

2022 KX11 Service Manual

The Manual provides information on KX11 Service Manual

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Information updated to2022 01

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Model overview

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1.1 Warnings and precautions

1.1.1 Warnings and precautions

1.1.1.1 Warnings and precautions

Definitions of 'Warning', 'Note' and 'Prompt'

The diagnosis and maintenance procedures in the maintenance manual include general and concrete “warning”, “notice” and “prompt”. Geely is committed to providing maintenance information to help diagnose of technicians and repair systems of after-sales service to enable the vehicle to run normally. However, certain procedures may pose a risk to the technician if the technician does not follow the recommended methods.

“Warning”, “Notice” and “Prompt” are prepared to prevent above risks but not all of risks can be foreseen. Such information is located prominently in the Maintenance Manual. Such information is prepared to prevent following situations:

- Serious injury to personnel.
- Vehicle damage.
- Unnecessary vehicle maintenance.
- Unnecessary components replacement.
- Improper repair or replacement of vehicle parts.

Definition of 'Warning'

When you encounter a 'warning', you are required to take necessary measures or prohibit certain measures. Ignoring “warnings” can result in the following consequences:

- Serious injury to personnel.
- If the vehicle is not repaired properly, it will cause serious personal injury to the driver and / or passenger of the vehicle.

Definition of 'Notice'

'Note' requires special attention to necessary measures or prohibited measures. Ignoring “notice” can result in the following consequences:

- Vehicle damage.
- Unnecessary vehicle maintenance.
- Unnecessary components replacement.
- Abnormal operation or performance of the system or component being maintained.
- Damage of related systems or components.
- Damage of fastener tightening, basic tools or special tools.
- Leakage of engine coolant, lubrication oil and other major oil

Definition of 'Prompt'

The “prompt” statement emphasizes the necessity of a diagnostic or maintenance procedure. The purpose of the “prompt” statement is as follows:

- Define the procedures.
- Provide additional information to complete a procedure.
- Explain the reasons for following the recommended procedures.
- Provides information that helps complete the procedure more efficiently.
- Provide the technician with information on past experiences to make the procedure easier to complete.

Warning about vehicle lifting

Warning !

To avoid vehicle damage, serious personal injury and even death, when the main components are removed from the vehicle, and the lifter is used for support, the jack should be used to support the vehicle part corresponding to the components to be removed.

Warning about handling anti-lock brake system components

Warning !

Certain components of anti-lock brake system (ABS) cannot be repaired in isolation. Attempting to remove or disconnect certain system components can result in personal injury and/or abnormal system operation. Only those components that are permitted to be removed and installed can be repaired.

Warning about equipment approved for collision repair

Warning !

To avoid personal injury from exposure to toxic fumes from welding arc or electroplating (zinc oxide) metals when grinding/cutting any type of metal or sheet moldings, the work must be in a well-ventilated area and licensed respirators, goggles, earplugs, gloves of welders and protective clothing must be worn.

Warning about assistant driving

Warning !

When the technician inspects the repaired faulty part, the assistant should drive the vehicle. Otherwise, it may cause personal injury.

Warnings regarding battery disconnection

Warning !

Before maintaining any electrical components, the power supply mode of the start and stop button must be in the OFF position, and all electrical loads must be "OFF" unless otherwise stated in the operating procedures. If tools or equipment are easily accessible to exposed live electrical terminals, disconnect the negative battery cable. Violation of these safety instructions may damage vehicles or vehicle parts, and may even lead to personal injury.

Warning !

During the maintenance of the airbag, it is necessary to disconnect the negative electrode of the battery at least 90s before other operations

Warning about brake dust

Warning !

Do not use dry brushing or compressed air to clean wheel brake components to avoid raising brake dust.

May contain fibers, which can be mixed with dust, inhalation of dust containing fibers can cause serious damage, please use a damp cloth to clean any dust from the brake components.

Warning about brake fluid

Warning !

Brake fluid is very easy to absorb moisture and moisture. Do not use brake fluid that may be contaminated by water in an open container. Using improper or contaminated brake fluid may cause system failure, loss control over the vehicle control and personal injury.

Warning about the irritation of brake fluid

Warning !

Brake fluid is irritating to skin and eyes. Once contacted, the following measures should be taken:

- Eye contact-flush thoroughly with water.
- Skin contact-wash with soap and water.

Warning about brake pipe replacement

Warning !

When replacing the brake pipe, please install and fix it carefully, and be sure to use the correct fasteners, otherwise it may cause damage to the brake pipe and brake system and thus cause personal injury.

Warnings regarding inhalation of R134a

Warning !

Inhalation of air-conditioning refrigerant R134a/R134a and lubrication oil vapor or mist should be avoided for fear that it will irritate the eyes, nose and pharynx. Work in a well-ventilated area. When discharging R134a from the A/C system, maintenance equipment (R134a recovery equipment) certified to meet the requirements of SAEJ2210 should be used. In case of accidental drainage of the system, the work area must be ventilated before the repair continues. Other health and safety information can be obtained from refrigerant and lubricant manufacturers.

Warning about collision sectioning

Warning !

Sectioning can only performed at the recommended part, otherwise it will damage the integrity of the vehicle structure and cause personal injury in the event of a vehicle collision.

Warning about cracks in vehicle windows

Warning !

If a window glass is cracked but remains intact, the protective tape should be cross-pasted to the window glass to prevent further damage to the window glass and personal injury.

Warnings regarding exhaust system maintenance

Warning !

To avoid burns, do not repair the exhaust system when it is hot. Please perform maintenance after the exhaust system has cooled down.

Warning about window lifting function

Warning !

When the driver's door operates the power window switch, the window glass moves very fast, and the window without anti-pinch cannot stop when it encounters resistance, which may cause personal injury.

Warning about eye protection

Warning !

Approved goggles and gloves should be worn to minimize the risk of personal injury when performing this procedure.

Warning about sound insulating foam**Warning !**

When an open fire is to be used in the body repair process, the foam insulation materials within the range of 152.4mm (6in) from the open fire must be removed. When foam insulation materials are reinstalled, smoke inhalation should be avoided, for it will be harmful to health.

Warnings regarding fuel and EVAP pipe**Warning !**

To reduce the risk of fire and personal injury, please observe the following:

- All fuel pipes that are scored, scratched or damaged during installation should be replaced, and no attempt should be made to repair the fuel pipe. -When installing a new fuel pipe, do not directly knock on the fuel pipe clamp with a hammer.
- When a welding torch is used near the fuel steam pipe, the fuel steam pipe must be covered with the wet towel. Besides, do not expose the vehicle to temperatures above 115°C (239°F) for more than 1 hour, and do not park it at temperatures above 90° C (194°F) for a long period of time.
- Before connecting the fuel pipe connectors, be sure to apply a few drops of clean engine oil to the male pipe connector to ensure correct reconnection and prevent possible fuel leakage. (During normal operation, the O-ring in the female connector may swell, and if it is not lubricated, it cannot be reconnected correctly.)

Warnings regarding fuel gauge leak**Warning !**

Wrap a rag around the fuel pressure gauge joints to reduce the risk of fire or personal injury. The rag will absorb the leaking fuel when connecting the fuel pressure gauge. After connecting the pressure fuel gauge, the rag should be put in an appropriate container.

Warnings regarding fuel pipe connectors**Warning !**

When connecting the fuel pipe joint, be sure to apply a few drops of clean engine oil to the positive pipe joint to reduce the risk of fire and personal injury, so as to ensure the correct reconnection and prevent possible fuel leakage. During normal operation, the O-ring in the female connector may swell, and if it is not lubricated, it cannot be reconnected correctly.

Warning !

When the fuel pipeline is assembled, check whether quick plug joints of fuel pipeline are in place following the steps of push first, sound second, pull third and push back forth.

Warnings regarding fuel storage**Warning !**

Fuel shall not be discharged into or stored an open container, otherwise fire or explosion may occur.

Warnings regarding fuel vapor in EVAP components**Warning !**

Do not inhale the air in the EVAP pipe or hose. The fuel vapor in the EVAP components may cause personal injury.

Warnings regarding gasoline/gasoline vapor**Warning !**

Gasoline or gasoline steam is very easy to burn and may cause a fire if there is a source of fire. To prevent fire or explosion, never drain fuel to or store fuel in an open container. Please provide a dry-chemical fire extinguisher nearby.

Caution

Fuel pressure must not exceed the specified value, otherwise it may damage the fuel pressure regulator or the fuel pressure gauge.

Warning about removal of the O-ring of fuel injector**Warning !**

Check the lower (small) O-ring of each injector which cannot be retained on the lower manifold to reduce the risk of fire and personal injury.

Warning !

If the O-ring is not removed with the injector, the service injector with the new O-ring will not be correctly placed in the injector seat, and improper placement will cause oil leakage.

Warnings regarding fuel pressure release**Warning !**

Before servicing the fuel system, remove the fuel tank cap and release the pressure of the fuel system to reduce the risk of personal injury. After the pressure of the fuel system is released, a small amount of fuel will overflow when servicing the fuel pipelines, fuel injectors, or joints. To reduce the risk of personal injury, cover the fuel system components with a rag before disconnecting. The rag can absorb fuel leaked out of the components. After disconnecting, place the rag in a suitable container.

Fuel pressure must not exceed the specified value, otherwise it may damage the fuel pressure regulator or the fuel pressure gauge.

Notice of damage to fuel tank strap**Caution**

Do not bend the fuel tank strap. Bending the fuel tank strap will damage the strap.

Warning about handling the glass and metal plates**Warning !**

When any glass or metal plate with sharp edges or rough edges are treated, approved goggles and gloves should be worn to reduce the risk of personal injury.

Warning about moving parts and hot surfaces**Warning !**

Avoid contact with moving components and hot surface when working around a running engine to prevent personal injury.

Warning regarding goggles and gloves**Warning !**

Goggles and gloves must be worn when exhaust system components are removed, otherwise rust and sharp edges that fall from worn exhaust system components will cause serious personal injury.

Warning about removal of the fluid reservoir cover**Warning !**

To avoid burns, the fluid reservoir cap must not be removed before the engine has cooled down. If the fluid reservoir cap is removed when the engine and radiator have not cooled down, the cooling system will release hot high-pressure liquid and vapor.

Warnings regarding cooling system maintenance**Warning !**

As long as there is pressure in the cooling system, even if the solution in the radiator is not boiling, the temperature of the solution will be much higher than the boiling temperature. If the fluid reservoir cap is opened and cooling system maintenance is performed when the engine is not cooled and the pressure is still high, the engine coolant will immediately boil and may be sprayed on the person who opens the radiator pressure cap, causing severe burns.

Warnings regarding road test**Warning !**

Under the premise of ensuring safety, test the vehicle on the road in accordance with all traffic laws. Do not try any operation that may endanger the control of the vehicle. Violating the above safety instructions may cause serious personal injury and damage to the vehicle.

Warning regarding goggles and fuel**Warning !**

When treating fuel, the goggles must be worn to prevent the fuel from splashing into the eyes.

Warnings about Supplemental Restraint System (SRS)**Warning !**

This vehicle is equipped with SRS, failure to follow proper operating procedures can result in the following:

- Airbag deployment
- Pretensioner burst
- Personal injury
- Unnecessary SRS maintenance

Warning !

To avoid the above situations, follow the following criteria:

- You should refer to the SRS assembly view to determine whether you are performing maintenance operations on the SRS assembly, around it, or on its circuit.
- If you are performing maintenance operations on the SRS components, around it, or on its circuit, you should release the SRS.
- Before operating any SRS components, you must wait at least three minutes for the ECU capacitor to fully discharge after disconnecting the battery.
- Do not use pneumatic or electric maintenance tools during maintenance.
- Be sure to place the airbag facing up.
- Do not decompose the airbag.

Warning regarding high temperature of deployed airbag modules

Warning !

When unfolded, the metal surface of the SRS components may be very hot, in order to avoid fire and personal injury:

- There should be sufficient cooling time before touching any metal surface of the SRS components.
- Do not place inflated SRS components next to any combustibles.

Warning about the clock spring of the SRS

Warning !

Incorrect installation of the steering wheel module (SWM) (clock spring assembly) will damage the internal spiral coil of the clock spring, which may cause coil fault and cause the front airbag (passenger) to work improperly, resulting in personnel injury.

Warning about the end-of-life of of the SRS module

Warning !

In order to prevent accidental deployment of airbags and cause personal injury, the unexpanded auxiliary restraint system modules shall not be disposed of as conventional workshop waste. If the sealed container is damaged during the scrapping process, some substances contained in the unexpanded module may cause serious illness or personal injury. Use the deployment procedure to safely scrap the undeployed airbag module.

Warning about the acquisition and storage of airbags in the SRS

Warning !

When transporting undeployed airbags:

- Do not carry the wires or connectors on the airbag for handling.
- Make sure that the air bag opening is not facing you or other people.

Warning !

When storing an undeployed airbag, make sure that the Safety airbag opening is not facing the surface where the airbag is placed. The airbag openness should not be downward. It is prohibited to place any object on the airbag modules. There should be enough space around the airbag for accident deployment, otherwise it will hurt people.

It is prohibited to immerse the non-deployed airbag modules in water or contact with other liquids.

The unexpanded airbag should be prohibited from fire sources or high temperatures to avoid accident deployment of the airbag that may hurt people.

Warnings about the handling of the SRS collision sensor

Warning !

Do not impact or shake the airbag system collision sensor. Before charging the collision sensor, make sure that the collision sensor is firmly fixed. Failure to follow the correct installation procedure may cause accidental detonation of the airbag system or malfunction at the time of detonation, causing personal injury.

Notice of filling the braking system with brake fluid**Caution**

When the brake fluid is added to the brake master cylinder tank, only the brake fluid from the clean, sealed brake fluid container can be used in line with DOT4. The use of the unrecommended brake fluid can lead to contamination and damage to rubber seals or rubber pads within hydraulic brake system components.

Notes to Brake Calipers**Caution**

When the brake caliper is removed, a steel wire should be used to hang the brake caliper to avoid damage to the brake pipe.

Note to the effect of the brake fluid on paint and electrical component**Caution**

The brake fluid should not be sprayed on the paint, electrical connectors, wires or cables. Brake fluid can damage the paint and corrode electrical components. If brake fluid sprays on the paint, flush the contact area with water immediately. If brake fluid sprays on the electrical connectors, wires or cables, wipe off brake fluid with the clean rag.

Pay attention to the installation of timing belt**Caution**

In order to avoid damage to the parts, the hexagonal part of the camshaft must be pulled with a wrench during removal or installation. If the reaction torque of the timing belt can not be avoided, it will lead to timing error fault.

Notice of belt dressing**Caution**

Do not use belt dressing on the drive belt, for it will cause the break of drive belt materials. Violation of this notice will damage the drive belt.

Notice of engine emission**Caution**

Modifications to the following systems may affect the emission control system of vehicles and cause the fault indicator light (MIL) and switch-on the indicator of “check engine”:

- Engine
- Transmission
- Exhaust system
- Fuel System

Caution

If the replaced tyres do not meet the performance standards of the original tyre, it will affect the emission control of the vehicle, which may cause the fault indicator light (MIL) and switch on the indicator of “check engine”:

Caution

Modifications to these systems or installation of tyres with incorrect performance standards may result in repairs beyond the warranty of the manufacturer, which may prevent the vehicle from passing the required emissions tests.

Notice of engine lifting**Caution**

When lifting or supporting the engine for whatever reason, do not hold the jack under the oil pan, any sheet metal or crankshaft belt pulley, which may cause components damage by incorrectly lifting the engine.

Notice of engine support**Caution**

If the engine support is broken, some components of drive components may be misaligned, resulting in ultimate damage to components of drive components.

Caution

If one engine support is broken, the stress applied to the other engine supports will increase, which may cause the rest of the engine supports to break.

Notice of excessive sealant on flywheel bolts**Caution**

The components should be assembled by applying an appropriate amount of sealant to the fastener tightening. Excessive sealant may lead to improper assembly of components or looseness of fastener tightening and improper assembly of components and fastener tightening may be loose or get adrift, resulting in serious damage to the engine.

Notice of exhaust manifold and oxygen sensor**Caution**

When the engine temperature is above 48°C (120°F), the oxygen sensor will be difficult to remove, and force removal will damage the thread of exhaust manifold and exhaust pipes.

Notice of exhaust system inspection**Caution**

When the exhaust system components are inspected or replaced, make sure that there is sufficient clearance from all points at the body rear to prevent the floor from overheating and possible damage to the passenger compartment and trim material.

Notice of removal of exterior logo**Caution**

When removing the sign/nameplate, use a plastic flat-bladed tool to avoid damage to the paint.

Note to fasteners**Caution**

Please use the correct fasteners in the correct position. The part numbers of the replaced fasteners must be correct. The fasteners that need to be replaced or the fasteners that need thread locking glue or sealant should be specifically pointed out in the maintenance procedure. Do not use paint, lubricating oil or corrosion inhibitors on the fasteners or fastener connecting surfaces unless otherwise specified. These paints affect the torque and clamping force of the fastener and may damage the fasteners. When installing fasteners, be sure to use the correct tightening sequence and tightening torque to avoid damage to parts and systems.

Note to handling electrostatic discharge sensitive parts**Caution**

Electrostatic discharge (ESD) can damage many solid electrical components. Not all components vulnerable to electrostatic discharge are marked with electrostatic discharge symbols. All electrical components should be treated carefully. Please follow the following safety instructions to avoid damage of electrostatic discharge:

- Before repairing any electrical component, the metal ground wire connecting points should be touched to discharge the static electricity (especially after sliding on the seats).
- Do not touch the exposed terminals. The terminals may be connected to circuits that are easily damaged by electrostatic discharge.
- When servicing connectors, do not allow tools to touch the exposed terminals.
- The components should not be removed from the protective shell unless required.
- Avoid the following operations unless specifically required by the diagnostic procedures:
 - Bridge over or ground parts or connectors.
 - Connect the test equipment probe to the component or connector. When using the test probe, connect the ground lead first.

Before opening the protective shell of the component, ground it first. Do not place solid components on a metal workbench or on top of TVs, radios and other electrical equipment.

Notice of oxygen sensor**Caution**

Do not remove the lead of the heated oxygen sensor (HO2S). Removing the lead or harness connector will affect the operation of the sensor.

Caution

Please take care of the oxygen release sensor and do not let it fall off. The in-line electrical connector and the grille cooling end should be kept free of grease, dirt or other pollutants. Do not use any type of cleaner.

Caution

Do not repair the wires, harness connectors or terminals of the oxygen sensor. If the lead, harness connector or terminal is damaged, the oxygen sensor must be replaced.

Caution

The outside clean air reference is obtained through signals and heater wires, and attempts to repair wires, harness connectors or terminals can clog the air reference and degrade the performance of the oxygen sensor.

Caution

The following principles must be followed when oxygen sensors are repaired:

- Do not smear contact cleaners or other materials on the sensor or harness connectors of the vehicle, as these materials may enter the sensor and cause poor performance.
- Do not damage the lead and harness of the sensor, exposing its internal lead, which will provide access to the sensor with foreign matters and performance fault.
- The sensor and the lead of the vehicle must not be bent or kinked. Large bends or kinks will blank plug the air reference channel through the leads.
- Make sure that the outer of harness connector is sealed to avoid damage due to water ingress.

Notice of not twisting or bending the hose during hose installation

Caution

The inlet and outlet hoses must not be twisted during the installation process. The hoses must not be bent or distorted for ease of installation, otherwise it will damage the components.

Notice of damage of machined surface

Caution

Do not scratch or damage the sealing surface. The sealing surface is a machined surface. Damage to the machined surface will cause leakage.

Notices for the power system control module and electrostatic discharge

Caution

Do not touch the connector pins or welded parts on the circuit board to prevent electrostatic discharge from damaging the electronic control module on the vehicle.

Note to sealant**Caution**

The sealant cured at room temperature must not enter the thread blind holes. If the sealant cured at room temperature enters the thread blind holes, fastener tightening will have a hydraulic lock up effect when it is tightened. The hydraulic lock up of fastener components causes the damage to fastener tightening and other components. It will also make it unable to get the correct clamp force of fastener tightening when tightening, resulting in incorrect tightness of fastener tightening, loose or separation of components and serious damage to the engine and other components.

Notice of harness**Caution**

When harness is assembled, all harness clips must be checked to be in place.

Notice of using the fault diagnosis instrument**Caution**

Before diagnosing the vehicle, you are required to pay attention to the following conditions, otherwise the control module may be damaged.

- The software version of the fault diagnosis instrument and terminal must be the latest.
- Vehicle battery must be fully charged, and battery voltage should be between 12-14V.
- The connection between the fault diagnosis instrument and the terminal cable must be firm.
- When programming the control module, the battery charger must not be connected to the battery.

Note that the steering wheel is in the steering limit position

Caution

The duration of the steering wheel in the steering limit position should not exceed 5s, otherwise the motor may be damaged.

Notice of test probe

Caution

The probe of test equipment (digital multimeter, etc.) must not be inserted into the harness connector or the fuse box terminals. The diameter of the test probe will deform most terminals. After deformed, the terminals will contact badly, which will lead to a system fault. The special tools must be used to detect the terminals from the front and paper clips or other substitutes are prohibited to detect the terminals.

Caution

When using special tools to test components, make sure that the selected terminal test adapter meets the size of the connector terminal. Do not select the terminal test adapter by visual inspection, because the hole of some connector terminals may be larger than the actual terminal in the hole. Large terminal test adapters will damage the terminals.

Important cautions for damage to the edge of the window

Caution

To avoid damaging the windows due to the exposed edges, the windows must be 1mm (0.025in) below the sheet metal surface to avoid damage to windows.

Important cautions for automatic transmission lifting

Caution

When lifting or supporting an automatic transmission for whatever reason, do not support the Jack under the oil pan or any sheet metal parts. Lifting the automatic transmission in any incorrect way will cause damage to the parts.

Important cautions for automatic transmission fluid

Caution

AW-1 (8AT) must be used when adding or completely changing fluids. Incorrect use of fluid can lead to damage to hoses and seals and fluid leakage.

Important cautions for the use of vehicles with automatic transmission

Caution

When the vehicle is running, it is forbidden to hang the shift lever into neutral, and make the vehicle in coasting state, otherwise it will lead to damage to the internal parts of the transmission. If you want to put the shift lever into the P-gear position, you must keep the vehicle at standstill, otherwise it will damage the transmission.

Important cautions for towing vehicles with automatic transmission

Caution

Emergency towing of the drive wheel is not allowed, and the drive wheel must be off the ground in case of emergency trailering.

Two-wheeled trailers are prohibited under any circumstances for vehicles equipped with a four-wheel drive system.

- Move the shift lever into the neutral (N), and keep the whole vehicle in a state of power supply during traction.
- The forward towing distance is not more than 50km, and the speed is not allowed to exceed 50km/h.
- The reverse towing distance is not more than 100m and the speed is not allowed to exceed 30km/h.
- There is no hardware damage to the transmission, no damage to the transmission parts of the whole vehicle, and no fault alarm for the combined instrument.
- It is forbidden to accelerate more than 50 km/h from 0 in 14 seconds.

1.2 Vehicle inspection

1.2.1 Instructions and operations

1.2.1.1 Items to be checked when operating the vehicle

Horn operation

It is needed to press the horn occasionally to ensure that it operates normally and check the positions of all buttons.

Operation of brake system

When braking, it is needed to keep alert to the signs of the abnormal sound of the brake system, the increase of brake pedal problems or the repetitive brake running deviation. In addition, if the brake system status indicator is lit continuously, some part of the brake system may fail.

Operation of exhaust system

It is important to be alert for sound changes of the system or smoke odor, which are signs that the system may be leaking or overheating. It is needed to check the system and repair it immediately.

Operation of tyres, vehicle and orientation

It is needed to be aware of steering wheel or seat vibration when driving at normal highway speeds. This condition may indicate that a wheel needs to be balanced. In addition, running deviation leftwards and rightwards on a flat road may indicate the necessity of adjusting tyre pressure or implementing wheel orientation.

Operation of steering system

It is needed to be aware of changes in steering action. It is important to check if the steering wheel turns hard or free travel is too large or there is abnormal sound while steering or parking.

1.2.1.2 Inspection items should be checked during each refueling

The loss of oil and fluid in any system (except the windscreen washer or the starting A/C) indicates a possible system fault and should be checked and repaired immediately.

Check the level of engine oil

After starting the vehicle, you can check whether the oil level is normal through the instrument combination setting interface.

Check the fluid level and condition of engine coolant

Check fluid level in the coolant recovery reservoir assembly and add engine coolant when necessary. Then check engine coolant and replace the smudgy engine coolant.

Check the level of windshield washer fluid

Check the level of the washer fluid in the fluid reservoir and add the some if necessary.

1.2.1.3 Inspect items every time after the replacement of the engine oil

Automatic transmission drive axle

Check the fluid level and add oil when necessary. See [Transmission fluid discharge and filling procedure \(8AT\)](#).

Brake system check

A low brake fluid level may indicate that the brake pads of the disc brake are worn and need to be repaired. In addition, if the brake system status indicator is lit continuously, the brake system may have some problem. If the ABS warning indicator stays on or lightened, there may be some problems with the ABS. The check should be completed when the wheels are removed for transposition. Check whether the pipeline and hose connection is correct, and whether there is catching, leakage, crack or scratch. Check the disc brake pads for wear. Check the surface condition of the brake disc and other brake parts, including brake wheel cylinder, parking brake, etc. Check the adjustment of parking brake. If driving habits or driving conditions require frequent braking, the time interval for checking should be shortened.

Inspection of steering system, suspension and front drive shaft shield and sealing elements

Check the front and rear suspension and steering system for damaged, loose or missing parts, and signs of wear or insufficient lubrication. Clean and check drive shaft sleeve and sealing elements for damage, breaking or leakage, and replace sealing elements if necessary.

Exhaust system check

Check the entire system, including catalytic converters, the body parts close to the exhaust system for breaking, damage, missing or misplacing of parts, and for cracks, holes, loose connections or other conditions that cause poor floor heat dissipation or allow exhaust to enter the trunk or passenger compartment.

Engine drive belt

Check all drive belts for cracks, fray, wear and proper tensile force, and adjust or replace drive belts as necessary.

Operation of bonnet lock

When the engine hood is opened, observe the operation of the auxiliary latch. When the primary latch is released, the auxiliary latch should be able to prevent the engine hood from fully opening and the engine hood must be able to be closed tightly.

1.2.1.4 Items to be checked at least once a month

Tire and wheel and air pressure check

Check whether the tire is abnormally worn or damaged. Check whether the wheel is damaged. Check the cold state pressure and the spare tire. Maintain the recommended pressure on the tire label.

Operation of the vehicle lamp

Check the operation of vehicle plate lamp, headlamp (including low beam and high beam), position lamp, fog lamp, tail lamp, stop lamp, turn lamp, reverse lamp and hazard warning indicator.

Oil and fluid leak check

After the vehicle has been parked for some time, check whether water, engine oil, fuel oil or other liquid remain on the ground under the vehicle regularly. Dripping after the use of the air-conditioning system belongs to the normal phenomenon. In case the fuel leakage or fume is found, find out the reason and remove the fault immediately.

1.2.1.5 Items to be checked at least twice a year

Brake master cylinder tank level

Check the oil and keep it at the correct level. A low brake fluid level may indicate that the brake pads of the disc brake are worn and need to be repaired. Check the vent hole on the reservoir lid to ensure that there is no dirt and that the air passage is clear.

Lubrication of doors and windows sealing strip grease

Use a clean rag to apply the sealing strip with silicone grease film.

1.2.1.6 Items to be inspected at least once a year

Condition and operation of seat belt

Check the safety belt system, including braided belt, lock actuator, lock plate, retractor, guide ring and fixing device.

Storage of spare tire and Jack

Existence of spare tire and jack shall be kept away from the rattling sound at the rear of the vehicle. Spare tire, all lifting equipment and tools must be fixed at all times. It is needed to lubricate the ratchet or screw mechanism of jack with engine oil after each use.

Lubricate and maintain body

Lubricate all door hinges, including engine hood, refuel cap, trunk (tailgate) hinges and plunger latches, glove box, console cap and any parts of the folding seat.

Flush body rear

First, it is needed to loose the sediment that has accumulated in the enclosed area of the vehicle. Then, it is needed to flush body rear with clean water. It is important to flush body rear at least once a year after winter. Flushing body rear can clear up corrosive substances used to remove snow, ice and dust.

Engine cooling system

Caution

It is important to avoid touching with moving parts and hot surfaces when working around a running engine to prevent injury.

Check the engine coolant. If the engine coolant becomes dirty or rusts, it is needed to discharge and flush the engine cooling system and refill with new engine coolant. It is needed to maintain appropriate engine coolant concentration to ensure the correct anti-freezing, anti-boiling, anti-corrosion performance and engine operating temperature. Check hoses and replace hoses that have cracked, expanded or aged. Fasten the clamp, clean the externals of the radiator and A/C system condenser and clean the filler cap and filler neck. It is needed to implement pressure test for the cooling system and cap to ensure the system is in normal operation.

1.2.1.7 Intermittent fault check

Descriptions:

- a. Clear DTC.
- b. Conduct simulation tests.
- c. Check and shake the harness, joints, and terminals.

When the fault cannot be confirmed by DTC inspection, and the fault phenomenon occurs only occasionally in use, all circuits and components that may cause the fault should be checked and confirmed. In many cases, the fault location can be quickly and effectively found by performing the basic checks shown in the following flow chart. Especially for faults such as poor contact of the harness connector.

Fault definition: The fault does not currently occur, but the historical fault diagnosis code record indicates that the fault has occurred. Or the distributor reported the fault for repair, but because the fault is not related to the fault diagnosis code, the fault symptoms cannot be reproduced currently.

Diagnosis steps:

Step 1	Check whether the battery voltage is normal?
--------	--

- a. Operate the starting switch to place the power in mode "OFF".
- b. Measure the battery voltage.
- c. According to the measured value, enter the corresponding diagnosis steps.

Results:	Go to Step
11 - 12V	Yes
Less than 11V	No

No

Check the battery. See the [Instructions and operation of the battery](#).

Yes

Step 2	Visual physical check.
--------	------------------------

Performing this step is an important means to initially determine the fault location:

- a. Check whether the harness is damaged, whether there are symptoms such as wear and tear.
- b. Check the harness for improper arrangement. It is strictly forbidden for the harness to approach the following high-voltage or high-current devices:
 - Starter, alternator and other electrical components. When these components operate, they will produce large electromagnetic interference, which will affect the correct transmission of signals and cause that the system does not operate.
 - Ignition coil, wire harness and other components.
- c. Check whether there are oxidation, loosening, wrong position and other phenomena in the module grounding point location and the car body grounding point location. The position of the grounding point of the control system must not be changed at will. This will affect the normal operation of the control system.
- d. Check whether the positive and negative cables of the battery are connected reliably and whether there is any looseness, oxidation, corrosion, etc.

Yes

Repair or replace the faulty part.

No

Step 3 | Check of harnesses and connectors.

- A. Connect the diagnostic instrument to the DLC interface.
- B. Operate the start-and-stop switch to place the power supply in mode "ON".
- C. Access the data flow of the switch you are checking.
- D. Turn on the switch manually.
- E. While monitoring the data flow, gently shake each connector or harness vertically and horizontally while viewing the data flow.
- F. Confirm whether the data flow is stable

No

Repair or replace the harness and connector.

Yes

Step 4 | Inspection of actuators or relays.

- A. Connect the diagnostic instrument to the DLC interface.
- B. Operate the start-and-stop switch to place the power supply in mode "ON".
- C. Prepare the output status control function for the actuator or relay you are checking.
- D. After the output state control function is activated, use the finger to vibrate the actuator or relay for 3s.
 - 1. If you hear an unstable "click" sound, check for poor connections or improper installation of actuators and / or relays.
 - 2. A highly vibrating relay may cause the relay to be disconnected.
- E. Confirm that the actuator or relay is working properly.

Yes

Repair or replace actuators or relays.

No

Step 5	Rain-shower test.
--------	-------------------

If the fault occurs only in high humidity or when it rains / snows, the following steps should be performed:

The temperature and humidity are changed indirectly by the water spout on the front of the radiator. If the vehicle is prone to leakage, the control module may be damaged. When testing whether a vehicle is leaking, special protective measures must be taken.

- A. If you want to check the sensor or switch, connect the diagnostics to the DLC interface.
- B. Operate the start switch to turn the power mode to the "ON" state (do not start the vehicle).
- C. If you want to check the sensor or switch, access the data flow of the sensor or switch.
- D. If you want to check the switch, turn it on manually.
- E. Spray water to the car, or drive the car past the car wash.
- F. Check to see if the data flow is stable.

No

Repair or replace the harness and connector.

Yes

Step 6	Reproduce the fault.
--------	----------------------

- a. Connect the vehicle fault diagnosis instrument and use the data recording function of the fault diagnosis instrument to record the data when the intermittent fault occurs on the vehicle for a road test. After the button of the vehicle data recorder is pressed down, the engine control module data can be recorded when intermittent faults occur, and this data can be used to find out the fault location.
- b. Another diagnostic method is to connect the digital multimeter to the suspicious circuit while the vehicle is driving. If the reading value of the digital multimeter indicates that there is a fault in this circuit.

Next Step

Step 7	The fault indicator lights up intermittently, but the system has not set the fault code.
--------	--

The following conditions may cause the fault indicator to light up intermittently, but the system will not set the fault diagnosis code:

- a. Electromagnetic interference caused by abnormal relays, solenoid valves, or switches.
- b. Non-original or after-sales accessories, for example: car phones, alarms, car lights, or radio equipment, are installed incorrectly.
- c. The fault indicator control circuit is intermittently shorted to GND.
- d. The grounding point is loose.

Next Step

Step 8	Other checks.
--------	---------------

- a. Test whether the diodes at both ends of the A/C compressor clutch and other diodes are circuit open.
- b. Check the charging system for the following conditions:
 - The fault of the alternator rectifier bridge may cause AC signal interference in the electrical system.
 - Whether the alternator output voltage is correct. If the alternator output voltage is lower than 9V or higher than 16V, then repair the charging system.

Next Step

Step 9	Enter the fault symptom table.
--------	--------------------------------

1.3 Lift the vehicle.

1.3.1 Instructions and operations

1.3.1.1 Lifting and jacking of vehicle

Warning !

Refer to “Warnings about vehicle lifting” in “Warnings and Notices”.

To avoid personal injury, use the jack pad when performing any operation on or under a vehicle supported by a jack only.

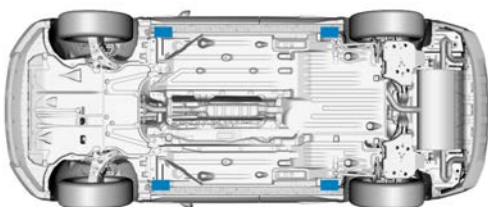
Caution

When lifting or jacking the vehicle on the frame side rails or other designated lifting points, make sure that the jack pad does not touch the catalytic converter, brake oil pipe, or fuel pipe. If the above-mentioned parts are touched, it will cause damage to the vehicle or deterioration of vehicle performance. Before starting any lifting procedures, make sure that the vehicle is on a clean, hard, and level surface. Ensure that all lifting devices meet the weight standard and are in good working status. Ensure that all vehicle loads are evenly distributed and stationary. If the vehicle is supported only from the frame rails, make sure that the lifting device does not exert excessive force on the frame rails or damage the frame rails.

Caution

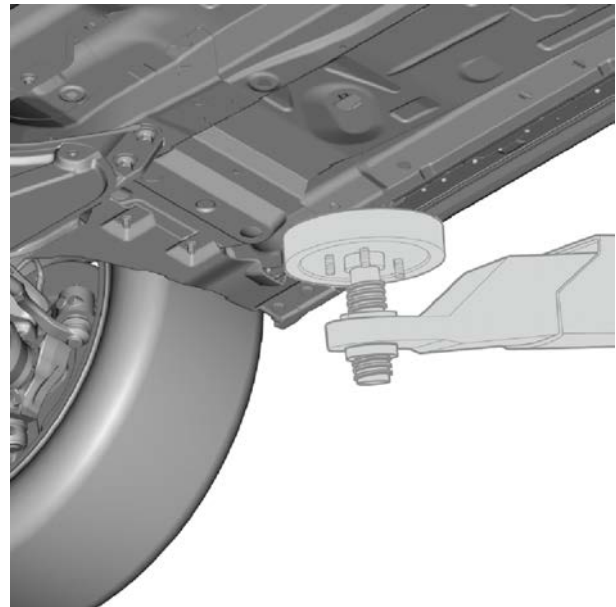
There are vehicle lifting point indication signs (inverted triangle shape) on the four door decoration panels. When installing the lifter pad, remember to avoid touching the door decoration board.

Vehicle lifting point



Lifting and jacking the vehicle - frame contact lifter

Front end lifter cushion block



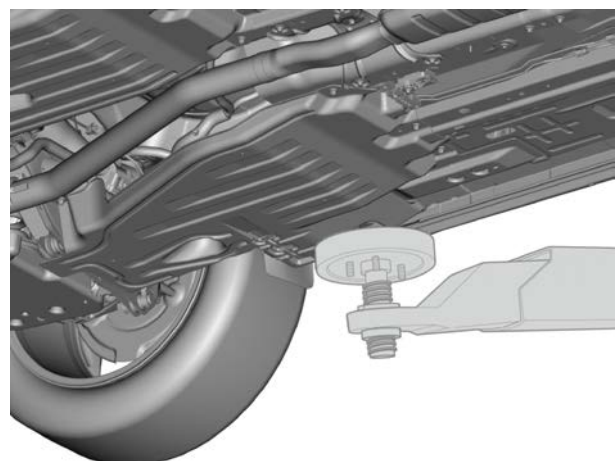
Caution

The front end lifter cushion block should not touch the rocker panel to the outside of the frame rail or the floor.

Place the front end cushion block in the following position

- Below the junction between the front frame rails and the side frame rails.

Rear end lifter cushion block



Caution

The rear end lifter cushion block should not touch the rocker panel to the outside of the frame rail or the floor.

Place the rear end cushion block in the following position

- Below the junction between the rear frame rails and the side frame rails.

1.4 Maintenance and Service

1.4.1 Specification

1.4.1.1 Oil and fluid capacity

Application	Capacity
Gasoline	62L
Engine oil (JLH-4G20TD)	6.8L (dry type)
	5.6L (wet type)
Engine coolant	7L
Brake fluid (vacuum booster)	0.86L
Brake fluid (brake booster module)	0.73L
Windshield washer fluid	4.0L
A/C Refrigerant	550g
Power take-off (AWD) lubricant	0.45L
Rear main reducer and differential assembly lubricant	0.45L
Torque manager lubricant	0.59L
8AT automatic transmission fluid	6.65L

1.4.1.2 Oil fluid capacity specification

Application	Specification
Gasoline	Refer to the refueling cap label
Engine oil (JLH-4G20TD)	Shell VCC RBS0-2AE 0W-20
Engine coolant	Ethylene glycol type coolants authorized by Geely
Brake fluid	DOT4
Windshield washer fluid	Water of hardness lower than 205g/1000kg or water solution with appropriate additive.
A/C Refrigerant	R134a
Power take-off (AWD) lubricant	75W-90
Rear main reducer and differential assembly lubricant	75W-90
Torque manager lubricant	Habot 311
8AT automatic transmission fluid	ATF AW-1

Caution

Recommendations for the use of windshield cleaners:

- a. When the ambient temperature outside the car is higher than 30 degrees, it is recommended to use a low-concentration washing liquid (ethanol content <20%)
- b. When the ambient temperature outside the car is lower than 30 degrees, it is recommended to use a high-concentration washing liquid (ethanol content >20%)

1.4.2 Instructions and operations

1.4.2.1 Tire rotation instructions

Caution

If there is obvious uneven tire wear, the fault cause of the wear should be eliminated.

It is recommended to check the balance of both tire and wheel assemblies if the tire is rotated.

1. Tire rotation is also recommended when performing brake checks on tires in accordance with the maintenance schedule described in the "handbook", or when the difference in tread depth between the front wheel tire and the rear wheel tire is 1.5mm (0.08in).
2. Lift and support the vehicle. See [Lifting and lifting vehicles](#)

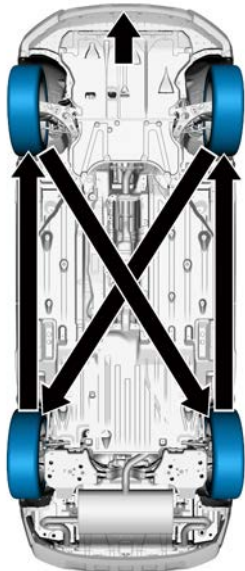
Caution

Record the original position of each tire and wheel assembly relative to the vehicle.

3. Remove tyre and wheel assembly. See [Replacement of wheel assembly](#)
4. Shift the position of tire and wheel assembly as shown in the following illustration.

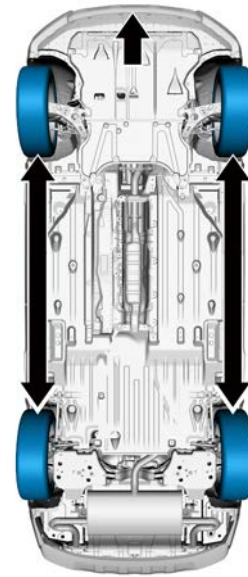
Caution

Perform rotation of "asymmetric tread pattern" tires as shown below.



Caution

Perform parallel transposition of "asymmetric tread pattern" tires as shown below.



5. Install the tyre and wheel assembly. See [Replacement of wheel assembly](#)
6. Remove safety stands.
7. Lower the vehicle.
8. Check and adjust tire inflation pressure.
9. Perform learning matching of the tire pressure sensor. See [Sensor learning](#)

1.4.3 Removing and installing

1.4.3.1 Engine oil discharge and filling procedure

For engine oil discharge and filling procedures, see [Replacement of drain plugs.](#)

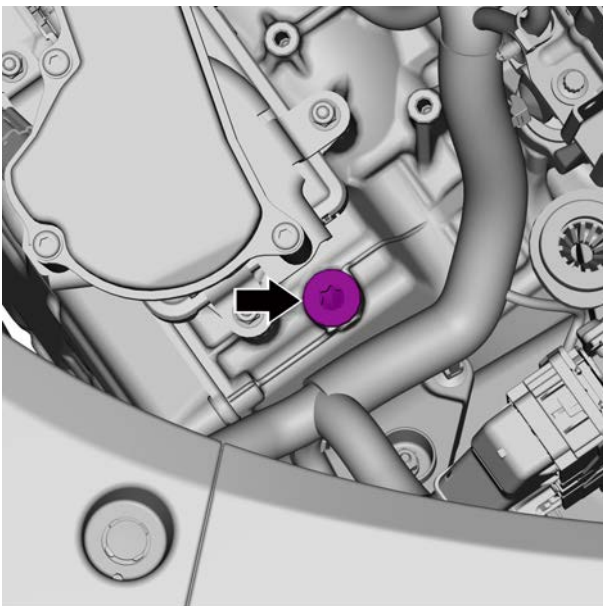
1.4.3.2 Transmission oil drainage and refilling procedures(8AT)

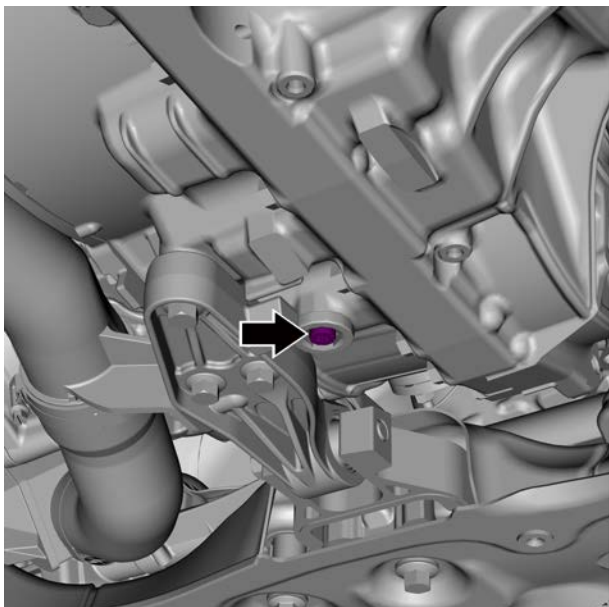
Emission process

Warning !

See [Automatic transmission maintenance precautions.](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the air filter assembly, refer to [replacement of air filter assembly.](#)
- 4 Lift the vehicle, see [Lift the vehicle](#)
- 5 Remove the engine fender, see [Engine fender replacement.](#)
- 6 Remove the fueling plug.

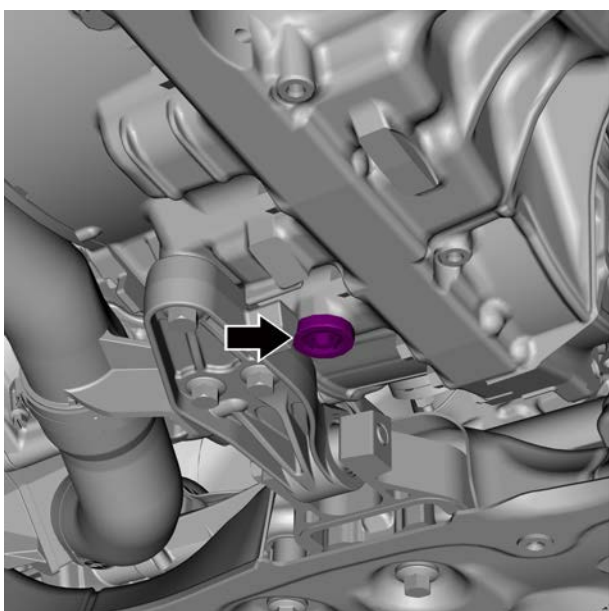




- 7 Remove the plug.

Caution

The transmission oil flows out of the transmission in a linear form, when it becomes a drop.



- 8 Remove drain bolt.

Caution

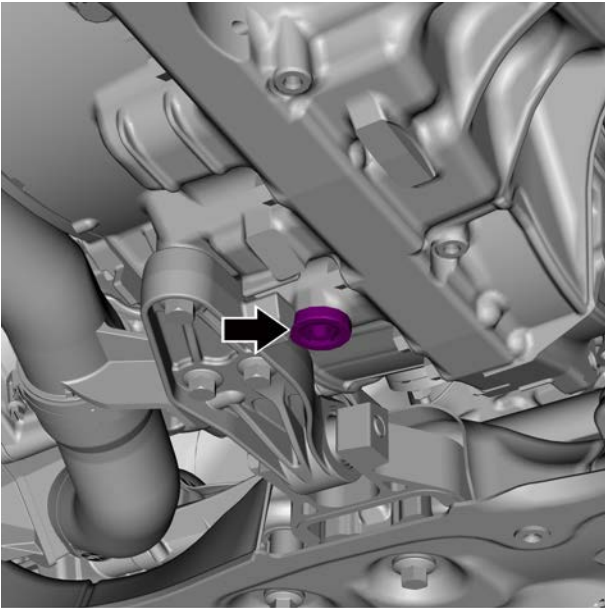
1. The transmission fluid here continues to flow out of the transmission in a linear manner, waiting for it to become a drop.

2. Oil cannot be reused.

3. Measure the quantity of the released oil as reference for the oil quantity to be refilled.

4. Wait 15 minutes before filling the fluid.

Refilling procedure



- 1 Install the drain bolt.

Torque: 47.N.m (metric system) 34.7 lb-ft (imperial system)

Caution

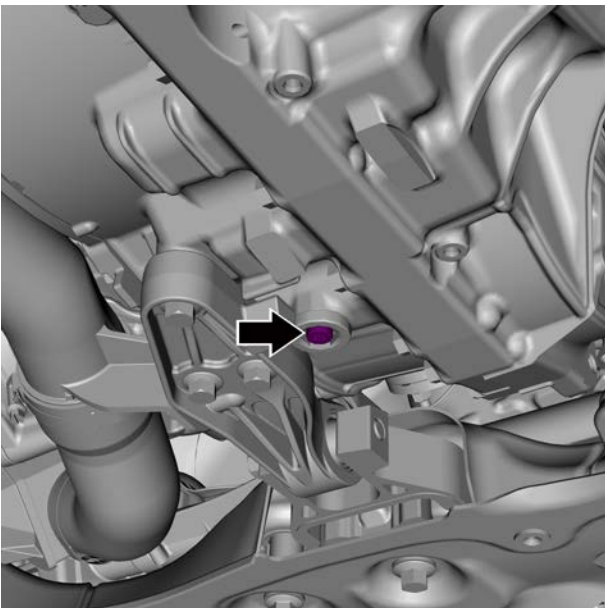
O-ring is a one-time wearing part, so must be replaced with a new one.

- 2 Fill transmission fluid until oil fluid droplets flow out of the overflow pipe.

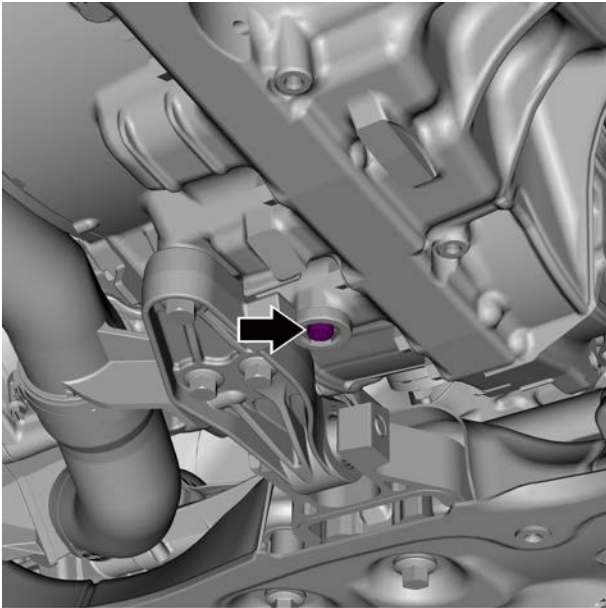
Transmission fluid specifications : see [General specifications](#).

- 3 Install the plug.

Torque: 7.4 N. m (metric system) 5.5 lb-ft (Imperial system)



- 4 Continue filling with 0.5L of transmission fluid.
- 5 Install the air filter assembly.
- 6 Connect the negative battery cable.
- 7 Start the engine, switch all gears from "P" to "D", each gear runs for more than 2 seconds, and return to "P" after 2 switches.

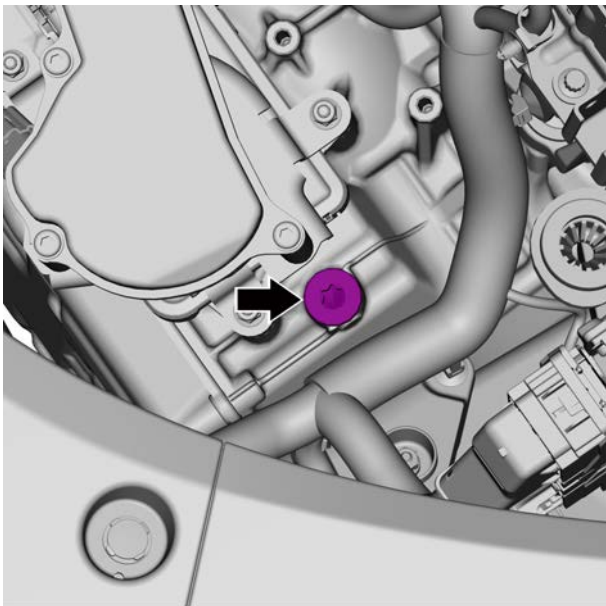


- 8 Connect the diagnostic instrument to monitor the transmission fluid temperature, so that the transmission fluid temperature is 50 °C ~ 60 °C.
- 9 Remove the plug and wait for the transmission fluid to drip.
- 10 Install and tighten the plug.

Torque: 7.4 N. m (metric system) 5.5 lb-ft (Imperial system)

Caution

1. O-ring is a one-time wearing part, so must be replaced with a new one.
2. Wait until there is no transmission fluid spill at the plug.



- 11 Install the engine fender.
- 12 Lower the vehicle and turn off the engine.
- 13 Disconnect the negative battery cable.
- 14 Dismount the air filter assembly.
- 15 Install and tighten the fluid refilling plug.

Torque: 39.2 N. m (metric system) 28.9 lb-ft (Imperial system)

Caution

- O-ring is a one-time wearing part, so must be replaced with a new one.

- 16 Install the air filter assembly.
- 17 Connect the negative battery cable.
- 18 Close the engine compartment cover.

1.4.3.3 Discharge and Filling of Engine Coolant

Emission process

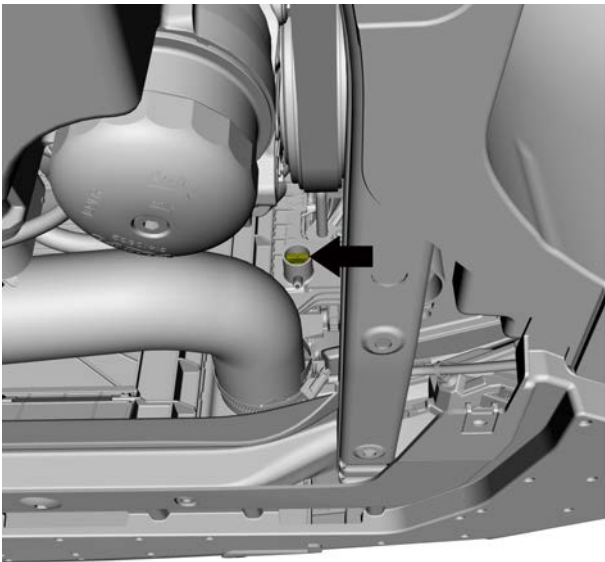
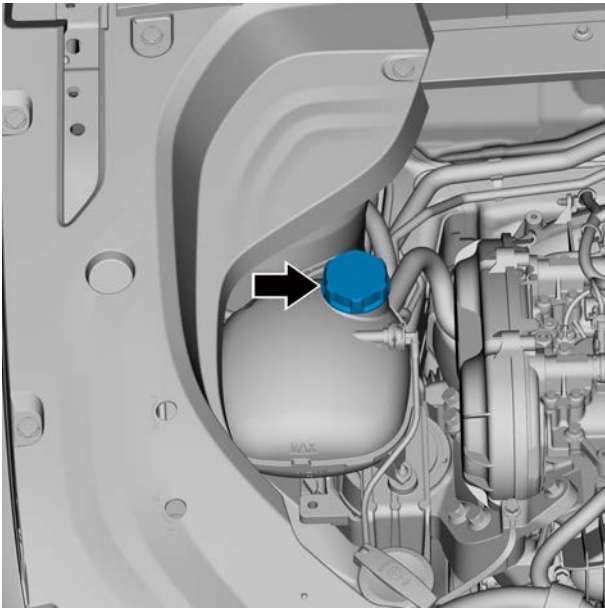
Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Lift the vehicle, see [Lift the vehicle](#)
- 3 Remove the engine fender, see [Engine fender replacement](#).
- 4 Remove the expansion tank cap.

Caution

When the coolant temperature is high, do not open the expansion tank cap to prevent the coolant from ejecting. Wait for the coolant to cool and then slowly loosen the the expansion tank cap to release its pressure.

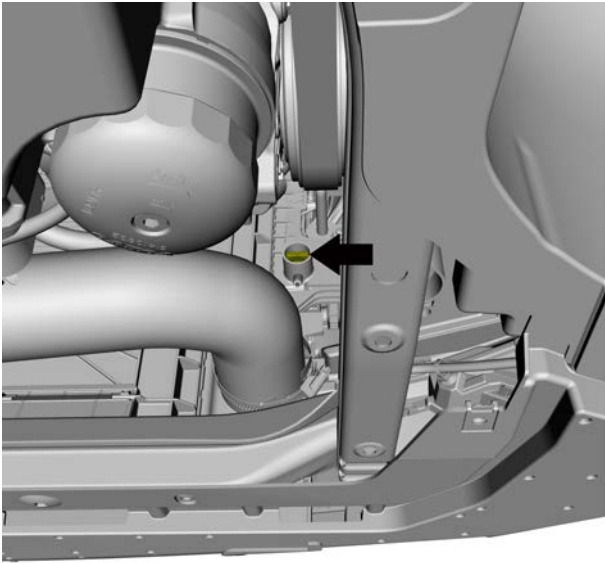


- 5 Screw counterclockwise to loosen the radiator drain plug.
- 6 Use the recovery container to receive the discharged engine coolant.

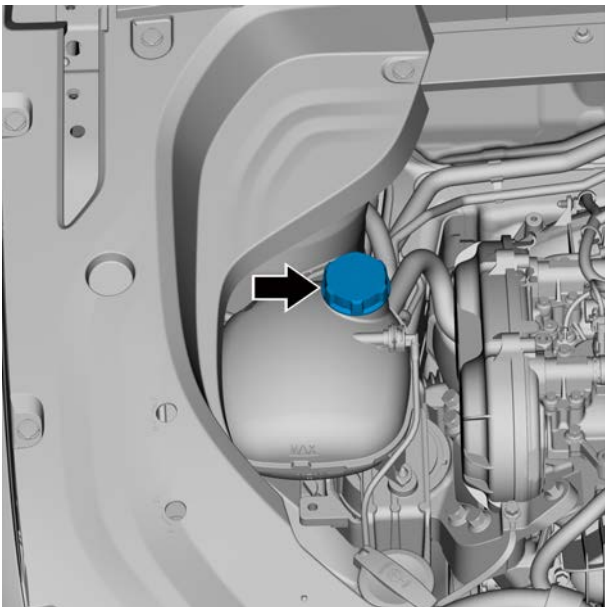
Caution

Collect and process the used engine coolant in a centralized manner for scrapping or recycling. Do not drain the used engine coolant into the sewer pipes to protect the environment.

Refilling procedure



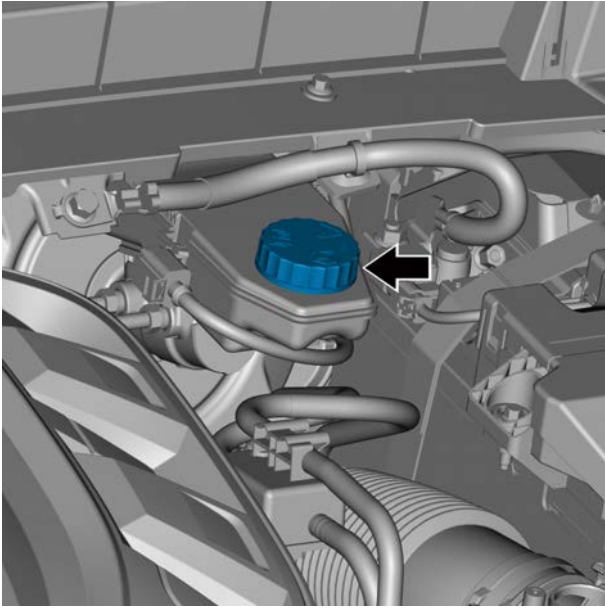
- 1 Screw and tighten the radiator drain plug clockwise.



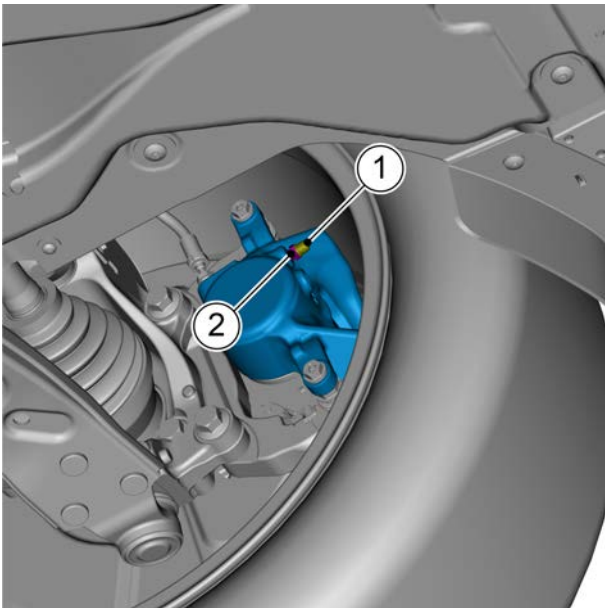
- 2 Clean expansion tank assembly.
- 3 Slowly fill the engine coolant to the expansion tank scale.
- 4 Start the engine until the thermostat is turned on. When both the inlet and outlet pipes of the two radiators become hot, you can be sure that the thermostat is turned on.
- 5 Shut down the engine, and make sure that the engine coolant drain valve is not leaking. Repeat the above steps until no bubbles appear from the liquid discharged from the exhaust pipe.
- 6 Open the cap of the expansion tank and fill with the engine coolant so that the liquid level reaches the expansion tank scale (between MIN and MAX).
- 7 Install the engine fender.
- 8 Lower the vehicle.
- 9 Close the engine compartment cover.

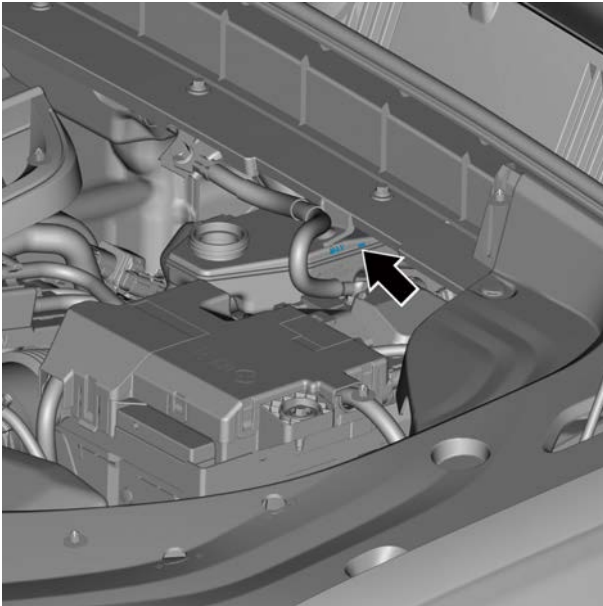
1.4.3.4 Discharge and filling procedure of brake fluid

- 1 Remove brake fluid tank cap.



- 2 Remove exhaust screw dust cover 1.
- 3 Connect a transparent tube to exhaust valve 2 on the RR brake cliper and place the transparent tube in a transparent container.
- 4 Slowly step on the brake pedal several times to drain all pipeline brake fluid.





- 5 Add brake fluid to the MAX position of the tank.

- 6 Exhaust the brake system.

Caution

The brake system exhaust should first start with exhausting the brake pipe of the wheel from far to near the main cylinder.

The exhaust maintenance process of brake system requires two people to cooperate with each other.

- 7 Slowly step on the brake pedal several times, then keep the pedal at the bottom.

Caution

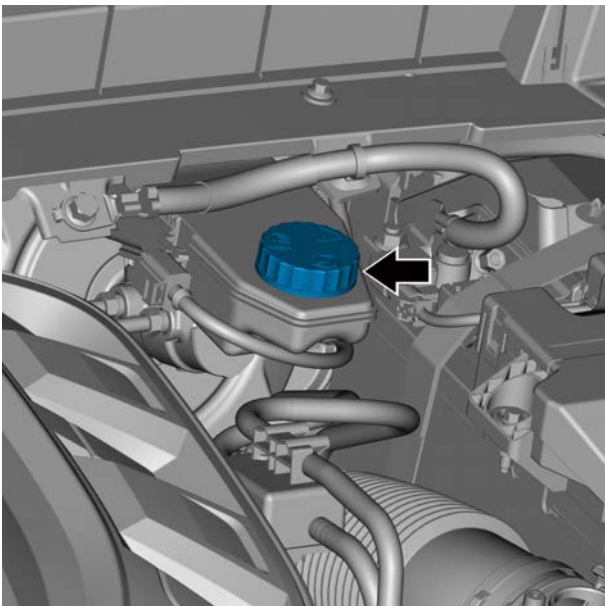
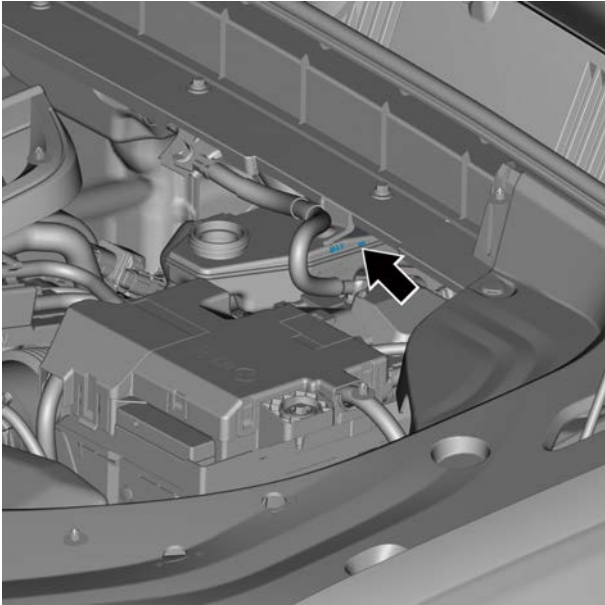
Do not step on the brake pedal sharply.

- 8 When pressing the brake pedal, loosen the bleed screw to discharge air from the brake clamp.
- 9 When the brake fluid no longer spills, tighten the exhaust screw and slowly loosen the brake pedal.
- 10 Repeat steps 7 to 9 until the gas in the brake fluid is completely discharged.
- 11 At the time of loosening the bleed screw, if no more bubble appears in the container, it indicates that all air has been discharged completely.

Caution

In the process of exhaust, the fluid level of the brake main cylinder storage tank should be kept at least halfway up.

- 12 Brake system exhaust sequence: RR wheel / FR wheel / RL wheel / FR wheel.
- 13 Tighten exhaust screws.



- 14 Operate in accordance with the procedure in the step 1-13. Drain air from the remaining brake calipers.
- 15 After discharging the whole air in the brake caliper, check whether the brake pedal is soft. In case the pedal is soft, repeat the whole exhaust procedure until normal.
- 16 After exhaust, add brake fluid to the MAX position of the tank.

- 17 Install brake fluid tank cap.

1.5 Maintenance Information System

1.5.1 Instructions and operations

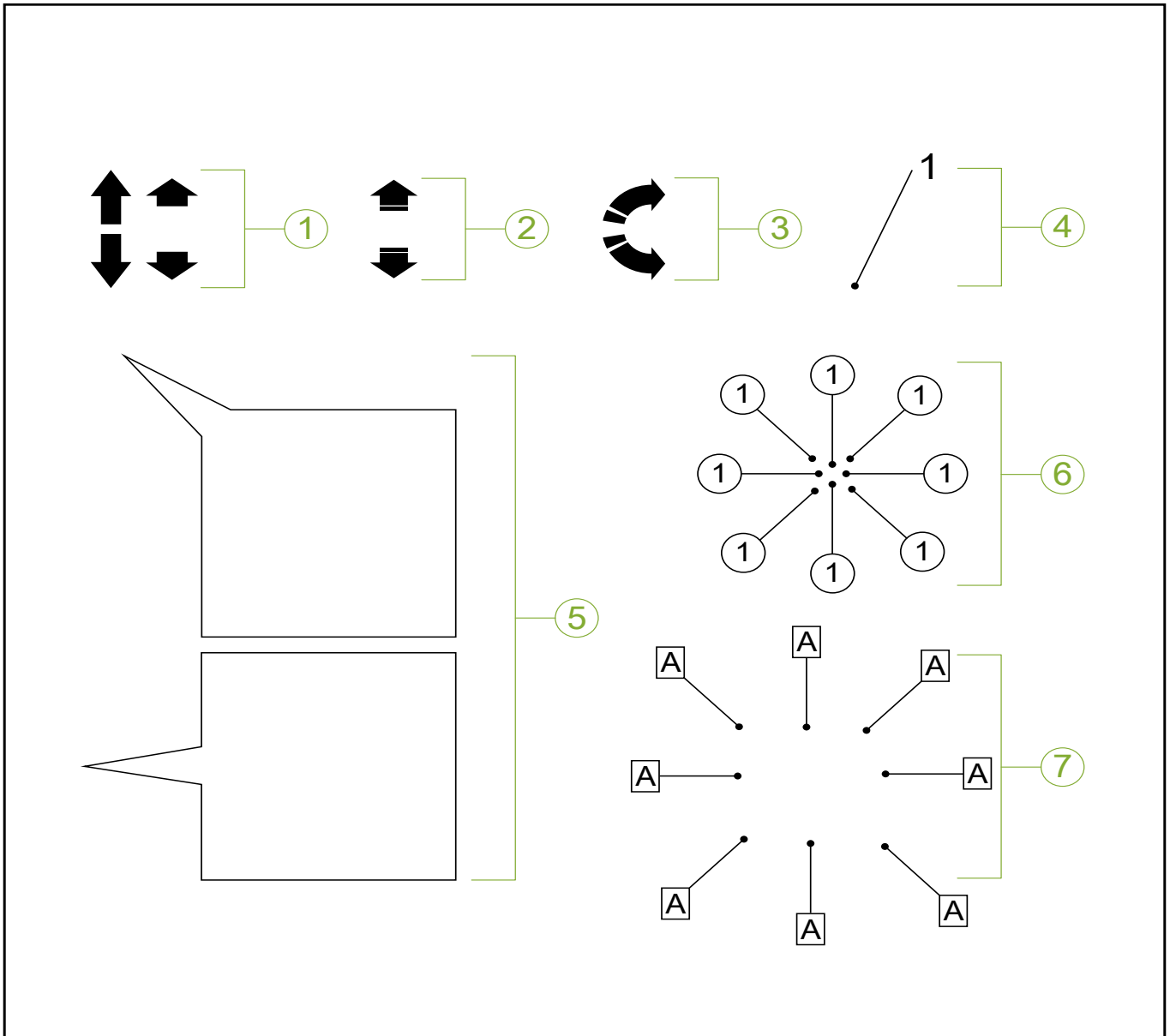
1.5.1.1 Description of abbreviations used in the manual

Abbreviation in English	Chinese description
ABS	Anti-lock braking system
AC	Air conditioning equipment
ACC	Adaptive cruise control system
ADAS	Driver Assist System
ADB	Adaptive driving beam
AEB	Automatic emergency brake (AEB) system
AFS	Adaptive front-lighting system
ALCM	Ambient light control module
ALT	Alternator
AMP	Power amplifier
APA	Automatic parking assist system
AQS	Air quality sensor
AUTO HOLD	Automatically parking
AVM	Panoramic image module
ASDM	Active safety domain master
AUD	Audio control module
BBM	Brake booster module
BNCM	BLE NFC communication module
CCD	Central console displayer
CCSM	Central console switch module
CCM	Temperature control module
CEM	Central electronic module
CKP	Crankshaft position sensor
CMP	CMP sensor
DDM	Driver door module
DDS	Driver door switch
DEM	Differential electronic module
DIM	Driver information module
DLC	Data link connector
DMSM	Central console switch module
DVR	Digital video recorder module
EBD	Electronic braking force distribution
E-CALL	Emergency call
B-CALL	Breakdown call
ECM	Engine control module (ECM)
ECT	Engine coolant temperature sensor

Abbreviation in English	Chinese description
EPB	Electronic parking brake
EPS	Power steering system
ESS	Emergency stop switch
EVAP	Evaporative solenoid valve
FLC	Forward-looking camera
FLR	Forward-looking radar
FRS	Front radar system
FSRL	Front left radar module
FSRR	Front right side radar module
GSM	Gear shifting-lever module
HAC	Hill-start Assist Control
HO2S	Oxygen sensor
HUD	Head-up display
HVAC	Temperature control module
HVSM	Heating / ventilation seat
IBS	Intelligent battery sensor
ICC	Intelligent Navigation System
IHBC	Smart high beam control system (IHBC)
IHU	Infotainment head unit
IPK	Instrument panel control unit
KS	Knock sensor
LDW	Lane departure warning
LDP	Lane departure assistance
LKA	Lane keeping assist system
LKS	Lane keeping assist
MAP	Manifold pressure sensor
MMI	Multimedia interactive system
PAS	Park assist system
PEPS	Passive Entry Passive Start
POT	Power operated tailgate module (POT)
RCSM	Rear console switch module
RDM	Driver door module
RFR	Radio frequency reception
RLDM	Rear left door module
RRDM	Rear right door module
RLSM	Rain and light sensor
SAS	Steering Angle Sensor
SMD	Driver seat module

Abbreviation in English	Chinese description
SMP	Driver seat module
SLIF	Speed limit information function (SLIF)
SODL	Left obstacle detection and control module
SODR	Right obstacle detection and control module
SRS	Supplemental restraint system module
SWM	Steering wheel module
TCAM	Ternary content addressable memory and interconnected antenna module
TCS	Traction Control System
TCM	Transmission control unit (TCU)
TPMS	Tire Pressure Monitoring System
TPS	Throttle position sensor
VDDM	Vehicle dynamic domain mainframe
VGM	Vehicle gateway module
VSS	Vehicle speed sensor
WPC	Wireless phone charger

1.5.1.2 Description of arrows and symbols used in manual

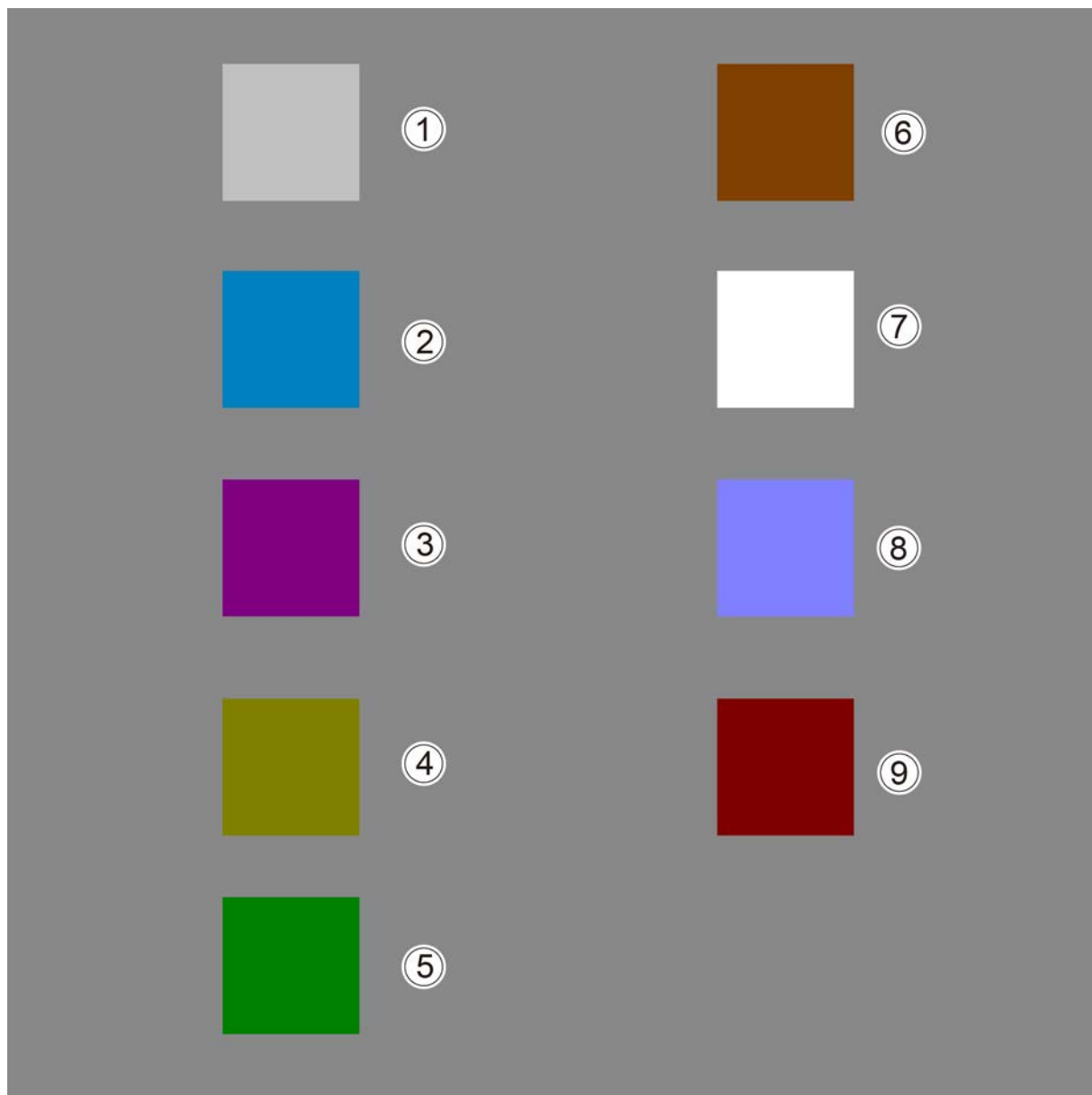


Legend

- | | |
|------------------------------------|---------------------------------------|
| 1. Indication arrow | 5. Enlarged area |
| 2. Movement direction of the arrow | 6. Maintenance program fastener mark |
| 3. Rotation direction of the arrow | 7. Maintenance program connector mark |
| 4. Part number mark | |

1.5.1.3 Descriptions of the color code used in the manual

In the maintenance information, different colors of the graphics represent different meanings, which can tell the user what to do. According to the above reference information, take the standard maintenance procedure as an example to learn the meaning of different color codes.



- | | |
|---|---------------------|
| 1. Peripheral material | 6. Secondary object |
| 2. Target piece | 7. Background |
| 3. Fasteners, connectors | 8. Special tool |
| 4. Parts that are moved but not removed | 9. Segment |
| 5. Preferred object | |

Please note that the picture may deviate from the actual view of the car. Some of the details can be viewed from a perspective. To avoid overly complicated diagrams, some details may be omitted.

1.6 Health and safety

1.6.1 Instructions and operations

1.6.1.1 Description

Many operations related to vehicle maintenance and repair can affect personal safety or health problems. This section lists some materials and equipment related to dangerous operation as well as the safety rules to avoid such hazards.

This section does not include all matters related to health and safety, so all operations, procedures and material handling should be conditional on safety and health. Before using any products, consult the product instruction manual provided by the manufacturer or the supplier.

1.6.1.2 Acid and alkali

See [Battery acid](#).

Such as sodium carbonate and vitriol that are corrosive.

Used for cleaning the battery and other materials.

Irritant or corrosive to eyes, skin, olfactory and throat, which will burn the human body and damage common protective clothing.

Avoid splash on eyes, skins, and clothing. Wear appropriate protection suits, gloves and goggles to avoid the inhalation of spray.

Please provide flush equipment nearby, such as an eye flush bottle, shower nozzle and soap to facilitate timely rescue at any time in case of a splattering event. Place a mark indicating eye danger in a prominent position

1.6.1.3 Airbag

See [Fire](#) and [Chemical materials](#).

Highly flammable and explosive - comply with the non-smoking rules.

Airbags are installed in steering wheel, front passenger seat, passenger front dashboard and A-pillar, B-pillar and C-pillar as auxiliary safety system.

The airbag expander contains a high-energy propellant, which generates extremely high temperature gas (2500°C/4532°F) when it is ignited.

This propellant is sealed in enclosed unit. When the airbag works, the gas will fill whole air pocket. The airbag should not be deployed during maintenance, because it will cause propellant contact and danger. If gas generator is found broken, one should wear protective clothing which can cover whole body when dealing with spilt material.

After normal detonation of airbag, one should wear safety goggles and gloves in dealing process.

Detonated airbag should be disposed in accordance with local relevant laws and regulations.

Measure should be taken after contacting the gas derivative directly:

- Flush thoroughly with clean water at the contact point
- Seek medical care depending on the situation

Airbag - operation should be executed (please wear safety device as well as possible for your safety; make sure that the power mode of start and stop button of vehicle is in “OFF” status. Unplug the key and disconnect battery negative cable. Wait for 90s, then the removal work can be operated).

- Store the airbag unit in vertical position.
- Keep the airbag unit dry in storage.
- Notice not to touch electrode with hands. Keep your body away from airbag as far as possible when carrying airbag unit.
- Place the protecting cover upwards when airbag unit is placed.
- Check carefully whether the airbag unit is damaged.
- Disconnect the battery negative cable first when connecting airbag. Wait for 90s, and stand on the side of airbag unit.
- Accurate correction and maintenance of all equipment.
- After disposing detonated airbag, make sure to wash hands.

Airbag - operations to be avoided

- Flammable materials and the unit or gas generator cannot be stored together.
- Airbag assembly should not be immersed in water or contact other fluid.
- The temperature of places where the gas generator is stored should not exceed 80°C/176°F.
- The unit should not be stored upside down.
- Do not try to open the shell of gas generator.
- The gas generator should be away from open flame or sources of intense heat.
- Do not place other items on the unit cover.
- Damaged unit should not be used.
- Do not touch the airbag assembly or gas generator within 10min of detonation of the assembly.
- Do not use any electric probe on the circuit.

1.6.1.4 A/C Refrigerant

See [Chemical materials](#).

Skin contact may cause frostbite.

It is needed to follow the manufacturer's descriptions, avoid naked lights and wear proper goggles and protective gloves.

If skin or eyes come into contact with refrigerant, it is necessary to wash the exposed area with water immediately. The eyes shall be flushed with appropriate flush solution and shall not be rubbed. Medical assistance shall be sought according to the specific situation.

A/C refrigerant - operations to be avoided

Do not store refrigerants in the places exposed to sunlight or heat sources.

- When filling, do not put the refrigerant bottles upright, and keep their valves facing downwards.
- Do not expose the refrigerant bottle to frost and snow.
- Do not drop the refrigerant bottle.
- Never discharge the refrigerant directly into the atmosphere under any circumstances.
- Do not mix the refrigerants, such as R12 (dichlorodifluoromethane) and R134a (tetrafluoroethane).

1.6.1.5 Adhesives and sealants

Notice of using adhesive and sealant

Before the adhesive and sealant are used, make sure that the surface of the sizing part is clean and it must be wiped with the special cleaner, so as not to affect the adhesive effect. The sealants cured at room temperature should not enter the thread blind holes when using the sealant. If the sealant cured at room temperature enters the thread blind holes, fastener tightening will have a hydraulic lock up effect when it is tightened. The hydraulic lock up of fastener components causes the damage to fastener tightening and other components. It will also make it unable to get the correct clamp force of fastener tightening when tightening, resulting in incorrect tightness of fastener tightening, loose or separation of components and serious damage to the engine and other components.

Adhesive for body repair

Health and safety

Since there are harmful substances in the materials used in adhesive and sealant, long-term exposure will cause some diseases, such as acute and chronic poisoning, career diseases and skin diseases. The ventilation device is used to maintain the ventilation of the workshop when applying glues; protective gloves, face mask, protective clothing, etc. should be worn during operation; hands should be washed carefully and the workshop should be clean, tidy and sanitary after working.

- Waste glues and wastes polluted by the solvent should be promptly cleaned up, and not be accumulated for a long time.
- Products should normally be kept in non-smoking areas. When used, they must keep clean and construction is carried out with applicators or containers as far as possible.

Maintenance of adhesive and sealant

In the event of fault or accidents of vehicle, it will cause body distort, cracking of steel plates and getting adrift of welding joint and part damages to the engine, chassis and other assembly components, causing the some adhesive/sealant products to be adrift and damaged. In the process of vehicle maintenance, the adhesive with the same performance should be selected according to the material and functional requirements of components. The following is a list of adhesives/sealants that can be used during automobile maintenance, which can be selected in the automobile maintenance.

Body repair

If the body interior trim and steel plates distort or crack and the adhesive on the body get adrift or cracked, the parts with adhesive should be repaired in the process of maintenance.

- Firstly, remove the adhesive on the body surface with a knife and wipe the remaining adhesive with alcohol.
- Wipe the adhesive parts with special cleaners to avoid residual impurities such as remaining adhesive on the sizing surface;
- Then apply the repair adhesive to the original sizing parts to achieve the adhesive and sealing effect.

Products	Base materials	Application	Recommended model
Body sealant	Single unit polyurethane	Bonding of vehicle body skin, interior/ exterior trims, body structure, etc. The adhesive should have a strong adhesive force and cohesion force and have good adhesion with metal, various paints, etc.	TONSAN®: 1922, 1923
Seam sealant	One-component polyurethane	Room temperature curing adhesive is used for sealing the weld inside the car body and is manually brushed with a brush; room temperature curing adhesive is used for fine sealing the engine hood of trunk and door hem, and special glue extrusion gun is used for thread coating.	China Auto Parts & Accessories Industry Corporation: C8802
Anti-collision primer	Rubber and resin	Anti-collision adhesive cured at room temperature used for chassis protection, forming a permanent anti-aging, elastic, corrosion resistant, protective coating at the bottom of the car and the wheel cover. This kind of product can substitute PVC coating, with excellent functions such as rust-proof, sound insulation, anti-stone chipping.	China Auto Parts & Accessories Industry Corporation: C312DW
Front windshield adhesive	Single unit polyurethane	Polyurethane adhesive cured at room temperature, used for direct bonding and sealing of automobile window glasses. The adhesive has a good adhesive performance. It can react with the moisture in the air, solidify and form excellent properties such as high strength, aging resistance, vibration and fatigue resistance, low-temperature resistance, and non-corrosion.	TONSAN®: 1956, 1924
Cleaner	-	Cleaning of all surfaces contacted with primer paint and adhesives.	-
Pressure-sensitive adhesive tape	Acrylic acid tape	Bonding of anti-scratch panel, nameplate, fender apron, mud apron, door protection, various trim strips, etc. This adhesive tape has properties of excellent weather resistance and endurance.	3M4229P, 4215, 4221L

Products	Base materials	Application	Recommended model
Heat-sensitive adhesive tape	Acrylic acid tape	It is mainly used for bonding the rubber sealing strip system of automobiles. This type of tape should have a strong binding force and strong sealing performance, to avoid clearance and corrosion due to poor adhesion.	3M4237P
Tape glue	-	Choose different primers according to the bonding surface materials. The bonding surface should be clean. After being thoroughly dried, apply the primer evenly on the bonding surface with a brush. After being dried, paste the adhesive tapes.	3MC-100, K-500\520, N-200

Component maintenance

If the parts of interior trim, engine, gear box and other parts are damaged, bonding and sealing repair is required. When

sealant is applied, the adhesive surface should be cleaned to avoid burrs and cracks affecting the adhesive effect.

Glue for component maintenance

Name	Application	Recommended model
Silicone rubber flat sealant	It is used in the flat sealing of large clearance and flexible joints, such as enclosure, flange, joint surface of bottom shell and end cap. After cleaning of remaining glue and drying, the sealing surface (or gasket) should be applied with an appropriate diameter of the sealing glue line. After application, the components should be aligned and closed immediately to avoid wrong movements. The bolts should be tightened to exclude excess glue or it is cleaned with blades after curing. This sealant contains no solvent and can be cured at room temperature. It does not corrode the parts and can withstand impact, medium and high temperature.	TONSAN®: 1596, 1598
Anaerobic thread locking sealant	For the fastening and locking of bolts, nuts, screws and other components, the mesh should be cleaned when they are applied. After drying, the glue can be applied to the mesh. After cured at room temperature, it has good impact resistance, vibration resistance, no leakage, corrosion resistance and other properties.	TONSAN®: 1243, 1242
Anaerobic sealant	It is used for the sealing and bolt locking of flat components with small clearance whose curing needs to be isolated from the air. It has water resistance, oil resistance, corrosion resistance and other properties	Loctite204, TONSAN®:1510

Other maintenance materials

Name	Application	Recommended model
Locking fluid	It is used for the fastening bolts with the maximum fastening dimension of M6, such as window glass lifter handles.	Loctite thread locking fluid
Rust inhibitor	It is a rust inhibitor based on the rubber. It is used for sound insulation and rust-proof treatment of automobile chassis, with the effect of anti-corrosion and sound insulation	Fudun

Construction cautions

– The role of adhesive/sealant is to prevent water and dust from entering the vehicle, but also has the function of anti-corrosion. The original sealing joints are obvious and should be resealed if they are damaged. High consistency fillers should be selected when open joints are sealed with adhesive/sealant. Follow the descriptions for the selected materials.

– When adhesive/sealant materials are sprayed, precautions must be taken to avoid spraying into component openings (such as door locks, window trays, window regulators and seat belt retractors) and any moving or rotating components, especially parking brake cables. After the adhesive/sealant is sprayed, make sure that all body bleed holes are opened.

– Special protective glasses and gloves should be worn during operation to prevent personal injury.

– When the vehicle is delivered, the body metal plates have been coated. After maintenance and/or replacement of components, all exposed metal surfaces must be treated with the rust-proof primer before glue is applied.

– After gluing maintenance, part of the adhesive/sealant needs to be dried and cured. The baking condition is (70 ~ 80) °C for 20 ~ 30min.

1.6.1.6 Engine coolant

See [Fire](#).

Such as isopropanol, ethyleneglycol, glycol and methyl alcohol.

Highly flammable combustibles.

Used in engine coolant circulation system of vehicles.

Engine coolant (glycol) may produce steam in case it is heated to high temperature. Inhalation of such steam should be avoided.

After directly contacting the engine coolant, the amount of engine coolant absorbed directly through the skin may reach toxic or harmful levels. If accidentally swallowing the engine coolant, it could be life-threatening and you should be sent to the hospital immediately for medical assistance.

These products cannot be disposed of in conjunction with common food or connected with the drinking water supply system.

1.6.1.7 Asbestos

Inhaling asbestos dust can easily cause lung damage and even cancer.

Prior to disposal, asbestos dust waste should be wetted, placed in a sealed container and clearly marked on the surface of the container, to facilitate safe disposal. If it is necessary to attempt to cut or drill holes in material containing asbestos, such material should be wetted first. And only hand tools or low-speed power tools should be used.

1.6.1.8 Battery acid

See [Acids and alkalis](#).

Gases released during charging are explosive. Never conduct open flame operation near the battery which is being charged or freshly charged.

Must keep proper ventilation.

1.6.1.9 Brake fluid

See [Fire](#).

If splashing on the skin and eyes, it will cause slight irritation. Measures should be taken to avoid the brake fluid directly contacting the skin and eyes. The risk of inhaling brake fluid vapor at normal temperature is not high, since its vapor pressure is extremely low.

1.6.1.10 Chemical material

Great care should be given to the use, storage, and disposal of chemical materials of solvents, sealants, adhesives, coatings, resin foam, battery acid fluid, engine coolant, brake fluid, fuel, lubrication oil, and grease. They may be toxic, harmful, erosive, irritant, or highly combustible and with high dangerous odor and dust.

The influence of long-term overexposure to the chemical substances in the environment may be immediate or chronic, transient or permanent, accumulative, superficial, life-threatening, or may affect lifespan.

Chemical materials – required operations

– Carefully read and follow the warnings and notices on the raw material container and any accompanying leaflet, poster,

and other instructions. The health and safety data form of raw materials can be obtained from the manufacturer.

- After being exposed to chemical materials, remove them from your skin and clothes immediately, and change heavily immersed clothing and wash it thoroughly.
- Strictly follow instructions and wear protective clothing to avoid direct contact of the materials with the skin and eyes.
- In case of dealing with chemical materials, clean before resting, eating, smoking, or using toilet facilities.
- Keep the tidiness and orderliness of the working area, and do not spill the chemical materials.

Chemical materials - operations that should be avoided

- Unless specified by the manufacturer, chemical materials cannot be mixed. Some chemical substances will form other toxic or harmful chemical substances and release other toxic and harmful gases during the mixture and cause an explosion or other accidents.
- Spraying chemical materials in an enclosed environment is not allowed.
- Unless specified by the Manufacturer, chemical materials cannot be heated, because some chemical materials are highly combustible and others may release toxic and harmful gases.
- Do not keep the chemical material container open. Released gases may accumulate to be toxic, harmful, or explosive. Some gases are heavier than the air and can be accumulated in an enclosed space.
- Putting chemical materials in containers without labeling is not allowable.
- Cleaning hands or clothing with chemical materials is not allowable. Chemical medicines, especially solvents and fuels, will dry out the skin and may cause allergies, scytitis, or the direct absorption of toxic and harmful substances, influencing the health of the body.
- Do not store other chemical materials in an empty container arbitrarily unless the container is cleaned under supervision.
- Do not sniff or smell chemical materials. Brief exposure to gases with high concentrations may still cause poisoning or injuries.

1.6.1.11 dust

Powder, dust, and dirt may be irritating, harmful, or poisonous. Avoid inhaling powdery chemicals or dust raised by dry friction operation. If ventilation is insufficient, it's required to wear a breathing mask and protective device to prevent inhalation of dust.

Fine dust of combustible material may have the risk of explosion. Avoid explosion and combustion source.

1.6.1.12 electric shock

Incorrect use of electrical equipment without following instructions or abuse of equipment in good condition may cause electric shocks.

Be sure to maintain the electrical equipment within the specified time and test it frequently. Faulty equipment should be marked and it'd better to move it outside the working area.

Do not wear, kink, cut, crack or otherwise damage wires, cables, plugs and sockets, and do not make electrical equipment and wires contact with water.

Ensure that electrical equipment is protected by correct fuses.

Misuse of electrical equipment is prohibited, and equipment with any hidden trouble must not be used, otherwise the result may affect personal safety.

The cables of mobile electrical equipment shall be guaranteed not to be clamped and damaged.

Basic first aid training must be carried out for specialized electrical appliance operators.

In the event of an electric shock:

- Turn off the power before contacting the victim.
- If the power supply cannot be turned off, the victim's power supply should be removed with dry insulator material.
- Those who have received special first aid training should immediately carry out on-site first aid.
- Request medical assistance.

1.6.1.13 Waste gas

The waste gas contains toxic and hazardous chemical substances, for example, carbon oxide, nitrogen oxide, acetaldehyde, lead and aromatic hydrocarbons. The engine can operate only when it is in a proper waste gas exhaustion equipment or common ventilation equipment and in an open space.

1.6.1.14 Fiber isolation

See [Dust](#).

Used to isolate noise and sound.

The fibrous nature of its surface and sharp edges can cause skin allergies.

Follow the operating procedure instructions and wear gloves during operation to avoid excessive skin contact with the fibers.

1.6.1.15 Fire

Many materials related to vehicle maintenance are highly flammable. Many materials will produce poisonous and harmful gases after burning.

Please make certain to follow the fire control safety standards in storing and disposing flammable materials or solvents, especially in places near to electrical equipment and where a welding operation is taking place.

Before using electrical and welding equipment, no potentials of the fire must be confirmed firstly.

In case of welding or using the heating equipment, it is needed to prepare a suitable fire extinguisher around the operation area.

1.6.1.16 first aid

It should not only comply with the law, but also have professional first aid coaching personnel in the working place.

If the eyes are splashed, they should be rinsed with water for at least 10 minutes.

If the skin is contaminated, wash the contaminated area with soap and water.

If suffered from frostbite, soak the frostbitten area in ice water or cold water.

The personal inhaling toxic gases should be immediately moved to the area with fresh air, if adverse reactions continue to occur, the injured personal should immediately be sent to a hospital for medical assistance.

In case of accidental ingestion of liquid, inform the physician of the information on the container or coil label, and do not blindly induce vomiting unless instructed to do so on the coil label.

1.6.1.17 Foam

See [Fire](#).

The cured foam is used as a buffer pad between the seat and decoration.

Manufacturer instructions are followed.

Components that do not produce chemical reactions are irritating and may be harmful to skins and eyes, gloves and goggles are needed to worn for operations.

For persons with problems of chronic respiratory diseases, asthma, and bronchus or with hereditary allergy, they should not handle or be close non-cured materials.

Spare parts, vapor, or spray of non-cured materials will cause direct stimulus and anaphylactic reactions that may be toxic and harmful.

Do not inhale vapor or spray. Such materials must be used under the condition of good ventilation and that breathing is protected. It is not allowable to remove the mask immediately after spraying, and it can be removed until the complete dissipation of vapor and spray.

The combustion of non-cured components and cured foam will produce poisonous and harmful gases. During the period of foam operation, unless vapor and spray have been completely cleared out, and smoking, open fire, and electric equipment are prohibited. The thermal cutting for any foam materials or special foam materials should be operated in a well-ventilated environment.

1.6.1.18 Fuel

Reduce direct skin contact with the fuel. When exposing to the fuel, immediately use soap and clear water to wash the skin that directly contacts the fuel.

Gasoline

The usage of inflammable gasoline should conform to the smoking banning regulations.

If swallowed by mistake it will cause irritation of the mouth and throat, absorption of the stomach will lead to general weakness and confusion, a small amount of gasoline will affect the safety of children's lives, and if the liquid enters the lungs, it is very dangerous.

The gasoline will cause dry skin and cause skin allergy and dermatitis if the gasoline is contacted for a long time or frequently. The liquid will cause severe pain when entering the eyes.

Motor gasoline contains a large quantity of benzene. Inhalation of it will lead to poisoning. Therefore, the concentration of the gasoline vapor should be maintained at a low level. Gasoline vapor in high concentration will trigger illnesses such as irritation, nausea, headache, depression and inebriation. The gasoline vapor with extremely high concentration will cause fast consciousness loss.

When the gasoline is treated, good ventilation should be maintained. In particular, when the operation is conducted in a confined space, it is needed to pay attention to the danger of gasoline vapor inhalation caused by splashing.

Special attention should be paid when gasoline storage equipment is cleaned and maintained.

The gasoline should not be used as detergent and should never be inhaled by mouth.

1.6.1.19 Gas cylinder

See [Fire](#).

Gases such as oxygen, acetylene, argon and propane, which are normally stored in gas cylinders at the pressure of 13.8 MPa (2001psi). Special attention must be paid to deal with these cylinders for avoiding mechanical damage to cylinders or valves.

Cylinders filled with gas shall be clearly and appropriately labeled.

Cylinders shall be stored in a well ventilation area and protected from snow, ice or direct sunlight. Fuel gases, for example: acetylene and propane shall not be stored with oxygen cylinders.

Special attention shall be paid to prevent leakage of gas cylinders and pipelines as well as ignition sources.

Only personnel with professional skills are allowed to perform work related to gas cylinders

1.6.1.20 General workshop tools and equipment

Always keep good working condition of all tools and equipment, and right operations during use, which are all significant.

Bear in mind that do not use tools or equipment applied for the purposes contrary to its design function. Do not make equipment such as crane, jack, axle, chassis bracket and sling bear the load exceeding the maximum limit it can bear. Damage caused by overload does not always appear immediately, and it may cause serious accidents in the next use.

Do not use tools or equipment that have been damaged or in poor working condition, especially some high-speed equipment such as grinding wheel. Damaged grinding wheel can shatter without warning and cause serious damage.

At the time of using grinding wheel, chisel or sandblasting equipment, appropriate eye protection equipment should be worn.

When operators use sandblasting equipment, handle materials containing asbestos or use spray equipment to conduct operation, appropriate breathing mask should be worn.

Ventilation equipment that can control the amount of dust, spray, and smoke in the environment must be equipped.

1.6.1.21 Lubricants and Greases

Avoid long time and repeated contact with mineral grease. All lubrication oils and lubricating greases are irritating to eyes and skin.

Used engine oil

Long time and repeated contact with mineral grease will give rise to the loss of natural skin oil, and cause dryness, irritation and dermatitis. Besides, it is highly likely that there is harmful substance that may cause skin cancer in the used engine oil. Skin protection equipment, as well as flushing equipment, should be used.

Do not use the used engine oil as lubrication oil, or any other usage that may contact skin directly.

Heath protection safety rules

- Long time and repeated contact with engine oil should be avoided, especially the used engine oil.
- Wear protective clothing, including impermeable gloves.
- Do not put wiping cloth stained with engine oil into pockets.
- Prevent the engine oil from contaminating clothing, especially the intimates.
- Do not wear clothing or shoes highly contaminated with engine oil. Working clothing must be cleaned regularly and kept clean.
- First aid treatment of open wound should be given without delay.
- In working, apply the protection cream to your skin as long as possible, so as to prevent your skin from directly contacting engine oil.
- Use soap and clean water to flush and eliminate all engine oil. Apply protective agent which contains wool grease. This will help replace natural oil removed from your skin.
- If skin lesion occurs, seek medical treatment immediately.
- Eliminate the residual grease on components as much as possible before working.
- If direct contact to eyes is possible, please wear protective goggles such as goggles or masks that are protective against chemicals and drugs. Besides, eyes flushing equipment is also needed.

Environment notices:

Used waste engine oil and oil filter should be recycled and handled by authorized or licensed waste processors, or waste engine oil recyclers. If you have any doubt, contact the relevant departments of the local competent authority in a timely manner.

It is prohibited by law to pour the used waste engine oil directly into the ground, sewers or drainages, or water pipes.

1.6.1.22 noise

High-decibel noise may be produced during the process of some operations, and it may cause harm to hearing. At this moment, the appropriate hearing protection equipment should be worn.

1.7 Standards and metrics

1.7.1 Instructions and operations

1.7.1.1 Equivalent decimal and metric

Fraction (in)	Decimalism (in)	Metric (mm)
1/64	0.015625	0.39688
1/32	0.03125	0.79375
3/64	0.046875	1.19062
1/16	0.0625	1.5875
5/64	0.078125	1.98437
3/32	0.09375	2.38125
7/64	0.109375	2.77812
1/8	0.125	3.175
9/64	0.140625	3.57187
5/32	0.15625	3.96875
11/64	0.171875	4.36562
3/16	0.1875	4.7625
13/64	0.203125	5.15937
7/32	0.21875	5.55625
15/64	0.234375	5.95312
1/4	0.25	6.35
17/64	0.265625	6.74687
9/32	0.28125	7.14375
19/64	0.296875	7.54062
5/16	0.3125	7.9375
21/64	0.328125	8.33437
11/32	0.34375	8.73125
23/64	0.359375	9.12812
3/8	0.375	9.525
25/64	0.390625	9.92187
13/32	0.40625	10.31875
27/64	0.421875	10.71562
7/16	0.4375	11.1125
29/64	0.453125	11.50937
15/32	0.46875	11.90625
31/64	0.484375	12.30312
1/2	0.5	12.7
33/64	0.515625	13.09687
17/32	0.53125	13.49375
35/64	0.546875	13.89062
9/16	0.5625	14.2875
37/64	0.578125	14.68437
19/32	0.59375	15.08125

Fraction (in)	Decimalism (in)	Metric (mm)
39/64	0.609375	15.47812
5/8	0.625	15.875
41/64	0.640625	16.27187
21/32	0.65625	16.66875
43/64	0.671875	17.06562
11/16	0.6875	17.4625
45/64	0.703125	17.85937
23/32	0.71875	18.25625
47/64	0.734375	18.65312
3/4	0.75	19.05
49/64	0.765625	19.44687
25/32	0.78125	19.84375
51/64	0.796875	20.24062
13/16	0.8125	20.6375
53/64	0.828125	21.03437
27/32	0.84375	21.43125
55/64	0.859375	21.82812
7/8	0.875	22.225
57/64	0.890625	22.62187
29/32	0.90625	23.01875
59/64	0.921875	23.41562
15/16	0.9375	23.8125
61/64	0.953125	24.20937
31/32	0.96875	24.60625
63/64	0.984375	25.00312

1.7.1.2 Conversion of imperial and metric system

Imperial system	Multiply/Divide	Metric system
When the unit is measured by imperial system, it should be divided by the number in the middle column.		
When the unit is measured by metric system, it should be multiplied by the number in the middle column.		
Length		
Inch (in)	25.4	Millimeter (mm)
Foot (ft)	0.3048	Meter (m)
Yard (yd)	0.9144	Meter (m)
Miles (mil)	1.609	Kilometer (km)
Area		
Square Inch (in ²)	645.2	Square Millimeter (mm ²)
Square Inch (in ²)	6.45	Square Centimeter (cm ²)
Square Foot (ft ²)	0.0929	Square Meter (m ²)
Square Yard (yd ²)	0.8361	Square Meter (m ²)

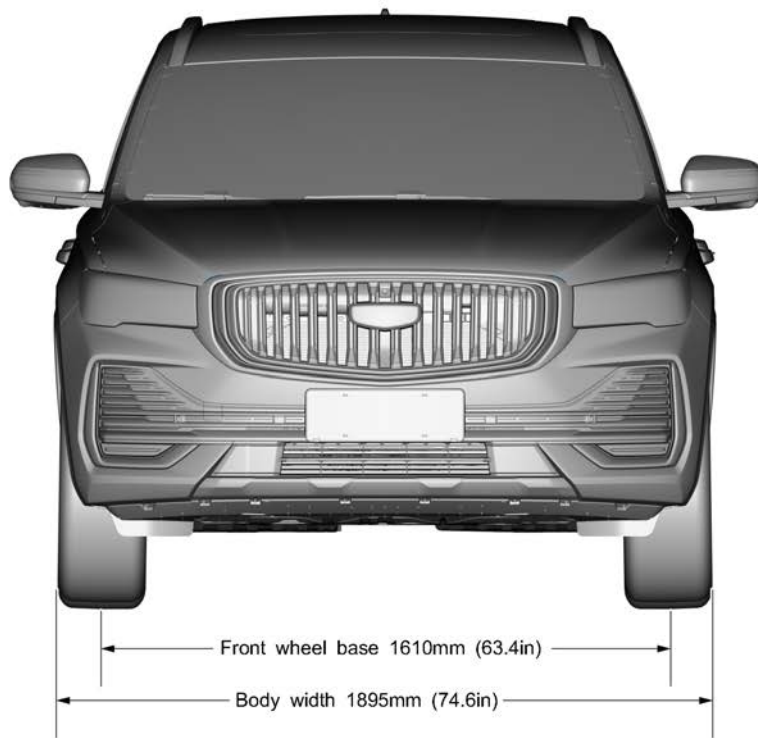
Imperial system	Multiply/Divide	Metric system
Volume		
Cubic Inch (in ³)	16,387.0	Cubic Millimeter (mm ³)
Cubic Inch (in ³)	16.387	Cubic Centimeter (cm ³)
Pint (pt)	0.5680	Liter (L)
Quart (quart)	0.9464	Cubic Decimeter (dm ³)
Gallon (Vsgal)	3.7854	Cubic Decimeter (dm ³)
Cubic Yard (yd ³)	0.764	Cubic Meter (m ³)
Weight		
Pound (kg)	0.4536	Kilogram (kg)
United Kingdom ton	907.18	Kilogram (kg)
United Kingdom ton	0.907	Ton (t)
Force		
Kilogram Force (kgf)	9.807	Newton (N)
Ounce Force (ozf)	0.2780	Newton (N)
Pound Force (lbf)	4.448	Newton (N)
Acceleration		
Foot/second2 (ft/s2)	0.3048	Meter/second2 (m/s2)
Foot/second2 (ft/s2)	0.0254	Meter/second2 (m/s2)
Torque		
Pound Inch (lb-in)	0.11298	Newton • Meter (N•m)
Pound Foot (lb-ft)	1.3558	Newton • Meter (N•m)
Power		
Horsepower (hp)	0.745	Kilowatt (kw)
Pressure (stress)		
Inch water column (inH2O)	0.2488	Kilopascal (kPa)
Pound/square Inch (lb-in ²)	6.895	Kilopascal (kPa)
Energy (Power)		
British Thermal Unit (Btu)	1,055.0	J (1J=1ws)
Pound Foot (lb-ft)	1.3558	J (1J=1ws)
Kilowatt-Hour (kWh)	3,600,000.0	J (1J=1ws)
Light		
Foot-Candle (fc)	10.764	Lumen/meter ² (lm/m ²)
Speed		
Mile/hour (mil/h)	1.6093	Kilometer/hour(km/h)
Temperature		
(°F-32)*5/9	=	°C
°F	=	(9/5*°C+32)

1.8 Vehicle specifications

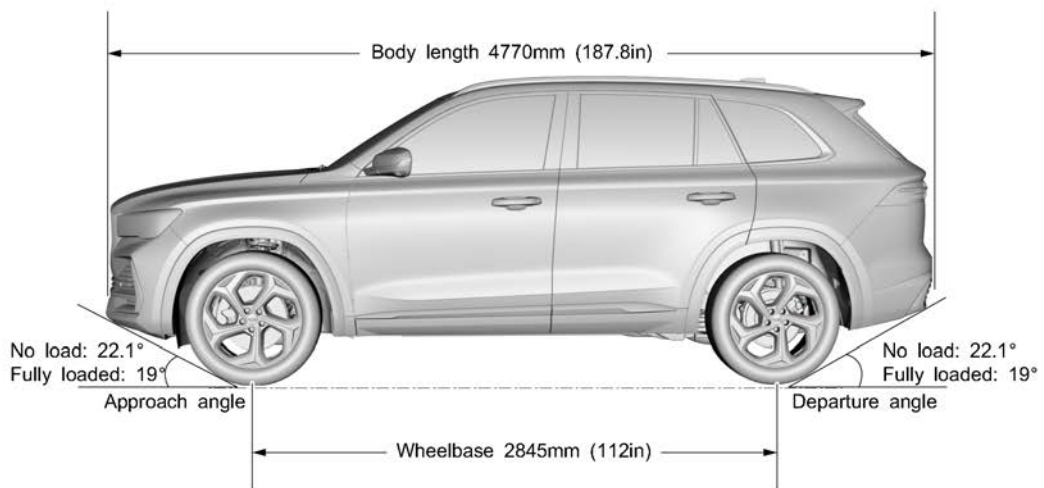
1.8.1 Specification

1.8.1.1 Whole vehicle dimensions

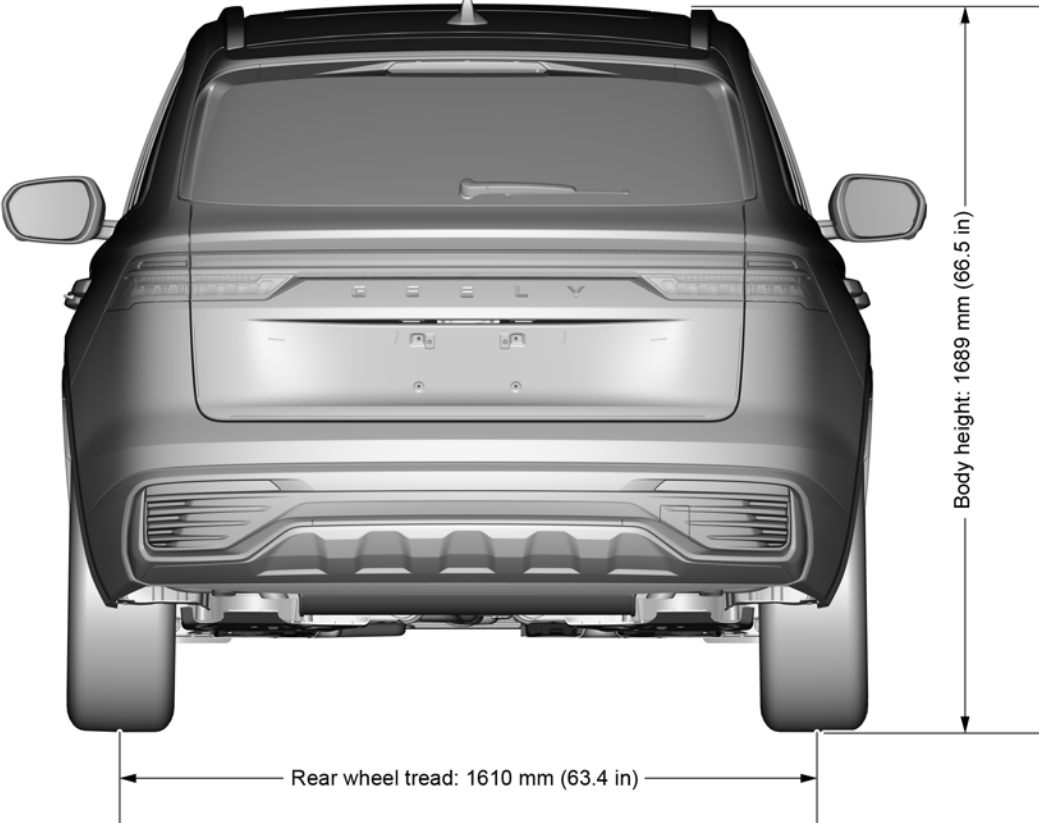
Front view



Side view



Rear view



1.8.1.2 Fastener specifications

Fastener tightening specifications diagram



4.6



4.8



5.6



8.8



9.8



10.8

Engineering standards of GEELY Automobile Co., Ltd. has adopted some of the standard metric fastener tightening dimensions defined by ISO. The purpose is to reduce the number of fastener tightening dimensions used while maintaining the best thread quality for each thread dimension. As indicated in the diagram above, the intensity level of metric bolts increases as the number increases.

1.9 Vehicle identification code

1.9.1 Instructions and operations

1.9.1.1 Vehicle identification

Vehicle identification number

The vehicle identification number (VIN) is a legal identifier.

LB37852Z8LS000576

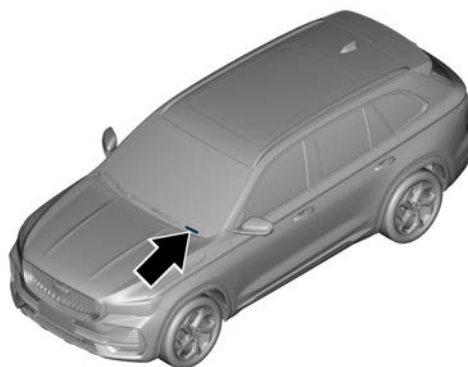
Engraving position of vehicle identification number (VIN)

The vehicle identification number (VIN) is engraved on the crossbeam of the front passenger seat.



Attachment location of vehicle identification number (VIN)

The vehicle identification number (VIN) is affixed to the sheet metal at the lower left of the front windshield and can be seen from the outside of the car through the front windshield.



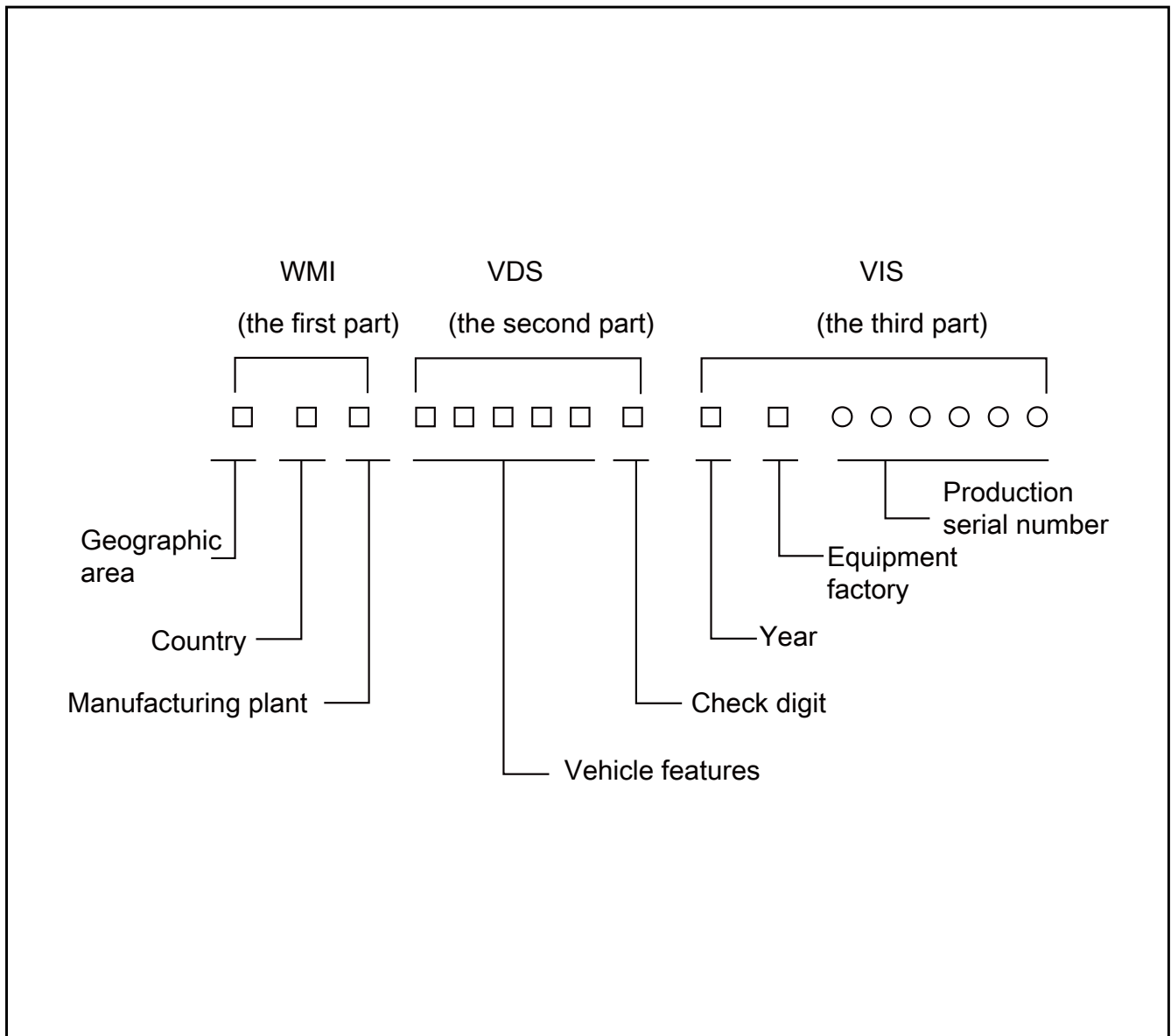
Attachment position of other VIN:

1. Left inner plate of the rear lift door;
2. Driver side of the front floor passageway;
3. Left side of brake pedal;
4. Left B column inner plate;
5. Right B column inner plate;
6. Front engine bay cover inner plate;

1.9.1.2 Description of Vehicle identification number (VIN)

The composition of the vehicle identification number:

The VIN consists of three parts (17 digits in total), including world manufacturer identifier (WMI), vehicle descriptor section (VDS) and vehicle identifier section (VIS), as shown in the figure below:



Taking the VIN LB37852Z8LS000576 as an example, the meaning of each digit is shown in the table below:

Position	Definition	Character	Description
1-3	World Manufacturer Identifier	LB3	Zhejiang Haoqing Automobile Manufacturing Co., Ltd.
4	Vehicle category code	7	Passenger vehicle
5	Principal parameter code of vehicle	8	Vehicle length is greater than 4.6-4.8m
6	Engine type	5	Front-mounted gasoline engine with the displacement of 1.9 - 2.1 L

Position	Definition	Character	Description
7	Body type	2	2 compartments / 5 doors
8	Drive type	Z	Front-mounted automatic transmission
9	Check digit	8	Vin check code
10	Year code	L	2020
11	Manufacturer code	S	Xi'an Branch of Zhejiang Haoqing Automobile Manufacturing Co., Ltd.
12-17	Manufacturer serial number	000576	Production serial number

World manufacturer identifier (WMI)

Use of the first part of the VIN (1st-3rd digit), shall be applied to the competent department at a higher level for approval by the enterprise. The approved code name of this enterprise: LB3

Rules for fourth digit code

Serial No.	Vehicle type	Code
1	Chassis (incomplete vehicle)	0
2	Truck	1
3	Special purpose vehicle	5
4	Bus	6
5	Passenger vehicle	7

Rules for fifth digit code

Passenger vehicle / bus				Truck / special-purpose vehicle			
Vehicle length, m	Code	Vehicle length, m	Code	Total weight, kg	Code	Total weight, kg	Code
≤3.5	0	> 4.0~4.2	5	≤1,000	K	> 3,000~3,500	R
> 3.5~3.6	1	> 4.2~4.4	6	> 1,000~1,500	L	> 3,500~4,000	S
> 3.6~3.7	2	> 4.4~4.6	7	> 1,500~2,000	M	> 4,000~4,500	T
> 3.7~3.8	3	> 4.6~4.8	8	> 2,000~2,500	N	> 4,500~5,000	U
> 3.8~4.0	4	≥4.8	9	> 2,500~3,000	P	≥5,000	V

Rules for sixth and seventh digit codes

The 6th and 7th digit combination codes are used to distinguish the characteristics of the power system and the types of the car body.

Serial No.	Fuel type		Engine displacement	Body type	Code
1	Mono-fuel	Gasoline	≤1	2 compartments / 5 doors	02
2			> 1~1.3		12
3			> 1.3~1.5		22
4			> 1.5~1.7		32
5			> 1.7~1.9		42
6			> 1.9~2.1		52
7			> 2.1		62
8			≤1	3 compartments / 4 doors	04
9			> 1~1.3		14
10			> 1.3~1.5		24
11			> 1.5~1.7		34
12			> 1.7~1.9		44
13			> 1.9~2.1		54
14			> 2.1		64
15			≤1	Cab-behind- engine specialized vehicle van	07
16			> 1~1.3		17
17			> 1.3~1.5		27
18			> 1.5~1.7		37
19			> 1.7~1.9		47
20			> 1.9~2.1		57
21			> 2.1		67
22	Dual-use fuel	Gasoline/ Compressed Natural Gas (CN G)	≤1.3	2 compartments / 5 doors	J2
23			> 1.3~3.0		K2
24			≤1.3	3 compartments / 4 doors	J4
25			> 1.3~3.0		K4
26			≤1.3	Cab-behind- engine specialized vehicle van	J7
27			> 1.3~3.0		K7
28	Dual fuel	Gasoline / methanol fuel	≤1.3	2 compartments / 5 doors	R2
29			> 1.3~3.0		S2
30			≤1.3	3 compartments / 4 doors	R4
31			> 1.3~3.0		S4
32			≤1.3	Cab-behind- engine specialized vehicle van	R7
33			> 1.3~3.0		S7

Serial No.	Fuel type		Engine displacement	Sum of peak power of drive motor kw	Body type	Code
34	Battery Electric Vehicle	Pure electric	/	150	2 compartments / 5 doors	U2
35			/	200		P2
36			/	240		V2
37			/	300		UA
38			/	350		W2
39			/	400		T2
40			/	450		X2
41		Petrol/electric hybrid	/	120	3 compartments / 4 doors	Y4
42			/	350	3 compartments / 5 doors	W5
43			/	450		X5
44			/	550		Z5
45			2 compartments / 5 doors	1.477	50	E2
46				1.477	60	F2
47				1.477	120	G2
48	1.969			130	H2	
49	3 compartments / 4 doors		1.477	60	F4	
50	Cab-behind-engine specialized vehicle van	1.477	120	G7		

Rules for eighth digit code

It is used to distinguish the drive type and transmission type of the vehicle.

Serial No.	Drive type	Transmission type	Code
1	Front wheel drive	Manual transmission	S
2		Automatic transmission	Z
3		No transmission	W
4	Rear wheel drive	Manual transmission	A
5		Automatic transmission	B
6		No transmission	N
7	Four-wheel drive	Manual transmission	C
8		Automatic transmission	D
9		No transmission	E

Rules for ninth digit code

The value calculated by the manufacturer according to the remaining 16 bit values and a certain formula. The code may be any digit (0-9) or letter "X", which is used to check the authenticity of the VIN code. Then, the uniqueness and validity of the VIN code can be guaranteed.

Rules for tenth digit code

It's used to distinguish the year. The year code is used according to the provisions of Table 11 (cycled once every 30 years).

Year	Code	Year	Code	Year	Code	Year	Code
2001	1	2011	B	2021	M	2031	1
2002	2	2012	C	2022	N	2032	2
2003	3	2013	D	2023	P	2033	3
2004	4	2014	E	2024	R	2034	4
2005	5	2015	F	2025	S	2035	5
2006	6	2016	G	2026	T	2036	6
2007	7	2017	H	2027	V	2037	7
2008	8	2018	J	2028	W	2038	8
2009	9	2019	K	2029	X	2039	9
2010	A	2020	L	2030	Y	2040	A

Rules for eleventh digit code

Distinguish different assembly plants

Serial No.	Manufacturer	Factory Name	Code
1	Zhejiang Haoqing Automobile Manufacturing Co., Ltd.	Zhejiang Haoqing Automobile Manufacturing Co., Ltd.	H
2		First Branch of Zhejiang Haoqing Automobile Manufacturing Co., Ltd.	L
3		Xiangtan Branch of Zhejiang Haoqing Automobile Manufacturing Co., Ltd.	X
4		Jinan Branch of Zhejiang Haoqing Automobile Manufacturing Co., Ltd.	J
5		Chengdu Branch of Zhejiang Haoqing Automobile Manufacturing Co., Ltd.	C
6		Baoji Branch of Zhejiang Haoqing Automobile Manufacturing Co., Ltd.	B

Serial No.	Manufacturer	Factory Name	Code
7		Shanxi Branch of Zhejiang Haoqing Automobile Manufacturing Co., Ltd.	A
8		Xi'an Branch of Zhejiang Haoqing Automobile Manufacturing Co., Ltd.	S

The twelfth to the seventeenth digits code regulations

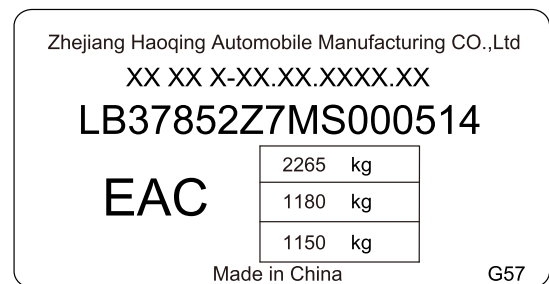
For the management of vehicle production sequence numbers, the vehicles produced by the same vehicle manufacturing company in the same year are arranged from 000001 each year.

1.9.1.3 Badge-Vehicle qualification certificate

The qualification certificate badge is located at the lower part of the right body side B-pillar.



Badge-Vehicle qualification certificate

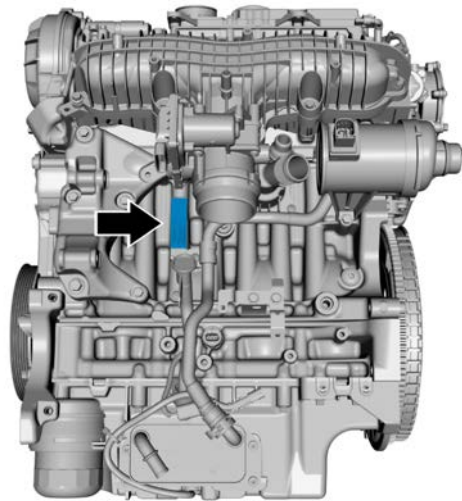


1.9.1.4 Tire label and location

The tire badge is located on the upper part of the left middle column outer.



Tire label



Engine identification number (JLH-4G20TDB)

kPa (bar)				
235/50R19	230 (34)	230 (34)	250 (36)	250 (36)
T125/80R18	420 (60)	420 (60)	420 (60)	420 (60)

8891181235

The tire label is permanently attached above the outside of the left pillar. For tire information, please refer to its contents. The label lists the maximum carrying capacity of the vehicle, tire size and cold inflation pressure.

1.9.1.5 Engine identification number and position

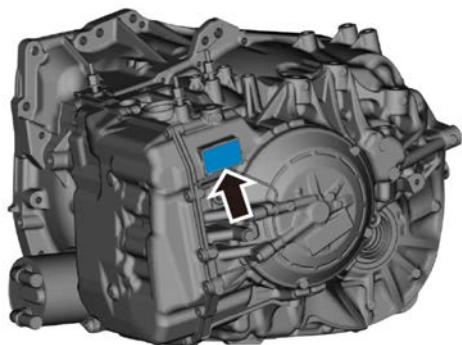
Position of engine identification number (JLH-4G20TDB)

JLH-4G20TDB*L5TB2100048*

- JL: enterprise code
- H: platform code
- 4: cylinder number
- G: gasoline fuel code
- 20: displacement code
- TD: direct injection of exhaust gas turbocharger
- B: authentication distinguishing code
- L: year (L represents 2020)
- 5: month
- T: code of engine production base
- B21: enterprise user-defined number
- 00048: production serial number of the current month

1.9.1.6 Identification number and location of transmission

Identification number position of the automatic transmission (8AT)



8AT automatic transmission identification number



1.10 Noise, vibration and abnormal noise

1.10.1 Instructions and operations

1.10.1.1 Diagnostic information and procedures

The meaning of NVH in Automotive Engineering

- N = noise-sound, audible.
- V = vibration-vibration, you can feel it.
- H = unevenness-wobble, tremble, can be heard and felt.

The types of noise in Automotive Engineering

Noise in Automotive Engineering is classified according to the intensity of sound, as follows:

- Low noise-low rumble, buzzing.
- Medium noise-a rapid buzzing sound.
- Loud noise-loud howling, shrill whistles.
- Loud howls and whistles can hurt the ear.

The part of a car where sounds of different intensities are produced:

- Most of the low-frequency noise comes from the engine.
- Low-frequency noise can also be generated on the road surface, especially on rough road surface. This is also a form of low noise, just like the vibration of the vehicle felt by the driver.
- High-frequency noise (common such as howling and shrill whistles) is usually generated by air currents or accessories such as alternators and drive belts.
- There will also be a click when the vehicle is driving on an uneven road. These unstable noises are usually caused by shock absorbers, chassis parts or loose parts in the car.

Noise and vibration phenomena on vehicles

The degree of noise felt by passengers varies depending on where they are on the vehicle.

Noise and vibration phenomena produced by intake system and exhaust system

The intake system is the air and solid noise source of the vehicle. The exhaust system is the air and solid noise source of the vehicle.

The transmission path of sound:

In addition to air noise, solid noise is the main source of noise in intake and exhaust systems. In order to minimize noise, sound insulation pads must be installed securely.

The exhaust system is a typical vibration component, which requires a good sound insulation device during installation, and the layout, direction and connection point with the car

body of the system should be selected properly to reduce the spread of solid noise.

Air intake system

- The length and volume of the intake system have been fixed and can not be changed during maintenance operation. During operation, pay attention to the fastening between the connecting parts, with no air leakage.
- The surface of the intake system components is subject to huge changes in gas pressure, which is most likely to produce strong vibration.
- The effect of temperature, such as heating the air filter, will change its rigidity (thus affecting the degree of vibration).
- In order to prevent the solid vibration produced on the surface of the intake system from transmitting to the car body, the following points should be paid attention to during the maintenance operation: a) the whole intake system is isolated from the car body, installed on the rubber pad and maintained a proper degree of freedom; b) intake pipe can not be in direct contact with the car body. Foam sound insulation pads must be installed where they come into contact with the car body or other parts.

Exhaust system

The exhaust system should not be installed too tightly. The rubber pad should not be installed too tightly. The exhaust manifold and catalytic purifier (if directly connected to the engine) must be rigidly connected to the engine (there should be no gap between them and the bracket).

Simple question test:

- Remove all suspension pads from the exhaust system. Hang the exhaust system with a rope (two-point suspension at most). Check the noise level of the cockpit during the road test. If the noise is eliminated, then the exhaust pad is the source of noise. Then a road test shall be carried out each time a pad is put back to check the noise level. Using this program, the pad causing the noise can be identified.

Resonance

- Each object has its own natural vibration frequency.
- If a system vibrates an object with its natural frequency, it will resonate.
- When the engine reaches the resonance frequency, the engine will show unstable operation (the critical speed of the engine).
- Once the speed of the engine exceeds this speed, it runs smoothly.

Wind noise/ air sound

Warning !

See [“Warnings about assistant driving”](#) in [“Warnings and cautions”](#).

Note

When the technical persons are checking the fault part reported for repair, the assistant should drive the vehicle, otherwise injury accident may occur.

The position of wind noise can be precisely confirmed when test drive is conducted in the vehicle. Generally, there are primary leakage and secondary leakage of wind noise. Therefore, if all leakages are not repaired during repair, the wind noise can only be decreased, but not be fully eliminated.

At the time of test drive, the maintenance personnel must be equipped with following tools in order to diagnose the specific position of wind noise:

- Echometer
- Masking tape
- Caulking strip
- Marking pen
- Screw driver

Conduct road test according to following procedures:

- Select a line with a straight street of four different directions, east, south, west and north.
- Select a street with less traffic or noise in order to avoid the influence on detection.
- The road test should be carried out at the vehicle speed at which the distributors consider the noise to be the most obvious or to be generated. In addition, the speed should be prohibited from exceeding the speed limited in law.
- The wind noise generated under the following conditions is external wind noise.
 - When the vehicle window glasses are down, the wind noise can be immediately heard when the driver is driving.
 - The wind noise will be immediately eliminated when packaging tape is attached to all decorative strips and clearance.
- The internal wind noise is caused by the escaping of the air from the vehicle. Therefore, following methods should be taken during repairing:
 - When the position of leakage is confirmed, pressure relief valve of body door lock supports should be attached by packing tape. Air pressure will be immediately formed inside the vehicle and the noise will be strengthened.
 - Use echometer to confirm the leakage position.
 - Use masking tape to temporary repair the leakage part.
 - Keep doing road test to ensure whether the wind noise is all eliminated or whether there is still other leakage part.
 - Confirm all leakage positions through road test and return to repair workshop. Use professional and reasonable orientation methods and sealed materials for permanent repair.

Vibration

Most of the high speed vibration is caused by wheel dynamic balance losing. If there is still vibration when there has a dynamic balance, the reasons may be:

- Tyre out-of roundness
- Rim out-of roundness
- Harness deviation of tyres

Measuring the free run-out value of tyres and wheels cannot detect all the reasons causing vibration. The above three reasons are considered as diameter hop of load. The former tyre and wheel assemblies should be replaced with known good tyres and wheel assemblies to repair the faulty vehicle.

The low speed vibration under vehicle speed below 64km/h generally is caused by hop. The high speed vibration under vehicle speed above 64km/h generally is caused by unbalance or hop.

Uneven tyre correction

Generally, there are two methods to correct the tyres which are already in balance but still vibrating. One method is to install the tyres on machine tool with automatic machine tool and rub off a small quantity of the rubber on the high spot of decorative design on the left and right of the tyres. Generally, this method of correcting tyres is permanent. No obvious influence on appearance of the tyres and the service life of tyre treads will be caused with correct operation. The machine tool with blade is not suggested to be used for tyre correction because it will shorten the service life of tyres and the problem cannot be solved fundamentally.

Another method is to remove the tires and turn the tires 180 degree on the rim. The method can only be used when the vibration is diagnosed to be caused by tyre and wheel assemblies. This is because this method can also cause vibration on completely wheel assemblies.

Abnormal sound

If there is a crunch noise under vehicle when the engine speed is high, check whether the thermal baffle touches the body understructure.

- Lift the vehicle and perform a visual inspection.
- Slightly bend the thermal baffle in order to create gap between body rear

There is a squeak noise at the front part of the vehicle in cold weather

Check vibration isolation gluesheath of the front balance pole.

- When the vehicle is cold, the vehicle should be conducted road drive through cavities on road and its front suspension should reach maximum stroke.

- Remove vibration isolation gluesheath and tape over the front balance pole. Afterwards, reinstall the vibration isolation gluesheath on the tape.

When the roads are uneven and bumpy, there is a depressing abnormal sound from the back of the vehicle

Check whether the spare tyre in trunk is correctly fixed.

- Open the trunk and check the spare tyre and driver's tools.
- Retighten the spare tyre and driver's tool.
- Conduct road test on the vehicle in order to check whether the abnormal sound is eliminated.

When the driver is driving on uneven and bumpy roads, there is a glass knocking noise from the rear of the vehicle. Check it.

Check whether the lock actuator of the rear door is improperly adjusted

- Check this kind of condition through road test vehicle.
- Loosen the nuts of the lock actuator and adjust the lock actuators.

The doors generate crunch noise

Check whether the harness connector inside the door trim panel generates crunch noise

- Gently knock the trim panel and hear carefully whether there is a crunch noise
- Remove the door trim panel and equip the foam pad on harness connectors according to actual vehicle condition.

When the vehicle doors are used, there is a squeak noise

Check whether the hinges of the vehicle doors lack lubrication.

- Repeatedly open and close the vehicle doors and carefully hear whether there is a squeak noise.
- Lubricate the hinges of the vehicle doors by rust remover and apply with lubricating grease.

1.10.1.2 Maintenance guidance

Check and confirm

1. Operate the vehicle to reproduce the situation to confirm customer's problems.
2. Take visual inspection to see if an obvious cause of the fault can be found.
3. If an obvious cause can be found in the visual inspection or the problem described by the customer, fix it (if possible) before performing the next step.
4. If the problem persists after the inspection, identify the symptoms and refer to the symptoms list.

Customer interview

Road tests and customer interviews (if possible) can provide information to identify the problem and provide the correct starting point for diagnosis.

Status confirmation

NVH usually occurs in four areas:

- Tire
- Engine accessories
- Suspension
- Drive shaft system

Therefore, it is important to isolate NVH problems in specific areas as soon as possible. The easiest and quickest way to do this is to perform a road test according to the instructions. To assist diagnostic and testing procedures, an approved appropriate NVH diagnostic tester can be used.

Noise diagnostic program

Non-axle noise

The five most common non-axle noises causes are exhaust, tires, roof frames, trim panels and transmissions. Therefore, before performing drive system removal and diagnosis, make sure that the following conditions are not the cause of the noise:

- In some cases, exhaust sounds a lot like gear noise. Some may be mistaken for the rumble of wheel bearings.
- Tires, especially snow tires, make a high-pitched rumble similar to gear noise. Radiation tyres also have this characteristic. At the same time, any non-standard tire with unique treads may also rumble.
- The panel will also whistle or whine.
- The rumble of the bearing sounded like a marble roll. This is usually caused by damage to wheel bearings.

Noise condition

Gear noise is usually caused by roaring or whining for gear damage or improper bearing preload. It will occur at different speeds and operating conditions, or it may be continuous.

A typical cackle sounds like a wooden stick inserted into a rotating bicycle wheel. It occurs when slowing down from 64km/h and usually lasts until the vehicle stops. Its frequency will change with the speed of the car.

A detonation sounds like a cackle. It occurs and becomes louder when accelerating or slowing down. Disassemble some parts to find out the location for maintenance.

Cackles, knocks, or frictions may be caused by the following reasons

- Wear, damage or erroneous installation of wheel bearings, suspension or brake components.
- Check and exclude items such as tires, exhaust and trim panels before decomposing transmission to perform diagnosis and maintenance gear noise.

Vibration condition

Vibrations on the road may be caused by the following reasons:

- Unbalanced front or rear wheels.
- Tyre out-of roundness

Tremor or vibration in acceleration may be caused by the following reasons:

- The powertrain / driveline fixed seat is damaged.
- The overhigh operating angle of the constant velocity (CV) joint caused by incorrect body height. Check the body height, confirm the correct spring rate, and check items under inoperable conditions.

Road test

The part driven by the gear will produce a certain amount of sound. Some noises are acceptable and may only be heard at certain speeds or under different driving conditions, such as on freshly paved asphalt. A little noise must be considered normal.

Road tests and customer interviews (if possible) can provide the information needed to confirm the status and provide direction for the correct diagnosis starting point.

1. Record the whole diagnostic process. Even the smallest information must be recorded, because it may become the most important.
2. Do not touch any parts until the road test and thorough visual inspection of the vehicle are completed. Keep the tire pressure and the load of the vehicle as they were when the condition was first discovered. Adjusting tire pressure, vehicle load, or other adjustments may reduce the strength of the condition to such an extent that it cannot be clearly identified. It may also cause something to enter the system and hinder the correct diagnosis.
3. Treat the visual inspection as part of the initial inspection procedure and write down any conditions that do not seem to feel normal. Record tire pressure, but do not adjust them in the first place. Record leaking liquid, loose nuts and bolts, or the bright marks on components may caused by rubbing against each other. Check to see if there is an unusual load on the loading space.

4. Perform the road test and copy the condition several times in the road test for confirmation.

5. As soon as the situation reappears, perform a quick road test. This helps to find the correct diagnostic procedure. Perform quick road test more than once to confirm that the results are correct. Remember, quick road tests may not tell you what the problem is, but they can tell you where is not problematic.

Quick road test

1. 24~80km/h

With a slight acceleration, a whimper is heard, and the front soleplate may also feel vibrating. It is particularly obvious at a specific engine speed and at a specific throttle opening accelerating at that speed. It also emits a whimper depending on the component that causes the noise.

2. Acceleration / deceleration

During slow acceleration and deceleration, sometimes the steering wheel / steering column, seats, front soleplate, front door trim, or front sheet metal are felt shaking. It is a low-frequency vibration (the cycle is about 9 times 15 times per second). It sometimes increases by tapping on the brakes.

3. High speed

The vibration of the front soleplate or seat which can be felt but cannot be seen is accompanied by a sound or rumbling or buzzing. When placing the shift paddle in the "N" gear (automatic transmission) and the engine is idling down coasting. If you still feel the vibration, it may be caused by the wheel, tire, front brake disc, wheel hub, or front wheel bearing.

4. engine speed sensitivity

When the engine reaches a certain speed, its vibration can be felt. It will disappear when coasting in neutral. This kind of vibration is more obvious when the vehicle is at rest and operates the engine at the speed of the fault. It can be caused by any component, from the accessory drive belt to the transmission.

5. The noise and vibration during steering (clicking, snapping, or friction) may be caused by the following reasons:

- Front wheel bearings are worn, damaged or installed incorrectly.
- The powertrain / driveline fixed seat is damaged.

Road condition

All experienced technicians will choose a route to conduct road tests for NVH diagnostics. The chosen road should be

fairly flat without ups and downs (unless special conditions are identified). It is better to drive on a flat asphalt road at different speeds. Gravel or rugged roads are not suitable because of the extra road noise. Once the route is established and frequently used, the variables of road noise can be removed from the test results.

If the customer complains that noise or vibration only occurs on a specific road, it may be caused by the road surface. If possible, the vehicle can be tested on the same type of road.

Wind noise/ air sound

External wind noise

Repairing methods of wind noise leaks and water leaks are very similar, refer to diagnostic information and procedures. Actual repair procedures depend on the type of seal being repaired

Vibration

Vehicle balance of tires and wheels

Use electric balancing machine lower part of the vehicle to carry out the wheels dynamic balance. Dynamic balancing machine is easy to use, can be static balance, also can be dynamic balance. Balance of lower part of the vehicle can not correct the imbalance of the brake disc, which is different from the balance of upper part of the vehicle. But the precision of the balance of lower part of the vehicle overcomes this shortcoming. Fix the wheels on the balancing machine, and let a cone-shaped body pass through the back of central hole, instead of the wheel nut hole.

Balance of wheels and tires of lower part of the vehicle

Vehicle balance can be corrected is because the vibration caused by imbalance in brake disc.

Warning !

Put lower control arm on the normal level position to avoid damaging drive axle. When wheels sink into full stroke, do not put into gear to operate the automobile.

1. During dynamic balance operation of upper part of the vehicle, remove counterbalance installed for wheels dynamic balancing is prohibited.
2. If the counterbalance needed for dynamic balance exceeds 25g (1lb), divide the counterbalance into two pieces, and install them on inner wheel rim and outer wheel rim respectively.
3. Use engine to rotate driven wheel and wheel assemblies.

Directional installment of wheels and tires

The installment of wheels and tires is carried out in the factory. The installment matches the part of thicker radius (also called high point) with the part of minimum radius of tires (also called low point).

When the tires are delivered out of factory, the high point of tires is marked with red painting, or wheel outer wall is labeled. Or match the light spot of the tire unbalance with the focus of the wheel unbalance, which is generally marked with yellow or white paint when the tire leaves the factory.

Low point of wheels is the position of valve.

Before removing the tire from the wheel, make a mark on the position of valve to make sure it can be installed on the original position. Before removing the tire from the wheel, make a mark on the position of valve to make sure it can be installed on the original position.

Repair of abnormal sound

The abnormal sound mainly is from the relative movement among vehicle components which should not exist. There are three repair method of the abnormal sound:

- Fasten parts and components to eliminate the relative movement in the running process of the vehicle.
- Separate parts and components to keep them out of contact when working.
- Isolate parts and components to eliminate the abnormal sound when the components are moving. Uniform low friction surface can be used to eliminate viscous sliding among the components.

1.11 water leakage

1.11.1 Instructions and operations

1.11.1.1 Diagnostic information and procedures

Water leakage diagnosis

Caution

Leakage parts must be found before the next repair can be conducted. Arbitrary repair may only block the leakage but may make future repairs more difficult. Carry out local tests on overall scale so as to find all leakage points.

Carry out correct tests and diagnosis on vehicles during repairing the body leakage. Adjust incorrectly positioned parts and repair water leakage fault with appropriate repairing materials. First, determine the leakage is caused by what environment. For example: the leakage only occurs when vehicles stop at the slope. Second, if finding a rough leakage area, determine correct leakage point with a water hose and breather hose. If the leakage part is not obvious, use the rain test stand to determine the specific leakage part. It is may be necessary to remove part of the interior trim panel or parts to find the specific water leakage points.

Preparations of water leakage test

- The vehicle is designed for the operation under normal environmental conditions.
- The design standard of sealing materials and parts of the vehicle has considered the seal strength required under natural environmental factors. But some specification standards cannot take all human conditions into account.
- Water leakage test procedures are related to environmental factors, and the driving performance under normal conditions of the vehicle can be determined.
- The first step of leakage diagnosis is to determine the condition under which the leakage occurs. If a rough leakage area can be determined, isolate exact water entry with a water hose or breather hose. It is needed to remove part of the trim panel or parts during repairing the leakage point.
- If the leakage occurs on the door, back door, window, or door and window glass lifter, it may be not caused by the poor seal of the sealing strip. Maybe adjusting these parts can eliminate the leakage fault.

Water hose test

Note

Do not use water hoses with nozzles.

1. Let the assistant confirm the specific leakage part.
2. Detect from the vehicle window or the bottom of the front air window.

3. Slowly move the hose upward to pass the whole vehicle roof.

Vent pipe test

Note

Breather hose test can only be used on completely cured adhesive. Otherwise, the test method will damage the adhesive layer and increase the leakage point.

1. After diluting the fluid cleaner per a certain proportion, put it into the spray bottle and spray it to edges of the vehicle windows. Spray from the bottom first and then gradually upward and pass the top.

Note

The pressure of the compressed air should not exceed 205kPa (29.75psi).

2. Let an assistant carry the air hose into the vehicle.
3. Let the assistant point the compressed air at the area suspected to be leaking, and if there is a leakage, the fluid cleaner in the leakage part will form bubbles.

1.11.1.2 Maintenance guidance

Maintenance of body leakage

When repairing the leakage, you may need to remove some trim panels or some parts and components depending on the leakage positions.

1. Cut open a section of joint binder on the leakage area inside or outside the vehicle.
2. Clean and eliminate the old binder residue on the leakage positions.
3. Apply body and joint sealants on the cleaned leakage position.
4. Wait several hours until the joint binder completely solidifies.
5. Check whether it still leaks.
6. Install the removed decorative components.

Fix the maintenance of the window leakage

When repairing the leakage, you may need to remove some trim panels or some parts and components depending on the leakage positions.






1. Ensure the specified leakage position
2. If the front windshield edge leaks, use dedicated joint binder to repair the leakage position or replace a new sealed front windshield.







3. If a fixed vehicle window side leaks, use dedicated binder to repair the leakage position or replace a new sealed window.







1.12 List of special tools for the whole vehicle



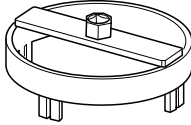
1.12.1 Special tools and equipment

1.12.1.1 Dedicated tools for the drive train



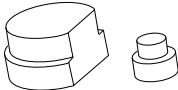
Serial No.	Illustration	Tool number	Name
1		4114870384	Crankshaft rotation special tools - JLH-4G20TD engine
2		4114870385	Crankshaft zero orientation special tools - JLH-4G20TD engine
3		4114870386	Oil seal, blank cover removal tool-JLH-4G20TD engine
4		4114870391	Oil pan assembly orientation and limiting special tools - JLH-4G20TD engine
5		4114720198	Oil filter dismounting and assembly special tools - JLH-4G20TD engine


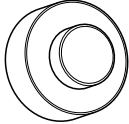
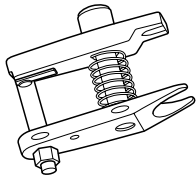
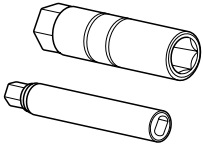
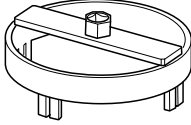
Serial No.	Illustration	Tool number	Name
6		4114720206	Front oil seal of intake and exhaust camshaft installation tools-JLH-4G20TD engine
7		4114870395	Camshaft rear seal assembly special tools - JLH-4G20TD engine
8		4114720208	Spark plug dismounting and assembly special tools - JLH-4G20TD engine
9		4114870398	Sealing surface crowbar - JLH-4G20TD engine
10		4114870399	Oil pipe (oil pump to the oil cooler) removal tool-JLH-4G20TD engine
11		4114870400	Oil pipe (oil pump to the oil cooler) installation tool-JLH-4G20TD engine

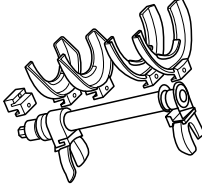
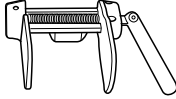
Serial No.	Illustration	Tool number	Name
12		4114870402	High voltage fuel injector dismantling tools - JLH-4G20TD engine
13		4114870403	Pulley - JLH-4G20TD engine
14		4114870404	VVT fastening special tools - JLH-4G20TD engine
15		4114870405	Camshaft position fastening special tools - JLH-4G20TD engine
16		4114870406	Belt tensioner compressing special tools - JLH-4G20TD engine
17		4114870407	Engine coolant temperature sensor dismounting and assembling special tools - JLH-4G20TD engine

Serial No.	Illustration	Tool number	Name
18		4114870408	Positioning bush pins installation - JLH-4G20TD engine
19		4114870424	Transformer assembly guide pin special tools - JLH-4G20TD engine
20		47Z03113	Fuel pump cap dismounting tools - JLH-4G20TD engine

1.12.1.2 Chassis special tools

Serial No.	Illustration	Tool number	Name
1		47Z03109A	Front hub flange removal and assembly toolset
2		47Z03109B	Front hub flange removal and assembly toolset
3		47Z03109C	Front hub flange removal and assembly toolset

Serial No.	Illustration	Tool number	Name
4		47Z03110A	Front hub flange removal and assembly toolset
5		47Z03110B	Front hub flange removal and assembly toolset
6		47Z03111	Ball head removal tool
7		47Z03112	Front Shock Absorber Bolt Removal Tool
8		47Z03113	Fuel pump removal tool

Serial No.	Illustration	Tool number	Name
9		47Z03114	Shock absorber spring removal tool
10		47T03107	Brake pump resetting tool

Engine

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2.1 Warnings and precautions

2.1.1 Warnings and precautions

2.1.1.1 Warnings and precautions

Warnings regarding battery disconnection

Warning !

Before servicing any electrical component, the start and stop button power supply mode shall be in the OFF status and all electrical loads must be "OFF (switch-off)" unless otherwise stated in the operating procedure. If tools or equipment are easily accessible to exposed live electrical terminals, disconnect the negative battery cable. Violation of these instructions may result in personal injury and/or damage to the vehicle or vehicle components.

Warnings regarding exhaust system maintenance

Warning !

To avoid burns, do not repair the exhaust system when it is hot. Please perform maintenance after the exhaust system has cooled down.

Warnings regarding fuel and EVAP pipe

Warning !

To reduce the risk of fire and personal injury, please observe the following:

- All fuel pipes that are scored, scratched or damaged during installation should be replaced, and no attempt should be made to repair the fuel pipe.
- When installing a new fuel pipe, do not directly knock on the fuel pipe clamp with a hammer.
- When operating a welding torch near the fuel vapor pipe, be sure to cover the fuel vapor pipe with a wet towel. In addition, do not expose the vehicle to temperatures above 115°C (239°F) for more than 1 hour, and do not park it at temperatures above 90°C (194°F) for long periods of time.
- Before connecting the fuel pipe connectors, be sure to apply a few drops of clean engine oil to the male pipe connector to ensure correct reconnection and prevent possible fuel leakage. (During normal operation, the O-ring in the female connector may swell, and if it is not lubricated, it cannot be reconnected correctly.)

Warnings regarding fuel gauge leak

Warning !

Wrap a rag around the fuel pressure gauge joints to reduce the risk of fire or personal injury. The rag will absorb the leaking fuel when connecting the fuel pressure gauge. After connecting the pressure fuel gauge, the rag should be put in an appropriate container.

Warnings regarding fuel pipe connectors

Warning !

Before connecting the fuel pipe connectors, be sure to apply a few drops of clean engine oil to the male pipe connector to reduce the risk of fire or personal injury. It also ensures correct reconnection and prevents possible fuel leakage. During normal operation, the O-ring in the female connector may swell, and if it is not lubricated, it cannot be reconnected correctly.

Warnings regarding fuel storage

Warning !

Do not drain fuel into an open container. Do not store fuel in open containers, otherwise there is a risk of fire or explosion.

Warnings regarding fuel vapor in EVAP components

Warning !

Do not inhale the air in the EVAP pipe or hose. The fuel vapor in the EVAP components may cause personal injury.

Warnings regarding gasoline/gasoline vapor

Warning !

Gasoline or gasoline vapor burns very easily. It may cause fire if there is a fire source. To prevent fire or explosion, never drain fuel to or store fuel in an open container. Please provide a dry-chemical fire extinguisher nearby.

Warnings regarding removal of the lower O-ring of fuel injector

Warning !

During inspection of O-rings of each injector, the O-rings must not remain on the intake manifold, to reduce the risk of fire and personal injury. If the O-ring is not removed with the fuel injector, the to-be-repaired fuel injector with a new O-ring cannot be properly placed in the fuel injector seat. Improper placement may cause oil leakage. When reassembling, the lower O-ring of the injector should be replaced.

Warnings regarding removal of the radiator cap

Warning !

To avoid burns, the radiator cap must not be removed before the engine has cooled down. If the radiator cap is removed when the engine and radiator have not cooled down, the cooling system will release hot high-pressure liquid and vapor.

Warnings regarding cooling system maintenance

Warning !

If the pressure cap is opened and cooling system maintenance is performed when the engine is not cooled and the pressure is still high, the engine coolant will immediately boil and may be sprayed on the person who opens the radiator pressure cap, causing severe burns.

Warnings regarding fuel pressure release

Warning !

Before servicing the fuel system, remove the fuel tank cap and release the pressure of the fuel system to reduce the risk of personal injury. After the pressure of the fuel system is released, a small amount of fuel will overflow when servicing the fuel lines, fuel injection pumps, or joints. To reduce the risk of personal injury, cover the fuel system components with a rag before disconnecting. The rag can absorb fuel leaked out of the components. After disconnecting, place the rag in a suitable container.

Warnings regarding road test

Warning !

Road test should be conducted under the premise of ensuring safety and observing all traffic regulations. Do not try any operation that may endanger the control of the vehicle. Violating the above safety instructions can cause serious personal injury and damage the vehicle.

Precautions for Self-learning

Caution

Use the diagnostic instrument for matching self-learning after replacing the fuel injector components, ECM and engine assembly.

Hint

Engine Section Type I refers to the electrical installation system, and Type II refers to the SPM (UAES) system

2.2 Engine control system JLH-4G20TD

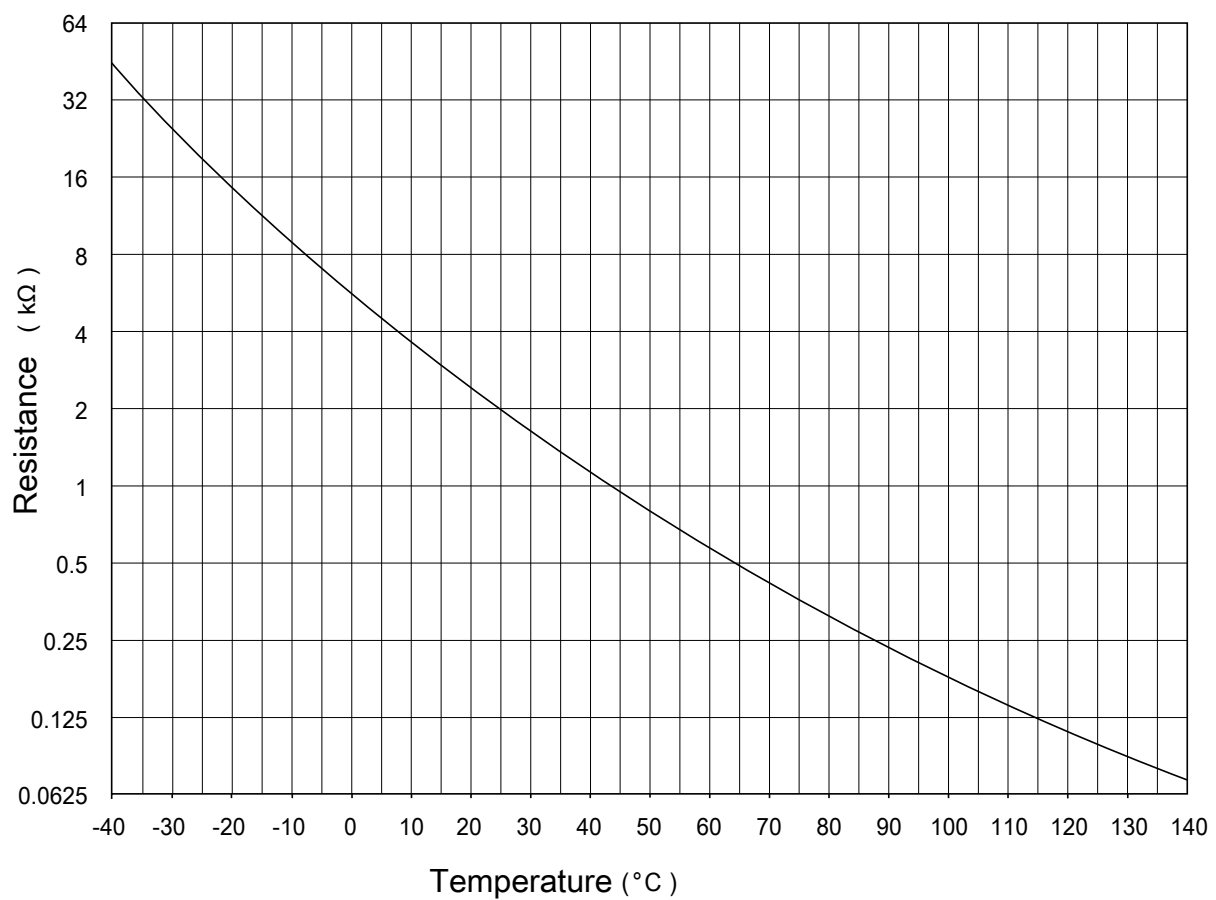
2.2.1 Specification

2.2.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Engine control module fixing bolt	M6×6	8.5~11.5	6.3~8.5
Engine control module fixing bolt	M6×30	8.5~11.5	6.3~8.5
Engine Control Module bracket assembly retaining bolts	M6×18×21.3M	8.5~11.5	6.3~8.5
Oil control valve retaining bolt	M6×20	8.5~11.5	6.3~8.5
Camshaft position sensor retaining bolt	M6×16	8.5~11.5	6.3~8.5
Manifold pressure sensor retaining screw	PF5×25	3~4	2.2~3
retaining bolt of engine harness sheath	M6×20	8.5~11.5	6.3~8.5
Fuel pressure sensor bracket retaining bolt	M6×20	8.5~11.5	6.3~8.5
Air pressure and air temperature sensor 2 retaining screw	PF6×16	4.25~5.75	3.1~4.2
Accelerator pedal sensor retaining bolt	M6×16×19.3	8.5~11.5	6.3~8.5
Throttle unit retaining screw	PF6×60	6~7	4.5~5.9
Engine coolant temperature sensor	-	20~24	14.8~17.7
Knock sensor fixing bolt	M8×35	24~28	17.7~20.7
Fixing screw of inlet pipe components of oil cooler	M6×16	8.5~11.5	6.3~8.5
Oil pressure and oil temperature sensor (Hella sensor)	-	15~16.5	11.1~12.2
Oil pressure and oil temperature sensor (Sensata sensor)	-	20~24	14.8~17.7
Crankshaft position sensor retaining bolt	M6×16	8.5~11.5	6.3~8.5

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Crankshaft position sensor bracket fixing bolt	M7×20	8.5~11.5	6.3~8.5
Oil level sensor retaining screw	M6×20	8.5~11.5	6.3~ 8.4

2.2.1.2 Engine coolant temperature sensor - relationship between input temperature and internal resistance

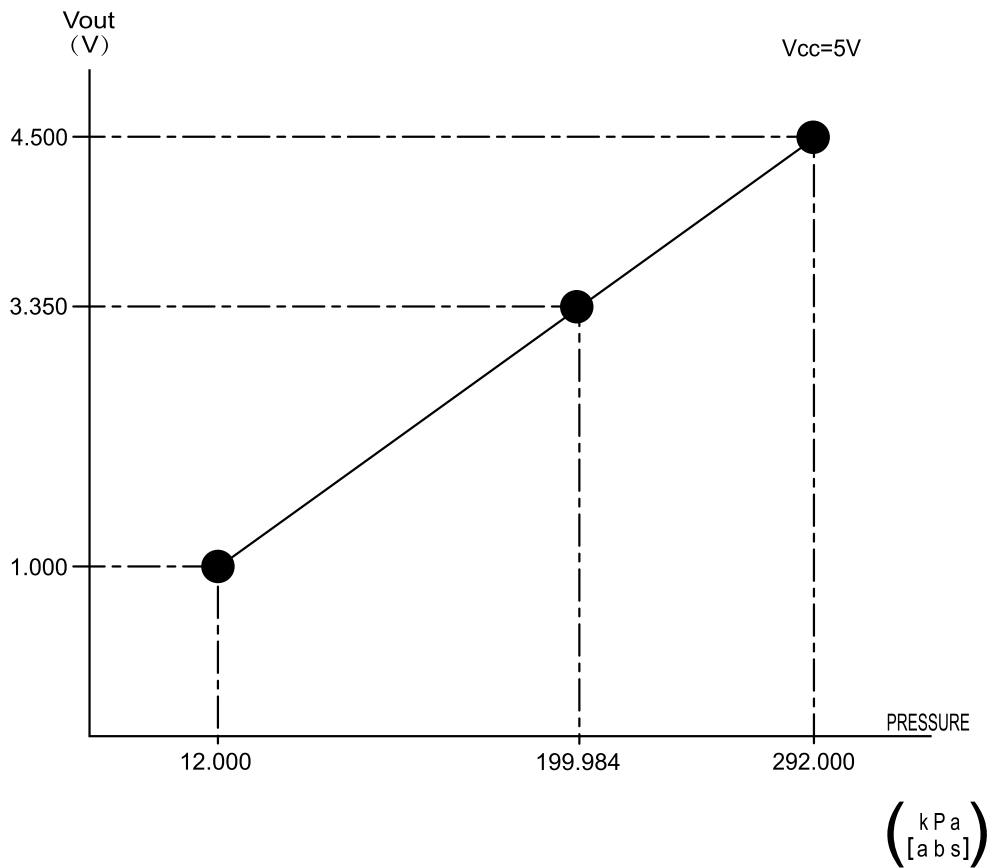


2.2.1.3 Relationship between elevation and atmospheric pressure

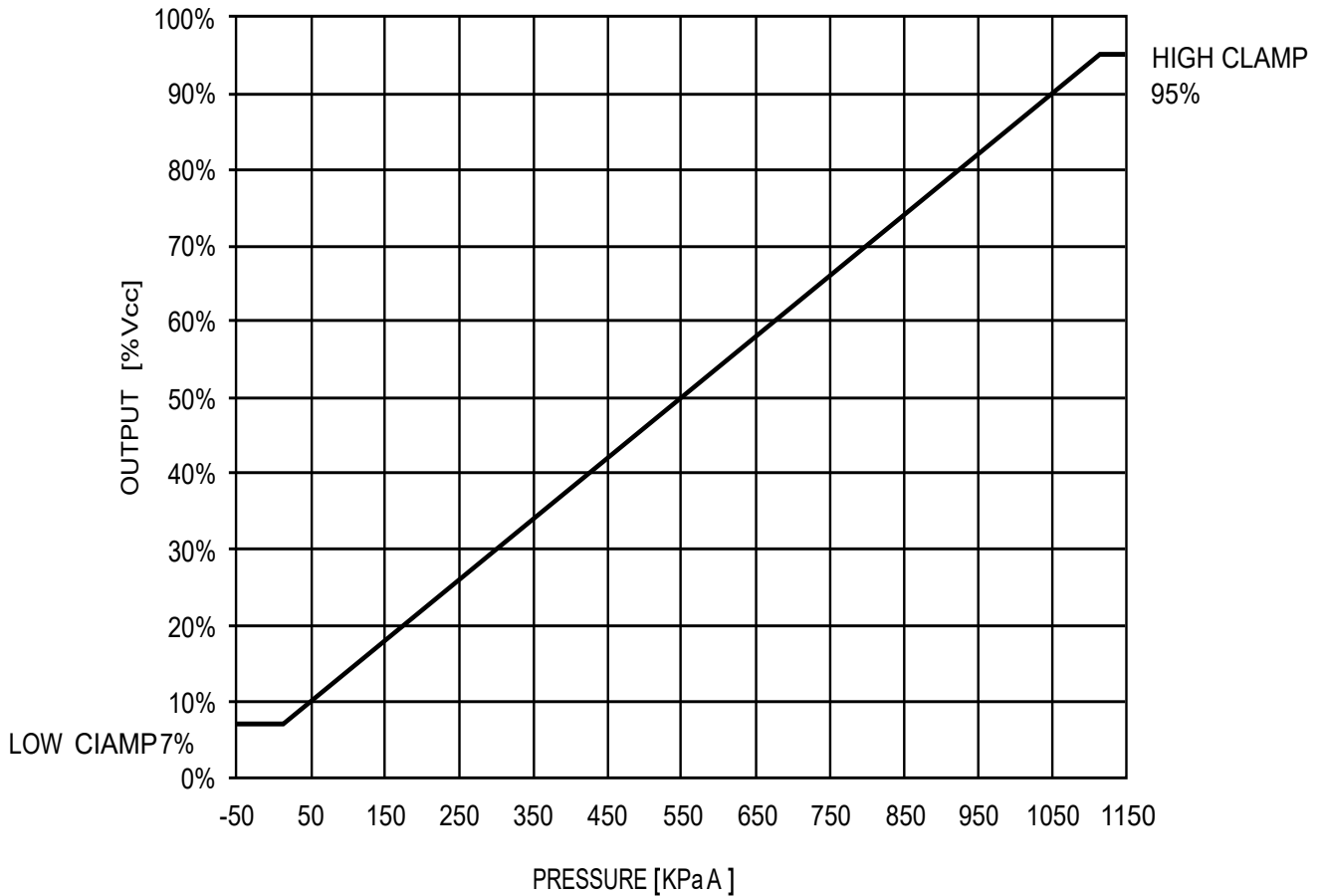
Altitude (m)/(ft)	Atmospheric pressure (kPa)/(psi)
4,200/13780	55/8
3,900/12795	58/8.4
3,600/11811	61/8.8
3,300/10827	64/9.3

Altitude (m)/(ft)	Atmospheric pressure (kPa)/(psi)
3,000/9843	66/9.6
2,700/8858	69/10
2,400/7874	71/10.3
2,100/6890	74/10.7
1,800/5906	77/11.2
1,500/4921	80/11.6
1,200/3937	83/12
900/2953	87/12.6
600/1969	90/13.1
300/984	93/13.5
0	100/14.5

2.2.1.4 Manifold pressure sensor- relationship between input pressure and output voltage



2.2.1.5 Oil pressure and oil temperature sensor- relationship between input pressure and output voltage



$$V_{out}/V_{cc} * 100 = 0.08 * P + 6$$

V_{out}: OUTPUT VOLTAGE[VDC]

V_{cc} : SUPPLY VOLTAGE [VDC]

P : INPUT PRESSURE[KPaA]

2.2.1.6 CMP sensor specification

Item	Parameter
Maximum speed forward	4000rpm
Clearance (mm)	0.9±0.6
Center distance of mounting hole (mm)	18
connector model and pin	3 pins
Supply voltage (V)	4.5~7

2.2.1.7 Crankshaft position sensor specifications

Item	Parameter
Maximum speed forward	8000rpm
Maximum speed reverse	2000rpm

Item	Parameter
Clearance (mm)	0.7±0.4
Center distance of mounting hole (mm)	19
Supply voltage (V)	5±0.5
connector model and pin	3 pins

2.2.1.8 Engine coolant temperature sensor specification

Item	Parameter
Resistance value (kΩ)	20 °C, 2.45 (+ 0.14, - 0.13) KΩ
Response time (s)	≤7s
Installing thread	M12X1.5

2.2.2 Instructions and operations

2.2.2.1 General

The engine is located in the engine compartment. Several other components are also installed in the engine compartment. The engine is an in-line four cylinder engine, which is installed laterally. The ignition sequence of cylinder is Cylinder 1, cylinder 3, cylinder 4 and cylinder 2. Observe along the driving direction of the vehicle. The cylinder on the right is No. 1 cylinder and the cylinder on the left is No. 4 cylinder. 4G20TD engine is the latest in cylinder direct injection, in-line four cylinder 2.0L 16 valve engine with exhaust gas turbocharging developed by Geely. The engine uses variable valve timing system, DIS (direct ignition system) and throttle unit control system. The control system is mainly composed of engine control module (ECM), ECM working circuit, system input and output components. ECM is the control center of engine control system. It continuously monitors signals from various sensors and controls various systems that affect vehicle performance. Engine control module can carry out system diagnosis function. It can identify operation faults, and alarm the driver through the malfunction indicator light (MIL) and save the fault diagnosis code indicating the fault location, so that the maintenance personnel can perform repair work. The engine performance can be improved through these control functions. The fuel economy and power performance are improved. The discharge of harmful exhaust is reduced.

Input information components: crankshaft position sensor, camshaft position sensor, manifold pressure sensor, engine coolant temperature sensor, knock sensor, accelerator pedal sensor, oxygen sensor, fuel pressure sensor, oil level sensor, oil pressure and oil temperature sensor, A/C pressure sensor, defrost heating enable input, air pressure and air temperature sensor 2, CAN information input, serial data line input.

Output components: throttle unit, fuel injector components, ignition coil, VVT solenoid (intake/exhaust), carbon canister control valve, turbine control valve (wastegate valve), main relay, oil pump relay and oil pump, engine cooling fan high/low speed relay, A/C compressor relay, turbocharger, CAN information output and serial data line output.

2.2.2.2 Input Information Components

1. Crankshaft position sensor



The crankshaft position sensor is used to measure the speed and position of the engine crankshaft. The sensor detects the N pole and S pole of the crankshaft signal wheel, outputs the corresponding voltage signal and inputs it to the ECM to determine the engine speed and top dead center information. The crankshaft position sensor is mainly used to monitor the position and speed of the crankshaft. The actual value will be transmitted to the Engine Control Module (ECM). Crankshaft position sensor is an important sensor of engine. The engine cannot be started or stopped when the crankshaft position sensor fails.

2. CMP sensor



With the rotation of the camshaft, the sensor identifies the convex teeth and concave teeth of the signal wheel on the camshaft, outputs the corresponding voltage signal, and the output signal can determine the position and speed of

the camshaft; the voltage signal is finally input to the ECM and calculated by the ECM software to determine the engine ignition timing. Camshaft position sensor is mainly used to monitor the position of camshaft. The actual value will be transmitted to the Engine Control Module (ECM). The engine control module will determine the position and speed of camshaft as per camshaft phase sensor signals. Moreover, it will coordinate with camshaft position sensor to judge the compression top dead center and the exhaust top dead center, indicating the piston position in Cylinder No.1 during the work stroke. Then the actual fuel injection order can be calculated by engine control module. If the CMP sensor signal is lost while the engine is running, the fuel injection system will switch to the sequential fuel injection mode calculated according to the last fuel injection pulse, and the engine will continue to run. Even if the trouble exists, the engine can be restarted.

3. Manifold pressure sensor (DENSO)

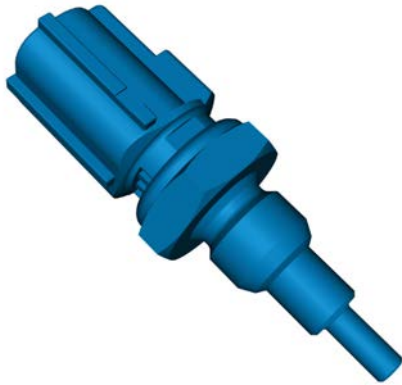


Manifold pressure sensor (UAES)



The manifold pressure sensor is a varistor located on the intake manifold and is used to monitor the pressure of the intake air in the intake manifold. The sensor measures the air pressure and temperature in the intake pipe between the intercooler and the throttle housing. The Engine Control Module (ECM) regulates the turbine according to the signal provided by the manifold air pressure sensor. The manifold pressure sensor chip can provide "Load Signal" to the controller according to the difference between atmospheric pressure and intake manifold pressure; the controller provides 5V voltage and feeds back 0-5V voltage to the controller according to different inlet pressure. So, it measures the absolute pressure of intake manifold and provide engine load information. The intake pressure sensing element measures the changes in intake manifold pressure caused by changes in engine load and speed, and it converts these changes into voltage output. The engine control module obtains the intake air temperature by measuring the voltage. The ECM uses this signal to correct the fuel injection pulse width and ignition timing.

4. Engine coolant temperature sensor



The coolant temperature can be measured. The Engine Control Module (ECM) controls multiple functions through the sensor. The sensor is an NTC (cathode temperature coefficient) thermistor whose resistance value changes according to the change of coolant temperature. The resistance value is higher when the engine coolant temperature is low and lower when the temperature is high. The NTC thermistor is encapsulated in the temperature sensor, and its resistance value changes with the change of temperature, to accurately and timely measure the change of ambient temperature and measure its output resistance value, that is, reflect the temperature of contact medium. It is used to monitor the coolant temperature of the engine. On the one hand, the ECM can judge the working condition of the engine and correct the fuel injection and ignition through the output resistance signal; on the other hand, output signals to relevant instruments, so that the operator can visually judge the working state of the engine. The ECM provides a 5V reference voltage for the sensor. The ECM can determine the engine coolant temperature by measuring the voltage change. The sensor is very important for the engine control system to correct the ignition timing and fuel injection quantity. Meanwhile, the signal is also transmitted to the instrument to display the current working temperature of the engine.

5. Knock sensor (DENSO)



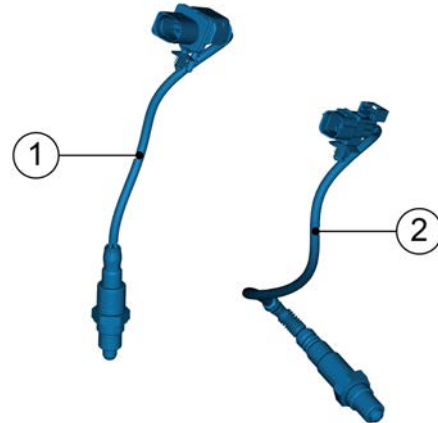
Knock sensor (UAES)



Knock sensor is mainly used to detect the actual value of cylinder knock. There is a piezoelectric element in the knock sensor, which can record the actual value of each cylinder knock and transmit it to the Engine Control Module (ECM). The piezoelectric ceramic in the sensor detects the vibration of the engine, outputs the voltage signal to the ECM, and determines whether the engine has knock through software calculation and processing, to prevent the engine from being damaged by knock.

6. Accelerator Pedal Sensor

Oxygen sensor (UAES)



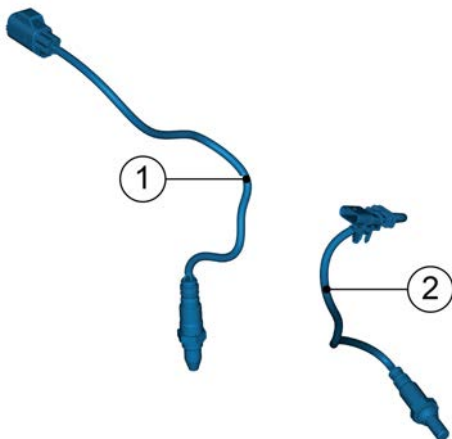
Contactless accelerator pedal sensor is adopted in the engine, which is integrated on the accelerator pedal assembly. Through monitoring the voltage on the signal circuit of the accelerator pedal position sensor, the engine control module calculates the accelerator pedal position to determine the intent of the driver, send the opening signal of the electronic throttle body to the electronic throttle body and control the vehicle speed according to the intent of the driver. The accelerator pedal sensor has two (primary and secondary) sensor circuits. If either of the sensor circuits has faults, engine ECM will detect abnormal signal times between two sensor circuits and switch to limp mode. Under the limp mode, the normal working circuit is used for calculation of acceleration pedal opening to control the vehicle operation during limp mode.

1. Lambda probe (front oxygen sensor)
2. Lambda probe (rear oxygen sensor)

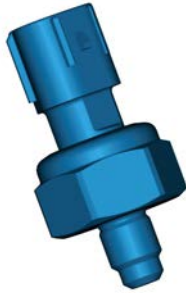
Located in front of and behind the catalytic converter, respectively. The ECM measures the oxygen content in the exhaust gas and sends it to the ECM.

Two oxygen sensors measure the remaining oxygen content in the exhaust gas. The measured value of the oxygen sensor can help the Engine Control Module (ECM) control the air-fuel ratio. The oxygen sensor consists of a zirconium probe and a heating element with a positive temperature coefficient resistor. In order to measure the oxygen content in the exhaust gas, the oxygen sensor needs to see the surrounding air, which is in contact with the sensor through the oxygen sensor harness. The oxygen sensor only works within a specific temperature range. The oxygen sensor contains a heating element for heating the oxygen sensor to reach the working temperature. The heating element takes about 30-40 s to heat the oxygen sensor. The operating temperature of Lambda probe (front oxygen sensor) and Lambda probe (rear oxygen sensor) will change, but the operating temperature of Lambda probe (front oxygen sensor) is usually 700-900 °C and that of Lambda probe (rear oxygen sensor) is 300-900 °C.

7. Oxygen sensor (DENSO)



8. Fuel pressure sensor (DENSO)



Fuel pressure sensor (UAES)



The fuel pressure in the fuel rail directly acts on the sensor sensing element (micro fused silicon strain gauge). The sensing element produces a micro displacement proportional to the fuel pressure, which changes the resistance of the sensor. It outputs a voltage value proportional to the pressure after being processed by the internal signal processing circuit of the sensor. Fuel pressure sensor is located at the high-pressure fuel rail pipe. It can directly measure the fuel pressure value inside the high-pressure fuel supply system. Through the fuel pressure sensor, the closed-loop control of fuel pressure can be achieved. ECM calculates the theoretical rail pressure according to the signal input by the relate sensors under the current working conditions of the engine, realizes rail pressure control by adjusting the fuel control valve of the high-pressure fuel pump, and relies

on the fuel pressure sensor to detect the current actual rail pressure, and compares it with the theoretical rail pressure and makes correction, thus achieving closed-loop control. The high-pressure fuel pump provides high oil pressure to the rail components. The fuel injection system of this engine adopts high-pressure fuel in cylinder direct injection technology. The pressure in the fuel rail is close to 11 Mpa when the engine is idling. The pressure fluctuates between 12MPa and 20MPa with the change of vehicle load. If the pressure in the fuel rail exceeds 23.5MPa, the safety valve in the high-pressure fuel pump will open to introduce the fuel into the low-pressure side. The fuel rail transfers fuel to each injector. The fuel injector is turned on by the control of the ECM output electrical signal, and injects fuel into the cylinder for combustion according to the established spray pattern. The amount of fuel injection is adjusted according to the air pressure in the intake manifold.

