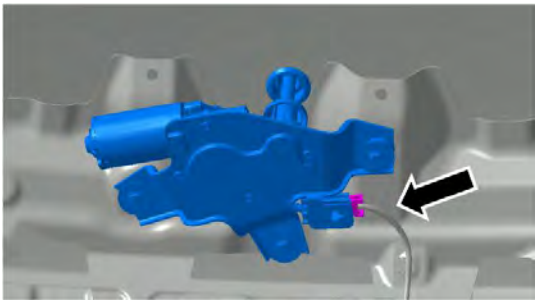
Installation

1. The installation order is the reverse of the removal order.

5.2.4.5 Rear wiper motor assembly

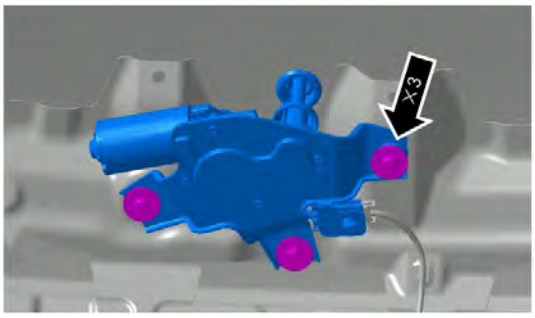
Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the rear wiper arm and blade. Refer to: Rear wiper arm and blade.
3. Remove the boot lid lower shield assembly. Refer to: Boot lid lower shield assembly.
4. Disconnect the rear wiper motor assembly harness connector.



5. Remove the rear wiper motor fixing bolts, and remove the rear wiper motor assembly.

   Torque: 9±1 Nm



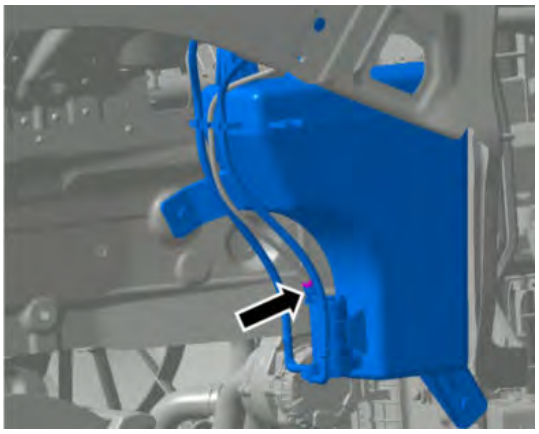
Installation

1. The installation order is the reverse of the removal order.

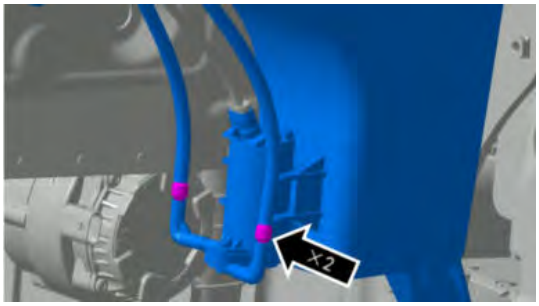
5.2.4.6 Washer pump

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the engine compartment cover plate. Refer to: Engine compartment cover plate.
3. Remove the front bumper assembly. Refer to: Front bumper assembly.
4. Remove the front right combination light assembly. Refer to: Front right combination light assembly.
5. Disconnect the washer pump harness connector.



6. Disconnect the washer pump harness connector. Disconnect the two washing hoses at the two two-way joints shown in the figure and remove the washing pump.



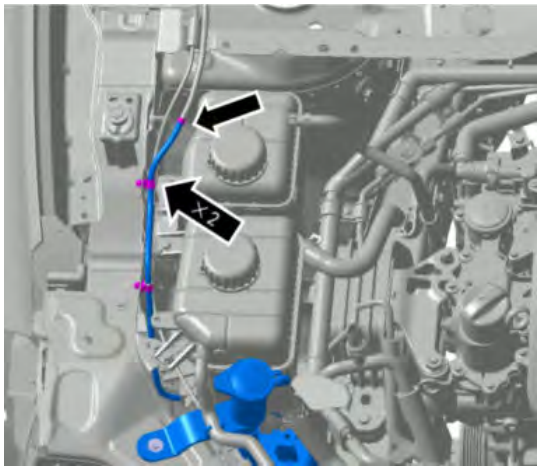
Installation

1. The installation order is the reverse of the removal order.

5.2.4.7 Washer Reservoir with Motor Assembly

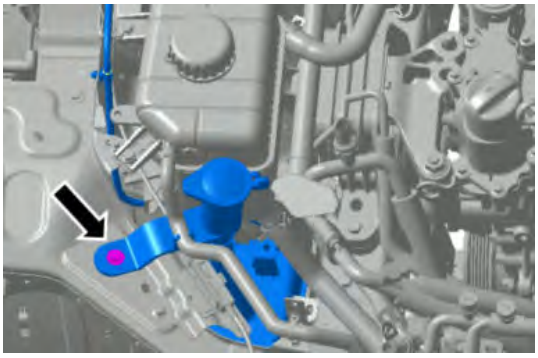
Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the engine compartment cover plate. Refer to: Engine compartment cover plate.
3. Remove the front bumper assembly. Refer to: Front bumper assembly.
4. Remove the headlight assembly. Refer to: Front right combination light assembly.
5. Disconnect the two washing pot hoses at the two-way joint shown in the figure, and remove the fixing clip of the washing pipe.

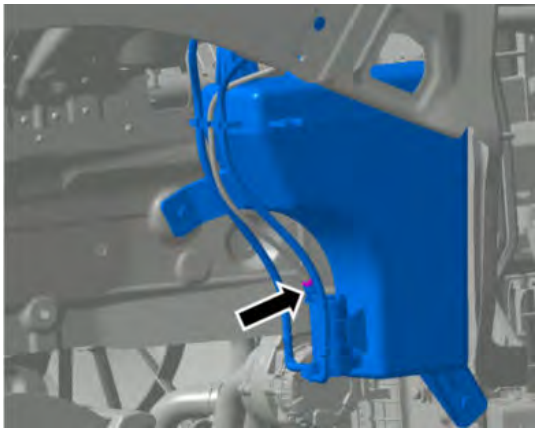


6. Remove the filling pipe fixing bolt.

   Torque: 9±1 Nm

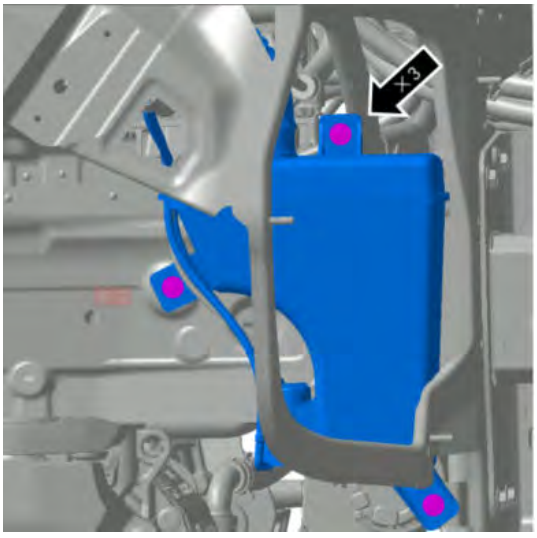


7. Disconnect the harness connector of washer fluid reservoir with motor assembly.



8. Remove the fixing bolts of the washer fluid reservoir with motor assembly, and take off the washer fluid reservoir with motor assembly.

   Torque: 9±1 Nm



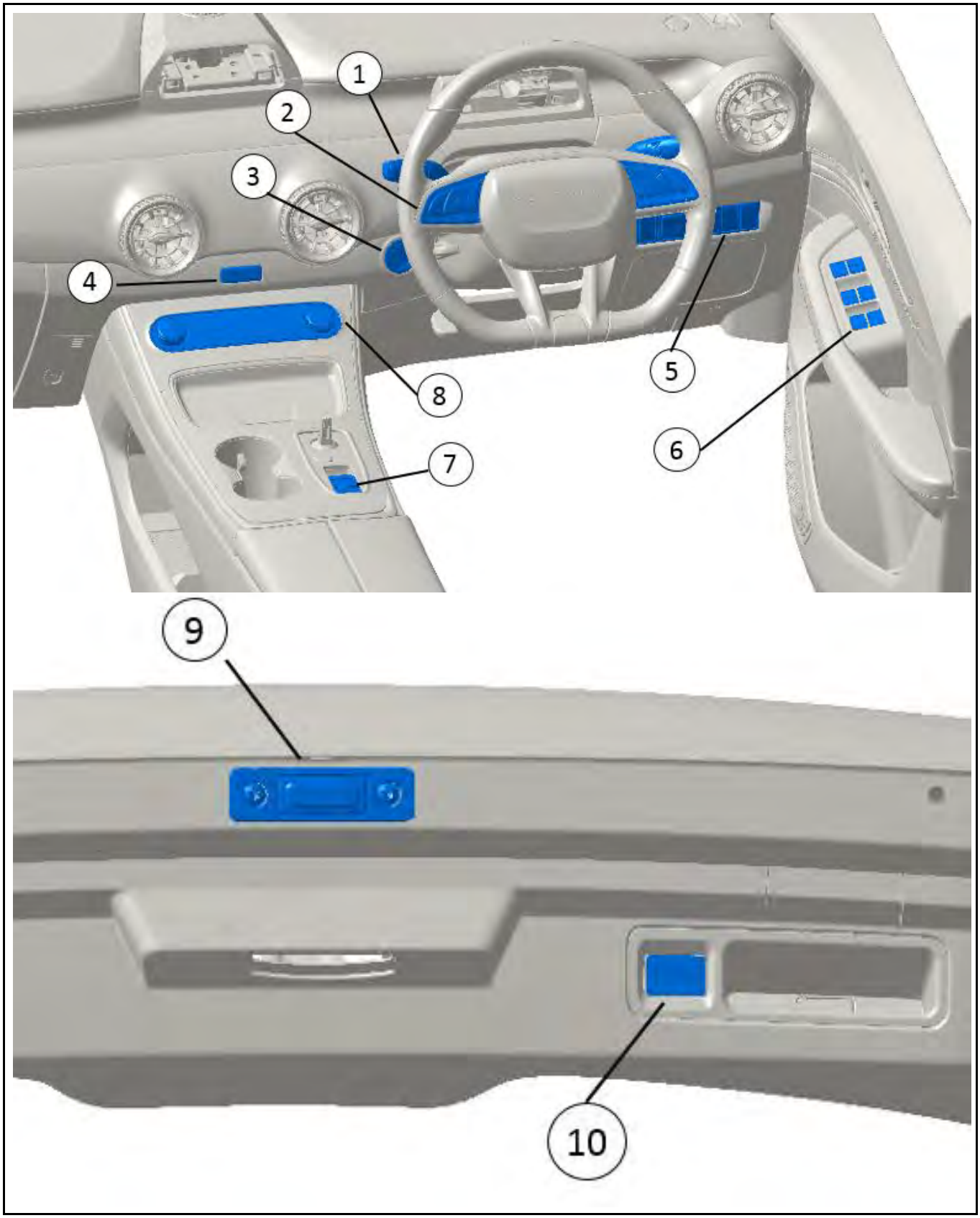
Installation

The installation order is the reverse of the removal order.

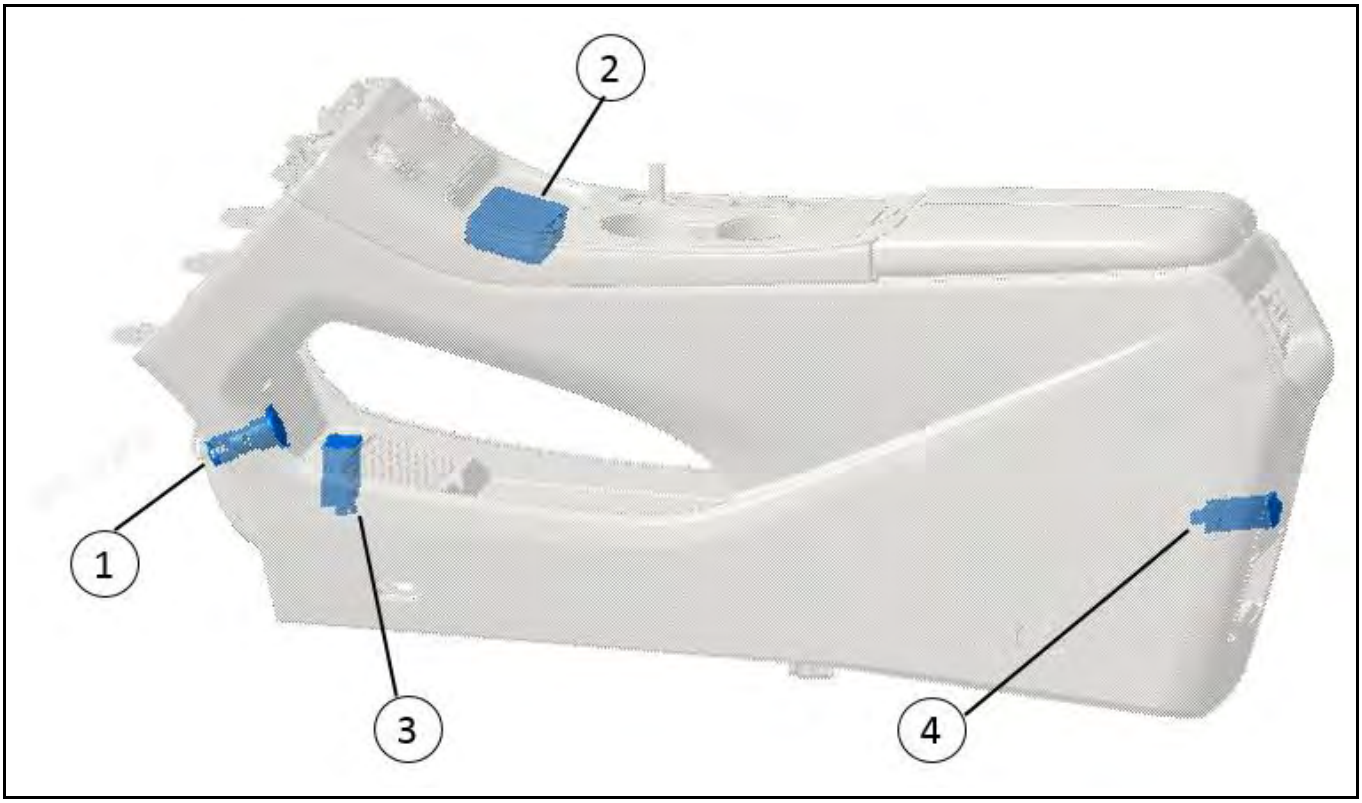
5.3 Control switch

5.3.1 Instructions and operations

5.3.1.1 Component Locating Diagram



Item	Description
1	Multi-function switch assembly
2	Multi-function steering wheel switch assembly
3	One-button start switch
4	Hazard warning light assembly
5	Panel switch component
6	APB switch assembly
7	A/C touch switch assembly
8	Window regulator switch assembly
9	Boot lid microswitch
10	Power boot lid closing switch



Item	Description
1	12V Power Supply Interface
2	Wireless charging assembly
3	Type-C power supply interface
4	USB power supply interface

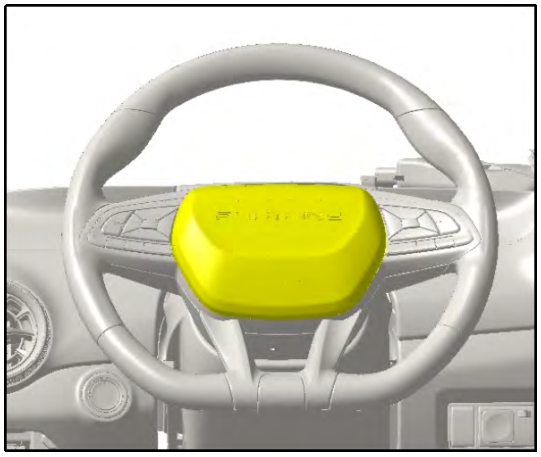
5.3.2 Removal and installation

5.3.2.1 Multi-function switch

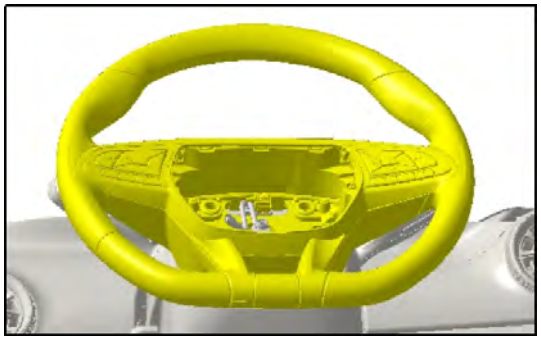
Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal

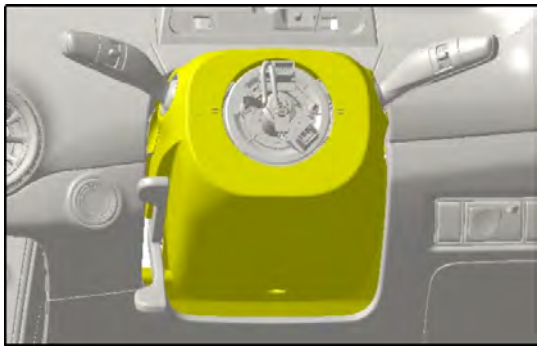
2. Remove the airbag. Refer to: Removal and installation of SRS.



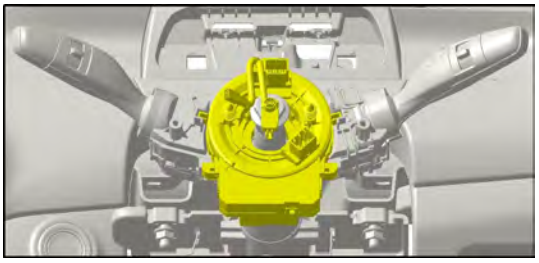
3. Remove the steering wheel assembly. Refer to: Removal and installation of steering wheel.



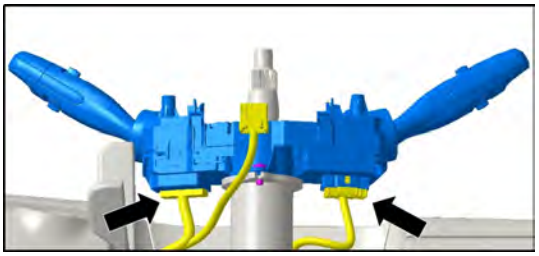
4. Remove the steering shield. Refer to: Removal and installation of the dashboard.



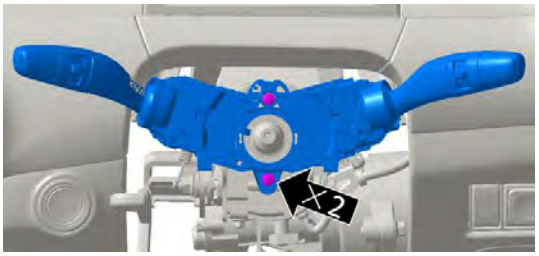
5. Remove the spiral cable assembly. Refer to: Removal and installation of spiral cable.



6. Disconnect the harness connector connected to the multi-function switch.



7. Remove the fixing screws of multi-function switch with a cross-head screwdriver.



8. Remove the combination switch assembly.

Installation

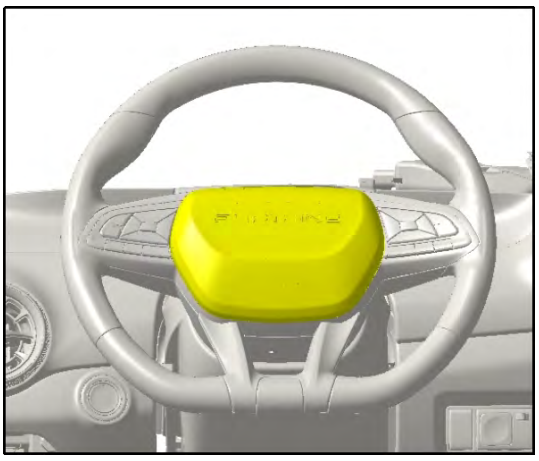
1. The installation order is the reverse of the removal order.

5.3.2.2 Steering wheel switch

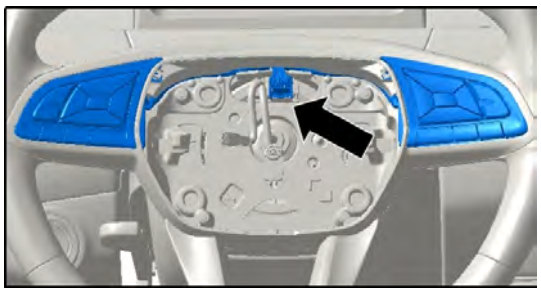
Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal.

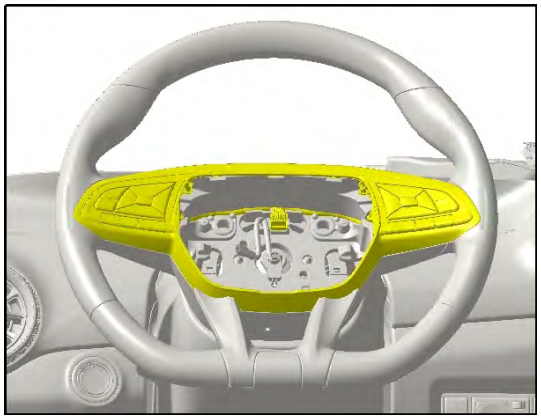
2. Remove the airbag.



3. Disconnect the wiring harness connector that connects the steering wheel switch to the spiral cable.



4. Remove the steering wheel trim strip.



5. Remove the fixing screws on the steering wheel switch with a cross-head screwdriver.

6. Remove the steering wheel switch assembly.

Installation

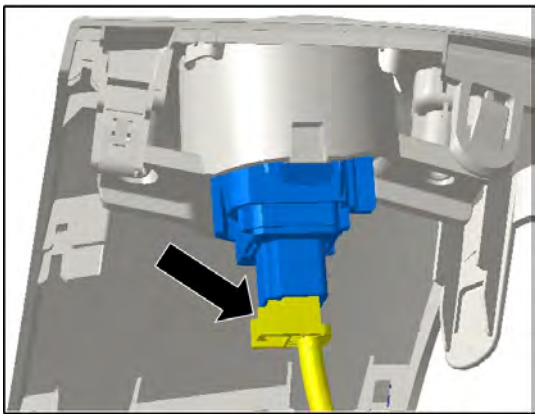
1. The installation order is the reverse of the removal order.

5.3.2.3 One-button start switch assembly

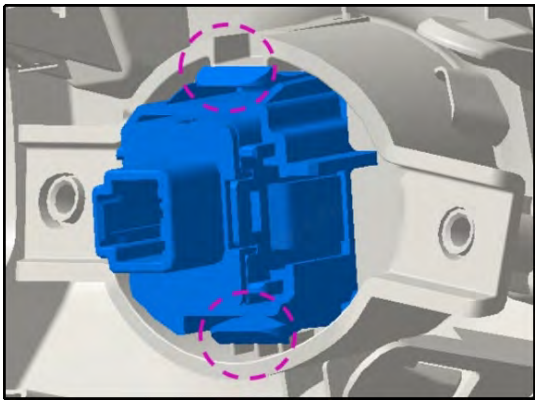
Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Remove the middle lower trim panel body of the dashboard. Refer to: Removal and installation of the dashboard.

3. Disconnect the harness connector connected to the one-button start switch assembly.



4. Hold the clip structure on the one-button start switch assembly and push the one-button start switch assembly outward.



5. Remove the one-button start switch assembly.

Installation

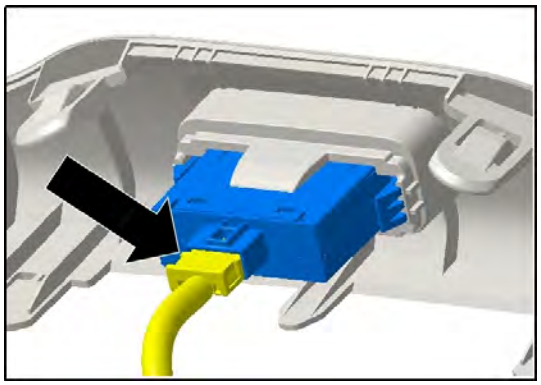
1. The installation order is the reverse of the removal order.

5.3.2.4 Hazard warning light switch assembly

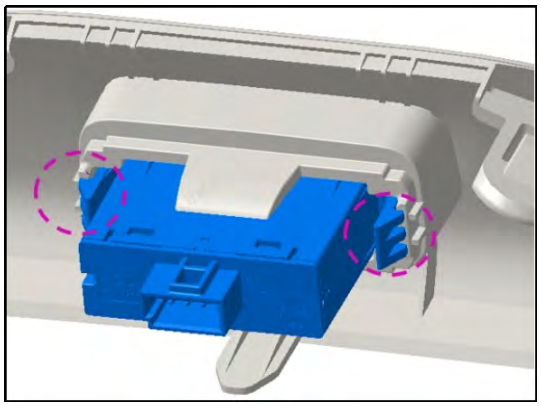
Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Remove the middle lower trim panel body of the dashboard. Refer to: Removal and installation of the dashboard.

3. Disconnect the harness connector connected to the hazard warning light.



4. Hold the clip structure on the switch on the hazard warning light and push the hazard warning light switch outward.



5. Remove the hazard warning light switch assembly.

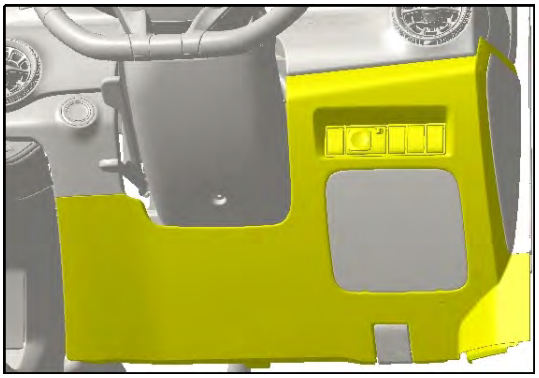
Installation

1. The installation order is the reverse of the removal order.

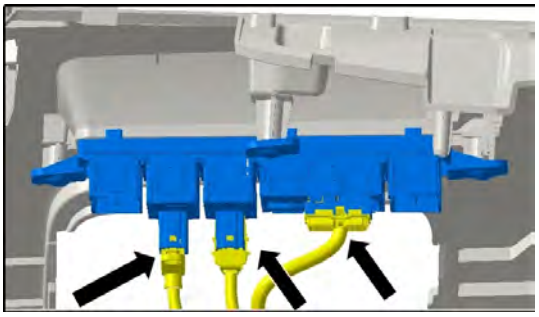
5.3.2.5 Panel switch component

Removal

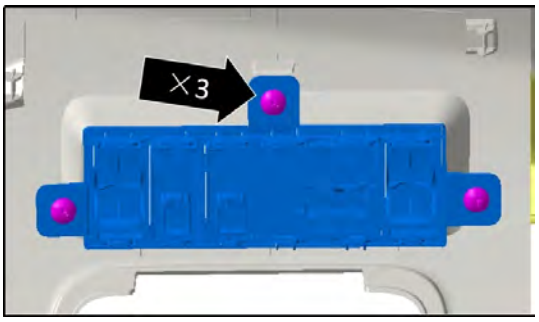
1. Remove the right lower shield body of dashboard.



2. Disconnect the harness connector that connects to the panel switch component.



3. Remove the fixing screws of panel switch component with a cross-head screwdriver.



4. Remove the panel switch component.

Installation

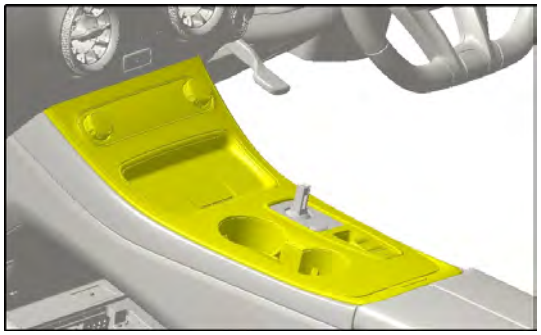
1. The installation order is the reverse of the removal order.

5.3.2.6 APB switch assembly

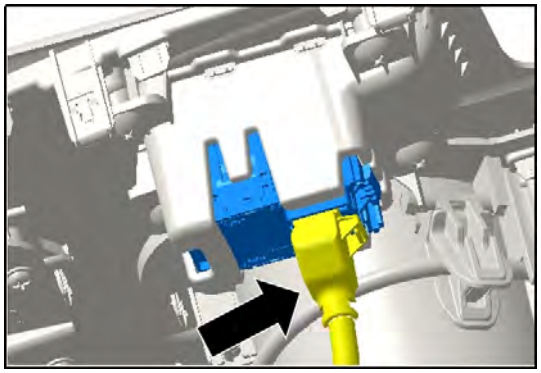
Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal

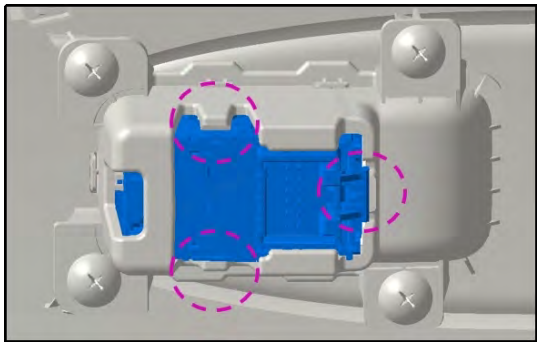
2. Remove the console upper trim panel assembly.



3. Disconnect the harness connector connected to the APB switch assembly.



4. Pry open the clip structure on the upper trim panel assembly and push out the APB switch assembly.



5. Remove the APB switch assembly.

Installation

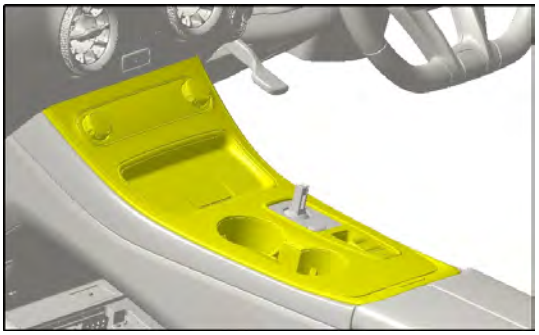
1. The installation order is the reverse of the removal order.

5.3.2.7 A/C switch assembly

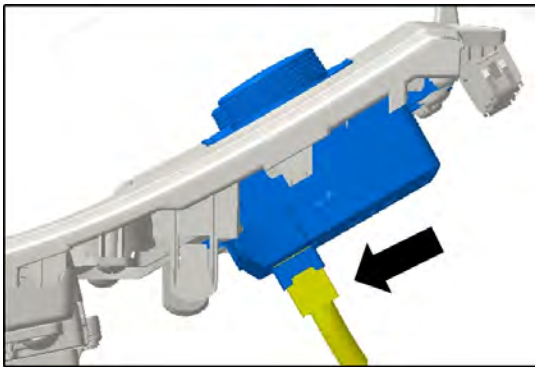
Removal

1. Confirm that the ignition switch is in the OFF position or the battery negative cable is disconnected. Refer to: Disconnect the battery negative terminal.

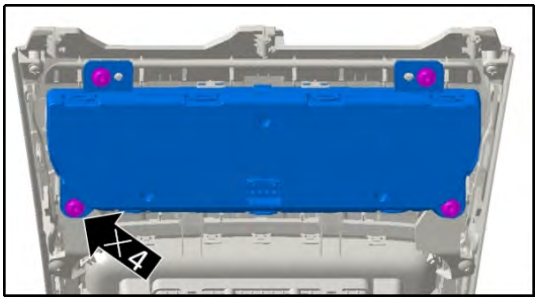
2. Remove the console upper trim panel assembly.



3. Disconnect the harness connector connected to the A/C switch assembly.



4. Remove the fixing screws of A/C switch assembly with a cross-head screwdriver.



5. Remove the A/C switch assembly.

Installation

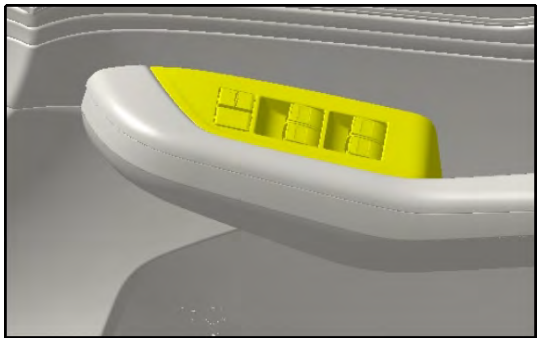
1. The installation order is the reverse of the removal order.

5.3.2.8 Driver's seat window regulator switch assembly

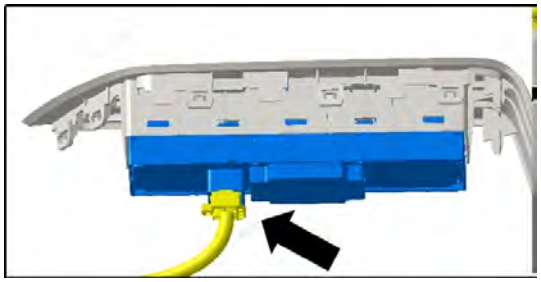
Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal

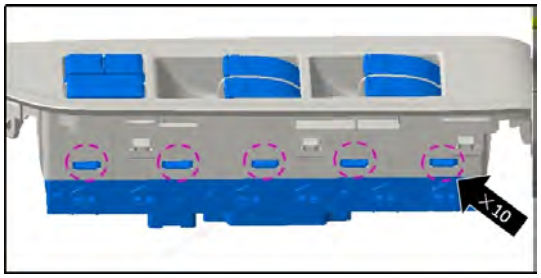
2. Remove the switch panel.



3. Disconnect the harness connector that connects to the window regulator switch assembly.



4. Pry open the clip structure of the window regulator switch assembly and push out the switch.



5. Remove the window regulator switch assembly.

Installation

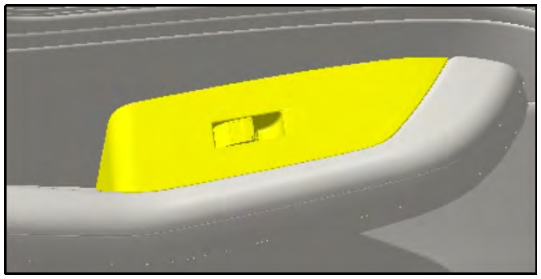
1. The installation order is the reverse of the removal order.

5.3.2.9 Front passenger and rear door window regulator switch assembly

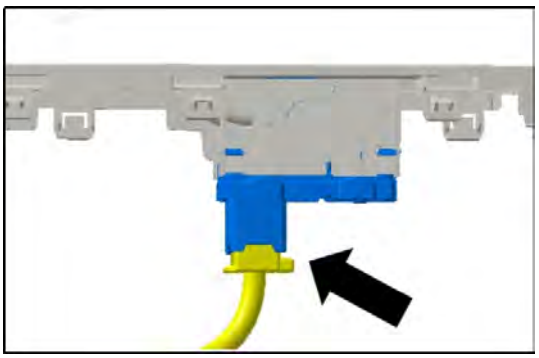
Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal

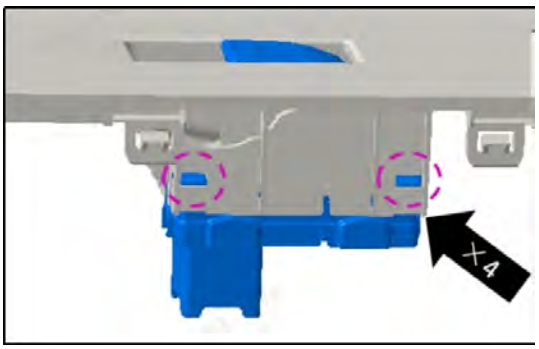
2. Remove the switch panel.



3. Disconnect the harness connector that connects to the window regulator switch assembly.



4. Pry open the clip structure of the window regulator switch assembly and push out the switch.



5. Remove the window regulator switch assembly.

Installation

1. The installation order is the reverse of the removal order.

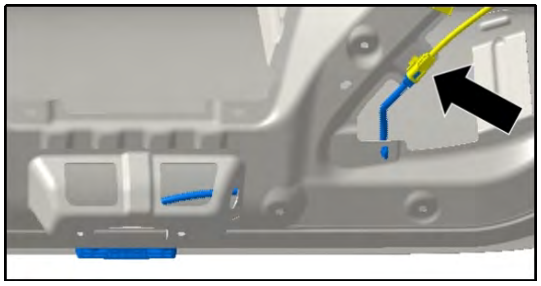
5.3.2.10 Boot lid microswitch

Removal

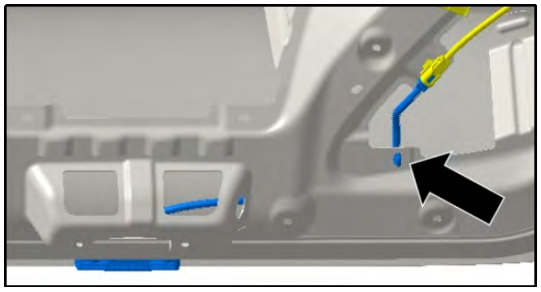
1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal

2. Remove the boot lid shield assembly.

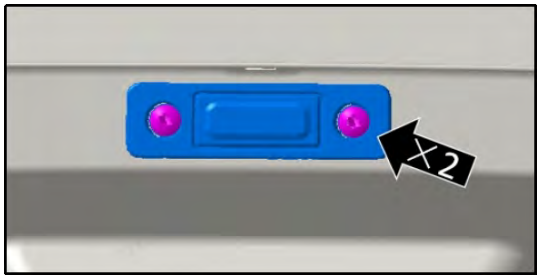
3. Disconnect the harness connector connected to the rear door microswitch.



4. Remove the rear door microswitch harness fixing clip.



5. Use a cross-head screwdriver to remove the fixing screws of the boot lid microswitch.



6. Take out the boot lid microswitch.

Installation

1. The installation order is the reverse of the removal order.

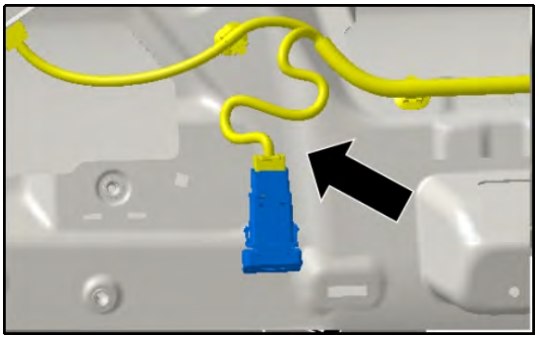
5.3.2.11 Power boot lid closing switch assembly

Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal

2. Remove the boot lid shield assembly.

3. Disconnect the harness connector connected to the electric boot lid closing switch.



4. Hold the clip structure on the power boot lid closing switch and push out the power boot lid closing switch.

5. Remove the power boot lid closing switch.

Installation

1. The installation order is the reverse of the removal order.

5.4 Door lock and handle system

5.4.1 Specification

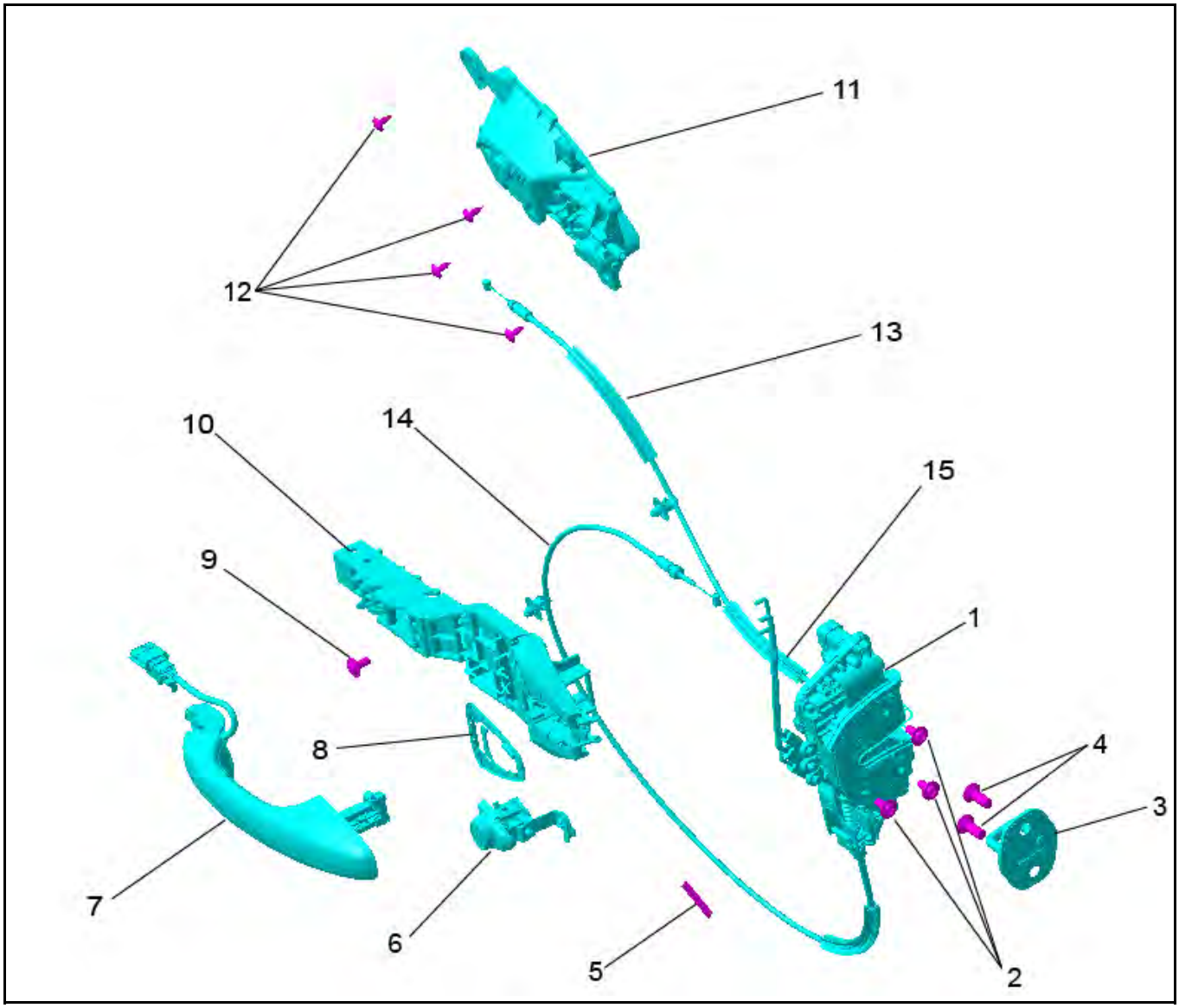
5.4.1.1 Torque specification

Name	Nm
Mounting bolt of bonnet lock head assembly	20±2
Mounting bolt of door lock body	5±0.5
Mounting bolt of boot lid lock body	9±1
Self-priming motor mounting nut	9±1

5.4.2 Instructions and operations

5.4.2.1 Door lock system

Exploded view (front door)

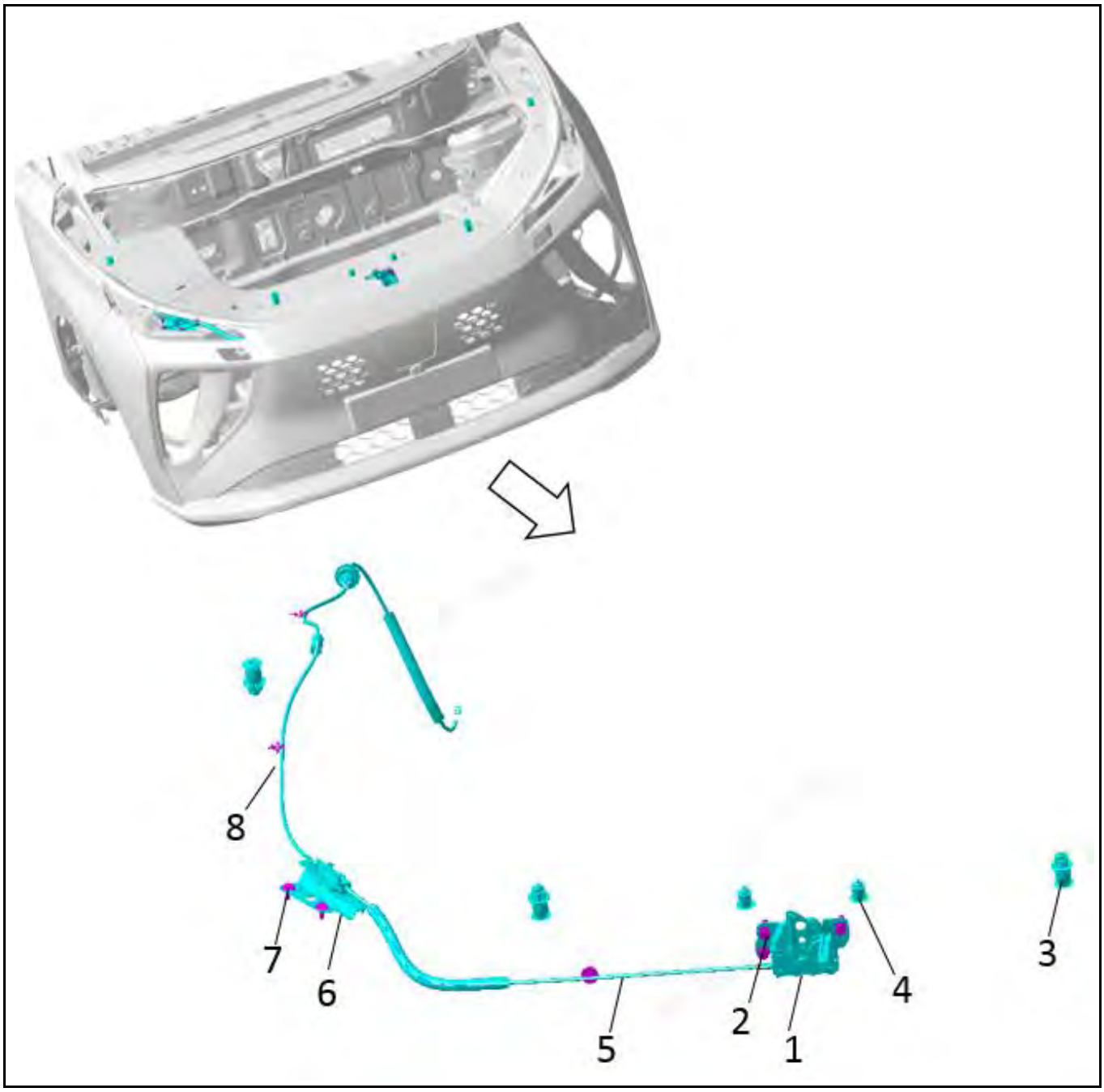


Item	Description	Item	Description
1.	Lock body	9.	Exterior handle mounting bolt component
2.	Lock body mounting bolt	10.	Handle base
3.	Buckle	11.	Interior handle
4.	Mounting bolt for lock catch	12.	Interior handle mounting screw
5.	Non-woven fabric of front wall (for fixing exterior release cable)	13.	Interior release cable of door lock

Item	Description	Item	Description
6.	Lock cylinder (driver side)/ fake lock cylinder (non-driver side)	14.	Exterior release cable of door lock
7.	Handle grip	15.	Lock cylinder pull rod (driver side)
8.	Sealing gasket of handle		

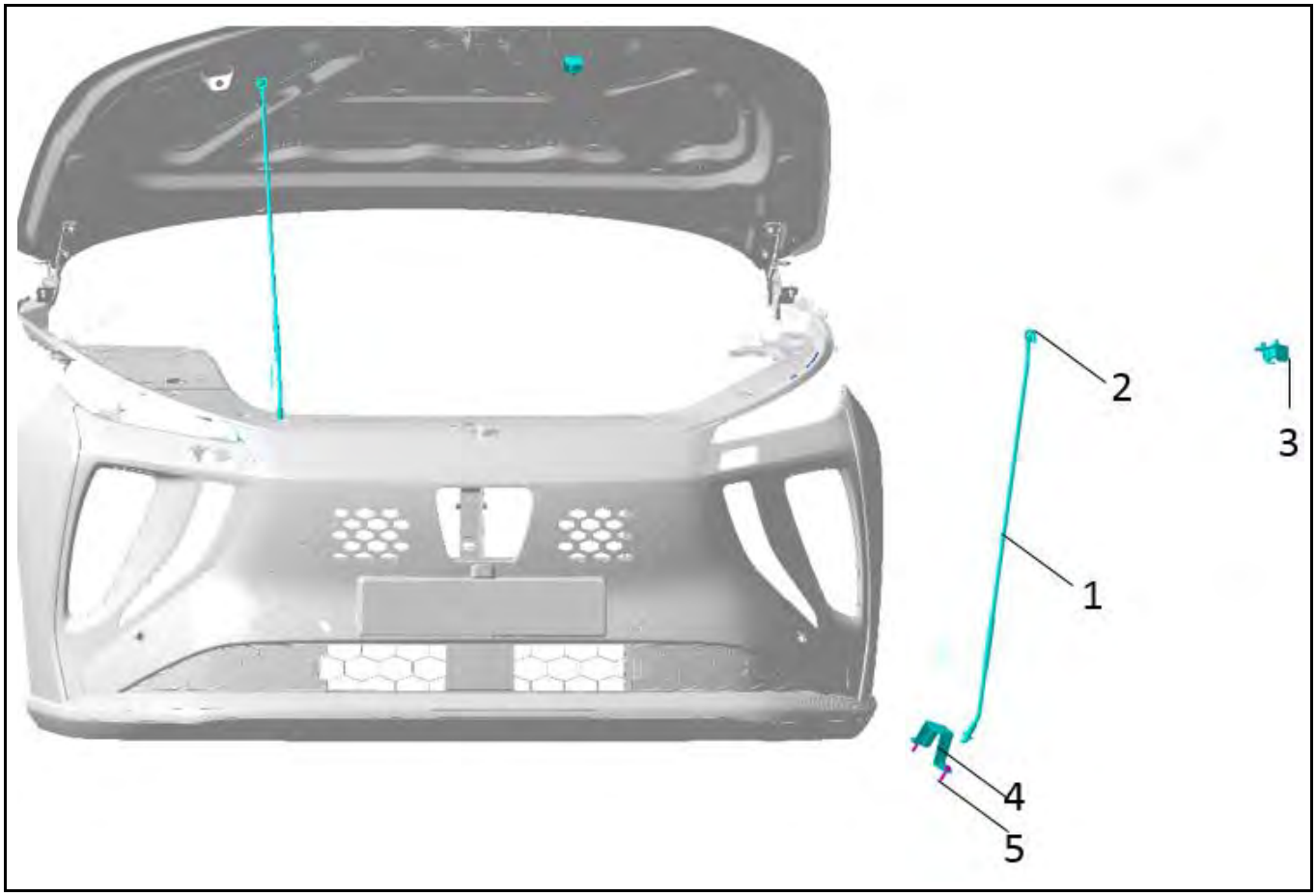
5.4.2.2 Exploded view

Engine bonnet lock system



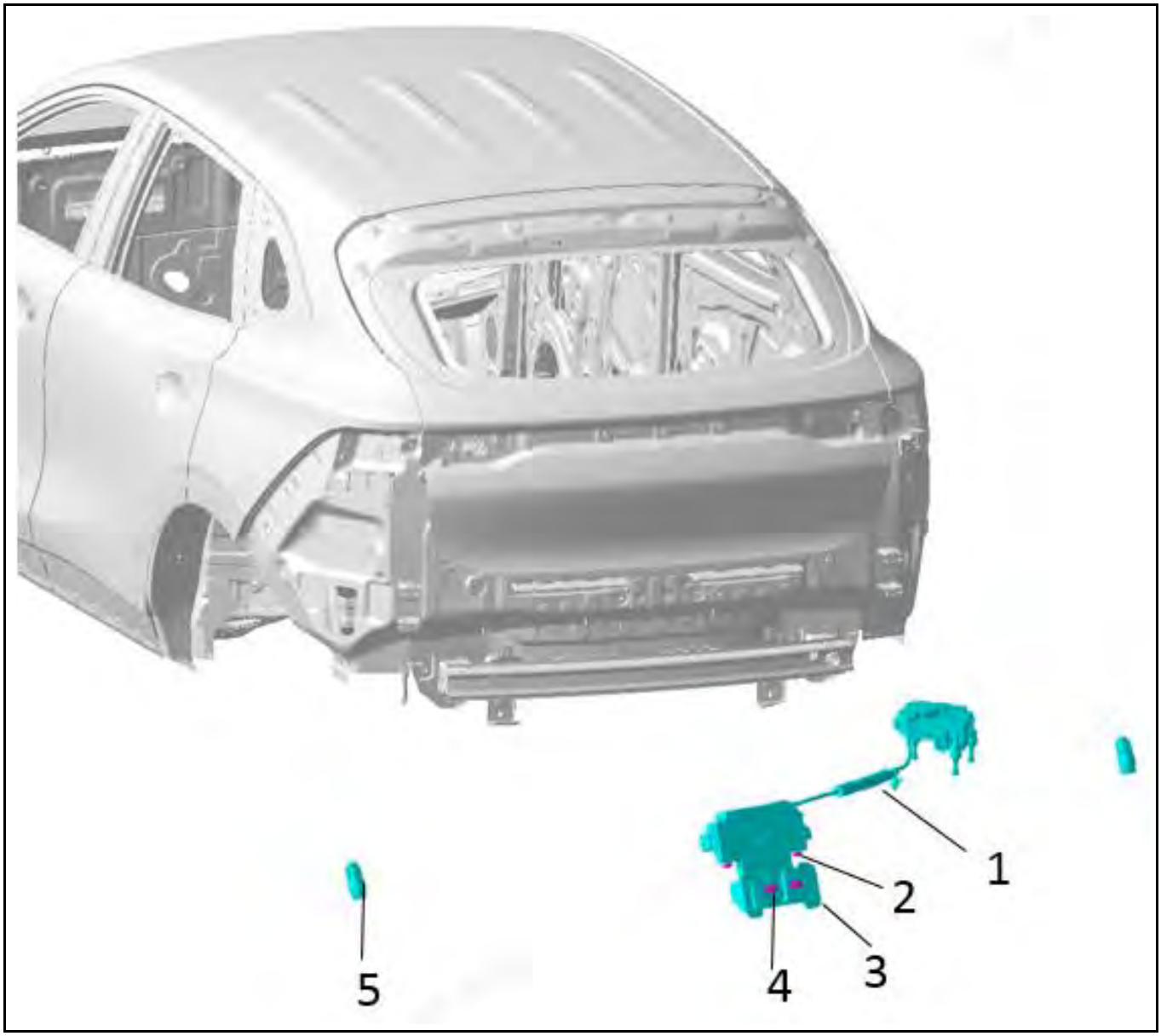
1	Engine bonnet lock body assembly	5	Bonnet release cable I
2	Bonnet lock body mounting bolt (M8)	6	Connection box bracket
3	Adjustable buffer block	7	Connection box bracket mounting bolt (M6)
4	Fixed buffer block	8	Bonnet release cable II

Engine bonnet stay bar system



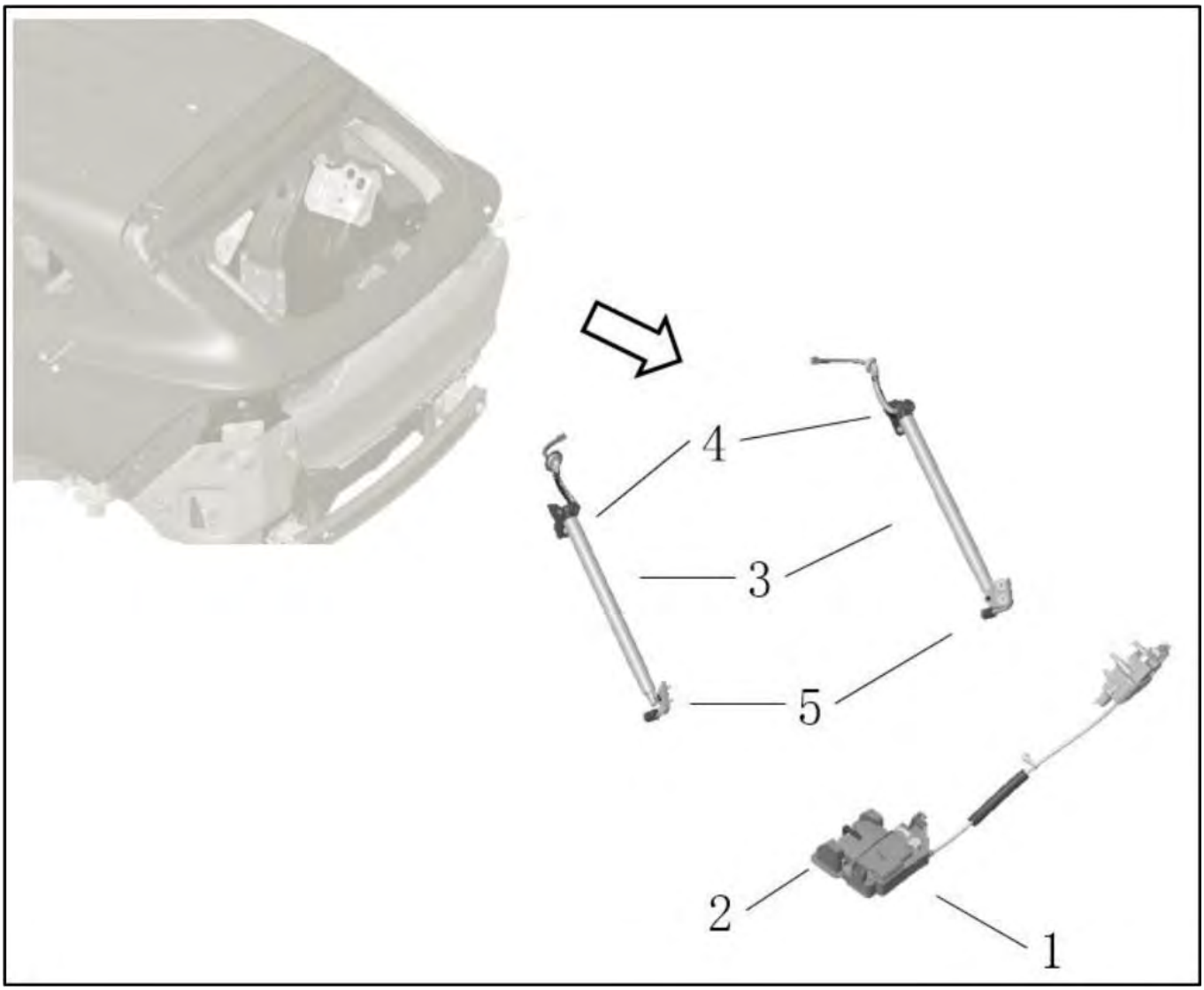
1	Engine bonnet stay bar assembly	4	Stay bar support bracket
2	Bonnet stay bar support clip	5	Hex flange bolt (M6)
3	Placement clip of bonnet stay bar		

Boot lid lock mechanism



1	Boot lid lock mechanism	4	Boot lid lock catch bolt (M6)
2	Boot lid lock body bolt (M6)	5	Boot lid buffer block
3	Boot lid lock catch		

5.4.2.3 Boot lid lock mechanism



Item	Description	Item	Description
1.	Boot lid lock mechanism	4.	Side wall bracket
2.	Boot lid lock catch	5.	Boot lid bracket
3.	boot lid strut		

5.4.2.4 Precautions

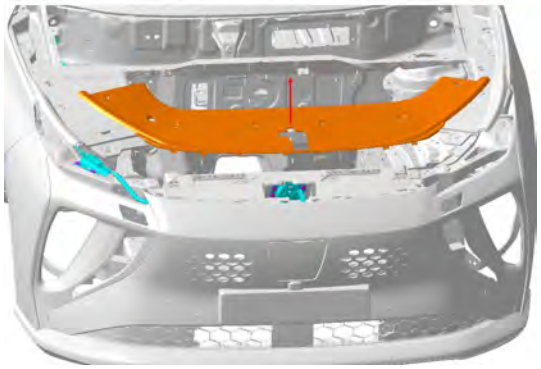
1. **Caution:** Please use genuine parts and components for maintenance; otherwise, the EFI system may not operate properly.
2. **Caution:** Please follow the specified maintenance and diagnostic procedures for maintenance work.
3. **Caution:** Do not disassemble the parts and components of the EFI system during maintenance.
4. **Caution:** Develop an awareness of environmental protection and effectively handle any waste generated during maintenance.