9. Oil level sensor



The oil level sensor is used to measure the oil level. The 4G20TDB engine does not use the traditional dipstick, and the combination instrument will display the engine oil level.

10. Oil pressure and oil temperature sensor



The engine oil pressure and oil temperature sensor is installed in front of the engine. The sensor is powered by 5V voltage. When the engine is working, the sensor can monitor the oil pressure in the engine oil passage in real time and feedback the pressure signal to ECU for the control and diagnosis of the engine variable displacement oil pump

11. A/C pressure sensor



The switch is installed on the high-pressure side of the air-conditioning pipeline and is mainly used for A/C system control. The ECM will only control the compressor relay after receiving the correct signal, so that the electromagnetic clutch of the compressor is engaged. The ECM will not record the fault code when the switch and circuit fail.

12. Defrosting and heating enable input

This signal is provide by CEM through special line and it is a voltage signal. In essence, the rear windshield defrosting heater is a heating resistance wire of fairly high power, which consumes relatively high electric energy. When the rear windshield defrosting heater is activated, the engine load will increase and cause the fluctuation of engine speed. In order to make the engine operate more smoothly, after receiving this signal, ECM will increase the torque output of the engine. When this signal fails, ECM will not record relevant fault code.

13. Air pressure and air temperature sensor 2

For the improvement of intake efficiency by the turbo charger, the fuel economy and power performance of the engine are greatly improved.

14. CAN information input

ECM downloads and uses the required signals through CAN from the network. The most typical signals are: brake switch signal, vehicle speed signal, ABS working status, etc.

15. Serial data line input

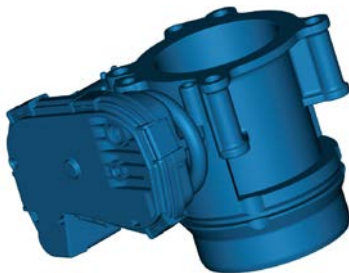
Press the start/stop button to turn the power supply ON. The anti-theft antenna will identify whether the smart key is illegal. This signal will be sent to ECM through anti-theft module and ECM will judge whether to activate the engine anti-theft immobilizer system, such as shut off the ignition, fuel injection and start circuits.

2.2.2.3 Output information unit

1. Throttle unit (DENSO)



Throttle unit (UAES)



The throttle unit actuator motor is integrated on the throttle unit assembly. The throttle unit opening is provided by the ECM to the ECM according to the driver's real-time torque demand of the engine through the accelerator pedal sensor. The ECM sends the throttle unit opening signal to the throttle unit according to the obtained torque demand information to drive the motor inside the throttle unit to rotate. Thus, the throttle unit can obtain the required opening. According to the frequency and pulse width of the signal provided by the ECM, the throttle unit can stay at a fixed position or change a position as needed to meet the needs of various real-time different working conditions of the engine.

2. Fuel injector components (DENSO)



Fuel injector components (UAES)



The fuel injector contains an electromagnet. The electromagnet drives the piston to open the valve and eject the pressurized fuel in the fuel rail through the nozzle. The nozzle sprays fuel into the cylinder according to the correct timing and sequence in the form of fine spray. The fuel injection nozzle is opened or closed according to the requirements of the Engine Control Module. The amount of fuel injected into the cylinder by the fuel injector, also known as pulse width, is determined by the time the fuel injector remains open.

Fuel injector assembly is installed in the cylinder head. The function of the fuel injector is that fuel is injected into the

engine intake manifold or directly injected into the cylinder to form the gas mixture with air. The high-voltage fuel injector of DENSO used by the engine 4G20TD is designed for direct injection in the cylinder, which has six injection orifices and injects fuel into the combustion chamber at a precise injection angle. ECM can control the fuel injector by duty cycle signal: Firstly, ECM sends out the digital control signal, and the digital control signal is converted into the analog control voltage signal and transmitted to the injector by the amplifier circuit. The DC converter converts the initial voltage of the control signal to about 65V; the 65V high voltage can improve the activating speed of the fuel injector. When the fuel injector needle valve is completely activated, the relatively low system voltage of 12V is enough to keep the needle valve activated. That is, the high voltage of 65V is used for activation and the normal voltage of 12V for keeping the valve activated.

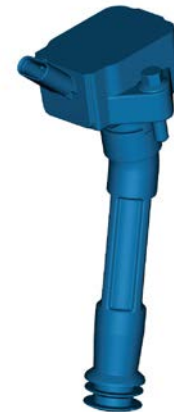
Caution

When the fuel injector is blocked or not closed tightly, the engine fault lamp may light up. But the detection fault codes are distortion of the oxygen sensor, unreasonable signal, abnormal air-fuel ratio and other faults. At this time, fault components should be carefully judged. When the fuel injector is blocked or leaks, the fuel injection amount is not controlled by the engine ECM injection pulse width. So the gas mixture concentration signal fed back by the oxygen sensor to the engine ECM will be quite different from the theoretical ECM control target. After the electronic control system of the engine detects this signal, it will determine that the oxygen sensor is not working properly. But whether it is the fault of the oxygen sensor or the joint fault of other components after damage can't be judged by the system. Therefore it is necessary to clearly identify the fault components when fixing such faults.

3. Ignition coil (DENSO)



Ignition coil (UAES)



The ignition coil supplies high voltage to the sparking plug. The ignition coil has an integrated voltage amplifier. The Engine Control Module (ECM) controls the ignition coil to ensure that the sparking plug generates spark at the correct time. The ignition coil is directly connected with the Engine Control Module and sparking plug.

Performance judgment failure mode: the ignition coil ignition performance can be detected: connect all system circuits, run the engine to detect the ignition performance, and replace the sparking plug if there is no fire; if there is a fire but it is yellow, check the capacitor itself and its circuit; normal ignition is blue and white.

Ignition coil is used to receive the ECM ignition signal and provide the spark plug with the high voltage for ignition in

the electronic control fuel injection system. Ignition coil operates according to the principle of electromagnetic induction. Two magnetically coupled copper coils including the primary coil and the secondary coil form an induction loop. Instantaneous induced voltage is generated by disconnection of the primary circuit switch. After amplification of this voltage by the induction coil, instantaneous high voltage will be generated in the secondary coil circuit. Then it ignites the gas mixture through the spark plug. To make the ignition coil work normally and have the good electromagnetic compatibility (EMC) performance, the supply lines and signal wires for the coil should be as far away as possible from the wires of other parts. The ignition module should not share a grounding wire with other vehicle electrical components. The grounding wire should be as short as possible. Because the ignition coil can produce a high voltage, when it is powered on, do not remove the ignition coil or the spark plug by hand. Do not contact any metal part or the high-voltage extension rod directly, otherwise you may be hurt by the high voltage.



4. VVT solenoid (intake)



VVT solenoid (exhaust)

Oil control valve can control VVT actuator through the signal of the ECM engine. When the engine stops, the oil control valve is in the normal position. The operation of the oil control valve includes advancing, postponing and keeping. Through the engine speed, air inflow quantity, the electronic throttle valve position and the engine coolant temperature, the engine ECM can calculate the best valve timing for each driving condition, and control the camshaft timing oil control valve. In addition, the engine ECM detects the actual valve timing through the signal from the camshaft phase sensor and the crankshaft position sensor to provide feedback control to realize the target valve timing. Precise target valve timing can help to improve fuel economy and reduce emission of hydrocarbon and nitric oxides.

5. EVAP



Basic working conditions of EVAP valve:

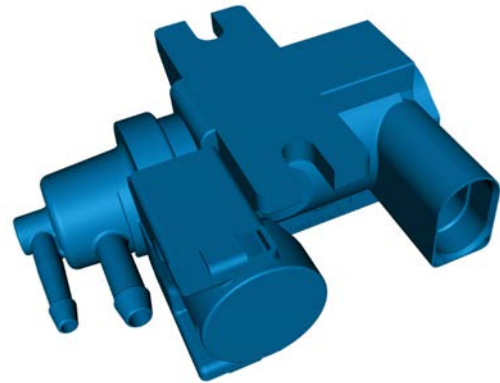
- Inlet air temperature: > - 10 °C
- The engine coolant temperature: > 40 °C
- The mixer shall not be too thick
- Failure related to carbon canister flushing will not be reported

The EVAP valve controls the fuel vapor introduced into the engine. The control valve opens and closes the connection between the activated carbon canister and the intake manifold. The flow of the EVAP valve is controlled by the Engine Control Module (ECM).

EVAP is located on the engine and is used to control the flow of canister cleaning airflow. The EVAP canister purge solenoid valve is controlled by the ECM which make comprehensive calculation based on a series of signals such as engine load, engine temperature, speed, etc., and issues the duration and frequency (i.e., duty cycle) of the electrical pulses. The excessive accumulation of gasoline vapor in the charcoal canister will cause the gasoline to leak out and cause environmental pollution. Therefore, the role of the EVAP is to open the canister at an appropriate time to allow the excess gasoline vapor to fully mix with the air in the carbon canister and enter the intake pipe to participate in the combustion. EVAP valve is composed of solenoid, armature and valve. There is a filter screen at the entrance. On the one hand, the air flow through the EVAP valve is related to the duty cycle of the electric pulse output by the ECM to the EVAP valve, on the other hand, it is also related to the pressure difference between the inlet and outlet of the EVAP valve. When there is no electric pulse, the EVAP valve is closed. ECM controls the conduction time of canister according to signals provided by all sensors of the engine and indirectly controls the size of cleaning airflow. When the engine coolant temperature, engine working time, load and other factors meet the predetermined requirements, ECM will control EVAP to work. The canister will not work under the following conditions :

- Some time after a cold start of engine.
- The engine coolant temperature is relatively low.
- The engine coolant temperature is high.
- The engine is under heavy load. The important sensor of the system is faulty.

6. Turbine control valve (wastegate)



The engine controller can switch on or switch off the vacuum control valve, switch on or switch off the vacuum channel of the vacuum control actuator according to the engine speed and the opening signal of the electronic throttle body. The vacuum actuator makes the control valve switched on or switched off to switch the inlet pipe. The intake chamber is divided into two sections by the clapboard to achieve the best effect of intake. Open and close the intake control valve of the clapboard to confirm the effective length of the intake chamber according to engine speed and the opening of the electronic throttle body, which increases the output of all power from low to high speed and provides high performance in all speed ranges.

7. Main relay

The main relay is controlled by the engine ECU. When the start switch is operated to set the power mode to ON, the battery voltage passes through the start switch to the fuse and finally reaches the engine ECU harness connector. After the engine ECU detects that there is power supply at this terminal, it will control the internal grounding of the corresponding terminal. The main relay works to heat the A/C compressor relay, engine cooling fan low-speed relay, engine cooling fan high-speed relay, oil pump relay, EVAP valve, VVT solenoid valve, ignition coil, fuel injector components, Lambda probe (front oxygen sensor) Lambda probe (rear oxygen sensor) heating and vehicle speed sensor provide power supply. So when the main relay does not work normally, the engine will not be running properly. However, ECU will not record the fault code related to the main relay.

8. Fuel pump relay and fuel pump

The fuel pump relay is located in the fuse box in the engine compartment, and the fuel pump is installed in the fuel tank.

After the ECU control oil pump relay is closed, the fuel pump works. The pump and the motor are mounted coaxially and enclosed in the same housing. Gasoline are filled around the pump and motor inside the housing, using fuel to dissipate heat and lubricate. Because the fuel pump relay is closed by suction, the battery supplies power to the electric fuel pump through the oil pump relay. The relay only turns on the electric fuel pump circuit while starting and when the engine is running. When the engine is stopped due to an accident, the fuel pump automatically stops running. The maximum pressure at the outlet of the electric fuel pump is determined by the pressure relief valve mounted on the fuel pump and is between 450kPa and 650kPa. "Half-return oil tube system" is adopted for the fuel system, and the fuel pressure is stable at about 400kPa.

9. Engine cooling fan high/low speed relay

Two cooling fan relays are located in the fuse box of the engine compartment and are mainly used to control the high and low speed running of the cooling fans. Engine ECU controls high/low speed relays of engine cooling fan respectively, according to the signal of the engine temperature sensor.

10. A/C compressor relay

The A/C compressor relay is located in the interior fuse relay box and is internally integrated. Mainly used to control the work of electromagnetic clutch of the compressor. When a fault occurs in the A/C compressor relay or its circuit, the fault code will be recorded. If the relay is damaged, only replace the interior fuse relay box assembly.

11. Turbo charger

The turbocharging system presses the intake air into the combustion chamber. The exhaust gas in the exhaust manifold provides energy for the turbocharger compressed air.

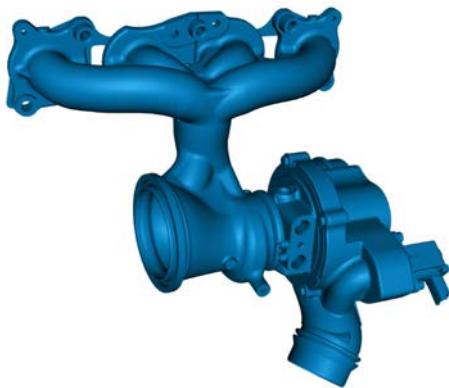
The high temperature and High-pressure tail gas from the exhaust manifold drives the turbocharger turbine; the turbine drives the pressure wheel, which pressurizes the air in the air inlet pipe and sends it to the intercooler. The compressed gas has a high temperature. After being cooled by the intercooler, the high-pressure normal temperature air is sent to the engine air inlet system and finally enters the combustion chamber.

12. CAN message output

ECM transmits the information needed by other modules through CAN network via CAN signal, thereby realizing network sharing. The most typical signals are: TPS, ECT, engine speed, etc.

13. Serial data line output

The most typical application of serial data line output is the communication message with the anti-theft module. Meanwhile, the serial data line is also used to complete the data transmission when the diagnostic scan tool is used to diagnose the ECM and read the data stream.



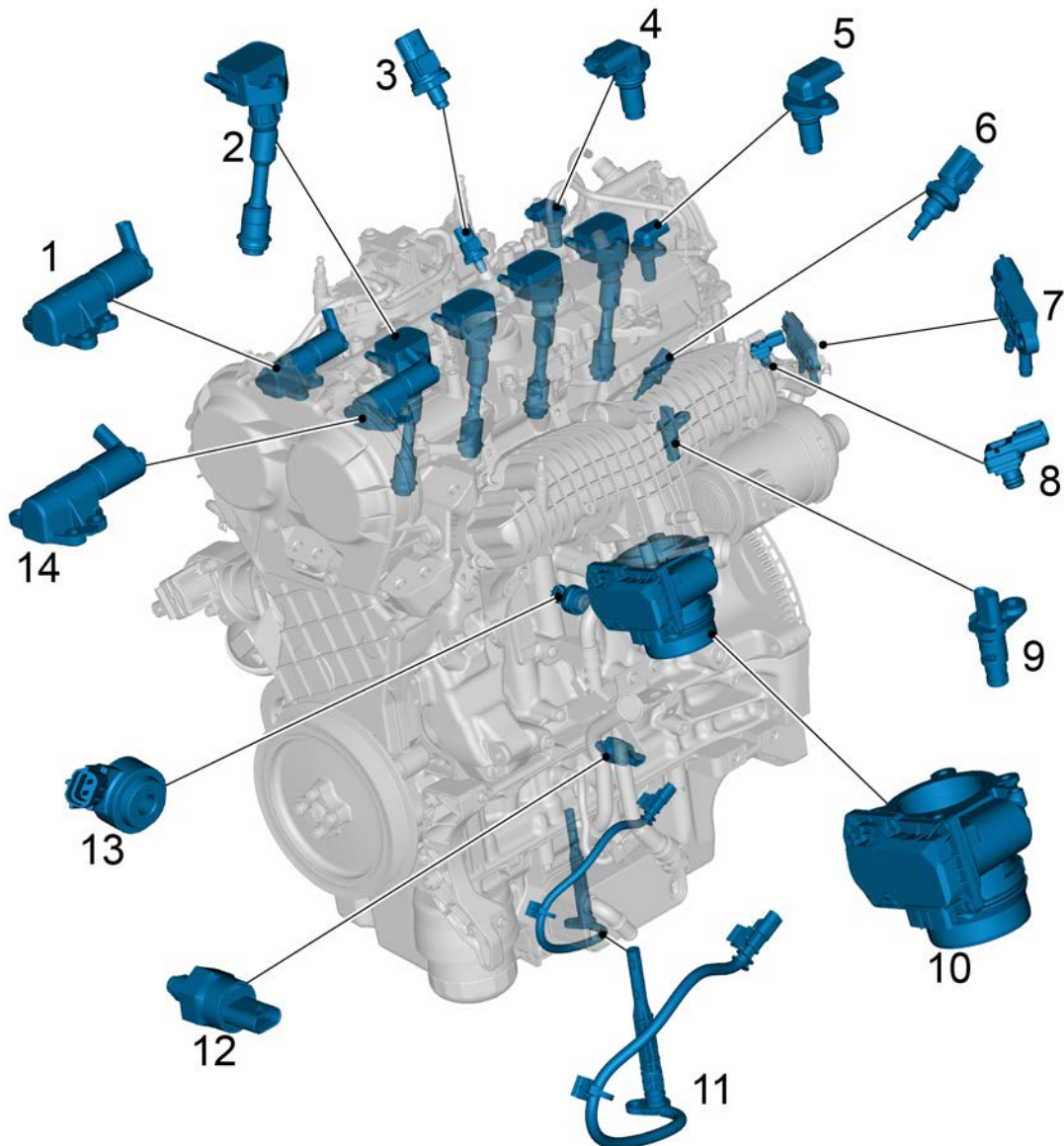
2.2.3 System working principles

2.2.3.1 System Working Principles

The role of the control unit is to calculate the basic fuel injection duration according to the signals of engine's air intake volume and speed, so as to supply the engine with a mixture close to the ideal air-fuel ratio, and control its operation. For example, when starting a vehicle in cold state, the ECU increases the fuel injection quantity and enables the engine start smoothly and controls the idle speed according to the relevant signals. In addition, engine ECU also has fault self-diagnosis and protection functions. When the engine fails, the control unit can automatically diagnose the fault and save the fault code, and issue a warning through the fault indicator light. The saved code can also be output under certain trigger conditions. Once the sensor or actuator fails, engine ECU automatically starts its backup system to ensure the safety of the vehicle and maintain the vehicle's ability to continue driving. The control unit can also communicate with the maintenance and diagnostic instruments. The diagnostic instruments can be used to view the DTC saved in the control unit, scan the current system parameters of the control unit, that is, the data flow. It can also use diagnostic instruments to perform forced drive tests on the actuators of the control system, which can provide great convenience during the maintenance and diagnosis of the control system

2.2.4 Component position

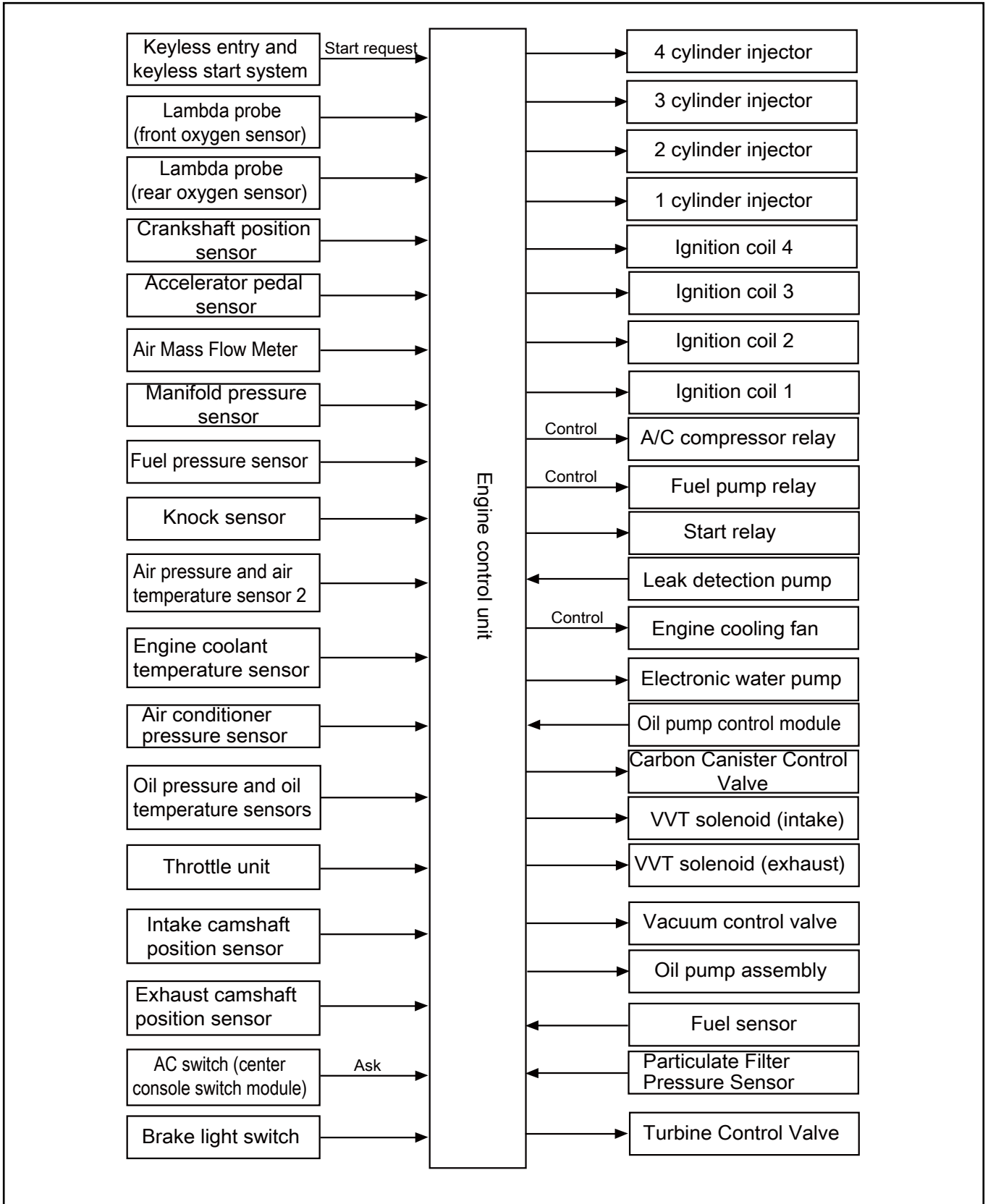
2.2.4.1 Component position layout of control system



- | | | | |
|----|-----------------------------------|-----|---|
| 1. | VVT solenoid (exhaust) | 8. | Crankshaft position sensor |
| 2. | Ignition coil | 9. | Throttle unit |
| 3. | Fuel pressure sensor | 10. | Oil level sensor |
| 4. | Exhaust CMP sensor | 11. | Oil pressure and oil temperature sensor |
| 5. | Intake CMP sensor | 12. | Knock sensor |
| 6. | Engine coolant temperature sensor | 13. | VVT solenoid (intake) |
| 7. | Manifold pressure sensor | | |

2.2.5 Electrical schematic diagram

2.2.5.1 Electrical schematic diagram



2.2.6 Diagnostic information and procedures

2.2.6.1 Diagnosis Description

Before diagnosing the faults of the control system, see the [overview](#) to understand and be familiar with the working principle of the control system, and then start the system diagnosis, which helps to determine the correct fault diagnosis steps in case of faults. More importantly, it also helps to determine whether the conditions described by the customer belong to normal operation. Any trouble diagnosis of the control system should start with the "control system check". The "control system check" will guide maintenance personnel to take the next logical step for diagnosis. Understanding and using the diagnosis flow chart correctly can shorten the diagnosis time and avoid misjudgment of parts.

2.2.7 Removing and installing

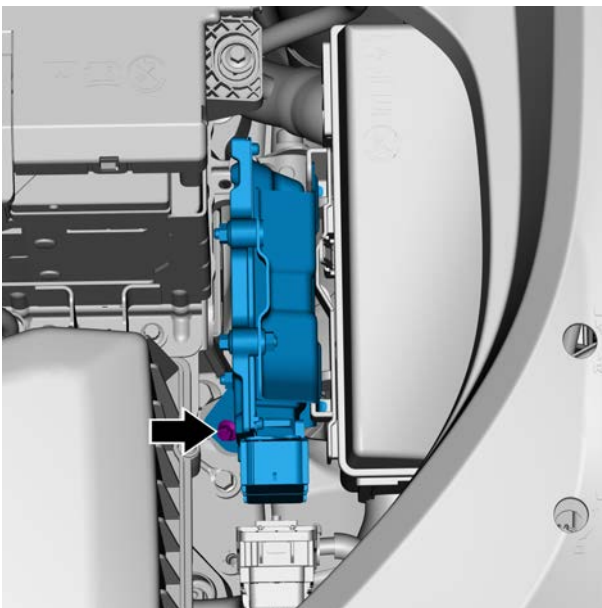
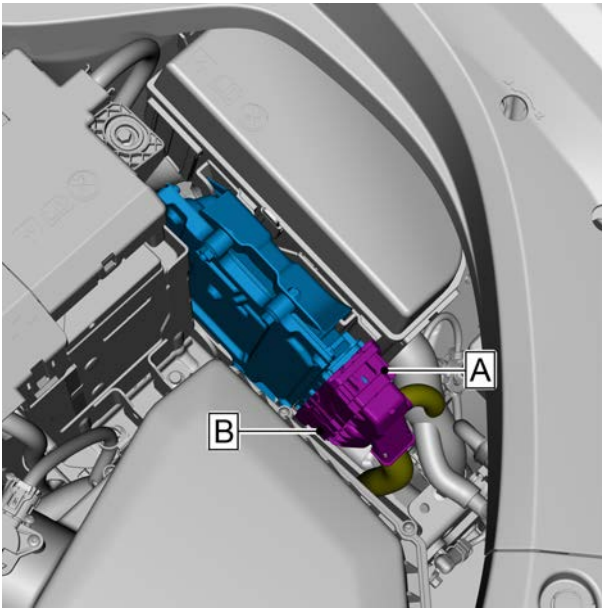
2.2.7.1 Replacement of Engine Control Module

Removal procedure

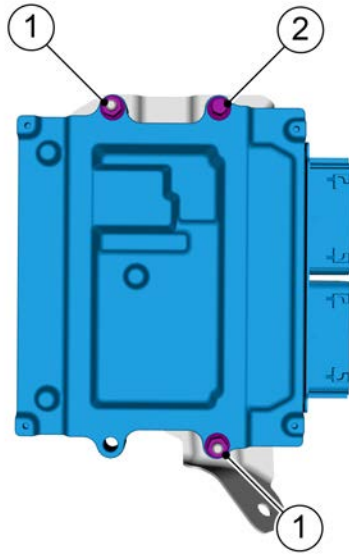
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

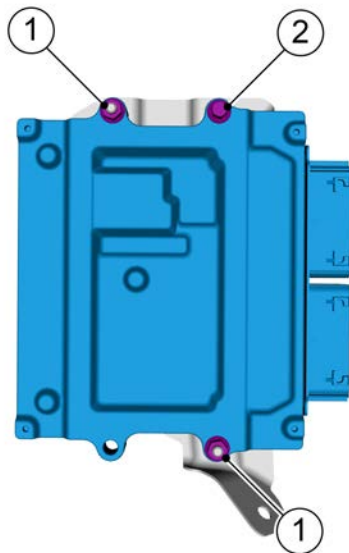
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Disconnect the harness connector A of engine control module.
- 4 Disconnect the harness connector B of engine control module.



- 5 Remove one retaining bolt of the Engine Control Module bracket assembly, and remove the Engine Control Module and the Engine Control Module bracket assembly.

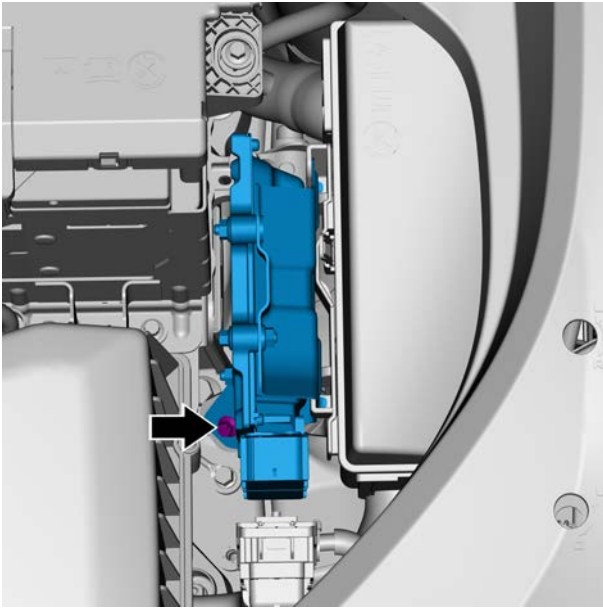


- 6 Remove 2 fixing nuts 1 from the Engine Control Module.
- 7 Remove one retaining bolt 2 of the Engine Control Module and remove the Engine Control Module.



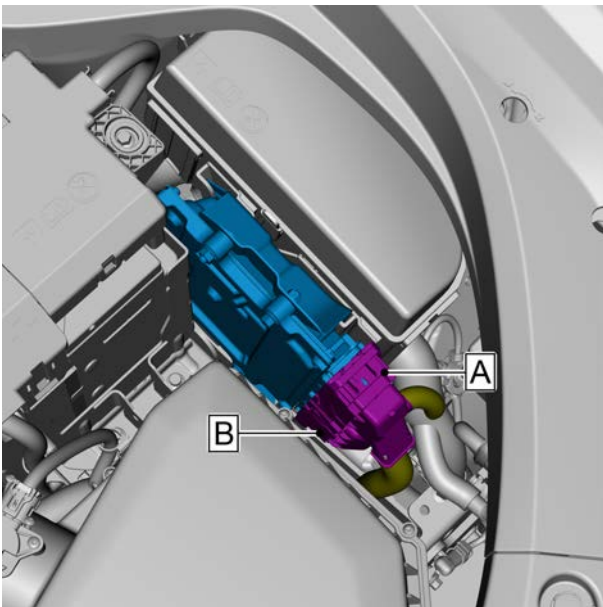
Installation procedure

- 1 Install the Engine Control Module, install and tighten one retaining bolt 2 of the Engine Control Module.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 2 Install 2 fixing nuts 1 onto the Engine Control Module and tighten them.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 3 Install the Engine Control Module and the Engine Control Module bracket assembly. Install and tighten one retaining bolt of the Engine Control Module bracket assembly.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 4 Connect the harness connector B of engine control module.
- 5 Connect the harness connector A of engine control module.

- 6 Connect the negative battery cable.
- 7 Use the GLDS diagnostic program, select the corresponding module under the [software] tab, and complete the software brushing operation according to the steps prompted by the diagnostic program.
- 8 Close the engine compartment cover.

2.2.7.2 Replacement of VVT solenoid (intake)

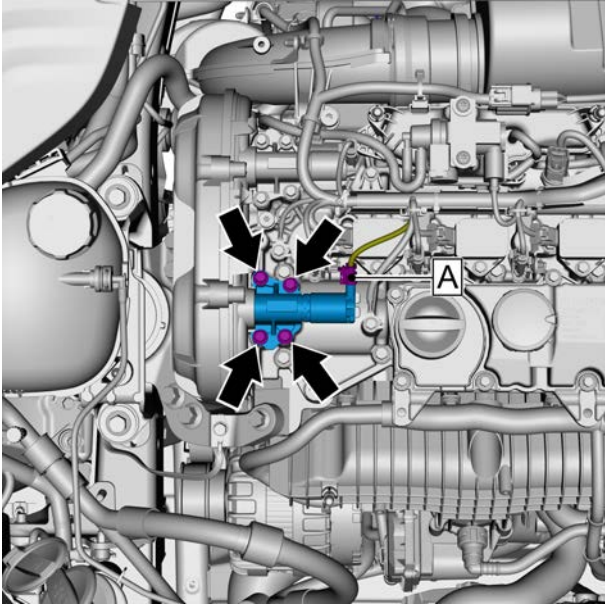
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.

- 2 Disconnect the battery negative cable, to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [assembly-engine trim cover](#).



- 4 Disconnect VVT solenoid (intake) harness connector A.

Caution

Confirm the cleanliness of the top of the engine and continue the removal only after meeting the requirements. Prevent foreign matters from falling into the engine.

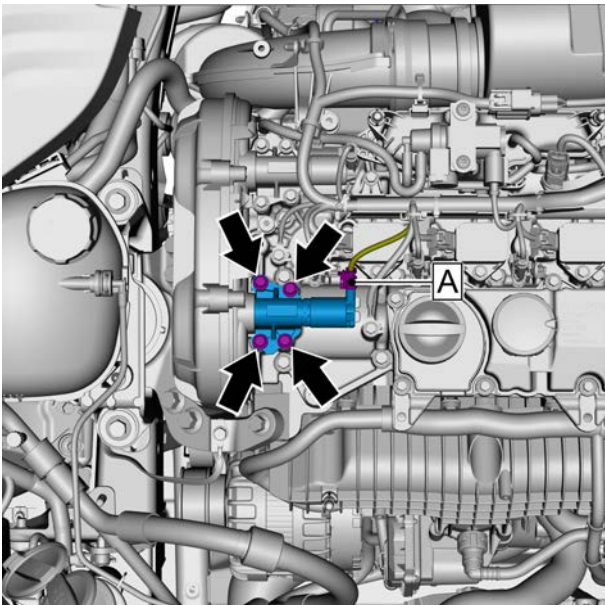
- 5 Remove 4 retaining bolts of VVT solenoid coil (air inlet), and remove VVT solenoid coil (air inlet) and gasket.

Installation procedure

- 1 Install the VVT solenoid (intake) gasket.

Caution

The sealing gasket of oil control valve is a disposable part, which needs to be replaced every time.



- 2 Install VVT solenoid coil (intake), Pre-tighten the 4 retaining bolts of the oil control valve on the intake side in a cross sequence, and then tighten the bolts to the standard torque.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

Caution

Before assembling VVT solenoid (intake), press the engine oil into the oil passage hole.

Caution

1. The clearance matching requirements of VVT and oil control valve parts are strict. If they fall during removal, they cannot be used. New VVT and oil control valve shall be replaced to ensure qualified flow characteristics.
 2. The intake and exhaust of oil control valve cannot be installed reversely.
 3. The hexagon head flange bolt cannot be reused after removal, but only once.
- 3 Connect VVT solenoid (intake) harness connector A.

Caution

The harness interface of oil control valve is easy to be polluted, the assembly environment shall be clean and tidy, and pay attention to dust protection.

- 4 Install the engine trim cover assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

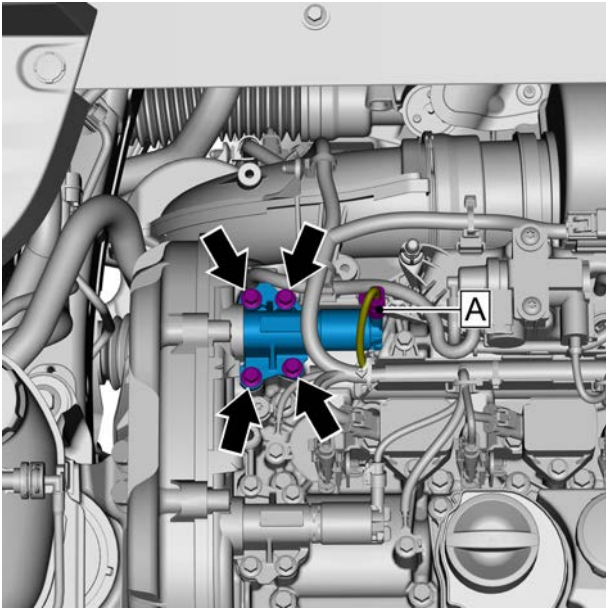
2.2.7.3 Replacement of VVT solenoid (exhaust)

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).



- 4 Disconnect VVT solenoid (exhaust) harness connector A.

Caution

Confirm the cleanliness of the top of the engine and continue the removal only after meeting the requirements. Prevent foreign matters from falling into the engine.

- 5 Remove 4 retaining bolts of VVT solenoid coil (exhaust), and remove VVT solenoid coil (exhaust) and gasket.

Installation procedure

- 1 Install VVT solenoid (exhaust) gasket.

Caution

The sealing gasket of oil control valve is a disposable part, which needs to be replaced every time.

- 2 Install the exhaust side oil control valve, Pre-tighten the 4 retaining bolts of the exhaust side oil control valve in a cross sequence, and then tighten the bolts to the standard torque.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

Caution

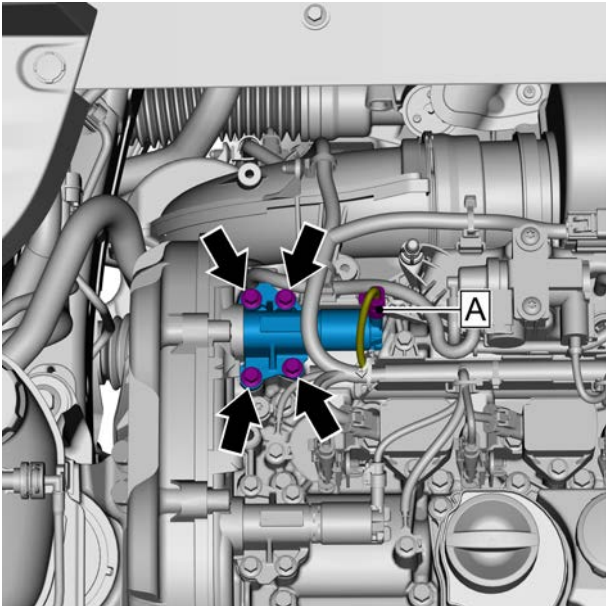
Before assembling VVT solenoid (exhaust), press engine oil into the oil passage hole.

Caution

1. The clearance matching requirements of VVT and oil control valve parts are strict. If they fall during removal, they cannot be used. New VVT and oil control valve shall be replaced to ensure qualified flow characteristics.

2. The intake and exhaust of oil control valve cannot be installed reversely.

3. The hexagon head flange bolt cannot be reused after removal, but only once.



- 3 Connect VVT solenoid (exhaust) harness connection A.

Caution

The harness interface of oil control valve is easy to be polluted, the assembly environment shall be clean and tidy, and pay attention to dust protection.

- 4 Install the engine trim cover assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

2.2.7.4 Cleaning of the oil control valve

Cleaning procedures

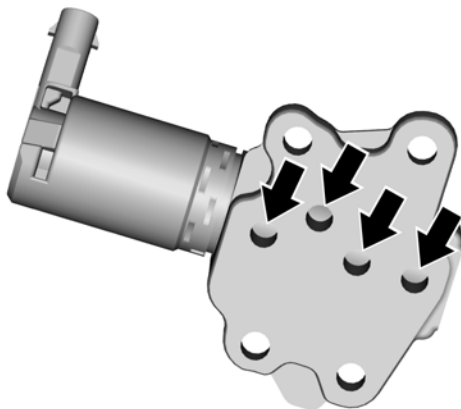
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the oil control valve, see [VVT solenoid coil \(intake\) replacement](#), [VVT solenoid coil \(exhaust\) replacement](#).
- 5 Clean the fuel feed hole, oil return hole, oil chamber at angle of entrance, and oil chamber at angle of delay of the oil control valve using the cleaner.
- 6 Clean the oil holes and oil chambers of the oil control valve using an air gun, and clear up the residual cleaner.
- 7 Continuously power on and off the oil control valve, let it work in the open and closed statuses, and then clean it with an air gun; repeat 2-3 times.

Caution

The power on time of each time shall not be more than 2s, otherwise the camshaft position sensor may be damaged



- 8 Install the oil control valve.
- 9 Install the engine trim cover assembly.
- 10 Connect the negative battery cable.
- 11 Close the engine compartment cover.

2.2.7.5 Replacement of exhaust CMP Sensor

Removal procedure

Warning !

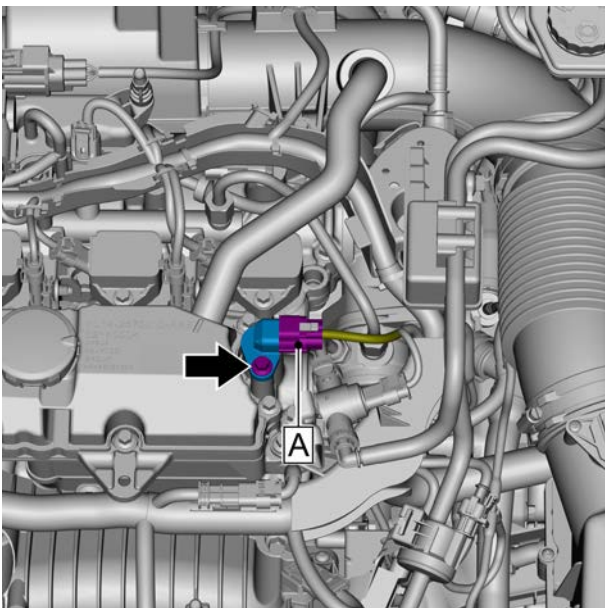
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Disconnect the harness connector of intake camshaft position sensor A.

Caution

Confirm the cleanliness of the top of the engine and continue the removal only after meeting the requirements. Prevent foreign matters from falling into the engine.

- 5 Remove one retaining bolt of the intake camshaft position sensor and remove the intake camshaft position sensor.



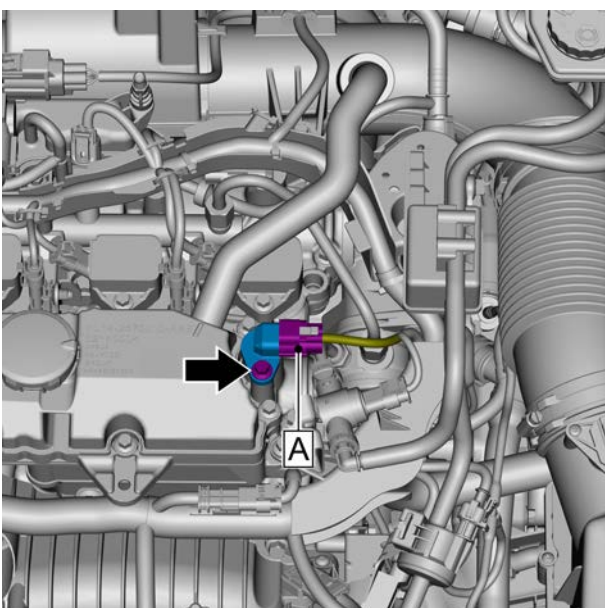
Installation procedure

- 1 Install the intake camshaft position sensor. Install and tighten one retaining bolt of the intake camshaft position sensor.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

Caution

1. If the sensor has been dropped or has been severely hit, replace it with a new sensor when installation.;
2. Check whether the o-ring is damaged before installation;
3. After the sensor is removed, if the pin and rubber ring are not damaged, it can continue to be used.
4. Apply P80 lubrication oil on the sealing ring before assembly.



- 2 Connect harness connector of intake camshaft position sensor A.
- 3 Install the engine trim cover assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

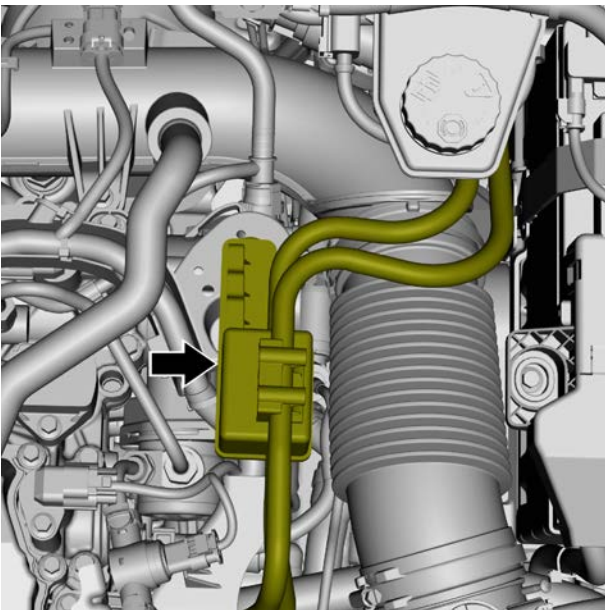
2.2.7.6 Replacement of Exhaust CMP Sensor

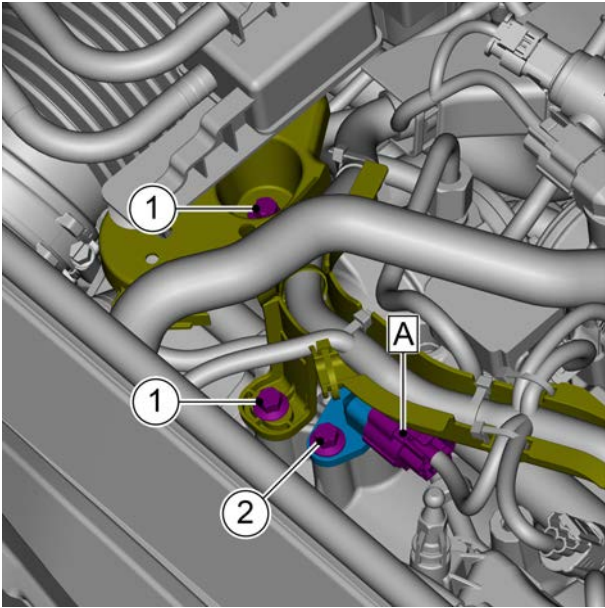
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover.](#)
- 4 Remove the fixing clip connecting the expansion pot and the engine harness sheath and move it aside.





- 5 Remove 2 retaining bolts 1 from the engine harness sheath.
- 6 Disconnect the Exhaust camshaft position sensor harness connector A.

Caution

Confirm the cleanliness of the top of the engine and continue the removal only after meeting the requirements. Prevent foreign matters from falling into the engine.

- 7 Remove one retaining bolt 2 of the exhaust camshaft position sensor and remove the exhaust camshaft position sensor.

Installation procedure

- 1 Install the exhaust camshaft position sensor. Install and tighten one retaining bolt 2 of the exhaust camshaft position sensor.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

Caution

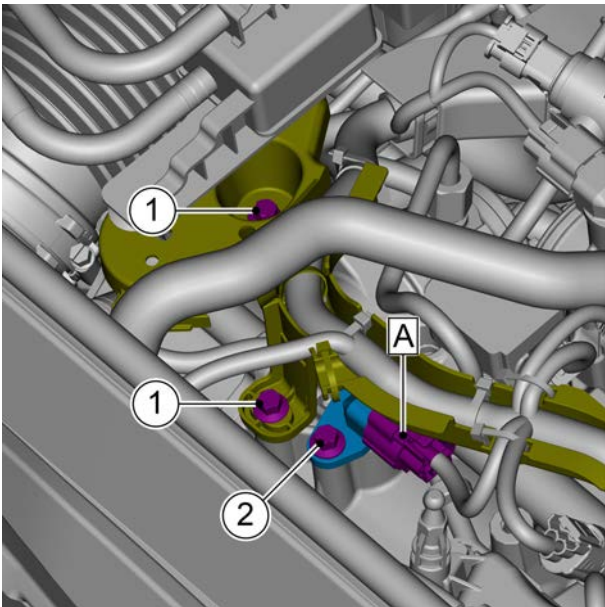
1. If the sensor has been dropped or has been severely hit, replace it with a new sensor when installation.;

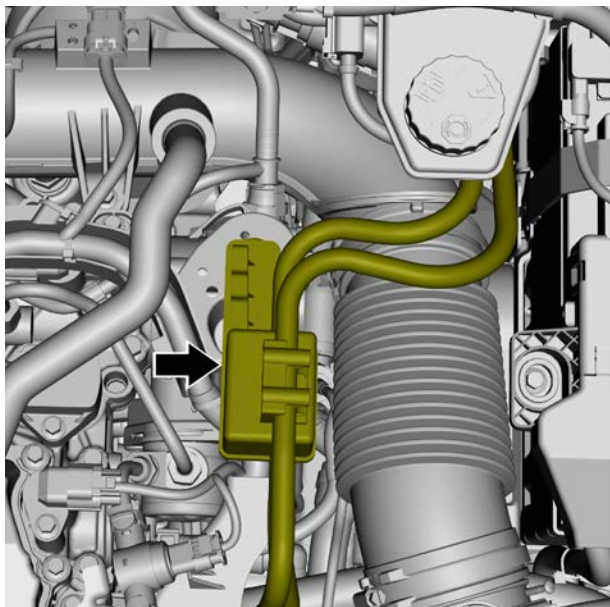
2. Check whether the o-ring is damaged before installation;

3. After the sensor is removed, if the pin and rubber ring are not damaged, it can continue to be used.

4. Apply P80 lubrication oil on the sealing ring before assembly.

- 2 Connect the Exhaust camshaft position sensor harness connector A.
- 3 Install 2 retaining bolts 1 onto the engine harness sheath.
Torque: 9 N. m (metric system) 6.64 lb-ft (Imperial system)





- 4 Install the expansion tank.

- 5 Connect the negative battery cable.
- 6 Install the engine trim cover assembly.
- 7 Close the engine compartment cover.

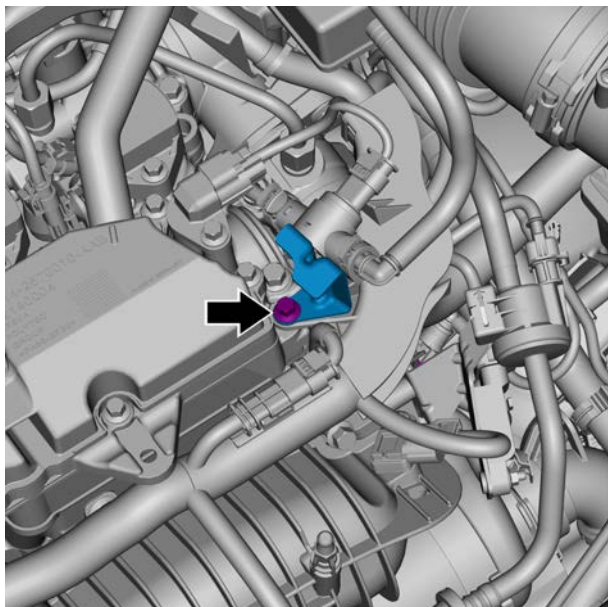
2.2.7.7 Replacement of manifold pressure sensor

Removal procedure

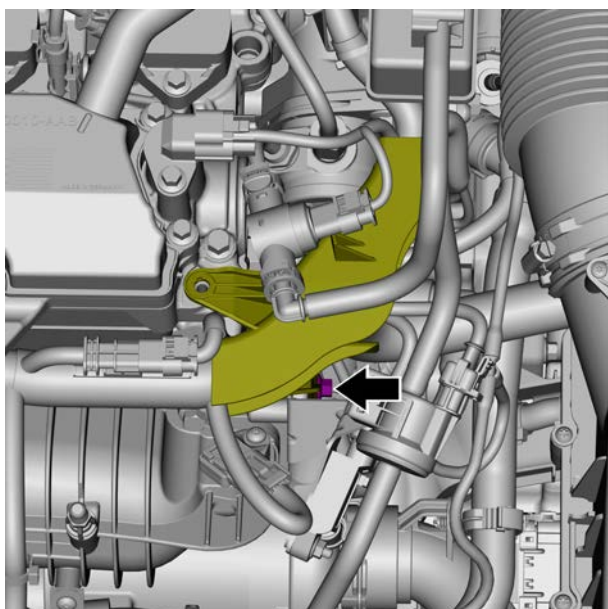
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

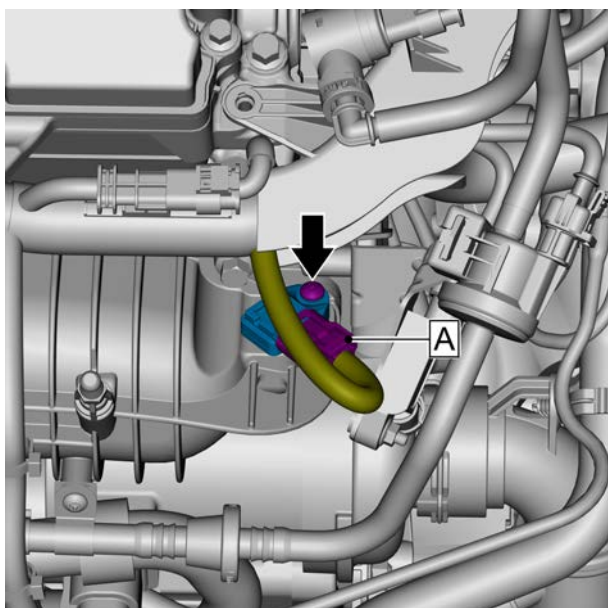
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).



- 4 Remove one retaining bolt of the fuel pressure sensor bracket and remove the fuel pressure sensor bracket.

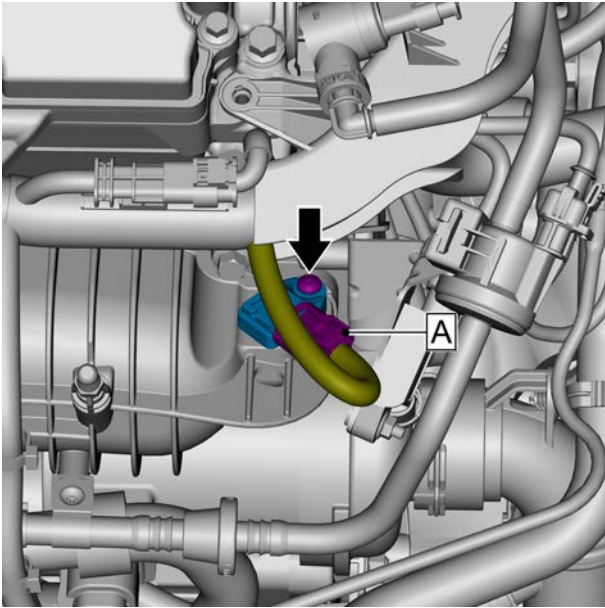


- 5 Remove 1 retaining bolt from the engine harness sheath.



- 6 Disconnect manifold pressure sensor harness connector A.
- 7 Remove one fixing screw of the manifold pressure sensor and pull out the manifold pressure sensor.

Installation procedure



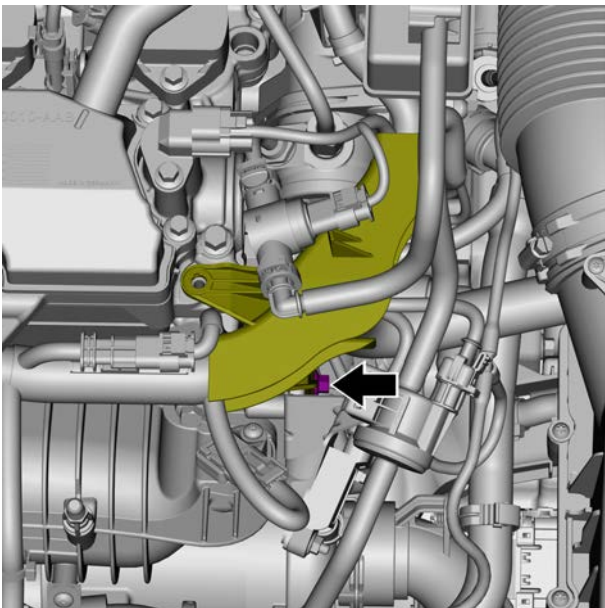
- 1 Install the manifold pressure sensor. Install and tighten one fixing screw of the manifold pressure sensor.

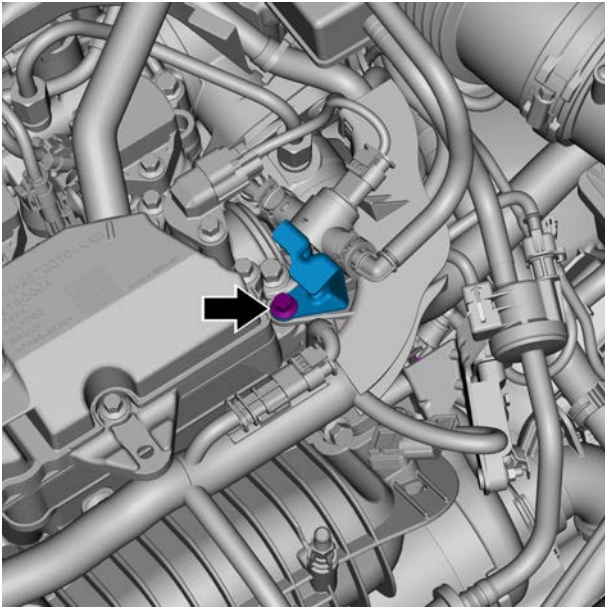
Torque: 3.5 N. m (metric system) 2.6 lb-ft (Imperial system)

Caution

1. If the sensor has been dropped or has been severely hit, replace it with a new sensor when installation.;
 2. Do not bias the sensor during installation to avoid crushing the o-ring;
 3. This sensor is an absolute pressure sensor, and the output value of the product under standard atmospheric pressure is approximately 2.1V. Since the ambient pressure is not an accurate value during measurement, this value is for reference only.
- 2 Connect manifold pressure sensor harness connector A.
 - 3 Install 1 retaining bolt from the engine harness sheath.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)





- 4 Install the fuel pressure sensor bracket, install and tighten one retaining bolt of the fuel pressure sensor bracket.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 5 Install the engine trim cover assembly.
- 6 Connect the negative battery cable.
- 7 Close the engine compartment cover.

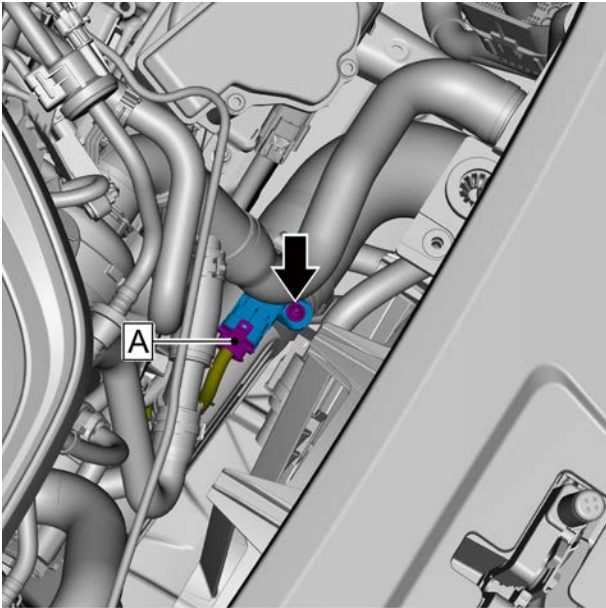
2.2.7.8 Replacement of air pressure and air temperature sensor 2

Removal procedure

Warning !

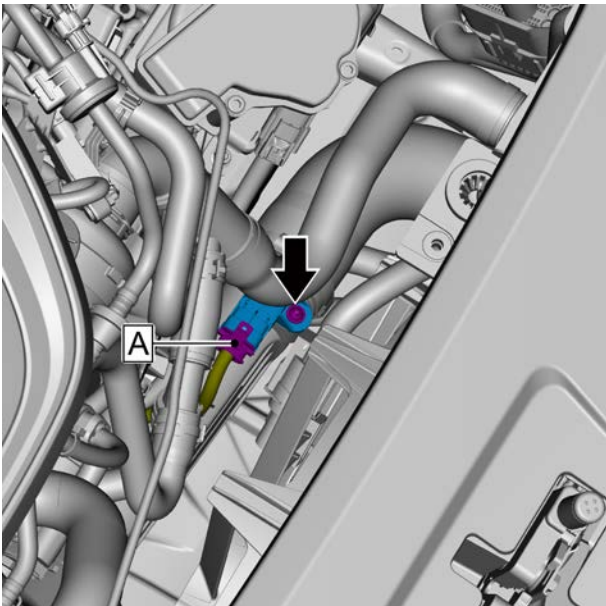
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 4 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe assembly](#).



- 5 Disconnect harness connector A of air pressure and air temperature sensor 2.
- 6 Remove one fixing screw of air pressure and air temperature sensor 2 and remove air pressure and air temperature sensor 2.

Installation procedure



- 1 Install the air pressure and air temperature sensor 2. Install and tighten one fixing screw of the air pressure and air temperature sensor 2.
Torque: 5 N. m (metric system) 3.7 lb-ft (Imperial system)
- 2 Connect harness connector A of air pressure and air temperature sensor 2.

- 3 Install the air inlet pipe of the air filter.
- 4 Install the air filter assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

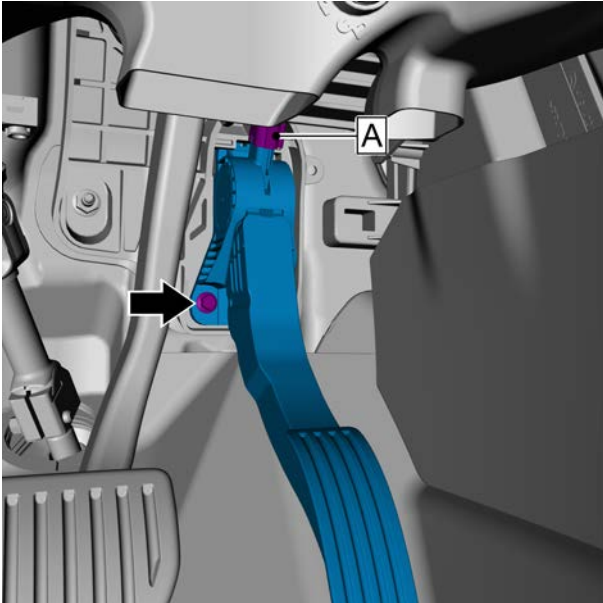
2.2.7.9 Replacement of accelerator pedal sensor

Removal procedure

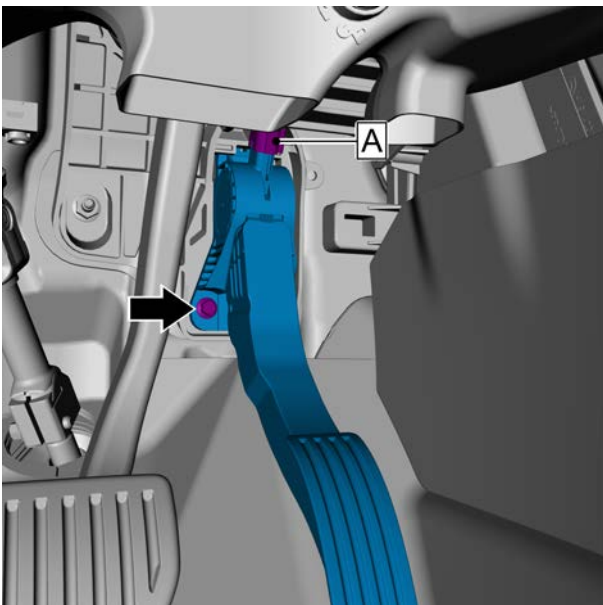
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the lower left baffle assembly, see [Replacement of the lower left baffle assembly.](#)
- 4 Disconnect accelerator pedal sensor harness connector A.
- 5 Remove one retaining bolt of the accelerator pedal sensor and remove the accelerator pedal sensor.

**Installation procedure**

- 1 Install the accelerator pedal sensor. Install and tighten one retaining bolt of the accelerator pedal sensor.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 2 Connect accelerator pedal sensor harness connector A.



- 3 Install the lower left foot shield assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

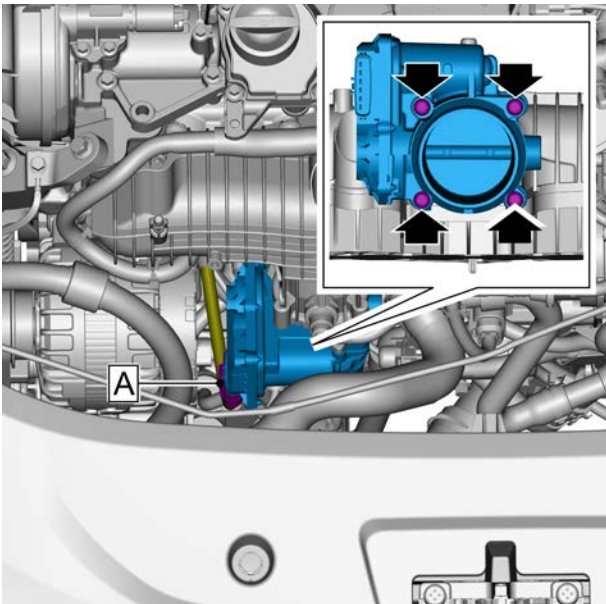
2.2.7.10 Throttle unit replacement

Removal procedure

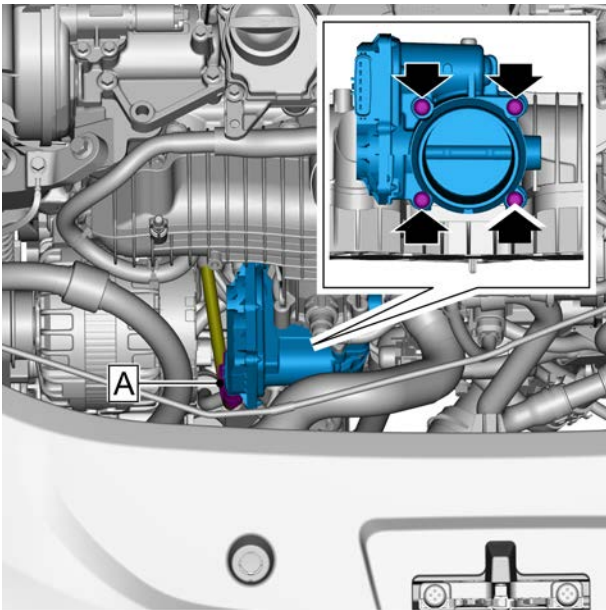
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover.](#)
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly.](#)
- 5 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe assembly.](#)
- 6 Lift the vehicle, see [Lift the vehicle](#)
- 7 Remove the engine fender, see [Engine fender replacement.](#)
- 8 Remove the air pressure and air temperature sensor 2, see [air pressure and air temperature sensor 2 replacement.](#)
- 9 Remove the intercooler outlet pipe assembly. See [intercooler outlet pipe assembly replacement.](#)
- 10 Disconnect the throttle unit harness connector A.
- 11 Remove the 4 retaining bolts of the throttle unit and remove the throttle unit.



Installation procedure



- 1 Install the throttle unit, install and tighten the 4 fixing screws of the throttle unit.

Torque: 6.5 N. m (metric system) 4.8 lb-ft (Imperial system)

Caution Install the throttle unit under the guidance of the two positioning pins.

- 2 Connect the throttle unit harness connector A.

- 3 Install the intercooler outlet pipe assembly.
- 4 Install air pressure and air temperature sensor 2.
- 5 Install the engine fender.
- 6 Lower the vehicle.
- 7 Install the air inlet pipe of the air filter.
- 8 Install the air filter assembly.
- 9 Install the engine trim cover assembly.
- 10 Connect the negative battery cable.
- 11 Close the engine compartment cover.

2.2.7.11 Replacement of Engine Coolant Temperature Sensor

Removal procedure

Warning !

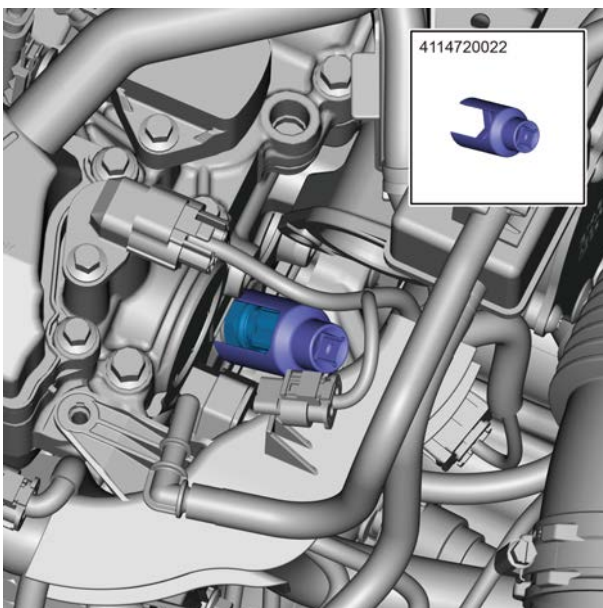
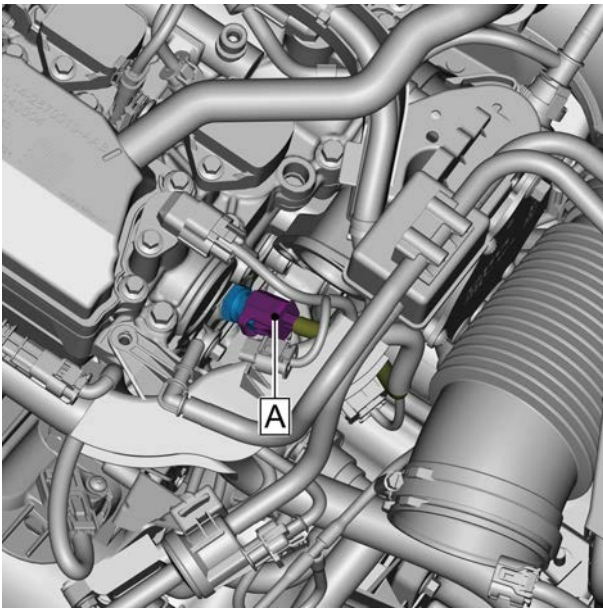
See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).

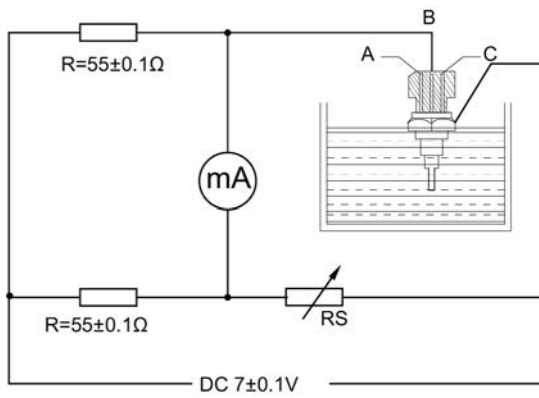
- 5 Remove the high-pressure oil pipe components. See [replacement of high-pressure oil pipe assembly](#).
- 6 Remove the fuel sensor, see [fuel sensor replacement](#).
- 7 Remove the high pressure oil pump, refer to replacement of the high pressure oil pump .
- 8 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 9 Remove the engine fender, see [Engine fender replacement](#).
- 10 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 11 Disconnect the harness connector A of the engine coolant temperature sensor.



- 12 Remove the engine coolant temperature sensor with the special tool.

Special tool for removal and assembly of engine coolant temperature sensor: 4114870407

Inspection procedure



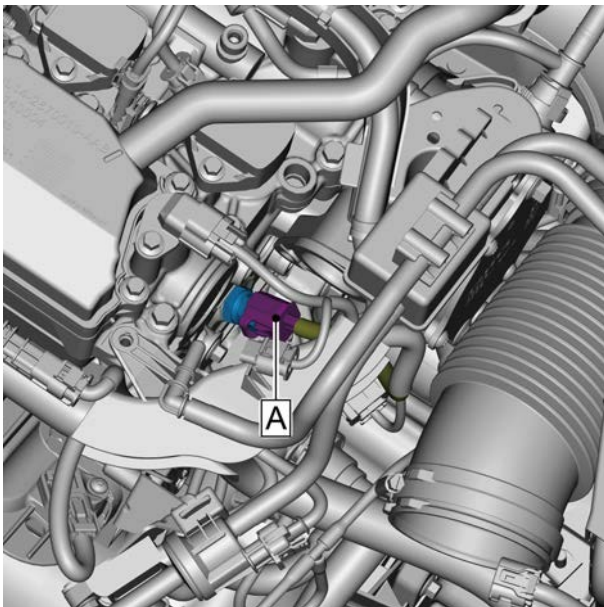
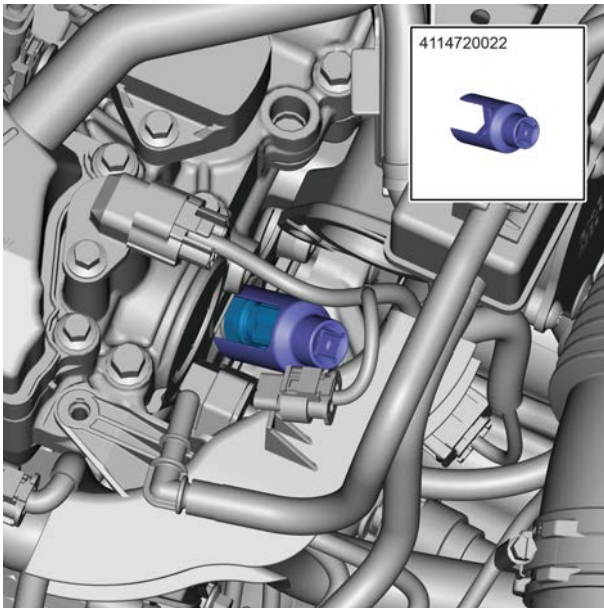
- As shown in the figure, place the sensor in the thermostatic bath, match the 7 V working voltage, and connect the 55Ω internal resistance of the instrument in series with the sensor. Under this condition, measure the resistance parameters of the sensor.

Resistance Temperature Characteristic Standard

Temperature ($^{\circ}\text{C}$)	Resistance ($\text{K}\Omega$)
-40	44.3
-30	25.4
-20	15.04 (+1.29,-1.20)
-10	9.16
0	5.74
10	3.70
20	2.45 (+0.18,-0.17)
30	1.66
40	1.15
50	0.811
60	0.584
70	0.428
80	0.318 (± 0.008)
90	0.240
100	0.1836
110	0.1417 (± 0.0018)
120	0.1108
130	0.0877
140	0.0703

Response time: $\leq 7\text{s}$

Installation procedure



- 1 Fasten the engine coolant temperature sensor with the special tool.

Special tool for removal and assembly of engine coolant temperature sensor: 4114870407

Torque: 22 N. m (metric system) 16.2 lb-ft (Imperial system)

Caution

1. The matching gasket is a disposable vulnerable part, and a new matching gasket shall be replaced.

2. Pre-tighten the engine coolant temperature sensor by hand.

- 2 Connect the engine coolant temperature sensor harness connector A.

- 3 Fill engine coolant.
- 4 Install the engine fender.
- 5 Install the air filter assembly.
- 6 Install the high-pressure fuel pump.
- 7 Install the fuel sensor.
- 8 Install the high-pressure oil pipe components.
- 9 Install the engine trim cover assembly.
- 10 Connect the negative battery cable.
- 11 Close the engine compartment cover.

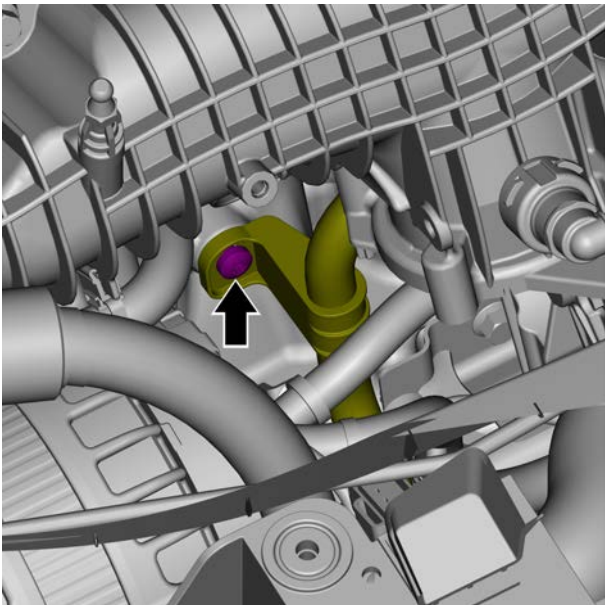
2.2.7.12 Replacement of Knock Sensor

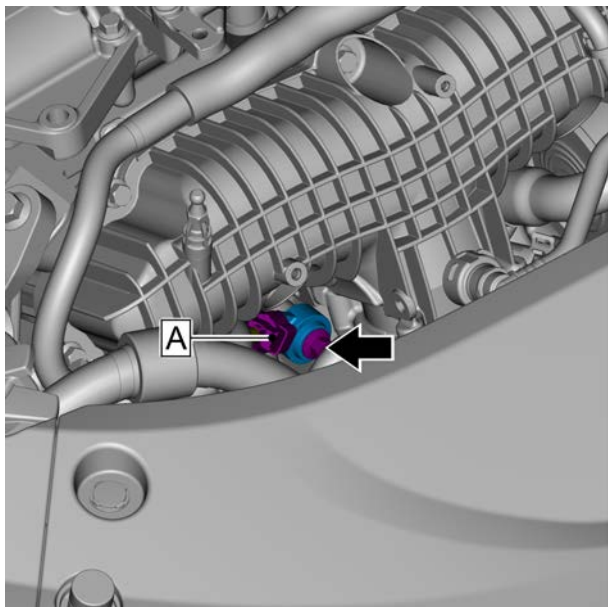
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Lift the vehicle, see [Lift the vehicle](#)
- 5 Remove the engine fender, see [Engine fender replacement](#).
- 6 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 7 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe assembly](#).
- 8 Remove the intercooler outlet pipe assembly. See [intercooler outlet pipe assembly replacement](#).
- 9 Remove the throttle unit, see [replacement of throttle unit](#).
- 10 Remove one retaining bolt of the inlet pipe components of the oil cooler and move it aside.





- 11 Disconnect the knock sensor harness connector A.
- 12 Remove one retaining bolt of the knock sensor and remove the knock sensor.

Installation procedure

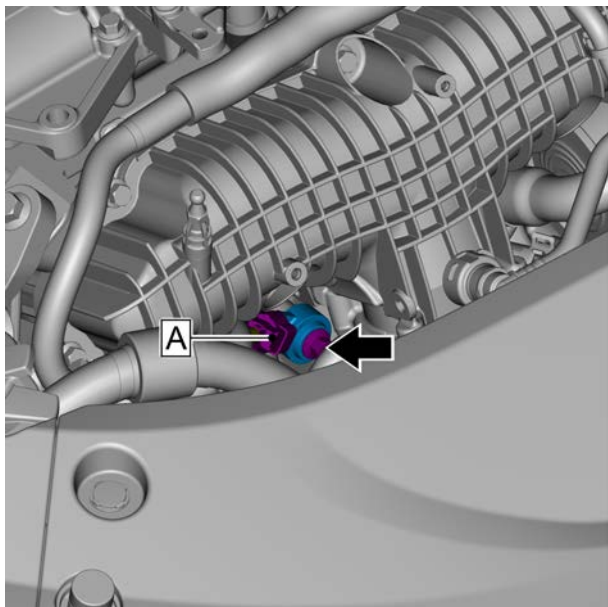
- 1 Install the knock sensor. Install and tighten one retaining bolt of the knock sensor.

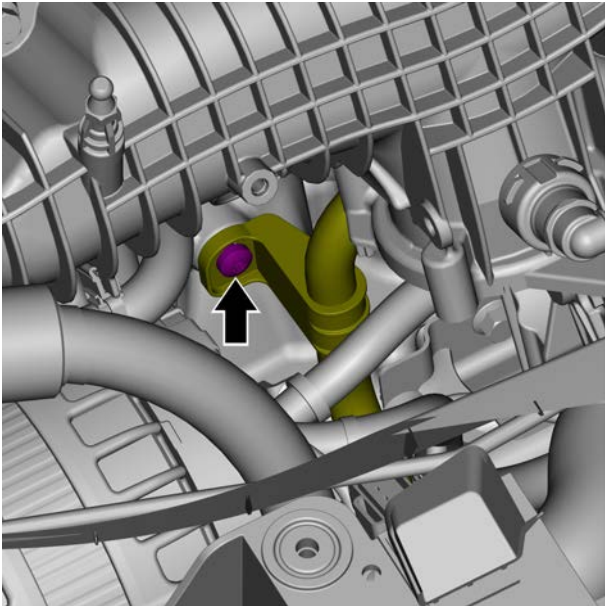
Torque: 26 N. m (metric system) 19.2 lb-ft (Imperial system)

Caution

If the sensor has been dropped or has been severely hit, replace it with a new sensor when installation.

- 2 Connect the knock sensor harness connector A.





- 3 Install the inlet pipe components of the oil cooler, and install and tighten one retaining bolt of the inlet pipe assembly of the oil cooler.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 4 Install throttle unit.
- 5 Install the intercooler outlet pipe assembly.
- 6 Install the air inlet pipe of the air filter.
- 7 Install the air filter assembly.
- 8 Install the engine fender.
- 9 Lower the vehicle.
- 10 Install the engine trim cover assembly.
- 11 Connect the negative battery cable.
- 12 Close the engine compartment cover.

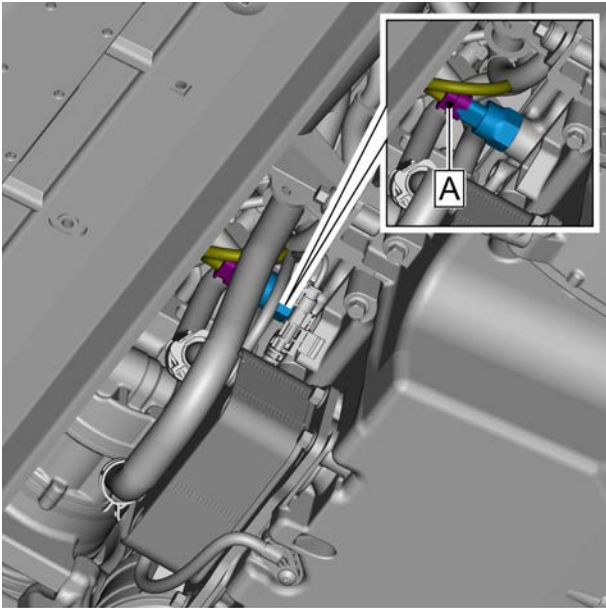
2.2.7.13 Oil pressure and oil temperature sensor replacement

Removal procedure

Warning !

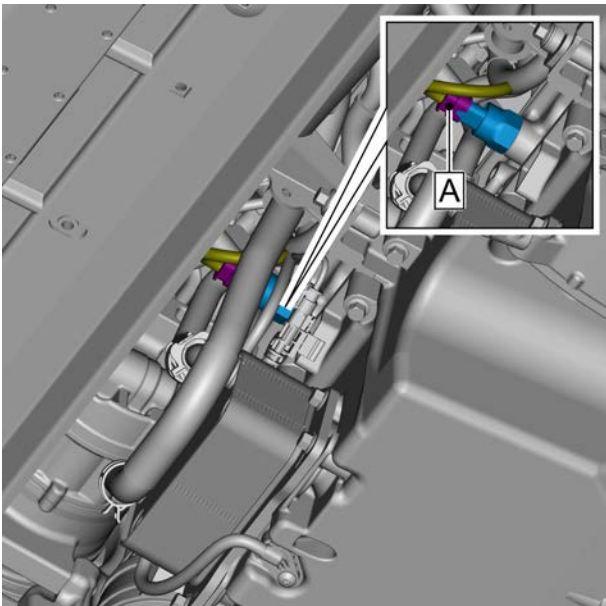
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement.](#)
- 5 Drain engine oil.
- 6 Remove the intercooler intake pipe assembly. See [intercooler intake pipe assembly replacement.](#)



- 7 Disconnect harness connector A of oil pressure and oil temperature sensor.
- 8 Remove the oil pressure and oil temperature sensor.

Installation procedure



- 1 Install and tighten the oil pressure and oil temperature sensors.
- Torque of Hella sensor: 15.75 N·m (metric system)
11.62 lb-ft (British)**
- Sensata sensor torque: 22 N·m (metric system) 16.3 lb-ft (British)**

Caution

1. Before installation, check whether the gasket has scratches and falls off, and whether the coating is intact;
 2. During assembly, the thread shall not be glued, and the flange surface installed with the sensor shall be free of burrs, pollutants and lubricants;
 3. The oil pressure and oil temperature sensors can only be disassembled and assembled once.
- 2 Connect harness connector A of oil pressure and oil temperature sensor.
 - 3 Install the intercooler intake pipe assembly.
 - 4 Fill with engine oil.
 - 5 Install the engine fender.
 - 6 Lower the vehicle.
 - 7 Connect the negative battery cable.
 - 8 Close the engine compartment cover.

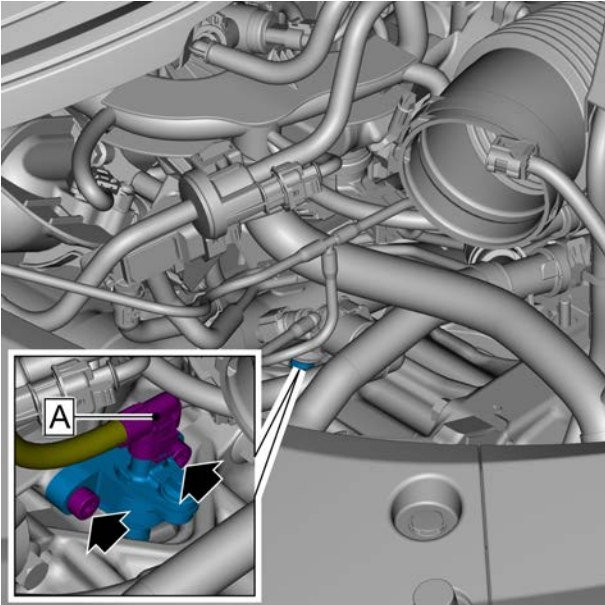
2.2.7.14 Replacement of Speed Sensor

Removal procedure

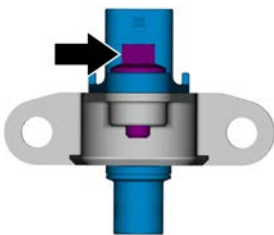
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

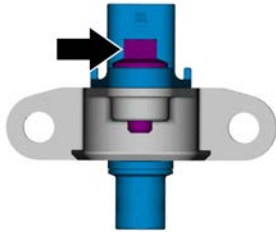
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the air filter assembly, refer to [replacement of air filter assembly.](#)
- 4 Disconnect the crankshaft position sensor harness connector A.
- 5 Remove 2 retaining bolts from the crankshaft position sensor bracket and remove the crankshaft position sensor components.



- 6 Remove one retaining bolt of the crankshaft position sensor and remove the crankshaft position sensor.



Installation procedure



- 1 Install the crankshaft position sensor. Install and tighten one retaining bolt of the crankshaft position sensor.

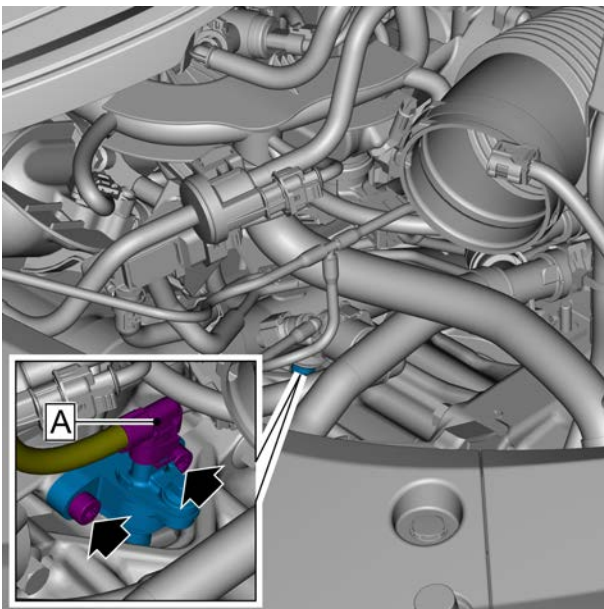
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

Caution

1. If the sensor has been dropped or has been severely hit, replace it with a new sensor when installation.;

2. Do not let the sensing end of the sensor contact with magnetic substances;

3. After the sensor is disassembled, check the appearance and pins for damage, and then continue to use.



- 2 Install the crankshaft position sensor components, install and tighten the 2 retaining bolts of the crankshaft position sensor bracket.


Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 3 Connect the crankshaft position sensor harness connector A.

- 4 Install the air filter assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

2.2.8 Special tools and equipment

2.2.8.1 Special tool

Serial No.	Illustration	Tool number	Name
1		4114870407	Special tool for removal and assembly of engine coolant temperature sensor

2.3 Fuel System JLH-4G20TD

2.3.1 Specification

2.3.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
High-pressure oil pipe components	-	Pre-tightening 13-17	9.6~12.5
		Final-tightening 20-30	14.8~22.1
Fuel pressure sensor bracket retaining bolt	M6×20	8.5~11.5	6.3~8.5
retaining bolt of engine harness sheath	M6×20	8.5~11.5	6.3~8.5
High pressure oil pump fixing bolt	M8×28	24~28	17.7~20.7
Fuel injector components retaining bolt	M7×45	19~21	14.0~15.5
retaining bolt of engine harness sheath	M6×20	8.5~11.5	6.3~8.5
Engine harness assembly grounding retaining bolt	M6×12	8.5~11.5	6.3~8.5
Fuel filter retaining bolt	M6×20	8.5~11.5	6.3~8.5
Fuel filter grounding wire fixing nut	M6×7.8	8.5~11.5	6.3~8.5
Retaining bolt of fuel tank fixing belt	M8× 45c	25~35	18.4~25.8
Oil filler pipe worm clamp	-	3.2~3.8	2.4~2.8
Retaining bolts of underfloor fuel pipe bracket	M8×30	25~35	18.4~25.8
Retaining bolts of conductive fuel pipe support under the floor	M8×30	25~35	18.4~25.8
Retaining bolt of underfloor support	M8×25	20~28	14.8~20.7
Fixing screw of long desorption pipe under floor	PF5×20	3~4	2.2~3.0
Retaining bolt of oil filler pipe assembly	M6×16	8.5~11.5	6.3~8.5

2.3.1.2 Fuel filter specification

Pressure	≤ 600 kPa
Flow	≤ 135 l/h
Temperature range	-40°C - +80°C

Clogging capacity	≥ 12 g
Differential pressure	70 kPa

2.3.1.3 Fuel pump specification

Correlation between resistance value of fuel pump oil level sensor and instrument display

Instrument fuel display	N/A	Alarming	1/4	1/2	3/4	Full
Resistance (Ω)	283 \pm 3.0	251 \pm 3.0	239 \pm 2.5	176 \pm 2.0	113 \pm 1.5	62 \pm 1.0

2.3.2 Instructions and operations

2.3.2.1 Instructions and Operations

The fuel tank and fuel pipe supply fuel to the fuel rail. The fuel system includes an evaporative emission system (EVAP), which prevents excessive discharge of hydrocarbons into ambient air. Electric controlled fuel direct injection (GDI) system is adopted by 4G20TD engine fuel system. The GDI system adopts the method of directly injecting the fuel into the cylinder and quickly igniting the mixture of fuel and air in the cylinder, thus the combustion pressure is highly improved. As a result, the output power of complete machine is improved. At the same time, because of the high efficiency of combustion, the economy of the fuel is obviously improved compared with port injection. According to the intake volumes under different load speeds, GDI system can precisely control the oil injection. It can also inject fuel in several times under some loads, further promoting the economy of fuel.

Fuel tank

The fuel tank is made of high density polystyrene and other materials. It is fixed by 2 metal hoops connected at the underbody. In addition, the fuel tank is equipped with fuel steam ventilation valve with roll-over protection function.

Fuel tank filler cap

Caution

When the fuel tank filler cap needs to be replaced, use the fuel tank filler cap with the same function as the original one. If the wrong fuel tank filler cap is used, serious faults of the fuel system may be caused.

The fuel tank filler hose is equipped with a screw on the filler cap that has the function of ventilation by turning. Ratcheting operation is adopted for the screw to prevent over tightening. The function of ventilation by turning makes it possible to relieve the pressure inside the fuel tank before removing. Instructions for proper use are printed on the filler cap. A vacuum safety pressure limiting valve is also integrated in this filler cap.

High-pressure fuel system

The fuel system transfers the fuel in the fuel tank into the engine. The high-pressure fuel pump provides high oil pressure to the fuel injector components. When the engine is idling, the pressure in the fuel rail is close to 11Mpa, and the pressure fluctuates between 12Mpa and 20Mpa as the vehicle load changes. If the pressure in the fuel rail exceeds 23.5MPa, the safety valve in the high-pressure fuel pump will open to introduce the fuel into the low-pressure side. The fuel rail transfers fuel to each injector. The fuel injector is turned on by the control of the ECM output electrical signal, and injects fuel into

the cylinder for combustion according to the established spray pattern. The amount of fuel injection is adjusted according to the air pressure in the intake manifold.

Caution

The fuel control valve is a part of the high-pressure fuel pump. Therefore, it cannot be replaced separately. If the continuous power-on time of the fuel control valve exceeds 3s, the fuel control valve will be damaged. Therefore, it is forbidden to connect exterior power supply to the fuel control valve.

Fuel rail

Provide sufficient and closed fuel cavity to suppress the pulsation of oil pressure in the fuel supply system;

Ensure that sufficient fuel with stable pressure is provided to all fuel injectors;

Fuel injection is based on the signal input from the ECM.

Fuel pressure sensor

Fuel pressure sensor is located at the high-pressure fuel rail pipe. It can directly measure the fuel pressure value inside the high-pressure fuel supply system. Through the fuel pressure sensor, the closed-loop control of fuel pressure can be achieved. ECM calculates the theoretical rail pressure according to the signal input by the relate sensors under the current working conditions of the engine, realizes rail pressure control by adjusting the fuel control valve of the high-pressure fuel pump, and relies on the fuel pressure sensor to detect the current actual rail pressure, and compares it with the theoretical rail pressure and makes correction, thus achieving closed-loop control.

Fuel injector

The fuel injector is mainly used to inject fuel into the combustion chamber of the 4G20TD engine. The timing and duration of fuel injection are controlled by ECM. The high-voltage fuel injector of DENSO used by the engine 4G20TD is designed for direct injection in the cylinder, which has six injection orifices and injects fuel into the combustion chamber at a precise injection angle. The fuel injector is the needle-valve type. The opening and closing of needle valve is controlled by solenoid coil to control fuel injection.

Electric fuel pump stainer

As a coarse filter, the stainer serves the following functions:

1. Filter out contaminants.
2. Improve the service life of electric fuel pump.

Fuel filter assembly

Fuel filter assembly is located at the left side of the bottom of the vehicle, and fixed on the fuel tank assembly. The filter is formed by paper filter element, which can filter the particle in the fuel that may damage components of the fuel system. Fuel filter can support the maximum fuel system pressure, temperature change and the effect of fuel additives.

Fuel level sensor assembly

Fuel level sensor consists of one fuel level floater and sensor resistance. Fuel level sensor is integrated with fuel pump assembly. The fuel level floater changes its position through the contact position of the slider, and provides variable circuit resistance for instrument cluster, the resistance is between 50-300Ω. The circuit harness is led from the varistor and extends to connect with the fuel pump harness connector.

Fuel filling

Fuel is injected into the fuel tank through the fuel filler pipe at the fuel tank cap. The fuel tank cap motor locks and unlocks the fuel tank cap under the control of the right front door module. If fuel overflows from the fuel filler equipment during fuel filling, the oil drain hose of the fuel filler module can be used. Fuel needed by the engine is stored in the fuel tank. Fuel tanks have different capacities and shapes depending on the vehicle type. When the fuel tank is filled with oil, the high-pressure steam in the fuel tank is evacuated back to the fuel filler equipment through a separate fuel pipe.

Fuel distribution system

The fuel distribution system is used to ensure that the engine receives the right amount of fuel at the right time and under the right pressure.

Fuel pump module

The fuel pump module delivers fuel in the fuel tank to the fuel injection pump through the fuel pipe. The fuel pump module is controlled by the fuel pump control module (PEM). The fuel level sensor sends a signal to the instrument cluster control unit (IPK) to indicate the amount of fuel remaining in the fuel tank. When the engine is running, the fuel is pumped through the fuel pipe to the fuel filter to remove pollutants. After that, the fuel flows along the fuel pipe to the front of the vehicle, through the fuel pressure sensor on the low-pressure side, and finally to the fuel injection pump. The low-pressure side fuel pressure sensor is an absolute pressure sensor used to measure the pressure in the fuel pipe in front of the fuel injection pump. The fuel injection pump produces high fuel pressure, and the control valve in the fuel injection pump can adjust the amount of fuel flowing into the fuel injection pump. The fuel injection pump is installed on the vacuum pump,

which produces high pressure. The supercharged fuel then flows through the fuel supply pipe to the fuel rail. The high-pressure side fuel pressure sensor is installed on the fuel rail to measure the actual pressure of the fuel rail. High-pressure side and low-pressure side fuel pressure sensors and fuel injection pumps send information to ECM and are controlled by ECM. Fuel is distributed to each injector through the fuel rail, and the injector injects fuel into the combustion chamber of the engine.

Fuel pump control module (PEM)

Average fuel consumption= cumulative fuel consumption after clearing/ cumulative mileage after clearing

PEM controls the fuel pump and the output flow and the pressure according to the pulse width modulation signal transmitted by ECM. The engine control unit calculates the expected fuel consumption and inputs the signal of the high-pressure side fuel pressure sensor into the fuel pump control module.

Evaporative emission system (EVAP)

EVAP is an integral part of the fuel system, used to prevent fuel vapor from being discharged into ambient air. Spilled fuel vapor in the fuel tank shall not be discharged into the atmosphere. It must be transferred into the intake manifold through the charcoal canister. Fuel vapor will burn in the engine.

2.3.3 System working principles

2.3.3.1 System Working Principles

The fuel system transfers the fuel in the fuel tank into the engine. The high-pressure fuel pump with vacuum pump provides high oil pressure for the fuel rail. When the engine is idling, the pressure in the fuel rail is close to 11Mpa, and the pressure fluctuates between 2Mpa and 20Mpa as the vehicle load changes. Changes in the load of the alternator and the A/C compressor can also cause fluctuations in fuel rail pressure. If the oil pressure in the fuel rail exceeds 23 MPa, the safety valve in the fuel pump will open and introduce the fuel to the low-pressure side. The fuel oil rail transfers fuel to each injector. The fuel injector is an electrically controlled valve. When the fuel burns in the cylinder and the pressure is 3-20Mpa, the fuel injector injects fuel into the cylinder. This process is called direct injection. The advantages of direct injection include low fuel consumption, low emission and high output power. Each cylinder is equipped with an injector. The fuel injector contains an electromagnet. The electromagnet drives the piston to open the valve and eject the pressurized fuel in the fuel rail through the nozzle. The nozzle sprays fuel into the cylinder according to the correct timing and sequence in the form of fine spray. The fuel injection nozzle is opened or closed according to the requirements of the Engine Control Module. The amount of fuel injected into the cylinder by the fuel injector, also known as pulse width, is determined by the time the fuel injector remains open. The oil pressure differential is not adjusted according to the amount of fuel required by the cylinder, but according to the air pressure in the intake manifold. The Engine Control Module controls the fuel quantity, i. e. pulse width, and determines the correct fuel quantity according to the information provided by each sensor.

Startup mode

Connection of engine control module to fuel pump relay for 2s when the start switch enters the start power mode. Then, the fuel pump generates fuel pressure. The engine control module also checks the engine coolant temperature sensor and throttle valve position sensor, and determines the most suitable air-fuel ratio for starting the engine. The engine control module controls the fuel supply in the startup mode by changing the time duration during which the fuel injectors are turned on and off. This is achieved by controlling the fuel injector in a pulsating manner of very short duration.

Acceleration mode

The engine control module responds to rapid changes in electronic throttle unit position and intake manifold pressure, and provides additional fuel.

Deceleration mode

The engine control module responds to changes in electronic throttle unit position and intake manifold pressure, and reduces the fuel supply. When decelerating rapidly, the engine control module can completely cut off the fuel in a short time.

Battery voltage correction mode

UAES system, the battery is lower than 13.5V, with corresponding compensation.

- Increase the pulse width of fuel injector components.

- Increase ignition duration

For the DENSO system, there is corresponding compensation if the battery is lower than 13.5V.

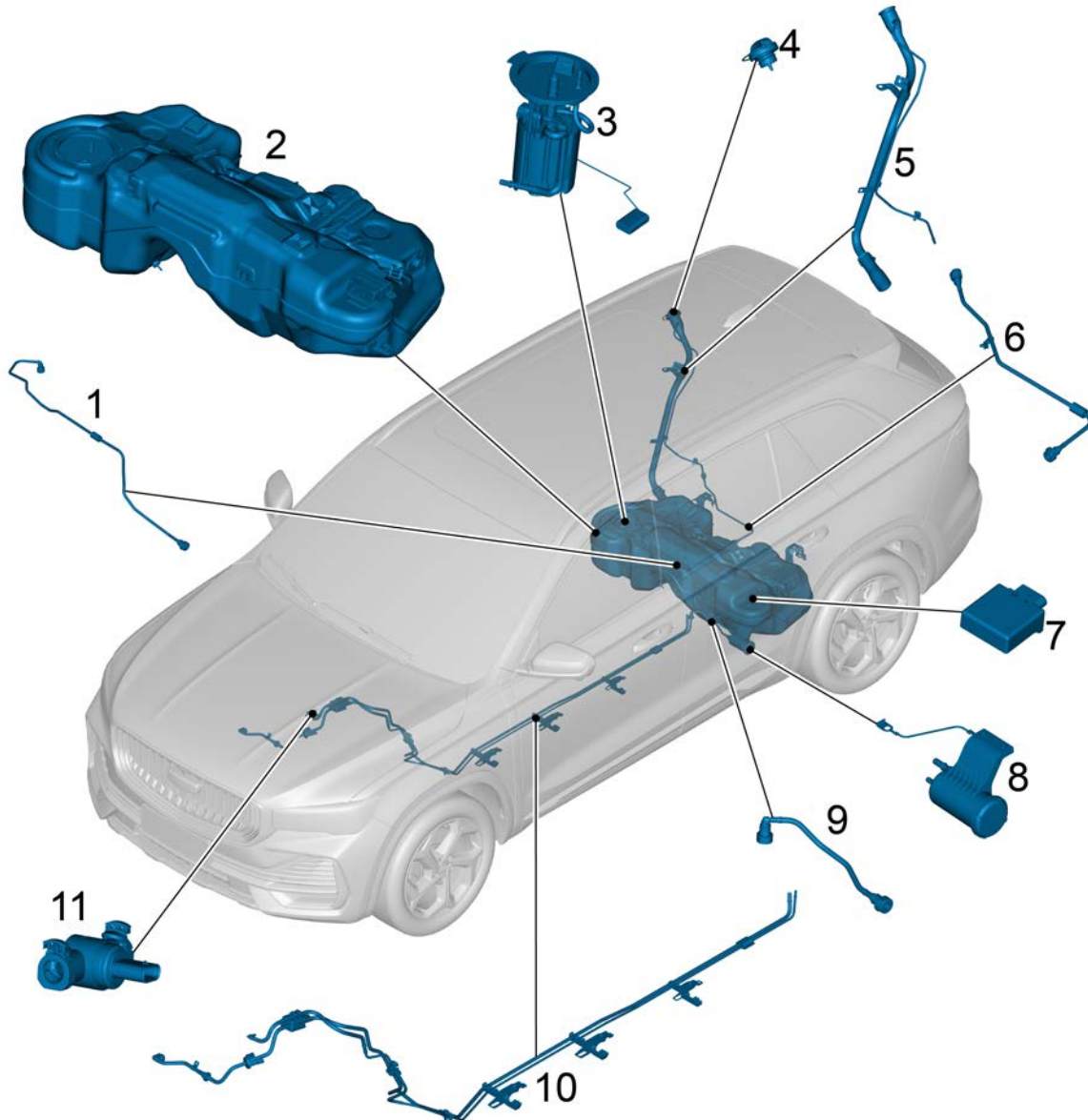
- Change the magnetization time.

Fuel cutoff mode

When the start switch is OFF, the fuel injector is not supplied with oil. This prevents the engine from continuing to ignite or failing to stall. In addition, if there is no reference pulse from the electrical center, no oil will be supplied, thus to avoid oil spilling.

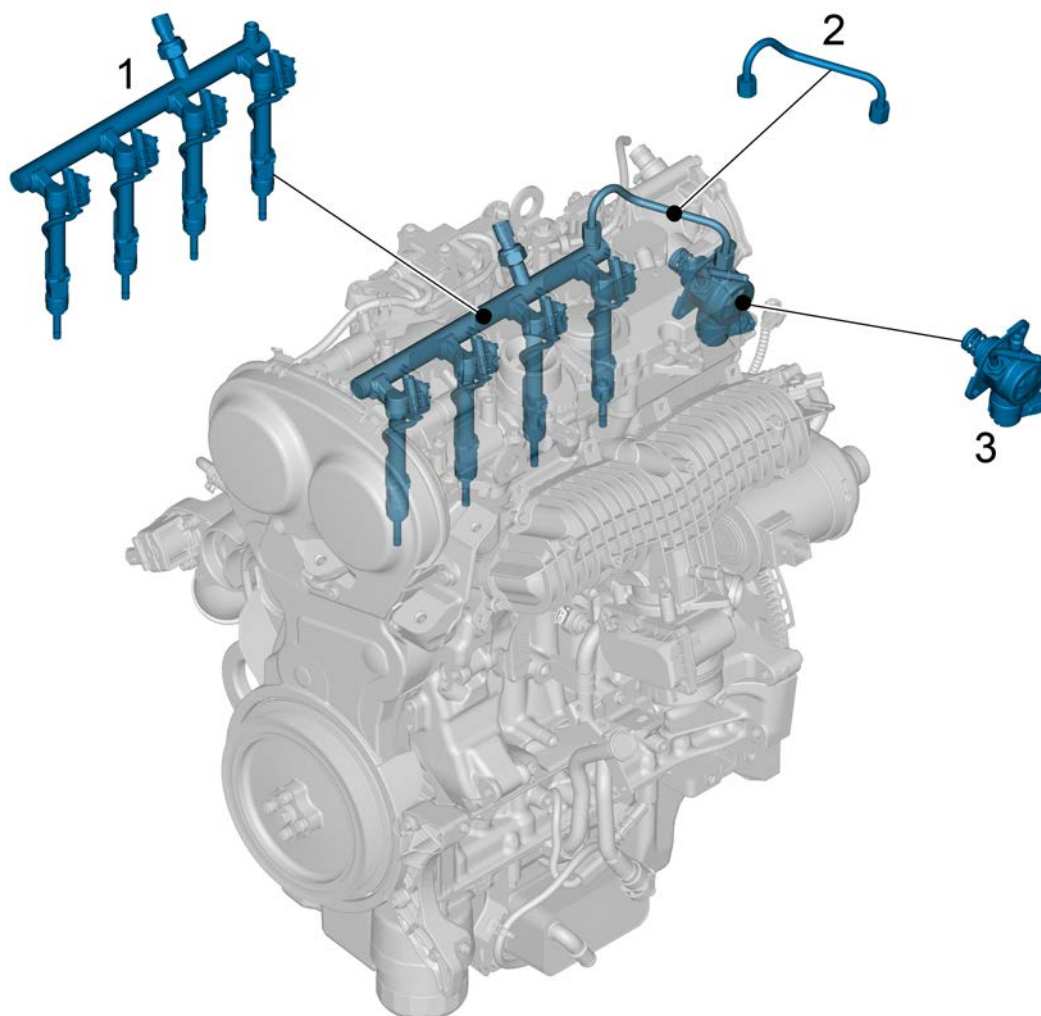
2.3.4 Component position

2.3.4.1 Low-pressure fuel system component position layout



- | | |
|-----------------------------------|------------------------|
| 1. Filter inlet pipe | 7. Fuel pump module |
| 2. Fuel Tank Assembly | 8. Fuel filter |
| 3. Fuel pump | 9. Filter outlet pipe |
| 4. Fuel filler cap assembly | 10. Long-pipe assembly |
| 5. Fuel filler hard pipe assembly | 11. Fuel sensor |
| 6. Leakage diagnosis pipeline | |

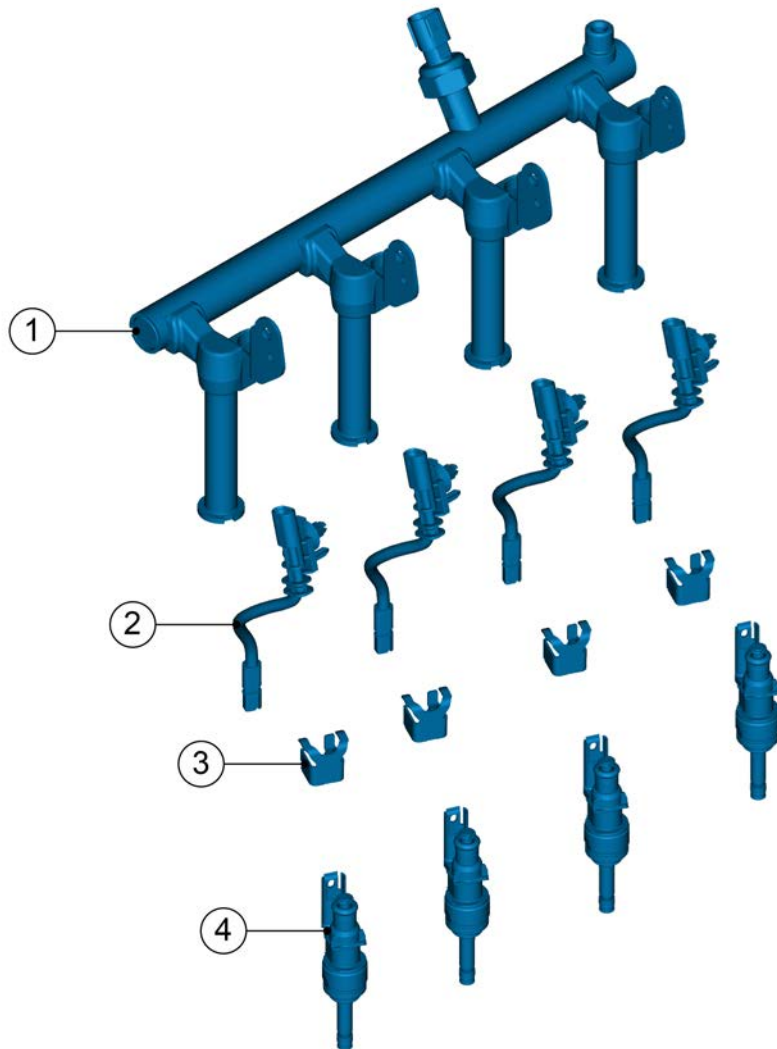
2.3.4.2 High-pressure fuel system component position layout



1. Fuel injector components
2. High-pressure oil pipe components
3. High-pressure fuel pump

2.3.5 Exploded view

2.3.5.1 Fuel injector components



1. Fuel rail components

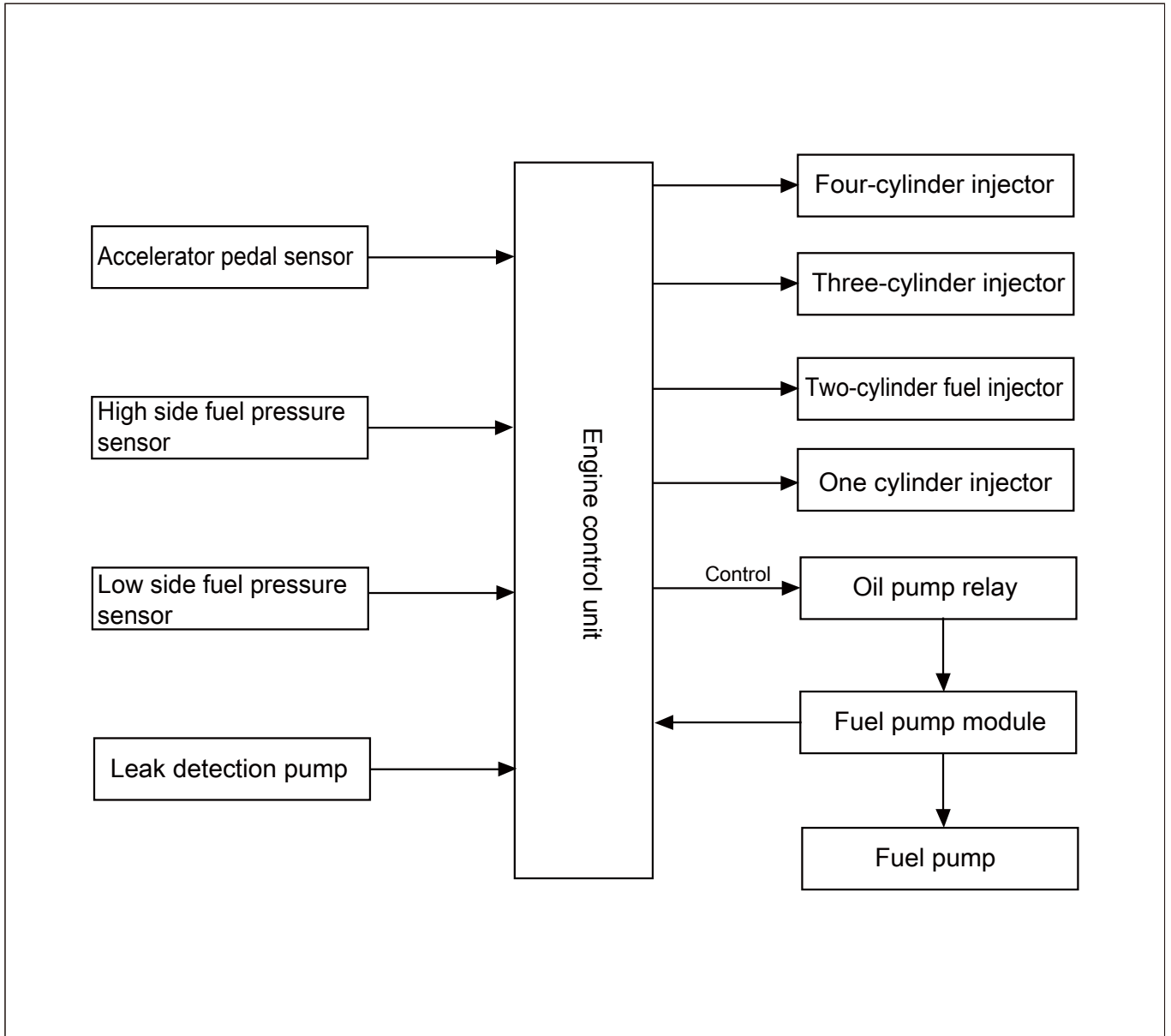
2. Fuel injector harness connector

3. Hold down ring

4. Fuel injector

2.3.6 Electrical schematic diagram

2.3.6.1 Electrical schematic diagram



2.3.7 Diagnostic message and steps

2.3.7.1 Diagnosis Description

See [description and operation](#) before diagnosing faults in the fuel system. Understand and familiarize yourself with working principle of fuel system before starting system diagnosis. This helps to determine the correct fault diagnosis steps when a fault occurs. More importantly, it also helps to determine whether the situation described by the customer is normal operation. Any fault diagnosis of the fuel system should start with the "visual inspection". The "visual inspection" will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

2.3.7.2 Visual Check

- Check after-sales installations that may affect the fuel system, to ensure that these devices cannot affect the fuel system operation.
- Check system components that are easily accessible or can be seen to find out if they are obviously damaged or have external leakage.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.
- Check whether the fuel in the fuel tank is the recommended fuel and whether it is sufficient.

2.3.7.3 Procedures for Fuel Pressure Test

Warning !

Gasoline or gasoline vapor is highly flammable. To avoid the risk of fire or explosion, please keep far away from fire. It is forbidden for operators to use mobile phones when performing these procedures. Do not use open containers to discharge or store gasoline. Please prepare a dry chemical fire extinguisher nearby before performing these procedures.

Warning !

Wrap a rag around the fuel pressure gauge and the fuel rail joint, enabling to absorb the leaked fuel when connecting the fuel pressure gauge, and reducing the risk of fire and injury. When the test is complete, place the rag in the designated container. Clean the oil pipe connector before removing the oil pipe.

Warning !

It is forbidden to discharge fuel into open containers, or store fuel in open containers, otherwise a fire may be caused.

Diagnosis steps:

Step 1	Perform road test. Confirm that the trouble is removed.
--------	---

Next Step

Step 2	Put the fuel pressure gauge exhaust hose into a designated gasoline container.
--------	--

Next Step

Step 3	Open the exhaust valve on the fuel pressure gauge to discharge air from the gauge.
--------	--

Next Step

Step 4	Operate the starting switch to place the power in mode "ON".
--------	--

Next Step

Step 5	Use the "function test" in the scan tool to forcibly drive the fuel pump relay to make the fuel pump work until all the air is discharged from the pressure gauge.
--------	--

Next Step

Step 6	Close the exhaust valve on the fuel pressure gauge.
--------	---

Next Step

Step 7	Use the scan tool to turn on the fuel pump and check whether there is fuel leak, if there is a leak, repair the faulty part.
--------	--

Next Step

Step 8	Start the engine when there is no leakage in the pipeline, and set the fuel pressure as 350 kPa (50.75 psi).
--------	--

Next Step

Step 9	Operate start button to place the power in mode OFF. Under normal status, system should maintain a system residual oil pressure of more than 200 kPa (29 psi). If the system oil pressure keeps going down, check fuel pump or fuel pressure regulator.
--------	---

Next Step

Step 10	The end.
---------	----------

2.3.8 Removing and installing

2.3.8.1 Fuel pressure release procedures

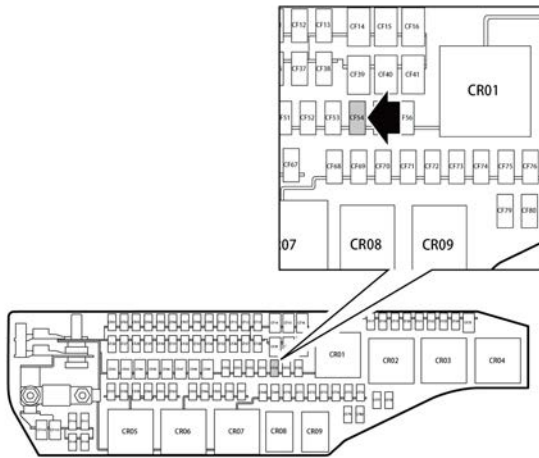
Release procedure

- 1 Open the tank cap.
- 2 Adjust the driver's seat forward to the limit position.
- 3 Lift the carpet.
- 4 Open the cover of indoor fuse relay box and pull out the fuse of cf54 fuel pump module.

Caution

See ["warning about disconnecting battery"](#) in [Warnings and cautions](#)

- 5 Start the engine until the engine stalls automatically.
- 6 Restart the engine after the engine stalls and allow the crankshaft to continue rotating for about 10s.



2.3.8.2 Fuel tank emission process

Emission process

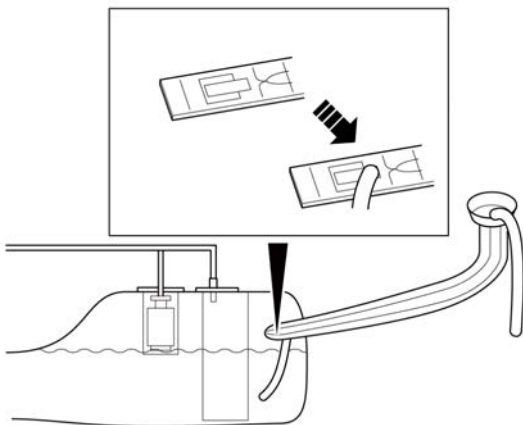
- 1 Open the fuel filler.
- 2 Insert the hose into the fuel tank until the hose touches the bottom of the fuel tank.
- 3 Use the pneumatic pump device to make the fuel as empty as possible with the oil filler pipe.

Warning !

Prohibit discharging or storing fuel in the open container. Be sure to use the approved fuel storage container to reduce the possibility of fire and explosion.

Warning !

Before carrying out the maintenance procedure on the vehicle, prepare a dry chemical fire extinguisher nearby. If these cautions are not followed, it may result in personal injury.



2.3.8.3 Replacement of High-pressure oil pipe components

Removal procedure

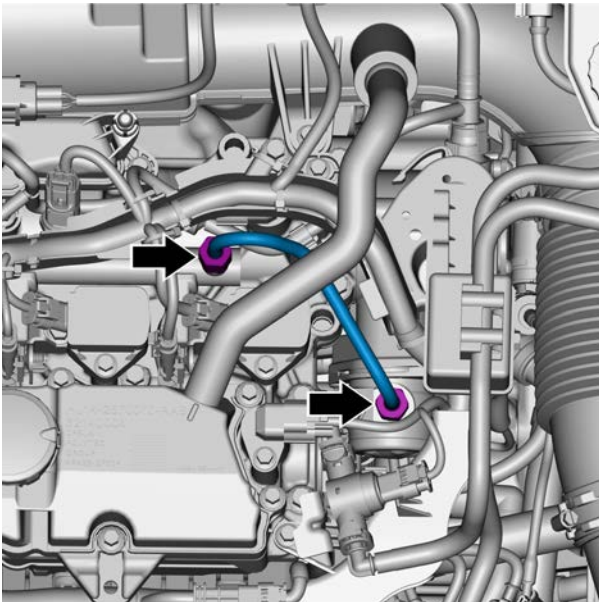
Warning !

See "Warnings Regarding Fuel Pressure Release" in [Warnings and Precautions](#).

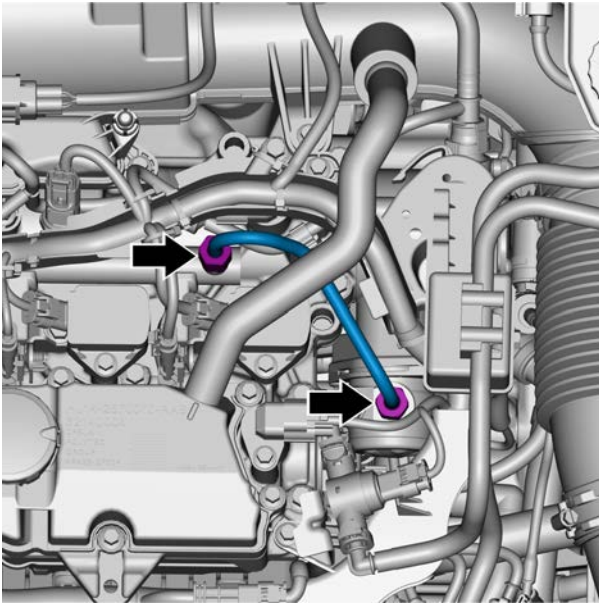
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 5 Remove the 2 fixing nuts of the high-pressure oil pipe components and remove the high-pressure oil pipe components.



Installation procedure



- 1 Install the high-pressure oil pipe components, install and tighten the 2 fixing nuts of the high-pressure oil pipe components.

Torque:

Pre-tightening:

15N·m (metric system) 11.1lb-ft (Imperial system)

Final:

25 N·m (metric system) 18.4 lb-ft (imperial system)

Caution

1. Ensure that the upsetting head of the high-pressure oil pipe components is aligned with the oil rail interface and the oil pump interface. Meanwhile, and Pre-tighten the two fixing nuts of the high-pressure oil pipe assembly by hand.
 2. The high-pressure oil pipe components can only be disassembled and assembled once.
- 2 Install the engine trim cover assembly.
 - 3 Connect the negative battery cable.
 - 4 Open the engine compartment cover.

2.3.8.4 Replacement of fuel sensor

Removal procedure

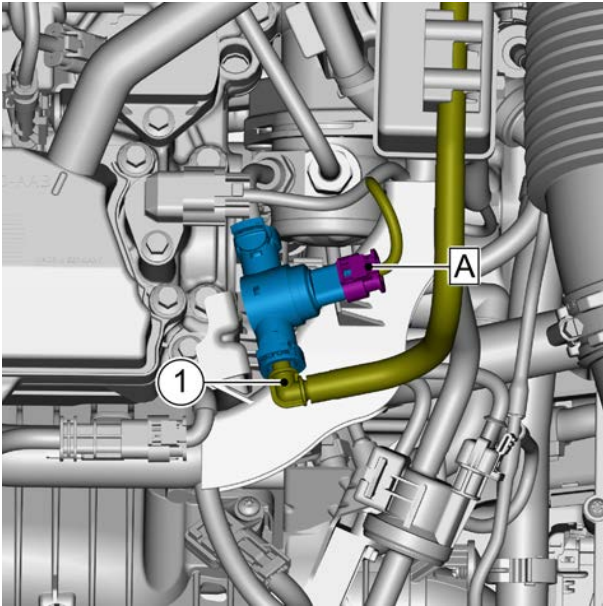
Warning !

See "Warnings Regarding Fuel Pressure Release" in [Warnings and Precautions](#).

Warning !

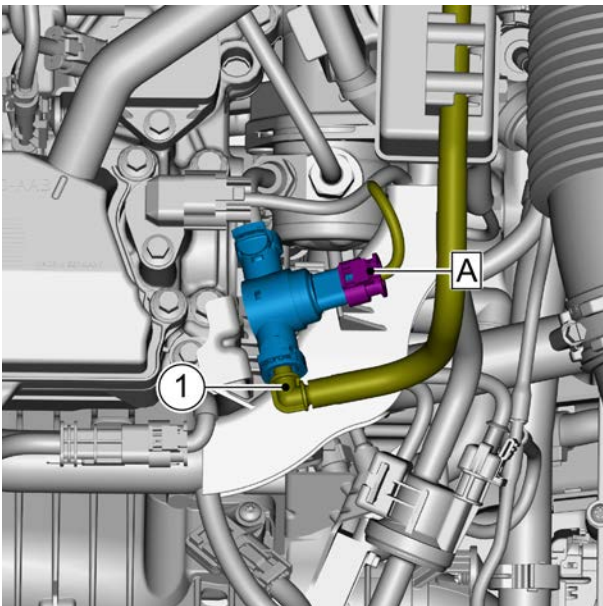
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).



- 5 Disconnect the fuel sensor harness connector A.
- 6 Disconnect the fuel sensor from the long under floor line 1.
- 7 Disconnect the fuel sensor from the high-pressure fuel pump and remove the fuel sensor.

Installation and removal



- 1 Connect the fuel sensor to the high-pressure fuel pump.
- 2 Connect the fuel sensor to the long underfloor pipe 1.
- 3 Connect fuel sensor harness connector A.

- 4 Install the engine trim cover assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

2.3.8.5 Replacement of the high pressure oil pump

Removal procedure

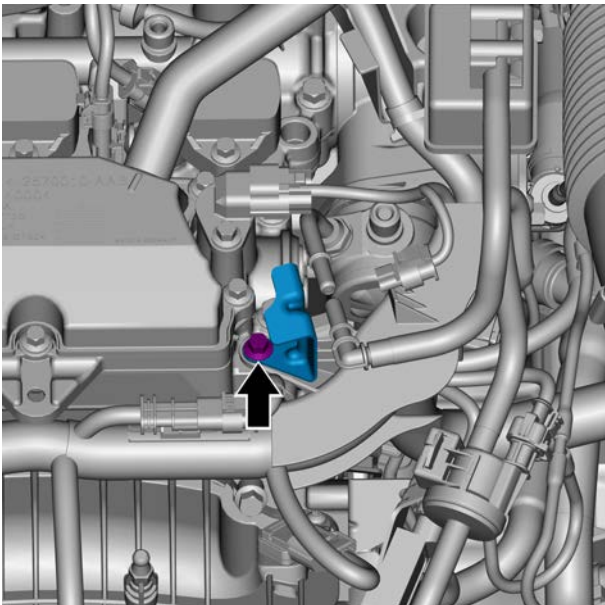
Warning !

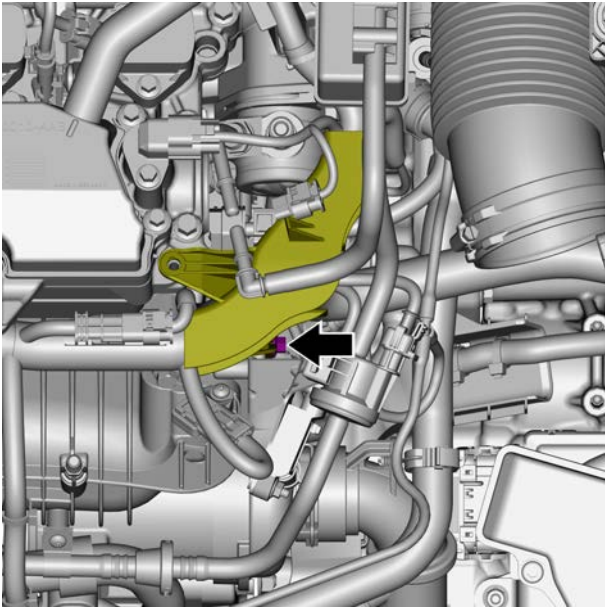
See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

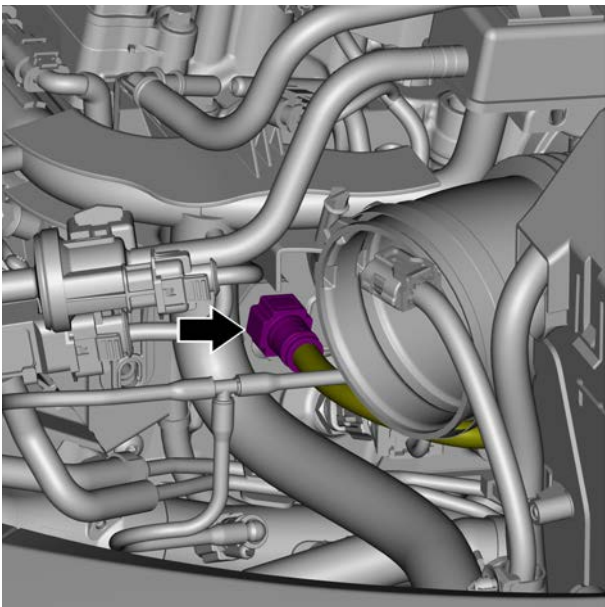
See "Warnings Regarding Fuel Pressure Release" in [Warnings and Precautions](#).

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 5 Remove the high-pressure oil pipe components. See [replacement of high-pressure oil pipe assembly](#).
- 6 Remove the fuel sensor, see [fuel sensor replacement](#).
- 7 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 8 Remove one retaining bolt of the fuel pressure sensor bracket and remove the fuel pressure sensor bracket.

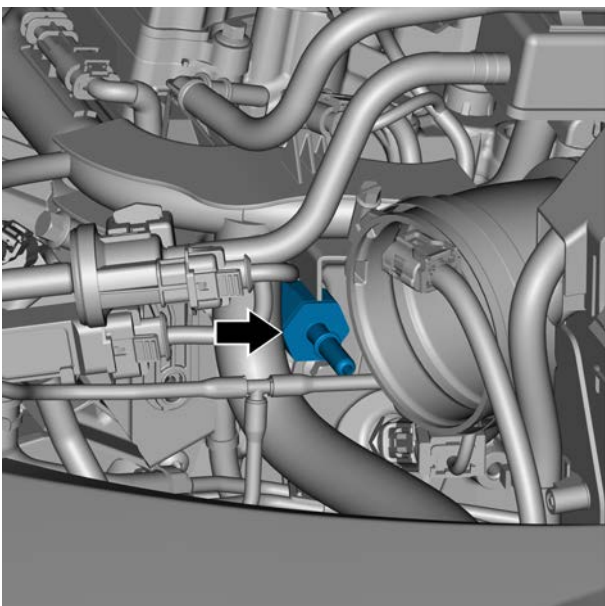




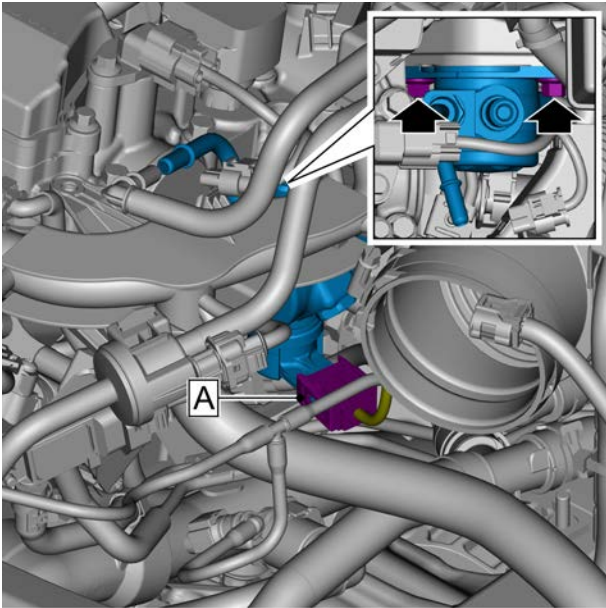
9 Remove 1 retaining bolt from the engine harness sheath.



10 Dismount the positive crankcase ventilation (PCV) pipe.



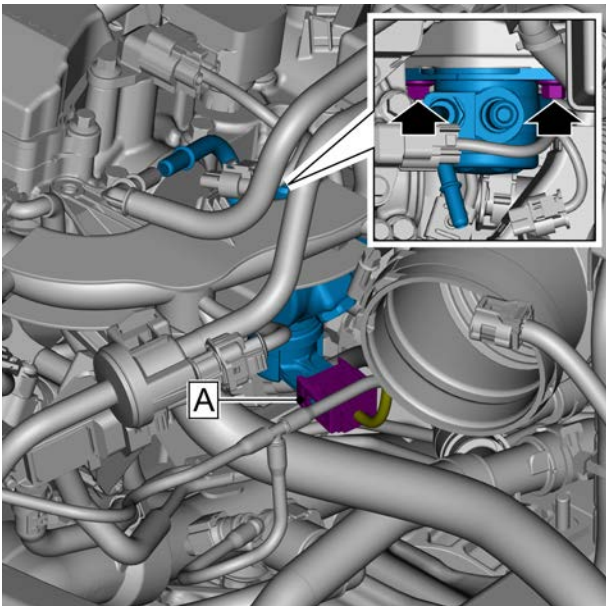
11 Remove the crankcase vent pipe joint.



- 12 Disconnect harness connector A of high-pressure fuel pump.
- 13 Remove 2 retaining bolts of the high-pressure fuel pump and take out the high-pressure fuel pump.

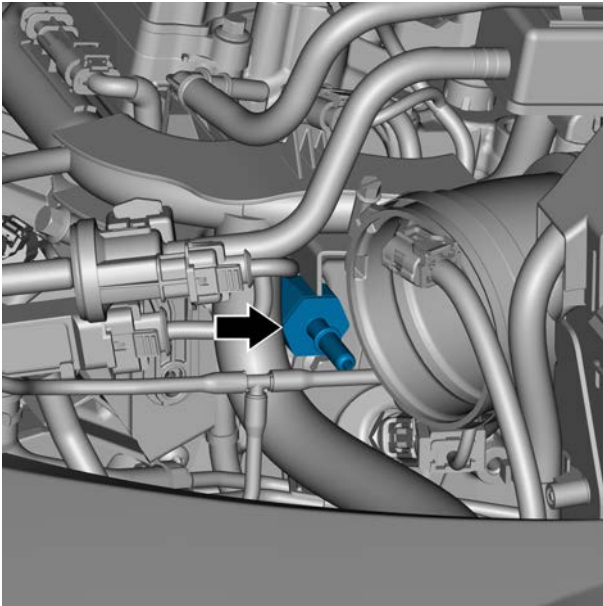
Caution

The two bolts shall be loosened alternately several times.

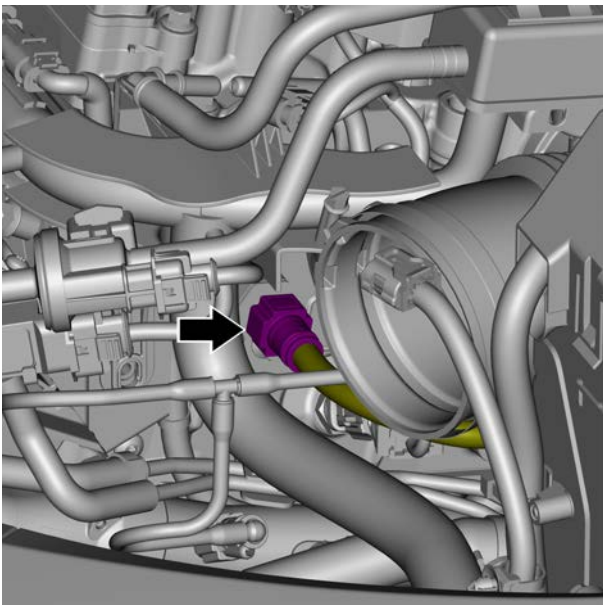


Installation procedure

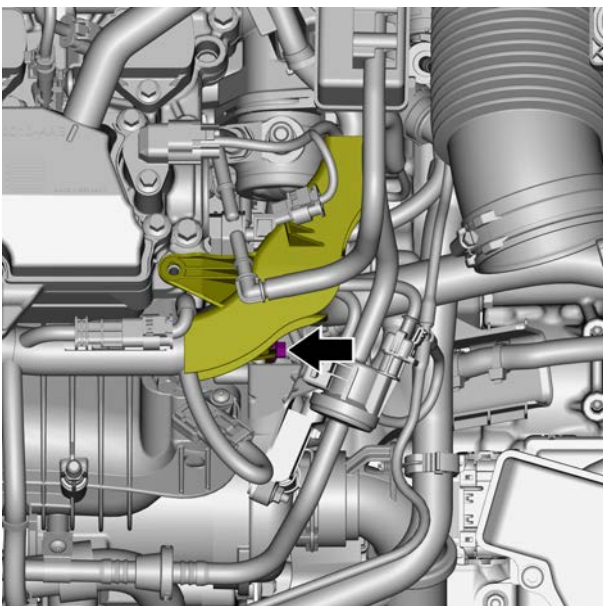
- 1 Check whether the sealing ring on the high-pressure fuel pump is intact and installed in place.
- 2 Install the high-pressure fuel pump and tighten the two retaining bolts of the high-pressure fuel pump alternately.
Torque: 26 N. m (metric system) 19.2 lb-ft (Imperial system)
- 3 Connect harness connector A of high-pressure fuel pump.



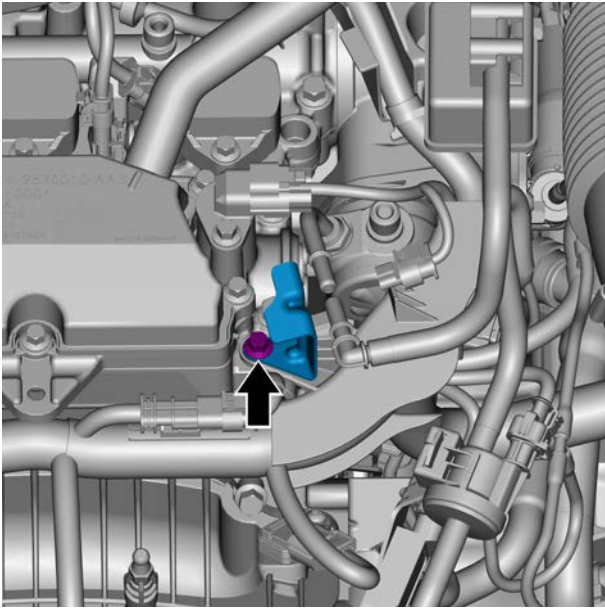
- 4 Install the crankcase ventilation pipe joint.
Torque: 12 N. m (metric system) 8.9 lb-ft (Imperial system)



- 5 Install the positive crankcase ventilation (PCV) pipe.



- 6 Install and tighten 1 retaining bolt of the engine harness sheath.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 7 Install the fuel pressure sensor bracket, install and tighten one retaining bolt of the fuel pressure sensor bracket.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 8 Install the air filter assembly.
- 9 Install the fuel sensor.
- 10 Install the high-pressure oil pipe components.
- 11 Install the engine trim cover assembly.
- 12 Connect the negative battery cable.
- 13 Close the engine compartment cover.

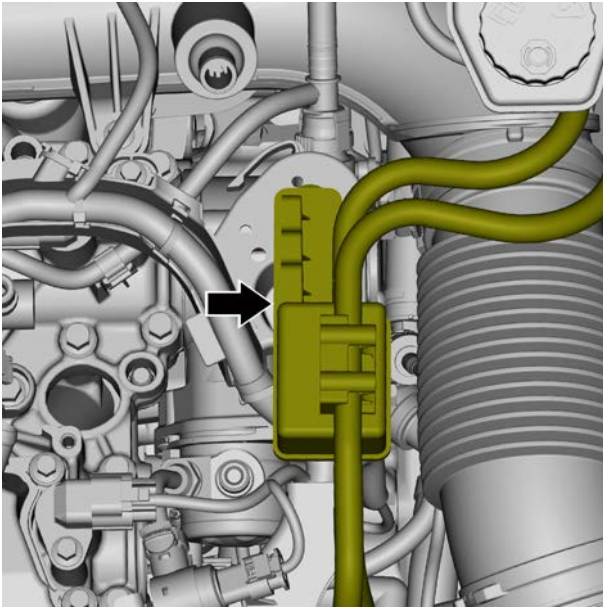
2.3.8.6 Replacement of fuel injector components

Removal procedure

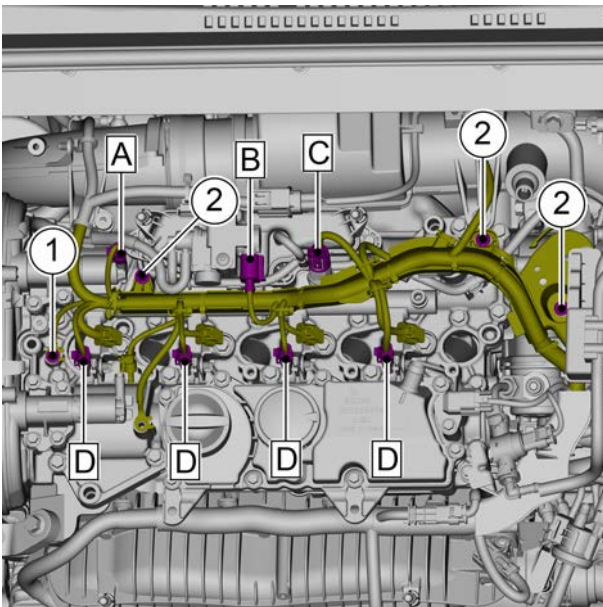
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

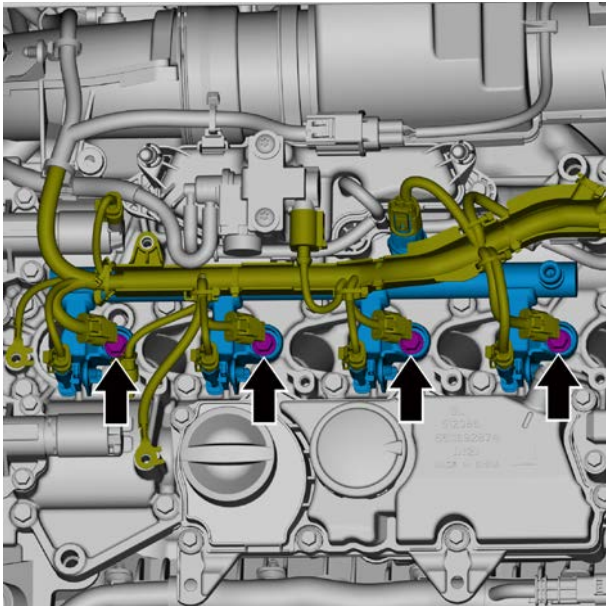
- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 5 Remove the ignition coil unit. See [replacement of ignition coil unit](#).
- 6 Remove the high-pressure oil pipe components. See [replacement of high-pressure oil pipe assembly](#).



7 Remove the expansion pot and move it aside.



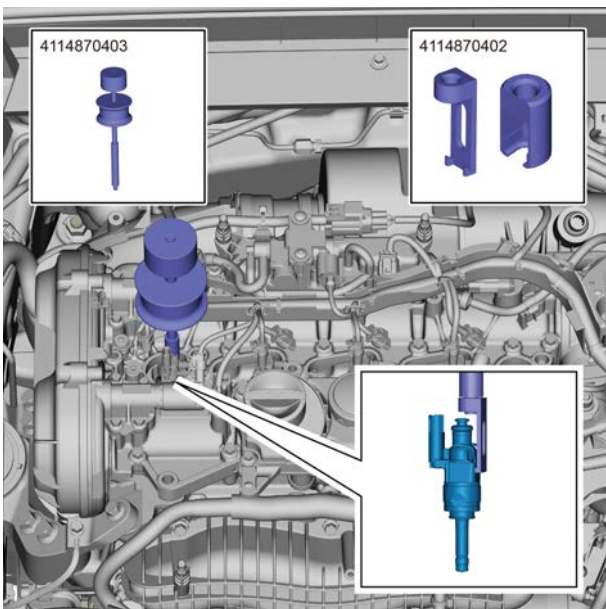
- 8 Disconnect VVT solenoid (exhaust) harness connector A.
- 9 Disconnect the turbine control valve (wastegate) harness connector B.
- 10 Disconnect the Fuel oil pressure sensor harness connector C.
- 11 Disconnect the fuel injection nozzle harness connector D.
- 12 Remove one retaining bolt 1 of the engine harness assembly grounding.
- 13 Remove 3 retaining bolts 2 from the engine harness sheath and move them aside.



- 14 Remove 4 retaining bolts of the fuel injector components and remove the fuel injector components.

Caution

Confirm the cleanliness of the top of the engine and continue the removal only after meeting the requirements. Prevent foreign matters from falling into the engine.



- 15 If the fuel injector cannot be taken out as a whole with the fuel rail components, use the special tool to pull out the fuel injector.

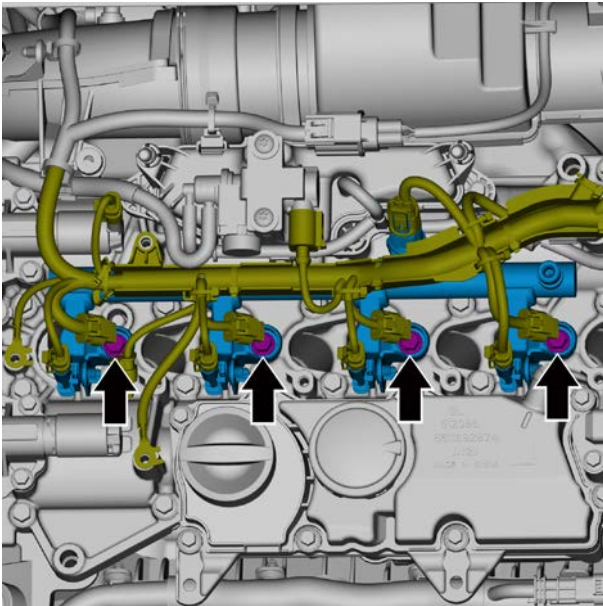
Special tool for removal of High-pressure fuel injector: 4114870402

Special tool for puller: 4114870403

Caution

Properly install the fuel injector on the fuel rail components, properly place the fuel injector assembly in a suitable container, and then cover it with non-woven fabric to prevent dust from entering.

Installation procedure

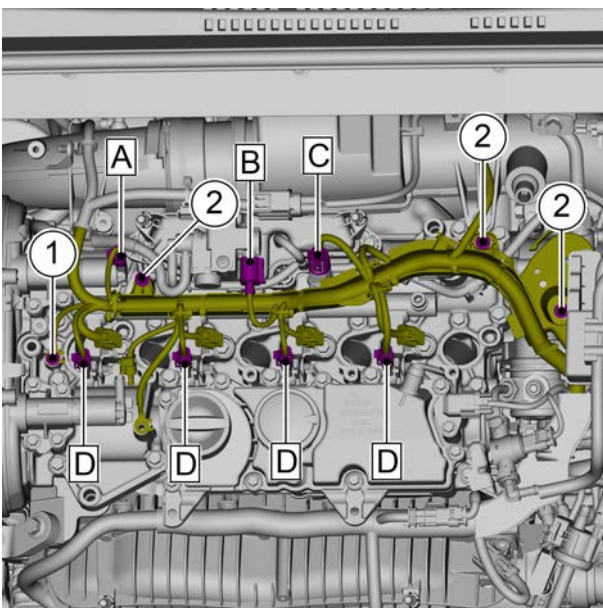


- 1 Align the fuel injector with the mounting hole of the fuel injector so that the fuel injector components are installed in place in parallel. During manual assembly, tighten the bolts step by step in the order of cylinder 2, cylinder 4, Cylinder 1 and cylinder 3, and finally tighten them to the specified torque.

Torque: 20 N. m (metric system) 14.8 lb-ft (Imperial system)

Caution

1. Apply lubrication oil on the sealing ring of fuel injector.
2. The installation process needs to be in a clean environment, and impurities are not allowed on the sealing surface and high-pressure oil pipe interface.
3. Do not move the fuel injector components with the fuel injector or fuel pressure sensor. Only apply force on the metal part of the fuel rail and do not bend the fuel injector.
4. Replace the bolts when reinstallation is required.
5. If the sealing ring and compression ring are damaged, they shall be replaced.



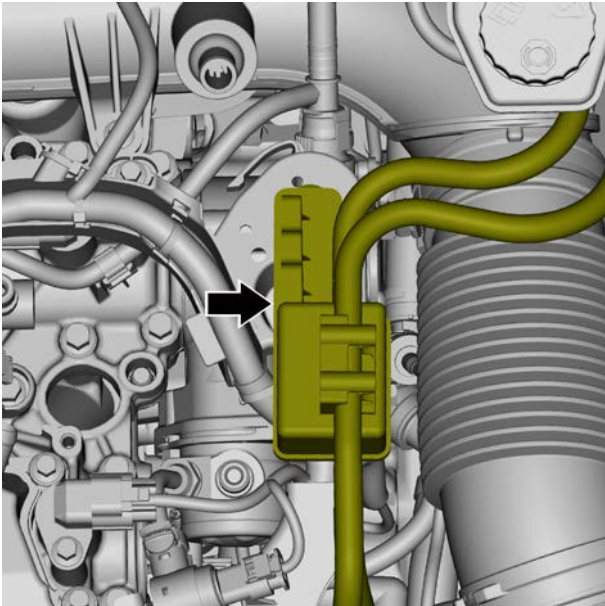
- 2 Install the engine harness sheath, install and tighten the three retaining bolts 2 of the engine harness sheath.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 3 Install and tighten one retaining bolt 1 of engine harness assembly grounding.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 4 Connect fuel injection nozzle harness connector D.
- 5 Connect the Fuel oil pressure sensor harness connector C.
- 6 Connect the turbine control valve (wastegate) harness connector B.
- 7 Connect VVT solenoid (exhaust) harness connector A.



8 Install the expansion tank.

- 9 Install the high-pressure oil pipe components.
- 10 Install the ignition coil unit.
- 11 Install the engine trim cover assembly.
- 12 Connect the negative battery cable.
- 13 Use the diagnostic instrument to self-study the fuel injector components.
- 14 Close the engine compartment cover.

2.3.8.7 Fuel Pump Replacement

Removal procedure

Warning !

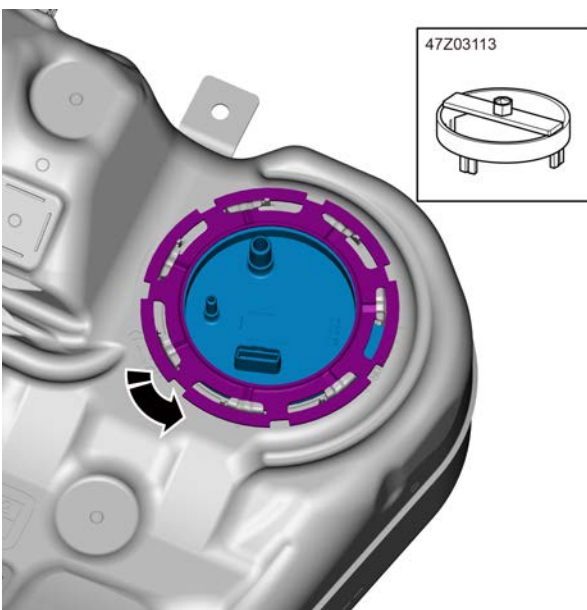
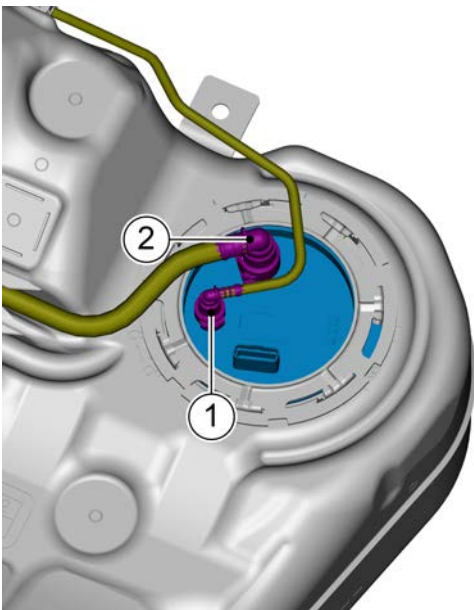
See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

See "Warnings Regarding Exhaust System Maintenance" in "[Warnings and Precautions](#)".

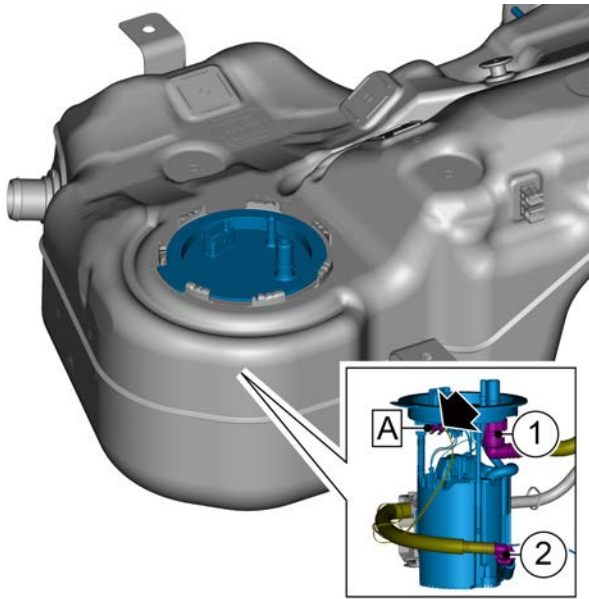
- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Fuel tank drain procedure, see [fuel tank drain procedure](#).
- 4 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 5 Lift the vehicle, see [Lift the vehicle](#)
- 6 Remove the RL tire, see [wheel assembly replacement](#).
- 7 Remove the exhaust cold end, see [exhaust cold end replacement](#).

- 8 Remove the drive shaft, see [drive shaft replacement](#).
- 9 Remove the left lower fender apron. See [replacement of left lower fender apron](#).
- 10 Remove the right lower fender apron, see [replacement of right lower fender apron](#).
- 11 Remove the rear channel heat shield, see [replacement of rear channel heat shield](#).
- 12 Remove the fuel tank heat shield, see [fuel tank heat shield replacement](#).
- 13 Remove the fuel filter, refer to [replacement of fuel filter](#).
- 14 Remove the fuel tank, see [fuel tank replacement](#).
- 15 Remove the connector 1 of the filter inlet line and move it aside.
- 16 Remove the connector 2 of the Evaporation pipe under the wheel housing and move it aside.



- 17 Use the special tool to rotate counterclockwise to remove the locking ring of the oil pump, and extract the fuel pump to a proper position.

Dedicated tool: 47Z03113



- 18 Remove the connector 1 of the Evaporation pipe.
- 19 Remove the connector 2 of the auxiliary fuel pump oil pipe.
- 20 Remove harness connector A of auxiliary fuel pump with fuel sensor assembly.
- 21 Disconnect the harness of the auxiliary fuel pump with fuel sensor assembly from the fuel pump and extract the fuel pump.

Caution

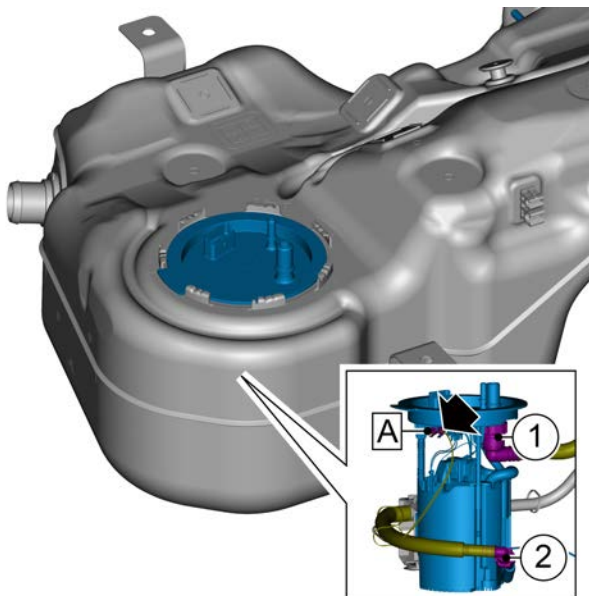
1. Be careful not to bend the float.
2. Be careful not to contaminate the fuel.

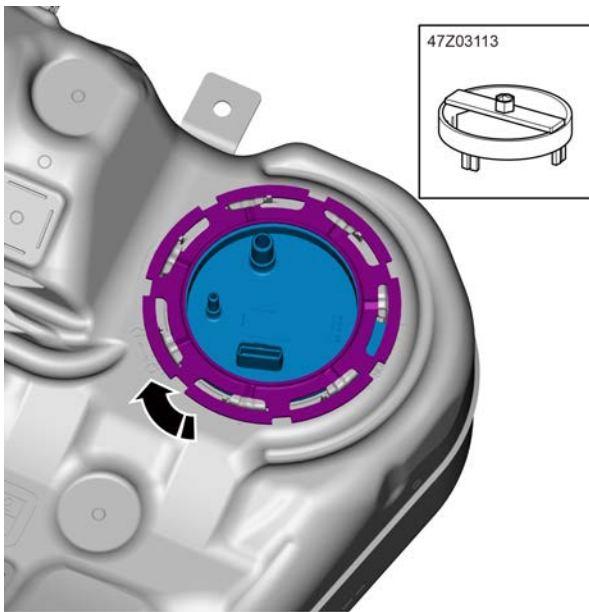
Installation procedure

- 1 Install the fuel pump and connect the harness of the auxiliary fuel pump with fuel sensor assembly and the fuel pump.

Caution

1. Be careful not to bend the float.
2. Be careful not to contaminate the fuel.
- 2 Install harness connector A of auxiliary fuel pump with fuel sensor assembly.
- 3 Install the connector 2 of the auxiliary fuel pump oil pipe.
- 4 Install the connector 1 of the Evaporation pipe.



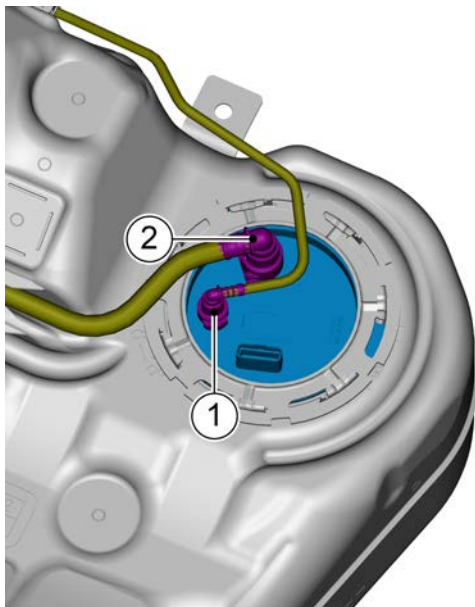


- 5 Clean the joint surface between the fuel pump and the fuel tank.
- 6 Install a new fuel pump sealing ring.
- 7 Install the fuel pump and oil pump locking ring, and use the special tool to install the oil pump locking ring clockwise.

Dedicated tool: 47Z03113

Caution

Ensure that the fuel pump is consistent with that before removal during installation.



- 8 Install the connector 2 of the evaporation pipe under the wheel housing.
- 9 Install connector 1 of the filter inlet line.

- 10 Install the fuel tank.
- 11 Install the fuel filter.
- 12 Install the fuel tank heat shield.
- 13 Install the rear channel heat shield.
- 14 Install the lower right fender apron.
- 15 Install the lower left fender apron.
- 16 Install the drive shaft.
- 17 Install the exhaust cold end.
- 18 Install the left rear tire.
- 19 Lower the vehicle.
- 20 Connect the negative battery cable.
- 21 Close the engine compartment cover.

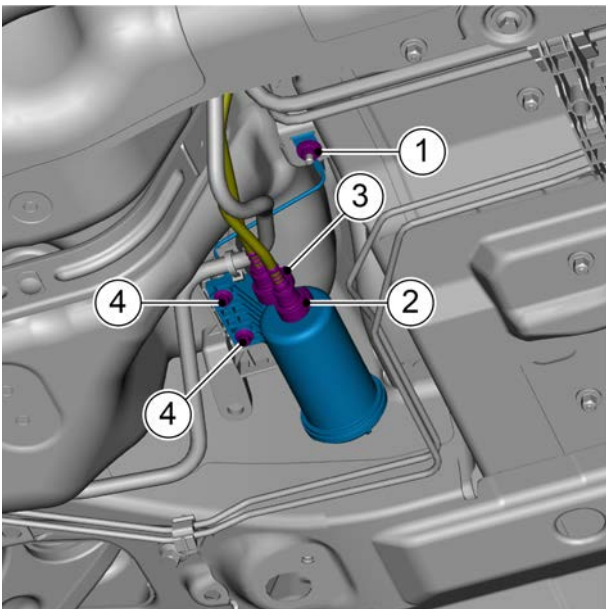
2.3.8.8 Replacement of Engine Oil filter

Removal procedure

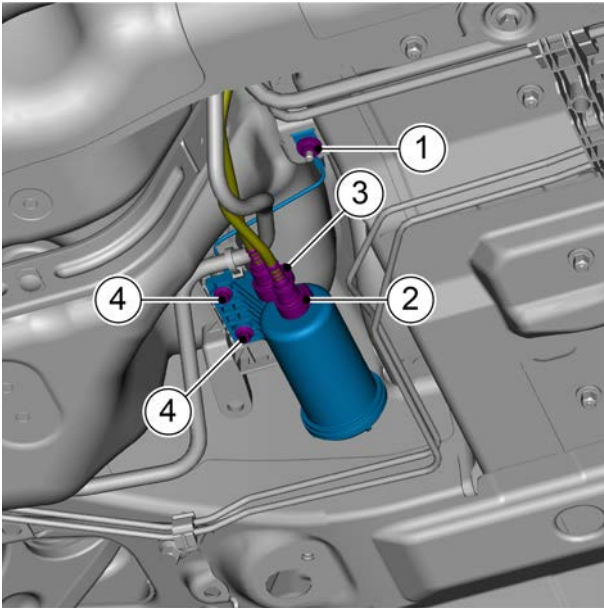
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Lift the vehicle, see [Lift the vehicle](#)
- 5 Remove the left lower fender apron. See [replacement of left lower fender apron](#).
- 6 Remove one fixing nut 1 of the ground wire of the fuel filter.
- 7 Remove the connector 2 of the filter outlet pipe.
- 8 Remove connector 3 of the filter inlet line.
- 9 Remove the two retaining bolts 4 of the fuel filter and remove the fuel filter.



Installation procedure



- 1 Install the fuel filter, install and tighten 2 retaining bolts of the fuel filter.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 2 Install connector 3 of the filter inlet line.
- 3 Install connector 2 of the filter outlet line.
- 4 Install and tighten one fixing nut 1 of the ground wire of the fuel filter.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 5 Install the lower left fender apron.
- 6 Lower the vehicle.
- 7 Connect the negative battery cable.
- 8 Close the engine compartment cover.

2.3.8.9 Fuel tank replacement

Removal procedure

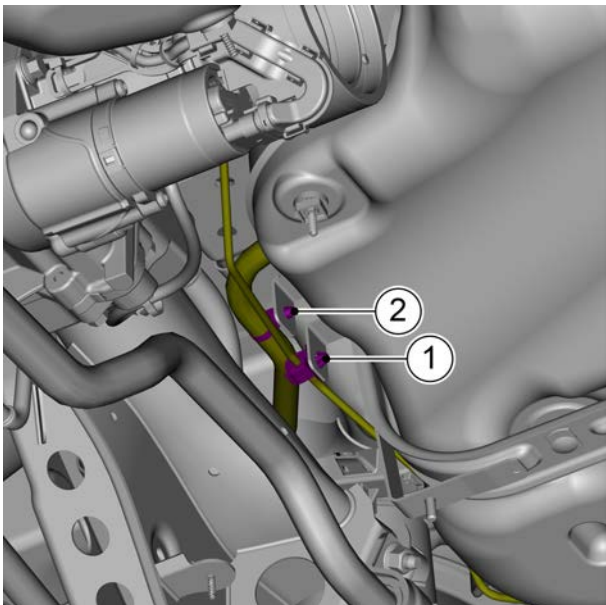
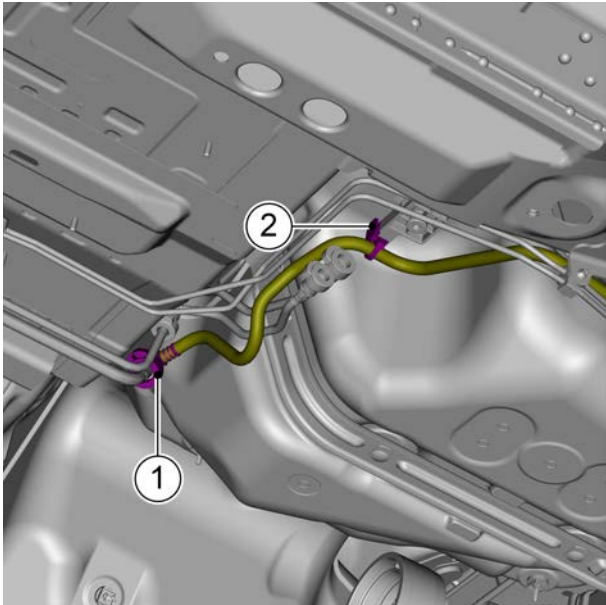
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

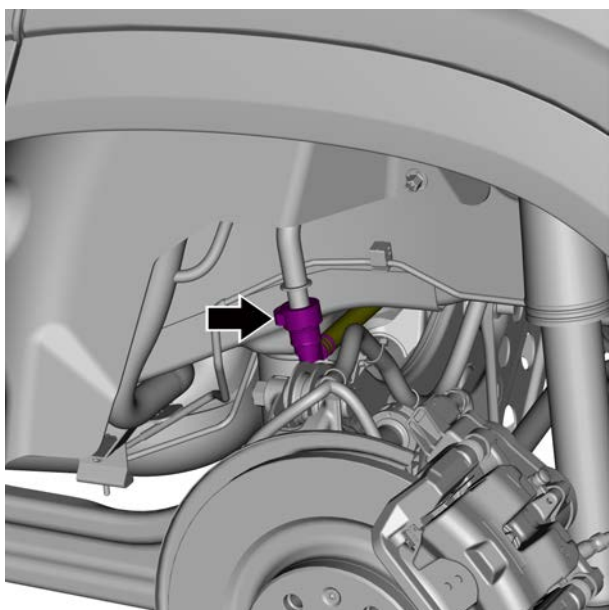
See "Warnings Regarding Exhaust System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Fuel tank drain procedure, see [fuel tank drain procedure](#).
- 4 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 5 Lift the vehicle, see [Lift the vehicle](#)
- 6 Remove the RL tire, see [wheel assembly replacement](#).
- 7 Remove the exhaust cold end, see [exhaust cold end replacement](#).
- 8 Remove the drive shaft, see [drive shaft replacement](#).
- 9 Remove the left lower fender apron. See [replacement of left lower fender apron](#).

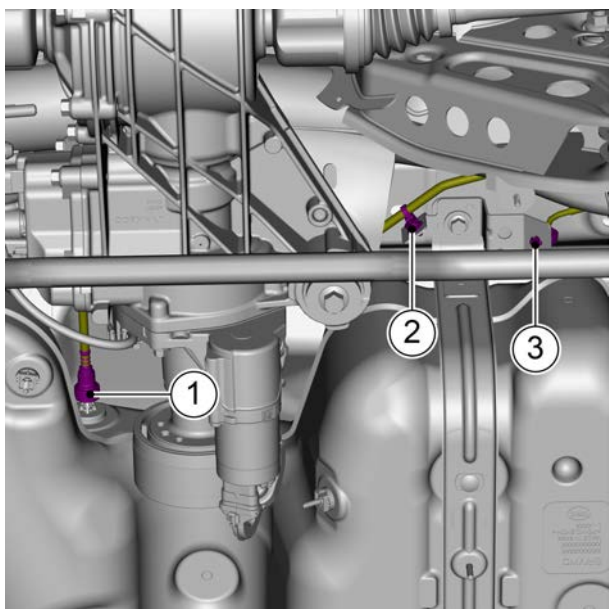


- 10 Remove the right lower fender apron, see [replacement of right lower fender apron](#).
- 11 Remove the rear channel heat shield, see [replacement of rear channel heat shield](#).
- 12 Remove the fuel tank heat shield, see [fuel tank heat shield replacement](#).
- 13 Remove the fuel filter, refer to [replacement of fuel filter](#).
- 14 Remove the connector 1 of the desorption pipe under the wheel housing.
- 15 Remove the fixing clip 2 of the wheel housing lower desorption pipe and move it aside.

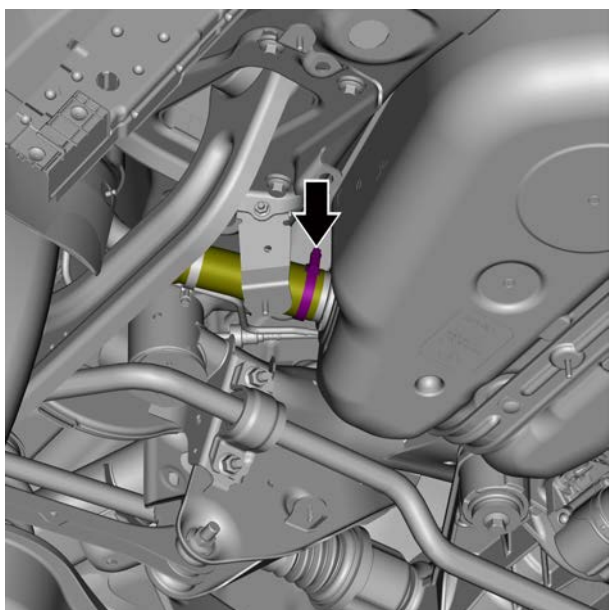
- 16 Remove the right rear brake hard pipe fixing clip 1.
- 17 Remove fixing clip 2 of evaporation pipe under wheel housing.



- 18 Remove the connector of the evaporation pipe under the wheel housing.



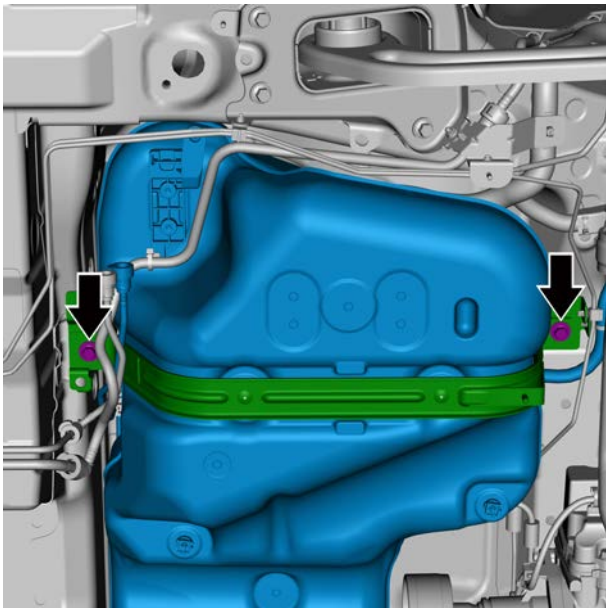
- 19 Remove the connector 1 of the leakage diagnosis line.
- 20 Remove the fixing clip 2 of the leakage diagnosis pipeline and.
- 21 Remove the right rear brake hard pipe fixing clip 3.



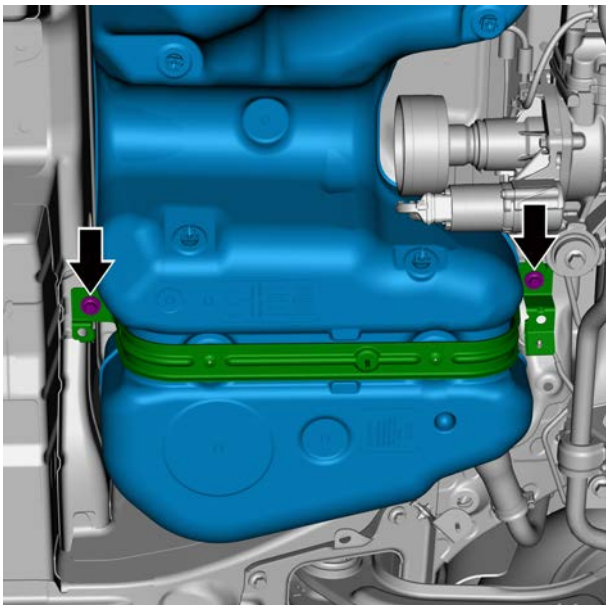
- 22 Loosen the fixed hoop of the oil filler pipe connecting hose and disconnect the oil filler pipe connecting hose from the fuel tank.

Caution

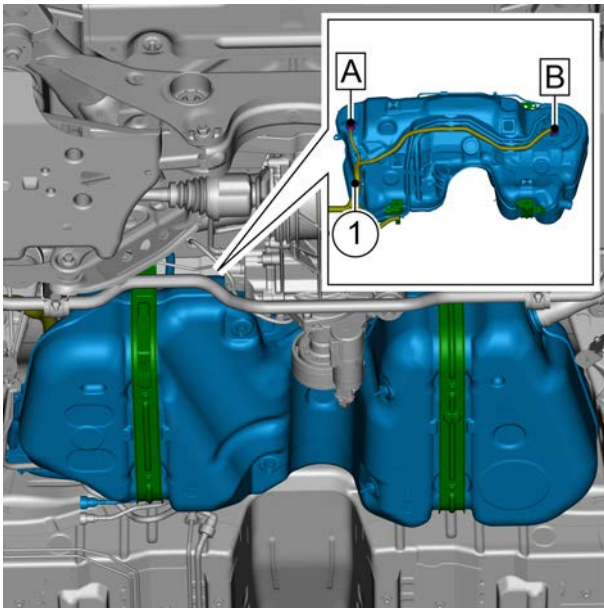
Block the fuel tank opening with a rag to prevent the tank from being dirty.



- 23 Use a hydraulic lift to hold the tank.
- 24 Remove 2 retaining bolts of fuel tank fixing belt.

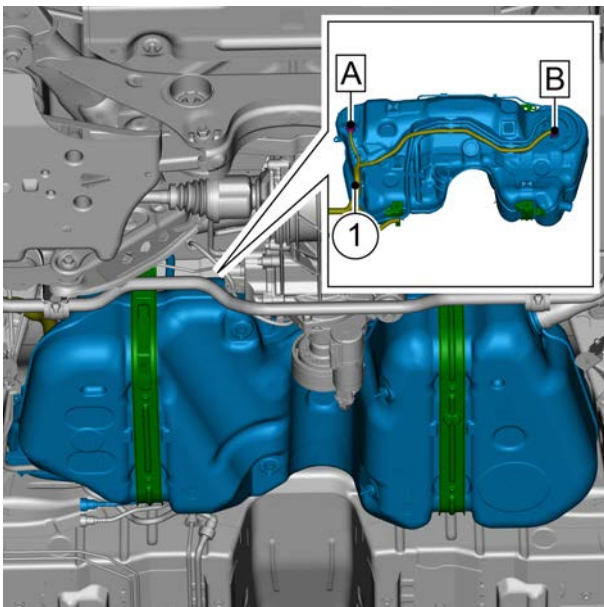


- 25 Remove 2 retaining bolts of fuel tank fixing belt.



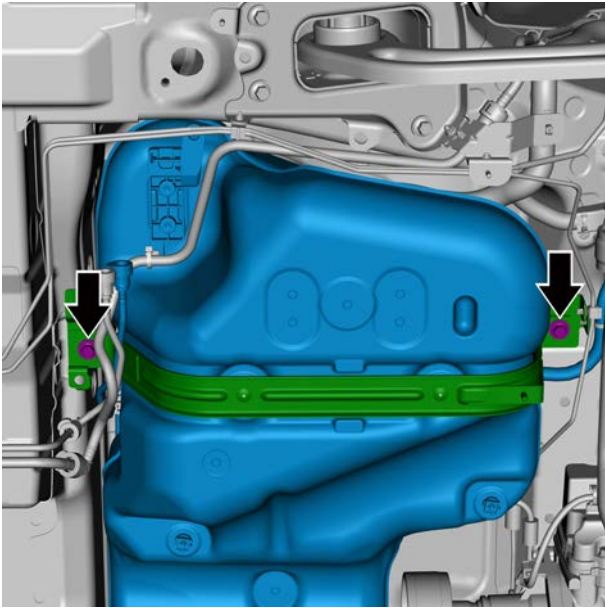
- 26 Slowly lower the hydraulic lift to the proper position.
- 27 Disconnect the fuel pump module harness connector A.
- 28 Disconnect the fuel pump harness connector B.
- 29 Remove fixing clip 1 of chassis harness.
- 30 Disconnect the chassis harness from the fuel tank and remove the fuel tank.

Installation procedure

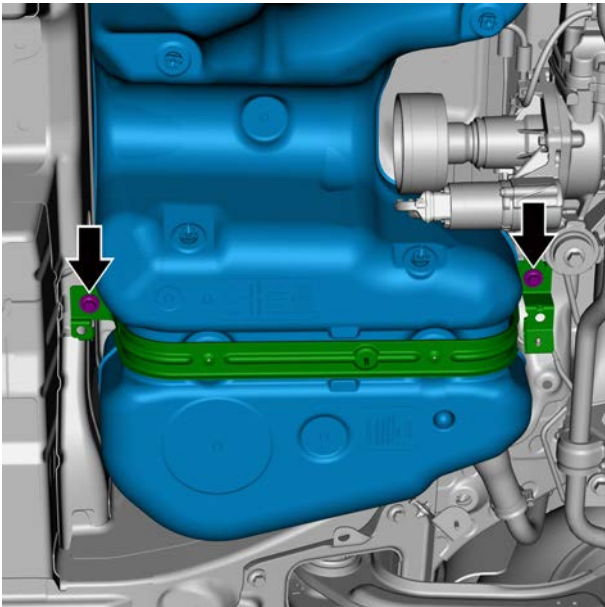


- 1 Use a hydraulic lift to lift the fuel tank to a suitable position.
- 2 Connect the chassis harness to the fuel tank.
- 3 Install the wire harness fixing buckle 1.
- 4 Connect fuel pump harness connector B.
- 5 Connect fuel pump module harness connector A.