5.4.3 Removal and installation

5.4.3.1 Engine bonnet lock

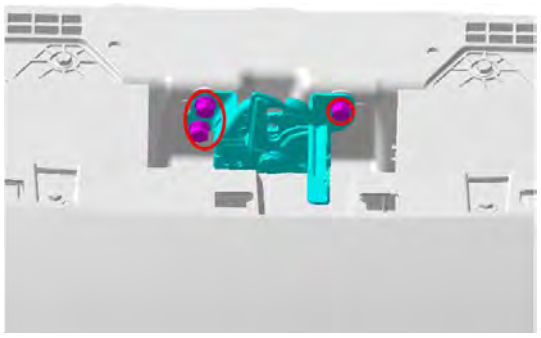
Removal

1. Remove the middle engine compartment trim cover plate.

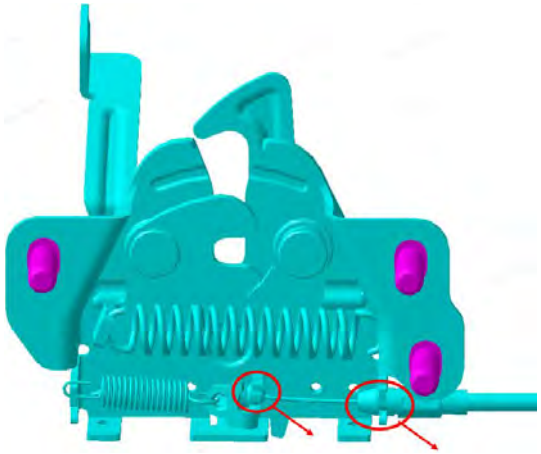


2. Remove the mounting bolts for the engine bonnet lock head assembly.

   Torque: 20±2 Nm



3. Take out the bonnet cable joint and ball joint from the lock body snap-on position.



Installation

The installation order is reverse to the removal order. Pay attention to the following points

Caution: Check whether the engine bonnet lock cable slot is correctly engaged with the engine bonnet lock.

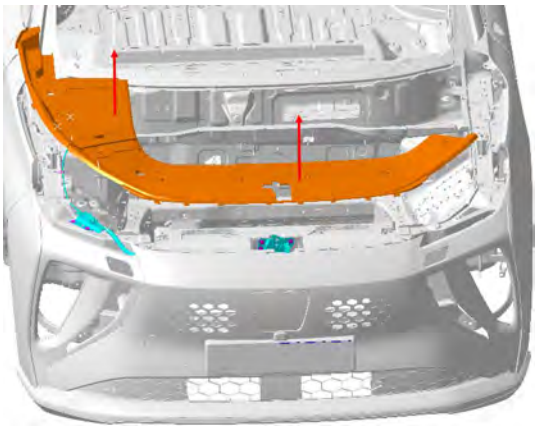
Caution: During the installation process, check whether the engine bonnet lock and the buckle are vertically engaged.

Caution: After installing the lock body, check whether the engine bonnet shakes. If it shakes, adjust the lock body up or down or adjust the exposed height of the buffer block.

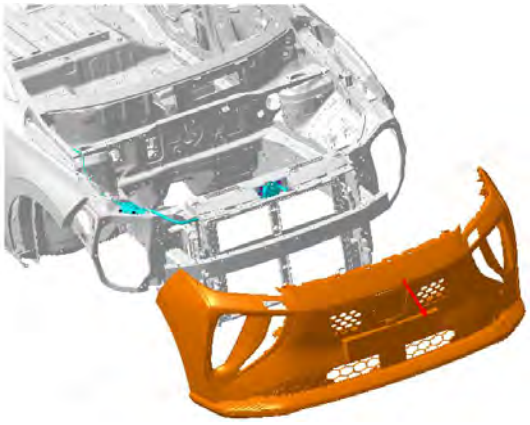
5.4.3.2 Engine bonnet lock release cable

Removal

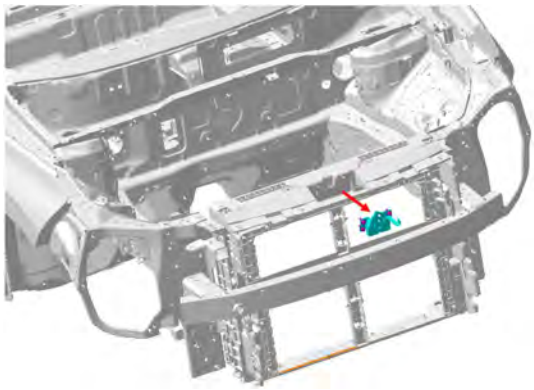
1. Remove the middle engine compartment trim cover plate and right engine compartment trim cover plate in turn.



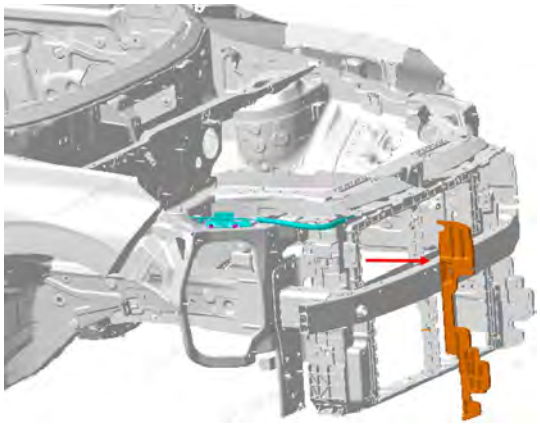
2. Remove the front bumper assembly.



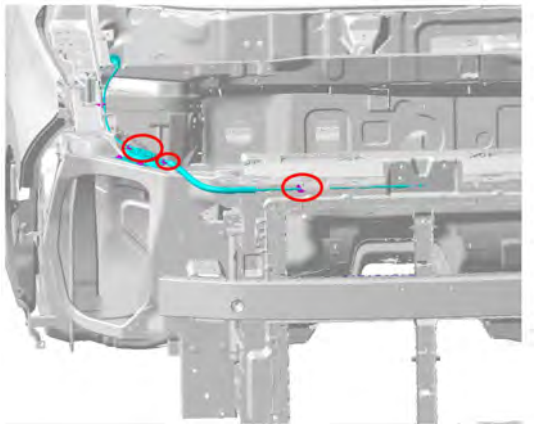
3. Remove the engine bonnet lock body.



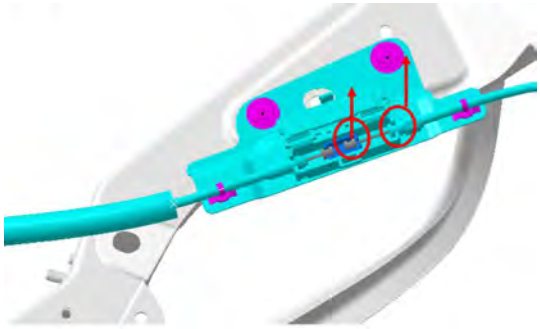
4. Remove the right deflector.



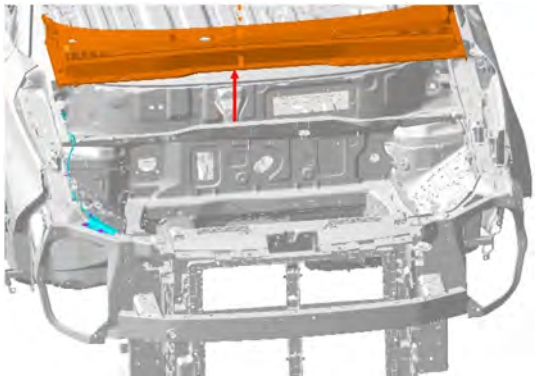
5. Take out the cable from the front-end module clip (1), the connection box bracket clip (1) of the right side beam, and the cable box clip in turn.



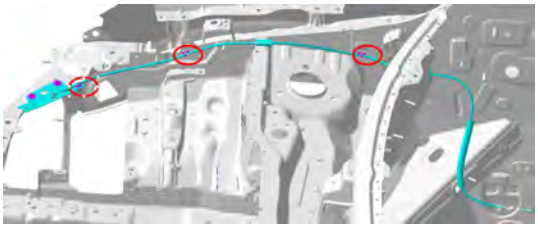
6. Open the cable connection box cover. After removing the rear engine bonnet release cable II from the cable box clip, hold the connection box and pull out the engine bonnet release cable I backwards.



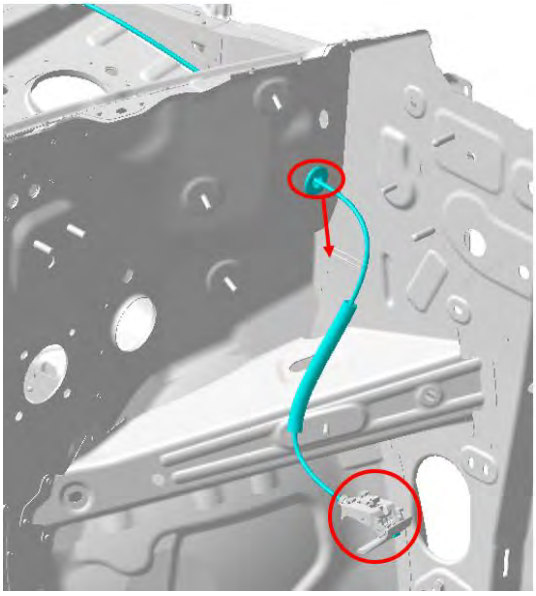
7. Remove the wiper cover plate.



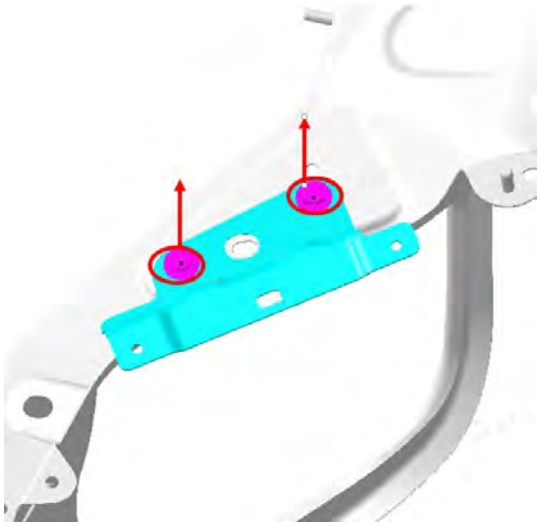
8. Sequentially remove the engine bonnet release cable II clips (3) from the front.



9. In the cab, remove the inner end of the cable from the engine bonnet interior release handle clip, then remove the cable sealing rubber sleeve inwards, and pull out the engine bonnet release cable II backwards.



10. Remove the 2 M6 bolts and remove the connection box bracket.



Installation

1 The installation sequence is the reverse of the removal sequence, and pay attention to the following items:

Caution: When pulling the cable, be careful not to let the sheet metal edge damage (peel) the outer surface of the cable when passing through the hole.

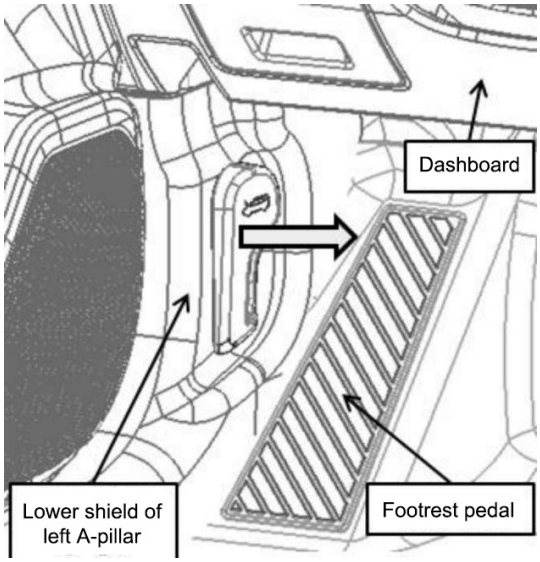
Caution: If the engine bonnet cable is severely bent or deformed, please replace it.

Caution: The cable tie clip on the cable is generally not reusable. If it is damaged, please replace it.

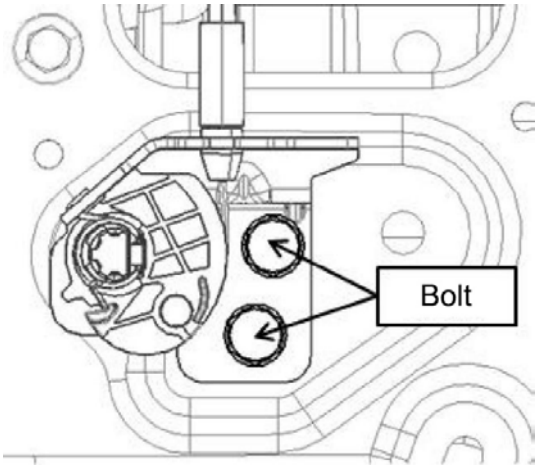
5.4.3.3 Interior engine bonnet lock release handle

Removal

1. Pull the handle off from the mounting base (the handle and base are secured by pre-tightening clips).



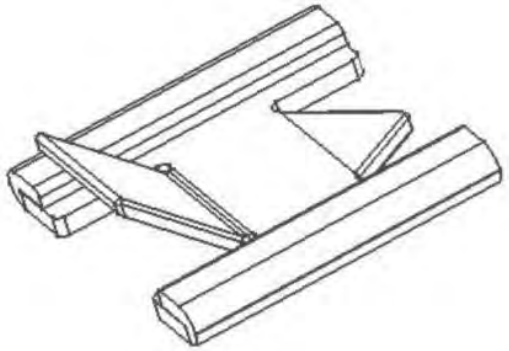
2. Remove the two bolts on the mounting base, take out the mounting base, and then remove the clip of the engine bonnet interior release cable from the slot on the mounting base.



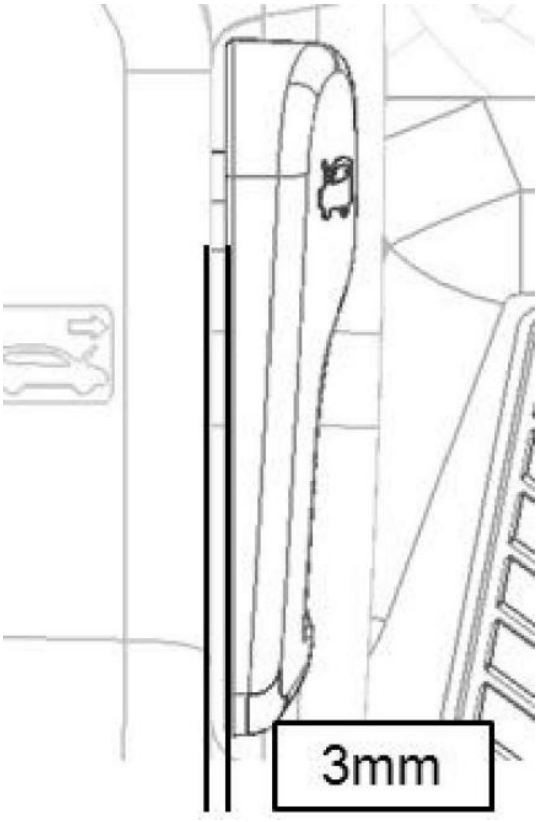
Installation

1. Install in the reverse order of disassembly and pay attention to the following matters:

Caution: When the handle is pulled off, the pre-tightening clip is prone to falling off. Please keep the pre-tightening clip safe to avoid loss.



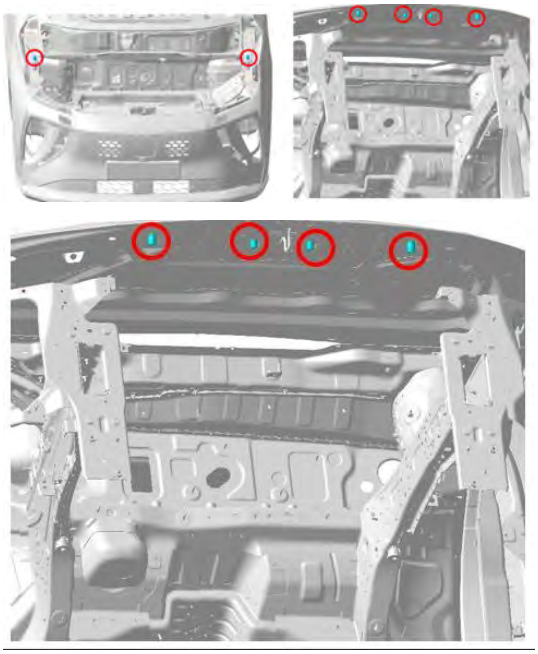
Caution: When assembling the handle, please ensure it is installed in place. Determination method: The clearance between the bottom surface of the handle and the surface of the left A-pillar lower shield is 3 mm.



5.4.3.4 Engine bonnet damper

Removal

Unscrew the adjustable buffer block and fixed buffer block out of the iron bracket or the inner plate of the engine compartment cover.



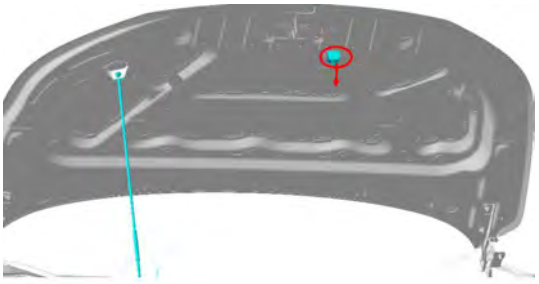
Installation

The installation order is the reverse of the removal order.

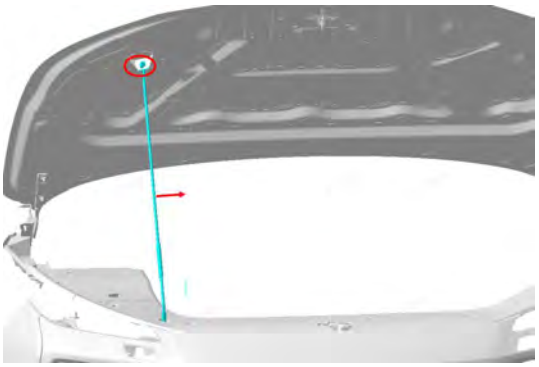
5.4.3.5 Engine bonnet stay bar

Removal

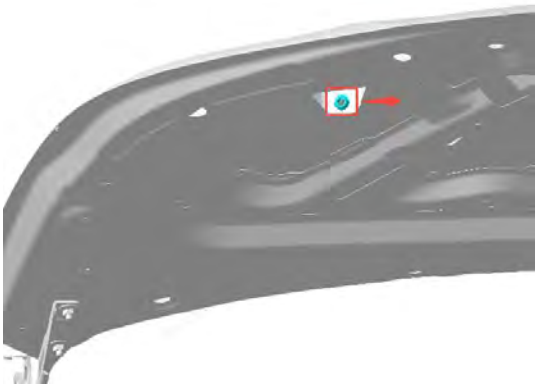
1. Use a straight screwdriver to remove the bonnet support rod placement clip from the inner panel of the bonnet.



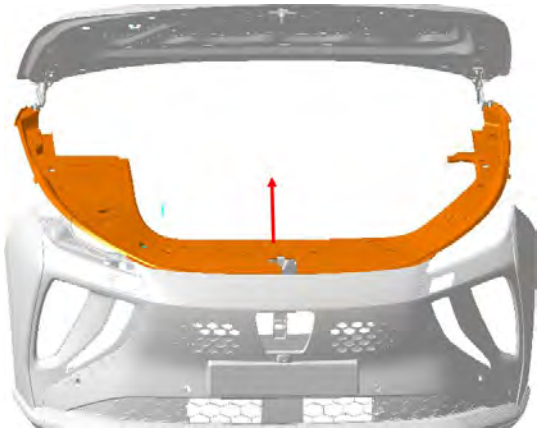
2. Remove the bonnet stay assembly from the bonnet bracket.



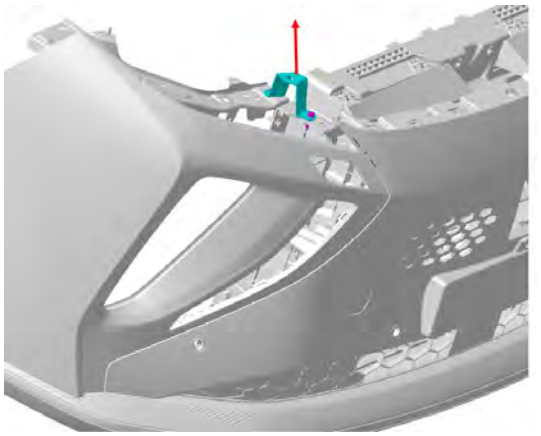
3. Remove the bonnet stay bar support clip from the bonnet bracket.



4. Remove the middle engine compartment trim cover plate.



5. Remove the 2 M6 screws and remove the strut support bracket.



Installation

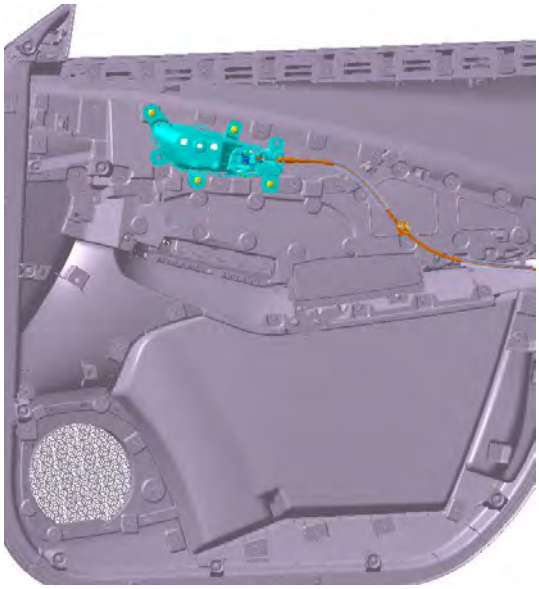
The installation order is the reverse of the removal order. The following matters should be noted:

Caution: The bonnet support rod assembly must be perpendicular to the bonnet bracket when it is removed.

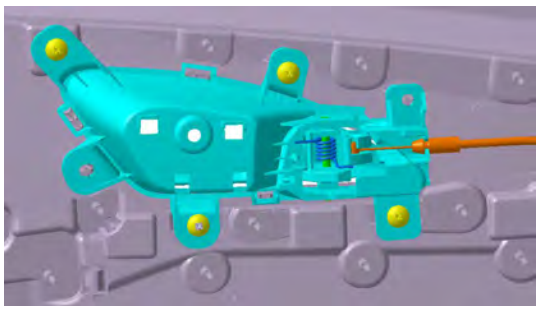
5.4.3.6 Front door interior handle

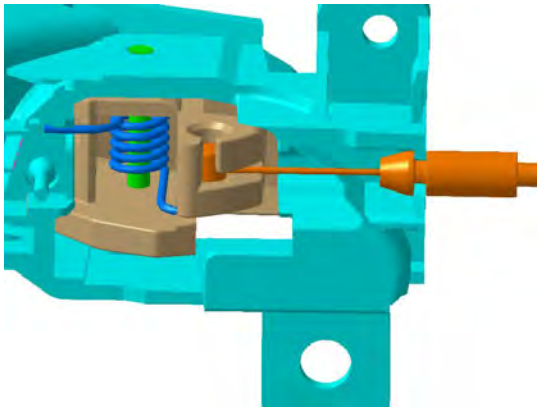
Removal

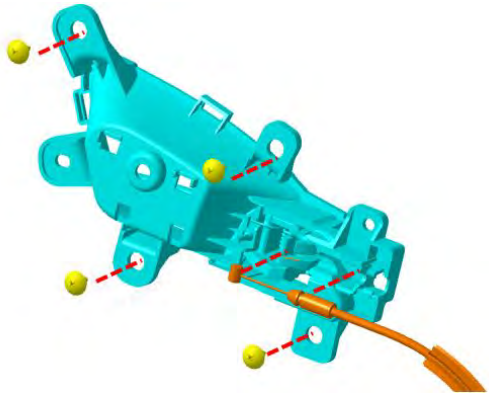
1. Remove front door shield.



2. Pull the cable out of the slot on the inner handle base, remove the cable cylindrical head, remove the handle fastening screw and take out the inner handle.







Installation

1 Installation order is the reverse of the removal order. The following matters should be noted:

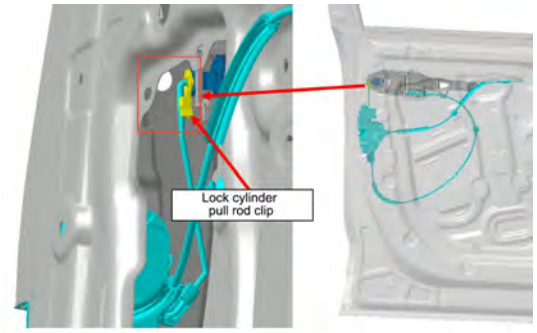
Caution: When installing the cable, carefully check if the cable groove is properly secured in place.

Caution: Check whether the door opening/closing and inner handle operation are normal.

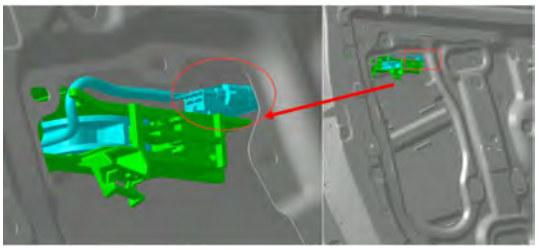
5.4.3.7 Door outer handle and lock cylinder

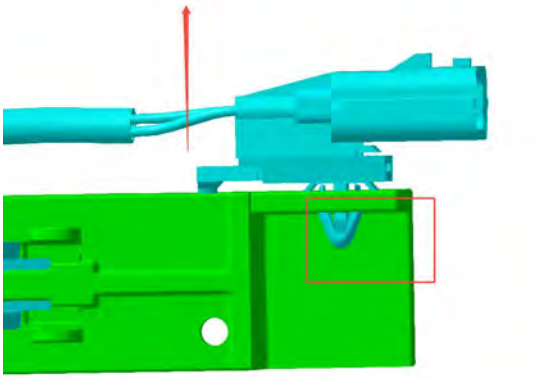
Removal

1. Close the door glass completely.
2. Remove the door shield assembly.Refer to: Door inner shield.
3. Remove the cable on the inner handle.
4. Remove the door waterproof film.
5. Remove the lock cylinder pull rod clip.

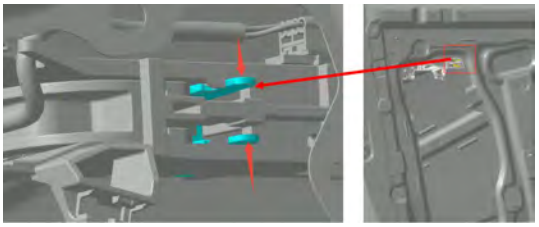


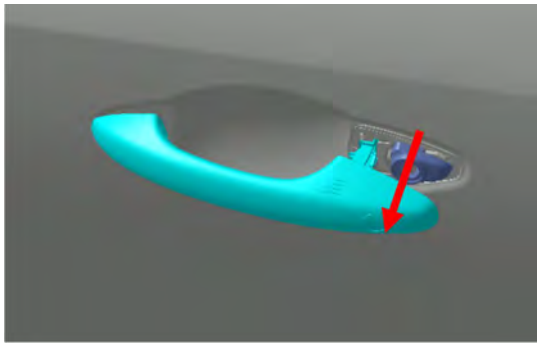
6. Use a screwdriver to lift the outer handle connector upward, remove the connector on the handle base, and disassemble its mating part harness connector.



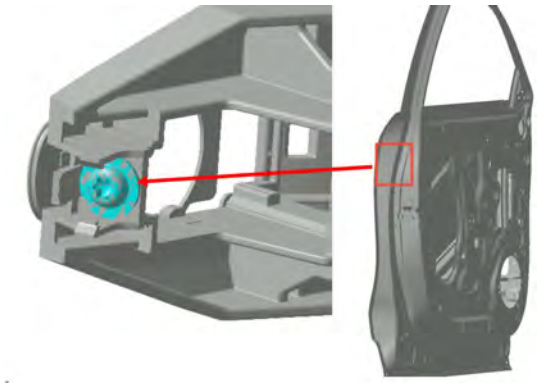


7. Press the 2 white paddles on the outer handle base to the middle and pull it toward the rear of the car at the same time. At this time, the outer handle bounces up slightly and remove the outer handle.

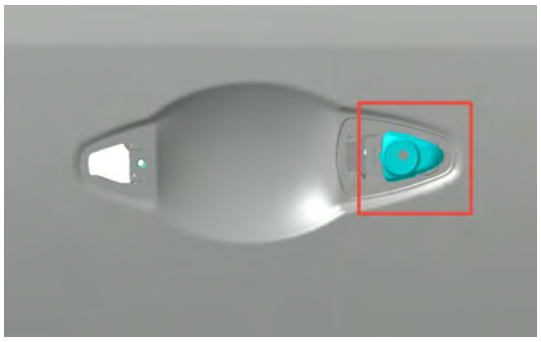




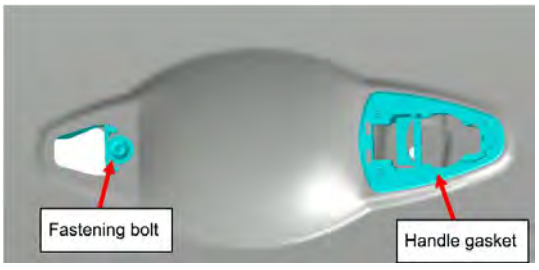
8. Loosen the lock cylinder mounting bolts (first remove the rubber plug cover at its opening position).

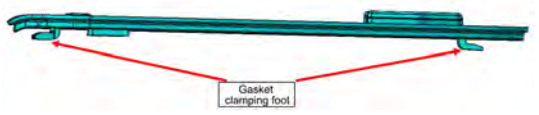


9. Take out the lock cylinder/fake lock cylinder.

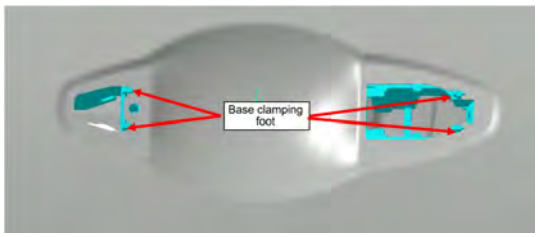


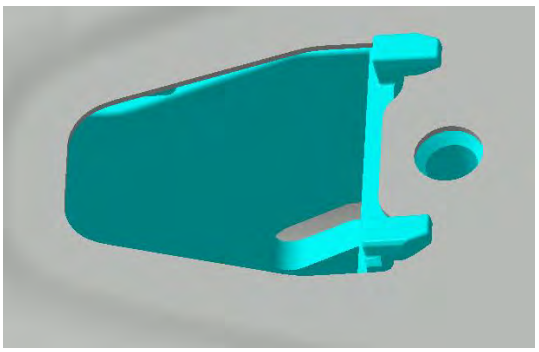
10. Remove the handle gasket (the front and rear of the handle gasket are fixed with clips), and remove the fastening bolts at the front end of the handle base.

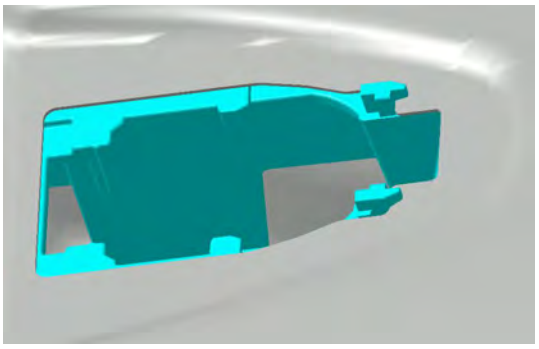




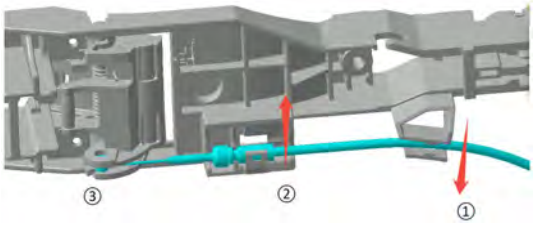
11. Push the handle base toward the front of the vehicle to disengage it from the 4 clamping feet, and remove the outer handle base.







12. Remove the door lock cable on the handle base in the order of ①②③.



Installation

1 Installation order is the reverse of the removal order. The following matters should be noted:

Caution: During disassembly and installation, do not lose the gasket, and be careful not to damage the gasket claws.

Caution: When installing the cable, carefully check if the cable groove is properly secured in place.

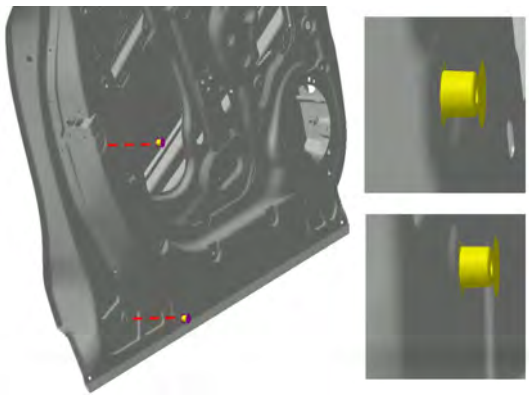
Caution: The base of the front door outer handle fitted to PEPS models is equipped with a harness clip. Be mindful of the harness routing during installation, and ensure the

connector is securely fastened; during removal, remember to disconnect the harness connector before removing the outer handle.

5.4.3.8 Door buffer block

Removal

1. Press the outermost end of the door buffer block to remove it.



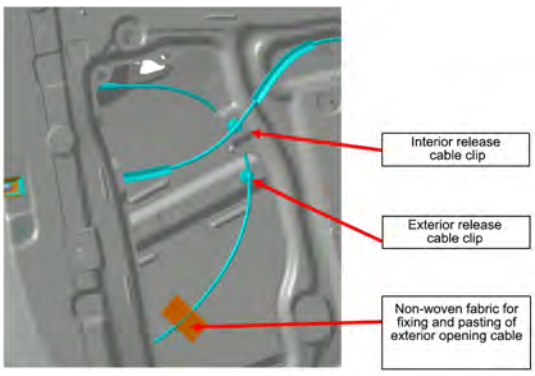
Installation

Directly press and rotate the buffer block to install it into the mounting hole.

5.4.3.9 Door lock

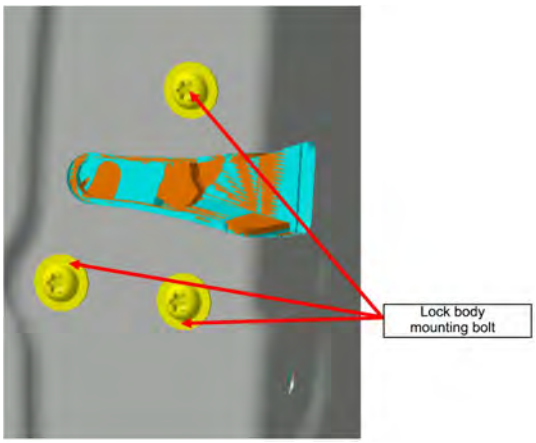
Removal

1. Remove the door shield. Refer to: Door inner shield.
2. Take down the cable on the interior handle.
3. Remove the door waterproof film.
4. Remove the rear lower guide rail of door glass. Refer to: Rear lower guide rail of door glass.
5. Remove the front door outer handle. Refer to: Outer door handle.
6. Remove the interior and exterior opening cable clips and adhesive cloth of the door lock body.



7. Loosen the door lock body mounting bolts and remove the lock body.

Torque: 5±0.5 Nm



Installation

The installation order is the reverse of the removal order. The following matters should be noted:

Caution: During removal of the front door lock body, remove the lock cylinder pull rod on the exterior handle base. The installation order is reverse to the removal order.

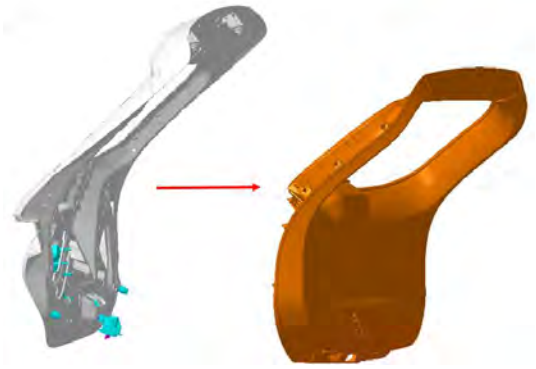
Caution: When removing the front door lock body, keep the lock cylinder pull rod directly on the lock body to avoid reverse installation of the pull rod end during assembling.

Caution: Check whether the door opening/closing and inner handle locking/unlocking operations are normal, whether the outer handle can be opened normally, and whether the lock cylinder is locked and unlocked normally.

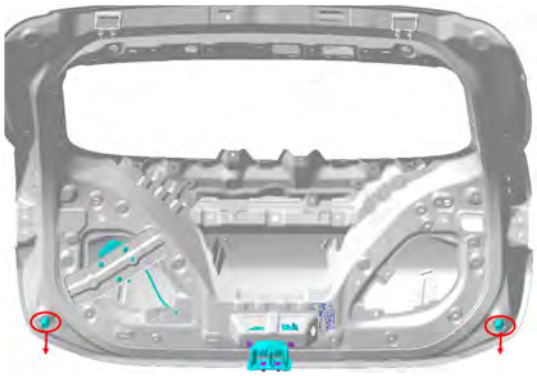
5.4.3.10 Boot lid lock body

Removal

1. Remove the boot lid inner shield.



2. Unscrew the adjustable buffer block out of the boot lid sheet metal.



3. Remove the boot lid lock body mounting bolts and self-priming motor mounting nuts (power boot lid configuration).

   Torque: 9±1 Nm

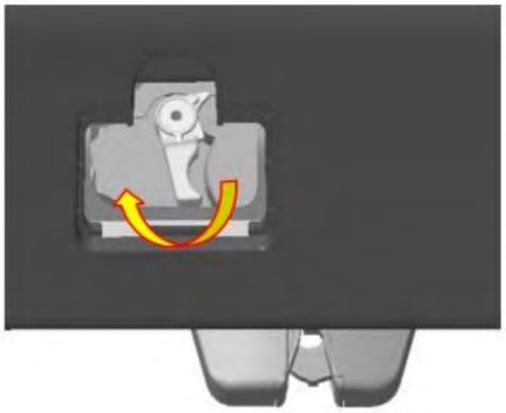
4. Unplug the lock body and suction motor connector (power boot lid configuration), and take out the lock body.

Installation

1. Install in the reverse order of disassembly and pay attention to the following matters:

Caution: Check whether the opening/closing, locking/unlocking operations of the boot lid lock are normal.

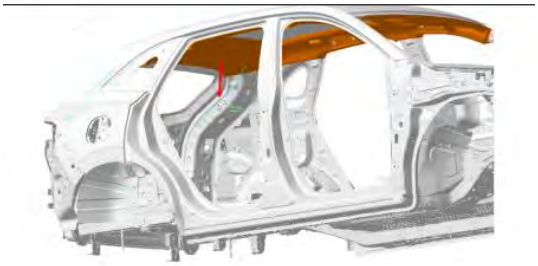
Caution: When you want to open the boot lid, besides unlocking by pressing the microswitch below the licence plate under the boot lid, there is another way to open the boot lid, which is emergency opening: there is an emergency opening trim cover on the boot lid shield. In an emergency, remove the trim cover and pull the emergency opening handle upward by hand from inside the vehicle to unlock the door lock, so as to open the boot lid.

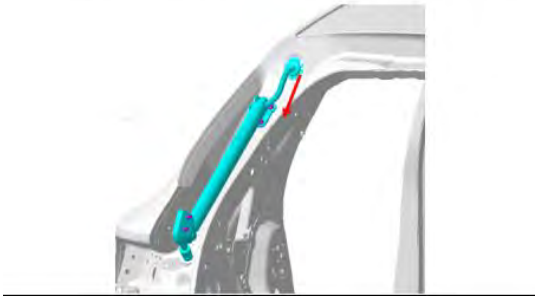


5.4.3.11 Boot lid stay bar

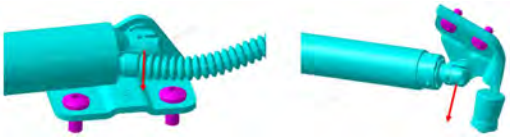
Removal

1. Remove the rear part of the roof and unplug the strut connector (for electric strut configuration).

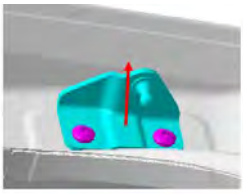




2. Use a straight screwdriver to remove the support rods from the boot lid bracket and side wall bracket ball joints in turn.



3. Remove the boot lid bracket and side wall bracket in turn.



Installation

1. Install in the reverse order of disassembly and pay attention to the following matters:

Caution: Two people are required to work together for removing and installing the boot lid strut (one for removal and installation, and one to assist in supporting the boot lid) to prevent the boot lid from falling and causing personal injury during the removal and installation process.

Caution: After completing the disassembly and assembly, check whether the strut opens and closes properly.

5.5 Glass system

5.5.1 Instructions and operations

5.5.1.1 Precautions

Adhesive and primer handling

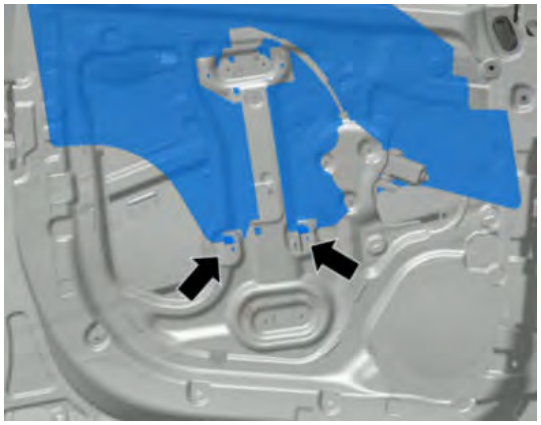
1. **Caution:** Do not use adhesive beyond its expiration date. The shelf life of such products is within six months from the date of production. The deadline or the production date printed on the box shall be strictly followed.
2. **Caution:** Store primers and adhesives in a cool, dry place. Ideally, keep them in a refrigerator.
3. **Caution:** Only open the seal of the primer and adhesive when ready to use. Discard any leftovers.
4. **Caution:** Shake the primer container thoroughly before use to ensure the primer is well mixed. Do not use if any foreign matter or floating particles are found.
5. **Caution:** Wipe off the primer or adhesive adhering to the skin with petrol or similar articles and clean the skin with soap.
6. **Caution:** The precautions listed in the operation manual shall always be followed in mind when using primer and adhesive.

5.5.2 Removal and installation

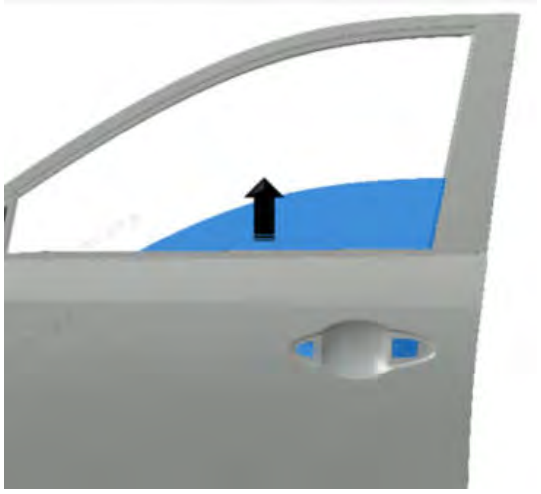
5.5.2.1 Front Door Glass Assembly

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the front door interior trim panel. Refer to: Front door shield.
3. Remove the front door waterproof film.
4. Remove the front door windowsill inner seal strip.
5. Remove the fixing bolts of front door glass.



6. Remove the front door glass assembly.



Installation

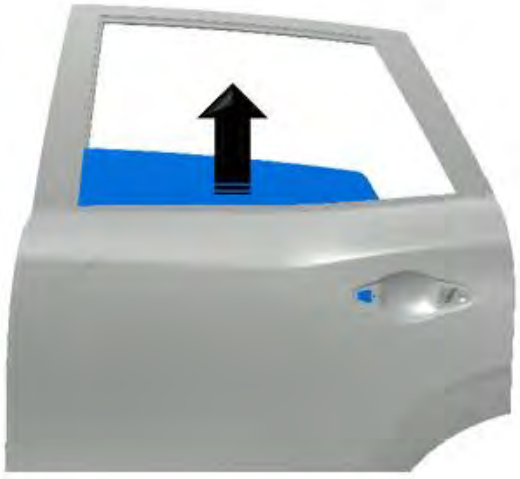
1. The installation order is the reverse of the removal order.

5.5.2.2 Rear door glass assembly

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the rear door interior trim panel. Refer to: Rear door shield.
3. Remove the rear door waterproof film.
4. Remove the rear door window inner weatherstrip.
5. Remove the rear door windowsill outer seal strip.
6. Remove the rear door glass rear lower guide rail. Refer to: Rear door glass rear lower guide rail.
7. Remove the rear door glass fixing bolts.

8. Remove the rear door glass assembly.



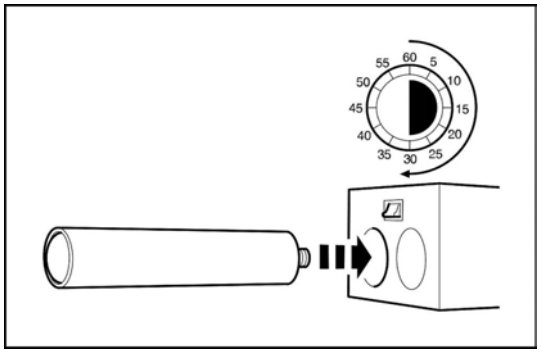
Installation

The installation order is the reverse of the removal order.

5.5.2.3 Rear side window

Removal

1. Remove the cap of glass glue DA533, and heat the glass glue DA533 for at least 30min.



2. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
3. Remove the upper interior trim panels of D pillars on both sides.
4. Cut the glass adhesive around the rear side window with a thin steel wire

   General tool: glass cutting wire

5. Remove the rear side window glass from the side window frame.

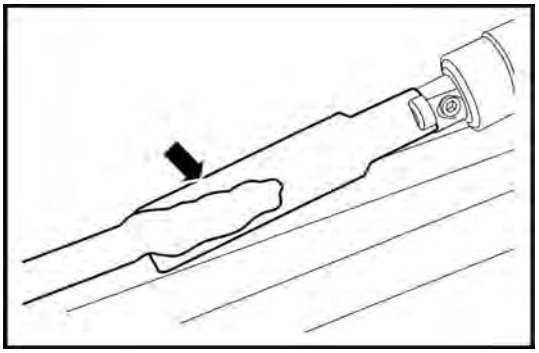
Installation

Caution: Leave 1 mm of adhesive at the edge.

Caution: Ensure that the surface to be bonded is clean and free of foreign objects.

1. Remove glass adhesives from the rear windscreen and window frame.

   General tool: knife

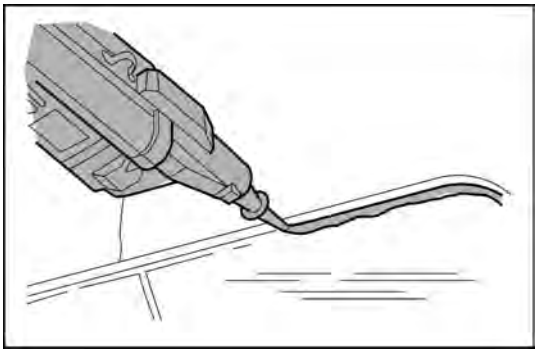


Caution: It is very important to ensure that the PU adhesive is cured and all bonding surfaces must be kept dry.

2. Deliver hot air (25°C) to the edges of the windscreen and the glass bonding joints with a heat gun, to remove all moisture.
3. Prepare glass, rear windscreen edges, and trimmed PU adhesive according to the instructions provided in the adhesive kit.

   Caution: Discard the first 100 mm of PU adhesive because the service life of this part may be short.

   Caution: To avoid water leakage, any breakage must be covered with 20 mm of adhesive.
4. Apply a continuous thin layer of PU adhesive to the edges of the rear windscreen with a mixing/spraying gun.



5. Press the glass evenly and tightly into place, pressing it on the glass surface. It is not allowed to press the bright trim strip.

Caution: During the curing process of the PU adhesive, the door windows must be open, to avoid pressure generated from opening and closing of doors.

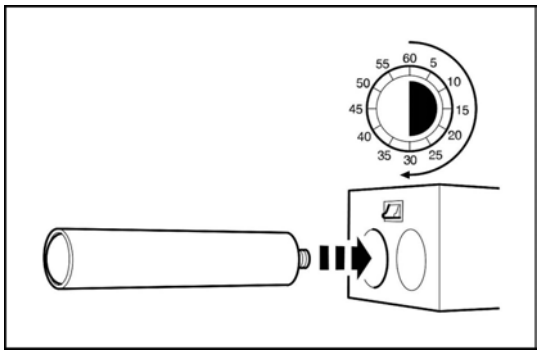
6. If the surrounding temperature is less than 10°C, deliver hot air (25°C) for 15 min (inside or outside the vehicle) continuously with a heat gun.

   General tool: heat gun

5.5.2.4 Front windscreen

Removal

1. Remove the cap of glass glue DA533, and heat the glass glue DA533 for at least 30min.



2. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
3. Remove the front wiper arm. Refer to: Front wiper arm.
4. Remove the front windscreen trim cover.
5. Remove the interior rearview mirror assembly-manual anti-glare (if equipped). Refer to: Interior rearview mirror assembly.
6. Remove the roof interior trim assembly. Refer to: Roof interior trim assembly.
7. Remove the light/rain sensor (if equipped).
8. Remove the front-view camera.

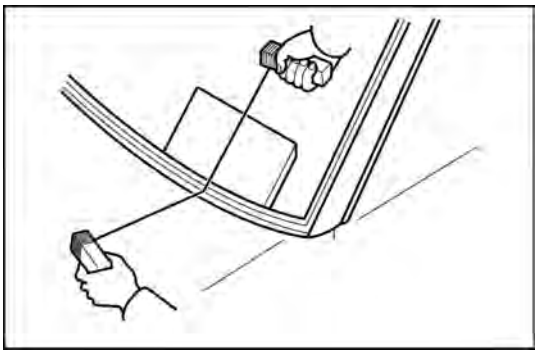
   Caution: Wrap wood blocks on both ends of the fine wire and have two persons work together to facilitate removal. Place a plastic gasket on the dashboard during operation to protect it from being scratched.

9. Cut the windscreen adhesive around the front windscreen with fine wire.

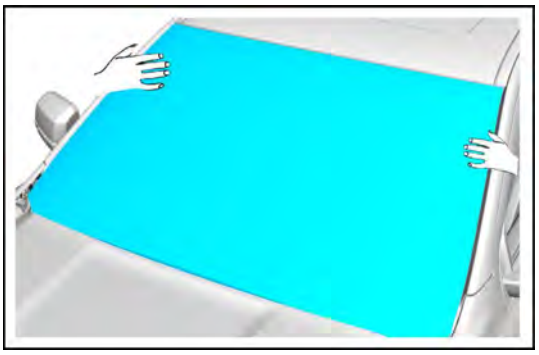
   Caution: This step needs to be completed by two maintenance technicians.

   Caution: Instrument protection measures must be taken during the cutting process to avoid scratching the instrument.

   General tool: glass cutting wire



10. Remove the front windscreen from the front windscreen frame.



Installation

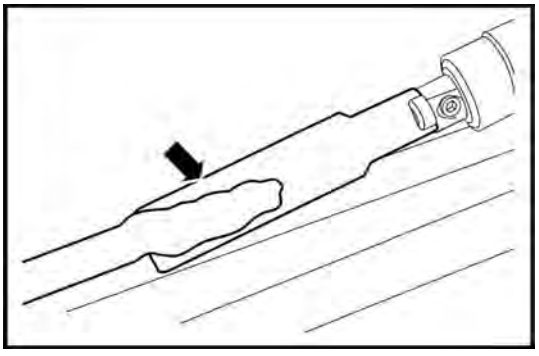
The installation order is reverse to the removal order. Pay attention to the following points

Caution: Leave 1 mm of adhesive at the edge.

Caution: Ensure that the surface to be bonded is clean and free of foreign objects.

1. Remove glass adhesives from the front windscreen and its frame.

   General tool: knife



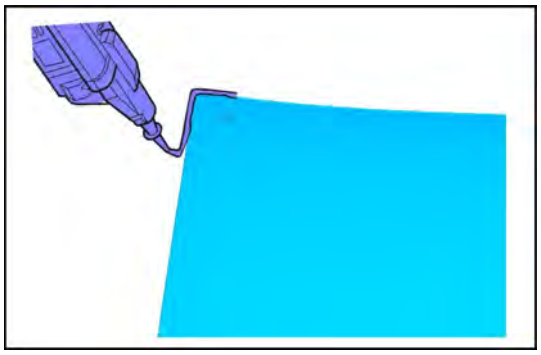
Caution: It is very important to ensure that the PU adhesive is cured and all bonding surfaces must be kept dry.

2. Deliver hot air (25°C) to the edges of the windscreen and the glass bonding joints with a heat gun, to remove all moisture.
3. Prepare glass, windscreen edges, and trimmed PU adhesive according to the instructions provided in the adhesive kit.

   Caution: Discard the first 100 mm of PU adhesive because the service life of this part may be short.

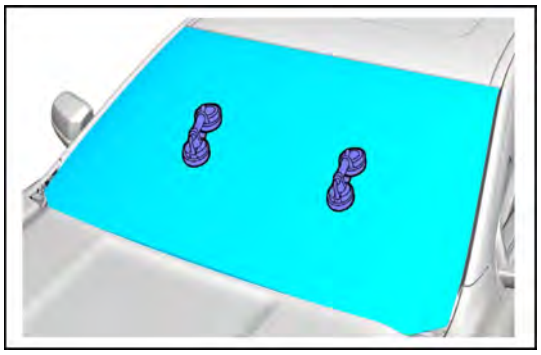
   Caution: To avoid water leakage, any breakage must be covered with 20 mm of adhesive.
4. Using a mixing/spraying gun, apply a layer of PU adhesive evenly and continuously around the windscreen.

   General tool: mixing/spraying gun

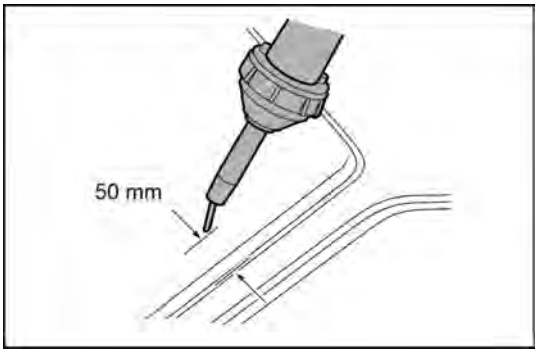


5. With the assistance of another technician, use a glass suction cup to press the glass evenly and tightly into place.

   General tool: glass sucker



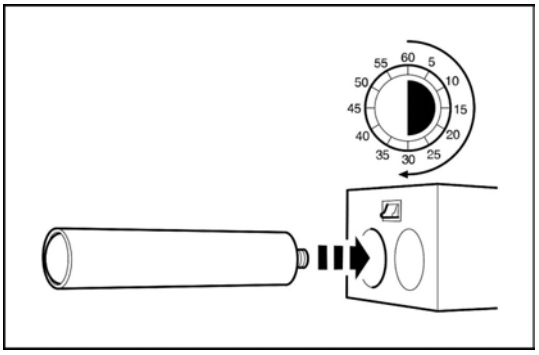
   Caution: During the curing process of the PU adhesive, the door windows must be open, to avoid pressure generated from opening and closing of doors.
6. Secure the windscreen at the correct position with suitable tape until PU adhesive cures.
7. If the surrounding temperature is less than 10°C, use a heat gun to deliver hot air (25°C) for 15 min (inside or outside the vehicle) continuously.



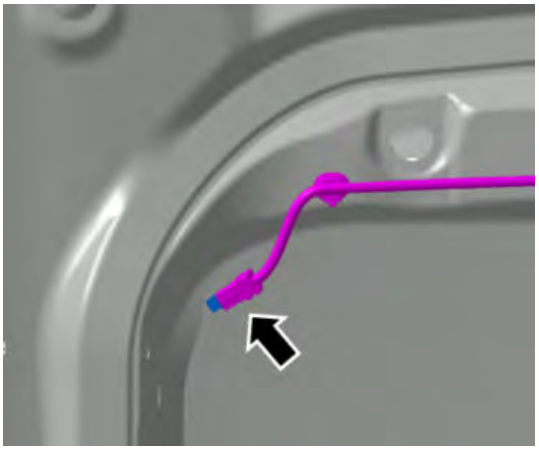
5.5.2.5 Rear windscreen

Removal

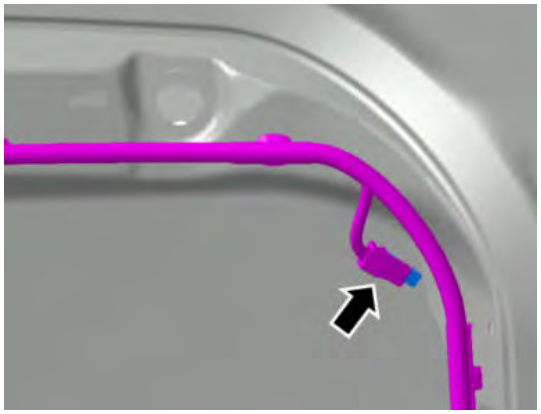
1. Remove the cap of glass glue DA533, and heat the glass glue DA533 for at least 30min.



2. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
3. Remove the interior trim panels of the rear wall.
4. Remove the rear spoiler assembly. Refer to: Rear spoiler assembly.
5. Remove the C-pillar upper interior trim panels on both sides. Refer to: C-pillar upper interior trim panel.
6. Disconnect the upper left rear windscreen harness connector.



7. Disconnect the upper right rear windscreen harness connector.



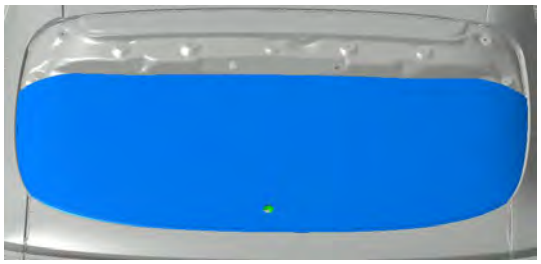
Caution: Wrap wood blocks on both ends of the fine wire and have two persons work together to facilitate removal. Place a plastic gasket on the dashboard during operation to protect it from being scratched.