- 6 Use a hydraulic lift to raise the fuel tank to installation position.

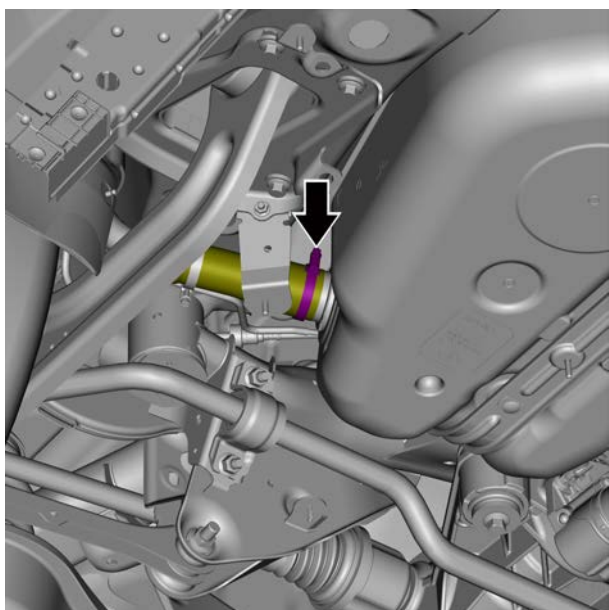


- 7 Install and tighten 2 retaining bolts of the fuel tank fixing belt.
Torque: 30 N. m (metric system) 22.1 lb-ft (Imperial system)



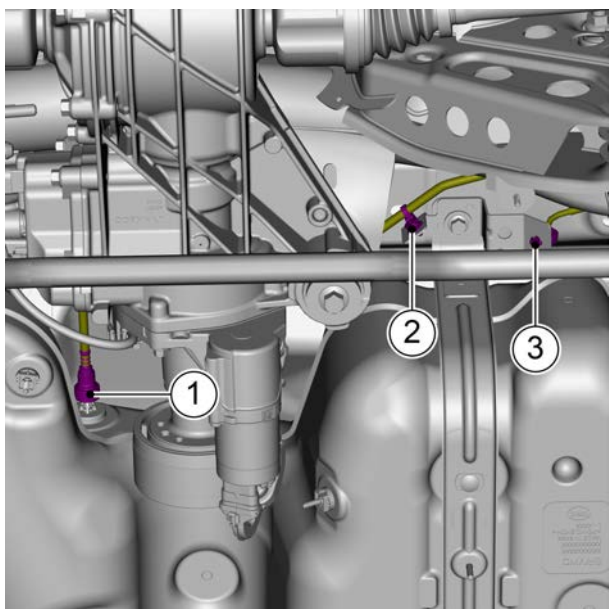
- 8 Install and tighten 2 retaining bolts of the fuel tank fixing belt.
Torque: 30 N. m (metric system) 22.1 lb-ft (Imperial system)

- 9 Remove the hydraulic lift.

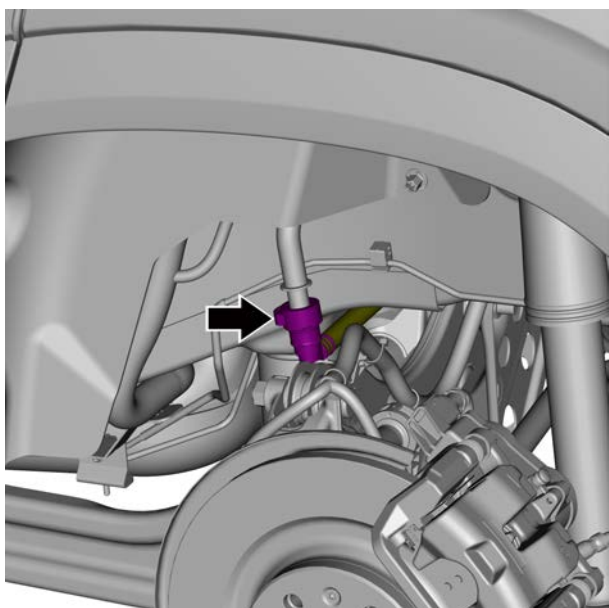


- 10 Connect the oil filler pipe connecting hose to the fuel tank, and tighten the fixing hoop of the oil filler pipe connecting hose.

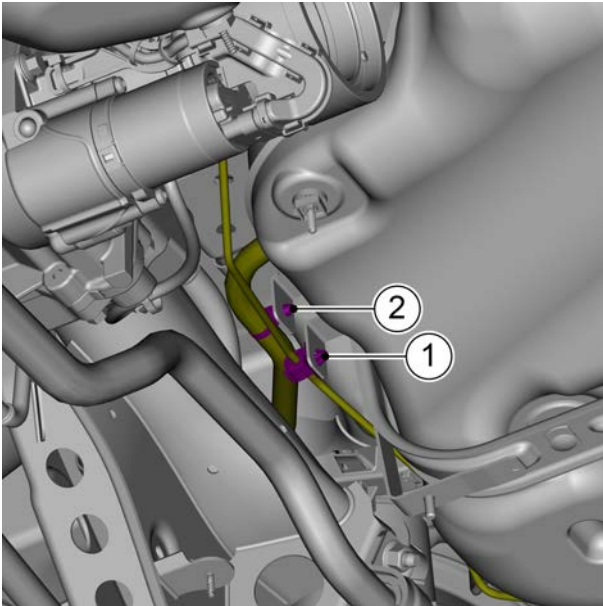
Torque: 3.5 N. m (metric system) 2.6 lb-ft (Imperial system)



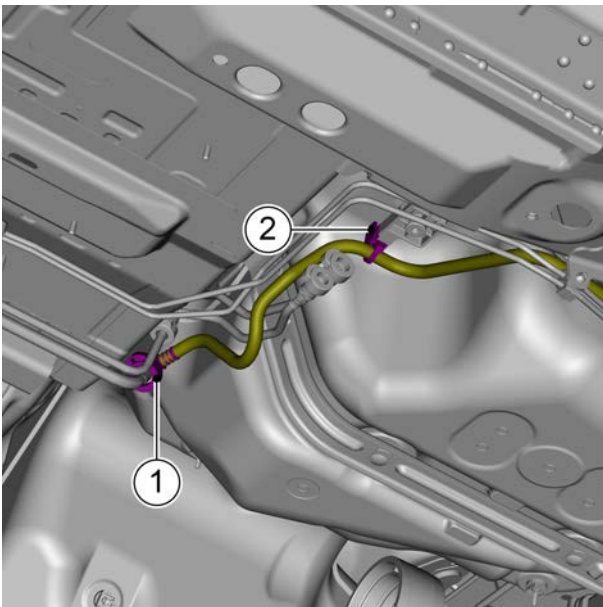
- 11 Install the right rear brake hard pipe fixing clip 3.
12 Install the fixing clip 2 of the leakage diagnosis pipeline.
13 Install the connector 1 of the leakage diagnosis line.



- 14 Install the connector of the Evaporation pipe under the wheel housing.



- 15 Install fixing clip 2 of Evaporation pipe under wheel housing.
- 16 Install the right rear brake hard pipe fixing clip 1.



- 17 Install fixing clip 2 of the wheel housing lower desorption pipe.
- 18 Install the connector 1 of the desorption pipe under the wheel housing.

- 19 Install the fuel filter.
- 20 Install the fuel tank heat shield.
- 21 Install the rear channel heat shield.
- 22 Install the lower right fender apron.
- 23 Install the lower left fender apron.
- 24 Install the drive shaft.
- 25 Install the exhaust cold end.
- 26 Install the left rear tire.
- 27 Lower the vehicle.
- 28 Connect the negative battery cable.
- 29 Close the engine compartment cover.

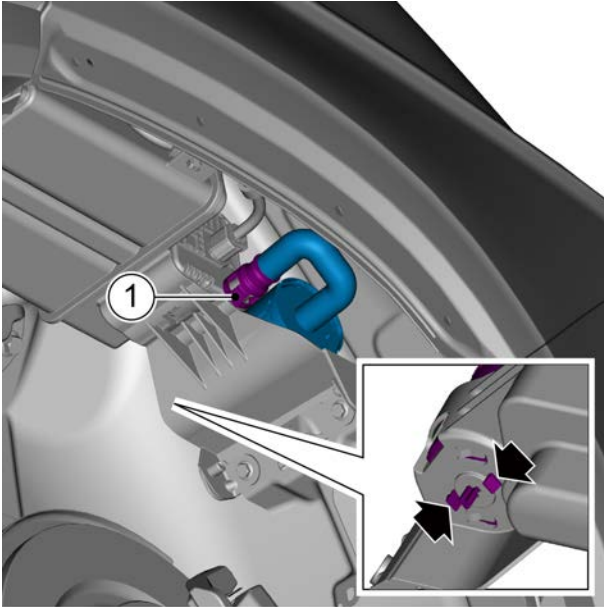
2.3.8.10 Replacement of ash filter assembly

Removal procedure

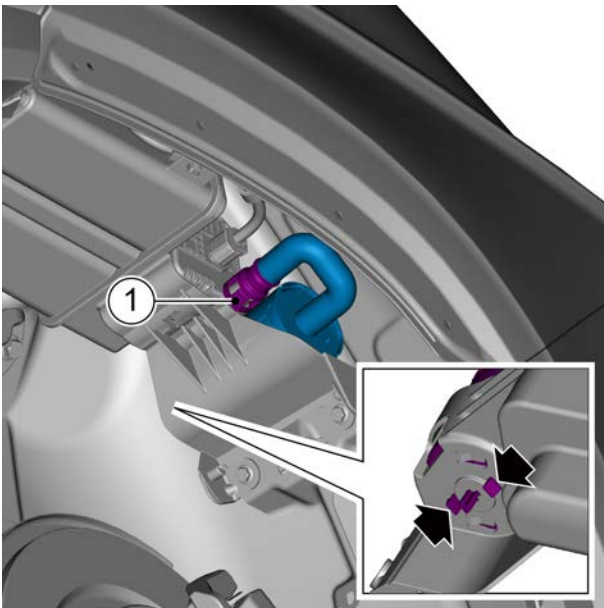
Warning !

See "Warnings Regarding Vehicle Lifting" in "Warnings and Precautions".

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the Left rear wheel. See [wheel assembly replacement](#).
- 3 Remove the splash guard rear wheel arch liner LH. See [replacement of splash guard rear wheel arch liner LH](#).
- 4 Disengage the upper fixing buckle of the ash filter assembly.
- 5 Disengage the lower fixing buckle of the ash filter assembly and remove the ash filter assembly.

**Installation procedure**

- 1 Install the ash filter assembly and fasten the clip.



- 2 Install the RL wheel cover splash fender assembly.
- 3 Install the left rear wheel.
- 4 Lower the vehicle.

2.3.8.11 Fuel pump module replacement

Removal procedure

Warning !

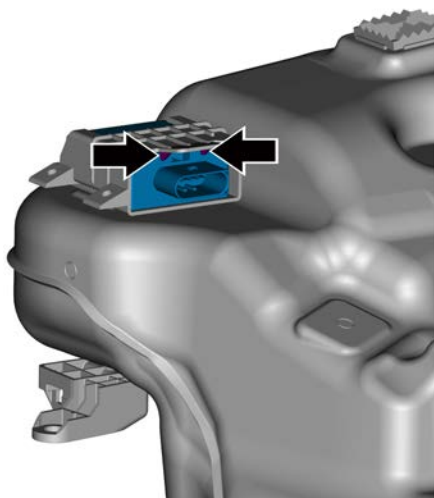
See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

See "Warnings Regarding Exhaust System Maintenance" in [Warnings and Precautions](#).

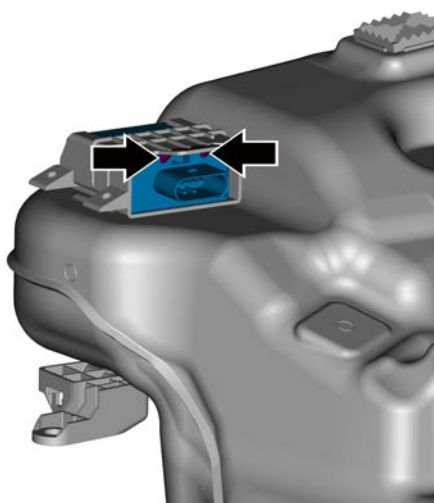
- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Fuel tank drain procedure, see [fuel tank drain procedure](#).
- 4 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 5 Lift the vehicle, see [Lift the vehicle](#)
- 6 Remove the RL tire, see [wheel assembly replacement](#).
- 7 Remove the exhaust cold end, see [exhaust cold end replacement](#).
- 8 Remove the drive shaft, see [drive shaft replacement](#).
- 9 Remove the left lower fender apron. See [replacement of left lower fender apron](#).
- 10 Remove the right lower fender apron, see [replacement of right lower fender apron](#).
- 11 Remove the rear channel heat shield, see [replacement of rear channel heat shield](#).
- 12 Remove the fuel tank heat shield, see [fuel tank heat shield replacement](#).
- 13 Remove the fuel filter, refer to [replacement of fuel filter](#).

- 14 Remove the fuel tank, see [fuel tank replacement](#).
- 15 Disconnect the fixing clip of the fuel pump module and remove the fuel pump module.



Installation procedure

- 1 Install the fuel pump module.



- 2 Install the fuel tank.
- 3 Install the fuel filter.
- 4 Install the fuel tank heat shield.
- 5 Install the rear channel heat shield.
- 6 Install the lower right fender apron.
- 7 Install the lower left fender apron.
- 8 Install the drive shaft.
- 9 Install the exhaust cold end.
- 10 Install the left rear tire.
- 11 Lower the vehicle.

- 12 Connect the negative battery cable.
- 13 Close the engine compartment cover.

2.3.8.12 Replacement of long pipeline assembly

Removal procedure

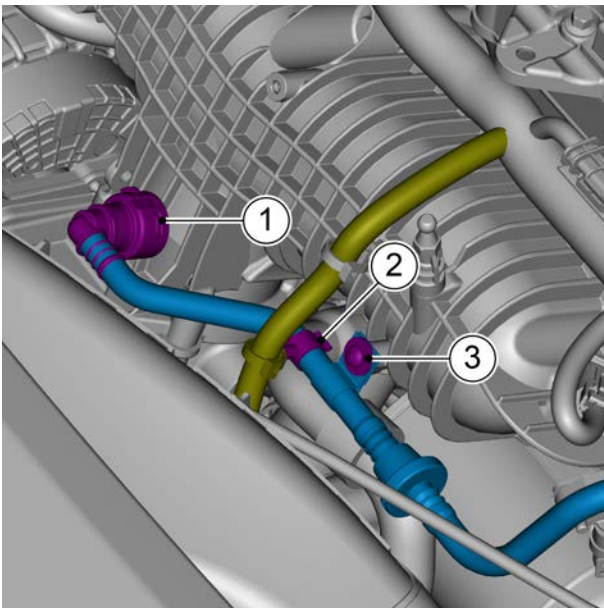
Warning !

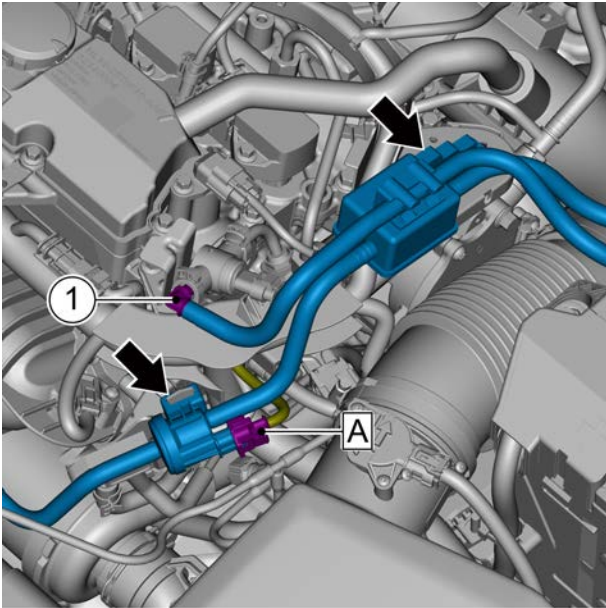
See "Warnings Regarding Fuel Pressure Release" in [Warnings and Precautions](#).

Warning !

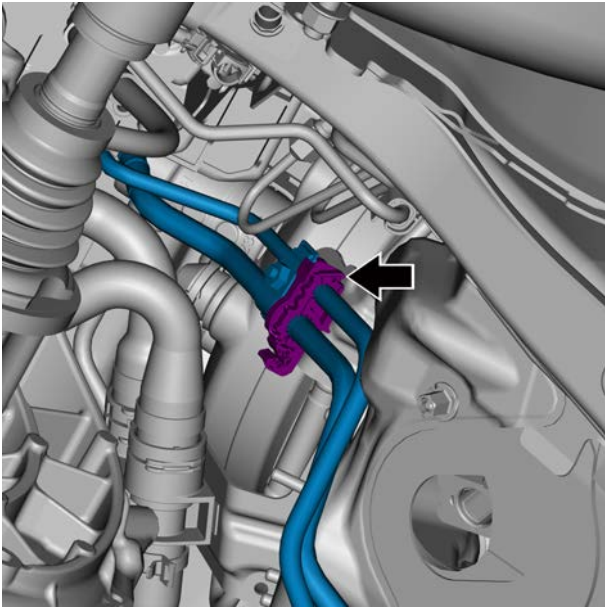
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 5 Remove the connector 1 of the long desorption pipe under the floor.
- 6 Disconnect the long desorption pipe clamp 2 under the floor.
- 7 Remove one retaining bolt 3 of the long desorption pipe under the floor.

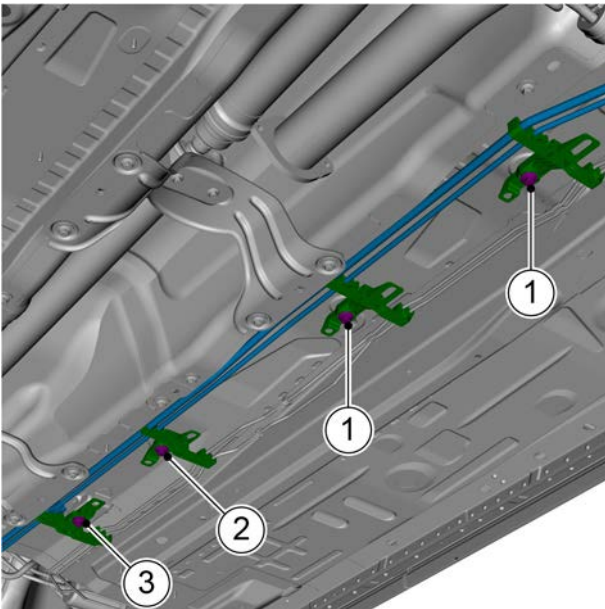




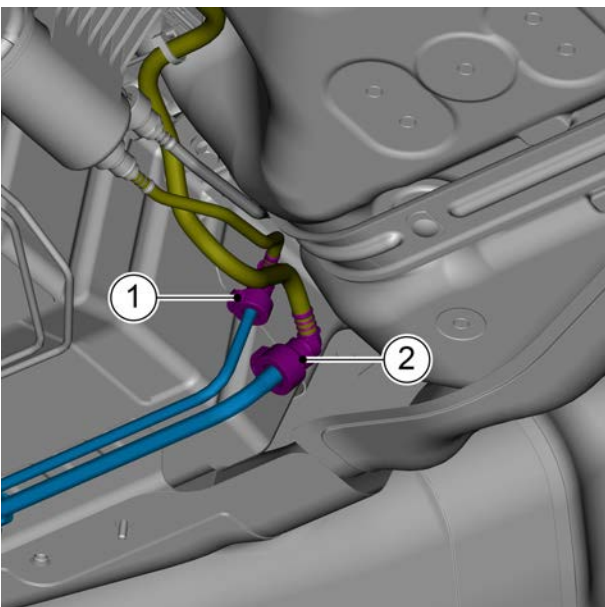
- 8 Disconnect the canister solenoid valve harness connector A.
- 9 Remove the connector 1 of the long pipeline under the floor.
- 10 Disconnect the canister solenoid valve from the canister solenoid valve bracket.
- 11 Remove the fixing clip connecting the expansion pot and the engine harness sheath.
- 12 Lift the vehicle, see [Lift the vehicle](#)
- 13 Remove the exhaust cold end, see [exhaust cold end replacement](#).
- 14 Remove the drive shaft, see [drive shaft replacement](#).
- 15 Remove the engine fender, see [Engine fender replacement](#).
- 16 Remove the RL suspension vibration isolation pad. See [replacement of RL suspension vibration isolation pad](#).
- 17 Remove the right rear suspension vibration isolation pad. See [replacement of right rear suspension vibration isolation pad](#).
- 18 Remove front subframe, refer to [replacement of front subframe](#).
- 19 Remove the front channel heat shield. See [replacement of front channel heat shield](#).
- 20 Remove the left lower fender apron. See [replacement of left lower fender apron](#).



- 21 Open the engine compartment pipeline clamp and disconnect the long pipeline assembly from the engine compartment pipeline clamp.

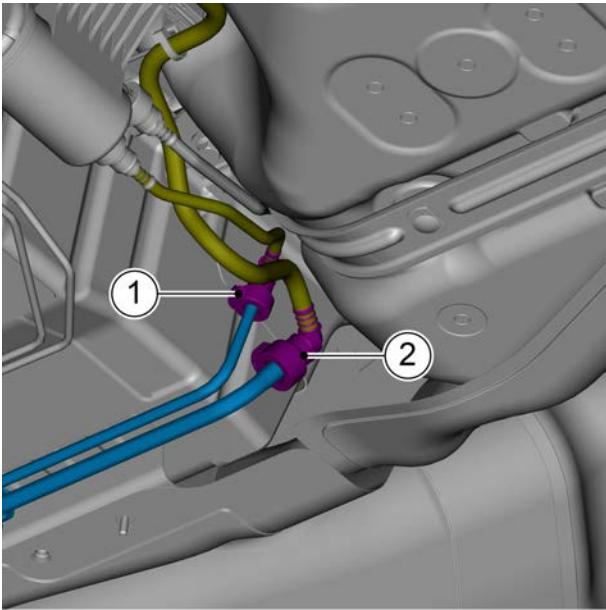


- 22 Remove the two retaining bolts 1 of the underfloor fuel pipe bracket, and disconnect the connection between the underfloor long desorption pipe and the underfloor long pipeline and the underfloor fuel pipe bracket.
- 23 Remove one retaining bolt 2 of the conductive fuel pipe support under the floor, and disconnect the long desorption pipe under the floor and the long pipeline under the floor from the conductive fuel pipe support under the floor.
- 24 Remove one retaining bolt 3 of the underfloor support, and disconnect the long desorption pipe and long pipeline under the floor from the underfloor support.

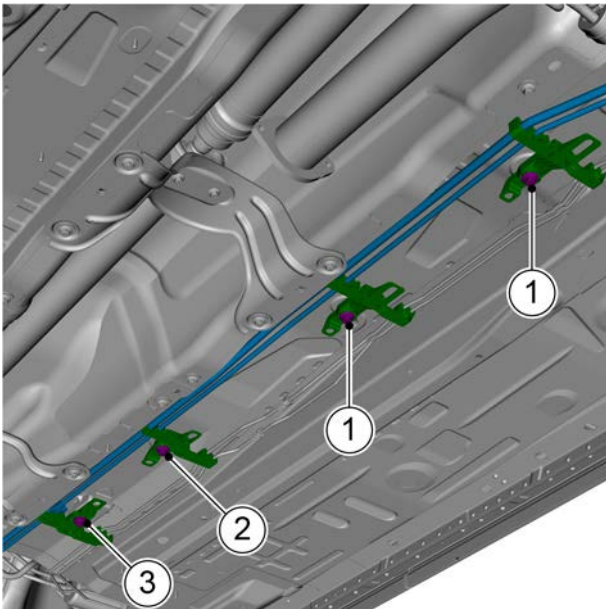


- 25 Remove the connector 1 of the filter outlet pipe.
- 26 Remove the connector 2 of the desorption pipe under the wheel housing and remove the long pipeline assembly.

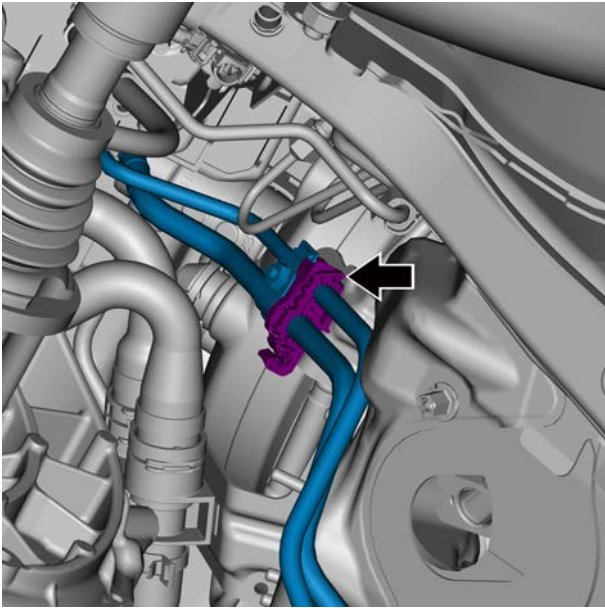
Installation procedure



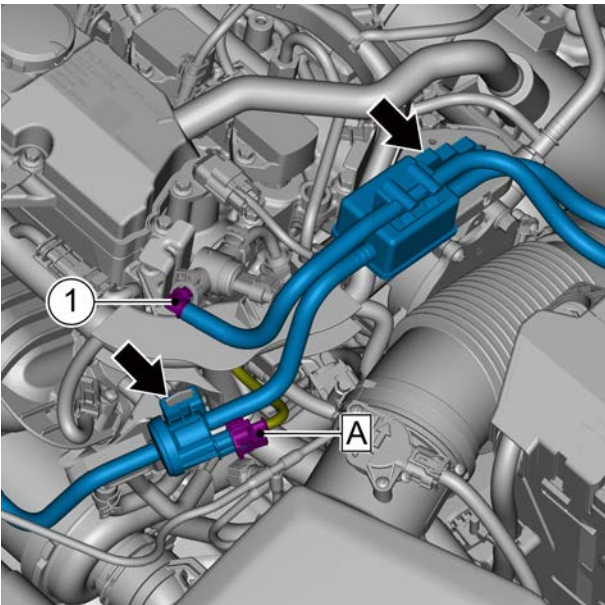
- 1 Install the long pipe assembly and the connector 2 of the desorption pipe under the wheel housing.
- 2 Install connector 1 of the filter outlet line.



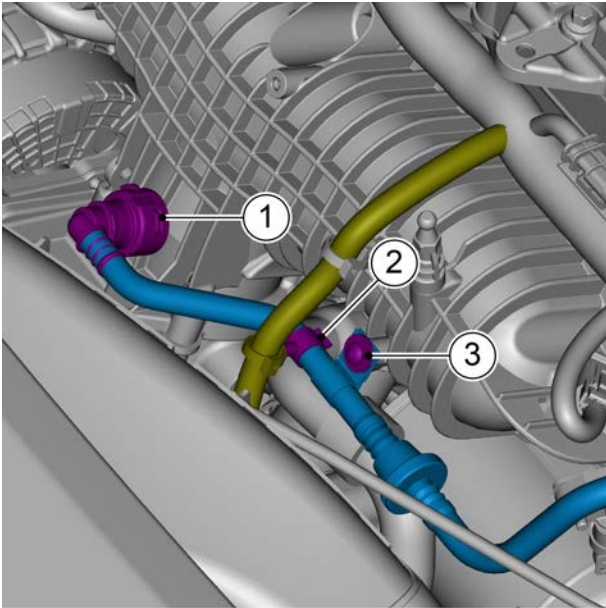
- 3 Connect the long desorption pipe under the floor and the long pipeline under the floor with the support under the floor, and install and tighten one retaining bolt 3 of the support under the floor.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)
- 4 Connect the long desorption pipe under the floor, the long pipeline under the floor and the conductive fuel pipe support under the floor, install and tighten one retaining bolt 2 of the conductive fuel pipe support under the floor.
Torque: 30 N. m (metric system) 22.1 lb-ft (Imperial system)
- 5 Connect the long desorption pipe under the floor, the long pipeline under the floor and the fuel pipe support under the floor. Install and tighten the two retaining bolt 1 of the fuel pipe support under the floor.
Torque: 30 N. m (metric system) 22.1 lb-ft (Imperial system)



- 6 Connect the long pipeline assembly with the engine compartment pipeline clamp, and close the engine compartment pipeline clamp.



- 7 Install the lower left fender apron.
- 8 Install the front channel heat shield
- 9 Install the front subframe.
- 10 Install the right rear suspension vibration isolation pad.
- 11 Install the rear left mount insulator.
- 12 Install the engine fender.
- 13 Install the drive shaft.
- 14 Install the exhaust cold end.
- 15 Lower the vehicle.
- 16 Install the expansion tank.
- 17 Connect the canister solenoid valve to the canister solenoid valve bracket.
- 18 Install the connector 1 of the long pipeline under the floor.
- 19 Connect the canister purge solenoid harness connector A.



- 20 Install and tighten one retaining bolt 3 of the long desorption pipe under the floor.
Torque: 3.5 N. m (metric system) 2.6 lb-ft (Imperial system)
- 21 Install the long desorption pipe clamp 2 under the floor.
- 22 Install the connector 1 of the long desorption pipe under the floor.

- 23 Install the engine trim cover assembly.
- 24 Connect the negative battery cable.
- 25 Close the engine compartment cover.

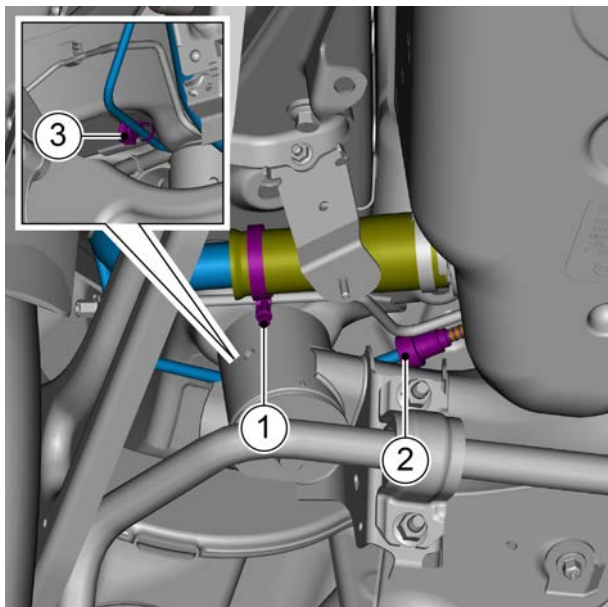
2.3.8.13 Replacement of Filler Pipe Assembly

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Fuel tank drain procedure, see [fuel tank drain procedure](#).
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Lift the vehicle, see [Lift the vehicle](#)
- 5 Remove the right rear tire. See [wheel assembly replacement](#).
- 6 Remove the right lower fender apron, see [replacement of right lower fender apron](#).
- 7 Remove the rear fender of the right rear wheel housing. See [replacement of the rear fender assembly of the Left rear wheel housing](#).
- 8 Remove the filler cap assembly. See [replacement of filler cap assembly](#).

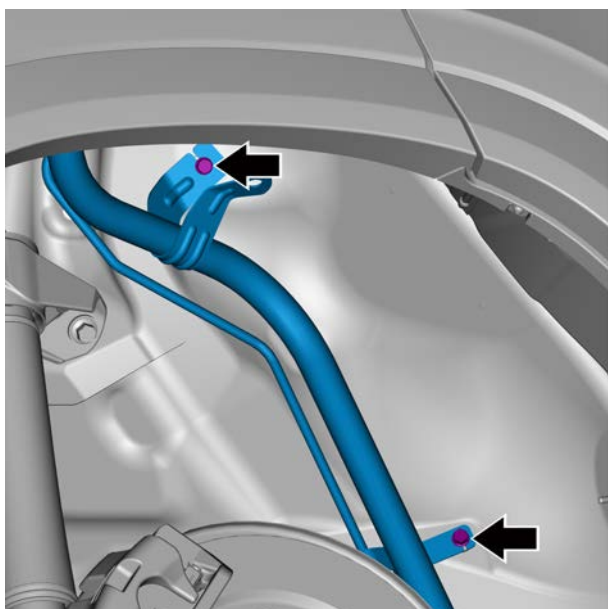


- 9 Loosen the fixing hoop 1 of the oil filler pipe connecting hose, and disconnect the oil filler pipe connecting hose from the filler pipe assembly.

Caution

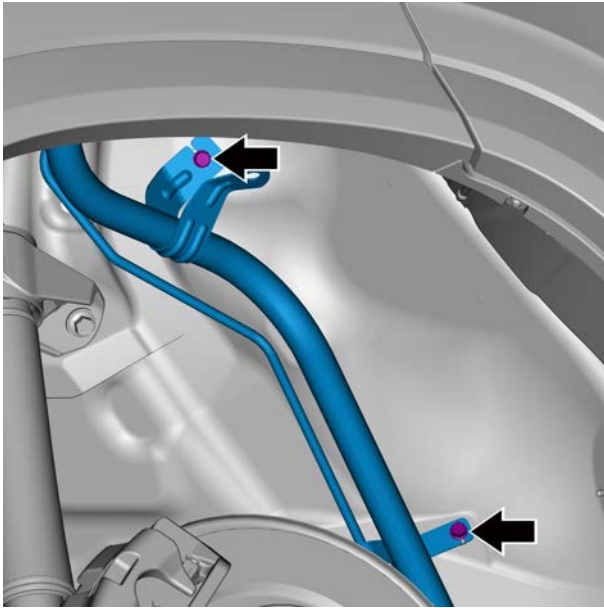
Use a rag to block the oil filler pipe connecting hose to prevent the fuel tank from being dirty.

- 10 Remove the connector 2 of the leakage diagnosis line.
- 11 Remove the fixing clip 3 of the fuel filling pipe assembly.

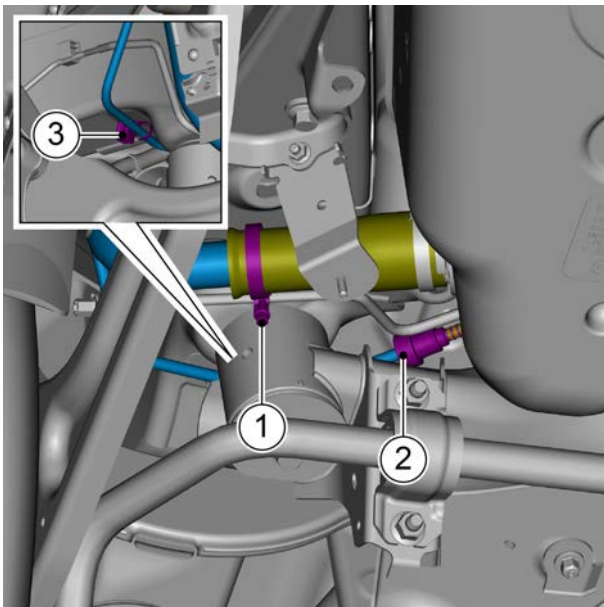


- 12 Remove 2 retaining bolts of the filler pipe assembly and remove the filler pipe assembly.

Installation procedure



- 1 Install the fuel filling pipe assembly, install and tighten the 2 retaining bolts of the fuel filling pipe assembly.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



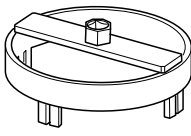


- 2 Install the fixing clip 3 of the filler pipe assembly.
- 3 Connect the fuel tank filler pipe connecting hose and the filler pipe assembly, and tighten the fixing hoop 1 of the fuel tank filler pipe connecting hose.
Torque: 3.5 N. m (metric system) 2.6 lb-ft (Imperial system)
- 4 Install the connector 2 of the leakage diagnosis line.

- 5 Install the fuel filler cap assembly.
- 6 Install the rear fender of the right rear wheel housing.
- 7 Install the lower right fender apron.
- 8 Install the right rear tire.
- 9 Lower the vehicle.
- 10 Connect the negative battery cable.
- 11 Close the engine compartment cover.

2.3.9 Special tools and equipment

2.3.9.1 Special tool

Serial No.	Illustration	Tool number	Name
1		4114870402	High-pressure fuel injector remover
2		4114870403	Pull hammer
3		47Z03113	Fuel pump removal tool

2.4 Refer to information and procedures in auxiliary emission control devices JLH-4G20TD

2.4.1 Specification

2.4.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Lambda probe (front oxygen sensor)	-	40~50	29.5~36.9
Lambda probe (rear oxygen sensor)	-	40~50	29.5~36.9
Canister fixing bolt	M8×25	8.5~11.5	6.3~8.5
Canister fixing nut	M6×7.8	8.5~11.5	6.3~8.5
Carbon canister fixing screw	M6×12×16.4	4.25~5.75	3.1~4.2

2.4.2 Instructions and operations

2.4.2.1 UEGO sensor

The Lambda probe (front oxygen sensor) used in 4G20TD engine is a wide range oxygen sensor. It is a planar zirconia sensor with two chambers and a heater is integrated inside. The planar wide-range oxygen sensor is equipped with two measuring units and one five-pin connector. Extremely accurate measurement can be achieved when the oil and gas mixture is at too thick and too lean operating conditions.

Operations

When the engine is starting, the system enters the “open-loop” operation. In open-loop mode, the engine control module (ECM) ignores the signal from the heated oxygen sensor (HO2S) and calculates the air-fuel ratio according to the air intake pressure from the engine coolant temperature sensor (ECT) and the air intake pressure & temperature sensor and the signal input from the air flow sensor. The sensor will remain in “open-loop” mode until the following conditions are met:

- The voltage output of the heated oxygen sensor changes, indicating that the temperature is high enough to allow normal operation.
- The temperature indicated by the engine coolant temperature sensor is higher than the specified temperature.
- A specified period of time has passed since the engine started.

Consequences of abnormal operation

The specific values in the above cases are stored in an electrically erasable programmable read-only memory (EEPROM). When these conditions are met, the system enters a “closed-loop” operation. In “closed-loop”, the engine control module calculates the air-fuel ratio (i.e., the fuel injector turn-on time) based on the oxygen sensor signal, so that the air-fuel ratio is always very close.

Caution

Once the engine control module confirms that the oxygen sensor is faulty, it will immediately switch to “open-loop” control, that is, the air-fuel ratio will no longer be adjusted according to the signal from the oxygen sensor.

2.4.2.2 Evaporative Emission Control System

The basic principle adopted by the evaporative emission control system is the activated carbon canister storage method. This method transfers fuel vapor from the fuel tank to the activated carbon storage device so as to preserve the vapor when

the vehicle is not running. When the engine is running, fuel vapor is sucked from the carbon core by the intake air flow and consumed during normal combustion. Gasoline vapor flows from the fuel tank into the fuel line marked with fuel vapor recovery. This vapor is absorbed by the canister. When the engine runs for a specified period of time, the engine control module provides a grounding circuit to energize the EVAP canister clean-up spurge solenoid, and air is drawn into the canister and mixed with the vapor. Then, this mixture is sucked into the intake manifold. The opening and closing EVAP canister clean-up spurge solenoid is controlled by pulse width modulation (PWM) signal. According to the operating conditions determined by air flow, fuel regulation and intake air temperature, the duty cycle of the pulse width modulation of the EVAP canister clean-up spurge solenoid changes.

EVAP is an integral part of the fuel system, used to prevent fuel vapor from being discharged into ambient air. Spilled fuel vapor in the fuel tank shall not be discharged into the atmosphere. It must be transferred into the intake manifold through the canister. Fuel vapor will burn in the engine.

The fuel vapor in the fuel tank is led to the carbon canister from the rollover (accident) safety valve on the top of the fuel tank through a hose. The rollover (accident) safety valve can prevent fuel leakage. The valve is closed when a rollover accident occurs. The carbon canister is an activated carbon storage device, which can purify fuel vapor. The fuel vapor is distributed to the intake manifold through the fuel pipe and enters the engine cylinder for combustion after purification. Install the intake manifold on the fuel pipe and install the carbon tank solenoid valve. The canister solenoid controls the fuel vapor introduced into the engine. The control valve opens and closes the connection between the canister and the intake manifold. The flow of the canister solenoid is controlled by the Engine Control Module (ECM). The carbon canister has an air inlet. When the fuel vapor is released into the intake manifold, there will be under-voltage in the carbon canister, and the air inlet can compensate for the insufficient pressure. The canister air inlet includes an air filter.

The following conditions can lead to poor idling, speed loss and poor maneuverability:

- The canister solenoid valve is inoperative.
- The canister is damaged.
- The hose is disconnected, cracked, or not properly connected to the correct pipe.

The EVAP canister is an emission control device containing activated carbon particles. The EVAP canister is used to store fuel vapor from the fuel tank. When certain conditions are met,

the engine control module will energize the canister purge solenoid, causing fuel vapor to be drawn into the engine cylinder and burned.

2.4.2.3 Positive crankcase ventilation (PCV) System

Compressed combustion gas that enters the crankcase through the piston ring is called blow-by gas. The blow-by gas contains nitrogen oxides, carbon monoxide and hydrocarbons. The positive crankcase ventilation system prevents blow-by gas from being discharged into the atmosphere. The positive crankcase ventilation system guides the blow-by gas in the crankcase back to the air intake system, so that the blow-by gas enters the combustion chamber for combustion. The positive crankcase ventilation system consists of the following components:

- Oil-gas separator
- natural ventilation hose.
- check valve (outside the engine).
- check valve (outside the engine).
- air supply pipe.

Breather valve assembly (air replenishment).

Leak

Gas leaks can occur around the piston rings and valve seals. This phenomenon is called "Air Leakage". The crankcase ventilation duct is a one-way channel used to guide the leakage of gas through a controlled path. If the gas is not discharged, the pressure in the crankcase and cylinder head will exceed the standard. The gas will be discharged through the crankcase vent pipe and the engine oil will be cleaned and separated from the gas. The crankcase vent line contains an oil separator. The separator is mounted on the camshaft housing. The crankcase vent line is connected to the engine oil filler cap. When the engine oil is changed or the engine oil needs to be filled for other reasons, it will be filled through the oil filler.

Operations

The main control device of the engine crankcase blow-by gas is the positive crankcase ventilation (PCV) valve. The positive crankcase ventilation valve measures the flow rate of blow-by gas according to the manifold vacuum signal. The positive crankcase ventilation valve below the lower O-ring seal is partially exposed to the vacuum of the air intake manifold, and the portion between the lower and upper O-ring seals is exposed to crankcase gas. The positive crankcase ventilation valve allows some vacuum pressure to pass through the internal orifice of the valve, which creates a low pressure state in

the crankcase. The blow-by gas in the crankcase is then drawn into the intake system and burned during normal combustion. The amount of blow-by gas entering the intake manifold is precisely controlled to maintain idle speed quality. The correct and correctly calibrated positive crankcase ventilation valve must be used. The relationship between blow-by gas flow rate and engine manifold vacuum is shown in the following table:

Manifold vacuum degree	Opening of positive crankcase ventilation valve	Blow-by gas flow rate
Low	Large	High
High	Small	Low

Consequences of abnormal operation

- Poor idle speed of engine
- Engine stalls or the idle speed is too low.
- Engine crankcase pressure is too high.
- Engine is leaking oil.
- Engine oil enters the air filter
- Sludge is found in the engine.
- High engine oil consumption
- Excessive exhaust emissions

2.4.3 System working principles

2.4.3.1 Operating Principles of the Canister Purge Solenoid

The activated carbon tank solenoid valve controls the fuel vapor introduced into the engine. The control valve opens and closes the connection between the activated carbon canister and the intake manifold. The flow of the activated carbon tank solenoid valve is controlled by the Engine Control Module (ECM). The activated carbon canister has an air inlet. When the fuel vapor is released into the intake manifold, there will be under-voltage in the activated carbon canister, and the air inlet can compensate for the insufficient pressure. The air inlet of the activated carbon canister includes an air filter.

Carbon canister solenoid valve consists of a solenoid coil, an armature, and a valve. The entrance is equipped with a strainer.

The airflow through the canister purge solenoid is related to the duty cycle of the electric pulse output by the ECM to the canister purge solenoid, and also related to the pressure

difference between the inlet and outlet of the canister purge solenoid. When there is no electric pulse, the canister purge solenoid is closed.

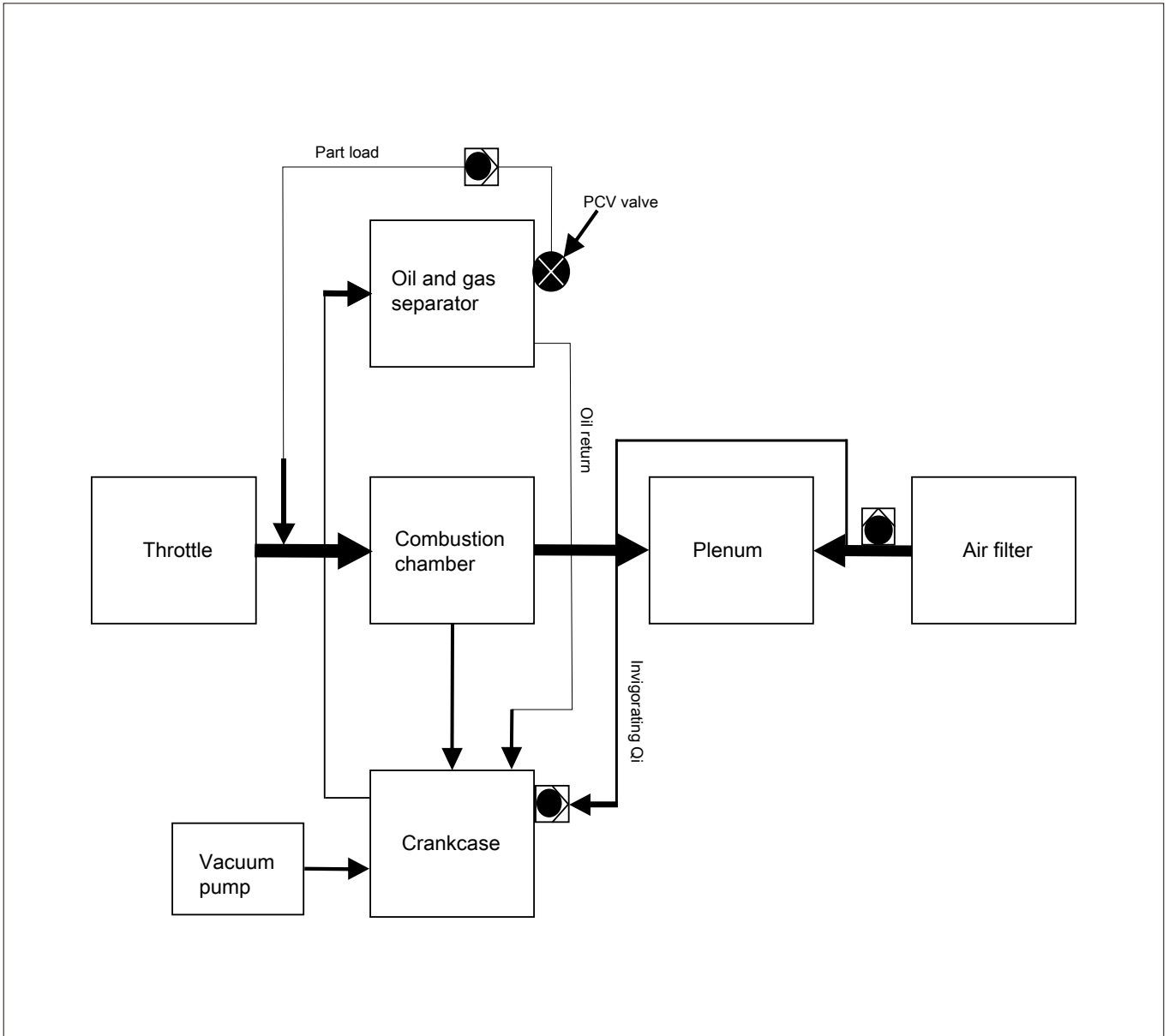
ECM controls the electrifying time of the canister purge solenoid according to the signals provided by the sensors of the engine, and thereby indirectly controls the cleaning air flow.

The ECM will control the operation of the canister purge solenoid when a series of factors such as water temperature, engine working time, load, etc. meet the predetermined requirements. The canister purge solenoid will not participate in the work under the following conditions:

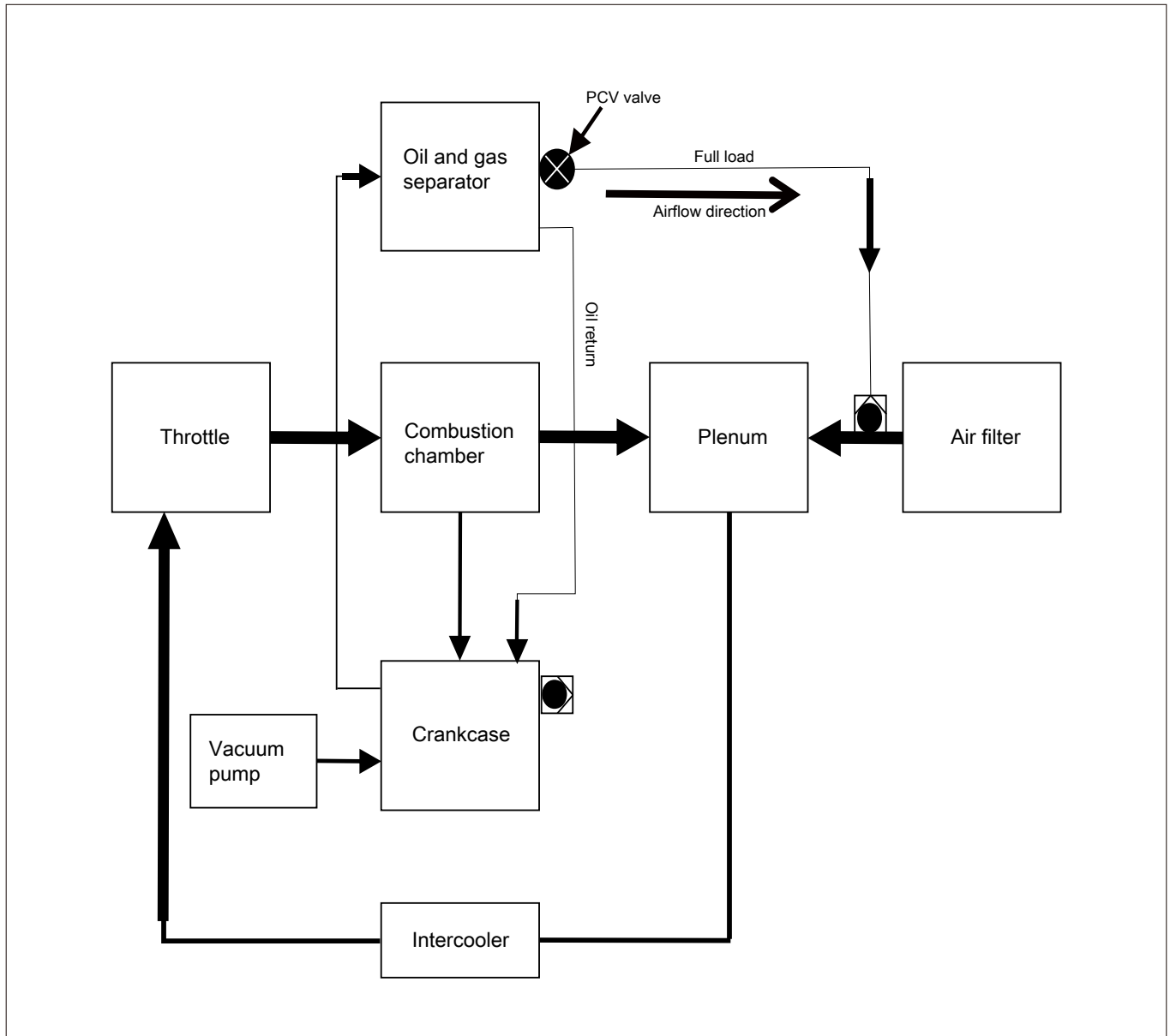
- A period of time after the engine cold starts.
- Engine coolant temperature is relatively low.
- The engine is in the idle operation phase.
- The engine is in the large load phase.
- There is a fault of an important sensor of the system.

2.4.3.2 Working principle of crankcase ventilation system

Partial load condition



Full load condition

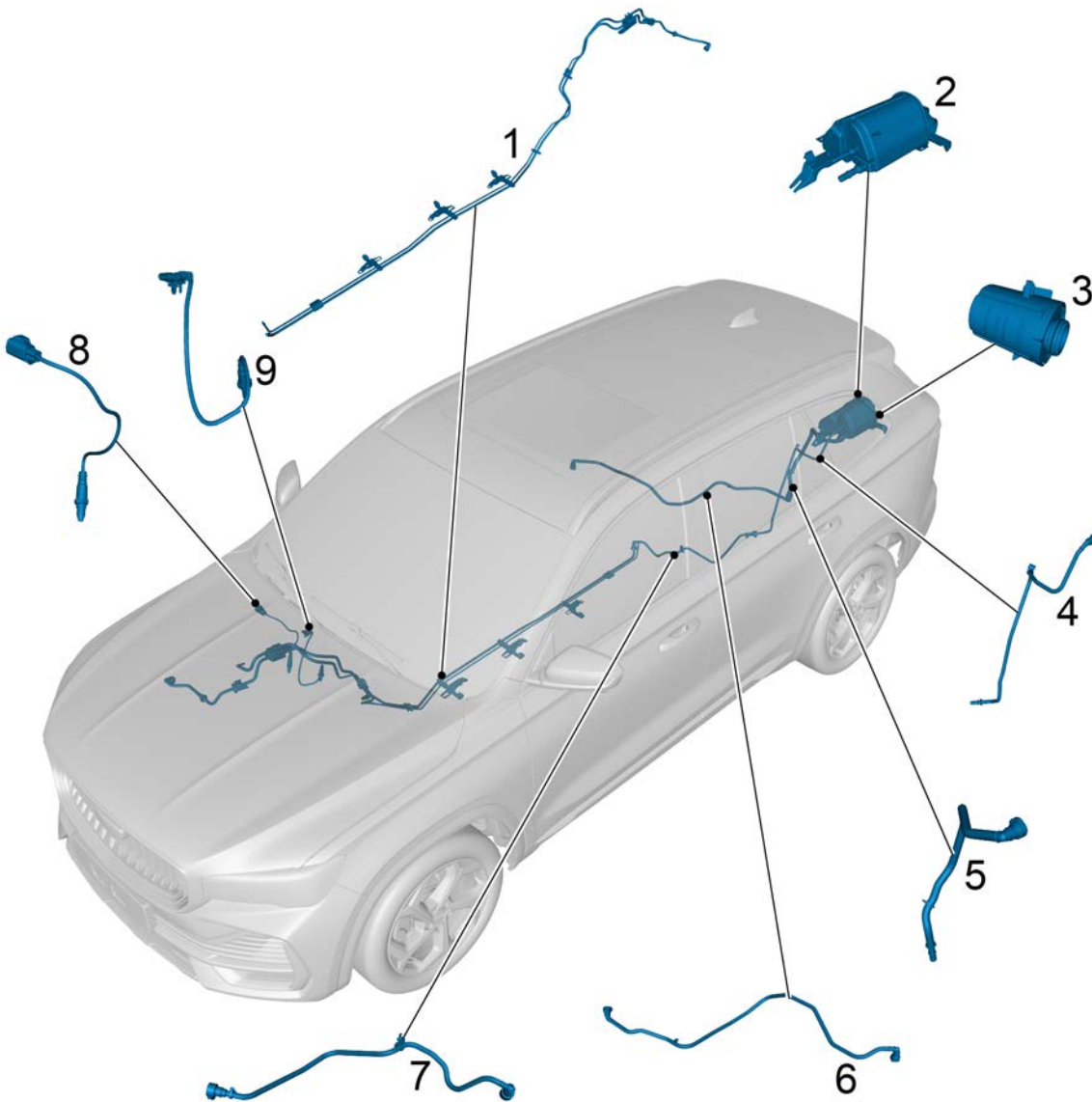


2.4.3.3 Working principle of oxygen sensor

Two oxygen sensors measure the remaining oxygen content in the exhaust gas. The measured value of the oxygen sensor can help the Engine Control Module (ECM) control the air-fuel ratio. The oxygen sensor consists of a zirconium probe and a heating element with a positive temperature coefficient resistor. In order to measure the oxygen content in the exhaust gas, the oxygen sensor needs to see the surrounding air, which is in contact with the sensor through the oxygen sensor harness. The oxygen sensor only works within a specific temperature range. The oxygen sensor contains a heating element for heating the oxygen sensor to reach the working temperature. The heating element takes about 30-40 s to heat the oxygen sensor. The operating temperature of Lambda probe (front oxygen sensor) and Lambda probe (rear oxygen sensor) will change.

2.4.4 Component position

2.4.4.1 Component position

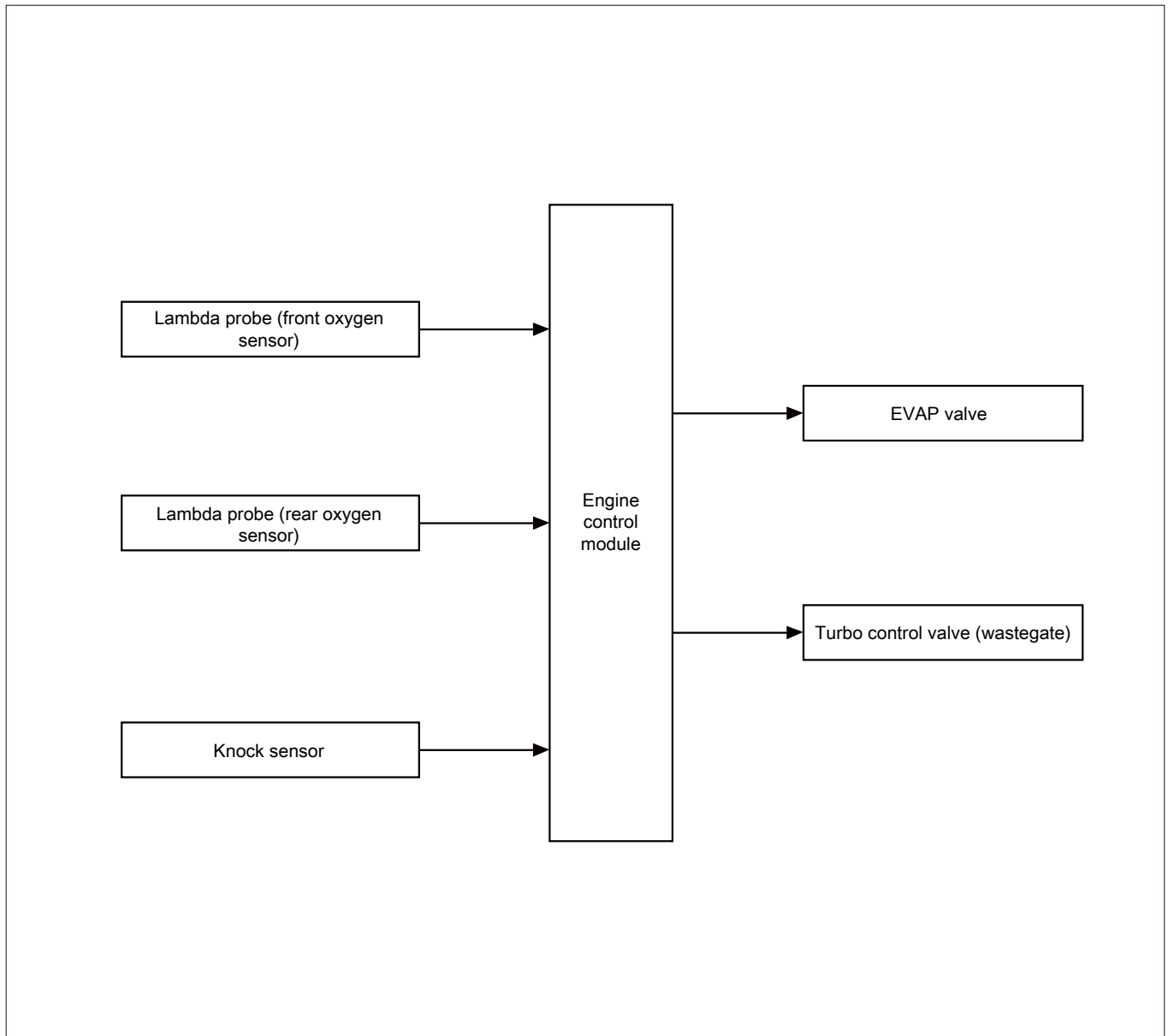


Legend

- | | | | |
|----|-----------------------------------|----|--------------------------------------|
| 1. | Long-pipe assembly | 6. | Evaporation pipe under wheel housing |
| 2. | Canister | 7. | Desorption pipe under wheel housing |
| 3. | Ash filter assembly | 8. | Lambda probe (front oxygen sensor) |
| 4. | Desorption pipe on wheel housing | 9. | Lambda probe (rear oxygen sensor) |
| 5. | Evaporation pipe on wheel housing | | |

2.4.5 Electrical schematic diagram

2.4.5.1 Electrical schematic diagram



2.4.6 Diagnostic message and steps

2.4.6.1 Diagnosis Description

See description and operation and system operating principle before diagnosing the fault of the auxiliary emission control device. Understand and be familiar with the working principle of the auxiliary emission control device, and then start system diagnosis. This will help to confirm the correct fault diagnosis steps when a fault occurs. More importantly, it can also help to confirm whether the situation described by the customer belongs to normal operation. Any fault diagnosis of the auxiliary emission control device should start with visual inspection, which will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

Precautions for maintenance of canister purge solenoid:

1. During installation, the airflow direction must be subject to the regulations.
2. When it is found that black particles inside the valve body of the canister solenoid valve cause the control valve to fail and that the canister solenoid valve needs to be replaced, check the canister.
3. During the maintenance, avoid liquids such as water and oil from entering the valve.
4. To avoid the transmission of solid sound, it is recommended to install the canister control valve in the air above the hose.

2.4.6.2 Visual Check

- Check after-sales installations that may influence the auxiliary emission control devices and ensure these devices cannot influence the operation of the auxiliary emission control devices.
- Check system components that are easily accessible or can be seen to find out if they are obviously damaged or have external leakage.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

2.4.6.3 Positive crankcase ventilation (PCV) system check and diagnosis

Consequences of incorrect operation

If the crankcase ventilation hose is blocked, the following malfunctions will occur:

- Unstable idle speed.
- Stall or idle speed is too low.
- Engine oil leakage.
- Engine oil accumulates in the air inlet pipe.
- Sludge is found in the engine.

2. Leakage of the ventilation hood or hose may cause the following faults:

- unstable idle speed and idle traveling block.

Diagnosis steps:

Step 1	Check whether there is vacuum in the crankcase ventilation hose. There shall be manifold vacuum in the hose. If not, check whether the hose is blocked, leaking or the vent pipe joint is blocked.
--------	--

Next Step

Step 2	Block the end of the vacuum hose when the engine is running. Check whether all parts of the hose collapse when the end of the hose is blocked. Replace the hose if the hose collapses when blocked.
--------	---

Next Step

Step 3	If engine oil accumulates in the air intake pipe, check for the following conditions:
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- A. The vacuum hole in the crankcase ventilation hood is blocked.
- B. The crankcase ventilation hood is blocked.
- C. Crankcase pressure or blow-by gas exceeds acceptable tolerance range. See diagnosis of abnormal consumption of engine oil.

Next Step

Step 4	Other check items.
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Next Step

Step 5	System is normal.
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2.4.7 Removing and installing

2.4.7.1 Lambda probe (front oxygen sensor) replacement

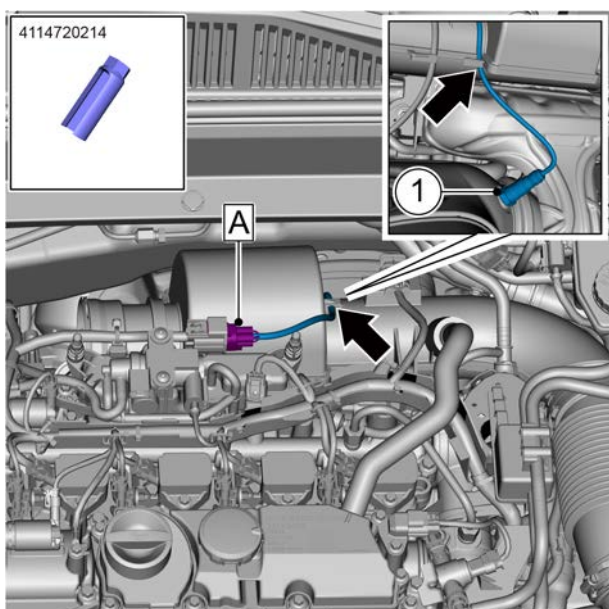
Removal procedure

Warning !

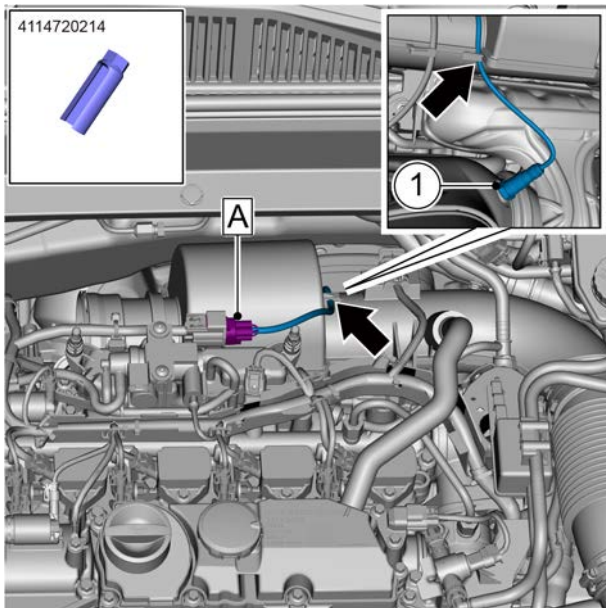
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Disconnect the Lambda probe (front oxygen sensor) harness connector A.
- 5 Disconnect the Lambda probe (front oxygen sensor) harness from the vent pipe on the air filter.
- 6 Remove Lambda probe (front oxygen sensor) 1 with special tool.

Special tool number: 4114720214



Installation procedure



- 1 Install and fasten Lambda probe (front oxygen sensor) 1 with special tool.

Special tool number: 4114720214

Torque: 45N·m (metric), 33.2lb·ft (imperial system)

- 2 Install the oxygen sensor harness.
- 3 Connect Lambda probe (front oxygen sensor) harness connector A.

- 4 Install the engine trim cover assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine hood

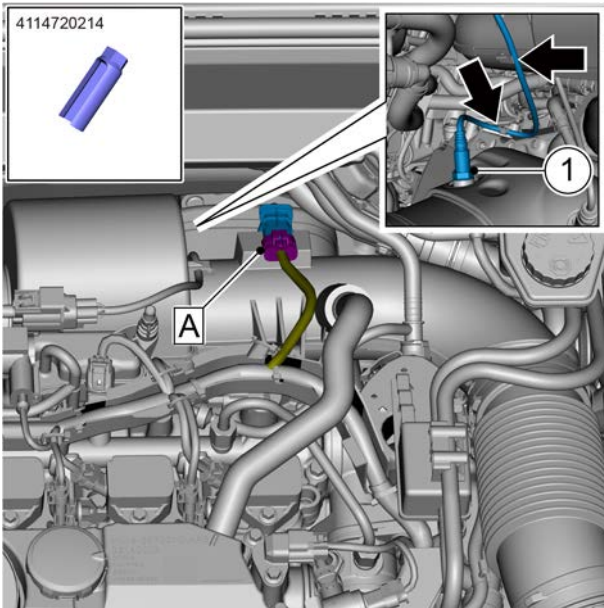
2.4.7.2 Replacement of Lambda probe (rear oxygen sensor)

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

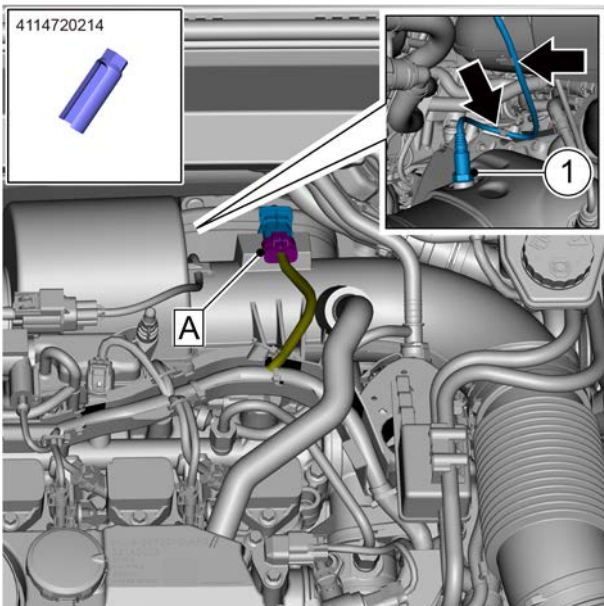
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).



- 4 Disconnect the Lambda probe (rear oxygen sensor) harness connector A and remove the fixing clip of Lambda probe (rear oxygen sensor) harness connector.
- 5 Disconnect the Lambda probe (rear oxygen sensor) harness from the vent pipe on the air filter and the catalytic of the catalytic converter.
- 6 Remove Lambda probe (rear oxygen sensor) 1 with special tool.

Special tool number: 4114720214

Installation procedure



- 1 Install and fasten Lambda probe (rear oxygen sensor) 1 with special tool.
Special tool number: 4114720214
Torque: 45N·m (metric), 33.2lb-ft (imperial system)
- 2 Install the Lambda probe (rear oxygen sensor) harness.
- 3 Install the Lambda probe (rear oxygen sensor) harness connector And connect the Lambda probe (rear oxygen sensor) harness connector A.

- 4 Install the engine trim cover assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine hood

2.4.7.3 Replacement of EVAP valve

Remove the EVAP valve, see [replacement of long pipeline assembly](#).

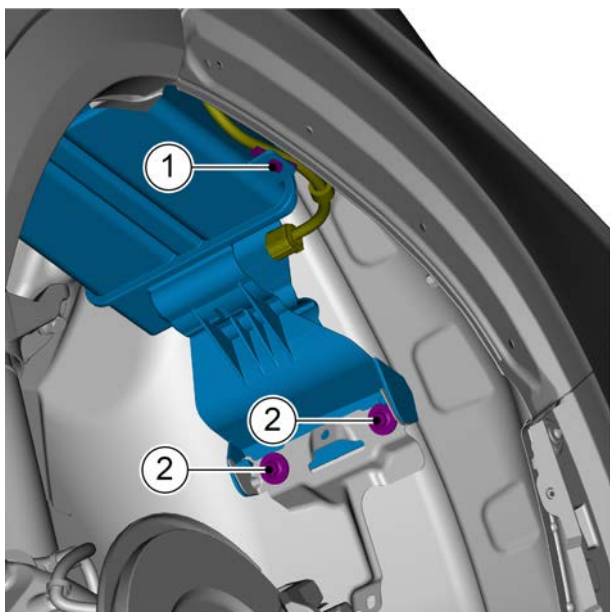
2.4.7.4 Replacement of Canister

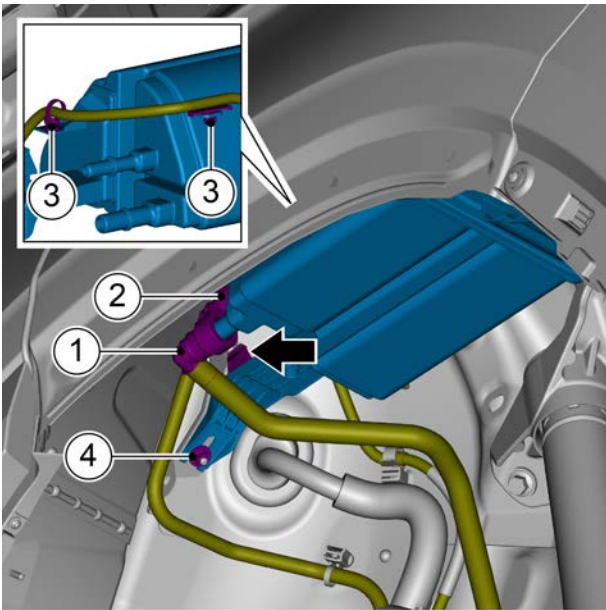
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

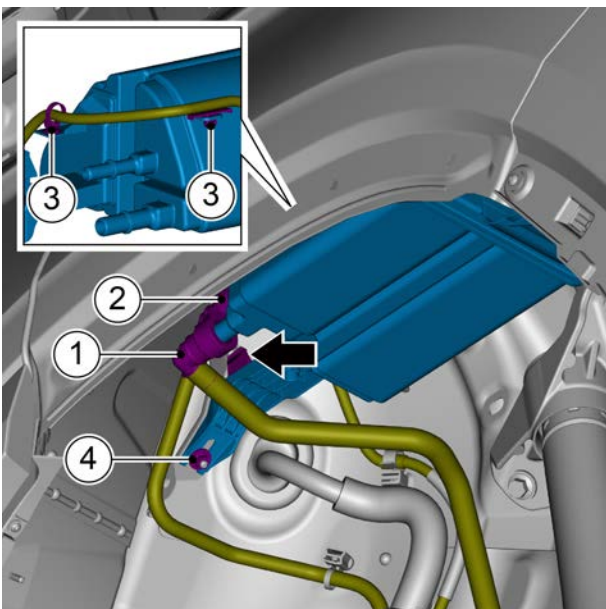
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the Left rear wheel. See [wheel assembly replacement](#).
- 5 Remove the rear fender of the Left rear wheel housing. See [replacement of the rear fender assembly of the Left rear wheel housing](#).
- 6 Remove the ash filter assembly, see [replacement of ash filter assembly](#).
- 7 Remove the 2 fixing bolts of the carbon canister.



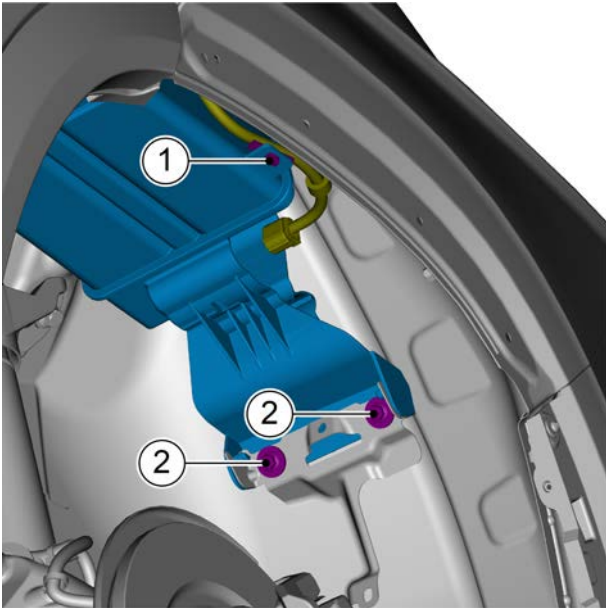


- 8 Remove the connector 1 of the Evaporation pipe on the wheel housing and move it aside.
- 9 Remove the connector 2 of the desorption pipe on the wheel housing and move it aside.
- 10 Remove one fixing nut 3 of the carbon canister.
- 11 Remove the carbon canister

Installation procedure



- 1 Install the canister.
- 2 Install and tighten one fixing nut 3 of the carbon canister.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 3 Install the connector 2 of the desorption pipe on the wheel housing.
- 4 Install the connector 1 of the Evaporation pipe on the wheel housing.



- 5 Install and tighten the 2 fixing bolts of the carbon canister.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 6 Install the ash filter assembly.
- 7 Install the RL wheel cover splash fender.
- 8 Install the left rear wheel.
- 9 Lower the vehicle.
- 10 Connect the negative battery cable.
- 11 Close the engine compartment cover.

2.5 Mechanical system JLH-4G20TD

2.5.1 Specification

2.5.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Turbine control valve (wastegate) retaining bolt	PF6×25	4.2~5.8	3.1~4.3
Ball joint of engine trim cover bolt	-	5.5~6.5	4.1~4.8
Vacuum chamber retaining bolt	M6×25	8.5~11.5	6.3~8.5
retaining bolt of engine harness sheath	M6×20	8.5~11.5	6.3~8.5
Vacuum pump retaining bolt	M8×110	24~28	17.7~20.7
Oil-gas separator fixing bolt	M6×25	Pre-tighten 3	Pre-tighten 2.2
		Final-tightening 8.5-11.5	Final-tightening 6.3-8.5
Fixing screw of front timing belt shield	M6×11.5	8.5~11.5	6.3~8.5
Rear timing belt shield fixing screw	M6×11.5	8.5~11.5	6.3~8.5
Automatic tensioner retaining bolt	M8×30	20~28	14.8~20.7
	M10×70	41~55	30.2~40.6
retaining bolts of vibration insulator assembly LH engine mount and transmission	M12×55	95~125	70.1~92.2
retaining bolts of vibration insulator assembly LH engine mount	M10×50	50~70	36.9~51.6
	M12×60	First: 90	First: 66.4
		Second time: 120 °	Second time: 120 °
Ground Wire retaining bolt	M6×14	8.5~11.5	6.3~8.5
retaining bolts of vibration insulator assembly RH engine mount	M12×55	First: 90	First: 66.4
		Second time: 90 °	Second time: 90 °
Engine right vibration isolation pad assembly and fixing bolt	M12×80	First: 90	First: 66.4
		Second time: 120 °	Second time: 120 °
	M10×40	50~70	36.9~51.6
Left-rear suspension vibration isolation pad retaining bolt	M12×75	First: 90	First: 66.4
		Second time: 120 °	Second time: 120 °
Fixing bolt of left rear suspension bracket	M10×45	First: 50	First: 36.9
		Second time: 90 °	Second time: 90 °

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
retaining bolts of RL suspension lower support and RL suspension vibration isolation pad	M12×70	95~125	70.1~92.2
retaining bolts of intercooler intake pipe assembly	M8×16	20~28	14.8~20.7
retaining bolt of right rear suspension vibration isolation pad	M12×80	First: 90	First: 66.4
		Second time: 120 °	Second time: 120 °
retaining bolts of right rear suspension vibration isolation pad and engine	M12×70	95~125	70.1~92.2
Engine harness grounding retaining bolt	M6×20	8.5~11.5	6.3~8.5
Drive train grounding harness retaining bolt	M8×25	20~28	14.8~20.7
retaining bolts of starting motor harness assembly	M8×9.4	20~28	14.8~20.7
Fixing screw of long desorption pipe under floor	PF5×20	3~4	2.2~3.0
Fixing nut of A/C low-pressure pipe assembly and A/C compressor	M8×8	20~28	14.8~20.7
Fixing nut of A/C High-pressure pipe assembly and A/C compressor	M8×8	20~28	14.8~20.7
Half-shaft support components retaining bolt	M10×45	50~70	36.9~51.6
Belt tensioner fixing bolt	M8×63	First time: first 5, reverse angle 40 ° ~ 50 °	First time: first 3.69, reverse angle 40 ° ~ 50 °
		Second: 22-28	Second: 16.2-20.7
Timing idler retaining bolt	M7×35	13.5~18.5	10.0~13.6
VVT components retaining bolt	M12×96	Pre-tighten first, and finally: 81 ~ 99	Pre-tighten first, and finally: 59.7 ~ 73.0
VVT cover plate fixing screw	M6×16	8.5~11.5	6.3~8.5
Inner dodecagonal flower shaped fixing screw of damping pulley	M8×45	First: 23~27	First: 17.0~19.9
		Second: 85°-95°	Second: 85°-95°

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
retaining bolt of damping pulley	M12×71	First: 100~120	First: 73.5~88.5
		Second: 85°-95°	Second: 85°-95°
Camshaft bearing cap specified bolt	M7×35	13.5~18.5	10.0~13.6

2.5.1.2 Mechanical System Specification

Item	Specification
Model	JLH-4G20TDB
Type	Inline 4 cylinders
Type of the combustion chamber	Roof type
Technical features	Central direct injection, integrated exhaust manifold turbo-charger, variable displacement oil pump, dry timing belt, aluminum cylinder, DVVT, double balance shaft, electronic water pump
Intake method	Supercharged intercooling
Cylinder diameter× Stroke (mm×mm)	82×93.2
Compression ratio	10.8: 1
Displacement (mL)	1969
Rated power (kw)	175
Maximum net power (kW)	175
Rated power speed (r/min)	5500
Maximum torque (N•m)	350
Maximum torque speed (r/min)	1800-4500
Fuel specification	Refer to the refueling cap label
Low speed torque (N•m/r/min)	160/1000
Minimum fuel consumption (g/kW•h)	236
Fuel consumption rate at 2000r/min/2bar (g/kW•h)	364
Forms of valve timing mechanism	DOHC, cup-shaped tappet, 16 valve, DVVT
Original valve phase	Valve opening 1mm angle: 390° intake/165.5° exhaust
	Valve closing 1mm angle: 587° intake/351.5° exhaust
Idle speed (r/min)	750±50
Direction of rotation	Clockwise (from the front of the petrol engine)
Ignition sequence	1-3-4-2
Total exhaust pressure loss (kPa/kg/h) (rated point)	≤45/720
Oil pressure (kPa)	150~450
Piston leakage (L/min)	≤90
Overall dimensions (Length x Width x Height) (mm)	631×627×710
Net engine weight (± 2%) (kg)	134.5

Item	Specification
Emission	Euro V
Cylinder head	
Cylinder joint surface flatness	0.015mm
Intake side flatness	0.02mm
Exhaust side flatness	0.02mm
Piston	
Standard diameter of piston	81.970±0.007mm
Standard clearance of the oil film	0.045mm
Maximum clearance of the oil film	0.059mm
Exhaust valve	
Length	110.175mm
Crown diameter	27mm
Shaft diameter	(5.934 mm) (hot end)
	(5.942 mm) (cold end)
Valve angle	45.5°
Gide pipe clearance	59-88µm (MP)
Valve clearance	0.52±0.05mm
Valve seat angle	45°
Intake valve	
Length	109.16mm
Crown diameter	31mm
Shaft diameter	5.97mm
Valve angle	45.5°
Gide pipe clearance	30-60 µm
Valve clearance	0.20±0.05mm
Valve seat angle	45°
Drive belt	
Length	1181±5.0mm
Width	21.36±0.5mm
Depth	4.8±0.4mm
Intake and exhaust camshaft	
Radial runout of camshaft	0.03
Maximum lift of intake camshaft	8.57mm
Maximum lift of exhaust camshaft	7.865mm
Camshaft diameter No.1	Φ55 (0 , -0.013) mm
Camshaft diameter others	Φ30 (-0.03 , -0.05) mm
Standard axial clearance of camshaft	0
Maximum axial clearance of camshaft	0.59mm
Camshaft pulley	
Tip diameter of exhaust camshaft	Φ125.97 (0 , -0.13) mm

Item	Specification
Crankshaft	
Maximum radial runout of crankshaft	0.015mm
Crankshaft journal diameter	53 (-0.016 , +0.003) mm
Maximum taper and roundness of crankshaft journal	0.004mm
Diameter of crankshaft connecting rod journal	50 (-0.019 , 0) mm
Crankshaft journal roundness	0.004
Crankshaft main journal oil film clearance	0.019-0.036mm
Crankshaft connecting rod journal oil film clearance	0.022-0.046mm
Engine oil specification and capacity	
Engine oil specification	Shell VCC RBS0-2AE 0W-20
Filling volume	6.8L
Filling volume (change the filter)	5.6L
Filling volume (without changing the filter)	5.2L
2. Canister	
Operation temperature	-40°C - +100°C
Capacity	30g
Emission value	
Total hydrocarbons (THC)	100 mg/ km
Non-methane hydrocarbons (NMHC)	68 mg/ km
Carbon monoxide (CO)	1000 mg/ km
Nitrogen oxides (NOx)	60 mg/ km
Particulate matter (PM)	4.5 mg/ km
Air filter	
Maximum air flow	0.19 kg/s
Clogging capacity	≥ 175 g
Coolant type and capacity	
Type	Ethylene glycol type coolants authorized by Geely
Capacity	7.0 L
Use the premixed coolant of -40°C	
Expansion water tank	
Maximum coolant flow	2.5 L/min
Sparking plug	
Sparking plug gap (mm)	0.6~0.7
Piston ring	
Side clearance of first compression ring (mm)	0.02-0.07mm
Side clearance of second compression ring (mm)	0.025-0.07mm
Camshaft	
Adjustment range of intake VVT	50°CA

Item	Specification
Adjustment range of exhaust VVT	28°CA
Sealant and adhesive	
Sealant for crankcase and cylinder	Plane silica gel LT5970
Sealant for camshaft bearing cap, cylinder and lower cylinder, and oil pan	Plane silica gel LT5970
Sealant for engine oil pan	Plane silica gel LT5970
Sealant for $\Phi 20$ bowl-shaped plug (cylinder)	Cylindrical bonding sealant LT648
Sealant for bowl-shaped plug (cylinder cover)	Cylindrical bonding sealant LT648

2.5.1.3 Main bearing selection table

Crankshaft group number	Cylinder group number														
	57.0000	57.0010	57.0020	57.0030	57.0040	57.0050	57.0060	57.0070	57.0080	57.0090	57.0100	57.0110	57.0120	57.0130	57.0140
D	E	F	G	H	J	K	I	M	N	O	P	R	S	T	
52.985	B	B	B	B	G	B	G	G	G	G	G	G	G	G	G
52.986	B	B	B	B	B	G	B	G	G	G	G	G	G	G	G
52.987	B	B	B	B	B	G	B	G	G	G	G	G	G	G	G
52.988	B	B	B	B	B	B	B	G	G	G	G	G	G	G	G
52.989	B	B	B	B	B	B	B	G	G	G	G	G	G	G	G
52.990	B	B	B	B	B	B	B	B	G	G	G	G	G	G	G
52.991	B	B	B	B	B	B	B	B	B	G	G	G	G	G	G
52.992	B	B	B	B	B	B	B	B	B	B	G	G	G	G	G
52.993	B	B	B	B	B	B	B	B	B	B	B	G	G	G	G
52.994	B	B	B	B	B	B	B	B	B	B	B	B	G	G	G
52.995	B	B	B	B	B	B	B	B	B	B	B	B	B	G	G
52.996	B	B	B	B	B	B	B	B	B	B	B	B	B	B	G
52.997	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
52.998	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
52.999	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
53.000	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
53.001	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
53.002	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
53.003	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B

Main bearing thickness grade

	Red	1.9900	1.9940	(mm)
R	Red	1.9900	1.9940	
y	Yellow	1.9940	1.9980	
B	Blue	1.9980	2.0020	
G	Green	2.0020	2.0060	

Thrust bearing thickness class

	Red	1.9930	1.9970	(mm)
R	Red	1.9930	1.9970	
y	Yellow	1.9970	2.0010	
B	Blue	2.0010	2.0060	
G	Green	2.0050	2.0090	

2.5.1.4 Connecting rod bearing option list

(mm)

Connecting rod big end		01		02		03			
		53—53.004		53.004—53.008		53.008—53.013			
Crankshaft connecting rod	A	49.981	49.988	Y	Y	Y	B	B	B
	B	49.988	49.994	R	Y	Y	Y	B	Y
	C	49.994	50	R	R	Y	R	Y	Y
Bush				Upper tile	Lower tile	Upper tile	Lower tile	Upper tile	Lower tile

Upper connecting rod bearing	R	Red	1.483	1.487
	Y	Yellow	1.487	1.491
	B	Blue	1.491	1.495
Lower connecting rod bearing	R	Red	1.485	1.489
	Y	Yellow	1.489	1.493
	B	Blue	1.493	1.497

2.5.1.5 List of parts used

Serial No.	Name	Position	Usage requirements
1	Hexagon head flange bolt	Oil control valve	≤1
2	Oil control valve gasket	Oil control valve	≤1
3	Connecting rod bolt	Connecting rod	≤5
4	VVT bolt	VVT components	≤1
5	Damping pulley bolt	Damping pulley	≤3
6	Internal dodecagonal Torx screw	Damping pulley	≤1
7	Vacuum pump gasket	Vacuum pump assembly	≤1
8	Camshaft plug	Rear-end of cylinder head	≤1
9	Engine heating connector	Rear-end of cylinder head	≤1

Serial No.	Name	Position	Usage requirements
10	Turbocharger drain gasket	Fuel return pipe of turbocharger	≤1
11	O-ring		≤3
12	Seal	Fuel inlet pipe of turbocharger	≤1
13	Turbocharger oil inlet pipe gasket		≤1
14	Oil cooler sealing ring	Oil cooler	≤1
15	Cylinder block inlet pipe gasket	Inlet pipe of cylinder block	≤1
16	Exhaust manifold gasket	Exhaust Manifold	≤1
17	Assembly-high pressure oil pipe	High-pressure fuel pump + fuel rail	≤1
18	Cylinder gasket	Cylinder head + cylinder block	≤1
19	Crankshaft rear oil seal	Rear-end of crankshaft	≤1
20	Crankshaft front oil seal components	Crankcase	≤1
21	Camshaft front oil seal	Front-end of camshaft	≤1
22	Exhaust valve oil seal	Exhaust valve	≤1
23	Intake valve oil seal	Intake valve	≤1
24	Hexagon head flange bolt	Balance shaft + crankcase	≤1
25	Hexagon flange nut	Turbo charger	≤1
26	Heat resistant double head stud	Turbocharger + cylinder head	≤1
27	Heat resistant bolt	Turbocharger + cylinder head	≤1
28	Main Bearing Cap Block Bolt	Crankcase + cylinder block	≤3
29	Drive plate bolt	Drive plate + crankshaft	≤1
30	Flywheel bolt	Flywheel + crankshaft	≤1
31	Cylinder head bolt	Cylinder head + cylinder block	≤1
32	Gasket	Piston cooling nozzle control valve + cylinder block	≤1
33	Sparking plug	Cylinder head	≤3
34	Piston ring 1	Piston	≤1
35	Pin sleeve	Cylinder body	≤1
36	Elastic cylindrical pin	Crankshaft	≤1
37	Crankshaft sprocket (replaced synchronously with the crankshaft)	Crankshaft	≤1
38	Hexagon head flange bolt	Cylinder body	≤1

Serial No.	Name	Position	Usage requirements
39	Pin sleeve	Crankcase and balance shaft	≤1
		Crankcase and oil pump	
40	Hexagon head flange bolt	Oil pan	≤1
41	Hexagon head flange bolt	Oil pan + crankcase	≤1
42	Oil pipe	Oil pan	≤1
43	Pin sleeve	Cylinder block + cylinder head	≤1
44	Jacket baffle	Cylinder body	≤1
45	Oil control valve gasket	Bearing cap of the camshaft	≤1
46	Hexagon socket head cap screw	Rear timing belt shield + engine	≤1
		Front timing belt shield + rear timing belt shield	
47	Oil pressure and oil temperature sensor	Oil pressure and oil temperature sensor + crankcase	≤1
48	Gasket	Screw plug + cylinder block	≤1
49	Combined oil ring	Piston	≤1
50	Piston ring 2	Piston	≤1
51	Piston pin circlip	Piston	≤1
52	Vacuum pump components	Cylinder head	≤1
53	Breather valve assembly	Cylinder head	≤1
54	Engine oil dipstick components	Cylinder body	≤1
55	O-ring	Inlet pipe of cylinder block	≤1
56	Washer	Turbo charger	≤1
57	O-ring	Turbocharger water pipe	≤1
58	Turbocharger water pipe	Turbocharger	≤1
59	Fuel rail components	Fuel pressure sensor + rail components	≤2
		High-pressure oil pipe components + oil rail components	≤3
60	Fuel pressure sensor	Fuel rail components	≤1
61	Hold down ring	Fuel injector	≤1
62	Fuel injector harness connector	Fuel rail components	≤1
63	Drain plug washer	Oil pan	≤1

2.5.2 Instructions and operations

2.5.2.1 Instructions and Operations

1. Cylinder head

The main function of the cylinder head is to seal the cylinder. The cylinder head forms a combustion space with the piston and bears the influence of high temperature and High-pressure gas. The cylinder head bears the mechanical load caused by gas force and tightened cylinder bolts. Meanwhile, it also bears the high heat load caused by contact with high-temperature gas. The cylinder head shall not be damaged or deformed to ensure the good sealing of the cylinder. Therefore, the cylinder head shall have sufficient strength and stiffness.

The cylinder head is made of aluminum alloy by casting process. The mode of the double overhead arrangement is adopted for the camshaft. One VVT actuator is installed on the intake/exhaust camshaft drive wheel respectively to adjust the timing of the intake/exhaust valve.

2. Intake manifold

The intake manifold is installed on the 4G20TD engine.

The intake manifold is mainly used for distributing the air inflow to each air inlet, which is very important for optimizing the efficiency and performance of the 4G20TD engine.

The manifold pressure sensor is located on the intake manifold and is used to monitor the pressure of the intake air in the intake manifold.

Intake manifold is the intake pipeline between the throttle unit and the cylinder head inlet. The function is to distribute air to the inlet of each cylinder.

3. Camshaft

The camshaft rotates continuously to drive the hydraulic valve rod up and down. Then control the opening and closing of the valve.

Double overhead camshafts (DOHC) are adopted. That is, there are two camshafts. One camshaft controls the intake valve, and the other camshaft controls the exhaust valve. Camshafts are located on the top of the engine. The bearing block of the cylinder head is fixed by the camshaft cover. The borehole on the camshaft journal of the cylinder head is used as an oil passage. Under the influence of pressure, engine oil flows down to the camshaft and lubricates each camshaft journal. Engine oil flows back to the oil pan through the oil return hole on the cylinder head. The cam lobe is machined. And at the right time, the intake and exhaust valves are accurately opened and closed by adding the right amount. Camshaft lobe

can be lubricated through the splash effect of the high-pressure engine oil that escapes from the camshaft journal.

4. Timing belt

The timing belt is mainly used to make the crankshaft and camshaft (intake camshaft and exhaust camshaft) rotate synchronously, to open and close the intake and exhaust valves at the appropriate time of the intake and exhaust stroke of each cylinder. The timing belt has teeth on the inner surface and is driven by the crankshaft.

5. Camshaft chain wheel

The main function of the camshaft sprocket is to transmit power from the crankshaft to the camshaft through the timing belt. Another function is to perform variable timing adjustments.

6. Piston

The function of the piston is to bear the air pressure and transmit it to the connecting rod through the piston pin to push the crankshaft to rotate. The top of the piston is also part of the combustion chamber.

7. Intake valve

The intake valve is mainly used to control the intake. During the intake stroke, the camshaft exhaust opens the intake valve and the intake air flows to the chamber. The valve spring closes the exhaust valve after air intake. The intake valves are closed during the compression, combustion and exhaust strokes. Each cylinder has two intake valves to improve intake. The inlet valve is larger than the exhaust valve.

8. Exhaust camshaft

The exhaust valve is mainly used to control exhaust emission. During the exhaust stroke, the camshaft exhaust valve opens to exhaust, and the exhaust flows out of the chamber. The valve spring closes the exhaust valve after discharge. The intake, compression and combustion strokes are too medium, and the exhaust valve is closed. Each cylinder has two exhaust valves to improve exhaust. The exhaust valve is smaller than the inlet valve.

9. Shock absorber

The shock absorber is mainly used to prevent the crankshaft from being affected by the torsional vibration caused by the power impact of 4G20TD engine. The shock absorber can also drive the alternator and A/C compressor solenoid valve through the drive belt.

10. Drive belt

The drive belt is mainly used to connect the A/C compressor solenoid valve, alternator, drive belt tensioner and shock absorber. The tension of the drive belt can be adjusted by the drive belt tensioner.

11. Balance shaft components

The main task of the balance shaft components is to reduce the vibration in the crank mechanism.

12. Intake and exhaust camshaft

The camshaft rotates continuously to drive the hydraulic valve rod up and down. Then control the opening and closing of the valve.

13. Drive belt tensioner

The drive belt tensioner is mainly used to adjust the tension of the drive belt. The drive belt will relax after using for a long time. The drive belt tensioner can automatically adjust the tension of the belt to prevent the drive belt from slipping. The drive belt tensioner can also reduce the noise of 4G20TD engine and make the drive belt run more smoothly.

14. Timing belt tensioner

Timing belt tensioner is mainly used to adjust the tension of timing belt. The timing belt will relax After a long time of use. The timing belt tensioner can automatically adjust the tension of the belt to prevent the timing belt from slipping. The timing belt tensioner can also reduce the noise of 4G20TD engine and make the timing belt run more smoothly.

15. Exhaust camshaft position actuator

The exhaust camshaft position actuator adjusts the angle of the exhaust camshaft and controls the flow of exhaust gas discharged from the combustion chamber, to reduce vehicle emissions. The exhaust camshaft position actuator is controlled by the Engine Control Module (ECM).

16. Intake camshaft position actuator

The intake camshaft position actuator adjusts the angle of the intake camshaft and controls the intake flow into the combustion chamber, to improve the fuel economy of the vehicle. The intake camshaft position actuator is controlled by the Engine Control Module (ECM).

17. Crankshaft

The crankshaft is the most important part of the engine. It bears the force transmitted by the connecting rod and converts it into torque, which is output through the crankshaft and drives other accessories on the engine. The crankshaft is affected by the centrifugal force of rotating mass, periodic inertia

force and reciprocating inertia force. Thus, the crankshaft is subjected to bending and torsional load.

18. Crankshaft timing belt pulley

The main function of the crankshaft timing pulley is to transmit power from the crankshaft to the camshaft through the timing belt.

2.5.3 System working principles

2.5.3.1 System Working Principles

Working principles of reciprocating piston engines

1. Inlet stroke: The exhaust valve is closed and the inlet valve is open. The piston is driven by the crankshaft from top dead center to bottom dead center. During the movement of the piston, the cylinder volume gradually increases, and a certain vacuum degree is formed in the cylinder. The ECM controls the fuel injector components to inject fuel into the cylinder, the intake valve opens, and the air is drawn into the cylinder through the intake port to form a combustible mixture.

2. Compression stroke: Exhaust and inlet valve are closed. After the air inlet stroke completes, the piston is driven by the crankshaft from bottom dead center to top dead center. As the piston moves, the volume of the cylinder decreases, which compresses the combustible mixture and causes its temperature to rise rapidly.

3. Power stroke: Exhaust and inlet valve are still closed. At the end of the compression stroke, the ECM controls the primary coil loop of the ignition coil to be disconnected, and a high voltage is induced at the secondary coil. The high voltage is quickly transmitted to the sparking plug installed at the top of the cylinder head through the ignition wire, and finally the high voltage breaks through the spark plug gap to generate an electric spark, igniting the combustible gas mixture in the cylinder. The flame is quickly transmitted to the entire combustion chamber, and the gas mixture in the cylinder gives off a large amount of heat energy with the volume expanding rapidly and pressure and temperature rising at the same time. The pressure of expansion acts on the top of the piston, causing it to move from top dead center to bottom dead center. Reciprocating motion of the piston is converted into the rotational motion by the connecting rod.

4. Exhaust stroke: Exhaust valve is opened and inlet valve is still closed. Under the action of the connecting rod, the crankshaft drives the piston from the bottom dead center to the top dead center. The inflated combustible gas is exhausted out the cylinder driven by residual pressure and the piston. When the piston reaches the top dead center, the exhaust stroke is completed and the exhaust valve is closed.

But in the actual design, the inlet valve opens earlier than the top dead center and closes later than the bottom dead center. It aims at making the inlet of air more full and reducing the energy loss in the inlet process. The exhaust valve will be

activated before the bottom dead center and be closed later than the top dead center. It aims at reducing combustible residual gases in the cylinder and reducing the energy loss in the inlet process. The design will allow the exhaust valve to have a certain overlap angle, that is, exhaust valves are open in a certain crankshaft angle. At this time, the combustible residual gas is discharged through the exhaust valve, which has certain inertia and makes the inlet of air more full to some extent. While it is not that the larger the valve overlap angle, the better. Engines under different operating conditions have different requirements for valve overlap, hence the variable valve timing system used in the engine, aiming at meeting different needs of engines for overlap angles under different operating conditions.

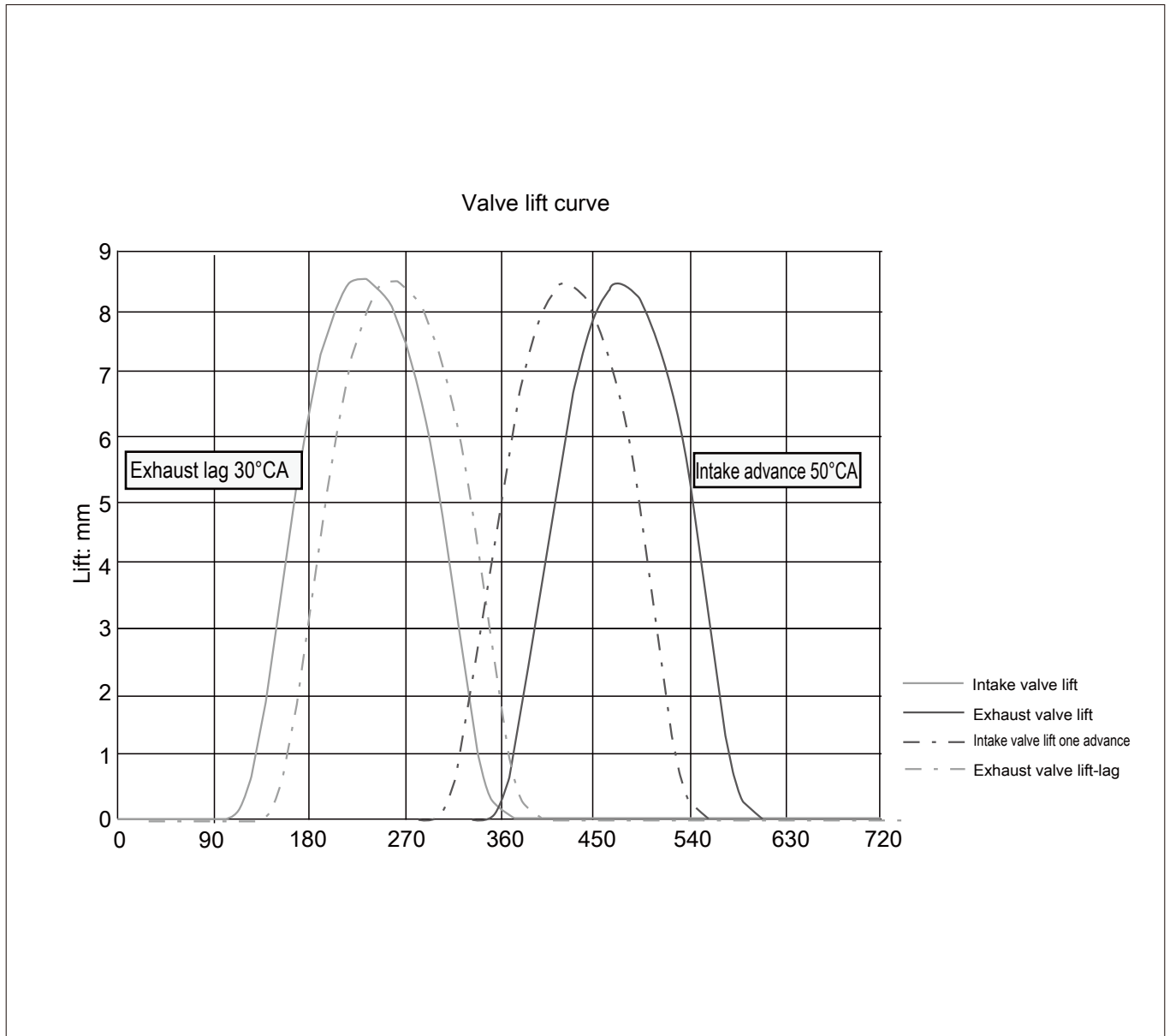
Working principle of VVT system

When the engine changes from idle speed to high speed, the ECM controls the oil control valve to press the oil to the rotor blades inside the VVT in a timely, appropriate and appropriate manner. Under the pressure, the rotor synchronously drives the camshaft to rotate forward or backward by a certain angle relative to the stator, to change the valve overlap angle and achieve the purpose of continuously adjusting the valve timing.

A set of hydraulic mechanism is installed on the engine to adjust the opening and closing time of the valve within a certain angle range through the control of ECM, or advance, delay or remain unchanged.

VVT is abbreviation for Variable Valve Timing, which is Variable Valve Timing System. Everything that has mass has inertia. Air that is drawn into the cylinder also has inertia, so there's still a tendency to go into the cylinder after the inlet process is completed. The high and low speed of the inlet influences exhaust flow and the combustion process in the cylinder. In case the speed is high, the inlet flow velocity is high with large inertia energy, so the advance opening of the inlet valve facilitates full inlet. On the contrary, when the speed is low, the inlet air flow velocity is low with small inertia energy. As the piston moves to the top dead center, fresh air will be discharged partly, leading to a decrease in inlet and unstable engine operation. Therefore, at low speeds, it is better to open the inlet valve later. The camshaft molded line is a balanced comprise plan considering high speeds and low speeds.

1. Dynamic schematic diagram of VVT variable valve timing system



2. The advancing process

When normal operation is initiated, the oil pressure generated by the oil pump acts on the VVT solenoid valve. ECM uses pulse width modulation signal to control the VVT solenoid valve. When the ECM needs VVT to adjust the intake valve to the maximum advance position, the ECM controls the opening of VVT solenoid valve to 100%. At this time, the pressure in the advance chamber is greater than the pressure in the lag chamber, and VVT rotor blades generate a phase angle that is ahead of crankshaft angle, and finally stays at the maximum advance position. At this time, the VVT phase advances.

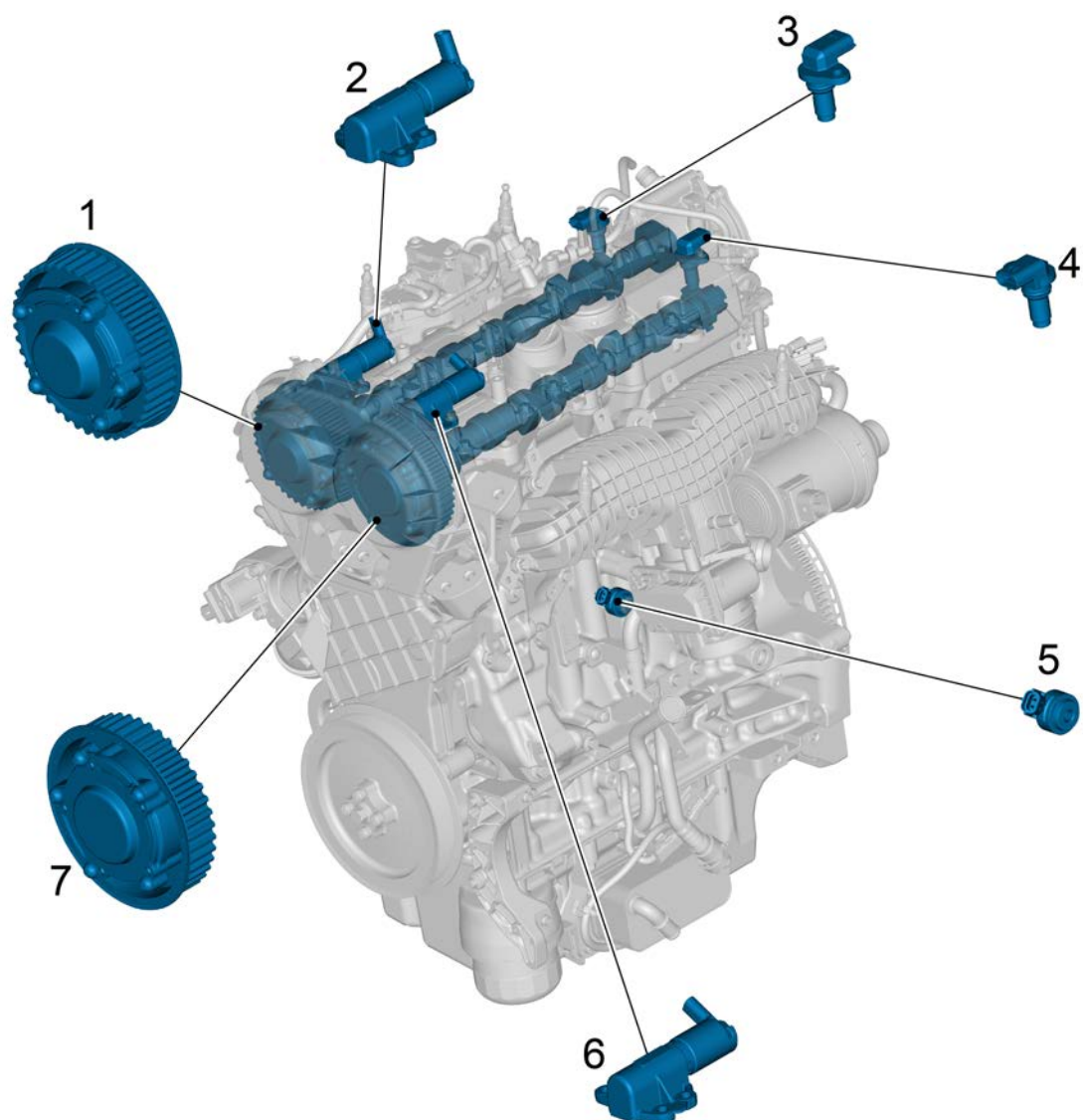
3. The lagging process

When normal operation is initiated, the oil pressure generated by the oil pump acts on the VVT solenoid valve. ECM adopts pulse width modulation signal for VVT solenoid

valve. If ECM wants VVT to adjust the intake valve at the maximum lag position, ECM controls the opening of VVT solenoid valve to 0%, and the oil pressure enters the lag chamber of VVT actuator. Therefore, VVT rotor blade produces displacement in the same direction relative to crankshaft angle, and finally stays at the maximum position.

2.5.4 Component position

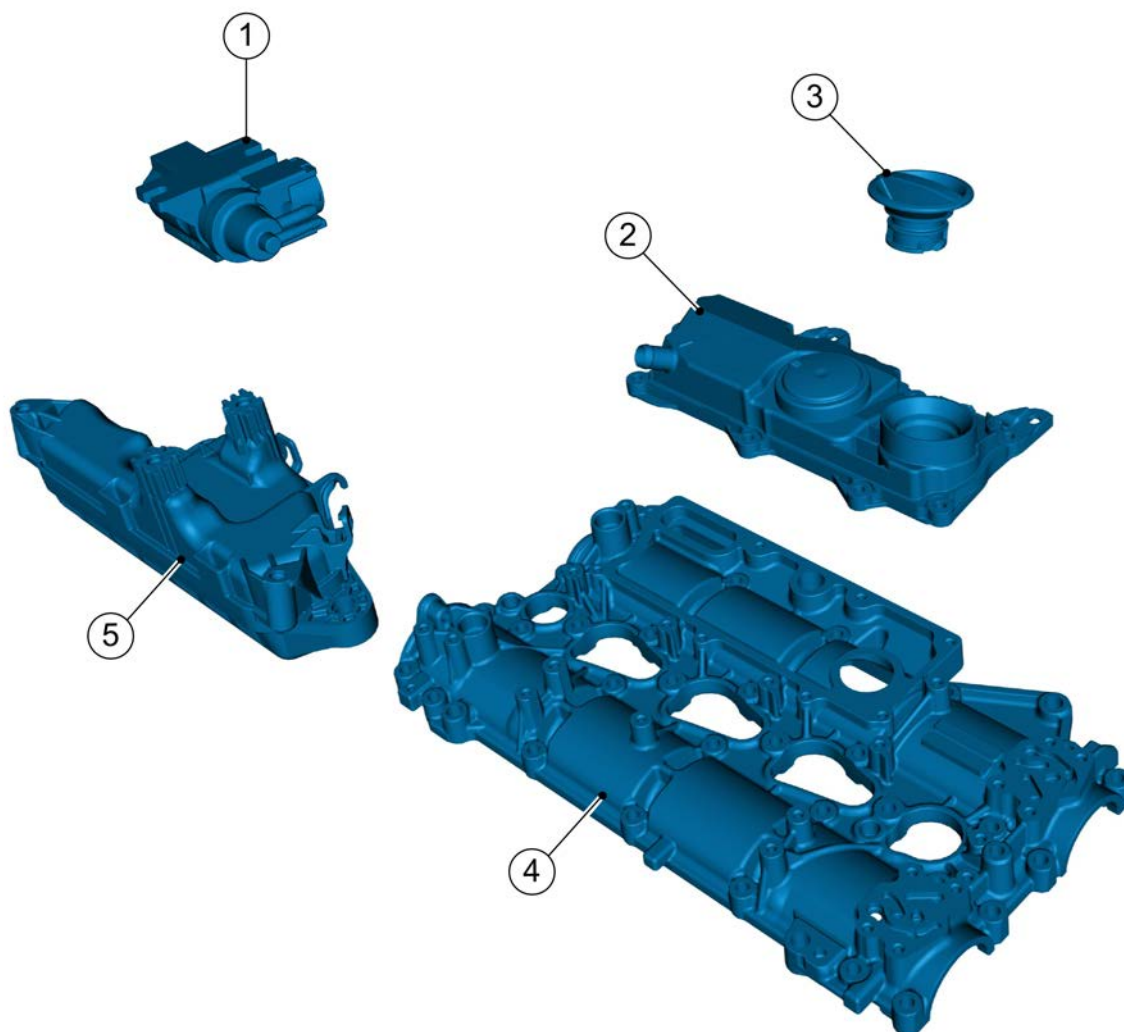
2.5.4.1 Location of VVT system parts



- | | | | |
|----|------------------------------------|----|-----------------------|
| 1. | Exhaust VVT unit | 5. | Knock sensor |
| 2. | VVT solenoid (exhaust) | 6. | VVT solenoid (intake) |
| 3. | Camshaft position sensor (exhaust) | 7. | Intake VVT unit |
| 4. | Camshaft position sensor (intake) | | |

2.5.5 Exploded view

2.5.5.1 Camshaft bearing housing



1. Turbine control valve (wastegate)

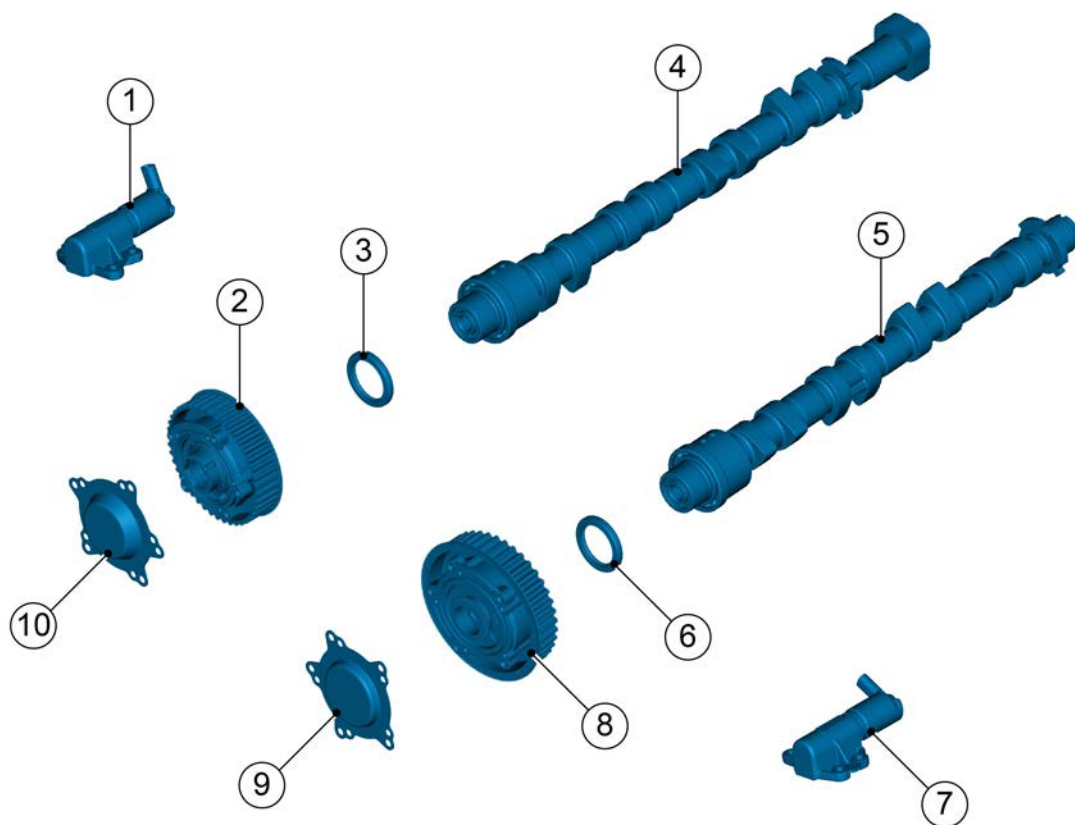
2. Oil-gas separator

3. Oil filler cap

4. Bearing cap of the camshaft

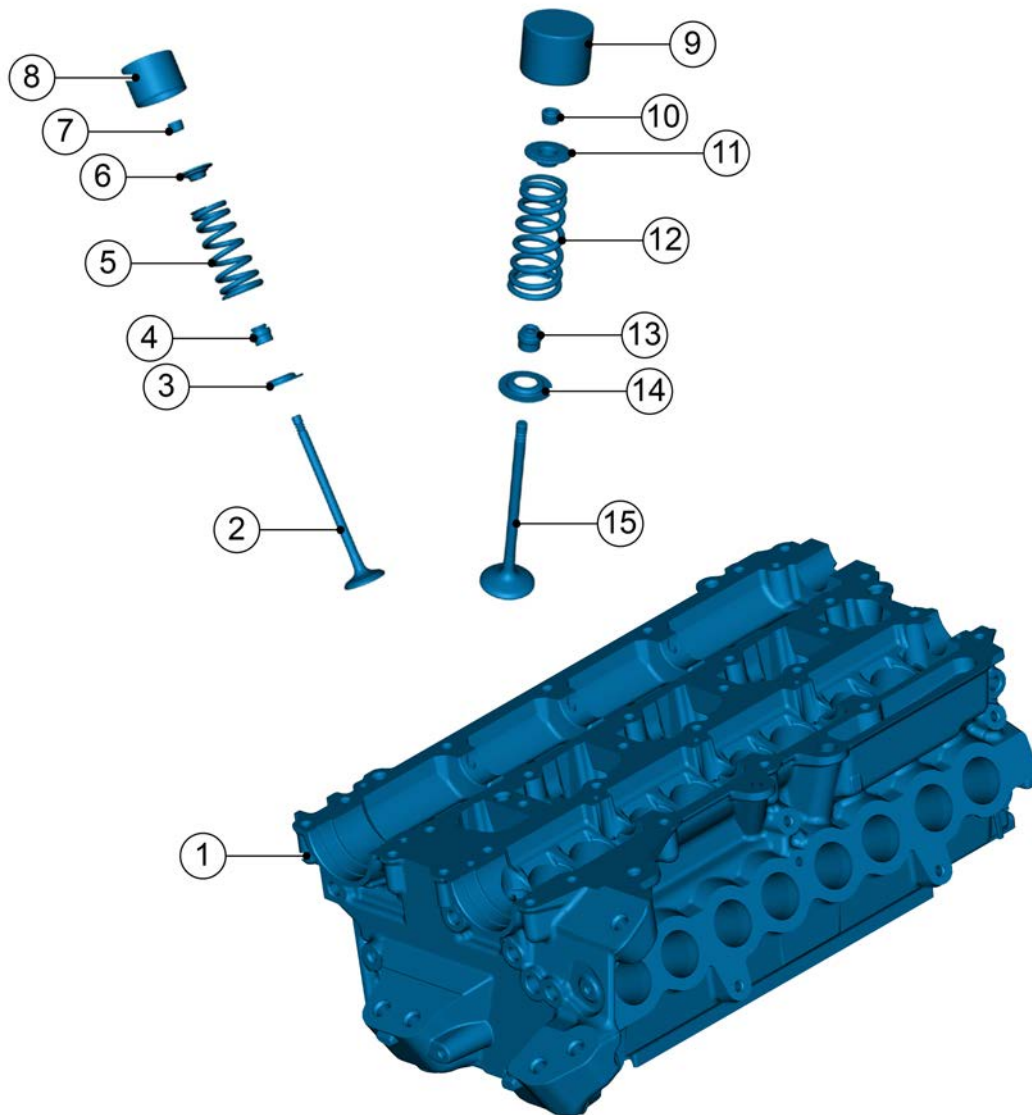
5. Vacuum chamber

2.5.5.2 Camshaft and accessories



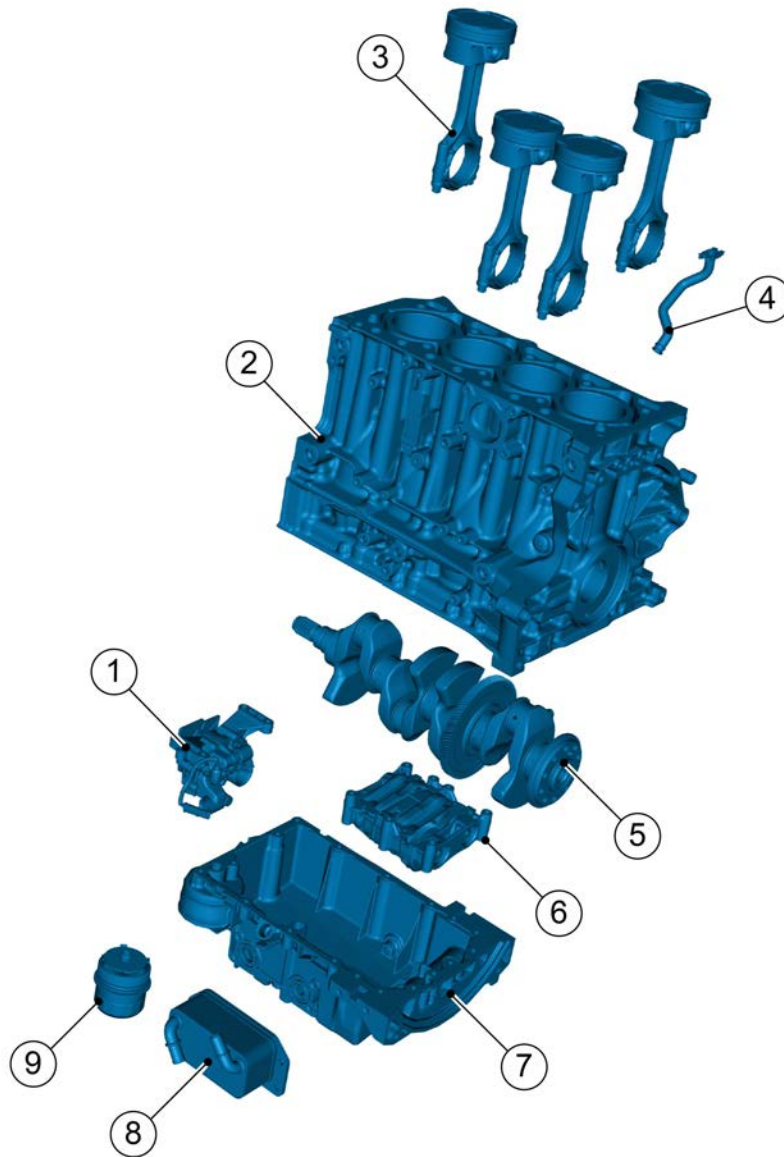
- | | |
|----------------------------|-----------------------------|
| 1. VVT solenoid (exhaust) | 6. Camshaft front oil seal |
| 2. Exhaust VVT unit | 7. VVT solenoid (intake) |
| 3. Camshaft front oil seal | 8. Intake VVT unit |
| 4. Exhaust camshaft | 9. Intake VVT cover plate |
| 5. Air intake camshaft | 10. Exhaust VVT cover plate |

2.5.5.3 Cylinder Head Cover Components



- | | | | |
|----|--------------------------|-----|--------------------------|
| 1. | Cylinder head | 9. | Valve tappet |
| 2. | Exhaust valve | 10. | Valve collet |
| 3. | Intake valve spring seat | 11. | Intake valve spring seat |
| 4. | Exhaust valve oil seal | 12. | Intake valve spring |
| 5. | Exhaust valve spring | 13. | Intake valve oil seal |
| 6. | Intake valve spring seat | 14. | Intake valve spring seat |
| 7. | Valve collet | 15. | Intake valve |
| 8. | Valve tappet | | |

2.5.5.4 Cylinder Body



- | | | | |
|----|-----------------------------------|----|---------------------------|
| 1. | Oil pump components | 6. | Stabilizer bar components |
| 2. | Cylinder block and crankcase | 7. | Oil pan |
| 3. | Piston | 8. | Oil cooler |
| 4. | Fuel return pipe of turbocharger | 9. | Filter as-oil components |
| 5. | Crankshaft with sprocket assembly | | |

2.5.6 Diagnostic information and procedures

2.5.6.1 Diagnosis Description

Before the diagnosis of the mechanical system fault, refer to Description and Operation and System Working Principle. Understand and familiarize yourself with the working principle of the vehicle control system, and then start system diagnosis. This will help to confirm the correct fault diagnosis steps when the fault occurs. More importantly, it can also help to confirm whether the situation described by the distributor is normal operation. Any fault diagnosis of the mechanical system should start with the visual inspection, which will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

2.5.6.2 Visual Check

- Check after-sales installations that may influence mechanical system performance to ensure that such installations will not influence the normal work of mechanical system.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage or there is a situation that may cause a malfunction.
- Confirm that the engine oil level is normal and the viscosity is normal.
- Record specific factors such as engine speed and ambient temperature.
- Compare with a known good engine to make sure the current engine is normal.

2.5.6.3 Comprehensive Inspection of Engine

1. Check the engine coolant
2. Check the engine oil
3. Check the battery
4. Check the sparking plug
5. Check the air filter
 - a. Dismount the air filter.
 - b. Check the air filter for dust, clogging, damage, etc.
 - If there is dust, clean it with compressed air.
 - If there is still dust or clogging after cleaning with compressed air, replace the air filter at this time.
6. Check the ignition timing.

Before checking the ignition timing, the engine must be at normal operating temperature.

(1) The detection method of using the fault diagnostic apparatus:

Step 1	Connect the scan tool.
--------	------------------------

- A. Place the starting switch in "OFF position.
- B. Connect the diagnostic scanner to the DLC.
- C. Start the engine until normal operating temperature is reached.
- D. Turn off the A/C switch.
- E. Choose in order: engine/data list/engine coolant temperature.

Standard timing:

8°-14° before top dead center at standard idle speed

(2) Detection method of using the timing lamp:

Step 1	Remove engine trim hood ball joint.
--------	-------------------------------------

Next Step

Step 2	Pull out the ignition coil of Cylinder 1.
--------	---

- A. Connect the clip of the timing lamp to the ignition coil of the first cylinder.

Next Step

Step 3	Check the ignition timing at idle speed.
--------	--

Standard timing:

8°-14° before top dead center at standard idle speed

Next Step

Step 4	Check the ignition timing during acceleration.
--------	--

- A. Accelerate the engine and observe to confirm that the ignition timing of the engine moves to the advance side.

Next Step

Step 5	Remove the timing lamp and restore the installation position of the ignition coil.
--------	--

Next Step

Step 6	The test is over.
--------	-------------------

(3) Cylinder compression test

Caution

Remove the CF54 and EF71A fuse to make the fuel and ignition system inoperable. After the test is completed, use the fault diagnosis apparatus to clear the fault diagnosis code.

Before conducting a compression test, the following conditions must be met:

- Engine must be at normal operating temperature.
- The throttle must be in the fully open position.
- The sparking plugs of 4 cylinders must be removed.
- The battery shall not be under voltage and must be fully charged.

Caution

During the start-up test, the start button should be in the "ST" position for no longer than 15s, otherwise the starter may be damaged.

Step 1	Test the pressure of each cylinder, the cause of the pressure drop may be the trouble of the valve closing or the wear of the piston ring.
--------	--

Next Step

Step 2	An appropriate amount of engine oil is injected into each cylinder.
--------	---

Next Step

Step 3	Install the cylinder pressure test gauge to each sparking plug installation port.
--------	---

Next Step

Step 4	Turn the ignition switch to the "ST" position to make each cylinder run 4-5 compression strokes.
--------	--

Next Step

Step 5	The lowest reading of a single cylinder pressure should not be lower than 75% of the highest reading of a single cylinder pressure, and the reading of any cylinder pressure gauge should not be lower than 750kPa.
--------	---

Next Step

Step 6	After four compression strokes of each cylinder has been completed, check the pressure gauge readings. The readings are explained as follows:
--------	---

- A. Normal situation: The pressure of each cylinder increases rapidly and evenly and reaches the specified pressure value.
- B. Piston ring trouble: The pressure of the first stroke is low, and it increases in the subsequent strokes, but the pressure has not reached the normal level. After adding engine oil to the cylinder block, the pressure increases significantly.
- C. Valve trouble: The pressure of the first stroke is low, and the pressure cannot be increased in subsequent strokes. The force increases slightly after the engine oil is added to the cylinder.

Next Step

Step 7	The test is over.
--------	-------------------

2.5.6.4 Engine noise diagnosis

Engine vibration actually refers to the resonance noise of the engine. When the vibration frequency of the engine and the vibration frequency of the point of trouble are the same, the noise will be perceived. In the case of severe vibration, the noise is usually loud and is caused by broken or severely worn internal parts of the engine. In the case of slight vibration, noise can be heard but not loud. The reason for the slight vibration is the wear of the internal parts of the engine, and the loose or broken external parts of the engine can also cause severe or slight vibration. When diagnosing noise faults, the source of resonant excitation must be found to troubleshoot.

2.5.6.5 There is a noise when the engine is under load

Step 1 Check the drive belt, and whether the belt tension is too tight or strained.

Yes

Replace/adjust the drive belt to the specified value, and confirm whether the fault is removed.

No

Step 2 Check the exhaust system. Is the system interfering with other parts or is it scratching the ground?

Yes

Reposition and install the exhaust system. Confirm whether the fault is removed.

No

Step 3 Check the flywheel for crack, deformation and interference with other components and whether the flywheel is normal.

Yes

Replace the flywheel assembly. Confirm whether the fault is removed.

No

Step 4 Check whether the main bearing clearance is too large, whether it exceeds the specified value.

Standard value:

0.013-0.031mm (0.0005-0.0012in)

Yes

Replace the main bearing. Confirm whether the fault is removed.

No

Step 5 Check the clearance of connecting rod bearing. Does it exceed the specified value?

Standard value:

0.018 ~ 0.044mm (0.0007 ~ 0.0017in)

Yes

Replace the connecting rod bearing. Confirm whether the fault is removed.

No

Step 6 Check whether the fit clearance between piston pin and connecting rod exceeds the specified value?

Standard value:**0.01 ~ 0.019mm (0.0003 ~ 0.0004in)**

Yes

Replace the piston pin and connecting rod and confirm whether the fault is eliminated.

No

Step 7	Check whether the fit clearance between piston and piston pin exceeds the specified value?
--------	--

Standard value:**0.004 ~ -0.012mm (0.0001 ~ -0.0002in)**

Yes

Replace the piston and piston pin and confirm whether the fault is eliminated.

No

Step 8	Check whether the gear backlash of stabilizer bar exceeds the specified number.
--------	---

Standard value:**0.045 ~ 0.18mm (0.0018 ~ 0.0071in)**

Yes

Replace the stabilizer bar. Confirm whether the fault is removed.

No

Step 9	Check whether the gear backlash of oil pump exceeds the specified number.
--------	---

Standard value:**0.04 ~ 0.13mm (0.0016 ~ 0.0051in)**

Yes

Adjust the gear backlash of oil pump to the specified value or replace oil pump unit to confirm whether the fault is removed.

No

Step 10	Confirm that the trouble is removed.
---------	--------------------------------------

2.5.6.6 Slight Vibration of Engine during Warm-up

Step 1 Check the tension of the drive belt, whether it is too loose or worn, and whether there is a trouble?

Yes

Replace the drive belt if necessary, and confirm whether the trouble is removed.

No

Step 2 Check the engine oil. Is the viscosity abnormal?

Yes

Refill the engine oil suitable for the current season temperature, and confirm whether trouble is removed.

No

Step 3 Check whether the alternator and A/C compressor work normally, and whether there any abnormal sound during work.

Yes

Replace the faulty component and confirm whether the trouble is removed.

No

Step 4 Check the operation of valve lifters, valve springs and other valve components. Is there any trouble?

Yes

Replace the faulty component and confirm whether the trouble is removed.

No

Step 5 Check the clearance of piston pin (clearance between piston pin hole and piston pin)

Standard value:

0.004-0.012mm (-0.0002-0.0005in)

Yes

Replace the faulty component and confirm whether the trouble is removed.

No

Step 6 Check whether the connecting rod is bent.

Yes

Replace the faulty component and confirm whether the trouble is removed.

No

Step 7	Check the clearance value from piston to cylinder liner (cylinder clearance)
--------	--

Standard value:**0.031~0.059mm (0.00122~0.00232in)**

Yes

Replace the faulty component and confirm whether the trouble is removed.
--

No

Step 8	Check whether the offset of the piston pin exceeds the standard value.
--------	--

Standard value:**0.59 ~ 0.61mm (0.0197 ~ 0.0275in)**

Yes

Replace the faulty component and confirm whether the trouble is removed.
--

No

Step 9	Confirm that the trouble is removed.
--------	--------------------------------------

2.5.6.7 Engine Vibration at Idle Speed and during Warm-up

Step 1	Check the tension of the drive belt, whether it is too loose or worn, and whether there is a trouble?
--------	---

Yes

Replace drive belt if necessary, and check whether the trouble is solved?

No

Step 2	Check whether the sparking plug works?
--------	--

No

If necessary, replace the spark plug and confirm whether the fault is eliminated.

Yes

Step 3	Check the engine oil. Is the viscosity abnormal?
--------	--

No

Refill the engine oil suitable for the current season temperature, and confirm whether trouble is removed.
--

Yes

Step 4 Check the alternator and A/C compressor. Is there any abnormal sound during operation?

Yes

Replace the faulty component and confirm whether the trouble is removed.

No

Step 5 Check the operation of valve lifters, valve springs and other valve components. Is there any trouble?

Yes

Replace the faulty component and confirm whether the trouble is removed.

No

Step 6 Check whether the clearance of the piston pin exceeds the standard value.

Standard value:
 (-0.016) ~ (-0.033)mm [(-0.0063) ~ (-0.0013)in]

Yes

Replace the faulty component and confirm whether the trouble is removed.

No

Step 7 Check whether the connecting rod is bent.

Yes

Replace the faulty component and confirm whether the trouble is removed.

No

Step 8 Check whether the clearance between the piston and the cylinder liner exceeds the standard value.

Standard value:
 0.051 ~ 0.0959mm (0.0020 ~ 0.0038in)

Yes

Replace the faulty component and confirm whether the trouble is removed.

No

Step 9 Check whether the offset of the piston pin exceeds the standard value.

Standard value:
 0.59 ~ 0.61mm (0.0197 ~ 0.0275in)

Yes

Repair components to confirm whether the trouble is solved.

No

Step 10	Confirm that the trouble is removed.
---------	--------------------------------------

2.5.6.8 Engine misfire with abnormal noise

Step 1	Use the diagnostic scanner to check whether there is a trouble code in the engine control system.
--------	---

Yes

Repair the faulty location according to the fault code.

No

Step 2	Use the diagnostic scanner to check the data about "knocking" in the engine data flow. Is it abnormal compared with the normal vehicle?
--------	---

Yes

Check whether the fuel is normal; check whether the timing system is normal. Repair the fault location, and confirm whether the fault is eliminated.

No

Step 3	Check the valve spring. Is the spring too soft and broken?
--------	--

Yes

Repair or replace the faulty part.

No

Step 4	Check whether the valve is stuck or bent.
--------	---

Yes

Repair or replace the faulty part.

No

Step 5	Check the valve lifter, whether the valve is stuck or wear, etc.
--------	--

Yes

Repair or replace the faulty part.

No

Step 6	Check the camshaft and cam for excessive wear or obvious defects.
--------	---

Yes

Replace the camshaft.

No

Step 7 Check the valve guide pipe for cracks, excessive wear, etc.

Yes

Repair or replace the faulty part.

No

Step 8 Check the valve spring retainer and valve lock plate, whether the assembly of valve spring retainer and valve lock plate is correct.

Standard value:

0.59 ~ 0.61mm (0.0197 ~ 0.0275in)

Yes

Repair or replace the faulty part.

No

Step 9 Confirm that the trouble is removed.

2.5.6.9 Inspection of the Drive Belt

Step 1 Check should be carried out when the engine is cool or after it has been switched off for 30 minutes.

Next Step

Step 2 Visually check whether the V-shaped drive over wears or cord thread wears. If any defect is found, the V-shaped drive belt should be replaced.

Next Step

Step 3 Visually inspect the inside and edges of the drive belt for damage, wear, and cracks, and replace it with a new belt.

Next Step

Step 4 If the drive belt is not provided with the above 2, 3 conditions after visual inspection, then tension of the drive belt should be measured. Clockwise rotate the crankshaft belt pulley for two circles and measure the tension distribution of the drive belt between drive pulleys.

Next Step

Step 5 Use a sound pressure meter (general repair tool) to measure the tension and frequency of the drive belt at the mark point A.

Belt	New belt	Old belt
Belt tension (N/lb)	400-500/89.9-112.4	300-400/67.4-89.9

1. After replacement with the new drive belt, clockwise rotate the crankshaft for two circles to make the drive belt completely wedge the drive pulley. Measure the tension force at the mark point A, and refer to the table above. Replace the drive belt when the range in the table is exceeded.
2. When the tension force of the drive belt in use (that is the old drive belt) is above the table range, the drive belt should be replaced.
3. When installing the drive belt, make sure it is properly engaged with the drive pulley groove.
4. Do not allow engine oil or engine coolant to get on the drive belt.
5. Do not excessively twist or bend the drive belt.

2.5.6.10 Diagnosis of Chirp of Drive Belt

Diagnostic hints: The symptom may be an intermittent trouble caused by dampness of the drive belt or pulley. It may be necessary to spray a small amount of water on the drive belt to reproduce the trouble reported by the customer. If the symptom reappears after spraying water, clean the pulley. Loose or improper installation of body parts, suspension parts or other vehicle parts may also cause chirp.

Trouble definition: The following conditions are symptoms of chirp of drive belt

- You can hear a chirp noise every time you turn the drive belt.
- Noise usually appears on rainy days or cold mornings.

Step 1	Confirm the trouble symptom. Does the engine really chirp?
--------	--

Yes

Go to Diagnosis hints.

No

Step 2	Remove the drive belt. Confirm whether the chirp has disappeared.
--------	---

- A. Dismount the drive belt.
- B. Run the engine, but the running time should not exceed 30s.
- C. Whether the chirp sound disappear.

Yes

Refer to disassemble view

No

Step 3	Check whether the drive belt surface is normal. (No pilling, cracks, etc.)
--------	--

Yes

Replace the drive belt.

No

Step 4	Check whether the installation of drive belt is correct. (There should be no misplacing, etc.)
--------	--

Yes

Reinstall the drive belt pulley, and replace the belt if necessary.

No

Step 5 Check whether the drive belt works normally.

Check whether the pulley is bent or twisted.

Yes

Replace the faulty belt pulley.

No

Step 6 Check whether all the fasteners related to the drive belt are normal.

Yes

Tighten the loose fasteners.

No

Step 7 Replace the drive belt, and confirm that the trouble is removed.

2.5.6.11 Diagnosis of Squeal of Drive Belt

Diagnostic hints: Loose parts such as vehicle body, suspension, or improper installation may also cause squeals. If there is intermittent noise, check the accessory drive part by changing the engine load. It is recommended to check whether the A/C system is overfilled, whether the power steering system hose is pinched, whether the power steering fluid is incorrect, and whether the alternator is malfunctioning.

Fault definition: the following conditions are the symptoms of drive belt squeal

- Squeal caused by slipping drive belts.
- Noise occurs when a large load is applied to the drive belt, such as the startup of the compressor of the A/C system, the rapid opening of the throttle valve when the engine is running, or the squeal caused by the drive belt slipping on the faulty accessory drive part.

Step 1 Confirm the trouble symptom. Does the engine really squeal?

Yes

Go to Diagnosis hints.

No

Step 2 Remove the drive belt, and confirm that the squeal has disappeared.

- A. Dismount the drive belt.
- B. Run the engine, but the running time should not exceed 30s.
- C. Does the squeal disappear?

Yes

Refer [to engine noise diagnosis](#).

No

Step 3 Check whether the bearings of all accessory drive pulleys are normal.

The pulley bearings must not be stuck or loose.

Yes

Replace damaged belt pulley or bearing

No

Step 4 Check whether the drive belt tensioner works normally.

Tensioner belt pulley bearings must not be stuck, loose, etc., and the tensioner must not be damaged or loose.

Yes

Replace the drive belt tensioner.

No

Step 5 Check whether the correct drive belt is used.

Check whether the drive belt is stretched.

Yes

Replace the drive belt.

No

Step 6 Check whether all the fasteners related to the drive belt are normal.

Yes

Tighten the loose fasteners.

No

Step 7 Check whether the drive belt works normally.

Check whether the pulley is bent or twisted.

Yes

Replace the faulty belt pulley.

No

Step 8 Go to Diagnosis hints.

2.5.6.12 Diagnosis of Drive Belt Whining

Diagnostic hints: The drive belt does not whine. If there is intermittent noise, check the accessory drive part by changing the load to ensure that the part runs under the maximum load. These conditions may be caused by (but not limited to) overfilling in the air conditioning system, clogging of the power steering system or incorrect steering fluid, and malfunction of the alternator.

Fault definition: continuous high-frequency noise

Step 1 Confirm the trouble symptom. Does the engine really whine?

Yes

Go to Diagnosis hints.

No

Step 2 Remove the drive belt, and confirm whether the whine has disappeared.

- A. Dismount the drive belt.
- B. Run the engine, but the running time should not exceed 30s.
- C. Does the squeal disappear?

Yes

Refer [to engine noise diagnosis](#).

No

Step 3 Check whether the bearings of all accessory drive pulleys are normal.

The pulley bearings must not be stuck or loose.

Yes

Replace damaged belt pulley or bearing

No

Step 4 Go to Diagnosis hints.

2.5.6.13 Diagnosis of Drive Belt Falling off

Diagnostic hints: If the drive belt repeatedly falls off from the drive pulley, the cause is the misalignment of the pulley. If the accessory drive component causes the load of the transmission belt to increase or decrease, the drive belt may be detached from the pulley. Check whether the accessory drive component works normally. If the length of the drive belt is improper, the drive belt tensioner will not be able to maintain the proper tension of the drive belt.

Fault definition: The drive belt gets adrift from the belt pulley or the drive belt cannot be correctly installed on the belt pulley.

Step 1 Check the drive belt for damage, and replace with a new drive belt if necessary.

Next Step

Step 2 Check the pulley for misalignment, and repair the faulty part.

Next Step

Step 3 Check whether the pulley is bent or sunken, and repair the faulty part.

Next Step

Step 4 Check whether the drive belt tensioner bracket is bent or cracked, and repair the faulty part.

Next Step

Step 5 Check whether the drive belt tensioner works normally, and repair the faulty part.

Next Step

Step 6	Check whether the drive belt tensioner works normally, and repair the faulty part.
--------	--

Next Step

Step 7	Check whether all fasteners of accessory drive parts are loose, and repair the faulty parts.
--------	--

Next Step

Step 8	Confirm that the trouble is removed.
--------	--------------------------------------

2.5.6.14 Diagnosis of Excessive Wear of Drive Belt

Diagnostic hints: Excessive wear of the drive belt is usually caused by improper installation or using the wrong drive belt. A slight misalignment of the drive pulley will not cause excessive wear, but it is likely to cause the drive belt to make noise or fall off. Severe misalignment of the drive belt pulley can cause excessive wear and also cause the drive belt to fall off.

Fault definition: Wear of the outer edge of the drive belt is due to improper installation of the drive belt.

Step 1	Check whether the drive belt rubs against the bracket, harness, hose and other components.
--------	--

Yes

Treat the faulty part.

No

Step 2	Check whether there are any abnormal scratches, edges and corners on the surface of all accessory drive pulleys.
--------	--

Yes

Troubleshoot the faulty parts, and replace with drive pulleys if necessary.

No

Step 3	Check if the installed belt model is wrong?
--------	---

Yes

Replace with drive belt of correct model.

No

Step 4	Go to Diagnosis hints.
--------	------------------------

2.5.7 Removing and installing

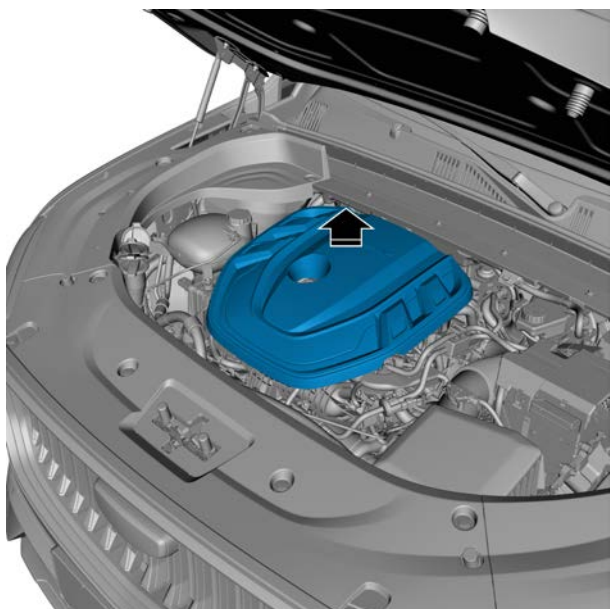
2.5.7.1 Replacement of engine trim cover assembly

Removal procedure

- 1 Open the engine compartment cover.
- 2 Remove the assembly-engine trim cover.

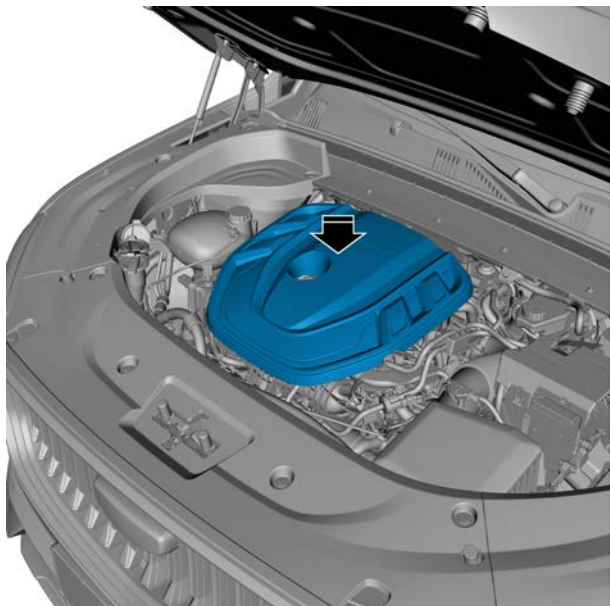
Caution

Disconnect the assembly-engine trim cover from the four-engine trim cover ball head bolts in the direction of the arrow, and then remove the assembly-engine trim cover. Otherwise, it may cause the engine trim cover ball stud to break.



Installation procedure

- 1 Install the engine trim cover assembly.



- 2 Close the engine compartment cover.

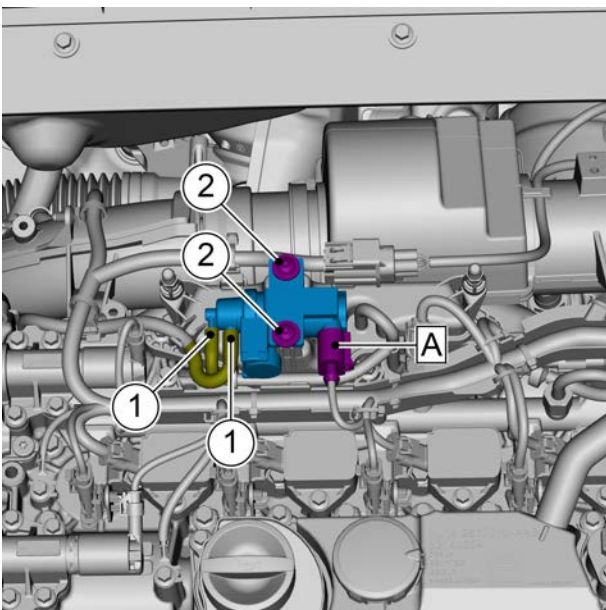
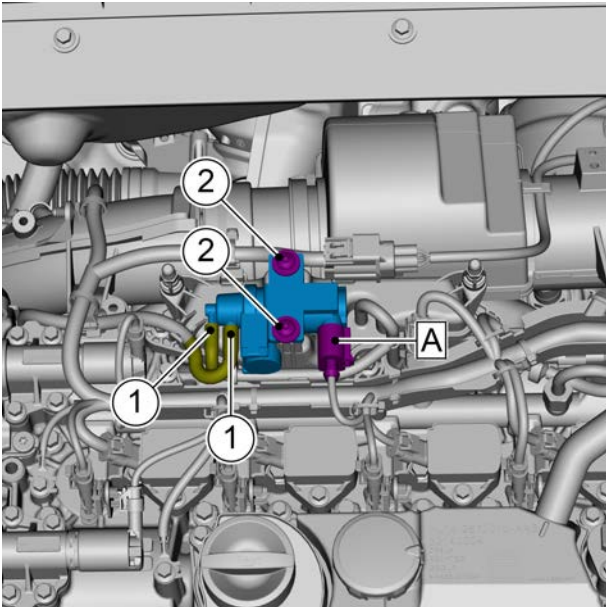
2.5.7.2 Turbine control valve (wastegate) replacement

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover.](#)
- 4 Disconnect the turbine control valve (wastegate) harness connector A.
- 5 Disconnect the turbine control valve (wastegate) air pipe 1.
- 6 Remove the two retaining bolts 2 of the turbine control valve (wastegate) and remove the turbine control valve (wastegate).

**Installation procedure**

- 1 Install the turbine control valve (wastegate), install and tighten the two retaining bolts 2 of the turbine control valve (wastegate).

Torque: 5N·m (metric), 3.7lb-ft (imperial)

- 2 Install the turbine control valve (wastegate) air pipe 1.
- 3 Connect the turbine control valve (wastegate) harness connector A.

- 4 Install the engine trim cover assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

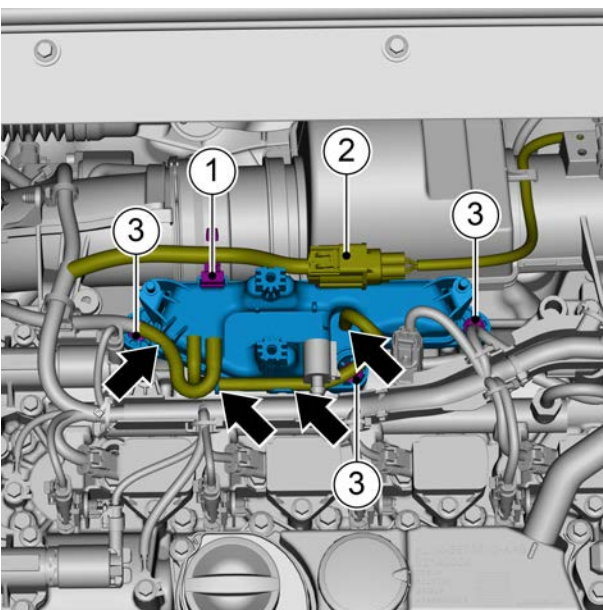
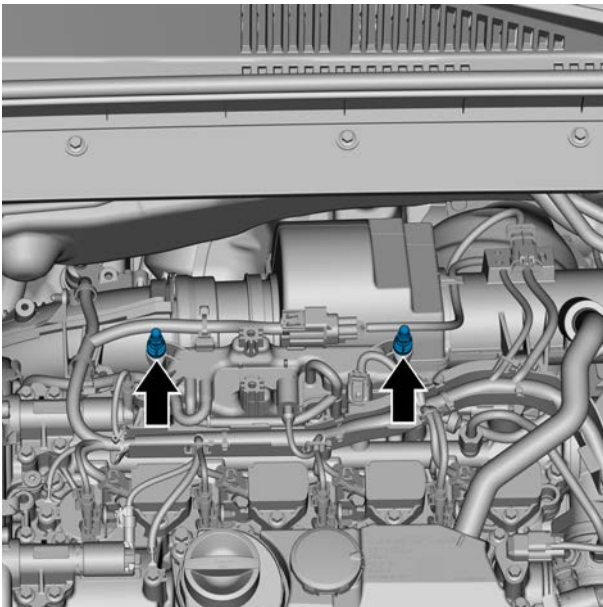
2.5.7.3 Replacement of true cavity

Removal procedure

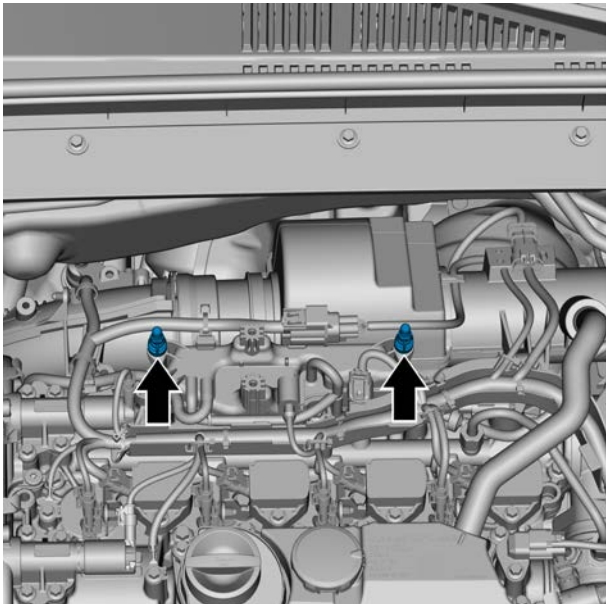
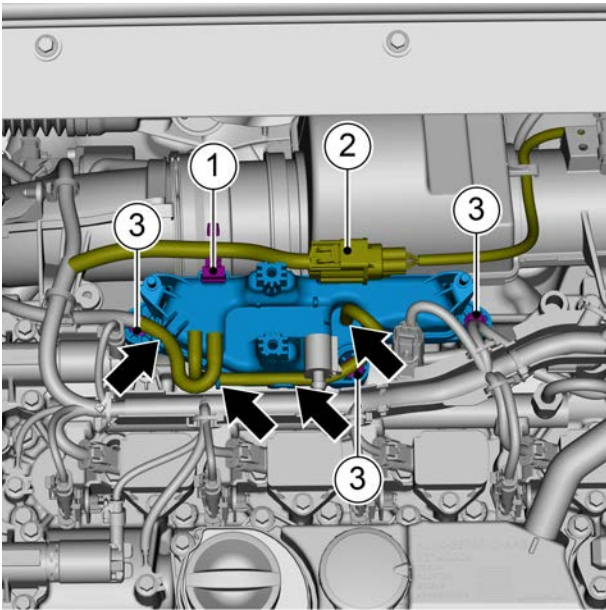
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover.](#)
- 4 Remove the turbine control valve (wastegate). See [turbine control valve \(wastegate\) replacement.](#)
- 5 Remove the ball head bolt of the engine trim cover.



- 6 Disconnect the vacuum tube from the true cavity.
- 7 Remove fixing clip 1 of engine harness.
- 8 Remove fixing clip 2 of Lambda probe (front oxygen sensor) harness connector.
- 9 Remove the three retaining bolts 3 of the vacuum chamber and remove the vacuum chamber.



Installation procedure

- 1 Install the vacuum chamber, install and tighten the three retaining bolts 3 of the vacuum chamber.
Torque: 10N·m (metric system) 7.4lb·ft (Imperial system)
- 2 Install fixing clip 2 of Lambda probe (front oxygen sensor) harness connector.
- 3 Install fixing clip 1 of engine harness.
- 4 Connect the vacuum tube to the vacuum chamber.

- 5 Install engine trim hood ball joint bolt.
Torque: 6 N. m (metric system) 4.4 lb·ft (Imperial system)

- 6 Install the turbine control valve (wastegate).
- 7 Install the engine trim cover assembly.
- 8 Connect the negative battery cable.
- 9 Close the engine compartment cover.

2.5.7.4 Replacement of vacuum pump

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

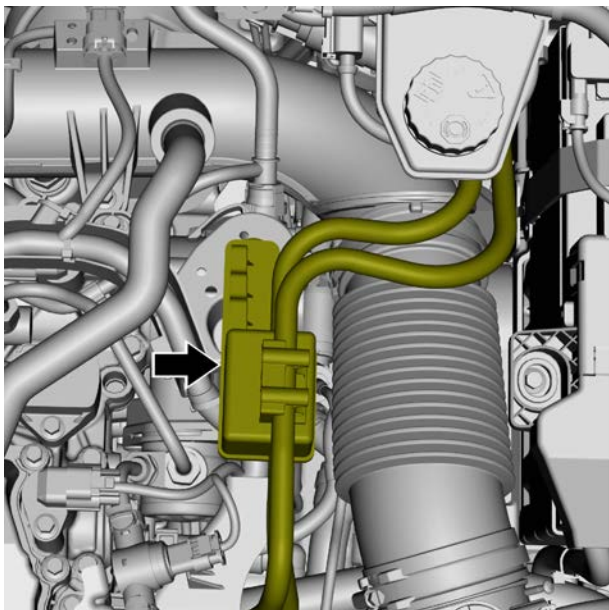
Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

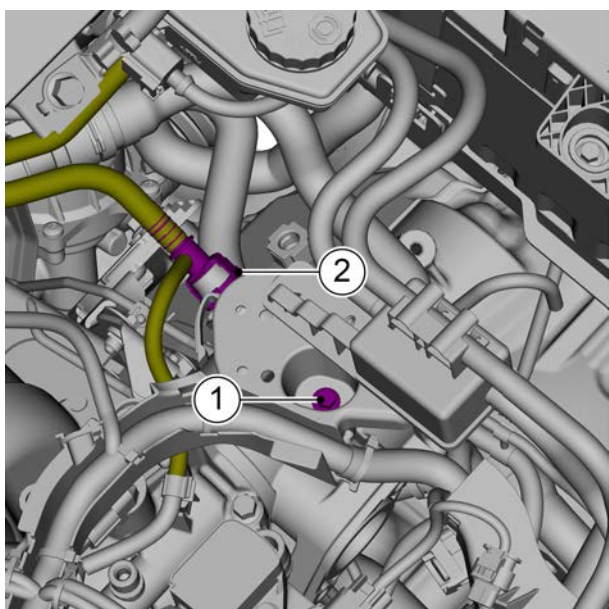
Warning !

See "Warnings Regarding Fuel Pressure Release" in [Warnings and Precautions](#).

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 5 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 6 Remove the high-pressure oil pipe components. See [replacement of high-pressure oil pipe assembly](#).
- 7 Remove the fuel sensor, see [fuel sensor replacement](#).
- 8 Remove the high pressure fuel pump, refer to [replacement of the high pressure fuel pump](#).
- 9 Remove the engine fender, see [Engine fender replacement](#).
- 10 Discharge coolants, refer to [discharge and filling of engine coolant](#).
- 11 Take out the high-pressure fuel pump tappet.

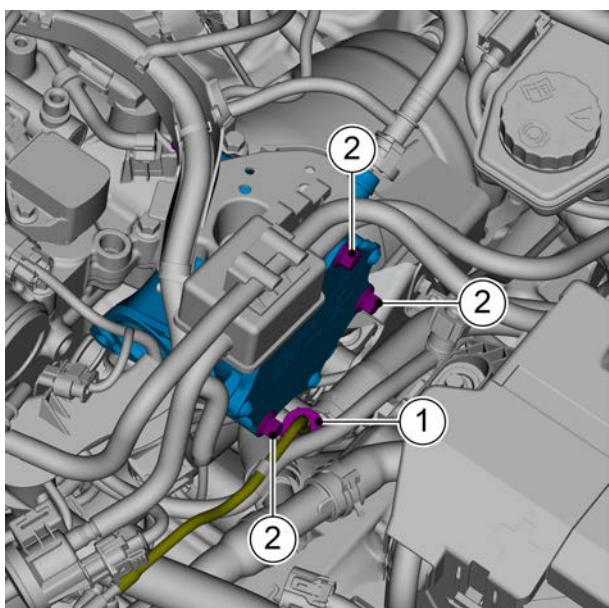


12 Remove the expansion pot and move it aside.



13 Remove 1 retaining bolts 1 from the engine harness sheath.

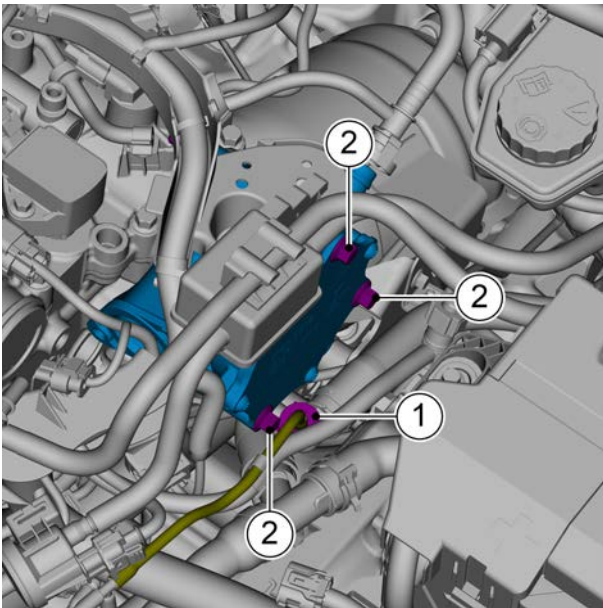
14 Disconnect the connector 2 of the vacuum pipe.



15 Disconnect the air hose connector 1.

16 Remove the three retaining bolts 2 of the vacuum pump and remove the vacuum pump.

Installation procedure

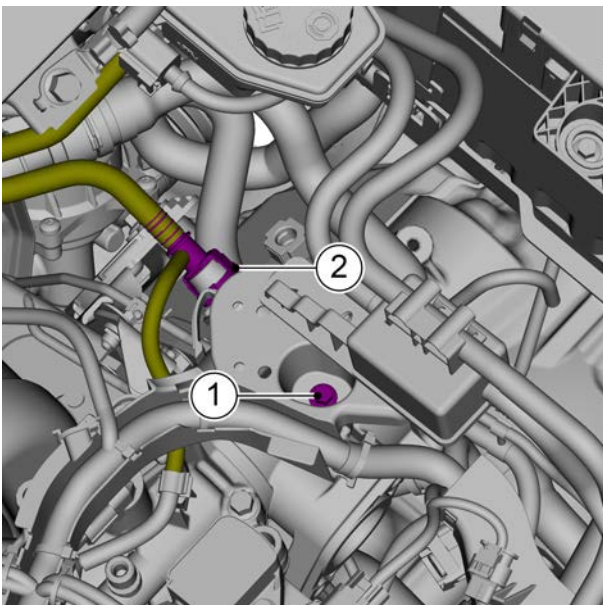


- 1 Install the vacuum pump, install and tighten the three retaining bolts 2 of the vacuum pump.

Torque: 26 N. m (metric system) 19.2 lb-ft (Imperial system)

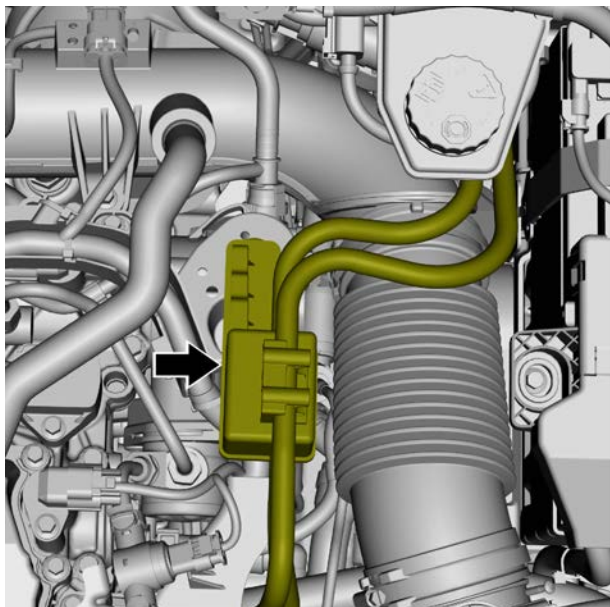
Caution Replace the gasket every time you disassemble the vacuum pump.

- 2 Install the connector 1 of the exhaust pipe.



- 3 Install the connector 2 of the vacuum pipe.
- 4 Install and tighten 1 retaining bolt of the engine harness sheath.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



5 Install the expansion tank.

6 Install the high-pressure fuel pump lifter.

7 Fill the coolant.

8 Install the engine fender.

9 Install the high-pressure fuel pump.

10 Install the fuel sensor.

11 Install the high-pressure oil pipe components.

12 Install the upper outlet pipe of the air filter.

13 Install the engine trim cover assembly.

14 Connect the negative battery cable.

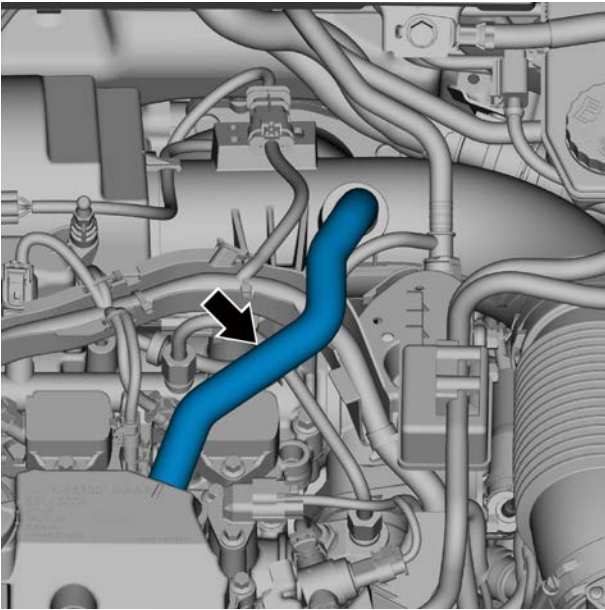
15 Close the engine compartment cover.

2.5.7.5 Replacement of oil-gas separator

Removal procedure

1 Open the engine compartment cover.

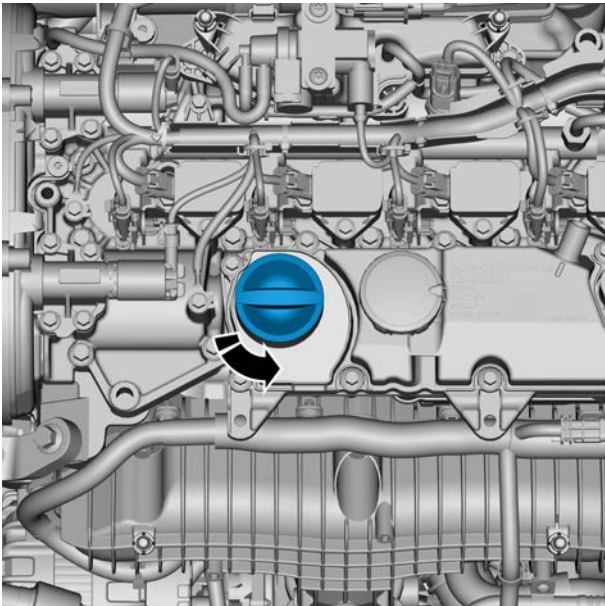
2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).



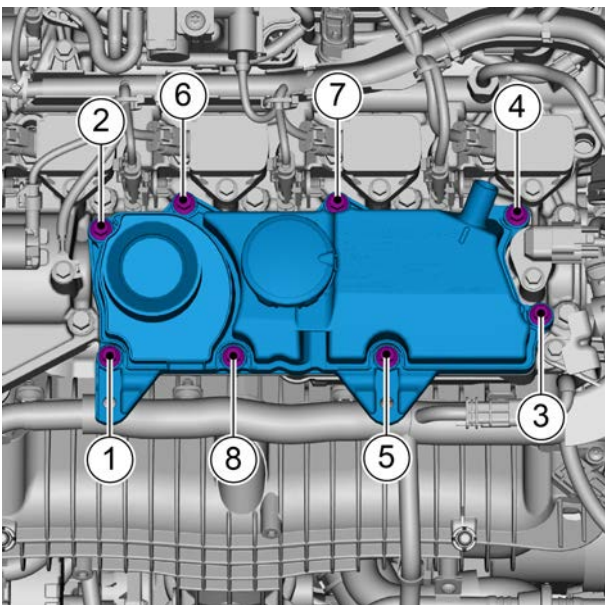
- 3 Remove the crankcase ventilation hose.

Caution

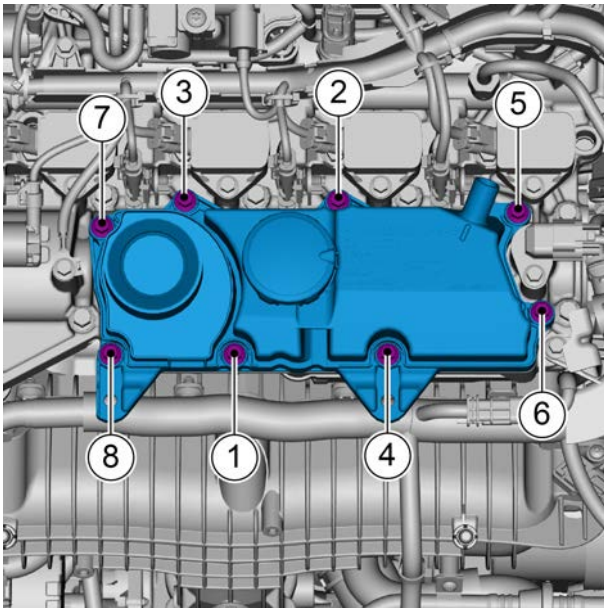
Confirm the cleanliness of the top of the engine and continue the removal only after meeting the requirements. Prevent foreign matters from falling into the engine.



- 4 Remove the engine oil filling cap.



- 5 Remove the 8 retaining bolts of the oil-gas separator according to the sequence shown in the figure, and remove the oil-gas separator and sealing gasket.



Installation procedure

- 1 Clean the installation contact surface between the oil-gas separator and the cylinder head, and install the gasket and oil-gas separator.
- 2 Tighten the 8 retaining bolts of the oil-gas separator according to the sequence shown in the figure. First Pre-tighten them according to the sequence, and then tighten them according to the final torque requirements.

Torque:

Pre-tightening:

3 N·m (metric system) 2.2 lb-ft (imperial system)

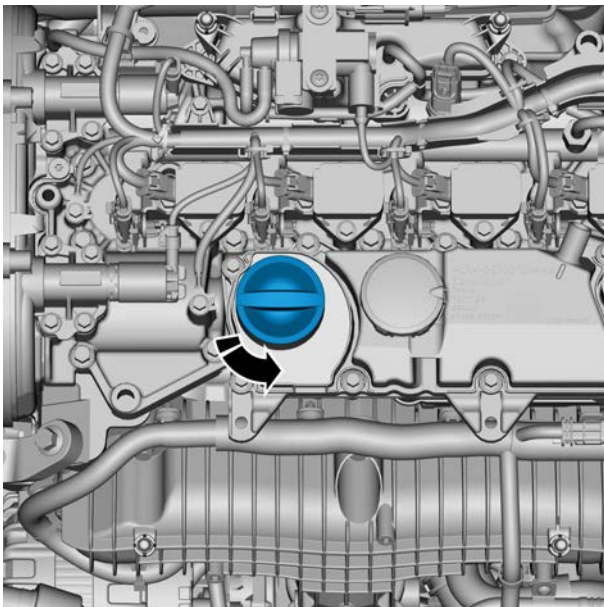
Final:

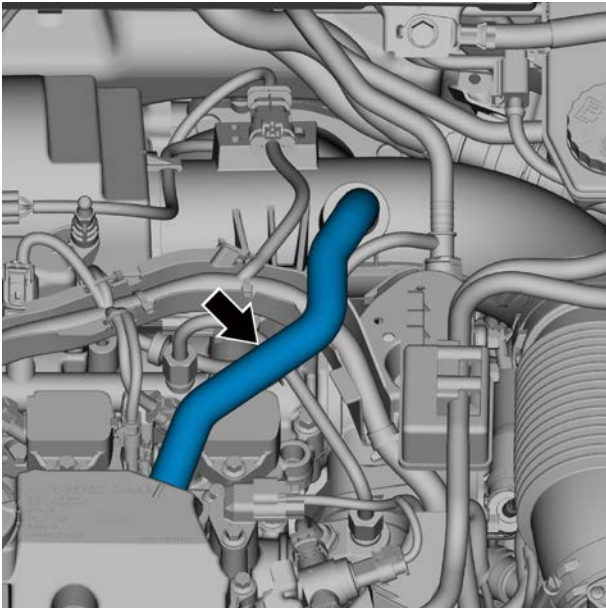
10 N·m (metric system) 7.4 lb-ft (imperial system)

Caution

Before installation, please make sure that the position of the sealing ring is correct (check whether the sealing ring is out and misaligned).

- 3 Install the oil filler cap.





- 4 Install the crankcase ventilation hose.

- 5 Install the engine trim cover assembly.

- 6 Close the engine compartment cover.

2.5.7.6 Front timing belt shield replacement

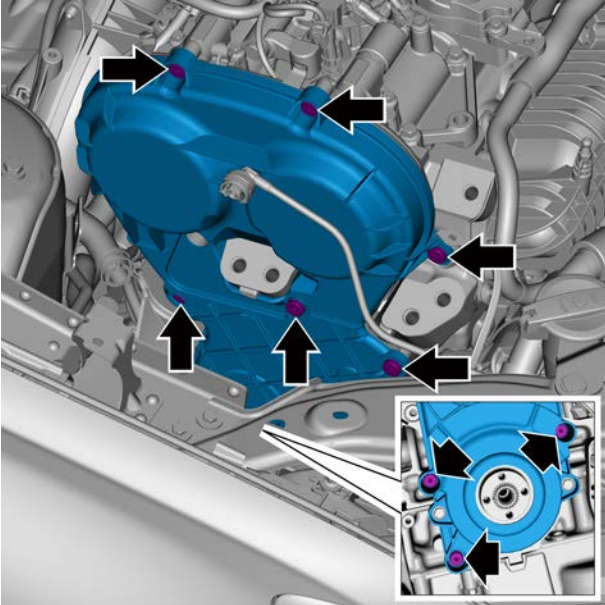
Removal procedure

Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 6 Remove the right engine compartment trim panel, see [replacement of left engine compartment trim panel](#).
- 7 Remove the expansion tank, see [replacement of expansion tank](#).
- 8 Lift the engine assembly slightly with a jack.
- 9 Remove the vibration insulator assembly RH engine mount. See [replacement of the vibration insulator assembly RH engine mount](#).
- 10 Remove the driving belt, refer to [replacement of the driving belt](#).

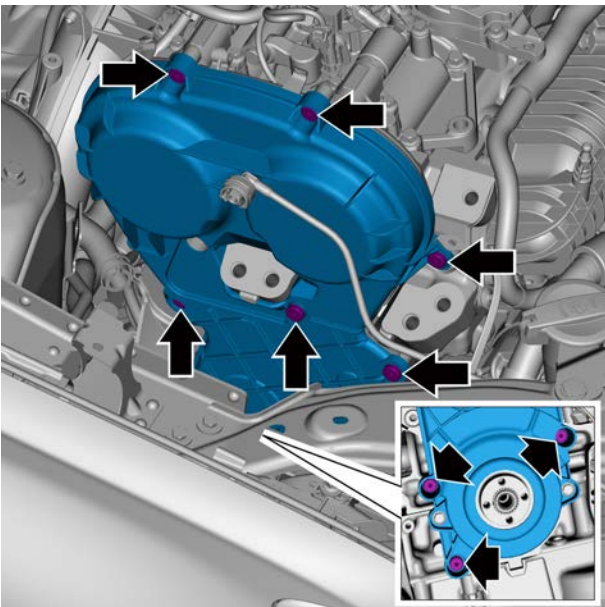
- 11 Remove the front right wheel. See [wheel assembly replacement](#).
- 12 Remove the right front wheel housing fender assembly. See [replacement of front left wheel housing fender assembly](#).
- 13 Remove the damping belt pulley, Refer to [replacement of damping belt pulley](#).
- 14 Remove the 9 retaining bolts of the front timing belt shield and remove the front timing belt shield.



Installation procedure

- 1 Install the front timing belt shield, install and tighten the 9 retaining bolts of the front timing belt shield.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 2 Install the damping belt pulley.
- 3 Install the right front wheel housing fender assembly.
- 4 Install the front right wheel.
- 5 Install the drive belt.

- 6 Install the right vibration insulator assembly of engine.
- 7 Lower and take out the jack.
- 8 Install the expansion tank.
- 9 Install the right engine compartment trim panel.
- 10 Fill engine coolant.
- 11 Install the engine fender.
- 12 Lower the vehicle.
- 13 Install the engine trim cover assembly.
- 14 Close the engine compartment cover.

2.5.7.7 Replacement of Drive Belt

Removal procedure

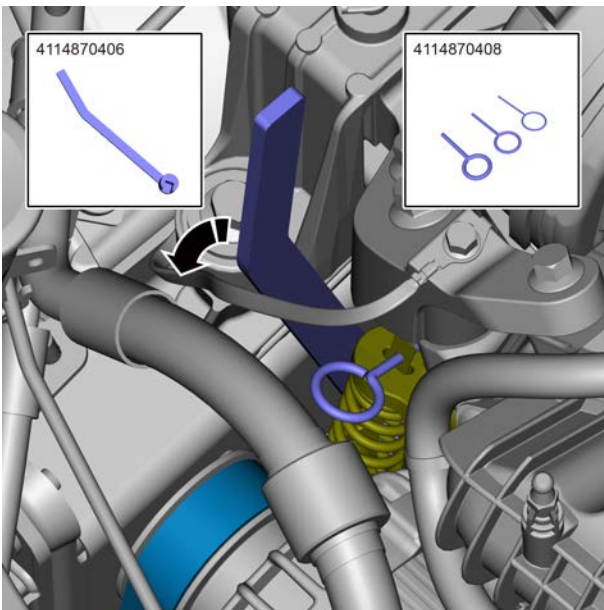
- 1 Open the engine compartment cover.
- 2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Use the special tool to pull the automatic tensioner clockwise, and use the positioning pin special tool to fix the automatic tensioner.

Special tool for belt tensioner compression:

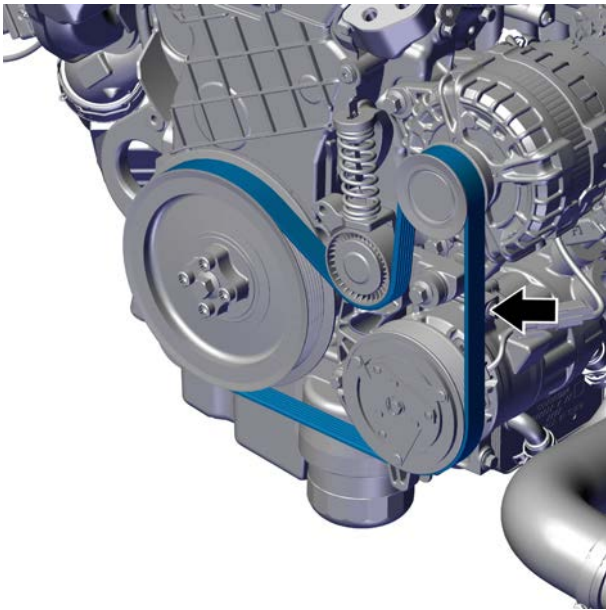
4114870406

Positioning pin set: 4114870408

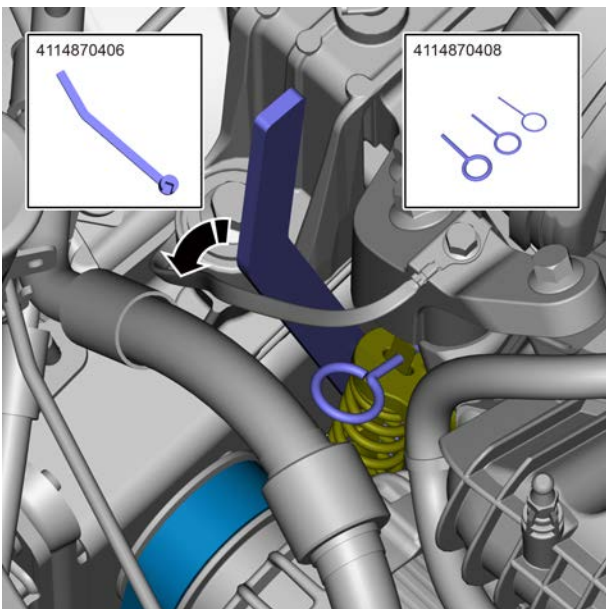
- 6 Remove the drive belt.



Installation procedure



- 1 Install the drive belt.



- 2 Use the special tool to pull the automatic tensioner clockwise, take out the special tool for positioning pin, and control the special tool to make the automatic tensioner tension the drive belt.

Special tool for belt tensioner compression:

4114870406

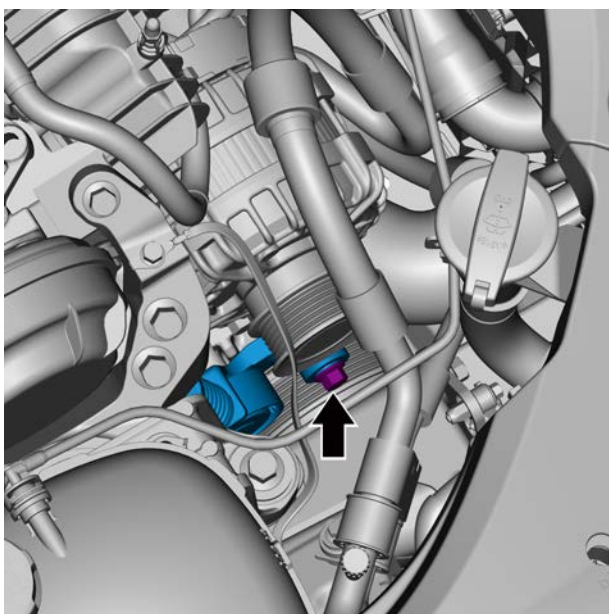
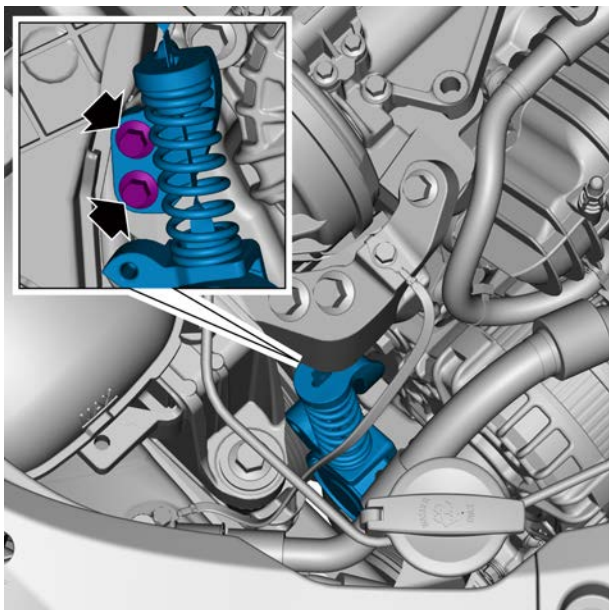
Positioning pin set: 4114870408

- 3 Install the engine fender.
- 4 Lower the vehicle.
- 5 Install the engine trim cover assembly.
- 6 Close the engine compartment cover.

2.5.7.8 Automatic tensioner replacement

Removal procedure

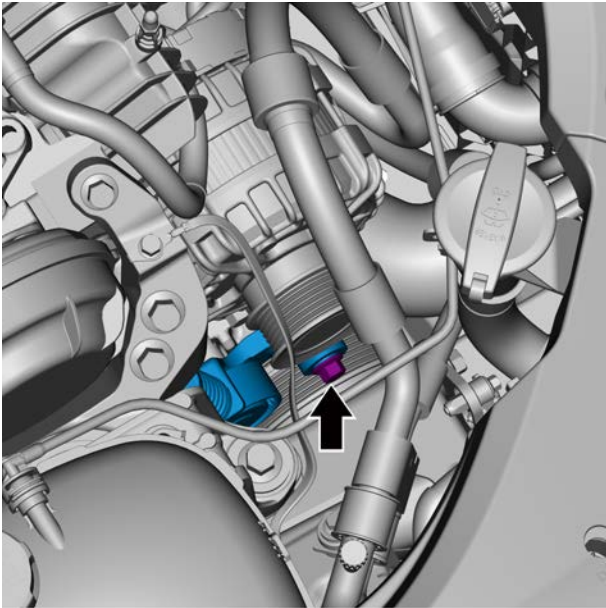
- 1 Open the engine compartment cover.
- 2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement](#).



- 5 Remove the driving belt, refer to [replacement of the driving belt](#).
- 6 Remove 2 retaining bolts of the automatic tensioner.

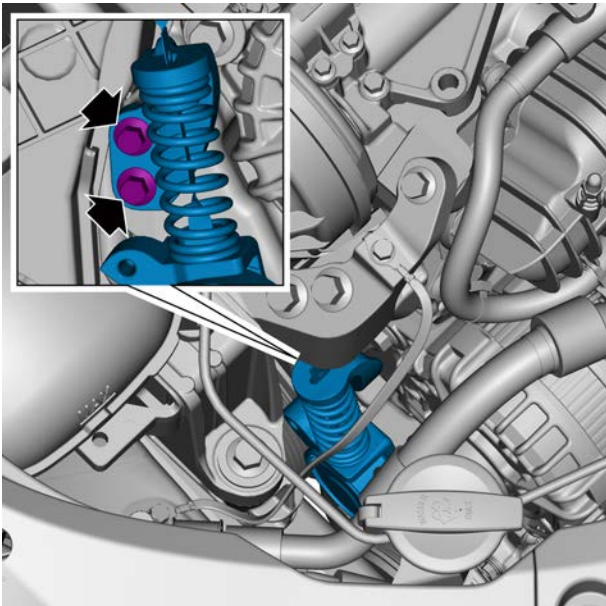
- 7 Remove one retaining bolt of the automatic tensioner and remove the automatic tensioner.

Installation procedure



- 1 Install the automatic tensioner, install and tighten one retaining bolt of the automatic tensioner.

Torque: 48N·m (metric), 35.4lb-ft (imperial)



- 2 Install and tighten 2 retaining bolts of the automatic tensioner.

Torque: 24N·m (metric), 17.7lb-ft (imperial)

- 3 Install the drive belt.
- 4 Install the engine fender.
- 5 Lower the vehicle.
- 6 Install the engine trim cover assembly.
- 7 Close the engine compartment cover.

2.5.7.9 Replacement of Left Vibration Insulator Assembly of Engine

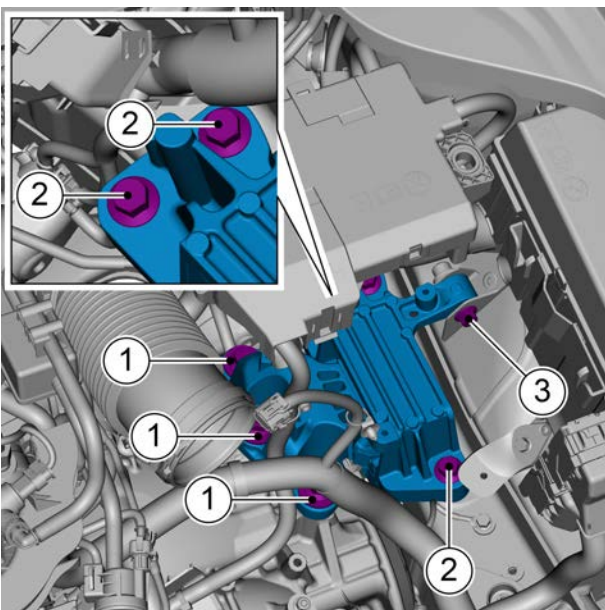
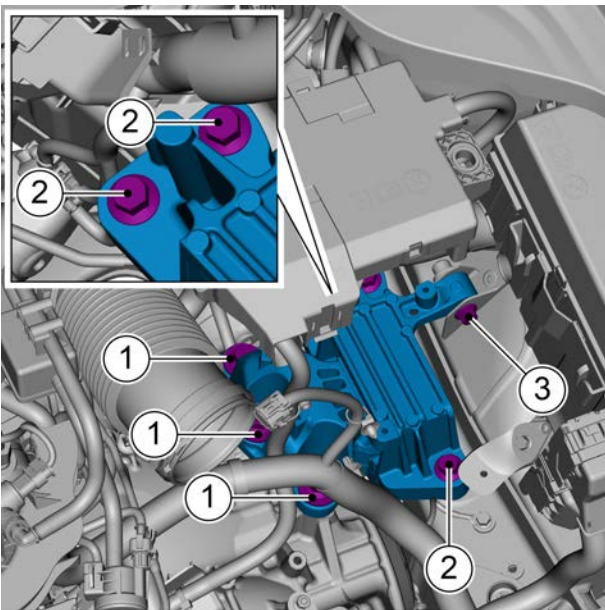
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.

- 2 Disconnect the battery cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 4 Remove the battery, refer [to Replacement of battery](#).
- 5 Remove the battery bracket assembly. See [battery bracket assembly replacement](#).
- 6 Replace the ECM, refer to Replacement of ECM.
- 7 Remove the engine fender, see [Engine fender replacement](#).
- 8 Support the transmission with a jack.
- 9 Remove 3 retaining bolts 1 connecting the vibration insulator assembly LH engine mount and the transmission.
- 10 Remove 3 retaining bolts 2 from the vibration insulator assembly LH engine mount.
- 11 Remove one retaining bolt 3 from the vibration insulator assembly LH engine mount and remove the vibration insulator assembly LH engine mount.



Installation procedure

- 1 Install the vibration insulator assembly LH engine mount, install and tighten one retaining bolt 3 of the vibration insulator assembly LH engine mount.
Torque: 60 N·m (metric system) 44.3 lb-ft (Imperial system)
- 2 Install and tighten 3 retaining bolts 2 onto the vibration insulator assembly LH engine mount.
Torque:
Step 1: 90 N·m (metric) 66.4 lb-ft (imperial system)
Step 2: turn 120 °
- 3 Install and tighten three retaining bolts 1 connecting the vibration insulator assembly LH engine mount and the transmission.
Torque: 110 N·m (metric system) 81.1 lb-ft (Imperial system)

- 4 Lower and take out the jack.
- 5 Install the engine fender.
- 6 Install the engine control module.
- 7 Install the battery bracket.
- 8 Install the battery heat shield.
- 9 Install the air filter assembly.
- 10 Connect the battery cable.
- 11 Close the engine compartment cover.

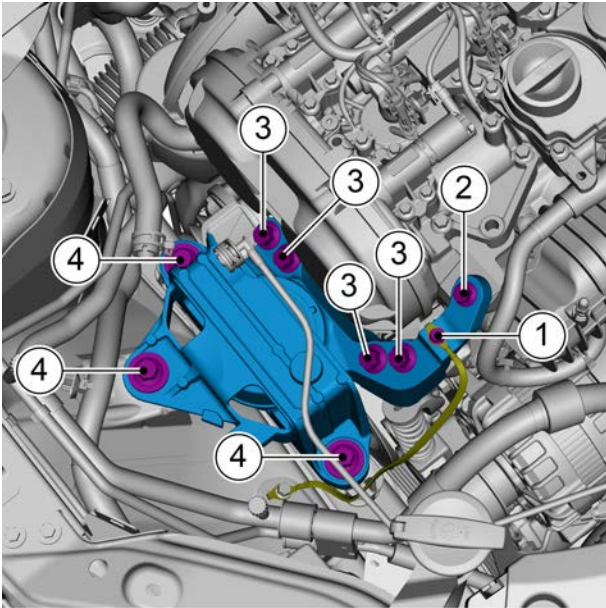
2.5.7.10 Replacement of Right Vibration Insulator Assembly of Engine

Removal procedure

Warning !

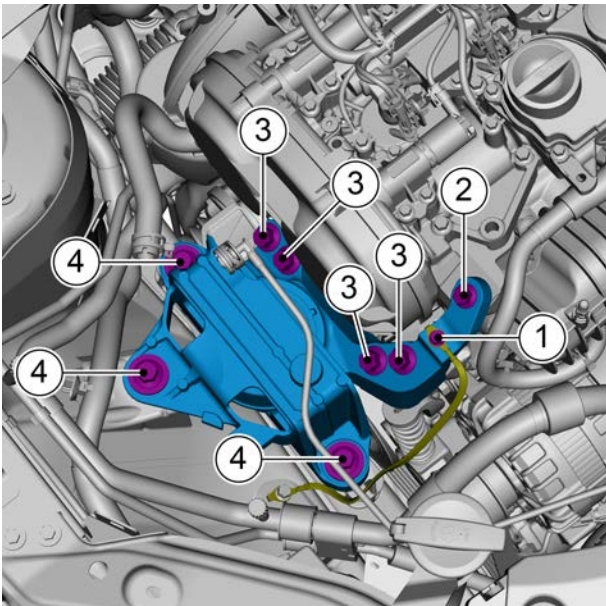
See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 6 Remove the right engine compartment trim panel, see [replacement of left engine compartment trim panel](#).
- 7 Remove the expansion tank, see [replacement of expansion tank](#).
- 8 Lift the engine assembly slightly with a jack.



- 9 Remove one retaining bolt 1 of the grounding wire and move it aside.
- 10 Remove 1 retaining bolts 2 connecting the vibration insulator assembly RH engine mount and the engine assembly.
- 11 Remove 4 retaining bolts 3 connecting the vibration insulator assembly RH engine mount and the engine assembly.
- 12 Remove 3 retaining bolts 4 from the vibration insulator assembly RH engine mount and remove the vibration insulator assembly RH engine mount.

Installation procedure



- 1 Install the vibration insulator assembly RH engine mount, install and tighten the three retaining bolts 4 of the vibration insulator assembly RH engine mount.

Torque:

Step 1: 90 N·m (metric) 66.4 lb-ft (imperial system)

Step 2: turn 90 °

- 2 Install and tighten 4 retaining bolts 3 connecting the vibration insulator assembly RH engine mount and the engine assembly.

Torque:

Step 1: 90 N·m (metric) 66.4 lb-ft (imperial system)

Step 2: turn 120 °

- 3 Install and tighten 1 retaining bolts 2 connecting the vibration insulator assembly RH engine mount and the engine assembly.

Torque: 60 N. m (metric system) 44.3 lb-ft (Imperial system)

- 4 Install the grounding wire, install and tighten one retaining bolt 1 of the grounding wire

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 5 Lower and take out the jack.

- 6 Install the expansion tank.

- 7 Install the right engine compartment trim panel.

- 8 Fill engine coolant.

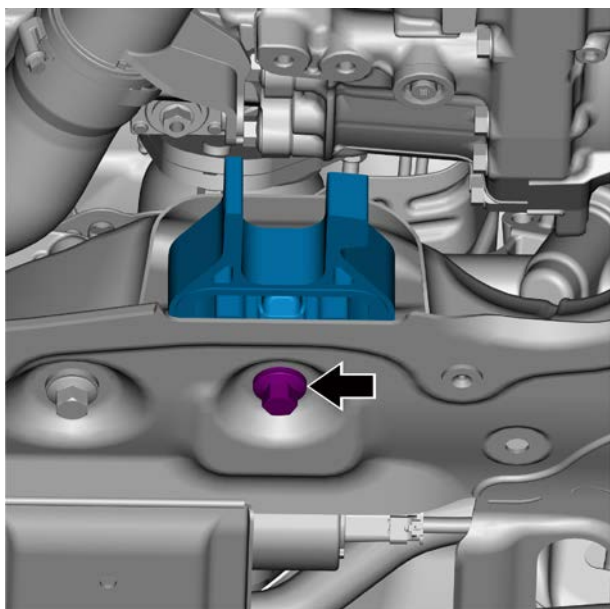
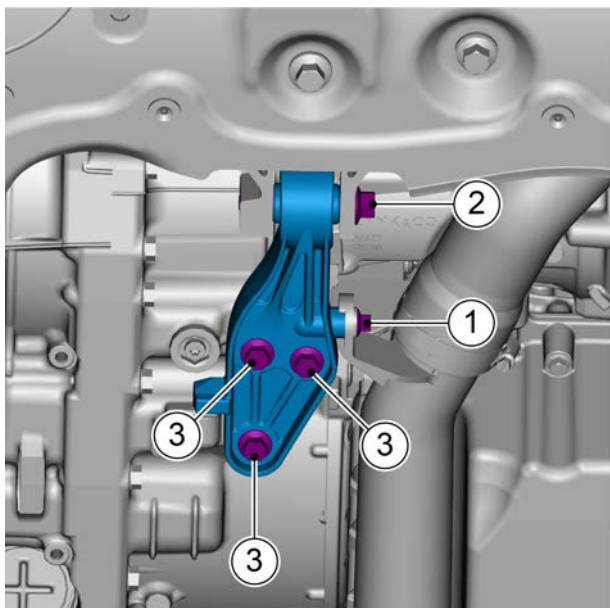
- 9 Install the engine fender.

- 10 Lower the vehicle.
- 11 Install the engine trim cover assembly.
- 12 Close the engine compartment cover.

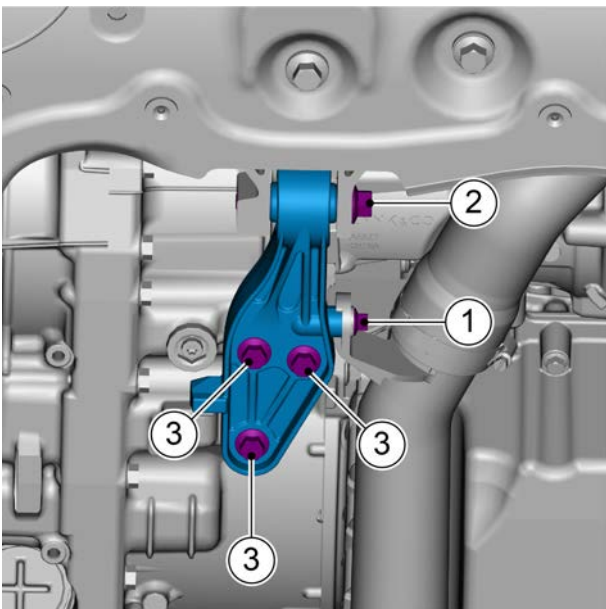
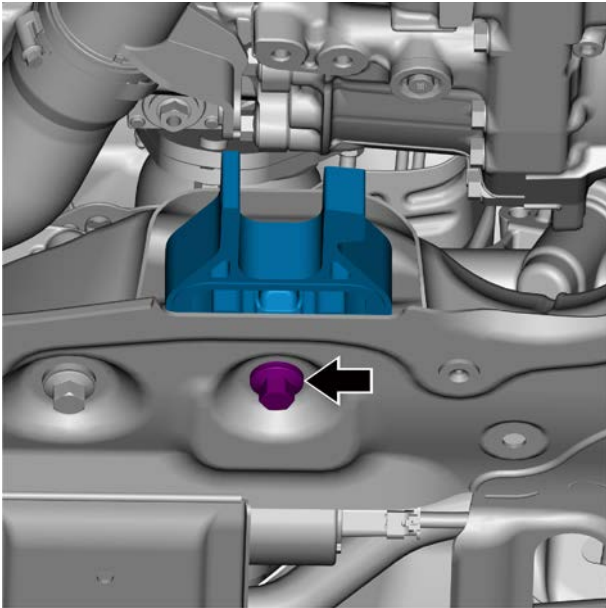
2.5.7.11 Rear left mount insulator replacement

Removal procedure

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the engine fender, see [Engine fender replacement](#).
- 3 Remove one retaining bolt 1 from the intercooler intake pipe assembly.
- 4 Remove 3 retaining bolts 3 from the lower bracket of the RL suspension.
- 5 Remove one retaining bolt 2 connecting the lower bracket of the RL suspension with the vibration isolation pad of the RL suspension, and remove the lower bracket of the RL suspension.
- 6 Remove one retaining bolt of the RL suspension vibration isolation pad and remove the RL suspension vibration isolation pad.



Installation procedure



- 1 Install the RL suspension vibration isolation pad, install and tighten one retaining bolt of the RL suspension vibration isolation pad.

Torque:

Step 1: 90 N·m (metric) 66.4 lb-ft (imperial system)

Step 2: turn 120 °

- 2 Install the lower bracket of the RL suspension, install and tighten one retaining bolt 2 connecting the lower bracket of the RL suspension and the vibration isolation pad of the RL suspension.

Torque: 110 N. m (metric system) 81.1 lb-ft (Imperial system)

- 3 Install and tighten three retaining bolts 3 of the lower bracket of the RL suspension.

Torque:

Step 1: 50 N·m (metric) 36.9 lb-ft (imperial system)

Step 2: turn 90 °

- 4 Install and tighten one retaining bolt 1 of the intercooler intake pipe assembly.

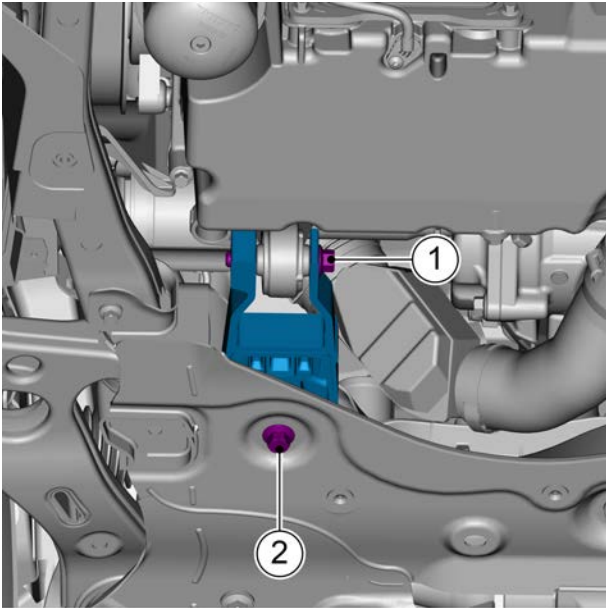
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

- 5 Install the engine fender.
- 6 Lower the vehicle.

2.5.7.12 Rear right mount insulator replacement

Removal procedure

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the engine fender, see [Engine fender replacement](#).



- 3 Remove one retaining bolt 1 between the right rear suspension vibration isolation pad and the right rear suspension support.
- 4 Remove one retaining bolt 2 of the right rear suspension vibration isolation pad and remove the right rear suspension vibration isolation pad.

Installation procedure

- 1 Install the right rear suspension vibration isolation pad, install and tighten one retaining bolt 2 of the right rear suspension vibration isolation pad.

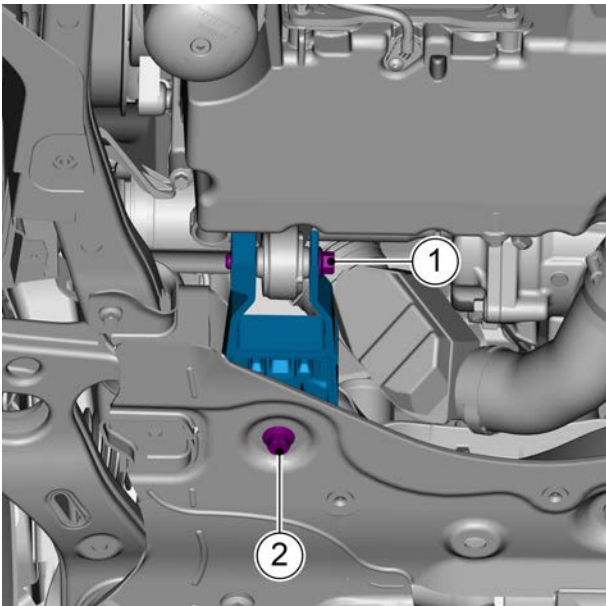
Torque:

Step 1: 90 N·m (metric) 66.4 lb-ft (imperial system)

Step 2: turn 120 °

- 2 Install and tighten one retaining bolt 1 between the right rear suspension vibration isolation pad and the right rear suspension support.

Torque: 110 N. m (metric system) 81.1 lb-ft (Imperial system)



- 3 Install the engine fender.
- 4 Lower the vehicle.

2.5.7.13 Powertrain replacement

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

See "Warnings Regarding Fuel Pressure Release" in [Warnings and Precautions](#).

Warning !

See "Warnings Regarding Cooling System Maintenance" in [Warnings and Precautions](#).

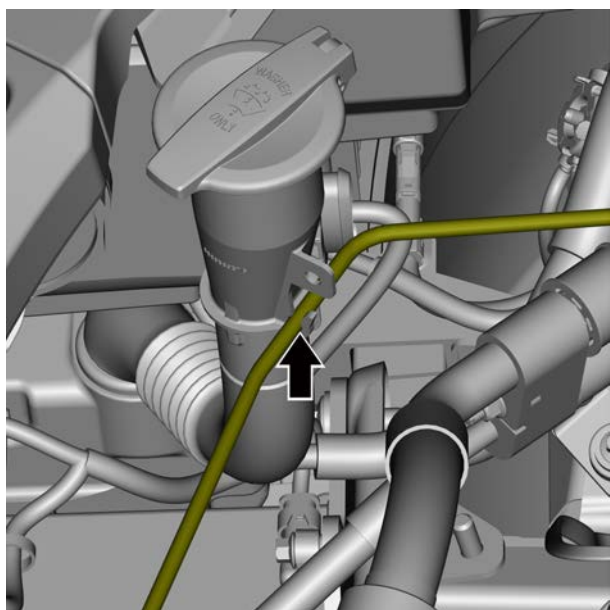
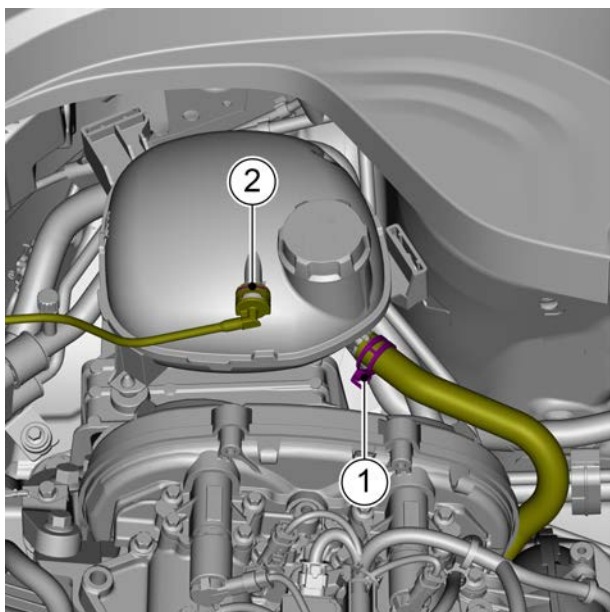
Warning !

See "Warnings Regarding Exhaust System Maintenance" in [Warnings and Precautions](#).

Warning !

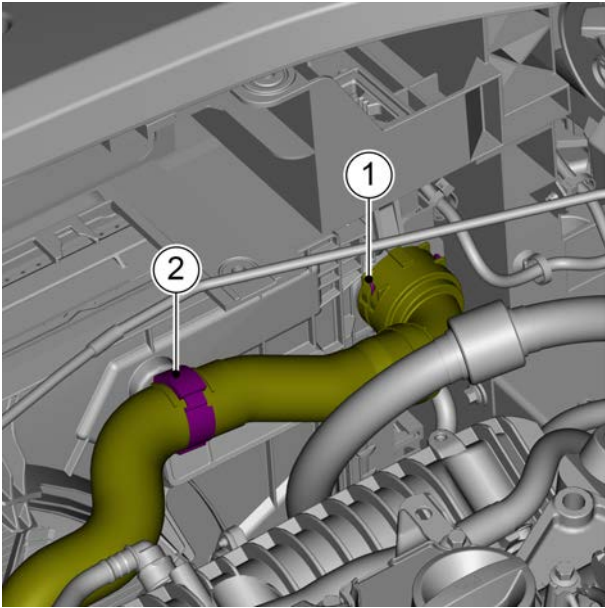
Refer to "warnings regarding the inhalation of R134a" in [Warnings and Notices](#).

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Disconnect the battery cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 5 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 6 Remove the air filter intake pipe assembly, refer [to replacement of the air filter intake pipe](#).
- 7 Remove the battery, refer [to Replacement of battery](#).
- 8 Remove the battery bracket assembly. See [battery bracket assembly replacement](#).
- 9 Recover the A/C refrigerant, see [A/C refrigerant recovery and filling](#).
- 10 Lift the vehicle, see [Lift the vehicle](#)
- 11 Remove the engine fender, see [Engine fender replacement](#).
- 12 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 13 Remove the air pressure and air temperature sensor 2, see [air pressure and air temperature sensor 2 replacement](#).

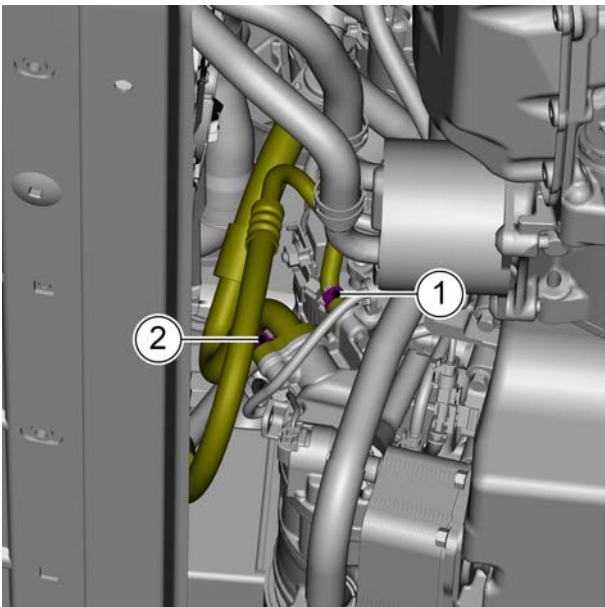


- 14 Remove the intercooler outlet pipe assembly. See [intercooler outlet pipe assembly replacement](#).
- 15 Remove the intercooler intake pipe assembly. See [intercooler intake pipe assembly replacement](#).
- 16 Remove the fixing clamp 1 of the outlet pipe of the expansion tank and disconnect the connection between the outlet pipe of the expansion tank and the expansion tank.
- 17 Unlock the quick insert elastic snap ring 2 and disconnect the vent hose from the expansion tank.

- 18 Disconnect the vent hose from the filler pipe of the windshield washer.



- 19 Remove fixing clip 2 of radiator inlet pipe.
- 20 Unlock the quick insert elastic circlip 1 and disconnect the radiator inlet pipe from the radiator.



- 21 Remove one fixing nut 1 of the A/C high-pressure pipe assembly and disconnect the A/C high-pressure pipe assembly from the compressor.

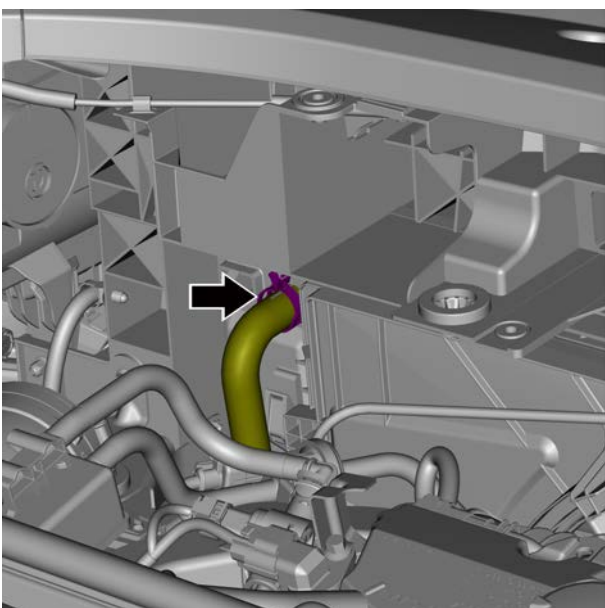
Caution

After the pipeline is disconnected, bandage the pipeline in time to prevent foreign matter from entering the pipeline.

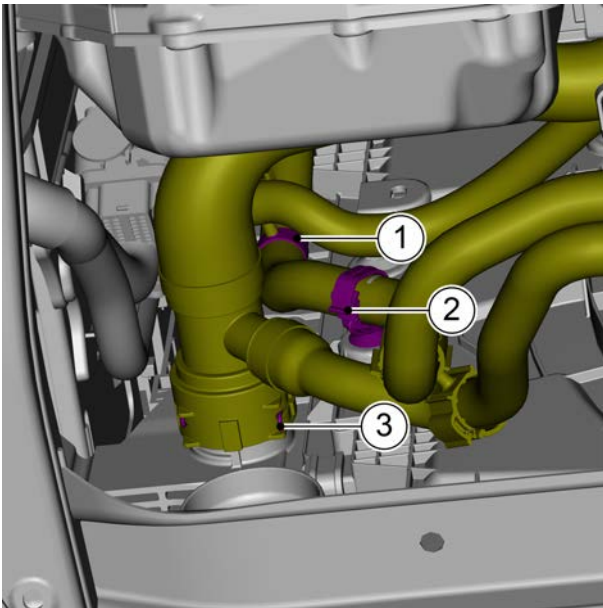
- 22 Remove one fixing nut 2 of the A/C low-pressure pipe assembly and disconnect the A/C low-pressure pipe assembly from the compressor.

Caution

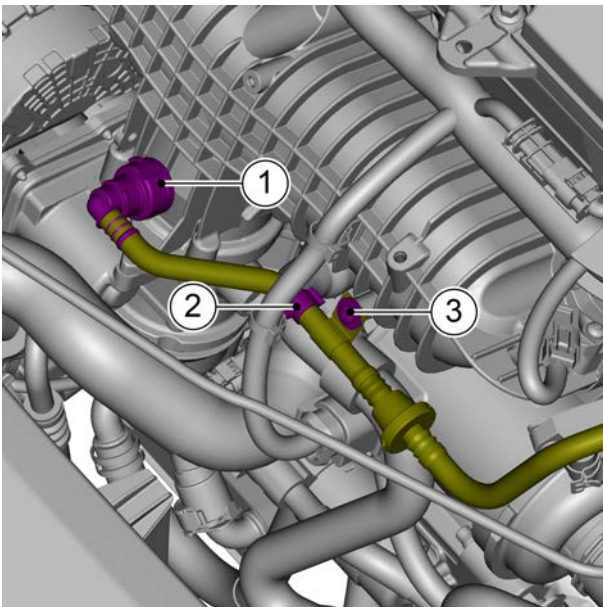
After the pipeline is disconnected, bandage the pipeline in time to prevent foreign matter from entering the pipeline.



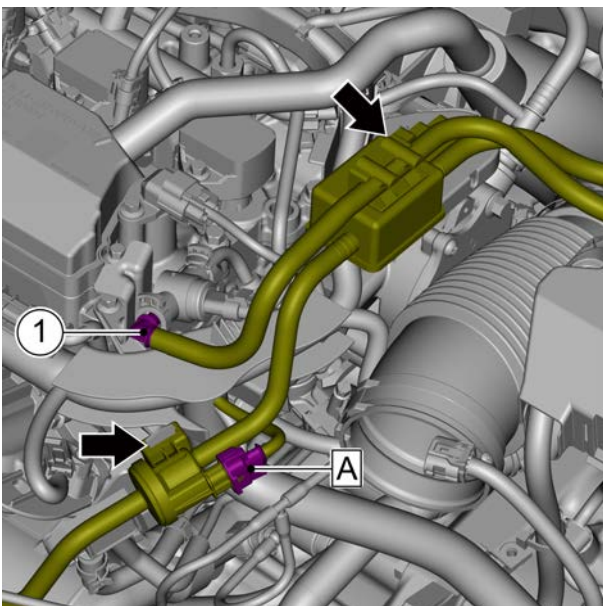
- 23 Remove the fixing clamp of the inlet pipe of the transmission fluid cooler and disconnect the connection between the inlet pipe of the transmission fluid cooler and the radiator.



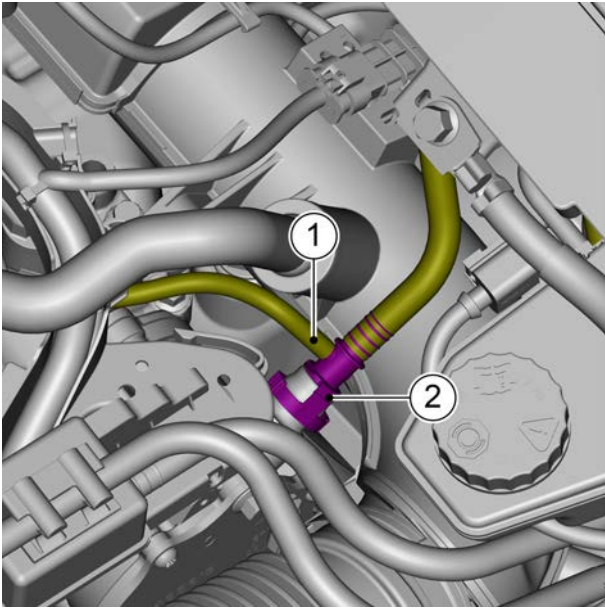
- 24 Disconnect the inlet pipe clamp 1 of the transmission fluid cooler.
- 25 Remove fixing clip 2 of inlet pipe of transmission fluid cooler.
- 26 Unlock the quick insert elastic circlip 3 and disconnect the radiator outlet pipe from the radiator.



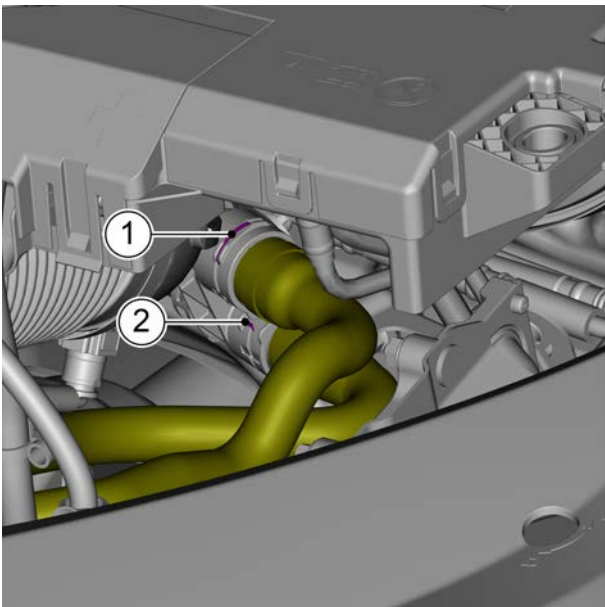
- 27 Remove the connector 1 of the long desorption pipe under the floor.
- 28 Disconnect the long desorption pipe clamp 2 under the floor.
- 29 Remove one retaining bolt 3 of the long desorption pipe under the floor.



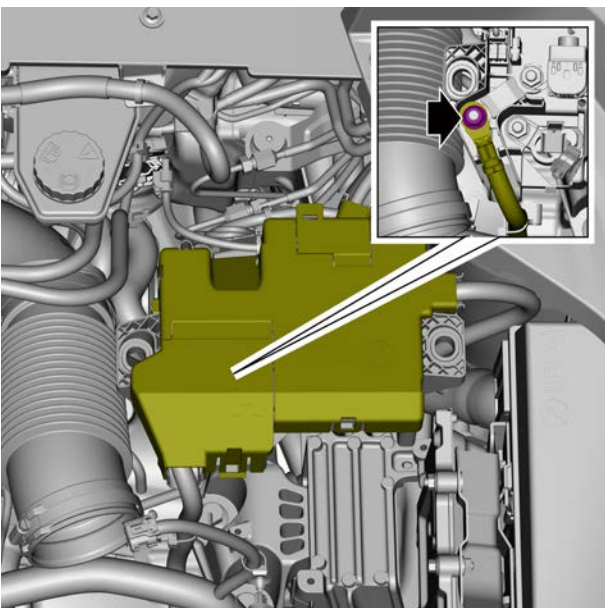
- 30 Disconnect the canister solenoid valve harness connector A.
- 31 Remove the connector 1 of the long pipeline under the floor.
- 32 Disconnect the canister solenoid valve from the canister solenoid valve bracket.
- 33 Remove the fixing clip connecting the expansion pot and the engine harness sheath.



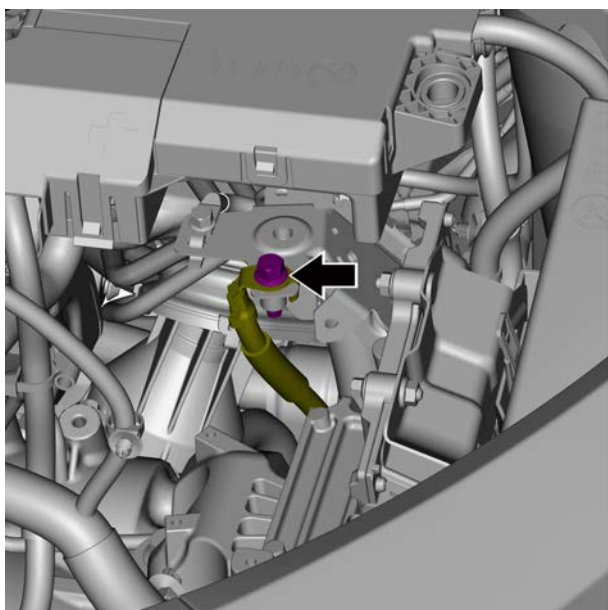
- 34 Disconnect Vacuum Hose 1.
- 35 Remove the connector 2 of the vacuum pipe.



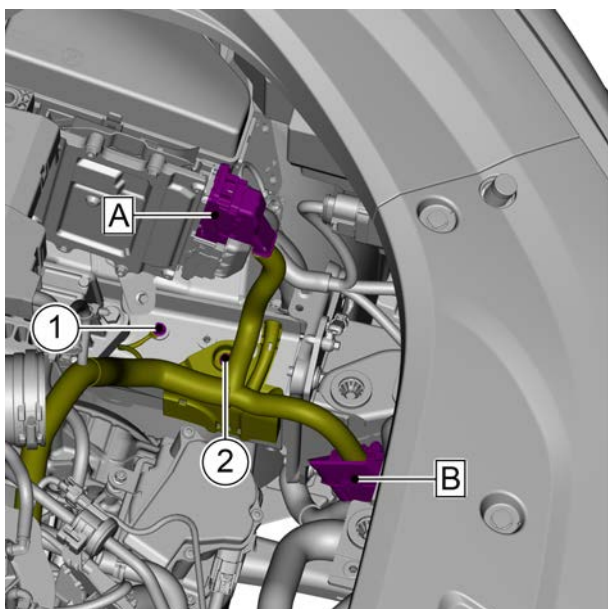
- 36 Unlock the quick insert elastic circlip 1 and disconnect the connection between the radiator outlet pipe and the A/C outlet pipe with the transition joint.
- 37 Unlock the quick insert elastic circlip 2 and disconnect the connection between the water intake pipe at the engine end of the A/C heater and the excessive joint of the A/C outlet pipe.



- 38 Open the battery positive cover.
- 39 Remove one fixing nut 2 from the starting motor harness assembly and move it aside.

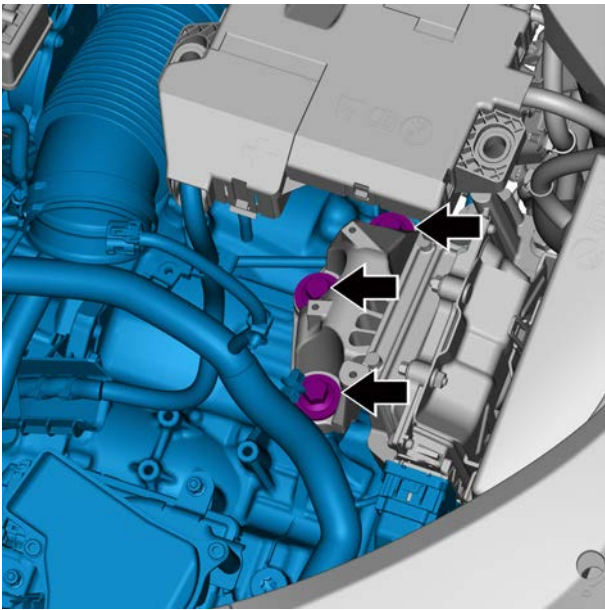


- 40 Remove one retaining bolt of the powertrain grounding harness and move it aside.

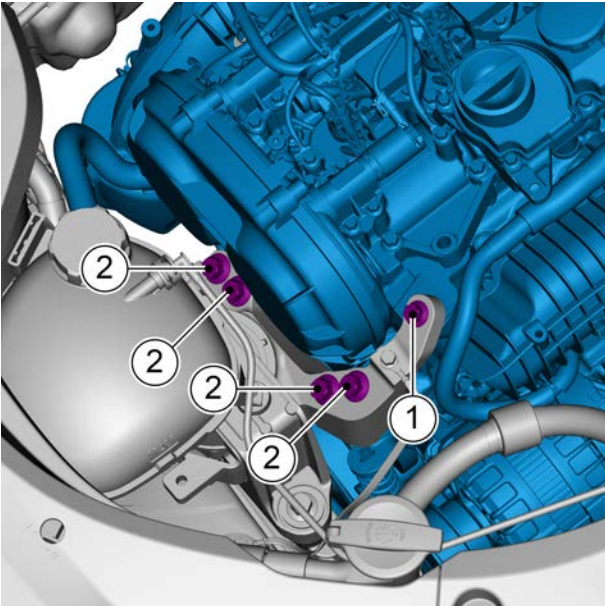


- 41 Remove 1 retaining bolt 1 of engine harness grounding.
 42 Remove 1 fixing nut 2 of engine harness.
 43 Disconnect engine harness connector A.
 44 Disconnect the engine harness connector B and move it aside.

- 45 Remove the drive shaft, see [drive shaft replacement](#).
 46 Remove the front constant speed drive shaft. See [replacement of front left constant speed drive shaft](#) and [replacement of right front constant speed drive shaft](#).
 47 Remove the RL suspension vibration isolation pad. See [replacement of RL suspension vibration isolation pad](#).
 48 Remove the right rear suspension vibration isolation pad. See [replacement of right rear suspension vibration isolation pad](#).
 49 Remove front subframe, refer to [replacement of front subframe](#).
 50 Remove the rear pipe of catalytic converter. See [replacement of rear pipe of catalytic converter](#).



- 51 Hold the drive train with a hydraulic lift.
- 52 Remove 3 retaining bolts 1 connecting the vibration insulator assembly LH engine mount and the transmission.



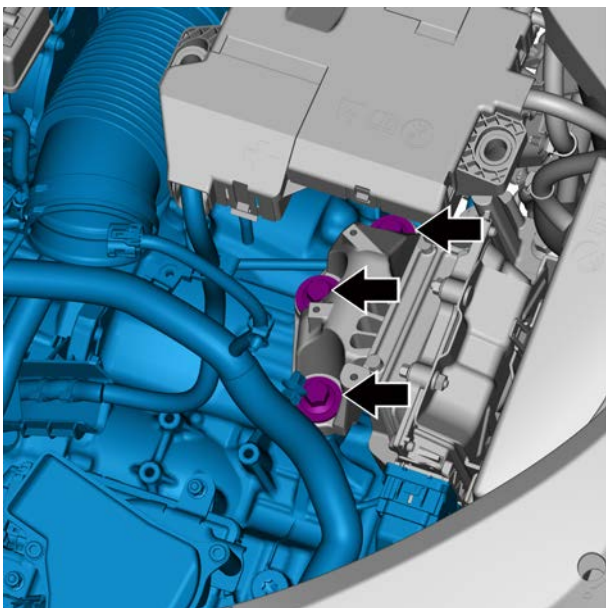
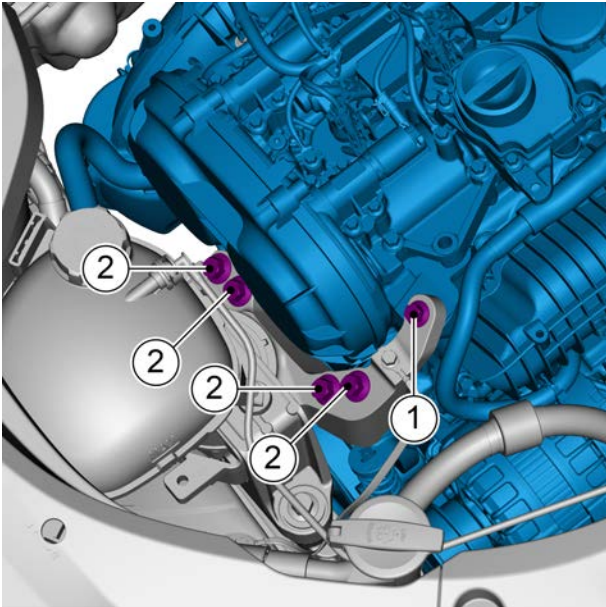
- 53 Remove 1 fixing bolt 1 that assembly connects the vibration insulator assembly RH engine mount to the engine.
- 54 Remove 4 retaining bolts 2 connecting the vibration insulator assembly RH engine mount and the engine assembly.

- 55 Slowly lower the hydraulic lift and pull out the drive train.

Caution

Operate with the assistance of multiple maintenance technicians.

Installation procedure



- 1 Operate the hydraulic lift to lift the drive train to the installation position.

Caution

Operate with the assistance of multiple maintenance technicians.

- 2 Install and tighten 4 retaining bolts 2 connecting the vibration insulator assembly RH engine mount and the engine assembly.

Torque:

Step 1: 90 N·m (metric) 66.4 lb-ft (imperial system)

Step 2: turn 120 °

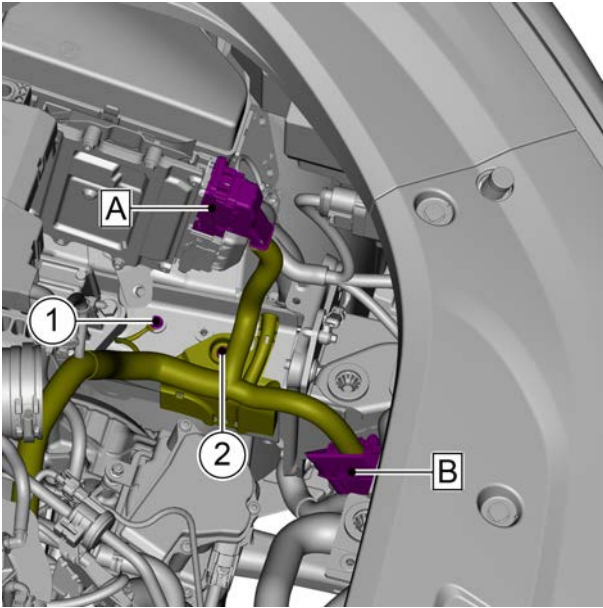
- 3 Install and tighten 1 retaining bolts 1 connecting the vibration insulator assembly RH engine mount and the engine assembly.

Torque: 60 N. m (metric system) 44.3 lb-ft (Imperial system)

- 4 Install and tighten three retaining bolts 1 connecting the vibration insulator assembly LH engine mount and the transmission.

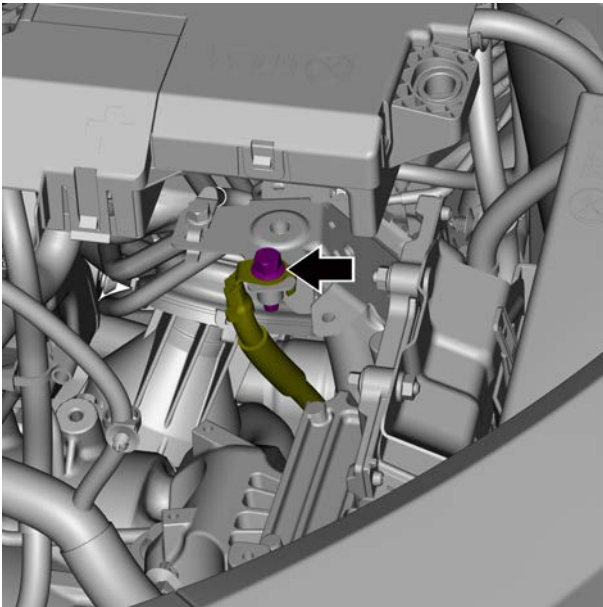
Torque: 110 N. m (metric system) 81.1 lb-ft (Imperial system)

- 5 Remove the hydraulic lift.
- 6 Install the rear pipe of catalytic converter.
- 7 Install the front subframe.
- 8 Install the right rear suspension vibration isolation pad.
- 9 Install the rear left mount insulator.
- 10 Install the front constant velocity drive shaft.
- 11 Install the drive shaft.



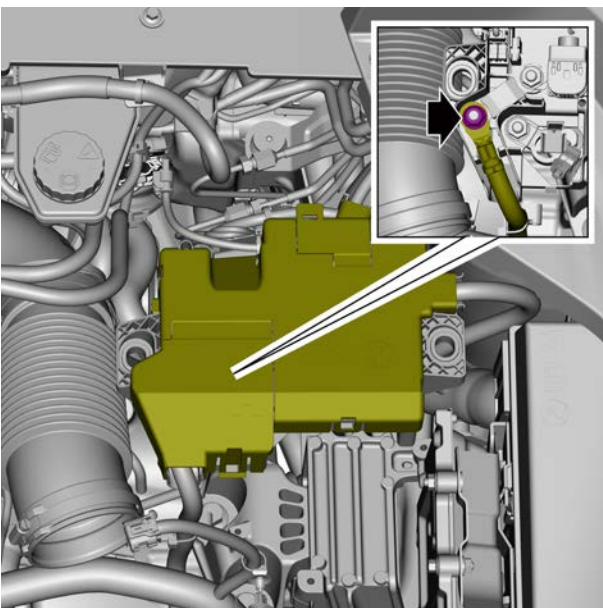
- 12 Connect Engine Harness connector B.
- 13 Connect Engine Harness connector A.
- 14 Install and tighten one fixing nut 2 of engine harness.
- 15 Install and tighten one retaining bolt 1 of engine harness grounding.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 16 Install the powertrain grounding harness, and install and tighten one retaining bolt of the powertrain grounding harness.

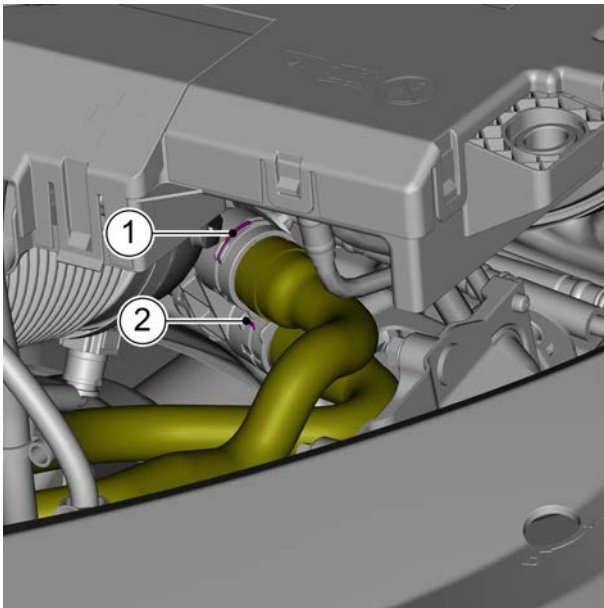
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



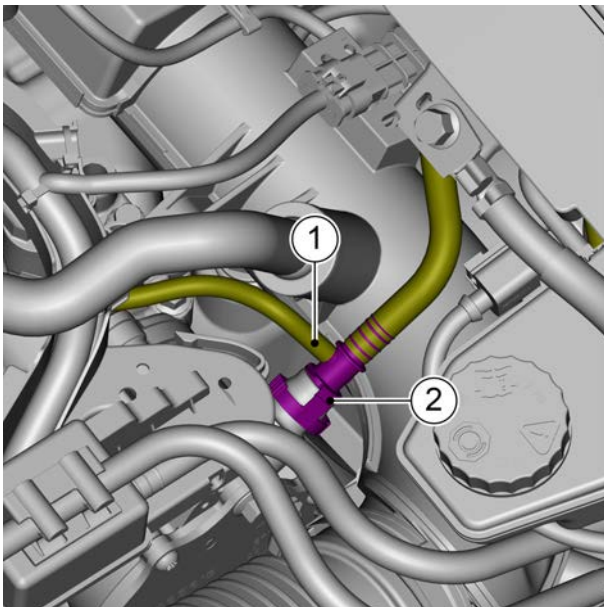
- 17 Install the starter harness assembly, install and tighten one fixing nut 2 of the starter harness assembly.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

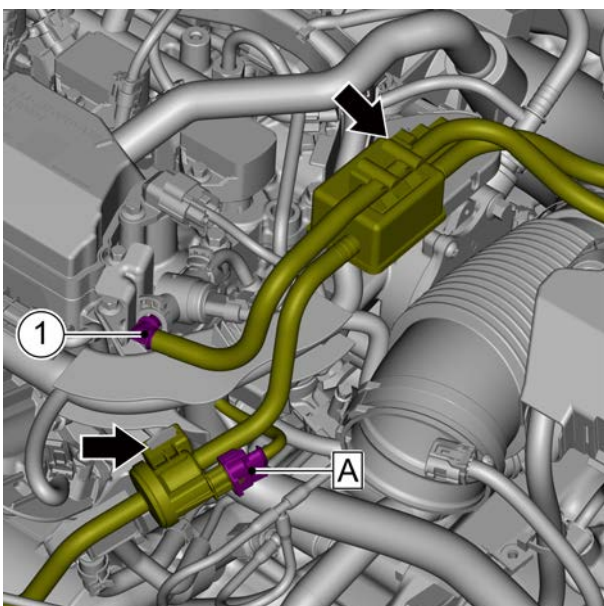
- 18 Close the battery positive cover.



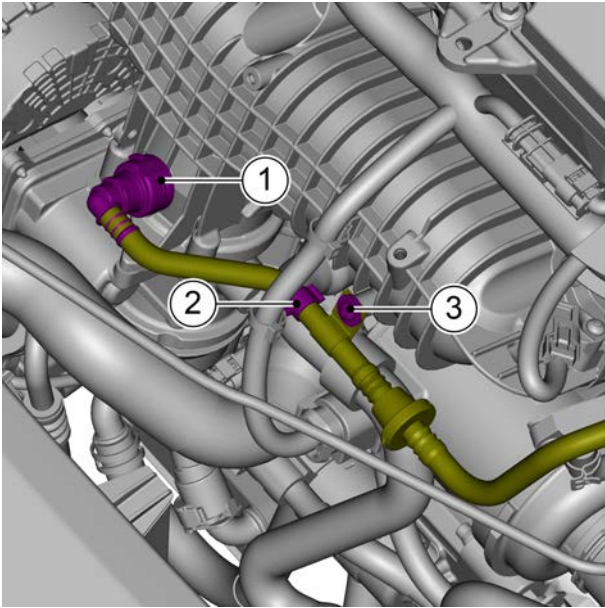
- 19 Connect the radiator outlet pipe and the air conditioner outlet pipe with the transition joint, and reset the quick insert elastic snap ring 1.
- 20 Connect the water intake pipe at the heating engine end of the air conditioner and the outlet pipe of the air conditioner with the excessive joint, and reset the quick insert elastic snap ring 2.



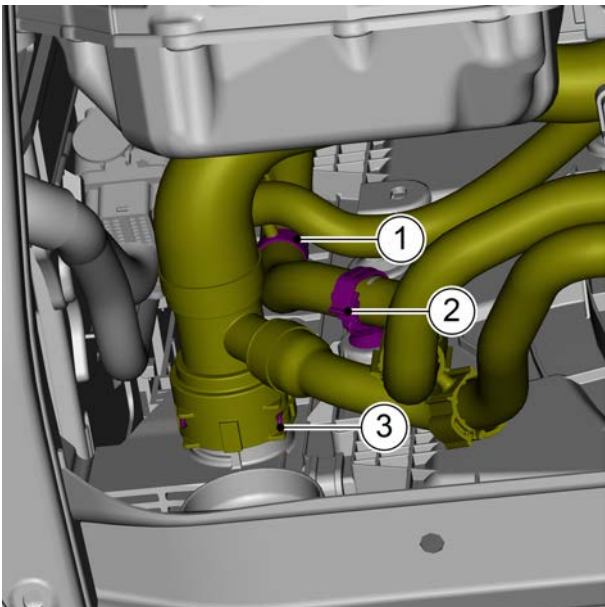
- 21 Install the connector 2 of the vacuum pipe.
- 22 Connect Vacuum Hose 1.



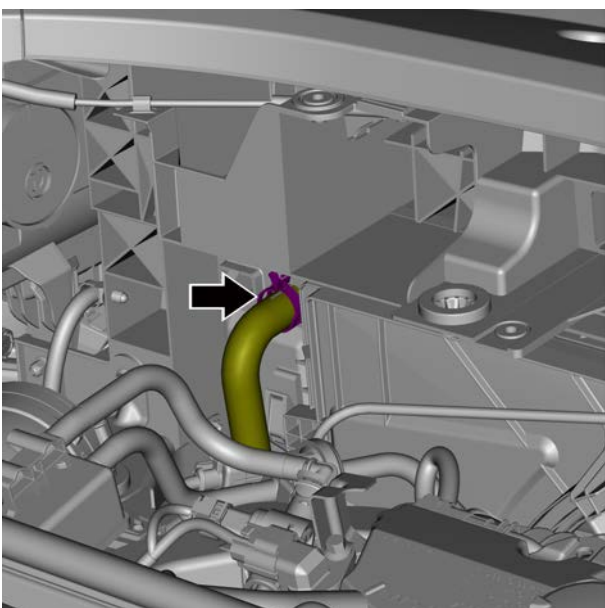
- 23 Install the expansion tank.
- 24 Connect the canister solenoid valve to the canister solenoid valve bracket.
- 25 Install the connector 1 of the long pipeline under the floor.
- 26 Connect the canister purge solenoid harness connector A.



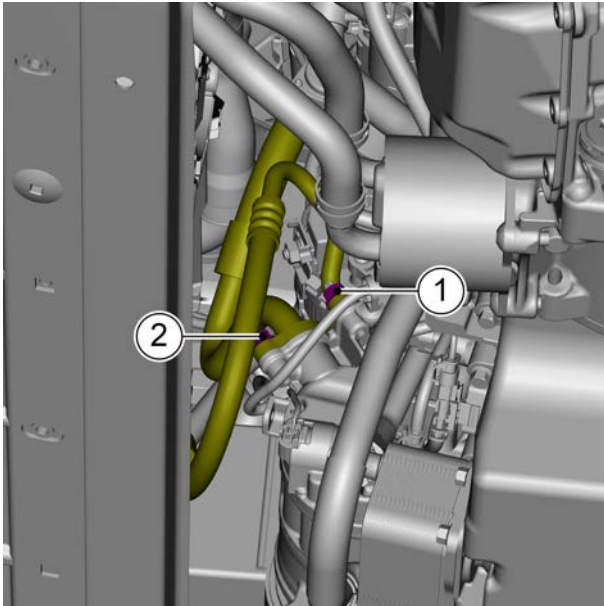
- 27 Install one retaining bolt 3 of the long desorption pipe under the floor.
Torque: 3.5 N. m (metric system) 2.6 lb-ft (Imperial system)
- 28 Install the long desorption pipe clamp 2 under the floor.
- 29 Install the connector 1 of the long desorption pipe under the floor.



- 30 Connect the radiator outlet pipe with the radiator and reset the quick insert elastic snap ring 3.
- 31 Install fixing clip 2 of inlet pipe of transmission fluid cooler.
- 32 Install the transmission fluid cooler inlet pipe clamp 1.



- 33 Connect the inlet pipe of the transmission fluid cooler with the radiator, and install the fixing clamp of the inlet pipe of the transmission fluid cooler.

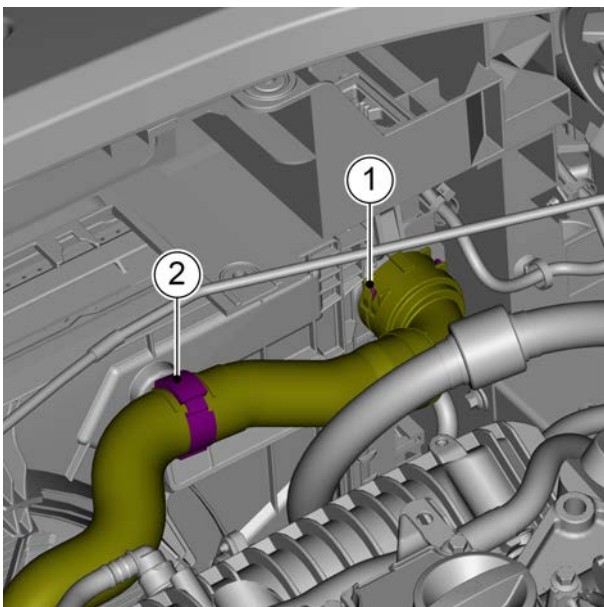


- 34 Connect the A/C high-pressure pipe assembly with the compressor, install and tighten one fixing nut 1 of the A/C high-pressure pipe assembly.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

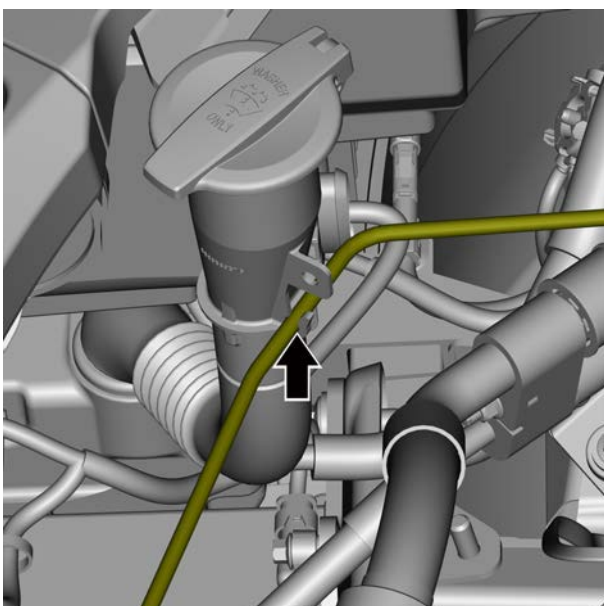
- 35 Connect the A/C low-pressure pipe assembly and the compressor, install and tighten one fixing nut 2 of the A/C low-pressure pipe assembly.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

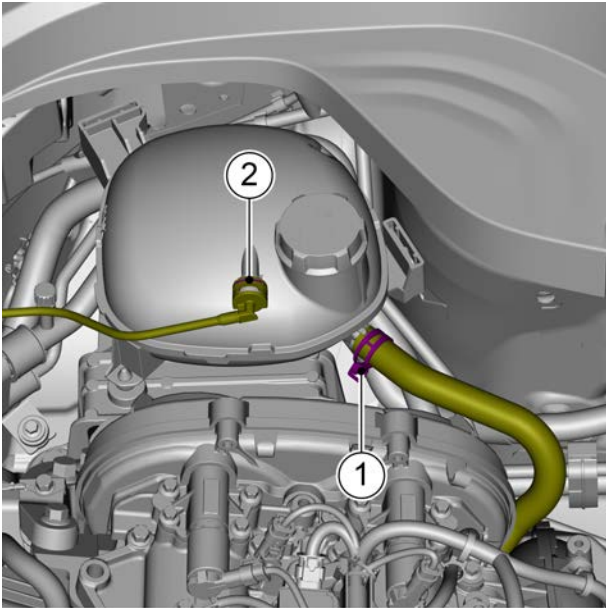


- 36 Install fixing clip 2 of radiator inlet pipe.

- 37 Connect the radiator inlet pipe with the radiator and reset the quick insert elastic snap ring 1.



- 38 Connect the exhaust pipe and the filler pipe of the windshield washer.



- 39 Connect the outlet pipe of the expansion tank with the expansion tank, and install the fixing clamp 1 of the outlet pipe of the expansion tank.
- 40 Connect the exhaust pipe and the expansion tank, and reset the Quick- insert Elastic Snap Ring 2.

- 41 Install the intercooler intake pipe assembly.
- 42 Install the intercooler outlet pipe assembly.
- 43 Install air pressure and air temperature sensor 2.
- 44 Fill engine coolant.
- 45 Install the engine fender.
- 46 Lower the vehicle.
- 47 Refill air conditioner refrigerant.
- 48 Install the battery bracket assembly.
- 49 Install the battery heat shield.
- 50 Install the air inlet pipe of the air filter.
- 51 Install the air filter assembly.
- 52 Install the engine trim cover assembly.
- 53 Connect the battery cable, start the vehicle, connect the diagnostic instrument, monitor the water temperature and the speed of the electronic water pump, and observe the liquid level of the expansion tank. If the liquid level drops, add coolant in time; fill the kettle with the expansion line until the kettle is filled with expansion liquid.
- 54 Close the engine compartment cover.

2.5.7.14 Replacement of engine assembly

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

See "Warnings Regarding Fuel Pressure Release" in [Warnings and Precautions](#).

Warning !

See "Warnings Regarding Cooling System Maintenance" in [Warnings and Precautions](#).

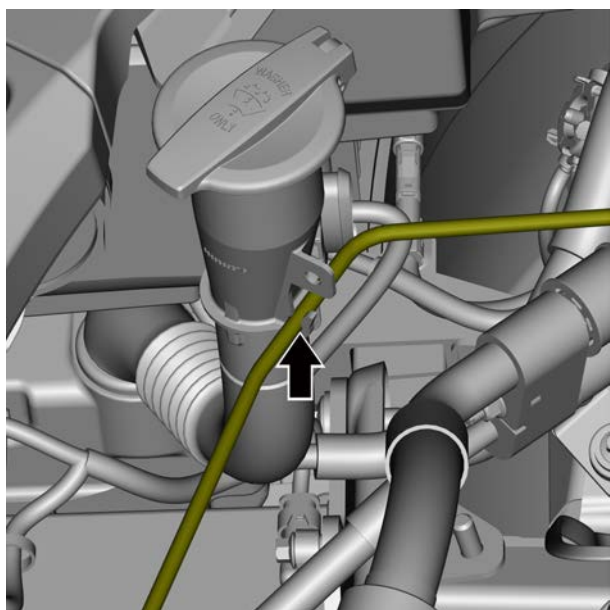
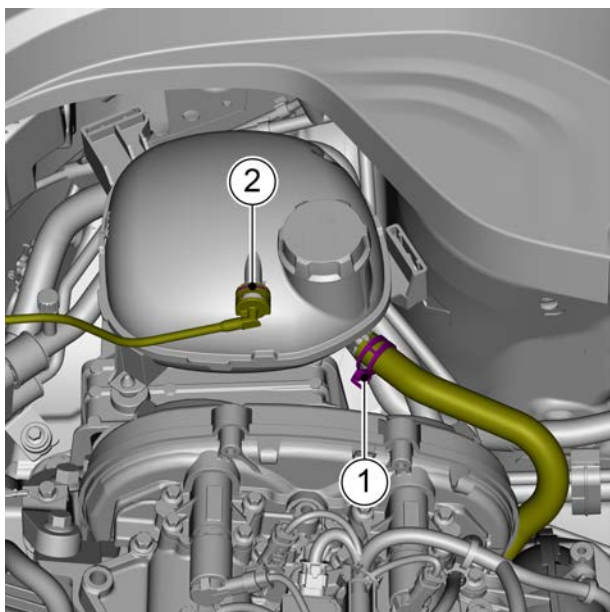
Warning !

See "Warnings Regarding Exhaust System Maintenance" in [Warnings and Precautions](#).

Warning !

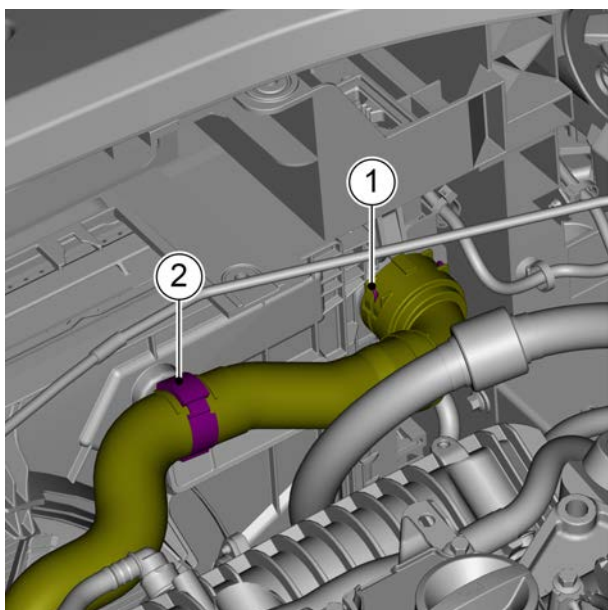
Refer to "warnings regarding the inhalation of R134a" in [Warnings and Notices](#).

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Disconnect the battery cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 5 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 6 Remove the air filter intake pipe assembly, refer [to replacement of the air filter intake pipe](#).
- 7 Remove the battery, refer [to Replacement of battery](#).
- 8 Remove the battery bracket assembly. See [battery bracket assembly replacement](#).
- 9 Recover the A/C refrigerant, see [A/C refrigerant recovery and filling](#).
- 10 Lift the vehicle, see [Lift the vehicle](#)
- 11 Remove the engine fender, see [Engine fender replacement](#).
- 12 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 13 Remove the air pressure and air temperature sensor 2, see the [Replacement of Air Pressure and Air Temperature Sensor 2](#).

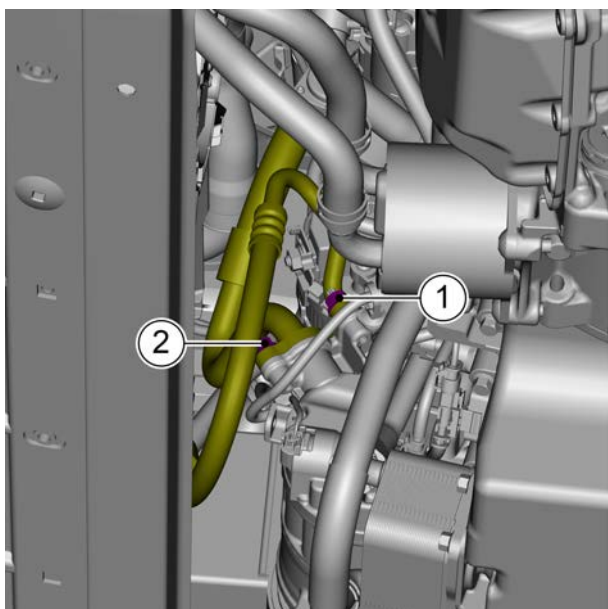


- 14 Remove the intercooler outlet pipe assembly. See [intercooler outlet pipe assembly replacement](#).
- 15 Remove the intercooler intake pipe assembly. See [intercooler intake pipe assembly replacement](#).
- 16 Remove the fixing clamp 1 of the outlet pipe of the expansion tank and disconnect the connection between the outlet pipe of the expansion tank and the expansion tank.
- 17 Unlock the quick insert elastic snap ring 2 and disconnect the vent hose from the expansion tank.

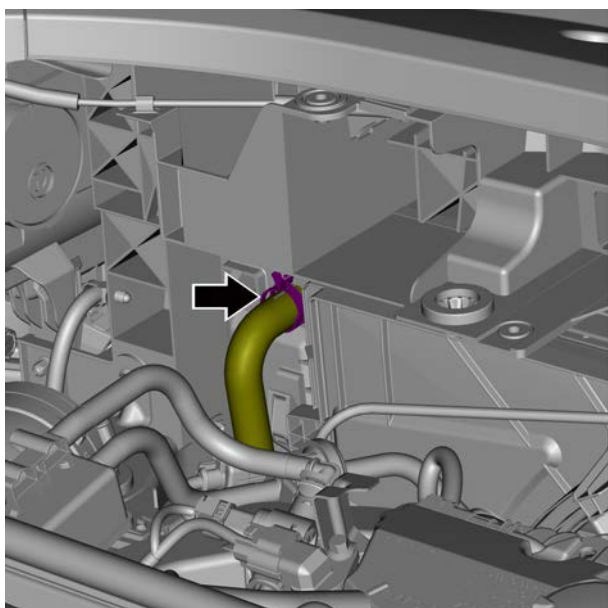
- 18 Disconnect the vent hose from the filler pipe of the windshield washer.



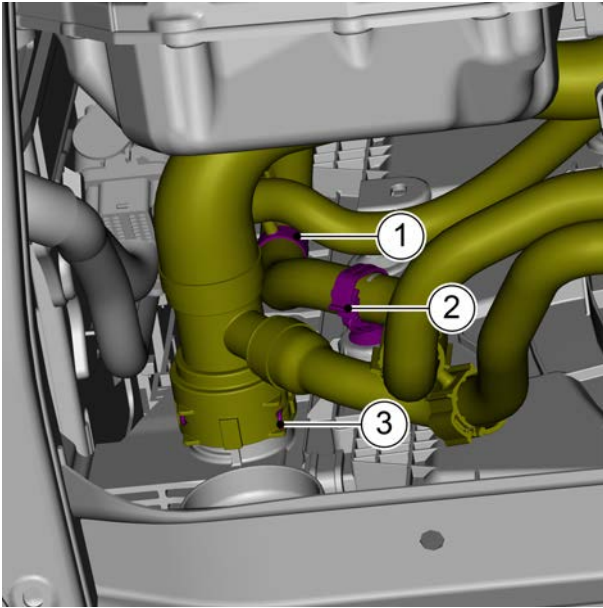
- 19 Remove fixing clip 2 of radiator inlet pipe.
- 20 Unlock the quick insert elastic circlip 1 and disconnect the radiator inlet pipe from the radiator.



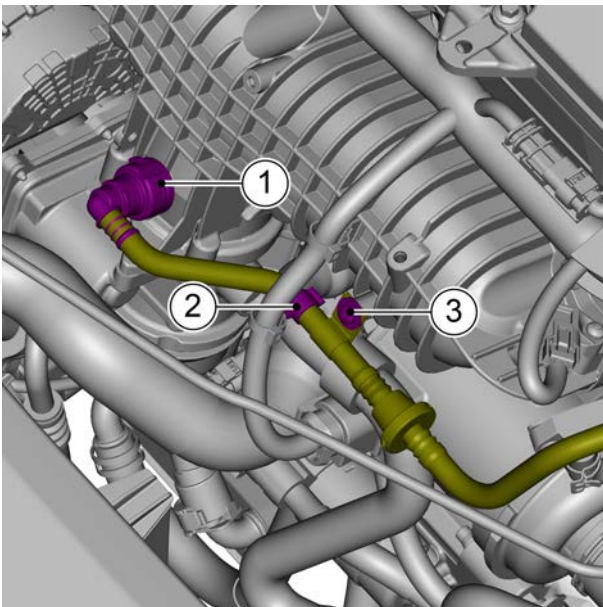
- 21 Remove one fixing nut 1 of the A/C high-pressure pipe assembly and disconnect the A/C high-pressure pipe assembly from the compressor.
- 22 Remove one fixing nut 2 of the A/C low-pressure pipe assembly and disconnect the A/C low-pressure pipe assembly from the compressor.



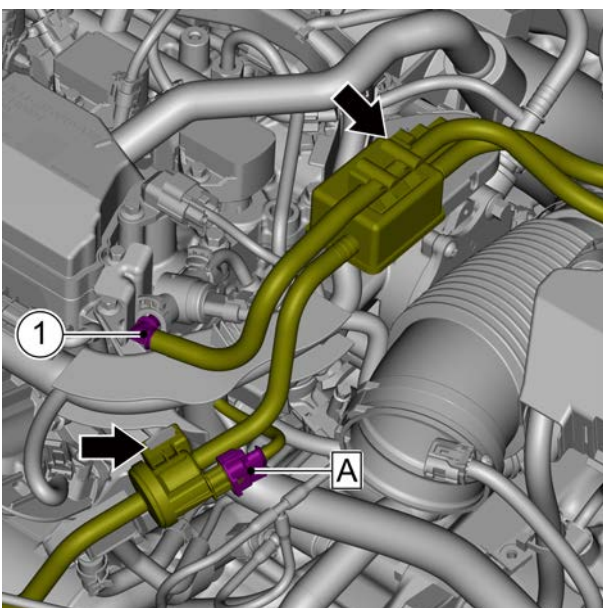
- 23 Remove the fixing clamp of the inlet pipe of the transmission fluid cooler and disconnect the connection between the inlet pipe of the transmission fluid cooler and the radiator.



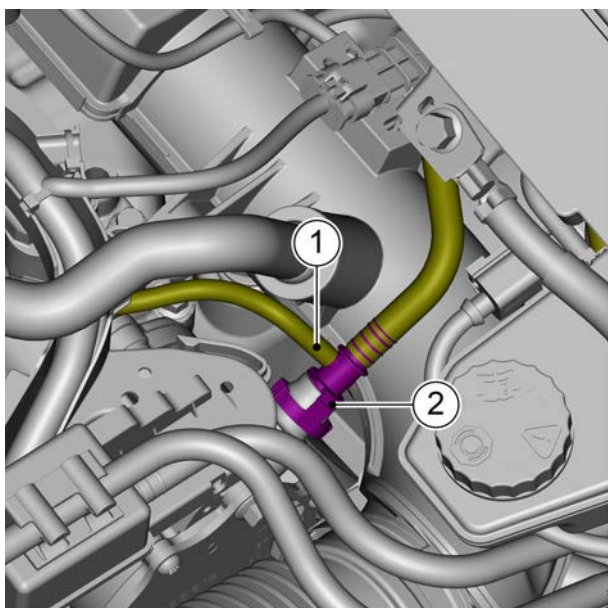
- 24 Disconnect the inlet pipe clamp 1 of the transmission fluid cooler.
- 25 Remove fixing clip 2 of inlet pipe of transmission fluid cooler.
- 26 Unlock the quick insert elastic circlip 3 and disconnect the radiator outlet pipe from the radiator.



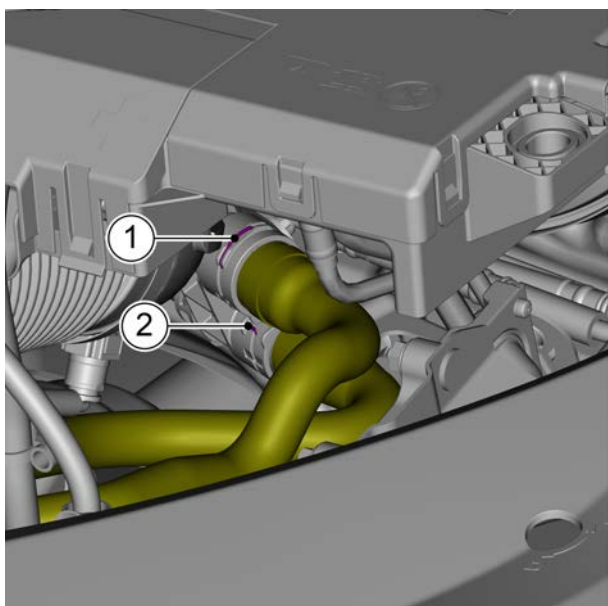
- 27 Remove the connector 1 of the long desorption pipe under the floor.
- 28 Disconnect the long desorption pipe clamp 2 under the floor.
- 29 Remove one retaining bolt 3 of the long desorption pipe under the floor.



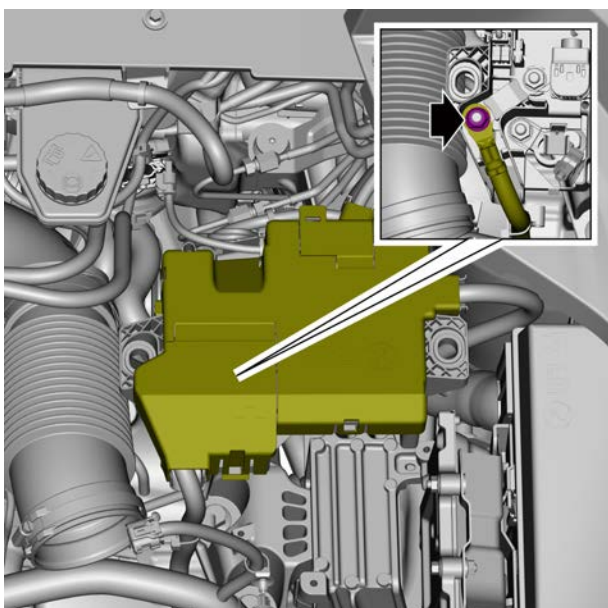
- 30 Disconnect the canister solenoid valve harness connector A.
- 31 Remove the connector 1 of the long pipeline under the floor.
- 32 Disconnect the canister solenoid valve from the canister solenoid valve bracket.
- 33 Remove the fixing clip connecting the expansion pot and the engine harness sheath.



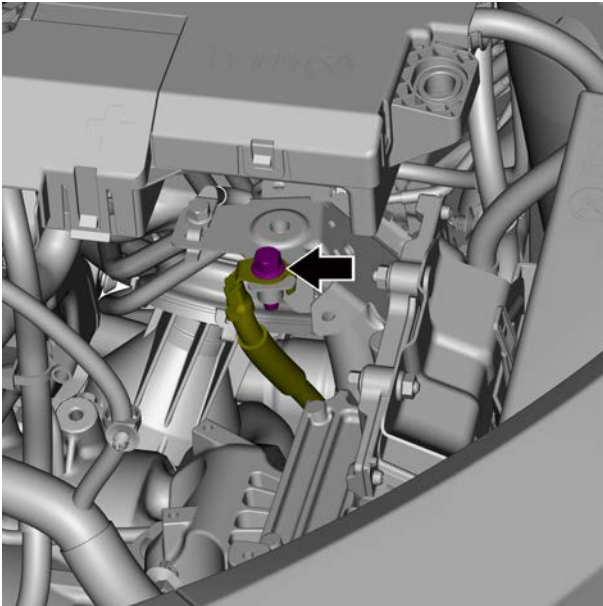
- 34 Disconnect Vacuum Hose 1.
- 35 Remove the connector 2 of the vacuum pipe.



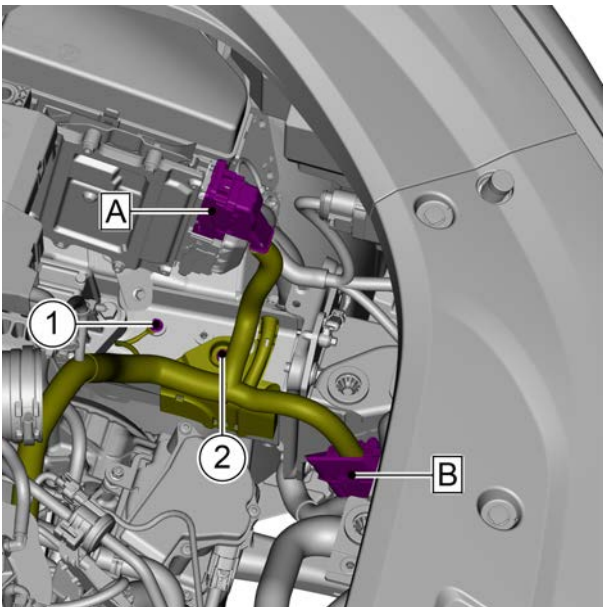
- 36 Unlock the quick insert elastic circlip 1 and disconnect the connection between the radiator outlet pipe and the A/C outlet pipe with the transition joint.
- 37 Unlock the quick insert elastic circlip 2 and disconnect the connection between the water intake pipe at the engine end of the A/C heater and the excessive joint of the A/C outlet pipe.



- 38 Open the battery positive cover.
- 39 Remove one fixing nut 2 from the starting motor harness assembly and move it aside.

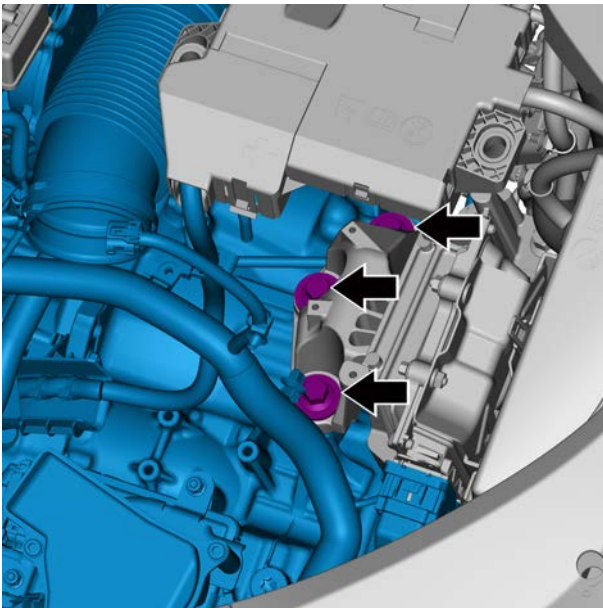


- 40 Remove one retaining bolt of the powertrain grounding harness and move it aside.

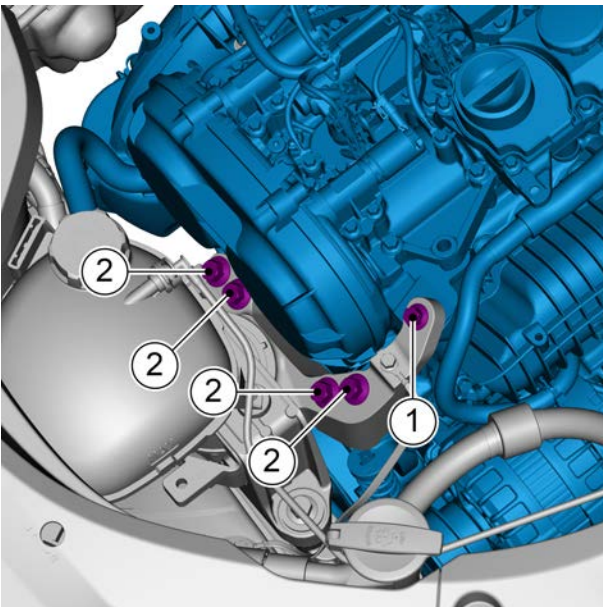


- 41 Remove one retaining bolt 1 of the engine harness assembly grounding.
- 42 Remove 1 retaining bolt 2 from the engine harness assembly.
- 43 Disconnect the Engine Harness Assembly Harness connector A.
- 44 Disconnect the Engine Harness Assembly Harness connector B and move it aside.

- 45 Remove the drive shaft, see [drive shaft replacement](#).
- 46 Remove the front constant speed drive shaft. See [replacement of front left constant speed drive shaft](#) and [replacement of right front constant speed drive shaft](#).
- 47 Remove the RL suspension vibration isolation pad. See [replacement of RL suspension vibration isolation pad](#).
- 48 Remove the right rear suspension vibration isolation pad. See [replacement of right rear suspension vibration isolation pad](#).
- 49 Remove front subframe, refer to [replacement of front subframe](#).
- 50 Remove the rear pipe of catalytic converter. See [replacement of rear pipe of catalytic converter](#).



- 51 Hold the drive train with a hydraulic lift.
- 52 Remove 3 retaining bolts 1 connecting the vibration insulator assembly LH engine mount and the transmission.



- 53 Remove 1 fixing bolt 1 that assembly connects the vibration insulator assembly RH engine mount to the engine.
- 54 Remove 4 retaining bolts 2 connecting the vibration insulator assembly RH engine mount and the engine assembly.

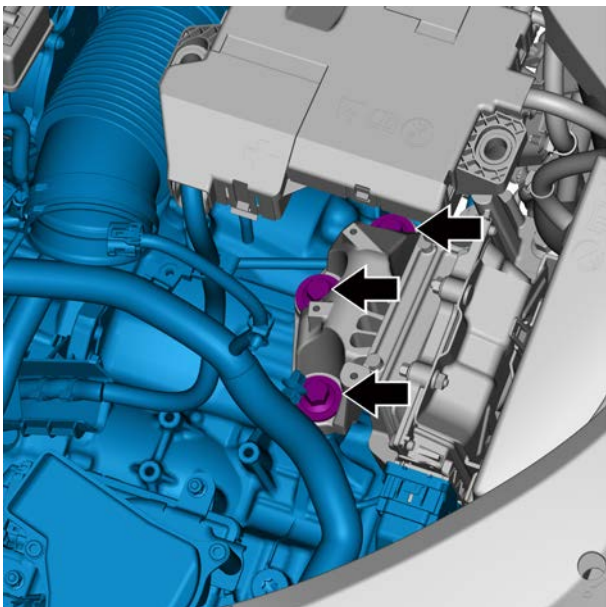
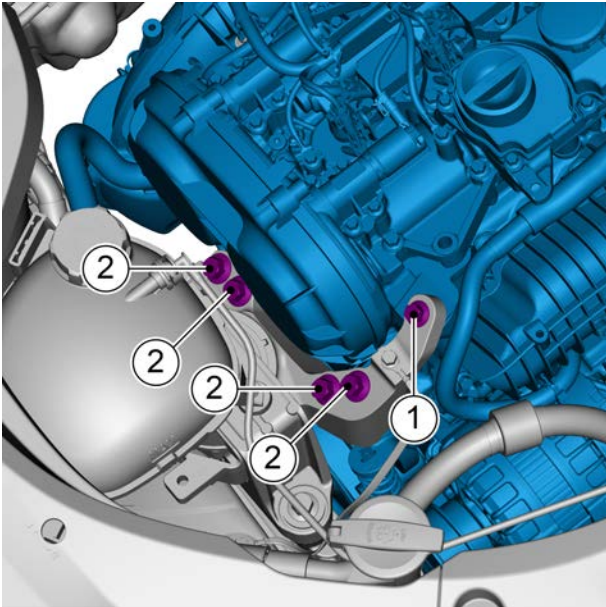
- 55 Slowly lower the hydraulic lift and pull out the drive train.

Caution

Operate with the assistance of multiple maintenance technicians.

- 56 Remove the automatic transmission assembly. See [automatic transmission assembly replacement](#).

Installation procedure



- 1 Install the automatic transmission assembly.
- 2 Operate the hydraulic lift to lift the drive train to the installation position.

Caution

Operate with the assistance of multiple maintenance technicians.

- 3 Install and tighten 4 retaining bolts 2 connecting the vibration insulator assembly RH engine mount and the engine assembly.

Torque:

Step 1: 90 N·m (metric) 66.4 lb-ft (imperial system)

Step 2: turn 120 °

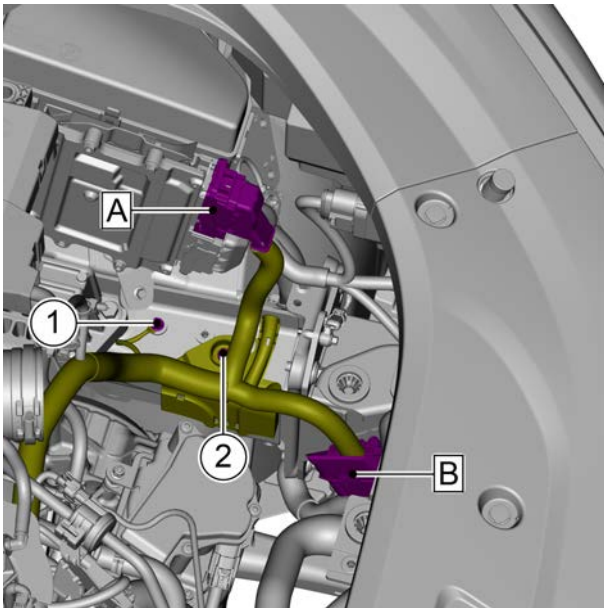
- 4 Install and tighten 1 retaining bolts 1 connecting the vibration insulator assembly RH engine mount and the engine assembly.

Torque: 60 N. m (metric system) 44.3 lb-ft (Imperial system)

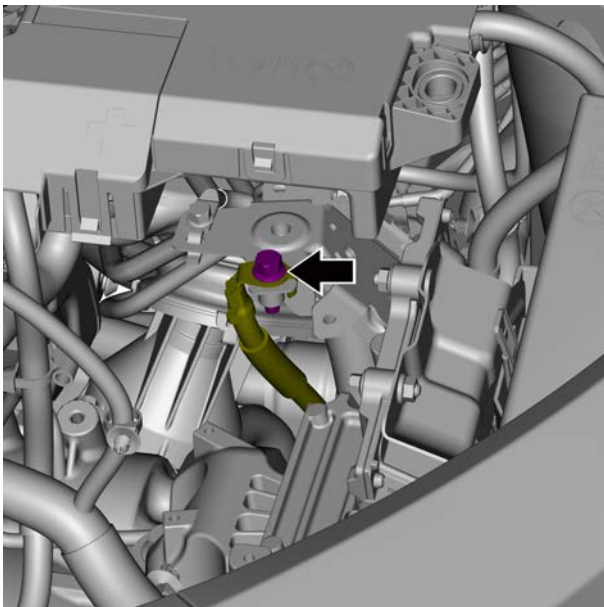
- 5 Install and tighten three retaining bolts 1 connecting the vibration insulator assembly LH engine mount and the transmission.

Torque: 110 N. m (metric system) 81.1 lb-ft (Imperial system)

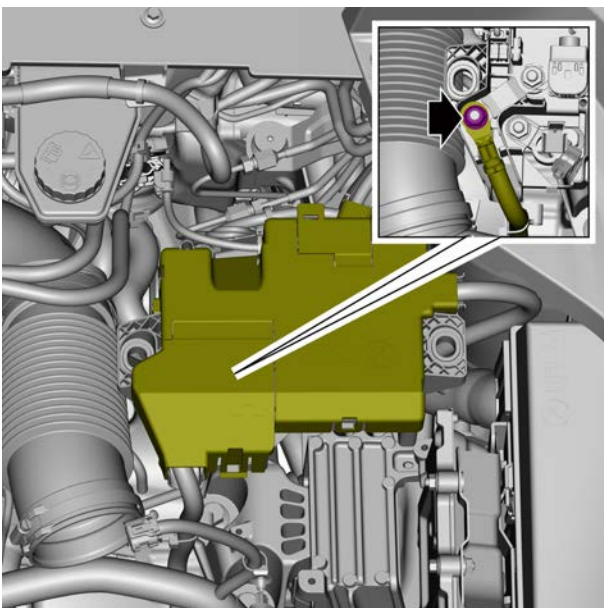
- 6 Remove the hydraulic lift.
- 7 Install the rear pipe of catalytic converter.
- 8 Install the front subframe.
- 9 Install the right rear suspension vibration isolation pad.
- 10 Install the rear left mount insulator.
- 11 Install the front constant velocity drive shaft.
- 12 Install the drive shaft.



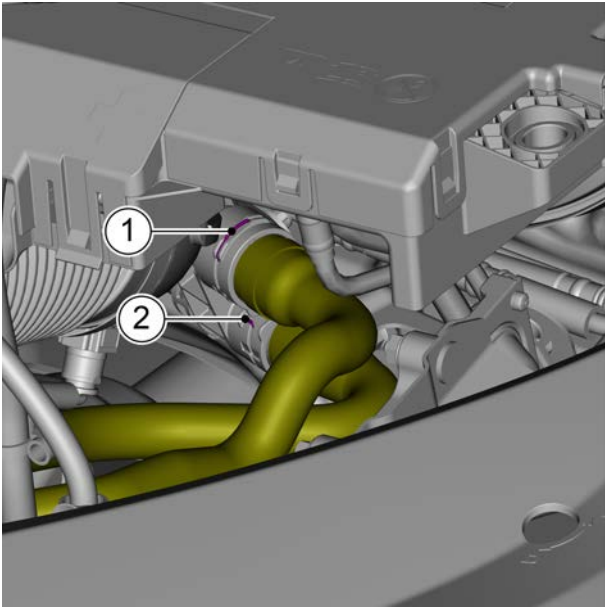
- 13 Connect the Engine Harness Assembly Harness connector B.
- 14 Connect the engine harness assembly harness connector A.
- 15 Install and tighten one retaining bolt 2 of the engine harness assembly.
- 16 Install and tighten one retaining bolt 1 of engine harness assembly grounding.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



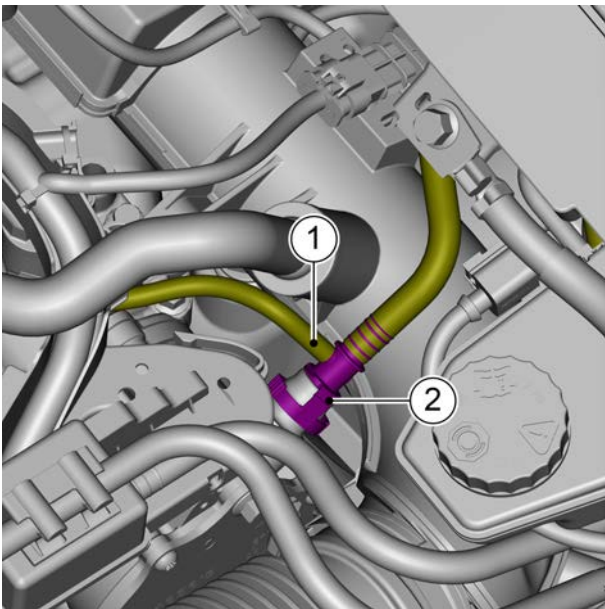
- 17 Install the powertrain grounding harness, and install and tighten one retaining bolt of the powertrain grounding harness.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



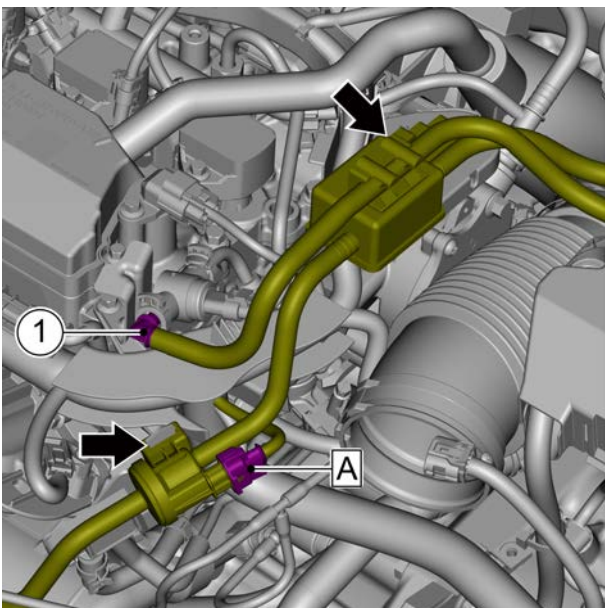
- 18 Install the starter harness assembly, install and tighten one fixing nut 2 of the starter harness assembly.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)
- 19 Close the battery positive cover.



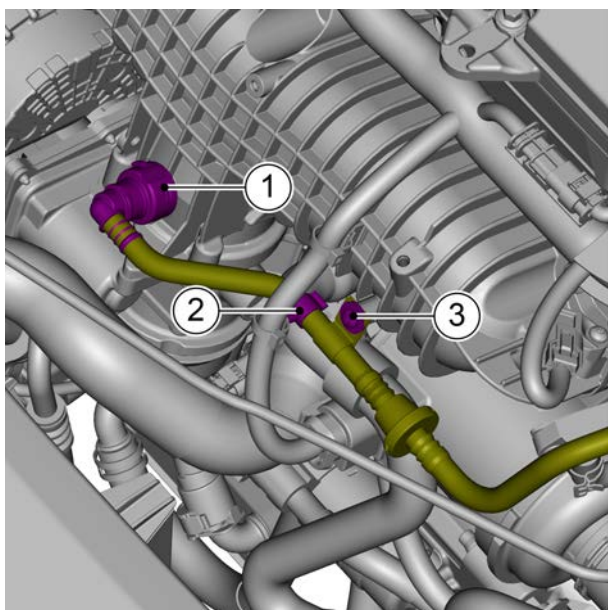
- 20 Connect the radiator outlet pipe and the air conditioner outlet pipe with the transition joint, and reset the quick insert elastic snap ring 1.
- 21 Connect the water intake pipe at the heating engine end of the air conditioner and the outlet pipe of the air conditioner with the excessive joint, and reset the quick insert elastic snap ring 2.



- 22 Install the connector 2 of the vacuum pipe.
- 23 Connect Vacuum Hose 1.



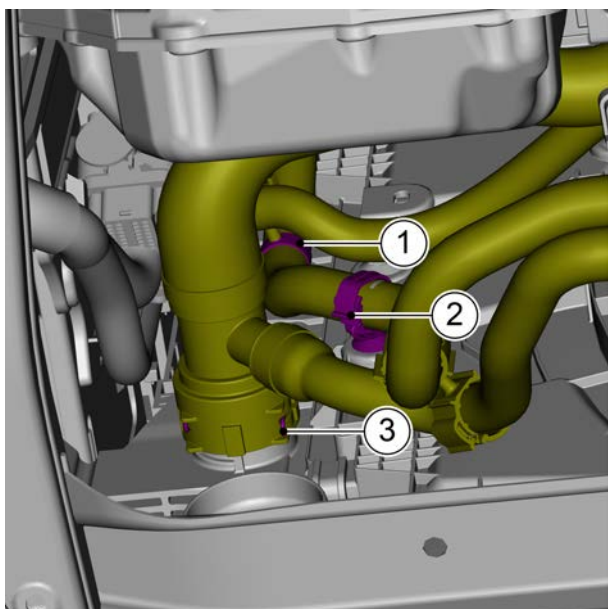
- 24 Install the expansion tank.
- 25 Connect the canister solenoid valve to the canister solenoid valve bracket.
- 26 Install the connector 1 of the long pipeline under the floor.
- 27 Connect the canister purge solenoid harness connector A.



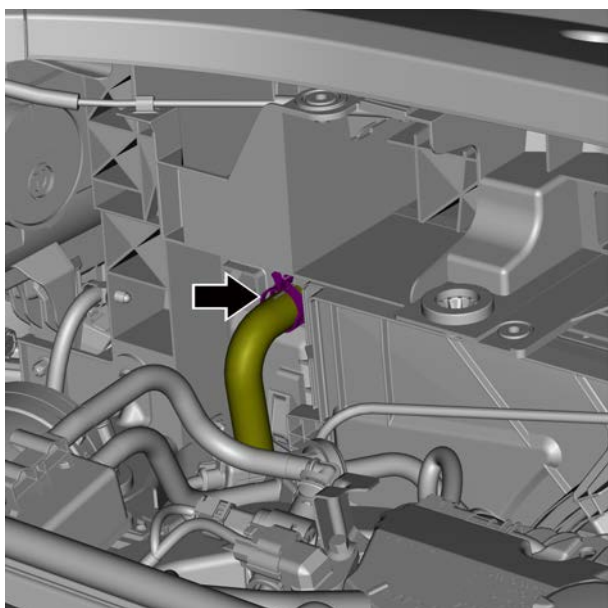
- 28 Install one retaining bolt 3 of the long desorption pipe under the floor.

Torque: 3.5 N. m (metric system) 2.6 lb-ft (Imperial system)

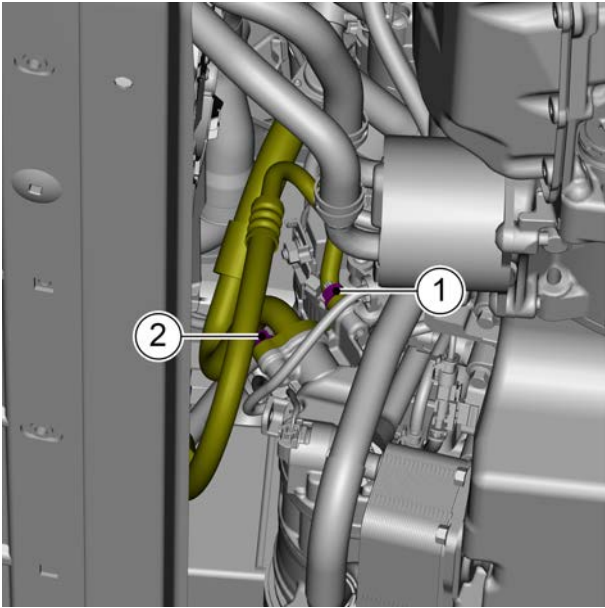
- 29 Install the long desorption pipe clamp 2 under the floor.
30 Install the connector 1 of the long desorption pipe under the floor.



- 31 Connect the radiator outlet pipe with the radiator and reset the quick insert elastic snap ring 3.
32 Install fixing clip 2 of inlet pipe of transmission fluid cooler.
33 Install the transmission fluid cooler inlet pipe clamp 1.



- 34 Connect the inlet pipe of the transmission fluid cooler with the radiator, and install the fixing clamp of the inlet pipe of the transmission fluid cooler.

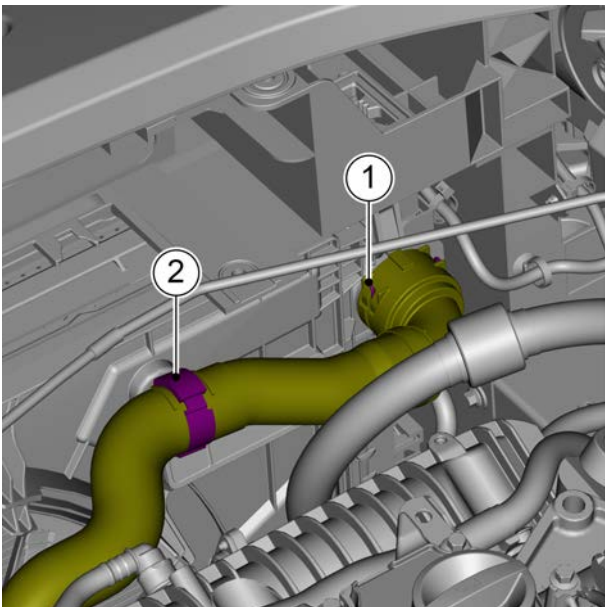


- 35 Connect the A/C high-pressure pipe assembly with the compressor, install and tighten one fixing nut 1 of the A/C high-pressure pipe assembly.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

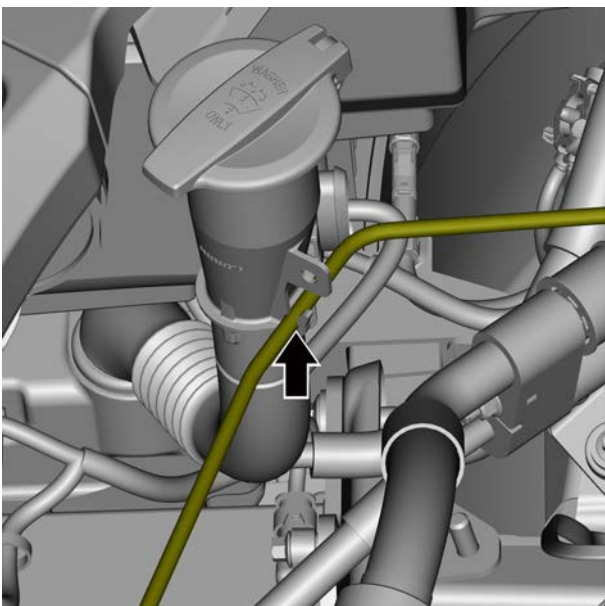
- 36 Connect the A/C low-pressure pipe assembly and the compressor, install and tighten one fixing nut 2 of the A/C low-pressure pipe assembly.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

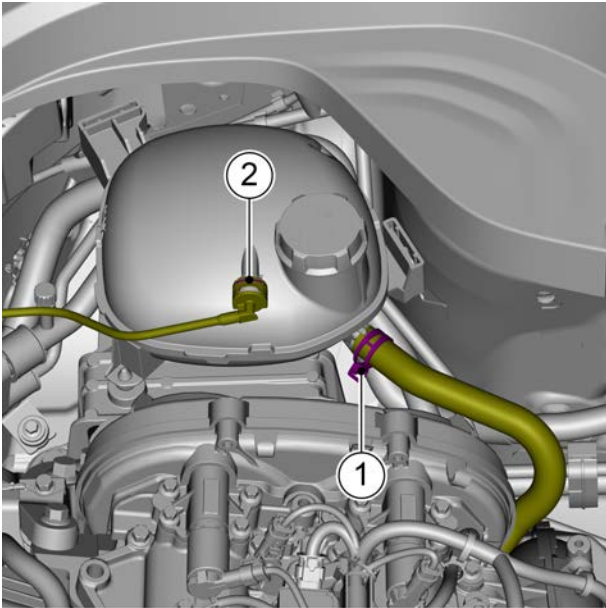


- 37 Install fixing clip 2 of radiator inlet pipe.

- 38 Connect the radiator inlet pipe with the radiator and reset the quick insert elastic snap ring 1.



- 39 Connect the exhaust pipe and the filler pipe of the windshield washer.



- 40 Connect the outlet pipe of the expansion tank with the expansion tank, and install the fixing clamp 1 of the outlet pipe of the expansion tank.
- 41 Connect the exhaust pipe and the expansion tank, and reset the Quick- insert Elastic Snap Ring 2.

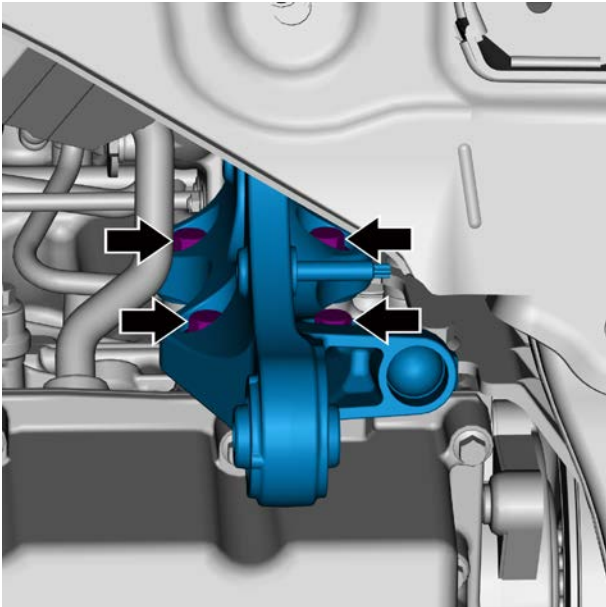
- 42 Install the intercooler intake pipe assembly.
- 43 Install the intercooler outlet pipe assembly.
- 44 Install air pressure and air temperature sensor 2.
- 45 Fill engine coolant.
- 46 Install the engine fender.
- 47 Lower the vehicle.
- 48 Refill air conditioner refrigerant.
- 49 Install the battery bracket assembly.
- 50 Install the battery heat shield.
- 51 Install the air inlet pipe of the air filter.
- 52 Install the air filter assembly.
- 53 Install the engine trim cover assembly.
- 54 Connect the battery cable, use the diagnostic instrument to self-study the engine assembly, monitor the water temperature and the speed of the electronic water pump with the diagnostic instrument, and observe the liquid level of the expansion tank. If the liquid level drops, add coolant in time; until the large circulation is opened, add coolant to the scribed line on the expansion tank, and tighten the lid of the expansion tank.
- 55 Close the engine compartment cover.

2.5.7.15 Replacement of axle shaft support components

Removal procedure

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the engine fender, see [Engine fender replacement](#).

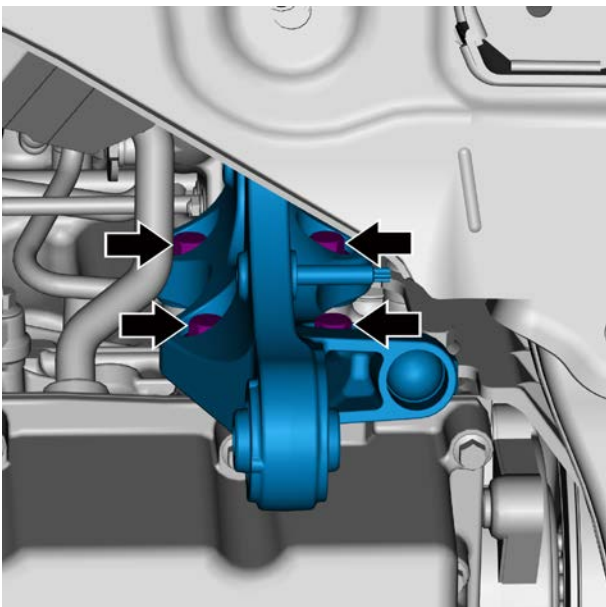
- 3 Remove the front right wheel. See [wheel assembly replacement](#).
- 4 Remove the front right constant speed drive shaft. See [replacement of front right constant speed drive shaft](#).
- 5 Remove the right rear suspension vibration isolation pad. See [replacement of right rear suspension vibration isolation pad](#).
- 6 Remove the 4 retaining bolts of the axle shaft support components and remove the axle shaft support components.



Installation procedure

- 1 Install the axle shaft support components, install and tighten the four retaining bolts of the axle shaft support components.

Torque: 60 N. m (metric system) 44.3 lb-ft (Imperial system)



- 2 Install the right rear suspension vibration isolation pad.
- 3 Install the front right constant velocity drive shaft.
- 4 Install the front right wheel.

- 5 Install the engine fender.
- 6 Lower the vehicle.

2.5.7.16 Rear timing belt shield replacement

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

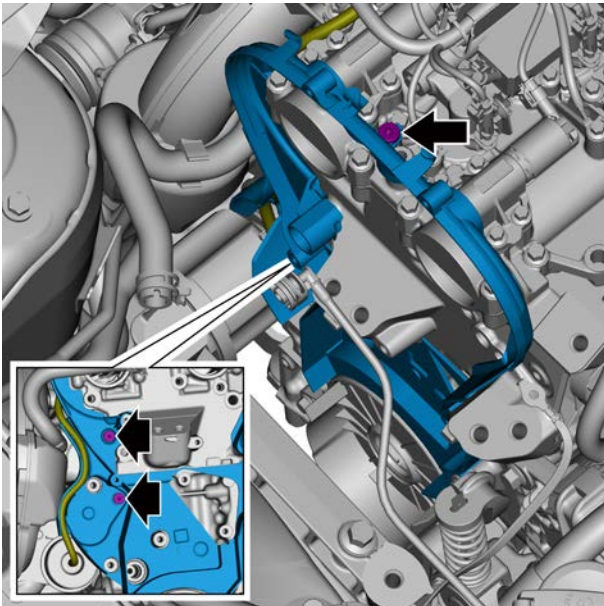
See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

Warning !

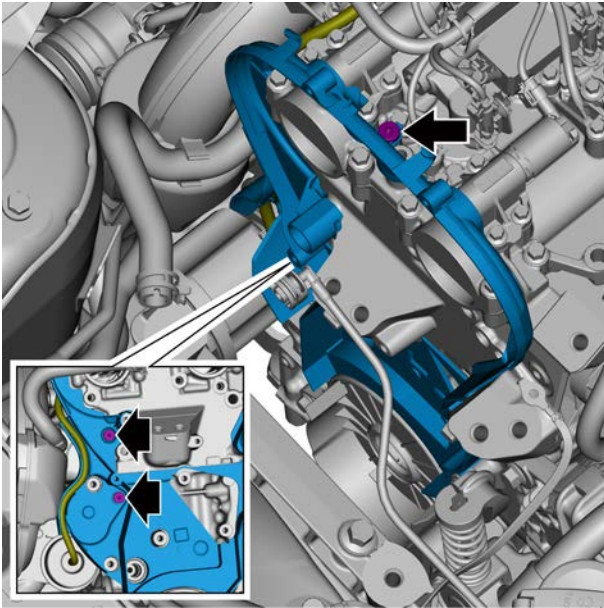
See "Warnings Regarding Fuel Pressure Release" in [Warnings and Precautions](#).

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 5 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 6 Remove the high-pressure oil pipe components. See [replacement of high-pressure oil pipe assembly](#).
- 7 Remove the fuel sensor, see [fuel sensor replacement](#).
- 8 Remove the high pressure fuel pump, refer to [replacement of the high pressure fuel pump](#).
- 9 Remove vacuum pump, refer to [replacement of vacuum pump](#).
- 10 Lift the vehicle, see [Lift the vehicle](#)
- 11 Remove the engine fender, see [Engine fender replacement](#).
- 12 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 13 Remove the right engine compartment trim panel, see [replacement of left engine compartment trim panel](#).
- 14 Remove the expansion tank, see [replacement of expansion tank](#).
- 15 Lift the engine assembly slightly with a jack.

- 16 Remove the vibration insulator assembly RH engine mount. See [replacement of the vibration insulator assembly RH engine mount](#).
- 17 Remove the driving belt, refer to [replacement of the driving belt](#).
- 18 Remove the front right wheel. See [wheel assembly replacement](#).
- 19 Remove the right front wheel housing fender. See [replacement of front left wheel housing fender assembly](#).
- 20 Remove the damping belt pulley, Refer to [replacement of damping belt pulley](#).
- 21 Remove the front timing belt shield. See [replacement of front timing belt shield](#).
- 22 Remove timing belt, refer to [Replacement of timing belt](#).
- 23 Remove VVT components, refer to [replacement of VVT components](#).
- 24 Remove the timing belt tensioner. See [replacement of timing belt tensioner](#).
- 25 Remove the timing idler. See [timing idler replacement](#).
- 26 Remove 3 retaining bolts from the rear timing belt shield.
- 27 Disconnect the vacuum hose from the rear timing belt shield and remove the rear timing belt shield.



Installation procedure



- 1 Install the rear timing belt shield and connect the vacuum hose with the rear timing belt shield.
- 2 Install and tighten the 3 retaining bolts of the rear timing belt shield.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 3 Install the timing idler.
- 4 Install the timing belt tensioner.
- 5 Install VVT components
- 6 Install timing belt.
- 7 Install the front timing belt guard.
- 8 Install the damping belt pulley.
- 9 Install the right front wheel housing.
- 10 Install the front right wheel.
- 11 Install the drive belt.
- 12 Install the right vibration insulator assembly of engine.
- 13 Lower and take out the jack.
- 14 Install the expansion tank.
- 15 Install the right engine compartment trim panel.
- 16 Fill engine coolant.
- 17 Install the engine fender.
- 18 Lower the vehicle.
- 19 Install vacuum pump.
- 20 Install the high-pressure fuel pump.
- 21 Install the fuel sensor.
- 22 Install the high-pressure oil pipe components.
- 23 Install the upper outlet pipe of the air filter.
- 24 Install the engine trim cover assembly.
- 25 Connect the negative battery cable.
- 26 Close the engine compartment cover.

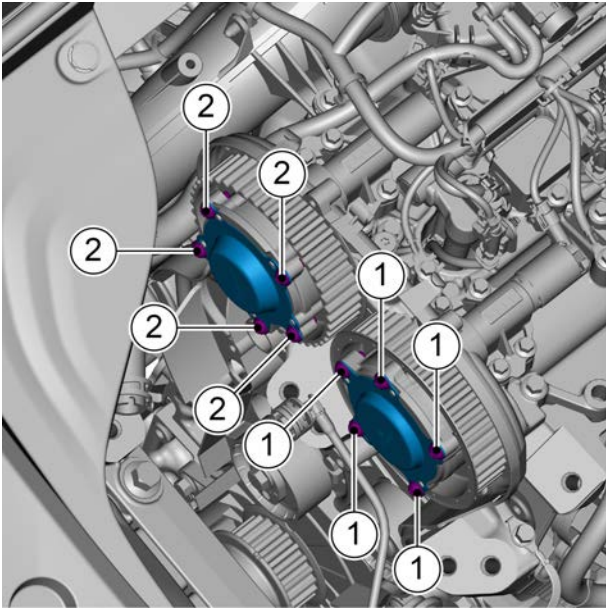
2.5.7.17 Replacement of timing belt cover 1

Removal procedure

Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 6 Remove the right engine compartment trim panel, see [replacement of left engine compartment trim panel](#).
- 7 Remove the expansion tank, see [replacement of expansion tank](#).
- 8 Lift the engine assembly slightly with a jack.
- 9 Remove the vibration insulator assembly RH engine mount. See [replacement of the vibration insulator assembly RH engine mount](#).
- 10 Remove the driving belt, refer to [replacement of the driving belt](#).
- 11 Remove the front right wheel. See [wheel assembly replacement](#).
- 12 Remove the right front wheel housing fender. See [replacement of front left wheel housing fender assembly](#).
- 13 Remove the damping belt pulley, Refer to [replacement of damping belt pulley](#).
- 14 Remove the front timing belt shield. See [replacement of front timing belt shield](#).



- 15 Remove the five retaining bolts 1 of the VVT cover plate on the intake side, and remove the VVT cover plate on the intake side and the O-ring of the intake VVT components.

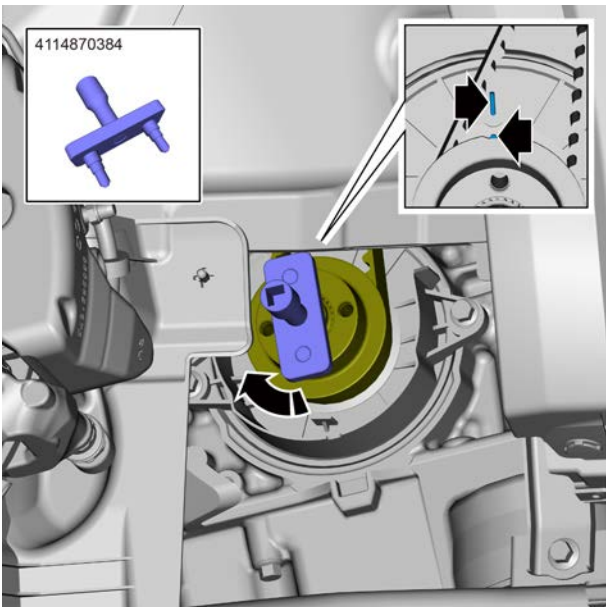
Caution

Protect VVT components with oil absorbent cloth.

- 16 Remove the five retaining bolts 2 of the exhaust side VVT cover plate, and remove the exhaust side VVT cover plate and the O-ring of the exhaust VVT components.

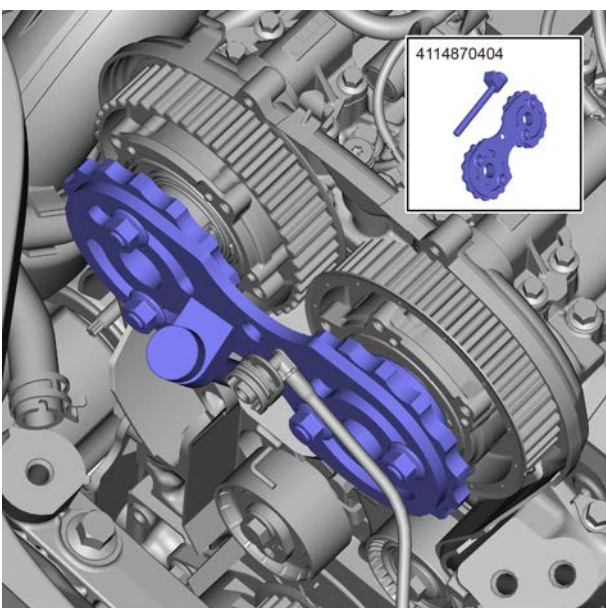
Caution

Protect VVT components with oil absorbent cloth.



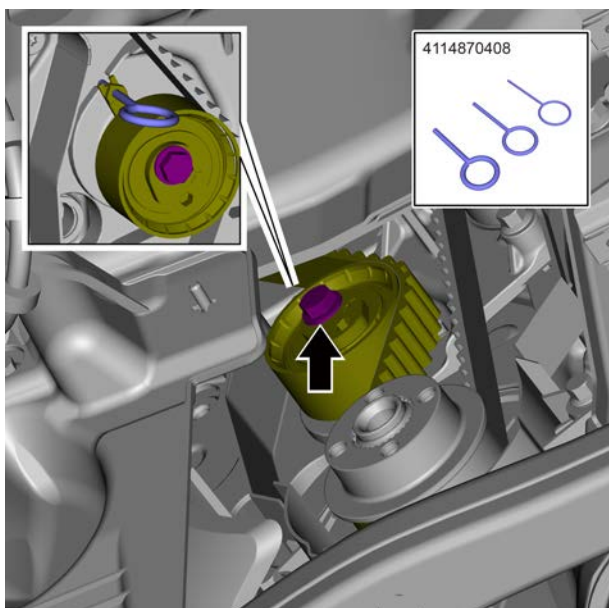
- 17 Rotate the crankshaft clockwise with the special tool to align the pointer of the crankshaft timing pulley components with the mark on the crankshaft front oil seal.

Special tool for crankshaft rotation: 4114870384



- 18 Install the special tool to fix the VVT components.

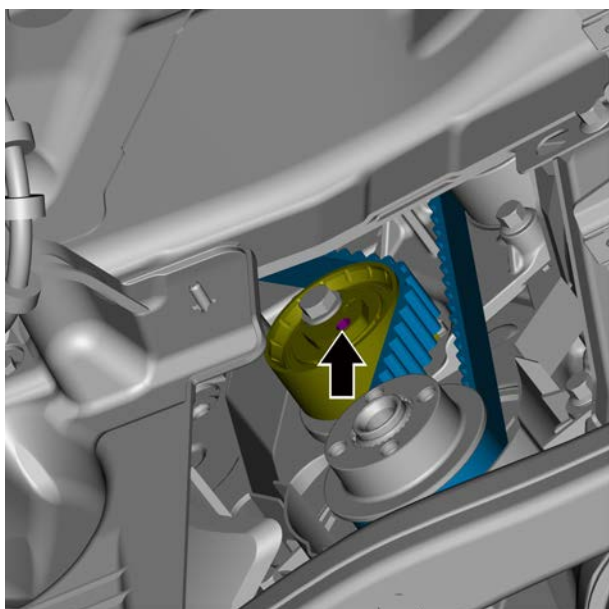
Special tool for fixing VVT: 4114870404



- 19 Insert the special tool into the locking hole of the timing belt tensioner.

Positioning pin set: 4114870408

- 20 Loosen one retaining bolt of timing belt tensioner.



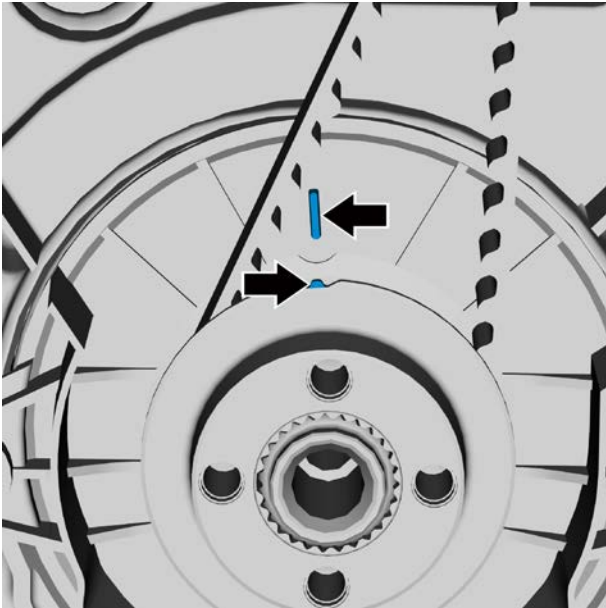
- 21 Use the Allen key to adjust the timing belt tensioner clockwise to make the timing belt in the maximum slack state.

- 22 Remove the timing belt.

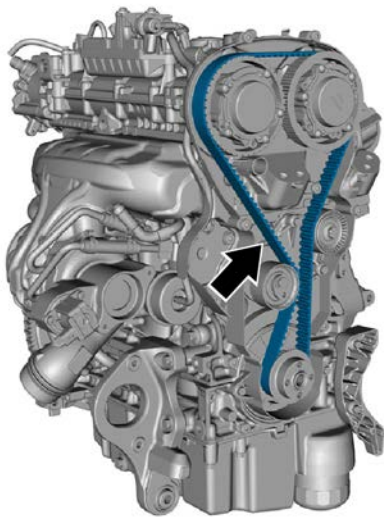
Caution

1. Do not bend the timing belt.
2. Replacing the timing belt requires synchronous replacement of the tensioner and idler.

Installation procedure



- 1 Determine whether the pointer of the crankshaft timing pulley components is aligned with the mark on the crankshaft front oil seal.

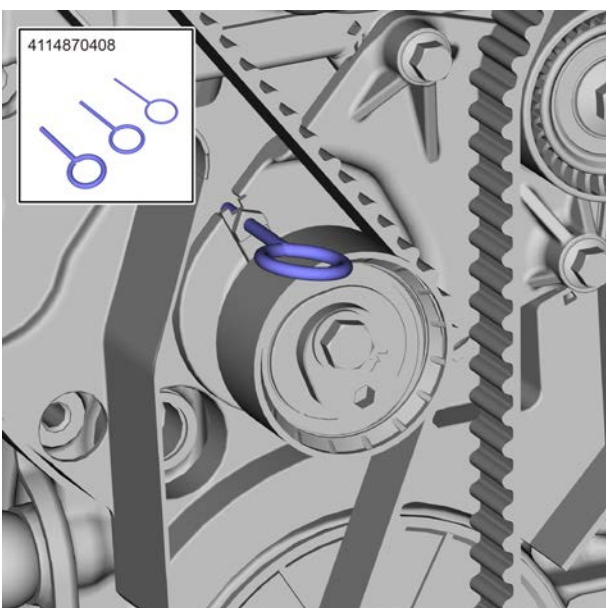


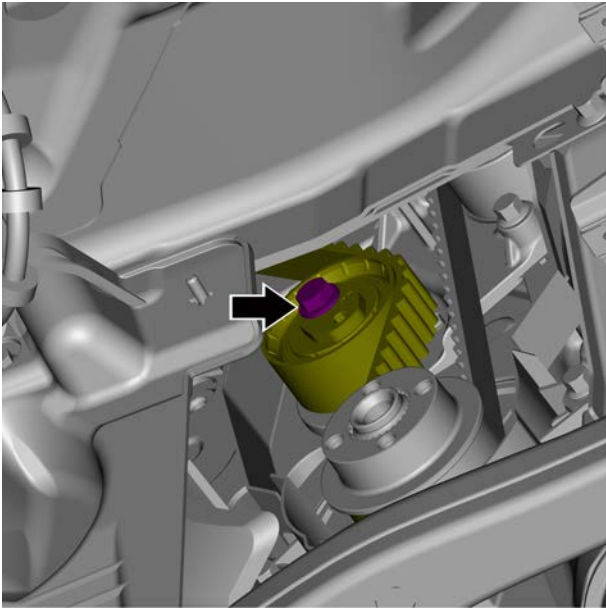
- 2 Put the timing belt on the crankshaft timing pulley components and VVT assembly to ensure that all teeth can mesh correctly with the pulley. Tighten the belt counterclockwise from the crankshaft timing pulley components until the belt is installed on the timing belt tensioner.

Caution

1. Do not bend the timing belt.
 2. Confirm that the belt position is in the middle of the VVT pulley after completing the belt assembly.
 3. Determine whether the pointer of the crankshaft timing pulley components is aligned with the mark on the crankshaft front oil seal. If not, reinstall the timing belt.
- 3 Remove the timing belt tensioner positioning pin.

Positioning pin set: 4114870408





- 4 Tighten 1 retaining bolt of timing belt tensioner.

Torque:

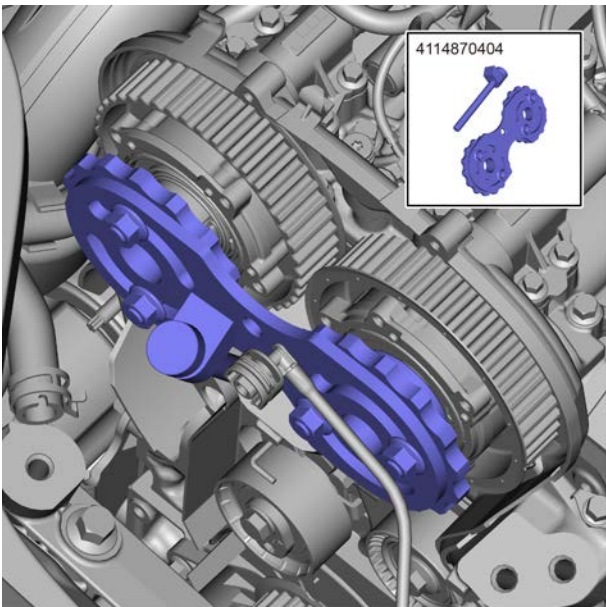
Step 1: 5 N·m (metric) 3.69 lb-ft (imperial system)

Step 2: reverse angle $45^{\circ} \pm 5^{\circ}$

- 5 Use the inner six angle wrench to adjust the timing belt tensioner adjusting arm to the pointer between 0 and 9 degrees, then adjust the timing belt tensioner adjusting arm to the pointer to reach the right edge of the rear panel notch.

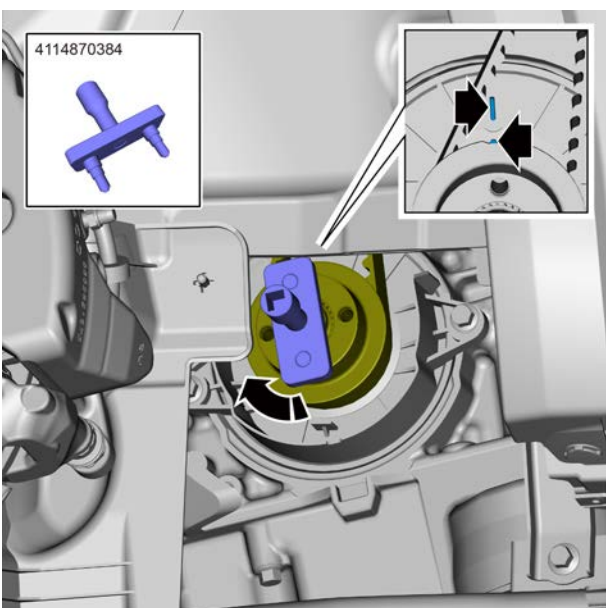
- 6 Tighten 1 retaining bolt of timing belt tensioner.

Torque: 25 N·m (metric system) 18.4 lb-ft (imperial system)



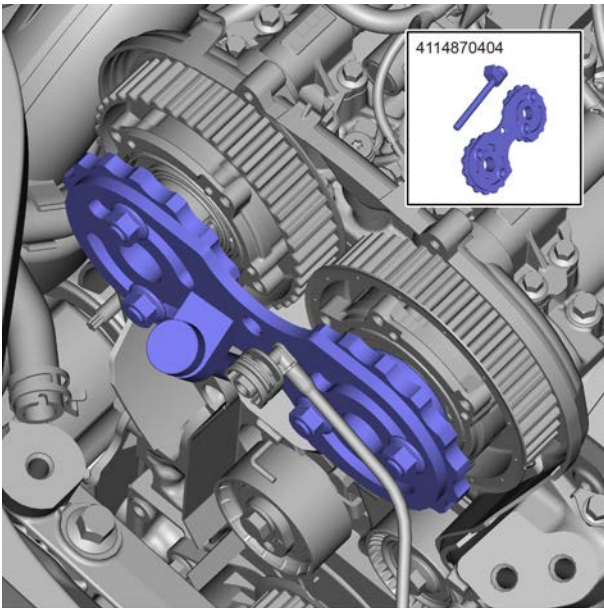
- 7 Remove the special tool for fixing VVT components.

Special tool for fixing VVT: 4114870404



- 8 Use the special tool to rotate the crankshaft clockwise for two turns to align the pointer of the crankshaft timing pulley components with the mark on the crankshaft front oil seal.

Special tool for crankshaft rotation: 4114870384



- 9 Install the special tool to fix the VVT components.

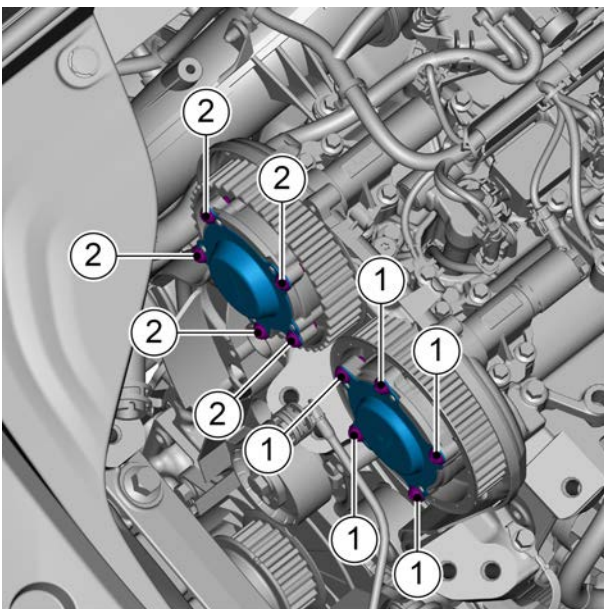
Special tool for fixing VVT: 4114870404

Caution

When the assembly is correct, the VVT fixing special tool can be installed easily.

- 10 Remove the special tool for fixing VVT components.

Special tool for fixing VVT: 4114870404



- 11 Install the O-ring seal of the intake VVT components and the intake side VVT cover plate, and install and tighten the five retaining bolts 1 of the intake side VVT cover plate.

Caution

The O-ring of intake VVT components is a disposable vulnerable part, and a new O-ring of intake VVT assembly shall be replaced.

- 12 Install the O-ring seal of the exhaust VVT components and the exhaust side VVT cover plate, and install and tighten the five retaining bolts 2 of the exhaust side VVT cover plate.

Caution

The O-ring of exhaust VVT components is a disposable vulnerable part, and a new O-ring of exhaust VVT assembly shall be replaced.

- 13 Install the front timing belt guard.
 14 Install the damping belt pulley.
 15 Install the right front wheel housing.
 16 Install the front right wheel.
 17 Install the drive belt.
 18 Install the right vibration insulator assembly of engine.
 19 Lower and take out the jack.
 20 Install the expansion tank.
 21 Install the right engine compartment trim panel.
 22 Fill engine coolant.
 23 Install the engine fender.

- 24 Lower the vehicle.
- 25 Install the engine trim cover assembly.
- 26 Close the engine compartment cover.

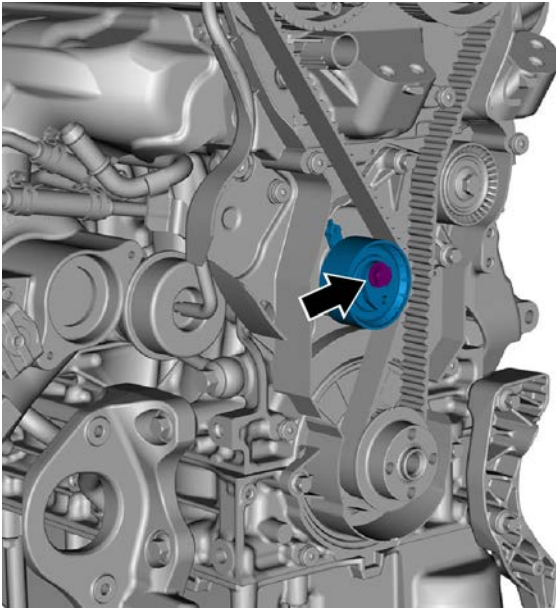
2.5.7.18 Timing belt tensioner replacement

Removal procedure

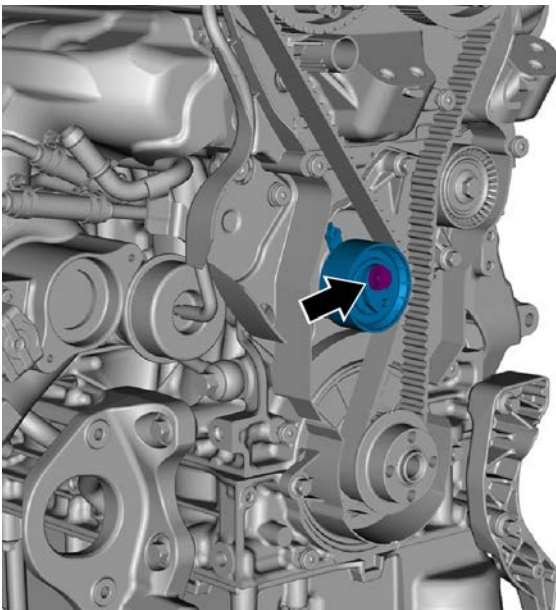
Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 6 Remove the right engine compartment trim panel, see [replacement of left engine compartment trim panel](#).
- 7 Remove the expansion tank, see [replacement of expansion tank](#).
- 8 Lift the engine assembly slightly with a jack.
- 9 Remove the vibration insulator assembly RH engine mount. See [replacement of the vibration insulator assembly RH engine mount](#).
- 10 Remove the driving belt, refer to [replacement of the driving belt](#).
- 11 Remove the front right wheel. See [wheel assembly replacement](#).
- 12 Remove the right front wheel housing fender. See [replacement of front left wheel housing fender assembly](#).
- 13 Remove the damping belt pulley, Refer to [replacement of damping belt pulley](#).
- 14 Remove the front timing belt shield. See [replacement of front timing belt shield](#).



- 15 Remove timing belt, refer [to Replacement of timing belt.](#)
- 16 Remove one retaining bolt of the timing belt tensioner and remove the timing belt tensioner.



Installation procedure

- 1 Install the timing belt tensioner onto the timing idler bracket, install and Pre-tighten one retaining bolt of the timing belt tensioner.

Torque:

Step 1: 5 N·m (metric) 3.69 lb-ft (imperial system)

Step 2: reverse angle $45^\circ \pm 5^\circ$, fix the bolt (ensure that the tensioner is adjustable)

Step 3: adjust the tensioner pointer to a reasonable position

Step 4: 25 n · m (metric system) 18.4 LB ft (British)

Caution

The timing belt tensioner shall have the same temperature as the engine to stabilize the belt tension, so do not install the timing belt tensioner on a hot or not fully cooled engine. The above requirements also apply to reassembled engine tensioners.

- 2 Install timing belt.
- 3 Install the front timing belt guard.
- 4 Install the damping belt pulley.
- 5 Install the right front wheel housing.
- 6 Install the front right wheel.
- 7 Install the drive belt.
- 8 Install the right vibration insulator assembly of engine.
- 9 Lower and take out the jack.

- 10 Install the expansion tank.
- 11 Install the right engine compartment trim panel.
- 12 Fill engine coolant.
- 13 Install the engine fender.
- 14 Lower the vehicle.
- 15 Install the engine trim cover assembly.
- 16 Close the engine compartment cover.

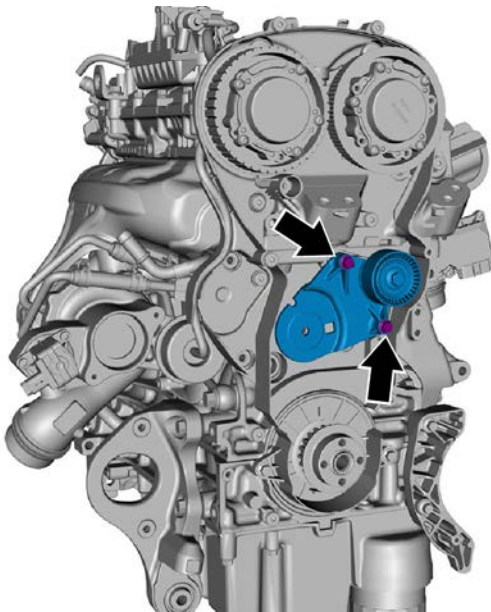
2.5.7.19 Timing idler gear replacement

Removal procedure

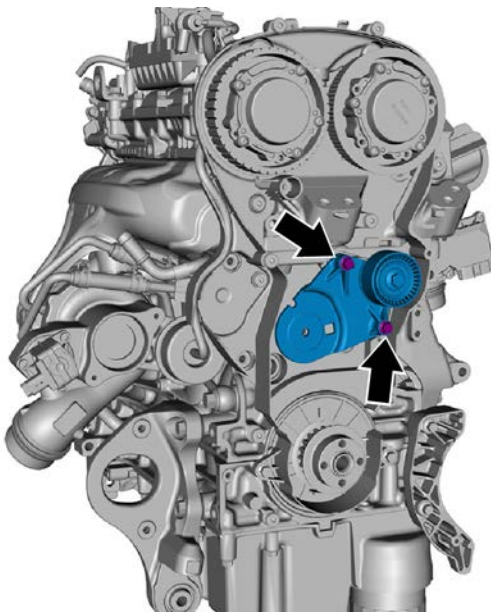
Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 6 Remove the right engine compartment trim panel, see [replacement of left engine compartment trim panel](#).
- 7 Remove the expansion tank, see [replacement of expansion tank](#).
- 8 Lift the engine assembly slightly with a jack.
- 9 Remove the vibration insulator assembly RH engine mount. See [replacement of the vibration insulator assembly RH engine mount](#).
- 10 Remove the driving belt, refer to [replacement of the driving belt](#).
- 11 Remove the front right wheel. See [wheel assembly replacement](#).
- 12 Remove the right front wheel housing fender. See [replacement of front left wheel housing fender assembly](#).
- 13 Remove the damping belt pulley, Refer to [replacement of damping belt pulley](#).
- 14 Remove the front timing belt shield. See [replacement of front timing belt shield](#).
- 15 Remove timing belt, refer to [Replacement of timing belt](#).



- 16 Remove the timing belt tensioner. See [replacement of timing belt tensioner](#).
- 17 Remove 2 retaining bolts of the timing idler gear and remove the timing idler gear.



Installation procedure

- 1 Install the timing idler onto the cylinder block, install and tighten the 2 retaining bolts of the timing idler.

Torque: 16 N•m (metric system) 11.80 lb-ft (imperial system)

Caution

Apply p80 oil to the mating surface of timing belt tensioner on the timing idler bracket.

- 2 Install the timing belt tensioner.
- 3 Install timing belt.
- 4 Install the front timing belt guard.
- 5 Install the damping belt pulley.
- 6 Install the right front wheel housing.
- 7 Install the front right wheel.
- 8 Install the drive belt.
- 9 Install the right vibration insulator assembly of engine.
- 10 Lower and take out the jack.

- 11 Install the expansion tank.
- 12 Install the right engine compartment trim panel.
- 13 Fill engine coolant.
- 14 Install the engine fender.
- 15 Lower the vehicle.
- 16 Install the engine trim cover assembly.
- 17 Close the engine compartment cover.

2.5.7.20 Replacement of VVT components

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

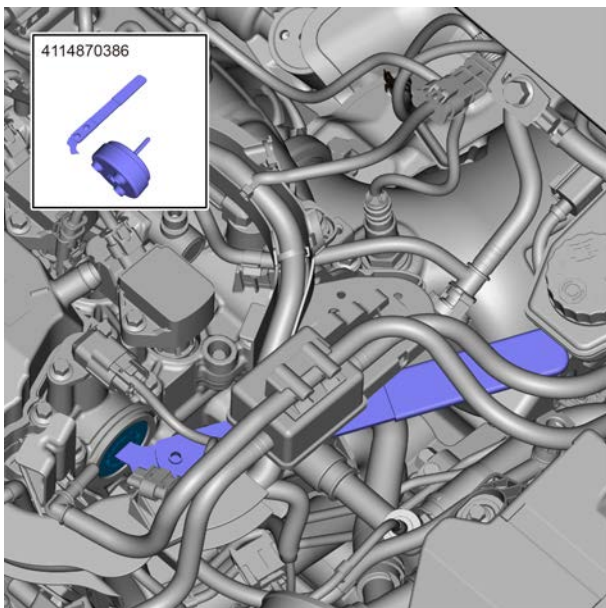
Warning !

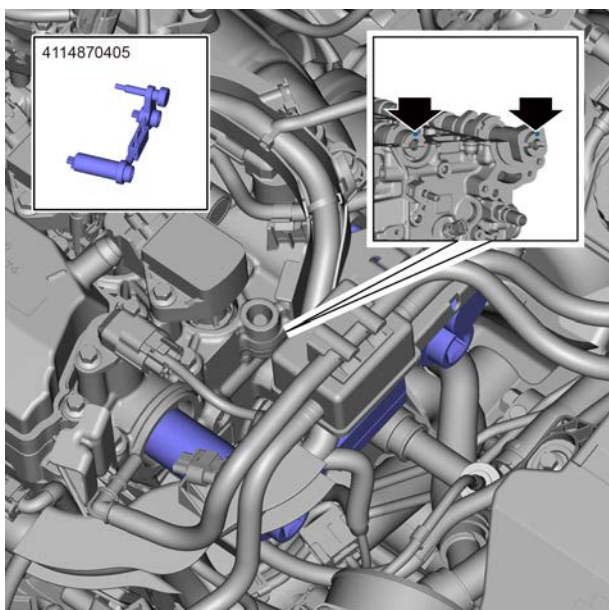
See "Warnings Regarding Fuel Pressure Release" in [Warnings and Precautions](#).

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 5 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 6 Remove the high-pressure oil pipe components. See [replacement of high-pressure oil pipe assembly](#).
- 7 Remove the fuel sensor, see [fuel sensor replacement](#).
- 8 Remove the high pressure fuel pump, refer to [replacement of the high pressure fuel pump](#).
- 9 Remove vacuum pump, refer to [replacement of vacuum pump](#).
- 10 Lift the vehicle, see [Lift the vehicle](#)
- 11 Remove the engine fender, see [Engine fender replacement](#).
- 12 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).

- 13 Remove the right engine compartment trim panel, see [replacement of left engine compartment trim panel](#).
- 14 Remove the expansion tank, see [replacement of expansion tank](#).
- 15 Lift the engine assembly slightly with a jack.
- 16 Remove the vibration insulator assembly RH engine mount. See [replacement of the vibration insulator assembly RH engine mount](#).
- 17 Remove the driving belt, refer to [replacement of the driving belt](#).
- 18 Remove the front right wheel. See [wheel assembly replacement](#).
- 19 Remove the right front wheel housing fender. See [replacement of front left wheel housing fender assembly](#).
- 20 Remove the damping belt pulley, Refer to [replacement of damping belt pulley](#).
- 21 Remove the front timing belt shield. See [replacement of front timing belt shield](#).
- 22 Remove timing belt, refer [to Replacement of timing belt](#).
- 23 Use the special tool to remove the camshaft plug.

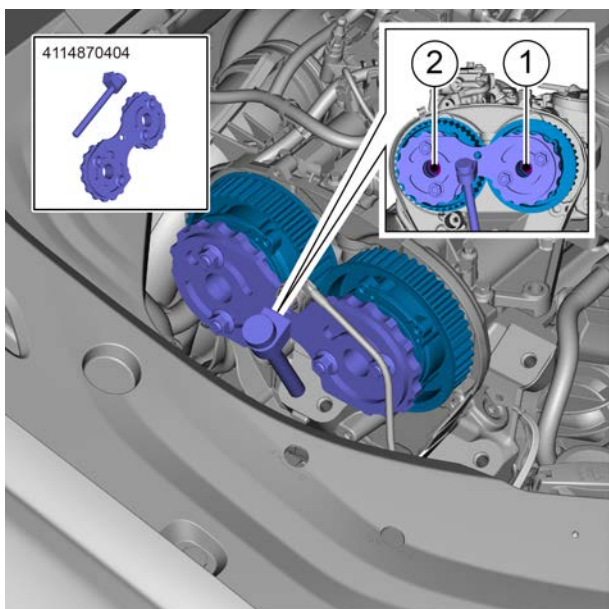
**Special tool for removing oil seal and plug cover:
4114870386**





24 Install the special tool to fix the camshaft.

Special tool for camshaft position fixing: 4114870405



25 Loosen one retaining bolt 1 of intake VVT components.

26 Remove one retaining bolt 2 of exhaust VVT components.

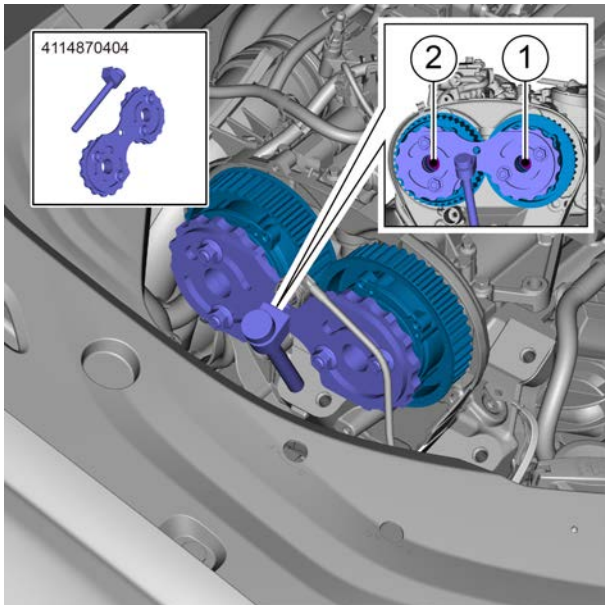
27 Remove the VVT fixing tool.

Special tool for fixing VVT: 4114870404

28 Remove one retaining bolt 1 of the intake VVT components and remove the intake VVT components.

29 Remove one retaining bolt 2 of the exhaust VVT components and remove the exhaust VVT components.

Installation procedure



- 1 Install the exhaust VVT components, install and Pre-tighten one retaining bolt 2 of the exhaust VVT components.

Caution

The retaining bolts of exhaust VVT components are disposable vulnerable parts, and the retaining bolts of exhaust VVT components shall be replaced with new ones.

- 2 Install the intake VVT components, install and Pre-tighten one retaining bolt 1 of the intake VVT components.

Caution

The retaining bolt of intake VVT components is a disposable vulnerable part, and the retaining bolt of intake VVT components shall be replaced with a new one.

- 3 Install the VVT fixing tool.

Special tool for fixing VVT: 4114870404

- 4 Tighten one retaining bolt 1 of intake VVT components.

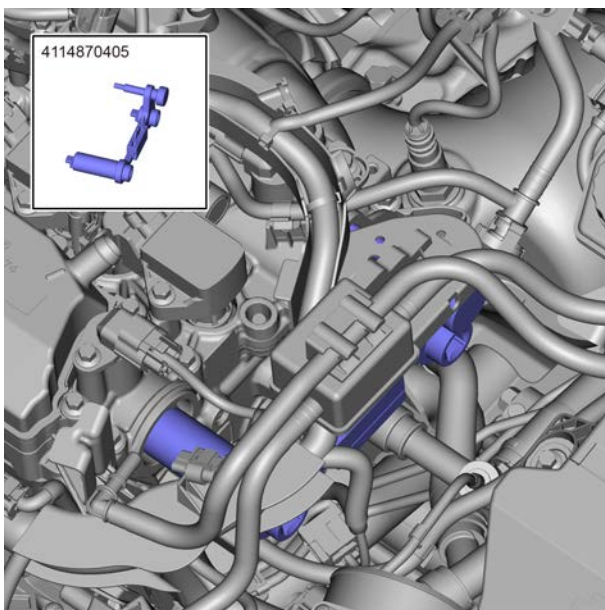
Torque: 90 N. m (metric system) 66.4 lb-ft (Imperial system)

- 5 Tighten one retaining bolt 2 of exhaust VVT components.

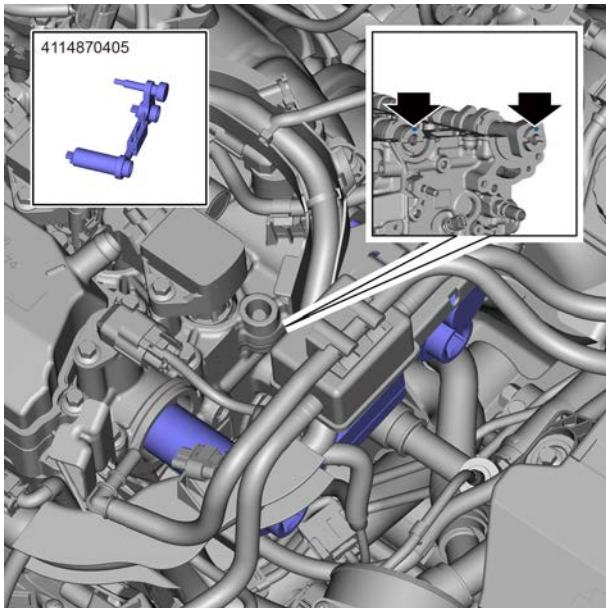
Torque: 90 N. m (metric system) 66.4 lb-ft (Imperial system)

- 6 Remove the special tool for fixing camshaft.

Special tool for camshaft position fixing: 4114870405



- 7 Install timing belt.



- 8 Install the special tool to fix the camshaft.

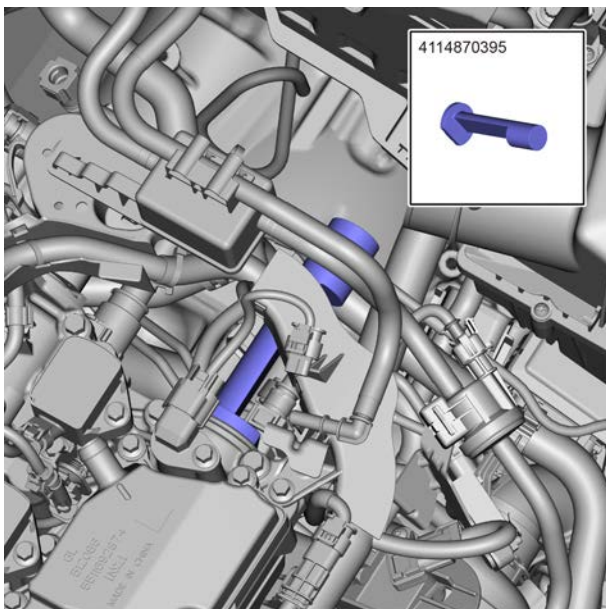
Special tool for camshaft position fixing: 4114870405

Caution

1. Make sure that the camshaft mark is vertical and upward.
2. When the assembly is correct, the special tool for fixing the camshaft position can be installed easily.

- 9 Remove the special tool for fixing camshaft.

Special tool for camshaft position fixing: 4114870405



- 10 Use the special tool to install the camshaft plug.

**Special tool for camshaft rear sealing assembly:
4114870395**

- 11 Install the front timing belt guard.
- 12 Install the damping belt pulley.
- 13 Install the right front wheel housing.
- 14 Install the front right wheel.
- 15 Install the drive belt.
- 16 Install the right vibration insulator assembly of engine.
- 17 Lower and take out the jack.
- 18 Install the expansion tank.
- 19 Install the right engine compartment trim panel.
- 20 Fill engine coolant.
- 21 Install the engine fender.
- 22 Lower the vehicle.

- 23 Install vacuum pump.
- 24 Install the high-pressure fuel pump.
- 25 Install the fuel sensor.
- 26 Install the high-pressure oil pipe components.
- 27 Install the upper outlet pipe of the air filter.
- 28 Install the engine trim cover assembly.
- 29 Connect the negative battery cable.
- 30 Close the engine compartment cover.

2.5.7.21 Replacement of intake/exhaust camshaft

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

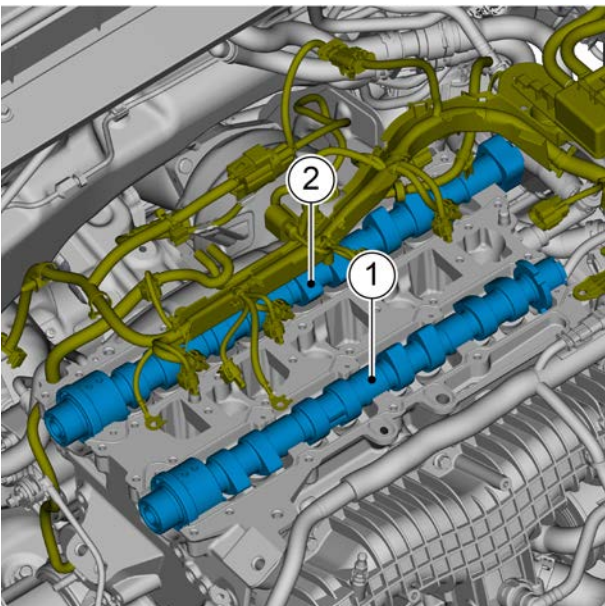
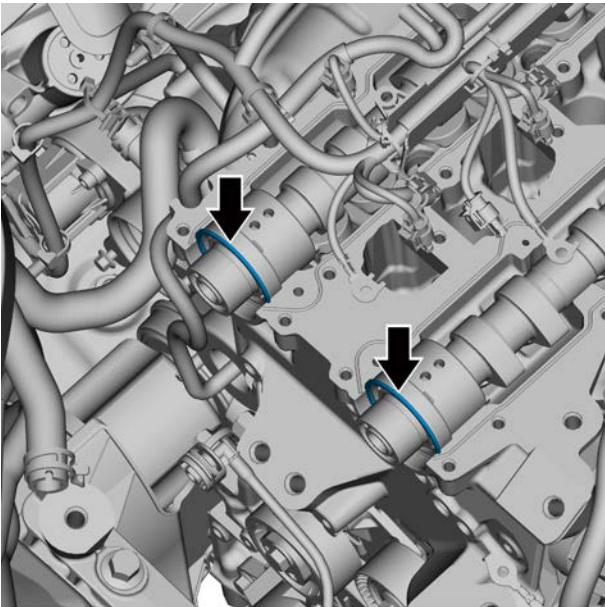
Warning !

See "Warnings Regarding Fuel Pressure Release" in [Warnings and Precautions](#).

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer [to Release procedure](#) of fuel pressure.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 5 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 6 Remove the lower outlet pipe of air filter. See [replacement of lower outlet pipe of air filter](#).
- 7 Remove the high-pressure oil pipe components. See [replacement of high-pressure oil pipe assembly](#).
- 8 Remove the fuel sensor, see [fuel sensor replacement](#).
- 9 Remove the high pressure fuel pump, refer to [replacement of the high pressure fuel pump](#).
- 10 Remove vacuum pump, refer to [replacement of vacuum pump](#).
- 11 Remove the ignition coil unit. See [replacement of ignition coil unit](#).

- 12 Remove the turbine control valve (wastegate). See [turbine control valve \(wastegate\) replacement](#).
- 13 Remove the vacuum chamber. See [replacement of vacuum chamber](#).
- 14 Remove VVT solenoid (intake). See [VVT solenoid \(intake\) replacement](#).
- 15 Remove VVT solenoid (exhaust). See [VVT solenoid \(exhaust\) replacement](#).
- 16 Remove the intake camshaft position sensor. See [intake camshaft position sensor replacement](#).
- 17 Remove the exhaust camshaft position sensor. See [exhaust camshaft position sensor replacement](#).
- 18 Remove oil-gas separator, refer to [replacement of oil-gas separator](#).
- 19 Remove the fuel injector components. See [replacement of fuel injector assembly](#).
- 20 Lift the vehicle, see [Lift the vehicle](#)
- 21 Remove the engine fender, see [Engine fender replacement](#).
- 22 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 23 Remove the right engine compartment trim panel, see [replacement of left engine compartment trim panel](#).
- 24 Remove the expansion tank, see [replacement of expansion tank](#).
- 25 Lift the engine assembly slightly with a jack.
- 26 Remove the vibration insulator assembly RH engine mount. See [replacement of the vibration insulator assembly RH engine mount](#).
- 27 Remove the driving belt, refer to [replacement of the driving belt](#).
- 28 Remove the front right wheel. See [wheel assembly replacement](#).
- 29 Remove the right front wheel housing fender assembly. See [replacement of front left wheel housing fender assembly](#).
- 30 Remove the damping belt pulley, Refer to [replacement of damping belt pulley](#).
- 31 Remove the front timing belt shield. See [replacement of front timing belt shield](#).
- 32 Remove timing belt, refer to [Replacement of timing belt](#).

- 33 Remove VVT components, refer to [replacement of VVT components](#).
- 34 Remove the timing belt tensioner. See [replacement of timing belt tensioner](#).
- 35 Remove the timing idler. See [timing idler replacement](#).
- 36 Remove the rear timing belt shield. See [replacement of rear timing belt shield](#).
- 37 Remove the camshaft front oil seal. See [replacement of camshaft front oil seal](#).
- 38 Remove the camshaft bearing cover. See [camshaft bearing cover replacement](#).
- 39 Remove the camshaft retaining ring.

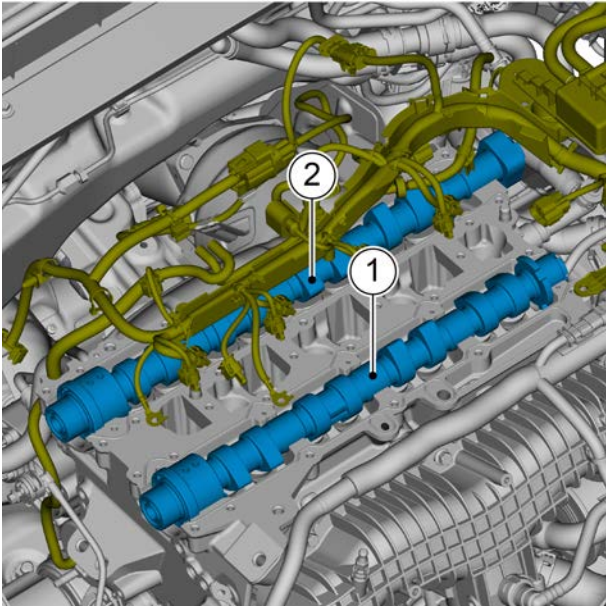


- 40 Remove inlet camshaft components 1 and exhaust camshaft components 2.

Caution

Mark it when removing so that it can be differentiated when installing.

Installation procedure



- 1 Install inlet camshaft 1 and outlet camshaft 2.

Caution

1. Distinguish the intake and exhaust camshaft components according to the marks made during removal. Before installation, apply 0w20 brand lubrication oil to all camshaft support journals of the cylinder head and the top surface of the valve lifter. Apply an appropriate amount of lubrication oil on the intake and exhaust camshaft journal.

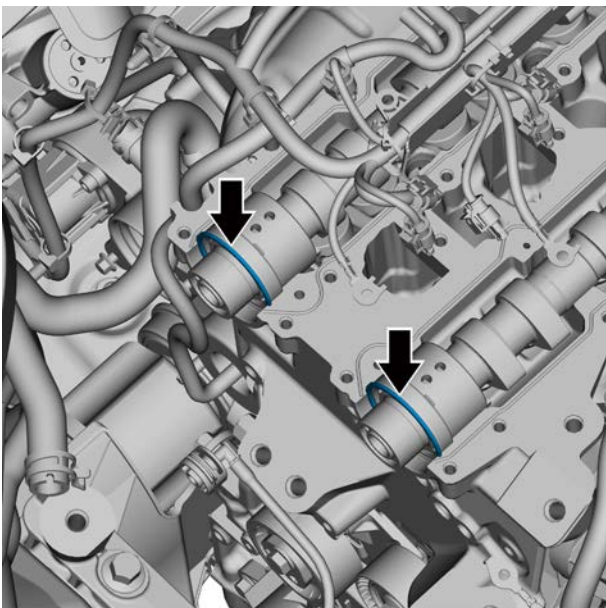
2. Before assembly, check the appearance of camshaft, slide the bushing to confirm whether the three sealing rings of each camshaft components are installed in place and whether the bushing operates freely.

3. Install the intake camshaft and exhaust camshaft on the cylinder head. There are two machined support keys on the camshaft bushing. Ensure that the two keys are flush with the top surface of the cylinder head, and ensure that the oil hole on the camshaft bushing faces up. Carefully take and place the intake and exhaust camshaft components.

- 2 Install the camshaft retaining ring.

Caution

When installing the cam bearing retaining ring, it is not allowed to scratch the sealing surface of the camshaft front oil seal. Check the crankshaft zero position before installing the cam bearing cover.



- 3 Install camshaft bearing cover.
- 4 Install the camshaft front oil seal.
- 5 Install the rear timing belt guard.
- 6 Install the timing idler.
- 7 Install the timing belt tensioner.
- 8 Install VVT components
- 9 Install timing belt.

- 10 Install the front timing belt guard.
- 11 Install the damping belt pulley.
- 12 Install the right front wheel housing fender assembly.
- 13 Install the front right wheel.
- 14 Install the drive belt.
- 15 Install the right vibration insulator assembly of engine.
- 16 Lower and take out the jack.
- 17 Install the expansion tank.
- 18 Install the right engine compartment trim panel.
- 19 Fill engine coolant.
- 20 Install the engine fender.
- 21 Lower the vehicle.
- 22 Install the fuel injector components.
- 23 Install oil-gas separator.
- 24 Install the exhaust CMP sensor
- 25 Install the air intake CMP sensor
- 26 Install VVT solenoid (exhaust).
- 27 Install VVT solenoid (intake).
- 28 Install the vacuum chamber.
- 29 Install the turbine control valve (wastegate).
- 30 Install the ignition coil unit.
- 31 Install vacuum pump.
- 32 Install the high-pressure fuel pump.
- 33 Install the fuel sensor.
- 34 Install the high-pressure oil pipe components.
- 35 Install the lower outlet pipe of the air filter.
- 36 Install the upper outlet pipe of the air filter.
- 37 Install the engine trim cover assembly.
- 38 Connect the negative battery cable.
- 39 Close the engine compartment cover.

2.5.7.22 Replacement of camshaft front oil seal

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

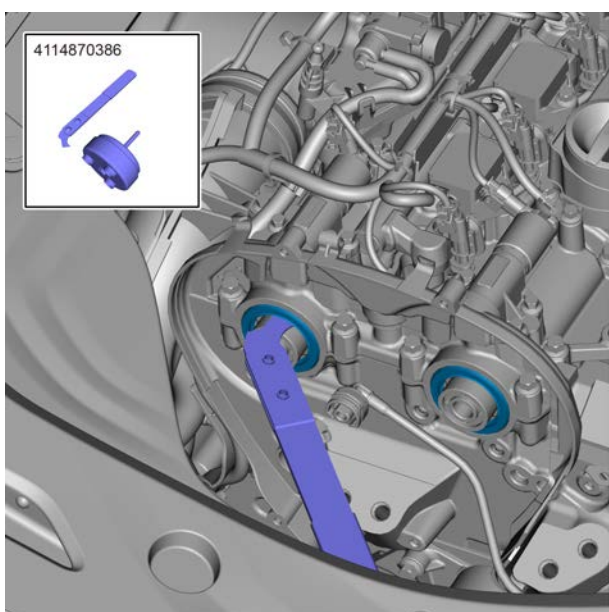
See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

Warning !

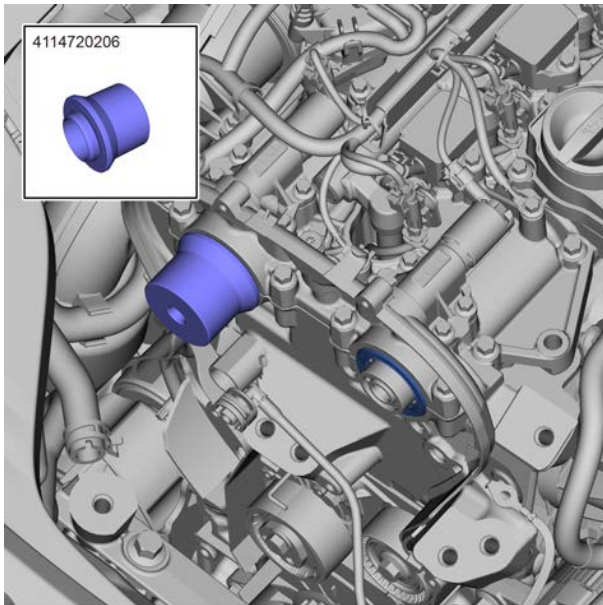
See "Warnings Regarding Fuel Pressure Release" in [Warnings and Precautions](#).

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer to [Release procedure](#) of fuel pressure.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 5 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 6 Remove the high-pressure oil pipe components. See [replacement of high-pressure oil pipe assembly](#).
- 7 Remove the fuel sensor, see [fuel sensor replacement](#).
- 8 Remove the high pressure fuel pump, refer to [replacement of the high pressure fuel pump](#).
- 9 Remove vacuum pump, refer to [replacement of vacuum pump](#).
- 10 Lift the vehicle, see [Lift the vehicle](#)
- 11 Remove the engine fender, see [Engine fender replacement](#).
- 12 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 13 Remove the right engine compartment trim panel, see [replacement of left engine compartment trim panel](#).
- 14 Remove the expansion tank, see [replacement of expansion tank](#).
- 15 Lift the engine assembly slightly with a jack.
- 16 Remove the vibration insulator assembly RH engine mount. See [replacement of the vibration insulator assembly RH engine mount](#).
- 17 Remove the driving belt, refer to [replacement of the driving belt](#).