8. Cut the windscreen adhesive around the rear windscreen with fine wire.

   General tool: glass cutting wire

Caution: This step needs to be completed by two maintenance technicians.

9. Remove the rear windscreen from the rear windscreen window frame.



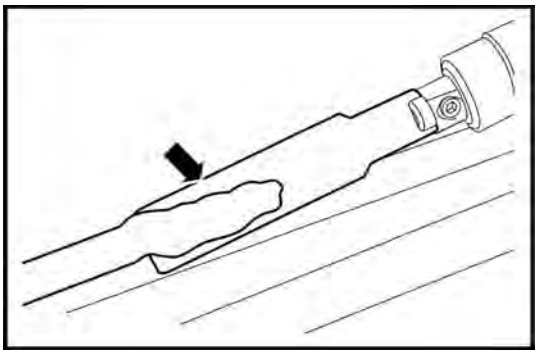
Installation

Caution: Leave 1 mm of adhesive at the edge.

Caution: Ensure that the surface to be bonded is clean and free of foreign objects.

1. Remove glass adhesives from the rear windscreen and window frame.

   General tool: knife



Caution: It is very important to ensure that the PU adhesive is cured and all bonding surfaces must be kept dry.

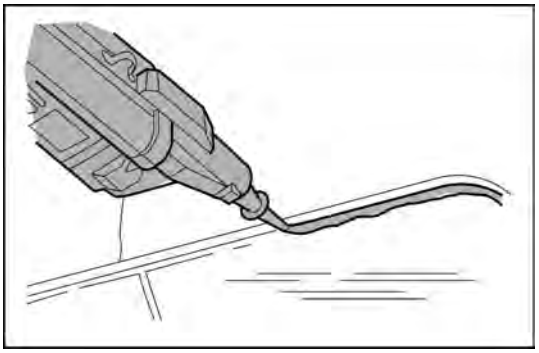
2. Deliver hot air (25°C) to the edges of the windscreen and the glass bonding joints with a heat gun, to remove all moisture.

3. Prepare glass, rear windscreen edges, and trimmed PU adhesive according to the instructions provided in the adhesive kit.

   Caution: Discard the first 100 mm of PU adhesive because the service life of this part may be short.

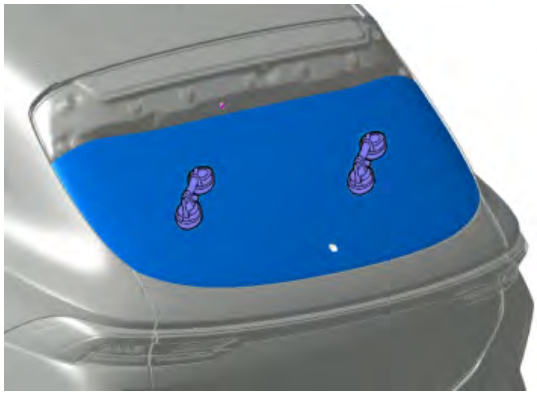
   Caution: To avoid water leakage, any breakage must be covered with 20 mm of adhesive.

4. Apply a continuous thin layer of PU adhesive to the edges of the rear windscreen with a mixing/spraying gun.



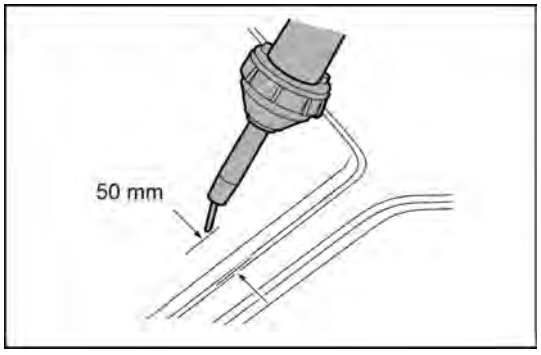
5. Use a glass sucker with the assistance of another technician.

   General tool: glass sucker

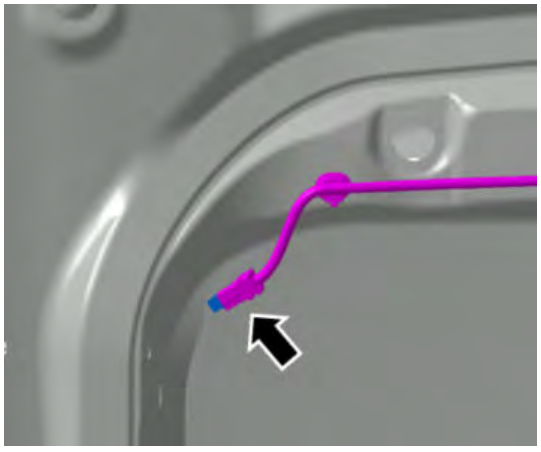


Caution: During the curing process of the PU adhesive, the door windows must be open, to avoid pressure generated from opening and closing of doors.

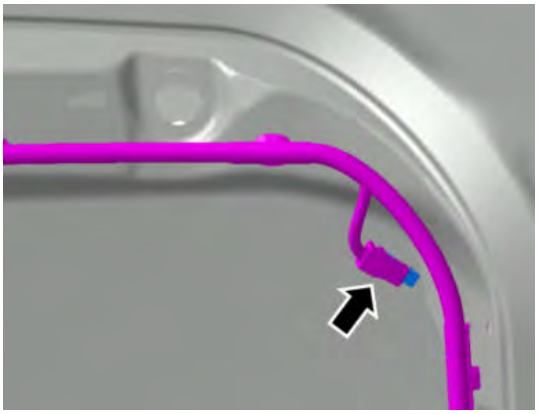
6. Secure the windscreen at the correct position with suitable tape until PU adhesive cures.
7. If the surrounding temperature is less than 10°C, deliver hot air (25°C) for 15 min (inside or outside the vehicle) continuously with a heat gun.



8. Connect the upper left rear windscreen harness connector.



9. Connect the upper right rear windscreen harness connector.

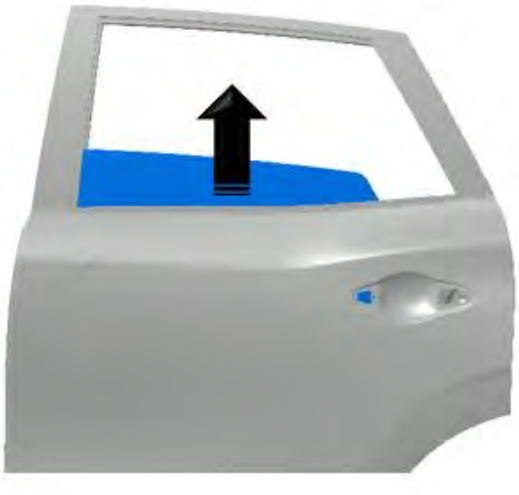


5.5.2.6 Rear door glass assembly

Removal

1. Power off the vehicle and disconnect the battery negative cable. Refer to: Disconnect the battery negative pole.
2. Remove the rear door interior trim panel. Refer to: Rear door shield.
3. Remove the rear door waterproof film.
4. Remove the rear door window inner weatherstrip.
5. Remove the rear door windowsill outer seal strip.
6. Remove the rear door glass rear lower guide rail. Refer to: Rear door glass rear lower guide rail.
7. Remove the rear door glass fixing bolts.

8. Remove the rear door glass assembly.



Installation

The installation order is the reverse of the removal order.

5.6 Auxiliary dashboard

5.6.1 Diagnosis and testing

5.6.1.1 Diagnosis and testing

Electronic gear shifter module (GSM)

General equipment

Diagnostic scanner

Inspection and confirmation

1. Confirm problems that owners complain about and check accordingly.
2. Check the parts and components thoroughly before repairing or replacing them.
3. Before the next check, solve the identified problem first.
4. The gear shifter handball and panel are exterior parts, please take care to avoid scratches.

5.6.1.2 Diagnosis and testing

Appearance Checklist

Mechanical	Electrical
– Gear lever	– Fuse – Electronic connector – Harness

5.6.1.3 Troubleshooting and Maintenance

Fault Symptom and Troubleshooting Method

Fault Symptom	Possible causes	Maintenance Measures
Unable to shift out of P gear	1. Loss of electronic gear shifter module body assembly signal 2. Loss of brake signal	Do not depress the brake pedal, push the gear shifter handball and observe the instrument cluster to see if there is a prompt of "Please depress the brake pedal for gear shifting": (1) If there is no prompt, it may be that the electronic gear selector module body assembly does not work normally. Please check whether the relevant harness lines and fuses are normal. (2) If there is a message "Please depress the brake pedal for gear shifting" on the instrument, please depress the brake pedal and then push the gear shifter handball to shift gears. If there is a message of "Please depress the brake pedal for gear shifting" again, it may be that the brake signal is lost. Please check the brake signal.
Gear indicator light (yellow light) on the panel does not illuminate	1. Poor contact of connectors on the panel 2. Component fault of indicator light module inside the panel	1. Pull out the panel harness connector for inspection and then reinstall it 2. Replace the electronic gear shifter module body assembly with a new one
Panel gear backlight (red light) does not illuminate	1. Poor contact of connectors on the panel 2. Component fault of indicator light module inside the panel	1. Pull out the panel harness connector for inspection and then reinstall it 2. Replace the electronic gear shifter module body assembly with a new one
The gear lever is jammed and does not return after shifting.	Electronic gear shifter module internal fault	Replace the electronic gear shifter module body assembly with a new one
The P gear button is stuck and does not return after being pressed	P gear button internal fault	Remove the panel to check the P gear button or replace with a new electronic gear shifter module body assembly

5.6.1.4 DTC List

The diagnosis in this manual requires technicians to have a certain skill level and diagnostic practical experience.

Refer to: Diagnostic methods.

S/N	DTC	Fault Name	Possible cause	Repairrecommendatio-ns
1	U007300	CAN bus off	CAN bus fault	Check CAN bus
2	U012200	Lost communication with VCM (vehicle control module)	VCM offline	Check VCM

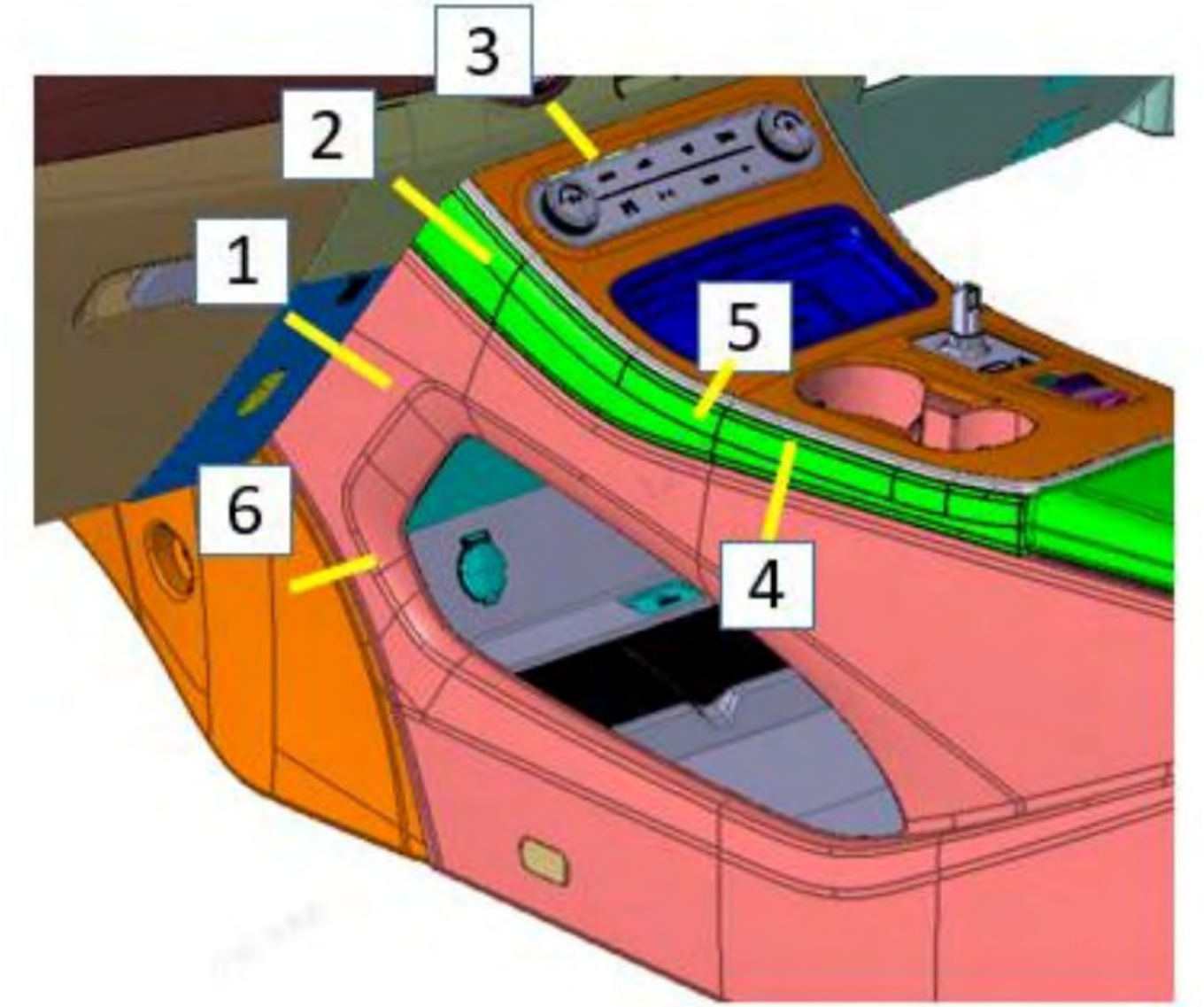
S/N	DTC	Fault Name	Possible cause	Repairrecommendatio-ns
3	U014000	Lost communication with BCM (body control module)	BCM offline	Check the BCM.
4	B350016	System undervoltage	Battery fault	Check the battery.
5	B350017	System overvoltage	Battery fault	Check the battery.
6	B350100	Hall sensor fault	Hall chip damaged	If gear shifting is not possible, replace the electronic gear shifter
7	B350200	P gear button stuck	P gear button stuck	Check whether the P button is pressed/stuck
8	B350300	X1 position stuck	X1 position stuck	Check whether the gear lever is in the X1 position
9	B350400	Y1 position stuck	Y1 position stuck	Check whether the gear lever is in the Y1 position
10	B350500	Calibration parameters are changed	Not calibrated	If gear shifting is not possible, replace the electronic gear shifter

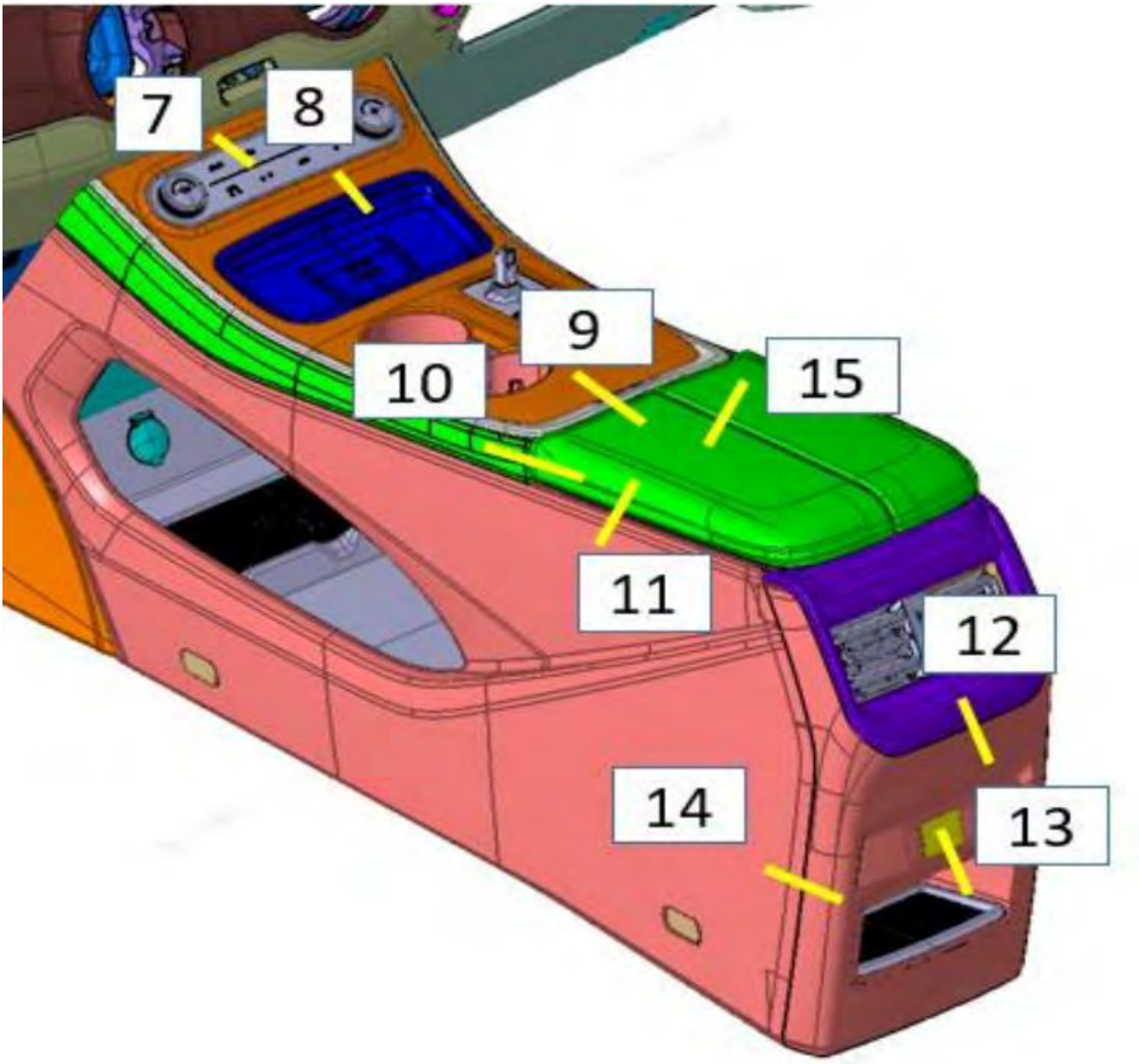
5.6.2 Specification

5.6.2.1 General specifications

Assembling gap of auxiliary dashboard assembly

The reference clearance data for maintenance and assembling are as follows:





S/N	Fitting area	Description	Design status
1.	Console assembly / IP	Clearance G	2±1
2.	Console assembly (coating) / IP	Clearance G	2±1
3.	Console assembly / IP	Clearance G	2±1
4.	Left soft coating assembly/ console body	Clearance G	0/+0.5
5.	Upper trim assembly panel/ left soft coating assembly	Clearance G	0/+0.5
6.	Extension plate / console body	Clearance G	0.5

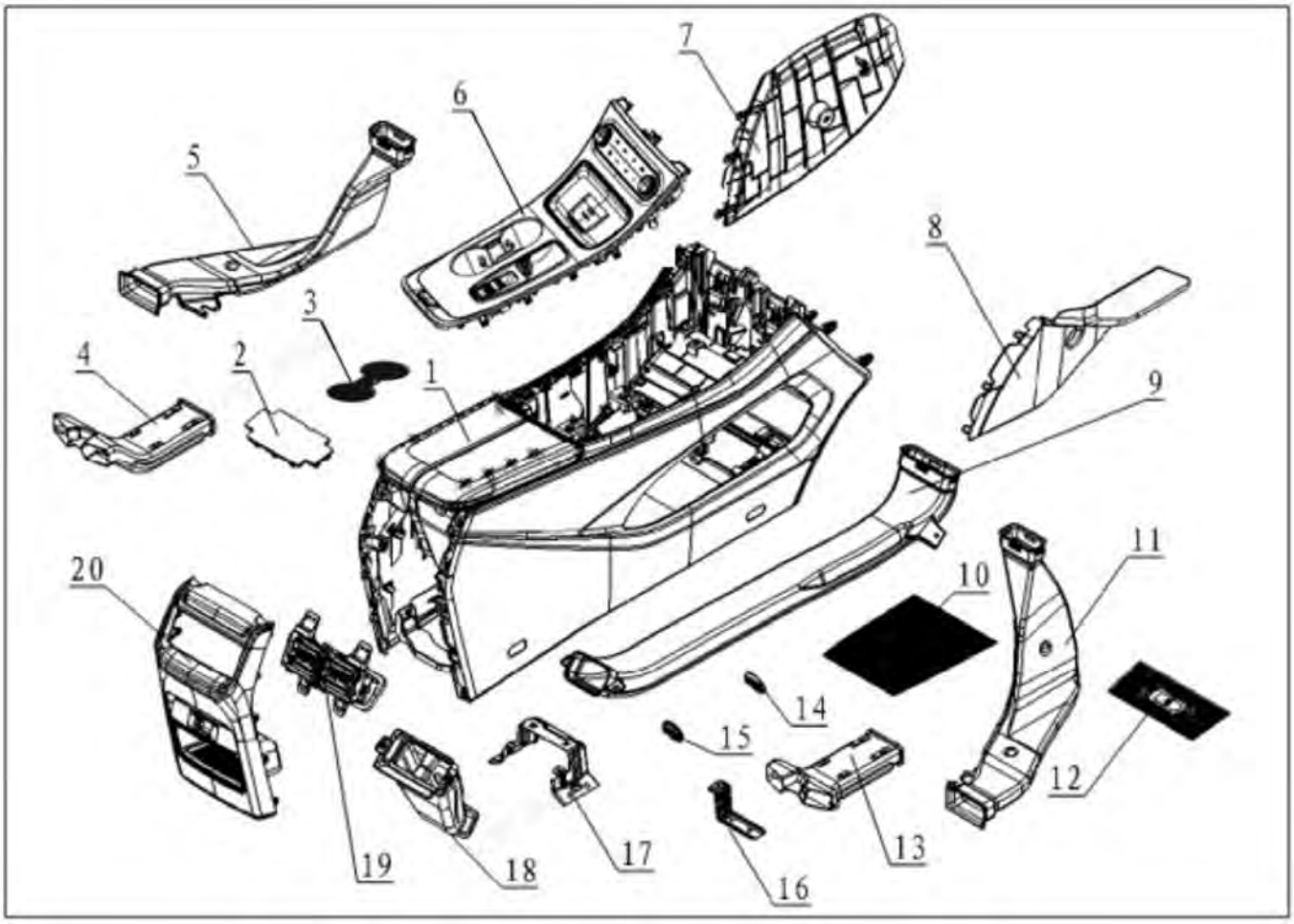
7.	Control panel / upper trim panel	Clearance G	0.5±0.5/1.5±0.7
8.	Storage box cover plate/ upper trim panel	Clearance G/flushness F	2±1.5
9.	Armrest / upper trim panel	Flushness F	2±1.5
10.	Armrest / left soft coating assembly	Clearance G	2±1.5
11.	Armrest / console body	Clearance G	4.5±1.5
12.	Rear end cover body/rear end cover trim panel	Clearance G/flushness F	0.3±0.3/-0.5±0.5
13.	Rear end cover body/plug cap	Clearance G	0.5±0.5
14.	Rear end cover / console body	Clearance G/flushness F	0.3±0.3/-0.5±0.5
15.	Armrest skin (left/right)	Clearance G/flushness F	3±1.5/0±1.5

5.6.2.2 Torque specification

Name	Nm
Screws of plastic parts (not specific to parts and components) of the auxiliary instrument panel system	5±0.5
Fixing bolt of electronic gear shifter base	9±1Nm

5.6.3 Instructions and operations

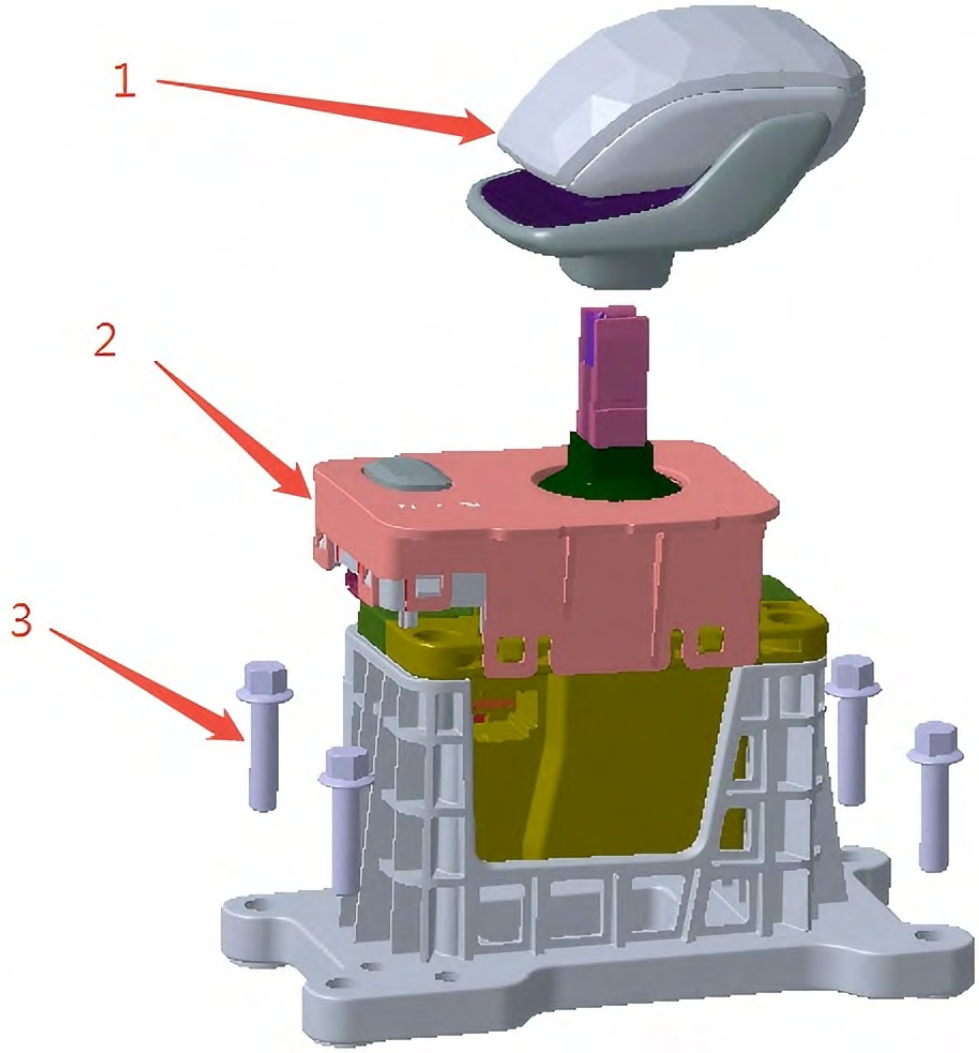
5.6.3.1 Auxiliary dashboard assembly



Item	Description	Item	Description
1.	Auxiliary dashboard body assembly	11.	Front section assembly of rear right air-to-footwell air duct
2.	Wireless charging block board	12.	Hollow-out front cushion (without wireless charging sign)
3.	Cup holder pad	13.	Rear left air-to-footwell air duct rear section assembly
4.	Rear left air-to-footwell air duct rear section assembly	14.	Refrigeration switch assembly
5.	Front section assembly of rear left air-to-footwell air duct	15.	Refrigerator reaming block board
6.	Upper trim panel assembly	16.	Front section mounting bracket assembly of face level air-to-face duct

Item	Description	Item	Description
7.	Left extension baffle assembly	17.	Rear storage box mounting bracket assembly
8.	Right extension baffle assembly	18.	Rear section assembly of rear air duct
9.	Front section assembly of rear air duct	19.	Rear air vent assembly
10.	Hollow-out rear cushion	20.	Rear end cover assembly

5.6.3.2 Electronic gear shifter module



Item	Description	Item	Description
1	Gearshift knob assembly	3	Hex nut and conical spring washer assembling unit
2	Electronic gear shifter module body assembly		

5.6.3.3 Overview

1. Gear information:

   P gear (parking gear): This gear is used when parking or putting the vehicle in a ready-to-drive state. Press the P gear button on the panel to enter the P gear. Be sure to stop the vehicle completely before shifting to the P gear.

   D gear (driving gear): The D gear can only be engaged when the vehicle is started . Use this gear when driving forward.

   R gear (reverse gear): The R gear can only be engaged when the vehicle is started. Please reverse using this gear. Be sure to stop the vehicle completely before shifting to the R gear.

   N gear (neutral): When the vehicle is in this gear, the drive assembly cannot output power and will not provide auxiliary parking. Be sure to stop the vehicle completely before shifting to the N gear.

2. Jinshi logo lighting:

   The Jinshi logo can be lit up. When any door is opened, the Jinshi logo on the crystal handball will light up in the form of a breathing light.

   When all doors are closed and the backlight of the vehicle is turned on, the Jinshi logo on the crystal handball will be always on; if the IVI can adjust the colour of the whole vehicle ambient light, the colour of the Jinshi logo light can change with the colour of the whole vehicle ambient light.

   1 Electronic gear shifter

   2 P gear button

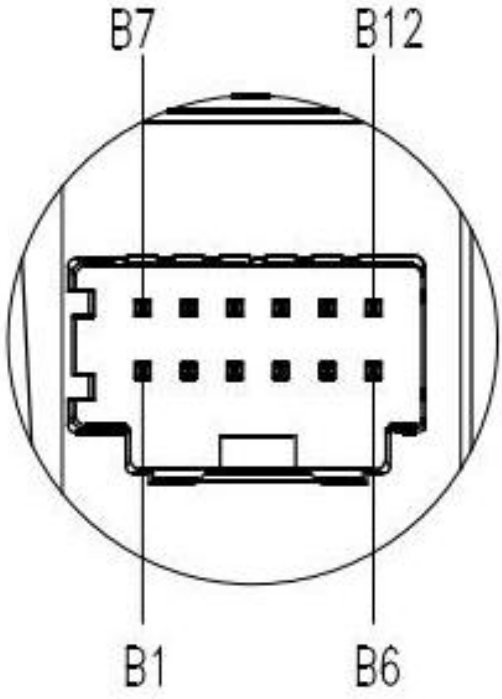
   3 Drive mode button

   4 Jinshi logo

3. Electrical interface: The electronic gear shifter is connected to the vehicle harness through the body connector, and the relevant signals communicate with the VCM through CAN communication.

   1 Electronic gear shifter body connector.

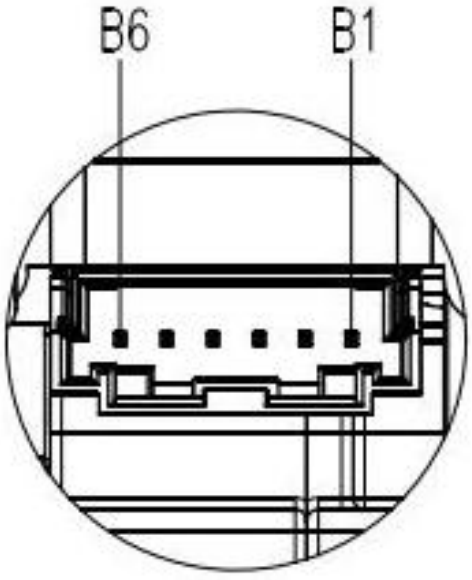
Gear shifter connector model	TE 1-1318772-3
Vehicle harness connector model	TE 1318774-1



Pin	Function definition	Pin	Function definition
Pin 1	KL30	Pin 7	CAN L
Pin 2	LIN	Pin 8	CAN H
Pin 3	GND	Pin 9	PWM1
Pin 4	P_SW	Pin 10	PWM2
Pin 5	KL15	Pin 11	PWM3
Pin 6	/	Pin 12	ILL+

2 P gear button and gear indicator connector

Shift panel connector model	CJT A2010WRC-S-6P-BK
Vehicle harness connector model	CJT A2010HC-6P



Pin	Function definition	Pin	Function definition
Pin 1	ILL+	Pin 4	PWM3
Pin 2	PWM1	Pin 5	P_SW
Pin 3	PWM2	Pin 6	GND

5.6.3.4 Precautions

Precautions for auxiliary dashboard maintenance process

1. **Caution:** Disconnect the battery cable in advance.
2. **Caution:** Be careful not to scratch the gasket and other parts and components.
3. **Caution:** When removing or disassembling any parts, be careful not to damage or deform them. Exercise caution to protect those parts and components that may tear the cloth.
4. **Caution:** When disassembling parts and components with a screwdriver or other tools, wrap the parts and components with vinyl tape or cloth for protection.
5. **Caution:** Protect the removed parts and components with cloth.
6. **Caution:** If non-reusable parts and components are removed, replace them with new ones.
7. **Caution:** Tighten the bolts and nuts to the specified torque.
8. **Caution:** After reassembling is completed, confirm that each part and component works normally.
9. **Caution:** Remove dirt as follows.
10. **Caution:** Water-soluble stains: Soak a soft cloth in water and wring it out vigorously. After removing stains, wipe with a soft, dry cloth.
11. **Caution:**Oil stains: Dissolve the synthetic detergent (concentration: 2~3% or lower) in warm water, wet the cloth and wipe away the oil stain. Then immerse the cloth in clean water and wring it out. Wipe away the detergent completely. At last, wipe the cleaned area with soft dry cloth. Then completely wipe off any detergent. Finally, wipe the cleaned area with a soft, dry cloth.
12. **Caution:** Do not use organic solvents such as thinners or petrol.

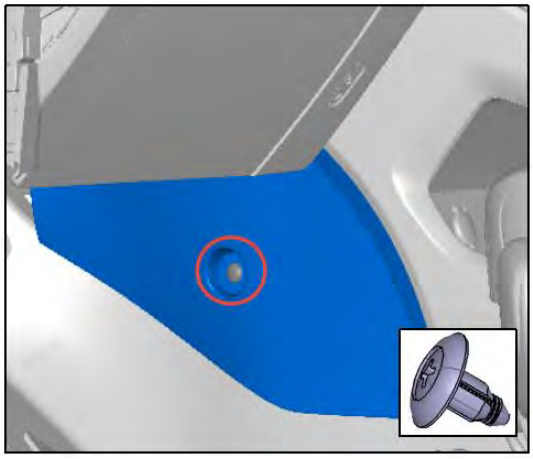
5.6.4 Removal and installation

5.6.4.1 Auxiliary dashboard assembly

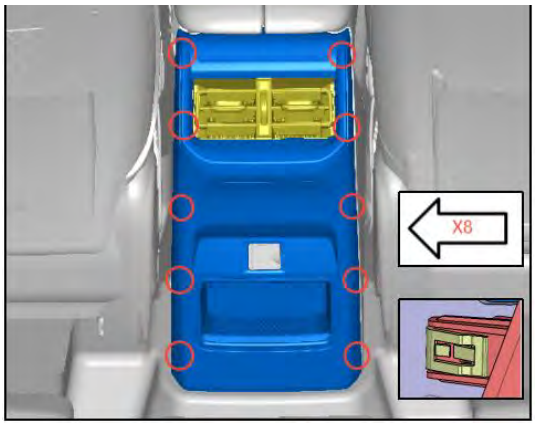
Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal

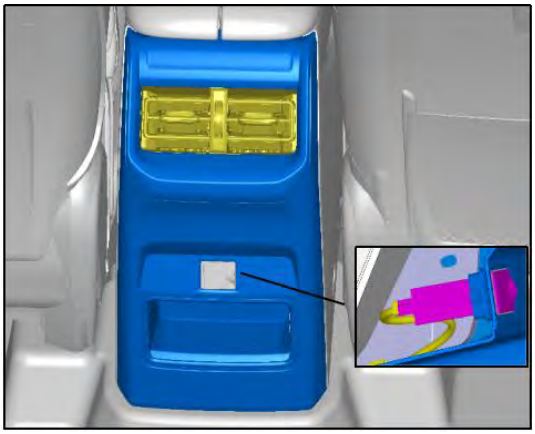
2. Remove 1 fixed plastic clip of the left/right extension plate with a cross-head screwdriver, and pull out the extension plate towards the front of the vehicle.



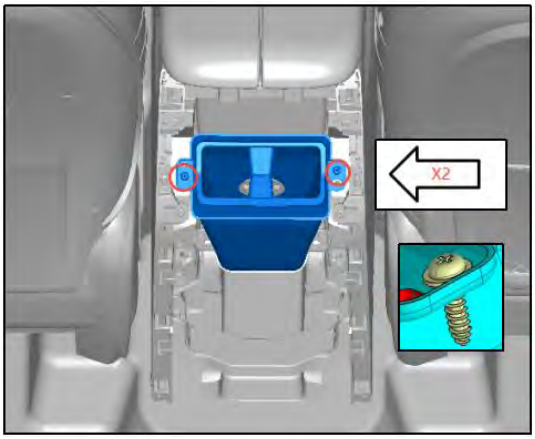
3. Pry loose the rear cover plate assembly from the bottom carpet with a straight screwdriver, pull out the rear cover plate assembly towards the rear of the vehicle with force, loosen the harness connector and take out the rear cover plate assembly.



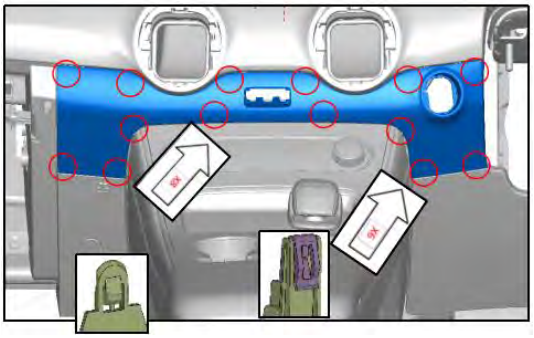
4. Disconnect the rear end cover connector of the console and remove the rear end cover harness of the auxiliary dashboard.



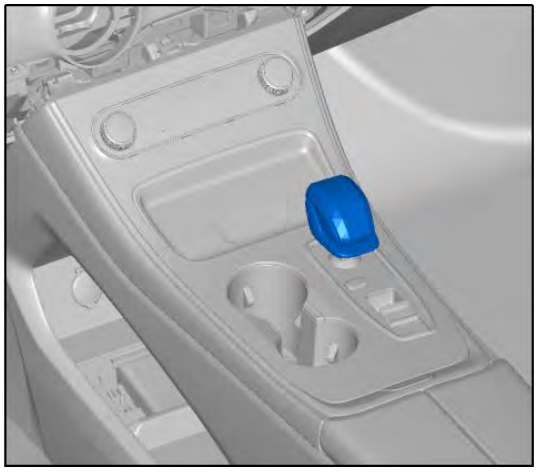
5. Loosen the 2 screws fixing the rear air duct with a cross-head screwdriver, and take out the rear end of the rear air-to-face duct.



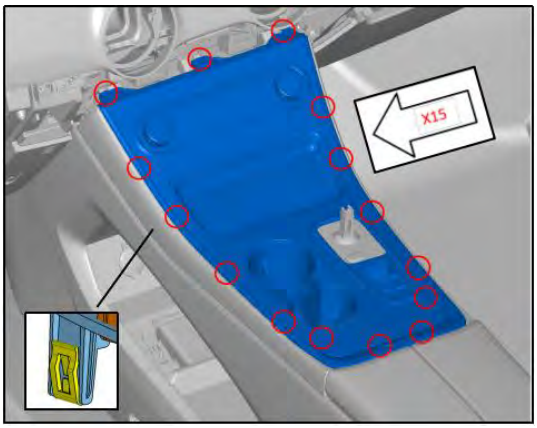
6. Pry loose the middle lower trim panel assembly with a straight screwdriver, and pull out the middle lower trim panel assembly with force along the rear direction of the vehicle.



7. Pull out the gearshift ball joint upward.



8. Pry up the upper trim panel assembly with force and remove the clip.

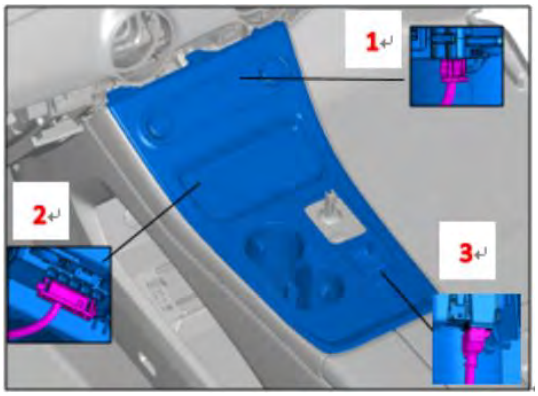


9. Disconnect the harness connector.

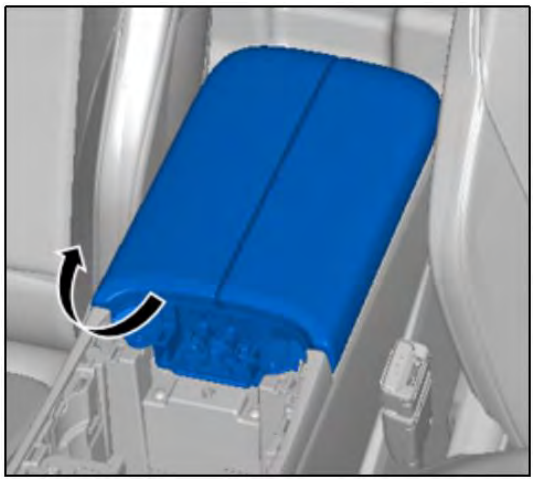
1 Disconnect the A/C controller connector.

2 Disconnect the wireless charging module connector.

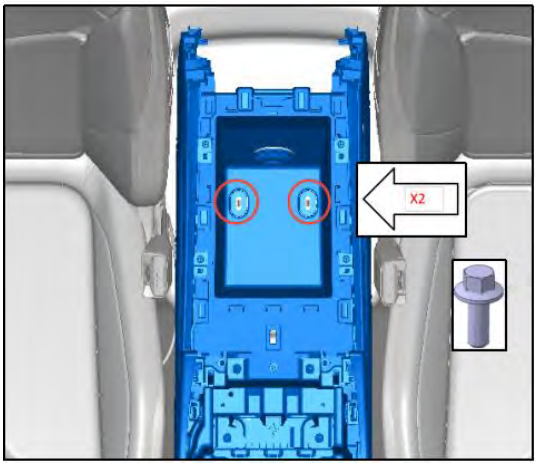
3 Disconnect the parking brake switch connector.



10. Open the console storage box cover and take out the rear storage box pad.

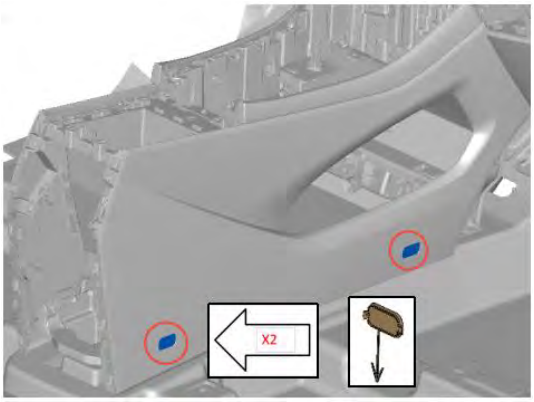


11. Remove the 2 bolts connecting the rear storage box mounting bracket assembly.



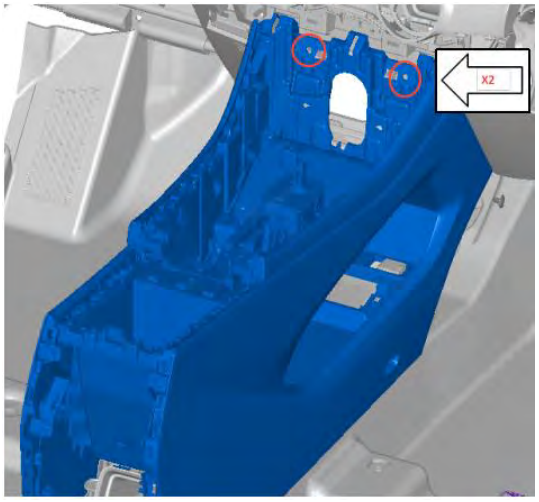
12. Use a straight screwdriver to remove the 4 symmetrical plugs on the side of the auxiliary dashboard body, and use a Phillips screwdriver to remove the four screws.

Torque: 5±0.5 Nm

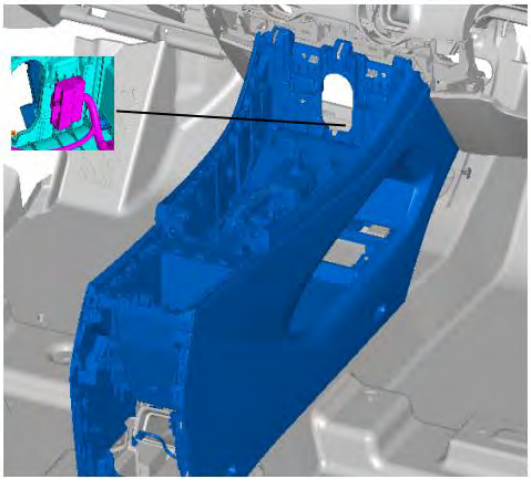


13. Remove the 2 screws on the front of the auxiliary dashboard body.

Torque: 5±0.5 Nm



14. Loosen all harness connectors of the auxiliary dashboard body, and remove the console body assembly backward.



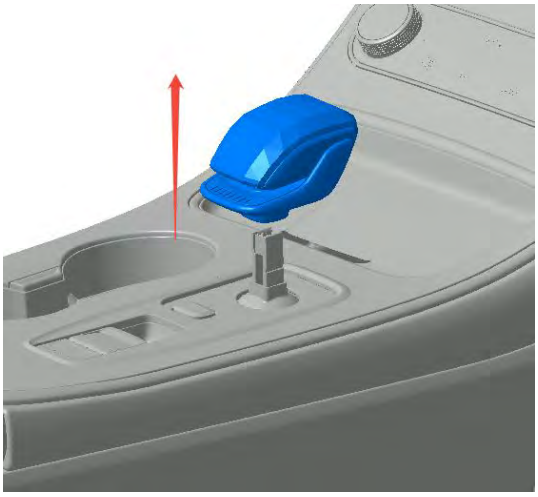
Installation

The installation order is reverse to the removal order.

5.6.4.2 Electronic gear shifter module

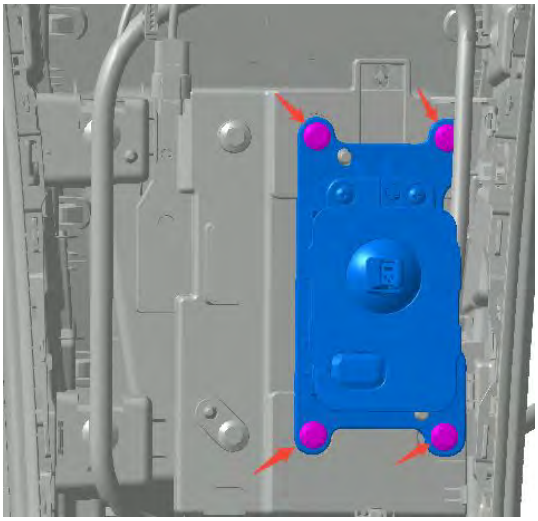
Removal

1. Grab the shift handball and pull it out vertically upward directly from the electronic gear shifter module body.

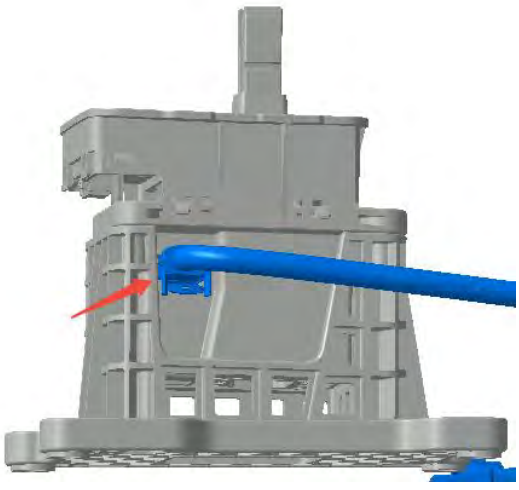


2. Remove the auxiliary dashboard upper trim panel.Refer to: Auxiliary dashboard assembly.
3. Loosen the 4 fixing bolts on the electronic gear shifter base.

   Torque: 9±1 Nm



4. Remove the low-voltage harness connector on the electronic gear shifter to complete the disassembly.



Installation

1. The installation order is the reverse of the removal order.

5.7 Dashboard

5.7.1 Diagnosis and testing

5.7.1.1 Diagnosis and testing

Instrument cluster

Inspection and confirmation

1. Confirm the problems raised by the customers and perform the appropriate checks and tests.
2. Check the appearance for obvious traces of mechanical and electrical damage.
3. Before the next check, solve the identified problem first.
4. If the cause cannot be determined by visual check, confirm the symptom firstly and then check according to the List of Symptoms.

5.7.1.2 Diagnosis and testing

Appearance Checklist

Mechanical	Mechanical
– Instrument panel – Instrument trim panel	– Fuse – Harness – Control switch – Instrument cluster

5.7.1.3 Symptom Table

Symptoms	Possible Cause	Measures
The speedometer does not work	– Circuit – Instrument cluster	– Check whether the instrument cluster circuit is damaged. – Check the circuit
The SOC indicator does not display	– Circuit – Instrument cluster – Power battery controller	– Check the instrument panel cluster. – Check the power battery controller.
The fuel gauge does not work	– Circuit – Instrument cluster – Fuel level sensor	– Check the instrument panel cluster. – Check whether the instrument cluster circuit is damaged. – Check the fuel level sensor.
When the ignition switch is in the "ON" position, the fuel gauge indicates below the 1/8 scale line and the fuel alarm indicator does not illuminate	– Instrument cluster	
The power meter does not work	– Circuit – Instrument cluster – ECU – ECU circuit	– Check the instrument panel cluster. – Check the ECU and ECU circuit

Symptoms	Possible Cause	Measures
When the ignition switch is in “ON” position and the vehicle is in parking state, the parking indicator light does not light up	– Circuit – Instrument cluster – EPB switch	– Check the parking brake switch – Check the circuit for damage
When the ignition switch is in the "ON" position, the brake fluid position warning indicator does not light up	– Circuit – Instrument cluster – Brake fluid level switch –	– Check the brake fluid level switch. – Check the instrument panel cluster. – Check whether the instrument cluster circuit is damaged.
When the ignition switch is in the "ON" position, the indicator does not light up during ESP self-inspection	– Circuit – Instrument cluster – ESP module – ESP module circuit	– Check whether the ESP module is damaged – Check the ESP module circuit – Check whether the instrument cluster circuit is damaged.

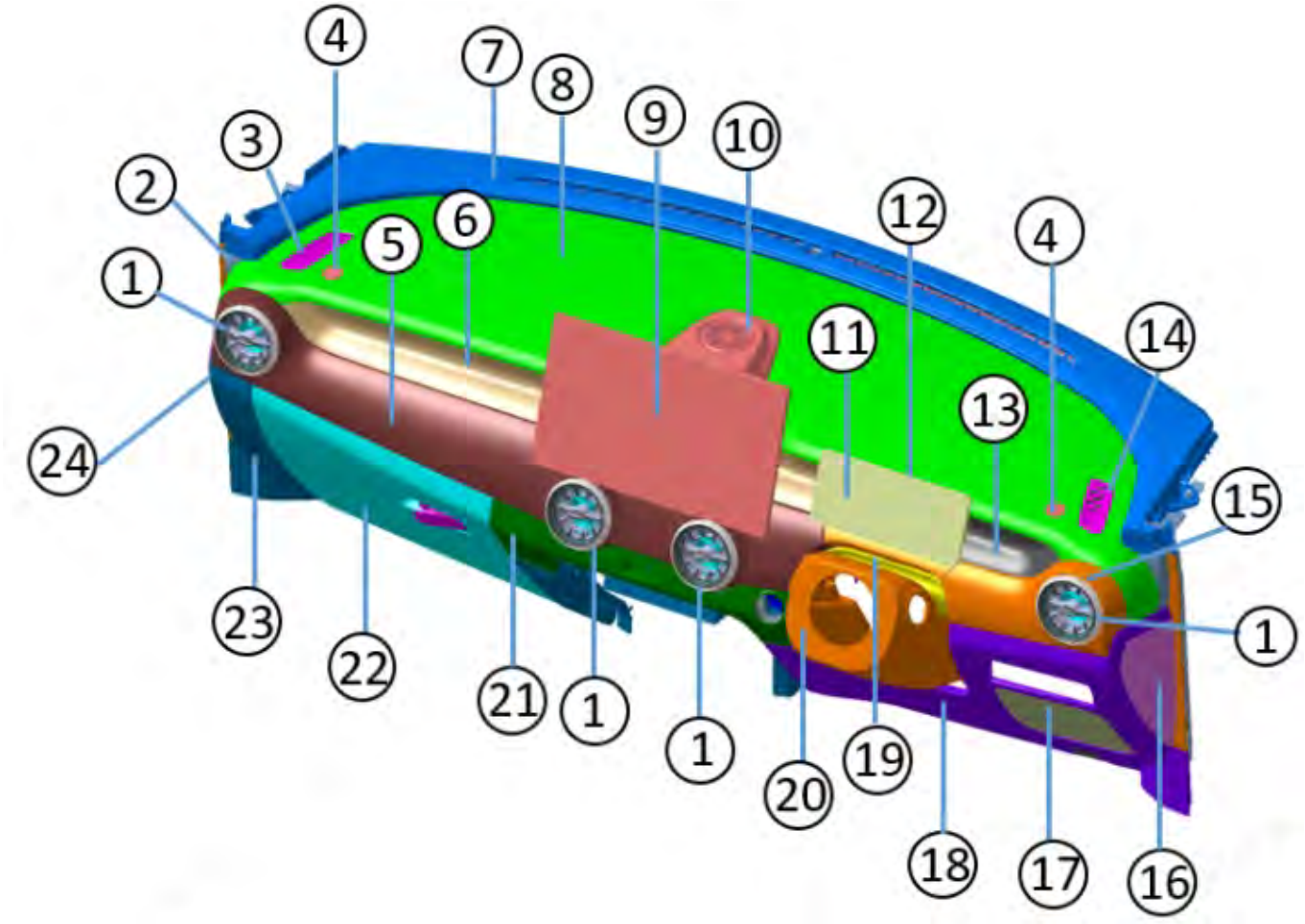
5.7.2 Specification

5.7.2.1 Torque specification

Name	Nm
Instrument panel system plastic parts (not specific to parts and components) screws	2.5±0.5
Tubular beam assembly and BIW bolt	25±2
Tubular beam assembly and left/right bracket	13±2
Instrument panel plastic parts and tubular beam bolts	13±2

5.7.3 Instructions and operations

5.7.3.1 Instrument Panel and Console



Item	Description	Item	Description
1.	Air vent assembly	13.	Right transition trim panel - RHD
2.	Instrument panel upper body assembly	14.	Right window defrosting air vent
3.	Left window defrosting air vent	15.	Right trim panel assembly
4.	Plug cap	16.	Right end cover plate assembly
5.	Left trim panel assembly	17.	Repair cover plate assembly
6.	Left transition trim panel - RHD	18.	Lower right shield assembly
7.	Front defrost cover plate	19.	Upper shield assembly of steering column
8.	Upper trim panel assembly	20.	Steering column lower shroud assembly

Item	Description	Item	Description
9.	Multimedia player display screen	21.	Middle lower trim panel assembly
10.	Large screen upper cover plate assembly	22.	Glove box assembly
11.	Instrument cluster - RHD	23.	Instrument panel lower body assembly
12.	Instrument mounting cover plate	24.	Left end cover plate assembly

5.7.3.2 Precautions

Precautions

1. **Caution:** Disconnect the battery cable in advance.
2. **Caution:** Disconnect the SRS circuit in advance.
3. **Caution:** Do not damage or force to open the airbag cover, otherwise it will have an adverse effect on the performance of the airbag.
4. **Caution:** Be careful not to scratch the gasket and other parts and components.
5. **Caution:** When removing or disassembling any parts, be careful not to damage or deform them. Exercise caution to protect those parts and components that may tear the cloth.
6. **Caution:** When removing parts and components with a screwdriver or other tools, wrap the parts and components with vinyl tape or cloth tape for protection.
7. **Caution:** Protect the removed parts and components with cloth.
8. **Caution:** If non-reusable parts and components are removed, replace them with new ones.
9. **Caution:** Tighten the bolts and nuts to the specified torque.
10. **Caution:** After reassembling is completed, confirm that each part and component works normally.
11. **Caution:** Remove dirt as follows.

    1 Water-soluble stains: Soak a soft cloth in water, then wring it out vigorously. After removing stains, wipe with a soft, dry cloth.

    2 Oil stains: Dissolve synthetic detergent (concentration 2-3% or lower) in warm water, wet the cloth, and then wipe away the oil stains vigorously. Then immerse the cloth in clean water and wring it out. Wipe away the detergent completely. At last, wipe the cleaned area with soft dry cloth. Then completely wipe off any detergent. Finally, wipe the cleaned area with a soft, dry cloth.

12. **Caution:** Do not use organic solvents such as thinners or petrol.

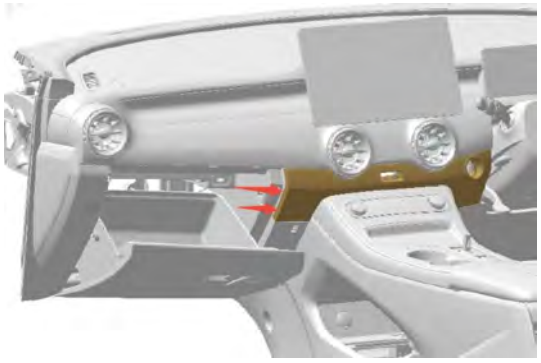
5.7.4 Removal and installation

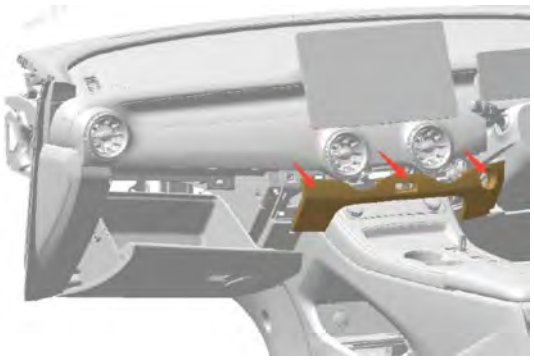
5.7.4.1 Dashboard

Removal

1. Remove the middle lower trim panel assembly of the dashboard, open the glove box, use a straight screwdriver to pry loose the middle lower trim panel assembly from the position indicated by the arrow in Fig. 1 below, pull out the middle lower trim panel assembly with force along the rear direction of the vehicle, disconnect the hazard warning switch and one-button start switch connectors, and remove the middle lower trim panel assembly.

   Caution: Pay attention to protection during the disassembly process to avoid scratching surrounding parts.

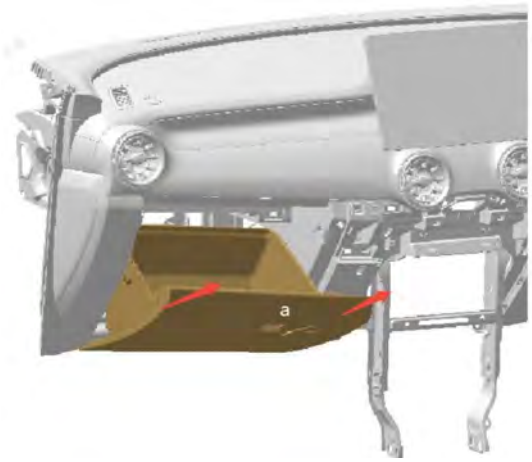




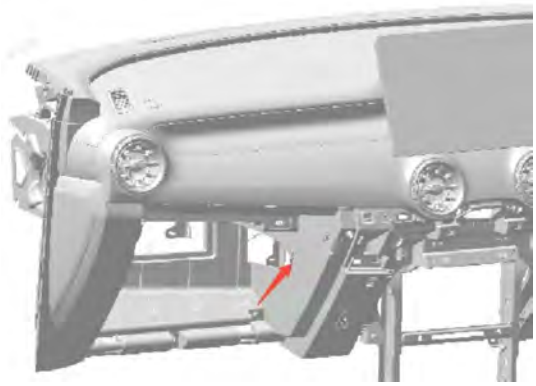
2. Remove the auxiliary instrument panel assembly. Refer to: Auxiliary dashboard assembly.

3. Remove the glove box assembly.

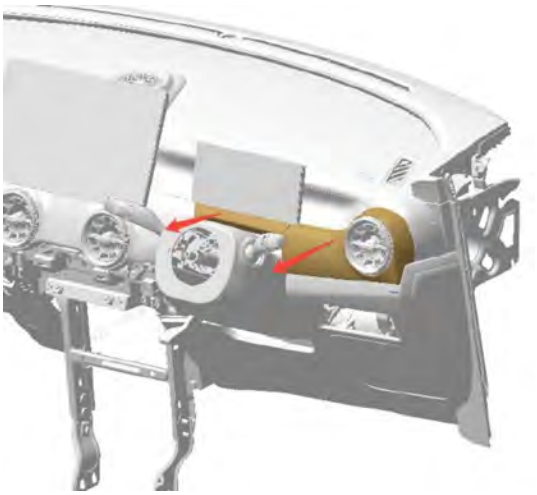
   1 Open the glove box (not to the maximum position) and use a large force to loosen the glove box hinge obliquely upward in the direction of the arrow;



   2 Take off the glove box by tilting it sideways, untie the right damper cable and hang the cable end at the arrow position of the lower body. Pay attention to check the left and right buffer rubbers to avoid loss.

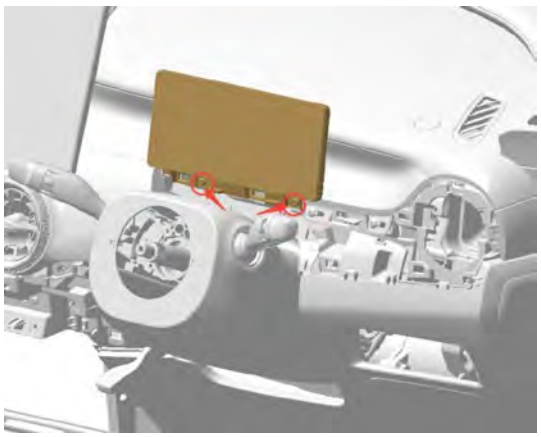


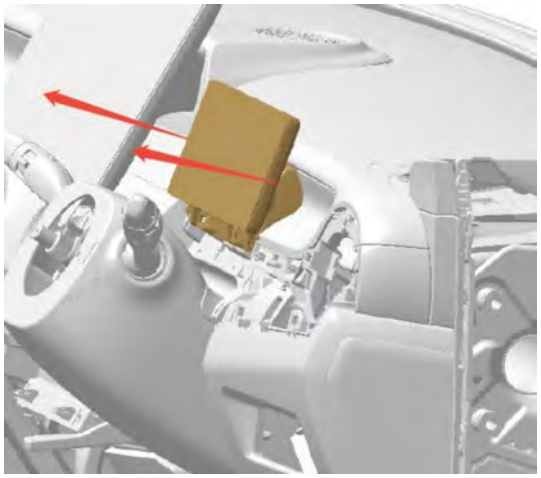
4. Remove the right trim panel assembly, adjust the steering column assembly to the lowest position, and use the Roof lining clamp removal tool or hook to remove it evenly in the direction shown. The right air vent will also be removed accordingly.



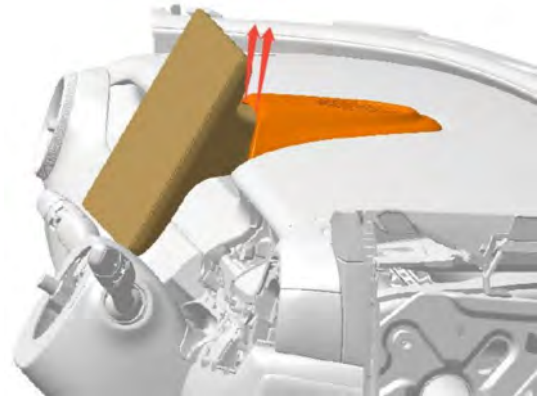
5. Remove the instrument, adjust the steering column to the lowest position, remove the two self-tapping screws with a cross-head screwdriver, and then grab both sides of the

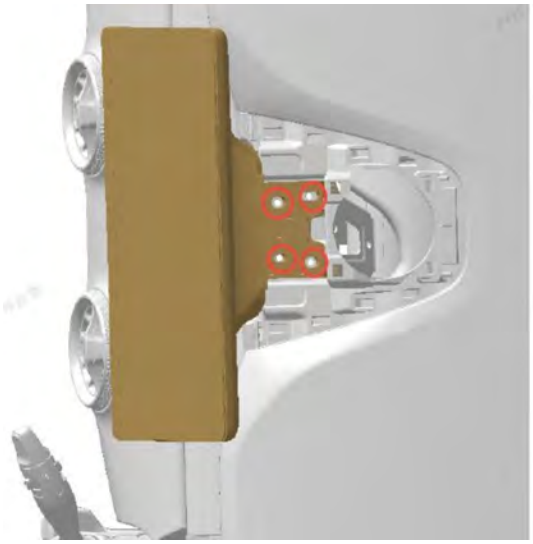
instrument in the direction shown in Fig. 8 and use a little force to remove the instrument. The instrument mounting bracket will also be removed together with the instrument.



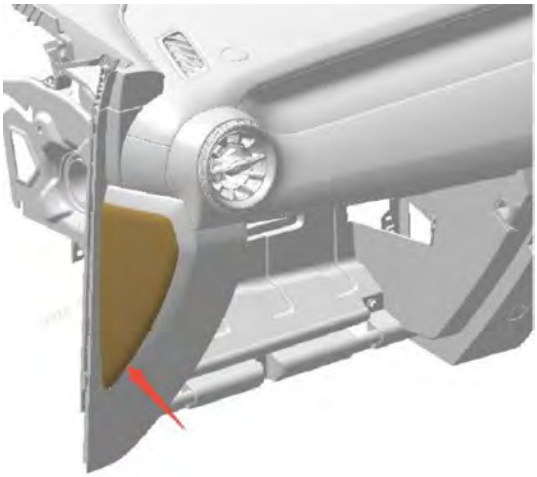


6. Remove the centre control panel assembly, use the roof lining clamp removal tool to forcefully pry up the back plate of the centre control panel in the direction of the arrow, use the S10 socket to knock down the 4 nuts installed on the large screen, and remove the centre control panel assembly downward.

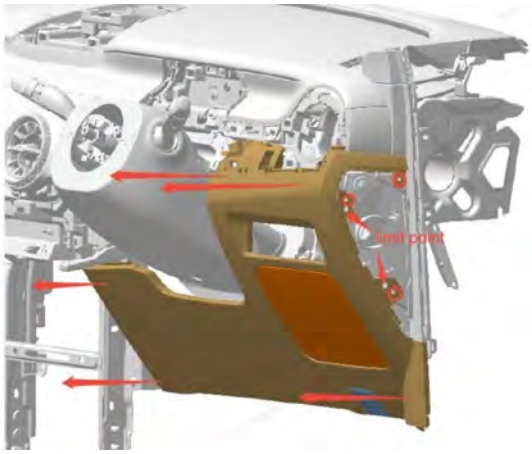




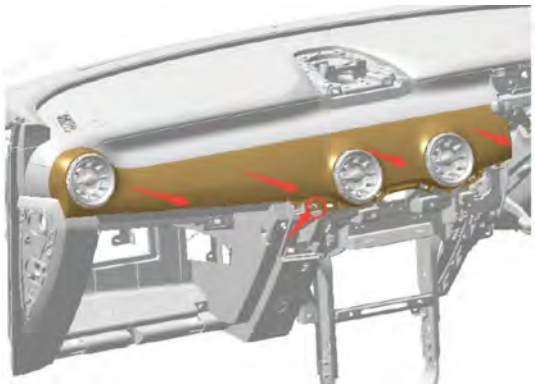
7. Remove the left/right end cover plate assembly, pry up the end cover plate from the position indicated by the arrow with a straight screwdriver, and remove the end cover plate (the removal scheme of the left/right end cover plates is the same).



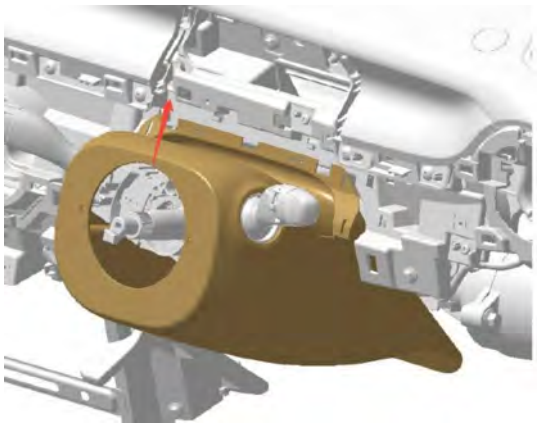
8. Remove the right lower shield assembly, remove the 3 self-tapping screws on the side with a cross-head screwdriver, and then use a straight screwdriver to pry up the limit and slightly apply force to remove the right lower shield assembly in the direction of the arrow. The repair cover plate (which can be removed separately from the two lower openings) and the engine bonnet opening handle assembly can be removed with the right lower shield assembly.

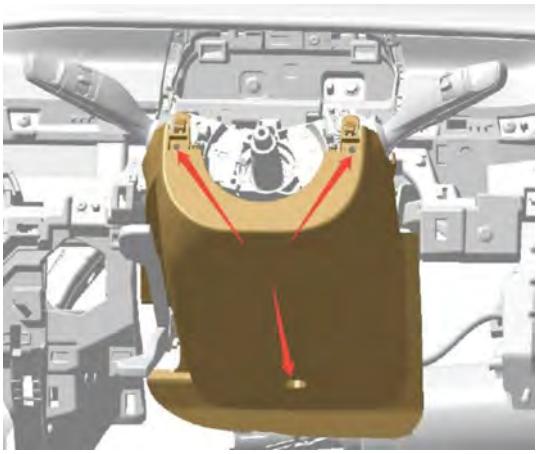


9. Use a cross-head screwdriver to remove the self-tapping screws shown by the arrow, and then remove the left trim panel assembly with a little force in the direction indicated by the arrow along the X direction. (The left air vent and the central air vent are removed together with the left trim panel)

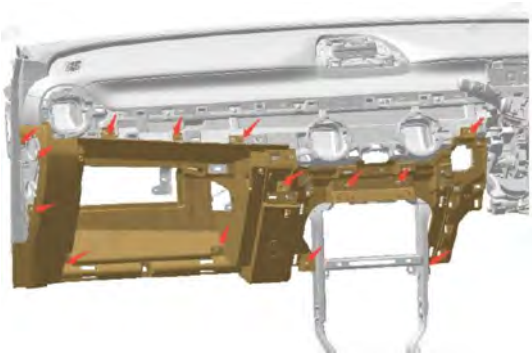


10. Remove the steering column shield, pull it up slightly from the gap on the end face of the steering wheel with a lining removal tool or hook-like tool to remove the upper shield of the steering column, and use a cross-head screwdriver to remove the 3 self-tapping screws shown by the arrow before removing the shield.





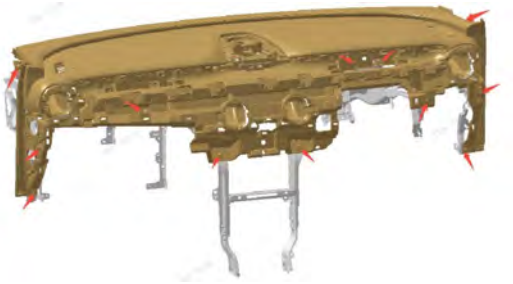
11. Remove the instrument panel lower body assembly, use a cross-head screwdriver and an S8 socket to remove the self-tapping screws and M6 bolts shown by the arrow, and then remove the lower body assembly with force along the X direction.



12. Remove the left/right transition trim panel assembly, use a cross-head screwdriver to drive down the self-tapping screws shown in the circle, and then remove the left/right transition trim panel assembly with a little force in the direction of the arrow.

Caution: The surface-treated parts must be well protected to avoid scratching the parts.

13. Remove the instrument panel upper body assembly, use an S8 socket to remove the bolts indicated by the arrow, and then remove the upper body assembly 23 degrees upward along the X direction.



14. To dismantle the tubular beam assembly, first use an S13 socket to remove the nuts that fasten the left/right connecting brackets as shown in the figure, and then remove the bolts connecting the tubular beam to the body. After all are removed, lift the tubular beam assembly slightly and then remove it in the +X direction.

Installation

1. The installation order is reverse to the removal order, and pay attention to the following items.

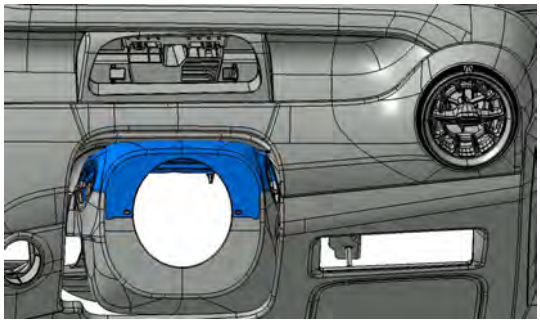
Caution: Assembly clearance meets the standard.

5.7.4.2 Instrument cluster

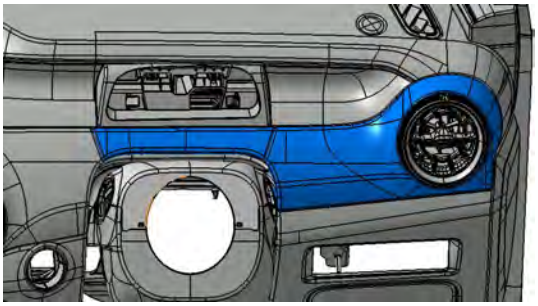
Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal

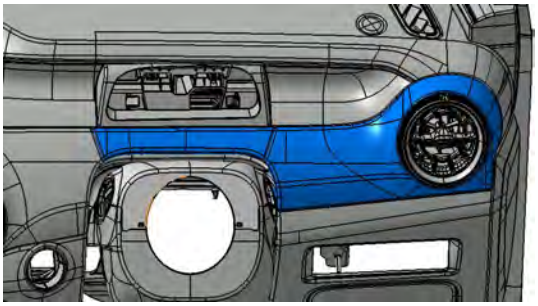
2. Adjust the steering wheel downward to the lowest position.



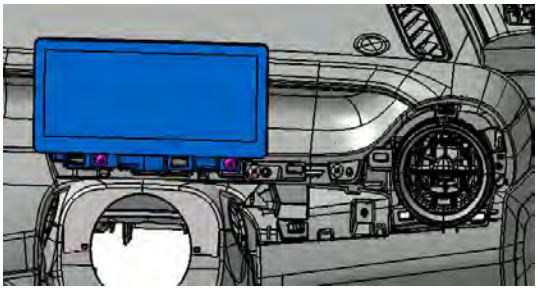
3. Remove the right trim panel covering skin.



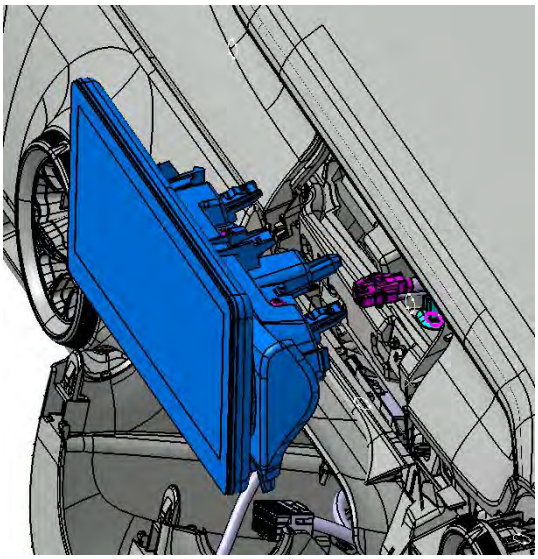
4. Remove the fixing screws of instrument mounting cover plate.



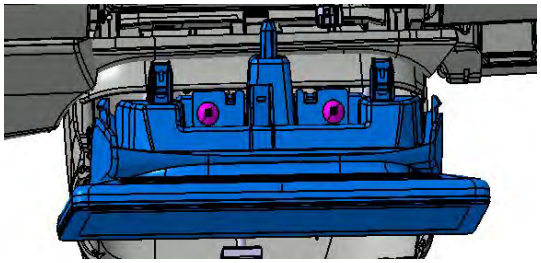
5. Remove the instrument mounting cover plate and disconnect the instrument screen connector.



6. Remove the fixing screws of instrument panel, and take off the instrument display screen assembly.



7. Take out the instrument display screen.



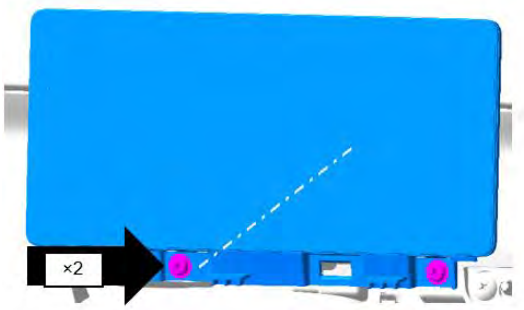
Installation

1. The installation order is the reverse of the removal order.

5.7.4.3 Mounting bracket of instrument panel cluster

Removal

1. Remove the left/right end A-pillar upper shield assembly. Pry up the end cover plate with a straight screwdriver and remove it (the removal schemes of left/right end cover plates are the same).



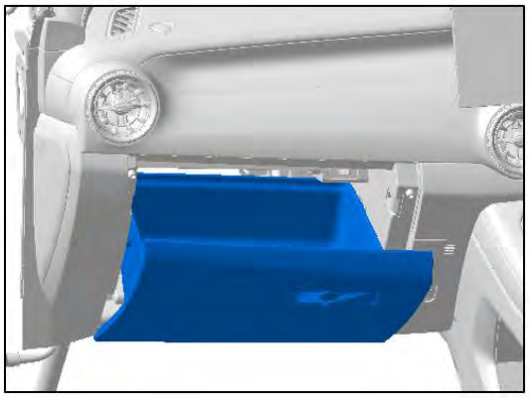
Installation

1. The installation order is the reverse of the removal order.

5.7.4.4 Glove box assembly

Removal

1. Open the glove box assembly.



2. Untie the right damper cable.

3. Loosen the glove box hinge obliquely upward and remove the glove box sideways.

Installation

1. The installation order is the reverse of the removal order.

5.7.4.5 Middle lower trim panel assembly

Removal

1. Loosen the middle and lower trim panel assembly with a straight screwdriver.
2. Remove the fixing clips of the middle and lower trim panel assembly.

3. Disconnect the hazard warning switch.
4. Disconnect the one-button start switch.

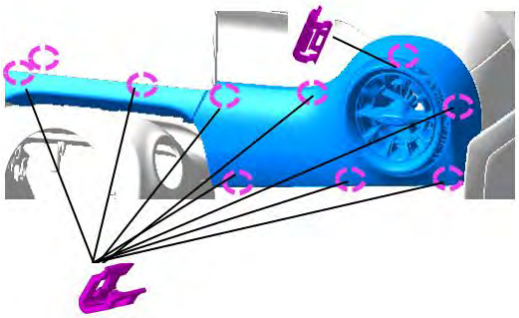
Installation

1. The installation order is the reverse of the removal order.

5.7.4.6 Right trim panel assembly

Removal

1. Remove the right trim panel assembly, adjust the steering column assembly to the lowest position, and remove it evenly with a headlining clamp removal tool or hook. The right air vent will also be removed.



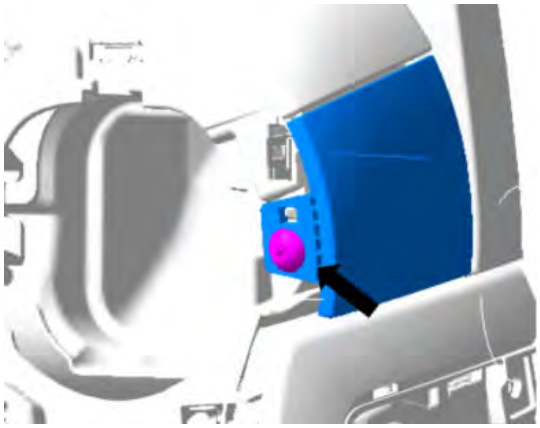
Installation

1. The installation order is the reverse of the removal order.

5.7.4.7 Left/right trim panel subassembly

Removal

1. Remove the screws with a screwdriver.



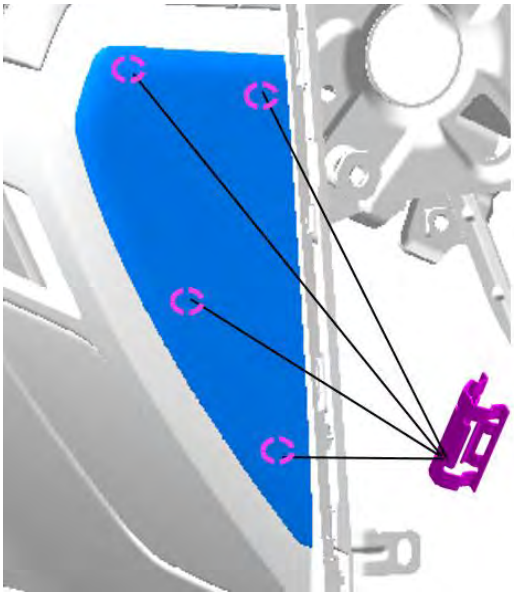
Installation

1. The installation order is the reverse of the removal order.

5.7.4.8 Left/right end cover plate assembly

Removal

1. Remove the left/right end cover plate assembly. Pry up the end cover plate with a straight screwdriver and remove it (the removal schemes of left/right end cover plates are the same).



Installation

1. The installation order is the reverse of the removal order.

5.7.4.9 Large screen upper cover plate assembly

Removal

1. Remove the centre control panel assembly. Use the Roof lining clamp removal tool to pry up the large screen upper cover assembly in the direction of the arrow shown in Fig. 9.

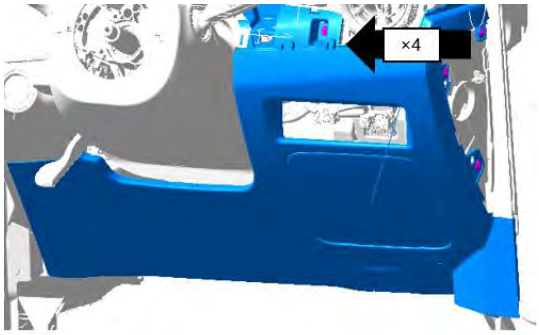
Installation

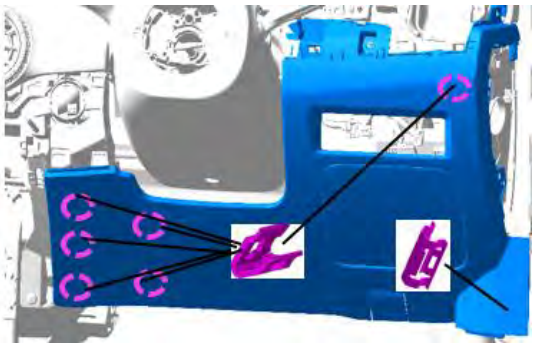
1. The installation order is the reverse of the removal order.

5.7.4.10 Lower right shield assembly

Removal

1. After removing the 4 self-tapping screws on the side with a screwdriver, use a straight screwdriver to pry up the limit and remove the right lower shield assembly with a little force. The repair cover plate (which can be removed separately from the two lower openings) and the engine compartment cover opening handle assembly can be removed with the right lower shield assembly.





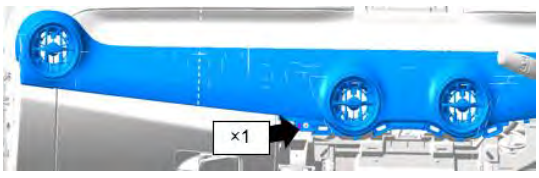
Installation

1. The installation order is the reverse of the removal order.

5.7.4.11 Left trim panel assembly

Removal

1. After removing the self-tapping screws shown by the arrow with a cross-head screwdriver, remove the left trim panel assembly slightly along the X direction. (The left air vent and the central air vent are removed together with the left trim panel)



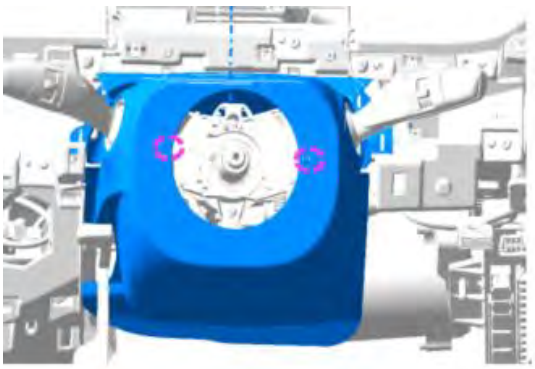
Installation

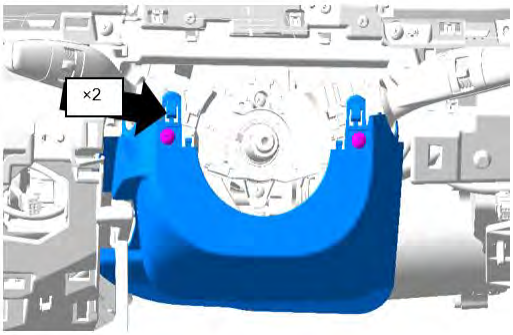
1. The installation order is the reverse of the removal order.

5.7.4.12 Upper and lower shield assemblies of steering column

Removal

1. Use a lining removal tool or hook-type tool (as shown by the arrow in Figure XIV) to pull up slightly from the gap on the end face of the steering wheel to remove the upper shield of the steering column, and use a cross-head screwdriver to remove the three self-tapping screws as shown by the arrow in Figure XV before removing the shield.





Installation

1. The installation order is the reverse of the removal order.

5.7.4.13 Instrument panel upper body assembly

Removal

1. After removing the bolts indicated by the arrow with a socket, remove the instrument panel upper body assembly diagonally facing the roof.

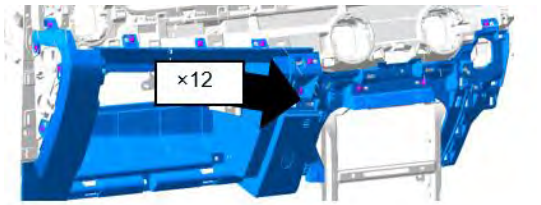
Installation

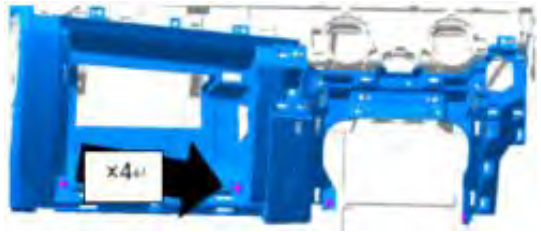
1. The installation order is the reverse of the removal order.

5.7.4.14 Instrument panel lower body assembly

Removal

1. Remove the instrument panel lower body assembly. After removing the self-tapping screws and M6 bolts shown by the arrow with a cross-head screwdriver and an S8 socket, remove the lower body assembly with force toward the rear of the vehicle.





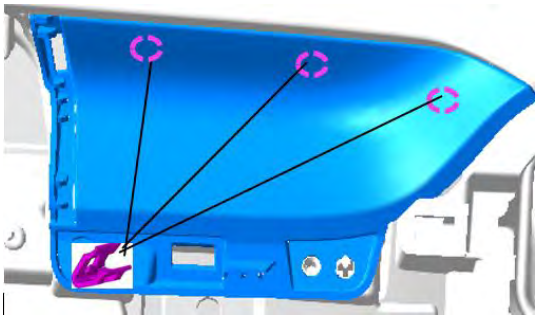
Installation

1. The installation order is the reverse of the removal order.

5.7.4.15 Left/right transition trim panel assembly

Removal

1. After removing the self-tapping screws shown with a screwdriver, remove the left/right transition trim panel assembly.



Installation

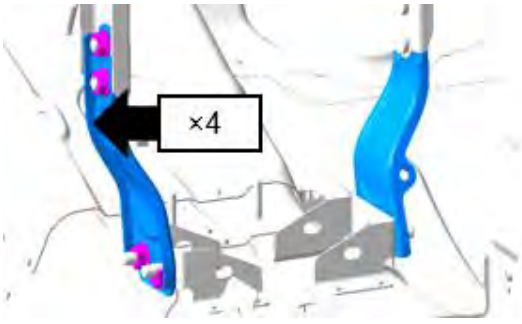
1. The installation order is the reverse of the removal order.

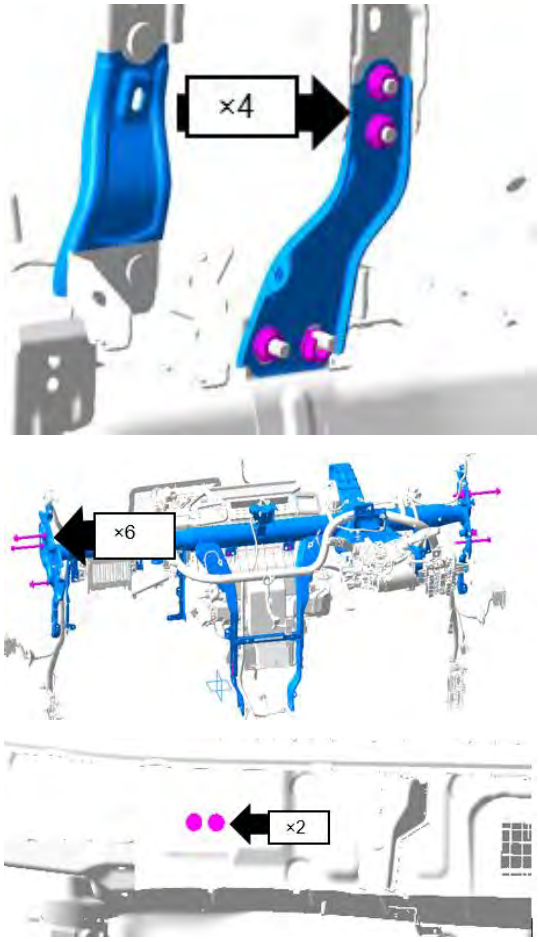
5.7.4.16 CCB assembly

Removal

1. To dismantle the tubular beam assembly, first use a sleeve to remove the nuts that tighten the left/right connecting brackets as shown in the figure, and then remove the bolts and washers connecting the tubular beam to the body. After all are removed, lift the tubular beam assembly slightly and then remove it toward the rear of the vehicle.

   Caution: After disassembling some electrical components in sequence, the pipe beam can be removed.





Installation

1. The installation order is the reverse of the removal order.

5.8 Interiors

5.8.1 Specification

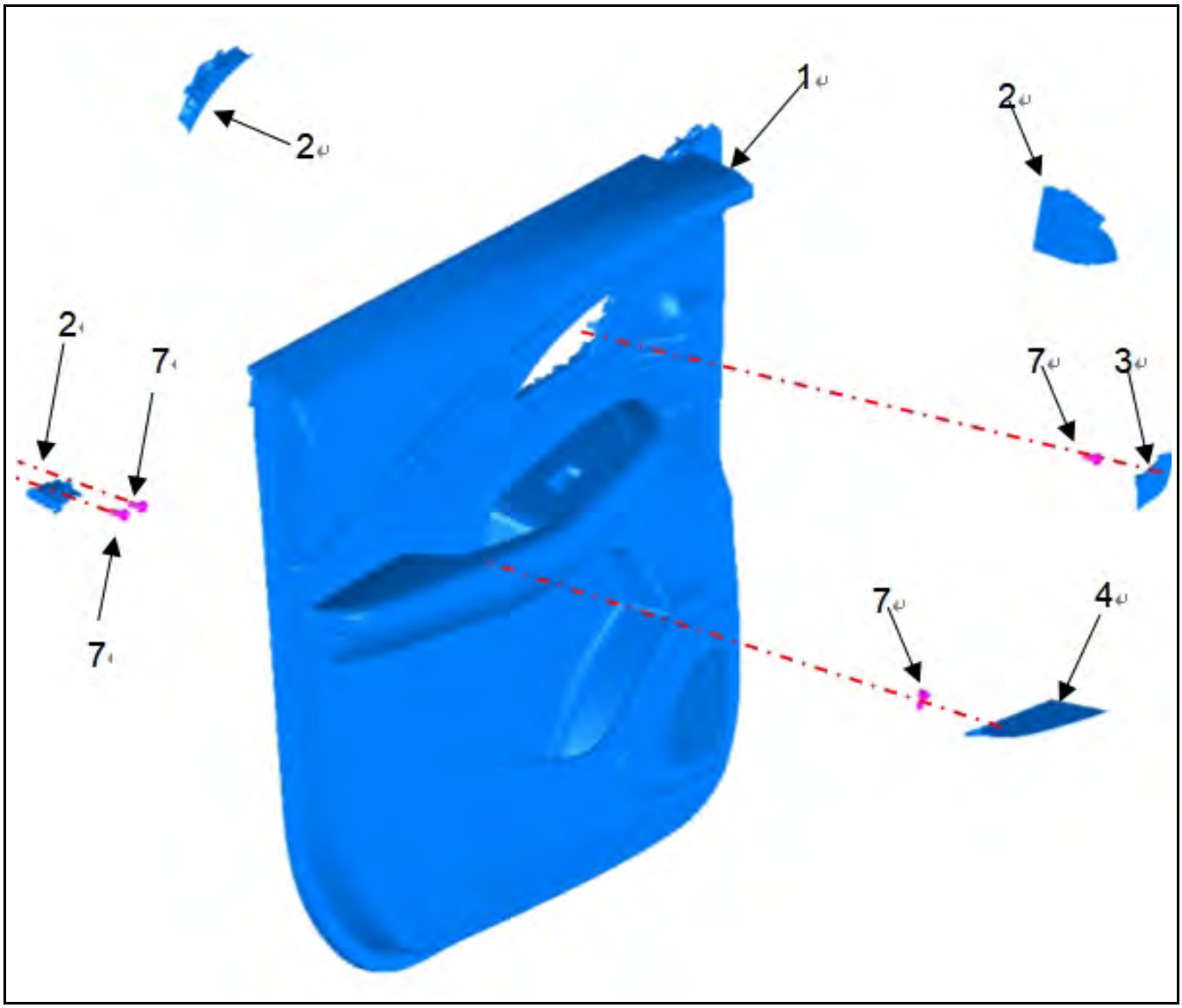
5.8.1.1 Torque specification

Name	Nm
Fixing screw of front door shield	4
Fixing screw of rear door shield	4
Fixing screw of left C-pillar upper shield	4
Fixing screw of left C-pillar lower shield	4
Fixing screw of boot lid left shield	4
Boot lid lower shield retaining screw	4
Roof armrest fixing screw	4
Fixing screw of sun visor	4
Fixing screw of the sun visor hooks	4

5.8.2 Instructions and operations

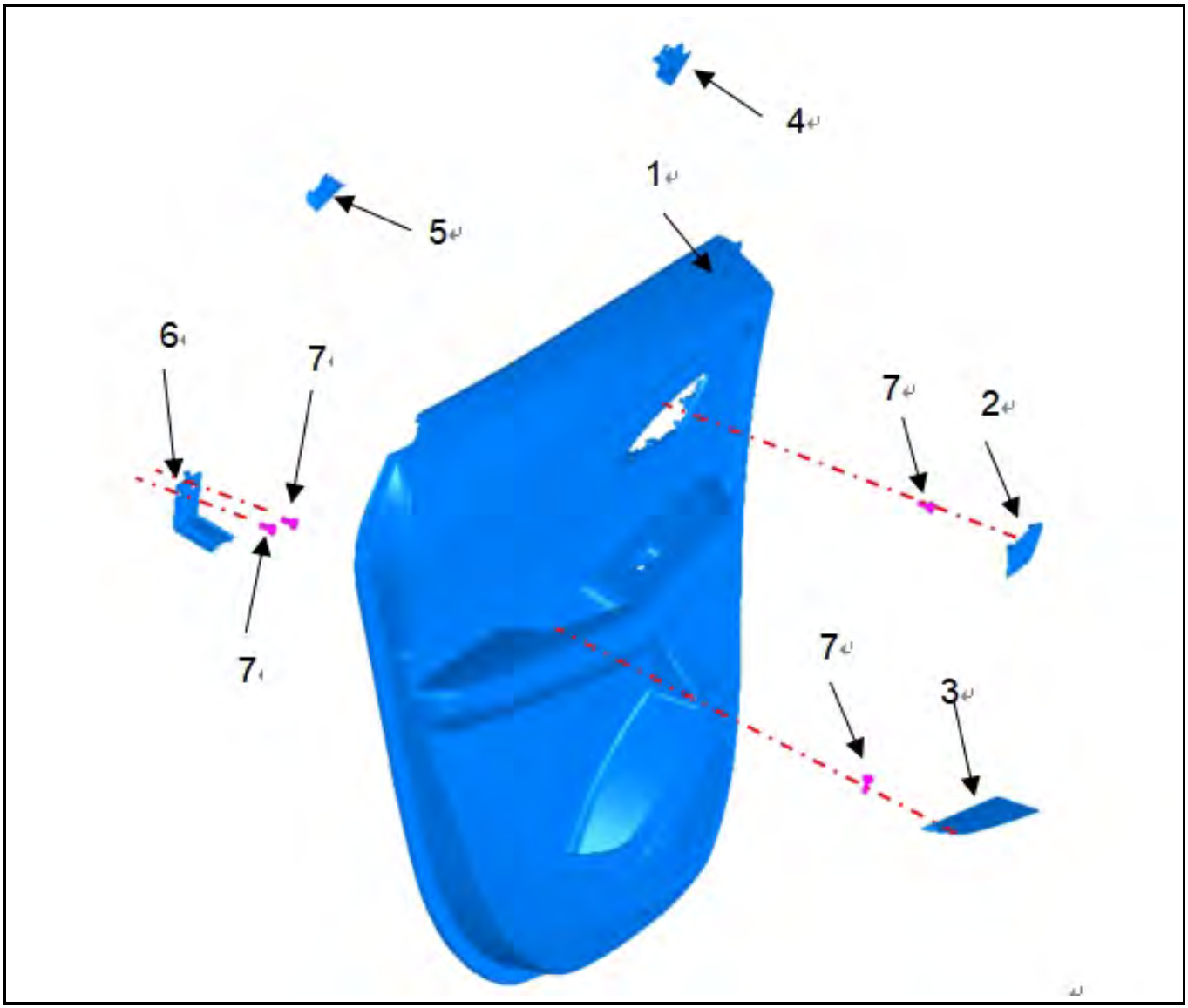
5.8.2.1 Interiors

Front Door Shield - Exploded View



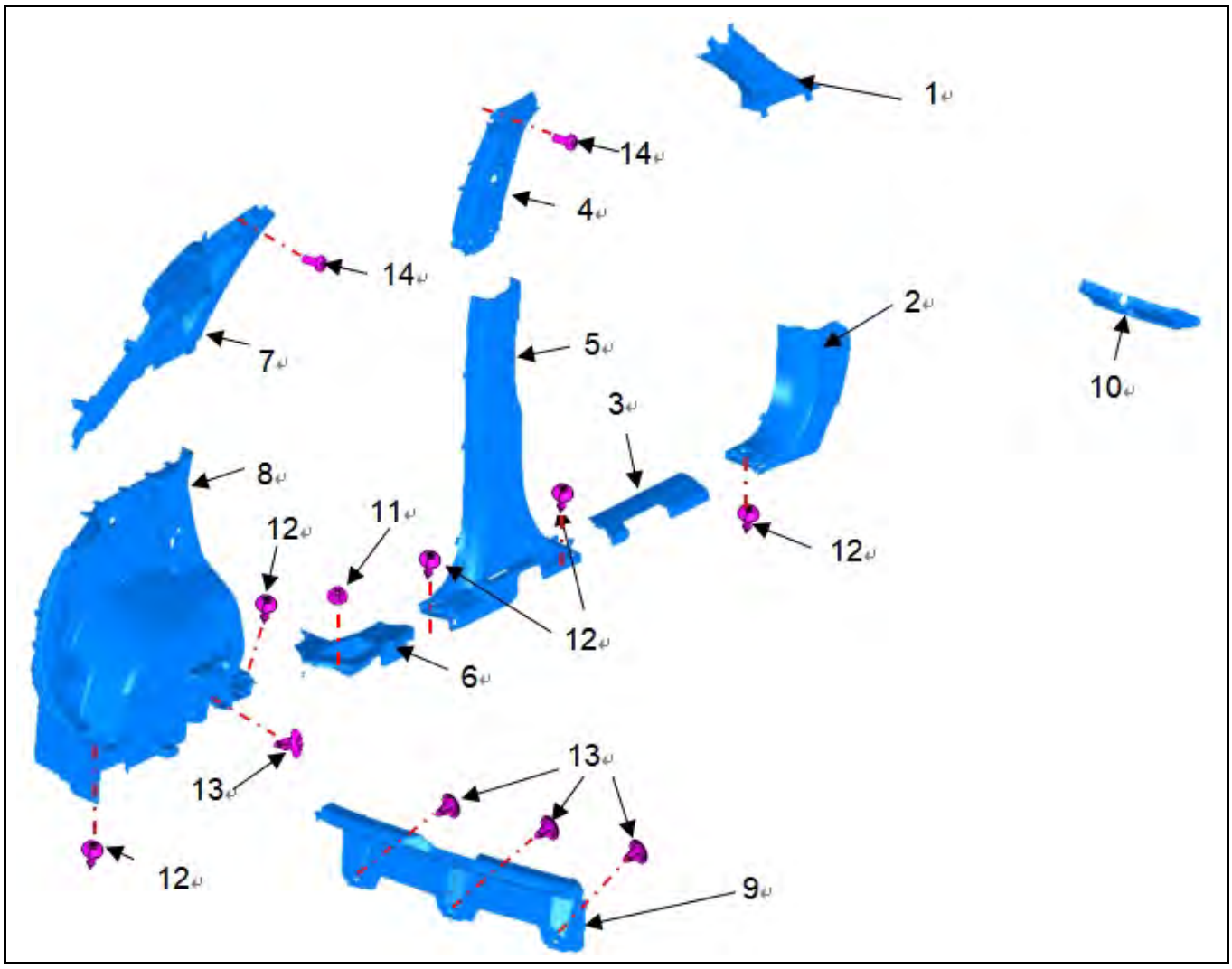
Item	Description	Item	Description
1.	Front left door shield assembly	5.	Front left sealing block
2.	Front left door triangle piece assembly	6.	Front left door armrest fixing bracket assembly
3.	Left door interior handle plug cap	7.	Pan head screw with cross recess and flat washer assembling unit
4.	Front left door handle recess plug cap		

Rear Door Shield - Exploded View



Item	Description	Item	Description
1.	Rear left door shield assembly	5.	Rear left sealing block
2.	Left door interior handle plug cap	6.	Rear door armrest fixing bracket assembly
3.	Rear left door handle box plug cap	7.	Pan head screw with cross recess and flat washer assembling unit
4.	Middle left sealing block		

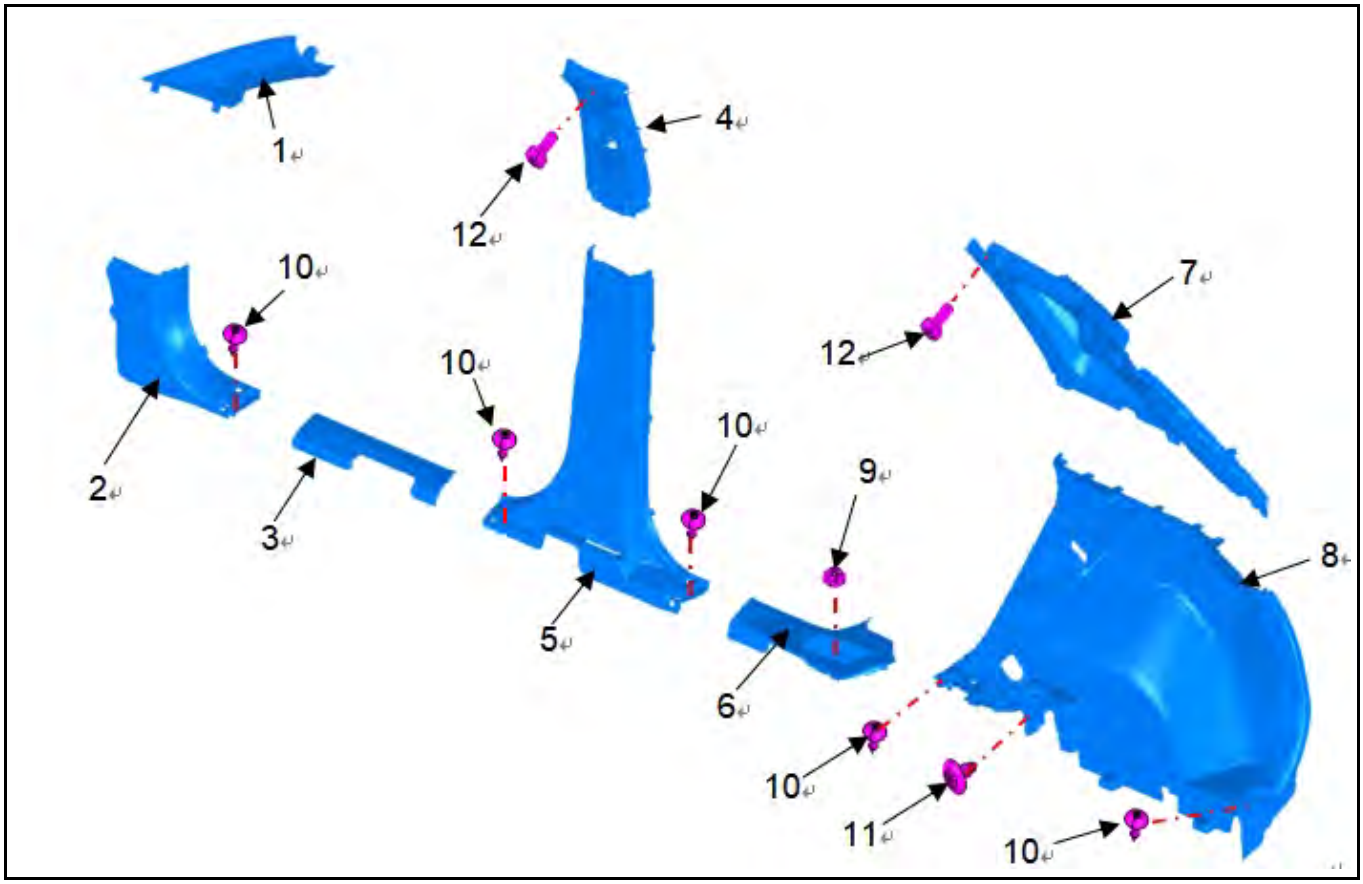
Exploded View of Left Side Wall Shield



Item	Description	Item	Description
1.	Left A-pillar upper shield assembly	6.	Rear left sill assembly
2.	Left A-pillar lower shield assembly	7.	Left C-pillar upper shield assembly
3.	Front left sill assembly	8.	Left C-pillar lower shield assembly
4.	Left B-pillar upper shield assembly	9.	Boot lid sill shield assembly
5.	Left B-pillar lower shield assembly	10.	Interior rearview mirror cover plate assembly

Right side wall shield

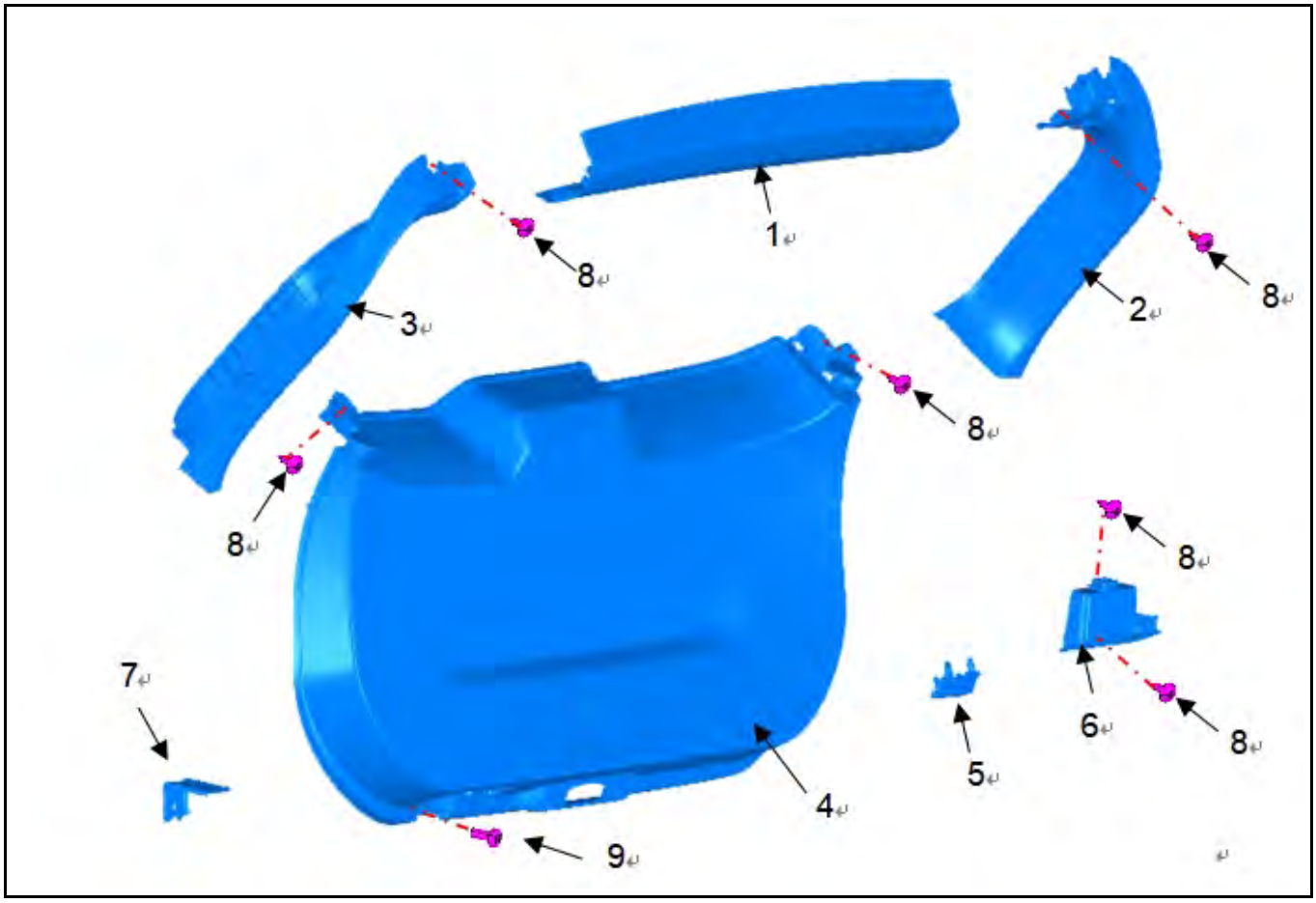
Exploded view



Item	Description	Item	Description
1.	Right A-pillar upper shield assembly	5.	Right B-pillar lower shield assembly
2.	Right A-pillar lower shield assembly	6.	Rear right sill assembly
3.	Front right door sill assembly	7.	Right C-pillar upper shield assembly
4.	Right B-pillar upper shield assembly	8.	Right C-pillar lower shield assembly

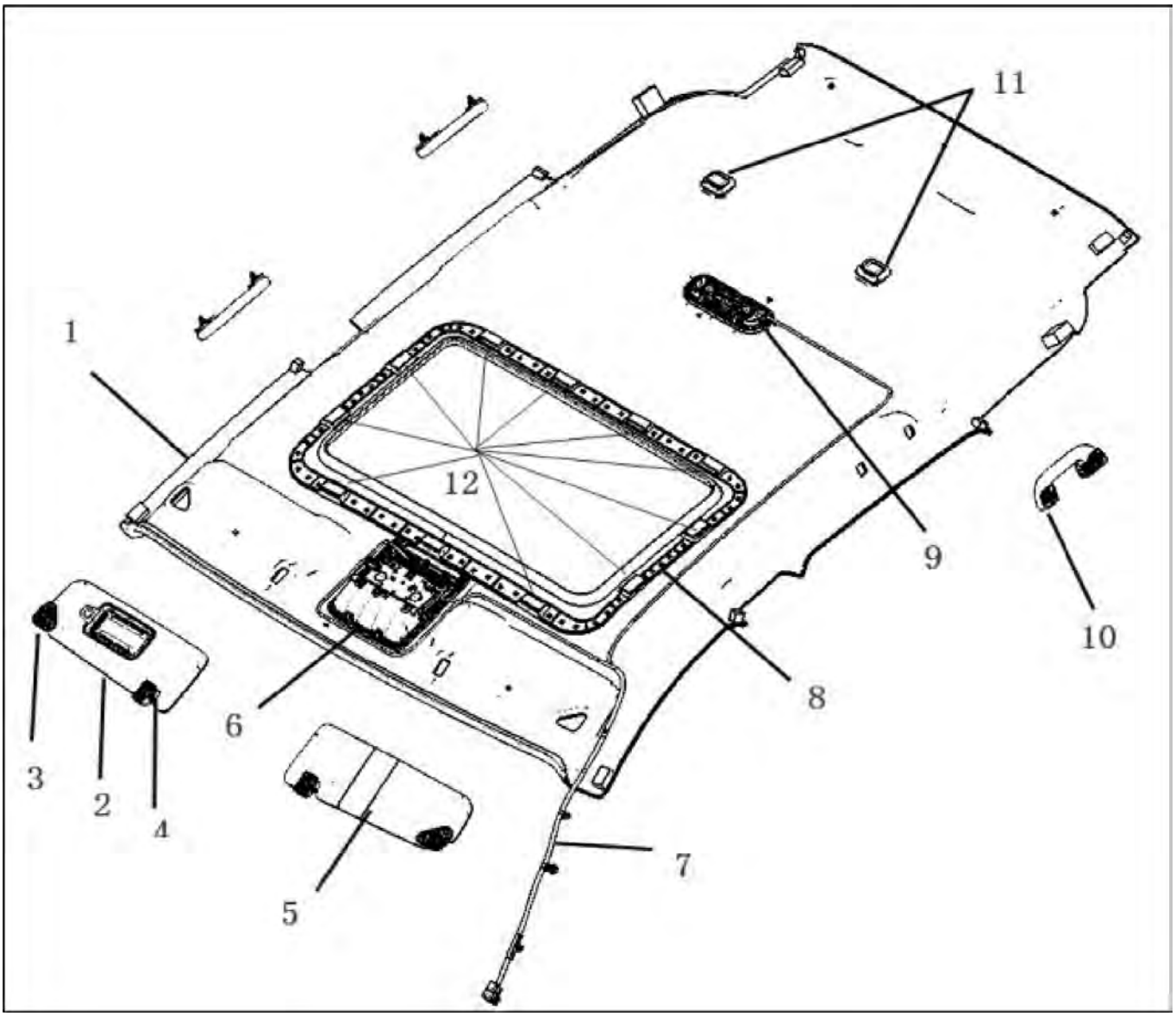
Boot lid protection cover

Exploded view



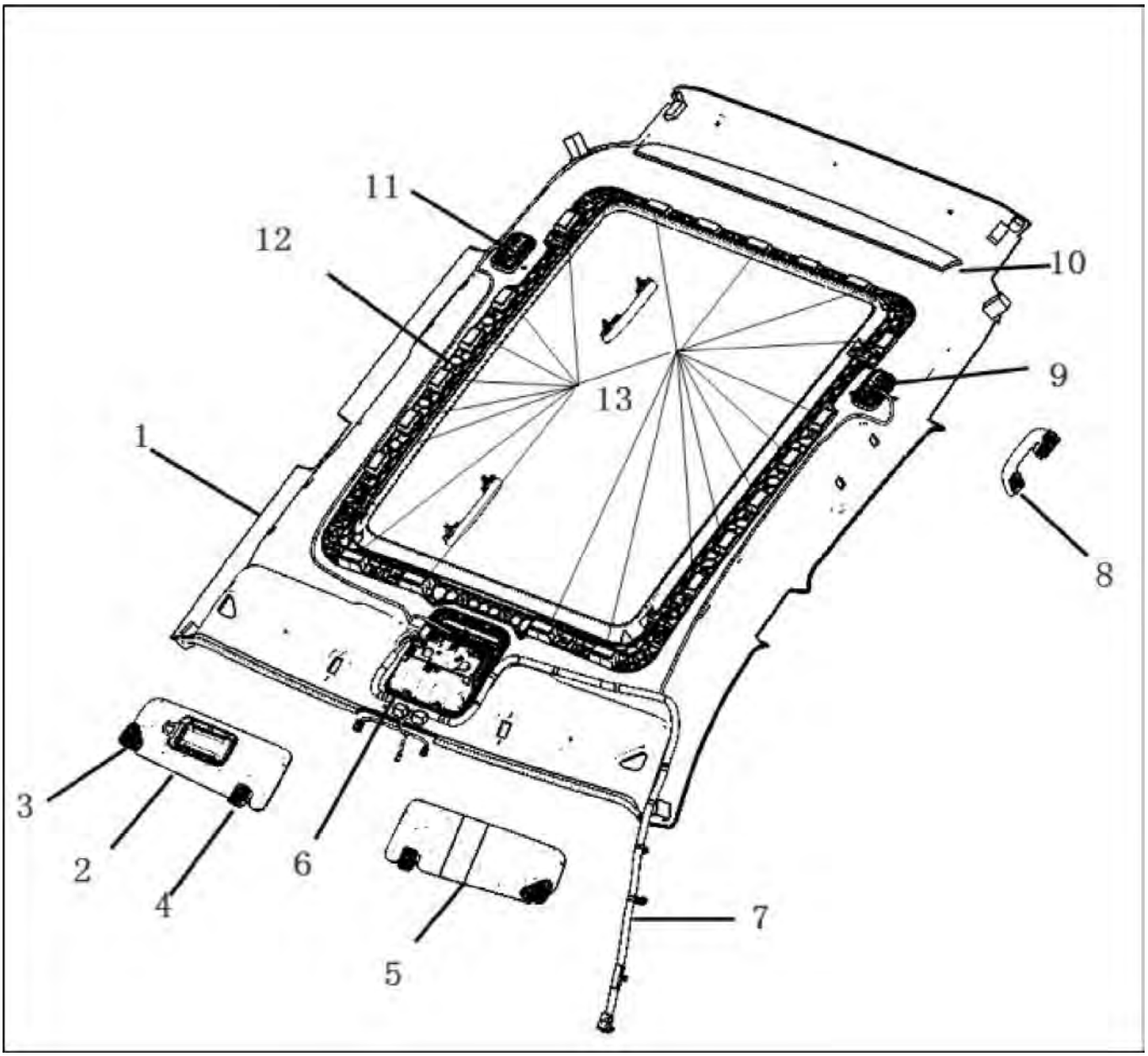
Item	Description	Item	Description
1.	Trunk lid upper shield assembly	6.	Handle box
2.	Trunk lid left shield assembly	7.	Handle bracket
3.	Boot lid right shield assembly	8.	Cross recessed truss head self-tapping screw
4.	Boot lid lower side shield assembly	9.	Pan head screw with cross recess
5.	Plug cap		