- 18 Remove the front right wheel. See [wheel assembly replacement](#).
- 19 Remove the right front wheel housing fender assembly. See [replacement of front left wheel housing fender assembly](#).
- 20 Remove the damping belt pulley, Refer to [replacement of damping belt pulley](#).
- 21 Remove the front timing belt shield. See [replacement of front timing belt shield](#).
- 22 Remove timing belt, refer to [Replacement of timing belt](#).
- 23 Remove VVT components, refer to [replacement of VVT components](#).
- 24 Use the special tool to remove the camshaft front oil seal.
Special tool for removing oil seal and plug cover:
4114870386



Installation procedure



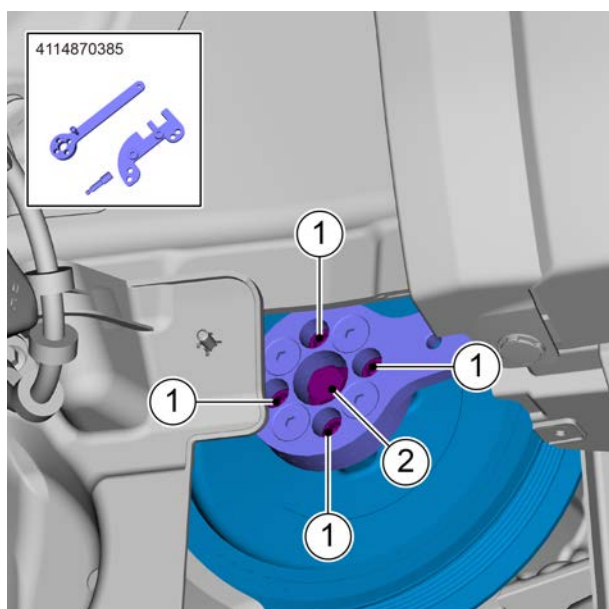
- 1 Use special tools to install the crankshaft front oil seal.
Special tool for installation of front oil seal of intake and exhaust camshaft: 4114720206
Press mounting depth of oil seal: - 0.2 ~ 0.2 mm
Parallelism: 0.25 mm

- 2 Install VVT components
- 3 Install timing belt.
- 4 Install the front timing belt guard.
- 5 Install the damping belt pulley.
- 6 Install the right front wheel housing fender assembly.
- 7 Install the front right wheel.
- 8 Install the drive belt.
- 9 Install the right vibration insulator assembly of engine.
- 10 Lower and take out the jack.
- 11 Install the expansion tank.
- 12 Install the right engine compartment trim panel.
- 13 Fill engine coolant.
- 14 Install the engine fender.
- 15 Lower the vehicle.
- 16 Install vacuum pump.
- 17 Install the high-pressure fuel pump.
- 18 Install the fuel sensor.
- 19 Install the high-pressure oil pipe components.
- 20 Install the upper outlet pipe of the air filter.
- 21 Install the engine trim cover assembly.
- 22 Connect the negative battery cable.
- 23 Close the engine compartment cover.

2.5.7.23 Replacement of Damping Belt Pulley

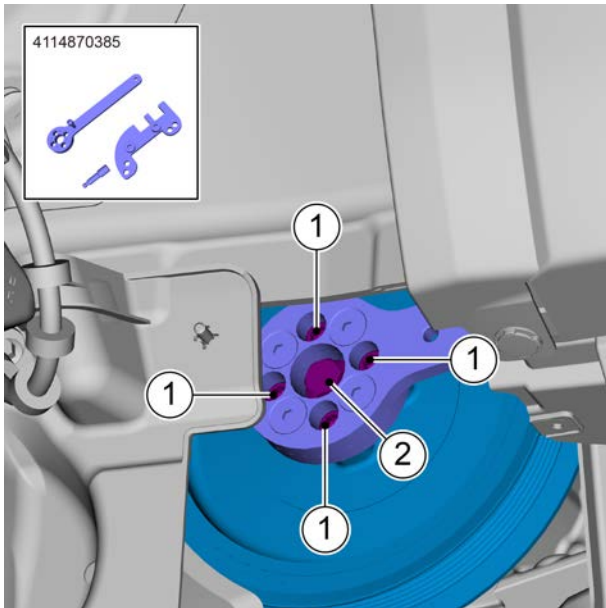
Removal procedure

- 1 Open the engine compartment cover.
- 2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove the driving belt, refer to [replacement of the driving belt](#).
- 6 Remove the front right wheel. See [wheel assembly replacement](#).
- 7 Remove the right front wheel housing fender assembly. See [replacement of front left wheel housing fender assembly](#).



- 8 Use the special tool to fix the damping pulley.
**Special tool for crankshaft zero-point positioning:
4114870385**
- 9 Loosen one retaining bolt 2 of the damping pulley.
- 10 Loosen the 4 fixing bolts 1 of the damping pulley.
- 11 Remove the special tool for fixing the damping pulley.
**Special tool for crankshaft zero-point positioning:
4114870385**
- 12 Loosen one retaining bolt 2 of the damping pulley.
- 13 Loosen the four retaining bolts 1 of the damping pulley and remove the damping pulley.

Installation procedure



- 1 Install the damping pulley, Pre-tighten the retaining bolts of the damping pulley, and fix the damping pulley with special tools.

**Special tool for crankshaft zero-point positioning:
4114870385**

- 2 Tighten one retaining bolt 2 of the damping pulley.

Caution

The shock absorber pulley bolt is a disposable part and shall be replaced with a new one.

Torque:

Step 1: 110 N·m (metric) 81.1 lb-ft (imperial system)

Step 2: turn 90 °± 5 °

- 3 Tighten 4 retaining bolts 1 of the damping pulley.

Caution

Tighten 4 inner dodecagonal bolts in a cross sequence.

Torque:

Step 1: 25 N·m (metric) 18.4 lb-ft (imperial system)

Step 2: turn 90 °± 5 °

- 4 Remove the special tool for fixing the damping pulley.

**Special tool for crankshaft zero-point positioning:
4114870385**

- 5 Install the right front wheel housing fender assembly.
- 6 Install the front right wheel.
- 7 Install the drive belt.
- 8 Install the engine fender.
- 9 Lower the vehicle.
- 10 Install the engine trim cover assembly.
- 11 Close the engine compartment cover.

2.5.7.24 Camshaft bearing cover replacement

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

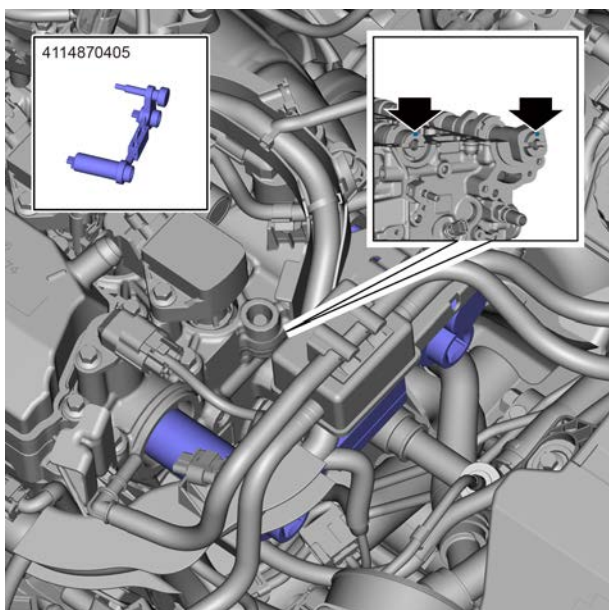
See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

Warning !

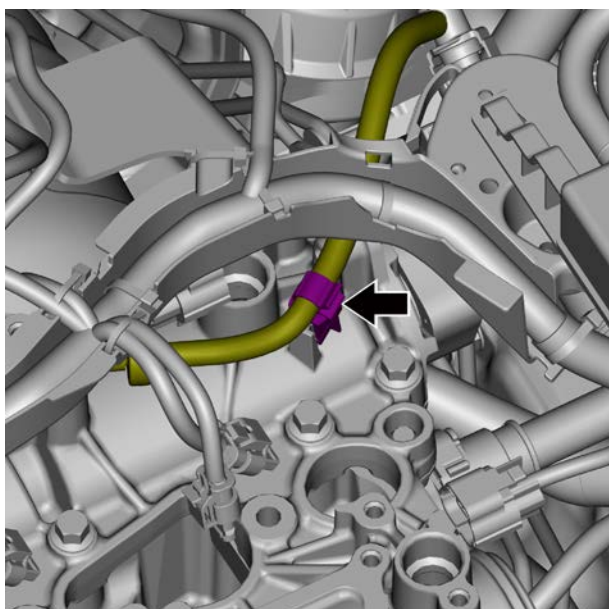
See "Warnings Regarding Fuel Pressure Release" in [Warnings and Precautions](#).

- 1 Open the engine compartment cover.
- 2 Release fuel pressure, refer to [Release procedure](#) of fuel pressure.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 5 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 6 Remove the lower outlet pipe of air filter. See [replacement of lower outlet pipe of air filter](#).
- 7 Remove the high-pressure oil pipe components. See [replacement of high-pressure oil pipe assembly](#).
- 8 Remove the fuel sensor, see [fuel sensor replacement](#).
- 9 Remove the high pressure fuel pump, refer to [replacement of the high pressure fuel pump](#).
- 10 Remove vacuum pump, refer to [replacement of vacuum pump](#).
- 11 Remove the ignition coil unit. See [replacement of ignition coil unit](#).
- 12 Remove the turbine control valve (wastegate). See [turbine control valve \(wastegate\) replacement](#).
- 13 Remove the vacuum chamber. See [replacement of vacuum chamber](#).
- 14 Remove VVT solenoid (intake). See [VVT solenoid \(intake\) replacement](#).
- 15 Remove VVT solenoid (exhaust). See [VVT solenoid \(exhaust\) replacement](#).
- 16 Remove the intake camshaft position sensor. See [intake camshaft position sensor replacement](#).
- 17 Remove the exhaust camshaft position sensor. See [exhaust camshaft position sensor replacement](#).

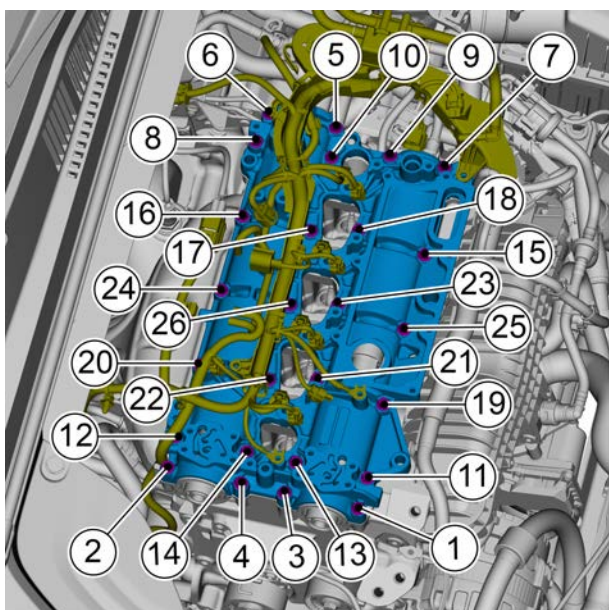
- 18 Remove oil-gas separator, refer to [replacement of oil-gas separator](#).
- 19 Remove the fuel injector components. See [replacement of fuel injector assembly](#).
- 20 Lift the vehicle, see [Lift the vehicle](#)
- 21 Remove the engine fender, see [Engine fender replacement](#).
- 22 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 23 Remove the right engine compartment trim panel, see [replacement of left engine compartment trim panel](#).
- 24 Remove the expansion tank, see [replacement of expansion tank](#).
- 25 Lift the engine assembly slightly with a jack.
- 26 Remove the vibration insulator assembly RH engine mount. See [replacement of the vibration insulator assembly RH engine mount](#).
- 27 Remove the driving belt, refer to [replacement of the driving belt](#).
- 28 Remove the front right wheel. See [wheel assembly replacement](#).
- 29 Remove the right front wheel housing fender assembly. See [replacement of front left wheel housing fender assembly](#).
- 30 Remove the damping belt pulley, Refer to [replacement of damping belt pulley](#).
- 31 Remove the front timing belt shield. See [replacement of front timing belt shield](#).
- 32 Remove timing belt, refer to [Replacement of timing belt](#).
- 33 Remove VVT components, refer to [replacement of VVT components](#).
- 34 Remove the timing belt tensioner. See [replacement of timing belt tensioner](#).
- 35 Remove the timing idler. See [timing idler replacement](#).
- 36 Remove the rear timing belt shield. See [replacement of rear timing belt shield](#).



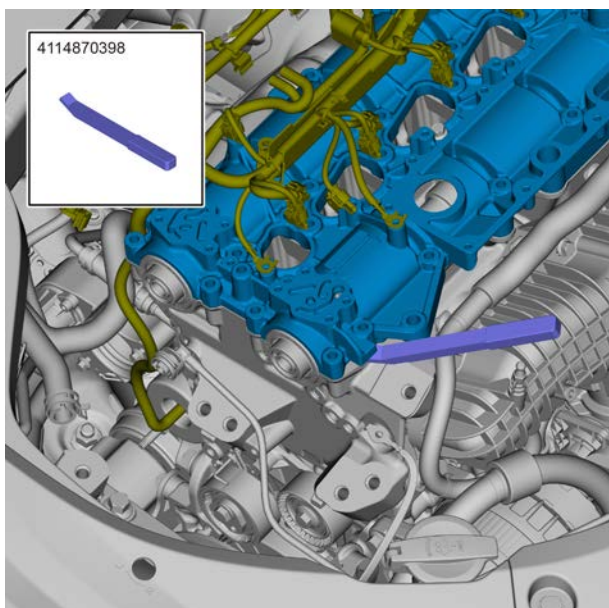
- 37 Remove the special tool for fixing camshaft.
Special tool for camshaft position fixing: 4114870405



- 38 Remove the vacuum pipe fixing clip.



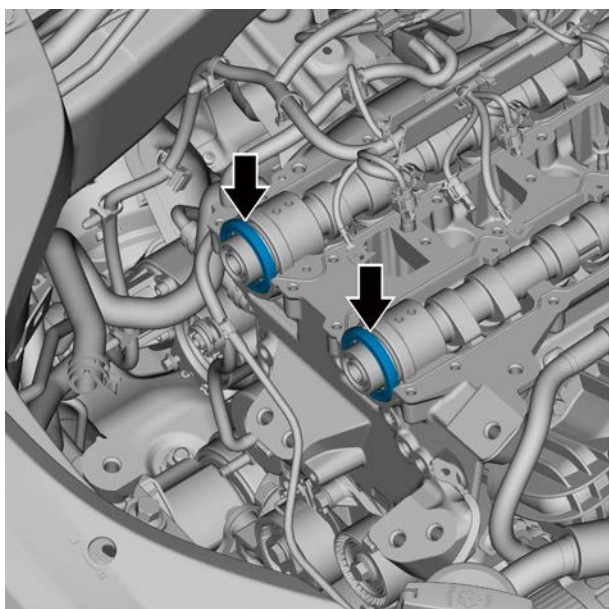
- 39 Remove the 26 retaining bolts of camshaft bearing cover in the sequence shown in the figure.



- 40 Use the special tool at the four corners of the camshaft bearing cover to jack off the connection between the camshaft bearing cover and the cylinder head.

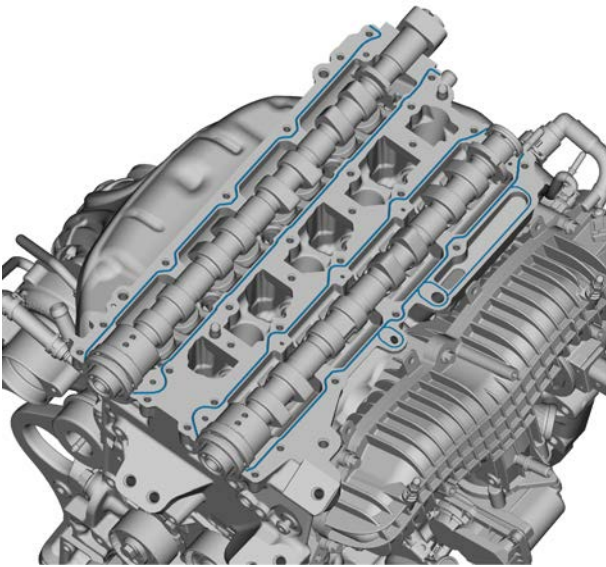
Sealing surface crowbar: 4114870398

- 41 Remove the camshaft bearing cover.



- 42 Remove the crankshaft front oil seal.

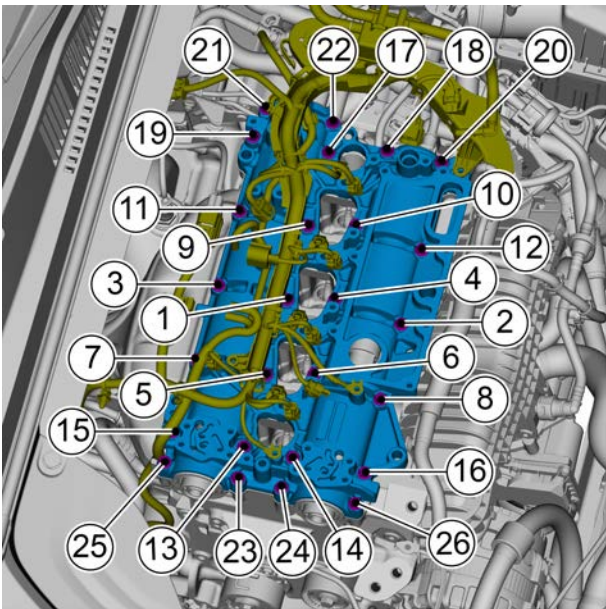
Installation procedure



- 1 Clean the mounting joint surface of camshaft bearing cover and apply sealant on the mounting surface of camshaft bearing cover.

Caution

Check the sealing surface and wipe it with modified alcohol or similar detergent to ensure that the surface is free of oil and grease, and the width of glue line is: (2 ± 0.3) mm, (1.5 ± 0.3) mm.

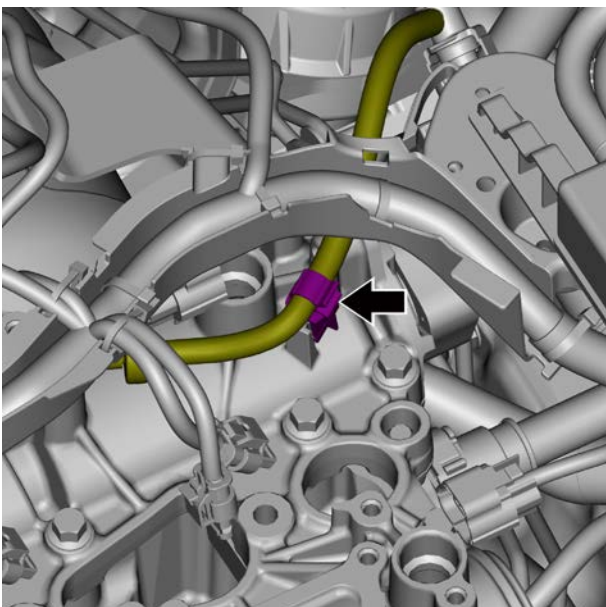


- 2 Install the camshaft bearing cover and tighten the 26 retaining bolts of the camshaft bearing cover in the sequence shown in the figure.

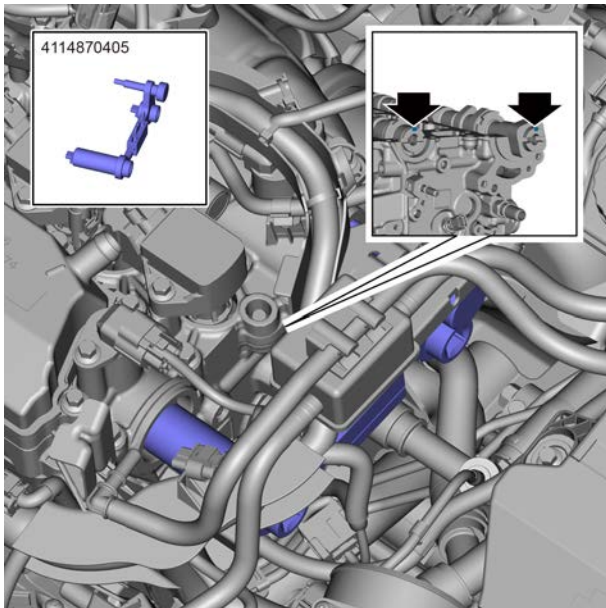
Torque: 16 N. m (metric system) 11.8 lb-ft (Imperial system)

Caution

In order to avoid damaging the camshaft bearing cover, when installing the camshaft bearing cover, it is very important that the sealing surface of the bearing cover is parallel to the sealing surface of the cylinder head. Ensure that the engine and camshaft are in the correct position before assembly. Keep the cover clean and confidential before assembly.



- 3 Install the vacuum pipe fixing clip.

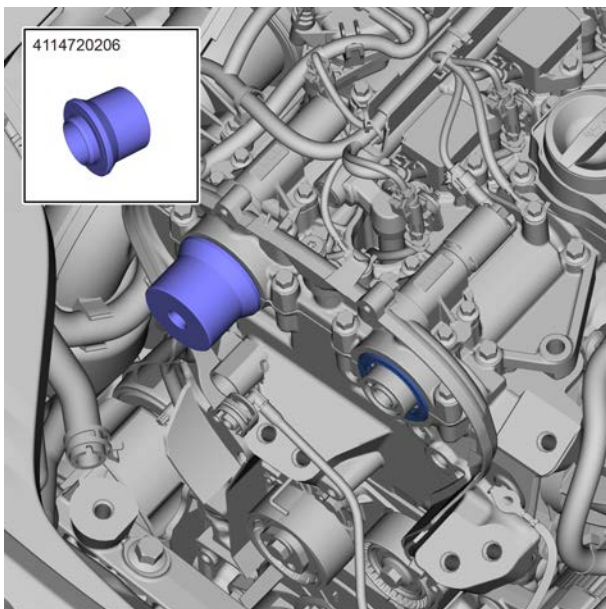


- 4 Install the special tool to fix the camshaft.

Special tool for camshaft position fixing: 4114870405

Caution

Make sure that the camshaft mark is vertical and upward.



- 5 Use special tools to install the crankshaft front oil seal.

Special tool for installation of front oil seal of intake and exhaust camshaft: 4114720206

Press mounting depth of oil seal: $-0.2 \sim 0.2$ mm







Parallelism: 0.25 mm





- 6 Install VVT solenoid (exhaust).
 7 Install VVT solenoid (intake).
 8 Install oil-gas separator.
 9 Install the vacuum chamber.
 10 Install the turbine control valve (wastegate).
 11 Install the exhaust CMP sensor
 12 Install the air intake CMP sensor
 13 Install the fuel injector components.
 14 Install the ignition coil unit.
 15 Install the rear timing belt guard.
 16 Install the timing idler.
 17 Install the timing belt tensioner.

- 18 Install VVT components
- 19 Install timing belt.
- 20 Install the front timing belt guard.
- 21 Install the damping belt pulley.
- 22 Install the right front wheel housing fender assembly.
- 23 Install the front right wheel.
- 24 Install the drive belt.
- 25 Install the right vibration insulator assembly of engine.
- 26 Lower and take out the jack.
- 27 Install the expansion tank.
- 28 Install the right engine compartment trim panel.
- 29 Fill engine coolant.
- 30 Install the engine fender.
- 31 Lower the vehicle.
- 32 Install vacuum pump.
- 33 Install the high-pressure fuel pump.
- 34 Install the fuel sensor.
- 35 Install the high-pressure oil pipe components.
- 36 Install the lower outlet pipe of the air filter.
- 37 Install the upper outlet pipe of the air filter.
- 38 Install air filter corrugated pipe.
- 39 Install the engine trim cover assembly.
- 40 Connect the negative battery cable.
- 41 Close the engine compartment cover.

2.5.8 Special tools and equipment

2.5.8.1 Special tool

Serial No.	Illustration	Tool number	Name
1		4114870406	Special tool for belt tensioner compression
2		4114870408	Positioning set pin
3		4114870385	Special tool for crankshaft zero-point positioning
4		4114870404	VVT fixing special tool
5		4114870405	Special tool for fixing camshaft position
6		4114870386	Special tools for oil seal and plug cover removal

Serial No.	Illustration	Tool number	Name
7		4114870398	Sealing surface crowbar
8		4114870384	Special tool for crankshaft rotation
9		4114870395	Special tool for camshaft rear sealing assembly
10		4114720206	Special tool for installation of front oil seal of intake and exhaust camshaft

2.6 Air intake system JLH-4G20TD

2.6.1 Specification

2.6.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Air inlet baffle retaining bolt	M6×25	8.5~11.5	6.3~8.5
retaining bolts of air filter intake pipe assembly	M6×35	9~11	6.6~8.1
Mass air flow sensor fixing screw	PF4×14	1.3~1.7	1.0~1.3
Fixing screw of upper housing of air filter	PF5×25	1.4~1.8	1.0~1.3
Worm clamp of air filter corrugated pipes	-	4~5	3.0~3.7
retaining bolt of upper outlet pipe of air filter	M6×30	8.5~11.5	6.3~8.5
retaining bolt of lower outlet pipe of air filter	M6×35	8.5~11.5	6.3~8.5
	M6×20×23.3	8.5~11.5	6.3~8.5
retaining bolts of intercooler outlet pipe assembly	M8× 25M	20~28	14.8~20.7
Worm clamp of intercooler outlet pipe assembly	-	4.5~5.5	3.3~4.1
retaining bolts of intercooler intake pipe assembly	M8×16	20~28	14.8~20.7
Worm clamp of intercooler intake pipe assembly	-	4.5~5.5	3.3~4.1
Ball joint of engine trim cover bolt	-	5.5~6.5	4.1~4.8
Fixing screw of long desorption pipe under floor	PF5×20	3~4	2.2~3.0
retaining bolt of engine harness sheath	M6×20	8.5~11.5	6.3~8.5
Intake manifold unit fixing bolt	M7×65	13.5~18.5	10~13.6
Manifold pressure sensor retaining screw	PF5×25	3~4	2.2~3.0
Carbon tank solenoid valve bracket fixing screw	PF6×16	4.25~5.75	3.1~4.2

2.6.2 Instructions and operations

2.6.2.1 Intake manifold assembly

The intake manifold is installed on the 4G20TD engine. It is mainly used to evenly distribute the intake air to each intake port, which is very important to optimize the efficiency and performance of 4G20TD engine. The manifold pressure sensor is located on the intake manifold and is used to monitor the pressure of the intake air in the intake manifold.

Intake manifold is the intake pipeline between the throttle unit and the cylinder head inlet. The function is to distribute air to the inlet of each cylinder.

Intake manifold: distribute fresh air evenly, sufficiently and stably to all cylinders of the engine to ensure the redistribution and uniform intake of Qutong gas;

Throttle unit: regulates the amount of air entering the engine. The throttle unit is controlled by the Engine Control Module (ECM);

In the model intake system, the intake of control engine for throttle valve is adopted, allowing for proper modification to control parameters of the engine and ensuring that the engine works in the optimal status. In addition, ETCS is applied in this system, achieving excellent throttle valve control.

2.6.2.2 Manifold pressure sensor

Manifold pressure sensor: monitors the intake pressure in the intake manifold and feeds back the results to the Engine Control Module. The Engine Control Module calculates the density of air in the intake manifold and determines the air mass flow of the engine.

2.6.2.3 Mass air flow sensor

Mass air flow sensor: measure the amount of air absorbed by the engine and feedback the results to the Engine Control Module. The Engine Control Module calculates the density of air in the intake pipe and determines the air mass flow of the engine.

2.6.3 System working principles

2.6.3.1 System Working Principles

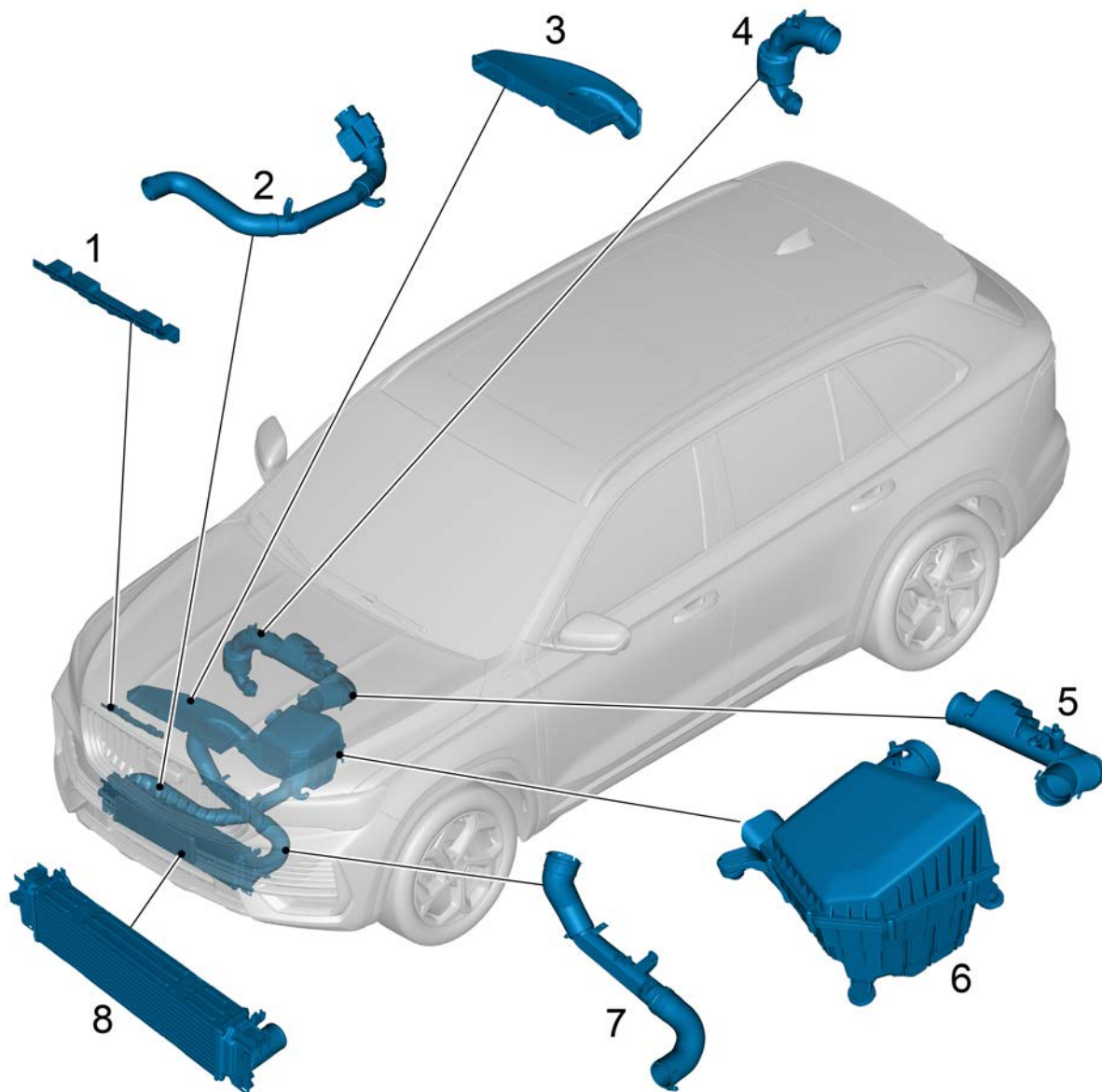
The function of the intake system is to allow air to enter the engine. Oxygen in the air is a necessary element for engine combustion. The intake system draws in air through a long plastic pipe. The plastic pipe passes through the air filter housing and the air filter. The air filter prevents dirt and particles from entering the engine, thus avoiding engine damage. After passing through the air filter, the air enters the turbocharger. The mass air flow sensor is located in the air duct between the air filter and the turbocharger. The mass air flow sensor is a combined sensor, which is used to measure the air flow and intake air temperature entering the engine. The measured data will be sent to the Engine Control Module (ECM). According to different torque requirements, air either passes directly without turbocharging, or enters the turbine bypass valve to enable the turbine of the turbocharger. If the turbocharger is activated, the turbocharger turbine is driven by the exhaust gas and begins to rotate. At this time, the incoming air will be compressed. The air continues to flow to the intercooler. After the air is compressed in the turbocharger, it will generate heat energy, and the intercooler is used to transmit the heat energy of the air. After the air is cooled by the intercooler, the density of the air entering the engine increases. The external air is sent to the intercooler by the engine cooling fan with the help of ram effect. The intercooler uses external air to cool the incoming air. After passing through the intercooler, the cooled air continues to flow through the throttle unit and into the intake manifold. The air pressure and air temperature sensor 2 measures the temperature and pressure of the air in the intake pipe between the intercooler and the throttle unit. The Engine Control Module (ECM) regulates the turbine based on the signals provided by the manifold air temperature and pressure sensor t-maps. The Engine Control Module controls the throttle unit. The throttle unit regulates the amount of air entering the intake manifold and the engine. The motor in the throttle unit adjusts the opening angle of the throttle plate. There are two potentiometers in the throttle unit to measure the throttle position. The larger the opening angle, the more air enters the engine. When the engine is idling, the opening angle of the throttle unit is small, but it remains open until the engine is completely closed. After passing through the throttle unit, the air enters the intake manifold, which evenly distributes the incoming air to each cylinder. Another sensor is used to measure the air in the intake manifold, that is, the manifold absolute pressure sensor, which is used to measure the air pressure. The measured data will be sent to the Engine Control Module. When the inlet valve opens, air enters the cylinder, and then the air is mixed with fuel in the cylinder and burned.

The manifold pressure sensor chip can provide "Load Signal" to the controller according to the difference between atmospheric pressure and intake manifold pressure; the controller provides 5V voltage and feeds back 0-5V voltage to the controller according to different inlet pressure. So, it measures the absolute pressure of intake manifold and provide engine load information. This sensor is an absolute pressure sensor, and the output value of the product under standard atmospheric pressure is approximately 2.1V.

The opening size of throttle unit is based on the input signal of throttle pedal controlled by the driver and the input signals from other various sensors, and the ECM calculates the engine's output power required by the vehicle at this time and in this state, controls the fuel supply (injection) quantity to the engine, and corrects the control parameters according to the feedback signal to ensure that the engine works in the optimal control state. The drive motor, the gear drive mechanism, and other parts and the throttle position sensor with stronger function and reliability are added to the throttle valve unit.

2.6.4 Component position

2.6.4.1 Component position

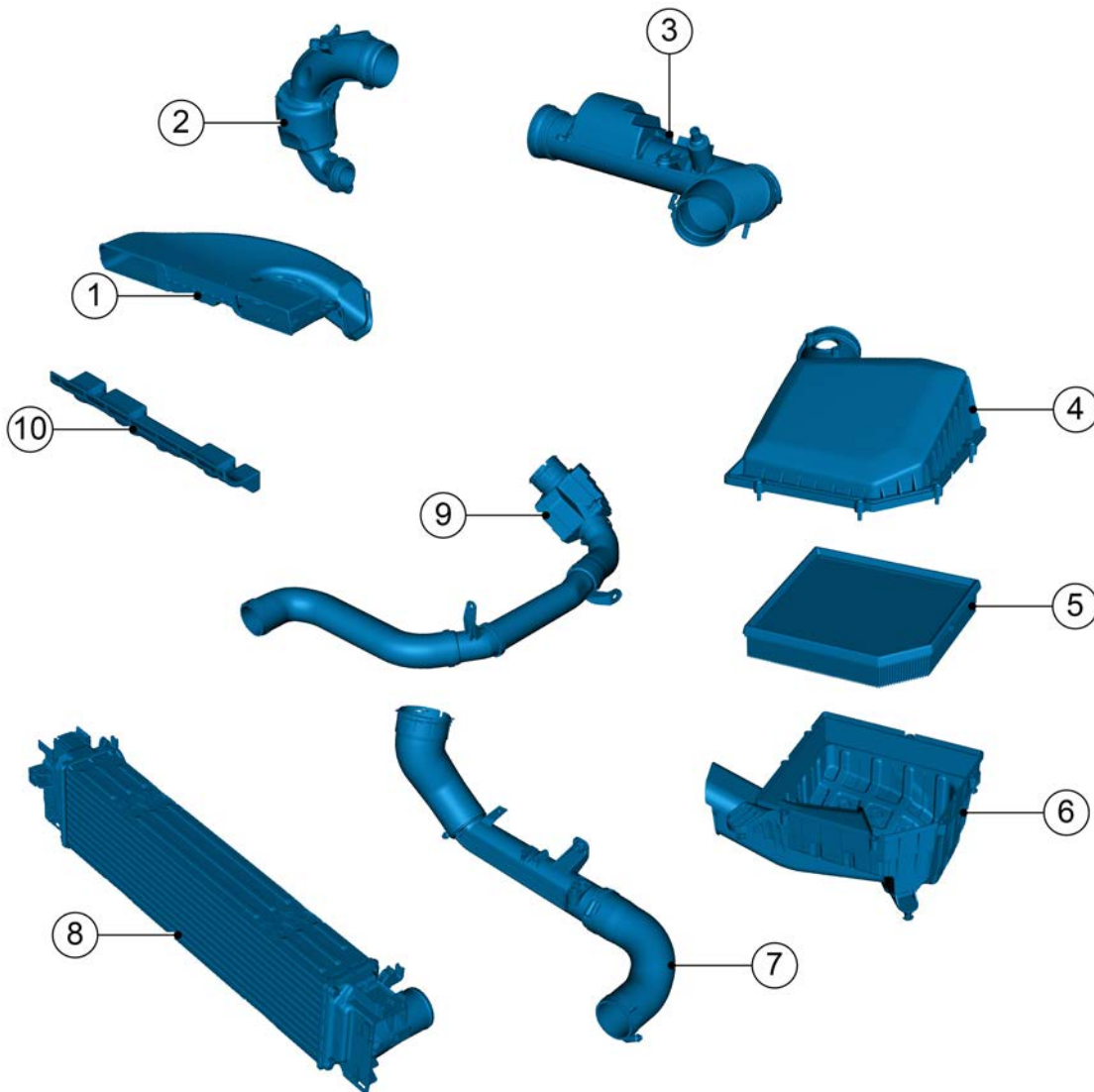


Legend

- | | | | |
|----|--|----|-------------------------------------|
| 1. | Air inlet baffle | 5. | Upper outlet pipe of the air filter |
| 2. | Intercooler intake pipe assembly | 6. | Air filter assembly |
| 3. | Air intake pipe assembly of the air filter | 7. | Intercooler outlet pipe assembly |
| 4. | Lower outlet pipe of the air filter | 8. | Intercooler |

2.6.5 Exploded view

2.6.5.1 Exploded view

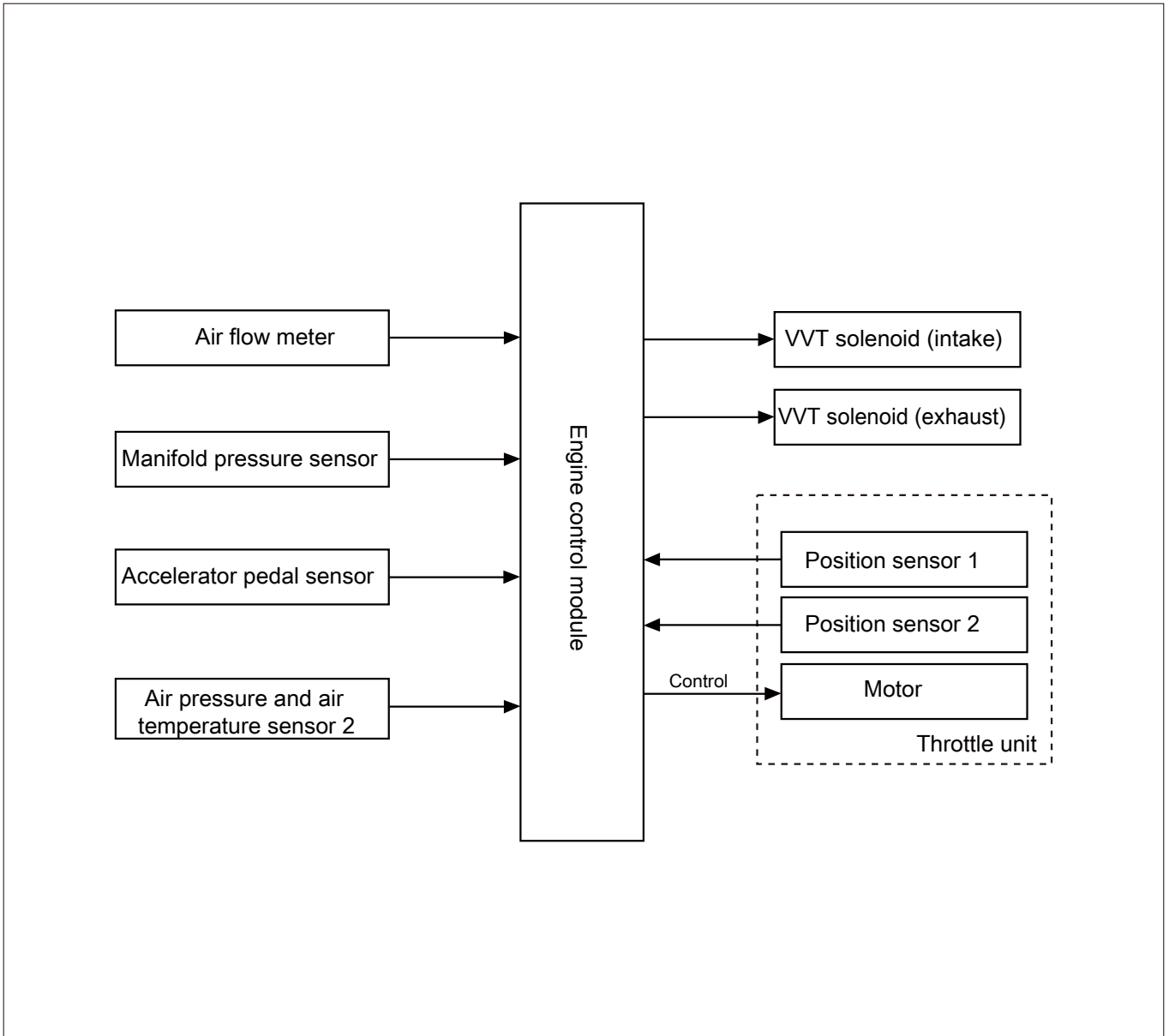


- 1. Air intake pipe assembly of the air filter
- 2. Lower outlet pipe of the air filter
- 3. Upper outlet pipe of the air filter
- 4. Upper housing of air filter
- 5. Air filter

- 6. Lower housing of air filter
- 7. Intercooler outlet pipe assembly
- 8. Intercooler
- 9. Intercooler intake pipe assembly
- 10. Air inlet baffle

2.6.6 Electrical schematic diagram

2.6.6.1 Electrical schematic diagram



2.6.7 Diagnostic information and procedures

2.6.7.1 Diagnosis Description

Before the diagnosis of the air intake system fault, refer to Description and Operation and System Working Principle. Understand and get familiar with air intake system working principle before starting system diagnosis. This helps to determine the correct fault diagnosis steps when a trouble occurs. More importantly, it also helps to determine whether the situation described by the distributor is normal. Any trouble diagnosis of the air intake system should start with visual inspection. The visual inspection will guide maintenance personnel to take the next logical step for diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

2.6.7.2 Visual Check

- Check after-sales installations that may affect intake system operation. Make sure these installations cannot affect normal working of the exhaust system.
- Check system components that are easily accessible or can be seen to find out if they are obviously damaged or have external leakage.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

2.6.8 Removing and installing

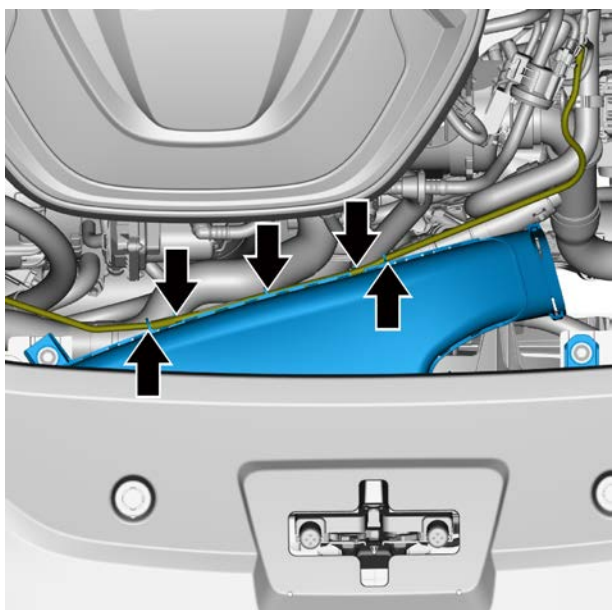
2.6.8.1 Replacement of air filter inlet pipe assembly

Removal procedure

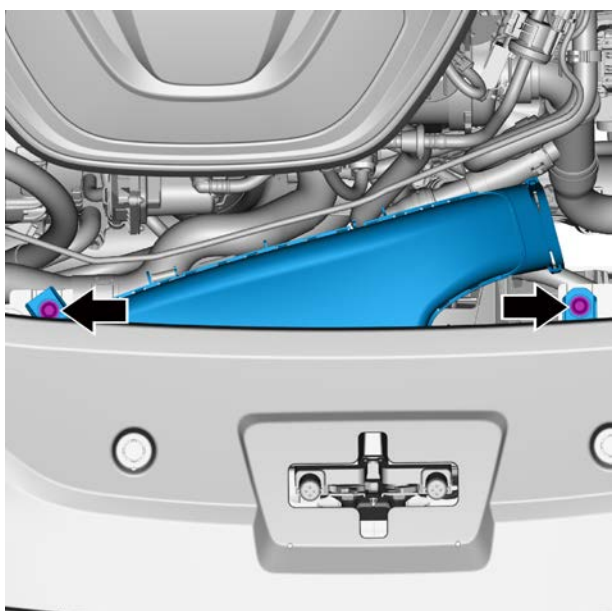
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the mass air flow sensor, see [replacement of mass air flow sensor.](#)
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly.](#)

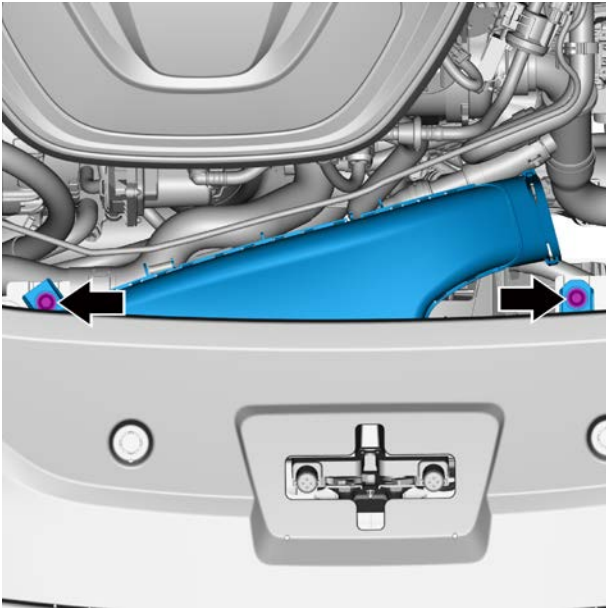


- 5 Disconnect the exhaust hose from the air filter intake pipe assembly.



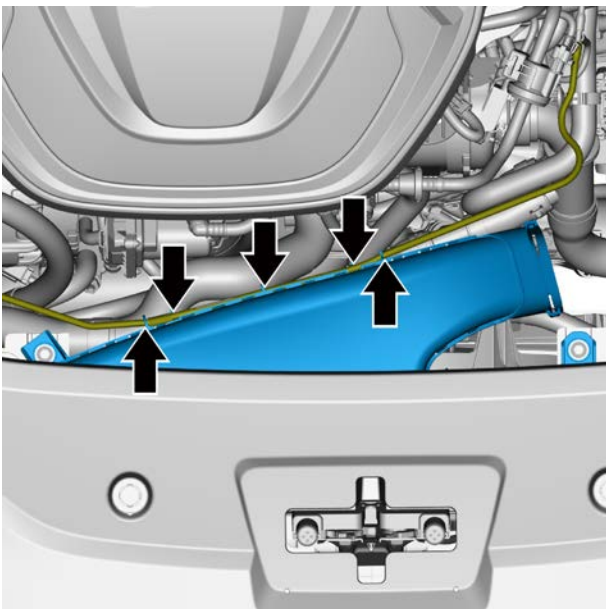
- 6 Remove 2 retaining bolts from the air filter intake pipe assembly and remove the air filter intake pipe assembly.

Installation procedure



- 1 Install the air filter intake pipe assembly. Install and tighten the 2 retaining bolts of the air filter intake pipe assembly.

Torque: 10N·m (metric), 7.4lb·ft (imperial system)



- 2 Connect the exhaust pipe and the air filter intake pipe assembly.

- 3 Install the air filter assembly.
- 4 Install the mass air flow sensor.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

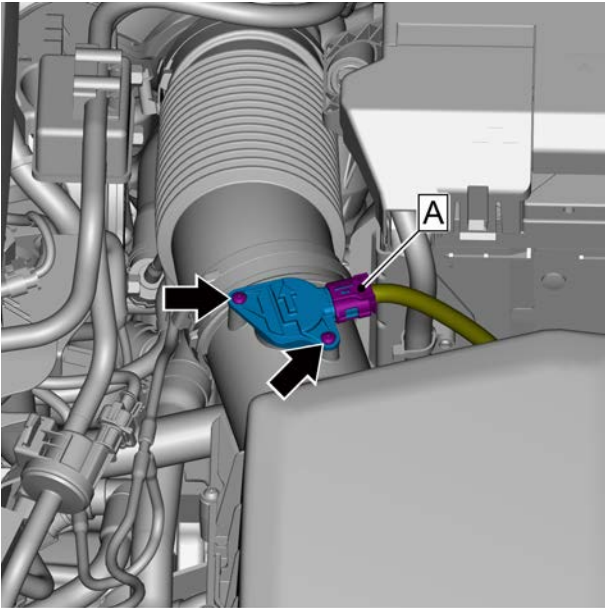
2.6.8.2 Replacement of mass air flow sensor

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

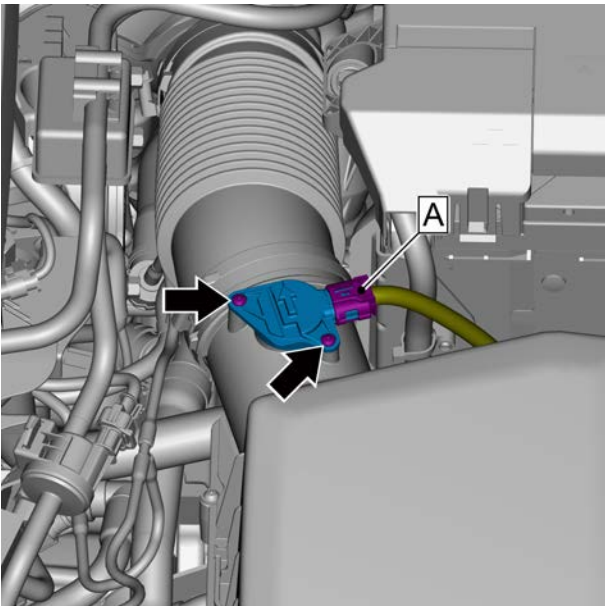
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).



- 3 Disconnect harness connector A of the air flowmeter.
- 4 Remove 2 fixing screws of the mass air flow sensor and remove the mass air flow sensor.

Installation procedure

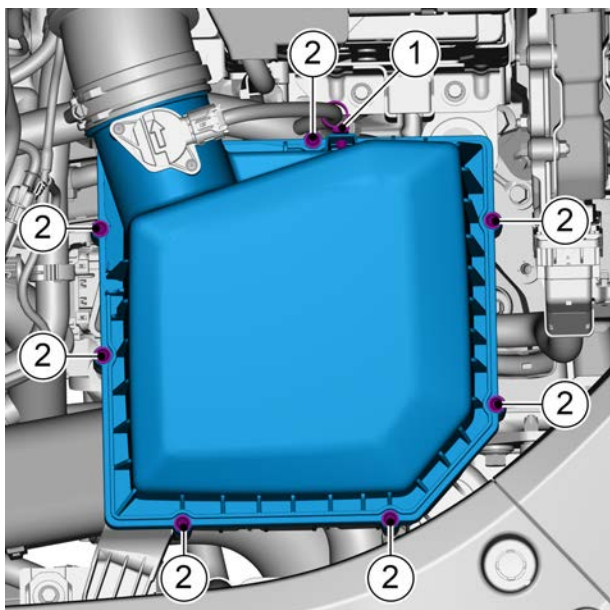
- 1 Install the mass air flow sensor, install and tighten the 2 fixing screws of the mass air flow sensor.
Torque: 1.5 N. m (metric system) 1.1 lb-ft (Imperial system)
- 2 Connect harness connector A of the air flowmeter.



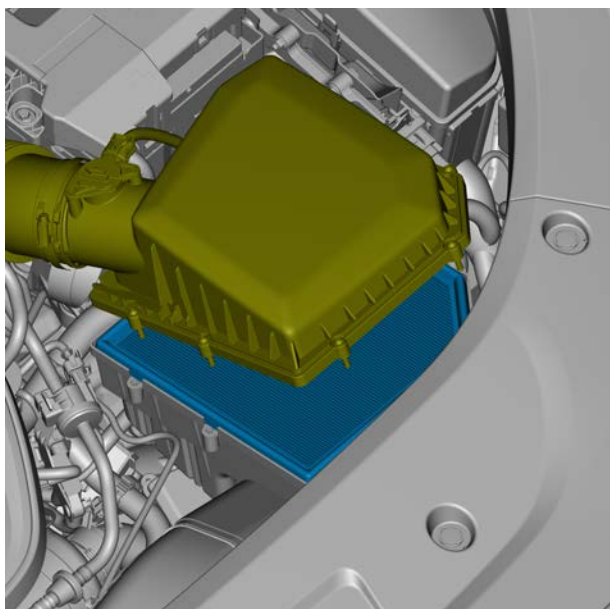
- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

2.6.8.3 Replacement of Air filter

Removal procedure

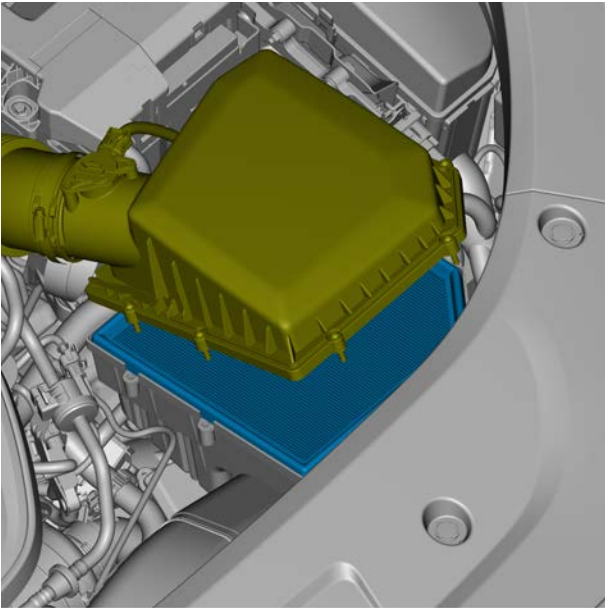


- 1 Open the engine compartment cover.
- 2 Remove fixing clip 1 of mass air flow sensor harness.
- 3 Remove 7 fixing screws 2 from the upper housing of the air filter.

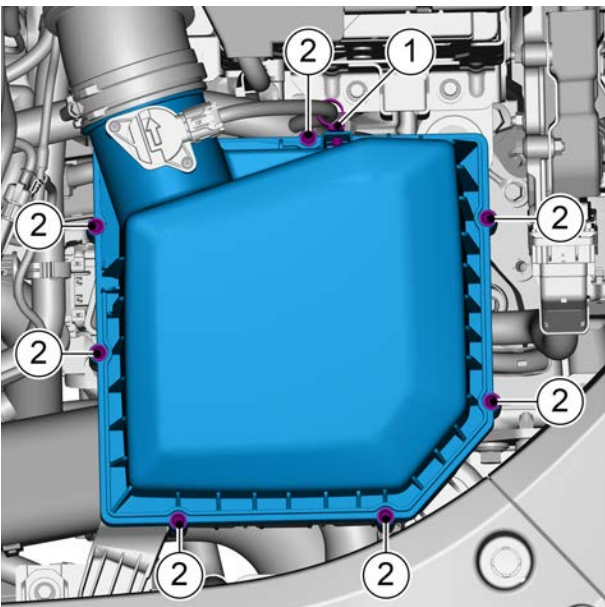


- 4 Remove the Air filter.

Installation procedure



1 Install the air filter element.



2 Install the upper housing of the air filter, and install and tighten seven screws 2 on the upper housing of the air filter.

Torque: 1.6 N. m (metric system) 1.2 lb-ft (Imperial system)

3 Install fixing clip 1 of mass air flow sensor harness.

4 Close the engine compartment cover.

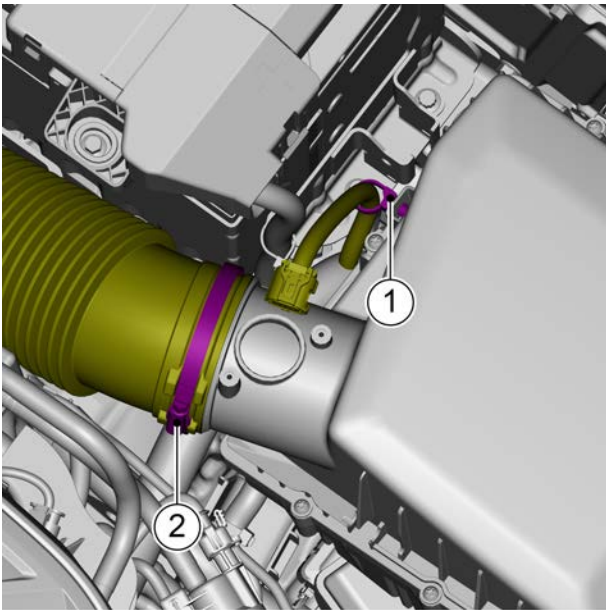
2.6.8.4 Air Filter Assembly Replacement

Removal procedure

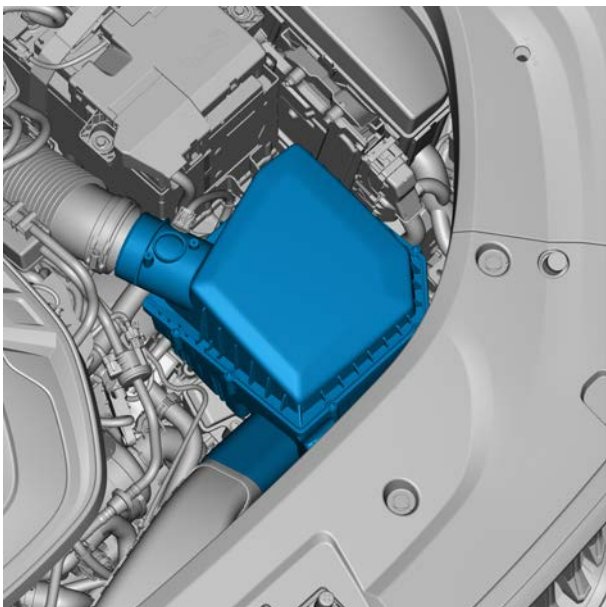
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the mass air flow sensor, see [replacement of mass air flow sensor](#).



- 4 Loosen the fixing hoop 2 of the air filter corrugated pipes and disconnect the air filter corrugated pipes from the air filter assembly.
- 5 Disconnect the fixing clip 1 of the mass air flow sensor harness.

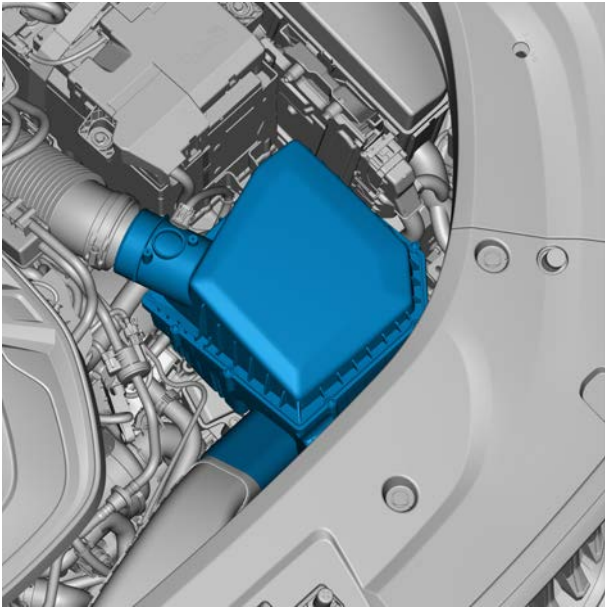


- 6 Remove the air filter assembly.

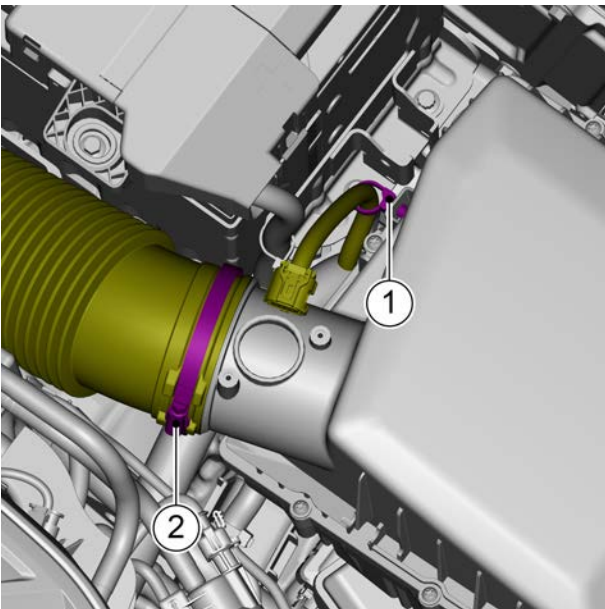
Caution

Connect the air filter intake pipe assembly with the air filter assembly by snap. Pay attention to the removal method.

Installation procedure



- 1 Insert the fixing feet of the air filter assembly into the air filter damping pad.



- 2 Install fixing clip 1 of mass air flow sensor harness.
- 3 Connect the air filter corrugated pipes and the air filter assembly, and tighten the fixing hoop 2 of the air filter corrugated pipes.

Torque: 4.5 N. m (metric system) 3.3 lb-ft (Imperial system)

- 4 Install the mass air flow sensor.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

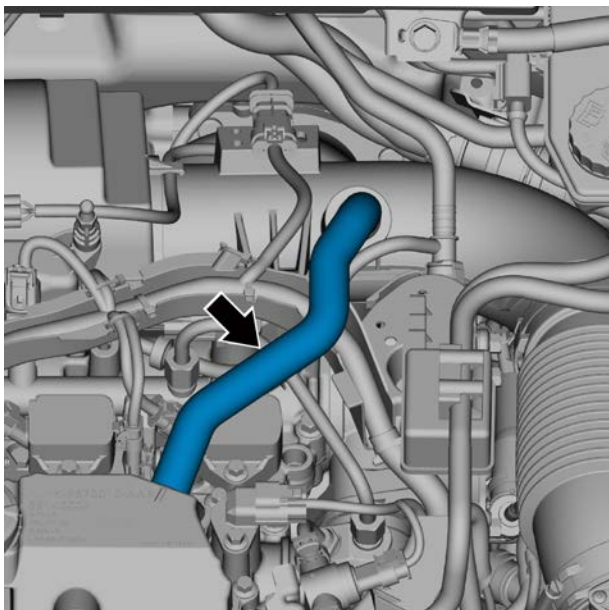
2.6.8.5 Replacement of vent pipe on air filter

Removal procedure

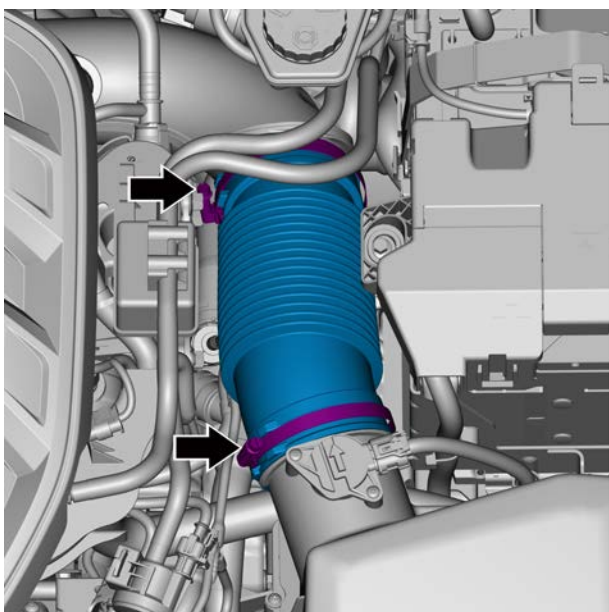
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

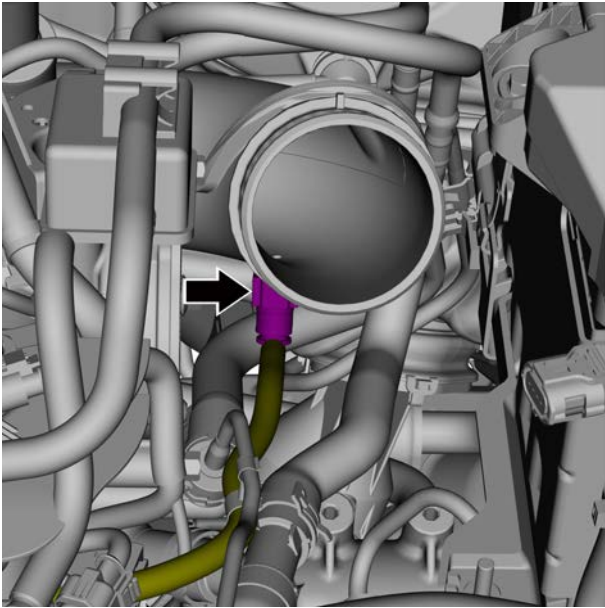
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)



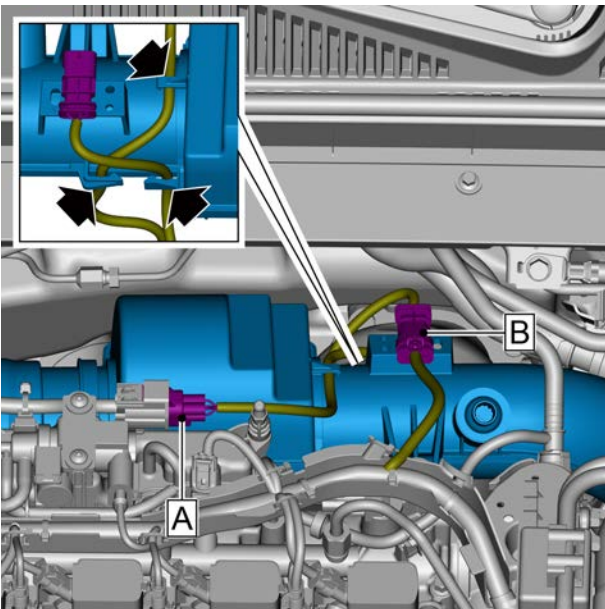
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the crankcase ventilation hose.



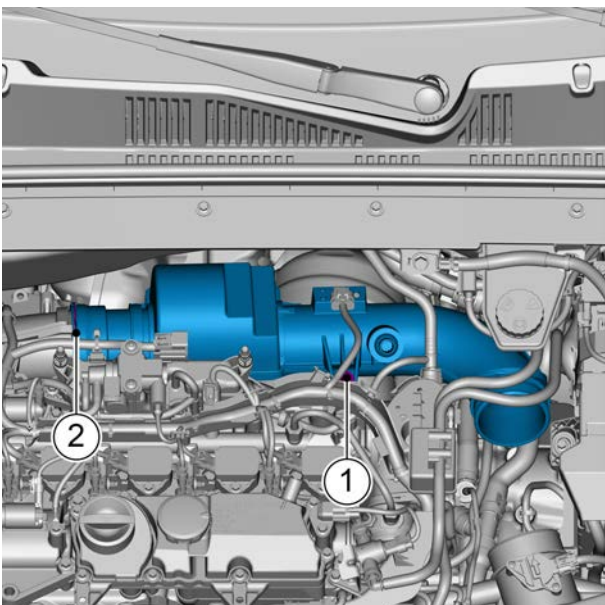
- 5 Loosen the fixing hoop of the air filter corrugated pipes and remove the air filter corrugated pipes.



- 6 Disconnect the connector of crankcase ventilation pipe.

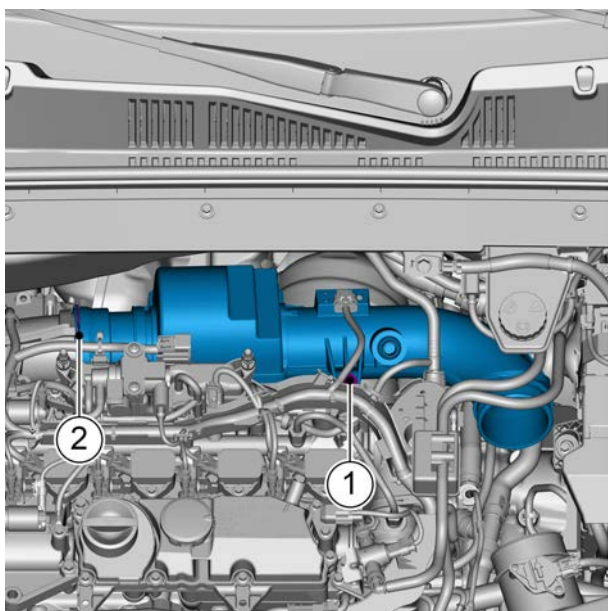


- 7 Disconnect the Lambda probe (front oxygen sensor) harness connector A.
- 8 Disconnect the harness connector B of Lambda probe (rear oxygen sensor) and remove the fixing clip of Lambda probe (rear oxygen sensor) harness connector.
- 9 Disconnect the oxygen sensor harness from the vent pipe on the air filter.



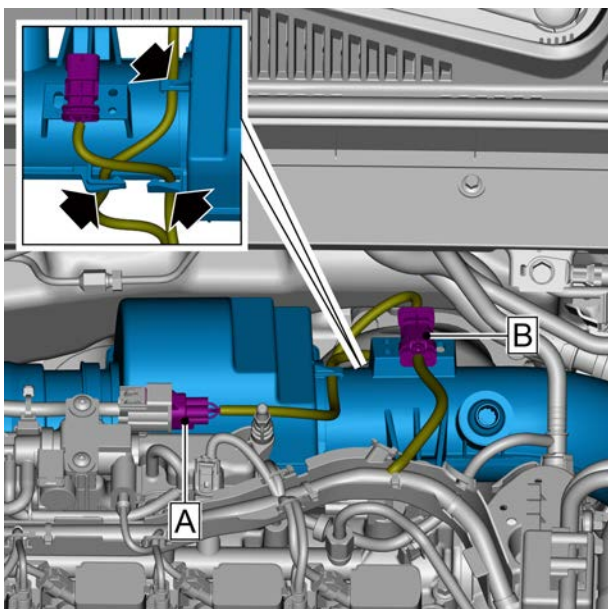
- 10 Remove one retaining bolt 1 of the upper outlet pipe of the air filter.
- 11 Unlock the quick insert elastic circlip 2 and remove the upper outlet pipe of the air filter.

Installation procedure

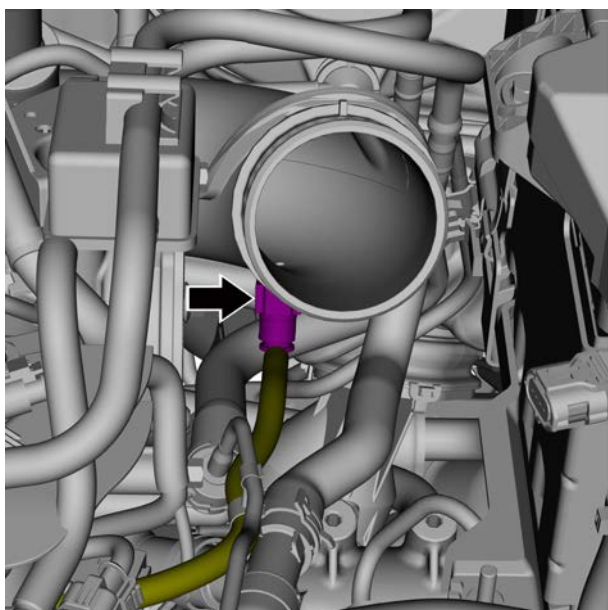


- 1 Reset the quick insert elastic circlip 2 and install the upper outlet pipe of the air filter.
- 2 Install and tighten one retaining bolt 1 of the upper outlet pipe of the air filter.

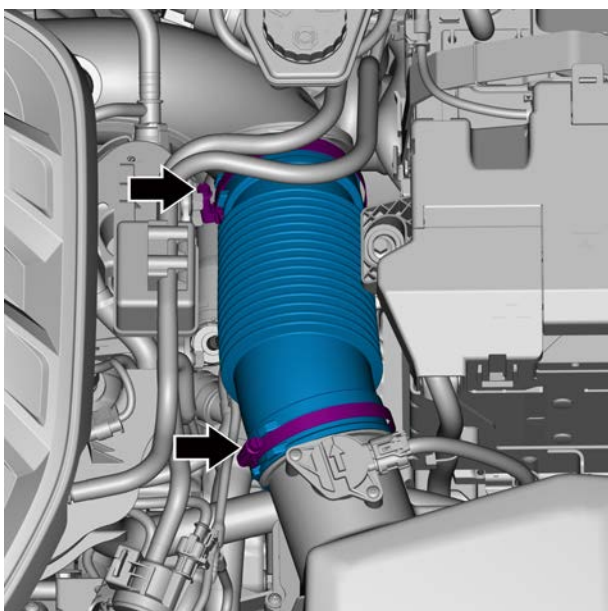
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 3 Install the oxygen sensor cable.
- 4 Connect the Lambda probe (rear oxygen sensor) harness connector B and install the fixing clip of Lambda probe (rear oxygen sensor) harness connector.
- 5 Connect Lambda probe (front oxygen sensor) harness connector A.



- 6 Install connector for crankcase vent line.

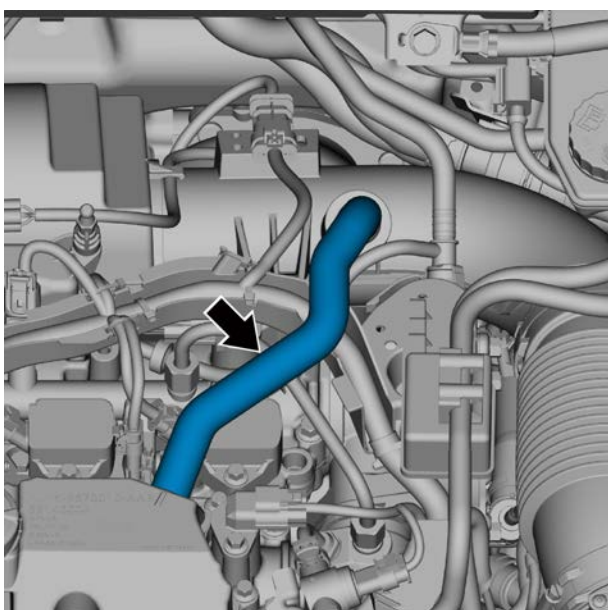


- 7 Install the air filter corrugated pipes and fasten the fixed hoop of the air filter corrugated pipes.

Torque: 4.5 N. m (metric system) 3.3 lb-ft (Imperial system)

Caution

Align the nozzle with the mark when connecting.



- 8 Install the crankcase ventilation hose.

- 9 Install the engine trim cover assembly.
- 10 Connect the negative battery cable.
- 11 Close the engine compartment cover.

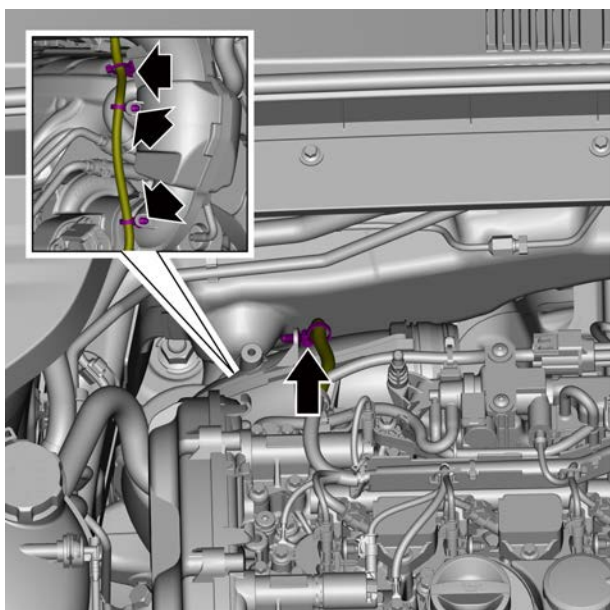
2.6.8.6 Replacement of lower outlet pipe of air filter

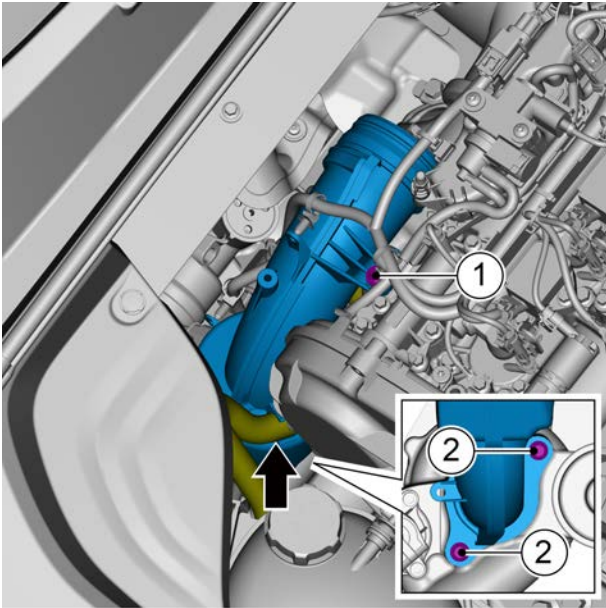
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

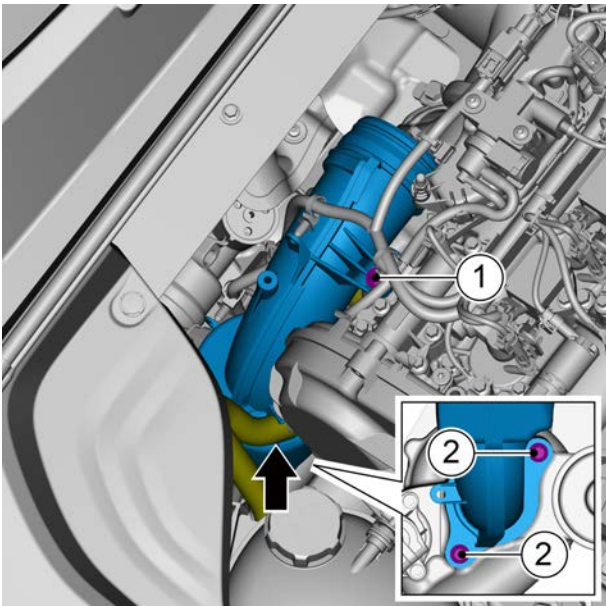
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover.](#)
- 4 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter.](#)
- 5 Remove fixing clip of engine harness.



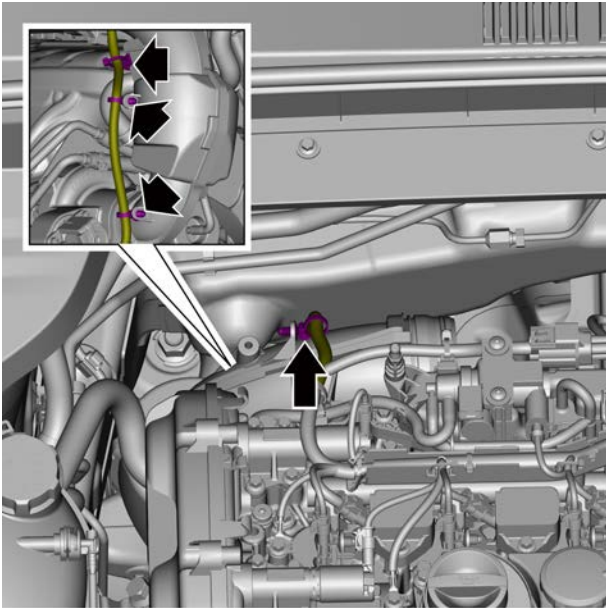


- 6 Remove one retaining bolt 1 of the lower outlet pipe of the air filter.
- 7 Remove 2 retaining bolts 2 of the lower outlet pipe of the air filter.
- 8 Disconnect the outlet pipe of the expansion tank from the lower outlet pipe of the air filter, and remove the lower outlet pipe of the air filter.

Installation procedure



- 1 Install the lower outlet pipe of the air filter and connect the outlet pipe of the expansion tank with the lower outlet pipe of the air filter.
- 2 Install and tighten 2 retaining bolts 2 of the lower outlet pipe of the air filter.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 3 Install and tighten 1 retaining bolts 1 of the lower outlet pipe of the air filter.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 4 Install fixing clip of engine harness.

- 5 Install the upper outlet pipe of the air filter.
- 6 Install the engine trim cover assembly.
- 7 Connect the negative battery cable.
- 8 Close the engine compartment cover.

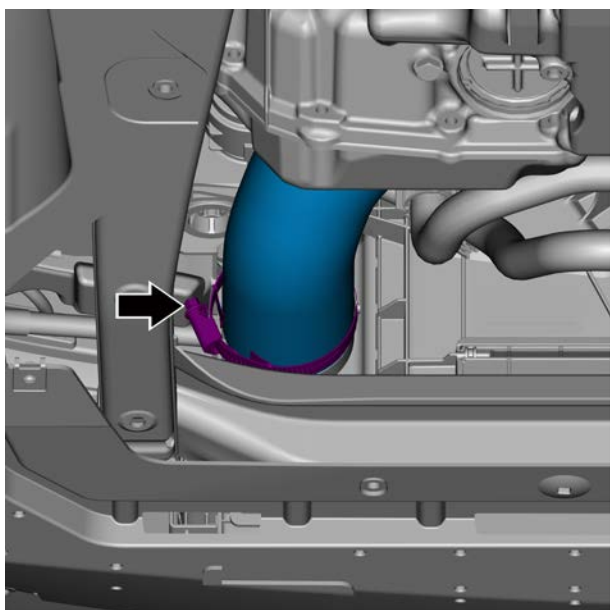
2.6.8.7 Replacement of air outlet pipe intercooler assembly

Removal procedure

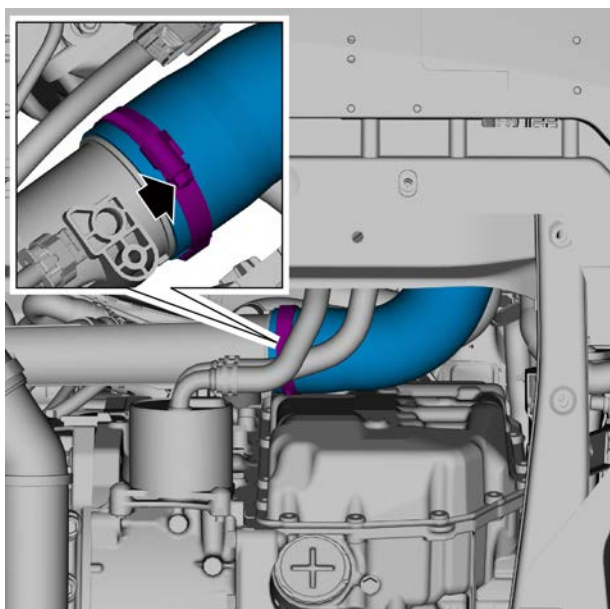
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

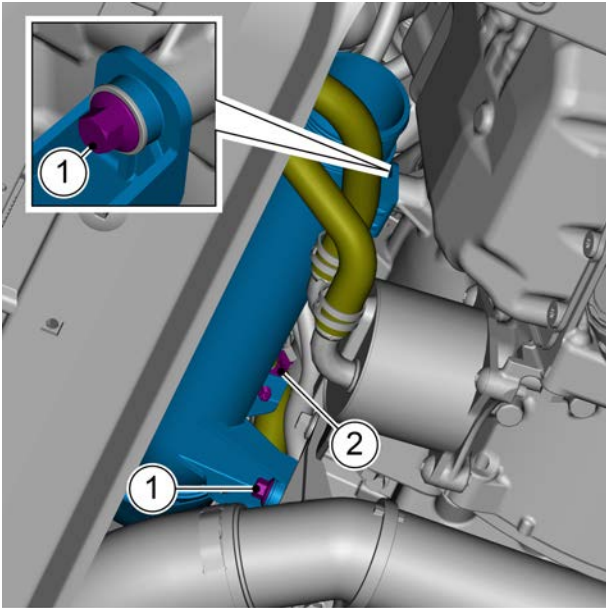
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 6 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe](#).
- 7 Remove the air pressure and air temperature sensor 2, see the [Replacement of Air Pressure and Air Temperature Sensor 2](#).



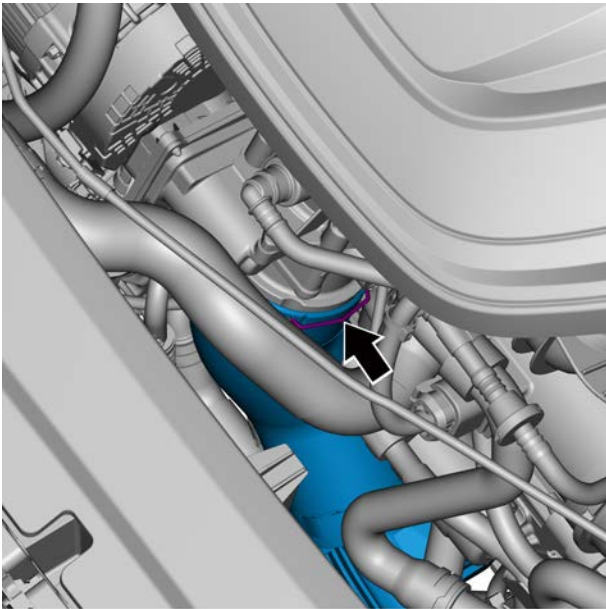
- 8 Loosen the fixing hoop of the intercooler outlet hose and disconnect the intercooler outlet hose from the intercooler.



- 9 Loosen the fixing hoop of the intercooler outlet hose and remove the intercooler outlet hose.

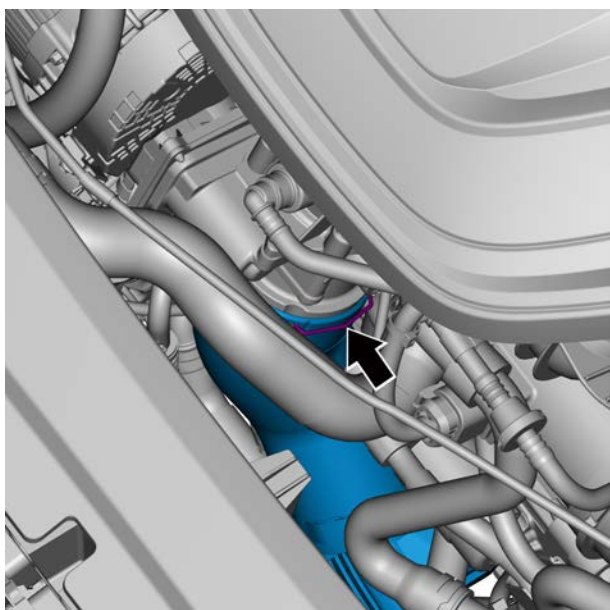


- 10 Remove fixing clip 2 of radiator outlet pipe.
- 11 Remove 2 retaining bolts 1 from the intercooler outlet pipe.

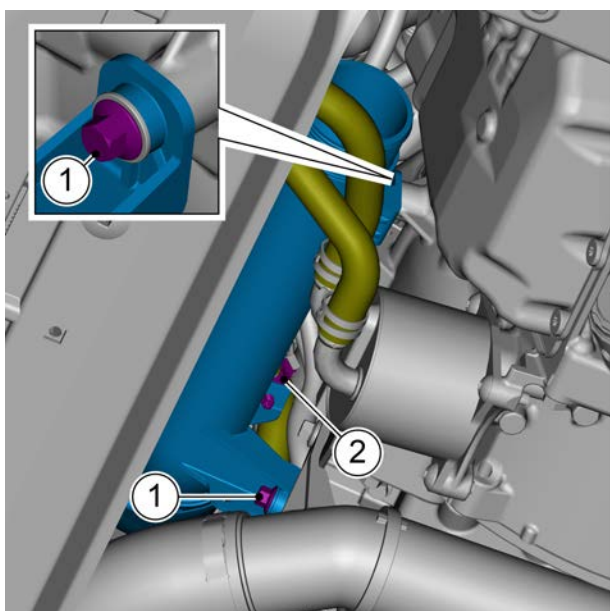


- 12 Unlock the quick insert elastic circlip And remove the intercooler outlet pipe.

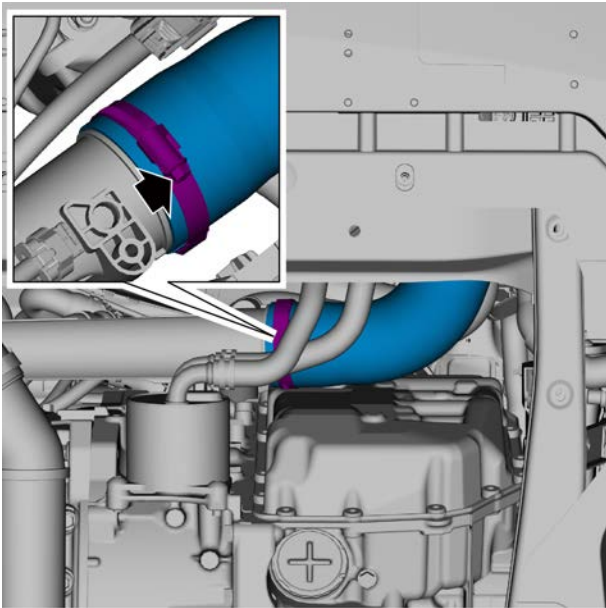
Installation procedure



- 1 Install the intercooler outlet pipe and reset the quick insert elastic snap ring.

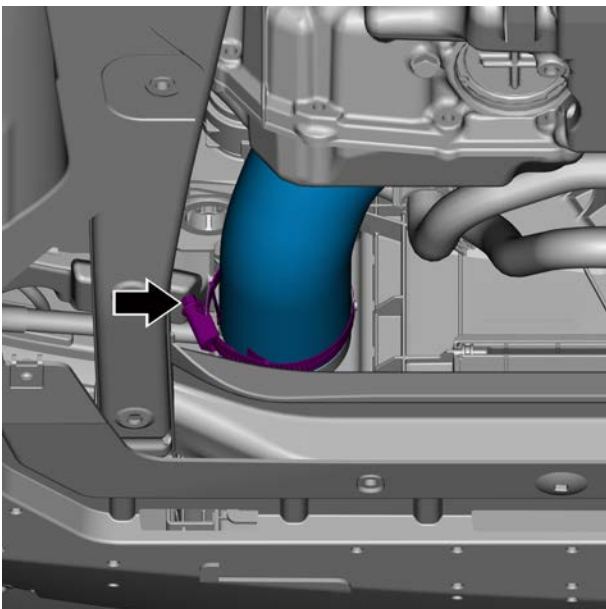


- 2 Install and tighten 2 retaining bolts 1 of the intercooler outlet pipe.
Torque: 24N·m (metric), 17.7lb-ft (imperial system)
- 3 Install fixing clip 2 of radiator outlet pipe.



- 4 Install the intercooler outlet hose and tighten the fixing hoop of the intercooler outlet hose.

Torque: 5 N. m (metric system) 3.7 lb-ft (Imperial system)



- 5 Connect the intercooler outlet hose to the intercooler, and tighten the fixing hoop of the intercooler outlet hose.

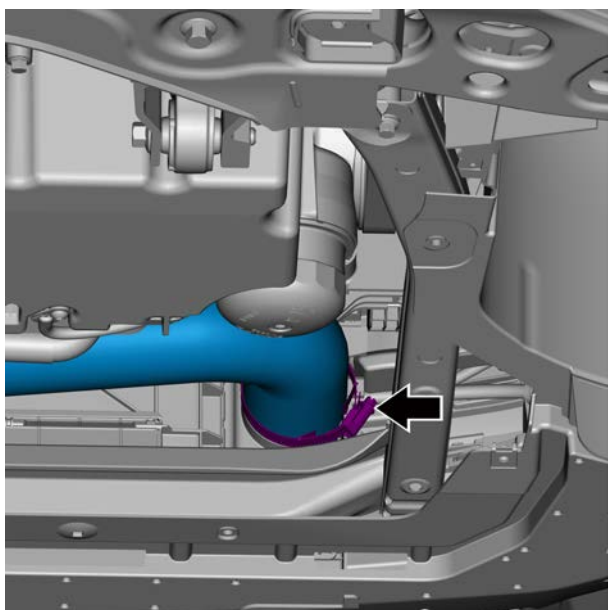
Torque: 5 N. m (metric system) 3.7 lb-ft (Imperial system)

- 6 Install air pressure and air temperature sensor 2.
- 7 Install the air inlet pipe of the air filter.
- 8 Install the air filter assembly.
- 9 Install the engine fender.
- 10 Lower the vehicle.
- 11 Connect the negative battery cable.
- 12 Close the engine compartment cover.

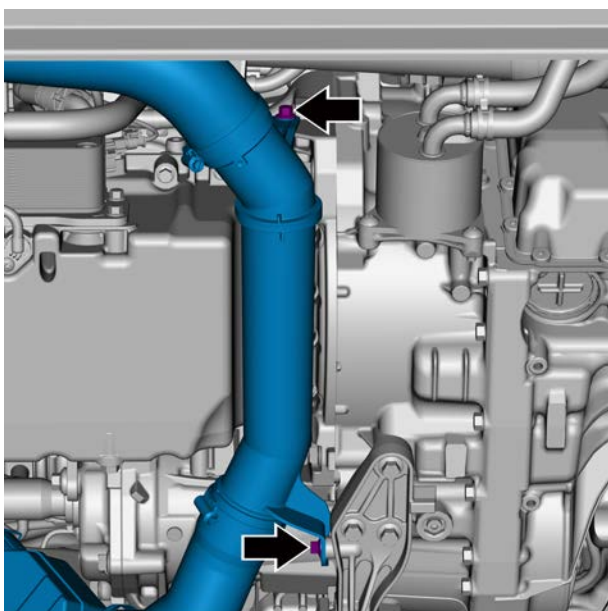
2.6.8.8 Replacement of air intake pipe of intercooler

Removal procedure

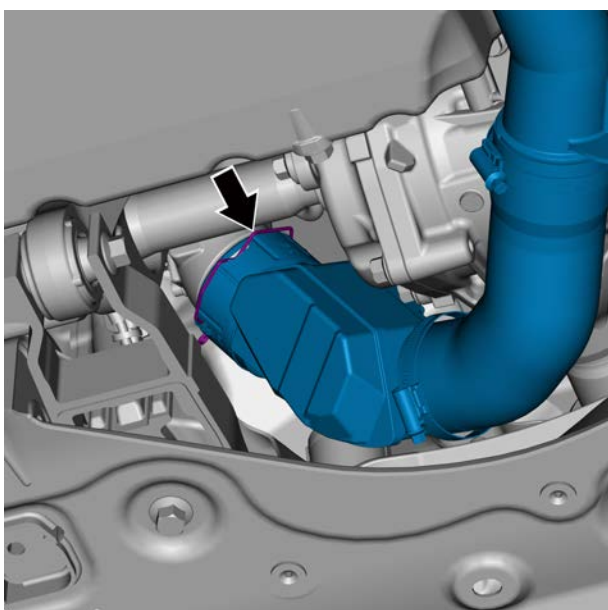
- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the engine fender, see [Engine fender replacement](#).



- 3 Loosen the fixing hoop of the intercooler inlet hose and disconnect the connection between the intercooler inlet hose and the intercooler.

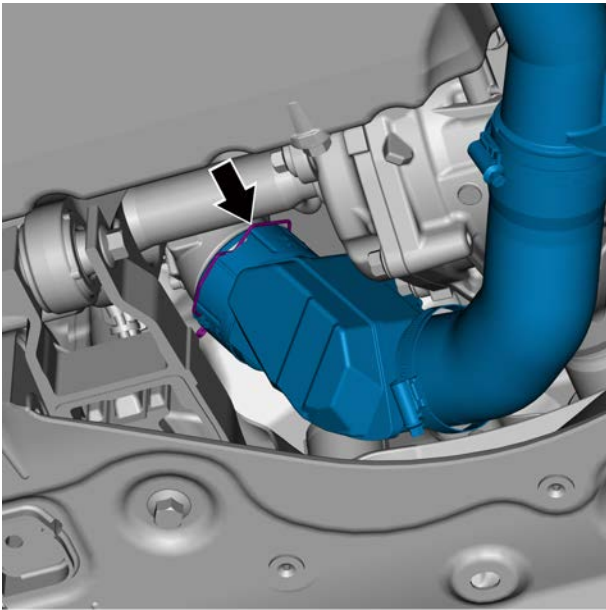


- 4 Remove one retaining bolt 2 from the intercooler intake pipe assembly.

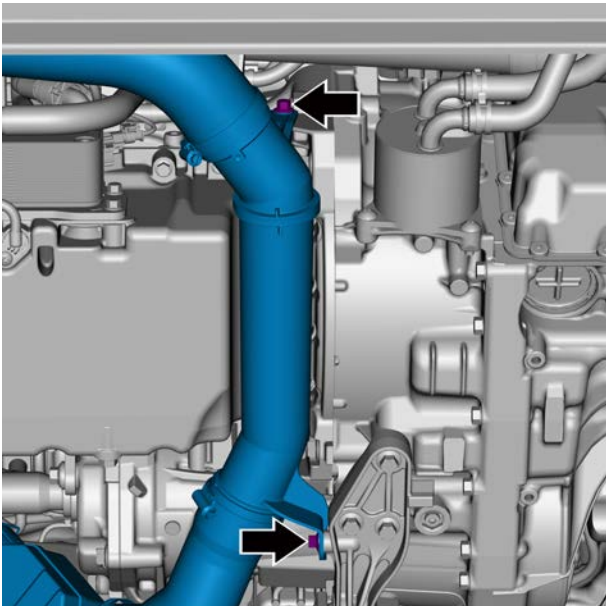


- 5 Unlock the quick insert elastic circlip And remove the intercooler intake pipe assembly.

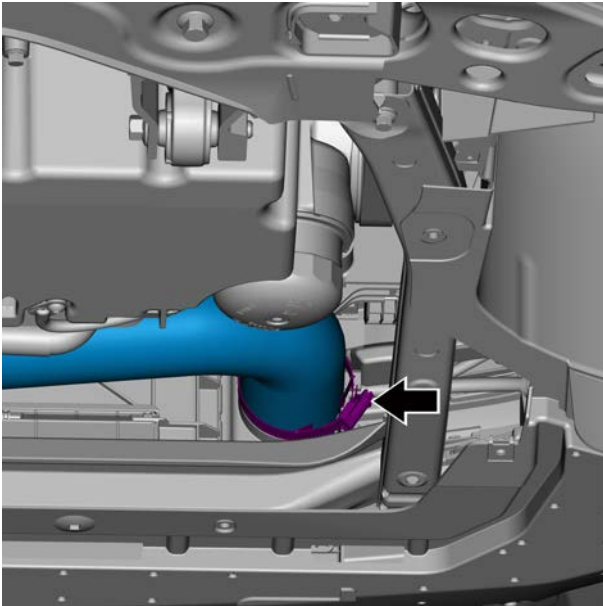
Installation procedure



- 1 Install the intercooler intake pipe assembly and reset the quick insert elastic circlip.



- 2 Install 2 retaining bolts onto the intercooler intake pipe assembly.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



- 3 Connect the air inlet hose of the intercooler and the intercooler, and tighten the fixing hoop of the air inlet pipe assembly of the intercooler.

Torque: 5 N. m (metric system) 3.7 lb-ft (Imperial system)

- 4 Install the engine fender.
- 5 Lower the vehicle.

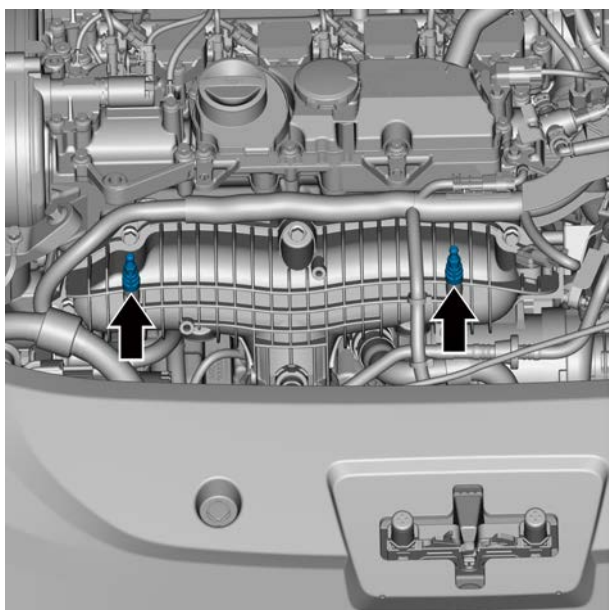
2.6.8.9 Intake manifold components replacement

Removal procedure

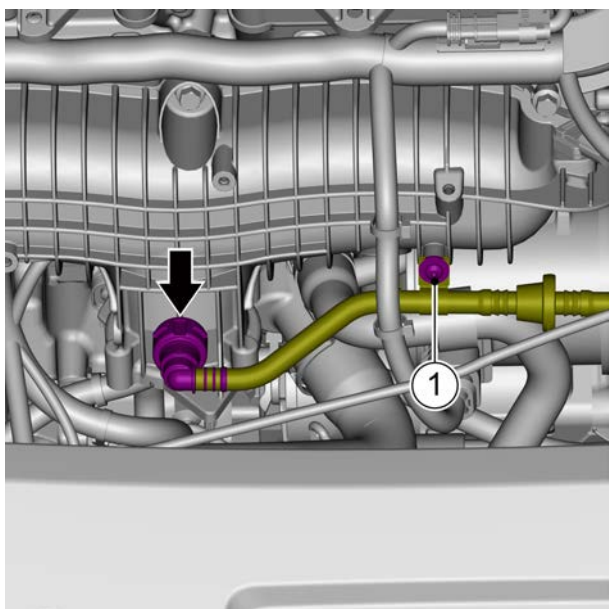
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

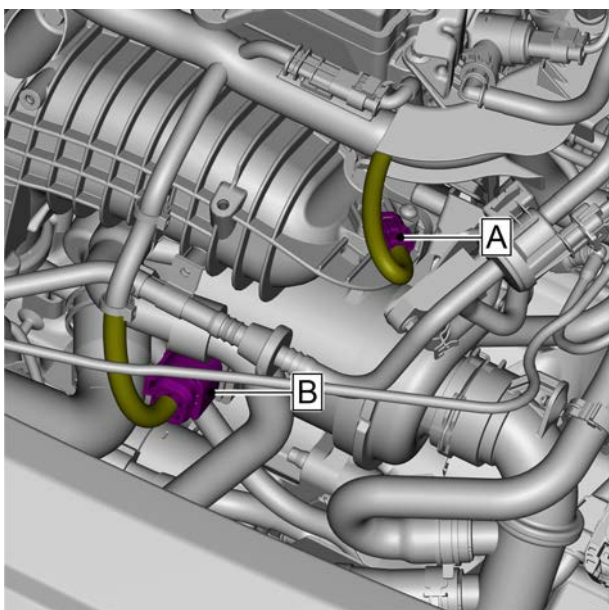
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover.](#)
- 4 Lift the vehicle, see [Lift the vehicle](#)
- 5 Remove the engine fender, see [Engine fender replacement.](#)
- 6 Remove the air filter assembly, refer to [replacement of air filter assembly.](#)
- 7 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe.](#)
- 8 Remove the air pressure and air temperature sensor 2, see the [Replacement of Air Pressure and Air Temperature Sensor 2.](#)
- 9 Remove the intercooler outlet pipe assembly. See [intercooler outlet pipe assembly replacement.](#)
- 10 Remove the throttle unit. See [replacement of throttle unit.](#)



11 Remove the ball head bolt of the engine trim cover.

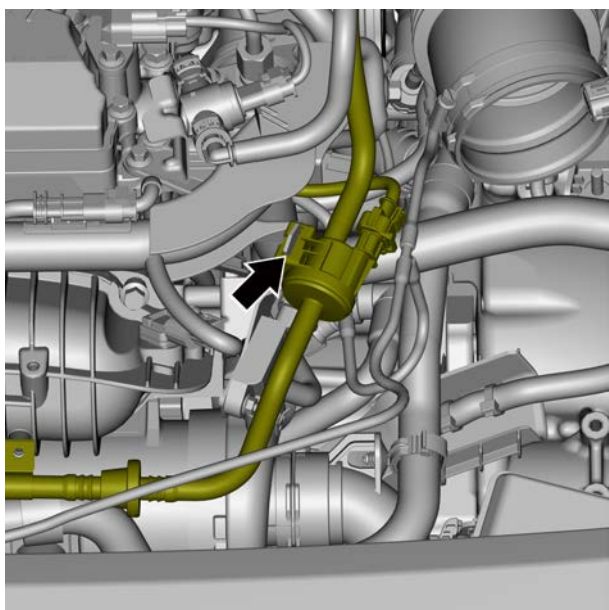


12 Remove the connector of the long desorption pipe under the floor, and remove one retaining bolt 1 of the long desorption pipe under the floor.

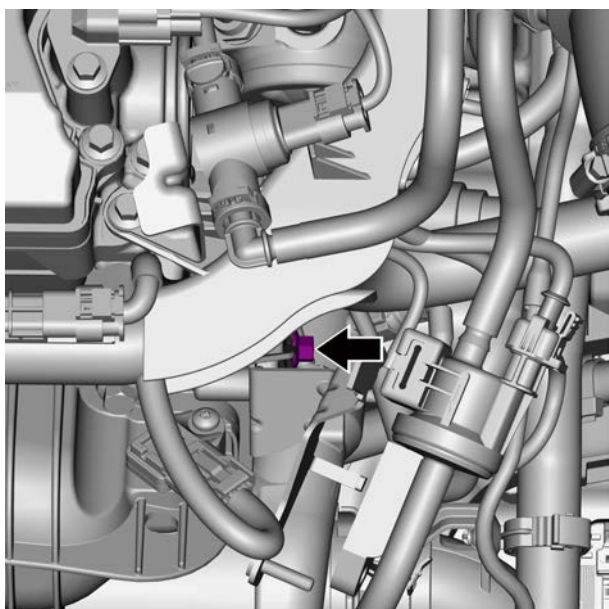


13 Disconnect manifold pressure sensor harness connector A.

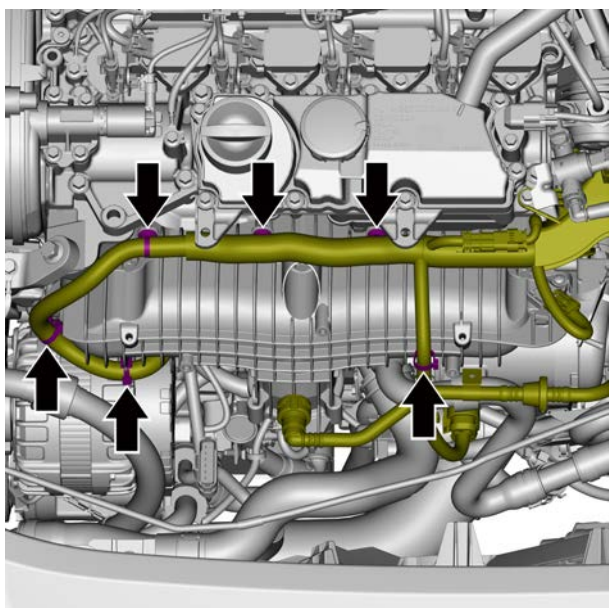
14 Disconnect the engine coolant pump harness connector B.



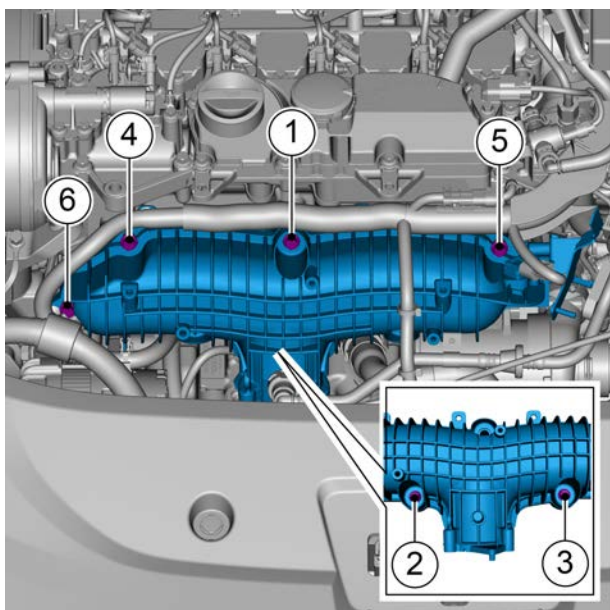
- 15 Disconnect the canister solenoid valve from the canister solenoid valve bracket and move it aside.



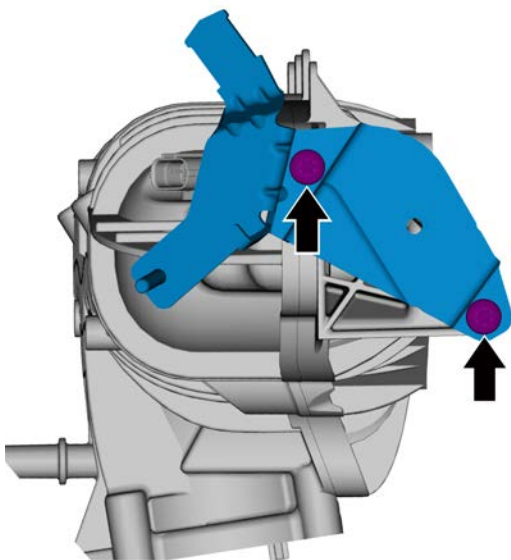
- 16 Remove 1 retaining bolt from the engine harness sheath.



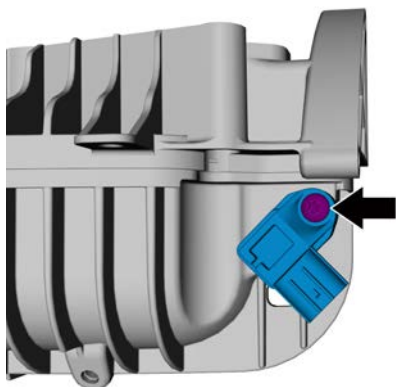
- 17 Remove fixing clip of engine harness.



- 18 Remove the 6 retaining bolts of the intake manifold components in the sequence shown in the figure and remove the intake manifold components.



- 19 Remove 2 retaining bolts from the carbon tank solenoid valve bracket and remove the carbon tank solenoid valve bracket.



- 20 Remove one retaining bolt of the manifold pressure sensor and pull out the manifold pressure sensor.

Installation procedure

- 1 Install the manifold pressure sensor. Install and tighten one retaining bolt of the manifold pressure sensor.

Torque: 3.5 N. m (metric system) 2.6 lb-ft (Imperial system)

Caution

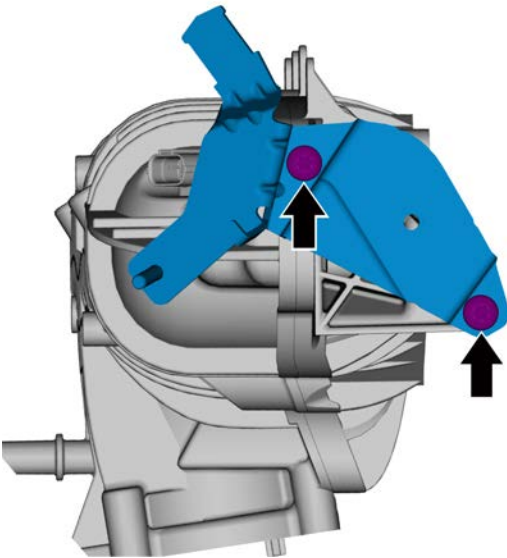
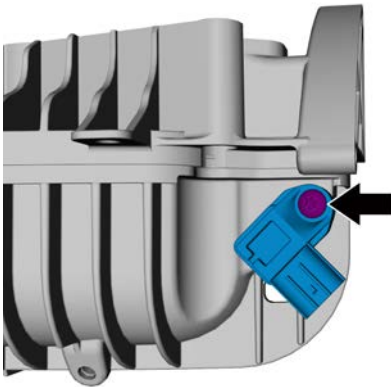
1. If the sensor has been dropped or has been severely hit, replace it with a new sensor when installation.;

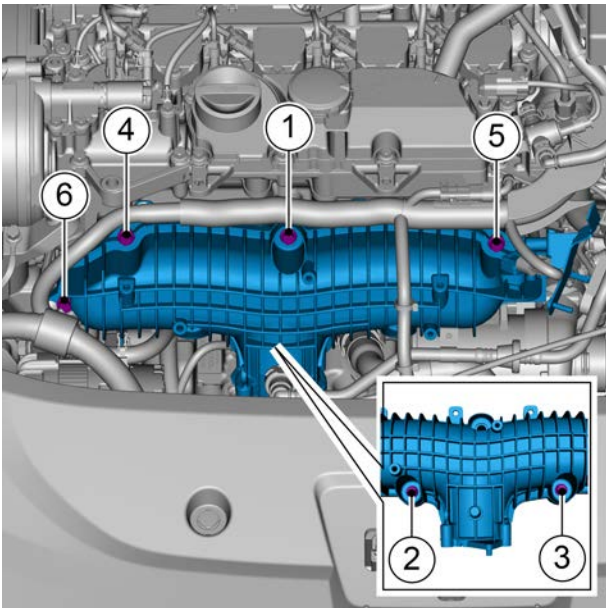
2. Do not bias the sensor during installation to avoid crushing the o-ring;

3. This sensor is an absolute pressure sensor, and the output value of the product under standard atmospheric pressure is approximately 2.1V. Since the ambient pressure is not an accurate value during measurement, this value is for reference only.

- 2 Install the carbon tank solenoid valve bracket, install and tighten the 2 retaining bolts of the carbon tank solenoid valve bracket.

Torque: 5 N. m (metric system) 3.7 lb-ft (Imperial system)



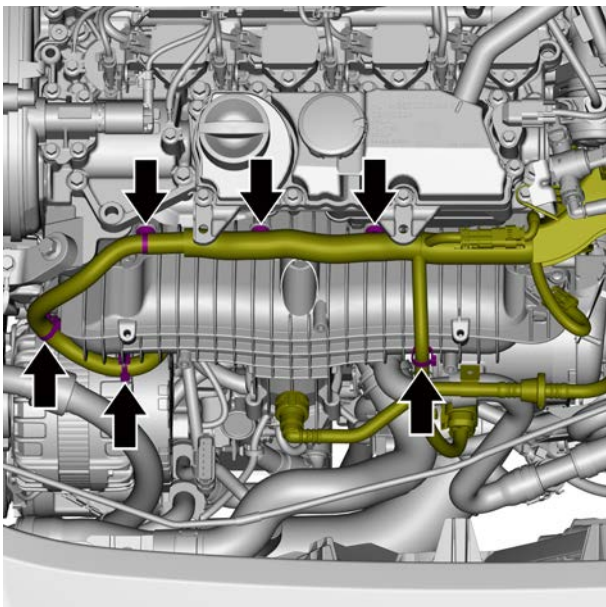


- 3 Install the intake manifold components, install and tighten the 6 retaining bolts of the intake manifold components in the sequence shown in the figure.

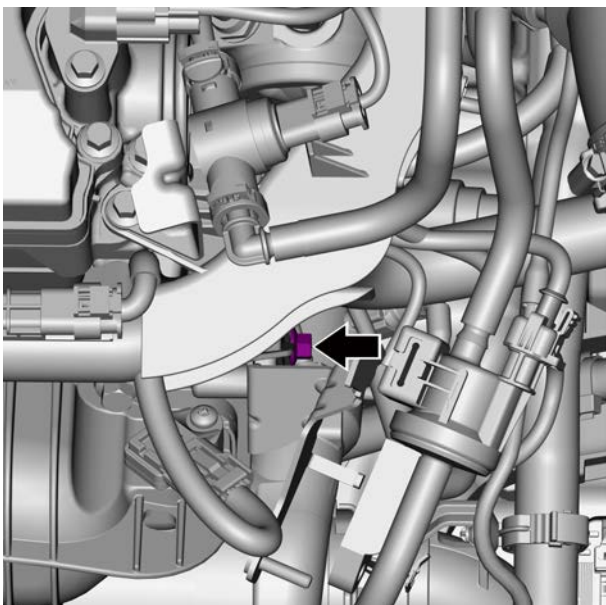
Torque: 16 N. m (metric system) 11.8 lb-ft (Imperial system)

Caution

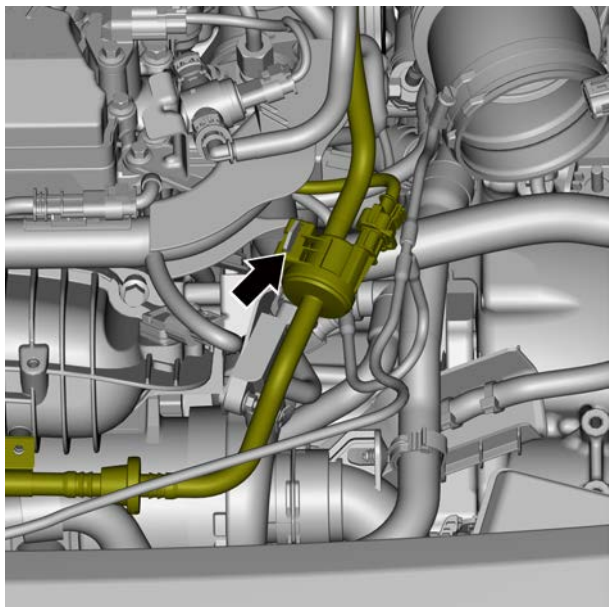
Before installation, visually check whether the sealing ring of intake manifold components and throttle unit are present and intact, so as to avoid leakage of intake manifold components caused by falling off or damage of sealing ring.



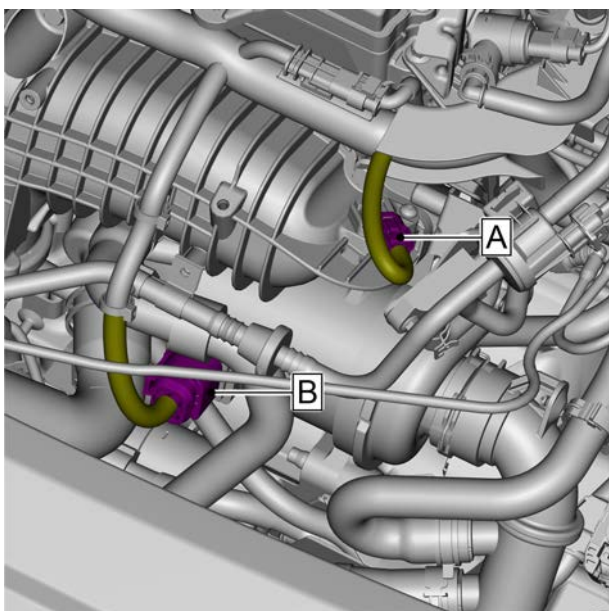
- 4 Install fixing clip of engine harness.



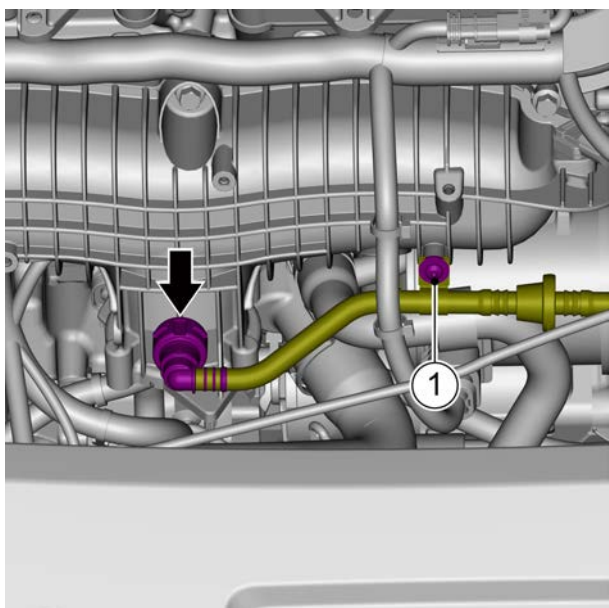
- 5 Install 1 retaining bolt from the engine harness sheath.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 6 Install the canister solenoid valve.

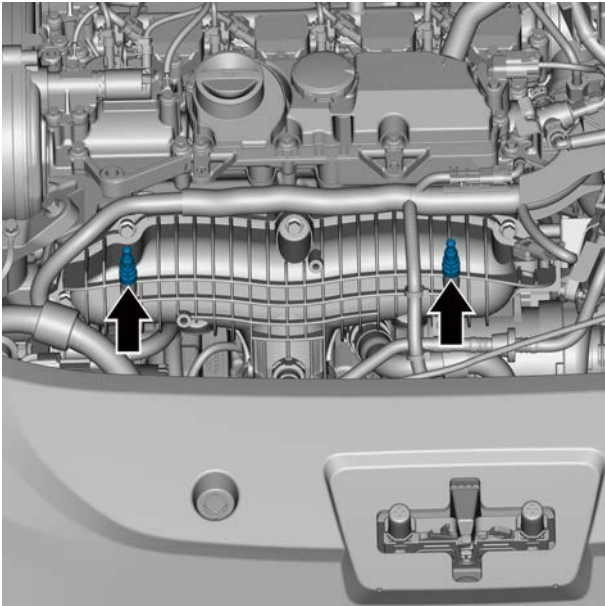


- 7 Connect engine coolant pump harness connector B.
- 8 Connect manifold pressure sensor harness connector A.



- 9 Install the connector of the long desorption pipe under the floor, and install and tighten one retaining bolt 1 of the long desorption pipe under the floor.

Torque: 3.5 N. m (metric system) 2.6 lb-ft (Imperial system)



- 10 Install engine trim hood ball joint bolt.
Torque: 6 N. m (metric system) 4.4 lb-ft (Imperial system)

- 11 Install throttle unit.
- 12 Install the intercooler outlet pipe assembly.
- 13 Install air pressure and air temperature sensor 2.
- 14 Install the air inlet pipe of the air filter.
- 15 Install the air filter assembly.
- 16 Install the engine fender.
- 17 Lower the vehicle.
- 18 Install the engine trim cover assembly.
- 19 Connect the negative battery cable.
- 20 Close the engine compartment cover.

2.7 Exhaust system JLH-4G20TD

2.7.1 Specification

2.7.1.1 Torque specification

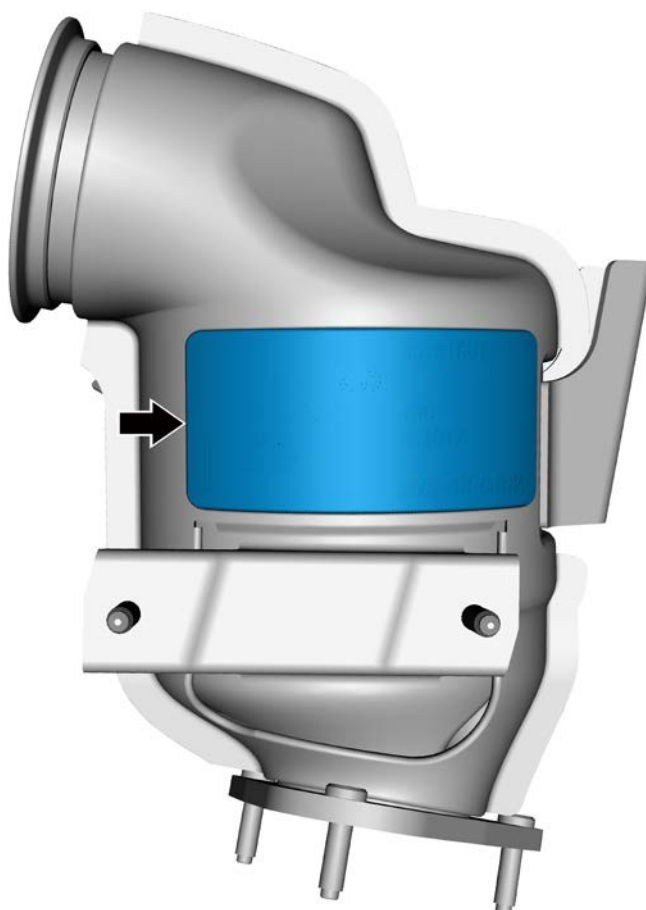
Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Front exhaust pipe clamp	-	19~21	14~15.5
Front exhaust pipe bracket retaining bolt	M8×25	20~28	14.8~20.7
VEP4 catalytic converter retaining bolt	M8×16	20~28	14.8~20.7
VEP4 catalytic converter fixing nut	M8×10.2	20~28	14.8~20.7
Engine compartment bracket fixing bolt.	M8×40	20~28	14.8~20.7
Fixing nut of rear pipe of catalytic converter and VEP4 catalytic converter	M8×9.4	20~28	14.8~20.7
Fixing nut of rear pipe of catalytic converter and exhaust cold end	M8×9.4	20~28	14.8~20.7
Rubber lifting lug retaining bolt	M10×35	41~55	30.2~40.6
Front channel heat shield retaining bolt	M8×25	20~28	14.8~20.7
Rear channel heat shield retaining bolt	M8×25	20~28	14.8~20.7
Fuel tank heat shield fixing plastic nut	T5×11	2	1.5
Exhaust pipe fuel tank heat shield fixing screw	PF5×20	Pre-tighten: 2	Pre-tighten: 1.5
		Re-tightening: 2.5	Re-tightening: 1.8
Exhaust pipe fuel tank heat shield fixing nut	M6×9.1	8.5~11.5	6.3~8.5
Retaining bolts of floor heat shield	M6×20	5~7	3.7~5.2
Fixing bolt of turbocharger heat shield	M6×10	8.5~11.5	6.3~8.5
Fuel return pipe unit turbocharger fixing bolt	M6×16	8.5~11.5	6.3~8.5
Fixing bolt of the turbo charger.	M8×32.5	18~22	13.3~16.2
Turbocharger fixing nut	M8×1.25	18~22	13.3~16.2

2.7.1.2 Specifications of Key Exhaust Components

Part Name	Model	Emission	Valid service life
Engine assembly.	JLH-4G20TD	Euro V	15 years or 300,000 kilometers
VEP4 catalytic converter	CAT-DAA	Euro V	10 years or 200,000 kilometers
Lambda probe (front oxygen sensor)	OXS-DAA	Euro V	15 years or 250,000 kilometers
Lambda probe (rear oxygen sensor)	OXS-DBA	Euro V	15 years or 250,000 kilometers

2.7.1.3 Catalytic labeling information of catalytic converter

Catalytic label position of catalytic converter



Description of catalytic label information of catalytic converter



1. Brand identity

2. Part Number

3. Product model number

4. Batch number

5. Country of origin

6. Cover manufacturer

7. Carrier manufacturers

8. Coating manufacturers

2.7.2 Instructions and operations

2.7.2.1 Three-way Catalytic Converter

Catalytic converter- the front part is mainly used to reduce harmful gases and hydrocarbons in the exhaust gas. The active substances in the front of catalytic converter include platinum, palladium and rhodium. Combine carbon monoxide (CO) and unburned water (H₂O) of the converter to produce carbon monoxide (CO). The converter also reduces nitrogen oxides (NO_x). The front oxygen sensor and Lambda probe (rear oxygen sensor) are located on the front of the catalytic converter and are used to measure the oxygen content in front of and behind the catalytic converter.

The stainless-steel shell is a ceramic carrier arranged in a honeycomb shape along the exhaust direction. The ceramic carrier is surrounded by a gasket. The main function of the gasket is to fix the ceramic carrier to prevent any contact and collision with the inner shell. Lambda probe (front oxygen sensor) (HO₂S) is installed at the Front-end of three-way catalytic purifier.

2.7.2.2 Turbo charger

The turbocharger is mainly used to increase the intake pressure. The turbocharger bypass valve is located on the turbocharger and is used to measure the intake pressure. The exhaust drives the impeller in the turbocharger to rotate at high speed, increasing the intake pressure and forcing more air into the combustion chamber.

The turbine control valve (wastegate) is mainly used to control the under pressure of the wastegate on the turbocharger. The turbine control valve (wastegate) has two pipes, one connected to the vacuum pump (generating under-voltage) and the other connected to the wastegate. The turbine control valve (wastegate) is controlled by the Engine Control Module (ECM).

2.7.3 System working principles

2.7.3.1 System Working Principles

Catalytic converters are used to reduce harmful gases and hydrocarbons (HC) produced by vehicles. The active substances in the catalytic converter include platinum, palladium and rhodium. The active substances in the catalytic converter have perforated small channels for exhaust gas to pass through. When the exhaust gas contacts the surface of these three chemical elements, it will produce catalytic effect. The catalytic converter combines carbon monoxide (CO) with unburned hydrocarbons (HC) to produce carbon dioxide (CO₂) and water (H₂O). Catalytic converters also reduce nitrogen oxides (NO_x).

JLH-4G20TD engine adopts exhaust gas turbocharger. For the improvement of intake efficiency by the turbo charger, the fuel economy and power performance of the engine are greatly improved.

The basic structure of turbocharger:

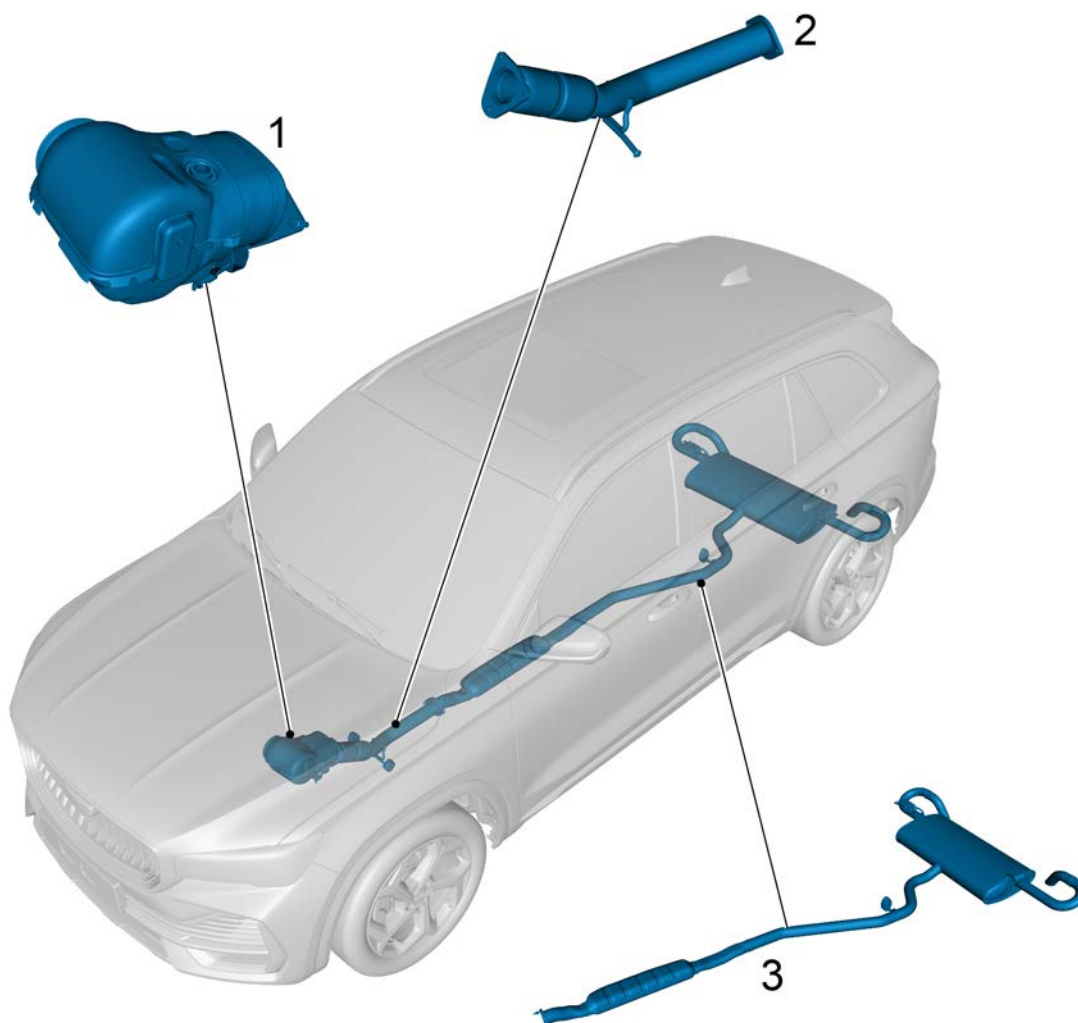
- Compressor: compress air to increase density.
- Turbine: use the exhaust pressure to drive the compressor to do work on the air intake.
- Intermediate: Support, lubricate, seal and cool.

Turbocharger working principle

Turbocharger is actually an air compressor, which increases the intake density through compressed air, and then increases the intake volume. It uses the exhaust gas pressure from the engine to drive the turbine in the turbine chamber. The high-pressure exhaust gas impacts the turbine to make it rotate at high speed. The turbine drives the coaxial compressor impeller, which can operate at high speed to compress the intake air. This speed is very high. Now the speed of vehicle turbocharging is between 100,000-240,000 rpm, increasing the air intake in the cylinder. The exhaust gas discharge speed and turbine speed also accelerate synchronously when the engine speed increases. The more fresh air is pressed into the cylinder within the boost pressure range, which effectively improves the fuel utilization and outputs higher power at the same time.

2.7.4 Component position

2.7.4.1 Component position layout of exhaust system

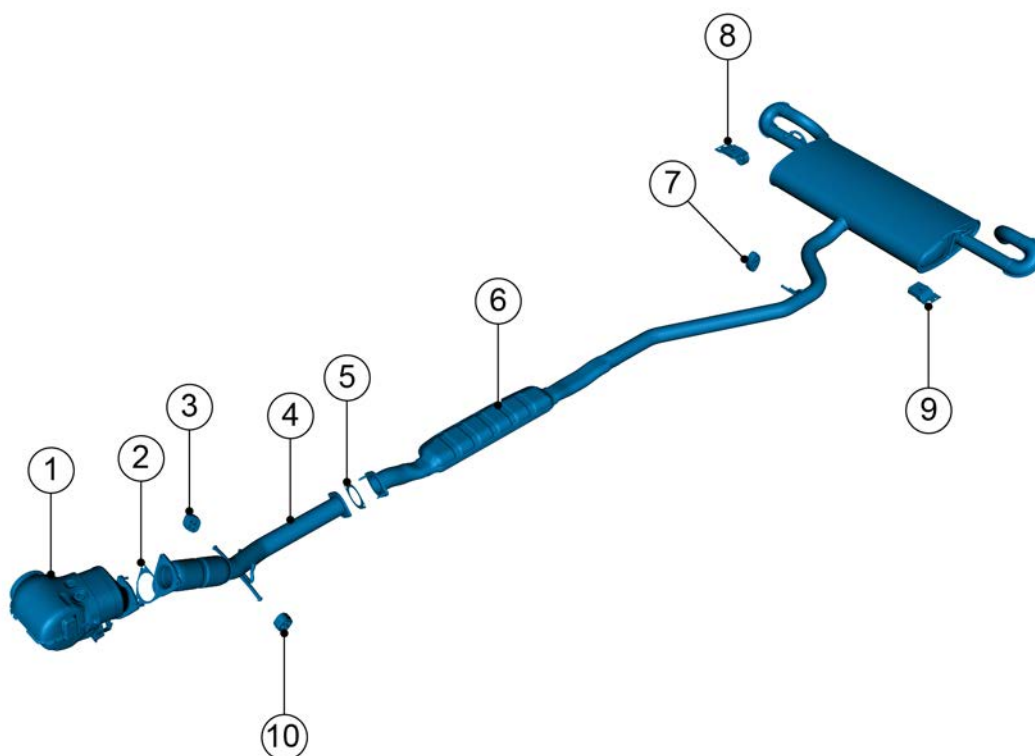


1. VEP4 catalytic converter
2. Rear pipe of catalytic converter

3. Exhaust cold end

2.7.5 Exploded view

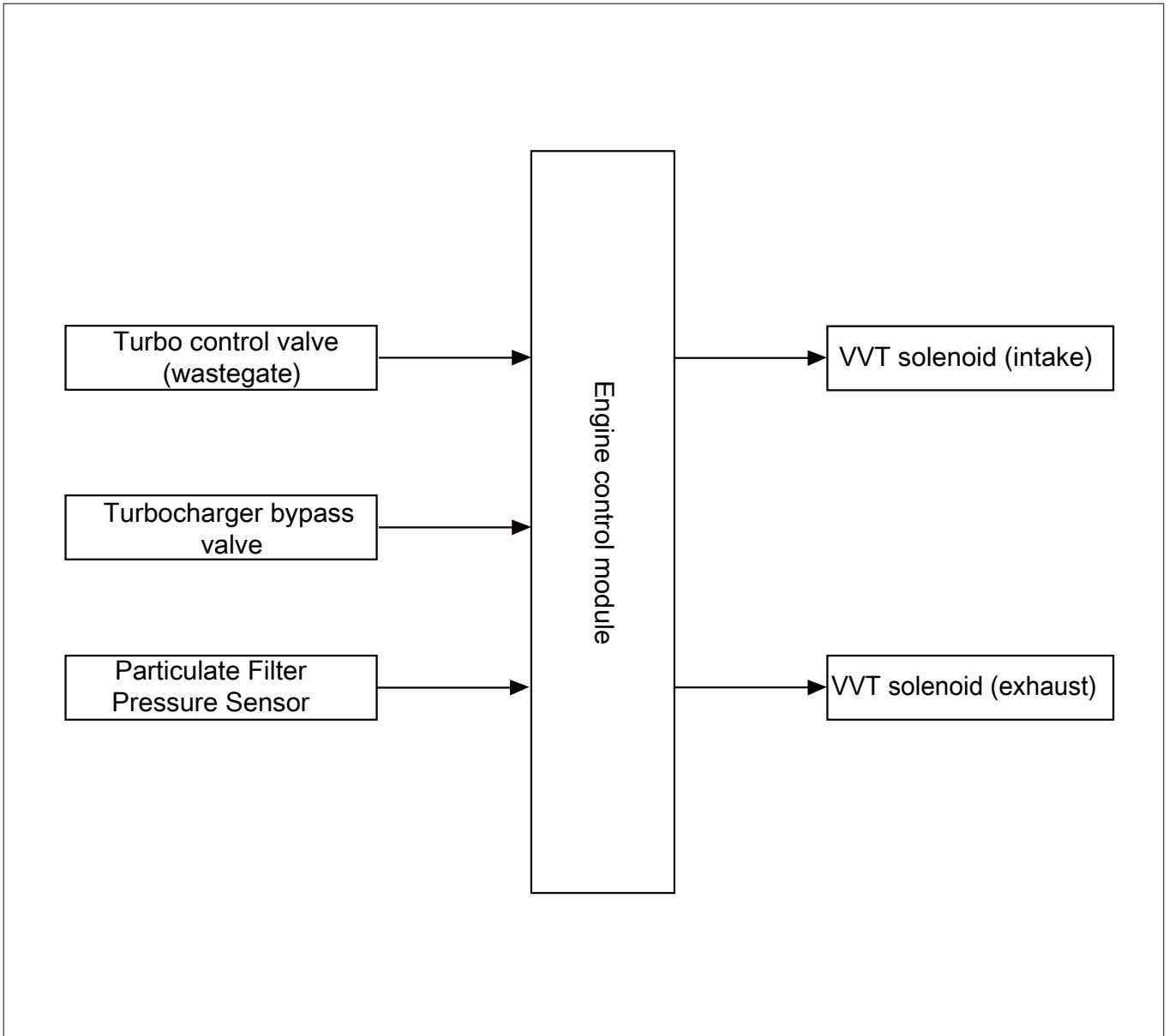
2.7.5.1 Exploded view



- | | | | |
|----|----------------------------------|-----|--------------------|
| 1. | VEP4 catalytic converter | 6. | Exhaust cold end |
| 2. | Exhaust gasket | 7. | Rubber lifting lug |
| 3. | Rubber lifting lug | 8. | Rubber lifting lug |
| 4. | Rear pipe of catalytic converter | 9. | Rubber lifting lug |
| 5. | Exhaust gasket | 10. | Rubber lifting lug |

2.7.6 Electrical schematic diagram

2.7.6.1 Electrical schematic diagram



2.7.7 Diagnostic message and steps

2.7.7.1 Diagnosis Description

Before the diagnosis of the exhaust system fault, refer to Description and Operation and System Working Principle. Understand and get familiar with exhaust system working principle before starting system diagnosis. This helps to determine the correct fault diagnosis steps when a trouble occurs. More importantly, it also helps to determine whether the situation described by the distributor is normal. Any trouble diagnosis of the exhaust system should start with visual inspection. The visual inspection will guide maintenance personnel to take the next logical step for diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

2.7.7.2 Visual Check

- Check after-sales installations that may affect exhaust system operation. Make sure these installations cannot affect normal working of the exhaust system.
- Check system components that are easily accessible or can be seen to find out if they are obviously damaged or have external leakage.
- Check whether the color of exhaust gas in the exhaust pipe is normal.

2.7.7.3 Exhaust System Is Blocked

When the engine has power loss, poor fuel economy or poor acceleration performance, it is necessary to check whether there is an "exhaust system blockage" fault. Use an exhaust back pressure gauge to monitor whether the system back pressure exceeds 40kPa to confirm the fault. The possible reasons are as follows :

The exhaust pipes are damaged.

There is debris in the exhaust pipes.

Internal fault of muffler or resonator.

The interior of the exhaust pipes rust and blank plug the exhaust outlet.

2.7.7.4 Exhaust System Leakage

If the engine makes a "hiss" sound or a cracking sound when it is running, please check whether there is a trouble of "exhaust system leakage", as shown in the following table:

Fault suspect	Maintenance plan
Exhaust system components are misplaced or installed incorrectly	-Position and tighten the exhaust system components to the specified torque. -Make sure that the exhaust pipe hook is in the correct position and is not loose.
Exhaust leakage at the following connections: -Turbocharger and VEP4 catalytic converter assembly -Flange	Tighten the relevant parts to the specified torque.
Leakage of sealing elements or gaskets: - Turbo charger assembly -Turbocharger assembly and VEP4 catalytic converter assembly -VEP4 catalytic converter assembly and catalytic converter rear pipe -Catalyst rear pipe and muffler assembly	Replace leaking sealing elements or gaskets.
Irregular joint surface at flange connection	Repair or replace related parts when necessary.
Leakage at the welded joints of exhaust system components	Replace the leaking parts.

2.7.7.5 Noise from exhaust system

When the engine is running, if the exhaust sound is loud or abnormal, it is required to check whether there is a fault of "noise from exhaust system", as shown in the table below:

Fault phenomenon	Maintenance plan
Crackling or hissing;	For leakage of exhaust system, refer to exhaust system leakage .
Exhaust sound is loud	1. Compare with known vehicles in good condition.
	2. Check the muffler assembly for damage or malfunction. Replace the faulty muffler assembly.
	3. Replace the turbocharger, replace the rear pipe of the catalytic converter, and replace the rear muffler.
External noise or vibration noise	1. Check whether the hook is bent or loosened, and whether the heat shield or fasteners tightening are loosened.
	2. Check the exhaust pipe for disturbance.
Internal noise	1. Use a rubber hammer to strike these parts to confirm the noise.
	2. Replace the faulty turbo charger assembly or catalytic converter assembly or muffler assembly. Replace the turbocharger or replace the three-way catalytic converter or replace the rear pipe of the catalytic converter or replace the rear muffler.

2.7.7.6 Precautions for Exhaust System Maintenance

Warning !

See "Warnings Regarding Exhaust System Maintenance" in "Warnings and Precautions".

Warning !

The fragmented three-way catalytic converter assembly must be replaced. It is not allowed to use an exhaust system without the three-way catalytic converter assembly, otherwise the exhaust will seriously pollute the air.

Caution

The three-way catalytic converter assembly may be damaged or fail if the following conditions occur:

- Operate beyond the limits of the closed-loop gas mixture control system.
- The engine burns a lot of engine oil.
- the exhaust gas temperature at the three-way catalytic purifier is too high, exceeding 850 °C (1,562 °F).

Caution

-Vehicles with a three-way catalytic converter assembly cannot use leaded gasoline. Lead will contaminate the three-way catalytic converter assembly.

-Never drop the three-way catalytic converter assembly, as this may damage the ceramic carrier.

-Do not allow water, engine oil or fuel to enter the converter, as this may contaminate the ceramic carrier.

-Never start the vehicle when the engine is misfired or the spark plug leads are disconnected.

2.7.8 Removing and installing

2.7.8.1 VEP4 catalytic converter replacement

Removal procedure

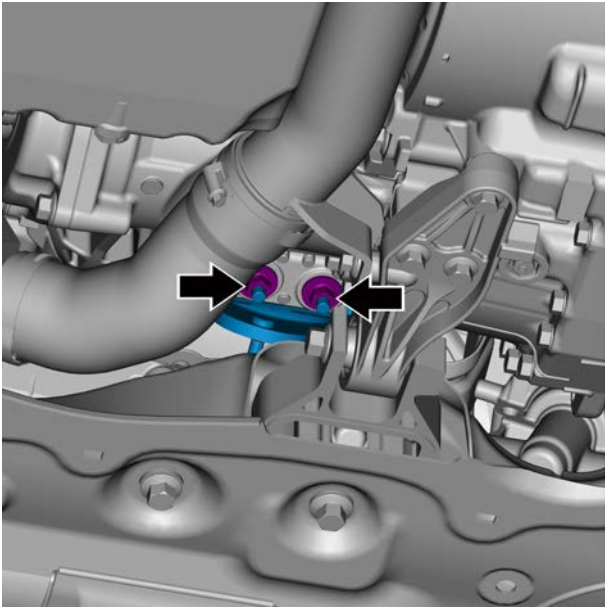
Warning !

See "Warnings Regarding Exhaust System Maintenance" in "[Warnings and Precautions](#)".

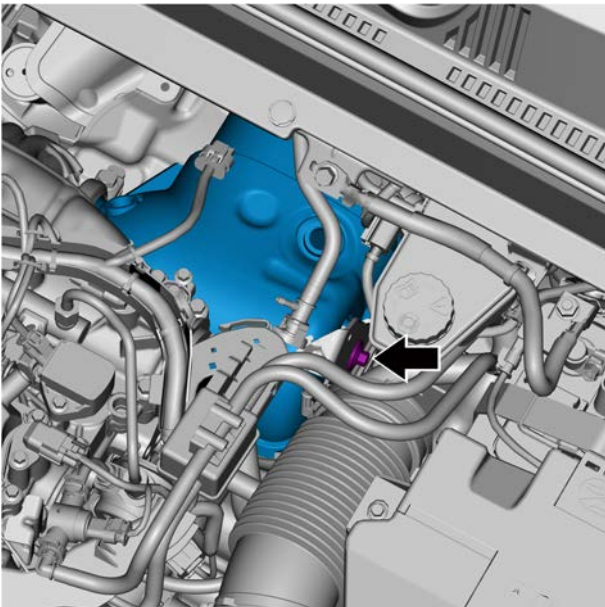
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

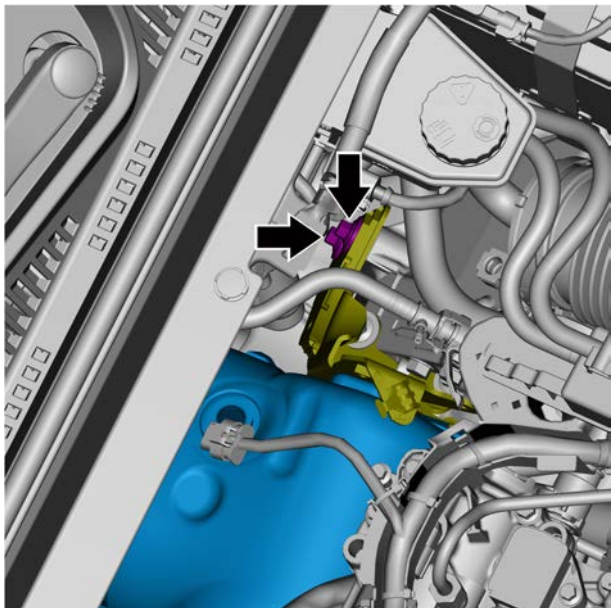
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 5 Remove the lower outlet pipe of air filter. See [replacement of lower outlet pipe of air filter](#).
- 6 Remove the turbocharger heat shield, see [turbocharger heat shield replacement](#).
- 7 Remove the turbine control valve (wastegate). See [turbine control valve \(wastegate\) replacement](#).
- 8 Remove the vacuum chamber. See [replacement of vacuum chamber](#).
- 9 Remove Lambda probe (front oxygen sensor), see [replacement of Lambda probe \(front oxygen sensor\)](#).
- 10 Remove Lambda probe (rear oxygen sensor), see [replacement of Lambda probe \(rear oxygen sensor\)](#).
- 11 Lift the vehicle, see [Lift the vehicle](#)
- 12 Remove the engine fender, see [Engine fender replacement](#).
- 13 Remove the rear pipe of catalytic converter. See [replacement of rear pipe of catalytic converter](#).



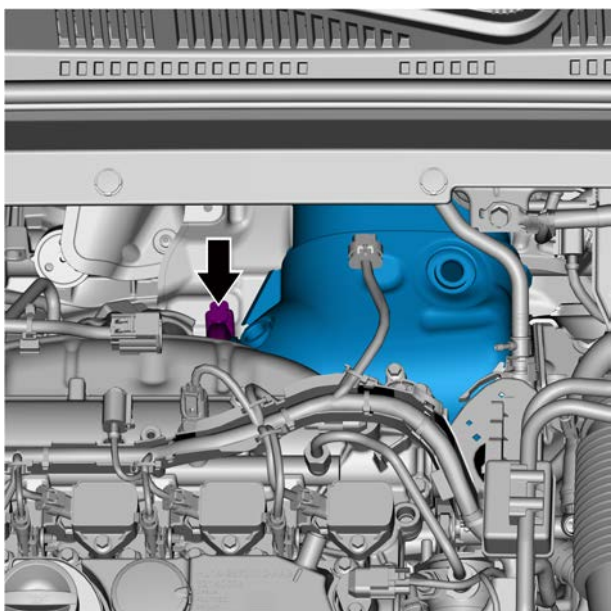
14 Remove 2 fixing nuts of VEP4 catalytic converter.



15 Remove 1 retaining bolt of VEP4 catalytic converter.

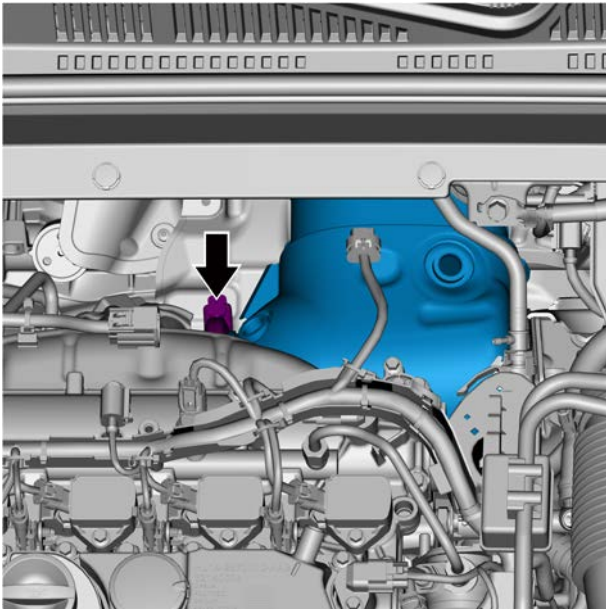


- 16 Remove 2 retaining bolts from the front exhaust pipe bracket and move them aside.



- 17 Remove the front exhaust pipe clamp, and remove the VEP4 catalyst and gasket.

Installation procedure

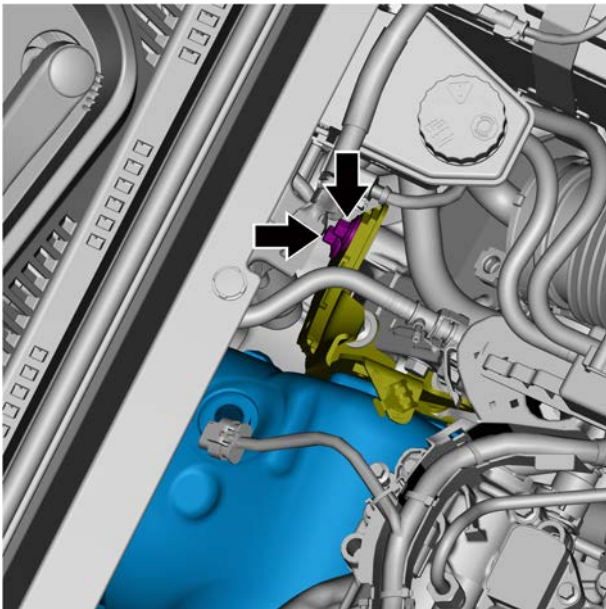


- 1 Install the VEP4 catalytic converter and gasket, install and fasten the front exhaust pipe clamp.

Torque: 20 N. m (metric system) 14.8 lb-ft (Imperial system)

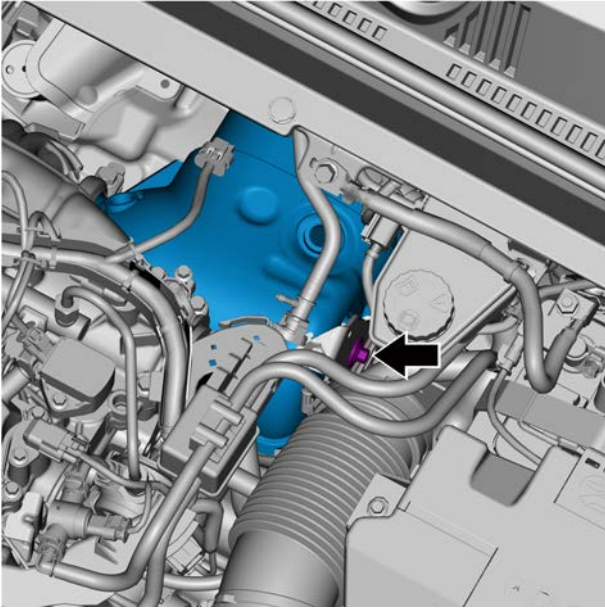
Caution

The sealing gasket is a disposable part, which cannot be reused and needs to be replaced.



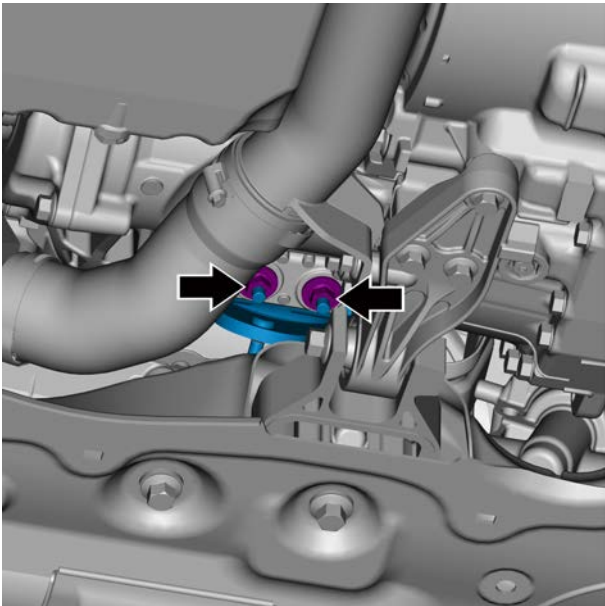
- 2 Install the front exhaust pipe bracket, install and tighten 2 retaining bolts of the front exhaust pipe bracket.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



- 3 Install and tighten 1 retaining bolt of VEP4 catalytic converter.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



- 4 Install and tighten 2 fixing nuts of VEP4 catalytic converter.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

- 5 Install the rear pipe of catalytic converter.
- 6 Install the engine fender.
- 7 Lower the vehicle.
- 8 Install Lambda probe (rear oxygen sensor).
- 9 Install Lambda probe (front oxygen sensor).
- 10 Install the vacuum chamber.
- 11 Install the turbine control valve (wastegate).
- 12 Install the turbocharger heat shield.
- 13 Install the lower outlet pipe of the air filter.
- 14 Install the upper outlet pipe of the air filter.
- 15 Install the engine trim cover assembly.

- 16 Connect the negative battery cable.
- 17 Close the engine compartment cover.

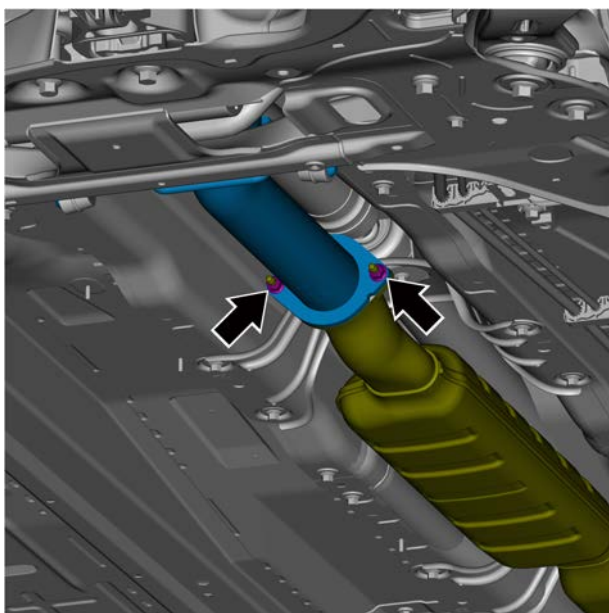
2.7.8.2 Catalytic converter rear pipe replacement

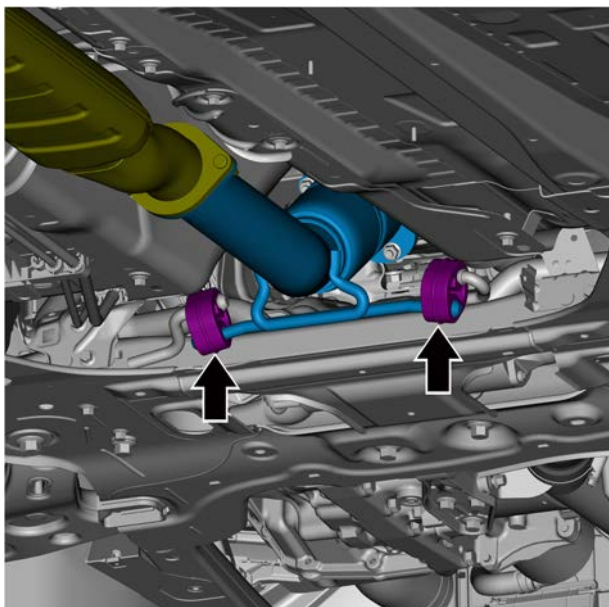
Removal procedure

Warning !

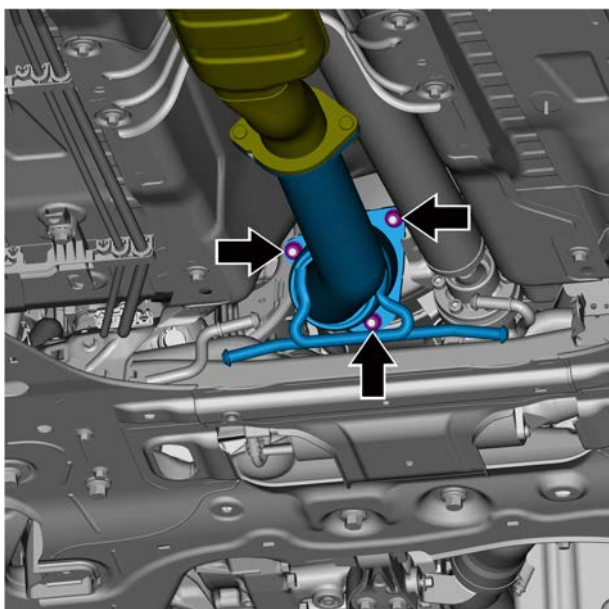
See "Warnings Regarding Exhaust System Maintenance" in "[Warnings and Precautions](#)".

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the engine fender, see [Engine fender replacement](#).
- 3 Remove the 2 fixing nuts connecting the rear pipe of the catalytic converter and the exhaust cold end, disconnect the connection between the rear pipe of the catalytic converter and the exhaust cold end, and remove the sealing gasket.



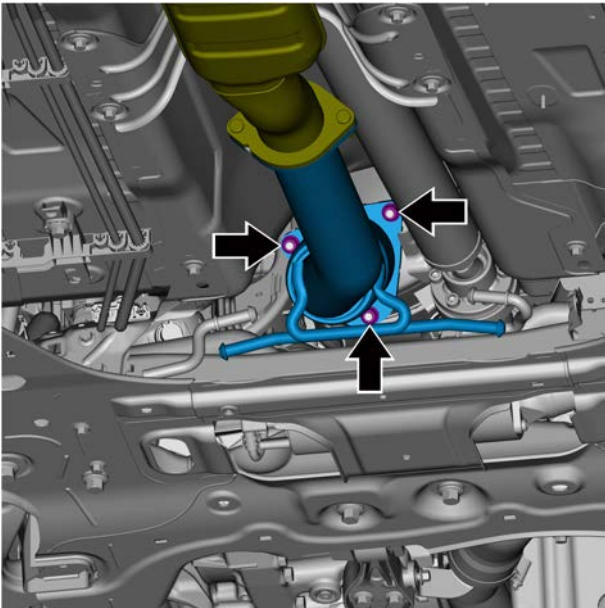


- 4 Disconnect the rubber lifting lug from the rear pipe of catalytic converter.



- 5 Remove 3 fixing nuts connecting the rear pipe of catalytic converter and VEP4 catalytic converter, remove the rear pipe of catalytic converter and remove the sealing gasket.

Installation procedure

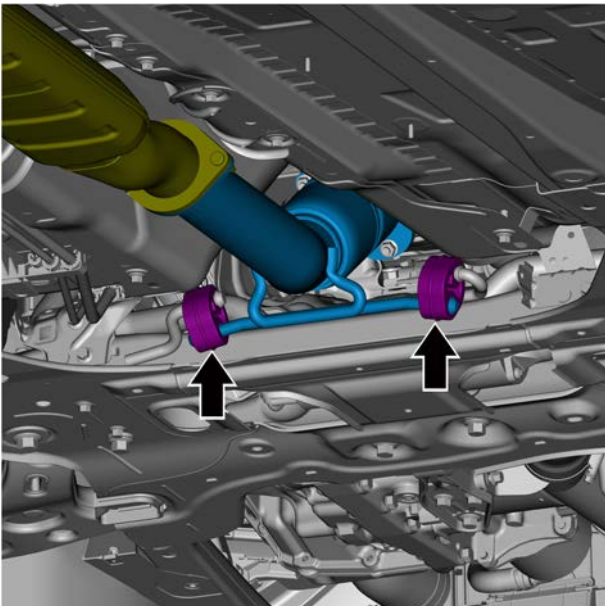


- 1 Install the rear pipe and gasket of the catalytic converter, and install and tighten the 3 fixing nuts connecting the rear pipe of the catalytic converter and the VEP4 catalytic converter.

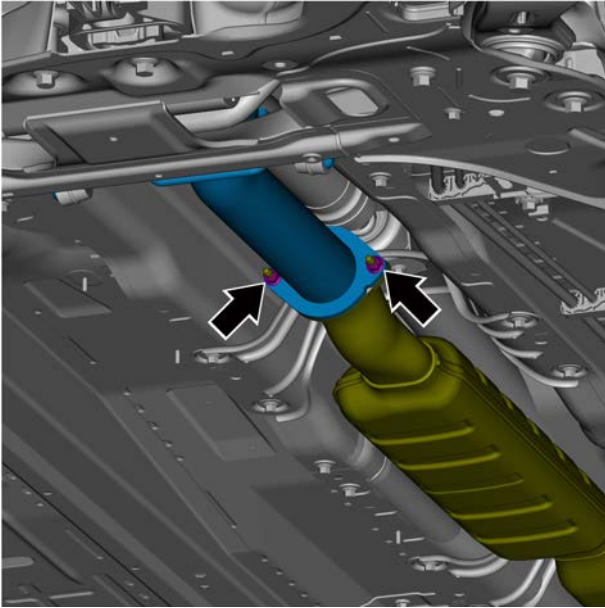
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

Caution

The sealing gasket is a disposable part, which cannot be reused and needs to be replaced.



- 2 Connect the rubber lifting lug to the rear pipe of the catalytic converter.



- 3 Install the gasket and connect the rear pipe of the catalytic converter with the exhaust cold end. Install and tighten the 2 fixing nuts connecting the rear pipe of the catalytic converter with the exhaust cold end.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

Caution

The sealing gasket is a disposable part, which cannot be reused and needs to be replaced.

- 4 Install the engine fender.
- 5 Lower the vehicle.

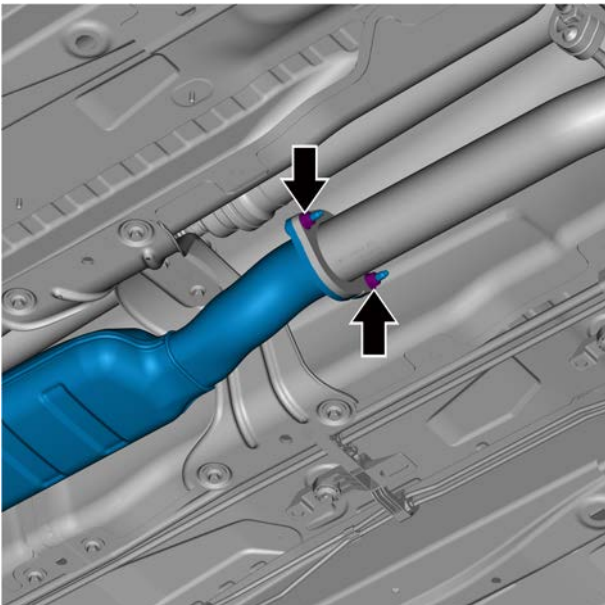
2.7.8.3 Replacement of exhaust cold end

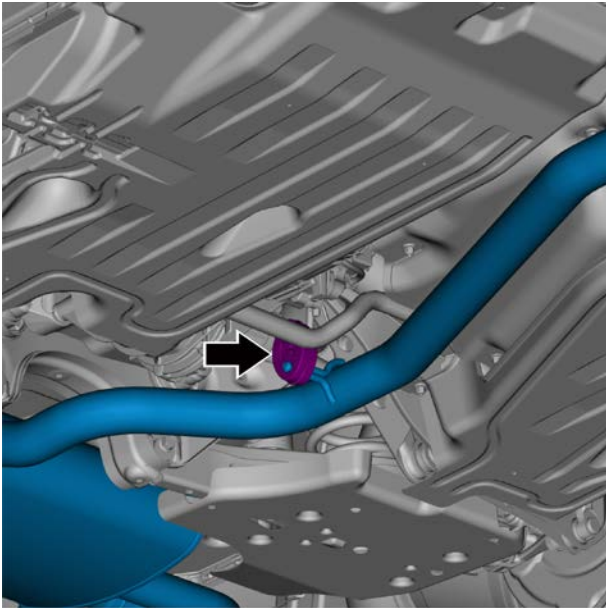
Removal procedure

Warning !

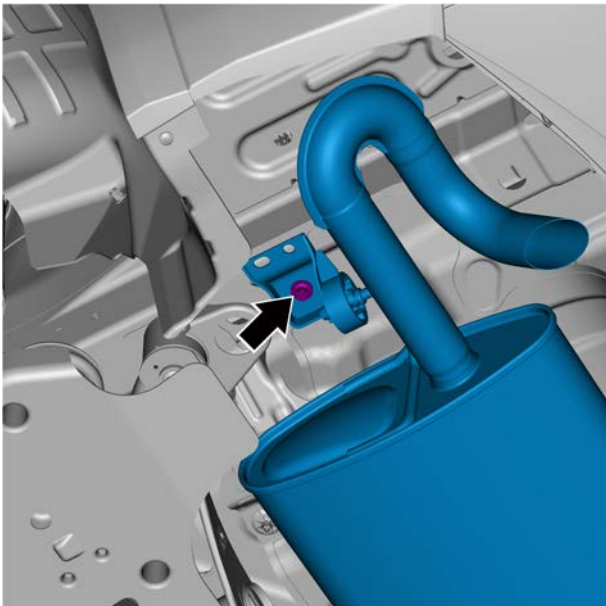
See "Warnings Regarding Exhaust System Maintenance" in "[Warnings and Precautions](#)".

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the 2 fixing nuts connecting the exhaust cold end to the rear pipe of the catalyst.





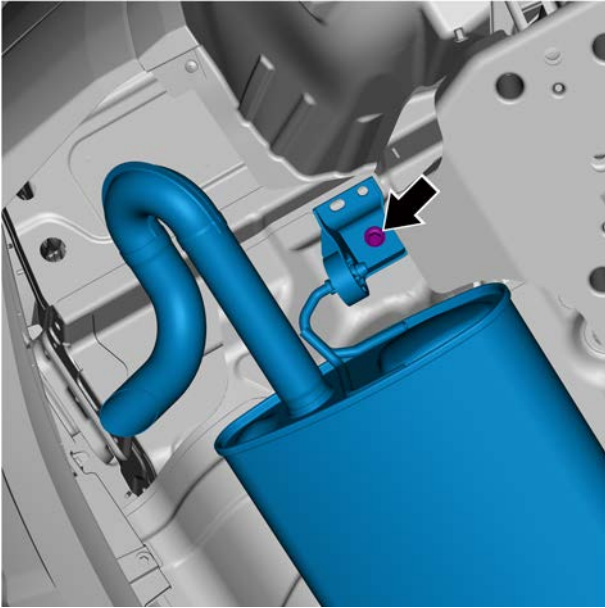
- 3 Disconnect the rubber lifting lug from the exhaust cold end.



- 4 Remove 1 retaining bolt of rubber lifting lug.

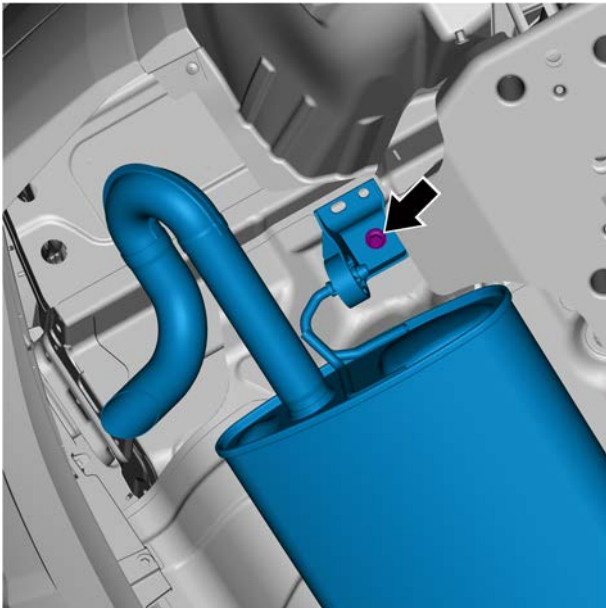
Caution

Two people are required to help remove it and pay attention to sliding.



- 5 Remove one retaining bolt of the rubber lifting lug and remove the exhaust cold end.

Installation procedure

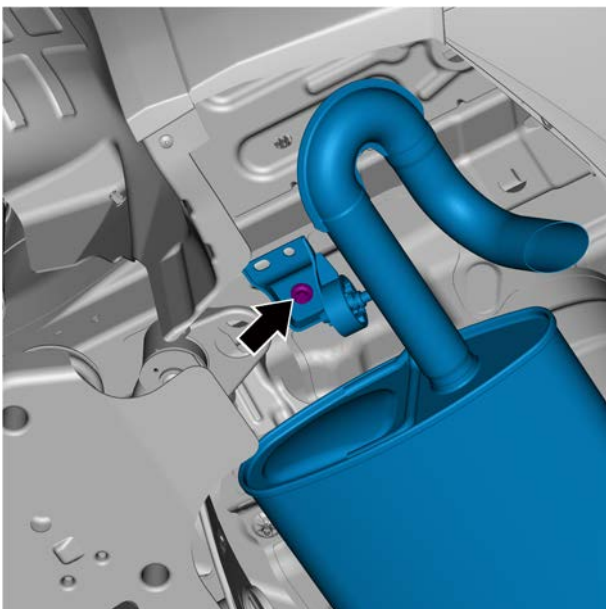


- 1 Install the exhaust cold end, install and tighten one retaining bolt of the rubber lifting lug.

Torque: 48 N. m (metric system) 35.4 lb-ft (Imperial system)

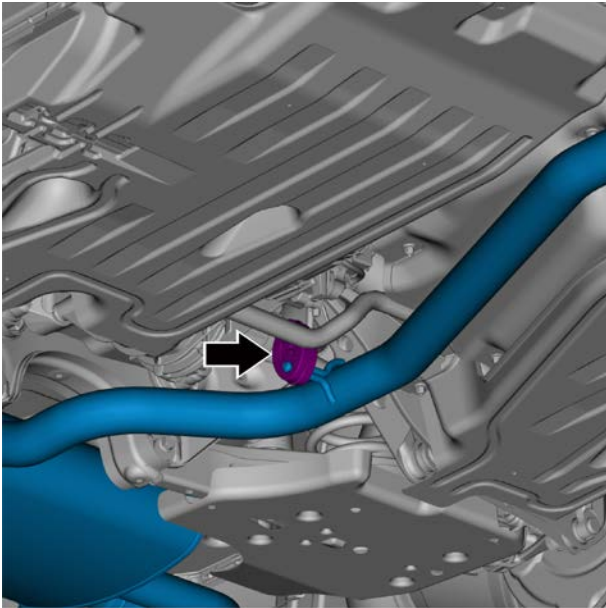
Caution

Two people are required to assist in installation and pay attention to sliding.

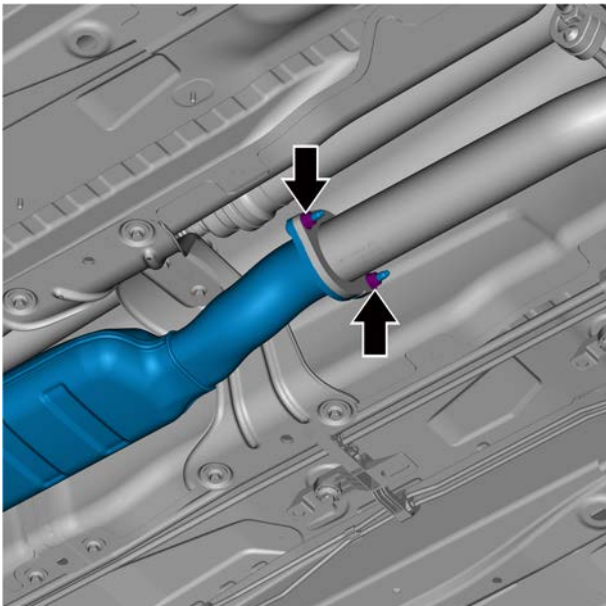


- 2 Install and tighten one retaining bolt of rubber lifting lug.

Torque: 48 N. m (metric system) 35.4 lb-ft (Imperial system)



- 3 Connect the rubber lifting lug to the exhaust cold end.



- 4 Install and fasten the 2 fixing nuts connecting the exhaust cold end to the catalytic rear pipe.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

- 5 Lower the vehicle.

2.7.8.4 Front channel heat shield replacement

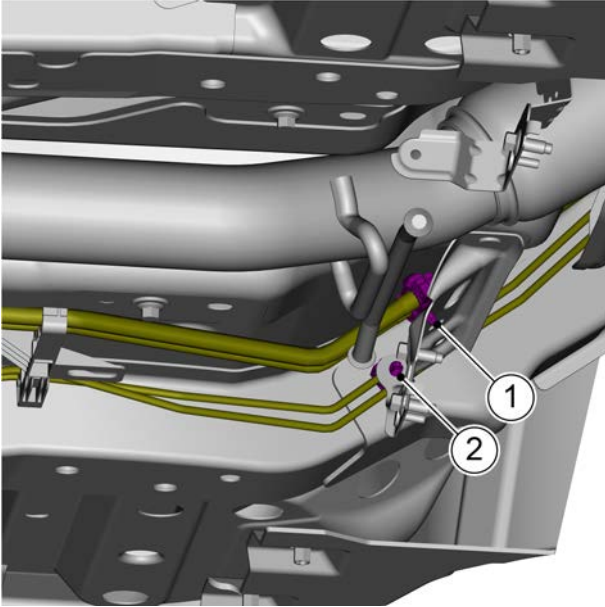
Removal procedure

Warning !

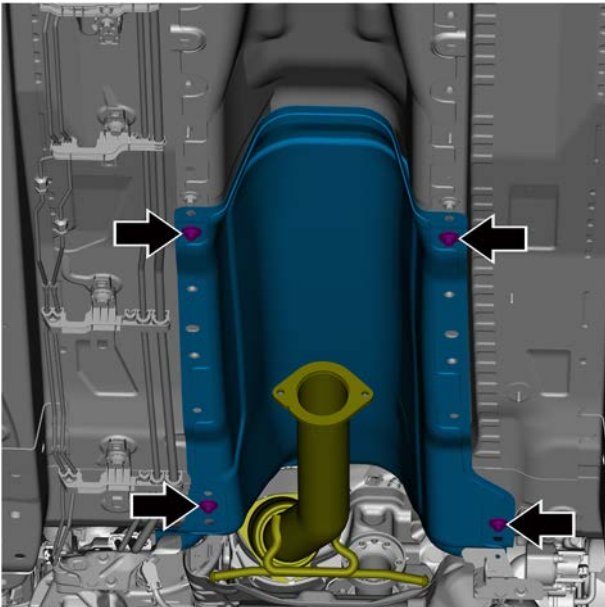
See "Warnings Regarding Exhaust System Maintenance" in "[Warnings and Precautions](#)".

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the exhaust cold end, see [exhaust cold end replacement](#).
- 3 Remove the drive shaft, see [drive shaft replacement](#).
- 4 Remove the engine fender, see [Engine fender replacement](#).

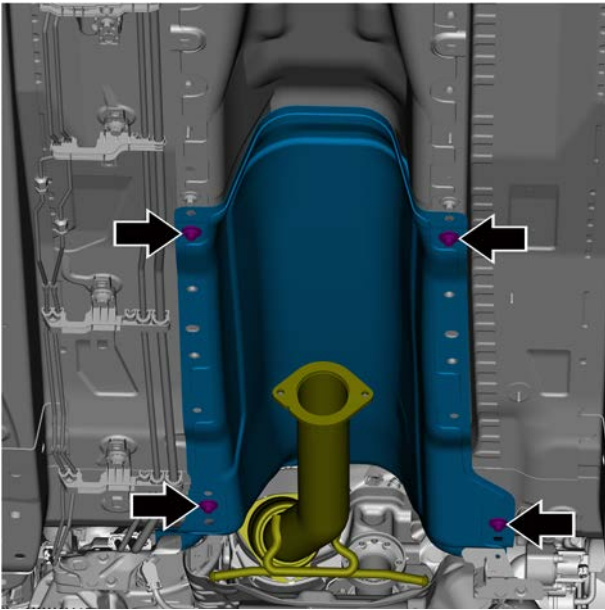
- 5 Remove the RL suspension vibration isolation pad. See [replacement of RL suspension vibration isolation pad](#).
- 6 Remove the right rear suspension vibration isolation pad. See [replacement of right rear suspension vibration isolation pad](#).
- 7 Remove front subframe, refer to [replacement of front subframe](#).
- 8 Remove fixing clip 1 of engine compartment pipeline clamp.
- 9 Remove the double pipe clamp fixing clip 2.



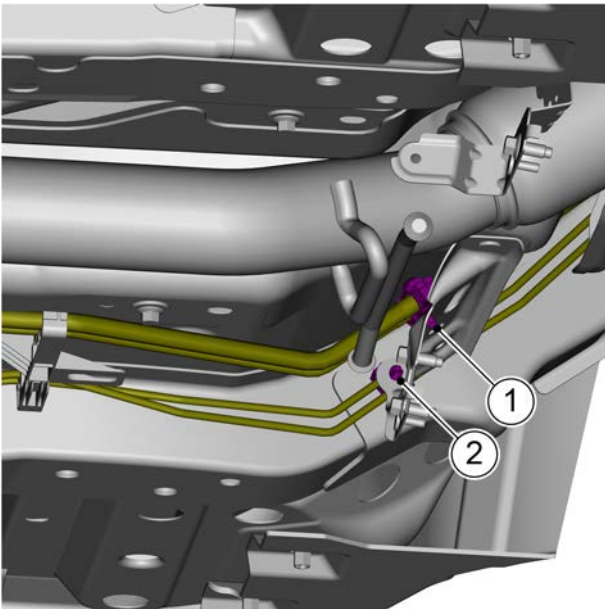
- 10 Remove 4 retaining bolts of the front channel heat shield and remove the front channel heat shield.



Installation procedure



- 1 Install the front channel heat shield, install and tighten the 4 retaining bolts of the front channel heat shield.
Torque: 24 N·m (metric system) 17.7 lb-ft (imperial system)



- 2 Install fixing clip 1 of engine compartment pipeline clamp.
- 3 Install the double pipe clamp fixing clip 2.

- 4 Install the front subframe.
- 5 Install the right rear suspension vibration isolation pad.
- 6 Install the rear left mount insulator.
- 7 Install the engine fender.
- 8 Install the drive shaft.
- 9 Install the exhaust cold end.
- 10 Lower the vehicle.

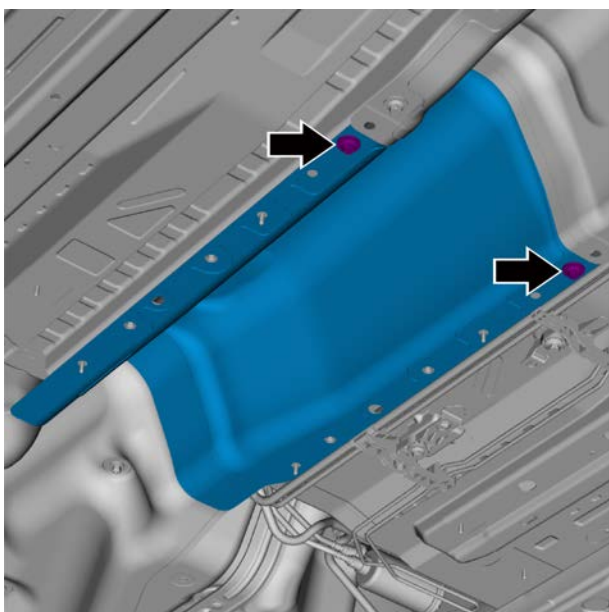
2.7.8.5 Rear channel heat shield replacement

Removal procedure

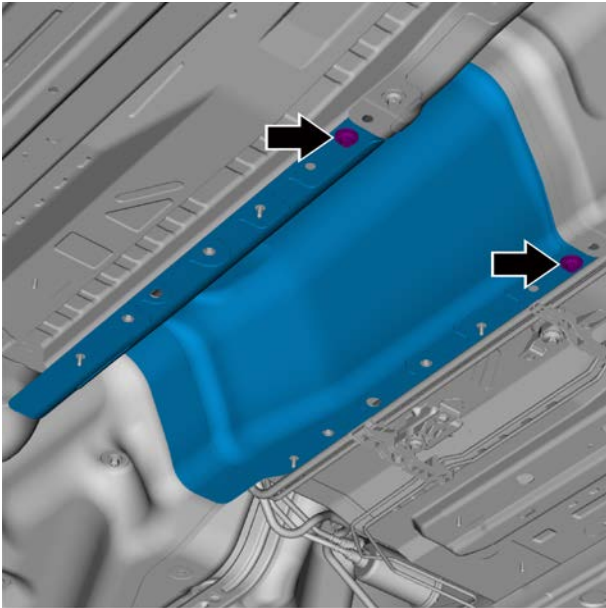
Warning !

See "Warnings Regarding Exhaust System Maintenance" in "[Warnings and Precautions](#)".

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the left lower fender apron. See [replacement of left lower fender apron](#).
- 3 Remove the right lower fender apron, see [replacement of right lower fender apron](#).
- 4 Remove the exhaust cold end, see [exhaust cold end replacement](#).
- 5 Remove the drive shaft, see [drive shaft replacement](#).
- 6 Remove 2 retaining bolts of the rear channel heat shield and remove the rear channel heat shield.



Installation procedure



- 1 Install the rear channel heat shield, install and tighten the 2 retaining bolts of the rear channel heat shield.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

- 2 Install the drive shaft.
- 3 Install the exhaust cold end.
- 4 Install the lower right fender apron.
- 5 Install the lower left fender apron.
- 6 Lower the vehicle.

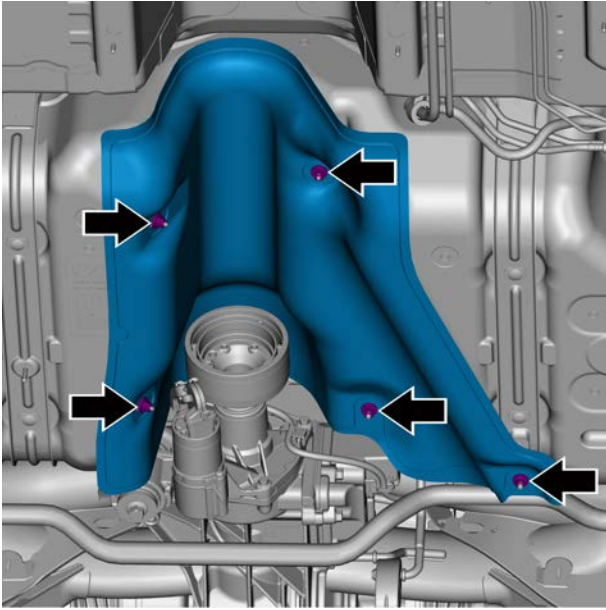
2.7.8.6 Fuel tank heat shield replacement

Removal procedure

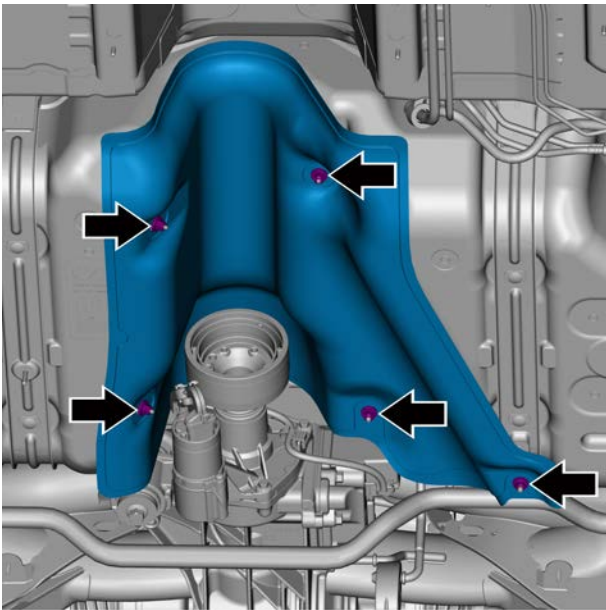
Warning !

See "Warnings Regarding Exhaust System Maintenance" in "[Warnings and Precautions](#)".

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the left lower fender apron. See [replacement of left lower fender apron](#).
- 3 Remove the right lower fender apron, see [replacement of right lower fender apron](#).
- 4 Remove the exhaust cold end, see [exhaust cold end replacement](#).
- 5 Remove the drive shaft, see [drive shaft replacement](#).



- 6 Remove the rear channel heat shield, see [replacement of rear channel heat shield](#).
- 7 Remove the 5 plastic fixing nuts of the fuel tank heat shield and remove the fuel tank heat shield.



Installation procedure

- 1 Install the fuel tank heat shield, install and tighten 5 plastic fixing nuts of the fuel tank heat shield.
Torque: 2 N. m (metric system) 1.5 lb-ft (Imperial system)

- 2 Install the rear channel heat shield.
- 3 Install the drive shaft.
- 4 Install the exhaust cold end.
- 5 Install the lower right fender apron.
- 6 Install the lower left fender apron.
- 7 Lower the vehicle.

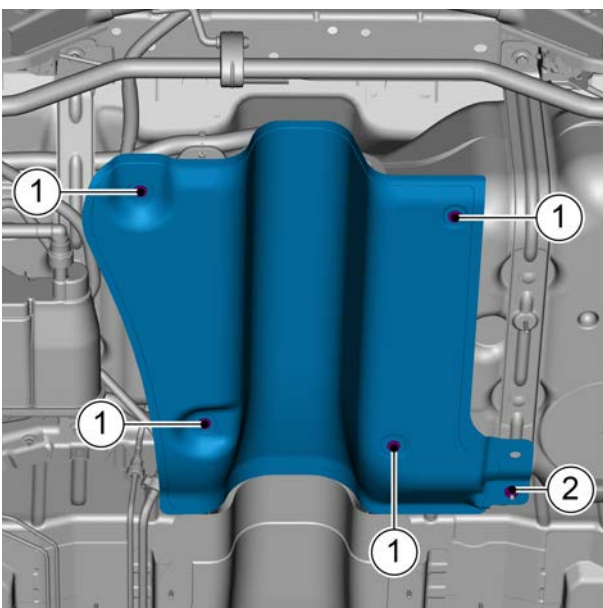
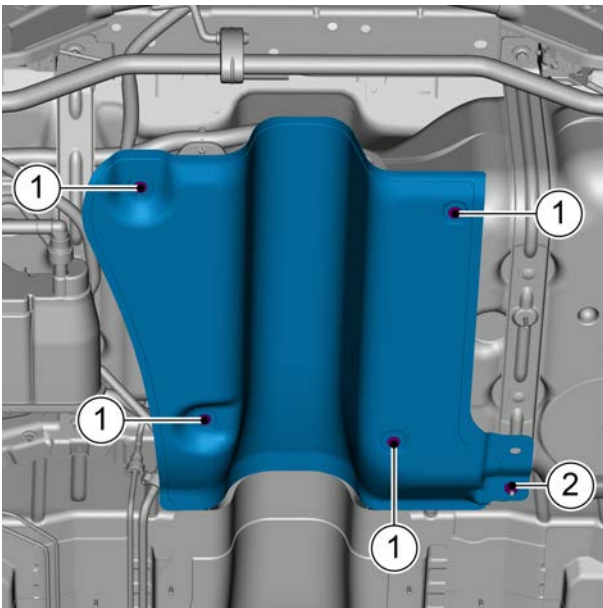
2.7.8.7 Exhaust pipe fuel tank heat shield replacement

Removal procedure

Warning !

See "Warnings Regarding Exhaust System Maintenance" in "[Warnings and Precautions](#)".

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the left lower fender apron. See [replacement of left lower fender apron](#).
- 3 Remove the right lower fender apron, see [replacement of right lower fender apron](#).
- 4 Remove the exhaust cold end, see [exhaust cold end replacement](#).
- 5 Remove 4 fixing screws 1 from the heat shield of the exhaust pipe fuel tank.
- 6 Remove one fixing nut 2 of the exhaust pipe fuel tank heat shield, and remove the exhaust pipe fuel tank heat shield.

**Installation procedure**

- 1 Install the exhaust pipe fuel tank heat shield, install and tighten one fixing nut 2 of the exhaust pipe fuel tank heat shield.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 2 Install and tighten 4 fixing screws 1 of the exhaust pipe fuel tank heat shield.

Torque:

pre-tighten them: 2 N m (metric system) 1.5 lb-ft (imperial system)

tightened: 2.5 N m (metric system) 1.8 lb-ft (imperial system)

- 3 Install the exhaust cold end.

- 4 Install the lower right fender apron.
- 5 Install the lower left fender apron.
- 6 Lower the vehicle.

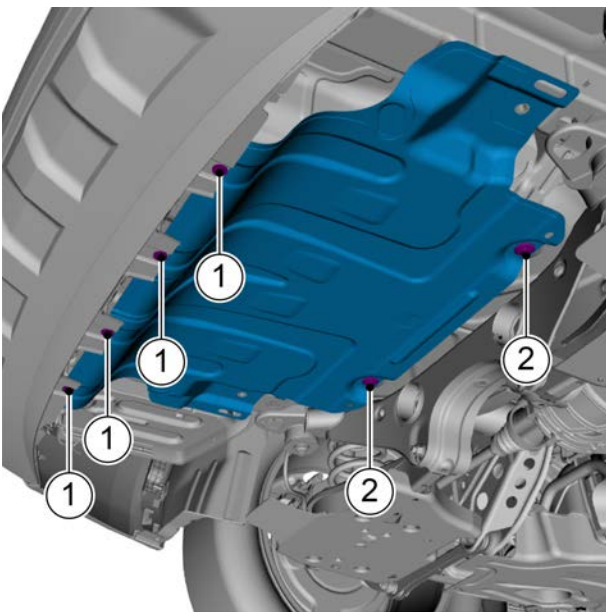
2.7.8.8 Replacement of floor heat shield

Removal procedure

Warning !

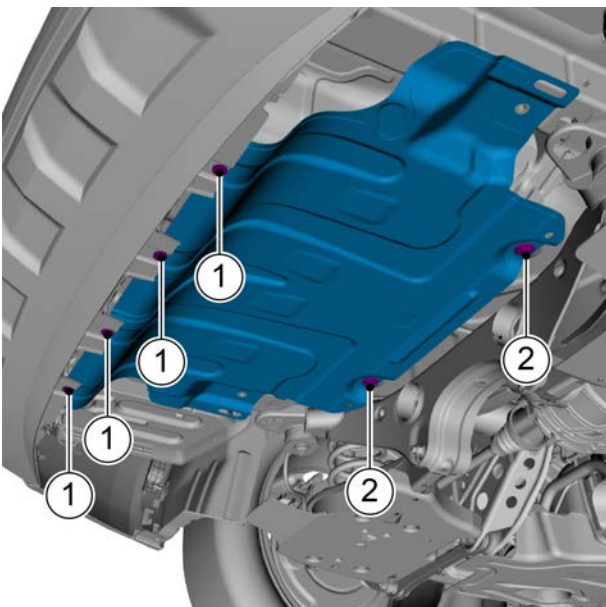
See "Warnings Regarding Exhaust System Maintenance" in "[Warnings and Precautions](#)".

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the exhaust cold end, see [exhaust cold end replacement](#).
- 3 Remove the 2 plastic fixing nuts 2 of the floor heat shield.
- 4 Remove the four retaining bolts 1 of the floor heat shield and remove the floor heat shield.



Installation procedure

- 1 Install the floor heat shield, install and tighten the four retaining bolts 1 of the floor heat shield.
Torque: 6 N. m (metric system) 4.4 lb-ft (Imperial system)
- 2 Install and tighten 2 plastic fixing nuts 2 of the floor heat shield.



- 3 Install the exhaust cold end.
- 4 Lower the vehicle.

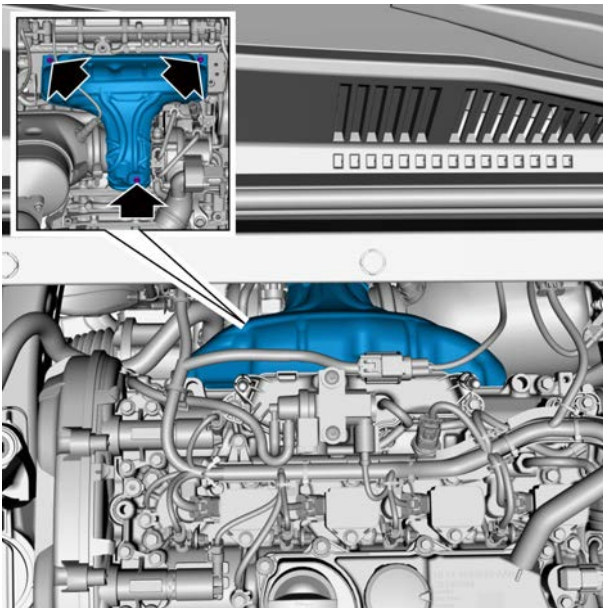
2.7.8.9 Turbocharger heat shield replacement

Removal procedure

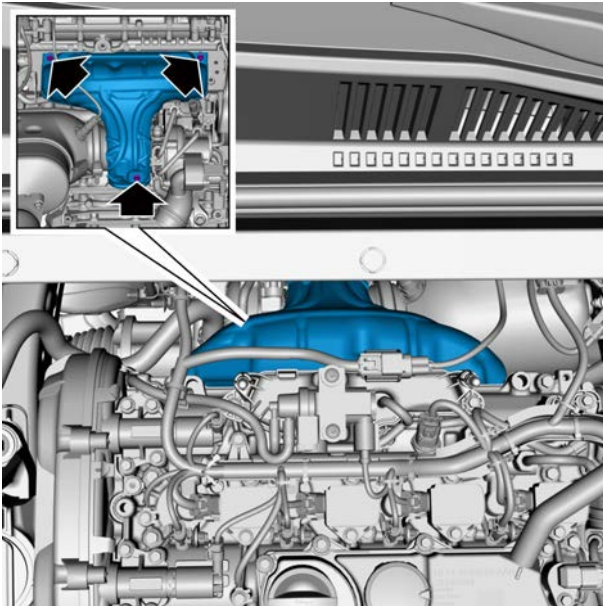
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 5 Remove the lower outlet pipe of air filter. See [replacement of lower outlet pipe of air filter](#).
- 6 Remove the 3 retaining bolts of the turbocharger heat shield and remove the turbocharger heat shield.



Installation procedure



- 1 Install the turbocharger heat shield, install and tighten the 3 retaining bolts of the turbocharger heat shield.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 2 Install the lower outlet pipe of the air filter.
- 3 Install the upper outlet pipe of the air filter.
- 4 Install the engine trim cover assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

2.7.8.10 Replacement of turbo charger

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

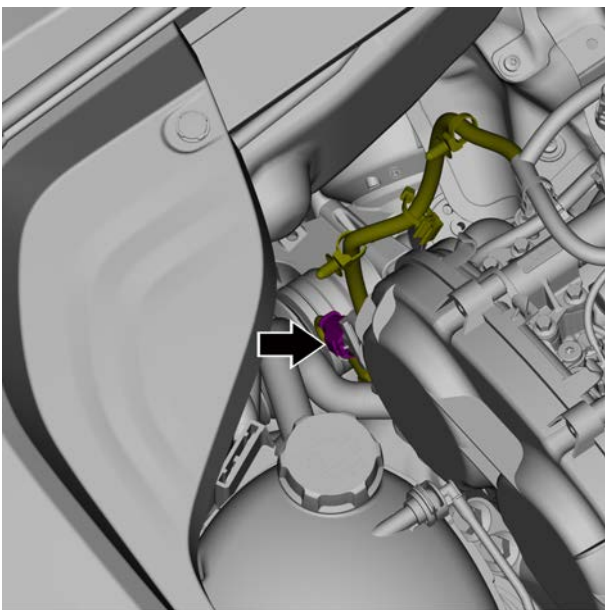
See "Warnings Regarding Exhaust System Maintenance" in "[Warnings and Precautions](#)".

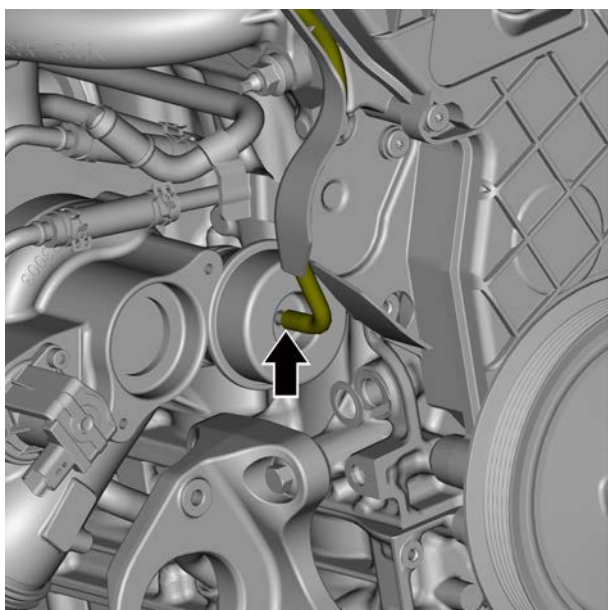
Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

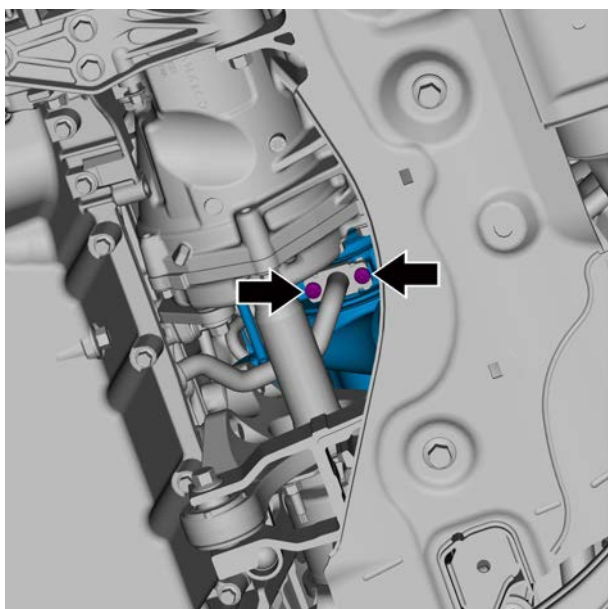
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 5 Remove the lower outlet pipe of air filter. See [replacement of lower outlet pipe of air filter](#).

- 6 Remove the turbocharger heat shield, see [turbocharger heat shield replacement](#).
- 7 Remove the vacuum chamber. See [replacement of vacuum chamber](#).
- 8 Remove the turbine control valve (wastegate). See [turbine control valve \(wastegate\) replacement](#).
- 9 Remove Lambda probe (front oxygen sensor), see [replacement of Lambda probe \(front oxygen sensor\)](#).
- 10 Remove Lambda probe (rear oxygen sensor), see [replacement of Lambda probe \(rear oxygen sensor\)](#).
- 11 Lift the vehicle, see [Lift the vehicle](#)
- 12 Remove the engine fender, see [Engine fender replacement](#).
- 13 Remove the intercooler intake pipe assembly. See [intercooler intake pipe assembly replacement](#).
- 14 Remove the rear pipe of catalytic converter. See [replacement of rear pipe of catalytic converter](#).
- 15 Remove VEP4 catalytic converter. See [replacement of VEP4 catalytic converter](#).
- 16 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 17 Remove the water pipe assembly of turbocharger. See [replacement of water pipe assembly of turbocharger](#).
- 18 Drain engine oil.
- 19 Remove the turbocharger oil inlet pipe. See [turbocharger oil inlet pipe replacement](#).
- 20 Disconnect the turbocharger harness connector.

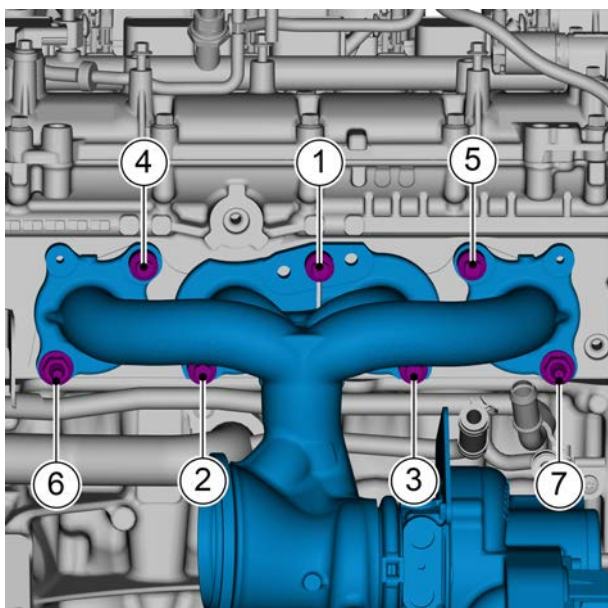




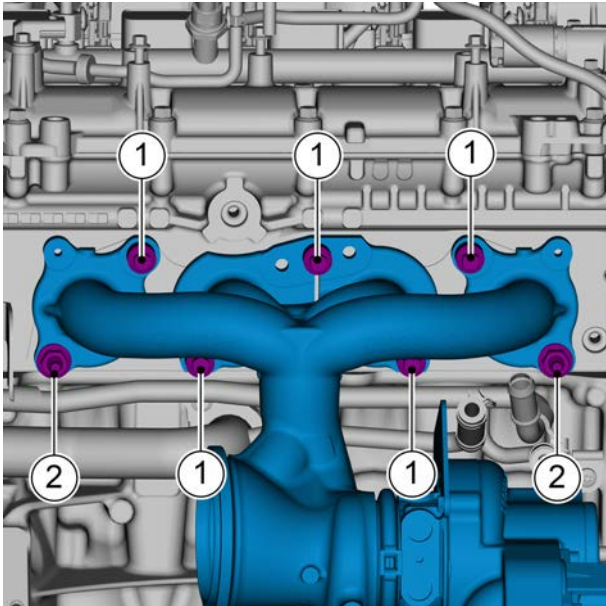
- 21 Disconnect the turbocharger vacuum pipe from the turbocharger.



- 22 Remove 2 retaining bolts connecting the turbocharger pipe-fuel return with the turbocharger.



- 23 Loosen 2 fixing nuts and 5 retaining bolts of the turbocharger in the sequence shown in the figure.



- 24 Remove 5 retaining bolts 1 from the turbocharger.
- 25 Remove the two fixing nuts 2 of the turbocharger and remove the turbocharger.

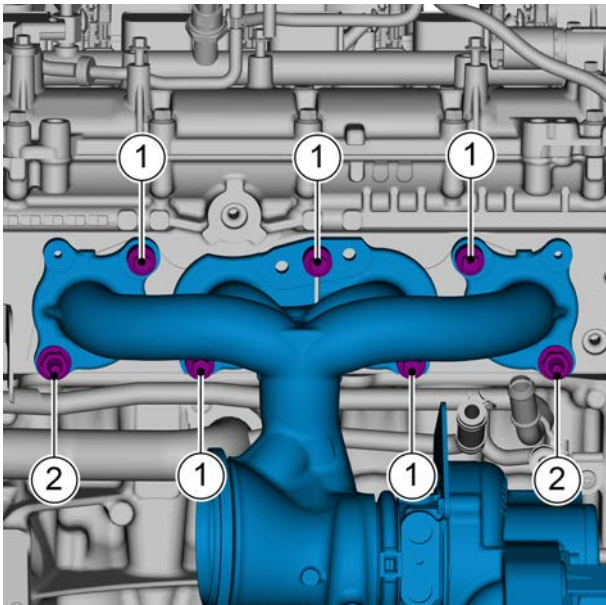
Installation procedure

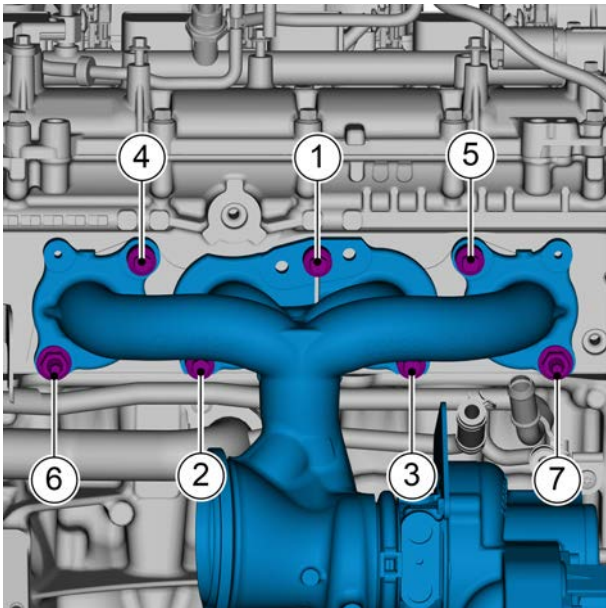
- 1 Install the turbocharger and Pre-tighten the two fixing nuts 2 of the turbocharger.

Caution

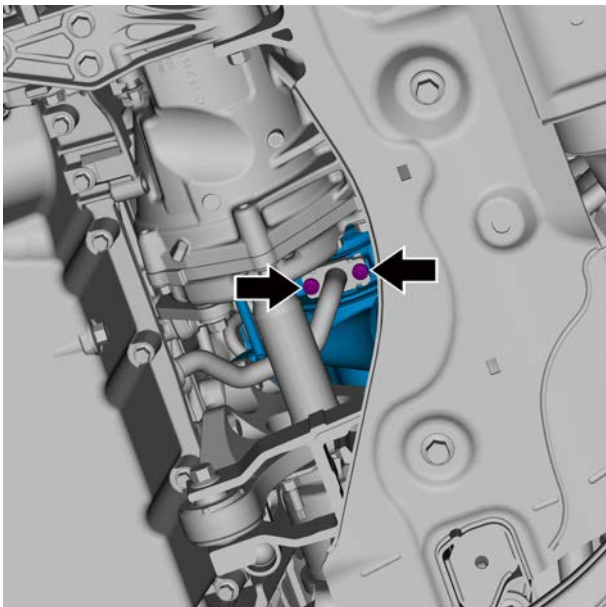
All removed seals such as exhaust pipe gasket, oil inlet / return pipe gasket and water pipe sealing ring of turbocharger shall be replaced with new ones.

- 2 Pre-tighten the five retaining bolts 1 of the turbocharger.

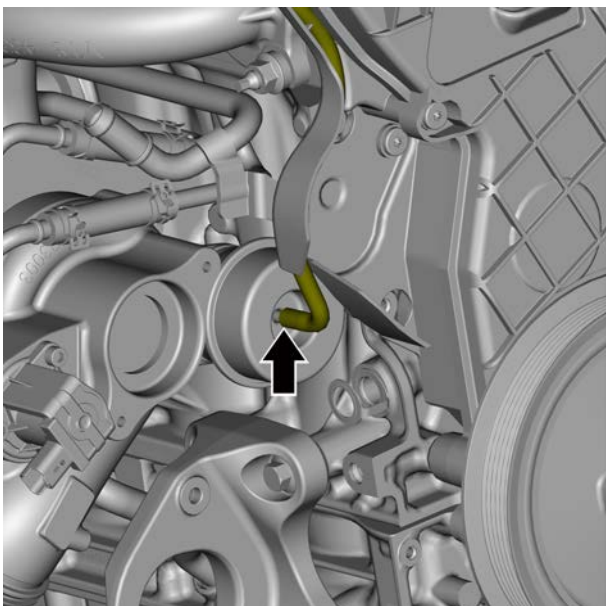




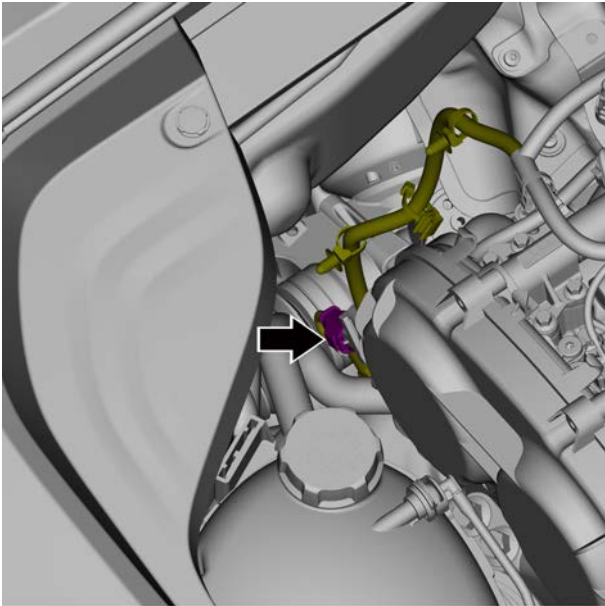
- 3 Tighten 2 fixing nuts and 5 retaining bolts of the turbocharger in the sequence shown in the figure.
Torque: 20 N. m (metric system) 14.8 lb-ft (Imperial system)



- 4 Install and tighten 2 retaining bolts connecting the turbocharger pipe-fuel return and the turbocharger.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 5 Install the connection between the turbocharger vacuum pipe and the turbocharger.



- 6 Connect the turbocharger harness connector.
- 7 Install the turbocharger oil inlet pipe.
- 8 Fill with engine oil.
- 9 Install the turbocharger water pipe assembly.
- 10 Fill engine coolant.
- 11 Install the catalytic of the catalytic converter.
- 12 Install the rear pipe of catalytic converter.
- 13 Install the intercooler intake pipe assembly.
- 14 Install the engine fender.
- 15 Lower the vehicle.
- 16 Install Lambda probe (rear oxygen sensor).
- 17 Install Lambda probe (front oxygen sensor).
- 18 Install the turbine control valve (wastegate).
- 19 Install the vacuum chamber.
- 20 Install the turbocharger heat shield.
- 21 Install the lower outlet pipe of the air filter.
- 22 Install the upper outlet pipe of the air filter.
- 23 Install the engine trim cover assembly.
- 24 Connect the cathode cable of the battery, start the vehicle, connect the diagnostic instrument, monitor the water temperature and the speed of the electronic water pump, and observe the liquid level of the expansion tank. If the liquid level drops, add coolant in time; until the large circulation is opened, add coolant to the scribed line on the expansion tank, and tighten the lid of the expansion tank.
- 25 Close the engine compartment cover.

2.8 Cooling system JLH-4G20TD

2.8.1 Specification

2.8.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Retaining bolts of turbocharger water pipe assembly	M6×10	8.5~11.5	6.3~8.5
Engine coolant pump retaining bolt	M7×25	13.5~18.5	10~13.6
Radiator retaining bolt	M8×50	20~28	14.8~20.7
Fixing screw of left lower air deflector of radiator	PF5×20	2.5~3.5	1.8~2.6
Fixing screw of lower right air deflector of radiator	PF5×20	2.5~3.5	1.8~2.6
Thermostat housing retaining bolts	M6×25	8.5~11.5	6.3~8.5

2.8.1.2 Cooling System Specification

Application	Specification
Cooling method	Water cooling
Engine coolant specification/brand	Ethylene glycol type coolants authorized by Geely
Coolant capacity	7L
Thermostat type	Wax type thermostat
Pump type	Electronic water pump
Vane diameter	/
Number of vanes	8 pieces
Opening temperature of the thermostat	90~105 °C (203~221°F)
Engine cooling fan low speed on temperature	105°C (221°F)
Engine cooling fan low speed off temperature	102°C (215.6°F)
Engine cooling fan high speed on temperature	110°C (230°F)
Engine cooling fan high speed off temperature	107°C (224.6°F)

2.8.2 Instructions and operations

2.8.2.1 Instructions and Operations

The main function of the engine cooling system is to prevent the engine from overheating and keep the temperature within the normal range. The system can also cool engine oil, transmission fluid and heat the A/C host.

The engine coolant temperature sensor measures the temperature of the coolant. The Engine Control Module (ECM) uses the measurement result information to control multiple functions, such as fan speed. When the engine is overheated, the driver will see a prompt message on the instrument panel.

The cooling system includes an expansion tank, which can avoid excessive pressure of the closed system due to thermal expansion.

The electronic water pump is controlled by the Engine Control Module (ECM). The coolant flows through the oil cooler and transmission fluid cooler to cool the engine oil and transmission fluid.

When the engine is working, the gas mixture is burned in the cylinder combustion chamber to generate high temperature, and the heat is transferred through the cylinder block. If the temperature is not reduced, the engine will stop working. Therefore, an engine coolant channel is provided in the cylinder body to exchange heat with the outside world through the circulation of the engine coolant. In this way, the working temperature of the engine can be kept within a certain range, so that the engine can work effectively under all working conditions.

When the engine is cold, the cooling system controls the circulation of engine coolant through the thermostat, which can quickly warm up the engine. The cooling system includes radiator, expansion tank assembly, engine cooling fan, thermostat and its shell, and electronic water pump; the electronic water pump is controlled by the ECM and operates at different speeds according to the signals sent by the ECM. Only when the above functions are performed normally can the cooling system work normally.

When the engine coolant reaches the working temperature of the thermostat, the thermostat opens. At this point, the engine coolant returns to the radiator and gets cooled. The cooling system introduces part of the engine coolant into the heater core through the water pipe. It is used for heating and defrosting. The expansion tank assembly is connected to the radiator and used to recover the engine coolant discharged due to temperature rise and expansion. The role of the expansion tank assembly is to maintain the correct engine coolant level. The expansion tank assembly is a transparent plastic tank,

similar to the front windshield glass cleaner tank. The expansion tank assembly is connected to the engine through a water pipe. As the vehicle travels, the temperature of the engine coolant gradually increases and expands. Part of the engine coolant flows into the expansion tank assembly from the engine due to expansion. The air trapped in the engine is also exhausted into the expansion tank assembly. When the engine is shut down, the engine coolant automatically cools and contracts, and the previously discharged engine coolant is sucked back into the engine. Thus, the coolant in the cooling system is kept at the appropriate liquid level and the cooling efficiency is improved.

When the cooling system is in the cold state, the engine coolant level should be maintained between the MIN (minimum) and MAX (maximum) marks on the expansion tank assembly. The cooling fan assembly is installed at the rear of the radiator in the engine compartment. It can increase the ventilation of the radiator and the air-conditioning condenser, thereby helping to increase the cooling speed of the vehicle at idle or low speed.

Warning !

Even when the engine is not running, the engine cooling fan under the engine compartment will start and hurt people, so please keep hands, clothes and tools away from the electric fan under the engine compartment.

Warning !

As long as there is pressure in the cooling system, even if the solution in the radiator is not boiling, the solution temperature will be much higher than the boiling temperature. If the pressure cap is opened when the engine is not cooled and the pressure is still high, the engine coolant will immediately boil and may generate explosive force, spraying on the engine, fenders and the person who opens the radiator pressure cap.

2.8.3 System working principles

2.8.3.1 System Working Principles

The engine can be cooled by coolant. The coolant contains the same amount of water and ethylene glycol. The coolant pump circulates the coolant in the cooling system between the radiator and the engine. The coolant flow controls and maintains the engine temperature within the allowable temperature range. If necessary, the coolant flow can also heat the air provided by the A/C unit to the occupant compartment. The cooling system is mainly connected with rubber hoses. The coolant pump is an electric water pump, which is controlled by the Engine Control Module (ECM). The mechanical thermostat is installed in the coolant pump housing and is a traditional wax thermostat. The thermostat opens when the coolant temperature reaches the specified value. The coolant also circulates in the radiator when the coolant needs to be cooled. The coolant is sent from the engine to the radiator for cooling. It is cooled by the air flow through the radiator when the coolant passes through the radiator. The electric engine cooling fan provides additional air flow through the cooling components, including the radiator, condenser and intercooler. The engine cooling fan sends a pulse width modulated signal to the Engine Control Module (ECM), which is controlled by the ECM. The engine cooling fan speed is determined according to the cooling demand. The greater the cooling demand, the higher the fan speed. The radiator rack is installed around the cooling module to guide the air flow into the cooling module. The thermostat will close and the coolant cannot flow through the radiator if the coolant temperature is not high enough.

-When the engine is cold: the normal operating temperature of the engine is generally around 100°C. Within this temperature range, the coordination of all engine parts is in the most ideal status. If the engine cannot reach the ideal operating temperature in a long time, the wear of the engine will be more intensive. Because of the low temperature, the gas mixture cannot be fully burnt in the combustion chamber, which will cause serious carbon deposition. Therefore, when the engine is at a low temperature, its operating temperature is required to reach the normal operating temperature as soon as possible, and the heat generated by the engine is required to exchange with the outside world as little as possible. At this time, the thermostat controls the engine coolant in the engine body to circulate only inside the engine body, bringing the heat generated around the cylinder wall to other parts of the engine, causing their temperature to rise rapidly, and the water pump circulates the engine coolant in the cylinder. Then, the engine

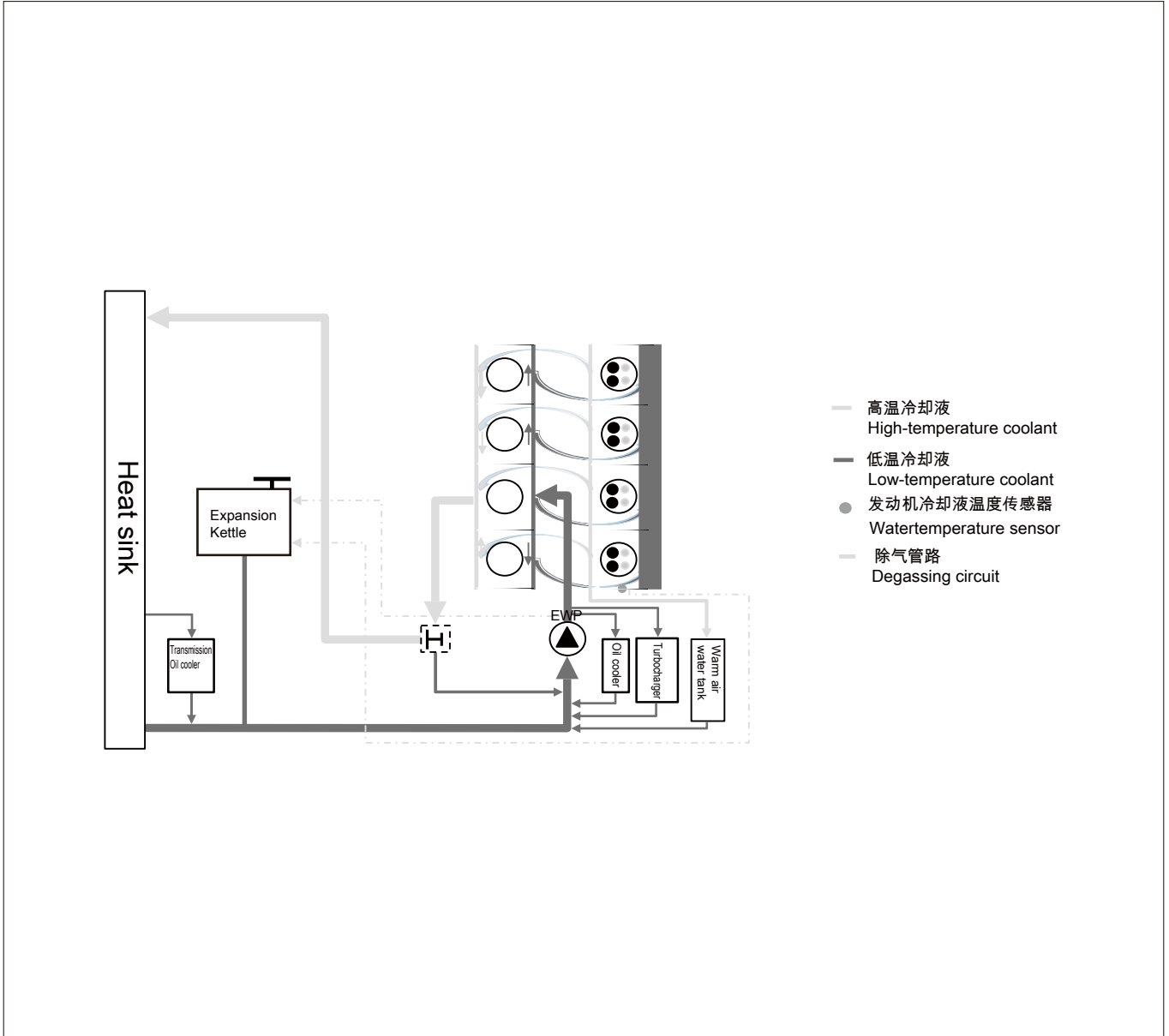
coolant circulates in the water jacket, water pipes, turbo charger and cylinder cover of the engine body. This status is called "micro circulation".

When the engine reaches the normal operating temperature: As the engine runs, the engine coolant inside the engine body heats up quickly. When the opening temperature of the thermostat is realized, the engine coolant is pumped to the water jacket, water pipes, turbo charger, cylinder cover, and radiator, and this status is called "macro circulation".

Thermostat: The function of the wax-type thermostat is to control the flow of engine coolant in the cooling system. The thermostat is installed at the front of the engine body, sealed by the engine outlet pipe joint assembly, and located at the front of the cylinder head. The thermostat prevents the engine coolant from flowing from the engine to the radiator, allowing the engine to quickly warm up and adjusting the engine coolant temperature. When the engine coolant temperature is low, the thermostat remains in the closed position, preventing the engine coolant from circulating through the radiator. At this time, only the engine coolant is allowed to circulate through the heater core, thereby quickly and uniformly warming up the engine. When the engine warms up, the thermostat opens. Allow engine coolant to flow through the radiator and dissipate heat through the radiator. The opening and closing of the thermostat will allow enough engine coolant to enter the radiator to keep the engine within the normal operating temperature range. The wax pellets in the thermostat are enclosed in a metal casing. Thermostat wax pill expands when heated and shrinks when cooled. As the vehicle travels and the engine warms, the engine coolant temperature rises. When the engine coolant reaches the specified temperature, the wax pellets in the thermostat expand, thus applying pressure to the metal casing, and open the valve. This allows the engine coolant to flow through the engine cooling system and cool the engine. When the wax pellets cool down and contract, the valve will close under the action of the spring.

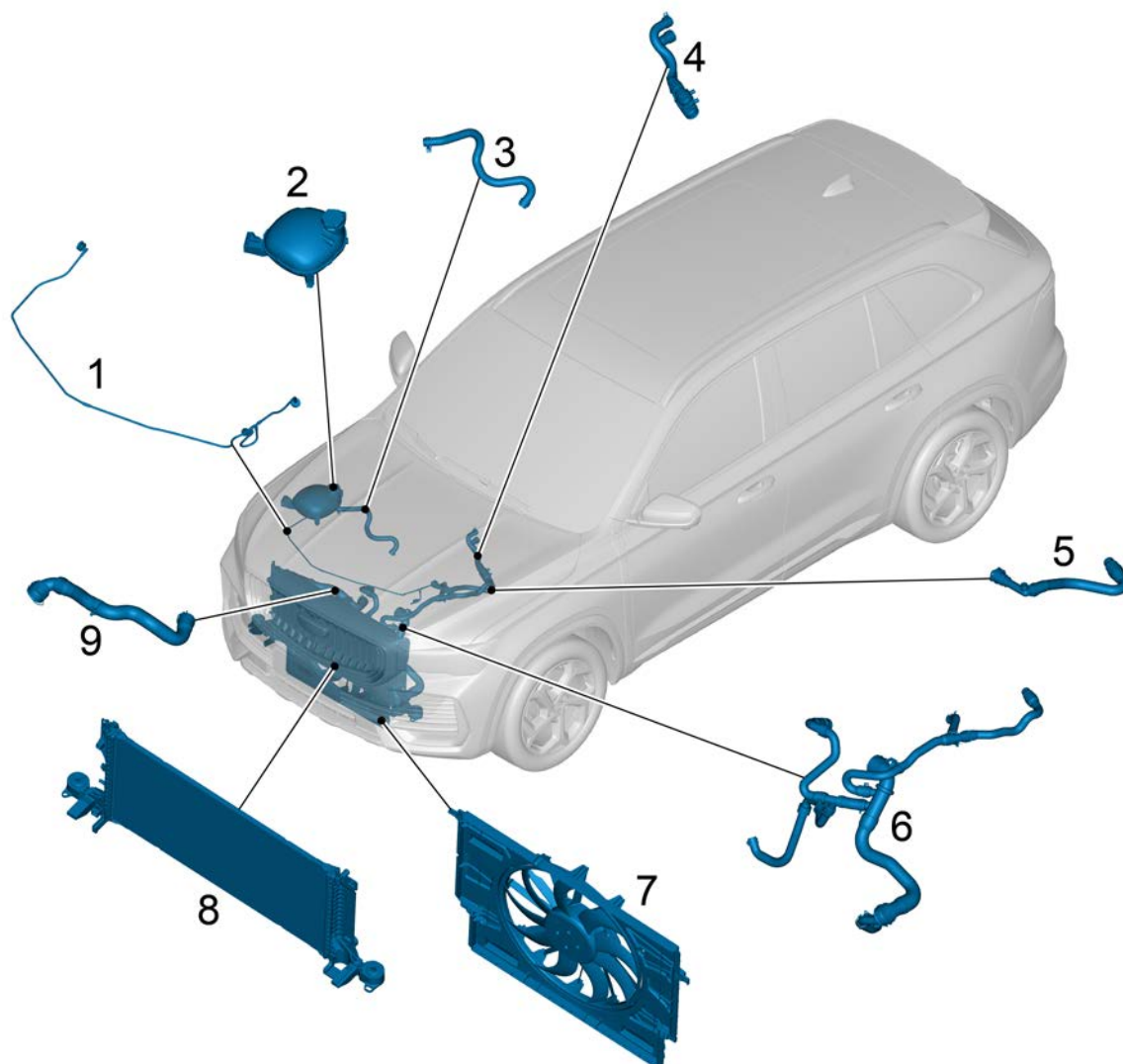
Description of engine cooling fan: electric engine cooling fan is mainly used to provide additional air flow through radiator, condenser and intercooler. The engine cooling fan sends a pulse width modulated signal to the Engine Control Module (ECM), which is controlled by the ECM. The engine cooling fan speed is determined according to the cooling demand. The engine cooling fan is directly connected to the Engine Control Module (ECM).

Cooling system circulation line



2.8.4 Component position

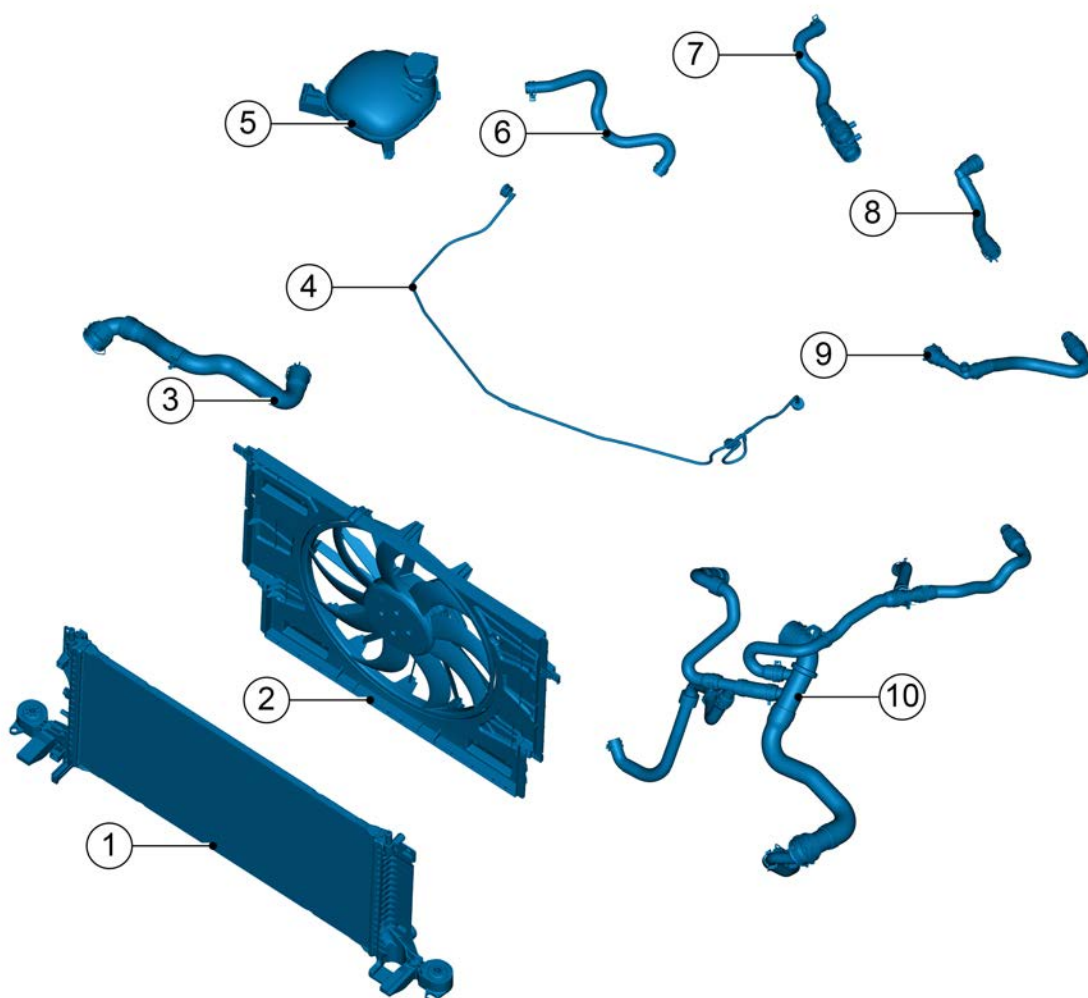
2.8.4.1 Component position



- | | | | |
|----|--|----|----------------------|
| 1. | Exhaust pipe | 6. | Radiator outlet pipe |
| 2. | Expansion tank | 7. | Engine cooling fan |
| 3. | Outlet pipe of expansion tank | 8. | Radiator |
| 4. | Air conditioning warm air pipe | 9. | Radiator inlet pipe |
| 5. | Engine to intelligent control valve hose | | |

2.8.5 Exploded view

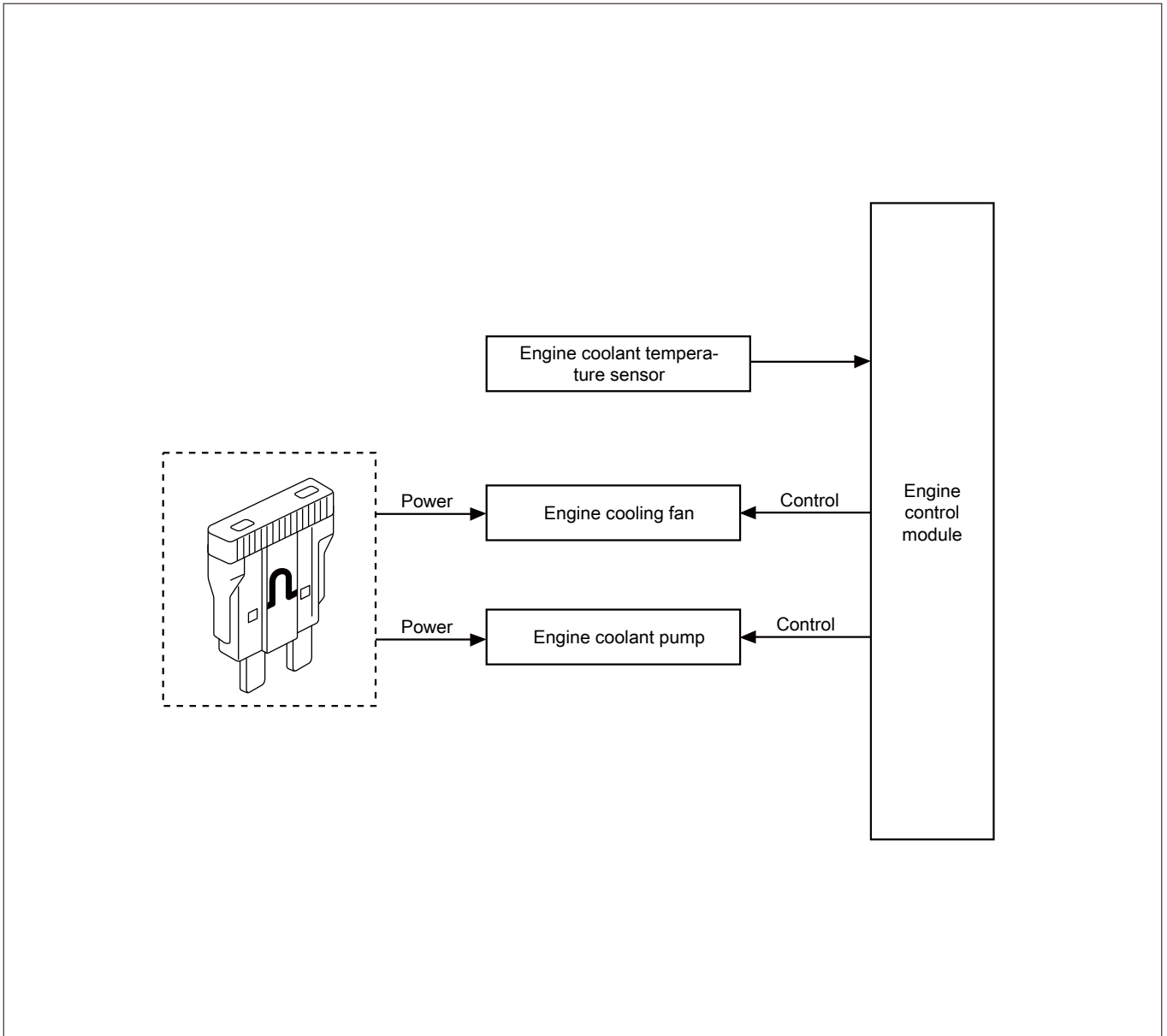
2.8.5.1 Exploded view



- | | | | |
|----|---------------------|-----|--|
| 1. | Radiator | 6. | Outlet pipe of expansion tank |
| 2. | Engine cooling fan | 7. | Air conditioning heater outlet pipe |
| 3. | Radiator inlet pipe | 8. | Air conditioning heater inlet pipe |
| 4. | Exhaust pipe | 9. | Engine to intelligent control valve hose |
| 5. | Expansion tank | 10. | Radiator water outlet pipe |

2.8.6 Electrical schematic diagram

2.8.6.1 Electrical schematic diagram



2.8.7 Diagnostic message and steps

2.8.7.1 Diagnosis Description

Before diagnosing the faults of the cooling system, refer to the description, operation, and system working principle. Understand and be familiar with the working principle of the cooling system before starting a system diagnosis. This helps to determine correct fault diagnosis steps when a fault occurs. More importantly, it also helps to determine whether the situation described by the distributor is normal. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

2.8.7.2 Visual Check

- Check the after-sales installations that may affect the operation of the engine cooling fan control devices.
- Check system components that are easily accessible or can be seen to find out if they are obviously damaged or have external leakage.
- Check whether the fuel in the fuel tank is the recommended fuel and whether it is sufficient.

2.8.7.3 Engine Coolant Drains too Quickly

Diagnosis steps:

Warning !

If the pressure cap is opened and cooling system maintenance is performed when the engine is not cooled and the pressure is still high, the engine coolant will immediately boil and may be sprayed on the person who opens the radiator pressure cap, causing severe burns.

Step 1	Check the radiator for leaks.
--------	-------------------------------

Yes

Replace the damaged radiator.

No

Step 2	Check for leaks at the following locations expansion tank assembly, water pipe.
--------	---

Yes

Replace the following parts as necessary: expansion tank assembly, water pipe.

No

Step 3	Check radiator water pipes and joints for looseness or damage.
--------	--

Yes

Remount the water pipe and replace the water pipe or hoops.

No

Step 4	Check whether the water pipe sealing ring leaks.
--------	--

Yes

Replace the water pipe seal.

No

Step 5 Check the cylinder head for torque.

Yes

Tighten the cylinder head bolts to the specified torque, and replace the cylinder head gasket if necessary.

No

Step 6 Check for leaks at the following locations:

- A. Intake manifold.
- B. Cylinder head gasket.
- C. Cylinder body bolt.
- D. Heater core.
- E. Radiator drain plug.
- F. Turbo charger

Yes

If necessary, repair or replace parts to eliminate leakage trouble.

No

Step 7 Confirm that the trouble is removed.

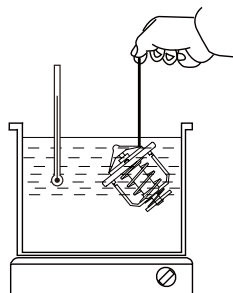
2.8.7.4 Diagnosis of Thermostat

Diagnosis steps:

Step 1 Remove the thermostat. Refer to [replacement of thermostat casing components](#).

Next Step

Step 2 Immerse the thermostat in water and heat the water.



- A. Check the opening temperature of the thermostat.
Standard value: 90 ± 2 °C (194 ± 3.6 °F)
- B. Confirm whether the opening temperature of the thermostat is normal.

No

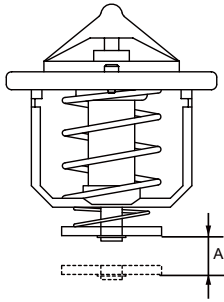
Replace the thermostat. Refer to [replacement of thermostat casing components](#).

Yes

Step 3	Check thermostat valve lift.
--------	------------------------------

A. Confirm whether the lift is normal.

Standard valve lift: 8mm (0.32in) or above at 105 ± 2 °C (221 ± 3.6 °F)



No

Replace the thermostat. Refer to [replacement of thermostat casing components](#).

Yes

Step 4	Check whether the thermostat is completely closed at low temperature.
--------	---

A. Check whether the valve is fully closed when the thermostat is below 90 ± 2 °C (194 ± 3.6 °F).

No

Replace the thermostat. Refer to [replacement of thermostat casing components](#).

Next Step

Step 5	The thermostat is normal.
--------	---------------------------

2.8.8 Removing and installing

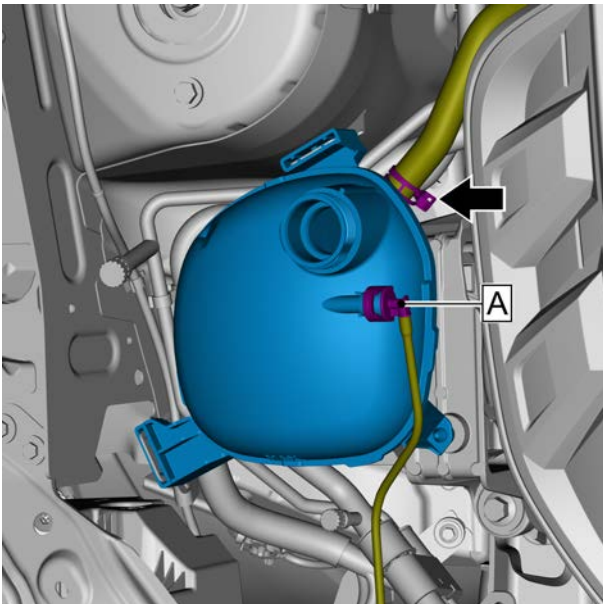
2.8.8.1 Replacement of expansion tank

Removal procedure

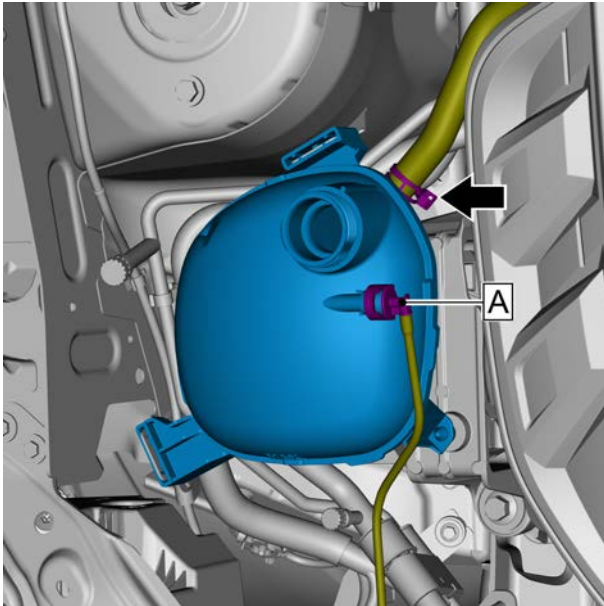
Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Lift the vehicle, see [Lift the vehicle](#)
- 3 Remove the engine fender, see [Engine fender replacement](#).
- 4 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 5 Remove the right engine compartment trim panel, see [replacement of left engine compartment trim panel](#).
- 6 Remove the connector A between the exhaust pipe and the expansion tank.
- 7 Remove the fixing clamp 1 of the outlet pipe of the expansion tank and disconnect the connection between the outlet pipe of the expansion tank and the expansion tank.
- 8 Remove the expansion tank.



Installation procedure



- 1 Install the expansion tank.
- 2 Connect the outlet pipe of the expansion tank with the expansion tank, and install the fixing clamp 1 of the outlet pipe of the expansion tank.
- 3 Install connector A of exhaust pipe and expansion tank
- 4 Install the right engine compartment trim panel.
- 5 Fill engine coolant.
- 6 Install the engine fender.
- 7 Lower the vehicle.
- 8 Close the engine compartment cover.

2.8.8.2 Replacement of radiator inlet pipe

Removal procedure

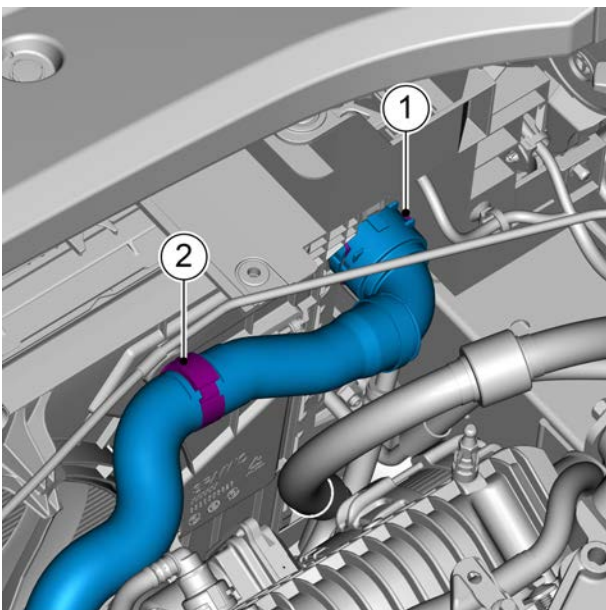
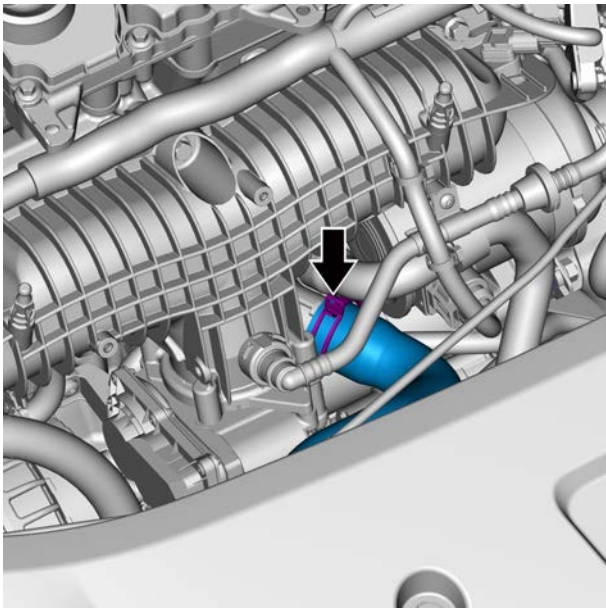
Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

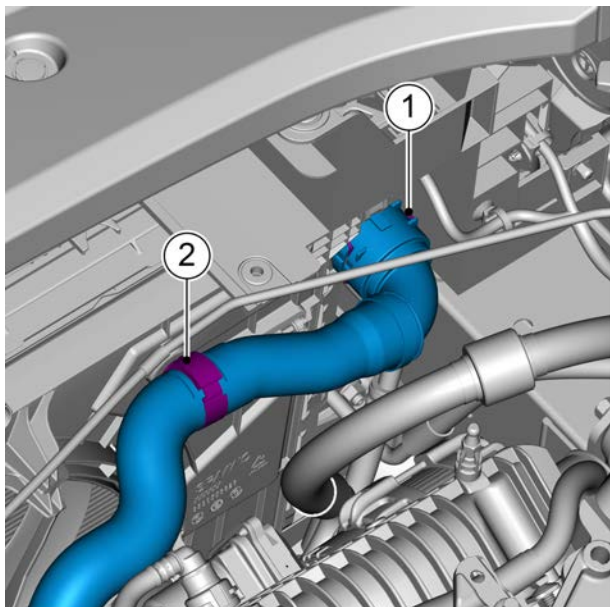
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 5 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe assembly](#).
- 6 Lift the vehicle, see [Lift the vehicle](#)
- 7 Remove the engine fender, see [Engine fender replacement](#).



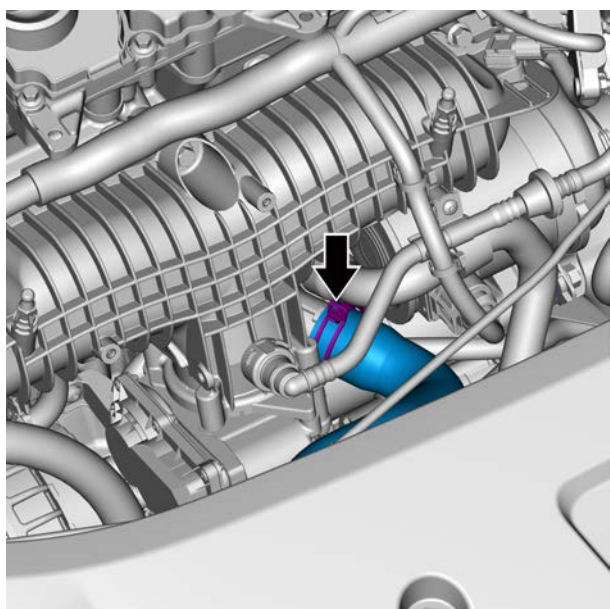
- 8 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 9 Remove the fixing clamp 1 of the radiator inlet pipe and disconnect the connection between the radiator inlet pipe and the thermostat housing components.

- 10 Remove fixing clip 2 of radiator inlet pipe.
- 11 Unlock the quick insert elastic circlip 1 and remove the radiator inlet pipe.

Installation procedure



- 1 Install the radiator inlet pipe and reset the quick insert elastic snap ring 2.
- 2 Install fixing clip 1 of radiator inlet pipe.



- 3 Connect the radiator inlet pipe and the thermostat housing components, and install the fixing clamp 1 of the radiator inlet pipe.

- 4 Fill engine coolant.
- 5 Install the engine fender.
- 6 Lower the vehicle.
- 7 Install the air inlet pipe of the air filter.
- 8 Install the air filter assembly.
- 9 Install the engine trim cover assembly.

- 10 Connect the cathode cable of the battery, start the vehicle, connect the diagnostic instrument, monitor the water temperature and the speed of the electronic water pump, and observe the liquid level of the expansion tank. If the liquid level drops, add coolant in time; until the large circulation is opened, add coolant to the scribed line on the expansion tank, and tighten the lid of the expansion tank.
- 11 Close the engine compartment cover.

2.8.8.3 Replacement of outlet hose radiator

Removal procedure

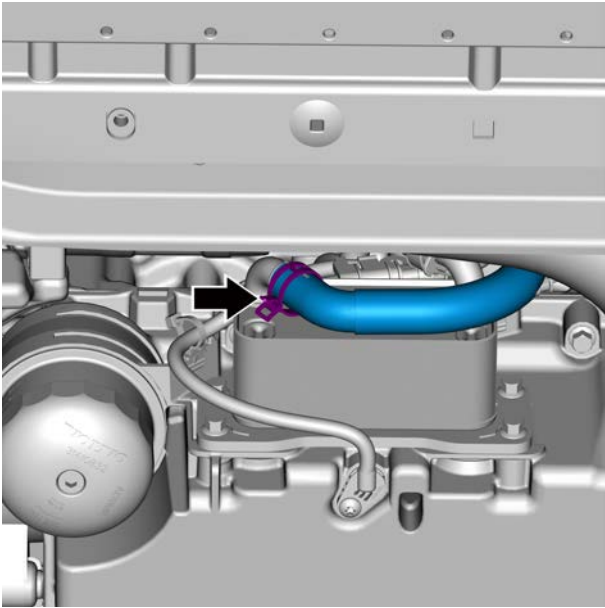
Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 5 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 6 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe assembly](#).
- 7 Remove the air pressure and air temperature sensor 2, see [air pressure and air temperature sensor 2 replacement](#).
- 8 Lift the vehicle, see [Lift the vehicle](#)
- 9 Remove the engine fender, see [Engine fender replacement](#).
- 10 Remove the intercooler outlet pipe assembly. See [intercooler outlet pipe assembly replacement](#).
- 11 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).

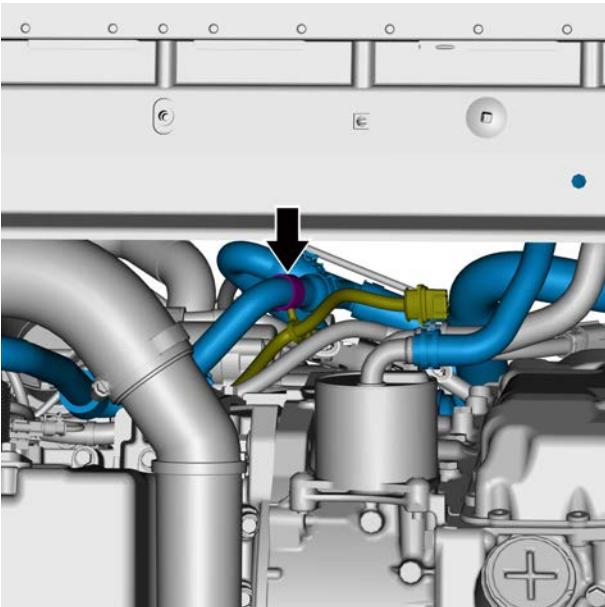


- 12 Remove the fixing clamp of the radiator outlet pipe and disconnect the connection between the radiator outlet pipe and the oil cooler.

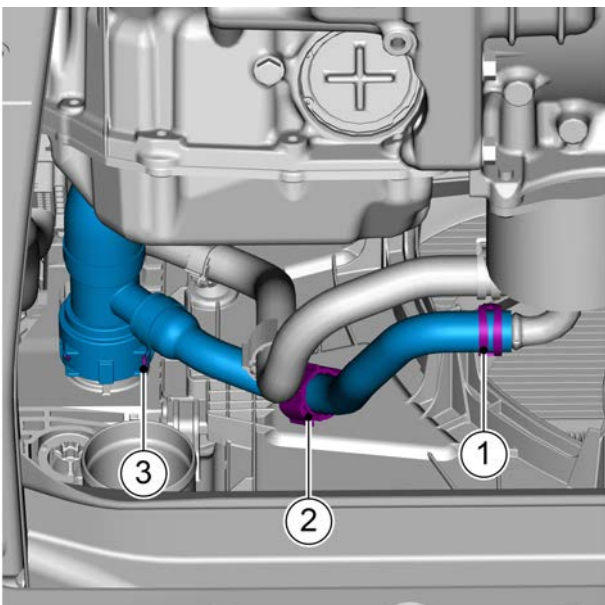
Caution

After the pipeline is disconnected, bandage the pipeline in time to prevent foreign matter from entering the pipeline.

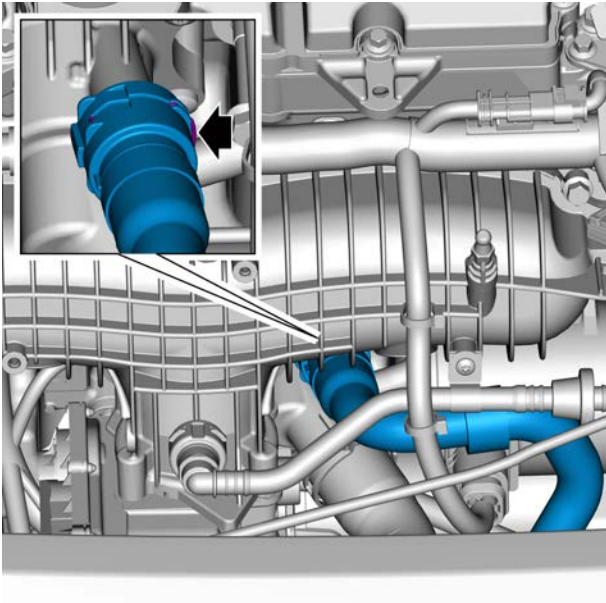
2. Before the water pipe is disconnected, please place a container at the bottom of the vehicle to catch antifreeze, so as not to pollute the ground.



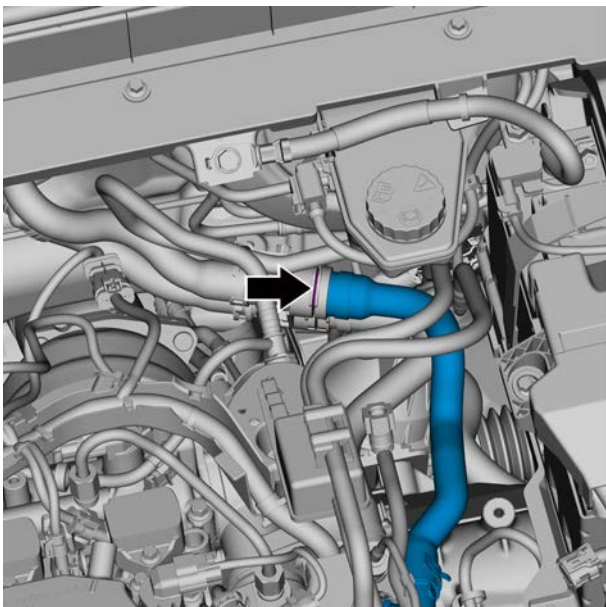
- 13 Remove the fixing clip of the radiator outlet pipe.



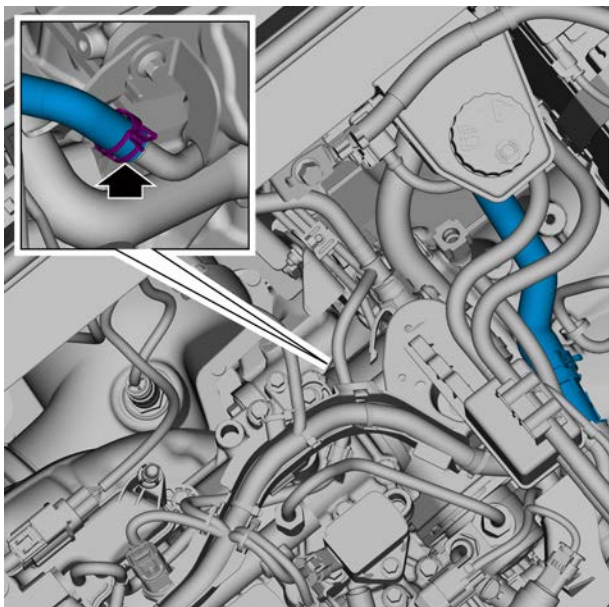
- 14 Remove the fixing clamp 1 of the radiator outlet pipe and disconnect the connection between the radiator outlet pipe and the oil cooler assembly.
- 15 Remove the fixing clip 2 of the radiator outlet pipe.
- 16 Unlock the quick insert elastic circlip 3 and disconnect the radiator outlet pipe from the radiator.



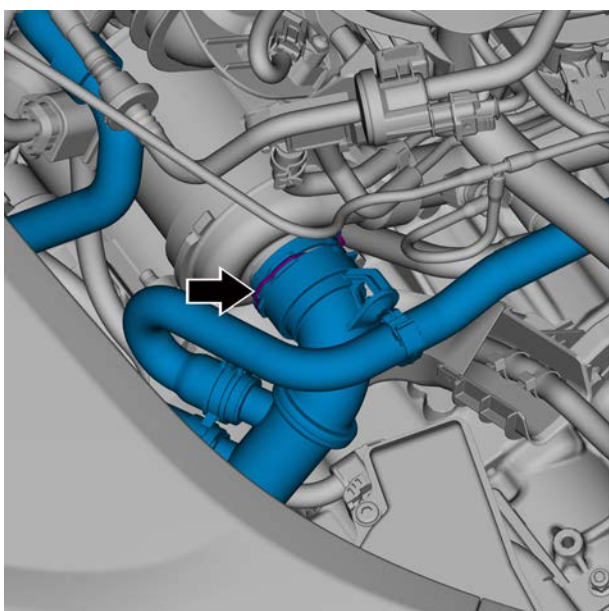
- 17 Unlock the quick insert elastic circlip 2 and disconnect the radiator outlet pipe from the thermostat housing components.



- 18 Unlock the quick insert elastic circlip and disconnect the radiator outlet pipe from the A/C warm vent pipe.

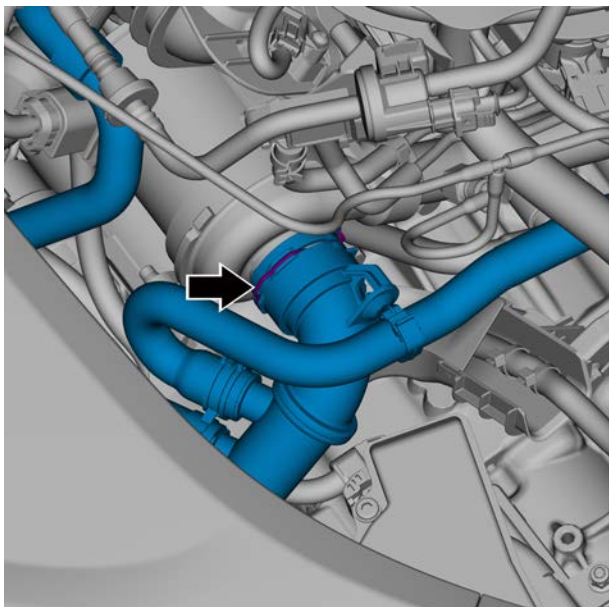


- 19 Remove the fixing clamp of the radiator outlet pipe and disconnect the connection between the radiator outlet pipe and the engine iron water pipe.

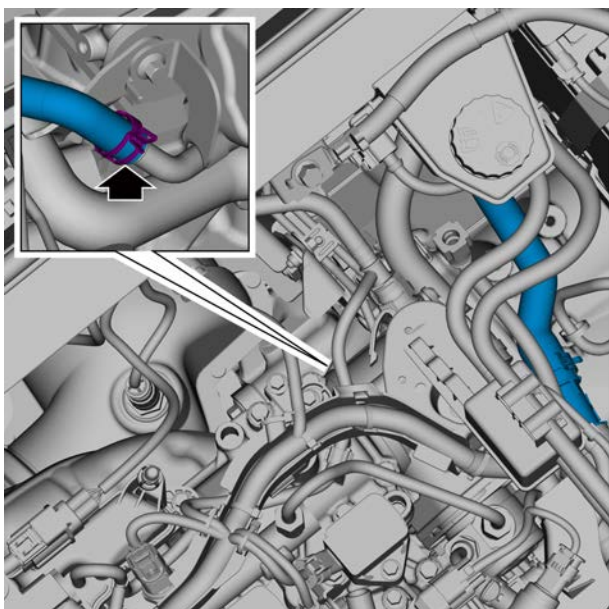


- 20 Unlock the quick insert elastic circlip and remove the radiator outlet pipe.

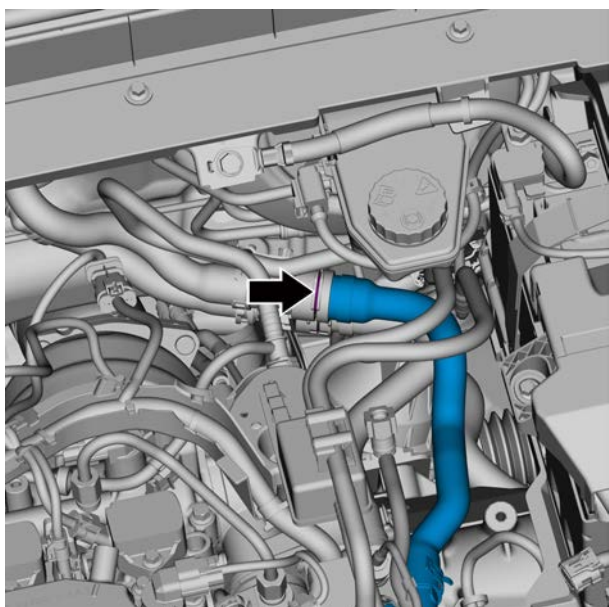
Installation procedure



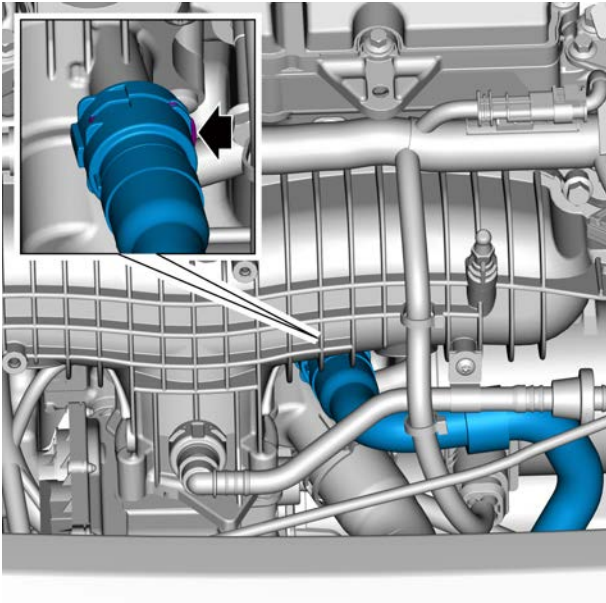
- 1 Install the radiator outlet pipe and reset the quick insert elastic snap ring.



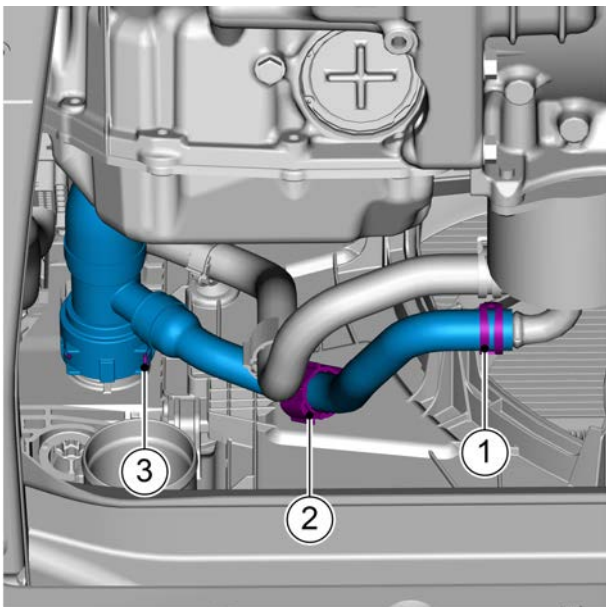
- 2 Connect the radiator outlet pipe with the hot metal pipe of the engine, and install the fixing clamp of the radiator outlet pipe.



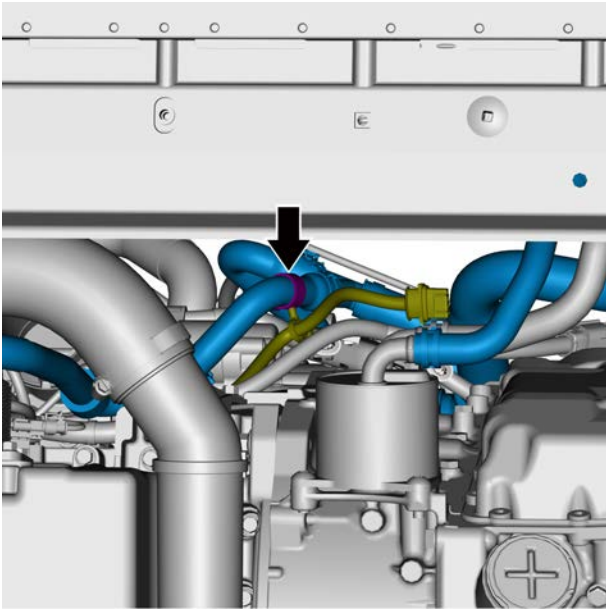
- 3 Connect the radiator outlet pipe and the A/C warm vent pipe, and reset the quick insert elastic circlip.



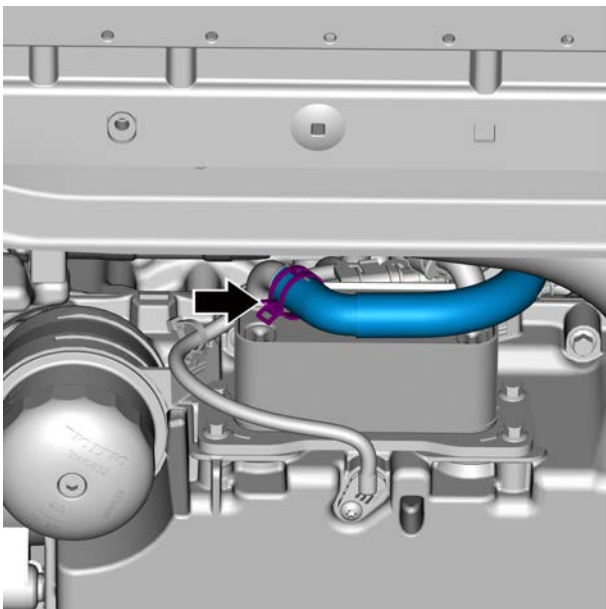
- 4 Connect the radiator outlet pipe and the thermostat housing components, and reset the quick insert elastic snap ring 2.



- 5 Connect the radiator outlet pipe with the radiator and reset the quick insert elastic snap ring 3.
- 6 Install the fixing clip 2 of the radiator outlet pipe.
- 7 Connect the radiator outlet pipe and the oil cooler assembly, and install the fixing clamp 1 of the radiator outlet pipe.



8 Install the fixing clip of the radiator outlet pipe.



9 Connect the radiator outlet pipe and the oil cooler, and install the fixing clamp of the radiator outlet pipe.

- 10 Fill engine coolant.
- 11 Install the intercooler outlet pipe assembly.
- 12 Install the engine fender.
- 13 Lower the vehicle.
- 14 Install air pressure and air temperature sensor 2.
- 15 Install the air inlet pipe of the air filter.
- 16 Install the upper outlet pipe of the air filter.
- 17 Install the air filter assembly.
- 18 Install the engine trim cover assembly.

- 19 Connect the cathode cable of the battery, start the vehicle, connect the diagnostic instrument, monitor the water temperature and the speed of the electronic water pump, and observe the liquid level of the expansion tank. If the liquid level drops, add coolant in time; until the large circulation is opened, add coolant to the scribed line on the expansion tank, and tighten the lid of the expansion tank.
- 20 Close the engine compartment cover.

2.8.8.4 Cleaning of the cooling system

Cleaning procedures

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Opening the engine hood
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Clean the cooling module by using clear water from the front grill to the cooling module. It is required that flush pressure $\leq 0.2\text{MPa}$ and flush angle $\leq 30^\circ$ (perpendicular to the surface of the radiator).

Caution

The harness plug-in should be avoided as far as possible during the flushing.

- 4 Connect the negative battery cable.

Caution

Wait until all the water on the cooling module surface has dried, and then connect the negative pole of the battery.

- 5 Close the engine hood

2.8.8.5 Replacement of water pipe assembly of turbocharger

Removal procedure

Warning !

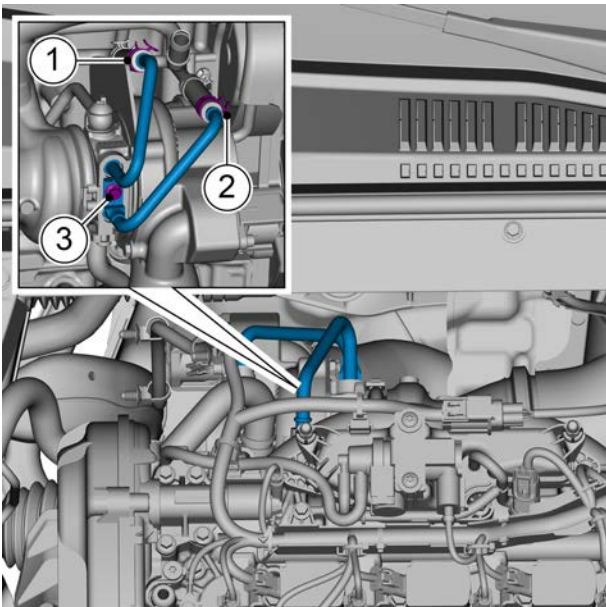
See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

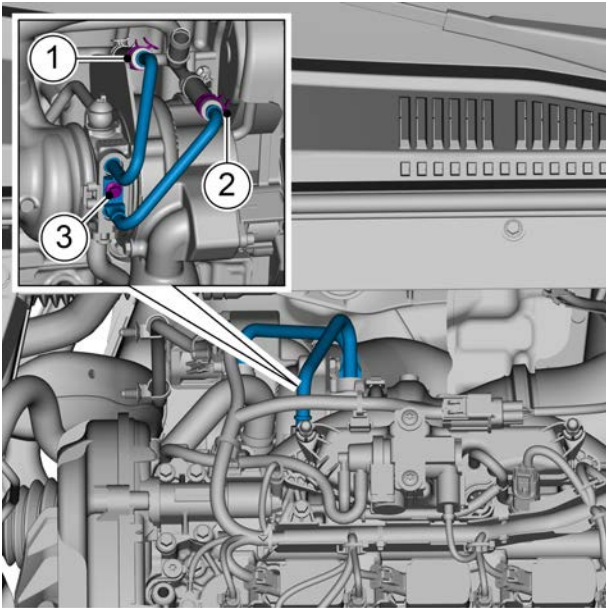
See "Warnings Regarding Cooling System Maintenance" in [Warnings and Precautions](#).

- 1 Open the engine compartment cover.

- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 5 Remove the lower outlet pipe of air filter. See [replacement of lower outlet pipe of air filter](#).
- 6 Remove the turbocharger heat shield, see [turbocharger heat shield replacement](#).
- 7 Lift the vehicle, see [Lift the vehicle](#)
- 8 Remove the engine fender, see [Engine fender replacement](#).
- 9 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 10 Remove fixing clamp 1 of inlet hose of turbocharger.
- 11 Remove the fixing clamp 2 of the outlet hose of the turbocharger.
- 12 Remove one retaining bolt 3 of the turbocharger water pipe assembly and remove the turbocharger water pipe assembly.



Installation procedure



- 1 Install the turbocharger water pipe assembly, install and tighten one retaining bolt 3 of the turbocharger water pipe assembly.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

Caution

1. Replace the O-ring with a new one;
 2. Make sure that the color code on the hose is aligned with the color code on the metal tube.
- 2 Install fixing clamp 2 of turbocharger outlet hose.
 - 3 Install fixing clamp 1 of turbocharger inlet hose.

- 4 Fill engine coolant.
- 5 Install the engine fender.
- 6 Lower the vehicle.
- 7 Install the turbocharger heat shield.
- 8 Install the lower outlet pipe of the air filter.
- 9 Install the upper outlet pipe of the air filter.
- 10 Install the engine trim cover assembly.
- 11 Connect the negative battery cable.
- 12 Close the engine compartment cover.

2.8.8.6 Engine coolant pump replacement

Removal procedure

Warning !

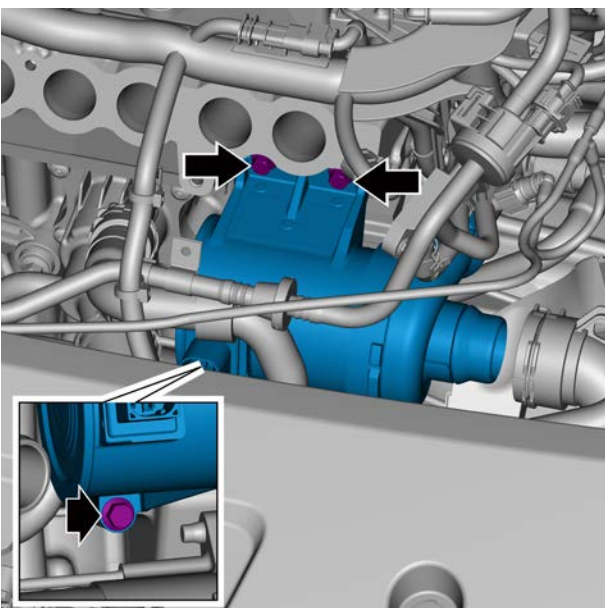
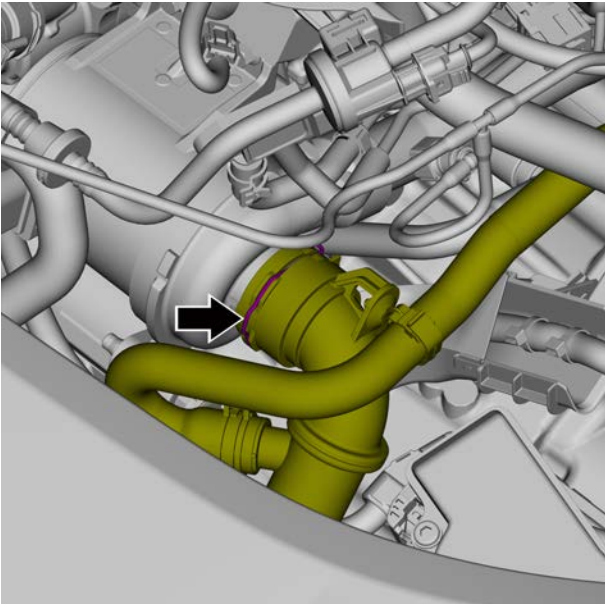
See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

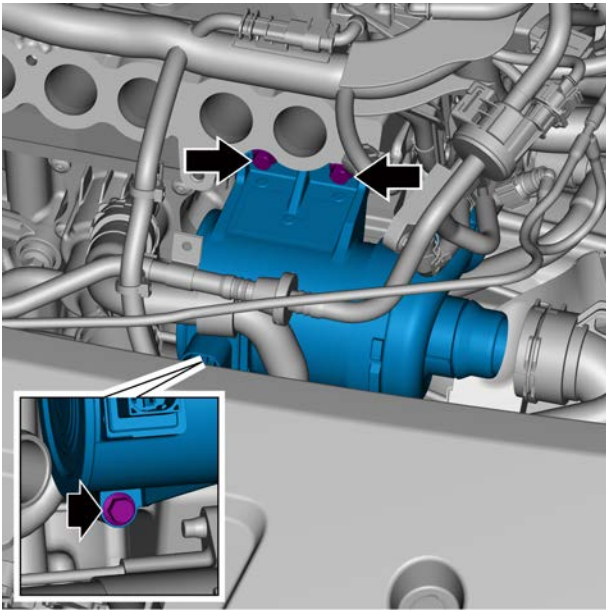
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 5 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe](#).

- 6 Lift the vehicle, see [Lift the vehicle](#)
- 7 Remove the engine fender, see [Engine fender replacement](#).
- 8 Remove the air pressure and air temperature sensor 2, see the [Replacement of Air Pressure and Air Temperature Sensor 2](#).
- 9 Remove the intercooler outlet pipe assembly. See [intercooler outlet pipe assembly replacement](#).
- 10 Remove the throttle unit. See [replacement of throttle unit](#).
- 11 Remove the intake manifold components, see [intake manifold assembly replacement](#).
- 12 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 13 Unlock the quick insert elastic circlip and disconnect the radiator outlet pipe from the engine coolant pump.

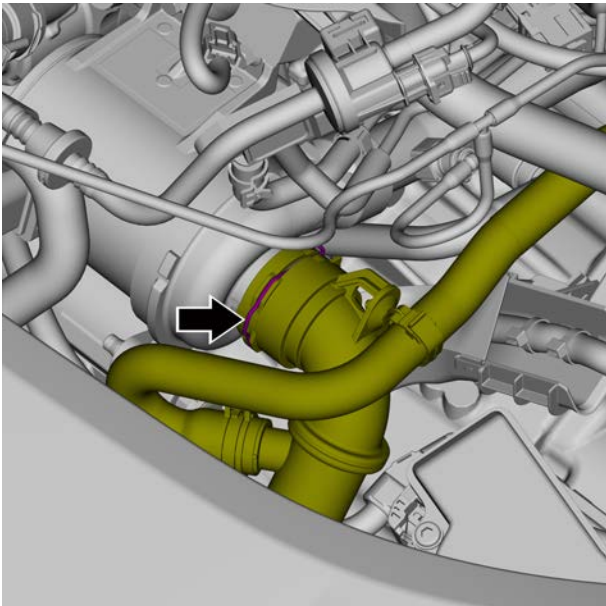


- 14 Remove 3 retaining bolts of the engine coolant pump and remove the engine coolant pump.

Installation procedure



- 1 Install the engine coolant pump, install and tighten 3 retaining bolts of the engine coolant pump.
Torque: 16 N. m (metric system) 11.8 lb-ft (Imperial system)



- 2 Connect the radiator outlet pipe with the engine coolant pump and reset the quick insert elastic circlip.

- 3 Fill engine coolant.
- 4 Install the intake manifold components.
- 5 Install throttle unit.
- 6 Install the intercooler outlet pipe assembly.
- 7 Install air pressure and air temperature sensor 2.
- 8 Install the engine fender.
- 9 Lower the vehicle.
- 10 Install the air inlet pipe of the air filter.
- 11 Install the air filter assembly.
- 12 Install the engine trim cover assembly.

- 13 Connect the cathode cable of the battery, start the vehicle, connect the diagnostic instrument, monitor the water temperature and the speed of the electronic water pump, and observe the liquid level of the expansion tank. If the liquid level drops, add coolant in time; until the large circulation is opened, add coolant to the scribed line on the expansion tank, and tighten the lid of the expansion tank.
- 14 Close the engine compartment cover.

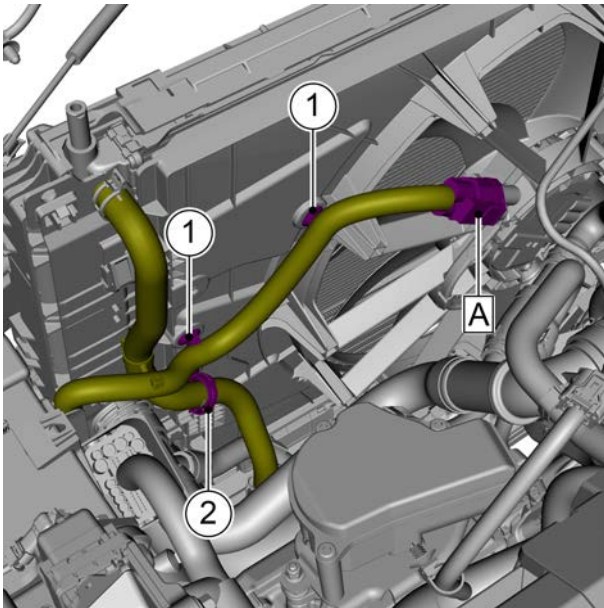
2.8.8.7 Engine Cooling Fan Replacement

Removal procedure

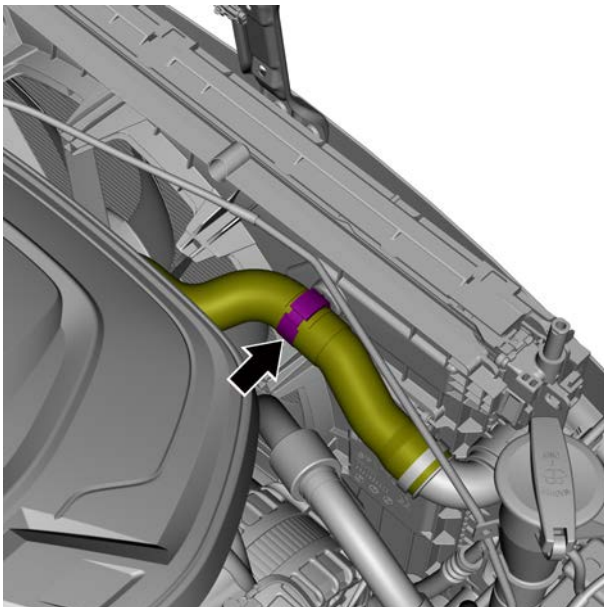
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

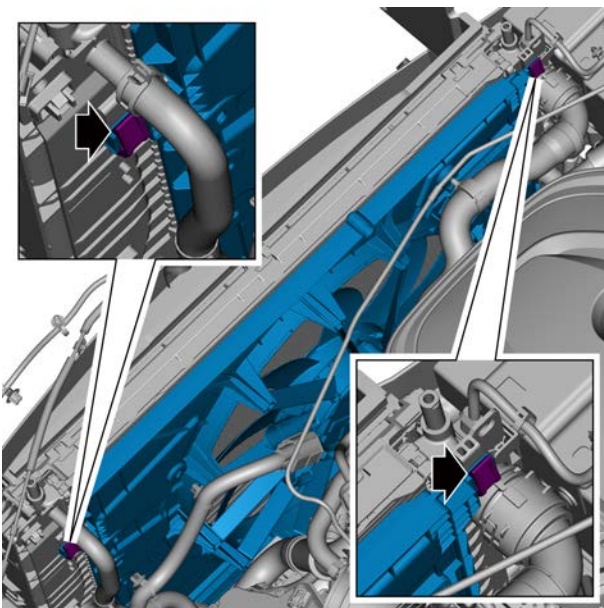
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 4 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe](#).
- 5 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 6 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 7 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 8 Remove the left and head lamp unit (FR). See the [Replacement of the headlamp unit \(front left\)](#).
- 9 Remove engine bonnet lock, see [Replacement of engine bonnet lock](#).
- 10 Remove the horn (tweeter) and see the [Replacement of the horn \(tweeter\)](#).
- 11 Remove the horn (woofer) and see the [Replacement of the horn \(woofer\)](#).
- 12 Remove the front-end module assembly, see the [Replacement of the front-end module assembly](#).



- 13 Disconnect the engine cooling fan connector A and remove the front compartment harness assembly fixing clip 1.
- 14 Remove fixing clip 2 of inlet pipe of transmission fluid cooler.



- 15 Remove fixing clip of radiator inlet pipe.



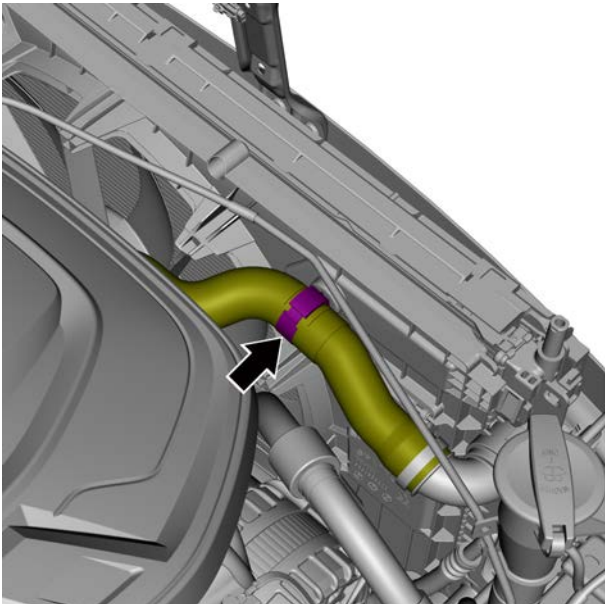
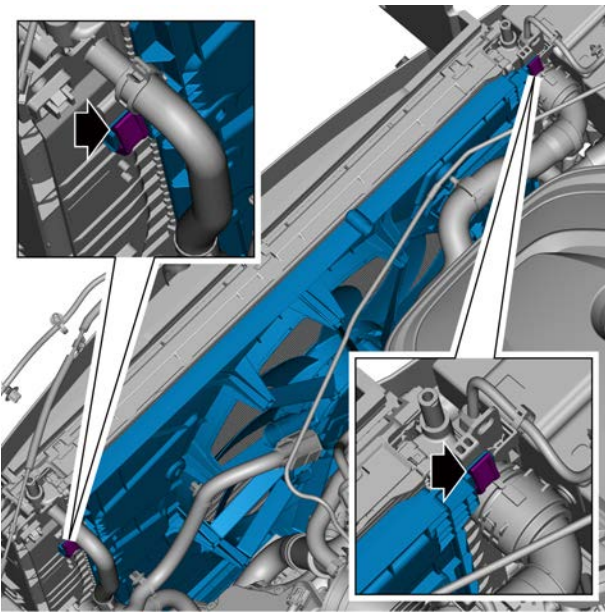
- 16 Disconnect the fixing clip of the engine cooling fan and remove the engine cooling fan.

Installation procedure

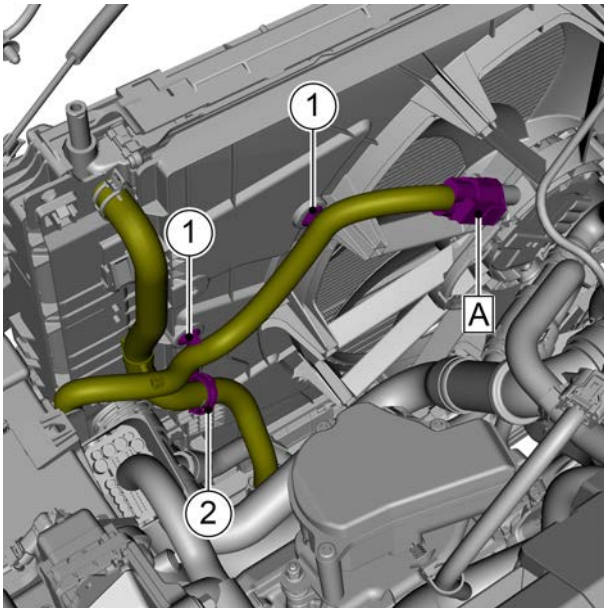
- 1 Install the engine cooling fan.

Caution

Check to ensure that the engine cooling fan is installed in place after installation.



- 2 Install fixing clip of radiator inlet pipe.



- 3 Install fixing clip 2 of inlet pipe of transmission fluid cooler.
- 4 Connect the engine cooling fan connector A and install the front compartment harness assembly fixing clip 1.

- 5 Install the front-end module assembly.
- 6 Install the horn (woofer).
- 7 Install the horn (tweeter).
- 8 Install the engine bonnet lock.
- 9 Install front left headlamp units (FR).
- 10 Install the front bumper assembly.
- 11 Install the front engine bay trim plate.
- 12 Install the left and right engine bay trim plates.
- 13 Install the air inlet pipe of the air filter.
- 14 Install the air filter assembly.
- 15 Connect the cathode cable of the battery and use the diagnostic instrument to test the action of the engine cooling fan.
- 16 Close the engine compartment cover.

2.8.8.8 Replacement of Radiator

Removal procedure

Warning !

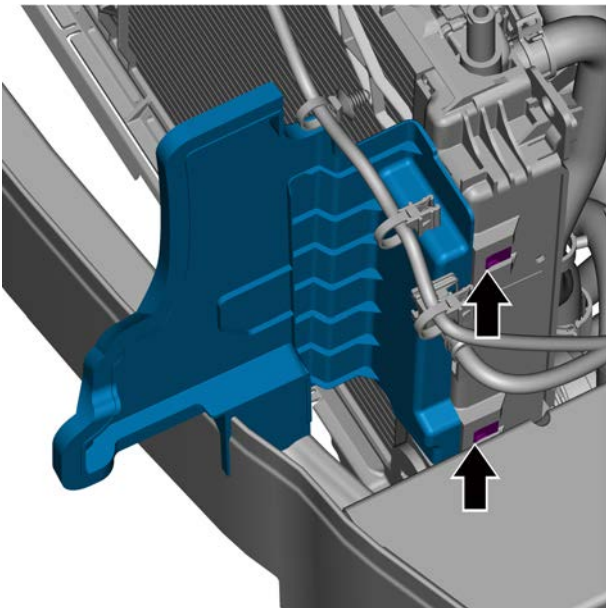
See "warning about disconnecting battery" in [Warnings and cautions](#)

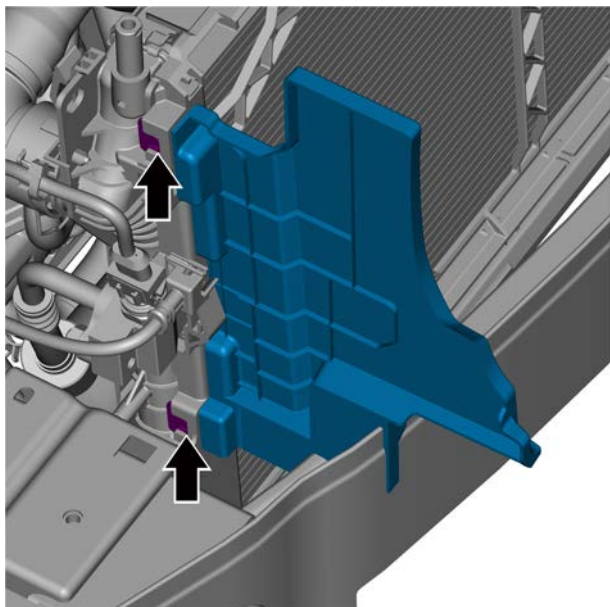
Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

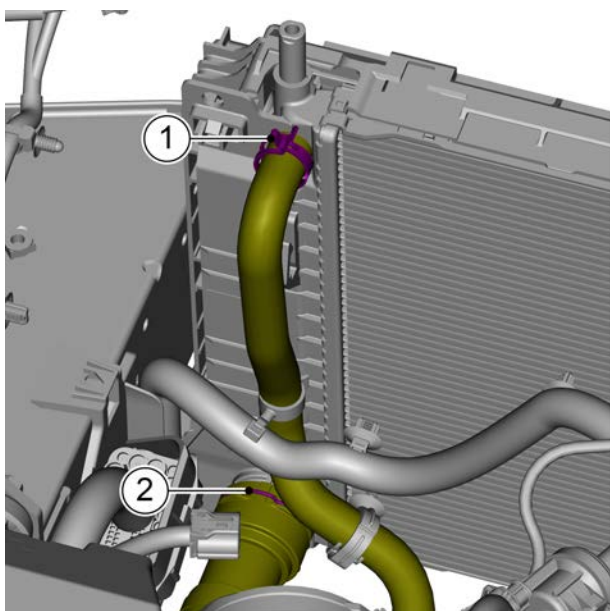
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

- 3 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 4 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe](#).
- 5 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 6 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 7 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 8 Remove front left headlamp units (front right). See [headlamp unit front left replacement](#).
- 9 Remove engine bonnet lock, see [Replacement of engine bonnet lock](#).
- 10 Remove the horn (tweeter). See [horn \(tweeter\) replacement](#).
- 11 Remove the horn (woofer). See [horn \(woofer\) replacement](#).
- 12 Remove the front-end module assembly, see the [Replacement of the front-end module assembly](#).
- 13 Replace the engine cooling fan, see [replace the engine cooling fan](#).
- 14 Remove the intercooler, see [intercooler replacement](#).
- 15 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 16 Disconnect the fixing clip of the left upper air deflector of the radiator and remove the left upper air deflector of the radiator.

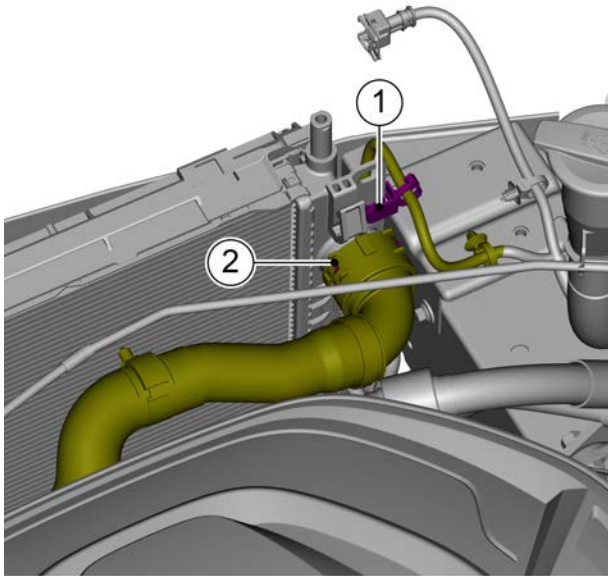




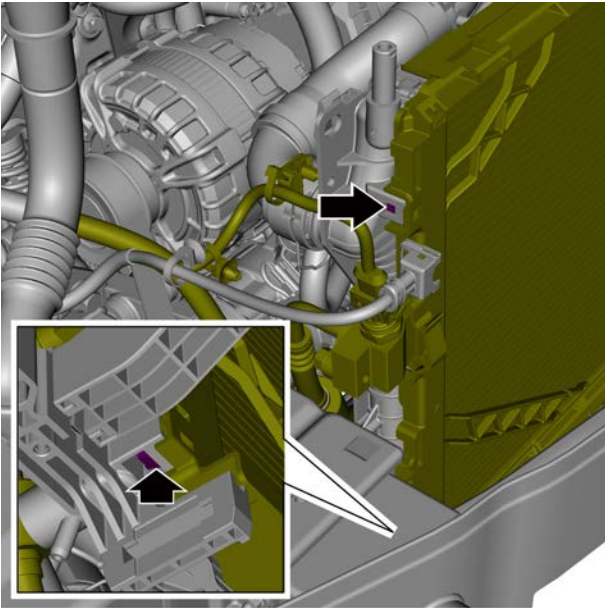
- 17 Disconnect the fixing clip of the upper right air deflector of the radiator and remove the upper right air deflector of the radiator.



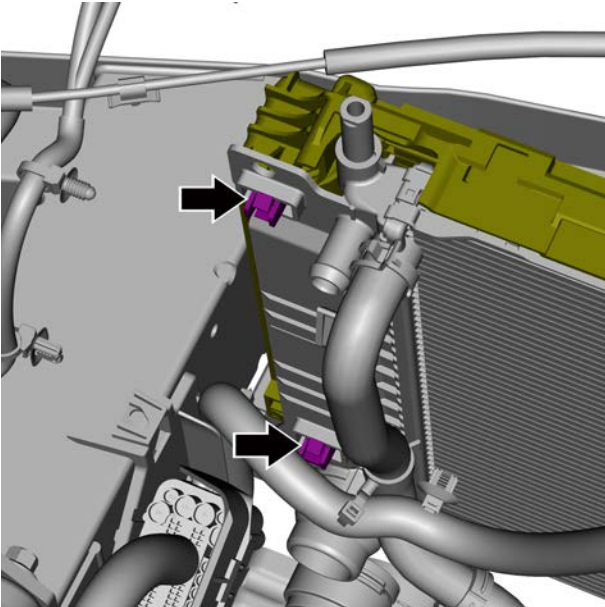
- 18 Remove the fixing clamp of the inlet pipe of the transmission fluid cooler and disconnect the connection between the inlet pipe of the transmission fluid cooler and the radiator.
- 19 Unlock the quick insert elastic circlip 2 and disconnect the radiator outlet pipe from the radiator.



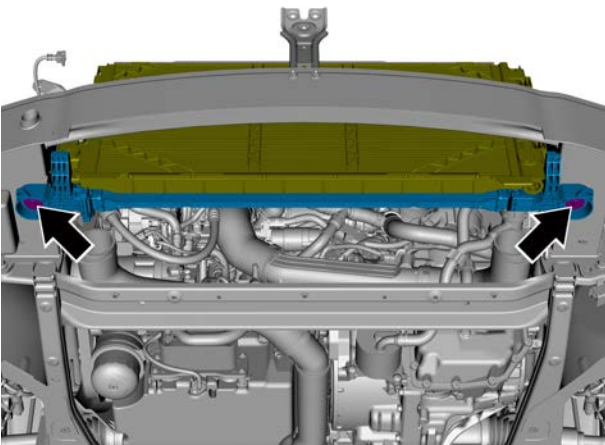
- 20 Remove the fixing clip 1 of the floor harness.
- 21 Unlock the quick insert elastic circlip 2 and disconnect the radiator inlet pipe from the radiator.



- 22 Disconnect the fixing clip of the condenser frame, move the condenser frame and the condenser assembly aside and fix them.



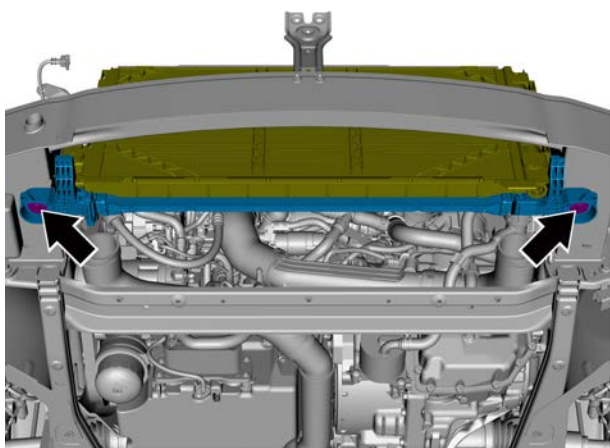
- 23 Remove the 2 retaining bolts of the radiator and remove the radiator.



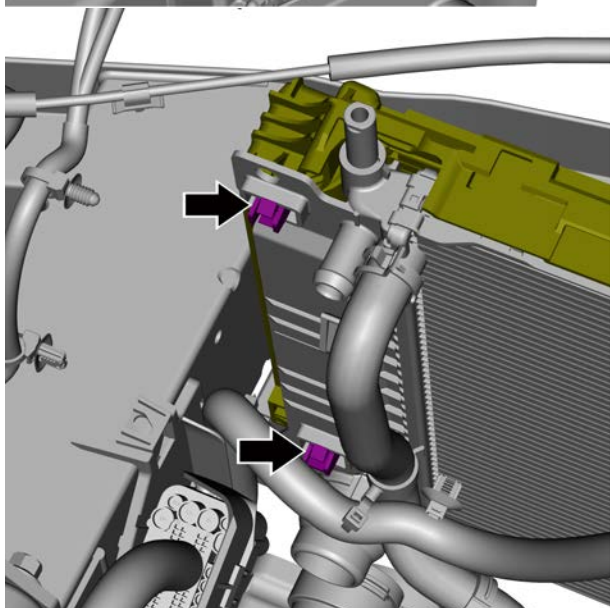
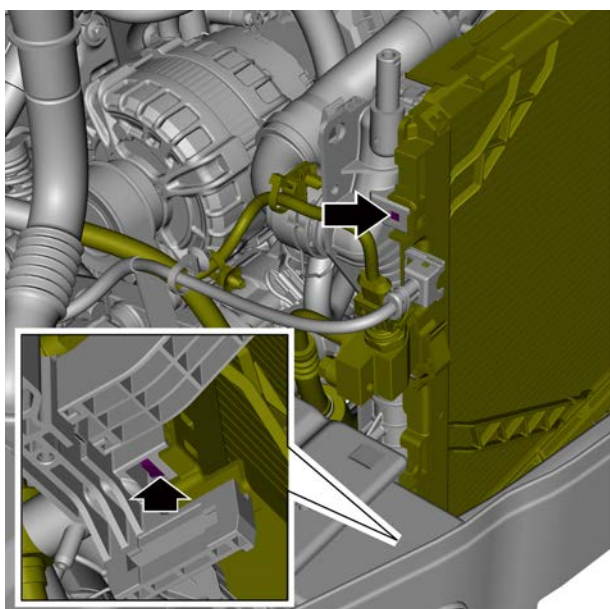
Installation procedure

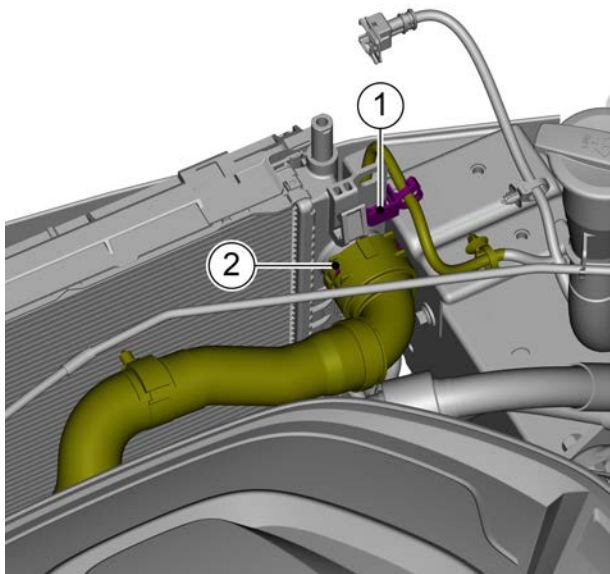
- 1 Install the radiator, install and tighten the 2 retaining bolts of the radiator.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

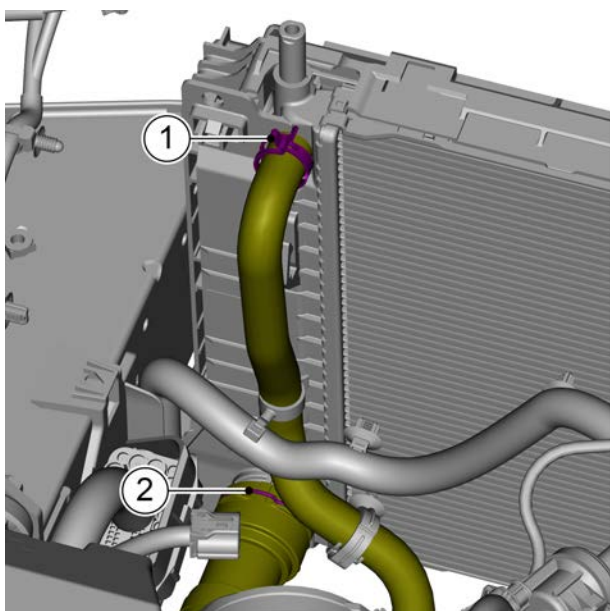


- 2 Install the condenser frame and condenser assembly.

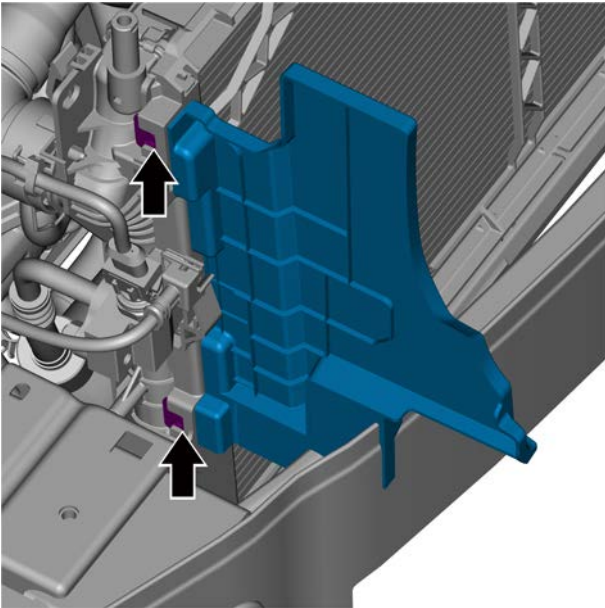




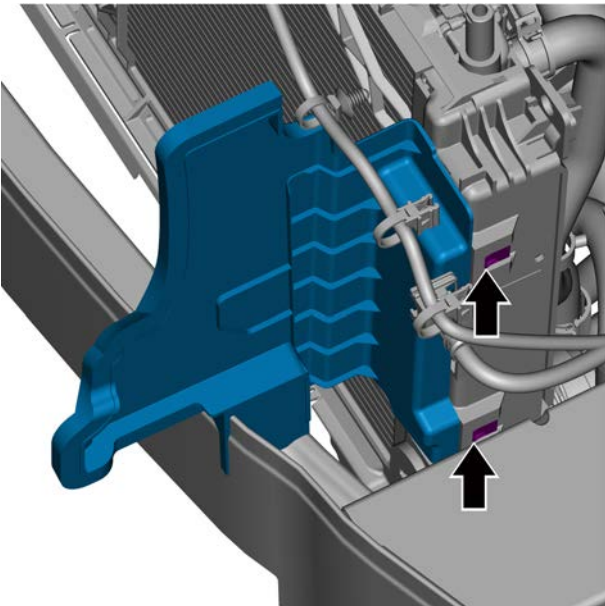
- 3 Connect the radiator inlet pipe with the radiator and reset the quick insert elastic snap ring 2.
- 4 Install the bottom wire harness fixing buckle 1.



- 5 Connect the connection between the radiator outlet pipe and the radiator, and reset the quick insert elastic snap ring 2.
- 6 Connect the inlet pipe of the transmission fluid cooler with the radiator, and install the fixing clamp of the inlet pipe of the transmission fluid cooler.



- 7 Install the upper right air deflector of radiator.



- 8 Install the upper right air deflector of radiator.

- 9 Fill engine coolant.
- 10 Install the intercooler.
- 11 Install the engine cooling fan.
- 12 Install the front-end module assembly.
- 13 Install the horn (woofer).
- 14 Install the horn (tweeter).
- 15 Install the engine bonnet lock.
- 16 Install front left headlamp units (FR).
- 17 Install the front bumper assembly.
- 18 Install the front engine bay trim plate.
- 19 Install the left and right engine bay trim plates.
- 20 Install the air inlet pipe of the air filter.

- 21 Install the air filter assembly.
- 22 Connect the cathode cable of the battery, start the vehicle, connect the diagnostic instrument, monitor the water temperature and the speed of the electronic water pump, and observe the liquid level of the expansion tank. If the liquid level drops, add coolant in time; until the large circulation is opened, add coolant to the scribed line on the expansion tank, and tighten the lid of the expansion tank.
- 23 Close the engine compartment cover.

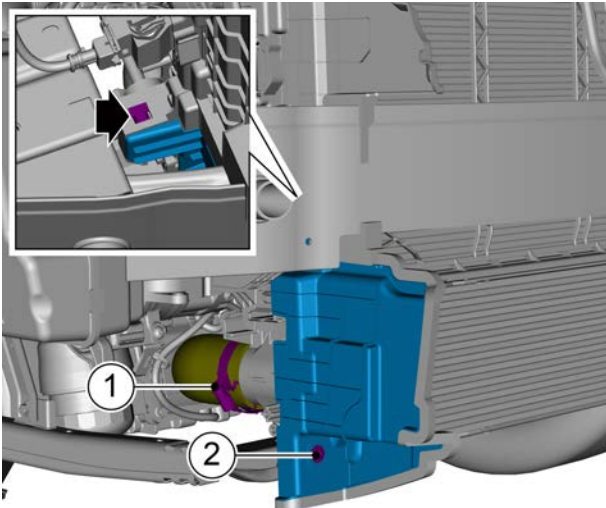
2.8.8.9 Intercooler replacement

Removal procedure

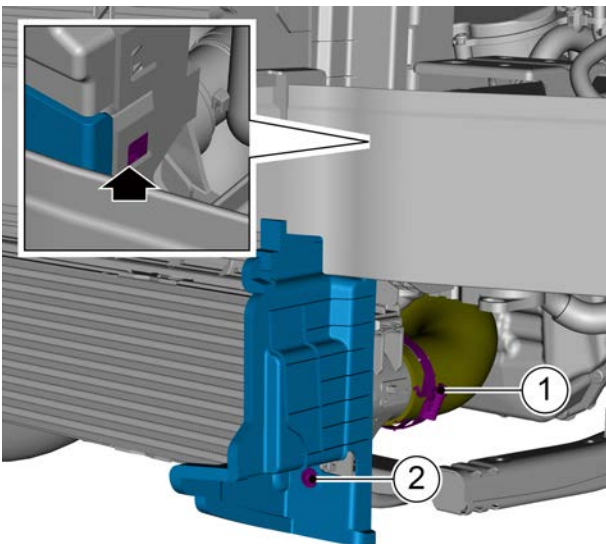
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

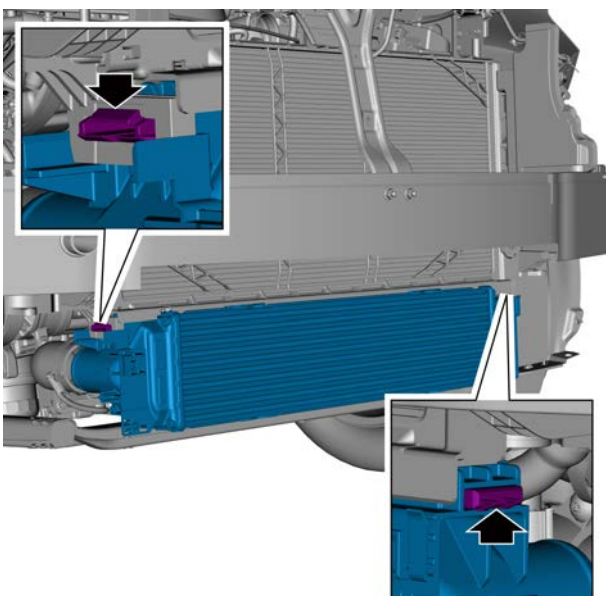
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 4 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe](#).
- 5 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 6 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 7 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 8 Remove front left headlamp units (front right). See [headlamp unit \(front left\) replacement](#).
- 9 Remove engine bonnet lock, see [Replacement of engine bonnet lock](#).
- 10 Remove the horn (tweeter). See [horn \(tweeter\) replacement](#).
- 11 Remove the horn (woofer). See [horn \(woofer\) replacement](#).
- 12 Remove the front-end module assembly, see the [Replacement of the front-end module assembly](#).
- 13 Replace the engine cooling fan, see [replace the engine cooling fan](#).



- 14 Loosen the fixing hoop of the intercooler inlet hose and disconnect the connection between the intercooler inlet hose and the intercooler.
- 15 Remove one fixing screw 2 from the lower right air deflector of the radiator.
- 16 Disconnect the fixing clip of the lower right air deflector of the radiator and remove the lower right air deflector of the radiator.



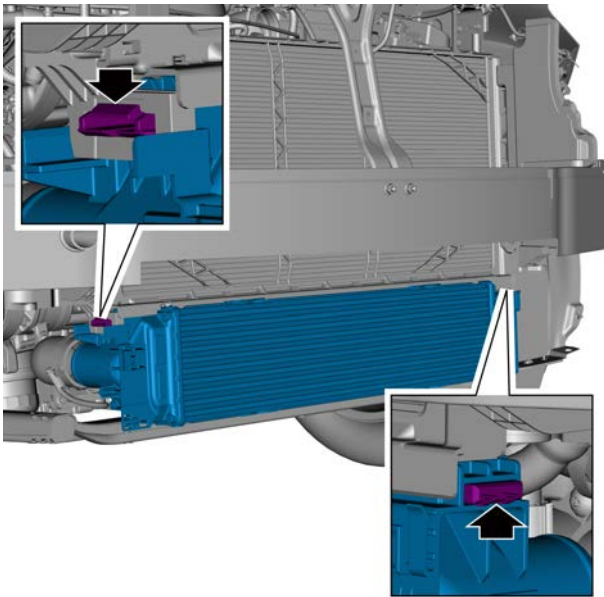
- 17 Loosen the fixing hoop of the intercooler outlet hose and disconnect the intercooler outlet hose from the intercooler.
- 18 Remove one fixing screw 2 from the left lower air deflector of the radiator.
- 19 Disconnect the fixing clip of the left lower air deflector of the radiator and remove the left lower air deflector of the radiator.



- 20 Disconnect the fixing clip of the intercooler and remove the intercooler.

Installation procedure

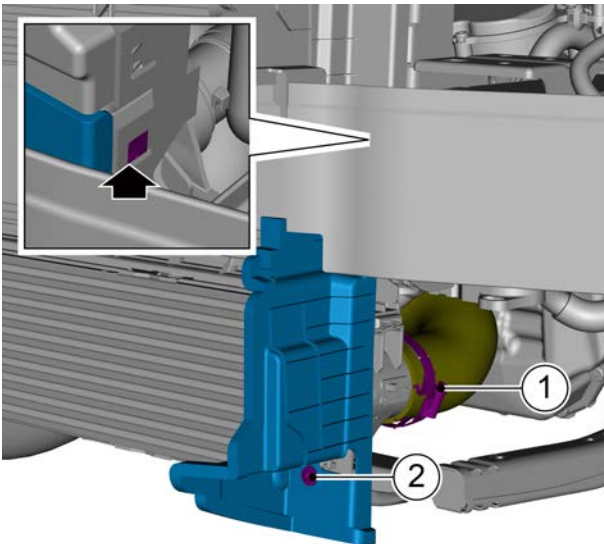
- 1 Install the intercooler.

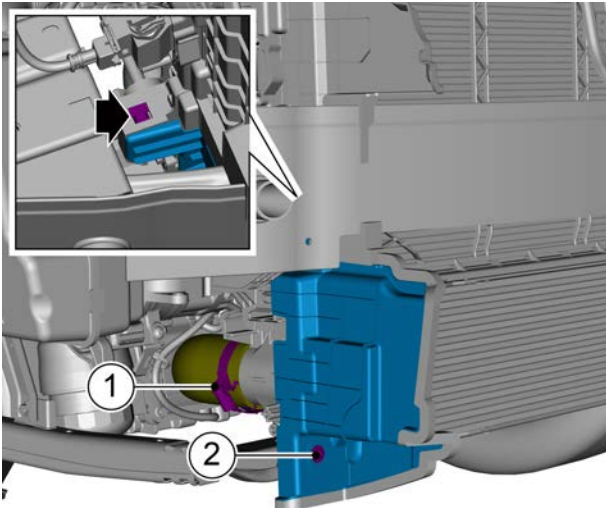


- 2 Install the lower left air deflector of radiator.
- 3 Install and tighten one fixing screw 2 on the left lower air deflector of the radiator.

Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)

- 4 Connect the intercooler outlet hose to the intercooler, and tighten the fixing hoop of the intercooler outlet hose.





- 5 Install the lower right air deflector of radiator.
- 6 Install and tighten one fixing screw 2 of the lower right air deflector of the radiator.

Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)

- 7 Connect the intercooler inlet hose and the intercooler, and tighten the Fixing Hoop 1 of the intercooler inlet hose.

- 8 Install the engine cooling fan.
- 9 Install the front-end module assembly.
- 10 Install the horn (woofer).
- 11 Install the horn (tweeter).
- 12 Install the engine bonnet lock.
- 13 Install front left headlamp units (FR).
- 14 Install the front bumper assembly.
- 15 Install the front engine bay trim plate.
- 16 Install the left and right engine bay trim plates.
- 17 Install the air inlet pipe of the air filter.
- 18 Install the air filter assembly.
- 19 Connect the negative battery cable.
- 20 Close the engine compartment cover.

2.8.8.10 Thermostat casing components replacement

Removal procedure

Warning !

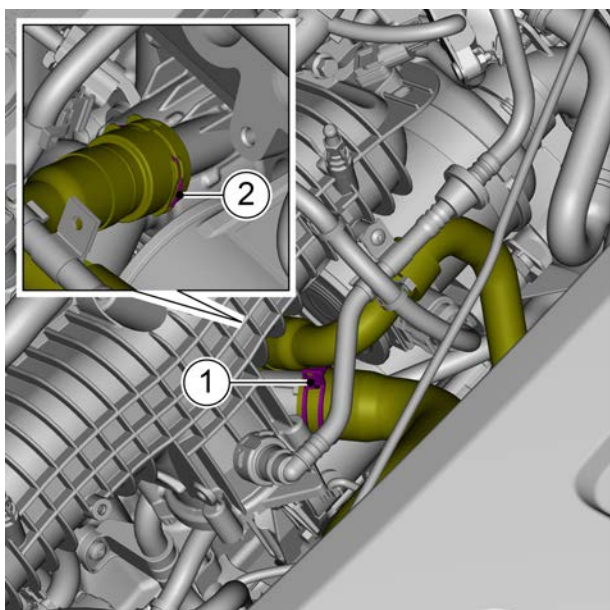
See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

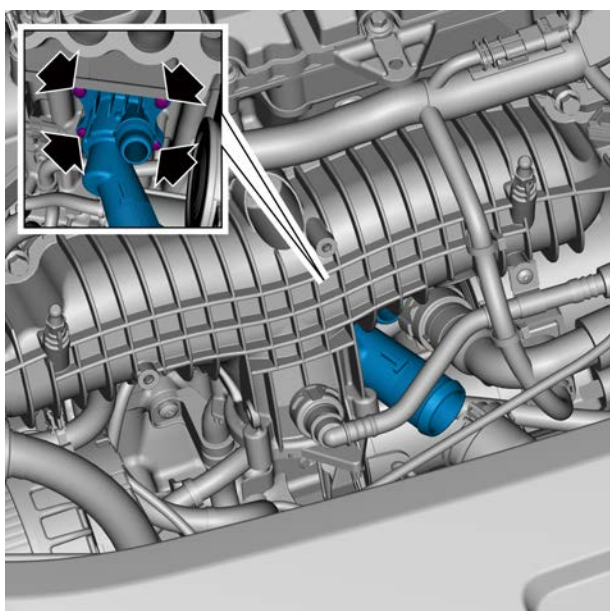
See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 5 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe](#).
- 6 Lift the vehicle, see [Lift the vehicle](#)
- 7 Remove the engine fender, see [Engine fender replacement](#).
- 8 Remove the intercooler outlet pipe assembly. See [intercooler outlet pipe assembly replacement](#).
- 9 Remove the throttle unit, see [replacement of throttle unit](#).
- 10 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).

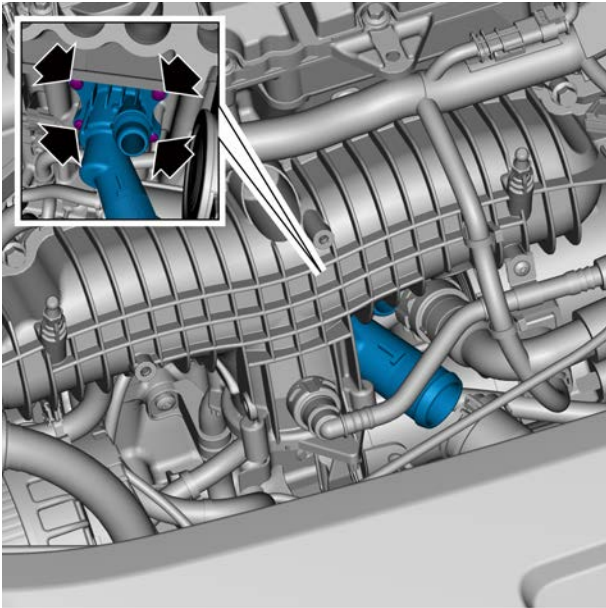


- 11 Remove the fixing clamp 1 of the radiator inlet pipe and disconnect the connection between the radiator inlet pipe and the thermostat housing components.
- 12 Unlock the quick insert elastic circlip 2 and disconnect the radiator outlet pipe from the thermostat housing components.



- 13 Remove the 4 retaining bolts of the thermostat housing components and remove the thermostat housing components.

Installation procedure

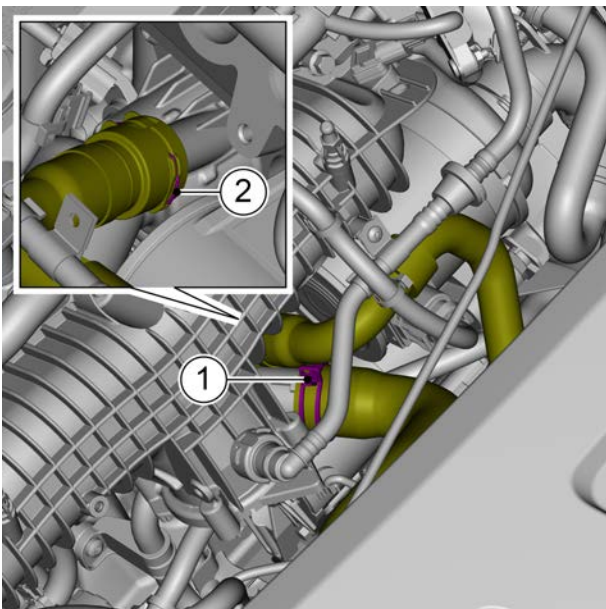


- 1 Install the thermostat housing components, install and tighten the 4 retaining bolts of the thermostat housing components.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

Caution

Confirm whether the sealing ring is clamped in place before installation.



- 2 Connect the radiator outlet pipe and the thermostat housing components, and reset the quick insert elastic snap ring 2.
- 3 Connect the radiator inlet pipe and the thermostat housing components, and install the fixing clamp 1 of the radiator inlet pipe.

- 4 Fill engine coolant.
- 5 Install throttle unit.
- 6 Install the intercooler outlet pipe assembly.
- 7 Install the engine fender.
- 8 Lower the vehicle.
- 9 Install the air inlet pipe of the air filter.
- 10 Install the air filter assembly.
- 11 Install the engine trim cover assembly.

- 12 Connect the cathode cable of the battery, start the vehicle, connect the diagnostic instrument, monitor the water temperature and the speed of the electronic water pump, and observe the liquid level of the expansion tank. If the liquid level drops, add coolant in time; until the large circulation is opened, add coolant to the scribed line on the expansion tank, and tighten the lid of the expansion tank.
- 13 Close the engine compartment cover.

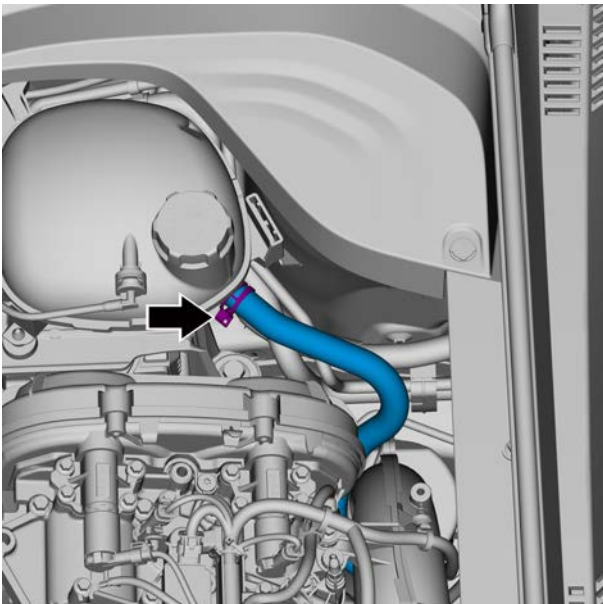
2.8.8.11 Replacement of outlet pipe of expansion tank

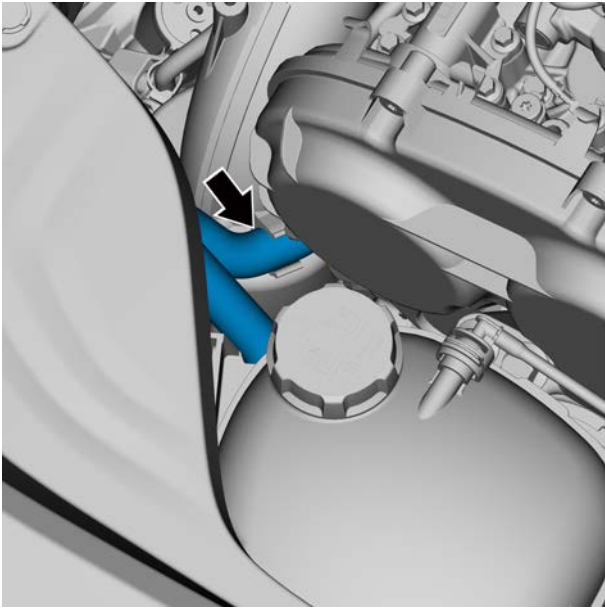
Removal procedure

Warning !

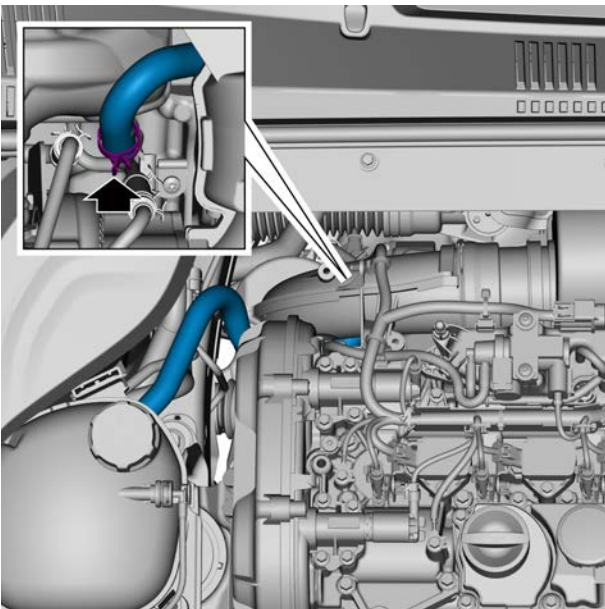
See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 6 Remove the fixing clamp 1 of the outlet pipe of the expansion tank and disconnect the connection between the outlet pipe of the expansion tank and the expansion tank.



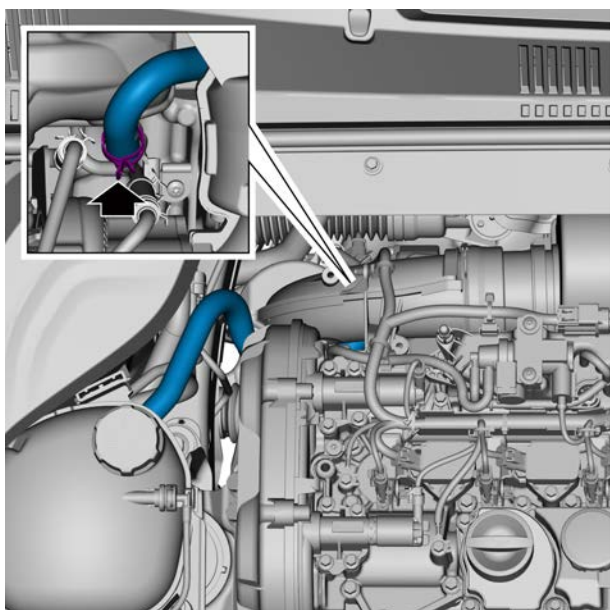


- 7 Disconnect the outlet pipe of the expansion tank from the lower outlet pipe of the air filter.

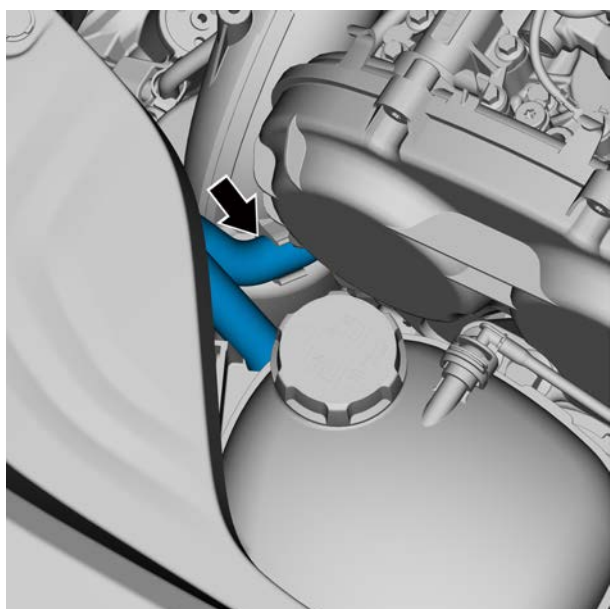


- 8 Remove the fixing clamp of the outlet pipe of the expansion tank and remove the outlet pipe of the expansion tank.

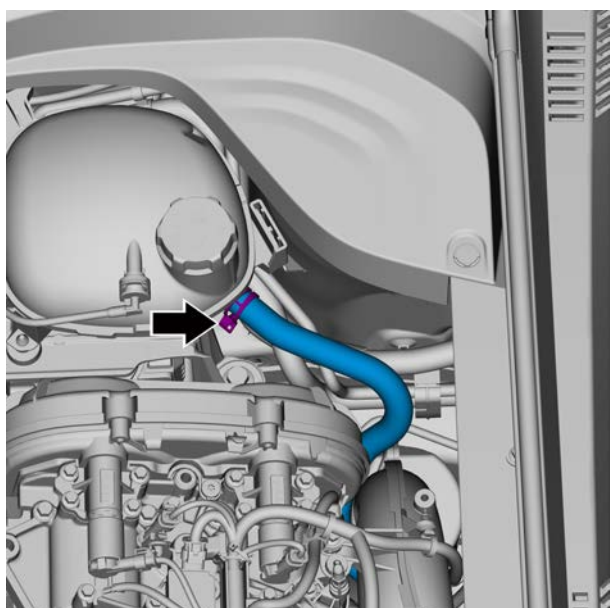
Installation procedure



- 1 Install the outlet pipe of the expansion tank and the fixing clamp of the outlet pipe of the expansion tank.



- 2 Connect the outlet pipe of the expansion tank with the lower outlet pipe of the air filter.



- 3 Connect the outlet pipe of the expansion tank with the expansion tank, and install the fixing clamp 1 of the outlet pipe of the expansion tank.

- 4 Fill engine coolant.
- 5 Install the engine fender.
- 6 Lower the vehicle.
- 7 Install the engine trim cover assembly.
- 8 Start the vehicle and connect the diagnostic instrument to monitor the water temperature and the speed of the electronic water pump, and observe the liquid level of the expansion tank. If the liquid level drops, add coolant in time; until the large circulation is opened, add coolant to the scribed line on the expansion tank, and tighten the lid of the expansion tank.
- 9 Close the engine compartment cover.

2.8.8.12 Replacement of exhaust pipe

Removal procedure

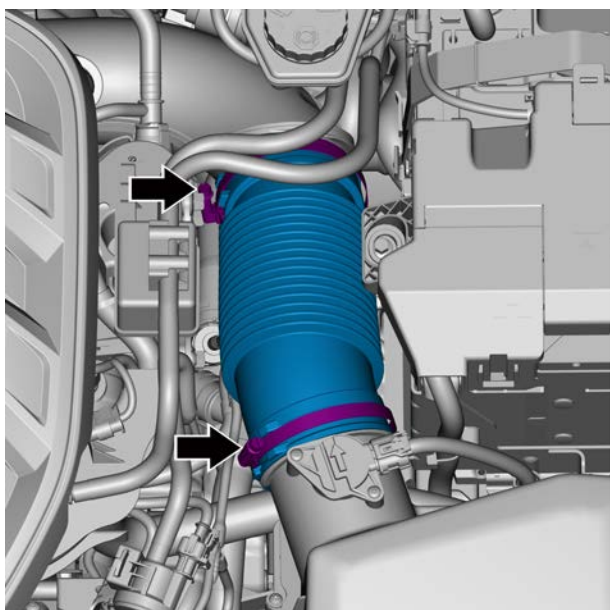
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

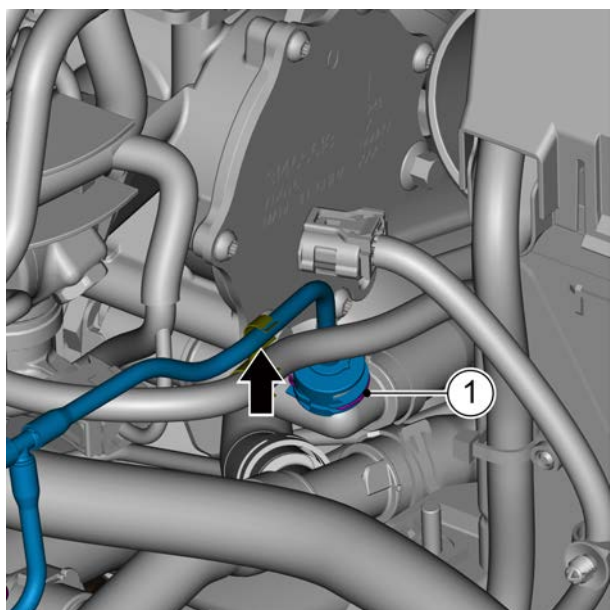
Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

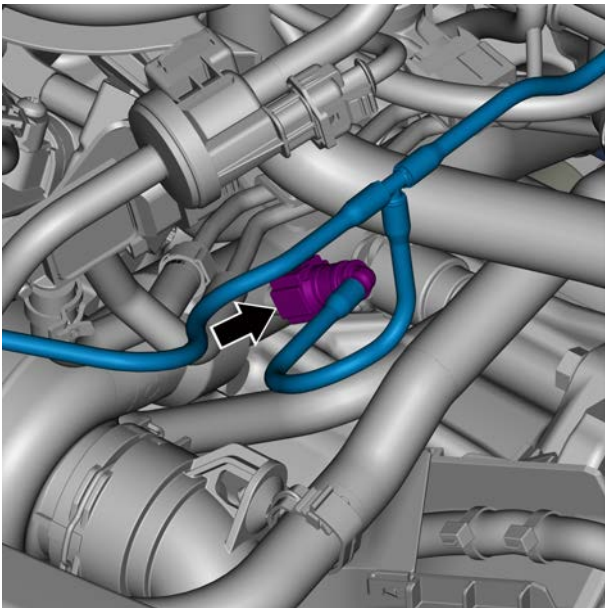
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement.](#)
- 5 Drain the engine coolant, refer to [Draining and filling of engine coolant.](#)



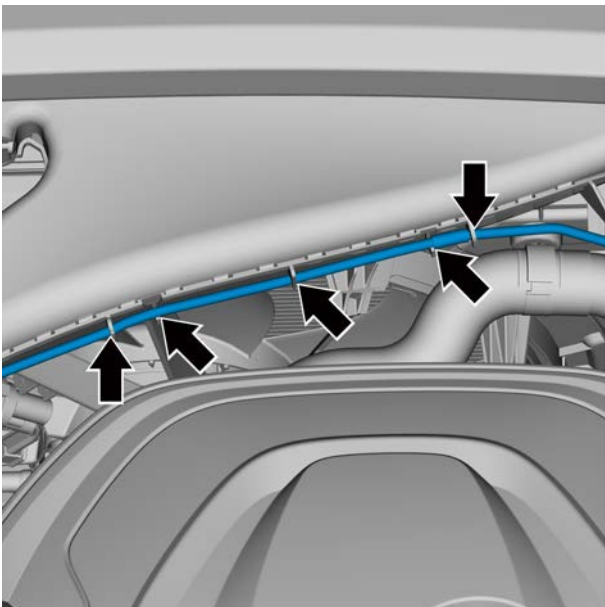
- 6 Loosen the fixing hoop of the air filter corrugated pipes and remove the air filter corrugated pipes.



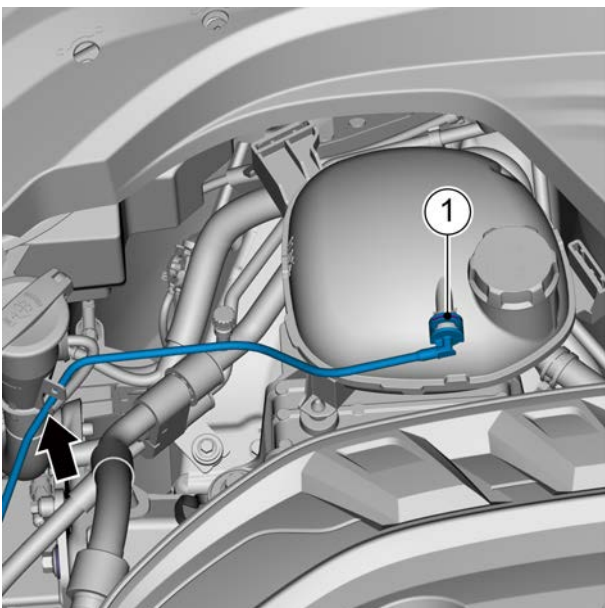
- 7 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 8 Unlock the quick insert elastic circlip 1 and disconnect the vent hose from the intelligent control valve hose.
- 9 Disconnect the exhaust pipe from the fixed pipe clamp.



10 Disconnect the air hose connector.



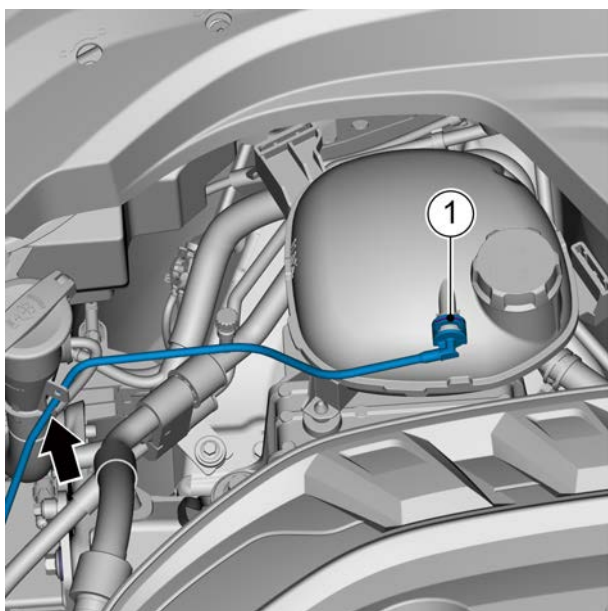
11 Disconnect the exhaust hose from the air filter intake pipe assembly.



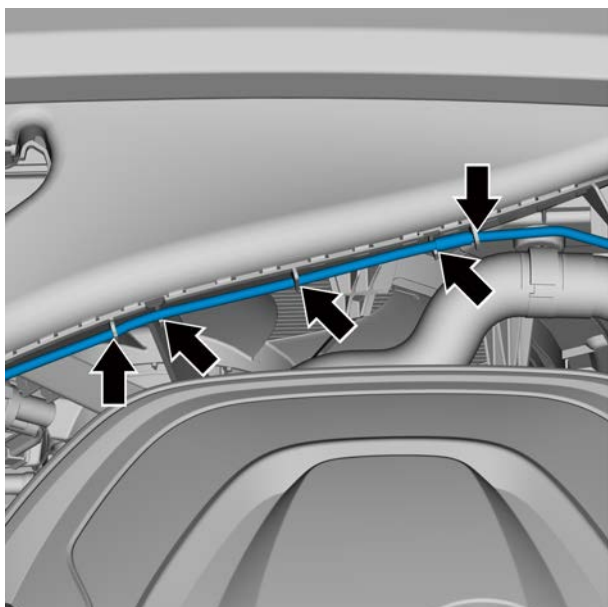
12 Disconnect the vent hose from the filler pipe of the windshield washer.

13 Unlock the quick insert elastic circlip 1 and remove the exhaust pipe.

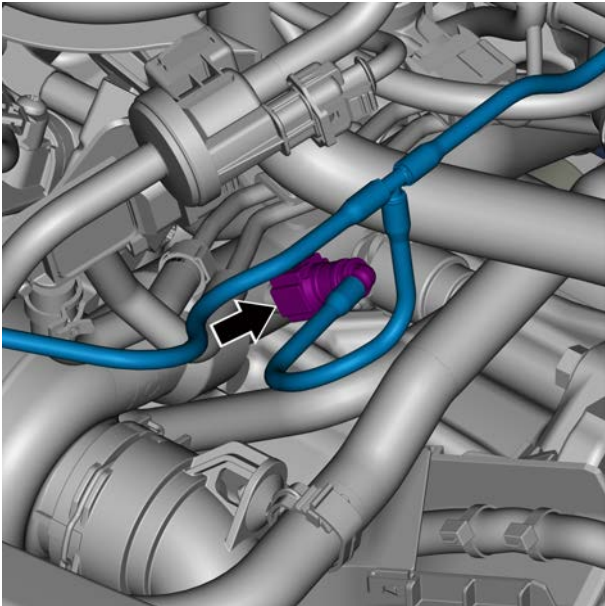
Installation procedure



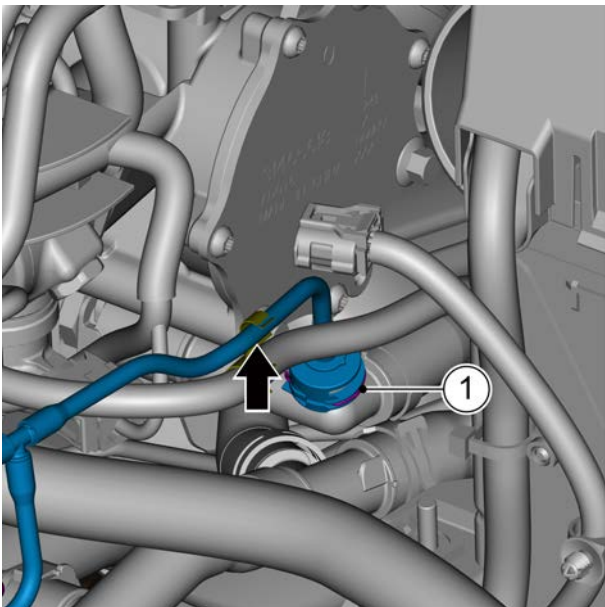
- 1 Install the exhaust pipe and reset the quick insert elastic circlip 1.
- 2 Connect the exhaust pipe and the filler pipe of the windshield washer.



- 3 Connect the exhaust pipe and the air filter intake pipe assembly.



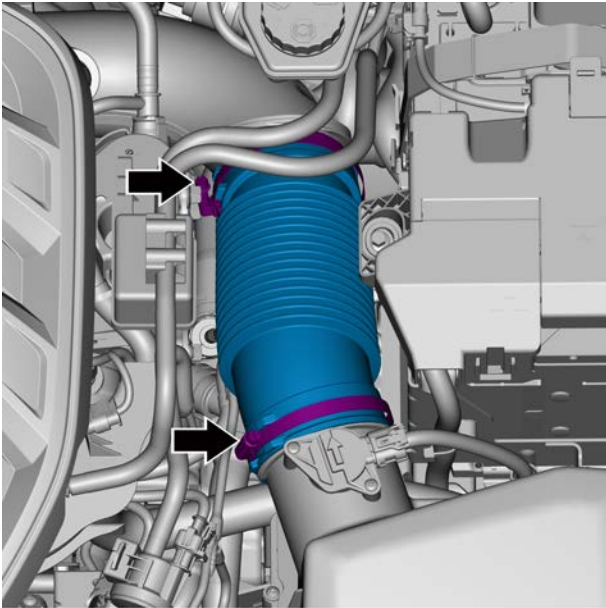
4 Connect the connector of the exhaust pipe.



5 Connect the exhaust pipe and the intelligent control valve hose, and reset the quick insert elastic snap ring 1.

6 Connect the exhaust pipe and the fixing clamp.

7 Install the air filter assembly.



- 8 Install the air filter corrugated pipes and fasten the fixed hoop of the air filter corrugated pipes.

Torque: 4.5 N. m (metric system) 3.3 lb-ft (Imperial system)

Caution

Align the nozzle with the mark when connecting.

- 9 Fill engine coolant.
- 10 Install the engine fender.
- 11 Lower the vehicle.
- 12 Connect the cathode cable of the battery, start the vehicle, connect the diagnostic instrument, monitor the water temperature and the speed of the electronic water pump, and observe the liquid level of the expansion tank. If the liquid level drops, add coolant in time; until the large circulation is opened, add coolant to the scribed line on the expansion tank, and tighten the lid of the expansion tank.
- 13 Close the engine compartment cover.

2.9 Lubrication system JLH-4G20TD

2.9.1 Specification

2.9.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Oil level sensor retaining screw	M6×20	8.5~11.5	6.3~ 8.4
Oil filter module	-	First 25 ~ 30, reverse rotation 30 °, and finally 25 ~ 30	First 18.4 ~ 22.1, reverse rotation 30 °, and finally 18.4 ~ 22.1
Oil cooler retaining bolt	M7×20	13.5~18.5	10~13.6
Oil pan retaining bolt	M7×45	13.5~18.5	10~13.6
	M7×35		
retaining bolts of oil pan and transmission	M10×40	41~55	30.2~40.6
retaining bolt of oil dipstick tube components	M6×16	8.5~11.5	6.3~ 8.4
retaining bolts of oil strainer components	M7×35	13.5~18.5	10~13.6
Turbocharger oil inlet pipe retaining bolt	M12×24	22~30	16.3~22.1
	M16×28	42~54	31~39.8
Oil drain plug	M18×18×1.5	50~54	36.9~39.8

2.9.1.2 Specifications of Oil Pump Unit

Engine oil capacity and quality	
Oil filling volume (L)	The dry filling amount is 6.8 ± 0.1 L, the maintenance filling amount is 5.6 ± 0.1 L (replace the filter element) and 5.2 ± 0.1 L (do not replace the filter element)
Engine oil specification	Shell VCC RBS0-2AE 0W-20

Oil pressure relation table of oil pump

Speed (R/min)	Torque (N.m)	Oil temperature (°C)	Oil pressure (kPa)
750	27.3	59.0	222.4
750	28.3	118.5	172.7
1000	12.9	119.9	199.6
1000	13.2	59.9	195.9
1000	160.9	60.7	386.7
1000	164.2	121.1	215.7
1500	10	119.7	220.7
1500	10.9	60.1	196.7
1500	160.7	121.6	303
1500	235.7	60.3	390.0

750	27.3	59.0	222.4
1999	354.4	62.2	392.2
2000	10.2	60.5	197
2000	10.5	119.9	227.6
2000	359.1	122.9	368
2500	10.3	119.6	229.8
2500	10.6	58.8	197.3
2500	355.4	58.9	391.9
2500	359.5	119.7	373.9
3000	10.1	59.3	197.9
3000	11.1	118.3	208.8
3000	354.1	60.4	392.5
3000	359	120.8	375.9
3500	9.4	58.0	393.4
3500	10.9	119.3	378.9
3500	355.0	69.9	393.4
3500	361	121.8	373.3
4000	9.7	119	378
4000	9.8	59.9	385.1
4000	362.2	60.9	383.3
4000	363.3	122.1	372.4
4500	9.8	57.8	384.1
4500	10.9	119.8	377.4
4500	349.2	59.6	383.1
4500	356	121.1	370.4
5000	8.8	58.5	384.8
5000	10.1	120.4	377.7
5000	333.5	62.0	382.1
5000	337	121.6	369
5500	9.6	59.3	384.8
5500	11.7	118.9	374.6
5500	302.3	61.7	382.3
5500	304.3	122.4	366.5
5950	10.0	60.8	385.3
5950	11.3	120.4	370.9
5950	268.7	120.3	333.8
5950	272.2	59.2	381.5

2.9.2 Instructions and operations

2.9.2.1 Instructions and Operations

Engine sump

The oil pan is mainly used to collect engine oil. There is an oil drain plug on the oil pan. The drain plug is located at the bottom of the oil pan and is used to drain the engine oil.

The engine oil pan is installed at the bottom of the crankcase. The oil pump extracts engine oil from the oil pan. After passing through the oil filter, the engine oil passes through two oil passages to lubricate the cylinder block and cylinder head respectively. In one oil passage, the engine oil passes through the engine oil passage in the crankshaft to the crankshaft connecting rod, then to the piston and cylinder, and finally returns to the oil pan; in addition, some of the lubrication oil flows to the turbocharger through a specific oil passage for lubrication of the turbocharger and finally returns to the oil pan. In the second oil passage, the engine oil passes through the engine oil passage to the camshaft, and the engine oil passes through the internal oil passage of the camshaft to lubricate the valve assembly and finally return to the oil pan.

Engine oil pump

The oil pump draws engine oil from the oil pan, and then delivers the engine oil to each part of the engine with pressure. A filter screen (i.e. oil suction filter) is installed at the oil pump inlet. A clogged filter net will damage the oil pump and will not pump oil normally. The lubricating system cannot establish normal lubricating oil pressure. This situation will cause damage to the mechanical parts of the engine. The oil pump is directly driven by the crankshaft gear. So as long as the crankshaft rotates, the oil pump will also participate in work. When the engine speed is high, the output pressure of the oil pump will exceed the demand of the engine lubrication system, so a safety valve is set on the oil pump assembly. When the output pressure exceeds the specified pressure, the safety valve opens and the excess oil flows back to the oil pan through the safety valve. The safety valve remains closed when the oil is supplied normally.

Oil level sensor

The oil level sensor is used to measure the oil level. A 4G20TD engine does not use a conventional dipstick. The dim displays the engine oil level.

Oil pressure and oil temperature sensor

Engine oil pressure and temperature sensors are installed in front of the engine. The sensor is a combination of oil pressure and temperature. The Engine Control Module supplies it with 5 V working voltage. The sensor generates pulse width

modulated signals for diagnosis, temperature and pressure measurement.

The engine oil pressure and temperature sensor component are a combination of two sensors. The Engine Control Module (ECM) supplies 5V voltage to the sensor, and the sensor feeds back the pulse width modulation signal.

Oil filter

The oil filter is located on the front right under the engine. The oil filter is mainly used to clean engine oil. Engine oil flows from the oil pan to the oil filter. The engine oil passes through the oil filter to remove pollutants from the engine. The filtered engine oil flows back to the oil pan.

Oil cooler

The oil cooler is mounted on the oil pan. The oil cooler is mainly used to cool the engine oil. The engine oil and the coolant in the oil cooler are separated. There are many radiator cores in the oil cooler to improve the cooling effect.

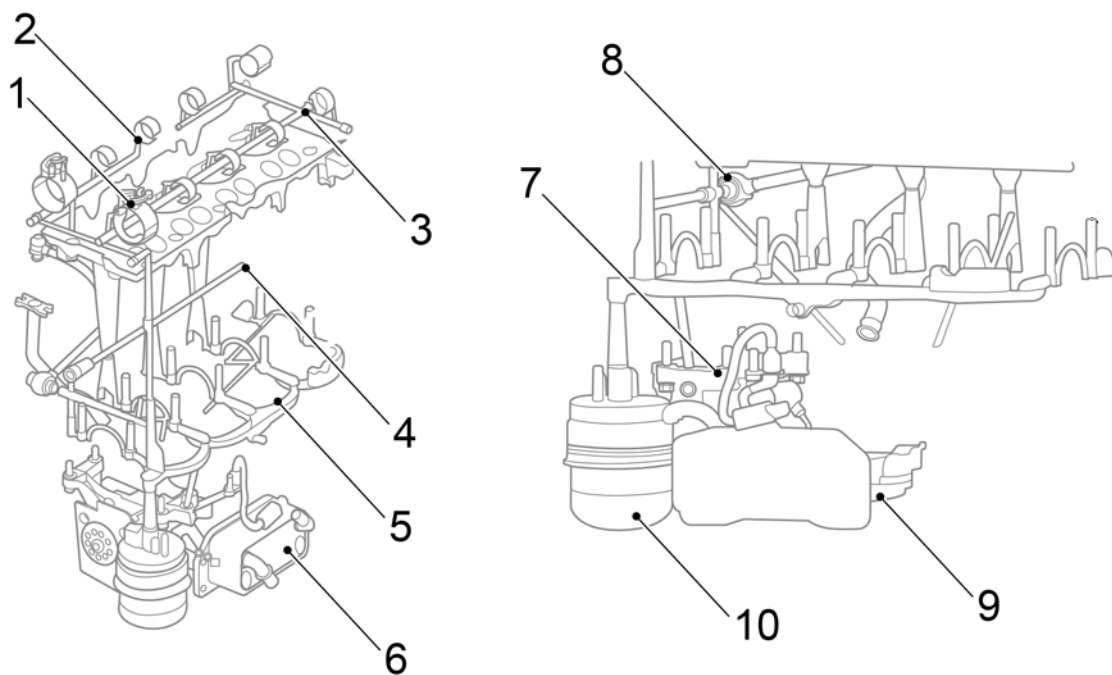
Lubricating instructions

The oil cooler and oil filter module are integrated in the engine oil sump. After the engine oil is cooled by the oil cooler components, it flows upward through the oil filter element through the upper oil passage of the oil filter base. Engine oil flows downward through the oil passage and passes the front of the cylinder block. These front oil passages supply engine oil to each cylinder head oil passage, main shaft passage and left balance shaft. Each cylinder head oil passage introduces engine oil into the oil control valve, hydraulic tappet and cam bearing. Engine oil flows from main oil duct, through the oil control valve filter element and oil control valve oil chamber to VVT components. The oil control valve is used to control the inlet and exhaust VVT components. The oil control valve is controlled by the engine control module (ECM). When the engine control module is electrified for the oil control valve, solenoid valve guides the engine oil flows upward through the front camshaft bearing cap of the cylinder cover. Engine oil enters the oil hole on the camshaft journal through intake camshaft bearing cap oil duct and flows into front of the intake camshaft mounting surface. Then, the engine oil flows into the corresponding oil duct of VVT components. The oil control valve guides the engine oil to flow into the corresponding oil duct in the system to make the pressurized engine oil act on the blade in the intake and exhaust. Engine oil acts on the blade to rotate the intake camshaft against the chain wheel. During the ignition timing, the inner lock pin locks the inner rotor into the outer housing of the intake and exhaust VVT components. At the time of starting, the intake and exhaust VVT components remain in the original position or default position. The oil control valve guides the engine oil pressure to loosen the lock

pin to make the intake and exhaust VVT components work. The second branch circuit leads to the main oil duct bearing hole. Engine oil is shunted to the turbocharger and the right balance journal. Engine oil flows back to the oil sump through the fuel return duct cast on the outer wall of the cylinder cover and cylinder body.