Roof Interior Trims



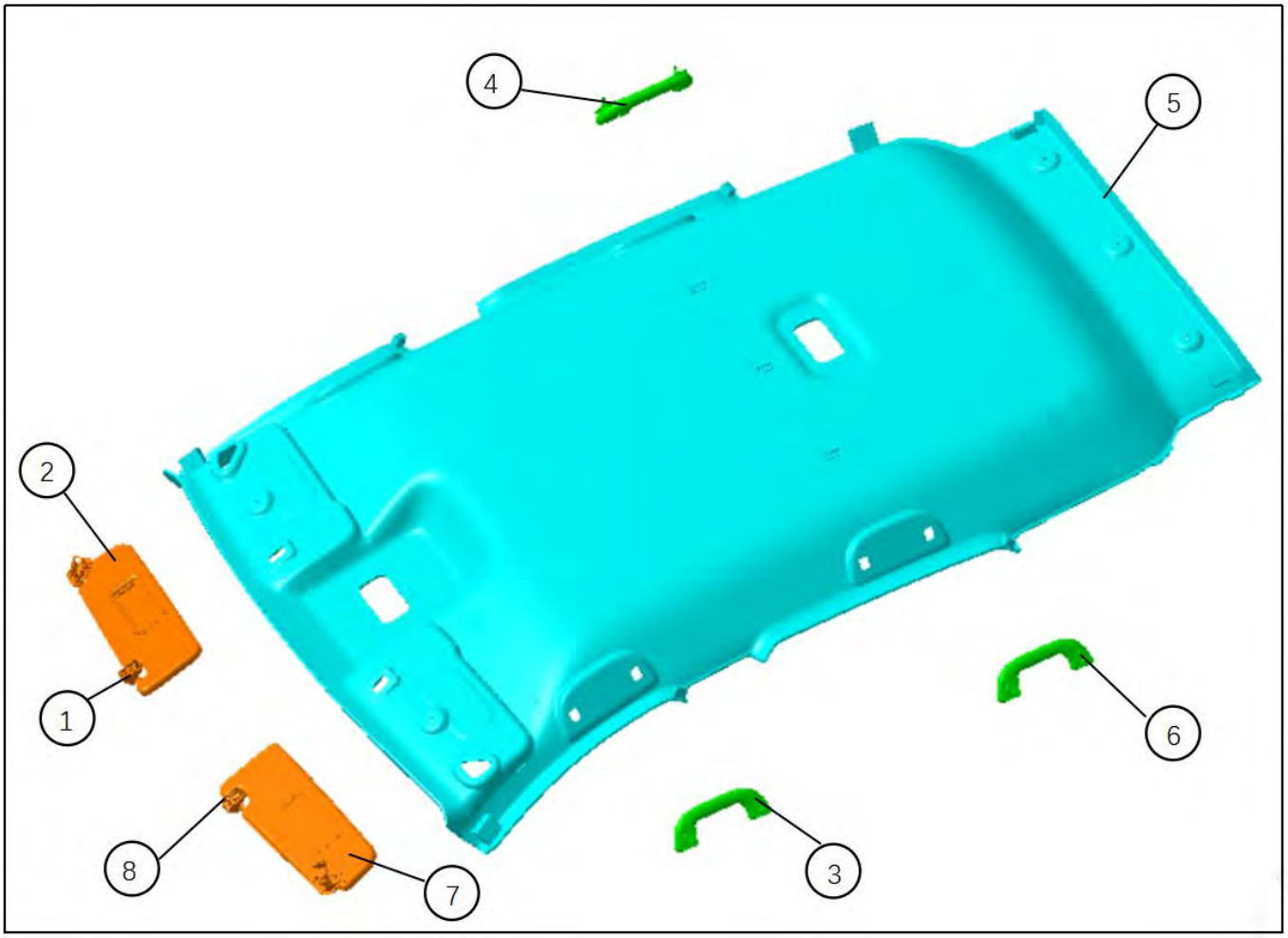
Item	Description	Item	Description
1.	Roof	7.	Roof harness
2.	Right sun visor	8.	Small sunroof opening reinforcement bracket
3.	Sun visor support	9.	Rear interior roof light assembly
4.	Sun visor hook	10.	Grab handle assembly
5.	Left sun visor	11.	Dual lock
6.	Front interior roof light assembly	12.	Dual lock of sunroof reinforcement bracket

Roof interior trim (with sunroof)



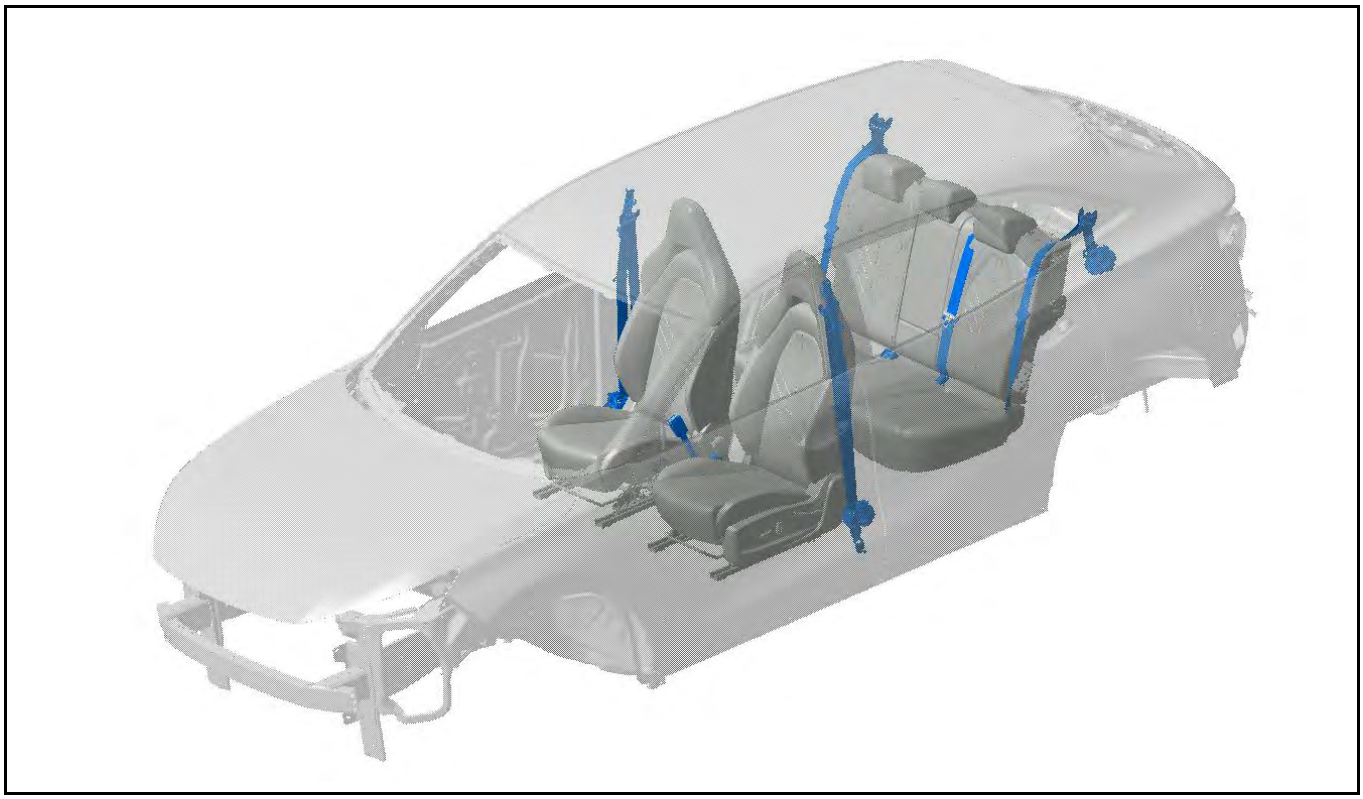
Item	Description	Item	Description
1.	Roof	8.	Grab handle assembly
2.	Right sun visor	9.	Left side compartment light
3.	Sun visor support	10.	Roof sound-absorbing cotton
4.	Sun visor hook	11.	Right side compartment light
5.	Left sun visor	12.	Panoramic sunroof opening reinforcement bracket
6.	Front interior light assembly	13.	Dual lock
7.	Roof harness		

Roof interior trim (without sunroof)



Item	Description	Item	Description
1	Right sun visor hook	5	Roof assembly
2	Right sun visor	6	Rear passenger handrail (left)
3	FRONT PASSENGER'S ARMREST	7	Left sun visor
4	Rear passenger handrail (right)	8	left sun visor hook

5.8.2.2 Component Locating Diagram



S/N	Name	S/N	Name
1	Front left seat belt assembly	6	Front left seat belt buckle assembly
2	Front right seat belt assembly	7	Front right seat belt buckle assembly
3	Rear left seat belt assembly	8	Rear seat left seat belt buckle assembly
4	Rear right seat belt assembly	9	Rear seat right seat belt buckle assembly
5	Rear middle seat belt assembly	10	Seat belt height adjuster assembly

5.8.2.3 Precautions for interior shield

1. **Caution:** Disconnect the battery cable in advance.
2. **Caution:** Disconnect the SRS circuit in advance.
3. **Caution:** Do not damage or force to open the airbag cover, otherwise it will have an adverse effect on the performance of the airbag.
4. **Caution:** Be careful not to scratch the gasket and other parts and components.
5. **Caution:** When removing or disassembling any parts, be careful not to damage or deform them. Exercise caution to protect those parts and components that may tear the cloth.
6. **Caution:** When removing parts and components with a screwdriver or other tools, wrap the parts and components with vinyl tape or cloth tape for protection.

7. **Caution:** Protect the removed parts and components with cloth.
8. **Caution:** Do not apply excessive force to the PP plastic parts in the shield.
9. **Caution:**During removal and installation of interior trim, avoid contact between sharp objects and the outer surface.
10. **Caution:**When prying open the shield, pay attention to protecting it from scratches.
11. **Caution:** If non-reusable parts and components are removed, replace them with new ones.
12. **Caution:** Tighten the bolts and nuts to the specified torque.
13. **Caution:** After reassembling is completed, confirm that each part and component works normally.
14. **Caution:**Treatment of water-soluble stains during maintenance: Soak a soft cloth in water, then wring it out thoroughly. After removing the stain, wipe the area with a soft, dry cloth.
15. **Caution:**Treatment of oil stains during maintenance: Dissolve synthetic detergent (with a concentration of 2% ~ 3% or less) in warm water, dampen a cloth with the solution, and vigorously wipe off the oil stains. Next, soak the cloth in clean water, wring it out thoroughly, and use it to completely remove any detergent residue. Finally, wipe the cleaned area with a soft, dry cloth.
16. **Caution:** Do not use organic solvents such as thinners or petrol.

5.8.2.4 Seat belt precautions

Warning: Before repair, carefully read the precautions related to the SRS module.

1. Before repair, turn off the ignition switch, disconnect the negative terminal of battery for more than 3 min, and release static electricity.
2. Operate on the side of the airbag instead of on the front.
3. Be sure to check all seat belt assemblies after any collision. Replace the seat belt assembly with a new one unless a qualified professional technician confirms that the assembly can work normally without damage. In addition, check the seat belt assembly not used during the collision, and replace it with a new one if it is damaged. Installing a new seat belt assembly using an incorrect installation procedure may increase the risk of personal injury during a collision.
4. The seat belt pretensioner is a pyrotechnic device. Always wear goggles when repairing a seat belt equipped with a pretensioner. Do not probe the electrical terminals of a pretensioner, as this operation may deploy the pretensioner or airbag and cause personal injury.
5. Failure to follow the correct operation will result in accidental deployment of airbags and failure of safety protection devices when necessary.

Caution: The seat belt should maintain a normal connection relationship with the retractor and buckle.

1. Keep sharp and destructive objects away from the seat belt.
2. Do not bleach or dye the webbing (clean it only with neutral soap and warm water).
3. When installing the seat belt, pre-tighten the threaded rod by hand to avoid stripping.
4. Do not attempt to repair the retractor or its cover. Replace the non-functioning assembly with a new one.
5. Keep the webbing dry and clean.
6. Replace the seat belt that has been cut or damaged.
7. Do not fill anything into the trim panel hole through which the seat belt webbing passes.
8. When disconnecting the seat belt retractor connector, insert a small screwdriver wrapped with adhesive tape into the slot of the connector to pry up the buckle, and then remove the connector.
9. After installing the seat belt retractor connector, check whether the buckle has been fully pressed in.

10. After removing fasteners, be sure to put them back in place. If a fastener needs to be replaced, use the fastener with the same part number. If a fastener with the same part number cannot be found, use one of the same size and strength (or higher). Remove any fastener, which cannot be reused or requires thread locking, from the vehicle. For fasteners requiring a specified tightening torque, tighten them to the specified torque during reinstallation. Failure to comply with the above requirements may result in damage to components or systems.
11. Seat belts and their accessories can affect the main components and systems of the vehicle. Therefore, they must be carefully inspected and replaced with original parts.
12. Do not use the pretensioner (retractor) that has been triggered, but replace it in the form of an assembly.

5.8.3 Removal and installation

5.8.3.1 Front door shield

Removal

Caution: The front left door shield is a PP plastic part. Do not apply excessive force to it.

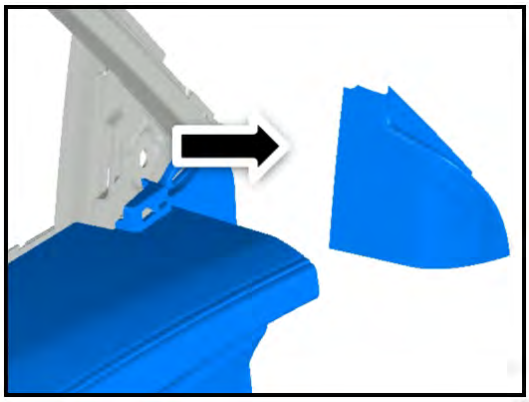
Caution: Prevent sharp objects from contacting the exterior surface during removal and installation.

Caution: During prying off the panel, protect the trim panel from being scratched.

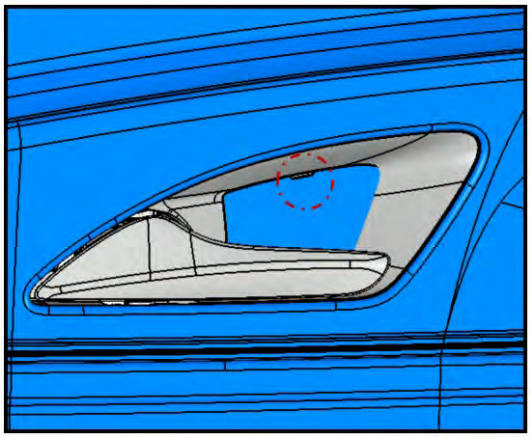
Caution: Please replace disposable parts and components, such as forceful clips (with assembly).

Caution: Keep removed small parts such as plugs and screws safe to prevent loss.

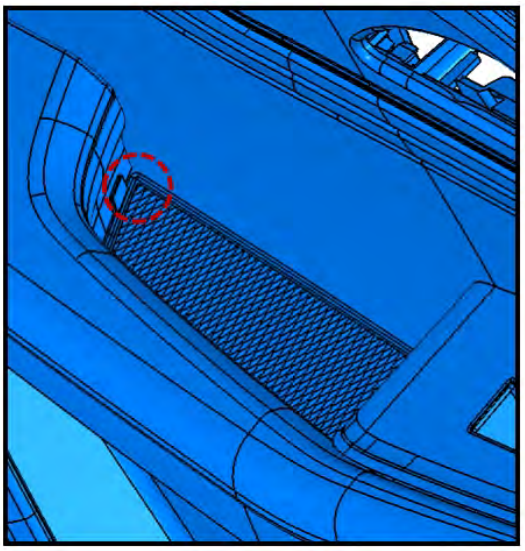
1. Remove the front left door triangle block assembly. Open the door, pry up the edge of front left door triangle block assembly along the interior direction, then disengage the fixing clip and take out the front left door triangle block assembly.



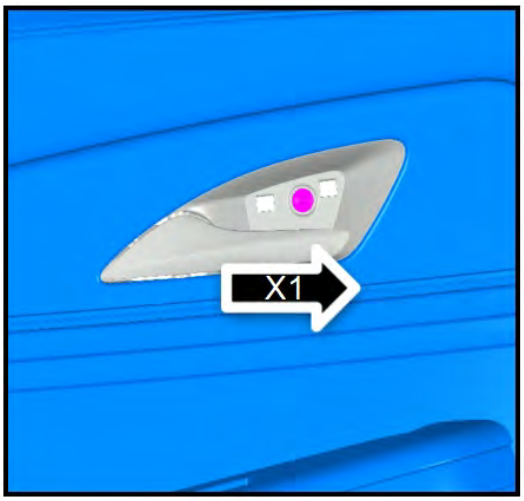
2. Remove the left interior door handle cover cap. Remove the interior handle cover cap using a straight screwdriver.

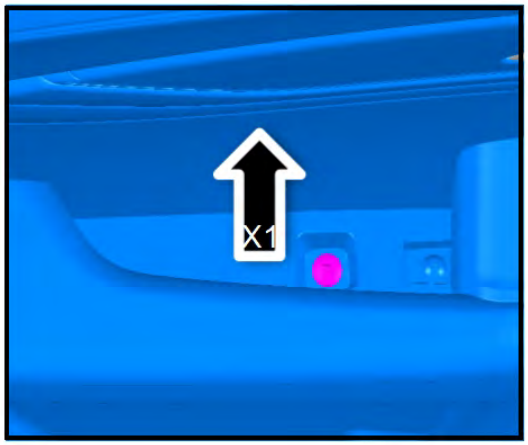


3. Drive to remove the front left door handle box plug cap. Hold the small blade of the handle box plug cap with fingers, and lift up the plug cap to take it out.



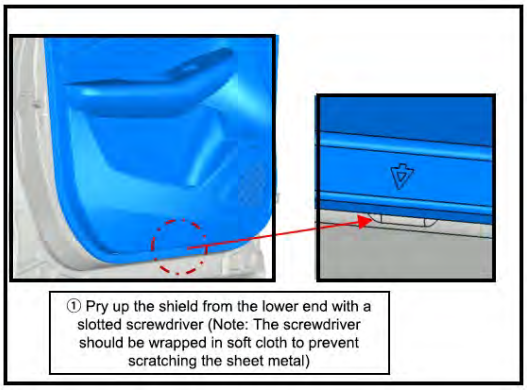
4. Remove screws. Use an electric screwdriver (cross-head screwdriver/straight screwdriver) to remove the two screws at the inner handle and handle box.

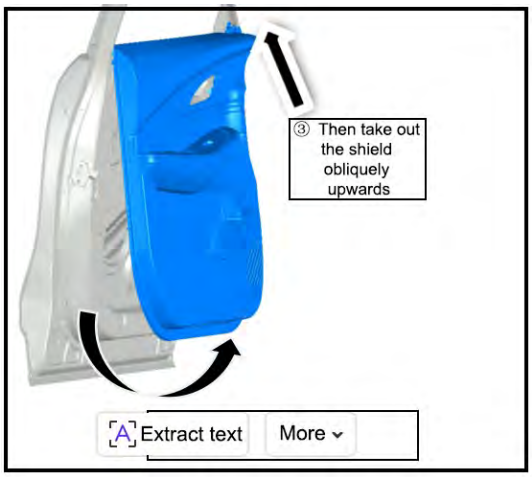




5. Remove the front left door shield assembly. First, use a flat screwdriver to pry open the shield from the bottom.

   Caution: The screwdriver needs to be covered with soft cloth to avoid scratching the sheet metal, disengage the clips on the shield, then take out the shield obliquely upwards, and then remove the interior handle cable and harness connector. Refer to relevant instructions for removing the interior handle cable and harness connector, and remove the front door shield.





6. Remove the armrest fixing bracket and sealing block on the door sheet metal inner panel.

Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

   Caution: The front right door shield has the same structure as the front left door shield, and the disassembly and assembly order is the same.

5.8.3.2 Rear door shield

Removal

Caution: The rear left door shield is a PP plastic part, please do not apply strong force to it.

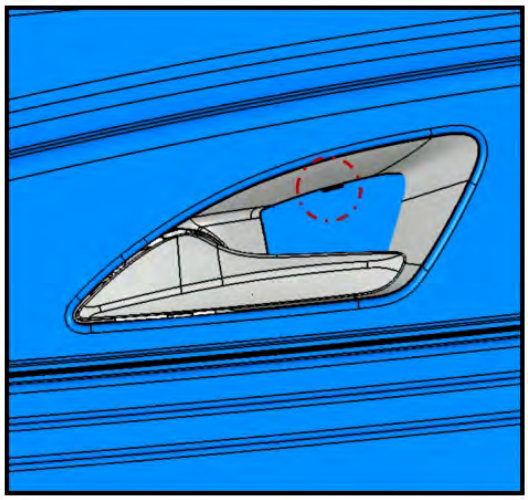
Caution: Prevent sharp objects from contacting the exterior surface during removal and installation.

Caution: During prying off the panel, protect the trim panel from being scratched.

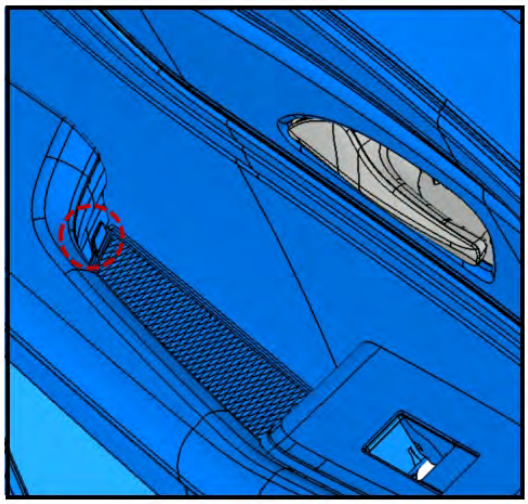
Caution: Please replace disposable parts and components, such as forceful clips (with assembly).

Caution: Keep removed small parts such as plugs and screws safe to prevent loss.

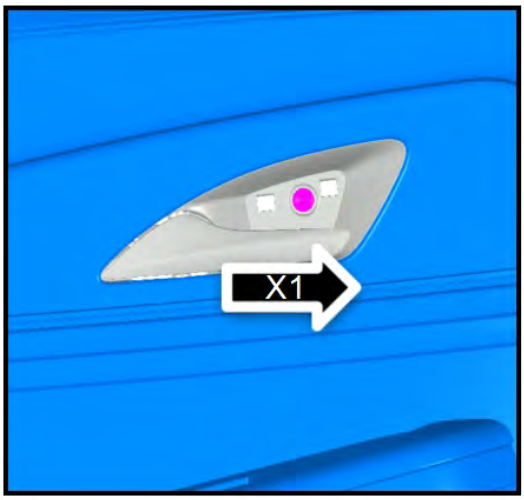
1. Remove the left interior door handle cover cap. Remove the interior handle cover cap using a straight screwdriver.

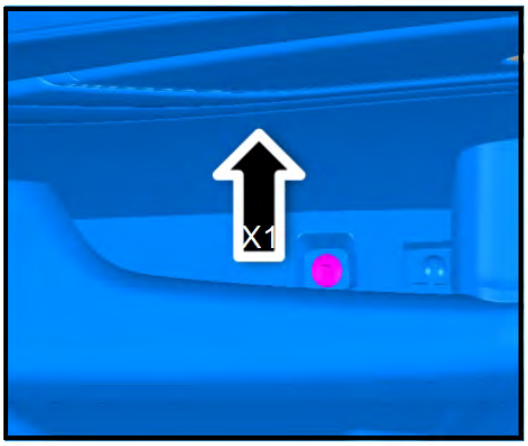


2. Drive to remove the rear left door handle box plug cap. Hold the small blade of the handle box plug cap with fingers, and lift up the plug cap to take it out.



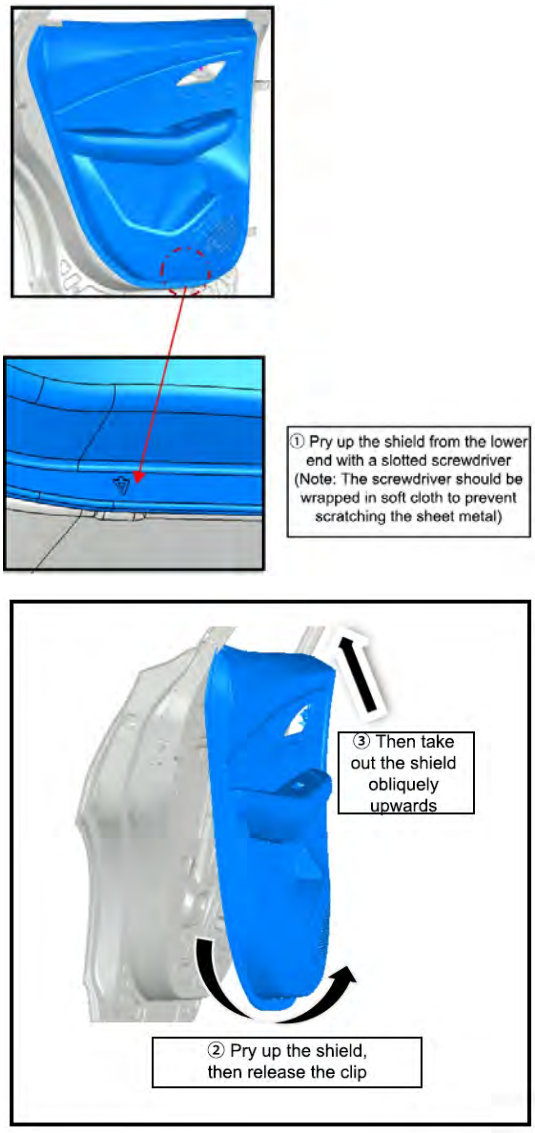
3. Remove screws. Use an electric screwdriver (cross-head screwdriver/straight screwdriver) to remove the two screws at the inner handle and handle box.





4. Remove the rear left door shield assembly. First, use a flat screwdriver to pry open the shield from the bottom.

   Caution: The screwdriver needs to be covered with soft cloth to avoid scratching the sheet metal, disengage the clips on the shield, then take out the shield obliquely upwards, and then remove the interior handle cable and harness connector. Refer to relevant instructions for removing the interior handle cable and harness connector, and remove the front door shield.



5. Remove the armrest fixing bracket and sealing block on the door sheet metal inner panel.

Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

   Caution: The rear right door shield has the same structure as the rear left door shield, and the disassembly and assembly order is the same.

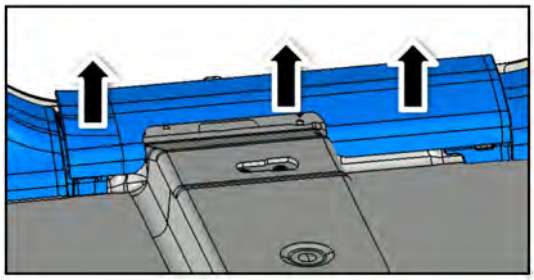
5.8.3.3 Front left door sill shield

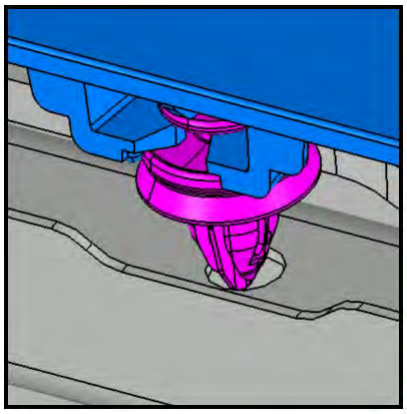
Removal

Caution: The side wall shield is a PP plastic part. Do not apply strong force to it. During disassembly and assembly, avoid sharp objects from contacting the outer surface. When

prying open the shield, pay attention to protecting the shield to avoid scratches.

1. Remove the door frame sealing rubber strip first.
2. Grab the edge of the sill trim panel upward from the carpet and pry it up. Pull out the forceful clip snapped into the sheet metal to remove the front sill shield.





Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

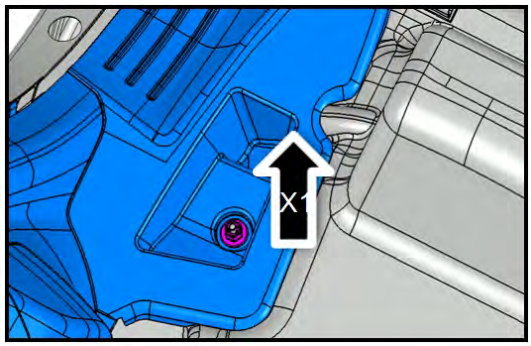
   Caution: The front right door sill shield has the same structure as the front left door sill shield, and the disassembly and assembly order is the same.

5.8.3.4 Rear left door sill shield

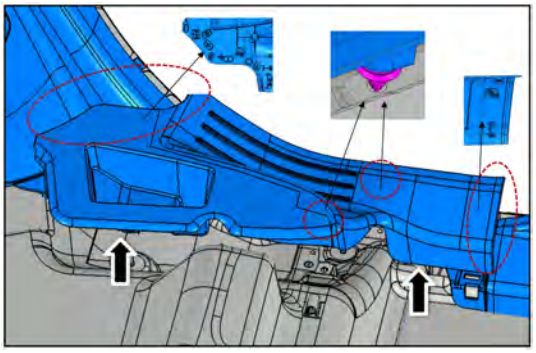
Removal

Caution: The side wall shield is a PP plastic part. Do not apply strong force to it. During disassembly and assembly, avoid sharp objects from contacting the outer surface. When prying open the shield, pay attention to protecting the shield to avoid scratches.

1. Remove the door frame sealing rubber strip first.
2. Lift the rear seat cushion and pull out the plastic nut hidden under the cushion.



3. Pry up from the direction of the arrow shown in the figure, and pull out all the clips and fasteners.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

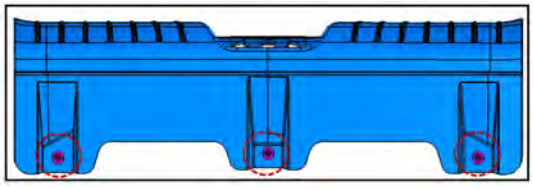
   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

   Caution: The rear right door sill shield has the same structure as the rear left door sill shield, and the disassembly and assembly order is the same.

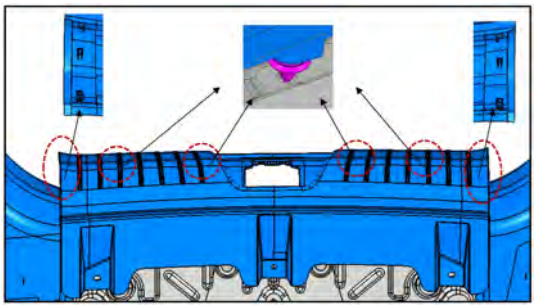
5.8.3.5 Trunk lid sill shield

Removal

1. Remove the door frame sealing rubber strip first.
2. Remove the spare tyre cover plate. Refer to: Rear carpet system (trunk cover plate and trunk cover plate support).
3. Remove the carpet support block under the cover plate and take out the spare tyre.
4. Use a cross-head screwdriver or blade to remove the 3 snap fasteners that fix the boot lid sill.



5. Pull upward to disengage the forceful clips (4 in total) and self-retaining clips (2 in total), and then remove the boot lid threshold.



Installation

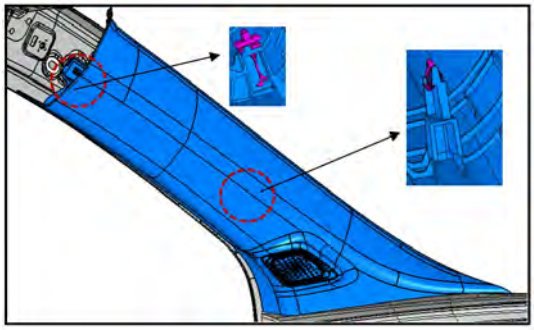
1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

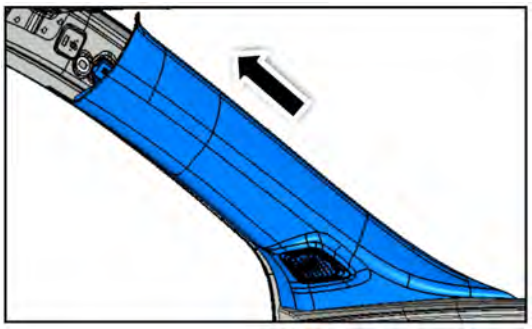
5.8.3.6 Left A-pillar upper shield

Removal

1. Remove the front door sealing rubber strip first.
2. Open the A-pillar upper shield from the upper end to the inside of the car, use a straight screwdriver to disengage the upper end of the A-pillar upper shield, and remove 2 mounting points, an anti-dislodgement buckle and a metal clip.



3. For models equipped with high-pitch speakers, the harness connector must be disconnected first. The method refers to the harness and high-pitch speaker disassembly instructions, and then the A-pillar upper shield is pulled out obliquely upwards.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

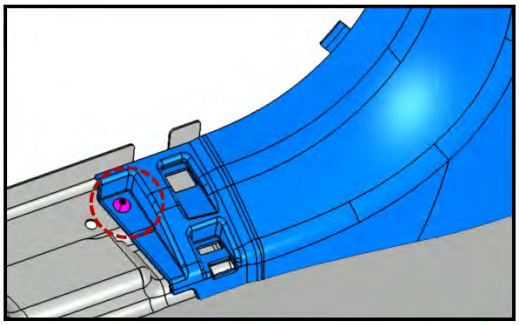
   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

   Caution: The right A-pillar upper shield has the same structure as the left A-pillar upper shield, and the removal and installation sequence is the same.

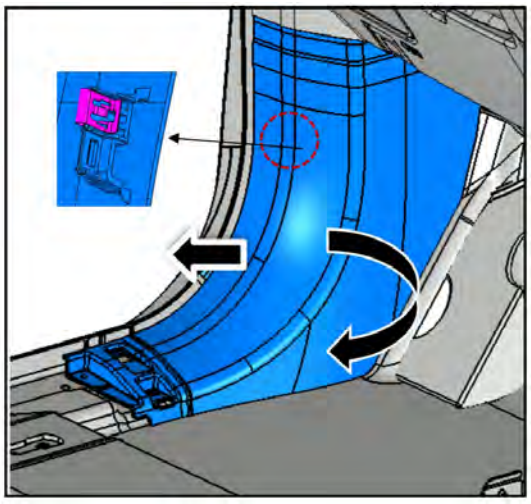
5.8.3.7 Left A-pillar lower shield

Removal

1. Remove the front door frame sealing rubber strip first.
2. Remove the engine bonnet opening handle. Refer to: Engine bonnet lock interior opening handle.
3. Remove the front sill shield. Refer to: Front left sill shield.
4. Use a cross-head screwdriver or blade to disassemble 1 snap fastener on the lower side of the sub-A-pillar at the position shown in the Fig.



5. Pull the shield toward the rear of the vehicle (X direction) and pull out the metal card that matches the upper end of the A-pillar lower shield with the sheet metal.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

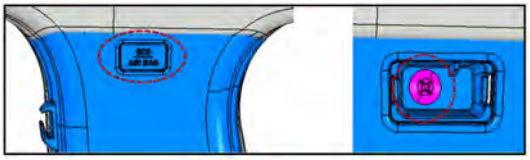
   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

   Caution: The right A-pillar lower shield has the same structure as the left A-pillar lower shield, and the disassembly and assembly order is the same.

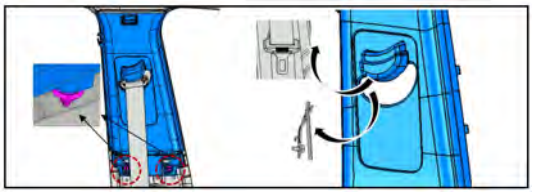
5.8.3.8 Left B-pillar upper shield

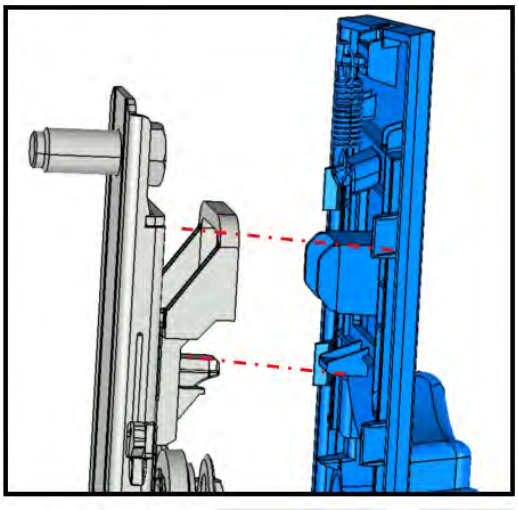
Removal

1. Remove the front and rear door sealing rubber strips first.
2. Remove the B-pillar lower shield, Refer to: Left B-pillar lower shield.
3. Disassemble the seat belt lower webbing fixing point, Refer to: Front left seat belt assembly.
4. Use a straight screwdriver to pry out the left B-pillar upper shield plug from the disassembly slot, and then use a cross-head screwdriver to remove 1 bolt under the plug.



5. Use a straight screwdriver to pry open the 2 plastic clips at the lower end of the shield, then pull out the left B-pillar upper shield obliquely downward, and pass the seat belt latch plate and lower fixing point structure through the shield through hole.





Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: For models equipped with high-profile seat belts, it is necessary to ensure that the sliding structure of the seat belt height adjuster and the sliding structure of the B-pillar upper shield are pushed to the upper limit position during assembly to ensure the accuracy of the relative position of the matching structure.

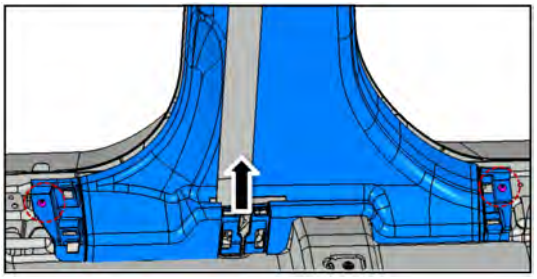
   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

   Caution: The right B-pillar upper shield has the same structure as the left B-pillar upper shield, and the removal and installation sequence is the same.

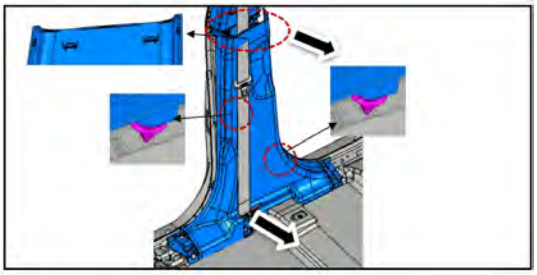
5.8.3.9 Left B-pillar lower shield

Removal

1. Remove the front and rear door sealing rubber strips first.
2. Remove the front door sill shield. Refer to: Front left door sill shield.
3. Remove the rear door sill shield. Refer to: Rear left door sill shield.
4. Use a cross-head screwdriver or blade to disassemble the snap fasteners at the front and rear ends, and pull out the small plug cover below upward.



5. Pull the flanges (both sides) indicated by the arrow, first disengage the clips that match the B-pillar upper shield, then disengage the clips (a total of 2 places) and, and remove the left B-pillar lower shield in the Y direction (the seat belt webbing is removed from the gap at the small plug position).



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

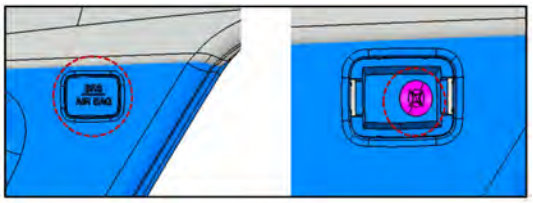
   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

   Caution: The right B-pillar lower shield has the same structure as the left B-pillar lower shield, and the removal and installation sequence is the same.

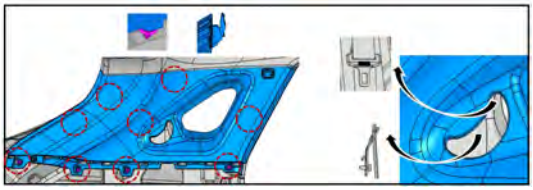
5.8.3.10 Left C-pillar upper shield

Removal

1. Remove the rear door sealing strip.
2. Remove the boot lid sealing strip.
3. Remove the left C-pillar lower shield, Refer to: Left C-pillar lower shield.
4. Disassemble the lower fixing point of the second row seat belt, Refer to: Rear left seat belt assembly.
5. Use a straight screwdriver to pry out the left C-pillar upper shield screw plug cover, and then use a cross-head screwdriver to remove the bolts under the plug cover.



6. Disengage the clip (9 places in total) and limit hook (1 place) toward the inside of the vehicle, remove the left C-pillar upper shield obliquely downward, and then pass the seat belt clip and lower fixing point through the shield hole.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

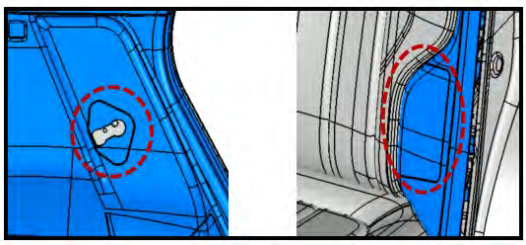
   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

   Caution: The right C-pillar upper shield has the same structure as the left C-pillar upper shield, and the disassembly and assembly sequence is the same.

5.8.3.11 Left C-pillar lower shield

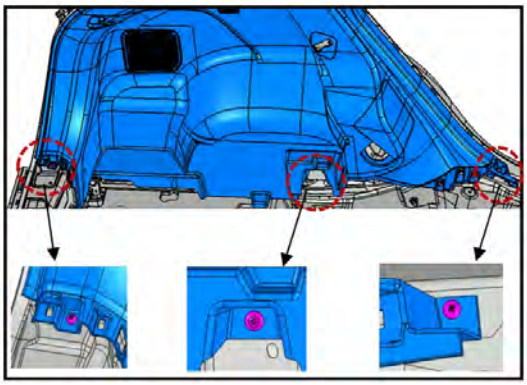
Removal

1. Remove the retractable trunk partition and remove the rear door seal.
2. Remove the boot lid sealing strip.
3. Remove the rear sill shield. Refer to: Rear left sill shield.
4. Remove the boot lid sill shield. Refer to: Boot lid sill shield.
5. Lay down the seat backrest, pry open the lock cover plate with a straight screwdriver, open the seat cover plate by hand, and then disassemble the seat. Refer to: Seat disassembly instructions.

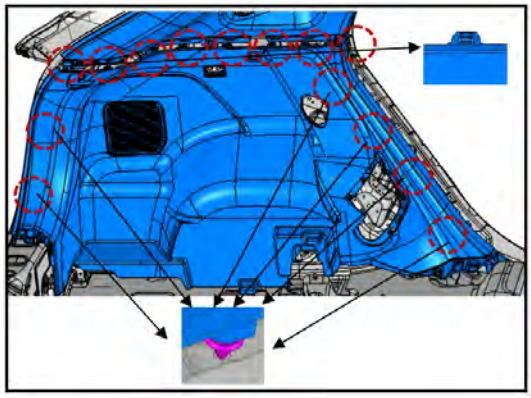


6. Remove the lower fixing point of the second row seat belt. Refer to: Rear left seat belt assembly.

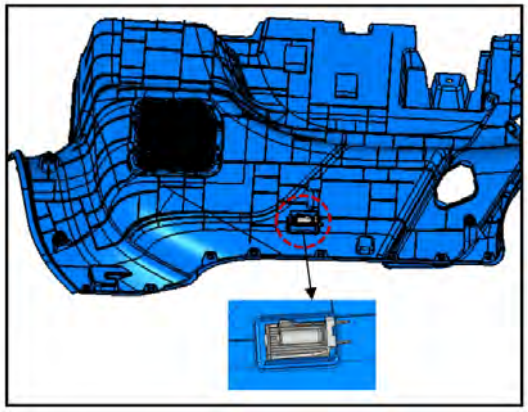
7. Use a cross-head screwdriver to disassemble the self-tapping screws at the front and rear ends of the left C-pillar lower shield and 1 snap fastener in the middle.



8. Remove the gantry card and clip that match the C-pillar upper shield.



9. Pull out the trunk light connector (only for the left C-pillar, refer to the light disassembly instructions), and remove the left C-pillar lower shield.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

   Caution: The right C-pillar lower shield has the same structure as the left C-pillar lower shield, and the disassembly and assembly sequence is the same.

5.8.3.12 Trunk lid upper shield assembly

Removal

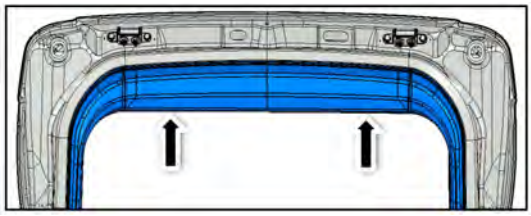
Caution: The boot lid cover is a PP plastic part, please do not apply strong force to it.

Caution: During removal and installation of interior trim, avoid contact between sharp objects and the outer surface.

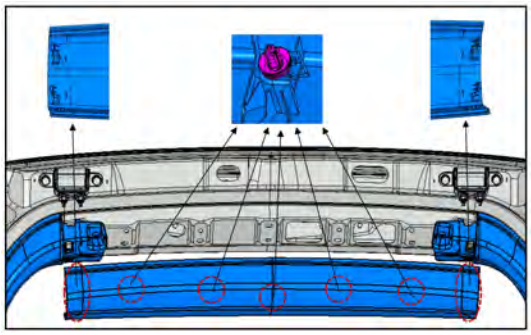
Caution: When prying open the shield, pay attention to protecting it from scratches.

Caution: Please replace disposable parts and components.

1. Insert a straight screwdriver (wrapped in cloth to prevent scratching or damaging the rear windscreen) into the clearance between the rear windscreen and the trunk lid upper trim panel, then pry it out with force.



2. Remove the clips (4 in total) and pin assemblies (2 in total), then remove the parts.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

   Caution: The removal method for the right boot lid shield assembly is the same as for the left one.

5.8.3.13 Trunk lid left shield assembly

Removal

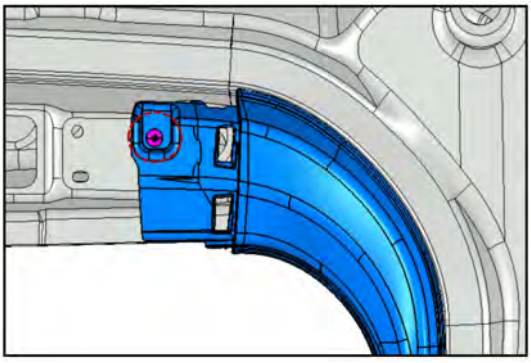
Caution: The boot lid cover is a PP plastic part, please do not apply strong force to it.

Caution: During removal and installation of interior trim, avoid contact between sharp objects and the outer surface.

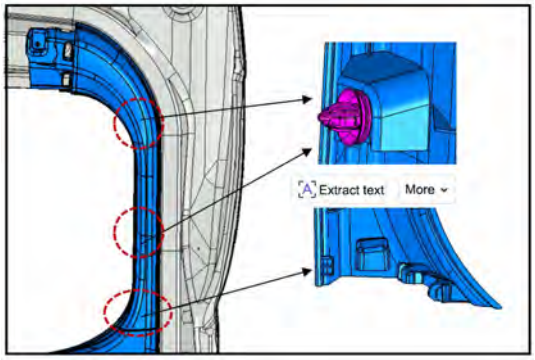
Caution: When prying open the shield, pay attention to protecting it from scratches.

Caution: Please replace disposable parts and components.

1. First remove the Boot lid upper side shield assembly, Refer to: Boot lid upper side shield assembly.
2. Remove the self-tapping screws using a cross-head screwdriver or electric screwdriver.



3. Remove the clips (2 places in total) and clip assembly (1 place in total), and then remove the parts (disassembled in Y direction).



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

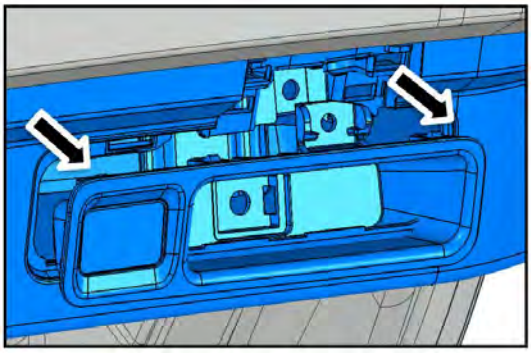
   Caution: The removal method for the right boot lid shield assembly is the same as for the left one.

5.8.3.14 Trunk lid lower shield assembly

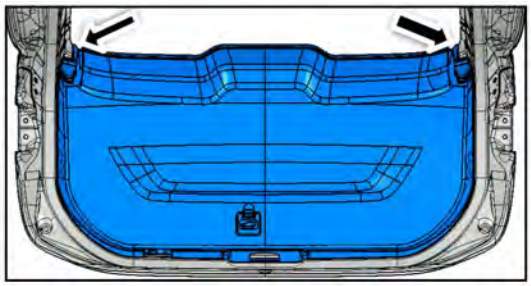
Removal

1. First remove the Boot lid upper side shield assembly, Refer to: Boot lid upper side shield assembly.
2. Remove the Boot lid left/right side shield assembly, Refer to: Boot lid left side shield assembly.
3. Use a straight screwdriver to pry open the boot lid plug cover and the small plug cover at the bottom of the handle box, and then use a cross-head screwdriver to disassemble the screws at the left and right corners of the boot lid shield and under the cover plate.

4. Pry out the boot lid handle box with a straight screwdriver. For power boot lid models, it is necessary to disconnect the boot lid switch connector.



5. Pry open the shield from both corners of the boot lid shield, disassemble the concealed clips from left to right (or from right to left), and then remove the part.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

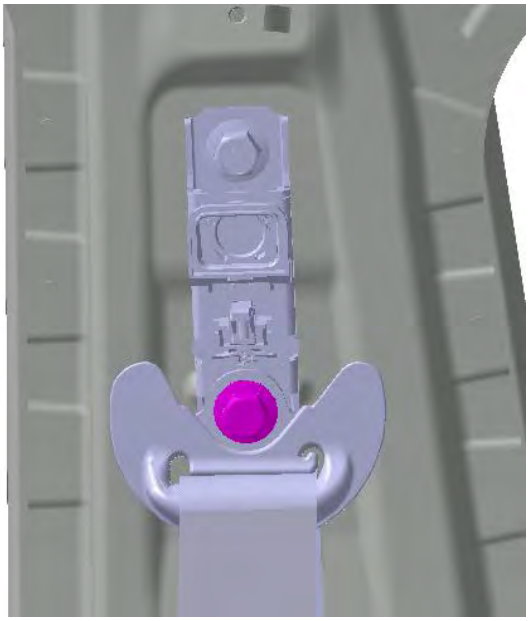
   Caution: Pay attention to adjusting the assembly gap of the shield after installation.

5.8.3.15 Seat belt height adjuster assembly

Caution: The removal and installation methods of the left and right seat belt height adjuster assemblies are the same. Take the left one as an example.

Removal

1. Remove the left B-pillar upper shield assembly. Refer to: Left B-pillar upper shield.
2. Remove 1 fixing nut at the upper part of front left seat belt assembly. Tightening torque: 45±5Nm



3. Remove 1 fixing bolt and take out the seat belt height adjuster assembly. Tightening torque: 45±5Nm

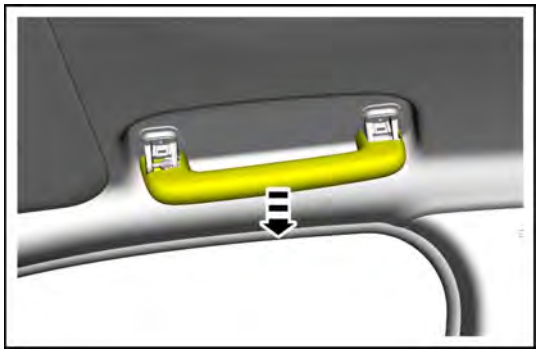
Installation

1. The installation order is the reverse of the removal order.

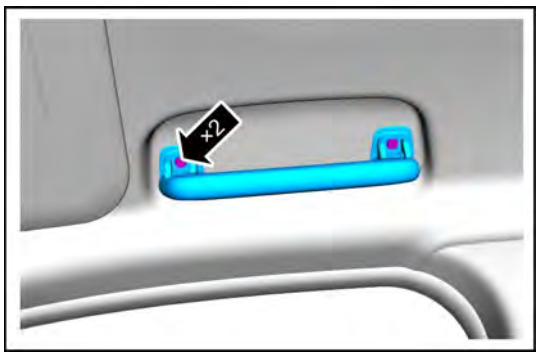
5.8.3.16 Roof armrests

Removal

1. Pull the roof armrest.



2. Remove the fixing screws of roof armrest, and take down the armrest.



Installation

1. The installation order is the reverse of the removal order.

5.8.3.17 Roof interior trim assembly

General Tools

Interior trim panel clip remover

Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Remove the front door sill shields on both sides. Refer to: Front left door sill shield.
3. Remove the rear door sill shields on both sides. Refer to: Rear left door sill shield.
4. Remove the A-pillar upper shields on both sides. Refer to: Left A-pillar upper shield.
5. Remove the B-pillar lower shields on both sides. Refer to: Left B-pillar lower shield.
6. Remove the B-pillar upper shields on both sides. Refer to: Left B-pillar upper shield.
7. Remove the C-pillar upper shields on both sides. Refer to: Left C-pillar upper shield.
8. Remove the harness connector of front roof light.

9. Remove the front passenger's armrest. Refer to: Roof armrest.

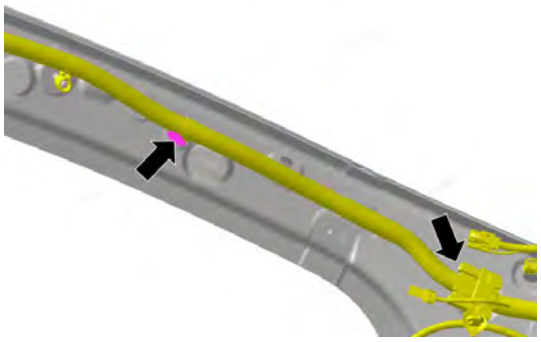
10. Remove the sun visors on both sides. Refer to: Sun visor.

11. Remove the interior rearview mirror housing (without USB). Refer to: Interior rearview mirror assembly.

12. Remove the interior rearview mirror housing (with USB). Refer to: Interior rearview mirror assembly.

Caution: While removing the rear fixing clip of roof interior trim, a person is required to help hold the front end of the roof interior trim.

13. Disconnect the left Roof harness connector and remove the fixing clip of the left Roof harness.

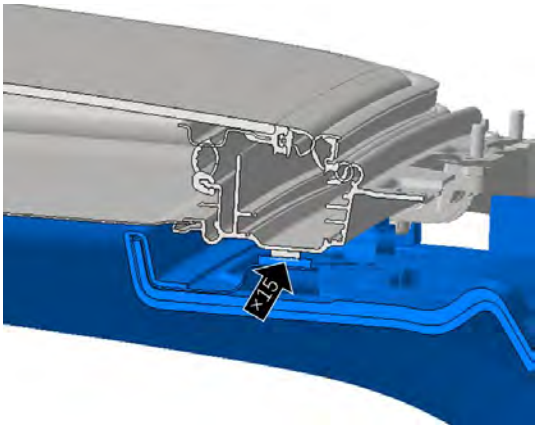


14. Disconnect the interior rearview mirror harness connector. Refer to: Interior rearview mirror assembly.

15. Remove the front and rear blade clips of Roof.

Caution: The following steps are applicable to low-end models.

16. Remove the mushroom buckle that overlaps the back of the Roof with the panoramic sunroof bracket.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

Caution: The installation of Roof with and without sunroof is basically the same.

5.8.3.18 Sun visor

Removal

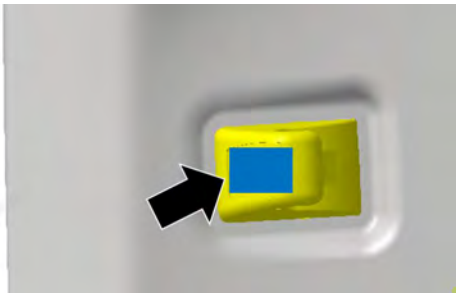
1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal

2. Remove the fixing screw cover plate of sun visor.

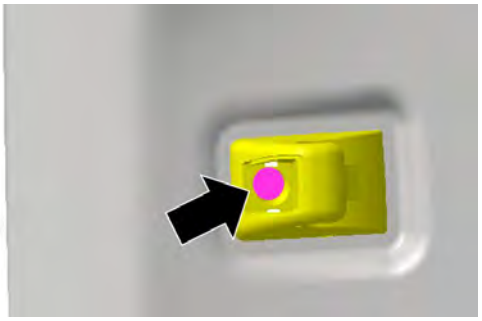
3. Remove the fixing screws of sun visor.

4. Disconnect the sun visor harness connector and remove the sun visor.

5. Remove the sun visor hook plug cap.



6. Remove the sun visor hook fixing screws and remove the sun visor hook.



Installation

1. The installation order is the reverse of the removal order.

5.8.3.19 Removal and installation of front left seat belt assembly

Caution: Before repair, the ignition switch should be turned off, the battery negative pole disconnected for more than 3 min, and static electricity prevented.

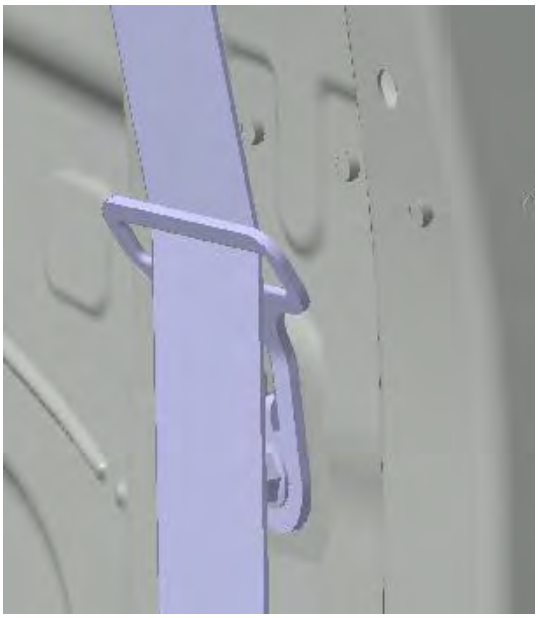
Caution: Never operate on the front of the SRS; operate on the side of the SRS.

Caution: The removal and installation methods of the left and right seat belt assemblies are the same. Take the left one as an example.