2.9.3 System working principles

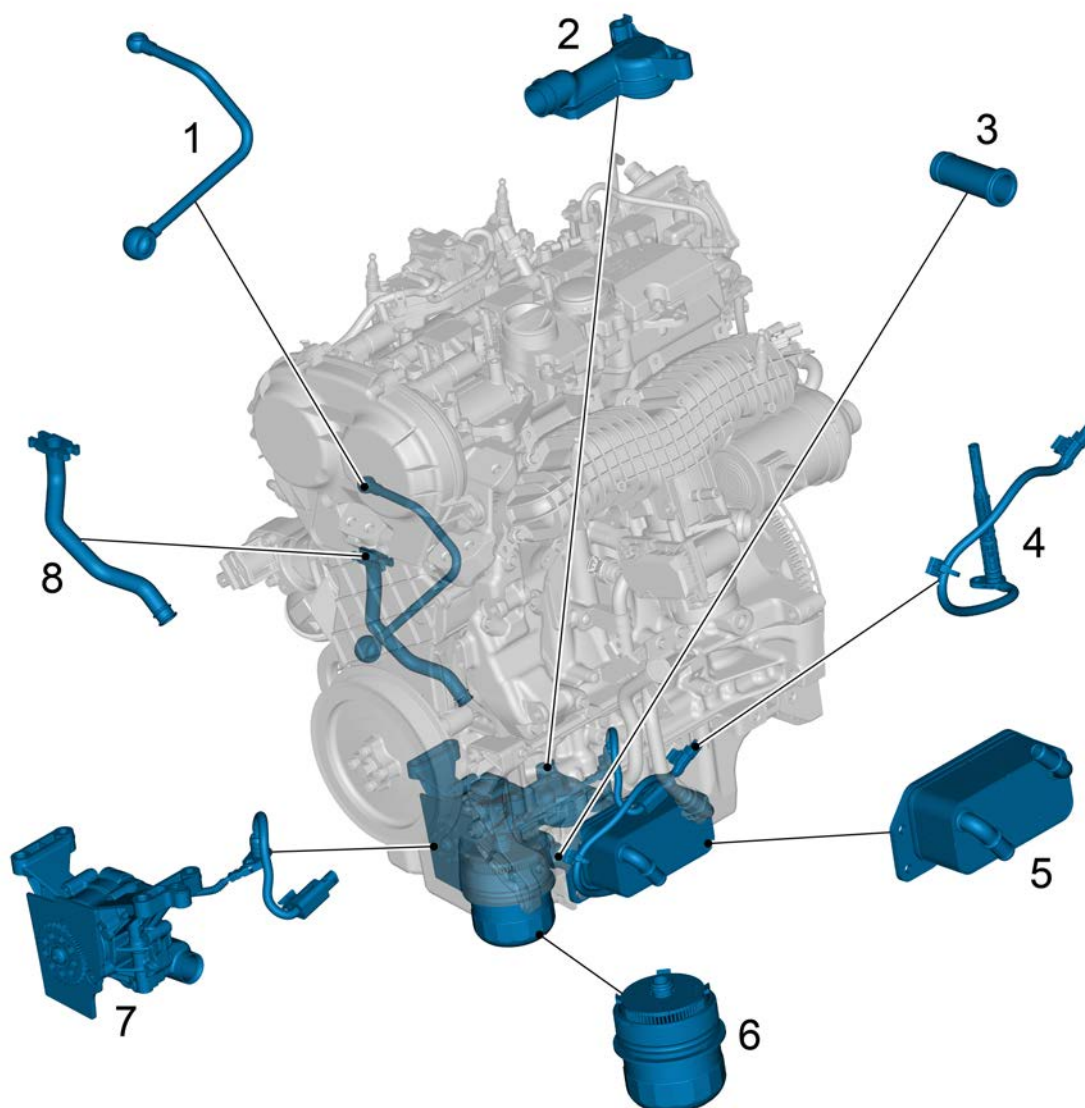
2.9.3.1 Lubricating Chart



- | | |
|--|------------------------------|
| 1. VVT | 6. Oil cooler |
| 2. Main oil passage of exhaust cylinder head | 7. Engine oil pump |
| 3. Main oil passage of intake cylinder head | 8. Turbocharger |
| 4. Piston cooling nozzle | 9. Engine oil suction filter |
| 5. Main oil passage of cylinder block | 10. Oil filter |

2.9.4 Component position

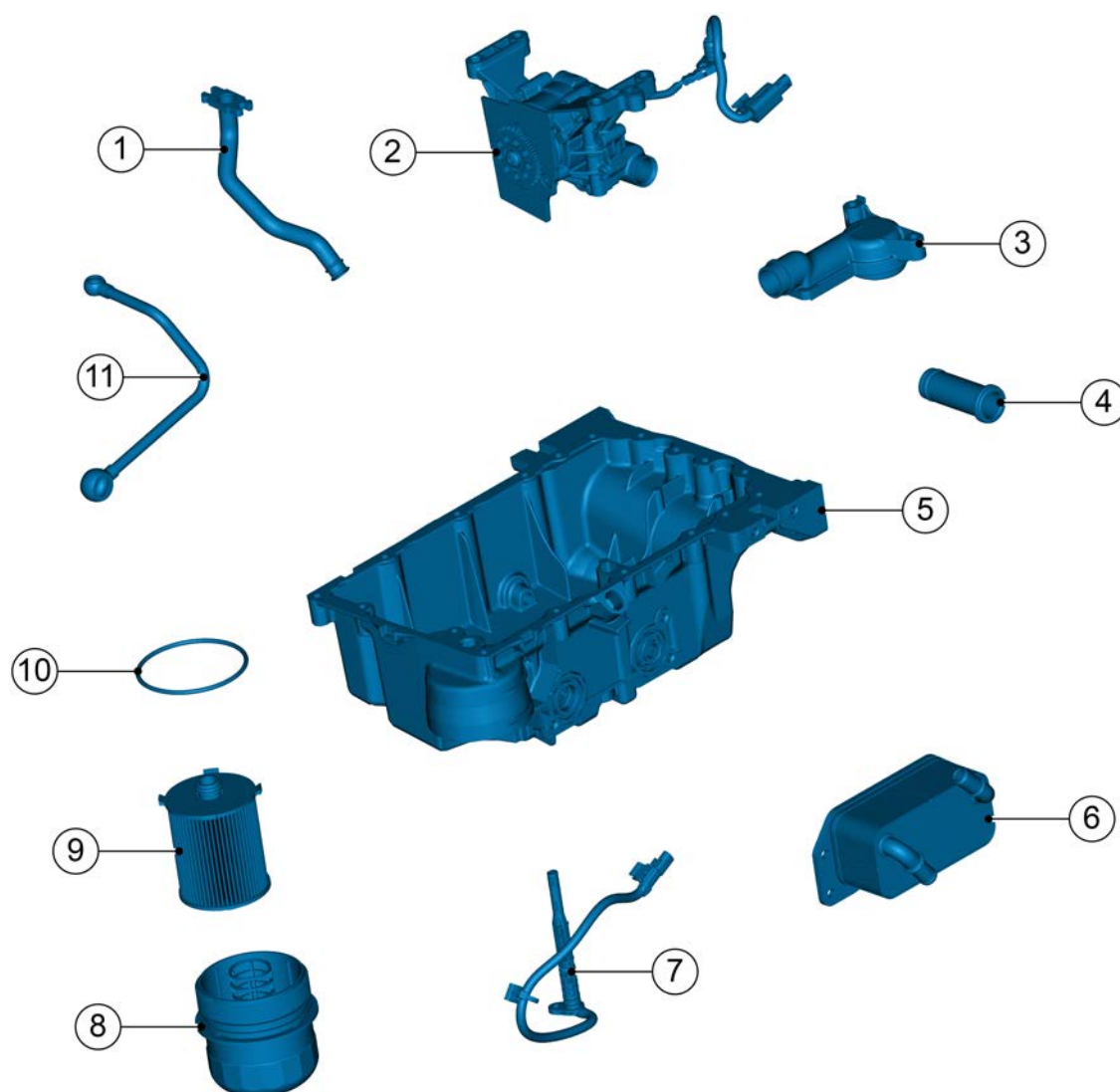
2.9.4.1 Component position



- | | | | |
|----|---------------------------------|----|----------------------------------|
| 1. | Fuel inlet pipe of turbocharger | 5. | Oil cooler |
| 2. | Engine oil suction filter | 6. | Oil filter |
| 3. | Oil pipe | 7. | Engine oil pump |
| 4. | Oil level sensor | 8. | Fuel return pipe of turbocharger |

2.9.5 Exploded view

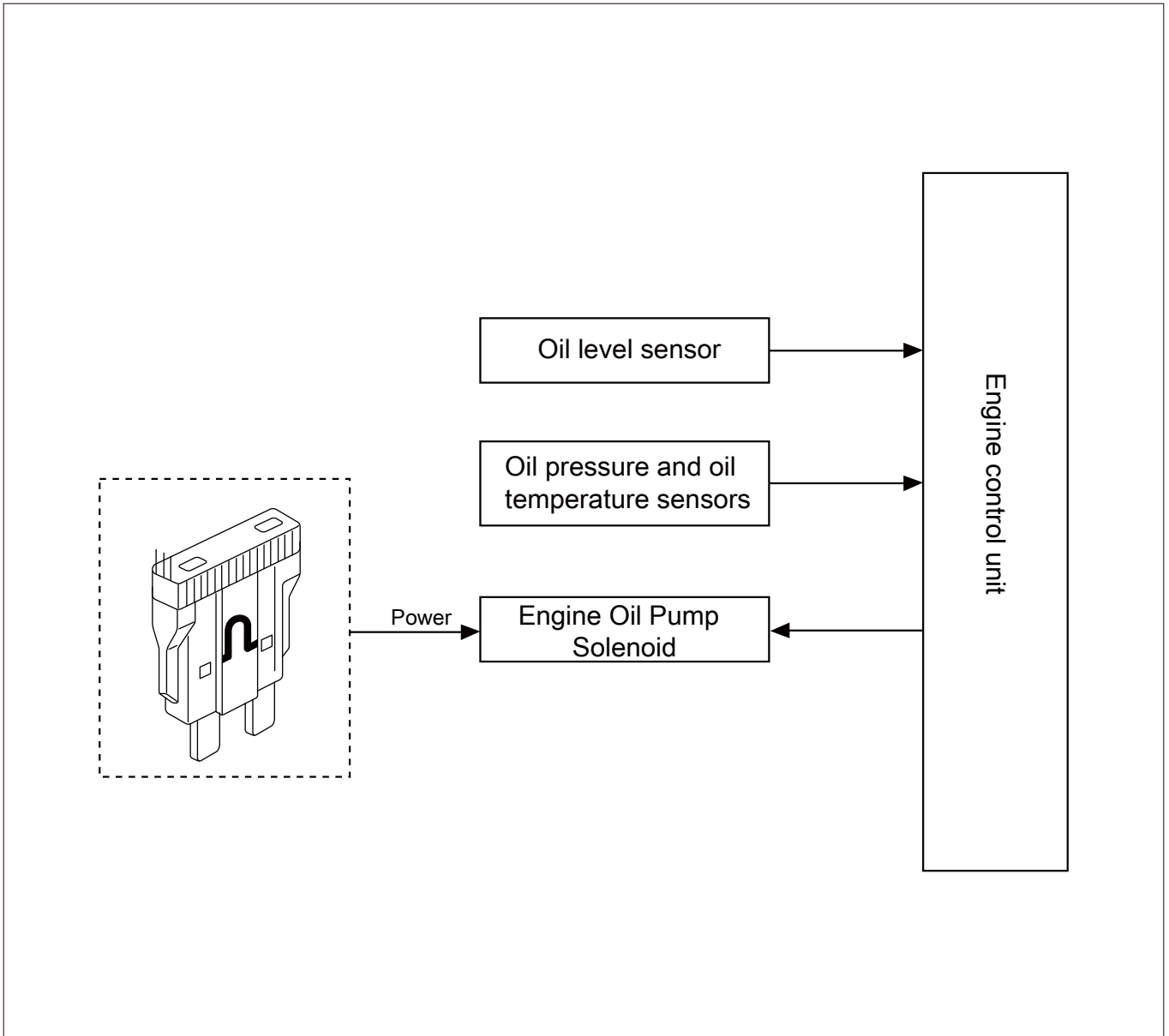
2.9.5.1 Exploded view



- | | | | |
|----|----------------------------------|-----|---------------------------------|
| 1. | Fuel return pipe of turbocharger | 7. | Oil level sensor |
| 2. | Engine oil pump | 8. | Oil filter housing |
| 3. | Engine oil suction filter | 9. | Oil filter |
| 4. | Oil pipe | 10. | Oil filter housing sealing ring |
| 5. | Oil pan | 11. | Fuel inlet pipe of turbocharger |
| 6. | Oil cooler | | |

2.9.6 Electrical schematic diagram

2.9.6.1 Electrical schematic diagram



2.9.7 Diagnostic information and procedures

2.9.7.1 Diagnosis Description

Before the diagnosis of the lubrication system fault, refer to Description and Operation and System Working Principle. Understand and be familiar with the working principle of lubrication system before starting the diagnosis. This will help to determine the correct diagnosis procedures when a fault occurs. More importantly, it can also help to confirm whether the situation described by the client is subject to normal operation. Any fault diagnosis of lubrication system should start with routine examination, and guide maintenance personnel to take the next logical step to conduct fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

2.9.7.2 Routine inspection

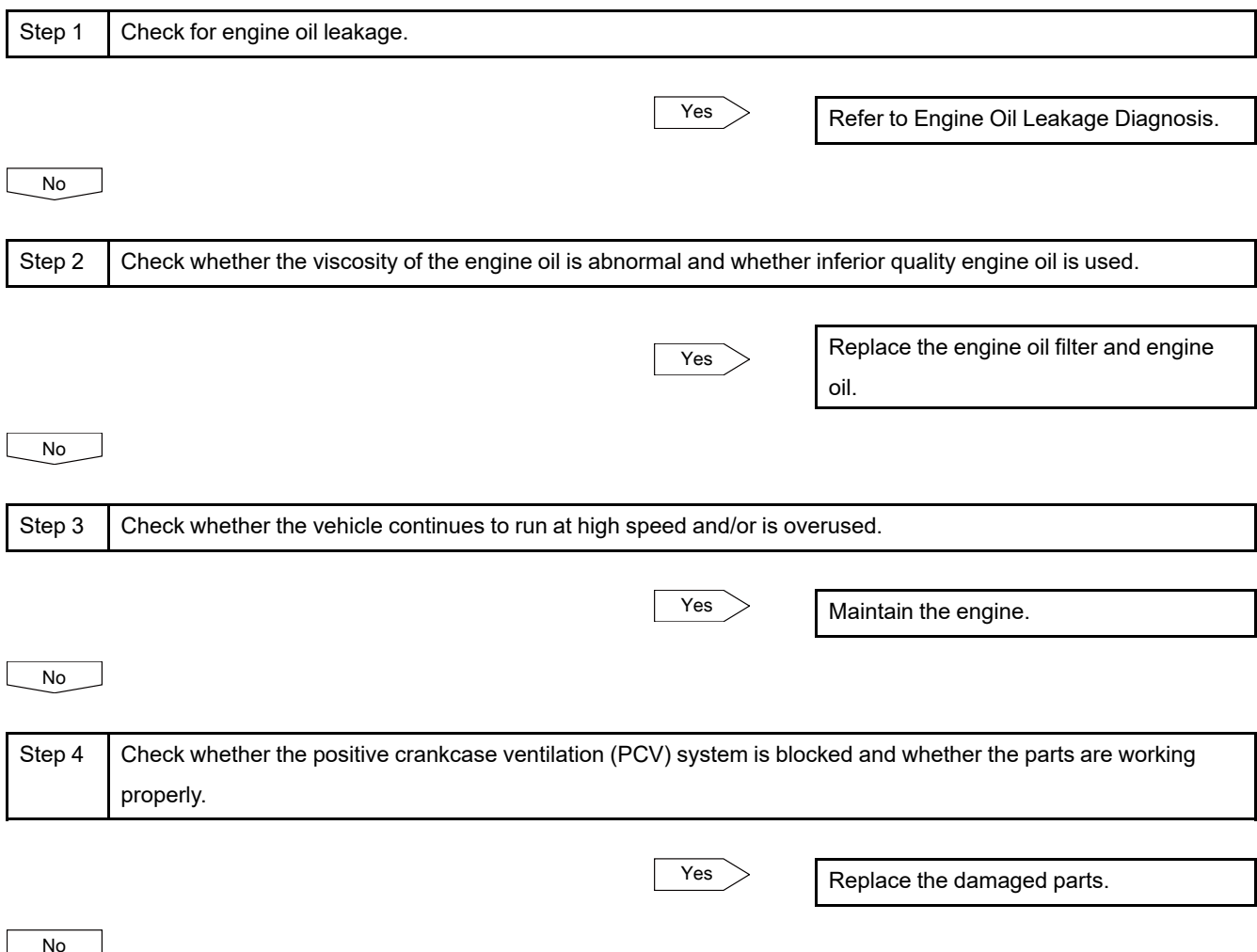
- Check after-sales installations that may affect lubrication system operation, to ensure these devices cannot affect the normal operation of the lubrication system.
- Check system components that are easily accessible or can be seen to find out if they are obviously clogged or whether there is leakage. If there is a leak, first confirm whether it is an engine oil leak.
- Check whether the oil filter is dirty or clogged and replace if necessary.

2.9.7.3 Diagnosis of Abnormal Consumption of Engine Oil

When the oil consumption amount of engine exceeds an acceptable range, a diagnosis program for abnormal consumption of engine oil must be executed.

Standard value of engine oil consumption: the normal value of engine oil consumption is 0.15L per 100L of gasoline

Diagnosis steps:



Step 5	Check valve guide pipe/or valve rod for wear, valve rod oil seal for wear, missing or improper installation.
--------	--

Yes

Repair the faulty part.

No

Step 6	Check whether the piston and piston ring are installed improperly in the cylinder.
--------	--

Yes

Repair the faulty part.

No

Step 7	Check whether the piston ring is properly sealed, whether the piston ring is broken or worn, and repair the faulty part if necessary.
--------	---

Next Step

Step 8	Confirm that the trouble is removed.
--------	--------------------------------------

2.9.7.4 Engine Oil Pressure Diagnosis and Test

Diagnosis steps:

Step 1	Check whether the viscosity of the engine oil is abnormal and whether inferior quality engine oil is used.
--------	--

Next Step

Step 2	Park the vehicle on a horizontal surface, let the engine run for a few minutes, wait for a long enough time (2-3min) to return the engine oil, and measure whether the engine oil level is too low.
--------	---

Next Step

Step 3	If necessary, add the recommended level of engine oil until the engine oil level reaches the full scale on the dipstick.
--------	--

Next Step

Step 4	Allow the engine to run for a short period of 10-15s, and confirm that the vehicle indicator does not indicate that the pressure is too low or that there is no engine oil pressure.
--------	--

Next Step

Step 5	Listen for valve system noise or knocking sound.
--------	--

Next Step

Step 6	Check for the following troubles:
--------	-----------------------------------

- A. The engine oil is foamy.
- B. The idle speed is too low.
- C. The engine oil filter is clogged.
- D. Engine oil is diluted with water or engine coolant.
- E. Check for malfunctioning oil filter bypass valves.
- F. The oil pressure indicator is incorrect or faulty.
- G. The oil pressure sensing plug is incorrect or faulty.
- H. The engine oil viscosity is not suitable for the predicted temperature.

Yes

Refer to the user manual, and use the engine oil recommended by Geely according to the local temperature.

No

Step 7 Operate the start switch to make the power mode OFF and remove the oil pressure alarm.

Next Step

Step 8 Install the engine oil pressure test tool to the oil pressure alarm base on the oil filter.

Next Step

Step 9 Start the engine and measure the engine oil pressure.

Next Step

Step 10 Compare the reading with the pressure value specified in the Oil Pump Specification. If the engine oil pressure is lower than the specified value, check whether one or more of the following conditions occur in the engine:

- A. The oil filter seat bolts are loosened.
- B. The O-ring or sealing element of the oil filter seat is missing or damaged.
- C. The oil pump is worn or dirty.
- D. The bolts connecting the oil pump to the cylinder block are loosened.
- E. The oil pump filter is loosened, clogged, or damaged.
- F. The O-ring of the engine oil filter screen is missing or damaged.
- G. The oil suction pipe of the oil pump filter screen is damaged or leaking.
- H. The oil pump pressure regulating valve is faulty.
- I. The engine oil passage plug is missing or improperly installed.
- J. The bolt of the intermediate drive shaft of the camshaft is loosened.
- K. The bearing clearances of the following components exceed the acceptable tolerance range: If necessary, repair or replace relevant parts and components.
 - 1. Connecting rod
 - 2. Crankshaft
 - 3. Camshaft
 - 4. Sprocket wheel of intermediate drive shaft of the camshaft
- L. The engine oil passages are cracked, porous, or clogged.
- M. The valve lifter is broken.

Next Step

Step 11	The test is over.
---------	-------------------

2.9.7.5 Engine Oil Leakage Diagnosis

Once an engine oil leak is detected in the vehicle, the following conditions must be checked:

Diagnosis steps:

Step 1	Check whether the engine oil level is too high.
--------	---

Yes

Drain the engine oil to the specified oil level.
--

No

Step 2	Check whether the engine oil pressure is too high.
--------	--

Yes

Check for clogged or malfunctioning oil filters or pressure bypass valves.

No

Step 3 Check for clogged or malfunctioning engine ventilation system.

Yes

Repair the faulty part.

No

Step 4 Check the fasteners for improper tightening or damage.

Yes

Replace the damaged parts and re-fasten them according to the specified torque.

No

Step 5 Check the relevant parts for cracks or porosity.

Yes

Repair the faulty part.

No

Step 6 Check whether the sealing surface is worn and whether the gasket is improperly installed or incorrectly.

Yes

Repair the faulty part.

Next Step

Step 7 Confirm that the trouble is removed.

2.9.8 Removing and installing

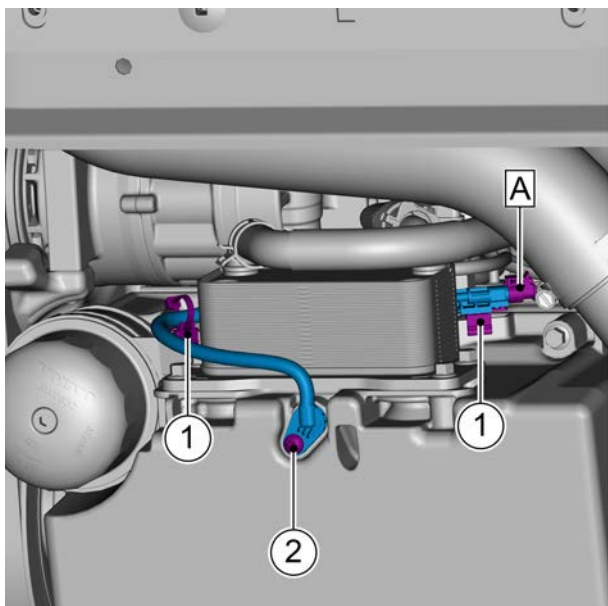
2.9.8.1 Oil level sensor replacement

Removal procedure

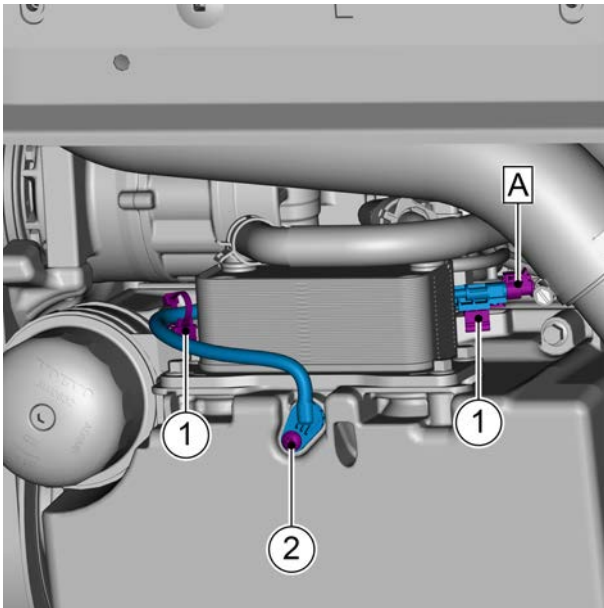
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Drain engine oil.
- 6 Disconnect the engine oil level sensor harness connector A.
- 7 Remove fixing clip 1 of oil level sensor.
- 8 Remove one fixing screw 2 of the oil level sensor and remove the oil level sensor.



Installation procedure



- 1 Install the oil level sensor. Install and tighten one fixing screw 2 of the oil level sensor.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

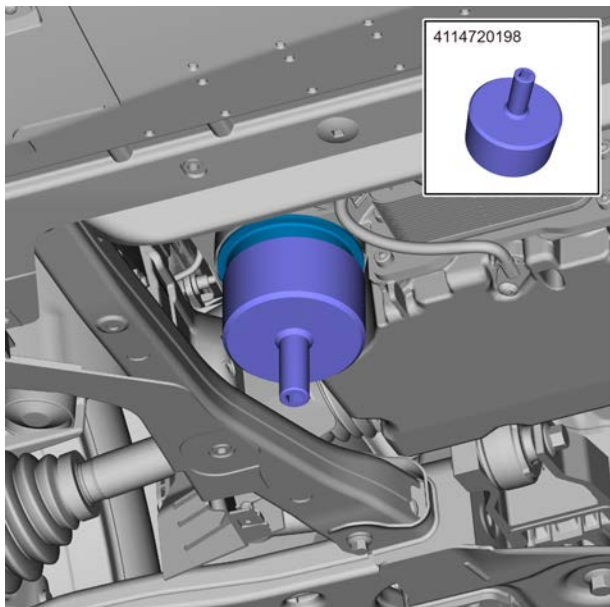
Caution

1. The installation torque is 10 ± 1.5 N·m.
 2. If the sensor has been dropped or has been severely hit, replace it with a new sensor when installation.;
 3. Before installation, check whether the sealing ring is installed in place and whether the coating on the surface of O-ring is damaged.
 4. The resistance value is less than 18Ω (the ambient temperature is 20 ± 1 °C, and the resistance value is only for reference when it is not measured at 20 °).
- 2 Install fixing clip 1 of oil level sensor.
 - 3 Connect the engine oil level sensor harness connector A.
 - 4 Fill with engine oil.
 - 5 Install the engine fender.
 - 6 Lower the vehicle.
 - 7 Connect the negative battery cable.
 - 8 Close the engine compartment cover.

2.9.8.2 Oil Filter Components Replacement

Removal procedure

- 1 Open the engine compartment cover.
- 2 Lift the vehicle, see [Lift the vehicle](#)
- 3 Remove the engine fender, see [Engine fender replacement](#).
- 4 Drain engine oil.

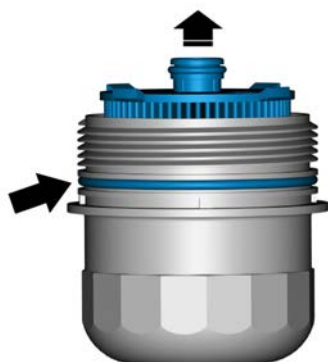


5 Use the special tool to remove the oil filter housing.

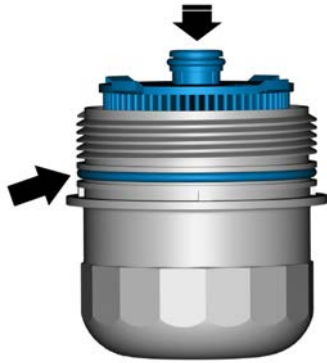
**Special tool for removal and assembly of oil filter:
4114720198**

6 Remove the oil filter.

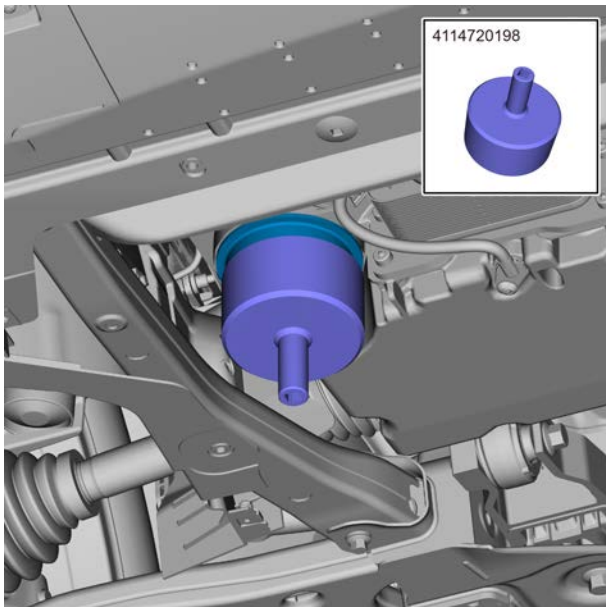
7 Remove and discard the O-ring seal.



Installation procedure



- 1 Apply a layer of clean lubrication oil to the new sealing ring and install a new sealing O ring.
- 2 Install a new oil filter into the oil filter housing.



- 3 Use the special tool to install and tighten the oil filter housing.

Special tool for removal and assembly of oil filter:

4114720198

Torque: first 27.5 N·m, reverse rotation 30 °, final 27.5

N·m (metric system) first 20.3 lb-ft, reverse rotation

30 °, final 20.3 lb-ft (Imperial System)

- 4 Fill with engine oil.
- 5 Install the engine fender.
- 6 Lower the vehicle.
- 7 Close the engine compartment cover.

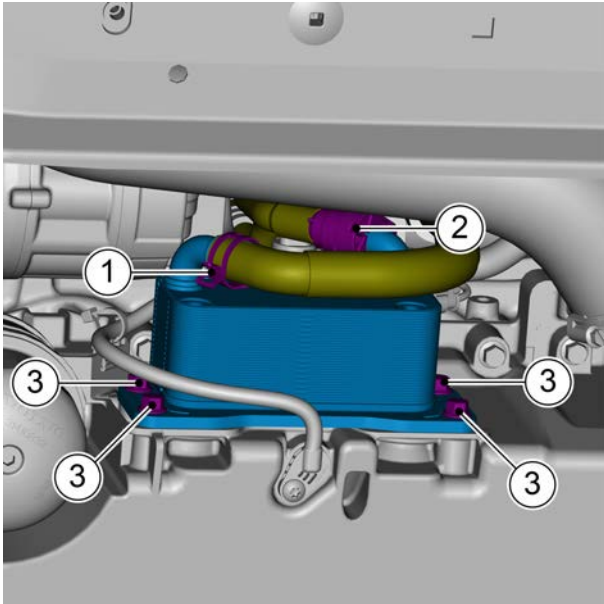
2.9.8.3 Replacement of oil cooler

Removal procedure

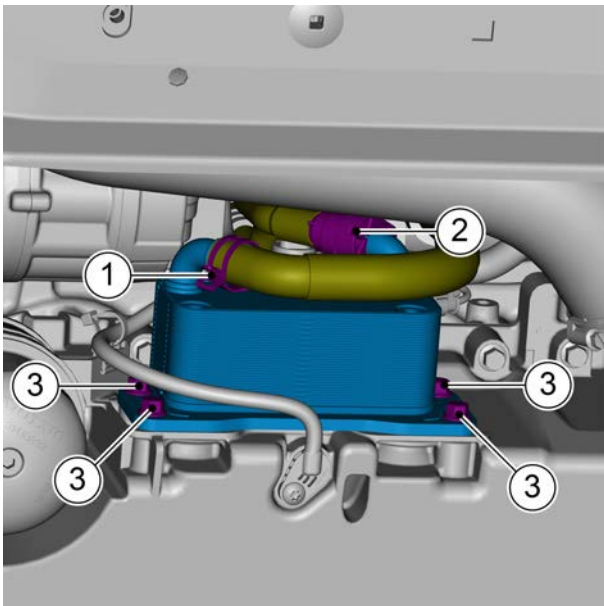
Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Lift the vehicle, see [Lift the vehicle](#)



- 3 Remove the engine fender, see [Engine fender replacement](#).
- 4 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 5 Drain engine oil.
- 6 Remove the fixing clamp of the radiator outlet pipe and disconnect the connection between the radiator outlet pipe and the oil cooler.
- 7 Remove connector 2 of inlet pipe of oil cooler.
- 8 Remove the four retaining bolts 3 of the oil cooler and remove the oil cooler and the sealing ring.



Installation procedure

- 1 Install the oil cooler, install and tighten the four retaining bolts 3 of the oil cooler in diagonal order.

Torque: 16 N. m (metric system) 11.8 lb-ft (Imperial system)

Caution

1. Before installing the oil cooler, confirm that the sealing ring is not damaged, and pre-install the sealing ring into the sealing ring groove of the oil pan.

2. The seal ring cannot be reused after removal.

- 2 Install connector 2 of inlet pipe of oil cooler.
- 3 Connect the radiator outlet pipe and the oil cooler, and install the fixing clamp of the radiator outlet pipe.
- 4 Fill with engine oil.
- 5 Fill the coolant.
- 6 Install the engine fender.
- 7 Lower the vehicle.
- 8 Close the engine compartment cover.

2.9.8.4 Replacement of oil pan

Removal procedure

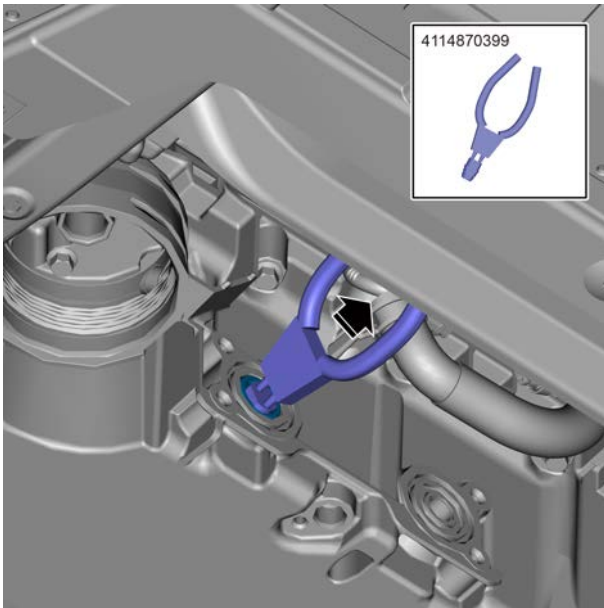
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

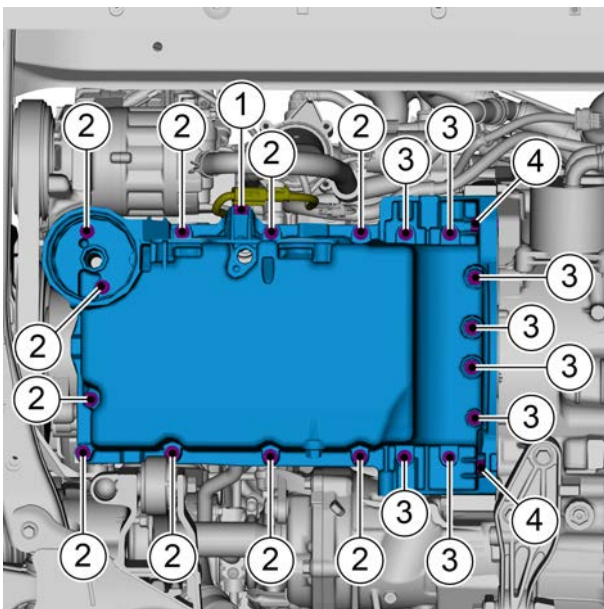
Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

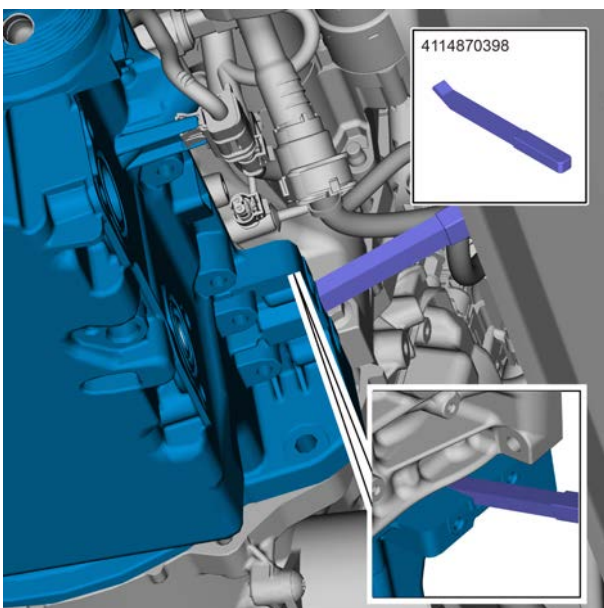
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 5 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe](#).
- 6 Lift the vehicle, see [Lift the vehicle](#)
- 7 Remove the engine fender, see [Engine fender replacement](#).
- 8 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 9 Drain engine oil.
- 10 Remove the air pressure and air temperature sensor 2, see the [Replacement of Air Pressure and Air Temperature Sensor 2](#).
- 11 Remove the intercooler outlet pipe assembly. See [intercooler outlet pipe assembly replacement](#).
- 12 Remove the intercooler intake pipe assembly. See [intercooler intake pipe assembly replacement](#).
- 13 Remove the throttle unit, see [replacement of throttle unit](#).
- 14 Remove the oil dipstick tube components, see [replacement of oil dipstick tube assembly](#).
- 15 Remove the oil cooler, see [oil cooler replacement](#).
- 16 Remove the oil level sensor, see [oil level sensor replacement](#).
- 17 Remove the oil filter components, see [oil filter components replacement](#).



- 18 Use the special tool to remove the oil pipe.
Special tool: 4114870399

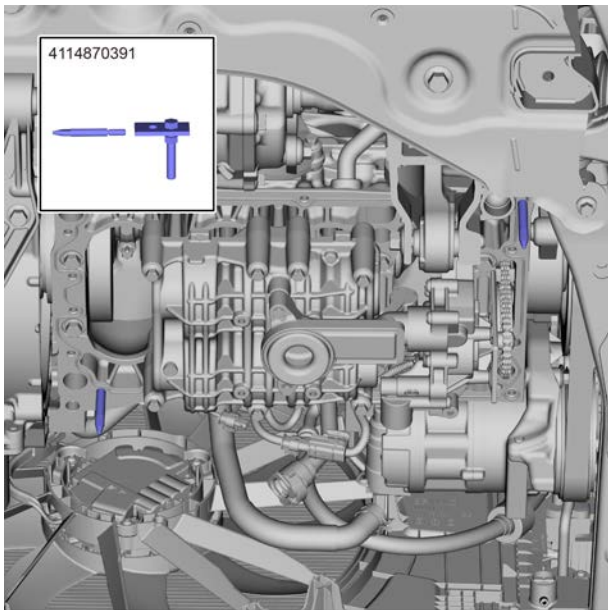


- 19 Remove fixing clip 1 of engine harness connector.
- 20 Remove 2 retaining bolts 4 connecting the oil pan and the transmission.
- 21 Remove 10 retaining bolts 2 from the oil pan.
- 22 Remove 8 retaining bolts 3 from the oil pan.



- 23 Use the special tool to separate and remove the oil pan.
Sealing surface crowbar: 4114870398

Installation procedure



- 1 Install the special tool for oil pan assembly and positioning.

Special tool for oil pan assembly, positioning and limit: 4114870391

- 2 Apply 2 ~ 3 mm flat sealing silica gel (Loctite 5970) on the mounting surface of the oil pan as shown in the figure.

Caution

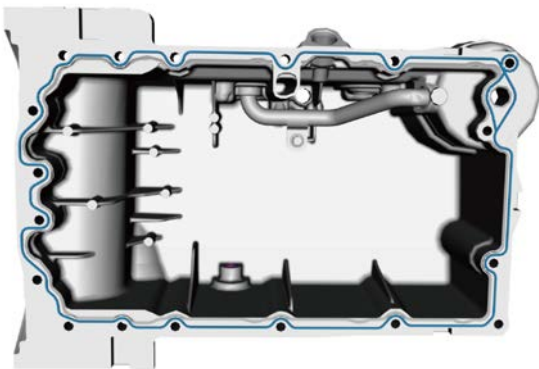
Check the sealing surface of crankcase and oil pan and wipe the surface with modified alcohol or similar cleaner to ensure that the surface is free of oil and grease.

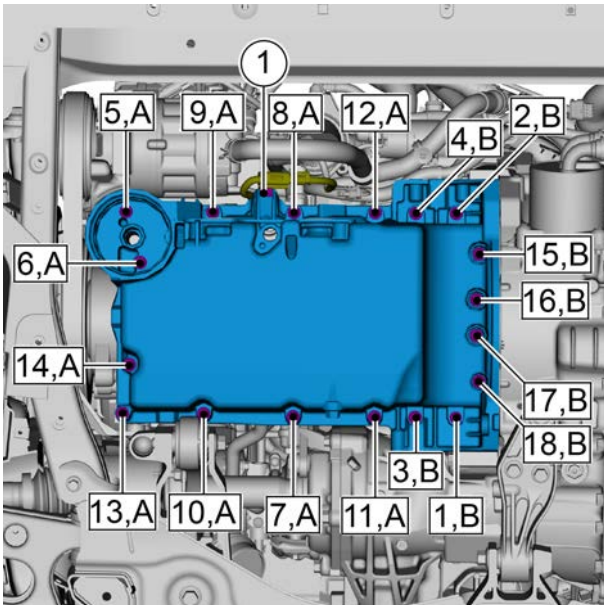
- 3 Install the oil pan on the crankcase.

Caution

The oil pan shall be assembled within 10min after gluing. If the installation time is exceeded, the glue line shall be cleaned and glued again.

When reassembling the oil pan, pay attention to ensure that the glued surface is kept clean, and check whether it is qualified with dyne pen 32.





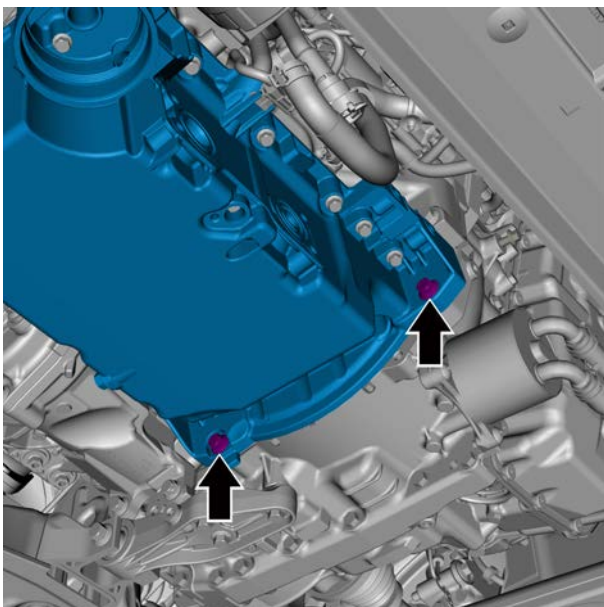
- Assemble the 18 bolts of the oil pan on the oil pan according to the position shown in the figure, and Pre-tighten them first and then tighten them according to the sequence shown in the figure.

Torque: 16 N·m (metric system) 11.8 lb-ft (imperial system)

Caution

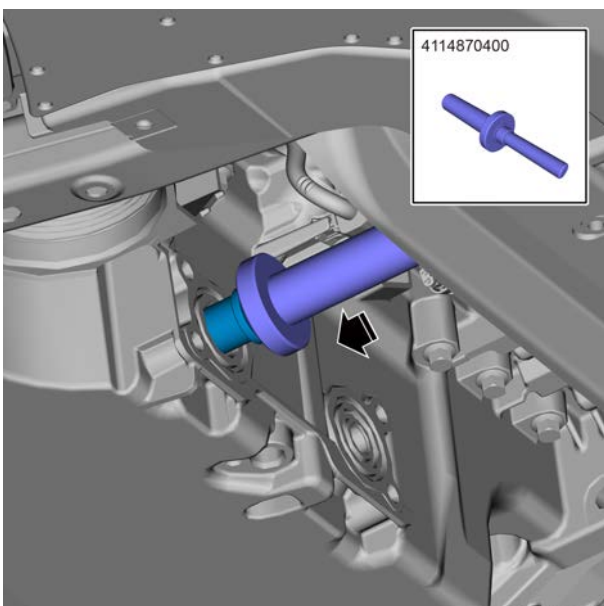
There are 10 bolts A and 8 bolts B in the figure. The positions of bolts A and B cannot be interchanged.

- Install fixing clip 1 of engine harness connector.



- Install and tighten 2 retaining bolts connecting the oil pan and the transmission.

Torque: 48 N. m (metric system) 35.4 lb-ft (Imperial system)



- Use the special tool to install the oil pipe.

Special tool for oil pipe (oil pump to oil cooler) installation: 4114870400

Caution

The oil pipe sealing ring is a disposable vulnerable part, and a new oil pipe sealing ring shall be replaced.

- 8 Install the oil filter components.
- 9 Install oil level sensor.
- 10 Install the oil cooler.
- 11 Install the oil dipstick tube components.
- 12 Install throttle unit.
- 13 Install the intercooler intake pipe assembly.
- 14 Install the intercooler outlet pipe assembly.
- 15 Install air pressure and air temperature sensor 2.
- 16 Fill with engine oil.
- 17 Fill engine coolant.
- 18 Install the engine fender.
- 19 Lower the vehicle.
- 20 Install the air inlet pipe of the air filter.
- 21 Install the air filter assembly.
- 22 Install the engine trim cover assembly.
- 23 Connect the negative battery cable.
- 24 Close the engine compartment cover.

2.9.8.5 Replacement of oil strainer components

Removal procedure

Warning !

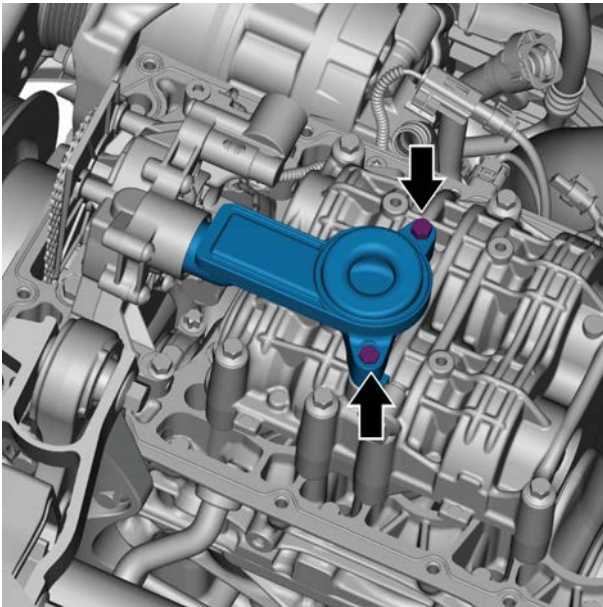
See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

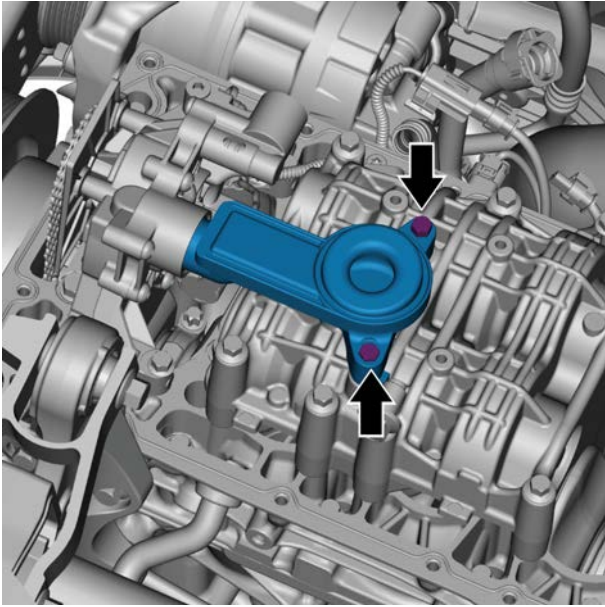
See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover.](#)
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly.](#)
- 5 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe.](#)
- 6 Lift the vehicle, see [Lift the vehicle](#)
- 7 Remove the engine fender, see [Engine fender replacement.](#)

- 8 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 9 Drain engine oil.
- 10 Remove the air pressure and air temperature sensor 2, see the [Replacement of Air Pressure and Air Temperature Sensor 2](#).
- 11 Remove the intercooler outlet pipe assembly. See [intercooler outlet pipe assembly replacement](#).
- 12 Remove the intercooler intake pipe assembly. See [intercooler intake pipe assembly replacement](#).
- 13 Remove the oil cooler, see [oil cooler replacement](#).
- 14 Remove the oil level sensor, see [oil level sensor replacement](#).
- 15 Remove the oil filter components, see [oil filter components replacement](#).
- 16 Remove the oil pan, see [oil pan replacement](#).
- 17 Remove 2 retaining bolts from the oil filter components.
- 18 Remove the oil filter components.



Installation procedure



- 1 Lubricate the seal ring or oil pump mounting hole with silicone oil.
- 2 Install the oil strainer components.

Caution

The filter collector shall not be obliquely inserted into the oil pump mounting hole to avoid damaging the sealing ring.

- 3 Install 2 retaining bolts of the oil filter components.

Torque: 16 N. m (metric system) 11.8 lb-ft (Imperial system)

- 4 Install the oil pan.
- 5 Install the oil filter components.
- 6 Install oil level sensor.
- 7 Install the oil cooler.
- 8 Install the intercooler intake pipe assembly.
- 9 Install the intercooler outlet pipe assembly.
- 10 Install air pressure and air temperature sensor 2.
- 11 Fill with engine oil.
- 12 Fill engine coolant.
- 13 Install the engine fender.
- 14 Lower the vehicle.
- 15 Install the air inlet pipe of the air filter.
- 16 Install the air filter assembly.
- 17 Install the engine trim cover assembly.
- 18 Connect the negative battery cable.
- 19 Close the engine compartment cover.

2.9.8.6 Replacement of turbocharger oil inlet pipe

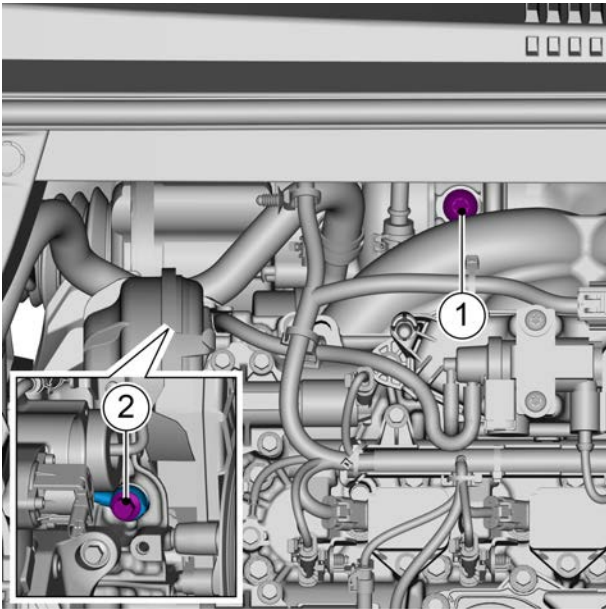
Removal procedure

Warning !

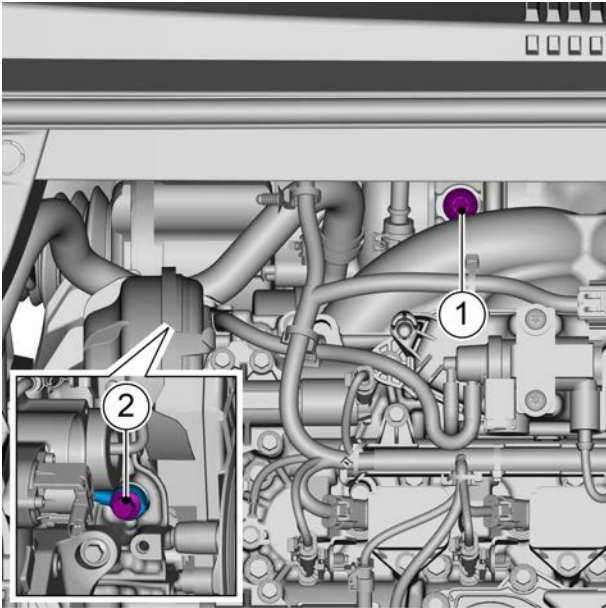
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.

- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 5 Remove the lower outlet pipe of air filter. See [replacement of lower outlet pipe of air filter](#).
- 6 Remove the turbocharger heat shield, see [turbocharger heat shield replacement](#).
- 7 Lift the vehicle, see [Lift the vehicle](#)
- 8 Remove the engine fender, see [Engine fender replacement](#).
- 9 Drain engine oil.
- 10 Remove one retaining bolt 1 connecting the turbocharger oil inlet pipe with the turbocharger.
- 11 Remove one retaining bolt 2 connecting the turbocharger oil inlet pipe to the engine, and remove the turbocharger oil inlet pipe and sealing gasket.



Installation procedure



- 1 Install the turbocharger oil inlet pipe and gasket, and install and tighten one retaining bolt 2 between the turbocharger oil inlet pipe and the engine.

Torque: 48 N. m (metric system) 35.4 lb-ft (Imperial system)

Caution

After removal, all gaskets are not allowed to be reused.

- 2 Install and tighten one retaining bolt 1 between the turbocharger oil inlet pipe and the turbocharger.

Torque: 26 N. m (metric system) 19.2 lb-ft (Imperial system)

- 3 Fill with engine oil.
- 4 Install the engine fender.
- 5 Lower the vehicle.
- 6 Install the turbocharger heat shield.
- 7 Install the lower outlet pipe of the air filter.
- 8 Install the upper outlet pipe of the air filter.
- 9 Install the engine trim cover assembly.
- 10 Connect the negative battery cable.
- 11 Close the engine compartment cover.

2.9.8.7 Replacement of turbocharger pipe-fuel return

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

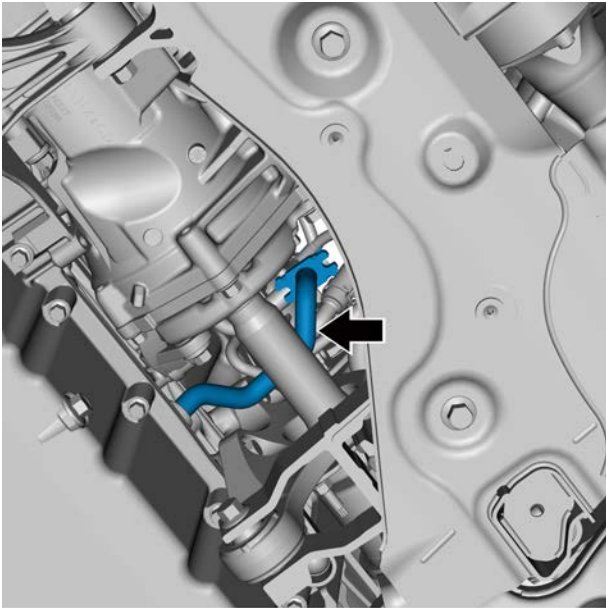
See "Warnings Regarding Exhaust System Maintenance" in "[Warnings and Precautions](#)".

Warning !

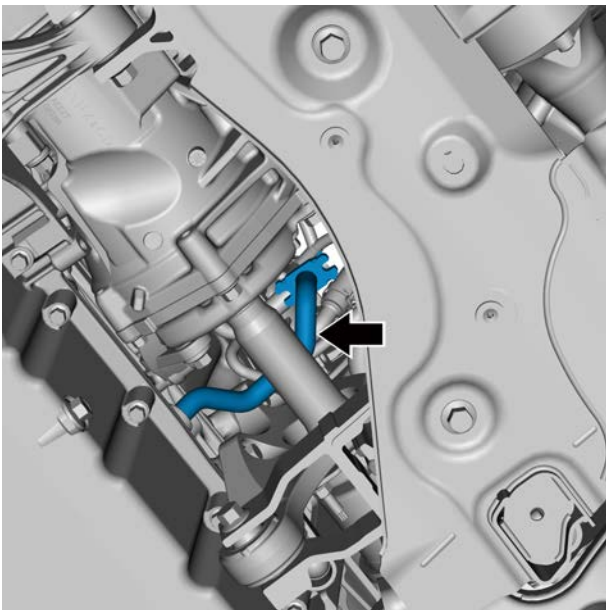
See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).

- 4 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 5 Remove the lower outlet pipe of air filter. See [replacement of lower outlet pipe of air filter](#).
- 6 Remove the turbocharger heat shield, see [turbocharger heat shield replacement](#).
- 7 Remove the vacuum chamber. See [replacement of vacuum chamber](#).
- 8 Remove the turbine control valve (wastegate). See [turbine control valve \(wastegate\) replacement](#).
- 9 Remove Lambda probe (front oxygen sensor), see [replacement of Lambda probe \(front oxygen sensor\)](#).
- 10 Remove Lambda probe (rear oxygen sensor), see [replacement of Lambda probe \(rear oxygen sensor\)](#).
- 11 Lift the vehicle, see [Lift the vehicle](#)
- 12 Remove the engine fender, see [Engine fender replacement](#).
- 13 Remove the intercooler intake pipe assembly. See [intercooler intake pipe assembly replacement](#).
- 14 Remove the rear pipe of catalytic converter. See [replacement of rear pipe of catalytic converter](#).
- 15 Remove VEP4 catalytic converter. See [replacement of VEP4 catalytic converter](#).
- 16 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 17 Remove the water pipe assembly of turbocharger. See [replacement of water pipe assembly of turbocharger](#).
- 18 Drain engine oil.
- 19 Remove the turbocharger oil inlet pipe. See [turbocharger oil inlet pipe replacement](#).



- 20 Remove the turbocharger, see [turbocharger replacement](#).
- 21 Remove the turbocharger pipe-fuel return.



Installation procedure

- 1 Install the turbocharger pipe-fuel return.

Caution

The gasket and sealing ring of the pipe-fuel return are disposable vulnerable parts, and the gasket and sealing ring of the pipe-fuel return shall be replaced with a new one.

- 2 Install the turbocharger.
- 3 Install the turbocharger oil inlet pipe.
- 4 Fill with engine oil.
- 5 Install the turbocharger water pipe assembly.
- 6 Fill engine coolant.
- 7 Install the VEP4 catalyst.
- 8 Install the rear pipe of catalytic converter.
- 9 Install the intercooler intake pipe assembly.
- 10 Install the engine fender.
- 11 Lower the vehicle.

- 12 Install Lambda probe (rear oxygen sensor).
- 13 Install Lambda probe (front oxygen sensor).
- 14 Install the turbine control valve (wastegate).
- 15 Install the vacuum chamber.
- 16 Install the turbocharger heat shield.
- 17 Install the lower outlet pipe of the air filter.
- 18 Install the upper outlet pipe of the air filter.
- 19 Install the engine trim cover assembly.
- 20 Connect the cathode cable of the battery, start the vehicle, connect the diagnostic instrument, monitor the water temperature and the speed of the electronic water pump, and observe the liquid level of the expansion tank. If the liquid level drops, add coolant in time; until the large circulation is opened, add coolant to the scribed line on the expansion tank, and tighten the lid of the expansion tank.
- 21 Close the engine compartment cover.

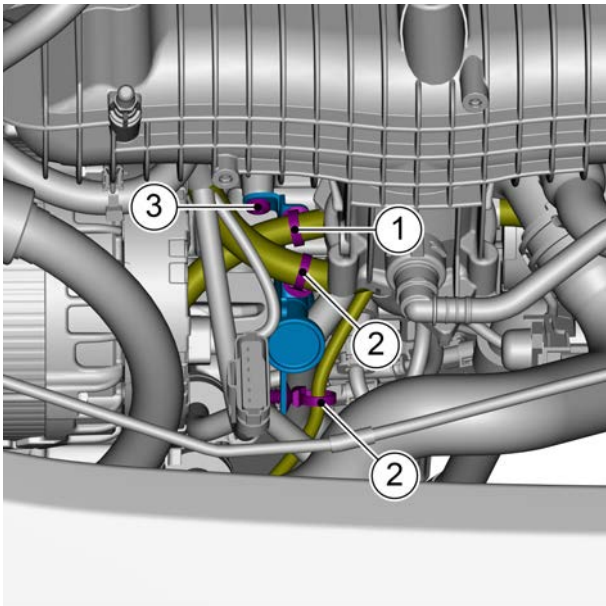
2.9.8.8 Replacement of oil dipstick component

Removal procedure

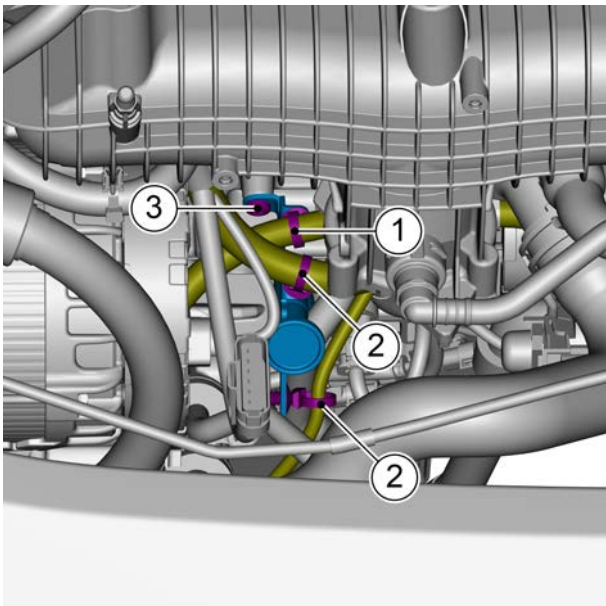
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 5 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe](#).
- 6 Lift the vehicle, see [Lift the vehicle](#)
- 7 Remove the engine fender, see [Engine fender replacement](#).
- 8 Remove the air pressure and air temperature sensor 2, see the [Replacement of Air Pressure and Air Temperature Sensor 2](#).
- 9 Remove the intercooler outlet pipe assembly. See [intercooler outlet pipe assembly replacement](#).



- 10 Remove the throttle unit, see [replacement of throttle unit \(Type I\)](#).
- 11 Drain engine oil.
- 12 Remove fixing clip 1 of starting motor harness assembly.
- 13 Remove fixing clip 2 of engine harness.
- 14 Remove one Retaining bolt 3 of the oil dipstick tube components and remove the oil dipstick tube components.



Installation procedure

- 1 Install the oil dipstick tube components, install and tighten one retaining bolt 3 of the oil dipstick tube components.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

Caution

The O-ring of the oil dipstick tube components is a disposable part, and a new O-ring of the oil dipstick tube components shall be replaced.

- 2 Install fixing clip 2 of engine harness.
- 3 Install fixing clip 1 of starting motor harness assembly.

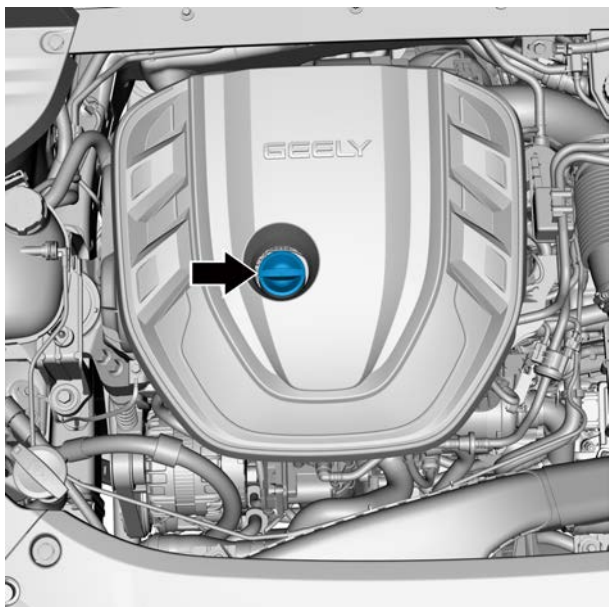
- 4 Fill with engine oil.
- 5 Install throttle unit.
- 6 Install the intercooler outlet pipe assembly.
- 7 Install air pressure and air temperature sensor 2.
- 8 Install the engine fender.
- 9 Lower the vehicle.
- 10 Install the air inlet pipe of the air filter.
- 11 Install the air filter assembly.

- 12 Install the engine trim cover assembly.
- 13 Connect the negative battery cable.
- 14 Close the engine compartment cover.

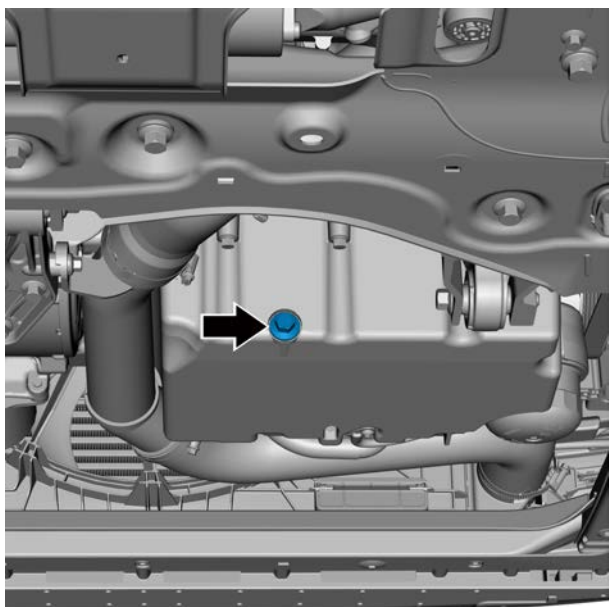
2.9.8.9 Replacement of oil drain plug

Removal procedure

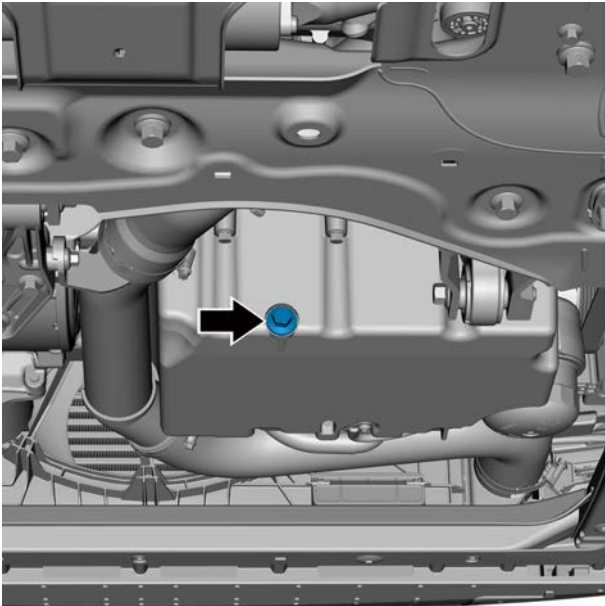
- 1 Open the engine compartment cover.
- 2 Open the oil filler cap.



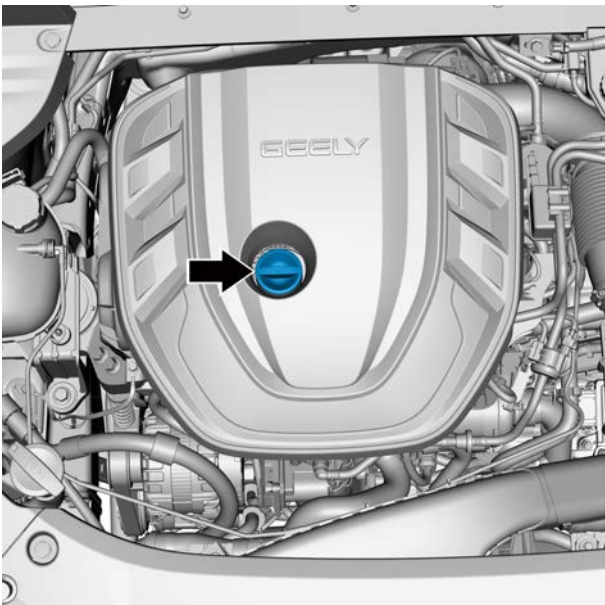
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove the oil drain plug.
- 6 Drain engine oil.



Installation procedure



- 1 Install a new oil drain plug and gasket.
Torque: 52 N. m (metric system) 38.4 lb-ft (Imperial system)



- 2 Add a certain amount of engine oil.
- 3 Tighten the Oil filling cap.

- 4 Start the vehicle to idle for 3 min., turn off the engine and wait for 10 minutes. Check the oil level from the instrument and adjust the oil level according to the display results of the instrument to make the oil level at the middle level.






Caution

The oil level check requires the vehicle to be parked in a horizontal position.

- 5 Install the engine fender.
- 6 Lower the vehicle.
- 7 Close the engine compartment cover.

2.9.9 Special tools and equipment

2.9.9.1 Special tool

Serial No.	Illustration	Tool number	Name
1		4114870398	Sealing surface crowbar
2		4114870399	Special tool for removing oil pipe (oil pump to oil cooler)
3		4114870400	Special tool for oil pipe (oil pump to oil cooler) installation
4		4114870391	Special tools for oil pan assembly, positioning and limit
5		4114720198	Special tool for removal and assembly of oil filter

2.10 Ignition system JLH-4G20TD

2.10.1 Specification

2.10.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Engine harness assembly grounding retaining bolt	M6×12	8.5~11.5	6.3~8.5
Ignition coil retaining bolt	M6×25	8.5~11.5	6.3~8.5
Sparking plug	M12×1.25	20~25	14.8~18.4

2.10.1.2 Specifications of Ignition System

Application	Specification
Ignition sequence	1-3-4-2
Ignition type	Independent ignition
Sparking plug manufacturer	Denso

2.10.1.3 Ignition Coil Specification

Item	Specification
Rated working voltage	14V
Allowable working voltage	(6- 16) V
Operating temperature	-40±130°C

2.10.2 Instructions and operations

2.10.2.1 Instructions and Operations

Sparking plug

The sparking plug is installed under the ignition coil unit. The sparking plug is mainly used to ignite the oil-gas mixture in the combustion chamber. The sparking plug is connected with the ignition coil unit, which generates high voltage. Thus, electric sparks are generated between the anode electrode and the cathode electrode of the sparking plug. The ignition timing is controlled by the Engine Control Module (ECM).

Ignition coil unit

The ignition coil unit is installed on the top of 4G20TD engine. The ignition coil unit supplies high voltage to the sparking plug. The ignition coil unit has an integrated voltage amplifier. The Engine Control Module (ECM) controls the ignition coil unit to ensure that the sparking plug produces a spark at the correct time. The ignition coil unit is directly connected to the Engine Control Module and the sparking plug.

A single cylinder independent ignition system is used in the engine to transmit the ignition voltage directly from the ignition coil to the spark plug. Main components of the ignition system includes: ECM, integrated ignition coil, spark plug, speed sensor, camshaft phase sensor, knock sensor and so on. The independent ignition method is also called direct ignition method and an independent ignition coil is set in each cylinder for ignition. When the sensor sends the ignition position before the top dead center of a cylinder to the engine control module (ECM), the ECM triggers the ignition coil of this cylinder to start ignition. Due to the use of a single cylinder independent ignition system, ECM can control the optimal ignition timing according to various engine loads, so that the output power, acceleration, economy and exhaust emissions of the engine can reach the optimal status, and the voltage of the ignition system will not decrease with the increase of the speed. Since there is no mechanical component, there is no mechanical error (fault).

Caution

The ignition coil component cannot be repaired and must be replaced as an assembly.

2.10.3 System working principles

2.10.3.1 System Working Principles

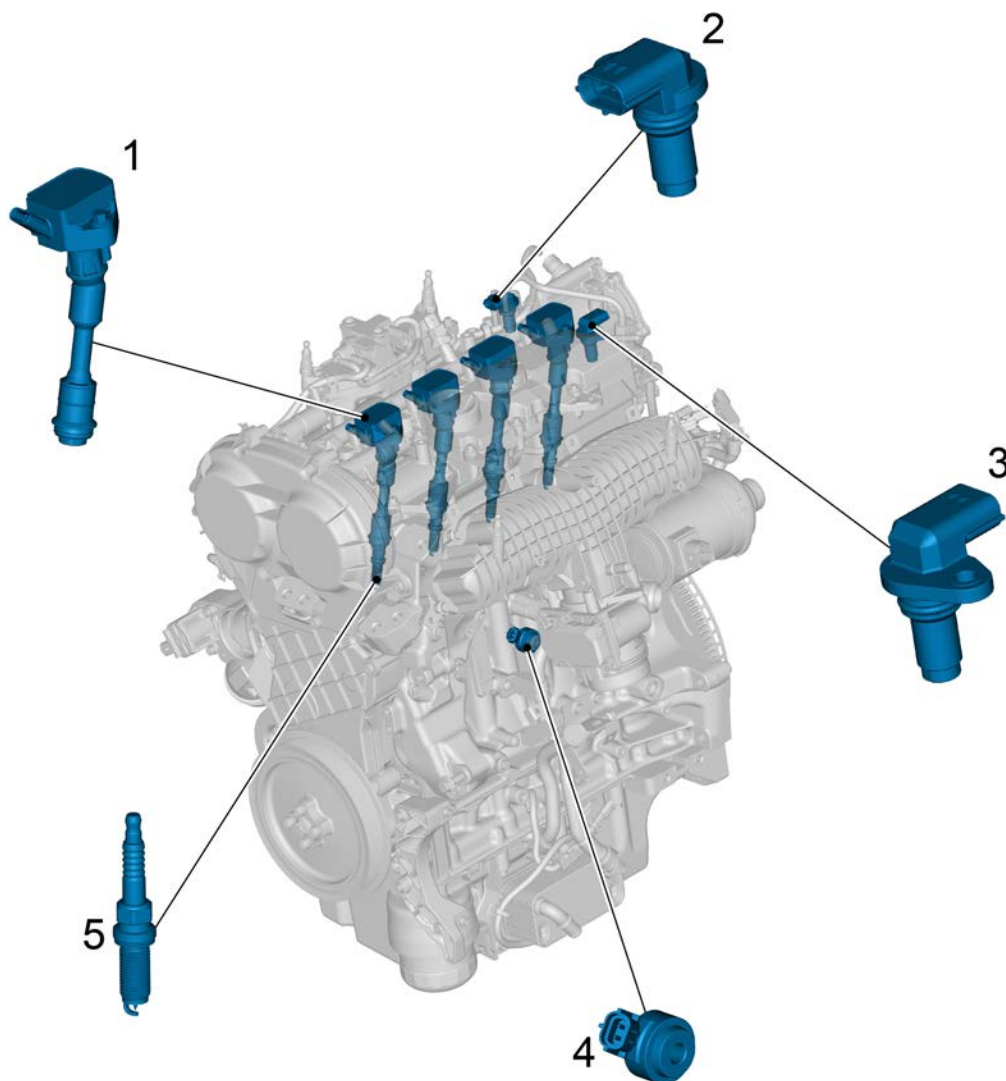
When the start switch is turned to the "ON" state, the start switch outputs the start signal to CEM, and the start signal is transmitted to ECM through CEM. Terminal A6 of ECM harness connector 4/46 controls the operation of ER04 main relay, and then the battery voltage reaches the ignition coil through ER04 main relay and EF71 fuse to provide working power for the ignition coil. The speed sensor is a Hall-type one. When the engine runs, the crankshaft position sensor signal panel also starts to rotate, thus the speed sensor also generates a corresponding alternating signal, which is sent to ECM. ECM calculates the current crankshaft angle according to the signal to determine the benchmark where the piston reaches the top dead center, which directly affects the accuracy of ignition advance angle control. So the sensor signal is a vital input signal in the ignition system. When ECM cannot receive this signal, the ignition system cannot work. ECM harness connector ED01K terminal 6 receives the signal input from the speed sensor, calculates the ignition advance angle, and then controls the ignition of each cylinder through ECM harness connector 4/46 terminals B12, B13, B14 and B15.

Caution

When the vehicle body anti-theft alarm system and engine anti-theft locking system are activated, ECM is prohibited to control the ignition coil, and the ignition system does not work at this time.

2.10.4 Component position

2.10.4.1 Component position

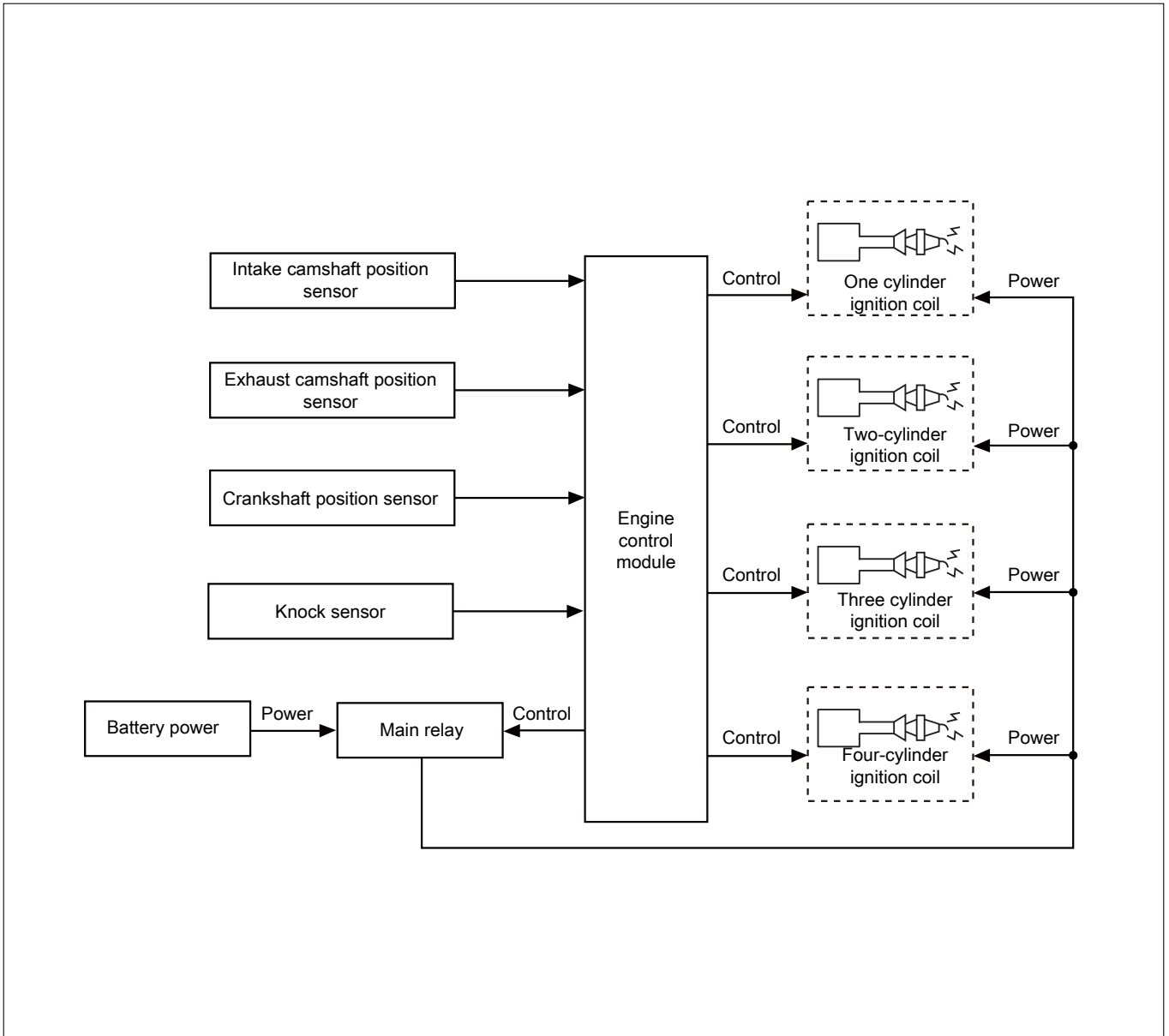


1. Ignition coil
2. Exhaust CMP sensor
3. Intake CMP sensor

4. Knock sensor
5. Sparking plug

2.10.5 Electrical schematic diagram

2.10.5.1 Electrical schematic diagram



2.10.6 Diagnostic information and procedures

2.10.6.1 Diagnosis Description

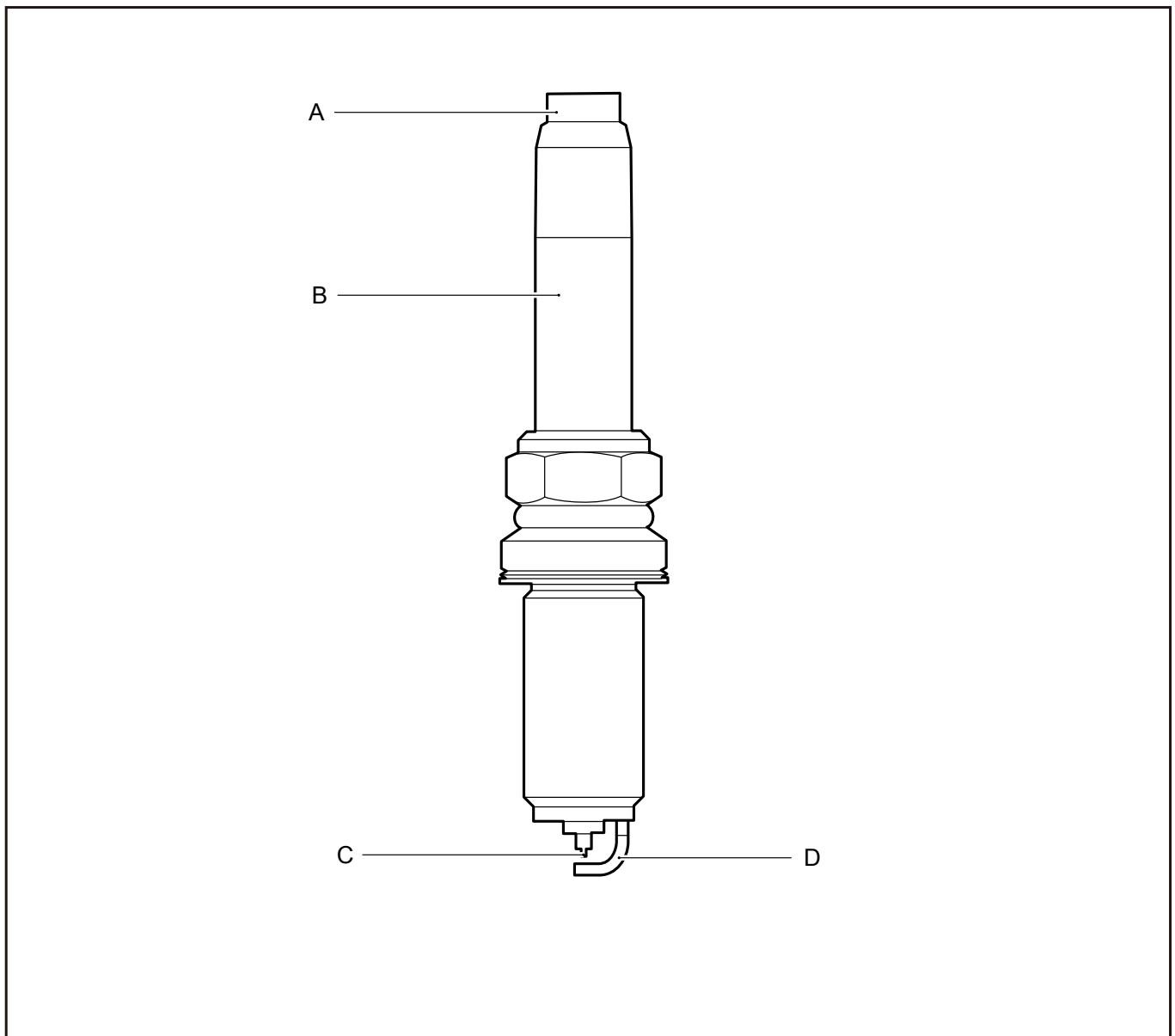
Before the diagnosis of the ignition system fault Refer to Description and Operation and System Working Principle. Understand and be familiar with working principles of ignition system before starting system diagnosis. This helps to determine the correct fault diagnosis steps when a fault occurs. More importantly, it also helps to determine whether the situation described by the customer is normal operation. Any fault diagnosis of the ignition system should start with visually inspection. The routine inspection will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

2.10.6.2 Routine inspection

- Check after-sale installations that may affect the operation of the ignition system to ensure that they do not affect the operation of the ignition system.
- Check system components that are easily accessible or can be seen to find out if they are obviously clogged or whether there is leakage. If there is a leak, first confirm whether it is an engine oil leak.

2.10.6.3 Sparking Plug Check and Diagnosis

Electrical schematic diagram:



- | | |
|------------------|----------------------|
| A. Extension rod | C. Central electrode |
| B. Insulator | D. Side electrode |

Diagnosis steps:

Step 1	Dismount the sparking plug. Refer to the Replacement of Sparking Plug.
--------	--

Next Step

Step 2	Check whether the terminal A is bent or broken, and test whether the terminal A is loosened by twisting and pulling it.
--------	---

Yes

Step 3	Check whether the insulator B flashes over or there are signs of leakage, which is caused by the discharge between the two ends of the insulator B between the terminal A and the grounding point.
--------	--

Check for the following troubles:

- A. –Check the ignition coil for damage.
- B. Check whether the sparking plug slot of the cylinder head is wet, and there must be no engine oil, engine coolant or water. After the sparking plug sleeve is completely damp, it will cause arc discharge.

Next Step

Step 4	Check whether the insulator B is cracked, otherwise it will cause discharge.
--------	--

Next Step

Step 5	Check the central electrode C for signs of abnormal discharge, and measure the gap between the central electrode and side electrode.
--------	--

- A. Check whether the spark plug torque is correct. The tightening torque of the spark plug is $22.5 \pm 25 \text{Nm}$ ($16.6 \pm 1.8 \text{lbft}$). If the torque is insufficient, the sparking plug will not work properly. Excessive tightening torque may cause the insulator B to crack.
- B. Check the insulator tip, not the central electrode C, for signs of leakage of electricity.
- C. Check whether the side electrode D is broken or worn.
- D. Check whether the central electrode C is broken, worn, or loosened by shaking the spark plug. If a click sound is heard, it means that the inside is damaged. If the central electrode C is loosened, it will reduce the spark intensity.
- E. Check whether there is a bridge short circuit between electrodes C and D. The deposits on electrode C will reduce or even eliminate the gap between them.

Caution

- 1. Standard clearance between the sparking plug C and D: 0.6 ~ 0.7mm
- 2. Limit clearance between the sparking plug C and D: 0.88mm

- F. Check whether the electrode is too dirty.

Next Step

Step 6	Check the sparking plug installing of the cylinder head for debris, otherwise the sparking plug may be damaged during installation.
--------	---

2.10.6.4 Common Troubles of Sparking Plugs in Use

The sparking plug is severely ablated: Scarring, damage or electrode melting or ablation on the top of the sparking plug indicate that the sparking plug has been damaged and should be replaced. When replacing, you should check the symptoms of ablation and the color change to analyze the cause of the trouble. Refer to the Replacement of Sparking Plug.

1. The electrode melts and the insulator is white, indicating that the temperature in the combustion chamber is too high. The reasons may be exhaust valve overheating or poor operation of cooling devices caused by excessive carbon deposits in the combustion chamber and oversize valve clearance, or because the sparking plug is not tightened to the specified torque.
2. The rounded electrodes and scars on the insulator indicate preignition of the engine, which may be due to premature ignition time or low gasoline octane value and high calorific value of the sparking plug.
3. The top of the insulator is cracked. Knocking combustion is the main reason for insulator rupture, and premature ignition time, low gasoline octane value, and high temperature in the combustion chamber may all cause knocking combustion in the engine.
4. There are gray-black stripes on the top of the insulator. These stripes indicate that the sparking plug has leaked gas and should be replaced with a new one.

There are deposits on the sparking plug: sometimes there are deposits between the top of the sparking plug insulator and the electrode, which can cause the engine to not work in severe cases. If the sparking plug is cleaned, it can be temporarily rectified.

In order to maintain good performance, the cause of the trouble must be identified.

Oily deposits. Oily deposits on the sparking plug indicate that the lubricant has entered the combustion chamber. If it is just an individual sparking plug, the oil seal of the valve stem may be damaged. If sparking plugs in all cylinders are stuck by such

deposits, it indicates oil blow-by of the cylinders, and it is necessary to check whether the air filter and the ventilation device are blocked.

Black deposits. Black deposits on the sparking plug electrode and inside of it indicate that the gas mixture is too rich, which can increase the speed of the engine and last a few minutes during which the black soot layer left on the electrode can be burnt off.

1. The central electrode of the sparking plug that burns fuel normally is gray or yellow.
2. The central electrode of the sparking plug that burns fuel excessively is severely eroded.
3. The sparking plug's calorific value is incorrect or the symptom is caused by the engine fuel system trouble. The central electrode of the sparking plug and the neutral insulating magnet have very serious carbon deposition.

2.10.7 Removing and installing

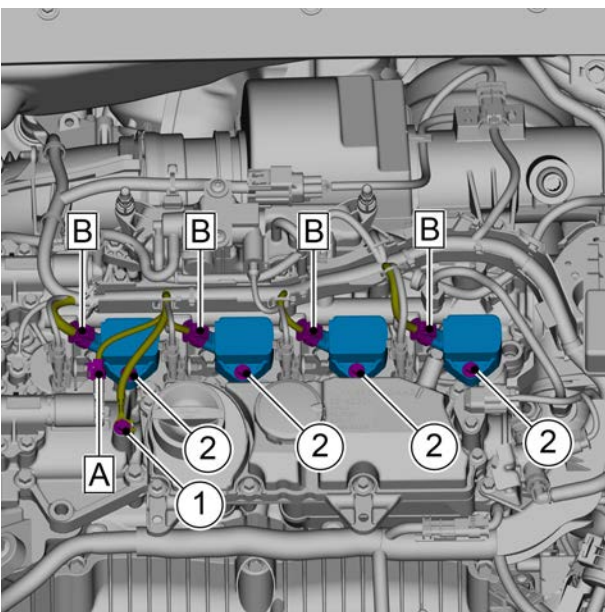
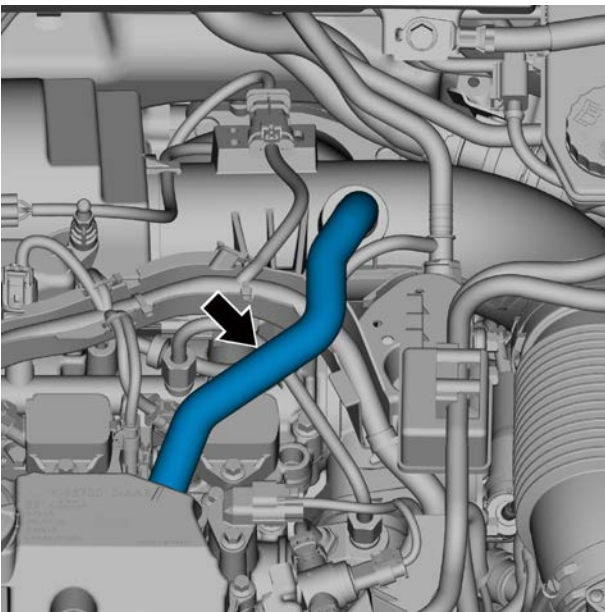
2.10.7.1 Replace ignition coil unit

Removal procedure

Warning !

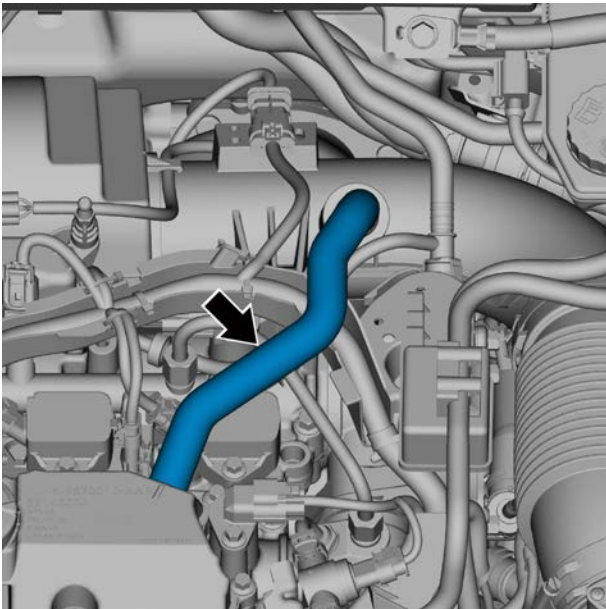
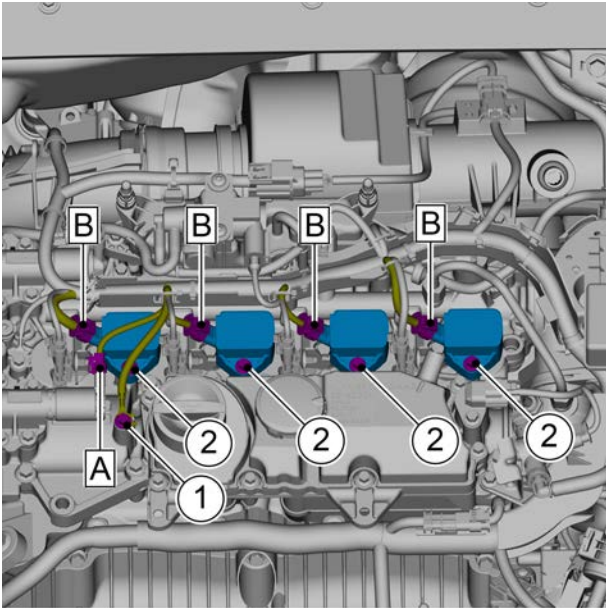
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the crankcase ventilation hose.



- 5 Remove one retaining bolt 1 of the engine harness assembly grounding.
- 6 Disconnect VVT solenoid (intake) harness connector A.
- 7 Disconnect ignition coil unit harness connector B.
- 8 Remove the four retaining bolts 2 of the ignition coil unit and remove the ignition coil unit.

Installation procedure



- 1 Install the ignition coil unit, install and tighten the four retaining bolts 2 of the ignition coil unit.

Torque: 10 N·m (metric system) 7.4 lb-ft (imperial system)

Caution

Ensure that the ignition coil unit is accurately installed on the sparking plug.

- 2 Connect ignition coil unit harness connector B.
- 3 Connect the intake side oil control valve harness connector A.
- 4 Install one retaining bolt 1 of engine harness assembly grounding.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 5 Install the crankcase ventilation hose.

- 6 Install the engine trim cover assembly.
- 7 Connect the negative battery cable.
- 8 Close the engine compartment cover.

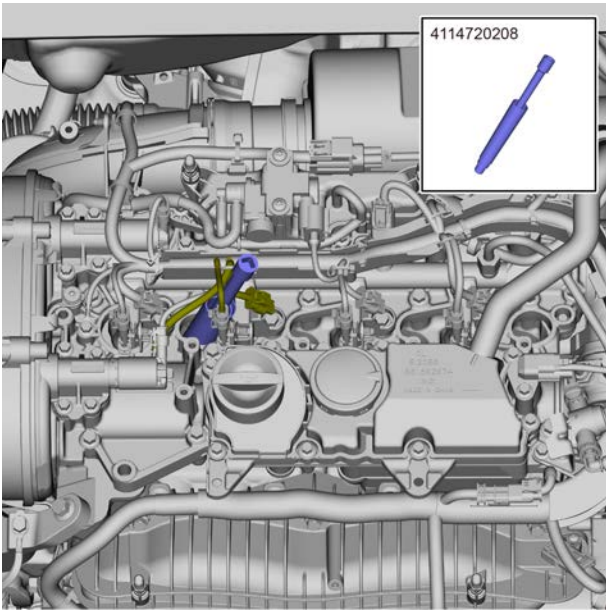
2.10.7.2 Replacement of Sparking Plug

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)



- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the ignition coil unit. See [replacement of ignition coil unit](#).

- 5 Remove the spark plug with special tool.

Special tool for removal and assembly of sparking plug: 4114720208

Caution

Insert the sleeve with shrapnel to the spark plug hole along with the guiding auxiliary tool, slightly press down, rotate and install the sleeve, and fully cover the sleeve into the hexagonal face of the spark plug while holding the end of the extension rod. It is needed to avoid damage to the spark plug due to extension rod inclination.

The spark plug, the sleeve, and the extension rod must be coaxial during the removal.

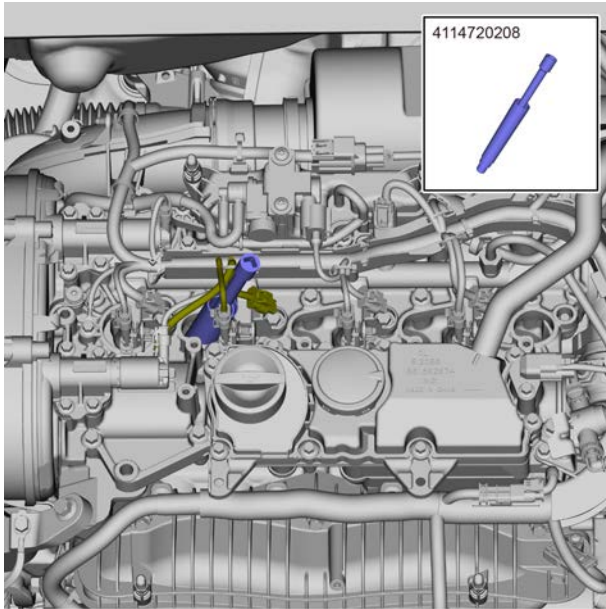
- 6 Remove the sparking plug from the cylinder cover.

Caution

The spark plug is a quick-wear part that must not fall off or touch hard object surfaces. After falling off or collision, isolation is required and it cannot be used.

Be sure to remove the spark plug at a low temperature.

Installation procedure



Caution

Spark plug electrode clearance should be detected before assembling the spark plug.

Clearance value: 0.6mm-0.7mm (metric system)
0.0236in-0.0276in (imperial system)

- 1 Use the special tool to install the sparking plug.

Special tool for removal and assembly of sparking plug: 4114720208

Caution

Insert the spark plug to the sleeve with shrapnel and install the spark plug in the cylinder cover hole along with the guiding auxiliary tool. During the tightening process, keep coaxial of the extension rod connecting the sleeve and the spark plug to avoid lateral force on the spark plug.

Torque: 22.5 N. m (metric system) 16.6 lb-ft (Imperial system)


Caution

The axis of the spark plug mounting hole has an angle of 17.65° with the cylinder hole. When tightening, avoid the spark plug to be subject to lateral force.

- 2 Install the ignition coil unit.
- 3 Install the engine trim cover assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

2.10.8 Special tools and equipment

2.10.8.1 Special tool

Serial No.	Illustration	Tool number	Name
1		4114720208	Special tool for removal and assembly of sparking plug

2.11 Start the charging system JLH-4G20TD

2.11.1 Specification

2.11.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Front compartment harness assembly retaining bolt	M6×25	8.5~11.5	6.3~8.5
Battery monitoring sensor	-	5.5	4.1
Battery anode cable	-	5.5	4.1
Battery negative cable fixing nut	M8×8	20~28	14.8~20.7
retaining bolt of battery fixing platen assembly	M6×25×28.02	9	6.6
Engine harness fixing nut	M6×6	8.5~11.5	6.3~8.5
Battery bracket assembly retaining bolt	M6×35	11~15	8.1~11.1
	M8×40	20~28	14.8~20.7
Alternator and starter harness fixing nut	-	13~17	9.6~12.5
Alternator retaining bolts	M10×80	41~55	30.2~40.6
Starter retaining bolt	M8×M10×71.65	41~55	30.2~40.6
	M10×45	41~55	30.2~40.6
	M6×20	11~15	8.1~11.1
Fixing nut of starter and starter harness	M7×20	11~15	8.1~11.1
Fixing nut of starter and engine harness	-	5~7	3.7~5.2
retaining bolts of starting motor harness assembly	M6×25	8.5~11.5	6.3~8.5
Fixing nut of starting motor harness assembly	M8×8	20~28	14.8~20.7
retaining bolts of starting motor harness assembly	M8×20	20~28	14.8~20.7

2.11.1.2 General Specification

Starter specifications

Starter specifications	
Rated voltage	12V
Rated power	1.5 kw

Alternator Specifications

Alternator Specifications	
Maximum output current	215A
Model	EL8Q

2.11.2 Instructions and operations

2.11.2.1 Instructions and Operation of the Battery

The vehicle adopts maintenance-free batteries. Compared with the traditional battery, there are no vent plugs on the battery cover, the battery is completely sealed except for the small vents on both sides of the battery. The small amount of gas generated by the battery can be discharged through the vent holes. A small amount of gas will be generated when the electrolyte in the battery undergoes a chemical reaction. If no vent hole is provided, the pressure inside the battery will continue to increase as the gas amount increases. After the body bears the limit, the housing will break. Compared with conventional batteries, this battery has the following advantages:

- No water needs to be added during the service life of the battery.
- Overcharge protection.
- The risk of electricity leakage is much less than that of conventional batteries.
- The weight and volume are smaller and the capacity is larger.

In the entire electrical system, the battery has three main functions:

- Provide engine starting energy when the vehicle starts.
- Play the role of an electrical system voltage regulator.
- When energy generated by generators cannot meet the needs of the electrical system, the battery can provide electricity within a certain time.

2.11.2.2 Instructions and Operation of the Starting System

The start system mainly consists of battery, start and stop button, CEM, ECM, starter, start relay and related circuits, all of which are connected by wires. When the start button is operated to turn the power supply mode to “ST” state, the start relay is closed. The power is supplied to the magnetic switch of the starter, and the starter runs. For specific control principles, refer to ► Start system working principle ◀.

2.11.2.3 Instructions and Operation of the Starting System

The charging system mainly consists of a battery, an alternator, ECM and related lines. The alternator consists of a voltage regulator, a rectifier, a stator, and a rotor, all of which are installed inside the alternator. When the engine runs, it drives the alternator to rotate through the drive belt, and the

alternating current generated by it is converted into direct current through the diode rectification and sent to the charging system. The voltage regulator automatically adjusts the magnetic field current of the alternator to control the voltage output to keep it within a suitable charging range. Refer to ► charging system working principles ◀ for specific working principles.

Charging procedure:

1. 1. When charging the sealed battery removed from the vehicle, the adaptive joint tool unit should be installed. Make sure all charger wires are clean and firm. For best results, charge the battery when the electrolyte and polar plate are at room temperature. If the battery temperature is too low, the battery cannot be charged within a few hours after starting the charger.
2. Charge the battery until the charger indicates that the battery is fully charged or the detected battery voltage is close to full charging. The battery should be checked every half hour of charging.
3. Test the battery load after charging. See [the working principle of charging system](#). Battery Discharge Current and Parasitic Loading Test Charging the battery completely discharged: The following procedures must be strictly followed, otherwise a perfect battery may be replaced by mistake.

The fully discharged battery must be charged according to the following procedure:

1. Use an accurate voltmeter to measure the voltages at the battery terminals. If the reading is less than 10V, the charging current will be very low, and only a few mA current can be charged into the battery after a certain period of time.
2. Set the battery charger to a higher value.
3. Continue to charge the battery and charge more than 4h at a voltage below 16V:
 - If there is still no charging current when the above time is reached, the battery should be replaced.
 - If the charging current is detected within the charging time, the battery is intact and can continue to be charged to a perfect state.

2.11.3 System working principles

2.11.3.1 Working Principles of Starting System.

Operate the starting switch to place the power in mode ST:

CEM will send low-frequency signal to check whether the key is available. If the key is available, the key will send RF response. When CEM receives the response and correct authentication results, CEM will check whether the starting conditions are met. If yes, CEM will authenticate with ECM. If all conditions are met, ECM will control start relay ER18 to work. From the output power of the starting relay to the B1 terminal input of the starting motor harness connector 6 / 25.

– The electromagnetic switch of the start motor is turned off after being energized, to provide a closed-loop circuit between the battery and the start motor. The start motor is grounded through the engine cylinder block. When two conditions for power supply and grounding are met, start motor runs and the engine starts.

Working principle of start motor: The motor is a DC reducer motor. The stator is a permanent magnet, and the rotor is a coil winding distributed on the armature and excited by winding field coil. The iron core of the electromagnetic switch is located in the drive end cover to protect them from dust, icing and splashing water. When the switch is closed, the energized electromagnetic switch coil generates magnetic force, attracting the iron core and the fork to move, causing the drive gear to engage with the engine flywheel ring gear. After the main contact of the electromagnetic switch is closed, the circuit from the battery to the start motor is connected. After the armature rotates, torque is increased by a reduction mechanism to drive the start motor to rotate. As driving gear engages with the flywheel ring gear of the engine, so the engine rotates. When the engine is started, the drive gear runs overspeed to prevent the armature speed from being too high until the switch is turned off, at this time the return spring separates the drive gear. In order to prevent speed from being too high to damage the start motor, CEM cuts off the control circuit of the start relay after starting the engine, and the start motor stops working.

2.11.3.2 Working Principles of Charging System

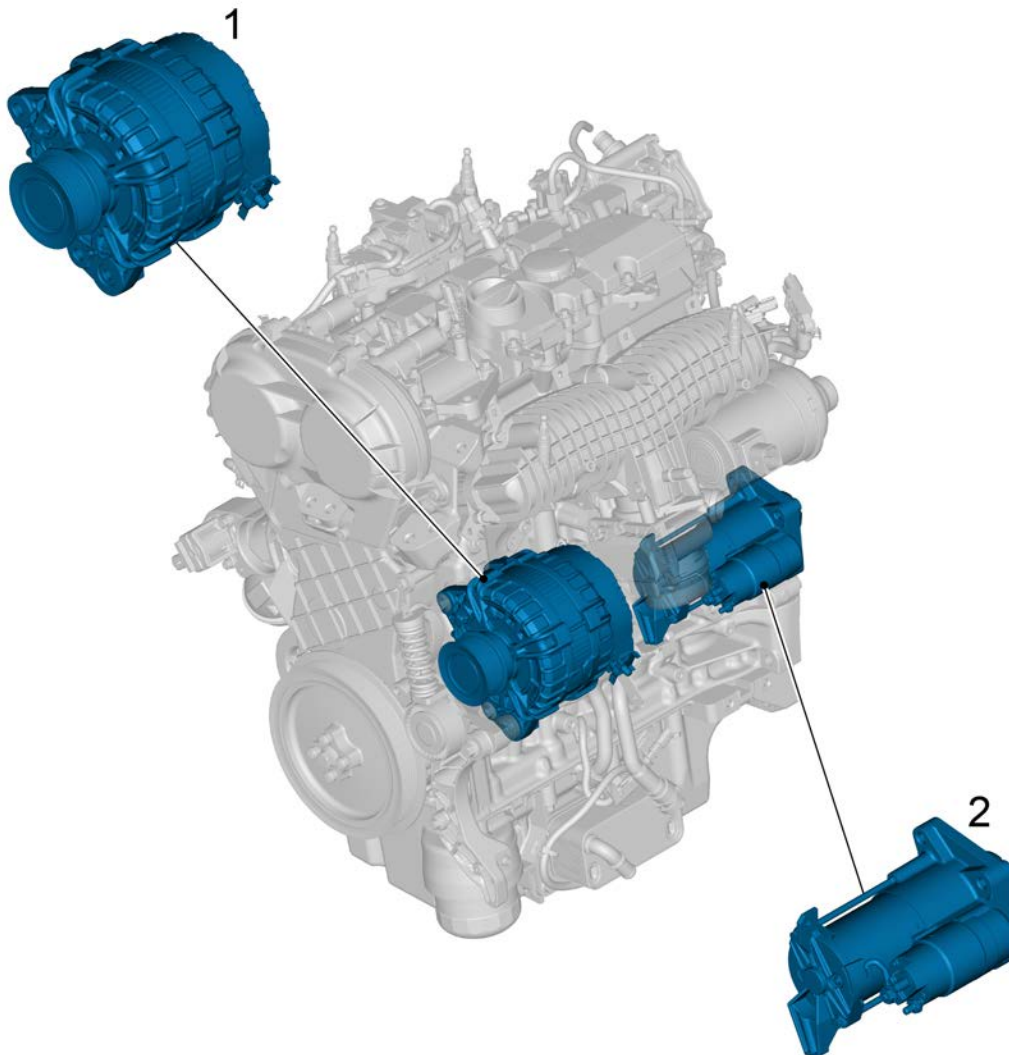
The alternator provides DC voltage to make the vehicle's electrical system work and maintain the battery at the charging state. The Engine Control Module monitors the status of the alternator through the LIN line, and the voltage output is controlled by the regulator integrated in the alternator:

– When the engine is running: because the exciting coil generates a magnetic field, the stator coil generates an induced alternating voltage. The voltage regulator senses this voltage and controls the magnetic field current. The AC voltage is generated by these stator coils, which is converted into a DC voltage by a rectifier in the generator. The generator output voltage adjusted by the voltage regulator is applied to the power supply circuit on the vehicle battery and the generator battery terminals.

– Because the alternator harness is connected to the battery, when the battery is fully charged, the voltage regulator will reduce the field excitation current, to reduce the output voltage of the alternator and prevent overcharge. When the battery is discharged or the load is large, the voltage regulator increases the field exciting current to increase the output voltage of the alternator.

2.11.4 Component position

2.11.4.1 Component position

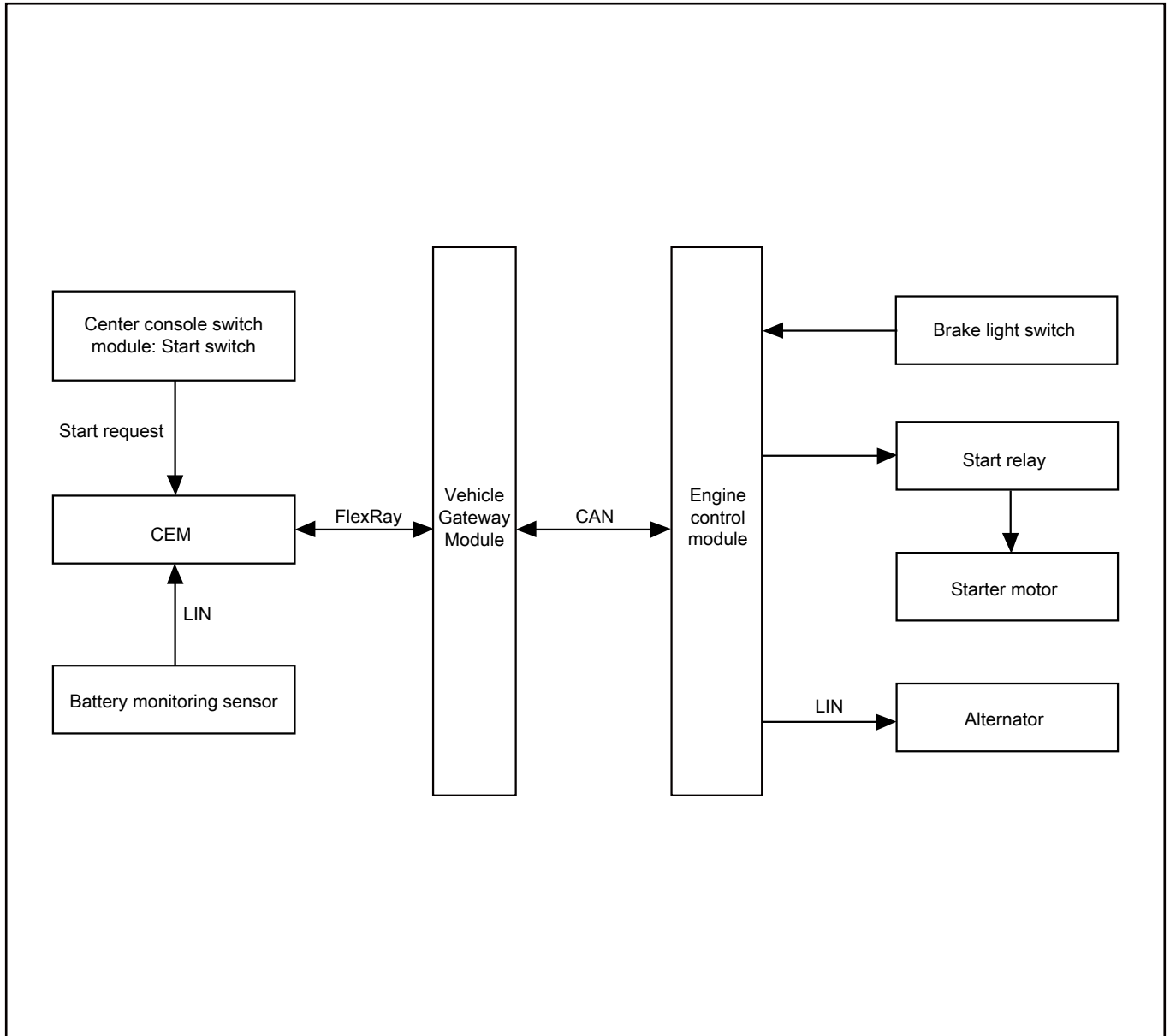


1. Alternator

2. Starter

2.11.5 Electrical schematic diagram

2.11.5.1 Electrical schematic diagram



2.11.6 Diagnostic information and procedures

2.11.6.1 Diagnosis Description

Before the diagnosis of the defrost system fault, refer to Description and Operation and System Working Principle. Understand and be familiar with the working principle of the starting/charging system before starting a system diagnosis. This will help determine the correct fault diagnosis steps when a fault occurs, and more importantly, help determine whether the condition described by the distributor is normal operation. Any fault diagnosis of the starting/charging system should start with routine diagnosis, guiding the maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

2.11.6.2 Visual Diagnosis

- Check the after-sales installations that may affect operations of starting, charging, or ignition system to ensure that they cannot affect operations of starting, charging, or ignition system.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Check whether the battery is installed correctly.
 - Test the state of the battery, the battery voltage should not be less than 11V.
 - Check whether the related wires are damaged, and check whether the connections of the starter, the electromagnetic switch of starter, start and stop button, battery and all related grounding points are reliable.
- If the battery, wires, and switches are functioning properly, and the engine functions properly, remove and test the starter.
- Check the charging system: When the charging system works normally, operate the start and stop button to set the power mode to ON state, the charging indicator will turn on. When the engine starts, the charging indicator will turn off.
- Check the generator to ensure that it is installed correctly and not loosened, and that the drive belt preload is normal and there is no possibility of slippage.

2.11.6.3 Starter Noise Fault

Before the commencement of diagnosis, please refer to the description and operation of battery, the description and operation of start system and the description and operation of charging system and perform necessary inspection.

Step 1	Start the engine and monitor whether the starter is rotating.
--------	---

- A. When the engine is started, but the starter is still in the engaged position, does it make a loud “wheeze” (which may sound like an alarm if the engine speed of the starter is further increased in the engaged position)?

Yes

Check the flywheel ring gear for the following troubles: cracked gear teeth, missed gear teeth, worn gear teeth, whether the flywheel is bent, or whether the upper gear teeth are damaged, and replace the flywheel if necessary.

No

Step 2	When the engine is started, as the starter gradually stops, can you hear a “rumble”, “roar” or in some cases a “knock”?
--------	---

Yes

Go to Step 4.

No

Step 3	When the engine starts, after the engine crankshaft rotates and starts normally, do you hear high-frequency dynamic whine?
--------	--

Yes

Replace the starter. Refer to [Replacement of starter.](#)

No

Step 4	Remove and inspect the starter.
--------	---------------------------------

A. Check the motor shaft sleeve of starter and clutch gear. Is the clutch gear cracked or worn, and is the shaft sleeve worn?

Yes

Replace the starter. Refer to [Replacement of starter.](#)

No

Step 5	Replace the flywheel.
--------	-----------------------

Next Step

Step 6	Trouble is removed.
--------	---------------------

2.11.6.4 Alternator noise fault

Diagnostic tip: alternator noise may be caused by electrical or mechanical noise. Electrical noise (electromagnetism whines) usually changes with the electrical load applied to the alternator. This is the normal operating characteristic of all alternators. Pay attention to distinguish them during maintenance and diagnosis, otherwise it will cause unnecessary complaints from customers. When diagnosing an alternator with mechanical noise, you should first check whether the parts around the alternator are loosened, interfering with each other, and so on. In some cases, even if the sound in the cabin is very light, it can be heard in the passenger cabin. If this is the case, replacing the alternator will not solve the problem, which will cause misjudgment.

Step 1	Disable the alternator and confirm whether the noise disappears.
--------	--

- A. Start the engine and confirm that noise can be heard.
- B. Shut down the engine.
- C. Operate the starting switch to place the power in mode "OFF".
- D. Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- E. Dismount the drive belt.
- F. Disconnect the battery negative cable, refer to battery cable disconnection and connection procedures.
- G. Start the engine
- H. Confirm whether the noise disappears.

Yes

Go to Step 6.

No

Step 2	Check the alternator shaft.
--------	-----------------------------

- A. Shut down the engine.
- B. Remove the drive belt. Refer to the Replacement of Drive Belt.
- C. Turn the alternator pulley by hand.
- D. Is the alternator rotating smoothly without stagnation and grinding noise?

Yes

Go to Step 6.

No

Step 3	Re-install the alternator.
--------	----------------------------

- A. Reinstall the alternator and tighten the alternator mounting bolts to the specified torque See Alternator Replacement
- B. Whether the noise disappears after the engine is started.

Yes

System is normal.

No

Step 4	Check whether the drive belt is loosened.
--------	---

Yes

Go to Step 7.

No

Step 5	Is the noise the same as that from the known vehicle in good condition?
--------	---

Yes

System is normal.

No

Step 6	Replace the alternator assembly.
--------	----------------------------------

Caution

If no specific alternator trouble is found, all other possible noise sources must be eliminated before the alternator can be replaced.

If the noise is made due to the normal characteristics of the alternator, the noise will not disappear after replacing the alternator.

Confirm that the trouble is removed.

Next Step

Step 7	Replace the drive belt or automatic tensioner.
--------	--

- A. Replace the drive belt or automatic tensioner, see [replacement of drive belt](#) or [replacement of automatic tensioner](#).

Next Step

Step 8	Trouble is removed.
--------	---------------------

2.11.6.5 Battery Discharge Current and Parasitic Loading Test

If the battery level is continuously low, the following test procedure should be performed to check whether the battery has parasitic current.

Caution

Before performing this procedure, please check whether the vehicle has after-sales installations, such as DVD, audio amplifier, boot subwoofer and other non-original accessories. If any of these devices exists, please disconnect these systems before performing this test procedure.

Warning !

See "Warnings Regarding Battery Disconnection" in Warnings and Precautions.

Step 1	Disconnect the battery negative cable, refer to battery cable disconnection and connection procedures .
--------	---

Next Step

Step 2	One end of the digital multimeter is connected to the negative cable of battery, and the other end is connected to the negative cable of battery.
--------	---

Next Step

Step 3	Select the gear of maximum range for the "current test" on the digital multimeter.
--------	--

Next Step

Step 4	Open the left front door and observe the reading on the multimeter display screen.
--------	--

Caution

Any other operations are strictly prohibited at this time, otherwise the multimeter may be damaged.

Next Step

Step 5	If the multimeter has no display, check the multimeter for damage. If there is a display, close the left front door, press the engine compartment switch, and press the door locking button on the remote controller.
--------	---

Next Step

Step 6	Wait for more than 10min and observe the multimeter reading (if the multimeter displays an abnormal reading, you can adjust the multimeter's gear downward), then the multimeter display should be below 30mA. If it is higher than 30mA, there may be parasitic current.
--------	---

Caution

When you can not confirm whether the parasitic current of the system is normal, you can find a trouble-free vehicle for comparative testing to help confirm the trouble.

2.11.6.6 Jump Starting Procedures

Warning !

See "Warnings Regarding Battery Disconnection" in "Warnings and Precautions".

Step 1	Park the vehicle that can provide the jumper power supply so that the jumper cable can connect the batteries of the two vehicles.
--------	---

Next Step

Step 2	Operate the starting switch to place the power mode of the two vehicles in mode "OFF" , and turn off the headlights and all accessory power equipment.
--------	--

Next Step

Step 3	Press the hazard warning indicator switch to turn on the hazard warning indicator.
--------	--

Next Step

Step 4	Activate the parking brakes of two vehicles.
--------	--

Next Step

Step 5	Make sure that the transmission gear is in neutral position.
--------	--

Caution

The jumper cables must be intact and no wire is exposed, otherwise it will cause unnecessary personal injury or vehicle damage.

Next Step

Step 6	Connect one end of the red cable to the positive terminal of the battery that provides sufficient power, and confirm that it is not in contact with other metal parts.
--------	--

Next Step

Step 7	Connect the other end of the red cable to the positive terminal of the discharged battery, and never connect the red cable to the negative terminal of the discharged battery.
--------	--

Caution

Do not connect the jumper cable directly to the negative terminal of the discharged battery to prevent sparks and possible battery gas explosion.

Next Step

Step 8	Connect one end of the black cable to the negative terminal of the battery that provides sufficient power.
--------	--

Next Step

Step 9	Finally, connect one end of the black cable to the grounding point of the engine of the vehicle with discharged battery, and at least 500mm (19.7in) from the discharged battery.
--------	---

Next Step

Step 10	Start the engine of the vehicle with battery that can provide enough power to make the engine run at medium speed for more than 3 minutes.
---------	--

Next Step

Step 11	Start the engine of the vehicle with the discharged battery.
---------	--

Next Step

Step 12	Remove the jumper cables in reverse order.
---------	--

Next Step

Step 13	Operations are completed.
------------	---------------------------

2.11.7 Removing and installing

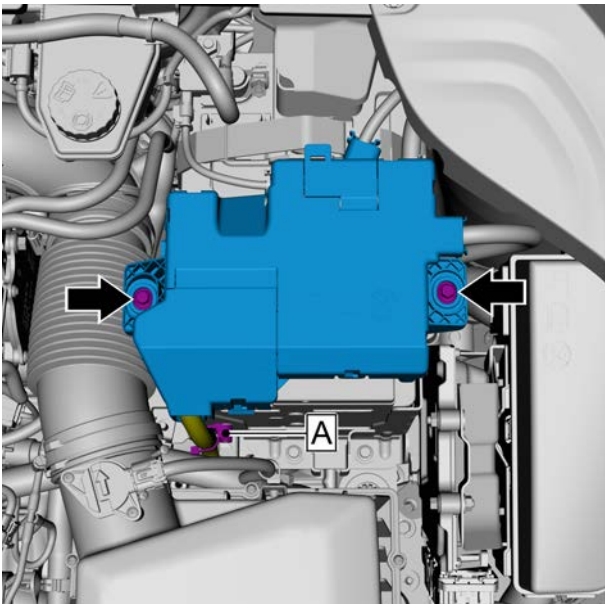
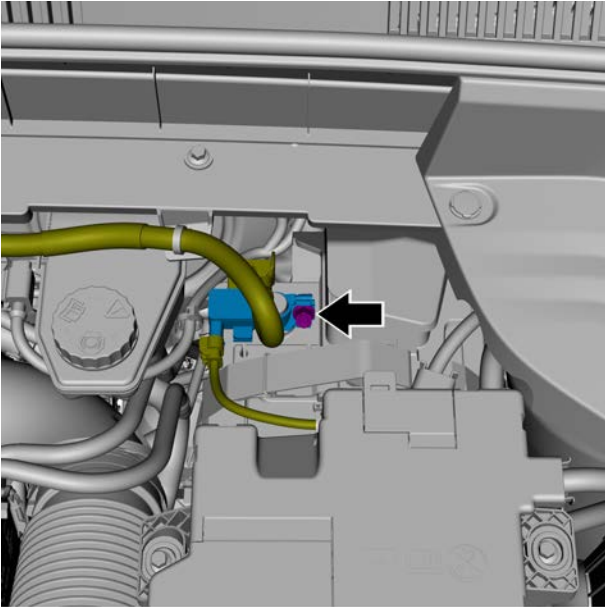
2.11.7.1 Battery Cable Disconnection and Connection Procedures

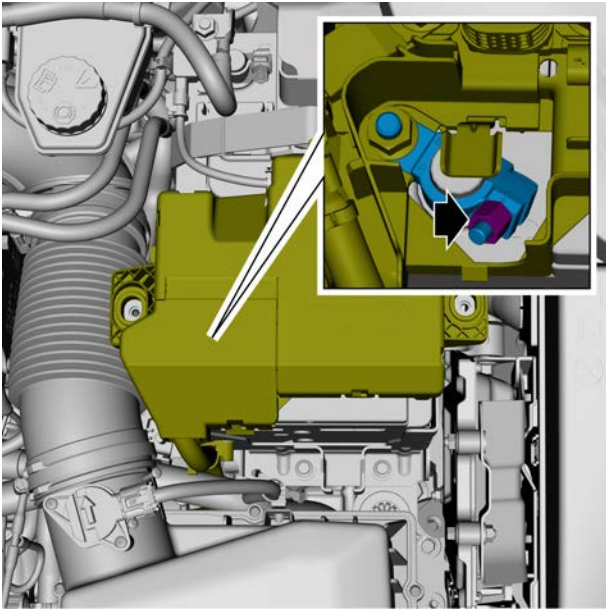
Disconnect program

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Loosen one fixing nut of the battery monitoring sensor and move it aside.
- 3 Remove 2 retaining bolts from the front compartment harness assembly.
- 4 Remove fixing clip A of starting motor harness assembly.

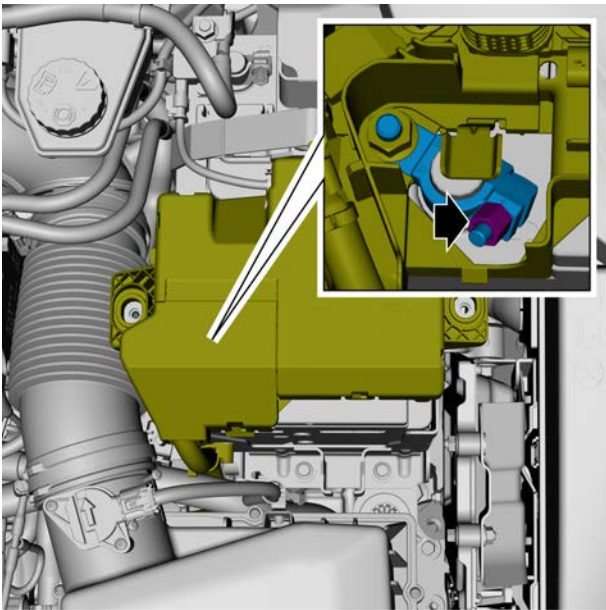


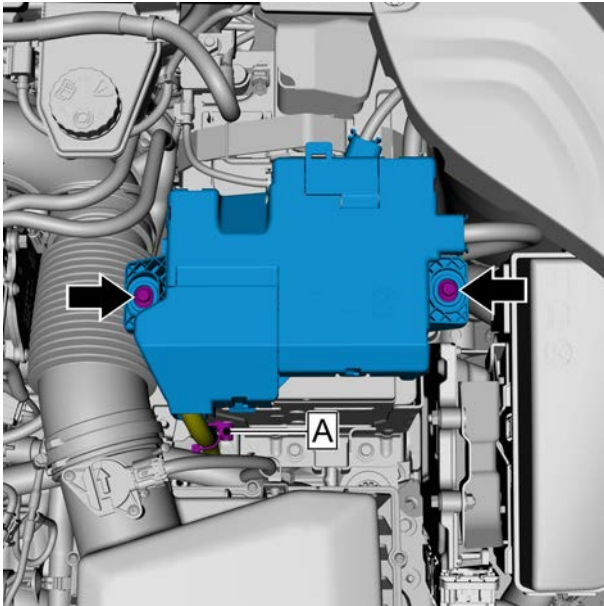


- 5 Open the battery positive cover.
- 6 Release the fastening nut of battery positive cable and disconnect the battery positive cable.

Connection procedure

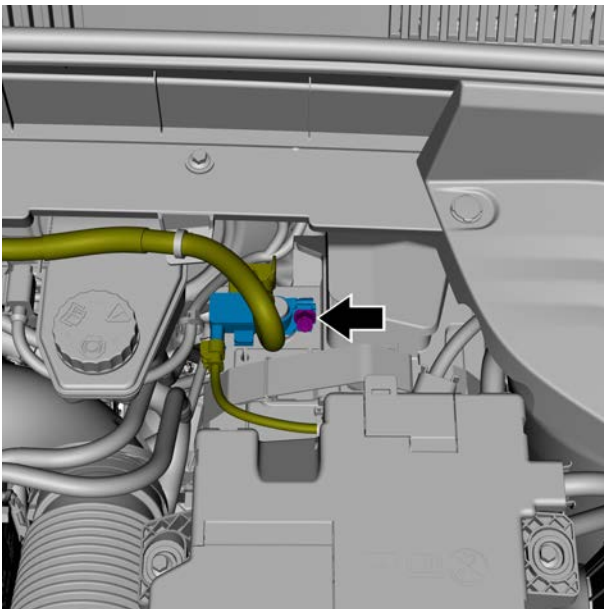
- 1 Connect the battery positive cable and tighten the retaining nut.
Torque: 5.5N·m (metric) 4.1lb-ft (imperial system)
- 2 Close the battery positive cover.





- 3 Install fixing clip A of starting motor harness assembly.
- 4 Install and tighten the retaining bolts of the front compartment harness assembly.

Torque: 10 N·m (metric system) 7.4 lb-ft (Imperial system)



- 5 Connect the battery monitoring sensor and tighten the fixing nut.

Torque: 5.5N·m (metric) 4.1lb-ft (imperial system)

- 6 Close the engine compartment cover.

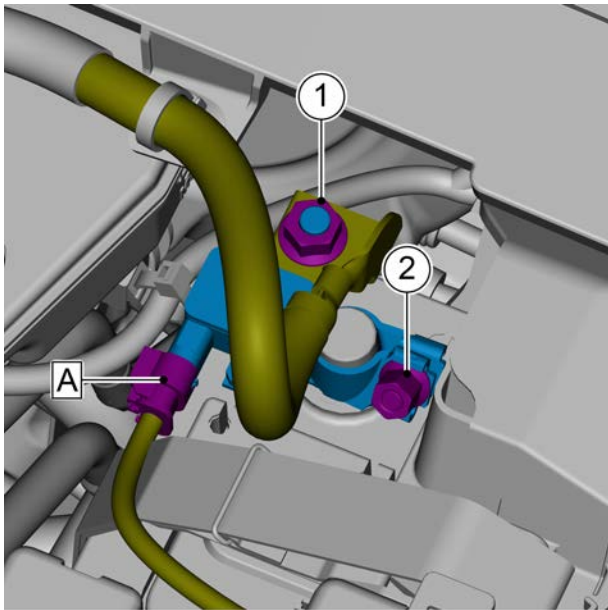
2.11.7.2 Replacement of battery inspection sensor

Removal procedure

Warning !

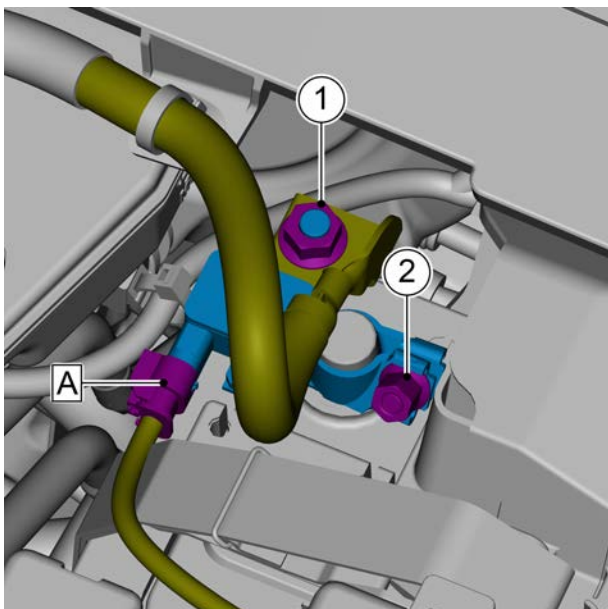
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Opening the engine hood



- 2 Remove one fixing nut 1 of the battery negative cable and move it aside.
- 3 Disconnect battery monitoring sensor harness connector A.
- 4 Loosen one fixing nut 2 of the battery monitoring sensor and remove the battery monitoring sensor.

Installation procedure



- 1 Install the battery monitoring sensor and tighten one fixing nut 2 of the battery monitoring sensor.
Torque: 5.5N·m (metric) 4.1lb-ft (imperial system)
- 2 Connect battery monitoring sensor harness connector A.
- 3 Install the battery negative cable, install and tighten one fixing nut 1 of the battery negative cable.
Torque: 24 N·m (metric system) 17.7 lb-ft (imperial system)

- 4 Use the GLDS diagnostic program, select the corresponding module under the [software] tab, and complete the software brushing operation according to the steps prompted by the diagnostic program.
- 5 Close the engine hood

2.11.7.3 Replacement of Battery

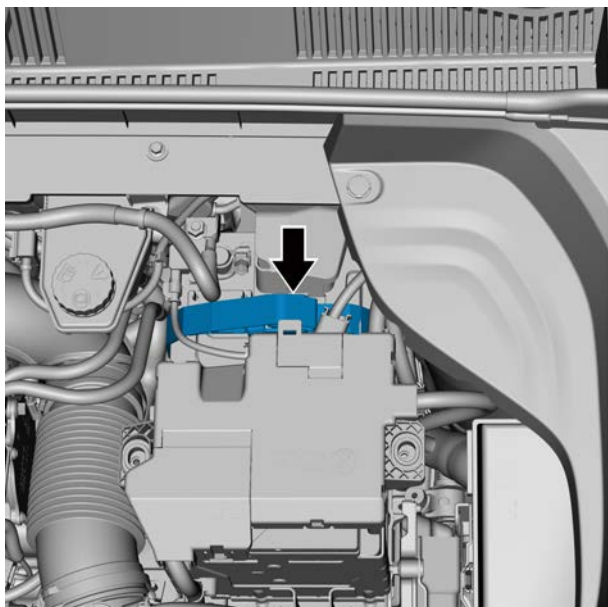
Removal procedure

Warning !

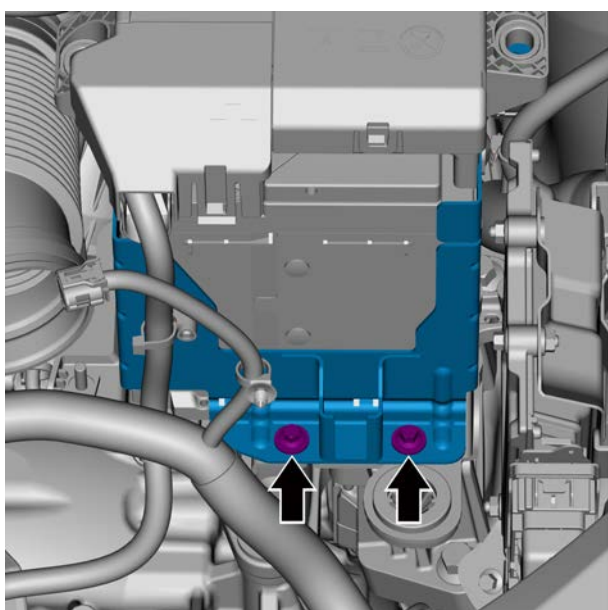
See "warning about disconnecting battery" in [Warnings and cautions](#)

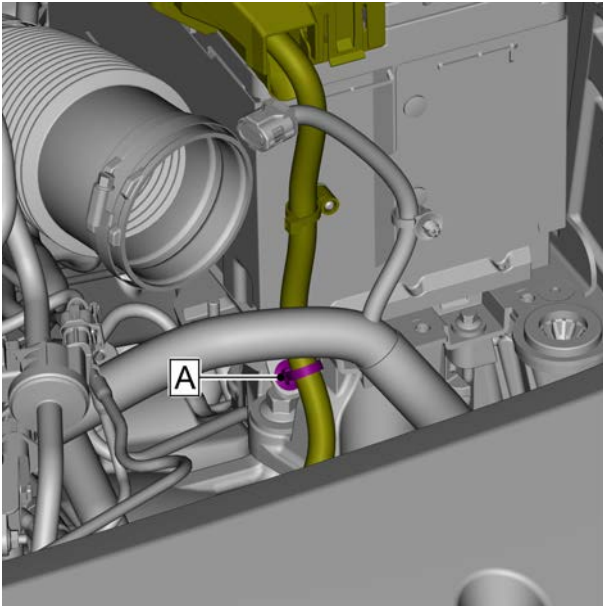
- 1 Open the engine compartment cover.

- 2 Disconnect the battery cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the mass air flow sensor, see [replacement of mass air flow sensor](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 5 Remove the battery tray strap.

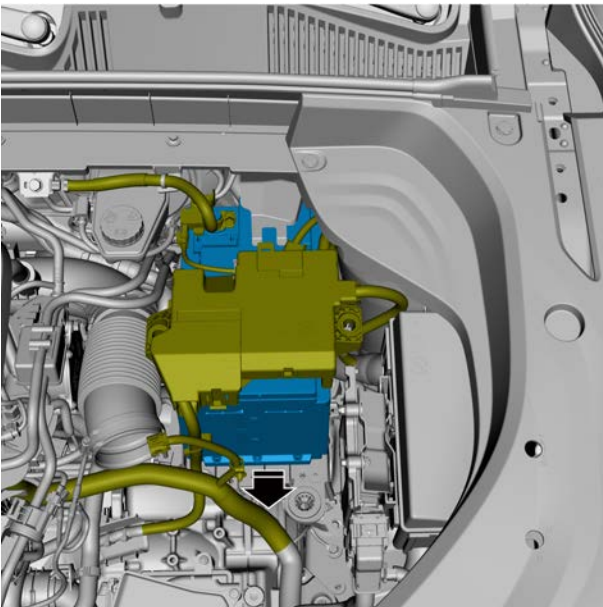


- 6 Remove 2 retaining bolts of the battery fixing platen assembly and remove the battery fixing platen assembly.

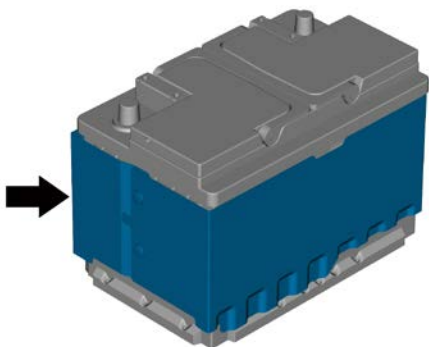




7 Remove fixing clip A of starting motor harness assembly.



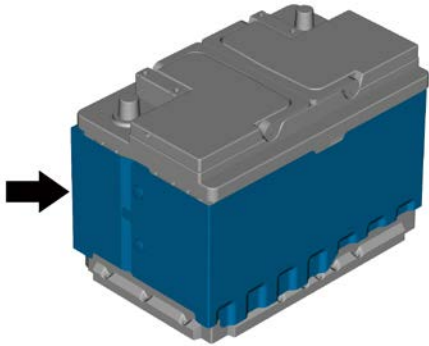
8 Move the battery and battery heat shield to a proper position in the direction of the arrow, and remove the battery and battery heat shield.



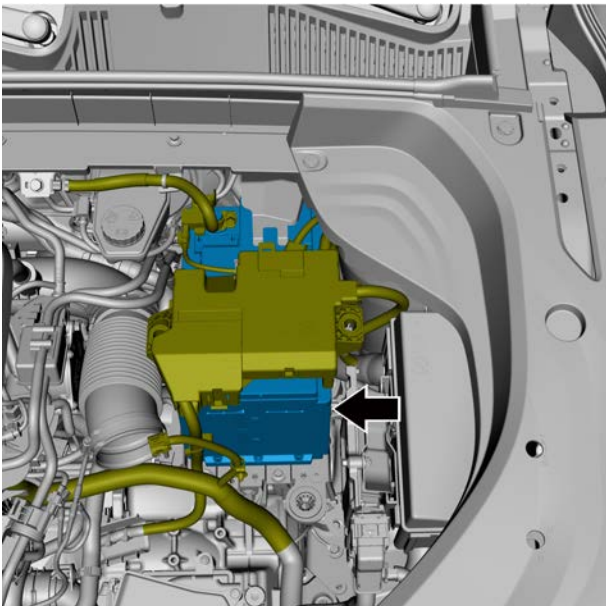
9 Dismount the battery heat shield.

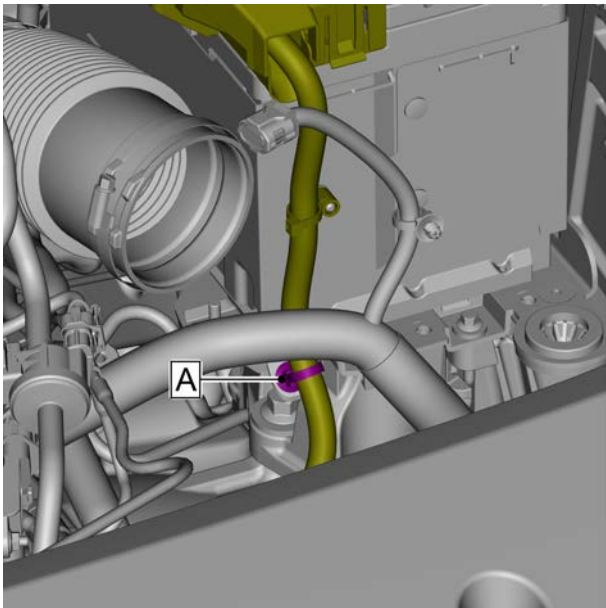
Installation procedure

- 1 Install the battery heat shield.

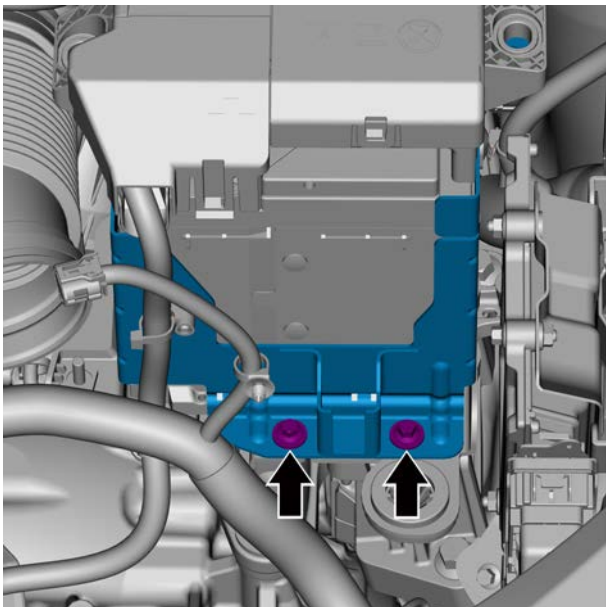


- 2 Install the battery and battery heat shield.



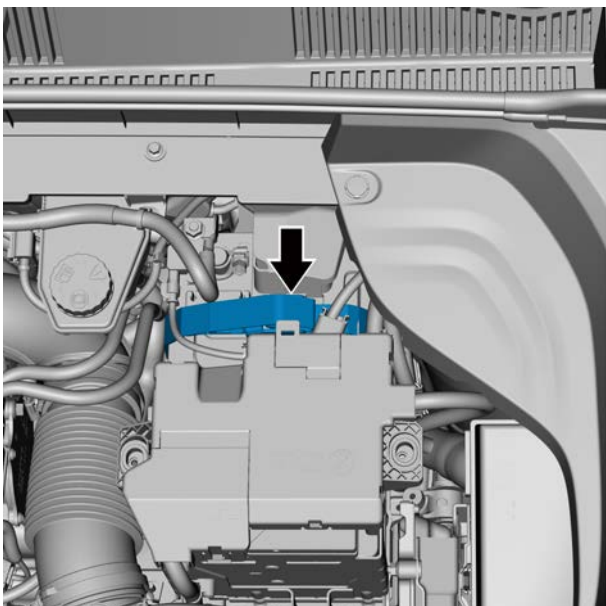


- 3 Install fixing clip A of starting motor harness assembly.



- 4 Install the battery fixing platen assembly, and install and tighten the 2 retaining bolts of the battery fixing platen assembly.

Torque: 9 N. m (metric system) 6.6 lb-ft (Imperial system)



- 5 Install the battery tray strap.

- 6 Install the air filter assembly.
- 7 Install the mass air flow sensor.
- 8 Connect the battery cable.
- 9 Close the engine compartment cover.

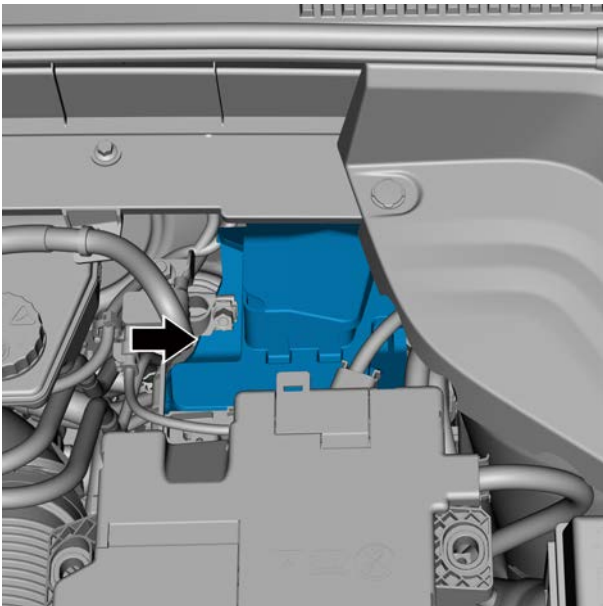
2.11.7.4 Replacement of battery bracket assembly

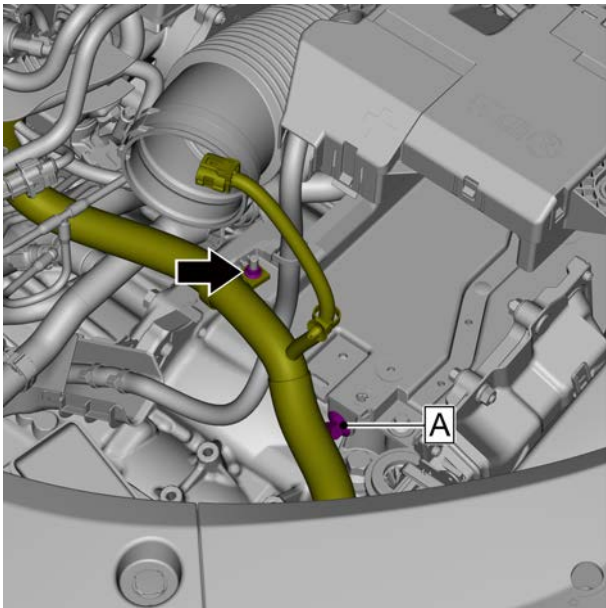
Removal procedure

Warning !

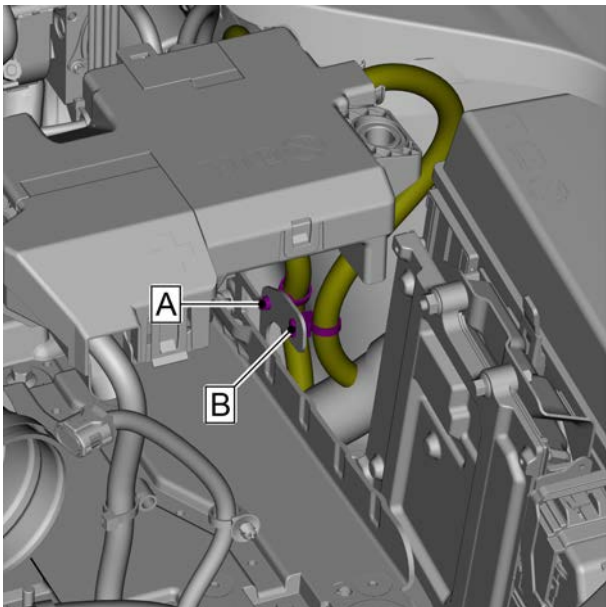
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the mass air flow sensor, see [replacement of mass air flow sensor](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 5 Remove the battery, refer to Replacement of battery.
- 6 Remove the battery stopper.

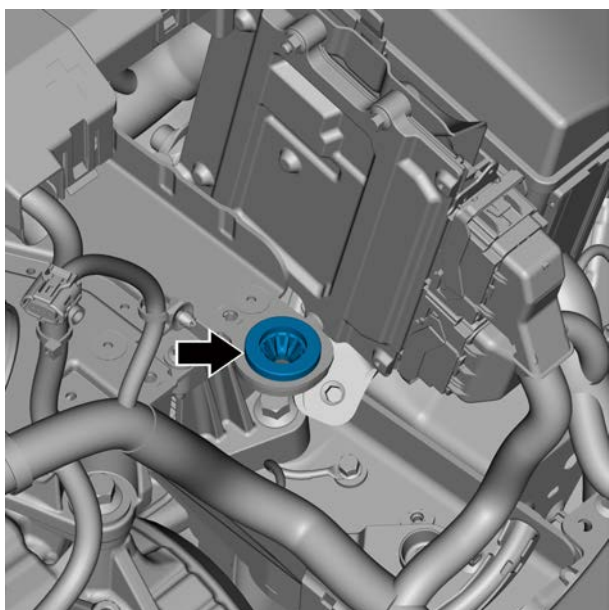




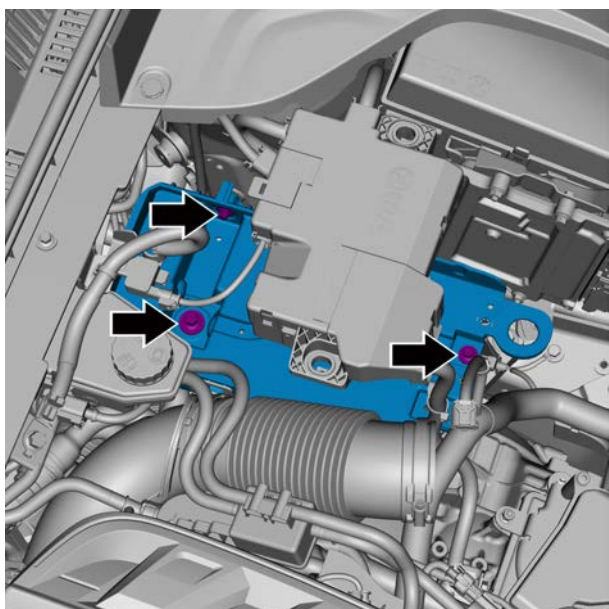
- 7 Remove fixing clip A of engine harness.
- 8 Remove one retaining bolt from the engine harness fixing bracket and move it aside.



- 9 Remove fixing clip B of front compartment harness assembly.
- 10 Remove fixing clip A of front compartment harness assembly.

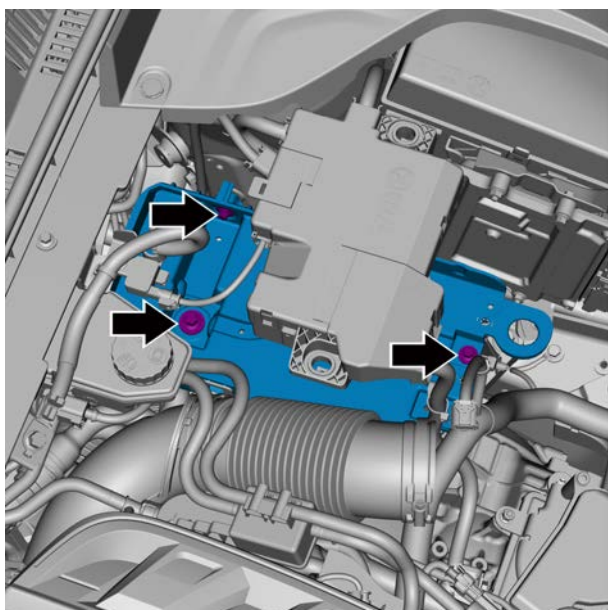


11 Remove the air filter damping pad.

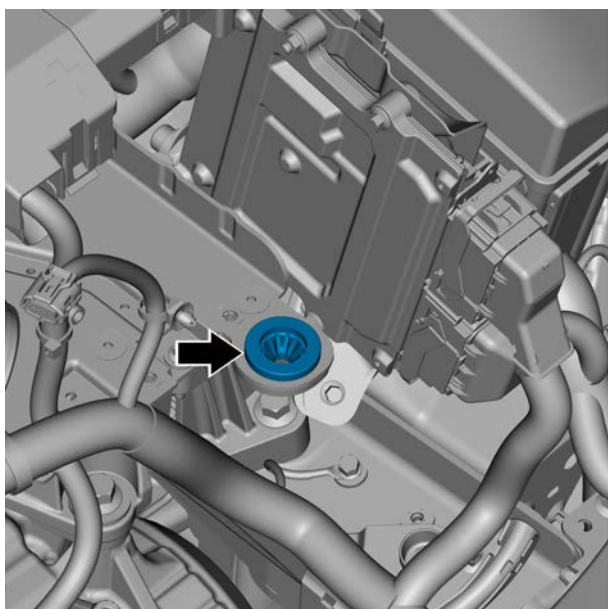


12 Remove 3 retaining bolts from the battery bracket assembly and remove the battery bracket assembly.

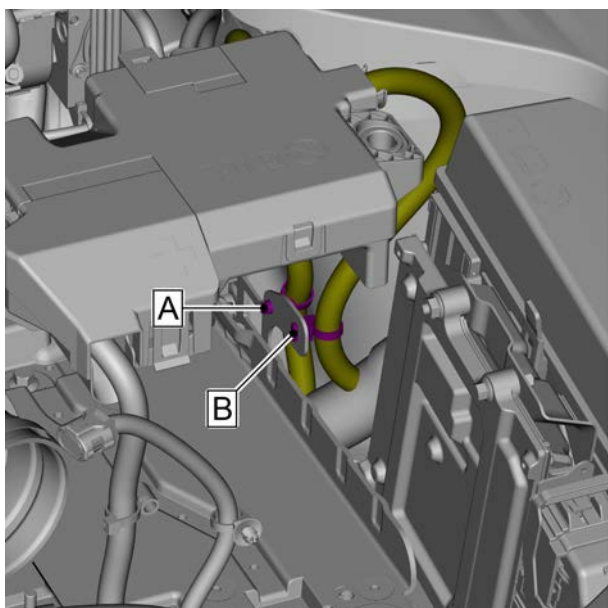
Installation procedure



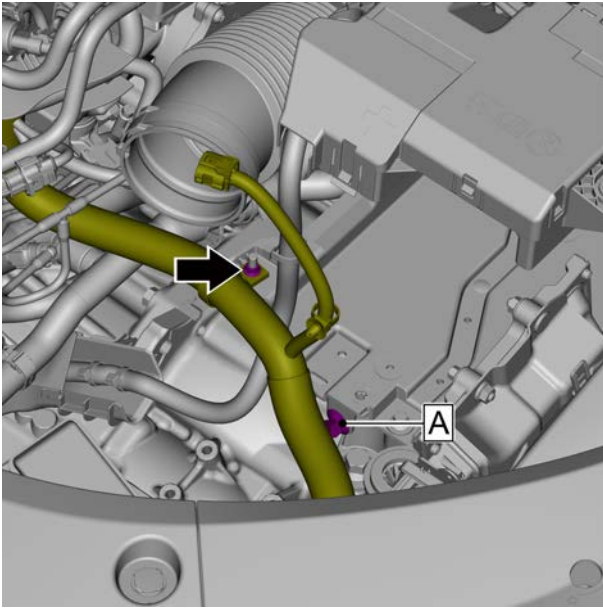
- 1 Install the battery bracket assembly, install and tighten the 3 retaining bolts of the battery bracket assembly.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



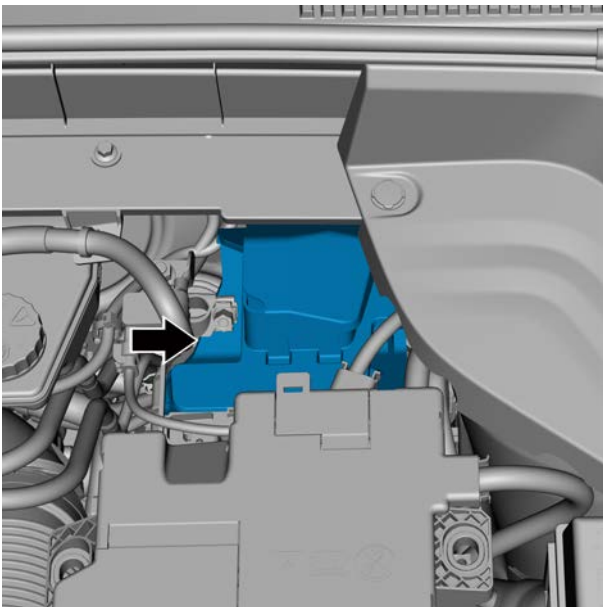
- 2 Install the air filter damping pad.



- 3 Install fixing clip A of front compartment harness assembly.
- 4 Install fixing clip B of front compartment harness assembly.



- 5 Install the engine harness bracket, install and tighten one fixing nut of the engine harness fixing bracket.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 6 Install fixing clip A of engine harness.



- 7 Install the battery stopper.

- 8 Install the battery heat shield.
- 9 Install the air filter assembly.
- 10 Install the mass air flow sensor.
- 11 Connect the battery cable.
- 12 Close the engine hood

2.11.7.5 Alternator Replacement

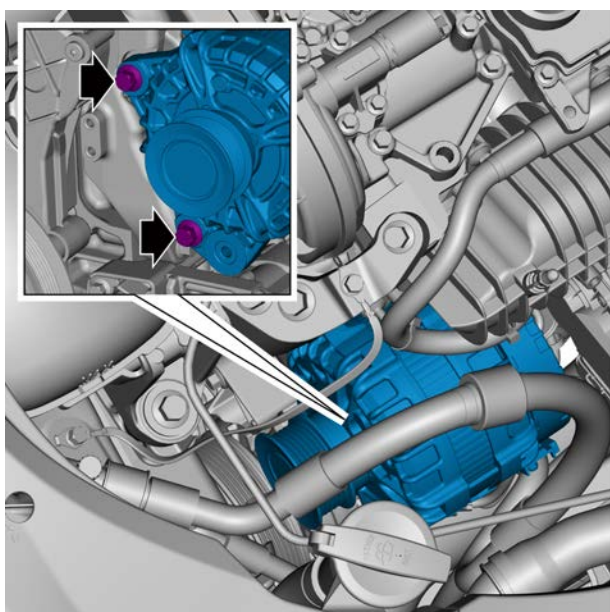
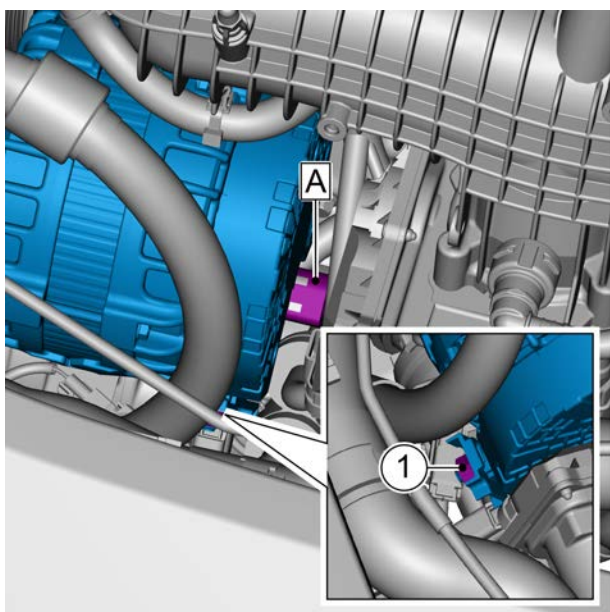
Removal procedure

Warning !

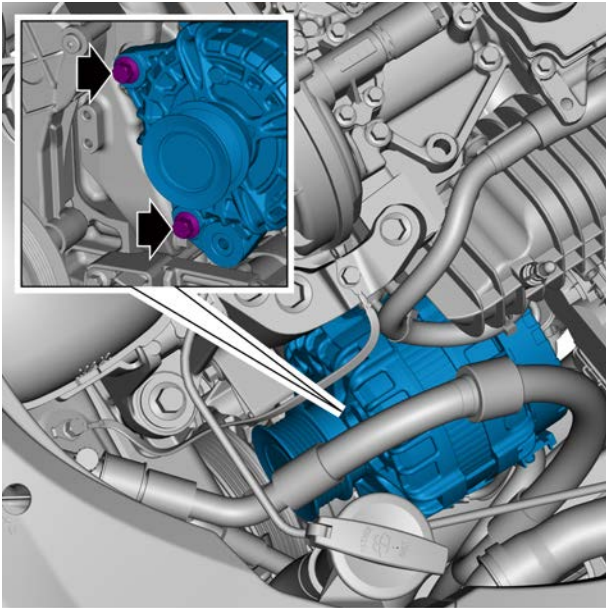
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.

- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the air filter assembly, refer to [replacement of air filter assembly.](#)
- 4 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe.](#)
- 5 Remove the driving belt, refer to [replacement of the driving belt.](#)
- 6 Remove the automatic tensioner, see [automatic tensioner replacement.](#)
- 7 Disconnect the alternator harness connector A.
- 8 Open the anode shield of the alternator, remove one fixing nut 1 of the starter harness assembly, and disconnect the starter harness assembly from the alternator.
- 9 Remove 2 retaining bolts of the alternator and remove the alternator.

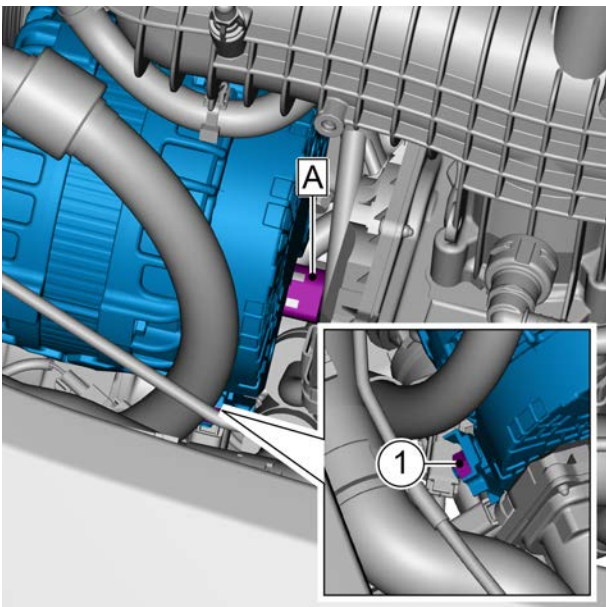


Installation procedure



- 1 Install the alternator, install and tighten 2 retaining bolts of the alternator.

Torque: 48 N. m (metric system) 35.4 lb-ft (Imperial system)



- 2 Connect alternator harness connector A.
- 3 Connect the starter harness assembly and the alternator, install and tighten one fixing nut 1 of the starter harness assembly, and close the alternator anode shield.

Torque: 15 N. m (metric system) 11.0 lb-ft (Imperial system)

- 4 Install the automatic tensioner.
- 5 Install the drive belt.
- 6 Install the air inlet pipe of the air filter.
- 7 Install the air filter assembly.
- 8 Connect the negative battery cable.
- 9 Close the engine compartment cover.

2.11.7.6 Replacement of the starter

Removal procedure

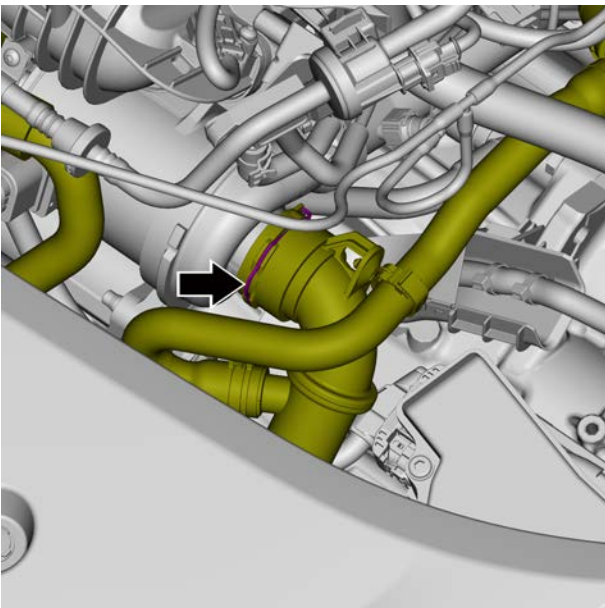
Warning !

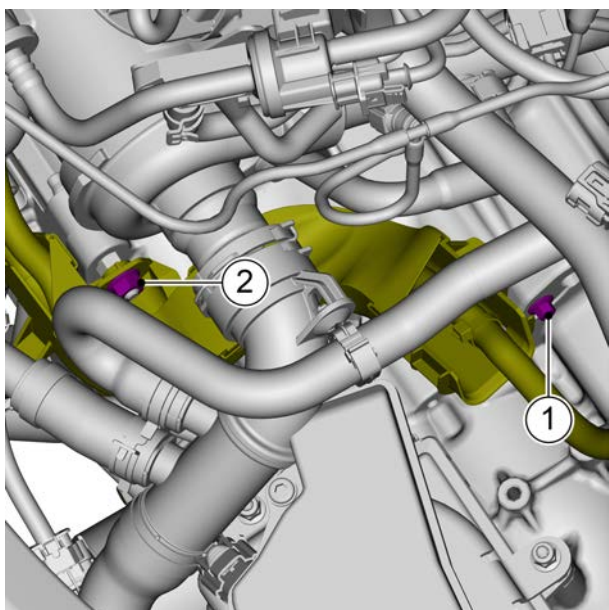
See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

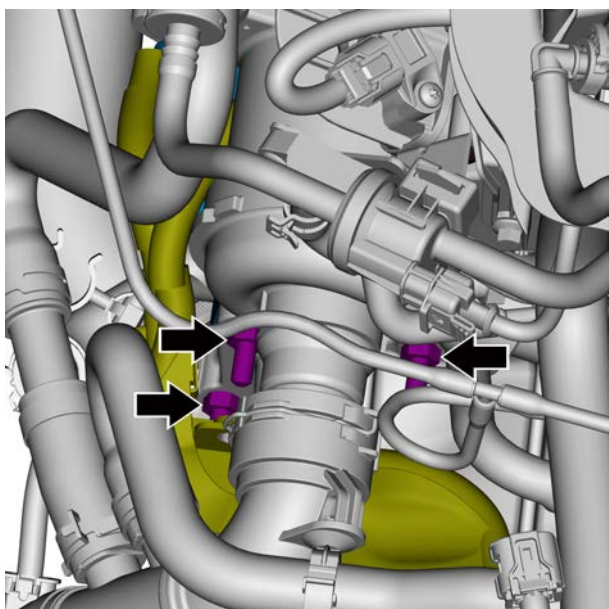
See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 5 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe](#).
- 6 Lift the vehicle, see [Lift the vehicle](#)
- 7 Remove the engine fender, see [Engine fender replacement](#).
- 8 Remove the intercooler outlet pipe assembly. See [intercooler outlet pipe assembly replacement](#).
- 9 Remove the throttle unit, see [replacement of throttle unit](#).
- 10 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 11 Unlock the quick insert elastic circlip and disconnect the radiator outlet pipe from the engine coolant pump.

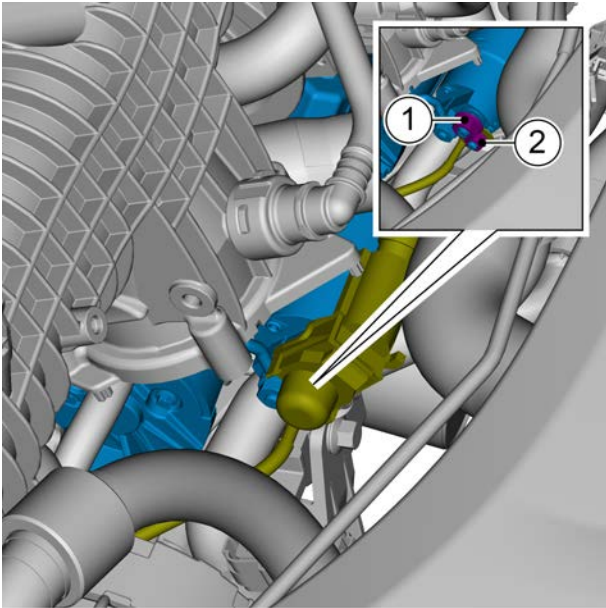




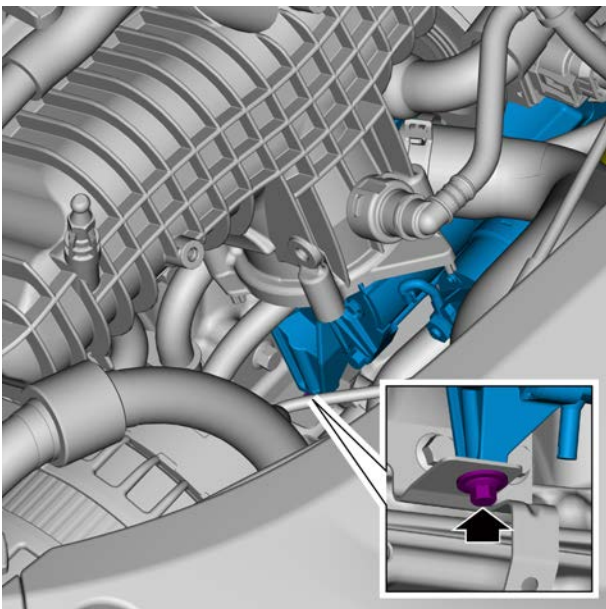
- 12 Remove one retaining bolt 1 from the starting motor harness assembly.
- 13 Remove one fixing nut 2 from the starting motor harness assembly and move it aside.



- 14 Remove 3 retaining bolts from the starter.

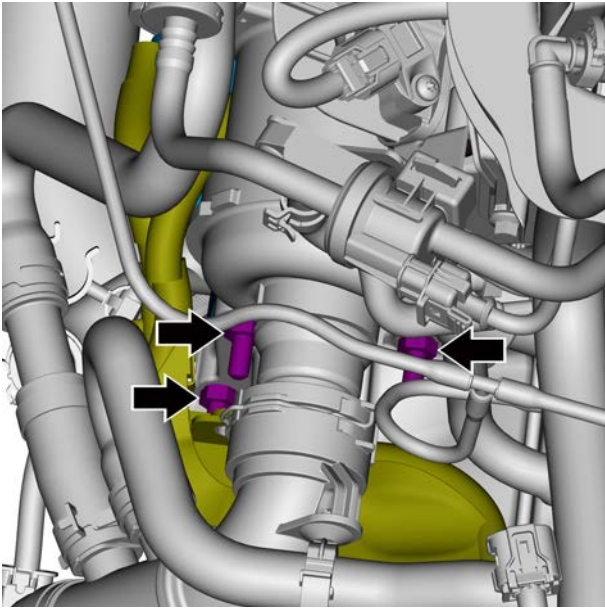


- 15 Open the anode shield of the starter.
- 16 Remove one fixing nut 1 of the starter harness assembly and disconnect the starter harness assembly from the starter.
- 17 Remove one fixing nut 2 of the engine harness and disconnect the engine harness from the starter.

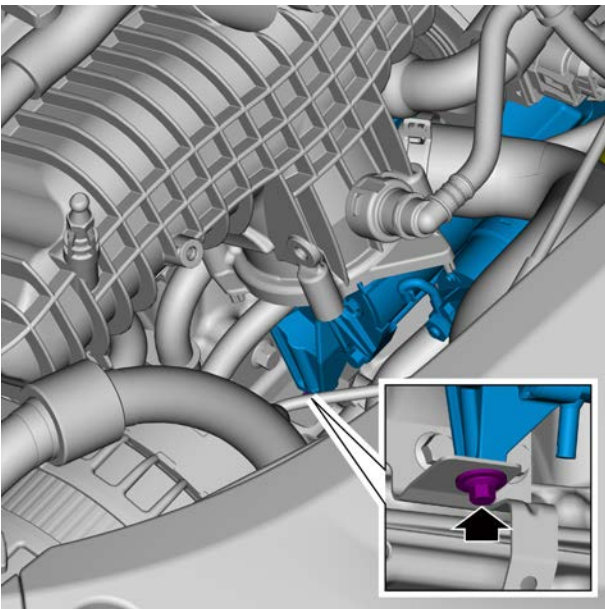


- 18 Remove 1 fixing bolts of the starter. Take down the starter.

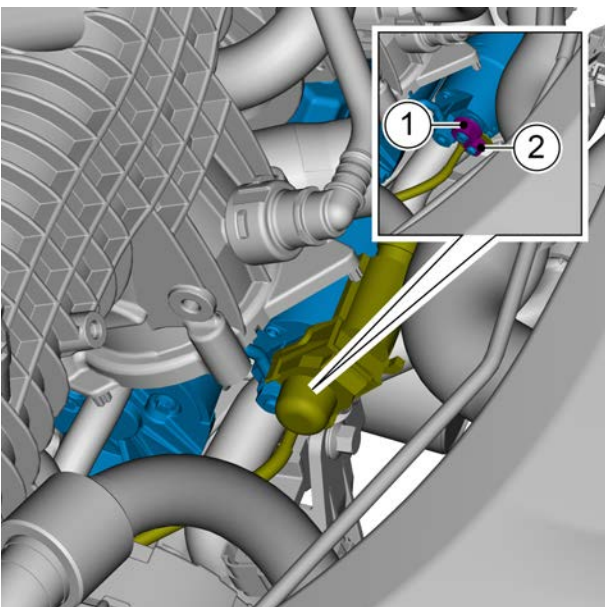
Installation procedure



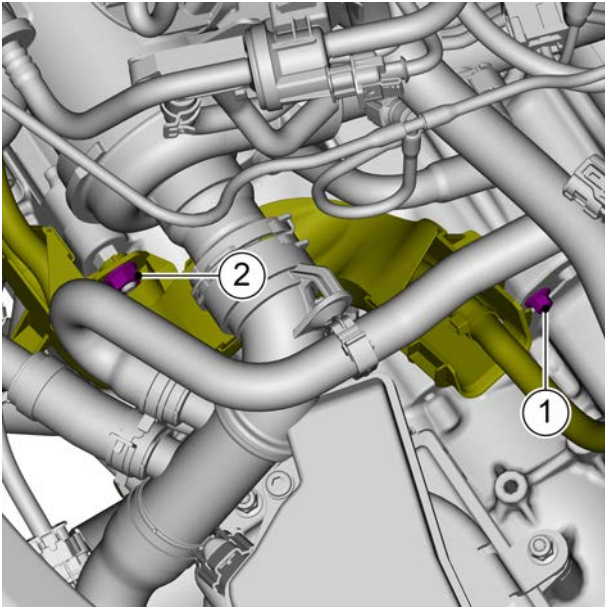
- 1 Install the starter, install and tighten the 3 retaining bolts of the starter.
Torque: 48 N. m (metric system) 35.4 lb-ft (Imperial system)



- 2 Install and tighten 1 retaining bolt of the starter.
Torque: 13 N. m (metric system) 9.6 lb-ft (Imperial system)



- 3 Connect the engine harness and starter, install and tighten one fixing nut 2 of the engine harness.
Torque: 6 N. m (metric system) 4.4 lb-ft (Imperial system)
- 4 Connect the starting motor harness assembly and the starting motor, install and tighten one fixing nut 1 of the starting motor harness assembly.
Torque: 13 N. m (metric system) 9.6 lb-ft (Imperial system)
- 5 Close the anode shield of the starter.

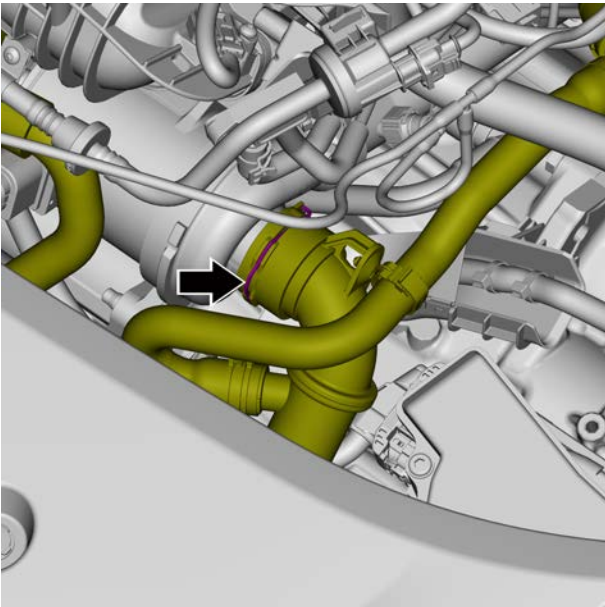


- 6 Install the starter harness assembly, install and tighten one fixing nut 2 of the starter harness assembly.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

- 7 Install and tighten one retaining bolt 1 of the starting motor harness assembly.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 8 Connect the radiator outlet pipe with the engine coolant pump and reset the quick insert elastic circlip.

- 9 Fill engine coolant.
 10 Install throttle unit.
 11 Install the intercooler outlet pipe assembly.
 12 Install the engine fender.
 13 Lower the vehicle.
 14 Install the air inlet pipe of the air filter.
 15 Install the air filter assembly.
 16 Install the engine trim cover assembly.

- 17 Connect the cathode cable of the battery, start the vehicle, connect the diagnostic instrument, monitor the water temperature and the speed of the electronic water pump, and observe the liquid level of the expansion tank. If the liquid level drops, add coolant in time; until the large circulation is opened, add coolant to the scribed line on the expansion tank, and tighten the lid of the expansion tank.
- 18 Close the engine compartment cover.

Transmission

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3.1 Warnings and precautions

3.1.1 Warnings and precautions

3.1.1.1 Warnings and precautions

Warnings regarding battery disconnection

Warning !

Before maintaining any electrical components, the ignition key must be in the OFF or LOCK position, and all electrical loads must be "OFF" unless otherwise stated in the operating procedures. If tools or equipment are easily accessible to exposed live electrical terminals, disconnect the negative battery cable. Violate these safety instructions may result in personal injury and/or damage to the vehicle or vehicle components.

Warning about moving parts and hot surfaces

Warning !

Avoid contact with moving components and hot surface when working around a running engine to prevent personal injury.

Warning regarding goggles and gloves

Warning !

Goggles and gloves must be worn when exhaust system components are removed, otherwise rust and sharp edges that fall from worn exhaust system components will cause serious personal injury.

Warnings regarding road test

Warning !

Road test should be conducted under the premise of ensuring safety and observing all traffic regulations. Do not try any operation that may endanger the control of the vehicle. Violating the above safety instructions can cause serious personal injury and damage the vehicle.

Engine lifting notice

Caution

Do not support the jack under the oil pan, any sheet metal parts or crankshaft belt pulley when lifting or supporting the engine for any reason. Lifting engines in the wrong way can cause damage to the components.

Fastener tightening notice

Caution

Please use the correct fastener tightening in the correct position, replace the fastener tightening with the correct part number, and the fastener tightening that need to be replaced or the fastener tightening that require lock glue or sealant are specially pointed out in the maintenance procedure. Paint, lubrication oil or corrosion inhibitor shall not be used on fastener tightening or on the joint surfaces of the fastener tightening unless otherwise described. In case these paints affect the torque and clamp force of the fastener tightening, they will damage the fastener tightening. When installing the fastener tightening, make sure to use correct tightening sequence and tightening torque to avoid damaging parts and systems.

Sealant notice

Caution

Do not allow room temperature hardening sealant to enter the tapped blind hole. If the room temperature hardening sealant enters the tapped blind hole, the fastener tightening will produce hydraulic lock effect when tightened. Hydraulic lock of fastener tightening will cause damage to fastener tightening and/or other components. In addition, the correct clamp force will not be obtained when fasteners are tightened. Incorrect clamping force can prevent components from getting the correct seal, which can lead to leakage. Failure to tighten fastener tightening properly can cause components to come loose or separate, leading to serious engine damage.