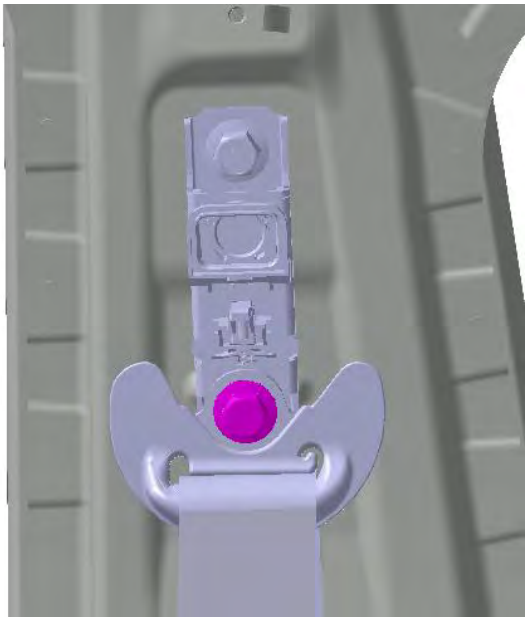
Removal

1. Remove the left B-pillar upper shield assembly. Refer to: Left B-pillar upper shield.

2. Remove the webbing guide. Tightening torque: 9±1 N•m



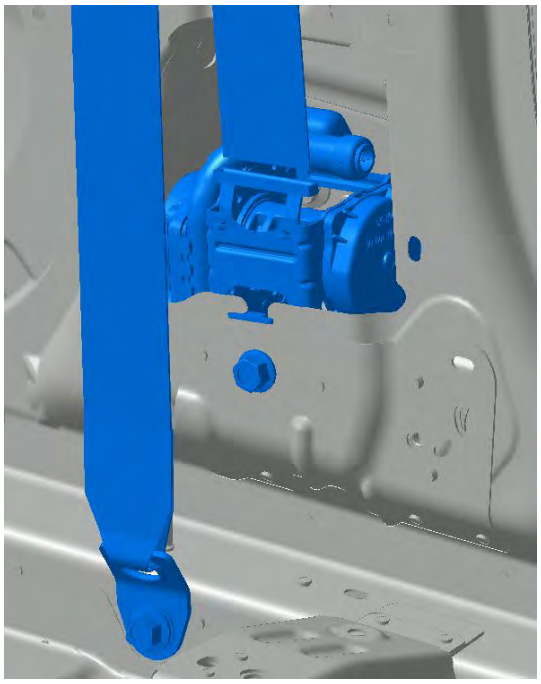
3. Remove 1 fixing nut at the upper part of front left seat belt assembly. Tightening torque: 45±5Nm



4. Remove the front left seat belt retractor assembly. After disconnecting 1 connector, remove 1 fixing bolt of the front

left seat belt retractor and take out the front left seat belt retractor assembly. Tightening torque: 45±5Nm

Caution: When disconnecting the connector, it is necessary to use a small screwdriver wrapped in adhesive tape to insert into the connector slot to pry up the lock catch before the connector can be unplugged.



Installation

1. The installation order is the reverse of the removal order.

   Caution: After installation, check whether the seat belt is installed in place, and make sure that it is not twisted or stuck.

5.8.3.20 Front left seat belt buckle assembly

Caution: The removal and installation methods of the left and right seat belt buckle assemblies are the same. Take the left one as an example.

Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Remove the auxiliary instrument panel body assembly. Refer to: Auxiliary dashboard assembly.
3. Remove the front left seat belt buckle assembly.

   Caution: Before removal, the seat assembly must be adjusted to the rearmost position.

   Disconnect 1 connector, then detach 1 harness clip, remove 1 fixing bolt, and take out the front left seat belt clip assembly. Tightening torque: 45±5Nm.

Installation

1. The installation order is the reverse of the removal order.

5.8.3.21 Rear left seat belt assembly

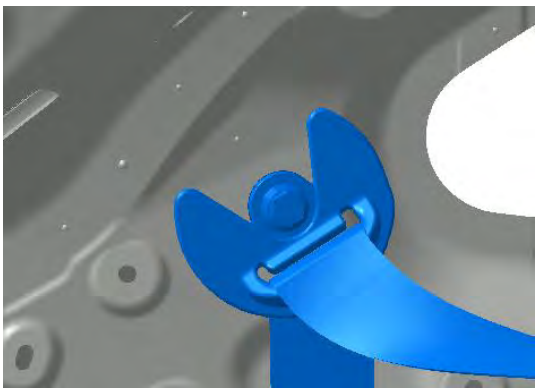
Caution: Before repair, the ignition switch should be turned off, the battery negative pole disconnected for more than 3 min, and static electricity prevented.

Caution: Never operate on the front of the SRS; operate on the side of the SRS.

Caution: The removal and installation methods of the left and right seat belt assemblies are the same. Take the left one as an example.

Removal

1. Remove the left C-pillar upper shield. Refer to: Left C-pillar upper shield.
2. Remove 1 fixing nut at the upper part of the rear left seat belt assembly. Tightening torque: 45±5Nm



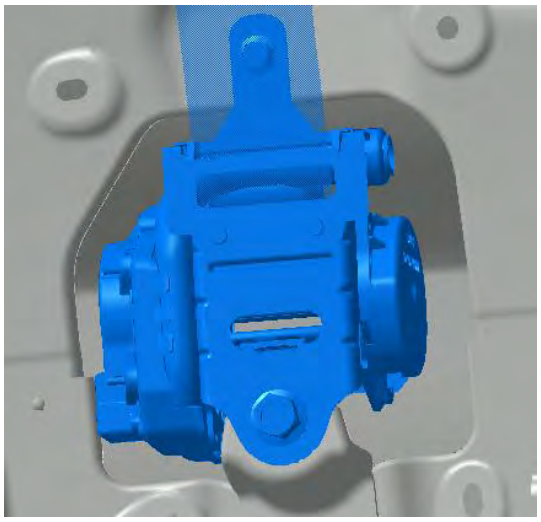
3. Remove the side wall shield assembly. Refer to: Boot lid left shield assembly.

4. Remove the rear left seat belt retractor assembly.

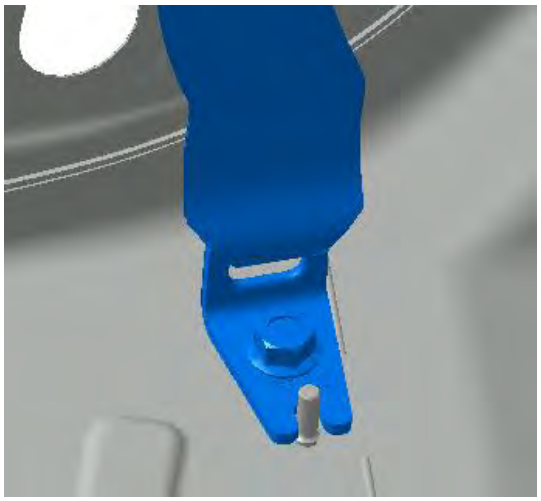
Caution: When disconnecting the connector, it is necessary to use a small screwdriver wrapped in adhesive tape to insert into the connector slot to pry up the lock catch before the connector can be unplugged.

After disconnecting 1 connector, remove 1 fixing bolt at the upper part of rear left seat belt retractor. Tightening torque: 9±1Nm.

Remove 1 fixing bolt of the rear left seat belt retractor, and then take out the front left seat belt retractor assembly. Tightening torque: 45±5Nm.



Remove 1 fixing bolt at the lower part of the front left seat belt. Tightening torque: 45±5Nm



Installation

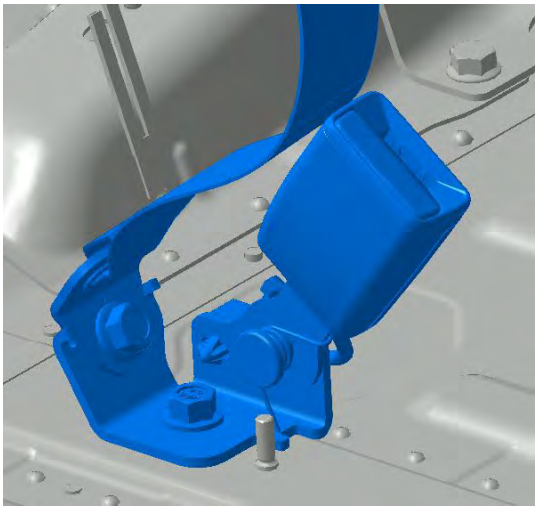
1. The installation order is the reverse of the removal order.

Caution: After installation, check whether the seat belt is installed in place, and make sure that it is not twisted or stuck.

5.8.3.22 Rear seat left seat belt buckle assembly

Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Remove the rear seat cushion assembly. Refer to: Rear 40%/60%-portion seat.
3. Remove the rear left seat belt buckle assembly. Disconnect 1 connector, remove 1 fixing bolt and take out the rear left seat belt buckle assembly. Tightening torque: 45±5Nm.



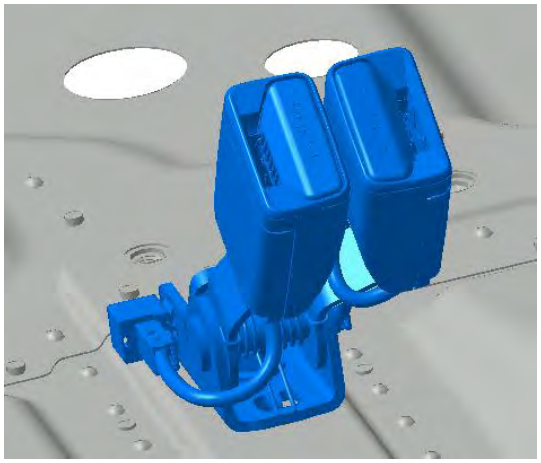
Installation

1. The installation order is the reverse of the removal order.

5.8.3.23 Rear seat right seat belt buckle assembly

Removal

1. Disconnect the battery negative terminal. Refer to: Disconnect the battery negative terminal
2. Remove the rear seat cushion assembly. Refer to: Rear 40%/60%-portion seat.
3. Remove the rear right seat belt buckle assembly. Disconnect 1 connector, remove 1 fixing bolt and take out the rear right seat belt buckle assembly. Tightening torque: 45±5Nm.



Installation

1. The installation order is the reverse of the removal order.

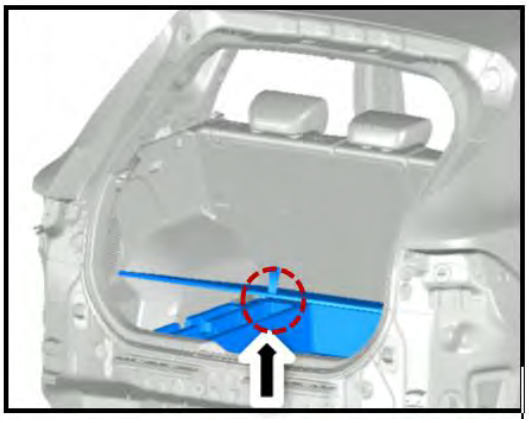
5.8.3.24 Rear carpet system (trunk cover plate and trunk cover plate support)

Removal

Caution: The lower support of the trunk cover plate is an EPP foam part, please do not apply strong force to it.

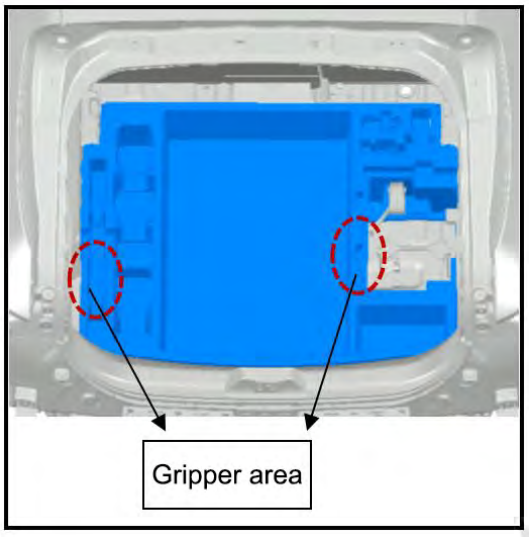
Caution: Prevent sharp objects from contacting the exterior surface during removal and installation.

1. Remove the boot cover plate assembly. (The trunk cover plate is installed flat. Open the boot lid, grab the webbing handle, and take it out of the car directly after lifting it).

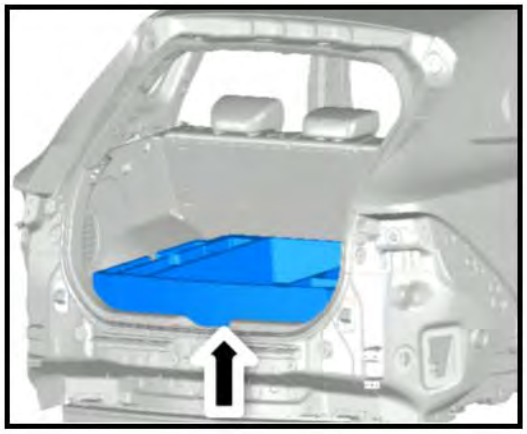


2. Remove the battery baffle, which is installed flat without fixing points and can be taken out directly upwards.

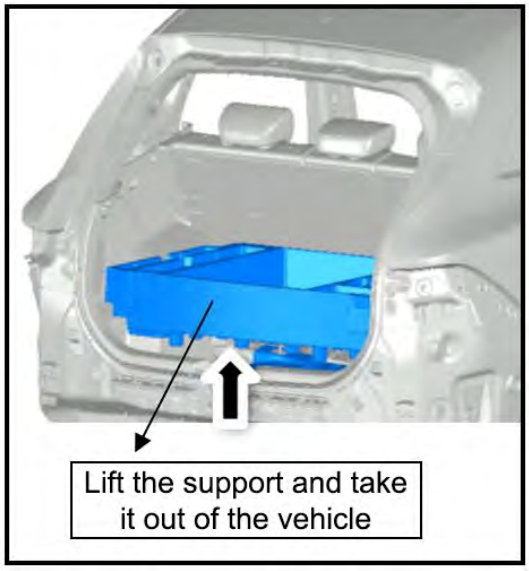
3. Remove the lower support of the trunk cover plate. The lower support of the trunk cover plate is installed flat without fixing points. After removing the trunk cover plate, use both hands to grasp the gripper area shown in Fig. on the right.



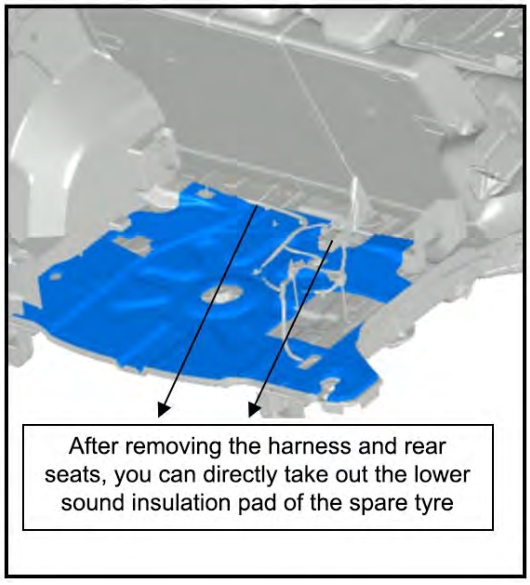
4. Lift it vertically upward until the front end of the support contacts the seat backrest.



5. Then lift the rear end of the support higher than the boot lid sill shield and take it out of the car along the direction of the boot lid opening.



6. To remove the lower NVH pad of the spare tyre, you need to remove the rear seats and harness first. After removing the rear seats and harnesses, directly lift the lower NVH pad of the spare tyre to remove it.



Installation

1. The installation order is reverse to the removal order.

5.9 Body exterior trim

5.9.1 Specification

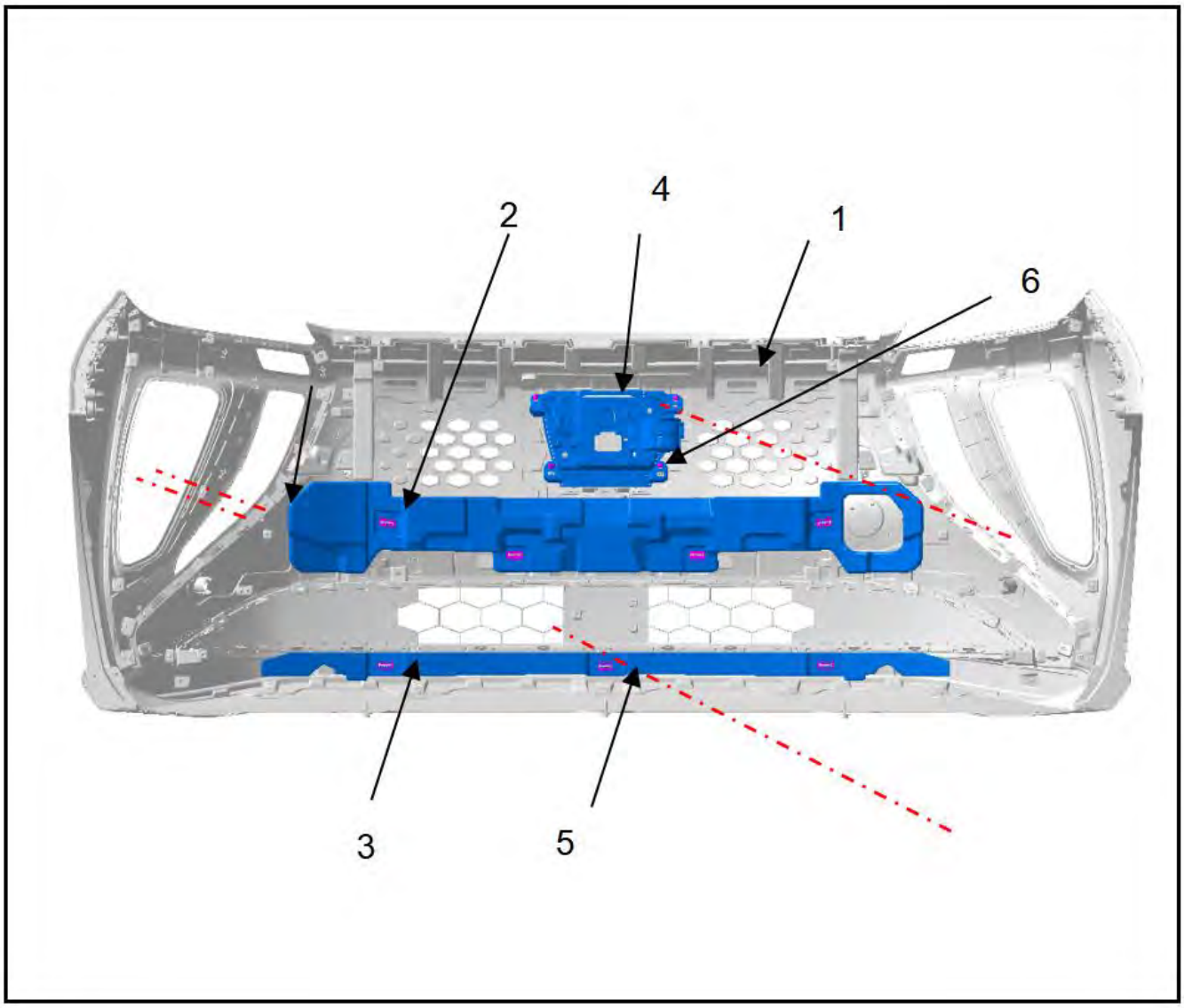
5.9.1.1 Torque specification

Name	Nm
Fixing bolt of front bumper	9±1
Wheel guard mudguard self-tapping screw	4
Engine lower shield fixing bolt	9±1
Rear spoiler mounting fixing bolt	9±1
Connecting bolt between front-end frame and front longitudinal beam of body	20±2
Front-end frame right connecting plate assembly fastening bolt	9±1
M6 bolts between the front bracket and the front-end frame	9±1
Luggage rack fixing bolt	9±1
Self-tapping screw of door exterior trim panel	4
Self-tapping screws shared by the front end of the fender bottom trim and the wheel guard	4
Front triangle outer cover plate fastening self-tapping screw	4
Front triangle outer cover plate front pan head screw with cross recess	5.5±1
Fixing bolt of underbody shield	9±1

5.9.2 Instructions and operations

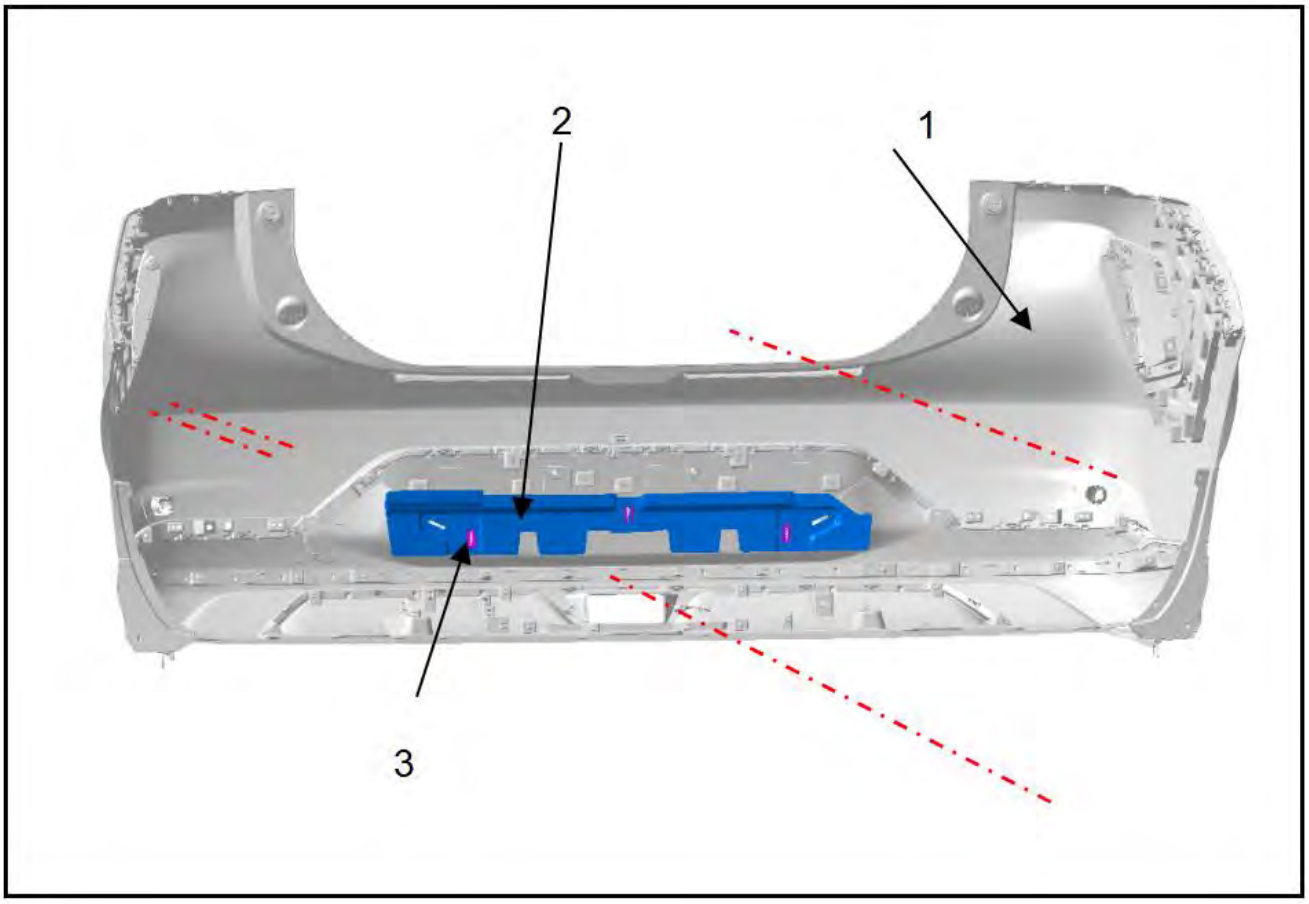
5.9.2.1 Body exterior trim

Exploded view of front bumper assembly



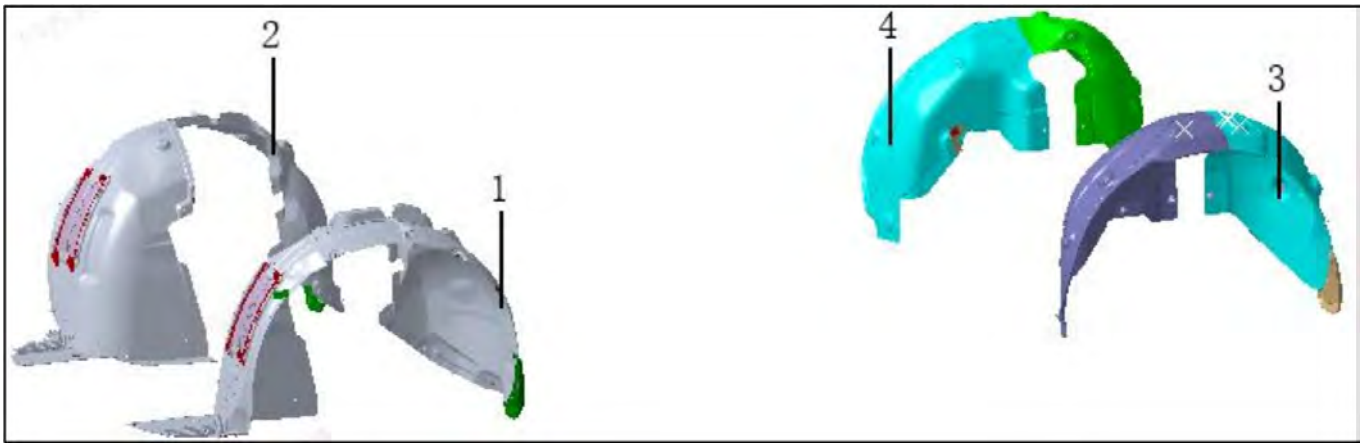
Symbol	Name	Quantity
1	Front bumper assembly	1
2	Front bumper foam block	1
3	Calf protection foam block	1
4	Front charging port cap assembly	1
5	C20-2804543 metal card	7
6	Q2734213F38 self-tapping screw	4

Exploded view of rear bumper



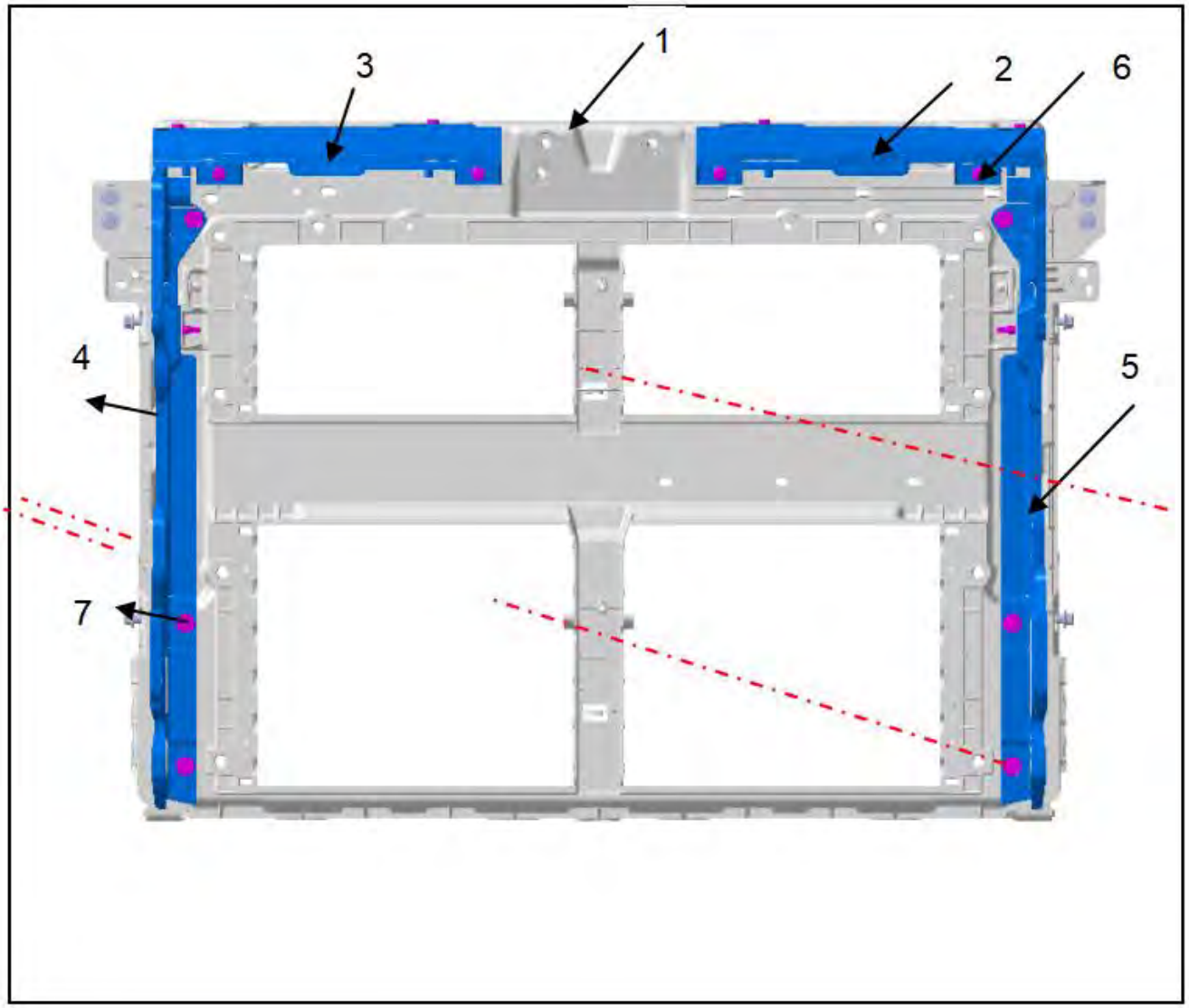
Symbol	Name	Quantity
1	Rear bumper assembly	1
2	Rear bumper foam block	1
5	C20-2804543 metal card	3

Exploded view of wheel guard mudguard system



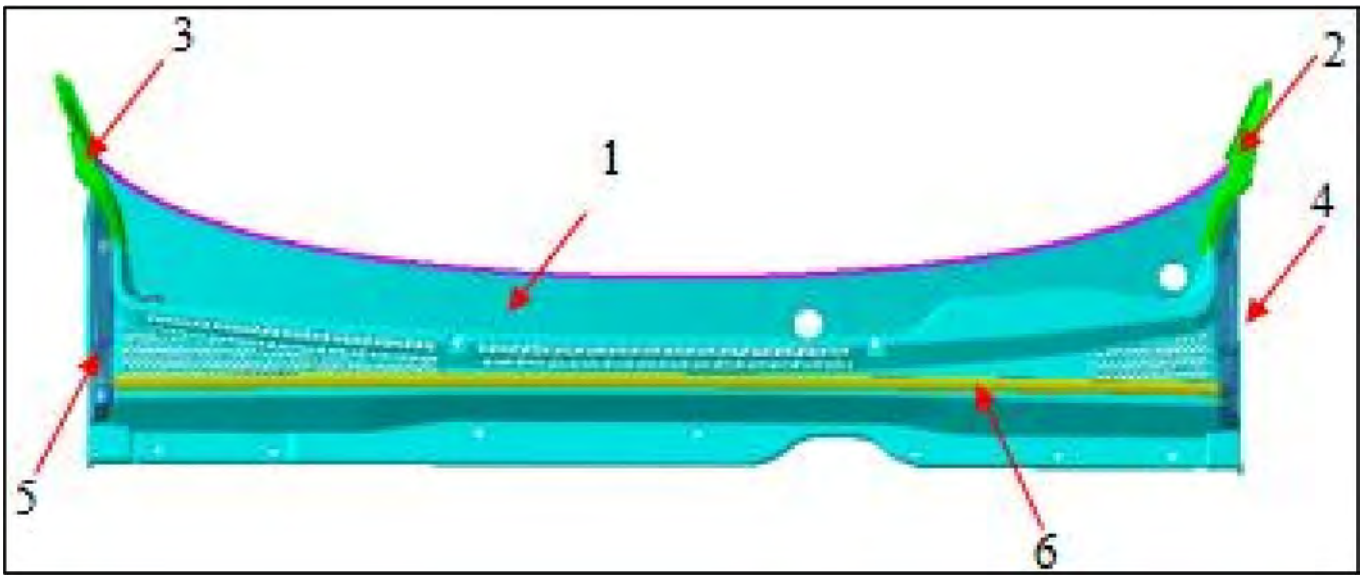
Item	Description	Item	Description
1.	Front left mudguard wheel guard	3.	Rear left mudguard wheel guard
2.	Front right mudguard wheel guard	4.	Rear right mudguard wheel guard

Exploded View of Front-end Frame Assembly



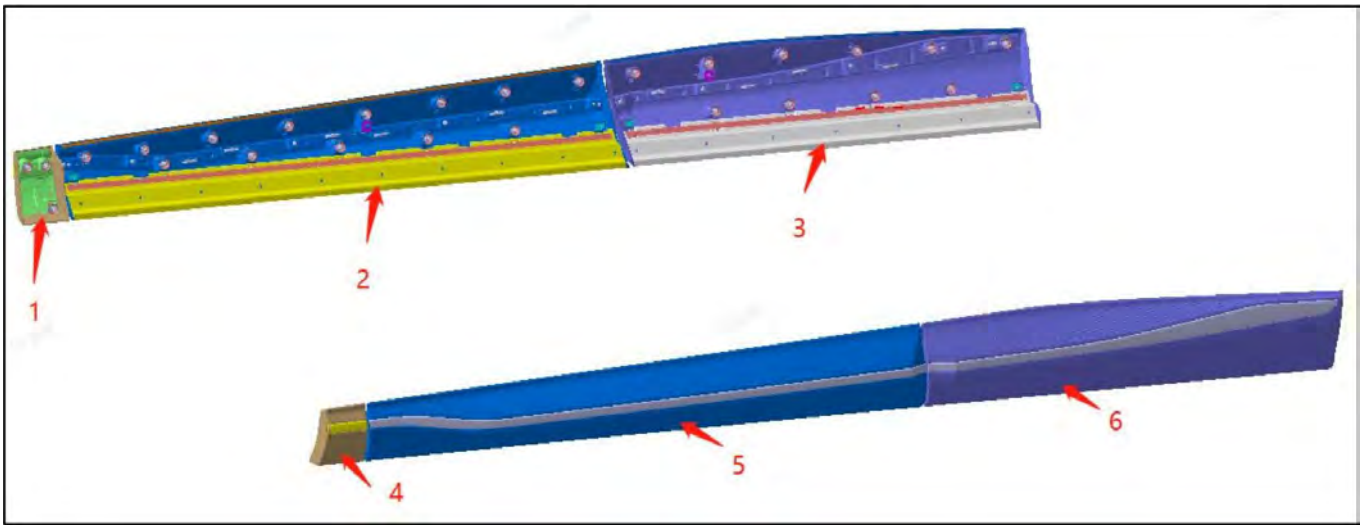
Symbol	Name	Quantity
1	Front-end frame assembly	1
2	Front left end bracket assembly	1
3	Front right end bracket assembly	1
4	Left deflector assembly	1
5	Right deflector assembly	1
6	Q1860625F38 bolt	4
7	BL346 snap fastener	8

Exploded view of wiper cover plate assembly



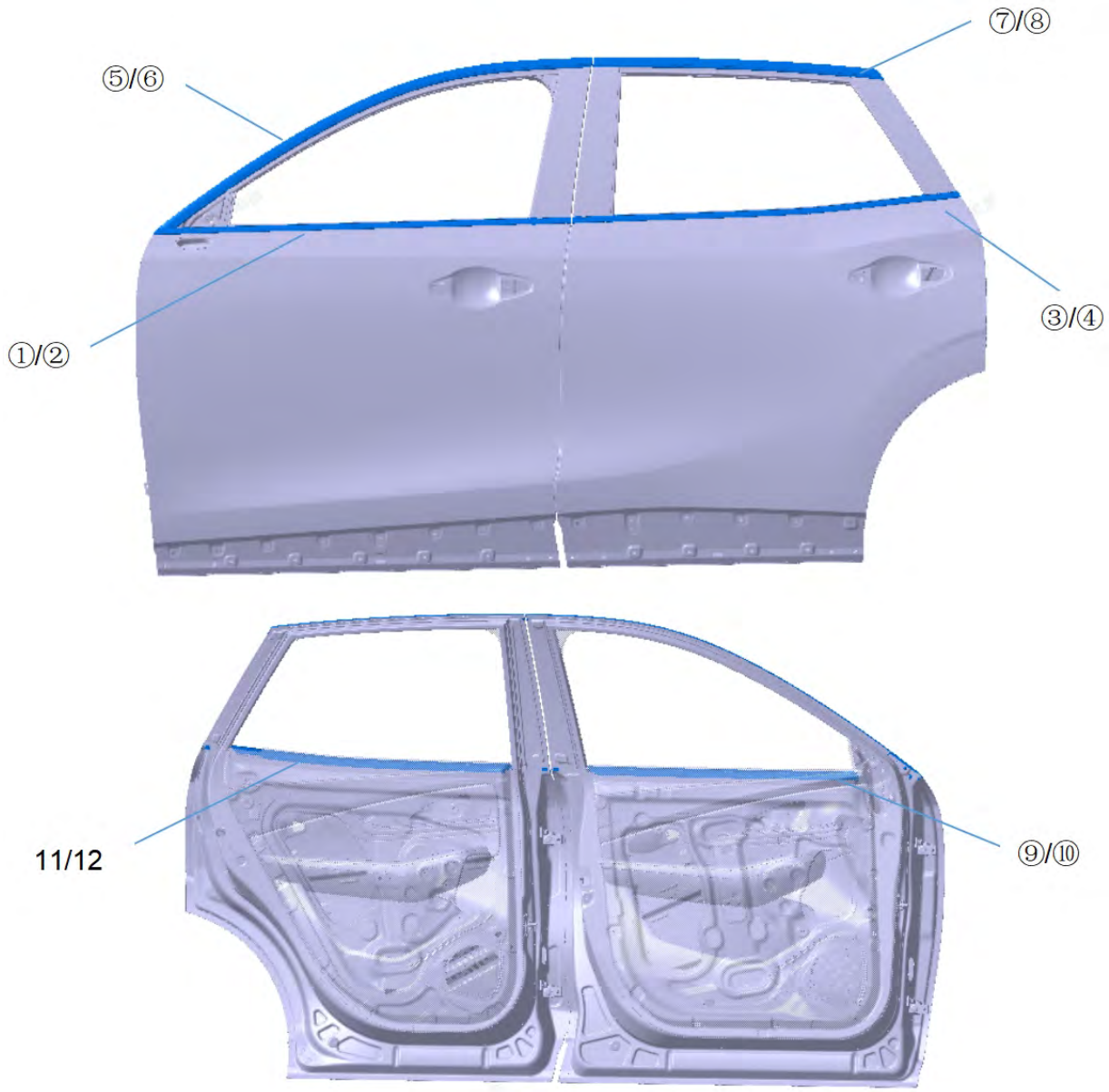
Item	Description	Item	Description
1.	Wiper cover plate assembly	4.	Left air block
2.	Upper trim panel of left wiper cover plate	5.	Right air block
3.	Upper trim panel of right wiper cover plate	6.	Sealing strip

Exploded view of exterior door trim panel assembly



Item	Description	Item	Description
1.	Right fender bottom trim	4.	Left fender bottom trim
2.	Front right door exterior trim panel	5.	Front left door exterior trim panel
3.	Exterior trim panel of rear right door	6.	Exterior trim panel of rear left door

5.9.2.2 Component Locating Diagram



Item	Part Name	Instruction for mounting positions
1	Outer weatherstrip of front left door	On the door
2	Outer weatherstrip of front left door	On the door
3	Rear left door outer weatherstrip	On the door
4	Rear right door outer weatherstrip	On the door
5	Front left door window frame trim strip assembly	On the door
6	Front right door window frame trim strip assembly	On the door
7	Rear left door window frame trim strip assembly	On the door
8	Rear right door window frame trim strip assembly	On the door

Item	Part Name	Instruction for mounting positions
9	Inner weatherstrip of front left door	On the door shield
10	Front right door inner weatherstrip	On the door shield
11	Rear left door inner weatherstrip	On the door shield
12	Rear right door inner weatherstrip	On the door shield

5.9.2.3 Precautions

Precautions during repair

1. **Caution:** Exterior parts and components are made of PP or ABS materials. Do not apply strong force to them.
2. **Caution:**During disassembly and assembly, avoid contact between sharp objects and the outer surface of the parts to prevent scratches.
3. **Caution:** When removing the clip, pay attention to protecting the surface of the parts and avoid scratches.
4. **Caution:** Please replace disposable parts and components, such as forceful clips (with assembly).

5.9.3 Removal and installation

5.9.3.1 Front bumper system

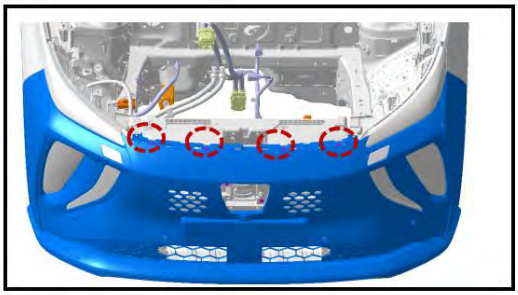
Removal

Caution: The front bumper is a PP plastic part. Do not apply excessive force to it.

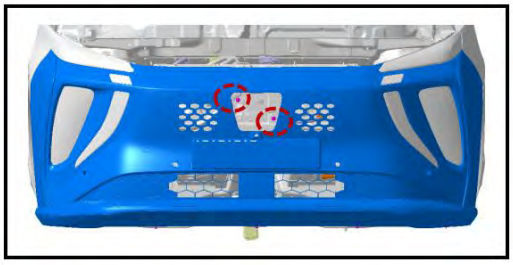
Caution: Prevent sharp objects from contacting the exterior surface during removal and installation.

Caution: When prying open the panel, pay attention to protecting the front bumper paint surface and avoid scratches.

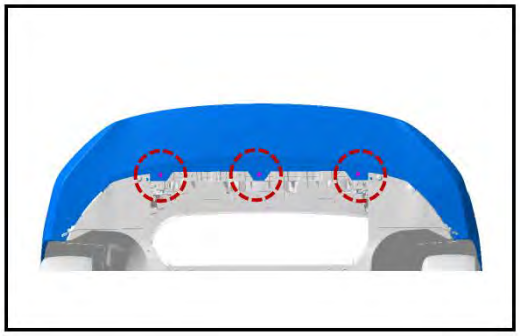
1. Open the bonnet and loosen the 4 bolts on the upper part of the front bumper with a socket.



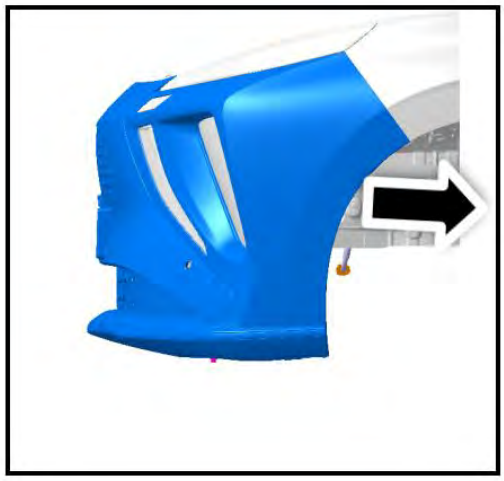
2. Open the Charging port cap and loosen the 2 bolts (hex socket) installed on the upper part of the front bumper.



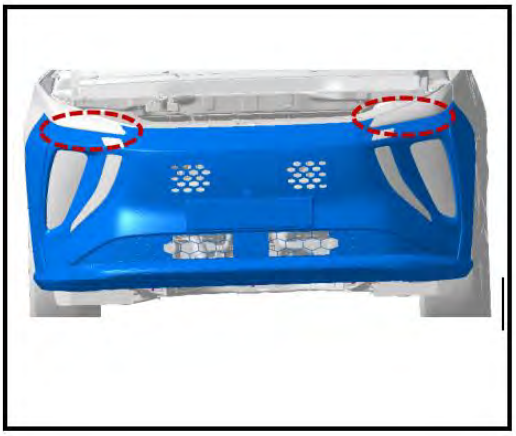
3. Lift the vehicle and loosen the 3 bolt mounting points at the bottom of the front bumper.



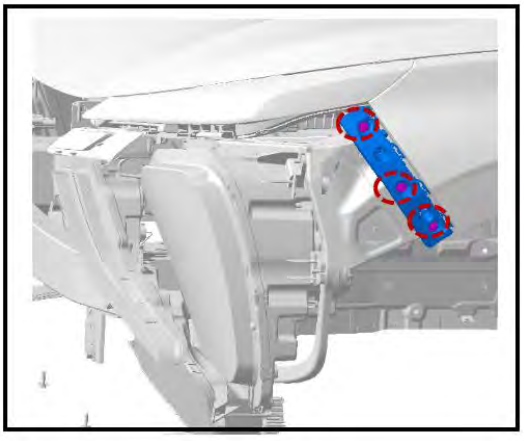
4. At the joint between the front bumper and the fender, pull out the front bumper vertically with force, and pull off the clamping structure of the front bumper and the plastic bracket.



5. The front bumper is connected to the light with a lower clamping connection. Pull out the clamping structure in the X direction and pull it off to complete the removal of the front bumper.



6. The left and right plastic brackets of the front bumper can be removed by loosening the 3 bolts with a socket and pulling them out with force.



Caution: After removing the front bumper, pay attention to the harness connecting the front bumper and the body. Unplug

the harness connector between the front bumper and the body, and then remove the front bumper.

Installation

The installation order is the reverse of the removal order.

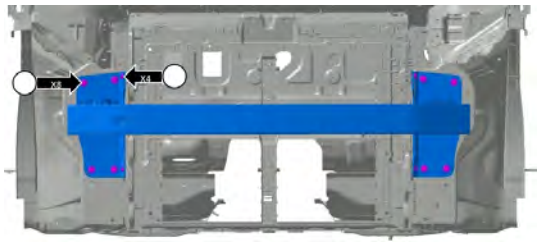
5.9.3.2 Front anti-collision beam assembly

Removal

1. Remove the front bumper assembly. Refer to: Front bumper assembly.
2. Remove the front bumper harness. Refer to: Front bumper harness.
3. Remove the fast and slow charging harness.
4. Remove the two-in-one power supply mounting bracket. Refer to: Power supply two-in-one mounting bracket.
5. Remove 12 fixing bolts and take out the front anti-collision beam assembly:

   1 Remove Q1840825F38, torque 23±2Nm

   2 Remove Q1861020F38, torque 45±5Nm



Installation

1. The installation order is the reverse of the removal order.

5.9.3.3 Rear bumper assembly

Removal

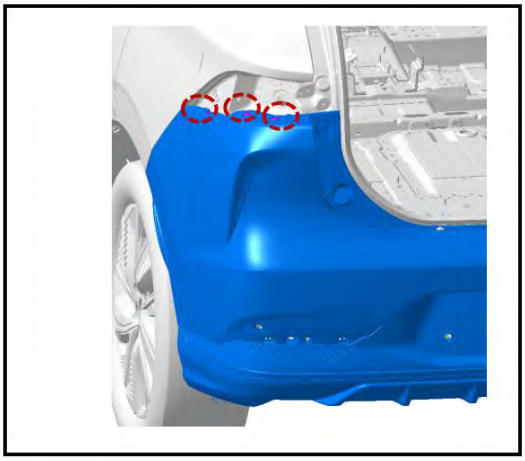
Caution: The rear bumper is a PP plastic part. Do not apply strong force to it.

Caution: Prevent sharp objects from contacting the exterior surface during removal and installation.

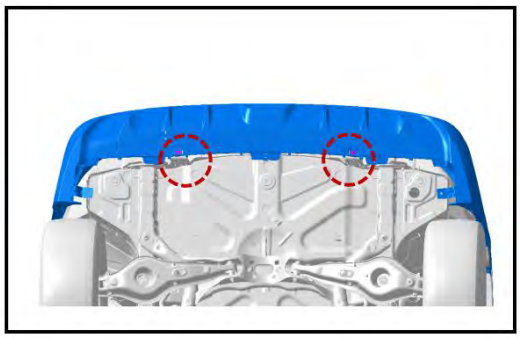
Caution: When prying open the panel, pay attention to protecting the front bumper paint surface and avoid scratches.

1. Open the boot lid, remove the rear combination light A before removing the rear bumper, and read the rear combination light disassembly instructions for details. After removing the rear combination light, use a straight screwdriver to remove the bolt installation cover plate on both sides of the rear bumper, and use a socket to loosen the 2 mounting bolts on both sides of the rear bumper.

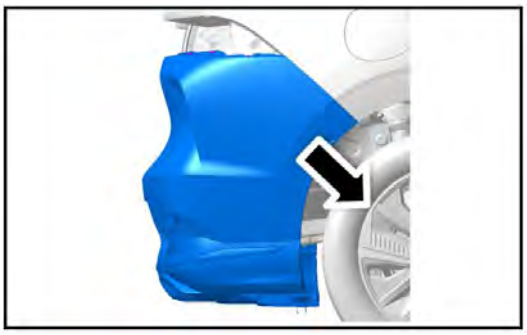
2. After the rear combination light A is removed, there are 3 mounting points on the rear bumper at the lower part of the rear combination light Remove 1 self-tapping screw and 2 plastic nails.



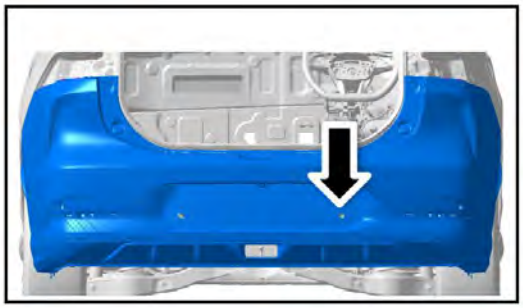
3. Lift the vehicle and loosen 2 bolt mounting points at the lower part of rear bumper.



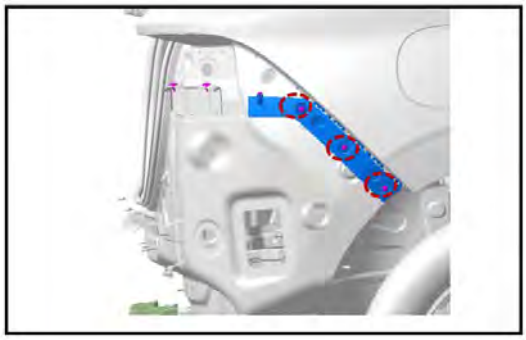
4. Pull out the rear bumper with force in a direction perpendicular to the rear side wall, and pull off the clamping structure between the rear bumper and the plastic bracket. Pull out the middle position of the rear bumper on both sides and pull it backward and outward along the X direction of the body to remove the rear bumper.



5. The front bumper is connected to the light with a lower clamping connection. Pull out the clamping structure in the X direction and pull it off to complete the removal of the front bumper.



6. The left and right plastic brackets of the front bumper can be removed by loosening 3 self-tapping screws through a sleeve and pulling them out with force.



Caution: After removing the rear bumper, pay attention to the harness connecting the front bumper and the body. Unplug the harness connecting the front bumper and the body, and then remove the front bumper.

Installation

The installation order is the reverse of the removal order.

5.9.3.4 Rear anti-collision beam assembly

Removal

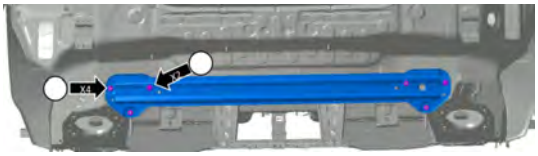
1. Remove the rear bumper assembly. Refer to: Rear bumper assembly.

2. Remove the rear bumper harness. Refer to: Rear bumper harness.

3. Remove 6 fixing bolts and take out the rear anti-collision beam assembly.

   1 Remove Q32008F36, torque 23±2Nm

   2 Remove Q1860816F38, torque 23±2Nm



Installation

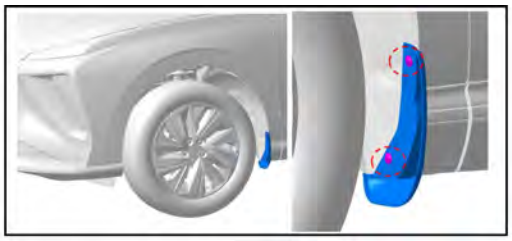
1. The installation order is the reverse of the removal order.

5.9.3.5 Left and right front/rear wheel guard assembly

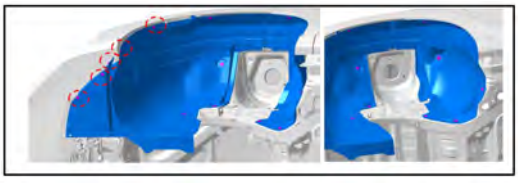
Removal

1. Lift the vehicle. Refer to: Lifting the vehicle.

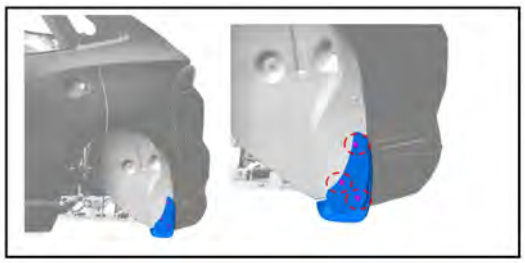
2. Left and right front mudguards: Use a cross-head screwdriver to loosen the two self-tapping screws. After loosening the self-tapping screws, remove the mudguards directly (bilaterally symmetrical).



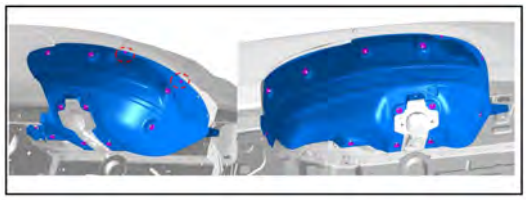
3. Left and right front wheel guards: First loosen and remove the 5 self-tapping screws connecting the wheel guard to the front guard, then pry out and pull out the plastic clip connected to the body to complete the removal of the front wheel guard.



4. Left and right rear mudguards: Use a cross-head screwdriver to loosen the two self-tapping screws. After loosening the self-tapping screws, remove the mudguards directly (symmetrical on both sides).



5. Left and right rear wheel guards: Loosen and remove the 2 self-tapping screws connecting the wheel guard to the rear bumper, then pry out and pull out the plastic clip connected to the body to complete the removal of the front wheel guard.



Installation

The installation order is the reverse of the removal order. The following matters should be noted:

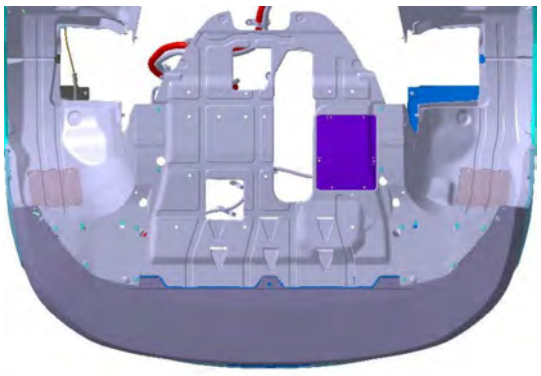
Caution: After installation, pay attention to check whether all wheel guard mounting points are tightened.

5.9.3.6 Underbody trim

Removal

1. Lift the vehicle. Refer to: Lifting the vehicle.

2. Engine lower shield: Raise the vehicle with a lift and remove the standard mounting parts. Remove 5 bolts, 8 self-tapping screws and 9 snap fasteners.



Installation

The installation order is the reverse of the removal order.

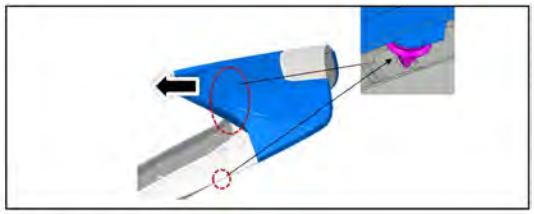
5.9.3.7 Rear spoiler assembly

Removal

1. Open the boot lid first and remove the boot lid sill shield. Refer to: Boot lid sill shield.

2. Loosen and remove the 4 mounting bolts of the rear spoiler, and then loosen and remove the top 2 nuts.

3. Tap backward from the direction of the arrow in the Fig., and pull out all the clips and clips to complete the rear spoiler removal.



Installation

The installation order is the reverse of the removal order. The following matters should be noted:

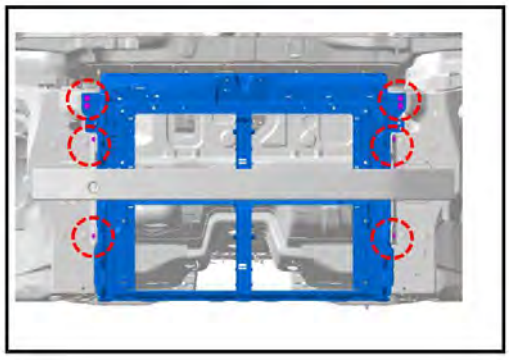
Caution: Pay attention to the assembly gap of the rear spoiler after installation.

5.9.3.8 Front-end frame assembly

Removal

Caution: The front end frame is a PP+GF40 plastic part. Protect the disassembled small parts, such as bolts, to prevent loss.

1. Remove the front end frame assembly. After removing the front bumper assembly, front combination light assembly and peripheral parts of front anti-collision beam, loosen and remove 8 bolts connecting the front end frame with the front longitudinal beam of body in turn. The front end frame can be removed upwards.



Installation

The installation order is the reverse of the removal order. The following matters should be noted:

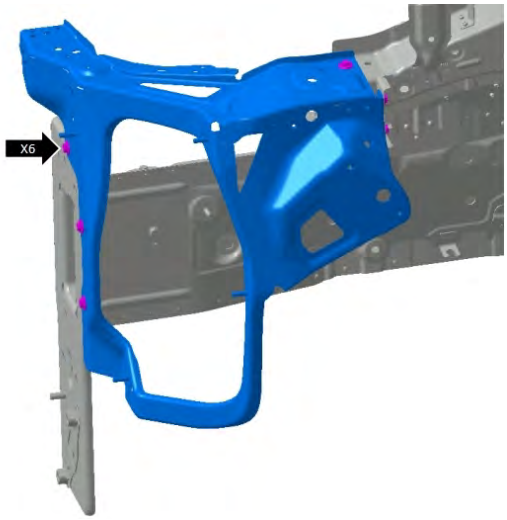
Caution: After installation, pay attention to the coordination between the front end frame and the surrounding area.

5.9.3.9 Left connecting plate assembly of front end frame

Removal

1. Remove the front bumper assembly. Refer to: Front bumper assembly.
2. Remove the front bumper harness. Refer to: Front bumper harness.
3. Remove the fast and slow charging harness.
4. Remove the two-in-one power supply mounting bracket. Refer to: Power supply two-in-one mounting bracket.
5. Remove the front anti-collision beam assembly. Refer to: Front anti-collision beam assembly.
6. Remove the underbody shield system. Refer to: Underbody shield system.
7. Remove the front left wheel guard mudguard assembly. Refer to: Left and right front/rear wheel guard assemblies.
8. Remove the radiator assembly. Refer to: Radiator assembly.
9. Remove the front-end module assembly.
10. Remove the front left combination light assembly. Refer to: Front combination light.
11. Remove the front left fender. Refer to: Left fender.
12. Remove 6 fastening bolts (Q140B0616F38L) from the left connecting plate assembly of front frame.

    Torque: 11±1 Nm



Installation

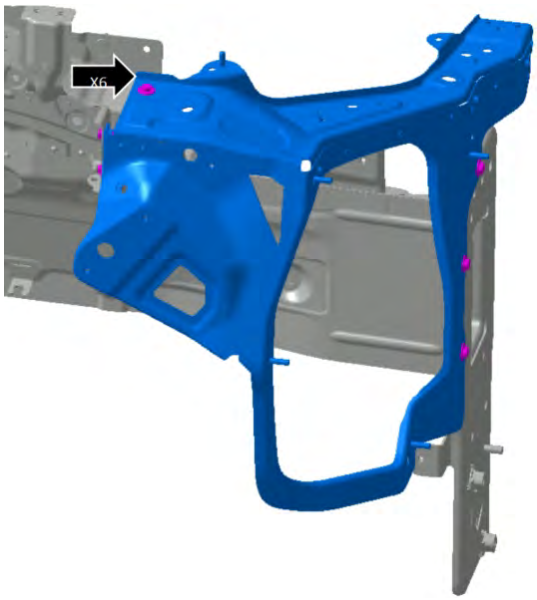
1. The installation order is reverse to the removal order. Pay attention to the following precautions:

Caution: After the fender is installed, confirm that the surrounding gap is normal and that there is no interference with each other when opening or closing the door.

5.9.3.10 Right connecting plate assembly of front end frame

Removal

1. Remove the front bumper assembly. Refer to: Front bumper assembly.
2. Remove the front bumper harness. Refer to: Front bumper harness.
3. Remove the fast and slow charging harness.
4. Remove the two-in-one power supply mounting bracket. Refer to: Power supply two-in-one mounting bracket.
5. Remove the front anti-collision beam assembly. Refer to: Front anti-collision beam assembly.
6. Remove the underbody shield system. Refer to: Underbody shield system.
7. Remove the front right wheel guard mudguard assembly. Refer to: Left and right front/rear wheel guard assemblies.
8. Remove the radiator assembly. Refer to: Radiator.
9. Remove the front-end module assembly.
10. Remove the front right combination light assembly. Refer to: Front combination light.
11. Remove the front right fender. Refer to: Right fender.
12. Remove 6 fastening bolts (Q140B0616F38L) from the front end frame right connecting plate assembly.



Installation

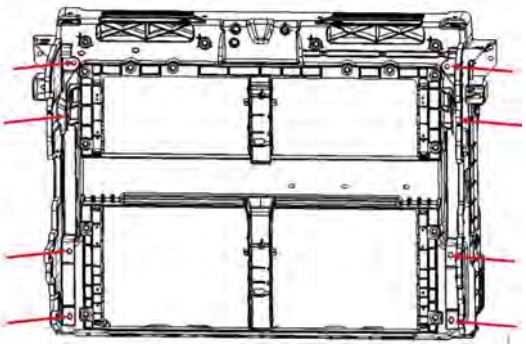
1. The installation order is reverse to the removal order. Pay attention to the following precautions:

Caution: After the fender is installed, confirm that the surrounding gap is normal and that there is no interference with each other when opening or closing the door.

5.9.3.11 Deflector assembly

Removal

1. Open the engine bonnet and remove the front bumper assembly.Refer to: Front bumper assembly.
2. Remove the front grille assembly. Refer to: Front grille assembly.
3. Remove the left and right deflectors.
4. Remove the snap fastener of front-end frame.



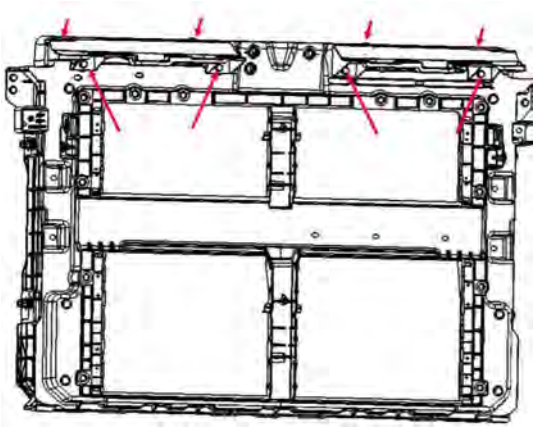
Installation

The installation order is the reverse of the removal order.

5.9.3.12 Front-end bracket assembly

Removal

1. Open the engine bonnet and remove the front bumper assembly.Refer to: Front bumper assembly.
2. Remove the front grille assembly.
3. Remove the M6 bolts between the front bracket and the front frame.



Installation

The installation order is the reverse of the removal order.

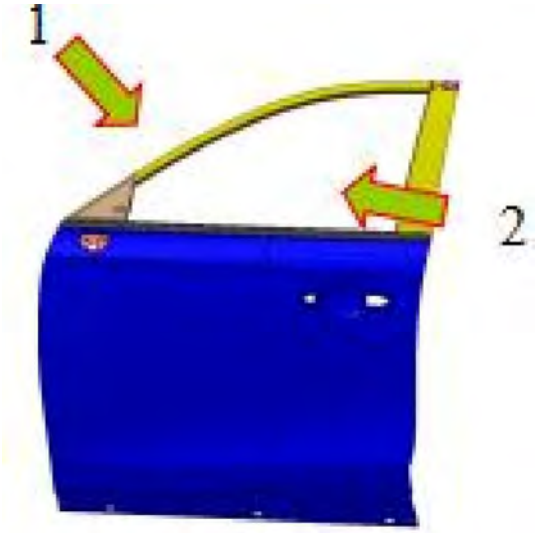
5.9.3.13 Black film system

Removal

1. Open the front and rear doors, and remove partial window frame sealing strip.
2. Remove the door outer weatherstrip.

3. Remove the triangle cover plate of front door.

4. Remove the horizontal sticker first, and then remove the vertical sticker.



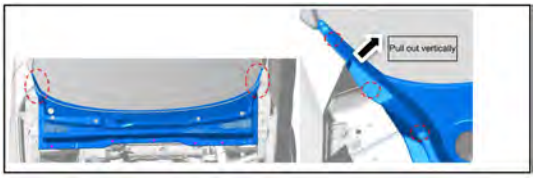
Installation

1. The installation order is the reverse of the removal order.

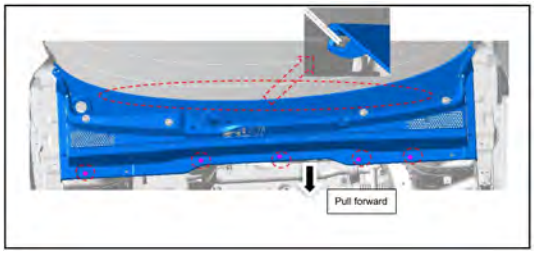
5.9.3.14 Wiper cover plate assembly

Removal

1. Open the bonnet first.
2. Wiper left and right trim panels: The wiper left and right trim panels are connected to the fender and wiper cover plate body through their own clips. Use a straight screwdriver to lift the wiper left and right trim panels, pull them up hard, and disengage the wiper left and right trim panel clips from the clips. The removal of the wiper left and right trim panel cover plates can be completed.



3. Wiper cover plate body: First, pry out and remove the mounting buckle of the wiper cover plate body, pull out the wiper cover plate along the front direction of the vehicle, and the wiper cover plate is disengaged from the glass card to complete the removal of the wiper cover plate body.



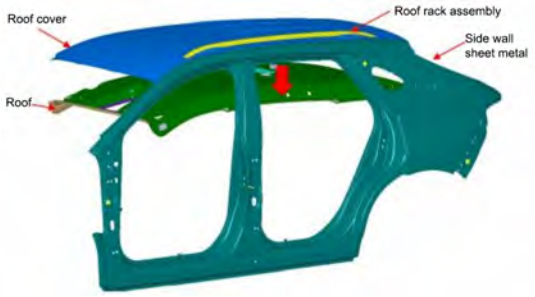
Installation

The installation order is the reverse of the removal order.

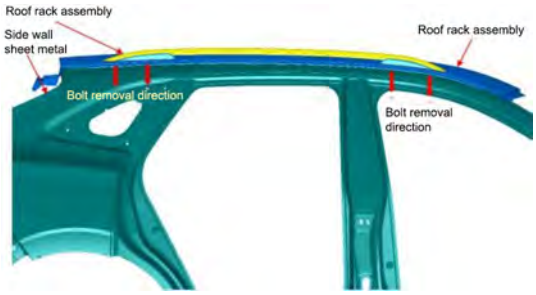
5.9.3.15 Roof rack assembly

Removal

1. Remove the roof, inner panel and other interior trims before removing the luggage rack.



2. Remove the nuts in sequence from inside of the body after removing the roof.



3. Take out the luggage rack upward from the upper end in the direction of the second installation point.

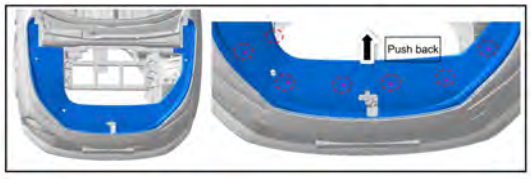
Installation

The installation order is the reverse of the removal order.

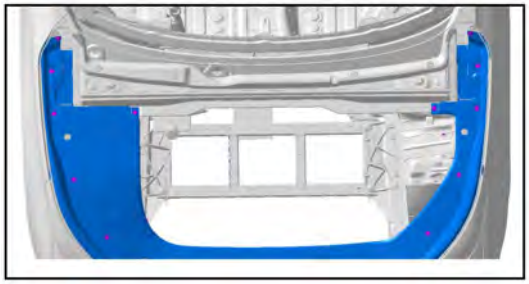
5.9.3.16 Engine compartment cover plate

Removal

1. Open the bonnet first.
2. Front engine compartment cover plate: The engine compartment cover plate is divided into three parts: front, left and right. You need to remove the front engine compartment cover plate first, pry out the front engine compartment cover plate connection clip and remove it. You can push the engine compartment cover plate backwards to complete the removal of the engine compartment cover plate.



3. Left and right engine compartment cover plates: Refer to the front engine compartment cover plate, pry out and remove the connecting clips of the left and right engine compartment cover plates, and pull out the engine compartment cover plates upwards to complete the removal of the left and right engine compartment cover plates.



Installation

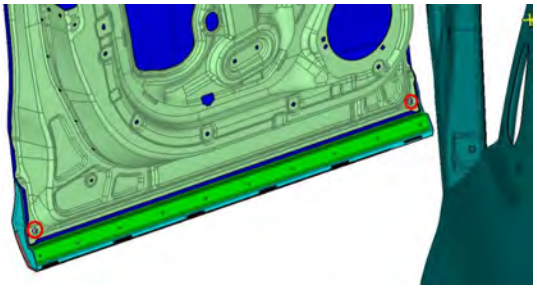
The installation order is the reverse of the removal order. The following matters should be noted:

Caution: After installation, pay attention to check whether all the mounting points of the engine compartment cover plate are tightened.

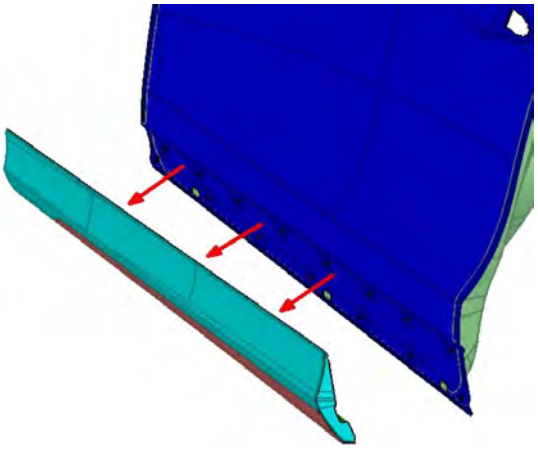
5.9.3.17 Door exterior trim panel assembly

Removal

1. Open the door to the maximum opening angle and remove the 2 self-tapping screws shown in Fig.



2. Remove the connecting clip between the lower door exterior trim panel and the body, and remove the door exterior trim panel.



Pay attention to the following matters:

Caution: The front, rear, left and right door exterior trim panels are removed in the same way.

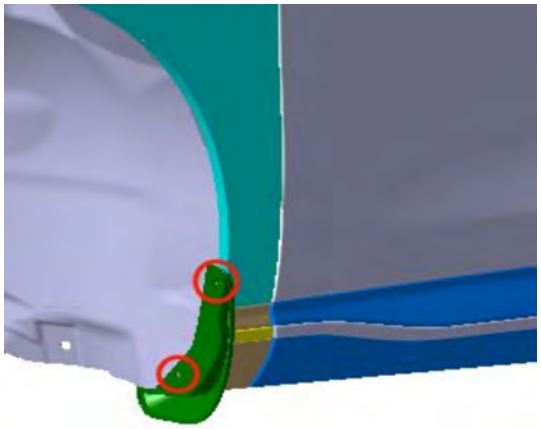
Installation

The installation order is the reverse of the removal order.

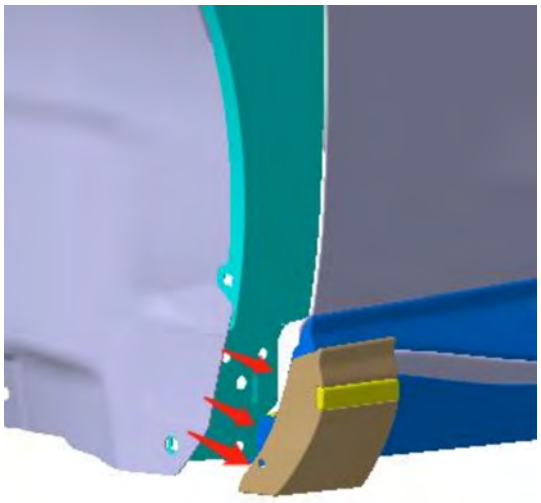
5.9.3.18 Removal and installation of fender bottom trim

Removal

1. Remove the self-tapping screws shared by the front end of the fender bottom trim and the wheel guard.



2. Remove the connecting clip between fender bottom trim and fender.



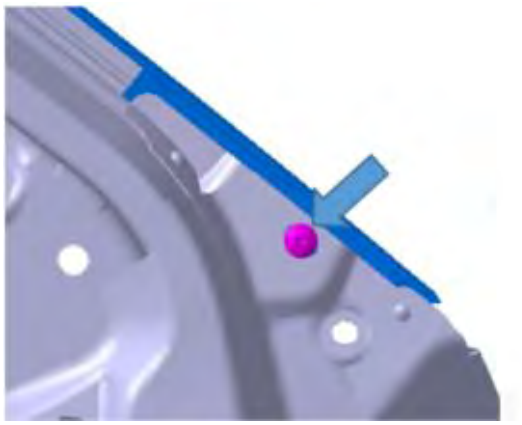
Installation

The installation order is the reverse of the removal order.

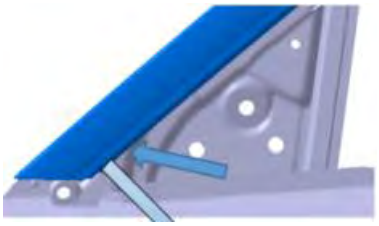
5.9.3.19 Front left/right door window frame trim strip

Removal

1. Use a cross-head screwdriver to remove the weatherstrip mounting screws at the A-pillar end and turn up the corners of the door outer sealing strip.



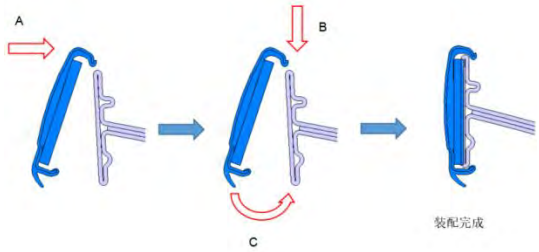
2. Remove the front door outer weatherstrip. Refer to: Front door outer weatherstrip.
3. Remove the front door triangle block, Refer to: Front door triangle block.
4. Pry up the lower part of the trim strip with a removal tool, rotate it outward and lift it upward from the A-pillar end to the B-pillar end, and gradually remove the trim strip.



Installation

1. Buckle the window frame trim strip from the top of the window frame to the window frame, push the window frame bright strip forward from the B-pillar, align the end face of the window frame trim strip with the sheet metal of the window frame B-pillar, and ensure that the inner side of the end cover clamps the sheet metal tightly.

2. Fit the front door bright trim strip onto the window frame from back to front. The specific method is as follows: hook the upper part on the window frame, press down to ensure that the upper part is completely fitted into the window frame, and then fit the lower part of the front door bright trim strip into the lower part of the window frame.

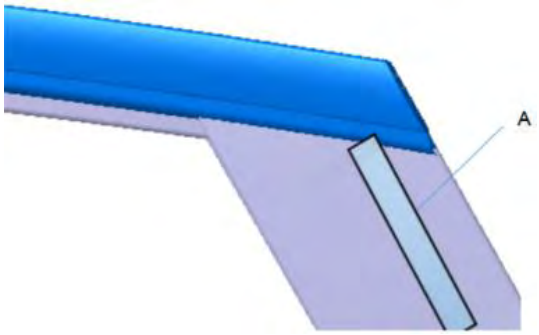


3. Tighten the front end with a cross-head screwdriver to align the bright strip stud with the hole on the front door sheet metal, tighten the front end of the front door bright strip with an M5 bolt (Q2140506F38), and finally confirm that the window frame trim strip is firmly inserted and pulled outward without looseness.

5.9.3.20 Rear left/right door window frame trim strip

Removal

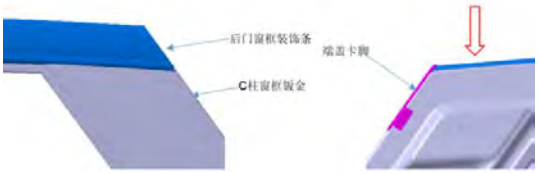
1. Use the removal tool to pry up the C-pillar end at the bottom of the trim strip, rotate it outward and lift it upward from the C-pillar end to the B-pillar end, and gradually remove the trim strip.



Installation

1. Buckle the rear door window frame trim strip from the top of the window frame to the window frame, push the window frame bright strip back from the B-pillar, align the end face of the rear door window frame trim strip with the sheet metal of the window frame B-pillar, and ensure that the inner side of the end cover clamps the sheet metal tightly.

2. Align the C-pillar end of the window frame trim strip with the window frame, and move it downward so that the end cover clip is inserted into the sheet metal.

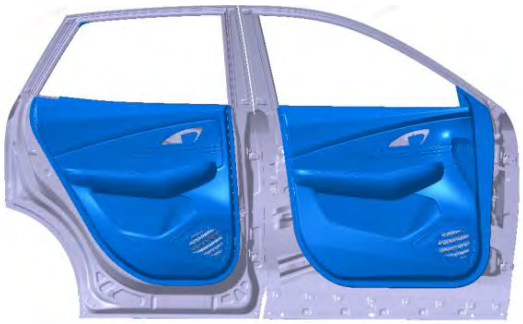


3. Clamp the window frame trim strip on the upper window frame from front to back. Refer to: Front door window frame trim strip.

5.9.3.21 Inner weatherstrip

Removal

1. Remove the door inner shield from the door.



2. Remove the inner water stop sealing strip from the inner shield.

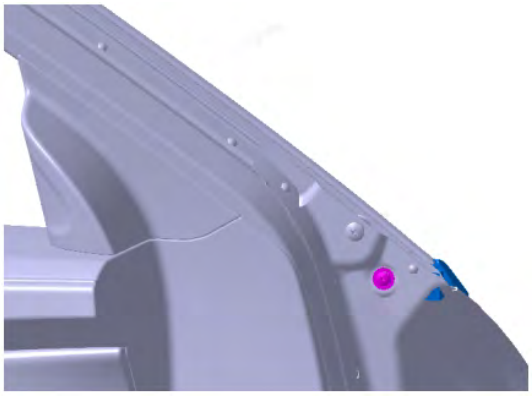
Installation

1. The installation order is the reverse of the removal order.

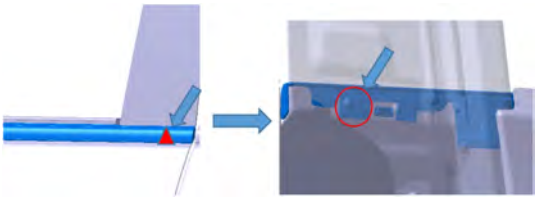
5.9.3.22 Outer weatherstrip of front left/right door

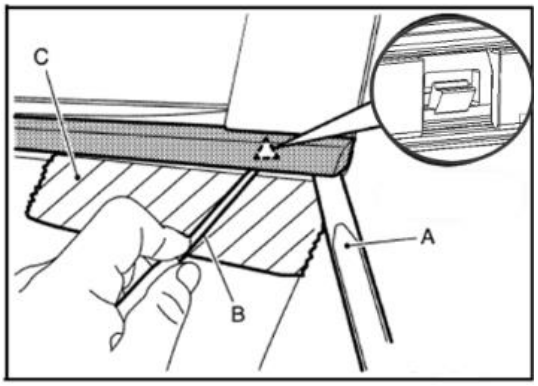
Removal

1. Fully open the front door window.
2. Use a cross-head screwdriver to remove the screws on the inside of the door at the A-pillar end.

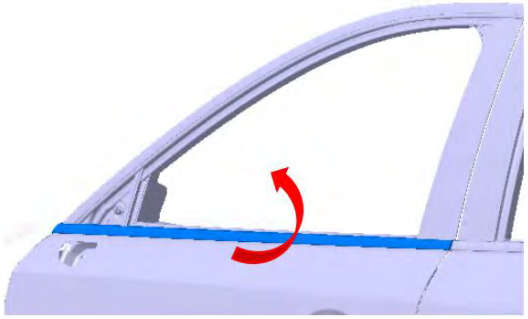


3. Use a plastic removal tool to separate the fixed pawl at the rear end (B-pillar end) of the front door outer weatherstrip. When removing and installing, pay attention to laying protective pads on the door to avoid scratches on the door. (A-removal tool, B-removal tool, C-protective pad).





4. Press down the middle part of the door outer weatherstrip and rotate it outward to take out the outer weatherstrip.



Installation

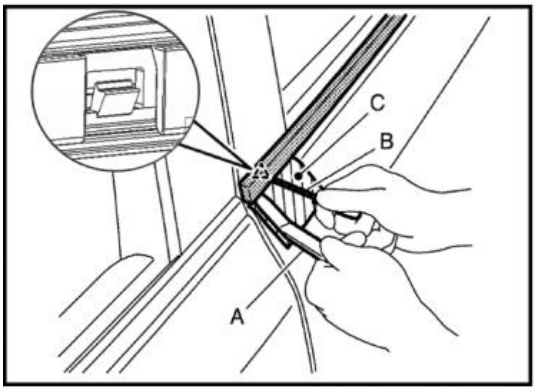
1. The installation order is the reverse of the removal order.

5.9.3.23 Outer weatherstrip of rear left/right door

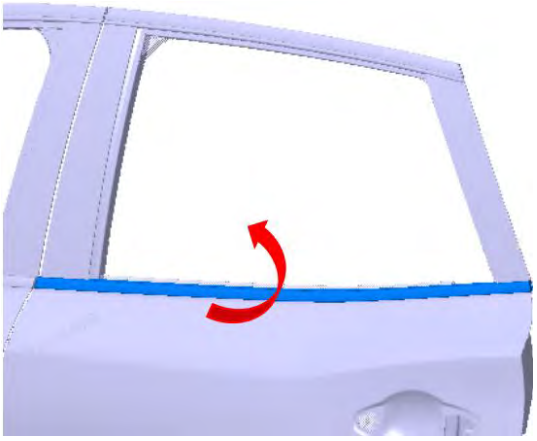
Removal

1. Fully open the rear door window.
2. Separate the fixing pawls at the front and rear ends (B-pillar end and C-pillar end) of the rear door outer weatherstrip with removal tools (A) and (B).

   Caution: Use protective tape (C) to protect the body and protect the painted surface from damage; do not pull up the outer molding of the rear door with excessive force to prevent damage to parts.



3. Press down the middle part of the door outer weatherstrip and rotate it outward to take out the outer weatherstrip.



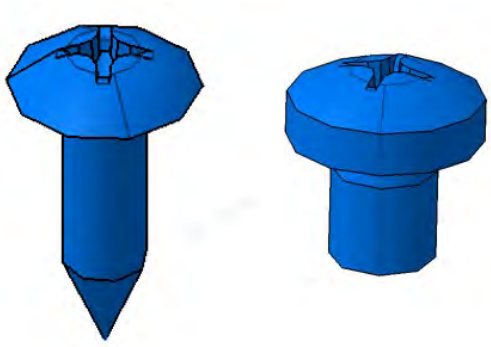
Installation

1. The installation order is the reverse of the removal order.

5.9.3.24 Front triangle outer cover plate

Removal

1. Remove the front triangular outer cover plate fastening self-tapping screws.



2. Remove the front pan head screw with cross recess of the front triangular outer cover plate (configuration 2 only).

3. Remove the front triangle outer cover plate clip.

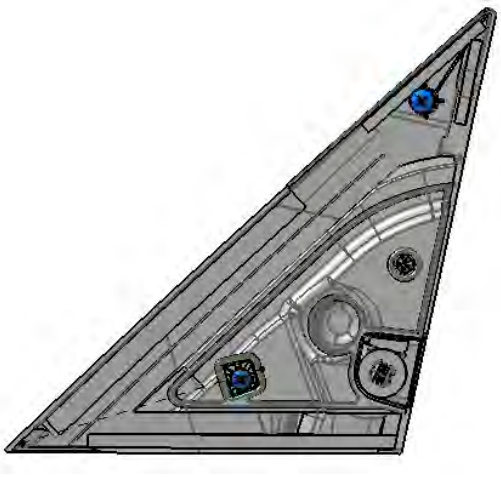
Removal:
Remove by bending with a flat-head screwdriver or clip removal tool.

4. Take out the front triangle outer cover plate in the direction of arrow.

Installation

1. The installation order is reverse to the removal order, and pay attention to the following items.

Caution: Before installation, check whether the clip of the disassembled front triangular outer cover plate has been deformed or damaged. If deformation/damage is found, replace the clip. **The installation direction of clips is shown in the figure below:**

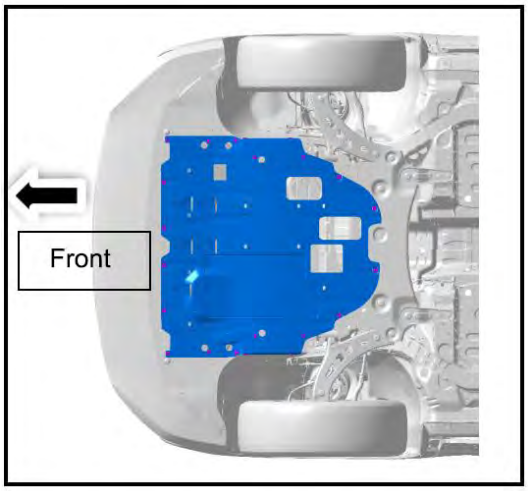


5.9.3.25 Underbody shield system

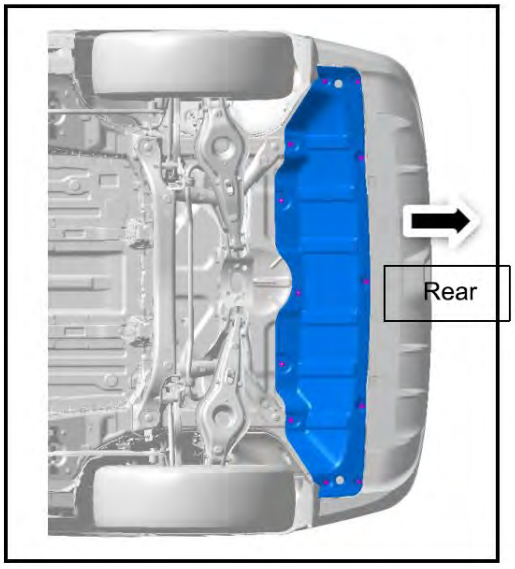
Removal

1. Lift and support the vehicle. Refer to: Lifting the vehicle.

2. Front underbody shield: First remove the front bolts, then loosen the self-tapping screws connected to the wheel guard, and lift out the clips connected to the subframe and wheel guard to complete the removal of the front underbody shield.



3. Rear underbody shield: First remove the rear bolts, then loosen the self-tapping screws and clips connected to the rear bumper, and loosen the nut sleeve connected to the body to complete the removal of the front underbody shield.



Installation

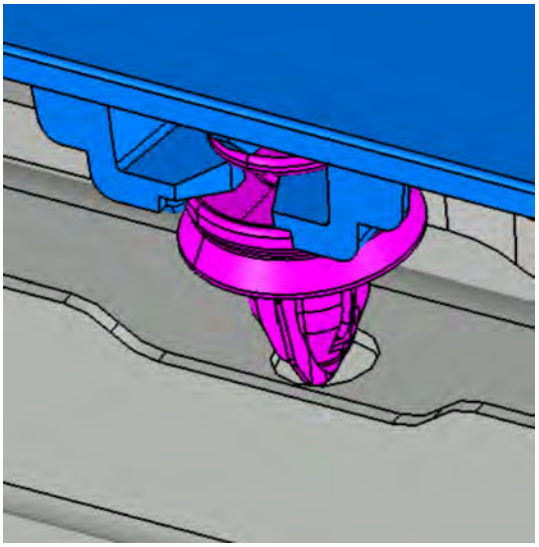
The installation order is the reverse of the removal order. The following matters should be noted:

Caution: After installation, pay attention to check whether all the shield mounting points are tightened.

5.9.3.26 Door exterior trim panel

Removal

1. Open the front and rear doors, first loosen and remove the 4 self-tapping screws (2 for the front door and 2 for the rear door) that fasten the front and rear door exterior trim panels to the car door. The fender trim is clamped on the fender sheet metal through 3 clips.
2. Pull outward from the door exterior trim panel perpendicular to the door exterior trim panel, and pull out the strong clip that fits into the sheet metal to remove the door exterior trim panel.



Installation

The installation order is the reverse of the removal order. The following matters should be noted:

Caution: Pay attention to adjusting the assembly gap of the shield after installation.

Caution: The right door exterior trim panel has the same structure as the left door exterior trim panel, and the disassembly and assembly order is the same.

5.10 Body-in-white

5.10.1 Specification

5.10.1.1 Torque specification

Component name	Tightening torque
Engine bonnet left hinge assembly and engine bonnet assembly	23±5 Nm
Engine bonnet right hinge assembly and engine bonnet assembly	23±5 Nm
Engine bonnet left hinge assembly and body	23±5 Nm
Front door check assembly and body	23±3 Nm
Front door check assembly and door	8±1 Nm
Front left door upper hinge plate and door	70±5 Nm
Front left door lower hinge plate and door	70±5 Nm
Front left door upper hinge base plate and body	23±3 Nm
Front left door lower hinge base plate and body	23±3 Nm
Hinge leaf plate and base	23±3.5 Nm
Rear door check assembly and body	23±3 Nm
Rear door check assembly and door	8±1 Nm
Rear left door upper hinge plate and door	70±5 Nm
Lower hinge plate of rear left door and door	70±5 Nm
Rear left door upper hinge base plate and body	23±3 Nm
Rear left door lower hinge base plate and body	23±3 Nm
Hinge leaf plate and base	23±3.5 Nm
Boot lid hinge assembly and body	23±5 Nm
Boot lid hinge assembly and boot lid	23±5 Nm
Front anti-collision beam assembly and front end plate of body	45±5Nm
Rear anti-collision beam assembly and rear end panel of body	23±2Nm
Front end frame left connecting plate assembly and body longitudinal beam	11±1Nm
Right connecting plate assembly of front end frame and body longitudinal beam	11±1Nm
Left fender fixing bolts	9±2Nm
Right fender fixing bolts	9±2Nm
Fuel filler/charging port assembly actuator mounting bolt	6±1Nm
Engine bonnet right hinge assembly and body	23±5 Nm

5.10.2 Diagnosis and testing

5.10.2.1 Fault Diagnosis

G11-6-4-1. Basic inspection and fault diagnosis of power boot lid Fault detection and diagnosis method

Power boot lid:

Steps	Measures	Yes	No
1	Press the cab power boot lid switch and boot lid microswitch, and listen to whether there is a buzzer sound from the power boot lid ECU.	Go to Step 5	Go to Step 2
2	Check whether the fuse is normal	Go to Step 3	Replacement of fuse
3	Use a digital multimeter to check whether the connector power supply is normal	Go to Step 4	Check the harness
4	Replace the power boot lid ECU.		
5	Use the X431 diagnostic scanner to read the DTC for repair.		

Inductive boot lid:

Steps	Measures	Yes	No
1	Press the power boot lid switch and boot lid microswitch in the cab to check whether the power boot lid works normally	Go to Step 2	Check the power boot lid
2	With the vehicle off, carry the key and perform a kick under the middle of the rear bumper, whether the boot lid opens normally		Go to Step 3
3	Check whether the key is charged	Go to Step 4	Repair the key.
4	Check whether the fuse is normal	Go to Step 5	Replacement of fuse
5	Check whether the power supply of the kick controller connector is normal with a digital multimeter	Go to Step 6	Check the harness

Steps	Measures	Yes	No
6	Replace the kick controller. With the vehicle off, carry the key and perform a kick under the middle of the rear bumper, whether the boot lid opens normally	Replace the kick controller	Go to Step 7
7	Replace the upper and lower kick sensors. With the vehicle off, carry the key and perform a kick under the middle of the rear bumper, whether the boot lid opens normally	Replace the upper and lower kick sensors	Go to Step 8
8	Replace the kick controller and upper and lower kick sensors		

5.10.2.2 G11-6-4-2. Basic inspection of power boot lid Check fault diagnosis DTC and detection method

S/N	DTC	Meaning	Possible cause	Repairrecommendatio-ns
1	U014000	Lost BCM communicaiton Loss of communication with BCM module	Circuit Short ,open or other Short-circuited, open-circuited or others	Check the BCM HW or EMC. Check BCM hardware or electromagnetic compatibility
2	U014001	Lost PEPS communication Lost communication with PEPS module	Circuit Short ,open or othe Short-circuited, open-circuited or others	Check the PEPS HW or EMC Check PEPS hardware or electromagnetic compatibility
3	U007300	CAN Bus Signal / Message Failures Bus off CAN bus fault	Circuit Short ,open or other Short-circuited, open-circuited or others	check CAN wires or EMC Check CAN harness and Electromagncetic Compatibility (EMC)
4	B240616	ECU Supply Voltage Low (non-powertrain system) ECU undervoltage (non-powertrain system)	Check whether the battery is abnormal	/

S/N	DTC	Meaning	Possible cause	Repairrecommendatio-ns
5	B240617	ECU Supply Voltage high (non-powertrain system) ECU overvoltage (non-powertrain system)	Check whether the battery is abnormal	/
6	B240054	POT isn't intialized/ Mechanical up end position is unlearned Power boot lid full stroke not learnt	learning procedure is not triggered The self-learning process has not been triggered.	trigger position learning procedure Trigger the self-learning process
7	B240123	Shutface stuck error Shutface switch stuck error	Shutface switch short to GND Shutface switch shorted to ground	check Shutface switch Check the Shutface switch
8	B240267	Boot/Trunk Primary Switch Algorithm Based Failures Signal incorrect after event Main lock signal timing fault of boot lid lock	unstable wire connection of primary signal or latch mechanical failure The primary lock signal connection is unstable or the boot lid lock has mechanical fault.	Check latch wires and latch. Check the boot lid lock harness and boot lid lock.
9	B240367	Boot/Trunk Motor Close switch Algorithm Based Failures Signal incorrect after event Back-to-zero signal timing fault of boot lid lock	a. home signal is stuck to high voltage b/c. unstable wire connection of home signal or latch mechanical failure a. The lock zero position signal sticks to the high level b/c. The lock zero position signal connection is unreliable or there is a mechanical fault of the door lock	Check Latch wires and latch Check the boot lid lock harness and boot lid lock.

S/N	DTC	Meaning	Possible cause	Repairrecommendatio-ns
10	B240412	Boot/Trunk motor close General Electrical Failures Circuit short to battery Boot lid self-priming motor drive circuit shorted to power supply	1 of power closing motor pin short to battery One of the self-priming motor output terminals shorted to power supply	Check PCU motor and wires Check the self-priming motor and harness
11	B240413	Boot/Trunk motor close General Electrical Failures Circuit open Boot lid self-priming motor drive circuit open-circuited fault	PCU drive circuit error or PCU motor failure Self-priming motor drive circuit fault or self-priming motor fault	Check PCU motor and wires Check the self-priming motor and harness
12	B240419	Boot/Trunk Motor Close General Electrical Failures Circuit current above threshold Boot lid self-priming motor running current excessively high fault	Obstacle during PCU contracting or Latch internal mechanical failure Obstacles or mechanical faults inside the lock exist during self-priming motor actuation	Check Latch and possible obstacle. Check whether there are obstacles at the lock and the boot lid
13	B240511	Trunk Motor General Electrical Failures Circuit short to ground Boot lid electric stay bar circuit short-circuited to GND	1 of left(right) spindle motor pin short to ground One of the left (right) boot lid stay bar motor output terminals shorted to ground	Check left and right spindle motor and wires. Check the left and right stay bar motors and harnesses
14	B240512	Trunk motor General Electrical Failures Circuit short to battery Boot lid electric stay bar circuit short-circuited to power supply	1 of left(right) spindle motor pin short to battery One of the left (right) boot lid stay bar motor output terminals shorted to power supply	Check left and right spindle motor and wires. Check the left and right stay bar motors and harnesses

S/N	DTC	Meaning	Possible cause	Repairrecommendatio-ns
15	B240519	Trunk Motor General Electrical Failures Circuit current above threshold Boot lid stay bar motor running current excessively high fault	Spindle motor error or extensive loads Boot lid stay bar motor fault or boot lid overload	Check spindle motor and possible extensive loads Check the boot lid stay bar motor and possible additional boot lid load
16	B240613	Trunk motor (left) General Electrical Failures Circuit open Boot lid left stay bar motor drive circuit open-circuited fault	unstable wire connection of left Spindle motor pins or Spindle internal failure Unreliable connection of output terminal of boot lid left stay bar motor or internal fault of stay bar motor	Check left spindle motor and wires. Check the left stay bar motor and harness
17	B240711	Sensor Power Supply 1 (left) General Electrical Failures Circuit short to ground Hall sensor power supply output signal of left stay bar motor short-circuited to GND	Hall Sensor power supply (left) short to Ground Hall sensor power supply output terminal of left stay bar motor shorted to GND	Check left spindle motor and wires. Check the left stay bar motor and harness
18	B240712	Sensor Power Supply 1 (left) General Electrical Failures Circuit short to battery Hall sensor power supply output signal of left stay bar motor short-circuited to power supply	Hall Sensor power supply (left) short to Battery Hall sensor power supply output terminal of left stay bar motor shorted to power supply	Check left spindle motor and wires. Check the left stay bar motor and harness

S/N	DTC	Meaning	Possible cause	Repairrecommendatio-ns
19	B240813	Trunk Motor 2 (right) General Electrical Failures Circuit open Boot lid right stay bar motor drive circuit open-circuited fault	unstable wire connection of right Spindle motor pins or Spindle internal failur Unreliable connection of output terminal of boot lid right stay bar motor or internal fault of stay bar motor	Check right spindle motor and wires. Check the right stay bar motor and harness
20	B240911	Sensor Power Supply 2 (right) General Electrical Failures Circuit short to ground Hall sensor power supply output signal of right stay bar motor short-circuited to GND	Hall Sensor power supply (right) short to Ground Hall sensor power supply output terminal of right stay bar motor shorted to ground	Check right spindle motor and wires. Check the right stay bar motor and harness
21	B240912	Sensor Power Supply 2 (right) General Electrical Failures Circuit short to battery Hall sensor power supply output signal of right stay bar motor short-circuited to power supply	Hall Sensor power supply (right) short to Battery Hall sensor power supply output terminal of right stay bar motor shorted to power supply	Check right spindle motor and wires. Check the right stay bar motor and harness
22	B240A11	Power Operated Tailgate (POT) Left Position Sensor 1 General Electrical Failures Circuit short to ground Hall sensor position signal 1 of left stay bar motor for power boot lid short-circuited to GND	Hall signal stuck on left position sensor 1 Hall sensor position signal 1 of left stay bar motor stuck	Check left spindle motor and wires. Check the left stay bar motor and harness

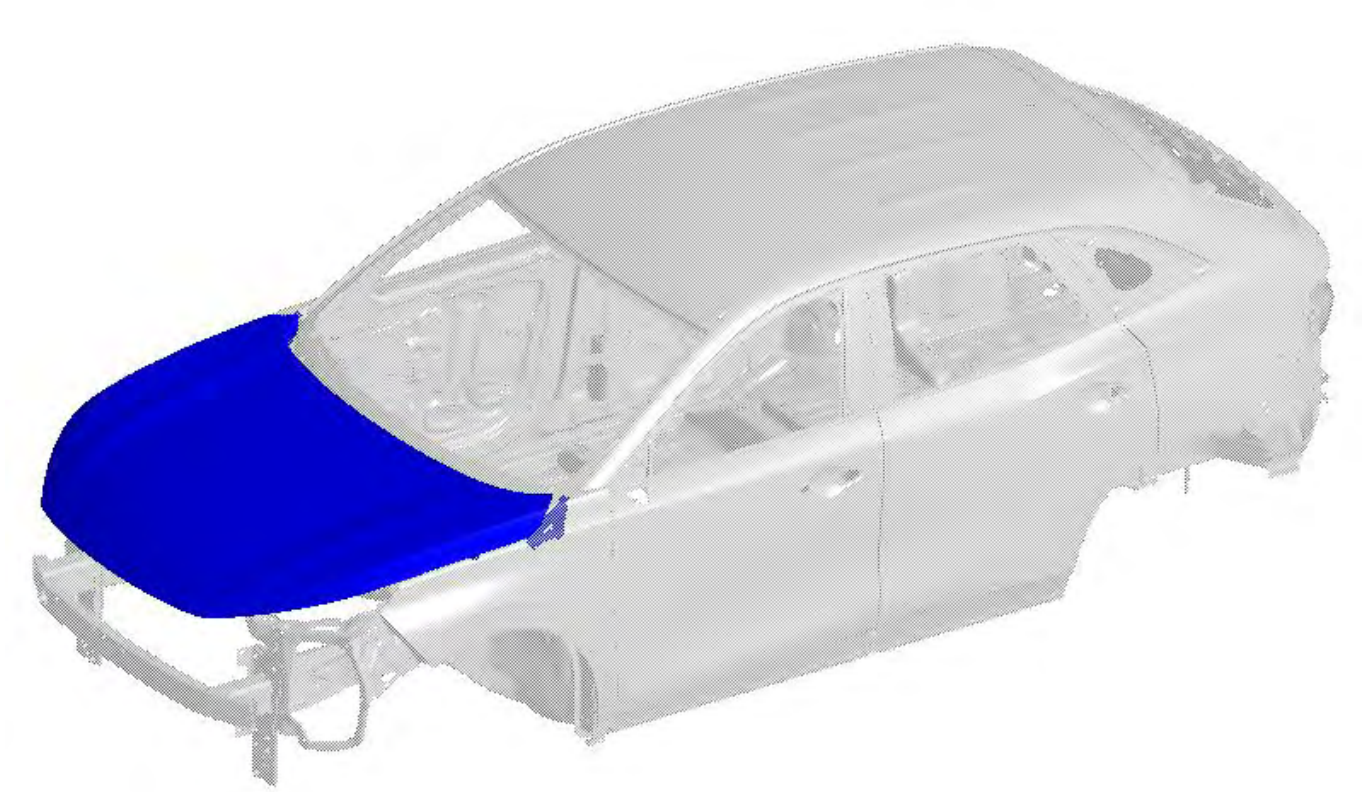
S/N	DTC	Meaning	Possible cause	Repairrecommendations
23	B240A15	Power Operated Tailgate (POT) Left Position Sensor 1 General Electrical Failures Circuit short to battery or open Hall sensor position signal 1 of left stay bar motor for power boot lid short-circuited to power supply or open-circuited fault	Hall signal stuck on left position sensor 1 Hall sensor position signal 1 of left stay bar motor stuck	Check left spindle motor and wires. Check the left stay bar motor and harness
24	B240B11	Power Operated Tailgate (POT) Left Position Sensor 2 General Electrical Failures Circuit short to ground Hall sensor position signal 2 of left stay bar motor for power boot lid short-circuited to GND	Hall signal stuck on left position sensor 2 Hall sensor position signal 2 of left stay bar motor stuck	Check left spindle motor and wires. Check the left stay bar motor and harness
25	B240B15	Power Operated Tailgate (POT) Left Position Sensor 2 General Electrical Failures Circuit short to battery or open Hall sensor position signal 2 of left stay bar motor for power boot lid short-circuited to power supply or open-circuited fault	Hall signal stuck on left position sensor 2 Hall sensor position signal 2 of left stay bar motor stuck	Check left spindle motor and wires. Check the left stay bar motor and harness

S/N	DTC	Meaning	Possible cause	Repairrecommendations
26	B240C11	Power Operated Tailgate (POT) Right Position Sensor 1 General Electrical Failures Circuit short to ground Hall sensor position signal 1 of right stay bar motor for power boot lid short-circuited to GND	Hall signal stuck on right position sensor 1 Hall sensor position signal 1 of right stay bar motor stuck	Check right spindle motor and wires. Check the right stay bar motor and harness
27	B240C15	Power Operated Tailgate (POT) Right Position Sensor 1 General Electrical Failures Circuit short to battery or open Hall sensor position signal 1 of right stay bar motor for power boot lid short-circuited to power supply or open-circuited fault	Hall signal stuck on right position sensor 1 Hall sensor position signal 1 of right stay bar motor stuck	Check right spindle motor and wires. Check the right stay bar motor and harness
28	B240D11	Power Operated Tailgate (POT) Right Position Sensor 2 General Electrical Failures Circuit short to ground Hall sensor position signal 2 of right stay bar motor for power boot lid short-circuited to GND	Hall signal stuck on right position sensor 2 Hall sensor position signal 2 of right stay bar motor stuck	Check right spindle motor and wires. Check the right stay bar motor and harness

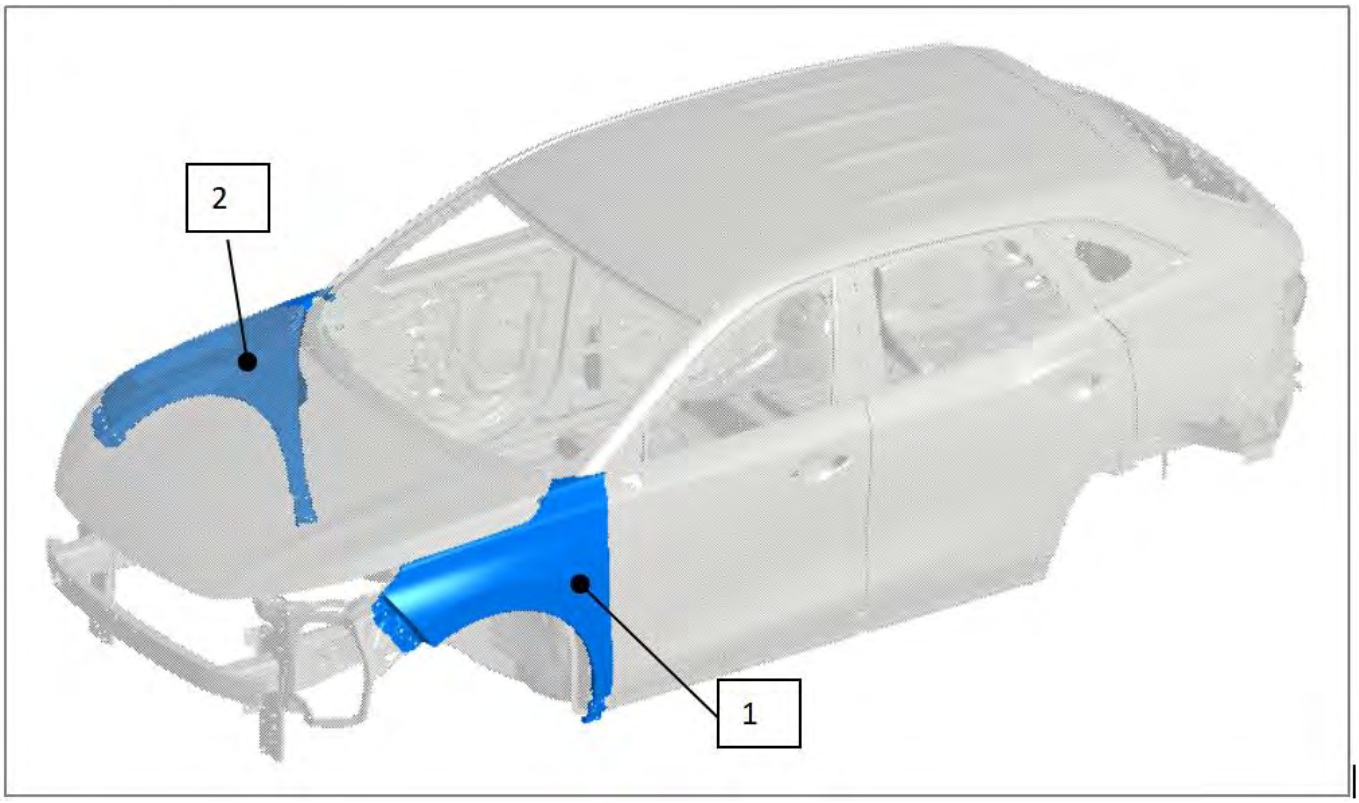
S/N	DTC	Meaning	Possible cause	Repairrecommendatio-ns
29	B240D15	Power Operated Tailgate (POT) Right Position Sensor 2 General Electrical Failures Circuit short to battery or open Hall sensor position signal 2 of right stay bar motor for power boot lid short-circuited to power supply or open-circuited fault	Hall signal stuck on right position sensor 2 Hall sensor position signal 2 of right stay bar motor stuck	Check right spindle motor and wires. Check the right stay bar motor and harness
30	U220D00	Limphome Network management limp home	Circuit Short ,open or other Short-circuited, open-circuited or others	check CAN wires or EMC Check CAN harness or electromagnetic compatibility

5.10.3 Instructions and operations

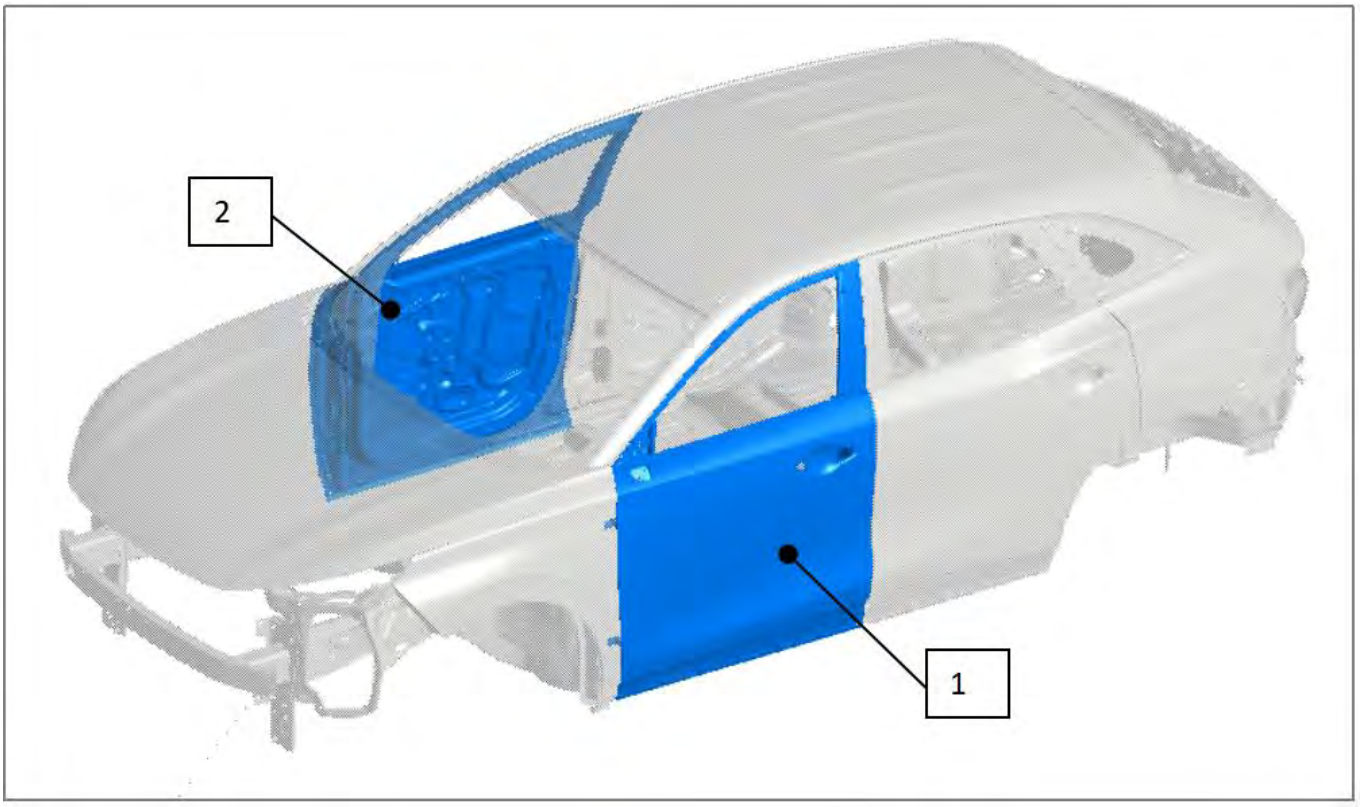
5.10.3.1 Component Locating Diagram



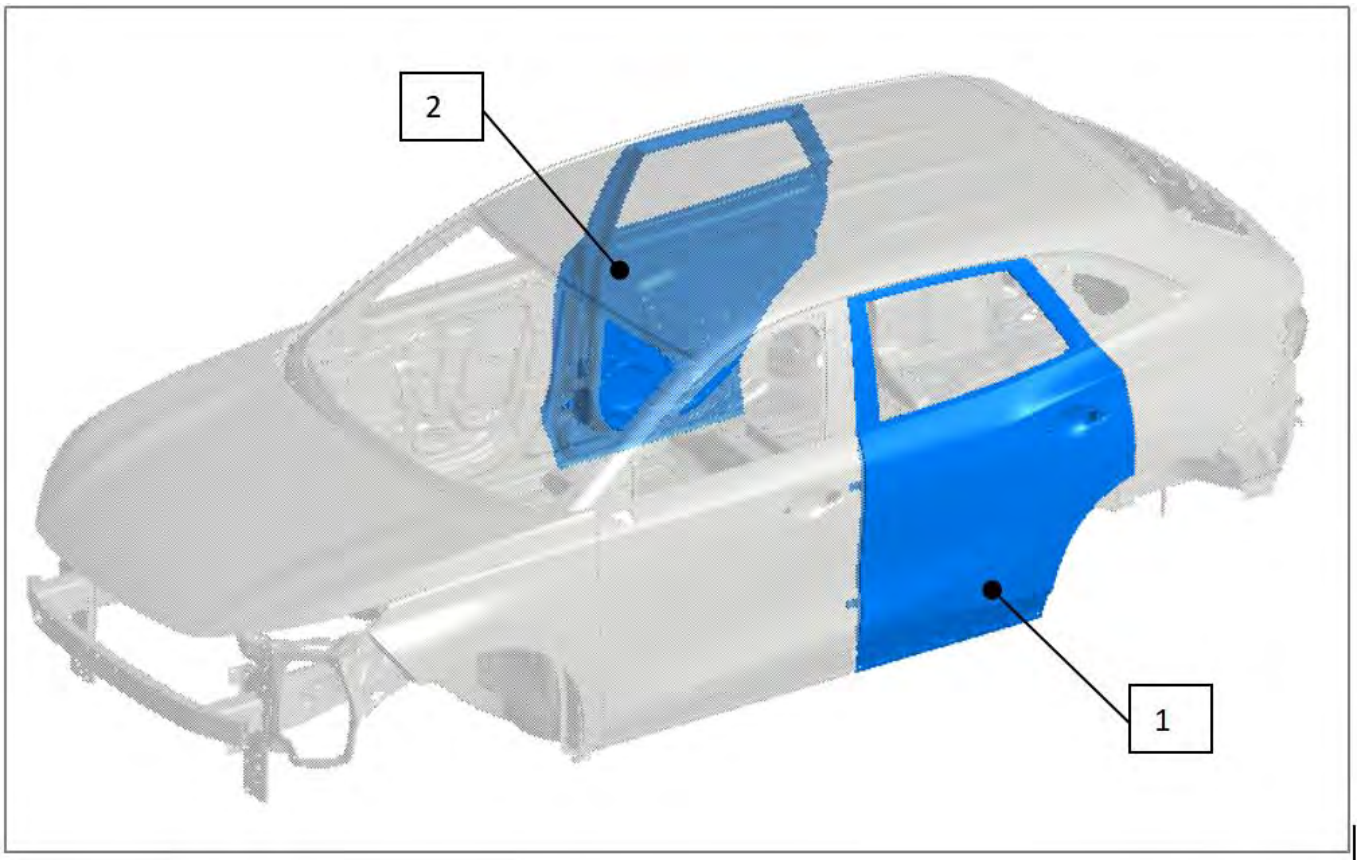
S/N	Name
1	Engine bonnet assembly



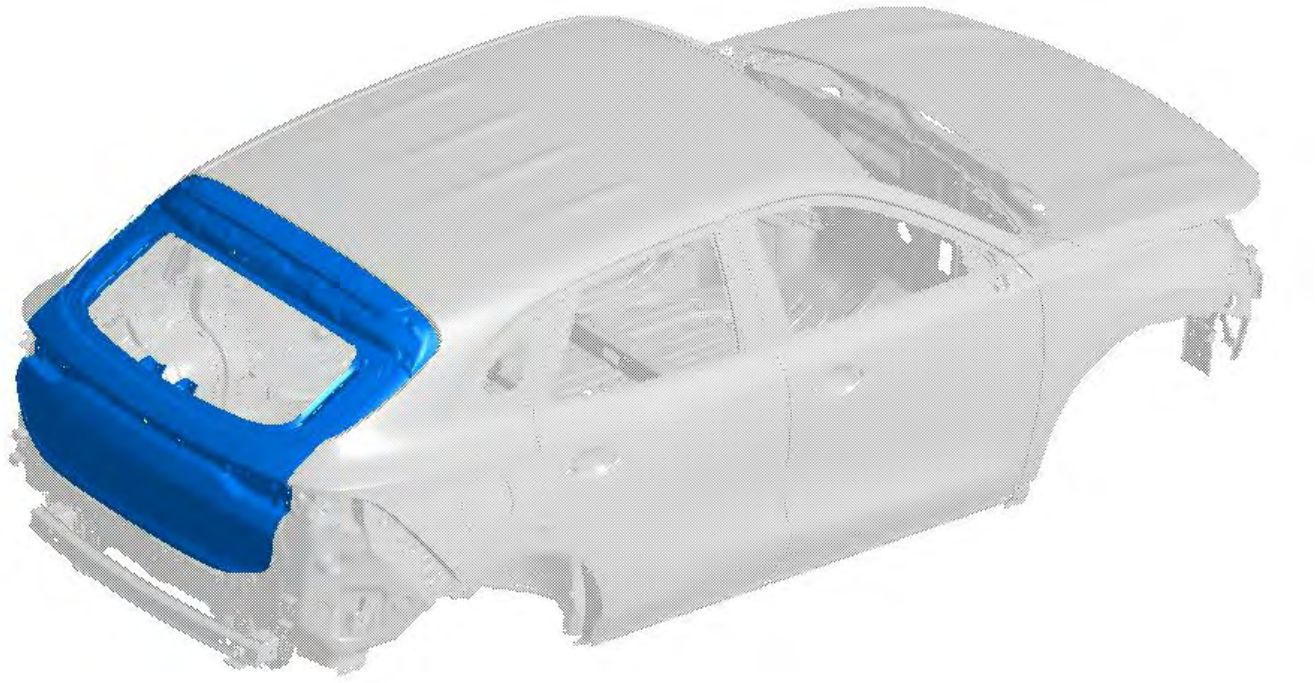
S/N	Name
1	Left fender
2	Right fender



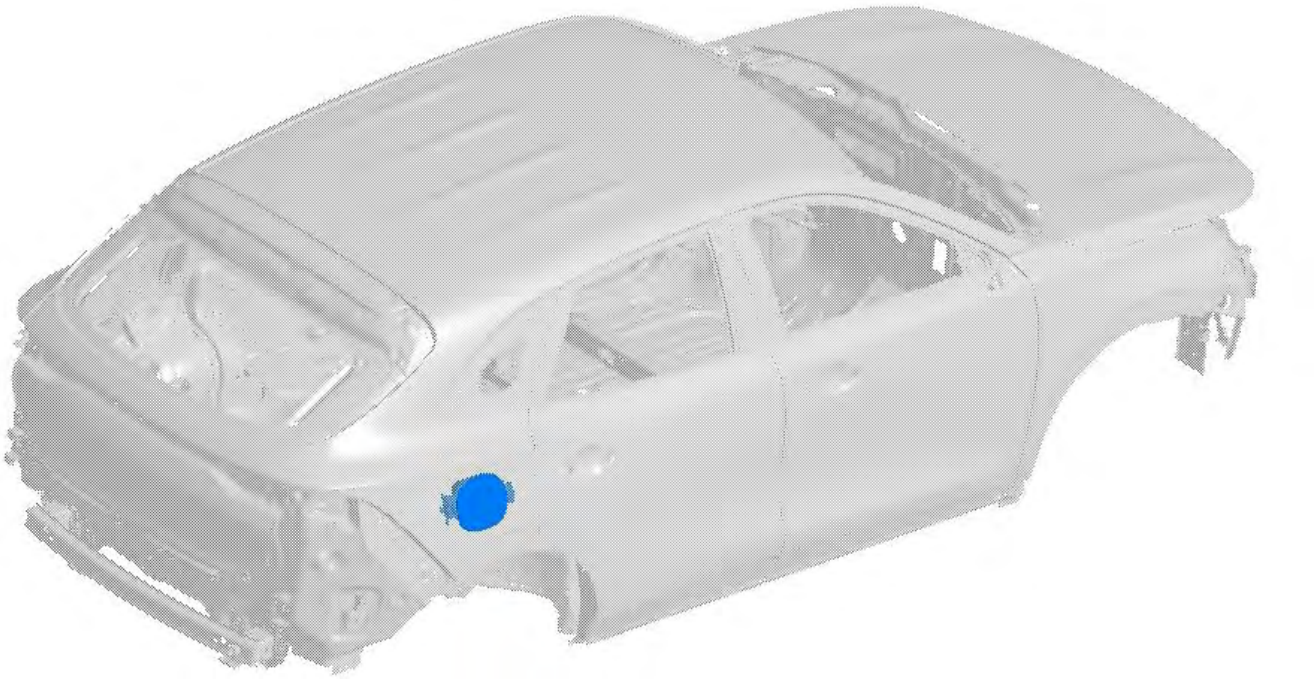
S/N	Name
1	Front left door assembly
2	Front right door assembly



S/N	Name
1	Rear left door assembly
2	Rear right door assembly



S/N	Name
1	Boot lid assembly



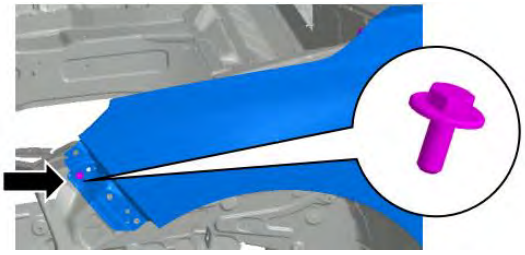
S/N	Name
1	Fuel filler/charging port assembly

5.10.4 Removal and installation

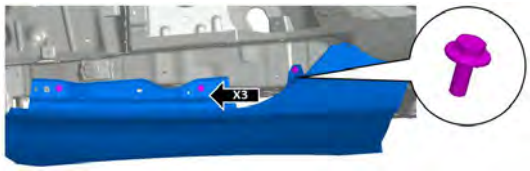
5.10.4.1 Left fender

Removal

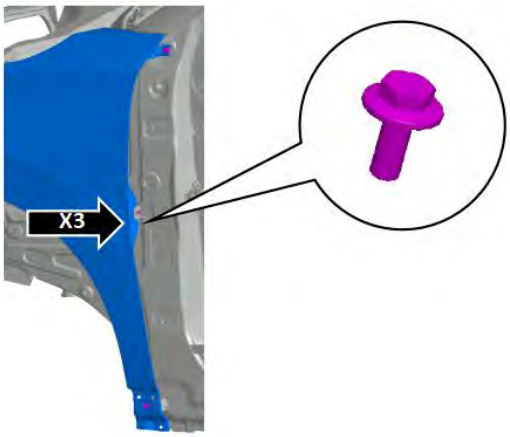
1. Remove the front bumper assembly. Refer to: Front bumper assembly.
2. Remove the left daytime running light assembly. Refer to: Daytime running light assembly.
3. Remove the engine compartment interior trim panel assembly.
4. Remove the front left mudguard. Refer to: Left and right front/rear wheel guard assemblies.
5. Remove the front left fender barrier pad.
6. Remove the fender bottom trim. Refer to: Fender bottom trim.
7. Remove one fixing bolt from the left fender.



8. Remove 3 fixing bolts from the left fender.



9. Remove 3 fixing bolts from the left fender.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

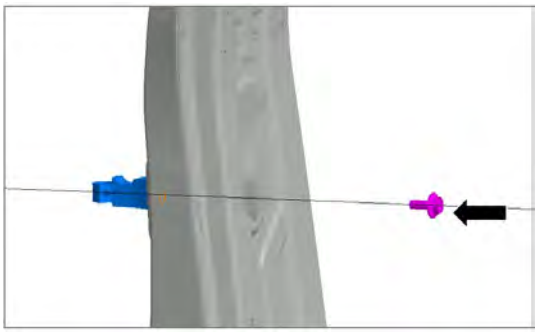
   Caution: When removing and installing sheet metal parts, please wear long-sleeved workwear and protective gloves to avoid being cut by sheet metal parts.

   Caution: Make sure that the peripheral clearance is normal when installing the fender assembly.

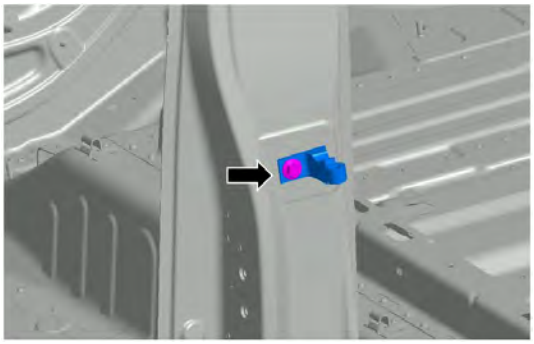
5.10.4.2 Rear left door upper hinge base plate

Removal

1. Remove the rear left door assembly. Refer to: Rear left door assembly.
2. Remove the upper hinge plate assembly of rear left door. Refer to: Front door hinge plate.
3. Remove the left B-pillar lower shield. Refer to: Left B-pillar lower shield.
4. Remove 1 fixing bolt from the inner side of rear left door upper hinge base plate. Tightening torque: 23±3N·m.



5. Remove 1 fixing bolt and take out the rear left door upper hinge base plate. Tightening torque: 23±3N·m.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

Caution: Check the parts and components thoroughly before repairing or replacing them.

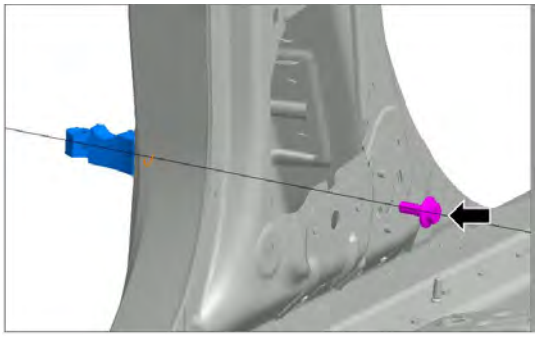
Caution: Remove the door assembly with the assistance of another repair technician.

Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

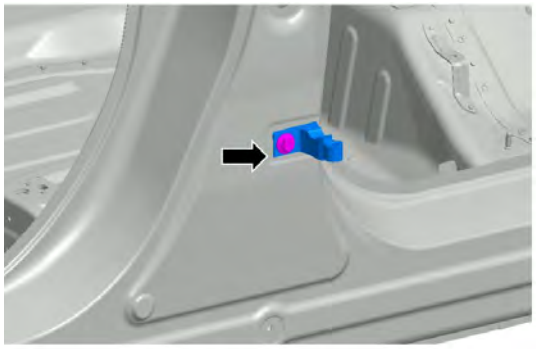
5.10.4.3 Rear left door lower hinge base plate

Removal

1. Remove the rear left door assembly. Refer to: Rear left door assembly.
2. Remove the lower hinge plate assembly of rear left door. Refer to: Front door hinge plate.
3. Remove the left B-pillar lower shield. Refer to: Left B-pillar lower shield.
4. Remove 1 fixing bolt on the inner side of rear left door lower hinge base plate. Tightening torque: 23±3N·m.



5. Remove 1 fixing bolt and take down the rear left door lower hinge base plate. Tightening torque: 23±3N·m.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

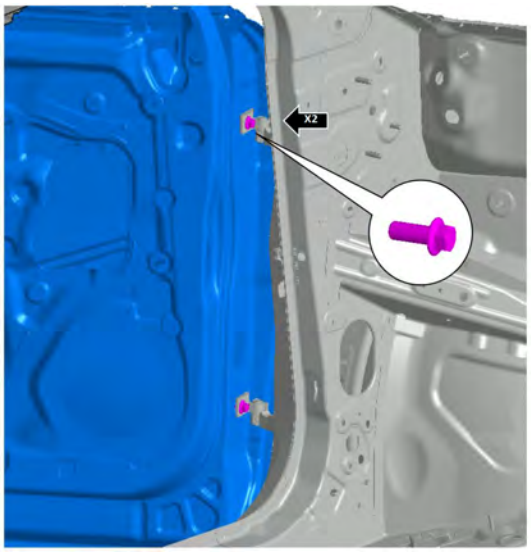
   Caution: Remove the door assembly with the assistance of another repair technician.

   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

5.10.4.4 Front left door assembly

Removal

1. Remove the left door harness. Refer to: Left door harness.
2. Remove the front door check. Refer to: Front door check.
3. Remove 2 fixing bolts and take down the front left door assembly. Tightening torque: 70±5N·M.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

   Caution: Remove the door assembly with the assistance of another repair technician.

   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

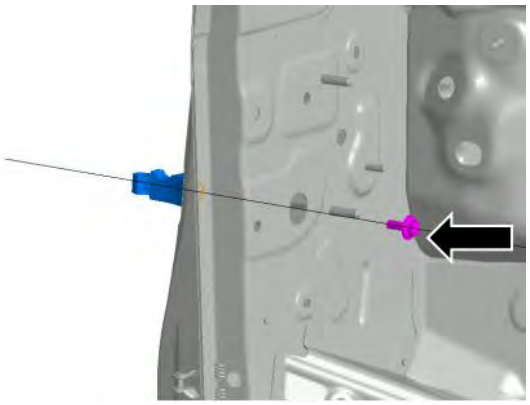
5.10.4.5 Front left door upper hinge base plate

Removal

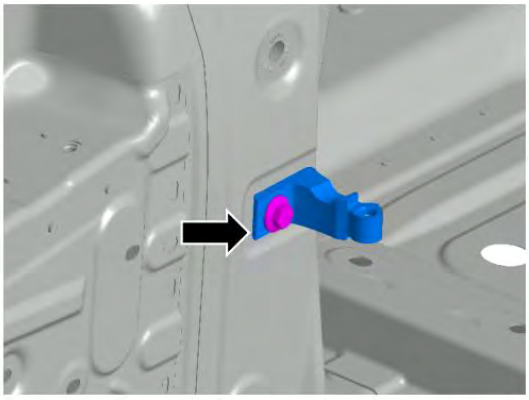
1. Remove the left fender. Refer to: Left fender.
2. Remove the front left door assembly. Refer to: Front left door assembly.
3. Remove the front left door hinge plate. Refer to: Front door hinge plate.

4. Remove the tubular beam assembly. Refer to: Tubular beam assembly.

5. Remove 1 fixing bolt from the inner side of front left door upper hinge base plate. Tightening torque: 23±3N·m.



6. Remove 1 fixing bolt and take out the front left door upper hinge base plate. Tightening torque: 23±3N·m.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

   Caution: Remove the door assembly with the assistance of another repair technician.

   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

5.10.4.6 Front left door lower hinge base plate

Removal

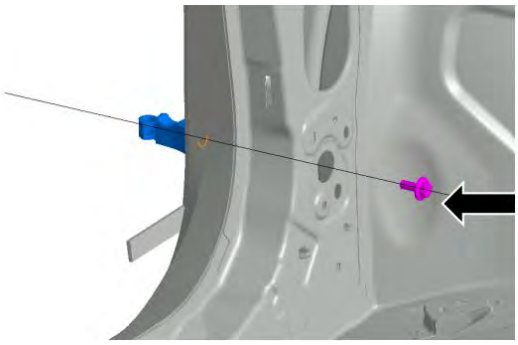
1. Remove the left fender. Refer to: Left fender.

2. Remove the front left door assembly. Refer to: Front left door assembly.

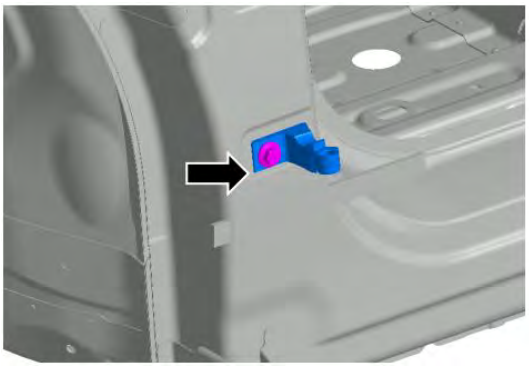
3. Remove the front left door lower hinge plate. Refer to: Refer to: Front door hinge plate.

4. Remove the left A-pillar lower shield assembly. Refer to: Left a-pillar lower shield.

5. Remove 1 fixing bolt from the inner side of front left door upper hinge base plate. Tightening torque: 23±3N·m.



6. Remove 1 fixing bolt and take out the front left lower hinge base plate. Tightening torque: 23±3N·m.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

   Caution: Remove the door assembly with the assistance of another repair technician.

   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

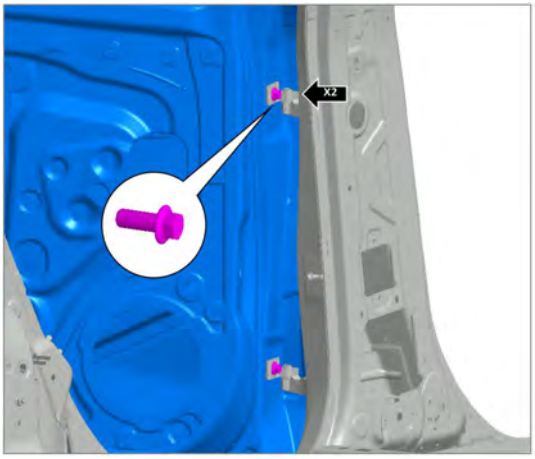
5.10.4.7 Rear left door assembly

Removal

1. Remove the rear left door harness. Refer to: Rear left door harness.

2. Remove the rear door check. Refer to: Rear door check.

3. Remove 2 fixing bolts and take down the rear left door assembly. Tightening torque: 70±5N·M.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

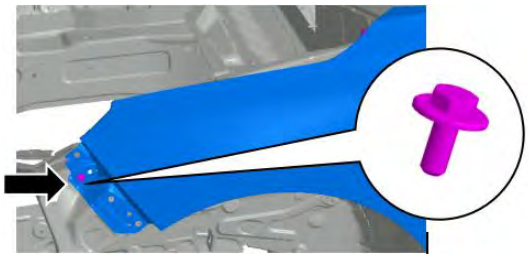
   Caution: Remove the door assembly with the assistance of another repair technician.

   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

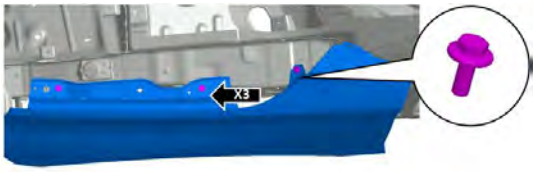
5.10.4.8 Right fender

Removal

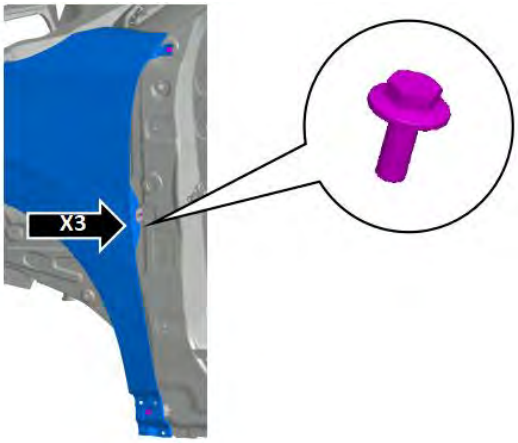
1. Remove the front bumper assembly. Refer to: Front bumper assembly.
2. Remove the right daytime running light assembly. Refer to: Daytime running light assembly.
3. Remove the right engine compartment trim cover plate.
4. Remove the front right mudguard. Refer to: Disassembly and assembly of left and right front and rear wheel guard systems.
5. Remove the right fender barrier pad.
6. Remove the right fender bottom trim body. Refer to: Fender bottom trim.
7. Remove one fixing bolt from the right fender.



8. Remove 3 fixing bolts from the right fender.



9. Remove 3 fixing bolts from the right fender.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

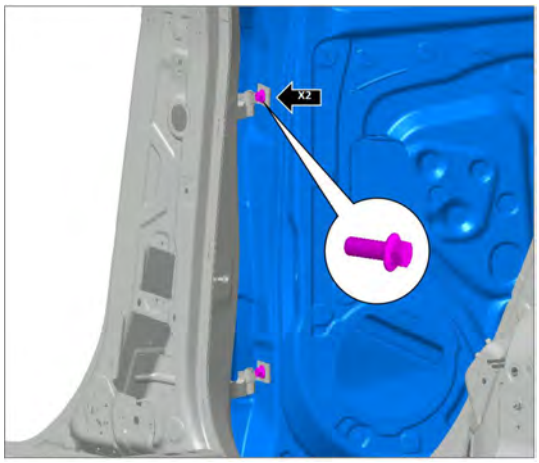
   Caution: When removing and installing sheet metal parts, please wear long-sleeved workwear and protective gloves to avoid being cut by sheet metal parts.

   Caution: Make sure that the peripheral clearance is normal when installing the fender assembly.

5.10.4.9 Rear right door assembly

Removal

1. Remove the rear right door harness. Refer to: Rear right door harness.
2. Remove the rear door check. Refer to: Rear door check.
3. Remove 2 fixing bolts and take out the rear right door assembly. Tightening torque: 70±5N·M.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

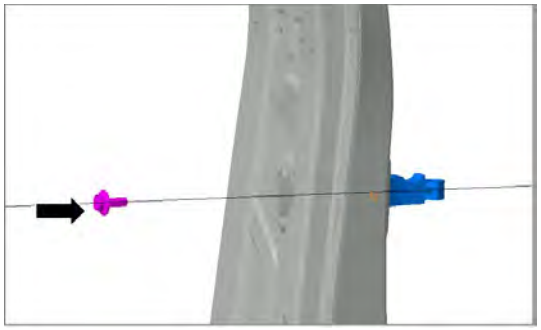
   Caution: Remove the door assembly with the assistance of another repair technician.

   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

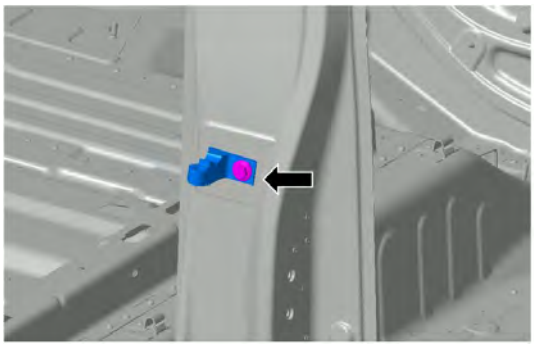
5.10.4.10 Rear right door upper hinge base plate

Removal

1. Remove the rear right door assembly. Refer to: Rear right door assembly.
2. Remove the upper hinge plate assembly of rear right door. Refer to: Front door hinge plate.
3. Remove the right B-pillar lower shield. Refer to: Left B-pillar lower shield.
4. Remove 1 fixing bolt from the inner side of rear right door upper hinge base plate. Tightening torque: 23±3N·m.



5. Remove 1 fixing bolt and take out the rear right upper hinge base plate. Tightening torque: 23±3N·m.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

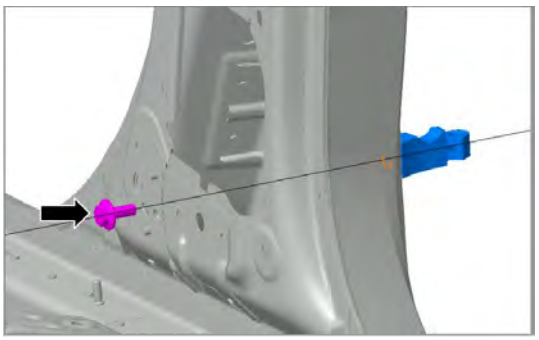
   Caution: Remove the door assembly with the assistance of another repair technician.

   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

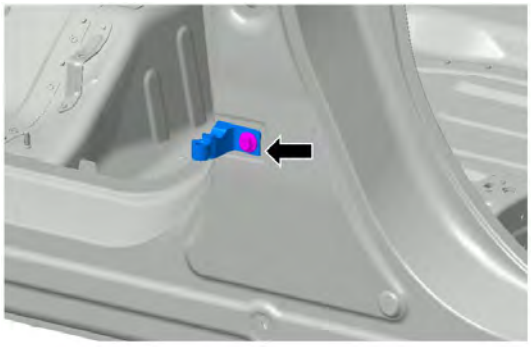
5.10.4.11 Rear right door lower hinge seat plate

Removal

1. Remove the rear right door assembly. Refer to: Rear right door assembly.
2. Remove the lower hinge plate assembly of rear right door. Refer to: Front door hinge plate.
3. Remove the right B-pillar lower shield assembly. Refer to: Left B-pillar lower shield.
4. Remove 1 fixing bolt on the inner side of rear right door lower hinge base plate. Tightening torque: 23±3N·m.



5. Remove 1 fixing bolt and take out the rear right lower hinge base plate. Tightening torque: 23±3N·m.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

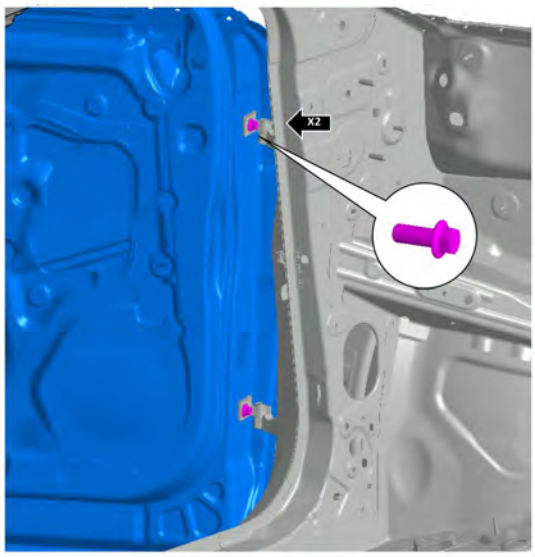
   Caution: Remove the door assembly with the assistance of another repair technician.

   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

5.10.4.12 Front right door assembly

Removal

1. Remove the front right door harness. Refer to: Front right door harness.
2. Remove the front door check. Refer to: Front door check.
3. Remove 2 fixing bolts and take out the front right door assembly. Tightening torque: 70±5N·M.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

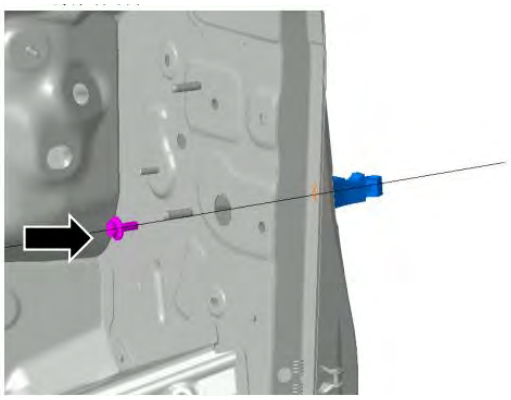
   Caution: Remove the door assembly with the assistance of another repair technician.

   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

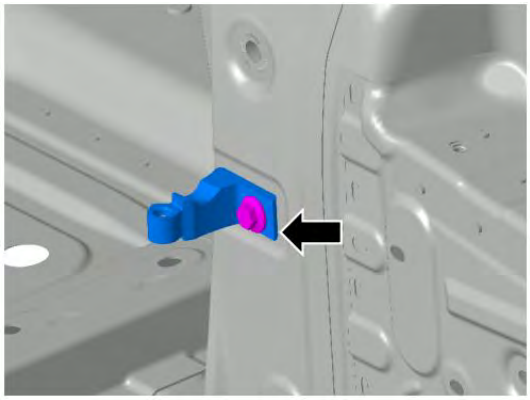
5.10.4.13 Front right door upper hinge base plate

Removal

1. Remove the right fender. Refer to: Right fender.
2. Remove the front right door assembly. Refer to: Front right door assembly.
3. Remove the upper hinge plate of front right door. Refer to: Front door hinge plate.
4. Remove the tubular beam assembly. Refer to: Tubular beam assembly.
5. Remove 1 fixing bolt from the inner side of front right door upper hinge base plate. Tightening torque: 23±3N·m.



6. Remove 1 fixing bolt and take out the front right lower hinge base plate. Tightening torque: 23±3N·m.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

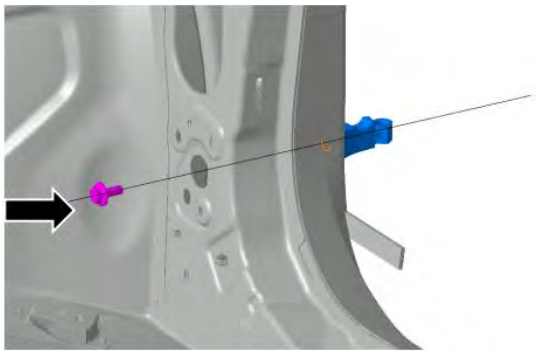
   Caution: Remove the door assembly with the assistance of another repair technician.

   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

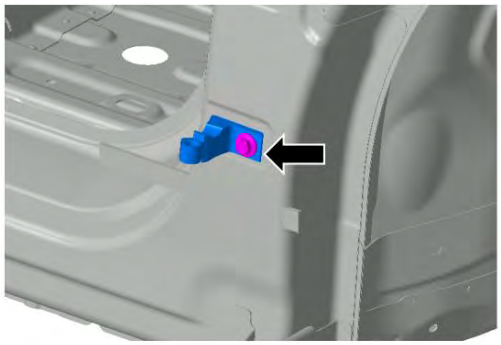
5.10.4.14 Front right door lower hinge base plate

Removal

1. Remove the right fender. Refer to: Right fender.
2. Remove the front right door assembly. Refer to: Front right door assembly.
3. Remove the lower hinge plate of front right door. Refer to: Front door hinge plate.
4. Remove the right A-pillar lower shield. Refer to: Left a-pillar lower shield.
5. Remove 1 fixing bolt from the inner side of front left door upper hinge base plate. Tightening torque: 23±3N·m.



6. Remove 1 fixing bolt and take out the front right lower hinge base plate. Tightening torque: 23±3N·m.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

   Caution: Remove the door assembly with the assistance of another repair technician.

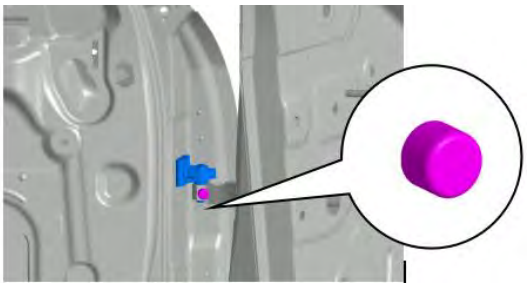
   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

5.10.4.15 Front door hinge plate

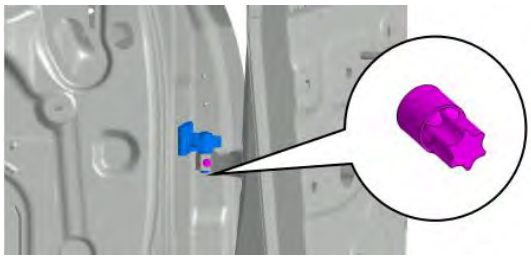
Removal

Caution: The removal and installation methods of the left and right front door (upper and lower) hinge plates are the same as those of the left and right rear door (upper and lower). Take the upper part of the left front door as an example.

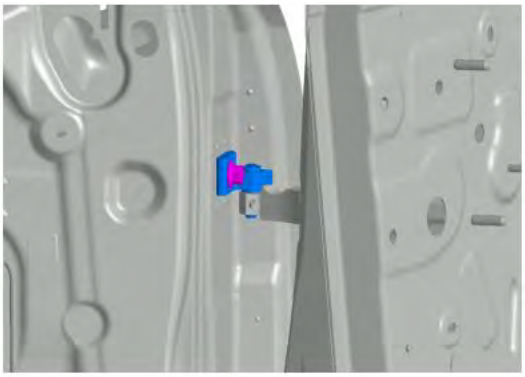
1. Remove the hinge fixing bolt plug cap.



2. Remove 1 hinge locking mechanism. Tightening torque: 23 ±3N·m.



3. Remove 1 fixing bolt and take out the front left door upper hinge plate. Tightening torque: 70±5N·m.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

   Caution: Remove the door assembly with the assistance of another repair technician.

   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

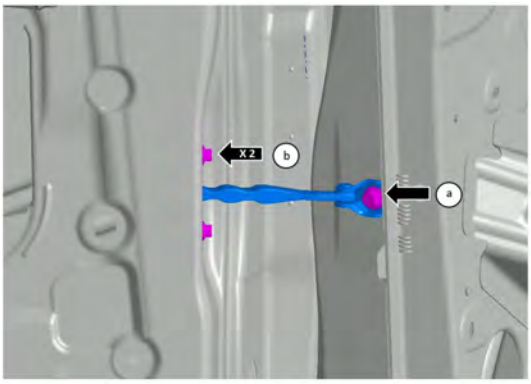
5.10.4.16 Front door check

Removal

Caution: The removal and installation methods of the front left and front right door check assemblies are the same. Take the left one as an example.

Caution: Raise the window glass assembly to the highest position before removing the door check assembly.

1. Remove 1 fixing bolt a. Tightening torque: 23±3 Nm.
2. Remove 2 fixing bolts b and take out the front door check assembly. Tightening torque: 8±1Nm.



   Caution: After installation, open and close the door 5~10 times to confirm whether the door check is loose or makes an abnormal sound. If any, loosen the bolt at a, open and close the door 5 times, and then tighten it again.

Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

   Caution: Remove the door assembly with the assistance of another repair technician.

   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

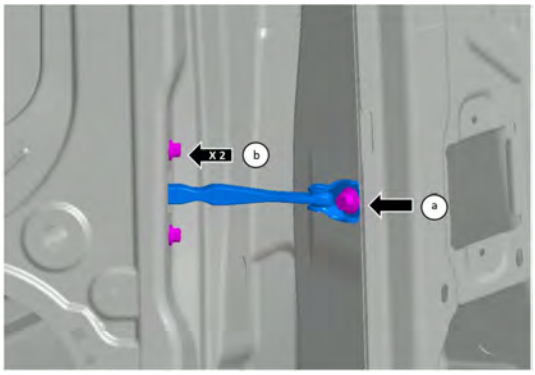
5.10.4.17 Rear door check

Removal

Caution: The removal and installation methods of the left and right rear door check assemblies are the same. The following takes the left side as an example.

Caution: Raise the window glass assembly to the highest position before removing the door check assembly.

1. Remove 1 fixing bolt a. Tightening torque: 23±3 Nm.
2. Remove 2 fixing bolts b and take out the front door check assembly. Tightening torque: 8±1 Nm.



   Caution: After installation, open and close the door 5~10 times to confirm whether the door check is loose or makes an abnormal sound. If any, loosen the bolt at a, open and close the door 5 times, and then tighten it again.

Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

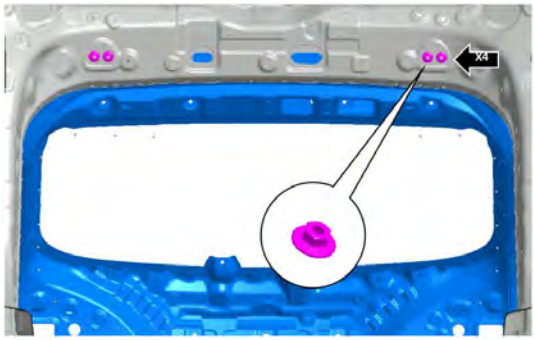
   Caution: Remove the door assembly with the assistance of another repair technician.

   Caution: When installing the front door assembly, it is necessary to confirm that the surrounding clearance is normal.

5.10.4.18 Boot lid assembly

Removal

1. Remove the roof interior trim assembly. Refer to: Roof interior trim assembly.
2. Remove 2 fixing nuts of the boot lid. Tightening torque: 23 ±5N·m.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

   Caution: Remove the boot lid assembly with the assistance of another repair technician.

   Caution: When installing the boot lid assembly, it is necessary to confirm that the surrounding gap is normal.

5.10.4.19 Boot lid hinge assembly

Removal

1. Remove the boot lid assembly. Refer to: Boot lid assembly.
2. Remove the 4 fixing bolts of the boot lid hinge. Tightening torque: 23±5N·m.

Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

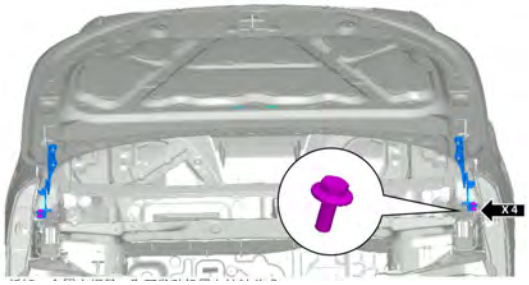
   Caution: Remove the boot lid assembly with the assistance of another repair technician.

   Caution: When installing the boot lid assembly, it is necessary to confirm that the surrounding gap is normal.

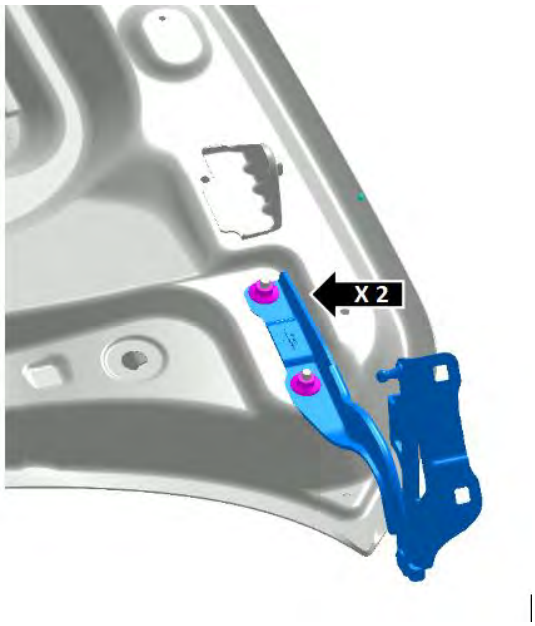
5.10.4.20 Engine bonnet left hinge assembly

Removal

1. Remove the left fender. Refer to: Left fender.
2. Remove the left engine compartment trim cover plate.
3. Remove the bonnet pneumatic rod assembly (if any).
4. Remove 2 fixing bolts and take out the engine bonnet assembly. The tightening torque is 23±5 N·m.



5. Remove 2 fixing nuts and take out the engine bonnet left hinge assembly. Tightening torque: 23±5 N·M.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

   Caution: When removing, perform the operation with the assistance of another maintenance worker to avoid injury caused by falling.

   Caution: After removing and installing the engine bonnet assembly or hinge, adjust its relative position.

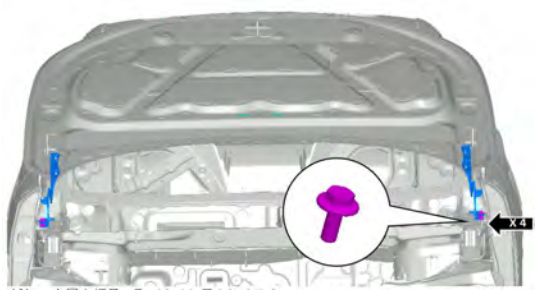
   Caution: After installation, the clearance of the front bonnet should be adjusted as specified to avoid motion interference.

   Caution: After installation, the fasteners must be checked for tightening torque.

5.10.4.21 Engine bonnet right hinge assembly

Removal

1. Remove the right fender. Refer to: Right fender.
2. Remove the right engine compartment trim cover plate.
3. Remove the bonnet pneumatic rod assembly (if any).
4. Use a cross-head screwdriver or blade to remove the 3 snap fasteners that fix the trunk lid sill. Tightening torque: 23±5 N·m.



5. Remove 2 fixing nuts and take out the engine bonnet right hinge assembly. Tightening torque: 23±5 N·m.

Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

   Caution: When removing, perform the operation with the assistance of another maintenance worker to avoid injury caused by falling.

   Caution: After removing and installing the engine bonnet assembly or hinge, adjust its relative position.

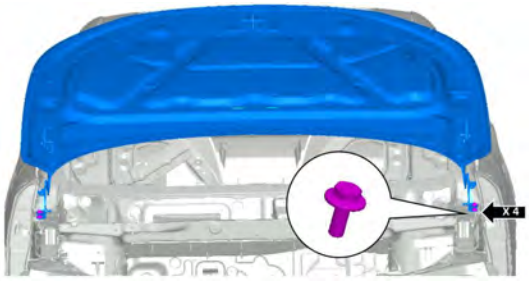
   Caution: After installation, the clearance of the front bonnet should be adjusted as specified to avoid motion interference.

   Caution: After installation, the fasteners must be checked for tightening torque.

5.10.4.22 Engine bonnet assembly

Removal

1. Remove the left fender. Refer to: Left fender.
2. Remove the right fender. Refer to: Right fender.
3. Remove the left and right engine compartment trim cover plates.
4. Remove the bonnet pneumatic rod assembly (if any).
5. Remove 4 fixing bolts and take out the engine bonnet assembly. Tightening torque: 23±5 N·m.



Installation

1. The installation order is reverse to the removal order. Pay attention to the following points:

   Caution: Check the parts and components thoroughly before repairing or replacing them.

   Caution: When removing, perform the operation with the assistance of another maintenance worker to avoid injury caused by falling.

   Caution: After removing and installing the engine bonnet assembly or hinge, adjust its relative position.

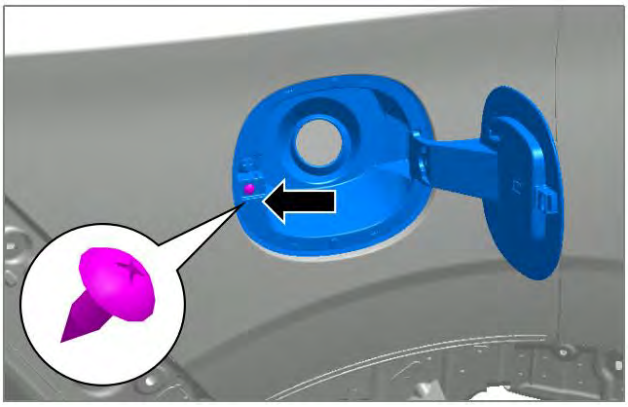
   Caution: After installation, the clearance of the front bonnet should be adjusted as specified to avoid motion interference.

   Caution: After installation, the fasteners must be checked for tightening torque.

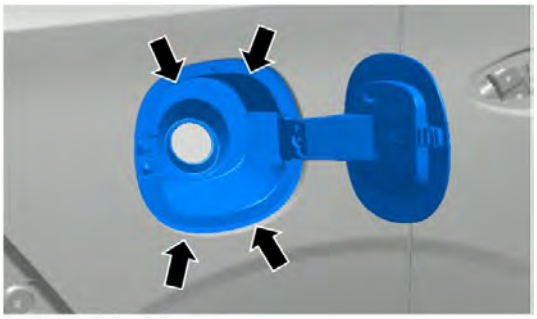
5.10.4.23 Fuel filler/charging port assembly

Removal

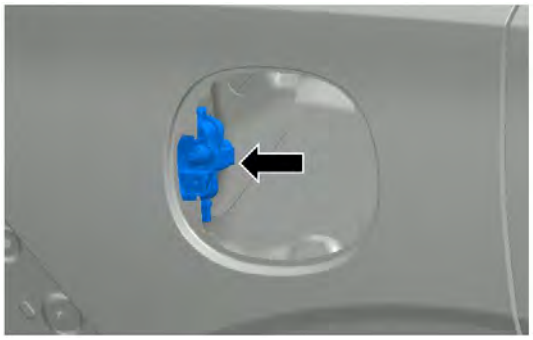
1. Remove 1 mounting bolt of the actuator.



2. Use a small flat-blade screwdriver to insert into the cover removal slot, apply force toward the outside of the cover, and remove the fuel filler/charging port assembly.



3. Remove the actuator horizontally.



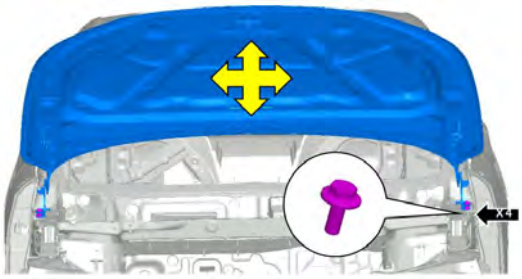
Installation

1. The installation order is the reverse of the removal order.

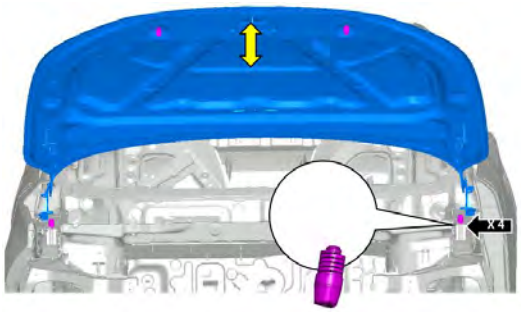
5.10.5 General procedures

5.10.5.1 Adjustment of engine bonnet assembly

1. Loosen the 4 fixing bolts and adjust the front, rear, left and right positions of the engine bonnet to ensure that the gaps between the engine bonnet assembly and the left and right fenders and front bumper assemblies are uniform.



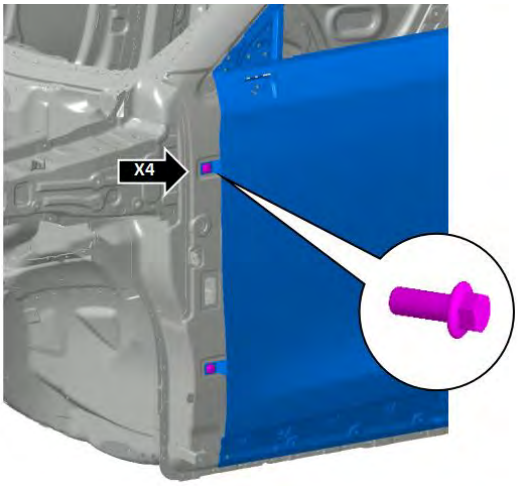
2. The Z-direction height of the 4 buffer rubber blocks on the engine compartment side beam and at the front end of the engine bonnet is adjusted to ensure the flushness between the engine bonnet and surrounding parts.



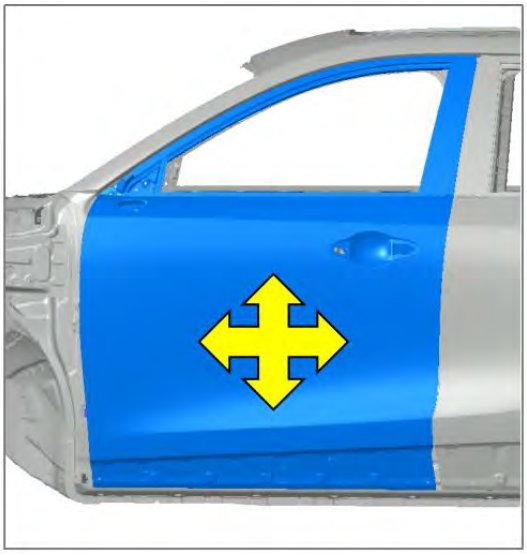
5.10.5.2 Adjustment of front door assembly

Caution: The adjustment method of the front left and right door assemblies is the same. Take the left one as an example.

1. Loosen 4 fixing bolts of front left door upper hinge base plate, which are on the inner and outer sides of the body. Tightening torque: 23±3N·m.



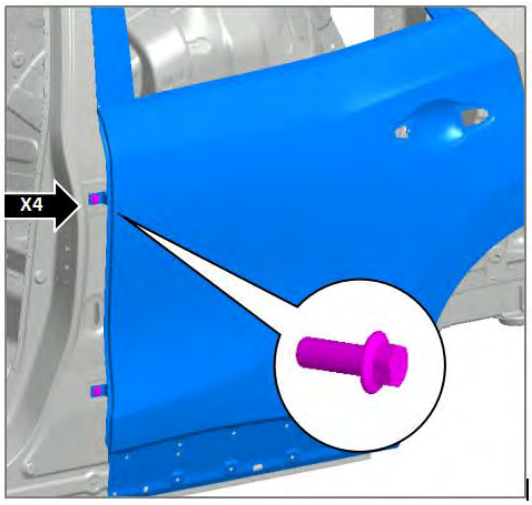
2. Adjust the front left door assembly horizontally and vertically.

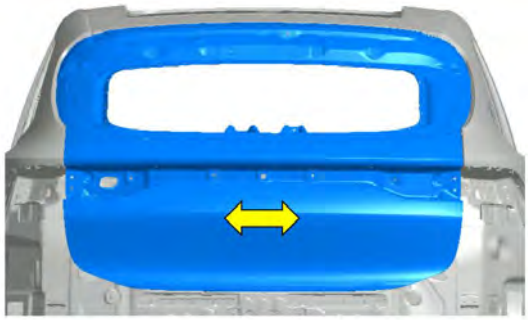


5.10.5.3 Adjustment of rear door assembly

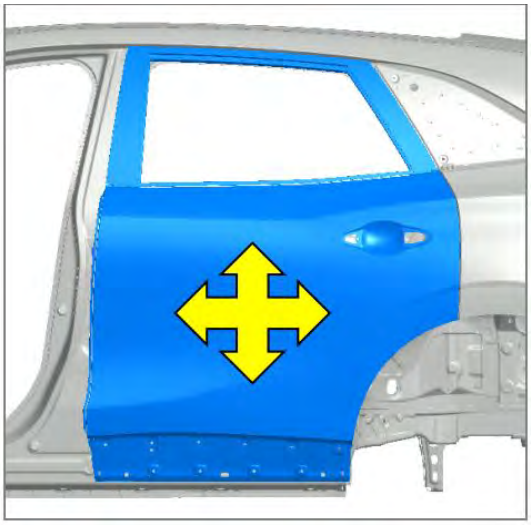
Caution: The adjustment methods for the left and right rear door assemblies are the same, the following takes the left side as an example.

1. Loosen the 4 fixing bolts of the rear left door upper hinge base plate located on the inner and outer sides of the body. Tightening torque: 23±3N·m.



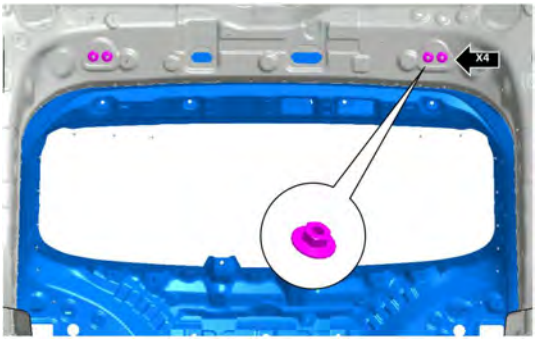


2. Adjust the rear left door assembly horizontally and vertically.



5.10.5.4 Adjustment of boot lid assembly

1. Loosen the 4 mounting nuts of the boot lid on the body side. Tightening torque: 23±3N·m.



2. Adjust the left and right positions of the boot lid to ensure that the gap between the boot lid and the side wall is uniform.

6.1 Parts Warranty Period

The warranty period of Forthing new vehicles starts from the date of first registration of the vehicle. The warranty period for each Forthing vehicle is 8 years/200,000 km, subject to the terms and conditions set out in this Warranty and Service Manual. The specific warranty period of parts is as follows

S/N	Detailed parts	Warranty period
1	Power battery pack assembly, drive unit and motor controller	Eight years or 200,000 km (SOC≥70%)
2	Engine block, cylinder head, crankshaft, connecting rod, subframe, rear axle welding assembly, rear axle bracket assembly, engine hood lock body, engine mount bracket, engine hood lock body, vehicle body (including vehicle body frame, vehicle body steel plate, door; excluding paint)	Six years or 200,000 km
3	Power output module, vehicle control module (VCM), battery heater assembly (optional), pedestrian approaching vehicle sound warning system, vacuum booster assembly, brake master cylinder, brake bottom plate assembly, brake cable assembly, brake pedal assembly, parking control device assembly, steering wheel body assembly (excluding leather trim), steering column assembly (excluding EPS steering column assembly) steering drive shaft assembly, power steering fluid reservoir, power steering gear assembly, mechanical steering gear assembly, steering knuckle, valve, valve tappet, camshaft, timing sprocket, timing gear, timing chain, piston, piston pin, oil pan	Five years or 150,000 km
4	Battery and tire	One year or 20,000 km
5	Spark plug, clutch disc, brake pad, remote key battery, bulb, fuse and ordinary relay (excluding integrated control unit), air filter, A/C filter, oil filter, fuel filter and wiper blade	Six months or 5,000 km

6	Warranty of anti-corrosion perforation: covers cases where painted metal vehicle body panels develop rust penetration from the inside or bottom due to material or process defects during the vehicle's original manufacturing process, or quality problems in the original factory paint application process. This warranty does not cover superficial damages such as surface corrosion, paint blistering, scabbing, peeling and fading; nor does it include corrosion and damage caused or aggravated by insufficient maintenance or improper operation, external impact (including foreign object bumps and scratches that are not handled in time), environmental factors (such as pollution, acid rain, saline-alkali erosion, dampness and mildew). Any corrosion problems caused by external factors beyond the control of the brand (such as long-term open-air storage, lack of anti-rust treatment after accidental damage and contact with corrosive substances) are not covered by this warranty.	Seven years or 200,000 km
7	Parts except for those listed above	Three years or 100,000 km

6.2 New car inventory maintenance record form

Service station abbreviation: chassis number: Date of receipt:

The items in the following table should be checked every 60 days, and all the following operations should be performed. After each item is completed, "√" should be marked, and "X" should be marked if abnormal.

date of examination			
Inspector (signature)			
If the wiper protection cover is not required, do not raise the wiper. If the wiper protection cover is not available, raise the wiper so that it does not come into direct contact with the windshield			

Measure the static voltage and CCA value with a battery tester. The static voltage ≥ 12.5V, and the CCA value ≥ rated value. If the test voltage or CCA value is below the standard, disassemble the battery and charge it according to the procedure (After standing for 4 hours, measure the static voltage to be ≥ 12.65V, and the CCA value ≥ rated value). Then reassemble it on the vehicle (keep the negative terminal disconnected).	Before charging V CCA price After charging V CCA price	Before charging V CCA price After charging V CCA price	Before charging V CCA price After charging V CCA price
Measure the tire pressure value, and inflate it to meet the standard when it is insufficient. The standard tire pressure value of each model is on the label on the driver's seat side			
Move the vehicle once			
Start the vehicle, lightly press the brake pedal, move the vehicle 3~5m, lubricate the engine, remove the rust on the brake disc			
Operation and maintenance are carried out by air condition switch, and the internal parts of the air conditioning compressor are lubricated			
Open all doors and engine hood at one time, check and confirm that all doors, electrical appliances and lighting lights are closed			

Traction Batteries of Plug-in and Extended-Range Hybrid Vehicles special: 1. If the checked power is less than 40%, charge it to more than 50% (slow charging is recommended); 2. If the inventory time exceeds 3 months, it is recommended to check once a month starting from the third month.	Before charging SOC % After charging SOC %	Before charging SOC % After charging SOC %	Before charging SOC % After charging SOC %
inspection record: 1．Fault phenomenon： result of handling： 2．Fault phenomenon： result of handling			

Non-plug-in hybrid vehicles shall undergo traction battery maintenance every 30 days. Perform all the following operations and mark a "√" next to the item upon completion.

date of examination						
Inspector (signature)						
Start the vehicle and switch to Sport mode, turn on the air conditioner and set it to cooling mode for discharging, then roll down all four windows (do not turn on the heating function). When the battery pack power is low, the vehicle will automatically switch to the engine start state and charge the battery pack. Maintain the entire charging and discharging process for 30 minutes.						

Notes：

1. When disconnecting and reconnecting the battery, always turn the ignition switch to OFF, otherwise it may damage the vehicle parts;
2. Before moving the vehicle, reconnect and correctly tighten the negative terminal of the battery to the negative terminal;
3. If the inventory time is less than 60 days, fill in the information at the top of the form, and fill in "The car was sold on X month X day, the inventory is less than 60 days, no inventory maintenance is required" in the inspection record; if the new car exceeds the inventory period of 180 days, please print a new form to continue the record;
4. Problems must be repaired immediately, and inspection records should be filled in. New cars with quality problems are not allowed to be delivered to customers;
5. The items listed in this table are not equipped in all models. Please check the actual vehicle;

6.3 Maintenance List

Maintenance operations	Symbol Explanation: I = Check and adjust or replace as necessary (materials are calculated separately). Note: ● Oils of different models cannot be mixed.								
Regard every 12 months or 15,000 kilometers as the maintenance interval, whichever comes first.	Mont-hs	12	24	36	48	60	72	84	96
	k-m×1,-500	10	20	30	40	50	60	70	80
Front compartment									
Engine oil and oil filter	Replace every 12 months or 15,000 kilometers								
The lubricating oil of the drive unit (for models with an independent drive unit arrangement)	Check every 12 months or 15,000 kilometers, and replace every 30,000 kilometers								
Dual-motor hybrid powertrain (vehicle model with integrated arrangement of generator and drive motor) lubricating oil	Check every 12 months or 15,000 kilometers, and replace every 30,000 kilometers								
Brake fluid, power steering oil (oil level height and leakage)	Check every 12 months or 15,000 kilometers, and replace every 2 years or 30,000 kilometers								
Coolant (liquid level and leakage)	Check every 12 months or 15,000 kilometers, and replace every 5 years or 75,000 kilometers								
Air filter, air conditioner filter	Clean every 12 months or 15,000 kilometers, and replace every 2 years or 30,000 kilometers								
Spark plug	Check every 2 years or every 30,000 kilometers								
Fuel filter	every 12 months or 15,000 kilometers. Replace if there is a fault								
All vacuum pipelines and joints	Check every 2 years or every 30,000 kilometers								
The fixing conditions of relevant terminals and wiring on the starter and generator, and whether there are abnormal phenomena such as corrosion and ablation	I	I	I	I	I	I	I	I	

Maintenance operations	Symbol Explanation: I = Check and adjust or replace as necessary (materials are calculated separately). Note: ● Oils of different models cannot be mixed.								
Regard every 12 months or 15,000 kilometers as the maintenance interval, whichever comes first.	Mont-hs	12	24	36	48	60	72	84	96
	k-m×1,-500	10	20	30	40	50	60	70	80
Whether the wiring harness connections in the front compartment are secure and free from damage		I	I	I	I	I	I	I	I
Check for damage to the-electric fan connector, and inspect the nearby wiring harness for abnormalities such as damage or aging		I	I	I	I	I	I	I	I
Drive belts		I	I	I	I	I	I	I	I
Drive belts, engine timing belts		Replace every 80,000 kilometers							
Engine timing chain		Check every 100,000 kilometers and replace according to the usage situation							
Cooling system		I	I	I	I	I	I	I	I
Battery voltage, the fixation of terminals and wiring, and whether there are abnormal phenomena such as corrosion and ablation		I	I	I	I	I	I	I	I
Chassis and body									
Check whether the fuel pipe connector is loose or has oil seepage		I	I	I	I	I	I	I	I
Check for bending, deformation, damage, cracking, oil seepage and other conditions on the fuel line, as well as signs of interference with other components		I	I	I	I	I	I	I	I

Maintenance operations	Symbol Explanation: I = Check and adjust or replace as necessary (materials are calculated separately). Note: ● Oils of different models cannot be mixed.							
Regard every 12 months or 15,000 kilometers as the maintenance interval, whichever comes first.	Mo-nths	12	24	36	48	60	72	84	96
	k-m×-1,5-00	10	20	30	40	50	60	70	80
The fixing condition of the brake oil pipe, whether there is oil leakage, and whether there are interference marks with other components		I	I	I	I	I	I	I	I
Steering, driving, transmission system parts and dust covers		I	I	I	I	I	I	I	I
Torque of main fasteners of the chassis		I	I	I	I	I	I	I	I
Tire condition, wear and tire pressure		I	I	I	I	I	I	I	I
The wear condition of the front and rear brake friction linings (discs)		I	I	I	I	I	I	I	I
Free play, travel and operation of foot brake and parking brake		I	I	I	I	I	I	I	I
Inspection of tire rotation and alignment status		Rotate the tires every 1 year or 15,000 kilometers							
Brak e boost er v acuum tube, connector and shut-off valve		Check every 2 years or 30,000 kilometers							
Door locks, hinges, sunroofs, engine hood locks		Lubricate every 12 months or 15,000 kilometers							
Seat belts, buckles and retractors		I	I	I	I	I	I	I	I
Signal lights, lighting, indicator lights and horns		I	I	I	I	I	I	I	I

Maintenance operations	Symbol Explanation: I = Check and adjust or replace as necessary (materials are calculated separately). Note: ● Oils of different models cannot be mixed.								
Regard every 12 months or 15,000 kilometers as the maintenance interval, whichever comes first.	Mo-nth-s	12	24	36	48	60	72	84	96
	k-m×-1,5-00	10	20	30	40	50	60	70	80
Front and rear wipers, wiper blades and washers		I	I	I	I	I	I	I	I
Read system fault codes		I	I	I	I	I	I	I	I
Airbag: Visually inspect whether there is any external damage and diagnose the fault code		inspection every 1 year or 15,000 kilometers							
Road driving test		Initial maintenance and inspection every 2 years or 30,000 kilometers							