3.2 Automatic transmission (8AT)

3.2.1 Specification

3.2.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Oil drain bolt	-	34~60	25~44.3
Screw plug	-	5.9~8.8	4.4~6.5
Refueling plug screw	-	23.5~54.9	17.3~40.5
Selector module retaining screw	M5×25	3.7~5.3	2.7~3.9
Electronic shift actuator assembly fixing nut	M6×9.1	8.5~11.5	6.3~8.5
Transmission control module stud retaining bolt	M8×1.25×20	19.6~29.4	14.5~21.7
retaining bolts of oil pan cover plate	M8×1.25×15.5	9.8~15.7	7.2~11.6
Oil cooler assembly retaining bolt	M8×1.25×24	16.8~25.2	12.4~18.6
Engine and transmission retaining bolts	M10×40	41~55	30.2~40.6
	M10×70	41~55	30.2~40.6
Hydraulic torque converter fixing nut	M10×13.5	56~64	41.3~47.2
Starting motor stud retaining bolt	M10×1.5×71.65	41~55	30.2~40.6
retaining bolts of starting motor harness assembly	M6×25	8.5~11.5	6.3~8.5
Fixing nut of starting motor harness assembly	M8×8	20~28	14.8~20.7
retaining bolts of power take-off and transmission	M10×40	First: 20	First: 14.8
		Second time: 45 °	Second time: 45 °
Power takeoff bracket and engine retaining bolt	M8×40	First: 18	First: 13.3
		Second time: 90 °	Second time: 90 °
Front exhaust pipe clamp	-	19~21	14~15.5
Lambda probe (front oxygen sensor)	-	40~50	29.5~36.9
Lambda probe (rear oxygen sensor)	-	40~50	29.5~36.9
Catalytic converter fixing nut	M8×10.2	20~28	14.8~20.7

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Front exhaust pipe bracket retaining bolt	M8×25	20~28	14.8~20.7
retaining bolts of front exhaust pipe bracket and DPS pipeline assembly	M6×16	8.5~11.5	6.3~8.5

3.2.1.2 General Specification

Transmission specification

Item	Unit	Parameter
Transmission quality	kg	98.1
Maximum input torque	N·m	350
Transmission fluid grade	-	AW-1
Transmission fluid quantity	L	6.65
Gear ratio of first gear	-	5.250
Gear ratio of 2st gear	-	3.029
Gear ratio of 3rd gear	-	1.950
Gear ratio of 4th gear	-	1.457
Gear ratio of 5th gear	-	1.221
Gear ratio of 6th gear	-	1.000
Gear ratio of 7th gear	-	0.809
Gear ratio of 8th gear	-	0.673
Gear ratio of R gear	-	4.015

3.2.2 Instructions and operations

3.2.2.1 Instructions and Operations

The vehicle adopts advanced eight-speed automatic gearbox and Lavini type planetary gear set. It adopts a high-precision clutch hydraulic control system to make the shift feel stable and sensitive.

The smooth locking control is performed according to the output speed signal (NOUT), the signal from the Engine Control Module (engine speed and throttle opening) and the vehicle speed. In addition, the slip rate is detected by inputting the speed signal (NIN), and the slip control is performed.

When the vehicle is at low speed or parked in "D" position, the transmission enters neutral state by releasing the clutch. By reducing the resistance loss of the torque converter, the load of the engine is reduced, the fuel economy is improved and the idle vibration is reduced.

As the transmission control module performs shift control learning and garage shift control learning, it provides smooth clutch engagement during shift and smooth and fine shift during driving.

By moving the shift lever from the "D" position to the manual shift position and switching to + (upshift) or - (downshift), the driver can select the required gear, so as to realize the sporty driving that feels like a manual transmission. However, the TCM will automatically upshift to prevent overspeed, downshift when the vehicle speed decreases, and implement lock up control.

3.2.2.2 Precautions for automatic transmission maintenance

Precautions for removal and assembly of electronic components

- When replacing electronic components, be sure to turn off the ignition switch and disconnect the cathode (-) terminal of the battery before servicing the system.
- When disconnecting the harness connector, release the lock and pull out the harness connector.

Caution

Do not pull the harness.

- When connecting the harness connector, push the harness connector until it is fully locked.

Caution

Check for an audible click.

- Do not impact electronic components. If the electronic components are dropped or impacted, please replace them with new ones.

Prevent foreign matters

- When removing relevant parts from the automatic transmission, be sure to completely remove the dust, sand, etc. from the automatic transmission.
- Put the removed parts into plastic bags to prevent dust from entering.
- Do not use work gloves or shop rags during repair procedures.

Prevent parts from being damaged

- When removing the attachment surface of the shell, etc., tap it gently with a plastic hammer to remove it.

Caution

Do not pry open parts with flat bladed tools.

- Do not pull out the automatic transmission valve body with excessive force.
- When installing parts, check whether the harness is squeezed.

Cleaning of parts

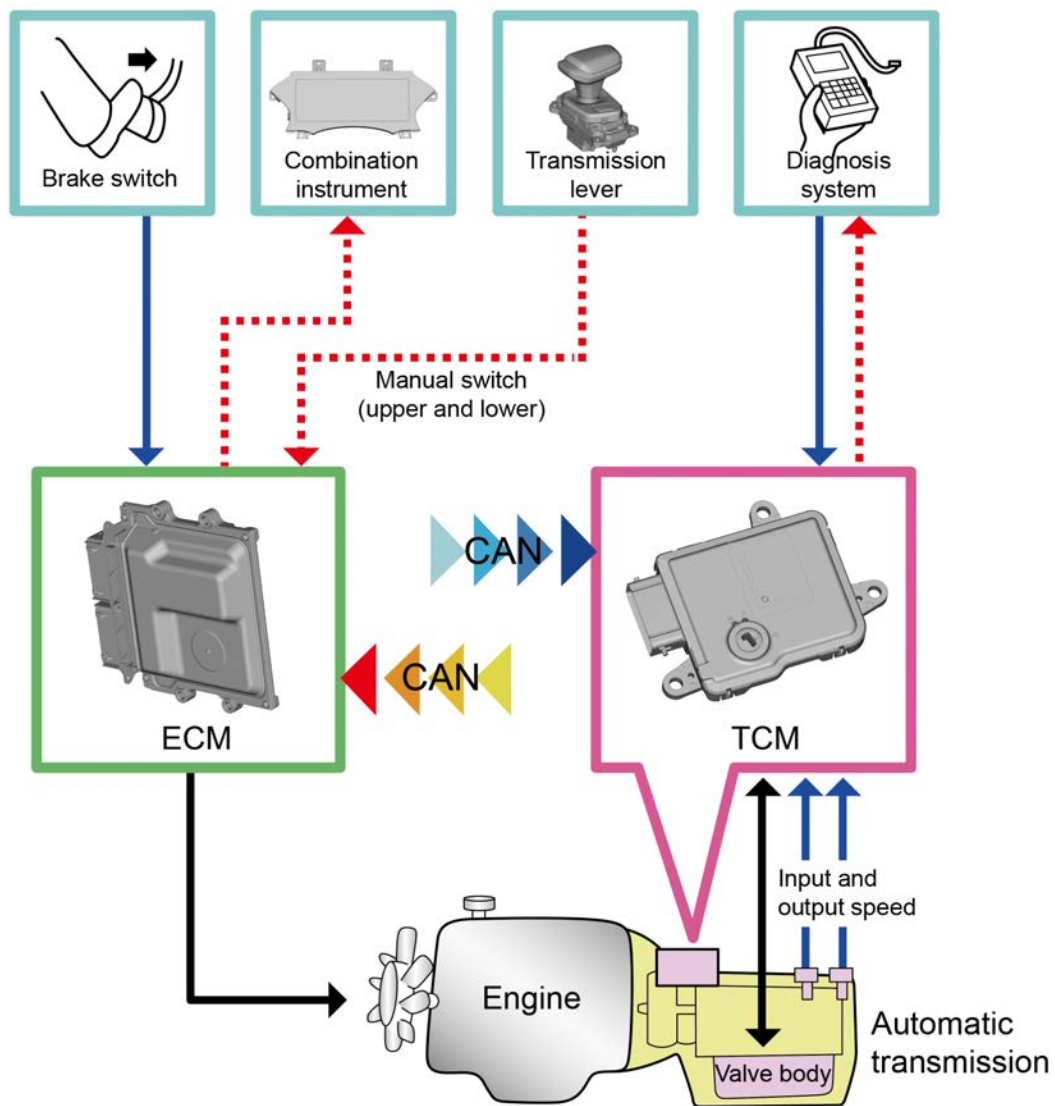
- All parts shall be thoroughly cleaned, dried and coated with specified grease.
- Do not clean aluminum and rubber parts with alkaline chemicals.
- Do not clean the rubber parts with gasoline.

Precautions when handling automatic transmission fluid

- Do not drain the automatic transmission fluid when the automatic transmission fluid is not cooled.
- When automatic transmission fluid splashes on the floor, wipe it immediately, because the floor will become very slippery and dangerous.
- Do not mix transmission fluids of different brands.

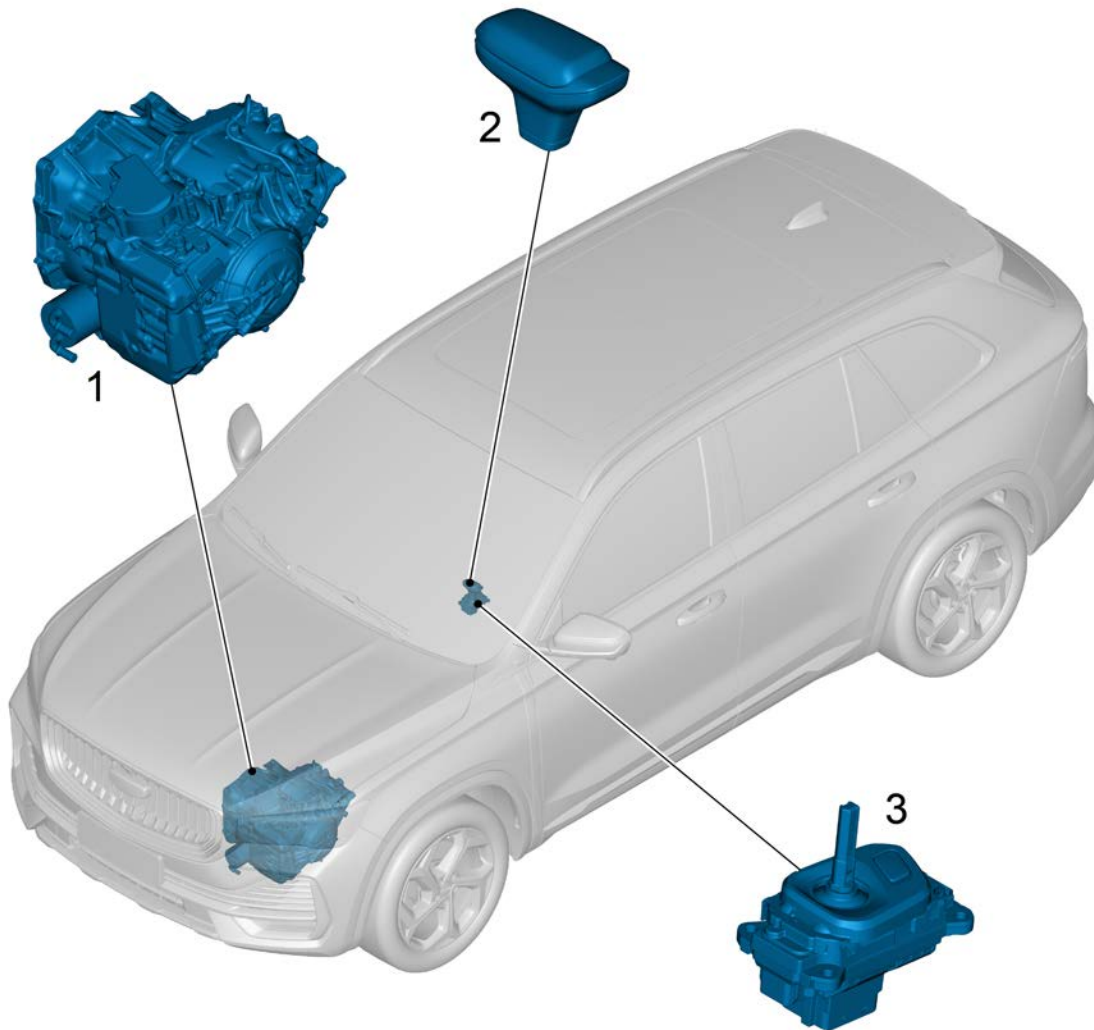
3.2.3 System working principles

3.2.3.1 System Working Principles



3.2.4 Component position

3.2.4.1 Component position



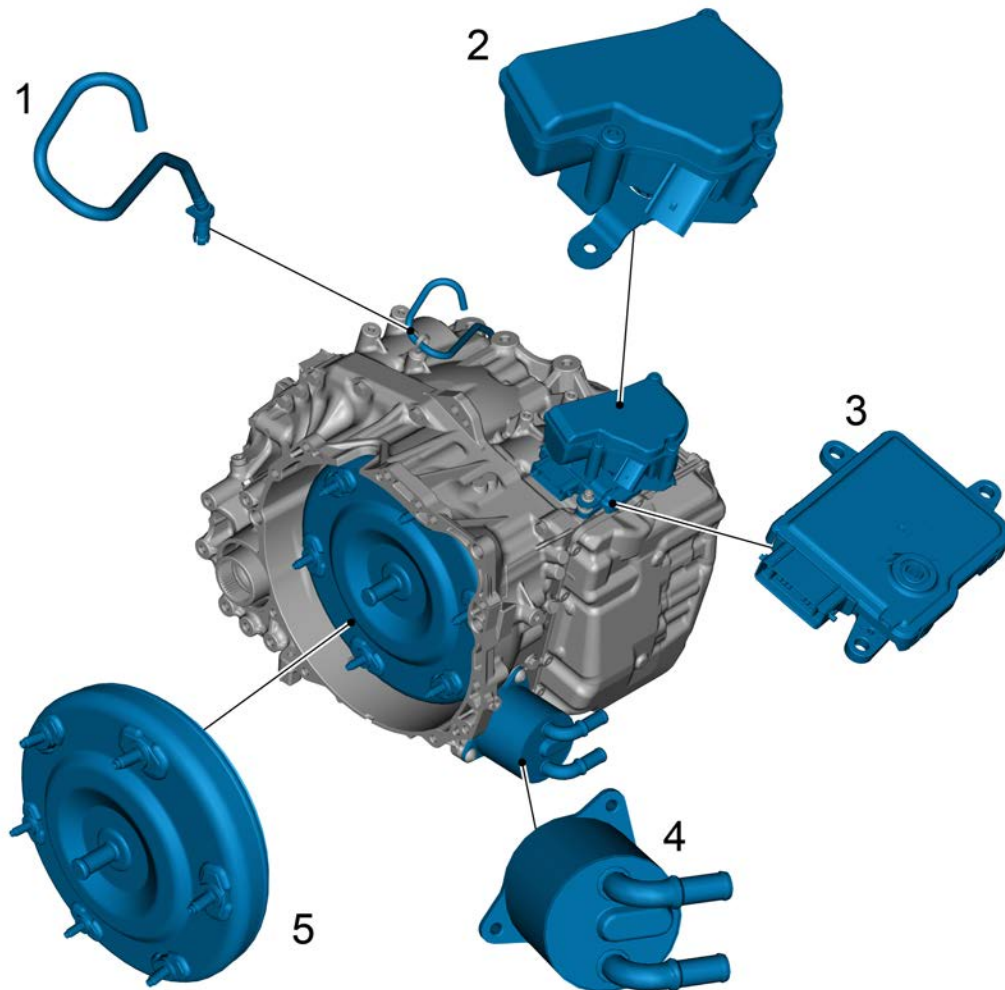
1. 8AT automatic transmission assembly

2. Shift lever

3. Gear shifting-lever module

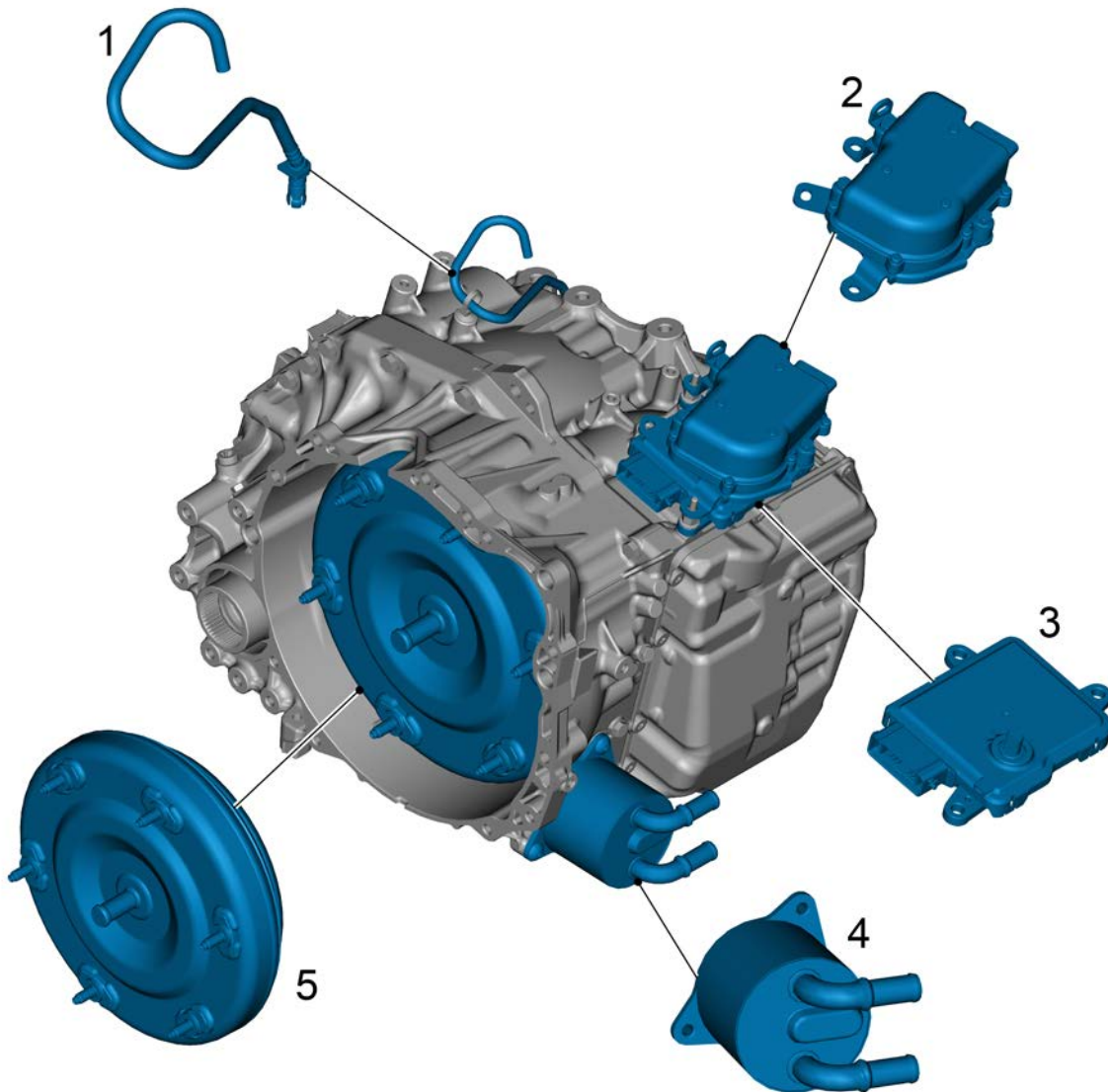
3.2.4.2 8 AT transmission assembly sensor location diagram

Type I



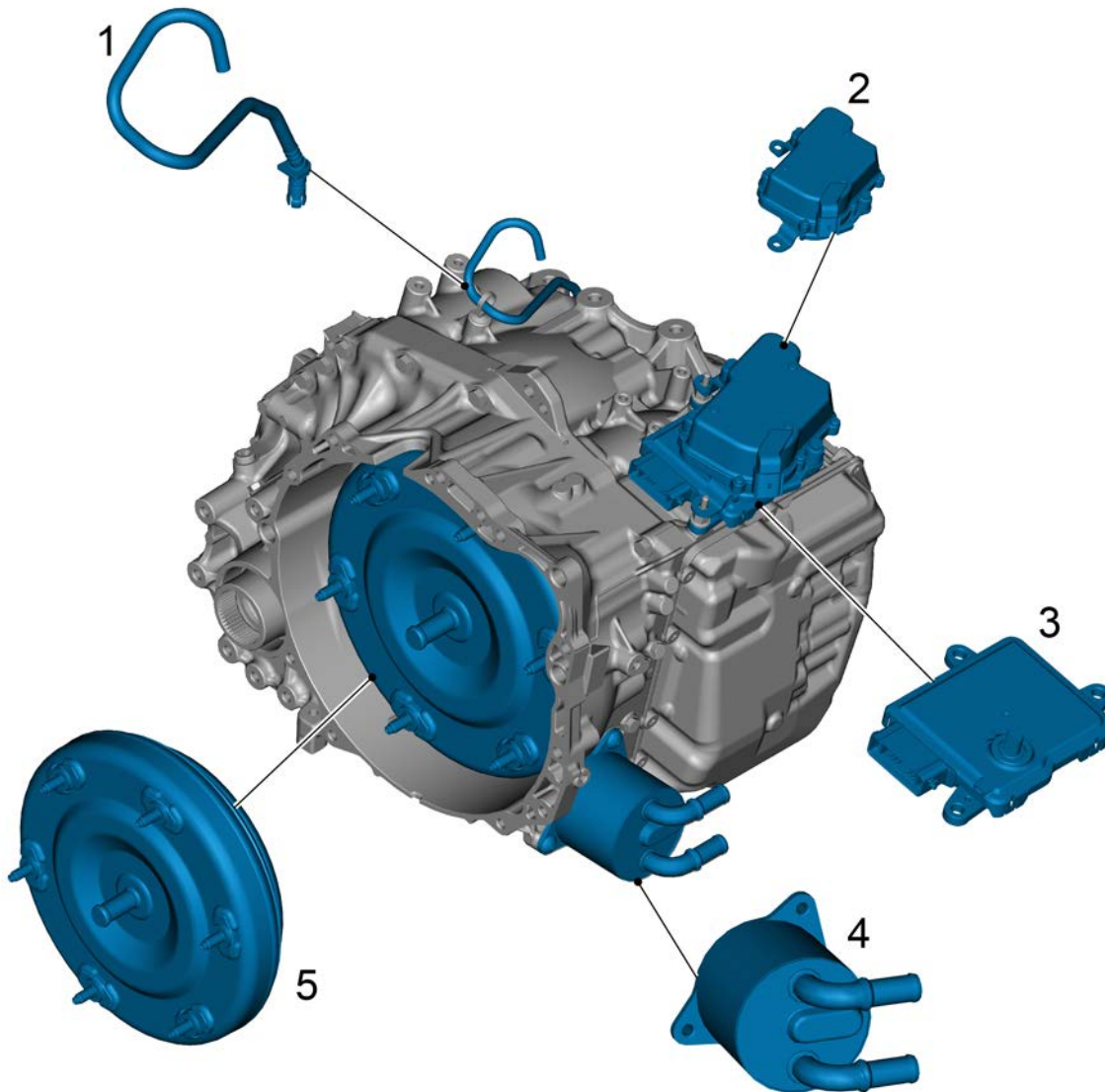
- | | |
|---|-------------------------------|
| 1. Automatic transmission breather pipe | 4. Transmission fluid cooler |
| 2. Electronic shift actuator assembly | 5. Hydraulic torque converter |
| 3. Transmission control unit (TCU) | |

Type II



- | | |
|---|-------------------------------|
| 1. Automatic transmission breather pipe | 4. Transmission fluid cooler |
| 2. Electronic shift actuator assembly | 5. Hydraulic torque converter |
| 3. Transmission control unit (TCU) | |

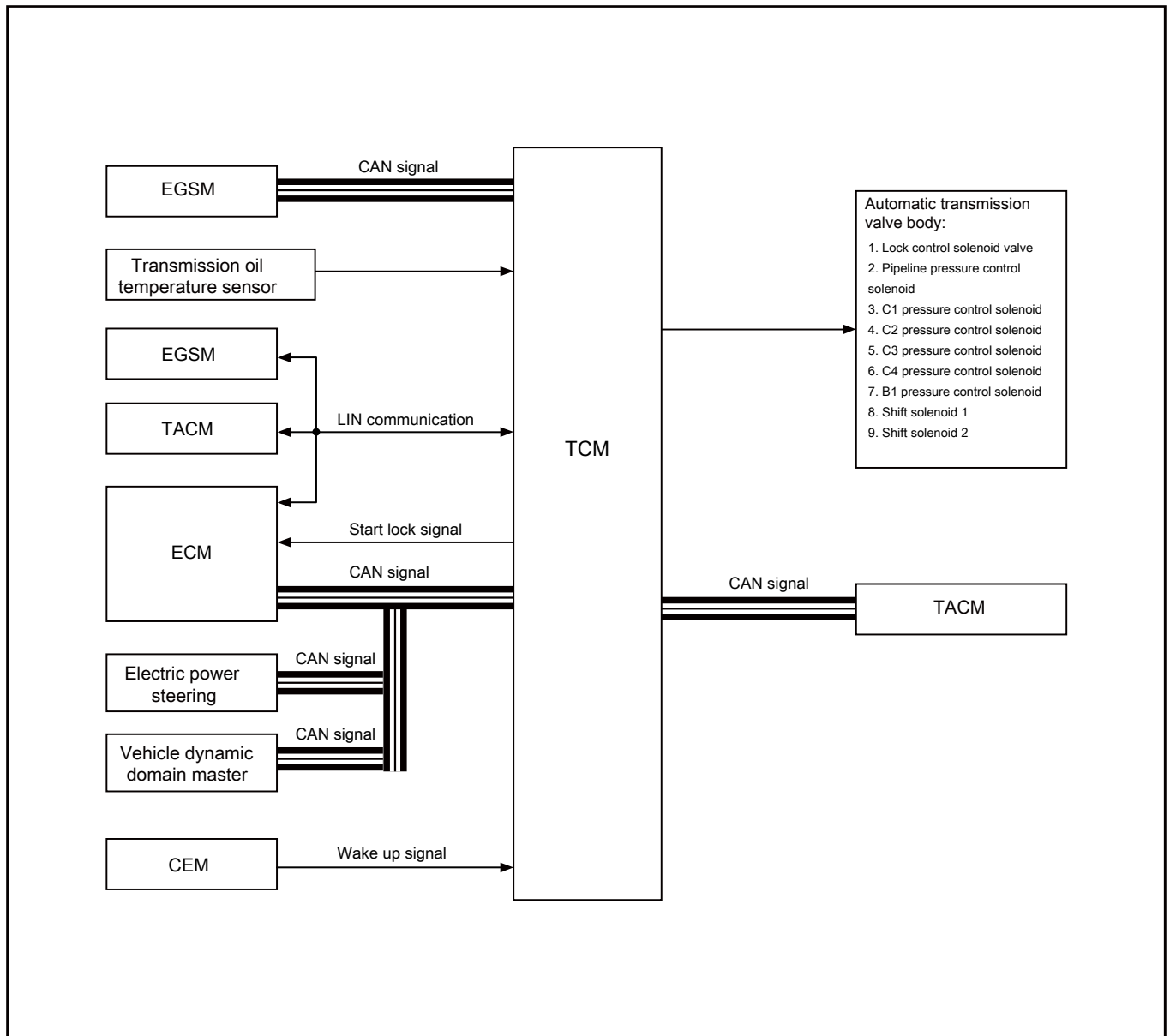
Type 3



- | | | | |
|----|--------------------------------------|----|----------------------------|
| 1. | Automatic transmission breather pipe | 4. | Transmission fluid cooler |
| 2. | Electronic shift actuator assembly | 5. | Hydraulic torque converter |
| 3. | Transmission control unit (TCU) | | |

3.2.5 Electrical schematic diagram

3.2.5.1 Electrical schematic diagram



3.2.6 Diagnostic information and procedures

3.2.6.1 DTC fault protection

Different symptoms and protective modes will be produced from different types of faults and vehicle operating conditions. The vehicle will return to normal after diagnostic completed.

3.2.6.2 Diagnosis system

1. Description

When fault elimination of a vehicle equipped with multiplex communication on-board diagnostics (OBD) is carried out, the vehicle must be connected to an intelligent detector. Then various data output by control module can be read.

OBD specifications require the on-board computer to light up the fault lamp when faults in parts and components of system are detected. The corresponding DTC will then be recorded in control module storage. If a fault does not appear again in 3 continuous cycles, the fault lamp will go out automatically. But DTC is still recorded in control module storage.

Connect the cable of fault diagnostic instrument to the diagnostic interface. It will operate the start and stop button to ON status. The diagnostic instrument is then enabled. If there is a communication error on the display screen, there is a problem either in the vehicle or in the diagnostic instrument.

Caution

If communication is normal when the diagnostic instrument is connected to another vehicle, then the diagnostic interface on the previous vehicle should be checked.

If the communication fails when the diagnostic instrument is connected to another vehicle, then there may be a problem in the diagnostic instrument. Please consult service department listed in the service manual of the diagnostic instrument.

3.2.6.3 Reading and clearing of fault diagnostic code

1. Read DTC

- a. Connect the fault diagnostic apparatus to the diagnostic interface.
- b. Operate the starting switch to place the power in mode "ON".
- c. Read the value of DTC according to the prompts on the diagnostic apparatus screen.

2. Clear DTC

- a. Connect the fault diagnostic apparatus to the fault diagnostic interface.
- b. Operate the starting switch to place the power in mode "ON".
- c. Delete DTC according to the prompts on the diagnostic apparatus screen.

3.2.6.4 Stall test

Stall test is often required when repairing the fault of automatic transmission. The stall test can judge whether the clutch slips, the engine power is insufficient or the hydraulic torque converter fails.

Stall test

- a. Stop the brake and lock the wheels.
- b. Secure the vehicle with a chain.
- c. Install the engine speed sensor.
- d. Step on the brake pedal with your left foot and shift to gear d or R; step on the accelerator pedal with your right foot and quickly check the engine speed.

Speed specification: 2,500 ± 150 RPMs

- The stall test will cause the ATF temperature to rise suddenly. The test shall not last for more than 5 seconds.
- Perform the test at least 3 times and calculate the average value.

Check test results

Low stall test results	Replace the hydraulic torque converter and check the engine parts (insufficient engine power).
High stall test results	Replace A/T

3.2.7 Removing and installing

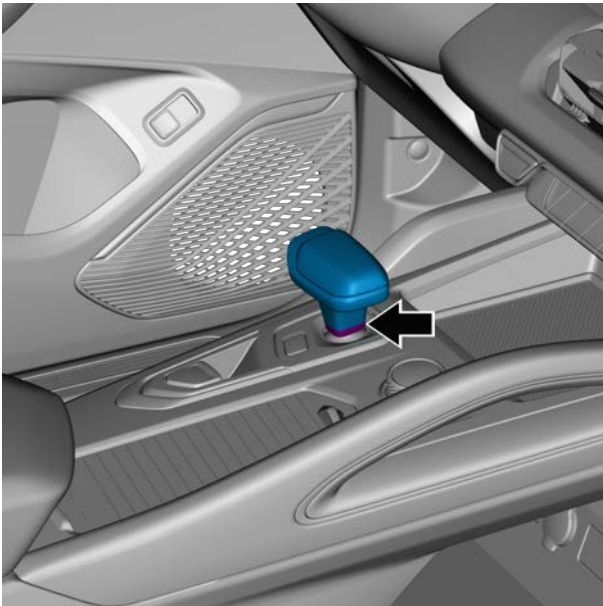
3.2.7.1 Shift lever replacement

Removal procedure

- 1 Rotate the locking ring clockwise (counter-clockwise) to remove the gearbox ball.

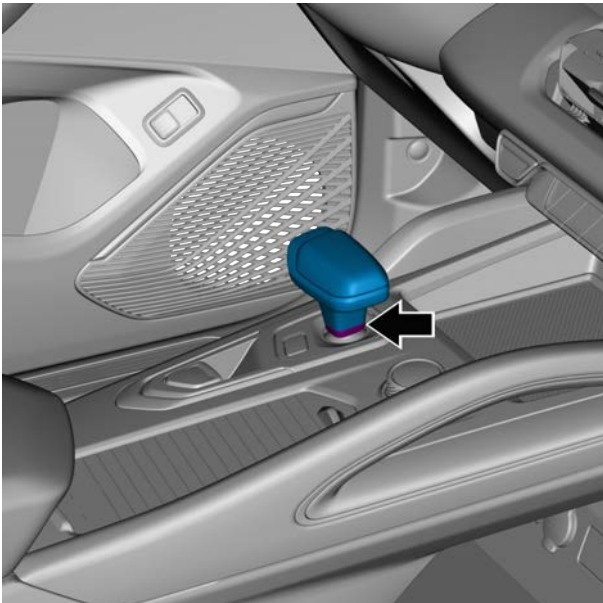
Caution

If unlocking torque 2Nm clockwise (counterclockwise) and the locking ring still cannot be released, please rotate the locking ring in the opposite direction and remove the gearbox ball;



Installation procedure

- 1 Install the gearbox ball and rotate the locking ring in the opposite direction (opposite to the direction of removal).



3.2.7.2 Selector module replacement

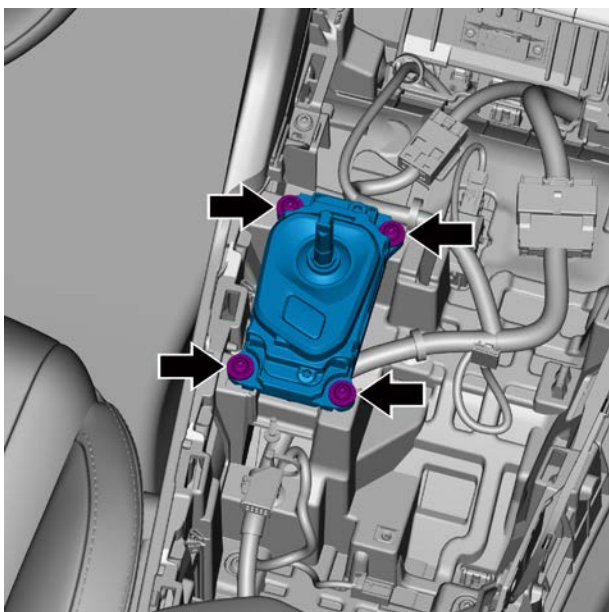
Removal procedure

Warning !

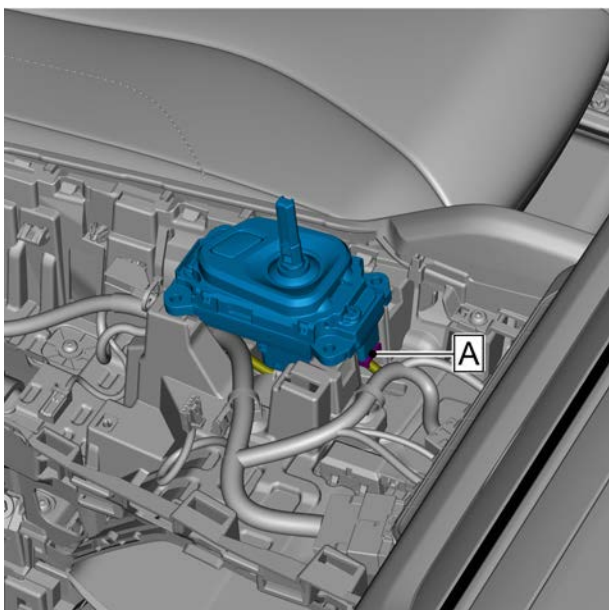
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)

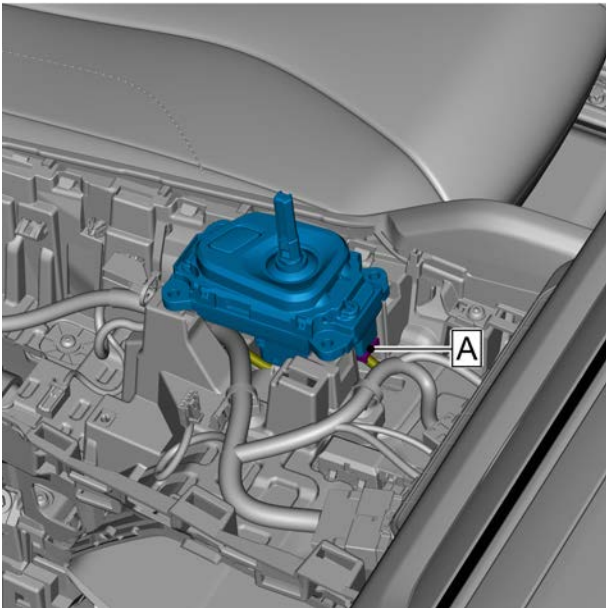
- 2 Remove and replace the shift lever. See [shift lever replacement](#).
- 3 Remove the shift panel assembly, see [Replacement of the shift panel assembly](#).
- 4 Remove 4 socket head cap screws from the selector module.



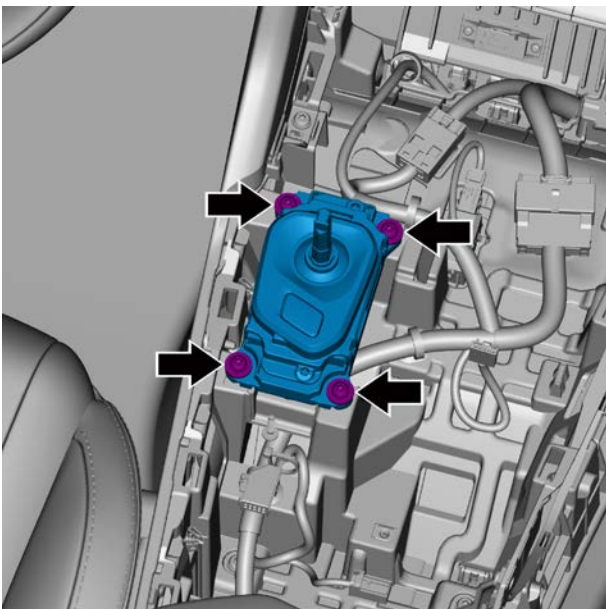
- 5 Disconnect the selector module harness connector A and remove the selector module.



Installation procedure



- 1 Install the selector module and connect the selector module harness connector A.



- 2 Install and tighten 4 socket head cap screws of the selector module.

Torque: 4.5 N. m (metric system) 3.3 lb-ft (Imperial system)

- 3 Install the shift panel assembly.
- 4 Install shift lever replacement.
- 5 Connect the negative battery cable.
- 6 Use the GLDS diagnostic program, select the corresponding module under the [software] tab, and complete the software brushing operation according to the steps prompted by the diagnostic program.

3.2.7.3 Replacement of Electronic Shift Actuator Assembly (Type 1)

Removal procedure

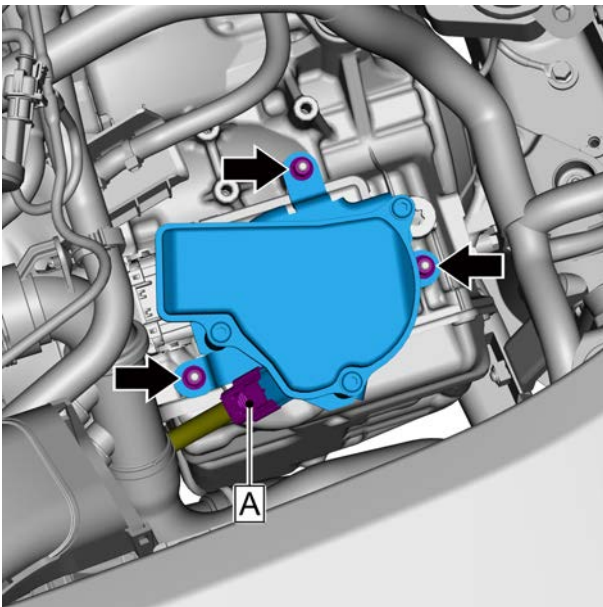
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

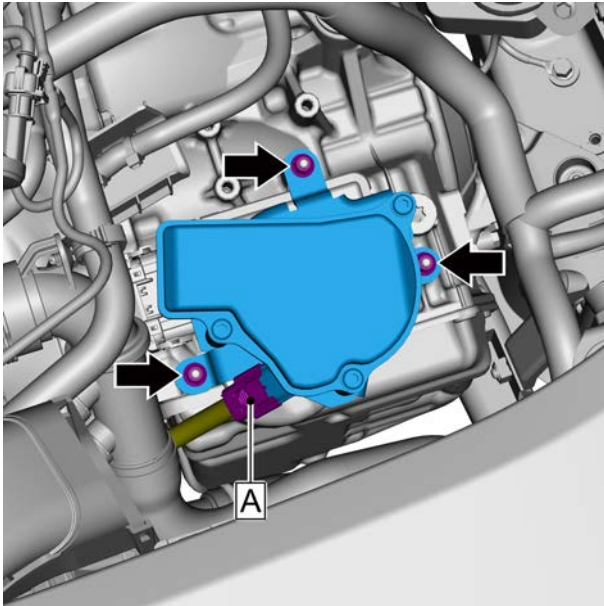
Warning !

See [Automatic transmission maintenance precautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the mass air flow sensor, see [replacement of mass air flow sensor](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 5 Disconnect harness connector A of electronic shift actuator assembly.
- 6 Remove 3 fixing nuts from the electronic shift actuator assembly and remove the electronic shift actuator assembly.



Installation procedure



- 1 Install the electronic shift actuator assembly. Install and tighten 3 fixing nuts of the electronic shift actuator assembly.
Torque:10 N·m (metric) 7.4 lb-ft (imperial system)
- 2 Connect harness connector A of electronic shift actuator assembly.

- 3 Install the air filter assembly.
- 4 Install the mass air flow sensor.
- 5 Connect the negative battery cable.
- 6 Use the GLDS diagnostic program, select the corresponding module under the [software] tab, and complete the software brushing operation according to the steps prompted by the diagnostic program.
- 7 Close the engine compartment cover.

3.2.7.4 Replacement of Electronic Shift Actuator Assembly (Type 2)

Removal procedure

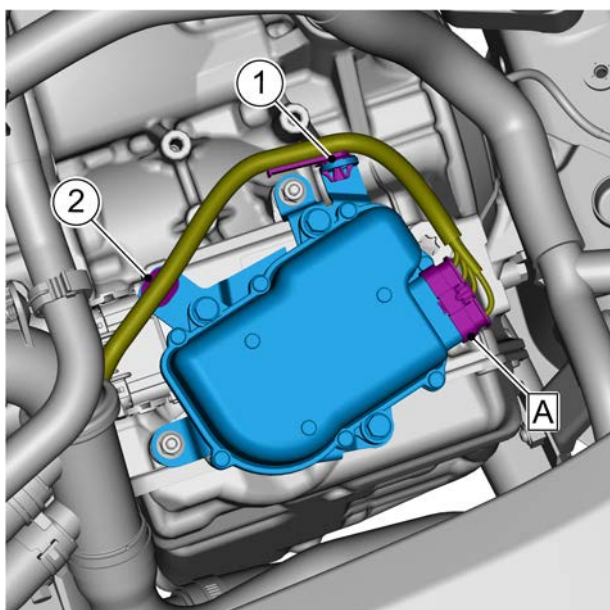
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

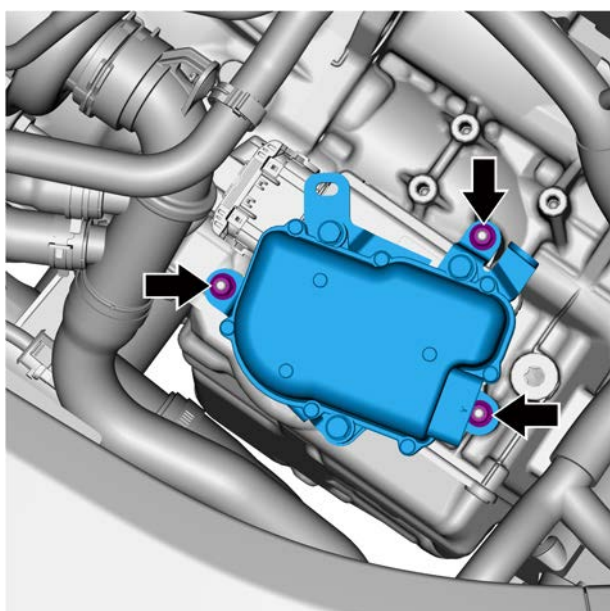
Warning !

See [Automatic transmission maintenance precautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the mass air flow sensor, see [replacement of mass air flow sensor](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).

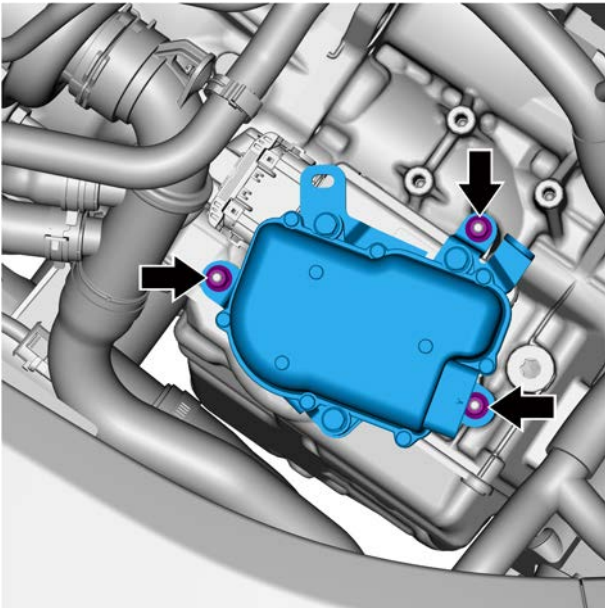


- 5 Disconnect harness connector A of electronic shift actuator assembly.
- 6 Disconnect the electronic shift actuator assembly harness retaining clips 1 and 2.



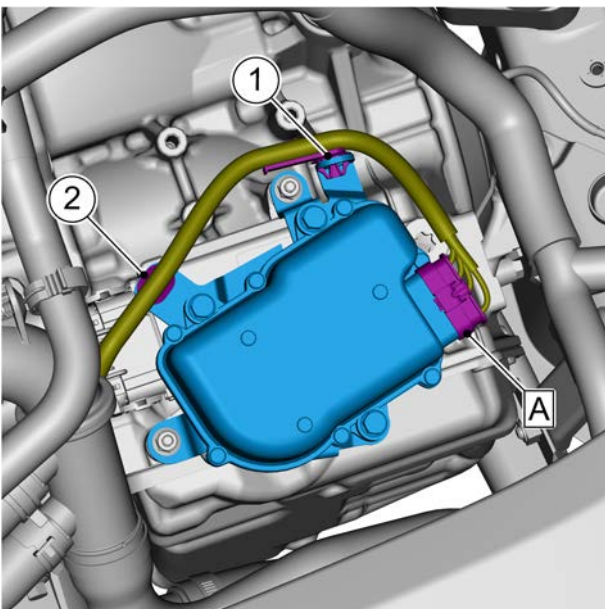
- 7 Remove the 3 fixing nuts of the electronic shift actuator assembly.
- 8 Remove the electronic shift actuator.

Installation procedure



- 1 Install the electronic shift actuator assembly. Install and tighten 3 fixing nuts of the electronic shift actuator assembly.

Torque:10 N·m (metric) 7.4 lb-ft (imperial system)



- 2 Connect harness connector A of electronic shift actuator assembly.
- 3 Install the electronic shift actuator assembly wire harness retaining clips 1 and 2.

- 4 Install the air filter assembly.
- 5 Install the mass air flow sensor.
- 6 Connect the negative battery cable.
- 7 Use the GLDS diagnostic program, select the corresponding module under the [software] tab, and complete the software brushing operation according to the steps prompted by the diagnostic program.
- 8 Close the engine compartment cover.

3.2.7.5 Replacement of Electronic Shift Actuator Assembly (Type 3)

Removal procedure

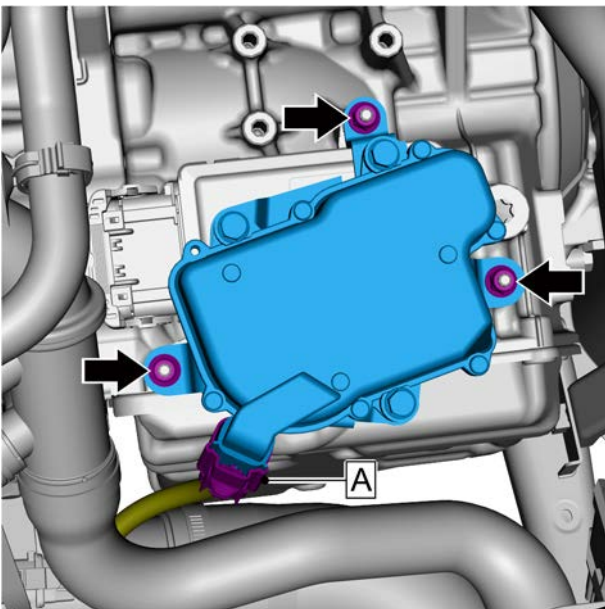
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

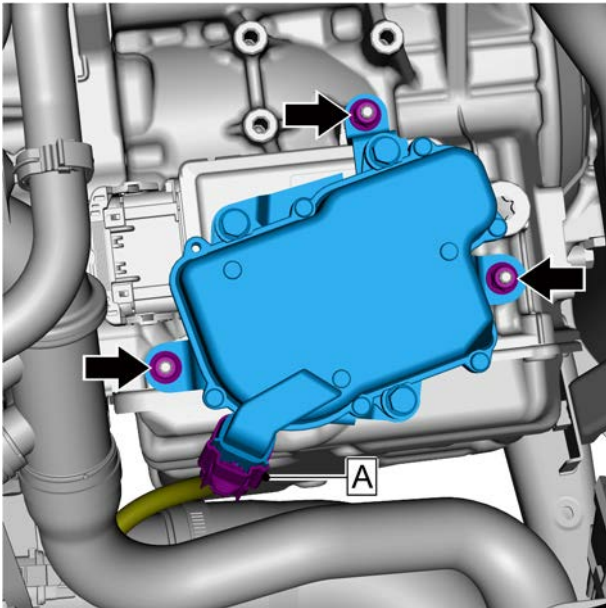
Warning !

See [Automatic transmission maintenance precautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the mass air flow sensor, see [replacement of mass air flow sensor](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 5 Disconnect harness connector A of electronic shift actuator assembly.
- 6 Remove 3 fixing nuts from the electronic shift actuator assembly and remove the electronic shift actuator assembly.



Installation procedure



- 1 Install the electronic shift actuator assembly. Install and tighten 3 fixing nuts of the electronic shift actuator assembly.
Torque:10 N·m (metric) 7.4 lb·ft (imperial system)
- 2 Connect harness connector A of electronic shift actuator assembly.

- 3 Install the air filter assembly.
- 4 Install the mass air flow sensor.
- 5 Connect the negative battery cable.
- 6 Use the GLDS diagnostic program, select the corresponding module under the [software] tab, and complete the software brushing operation according to the steps prompted by the diagnostic program.
- 7 Close the engine compartment cover.

3.2.7.6 Replacement of 8AT transmission control module

Removal procedure

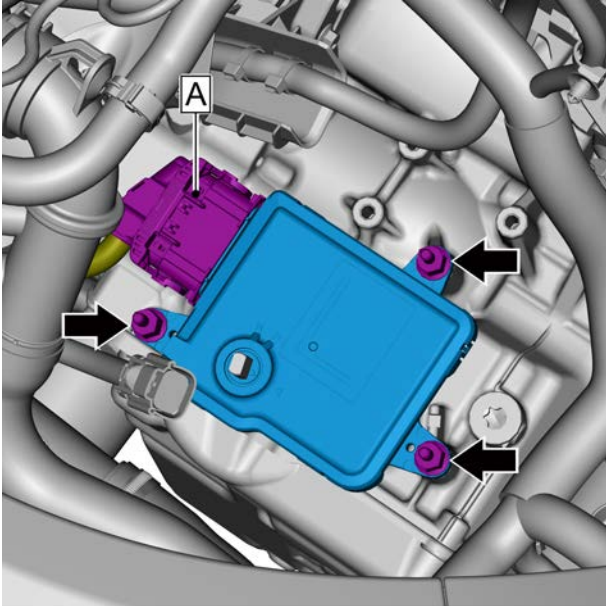
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

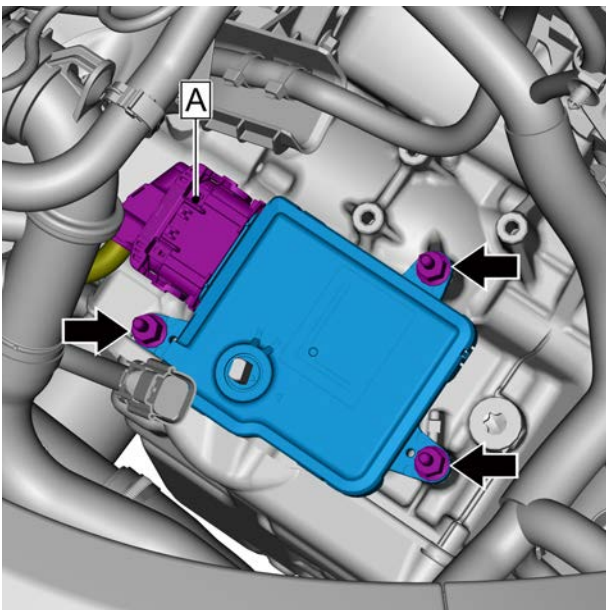
Warning !

See [Automatic transmission maintenance precautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the mass air flow sensor, see [replacement of mass air flow sensor](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).



- 5 To remove the electronic shift actuator assembly, see [Replacement of the Electronic shift actuator assembly \(type 1\)](#), [Replacement of the Electronic shift actuator assembly \(type 2\)](#), and [Replacement of the Electronic shift actuator assembly \(type 3\)](#).
- 6 Disconnect the transmission control module harness connector A.
- 7 Remove the 3 fixing bolts of the transmission control module, and remove the transmission control module.



Installation procedure

- 1 Install the transmission control module, install and tighten the 3 retaining bolts of the transmission control module.
Torque: 24.5 N. m (metric system) 18.0 lb-ft (Imperial system)
- 2 Connect the transmission control module harness connector A.
- 3 Install the electronic shift actuator assembly.
- 4 Install the air filter assembly.
- 5 Install the mass air flow sensor.
- 6 Connect the negative battery cable.

- 7 Use the GLDS diagnostic program, select the corresponding module under the [software] tab, and complete the software brushing operation according to the steps prompted by the diagnostic program.
- 8 Close the engine compartment cover.

3.2.7.7 Oil pan cover plate replacement

Removal procedure

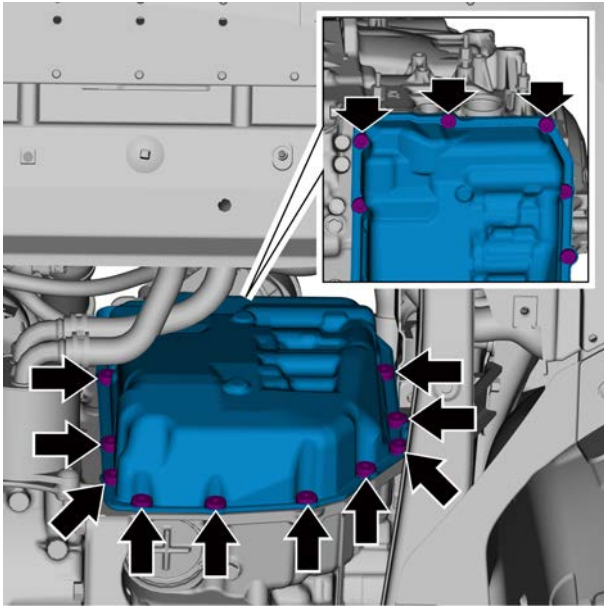
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Warning !

See [Automatic transmission maintenance precautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Lift the vehicle, see [Lift the vehicle](#)
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 6 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe](#).
- 7 Remove the intercooler outlet pipe assembly. See [intercooler outlet pipe assembly replacement](#).



- 8 Drain the transmission fluid. See [transmission fluid drain and fill procedure \(8AT\)](#).
- 9 Pre remove the 13 retaining bolts of the oil pan cover plate in diagonal order, knock the oil pan cover plate with a plastic hammer and remove the oil pan cover plate.

Caution

Do not damage the joint surface between the oil pan cover plate and the transmission.

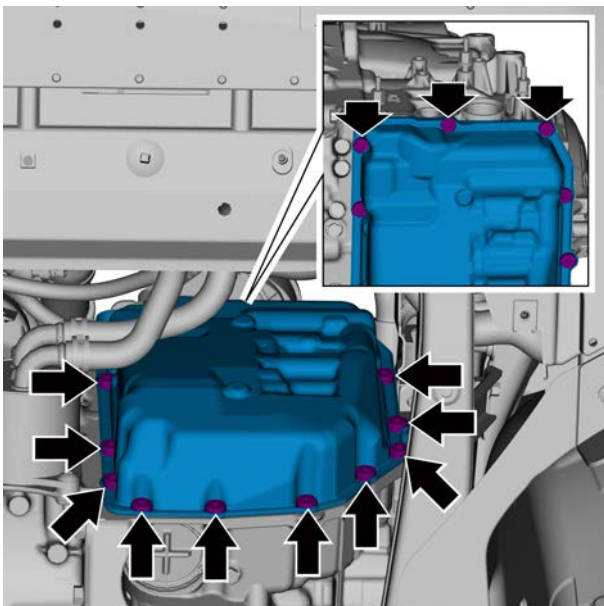
Installation procedure

- 1 Clean the joint surface between the oil pan cover plate and the transmission, and apply sealant on the mounting surface of the oil pan cover plate.
- 2 Install the oil pan cover plate, Pre-tighten and tighten the 13 retaining bolts of the oil pan cover plate in diagonal order.

Torque: 12.8 N. m (metric system) 9.4 lb-ft (Imperial system)

Caution

1. The oil pan cover plate is a disposable vulnerable part, and a new oil pan cover plate shall be replaced.
2. The retaining bolts of the oil pan cover plate are disposable vulnerable parts, and the retaining bolts of the oil pan cover plate shall be replaced with new ones.



- 3 Install the intercooler outlet pipe assembly.
- 4 Install the air inlet pipe of the air filter.
- 5 Install the air filter assembly.
- 6 Connect the negative battery cable.
- 7 Fill the transmission oil.
- 8 Install the engine fender.

- 9 Lower the vehicle.
- 10 Close the engine compartment cover.

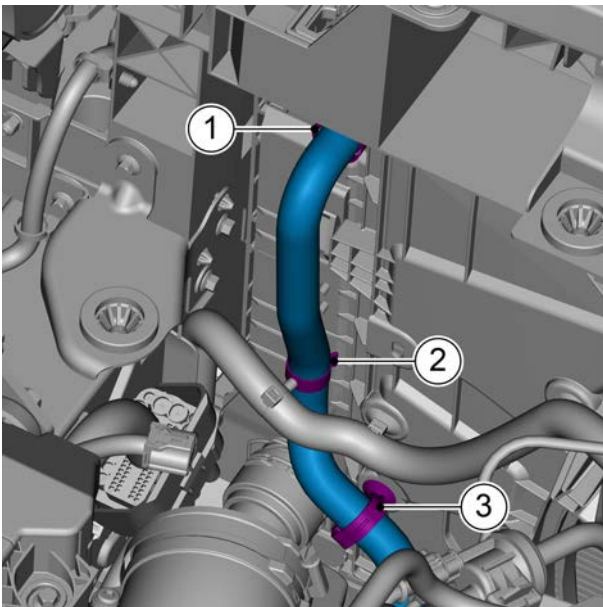
3.2.7.8 Replacement of inlet pipe of transmission fluid cooler

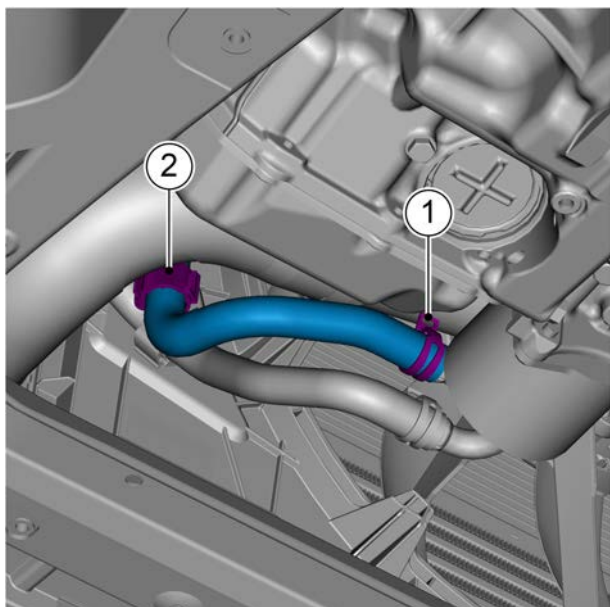
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

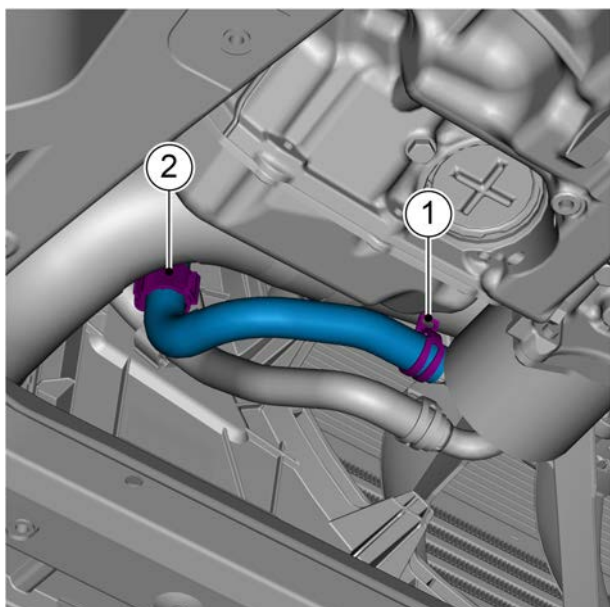
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the mass air flow sensor, see [replacement of mass air flow sensor](#).
- 4 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 5 Lift the vehicle, see [Lift the vehicle](#)
- 6 Remove the engine fender, see [Engine fender replacement](#).
- 7 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 8 Remove the fixing clamp of the inlet pipe of the transmission fluid cooler and disconnect the connection between the inlet pipe of the transmission fluid cooler and the radiator.
- 9 Disconnect the inlet pipe clamp 2 of the transmission fluid cooler.
- 10 Remove fixing clip 3 of inlet pipe of transmission fluid cooler.



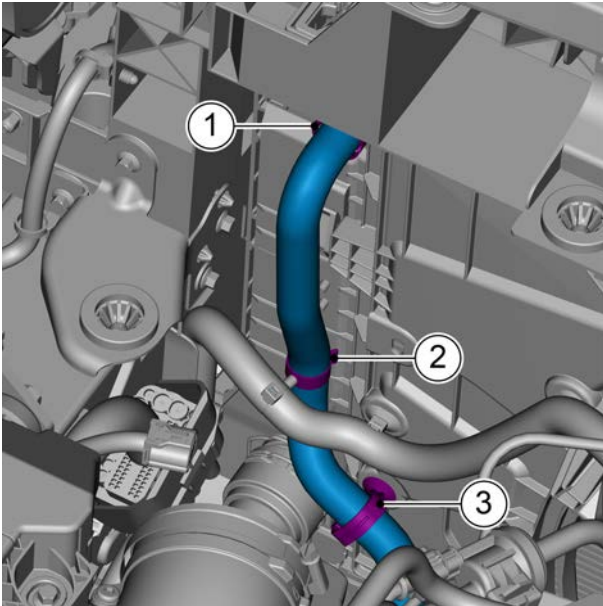


- 11 Remove the fixing clip 2 of the inlet pipe of the transmission fluid cooler.
- 12 Remove the fixing clamp 1 of the inlet pipe of the transmission fluid cooler, and remove the inlet pipe of the transmission fluid cooler.

Installation procedure



- 1 Install the inlet pipe of the transmission fluid cooler, and install the fixing clamp 1 of the inlet pipe of the transmission fluid cooler.
- 2 Install the fixing clip 2 of the inlet pipe of the transmission fluid cooler.



- 3 Install fixing clip 3 of inlet pipe of transmission fluid cooler.
- 4 Install the transmission fluid cooler inlet pipe clamp 2.
- 5 Connect the inlet pipe of the transmission fluid cooler with the radiator, and install the fixing clamp of the inlet pipe of the transmission fluid cooler.

- 6 Fill engine coolant.
- 7 Install the engine fender.
- 8 Lower the vehicle.
- 9 Install the air filter assembly.
- 10 Install the mass air flow sensor.
- 11 Connect the cathode cable of the battery, start the vehicle, connect the diagnostic instrument, monitor the water temperature and the speed of the electronic water pump, and observe the liquid level of the expansion tank. If the liquid level drops, add coolant in time; until the large circulation is opened, add coolant to the scribed line on the expansion tank, and tighten the lid of the expansion tank.
- 12 Close the engine compartment cover.

3.2.7.9 Replacement of oil cooler assembly

Removal procedure

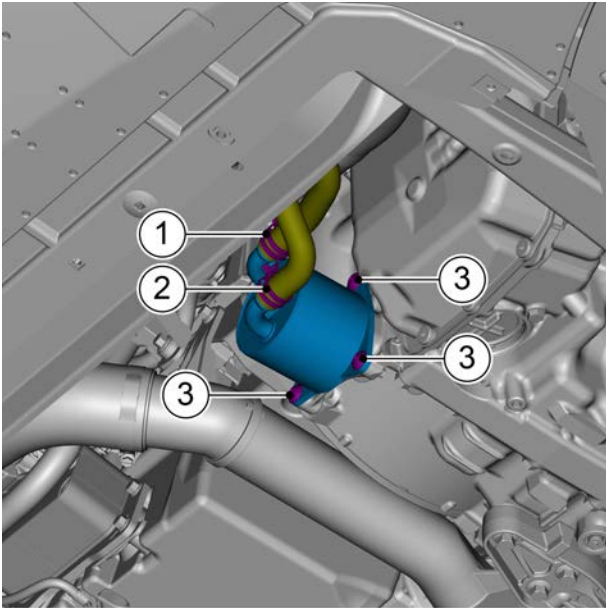
Warning !

See "Warnings Regarding Cooling System Maintenance" in "[Warnings and Precautions](#)".

Warning !

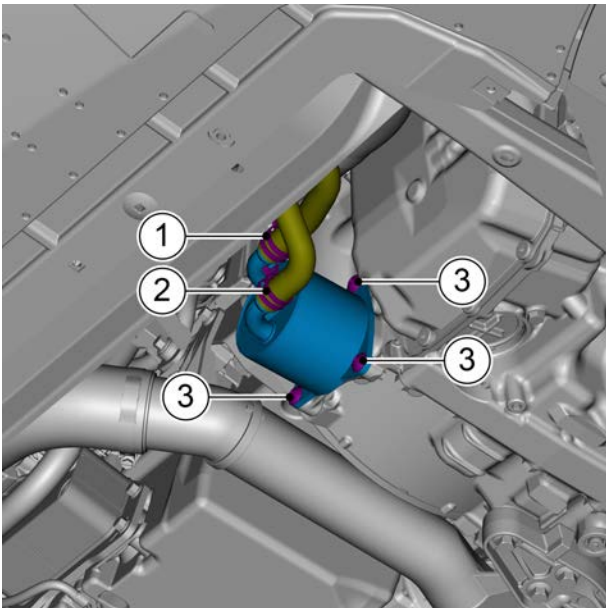
See [Automatic transmission maintenance precautions](#).

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the engine fender, see [Engine fender replacement](#).
- 3 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).



- 4 Drain the transmission fluid. See [transmission fluid drain and fill procedure \(8AT\)](#).
- 5 Remove the fixing clamp 1 of the inlet pipe of the transmission fluid cooler, and disconnect the connection between the inlet pipe of the transmission fluid cooler and the oil cooler assembly.
- 6 Remove the fixing clamp 2 of the radiator outlet pipe and disconnect the connection between the radiator outlet pipe and the oil cooler assembly.
- 7 Remove the three retaining bolts 3 of the oil cooler assembly and remove the oil cooler assembly.

Installation procedure



- 1 Install the oil cooler assembly, install and tighten the three retaining bolts 3 of the oil cooler assembly.

Torque: 21 N. m (metric system) 15.5 lb-ft (Imperial system)

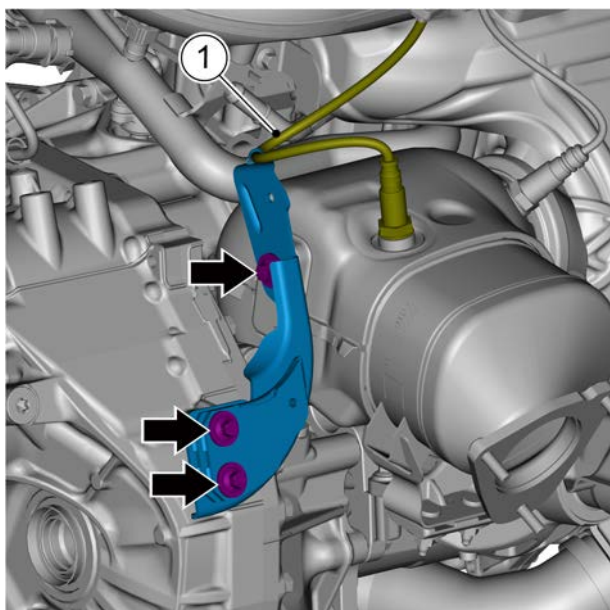
Caution

The sealing ring of the oil cooler assembly is a disposable vulnerable part, and a new sealing ring of the oil cooler assembly shall be replaced.

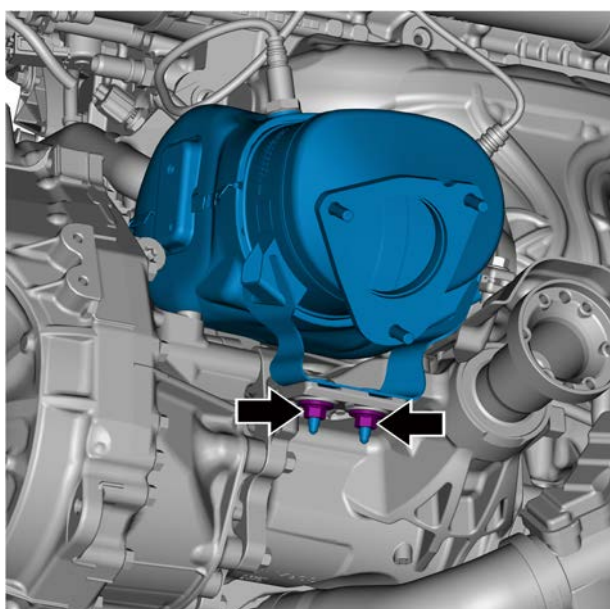
- 2 Connect the radiator outlet pipe and the oil cooler assembly, and install the fixing clamp 2 of the radiator outlet pipe.
- 3 Connect the transmission fluid cooler inlet pipe and the oil cooler assembly, and install the fixing clamp 1 of the transmission fluid cooler inlet pipe.
- 4 Fill the transmission oil.
- 5 Fill engine coolant.
- 6 Install the engine fender.
- 7 Lower the vehicle.

3.2.7.10 Replacement of Automatic Transmission Assembly

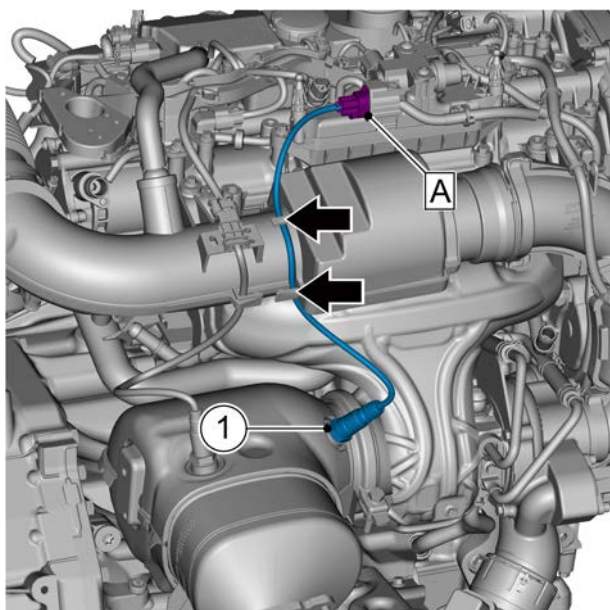
Removal procedure



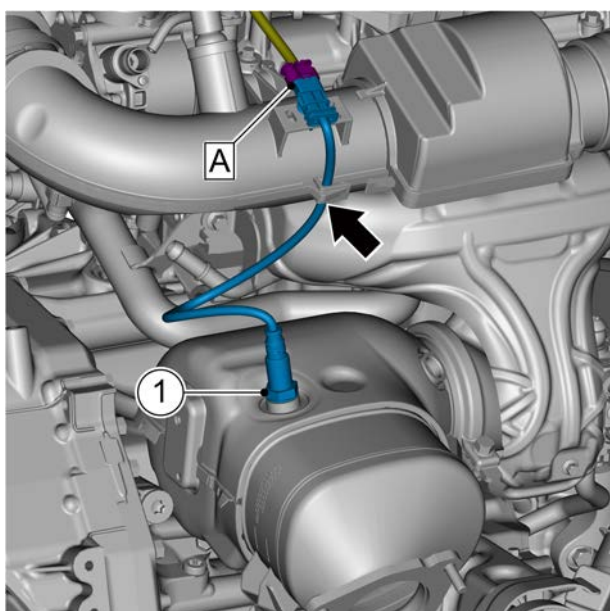
- 1 Remove the drive train. See [drive train replacement](#).
- 2 Remove the 3 fixing bolts of the front exhaust pipe bracket.
- 3 Disconnect the Lambda probe (rear oxygen sensor) harness 1.



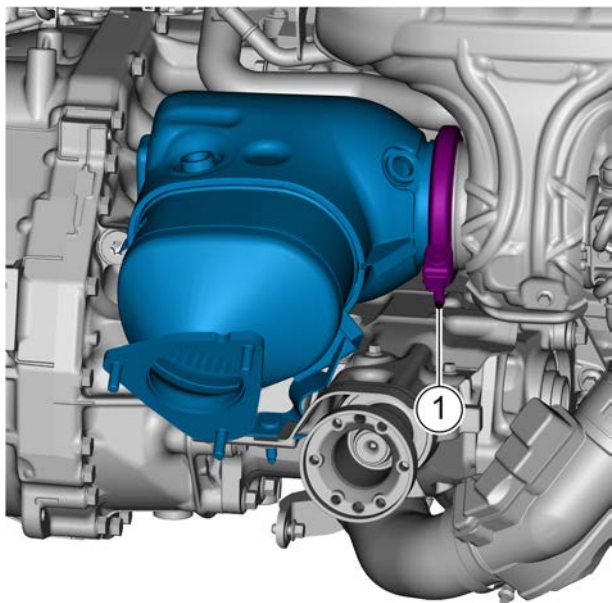
- 4 Remove 2 fixing nuts of catalytic of the catalytic converter.



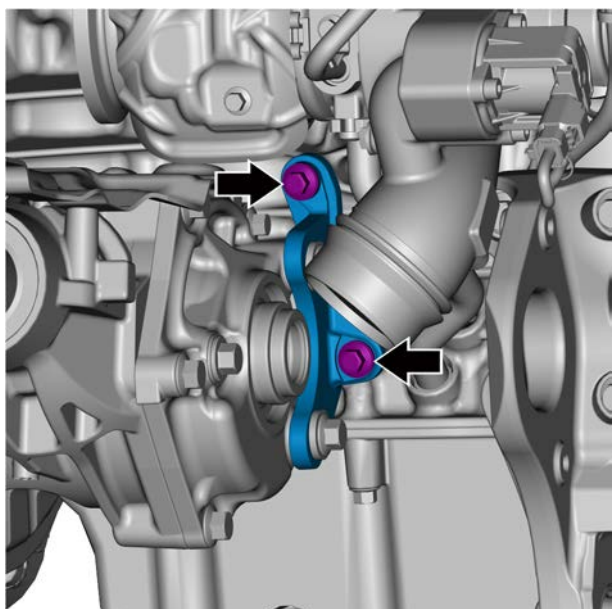
- 5 Disconnect the Lambda probe (front oxygen sensor) harness connector A.
- 6 Disconnect the Lambda probe (front oxygen sensor) harness from the vent pipe on the air filter.
- 7 Remove Lambda probe (front oxygen sensor) 1.



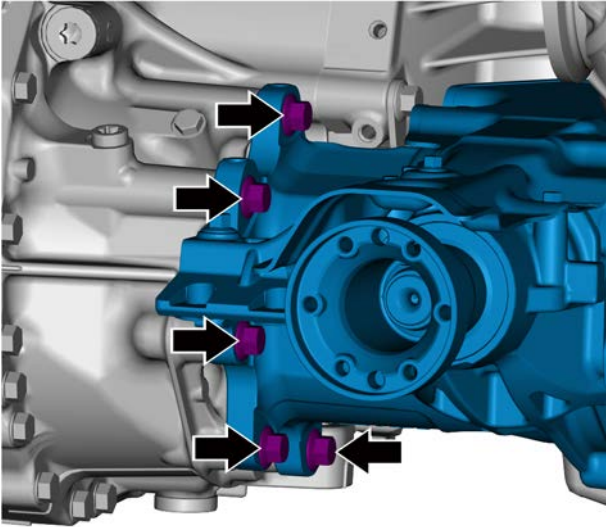
- 8 Disconnect the Lambda probe (rear oxygen sensor) harness connector A.
- 9 Disconnect the wiring harness of the Lambda probe (rear oxygen sensor) from the air outlet pipe on the air filter.
- 10 Remove Lambda probe (rear oxygen sensor) 1.



- 11 Remove the front exhaust pipe clamp 1 and remove the catalytic of the catalytic converter.



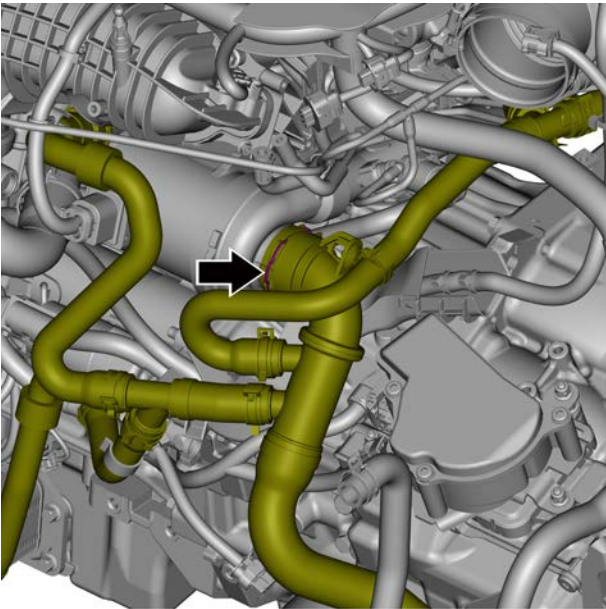
- 12 Remove the 2 retaining bolts of the power takeoff bracket.



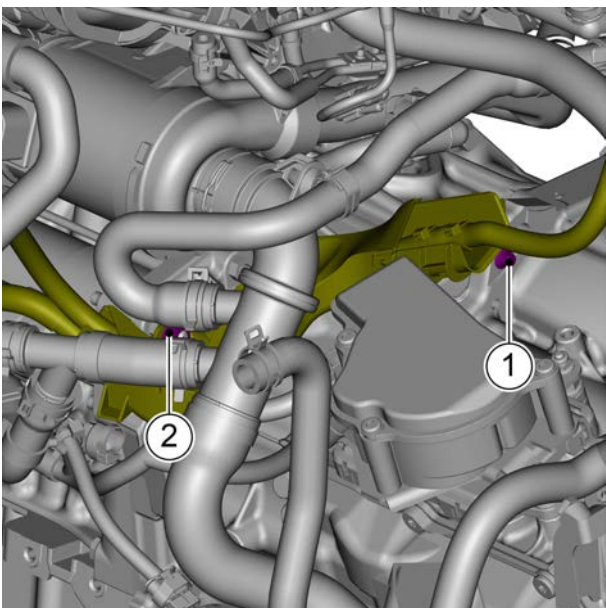
- 13 Remove the five retaining bolts of the power take-off and remove the power take-off.

Caution

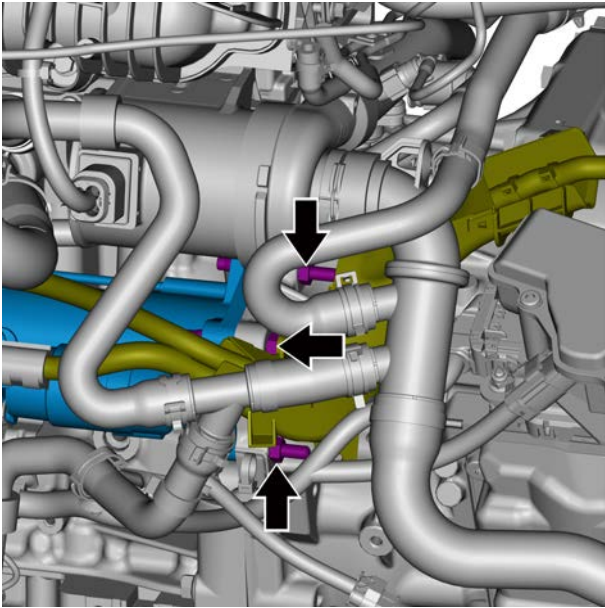
Bolts are disposable wearing parts, and new bolts shall be replaced.



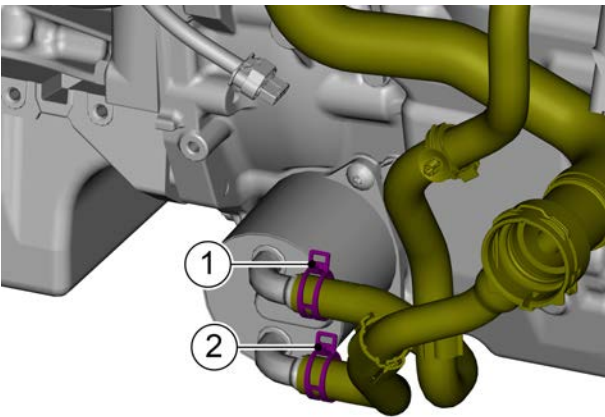
- 14 Unlock the quick insert elastic circlip and disconnect the radiator outlet pipe from the engine coolant pump.



- 15 Remove one retaining bolt 1 from the starting motor harness assembly.
- 16 Remove one fixing nut 2 from the starting motor harness assembly and move it aside.

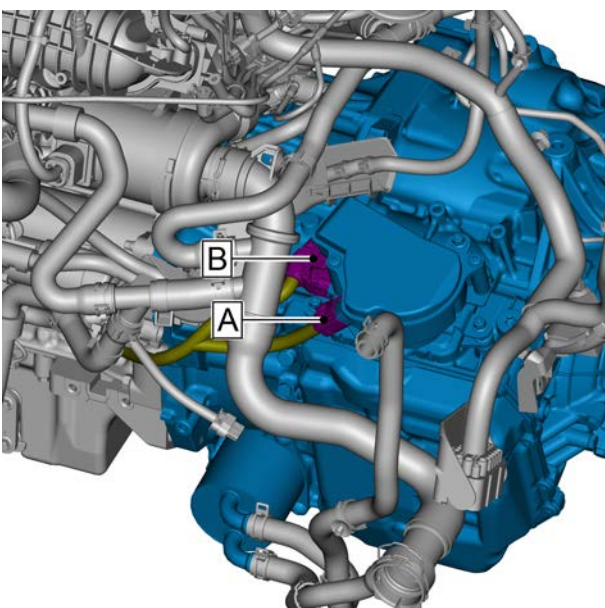


17 Remove 3 retaining bolts from the starter.



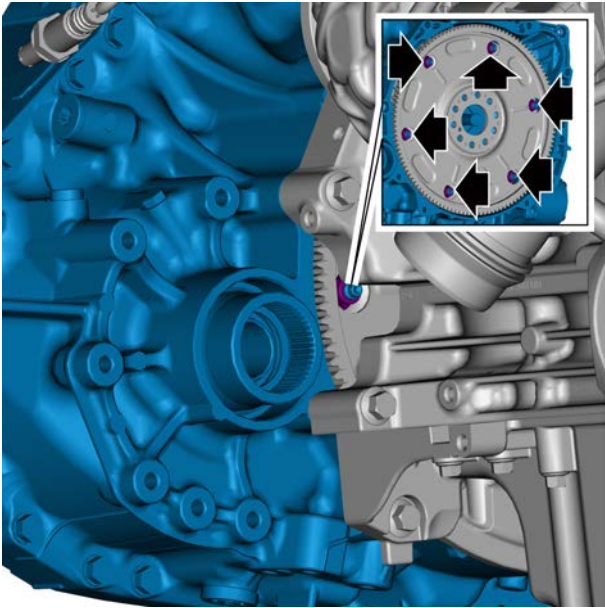
18 Remove the fixing clamp 1 of the inlet pipe of the transmission fluid cooler, and disconnect the connection between the inlet pipe of the transmission fluid cooler and the oil cooler assembly.

19 Remove the fixing clamp 2 of the radiator outlet pipe and disconnect the connection between the radiator outlet pipe and the oil cooler assembly.

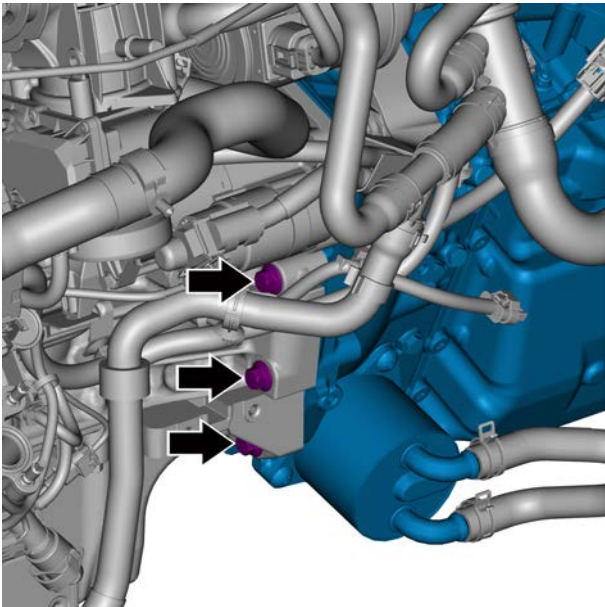


20 Disconnect harness connector A of electronic shift actuator assembly.

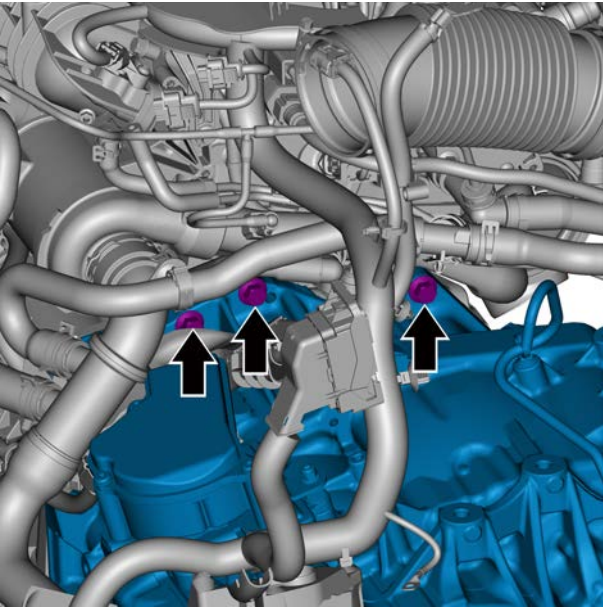
21 Disconnect the transmission control module harness connector B.



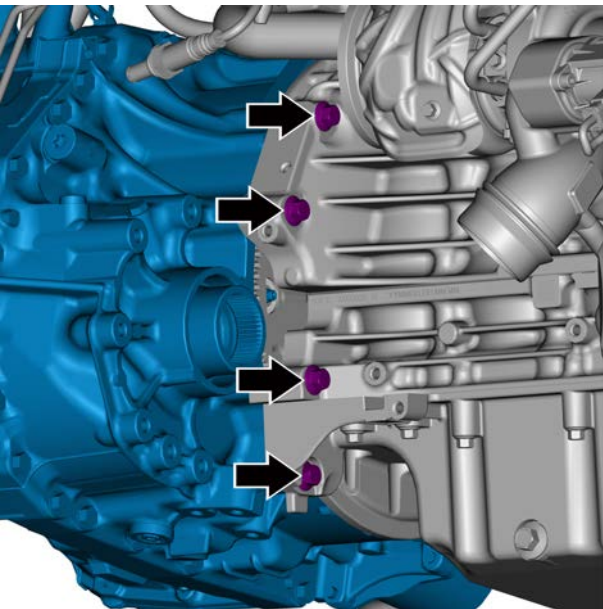
22 Remove 6 fixing nuts of hydraulic torque converter.



23 Remove 3 retaining bolts from the automatic transmission assembly.



- 24 Remove 3 retaining bolts from the automatic transmission assembly.

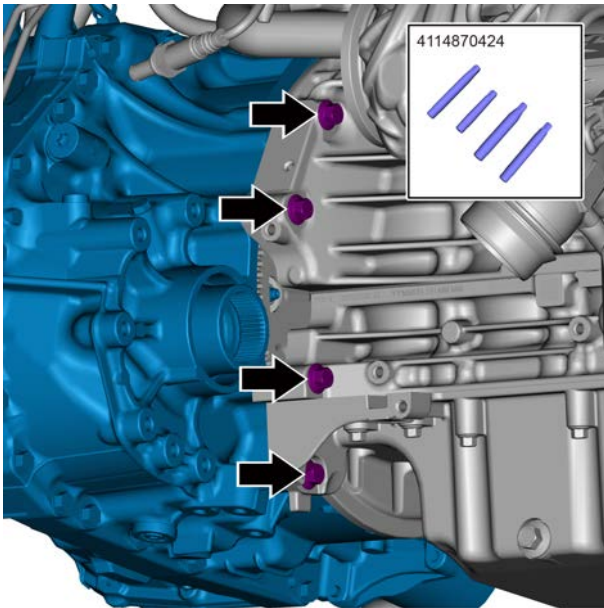


- 25 Remove 4 retaining bolts from the automatic transmission assembly and remove the automatic transmission assembly.

Caution

1. Remove the automatic transmission assembly with the assistance of multiple service technicians.
2. Remove the hydraulic torque converter together when removing the automatic transmission assembly.

Installation procedure



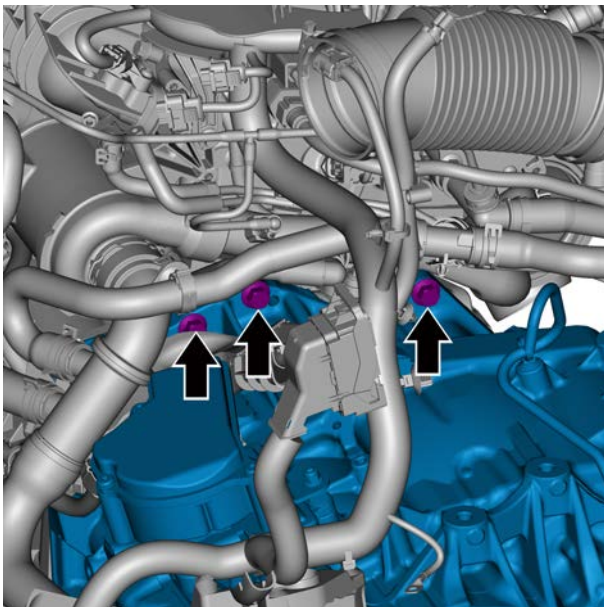
- 1 Install the generator transformer assembly guide pin tool, install the automatic transmission assembly, and install and tighten the 4 retaining bolts of the automatic transmission assembly.

Torque: 48 N. m (metric system) 35.4 lb-ft (Imperial system)

Special tool: 4114870424

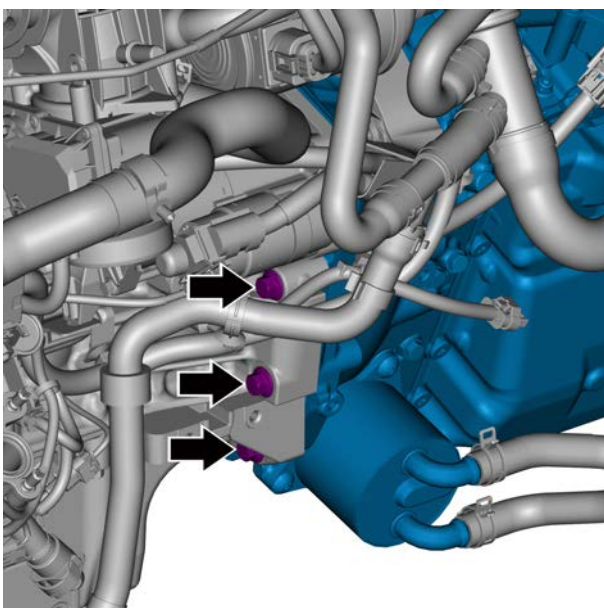
Caution

1. Install the automatic transmission assembly with the assistance of multiple service technicians.
2. Remove the guide pin tool for generator transformer assembly after assembly.



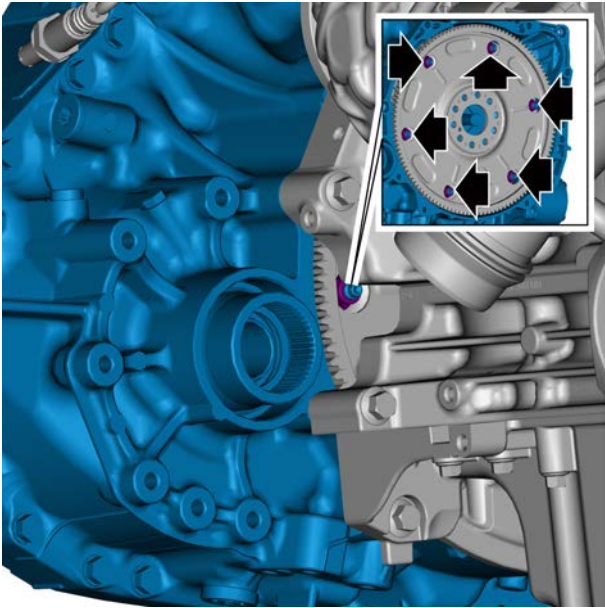
- 2 Install and tighten 3 retaining bolts onto the automatic transmission assembly.

Torque: 48 N. m (metric system) 35.4 lb-ft (Imperial system)



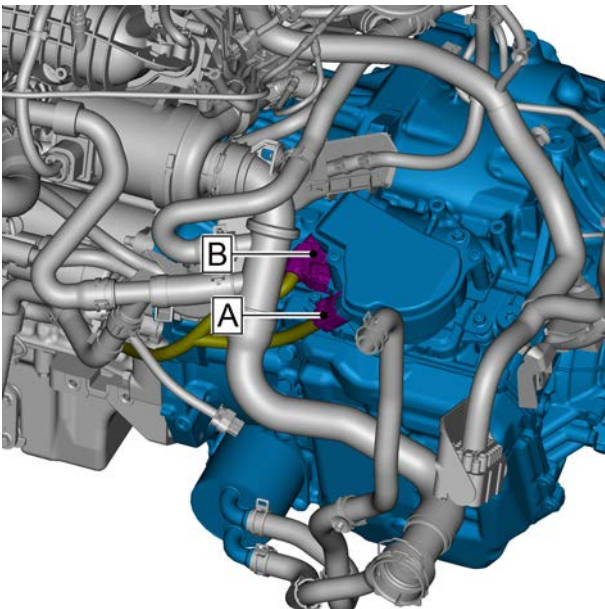
- 3 Install and tighten 3 retaining bolts onto the automatic transmission assembly.

Torque: 48 N. m (metric system) 35.4 lb-ft (Imperial system)

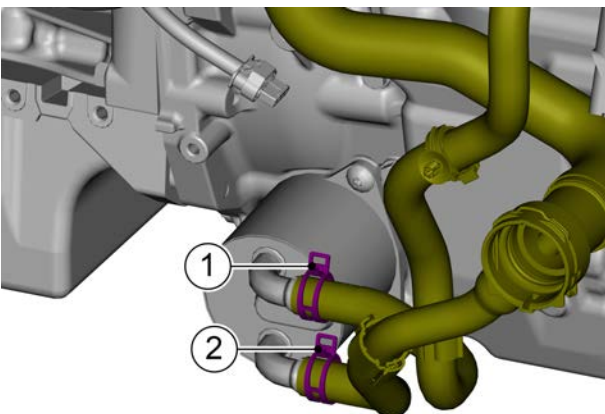


- 4 Install and tighten 6 fixing nuts of hydraulic torque converter.

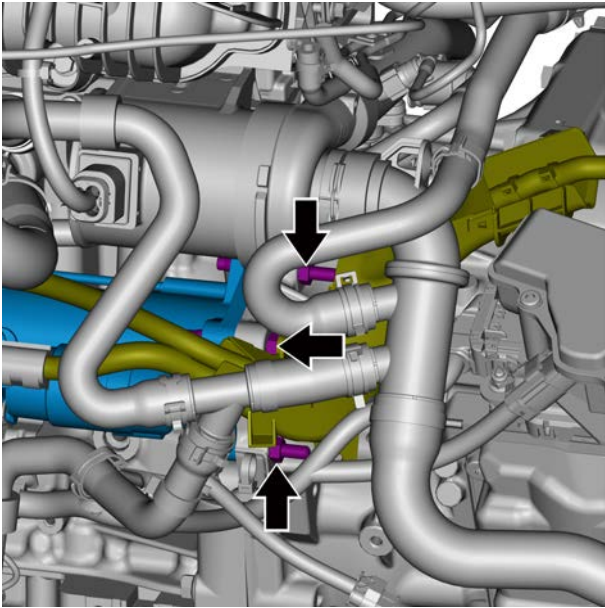
Torque: 60 N·m (metric system) 44.3 lb-ft (imperial system)



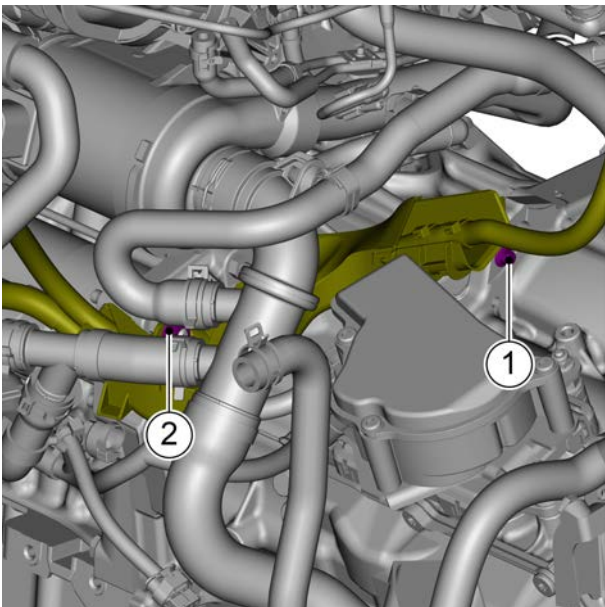
- 5 Connect the transmission control module harness connector B.
- 6 Connect harness connector A of electronic shift actuator assembly.



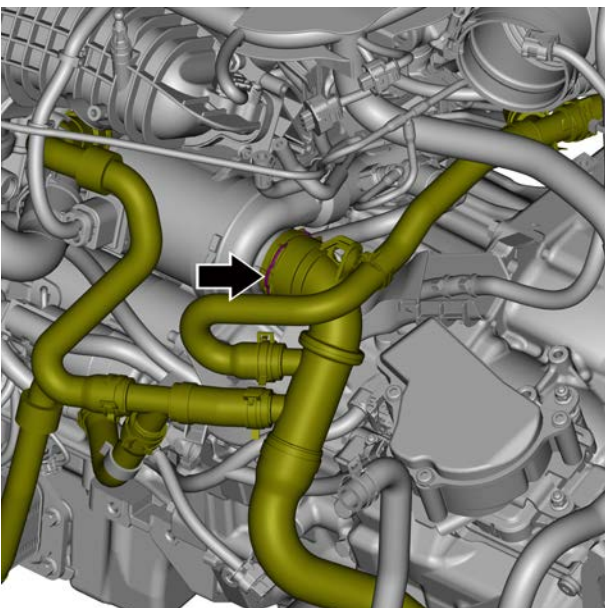
- 7 Connect the radiator outlet pipe and the oil cooler assembly, and install the fixing clamp 2 of the radiator outlet pipe.
- 8 Connect the transmission fluid cooler inlet pipe and the oil cooler assembly, and install the fixing clamp 1 of the transmission fluid cooler inlet pipe.



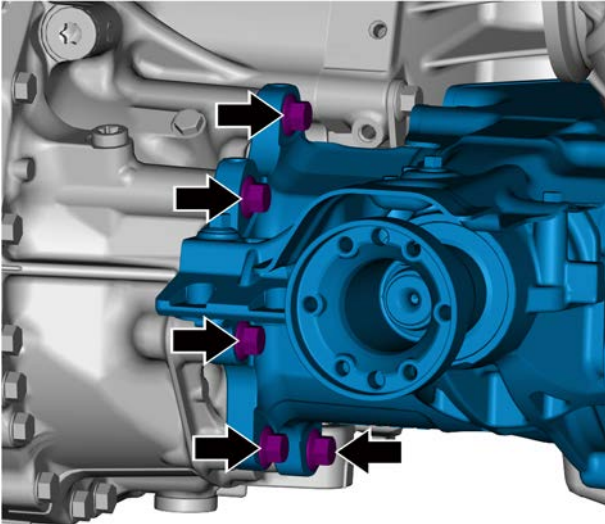
- 9 Install and tighten 3 retaining bolt of the starter.
Torque: 48 N. m (metric system) 35.4 lb-ft (Imperial system)



- 10 Install the starter harness assembly, install and tighten one fixing nut 2 of the starter harness assembly.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)
- 11 Install and tighten one retaining bolt 1 of the starting motor harness assembly.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 12 Connect the radiator outlet pipe with the engine coolant pump and reset the quick insert elastic circlip.



- 13 Install the power take-off, install and tighten the five retaining bolts of the power take-off.

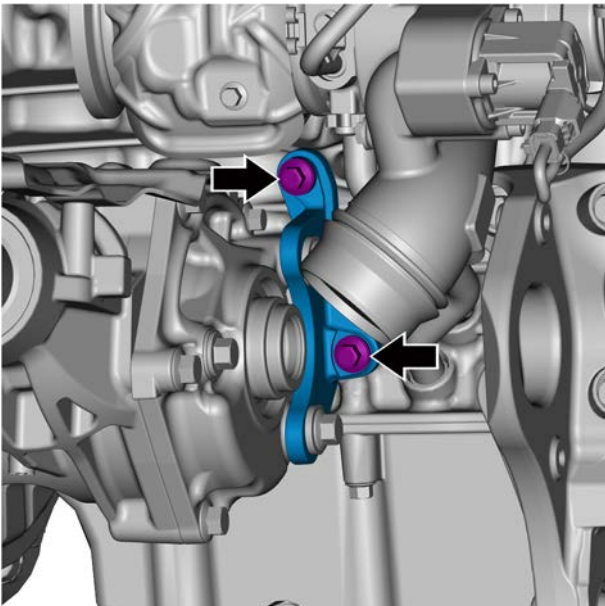
Torque:

Step 1: 20 N·m (metric) 14.8 lb-ft (imperial system)

Step 2: turn 45 °

Caution

Before installing the power take-off, evenly apply lubricating grease on the differential spline for about 3g.

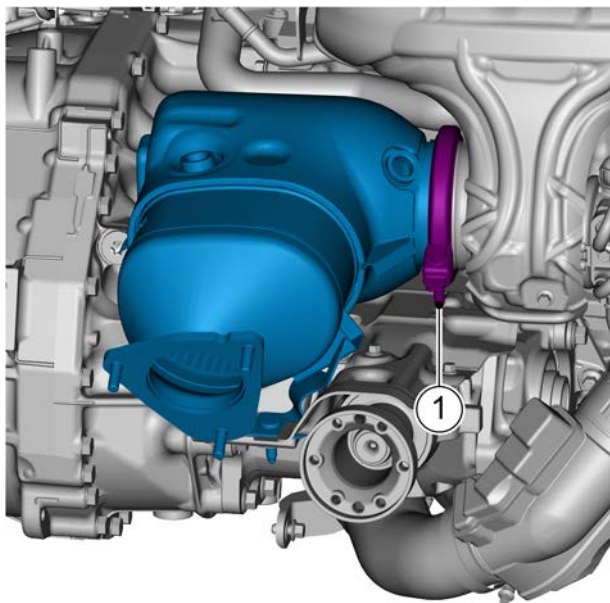


- 14 Install and tighten 2 retaining bolts of the power take-off bracket.

Torque:

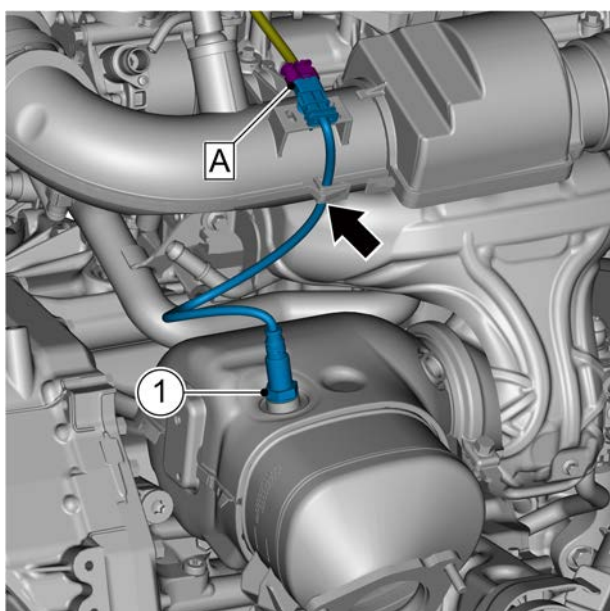
Step 1: 18 N·m (metric) 13.3 lb-ft (imperial system)

Step 2: turn 90 °

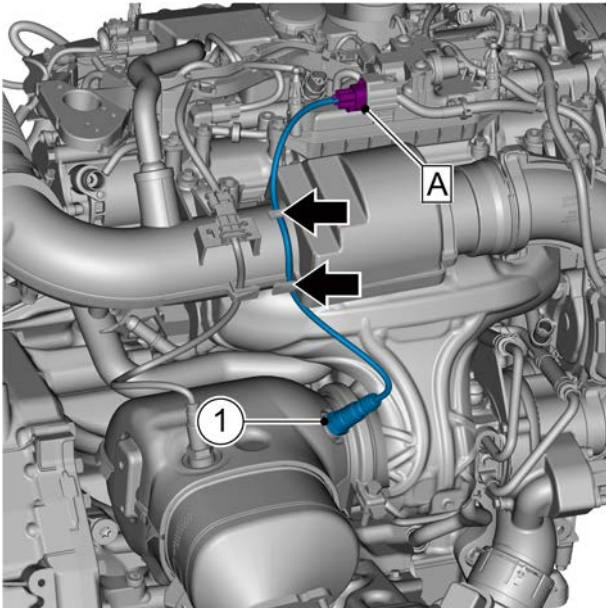


- 15 Install the catalytic of the catalytic converter, install and tighten the clamp 1 of the front exhaust pipe.

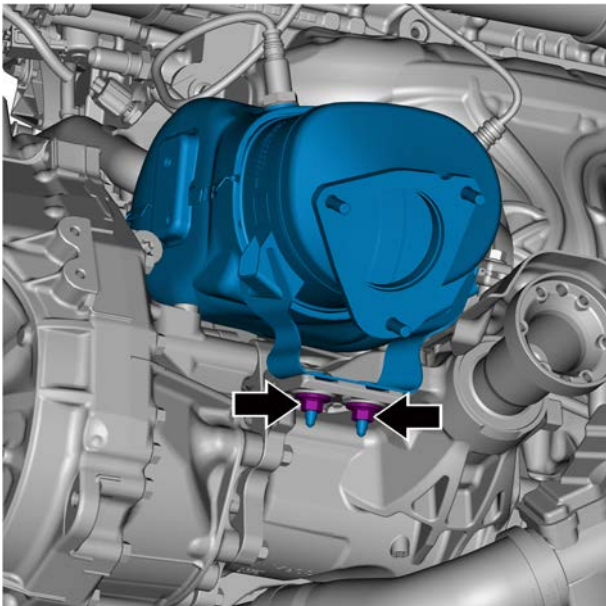
Torque: 20 N. m (metric system) 14.8 lb-ft (Imperial system)



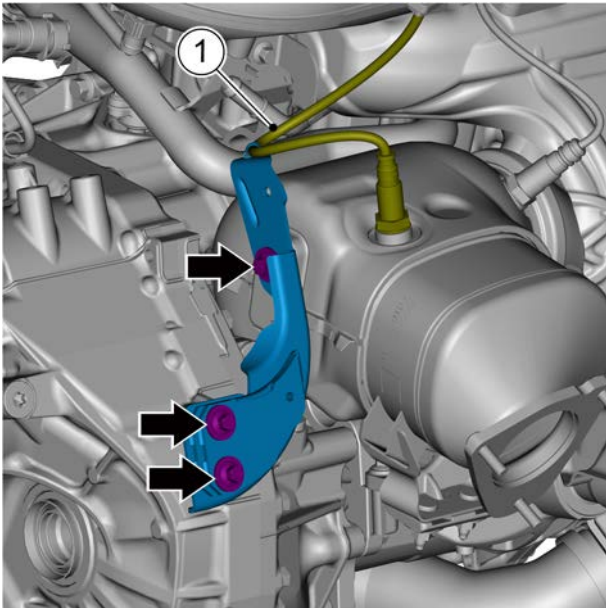
- 16 Install and tighten Lambda probe (rear oxygen sensor) 1.
Torque: 45 N. m (metric system) 33.2 lb-ft (Imperial system)
- 17 Install the Lambda probe (rear oxygen sensor) harness.
- 18 Connect Lambda probe (rear oxygen sensor) harness connector A.



- 19 Install and tighten Lambda probe (front oxygen sensor) 1.
Torque: 45 N. m (metric system) 33.2 lb-ft (Imperial system)
- 20 Install the Lambda probe (front oxygen sensor) harness.
- 21 Connect Lambda probe (front oxygen sensor) harness connector A.



- 22 Install and tighten 2 fixing nuts of catalytic of the catalytic converter.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



- 23 Install the Lambda probe (rear oxygen sensor) harness 1.
- 24 Install and tighten 3 retaining bolts of the front exhaust pipe bracket.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

- 25 Install the powertrain.
- 26 Use the GLDS diagnostic program, select the corresponding module under the [software] tab, and complete the software brushing operation according to the steps prompted by the diagnostic program.

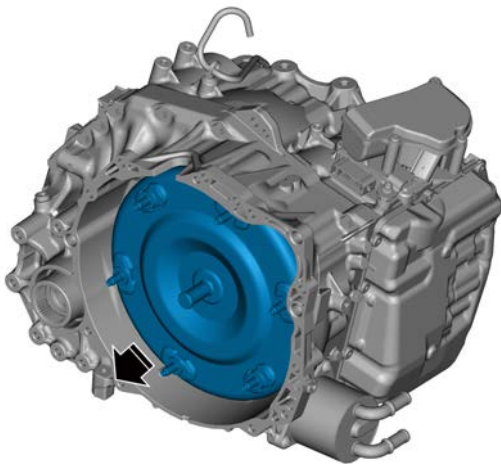
3.2.7.11 Replacement of Hydraulic Torque Converter Assembly

Removal procedure

- 1 Remove the drive train. See [drive train replacement](#).
- 2 Remove the automatic transmission assembly. See [automatic transmission assembly replacement](#).
- 3 Drain the transmission fluid. See [transmission fluid drain and fill procedure \(8AT\)](#).
- 4 Remove the assembly-hydraulic torque converter.

Caution

1. Do not damage the input shaft oil seal.
2. Do not drop the assembly-hydraulic torque converter.

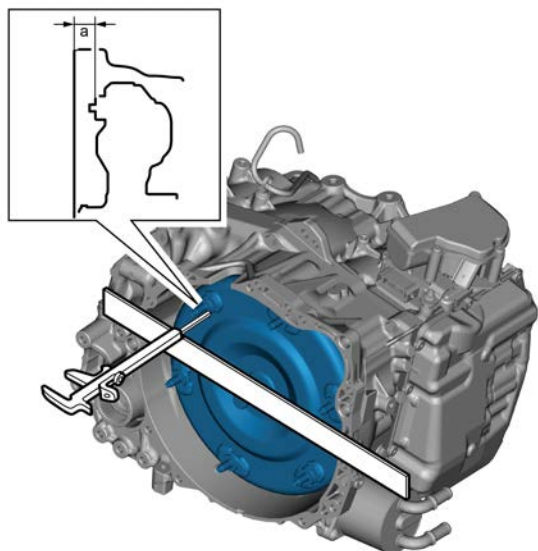
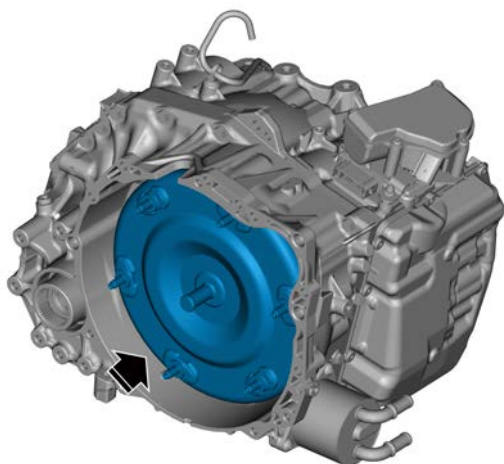


Installation procedure

- 1 Install the assembly-hydraulic torque converter.

Caution

1. Do not damage the input shaft oil seal.
2. Do not drop the assembly-hydraulic torque converter.




- 2 Check the installation position of assembly-hydraulic torque converter.

a > 30.5mm

- 3 Install the automatic transmission assembly.
- 4 Install the powertrain.
- 5 Fill the transmission oil.

3.2.8 Special tools and equipment

3.2.8.1 Special tool

Serial No.	Illustration	Tool number	Name
1		4114870424	Special tool for assembling guide pin of generator transformer

Suspension System

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4.1 Warnings and precautions

4.1.1 Warnings and precautions

4.1.1.1 Warnings and precautions

Warning about assistant driving

Warning !

When the technician is checking the fault parts reported for repair, the vehicle should be driven by the assistant. Otherwise, it may lead to personal injury.

Warnings regarding battery disconnection

Warning !

Before maintaining any electrical components, the ignition key must be in the OFF or LOCK position, and all electrical loads must be "OFF" unless otherwise stated in the operating procedures. If tools or equipment are easily accessible to exposed live electrical terminals, disconnect the negative battery cable. Violate these safety instructions may result in the injury for people or the damage for vehicle and the damage for vehicle components.

Warnings regarding road test

Warning !

Road test should be conducted under the premise of ensuring safety and observing all traffic regulations. Do not try any operation that may endanger the control of the vehicle. Violating the above safety instructions can cause serious personal injury and damage the vehicle.

Engine lifting notice

Warning !

Do not support the jack under the oil pan, any sheet metal parts or crankshaft belt pulley when lifting or supporting the engine for any reason. Lifting engines in the wrong way can cause damage to the components of vehicle.

4.2 Front suspension

4.2.1 Specification

4.2.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
front shock absorber assembly LH and body retaining bolts	M12×1.25×16	31~37	22.9~27.4
Fixing nut of front stabilizer link and front steering knuckle assembly	M10×11.4	59~81	43.5~59.7
retaining bolts between drive shaft middle support and vehicle body	M8×25	20~28	14.8~20.7
front suspension lower U-beam and support beam retaining bolts	M8×16	20~28	14.8~20.7
front suspension lower U-beam and sub-chassisframe fixing bolts	M8×65	25 N.m+140°	18.4 lb-ft+140°
Front damper assembly LH upper mount and shock absorber fixing nut	M12×1.25×16	49~67	36.1~49.4
Front suspension stabilizer bar and sub-chassisframe left fixing bolt	M8×65	20~28	14.8~20.7
Front stabilizer bar connecting rod and front stabilizer bar assembly fixing nut	M10×11.4	59~81	43.5~59.7
retaining bolts of front wheel brake protective cover and front steering knuckle assembly	M6×12	8.5~11.5	6.3~8.5
retaining bolts of drive hub assembly and front knuckle assembly	M12×55	90 N.m+90°	66.4 lb-ft+90°
retaining bolts of front steering knuckle assembly and Front damper assembly LH assembly	M12×75	90 N.m+90°	66.4 lb-ft+90°

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
retaining bolts of front steering knuckle assembly and lower control arm ball joint pin	M12×65	90 N.m+75°	66.4 lb-ft+75°
Front suspension left lower swing arm assembly rear point and front sub-chassisframe fixing bolts	M14×80	140 N.m+90°	103.3 lb-ft+90°
fixing bolts between front point of left lower swing arm assembly of front suspension and front sub-chassisframe	M14×105	140 N.m+90°	103.3 lb-ft+90°
Front subframe front point and body fixing bolt	M12×100	90 N.m+90°	66.4 lb-ft+90°
Front subframe rear point and body fixing bolt	M12×100	90 N.m+90°	66.4 lb-ft+90°
sub-chassisframe reinforcing point and body fixing bolt	M14×40	140 N.m+90°	103.3 lb-ft+90°
Front suspension stabilizer bar and subframe fixing bolts	M8×65	20~28	14.8~20.7
Front channel heat shield left mounting bracket assembly and front sub-chassisframe fixing bolts	M8×16×19.9	20~28	14.8~20.7
fixing bolts of right front bracket of heat shield and front sub-chassisframe	M8×16×19.9	20~28	14.8~20.7

4.2.2 Description and operation

4.2.2.1 Instructions and Operations

The function of suspension is to transmit the force and torque acting on the wheel and sub-chassisframe, and buffer and absorb the vibration from the wheel. Meanwhile, it can provide good steering maneuverability and stability, and ensure the comfort of occupants. It can absorb the energy of vertical acceleration wheels to free the frame and body from interruption while the wheels bounce up and down with the road. The front suspension used in this vehicle is McPherson independent suspension, including the following components: spring, shock absorber, stabilizer bar, front lower swing arm and front sub-chassisframe.

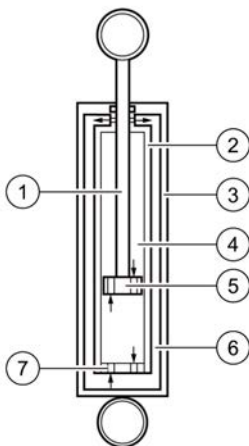
4.2.3 System working principles

4.2.3.1 Working principle of suspension system components

Spring:

The rigidity of spring will affect the response of the sprung mass when the vehicle is running. The vehicle with a small spring rigidity can eliminate turbulence and provide a very smooth driving feeling, but at the same time, it is prone to dive and squat during braking and accelerating, and prone to roll and tumble when turning. Vehicles with excessive spring rigidity have less stability on bumpy roads, but its body moves very little, which means they can be driven fast even when turning. Although the spring itself may look simple, by designing and implementing these devices in the automobile, and balancing the passenger's comfort with the handling performance of the automobile, the spring alone cannot provide an extremely smooth ride. Because springs are excellent at absorbing energy but less so in terms of dissipation capacity. Therefore, the suspension system requires a kind of component called shock absorber. Without a damper structure, the spring will bounce off at an uncontrollable rate and release the jolting energy it absorbs, continuing to bounce off at its frequency until it has exhausted all the energy originally applied to it. The suspension, built on a spring, will itself allow the automobile to drive in a bouncing manner without being controlled.

Shock absorber:



1. Piston push rod
2. Inner cylinder
3. Outer cylinder

4. Hydraulic chamber
5. Piston and valve
6. Fluid reservoir
7. Inner cylinder bottom valve

It controls the unwanted spring motion through a process called damping. Shock absorbers slow and reduce the magnitude of vibratory motion by converting the kinetic energy of suspension motion to heat energy that can be dissipated through hydraulic fluid. The upper support of the shock absorber is connected to the frame (namely sprung mass), and the lower support is connected to the shaft near the wheel (namely non-sprung mass). In double-cylinder design, one of the most common types of the shock absorber is the upper support connected to the piston rod, and the piston rod is connected to the piston, which is located in a cylinder filled with hydraulic oil. The inner cylinder is called pressure cylinder and the outer cylinder is called oil reservoir cylinder. The oil reservoir cylinder stores the excess hydraulic oil. When the wheel hits a bumpy road and causes spring compacts and stretches, the energy of spring is transferred to the shock absorber via the upper support and down to the piston via the piston rod. The piston has punched holes, through which hydraulic oil can leak out as the piston moves up and down in the pressure cylinder. Because these holes are so tiny that only very little hydraulic oil can pass through them under great pressure. This slows down the piston motion, thus slows down the spring. The operation of the shock absorber consists of two cycles, the compression cycle and the extension cycle. The compression cycle refers to compress the hydraulic oil below the piston when it moves downward. Extension cycle refers to the hydraulic oil above the piston as it moves upwards to the top of the pressure tank. For a typical automobile, the resistance of the extension cycle is greater than the resistance of the compression cycle. It should also be noticed that the compression cycle controls the movement of the unsprung mass of a vehicle, while the extension cycle controls the movement of the sprung mass which is relatively heavier. All modern shock absorbers have speed-sensing feature. The faster the suspension moves, the more resistance the shock absorber provides. It allows the shock absorber to adjust to road conditions and control any undesired movement that might occur in a moving vehicle, including bouncing, rolling, braking, diving, and accelerating into a crouch.

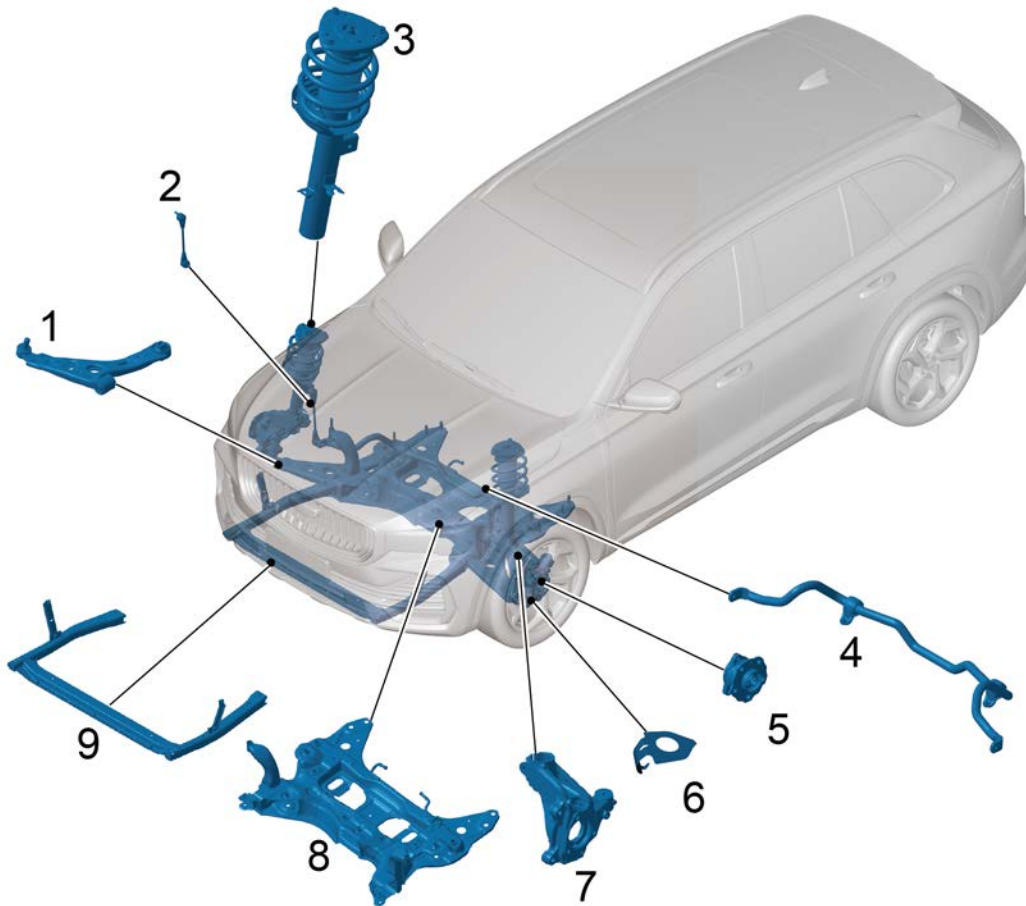
Stabilizer bar:

Used in conjunction with shock absorbers to provide additional stability to a moving automobile. The stabilizer bar is a metal rod that spans the entire vehicle shaft, which effectively connects the two sides of the suspension. As the suspension

on one wheel moves up and down, the stabilizer bar will transmit the movement to the other wheels. This can make the ride smoother and reduce the inclination of the vehicle. In particular, it can offset the rollover tendency of the automobile on the suspension when turning.

4.2.4 Component position

4.2.4.1 Component position



- | | | | |
|----|---|----|---------------------------------|
| 1. | Front suspension right lower arm assembly | 6. | Front knuckle washer |
| 2. | Front stabilizer bar connecting rod. | 7. | Front steering knuckle assembly |
| 3. | Front shock absorber assembly | 8. | Front subframe assembly |
| 4. | Forward Stabilizer Bar Assembly | 9. | Front suspension lower U-beam |
| 5. | Drive hub assembly | | |

4.2.5 Diagnostic message and steps

4.2.5.1 Diagnosis Description

Before diagnosing the front suspension, see [description and operation](#) and [the operating principle of suspension system components](#). Understand and be familiar with the working principle of front suspension, and then start the system diagnosis. This will help to confirm the correct fault diagnosis steps when a fault occurs. More importantly, it can also help to confirm whether the situation described by the customer belongs to normal operation. Any fault diagnosis of front suspension should start with routine inspection. The routine inspection will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

4.2.5.2 Routine inspection

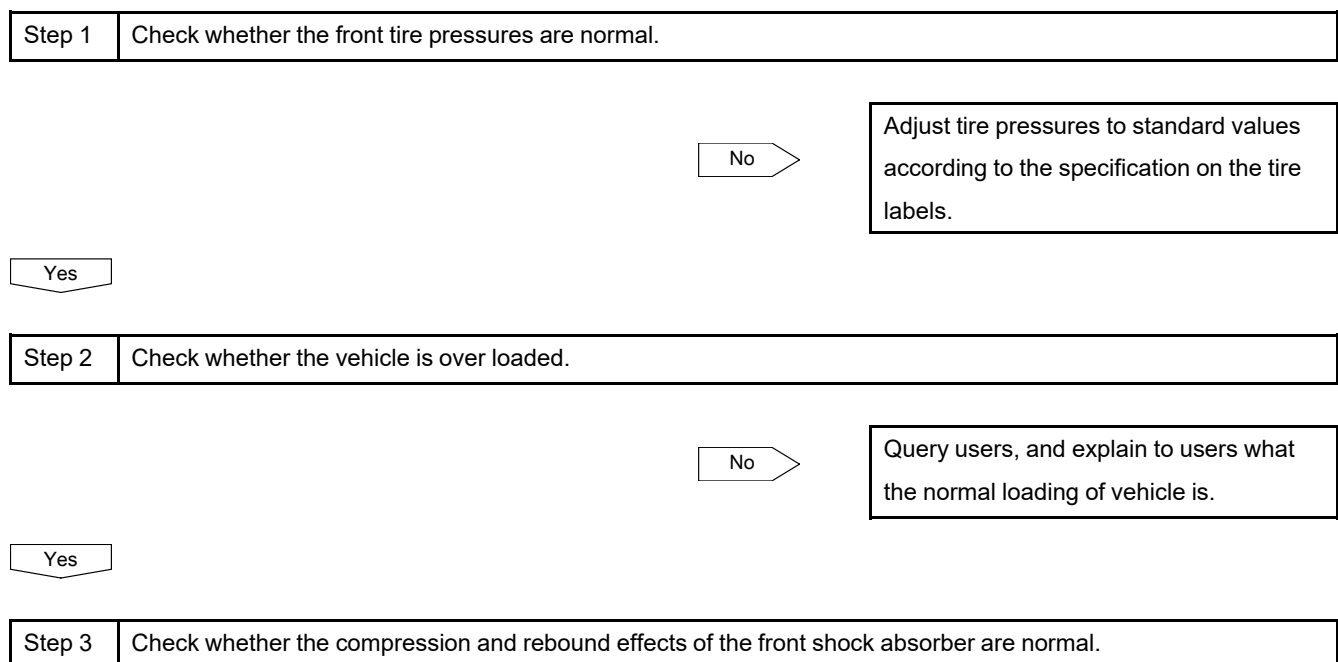
- Confirm trouble symptom

The most difficult situation in trouble shooting is the absence of any symptoms. In this case, the fault described by the user must be thoroughly analyzed. The same or similar conditions and environment when the fault of the distributor's vehicle comes out should be simulated. No matter how experienced and skilled the maintenance personnel is, if they do not confirm the symptoms of the fault, they will ignore some important things in the repair and make wrong guesses in some places. It will make trouble shooting to fail.

- Check the easily accessible or visible system components to find out whether they have obvious damage or conditions that may lead to failure. If so, repair or replace the components.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.
- The connector joints and vibration fulcrum are the main parts that should be thoroughly checked. Vibration method is recommended in case of failure due to vibration.
 - Gently vibrate the potentially faulty sensor part with fingers and check for faults.
 - Gently shake the connector in both vertical and horizontal directions.
 - Gently shake the harness in both vertical and horizontal directions.

4.2.5.3 Inspection of Front damper assembly LH assembly

Front damper is too soft



a. Quickly press and release the corner of the bumper closest to the Front damper assembly LH being tested, and compare the compression and rebound effects with normal similar vehicles.

No

Replace the Front damper assembly LH, see [replacement of front shock absorber assembly LH](#).

Yes

Step 4	System is normal.
--------	-------------------

The front shock absorber is noisy

Step 1	Check whether the installation of front shock absorber is normal and check whether all components of the front shock absorber work normal. (No abnormal condition such as loosening is allowed.)
--------	--

No

Replace the Front shock absorber assembly LH, see [replacement of front shock absorber assembly LH](#).

Yes

Step 2	Check whether the compression and rebound effects of the front shock absorber are normal.
--------	---

a. Quickly press and release the corner of the bumper closest to the Front shock absorber assembly LH being tested, and compare the compression and rebound effects with normal similar vehicles.

No

Replace the Front shock absorber assembly LH, see [replacement of front shock absorber assembly LH](#).

Yes

Step 3	System is normal.
--------	-------------------

There is oil leakage in the front shock absorber

Step 1	Check whether the installation of front shock absorber is normal and check whether all components of the front shock absorber work normal. (No abnormal condition such as loosening is allowed.)
--------	--

Next Step

Step 2	Check the sealing condition of front shock absorber when it is fully extended, and whether the dust cover is damaged, etc.
--------	--

No

Replace the Front shock absorber assembly LH, see [replacement of front shock absorber assembly LH](#).

Yes

Step 3	Check whether there is too much oil fluid on the front shock absorber.
--------	--

No

Replace the Front shock absorber assembly LH, see [replacement of front shock absorber assembly LH](#).

Yes

Step 4	System is normal.
--------	-------------------

4.2.5.4 Ball pin and steering knuckle inspection

Warning !

Refer to "Warnings Regarding Vehicle Lifting" in "Warnings and Precautions".

Step 1	Raise the front end of the vehicle and keep the front suspension in a freely suspended status.
--------	--

Next Step

Step 2	Grab the top and bottom of the front tire and turn the top of the wheel inward and outward.
--------	---

Next Step

Step 3	Note whether there is clearance and whether the steering knuckle moves horizontally relative to the control arm.
--------	--

Next Step

Step 4	In case of the following situations, the ball head must be replaced.
--------	--

- a. Loose ball joint.
- b. The ball seal is broken.
- c. The ball bolt is disconnected from the steering knuckle.
- d. The ball bolt is loose on the steering knuckle.
- e. The ball bolt twists in the seat when it is pressed with a finger.

No

Replace the left outer tie rod of steering gear. See [replacement of left outer tie rod of steering gear](#).

Next Step

Step 5 Normal system components.

4.2.5.5 Inspection of ball bolt

Each time the ball joint is checked, check whether the ball bolts are securely installed in the steering knuckle boss.

Methods to check whether the ball bolts are worn:

- a. Shake the wheel and feel the bolt head or slotted nut move in the steering knuckle boss.
- b. Check the fastening torque of the slotted nut. The loosening of the nut indicates that the ball bolt is under stress or has holes in the steering knuckle boss.

Worn or damaged ball joints or steering knuckles must be replaced if any of the above conditions exist. See [front suspension left lower swing arm assembly replacement](#).

4.2.5.6 Excessive friction check

Check whether the friction of front suspension is too large under the following procedures:

Step 1 Raise the front bumper to raise the vehicle as high as possible.

Next Step

Step 2 Gently lower the bumper to make the vehicle to restore its normal vehicle front end height.

Next Step

Step 3 Measure the distance between ground and the center of bumper.

Next Step

Step 4 Press the bumper and then slowly release it to make the vehicle to restore its normal vehicle front end height.

Next Step

Step 5 Measure the distance between ground and the center of bumper.

Next Step

Step 6	Difference between two measured values should be <12.7 mm (0.5 in). Where the distance exceeds this limit, it is needed to check whether the control arm, front shock absorber and ball joint are damaged or worn.
--------	--

4.2.5.7 Ride performance diagnose (too soft or too hard)

Too soft

Step 1	Check whether the front shock absorber is worn. Replace the front shock absorber if necessary.
--------	--

Next Step

Step 2	Check whether the front coil spring is fractured or loose. Replace the front coil spring if necessary.
--------	--

Too hard

Step 1	Check whether the front shock absorber is installed correctly and whether the front shock absorber conforms to the model. Replace the front shock absorber if necessary.
--------	--

Next Step

Step 2	Check whether the front coil spring is installed correctly. Replace the front coil spring if necessary.
--------	---

4.2.5.8 The body leans or sways when turning

Step 1	Check the connecting rod of the stabilizer bar link for loosening. Retighten the connecting nut of the connecting rod of the stabilizer bar link and the front strut assembly according to the prescribed torque.
--------	---

Next Step

Step 2	It is needed to check whether the front shock absorber and the front bolt spring retainer is worn. It is important to replace the front shock absorber if necessary and re-fasten the fixing nut on the front shock absorber.
--------	---

Next Step

Step 3	Check the vehicle for the overload and explain it to the user reasonably.
--------	---

Next Step

Step 4	Check the front coil spring for breaking off or loosening and replace it if necessary.
--------	--

4.2.5.9 Noise diagnosis

Step 1	Check whether ball joints are not lubricated enough.
--------	--

Yes

Replacement of ball joints

No

Step 2 Check whether the steering knuckle washer is installed or installed in place? The dust cover of the swing arm ball joint is damaged, resulting in abnormal sound of the ball joint.

Yes

Reinstall the steering knuckle gasket and replace the ball joint.

No

Step 3 Check whether front suspension component is worn.

Yes

Replace the damaged front suspension components.

No

Step 4 Check whether front stabilizer bar link is loose.

Yes

Fasten fixing nut of the front stabilizer bar link.

No

Step 5 Check whether there is misplace in installment of front shock absorber or front strut coil spring retainer vibration isolation cushion, whether there is damage.

Yes

Replace the damaged components.

No

Step 6 Check whether there is misplace in the installment of the front strut coil spring.

Yes

New installment of front coil spring.

No

Step 7 Check whether there is excessive wear in front stabilizer bar fixing bushing.

Yes

Replacement of front stabilizer bar fixing bushing. Refer to Replacement of Front Stabilizer Bar Assembly.

No

Step 8	Find a same model vehicle, and make a comprehensive assessment of whether the noise is normal working noise.
--------	--

No

Step 9	Normal system components.
--------	---------------------------

4.2.5.10 The height of the head is abnormal

Step 1	Check whether the coil springs in the front strut assembly are broken or loosening and replace them when necessary.
--------	---

Next Step

Step 2	Check whether the vehicle is overloaded, and explain the hazards of it to the user when necessary.
--------	--

Next Step

Step 3	Check whether the coil springs in the front strut assembly are correct or too soft. Replace the coil spring of Geely original factory.
--------	--

4.2.6 Removing and installing

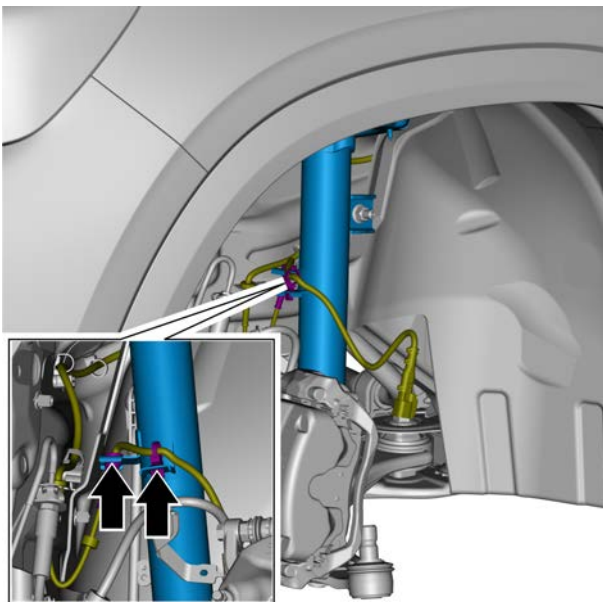
4.2.6.1 front shock absorber assembly LH replacement

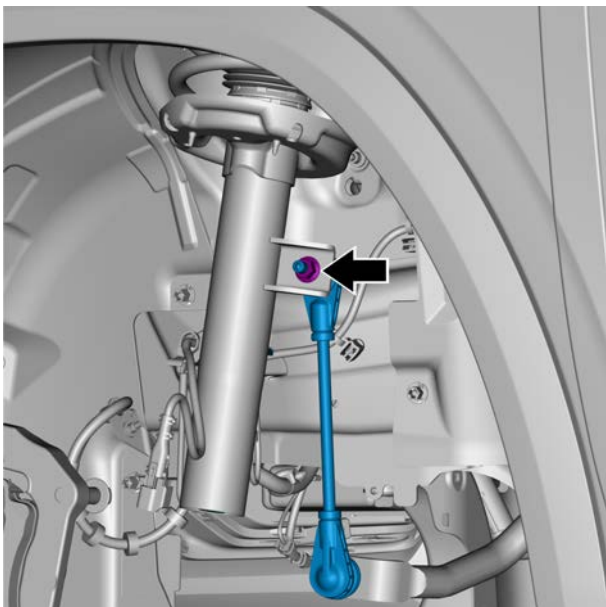
Removal procedure

Caution

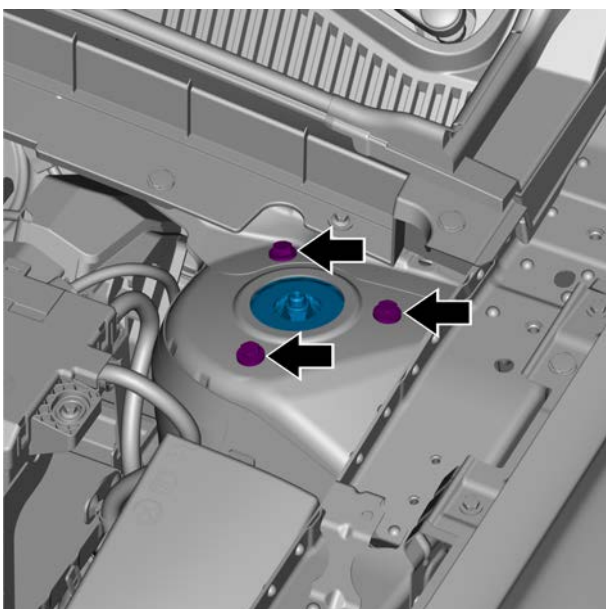
The removal methods of front left Front shock absorber assembly LH assemblies are similar.

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the Assembly-front brake caliper LH. See [replacement of Assembly-front brake caliper LH](#).
- 4 Remove the front brake disc LH. See [replacement of front brake disc LH](#).
- 5 Remove front left constant speed drive shaft. See [replacement of front left constant speed drive shaft](#).
- 6 Remove the front steering knuckle LH assembly. See [replacement of front steering knuckle LH assembly](#).
- 7 Remove the left engine bay trim plate, see the [Replacement of the left engine bay trim plate](#).
- 8 Remove the fixing clip of wheel speed sensor (front left).





- 9 Remove and discard the fixing nut of front left stabilizer bar connecting rod, and disconnect front left stabilizer bar connecting rod from the Front shock absorber assembly LH assembly.



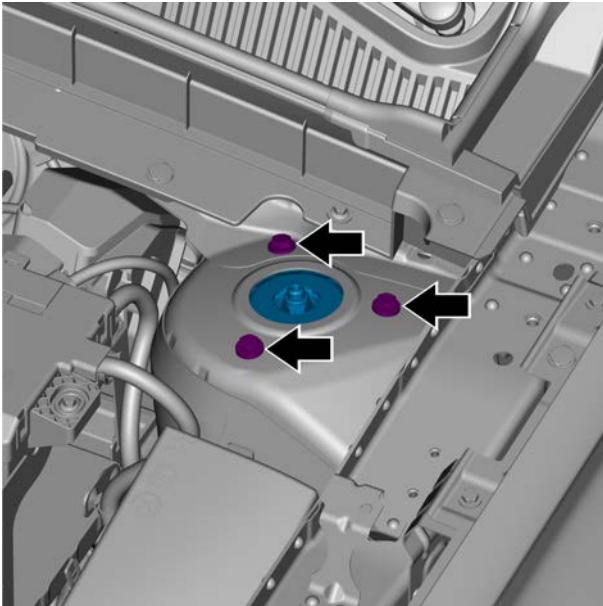
- 10 Remove 3 retaining bolts from the upper part of the Front shock absorber assembly LH assembly to the vehicle body.

Caution

When removing the Front shock absorber assembly LH assembly, two people shall cooperate to prevent maintenance accidents.

- 11 Take out the Front shock absorber assembly LH assembly.

Installation procedure

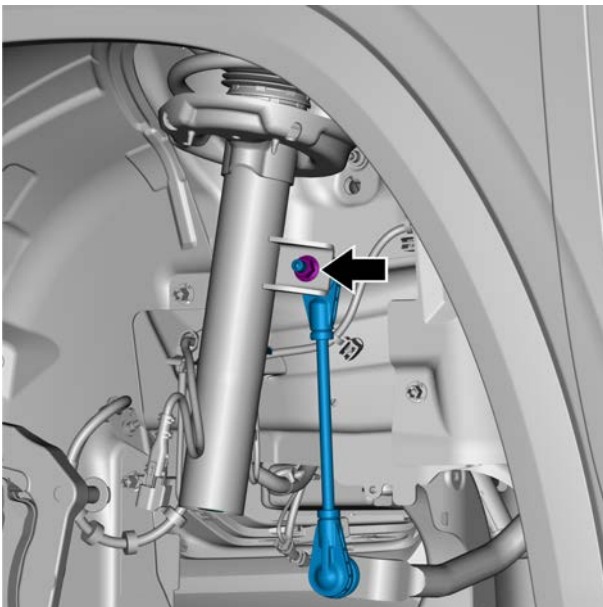


- 1 Install the Front shock absorber assembly LH assembly into the body hole on the side of the front engine compartment, and tighten 3 retaining bolts.

Torque: 34 N. m (metric system) 25.2 lb-ft (Imperial system)

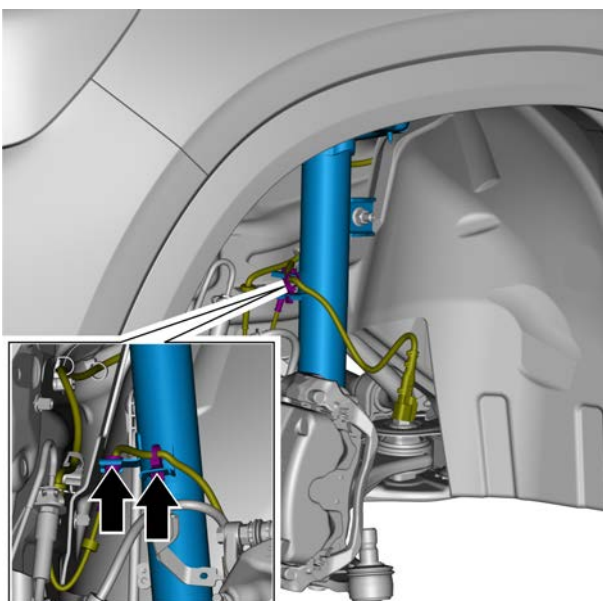
Caution

Special attention shall be paid to the operation process when we move the front suspension coil spring for the purpose of avoiding damaging and scratching the coating. The damage to coating can cause early fault.



- 2 Install the connecting rod of the left stabilizer bar, and install and tighten new fixing nuts.

Torque: 70 N. m (metric system) 51.6 lb-ft (Imperial system)



- 3 Install fixing clip of wheel speed sensor (front left) harness.

- 4 Install the front steering knuckle LH assembly.
- 5 Install the constant velocity drive shaft.
- 6 Install the left brake disc.
- 7 Install the left brake caliper assembly.
- 8 Install the left engine bay trim plate.
- 9 Install the wheel.
- 10 Lower the vehicle.
- 11 Check the four-wheel alignment data of the vehicle.

4.2.6.2 Removal of front shock absorber assembly LH

Removal procedure

Caution

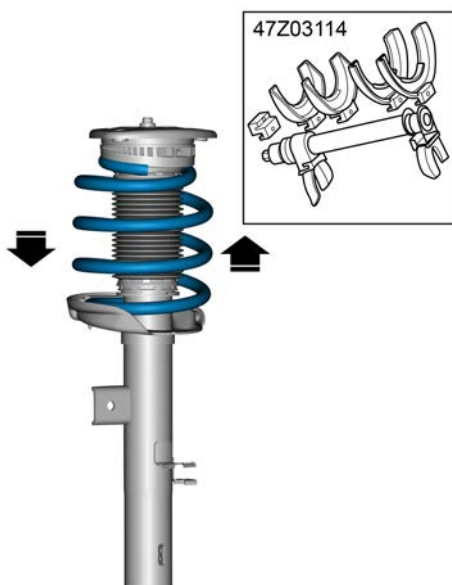
The removal methods of front left Front shock absorber assembly LH assemblies are similar.

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the Front shock absorber assembly LH. See [replacement of front left shock absorber assembly](#).
- 4 Fix the Front shock absorber assembly LH assembly on the Bench Vise.
- 5 Use the spring compression tool to compress the coil spring until the coil spring and the spring compression tool can move freely.

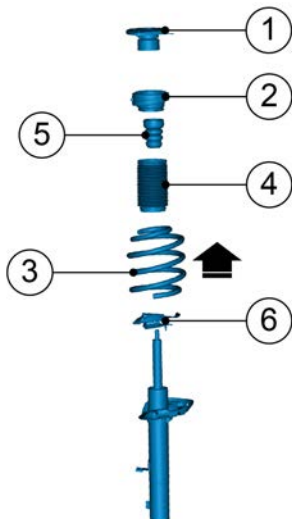
Caution

Do not use an air-operated spanner, otherwise the compression tool will be damaged.

Confirm that the spring fits closely with the compression spring tool, and pay attention to the spring state at all times

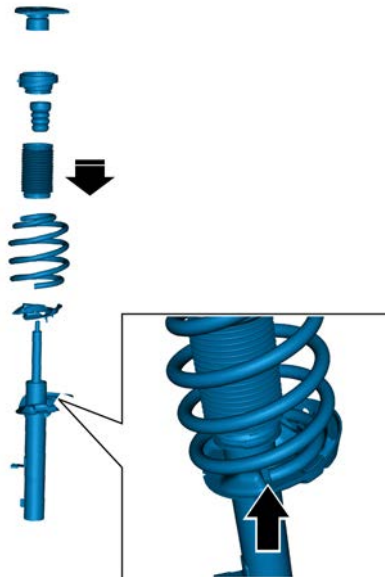
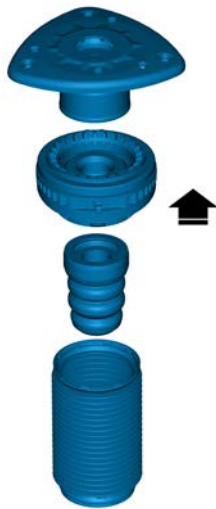


- 6 Fix the spring seat, remove and discard the lock nut.



- 7 Take out the Front shock absorber assembly LH upper support assembly 1, support bearing 2, front suspension coil spring 3, front suspension buffer shield 4, front suspension bump buffer 5 and front coil spring lower vibration isolation pad 6 in turn.

Installation procedure

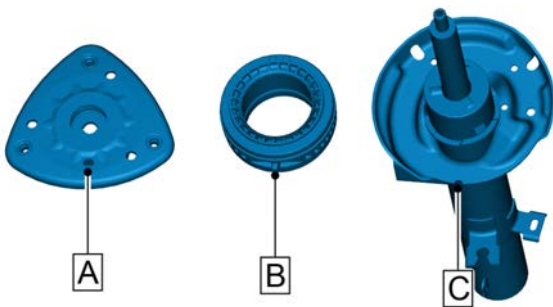


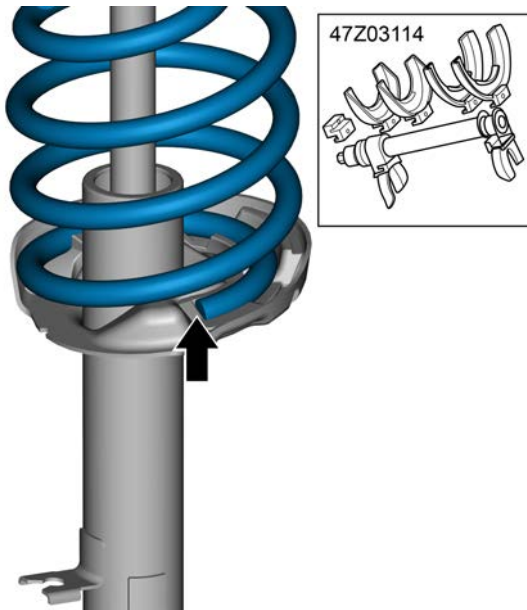
- 1 Clip the bearing into the outer ring of the cup seat of the upper support of the Front shock absorber assembly LH, clip the upper end (big end) of the front suspension bump buffer into the inner ring of the cup seat, and then clip the upper end (big end) of the front suspension buffer shield into the buckle outside the support bearing.

- 2 Use spring compression tools to compress the coil spring.
- 3 On the shock absorber, install the front suspension lower spring gasket, front suspension bump buffer, front suspension coil spring, support bearing, front suspension buffer shield and upper connecting support assembly in turn, and clip the small end of the front suspension buffer shield into the buckle outside the shock absorber.

Caution

When installing the upper connecting support, support bearing and shock absorber, the notch positioning marks a, B and C shall be aligned.





- 4 Ensure that the lower end of the coil spring is installed in the groove of the spring pad.



- 5 Fix the spring seat, install and tighten the new lock nut.
Torque: 58 N. m (metric system) 42.8 lb-ft (Imperial system)

Caution

When tightening the nut, it is necessary to "do not turn" the piston rod with a hexagonal wrench.

- 6 Install the Front shock absorber assembly LH assembly.
- 7 Install the wheel.
- 8 Lower the vehicle.

4.2.6.3 Front suspension stabilizer bar replacement

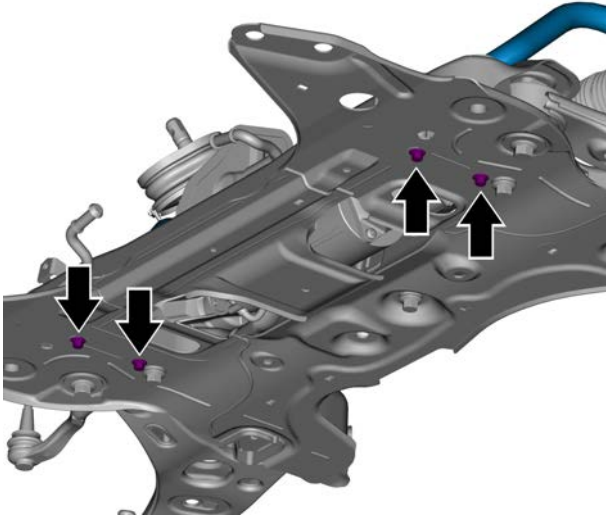
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Lift the vehicle, see [Lift the vehicle](#)

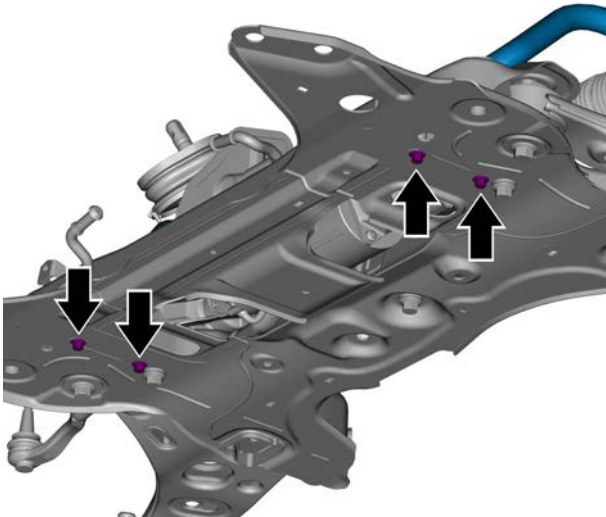
- 3 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 4 Remove front subframe, refer to [replacement of front subframe](#).
- 5 Remove and discard the 2 fixing bolts from front left (front left)s of the front suspension stabilizer bar to the front sub-chassisframe.
- 6 Take out the front suspension stabilizer bar.



Installation procedure

- 1 Place the front suspension stabilizer bar in the installation position.
- 2 Install and tighten 2 new fixing bolts on front left of the front suspension stabilizer bar and the front sub-chassisframe.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



- 3 Install the front subframe.
- 4 Install the wheel.
- 5 Lower the vehicle.
- 6 Connect the negative battery cable.

4.2.6.4 Replacement of front left stabilizer bar connecting rod

Removal procedure

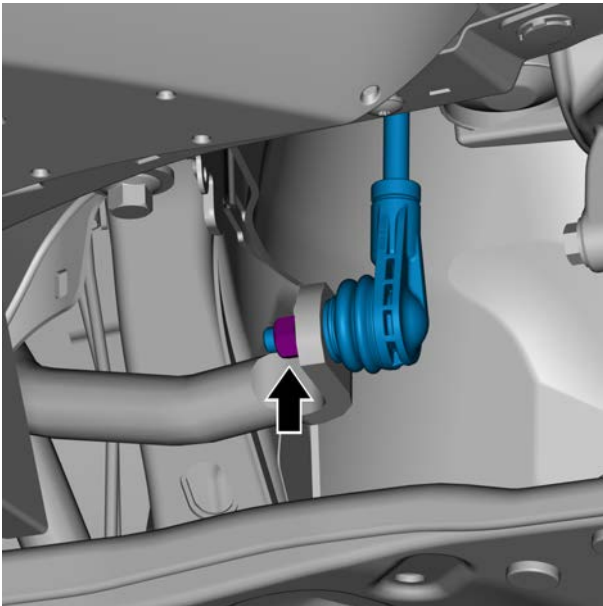
Caution

The removal and assembly methods of the connecting rod of front left front stabilizer bars are similar.

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove and discard the fixing nut of the connecting rod between the front suspension stabilizer bar and front left stabilizer bar.

Caution

Use hexagon head to fix the ball joint pin during removal.

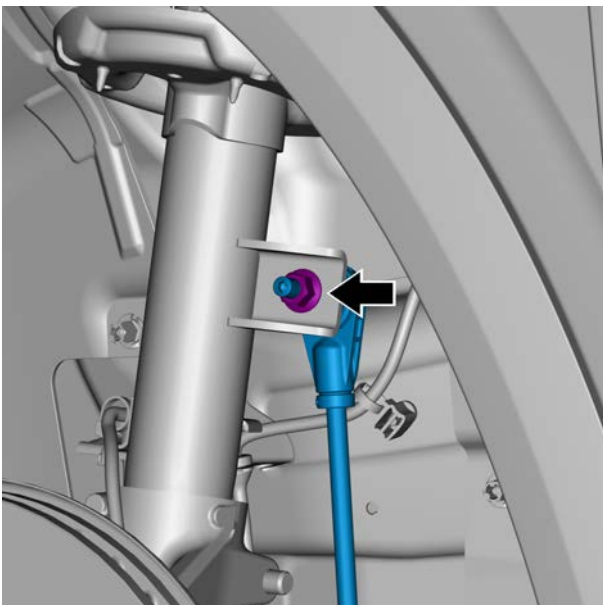


- 4 Remove and discard the fixing nut between front left stabilizer bar connecting rod and the front shock absorber assembly LH.

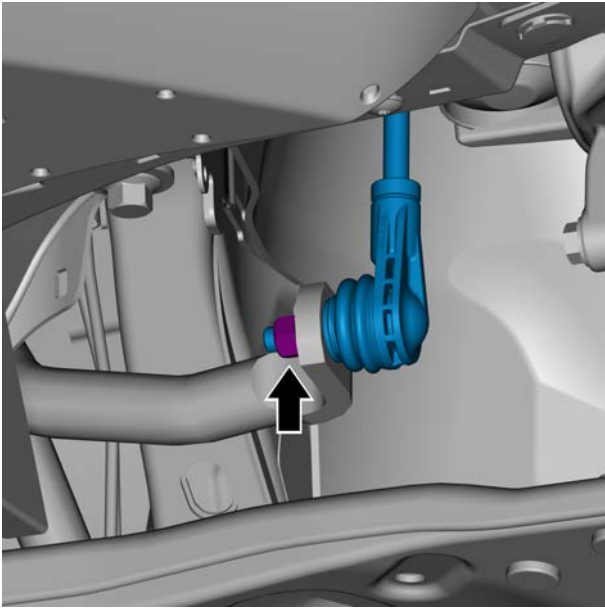
Caution

Fix the ball joint pin with hexagon head during removal.

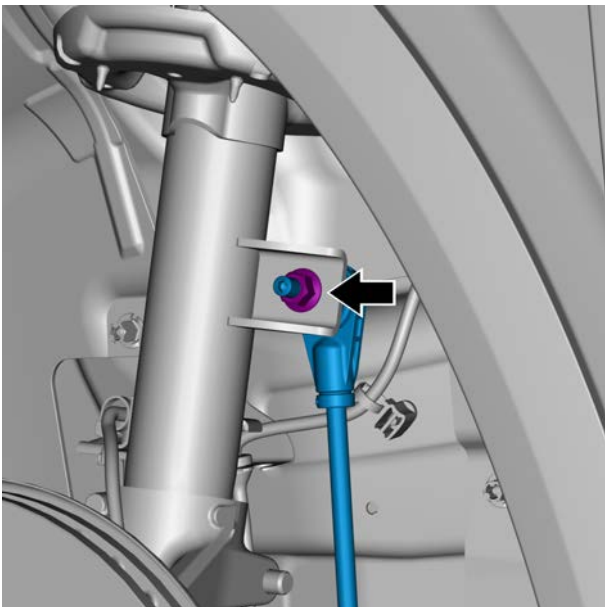
- 5 Take down the front left stabilizer bar connecting rod.



Installation procedure



- 1 Install front left stabilizer bar connecting rod onto the front suspension stabilizer bar, and tighten the new fixing nut.
Torque: 70 N. m (metric system) 57 lb-ft (Imperial system)



- 2 Install the nut that secures the Front shock absorber assembly LH to front left stabilizer bar.
Torque: 70 N. m (metric system) 57 lb-ft (Imperial system)

- 3 Install the wheel.
- 4 Lower the vehicle.

4.2.6.5 Front suspension left lower arm assembly

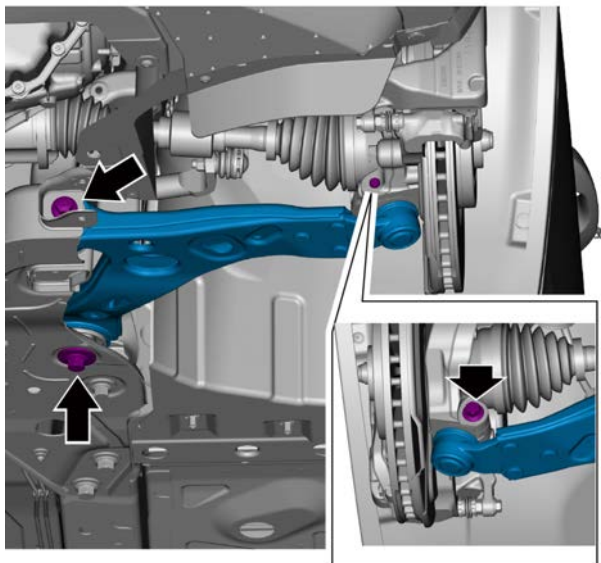
Removal procedure

Caution

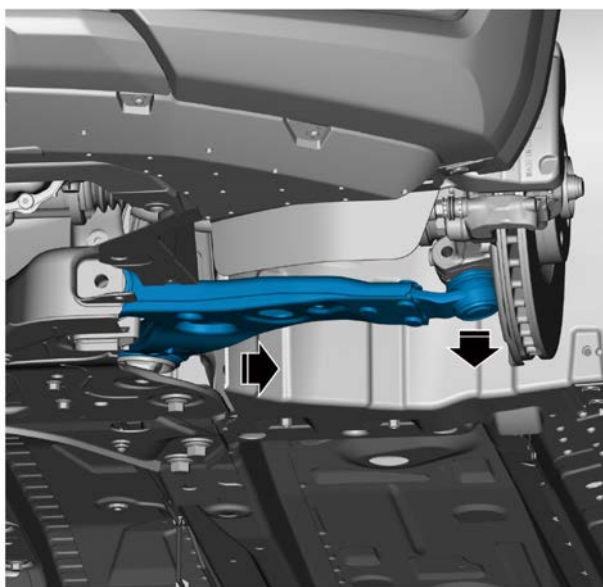
The removal and assembly methods of front left front lower swing arms are similar.

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the engine fender, see [Engine fender replacement](#).

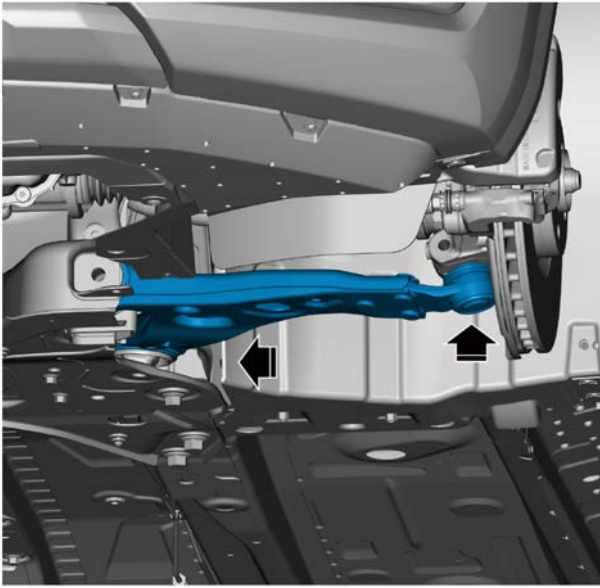
- 4 Remove the front suspension lower U-beam, see [front suspension lower U-beam replacement](#).
- 5 Remove and discard the 3 retaining bolts of the left lower swing arm assembly of the front suspension.



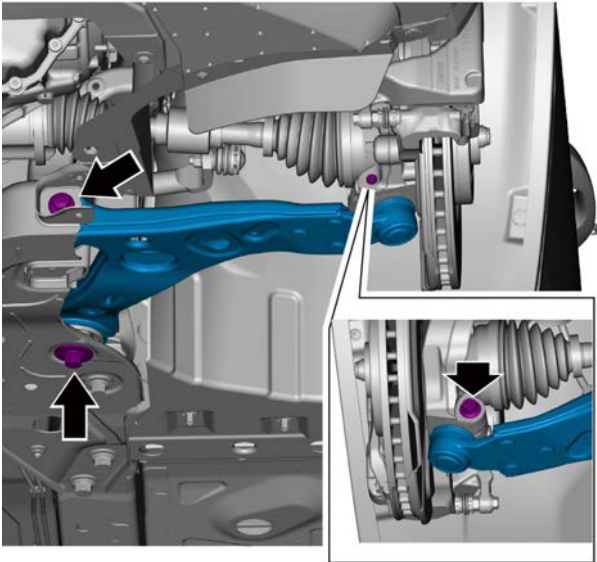
- 8 Disconnect the left lower swing arm assembly of the front suspension from the front steering knuckle assembly, and remove the left lower swing arm assembly of the front suspension.



Installation procedure

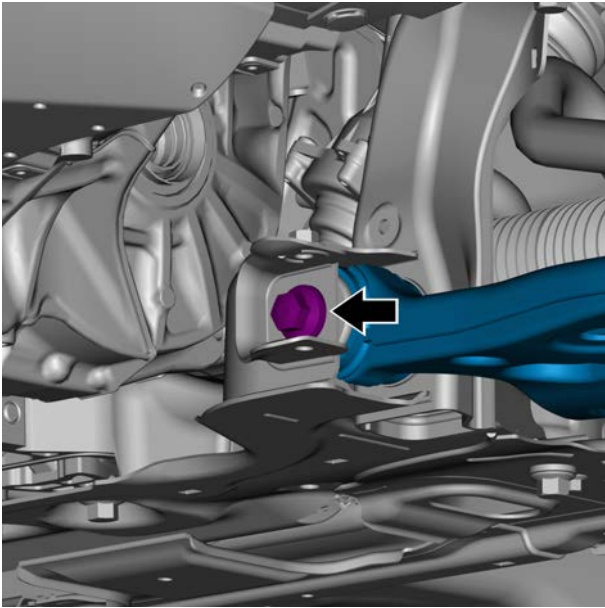


- 1 Install the lower front swing arm assembly of the front suspension.



- 2 Pre-tighten 3 new retaining bolts of the left lower swing arm assembly of the front suspension.

- 3 Install the wheels, lower the vehicle,

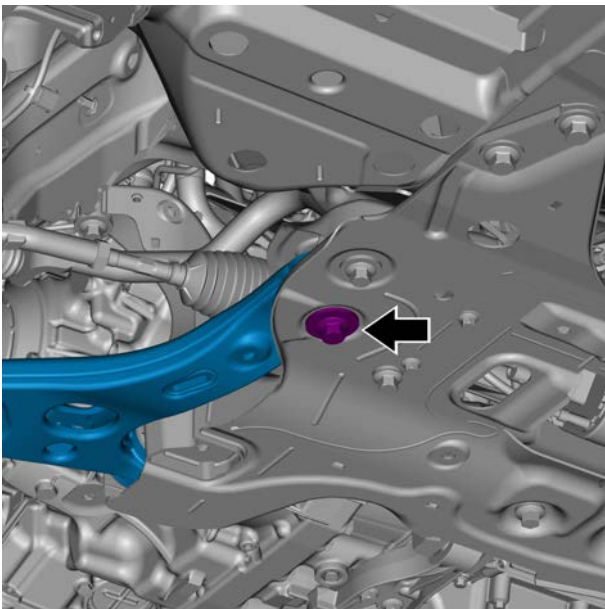


- 4 Tighten the fixing bolts connecting the Front-end of the left lower swing arm assembly of the front suspension with the sub-chassisframe.

Torque: 140 N.m + 90 ° (metric system) 103.3 lb-ft+90° (Imperial System)

Caution

Make sure the vehicle height is correct when tightening the bolts.



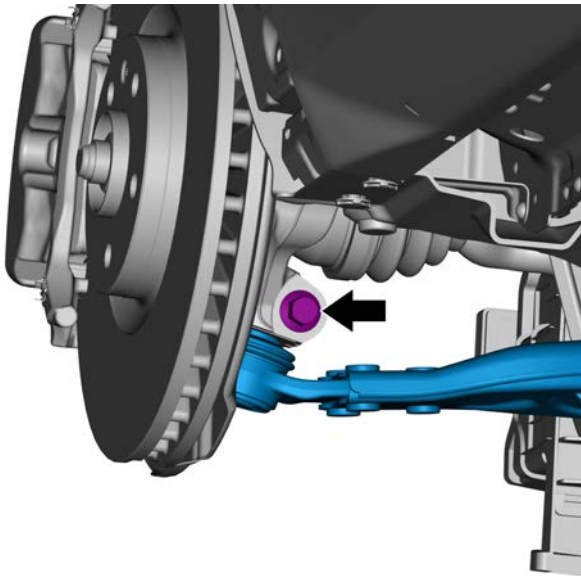
- 5 Tighten the fixing bolts connecting the Rear-end of the left lower swing arm assembly of the front suspension with the sub-chassisframe.

Torque: 140 N.m + 90 ° (metric system) 103.3 lb-ft+90° (Imperial System)

Caution

Make sure the vehicle height is correct when tightening the bolts.

- 6 Lift the vehicle, see [Lift the vehicle](#)
- 7 Remove the wheel, refer to [Replacement of wheel assembly](#).



- 8 Tighten the retaining bolts connecting the left lower swing arm assembly of the front suspension and the front steering knuckle LH assembly.

Torque: 90 N.m + +75 ° (metric system) 66.4 lb-ft+75° (Imperial System)

Caution

Make sure the lower swing arm is in the correct position before tightening the bolts.

- 9 Install the front suspension lower U-beam.
- 10 Install the engine fender.
- 11 Install the wheel.
- 12 Lower the vehicle.
- 13 Check the four-wheel alignment data.

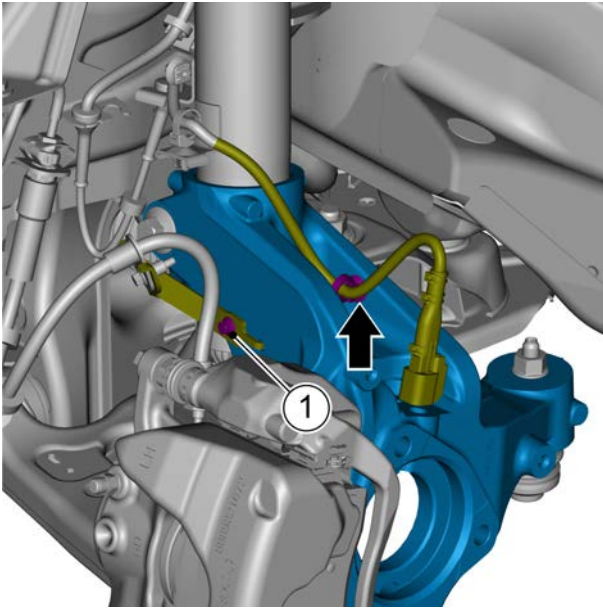
4.2.6.6 front steering knuckle LH assembly replacement

Removal procedure

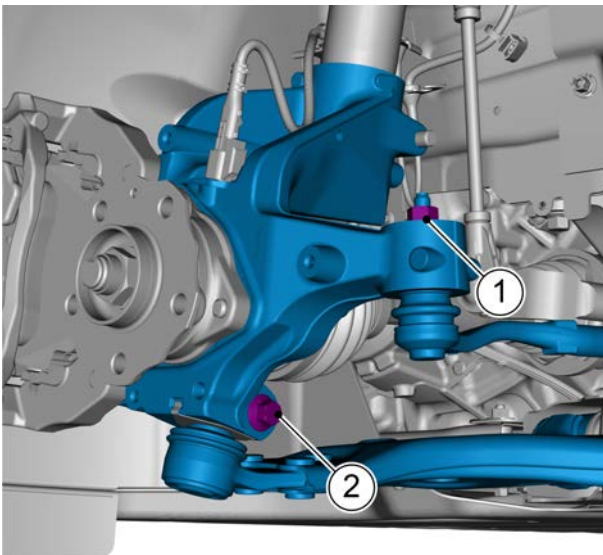
Caution

The removal and assembly methods of front left front steering knuckle assemblies are similar.

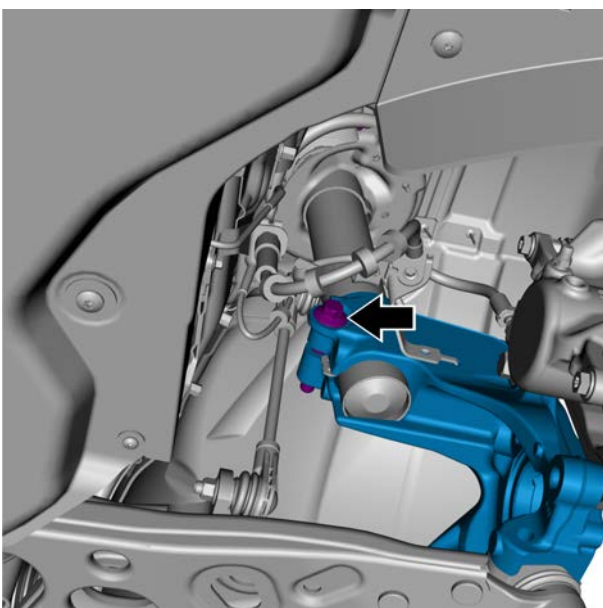
- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the Assembly-front brake caliper LH. See [replacement of Assembly-front brake caliper LH](#).
- 4 Remove the front brake disc LH. See [replacement of front brake disc LH](#).
- 5 Remove front left constant speed drive shaft. See [replacement of front left constant speed drive shaft](#).
- 6 Remove front left wheel brake protective cover. See [front left wheel brake guard replacement](#).
- 7 Remove front left drive hub assembly. See [replacement of front left drive hub assembly](#)
- 8 Remove front left wheel toe in sensor. See [replacement of wheel speed sensor \(front left\)](#).



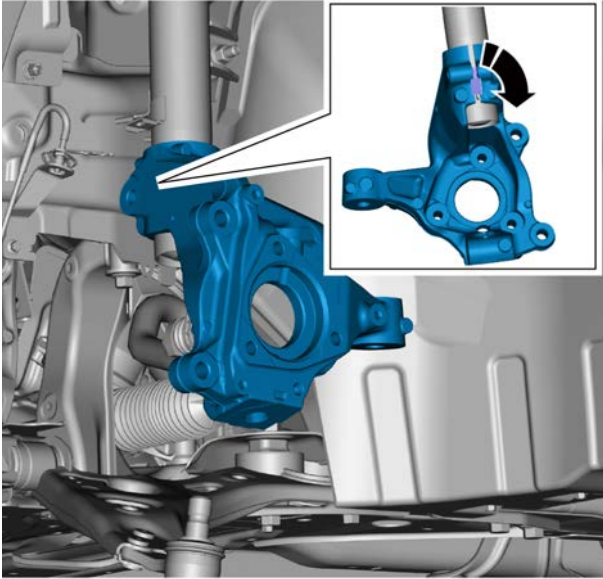
- 9 Remove the fixing clip on the wheel speed sensor (front left) harness.
- 10 Remove the retaining bolt 1 of the front brake hose bracket LH and disconnect it from the front steering knuckle LH.



- 11 Remove and discard the fixing nut 1 and disconnect the left outer tie rod of the steering gear from the front steering knuckle LH assembly.
- 12 Remove and discard the retaining bolt 2, and disconnect front left lower swing arm assembly from the front steering knuckle LH assembly.

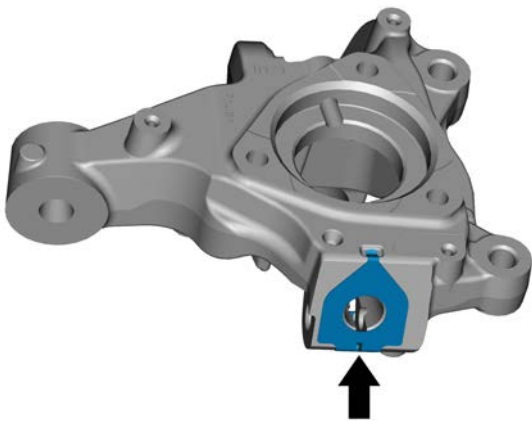


- 13 Remove and discard the retaining bolts connecting the front steering knuckle LH assembly and the shock absorber, and remove the front steering knuckle LH assembly



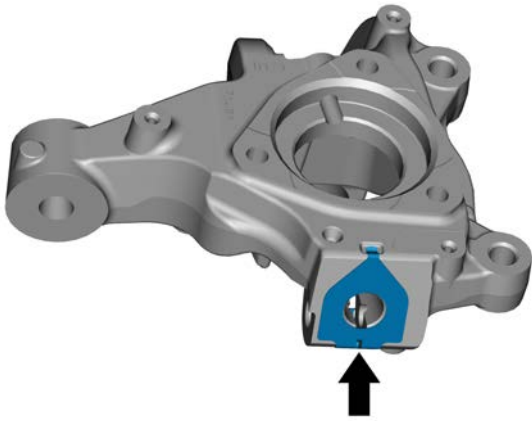
- 14 Insert a suitable tool and turn the tool with a wrench to loosen the steering knuckle from the Front shock absorber assembly LH assembly.

- 15 Remove the steering knuckle washer.

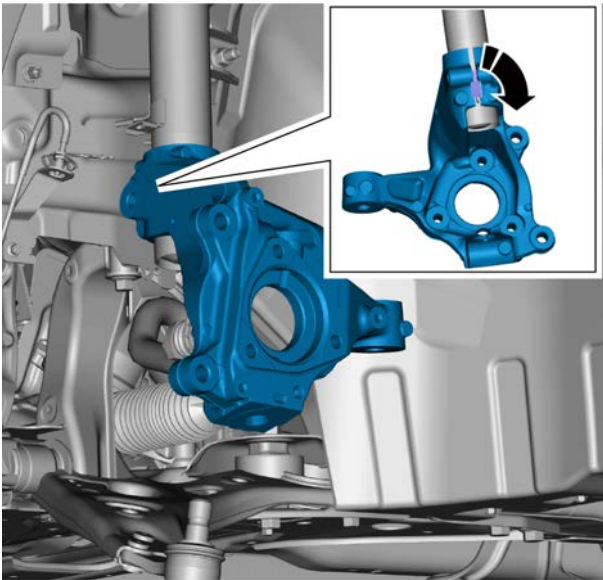


Installation procedure

- 1 Install the steering knuckle washer.

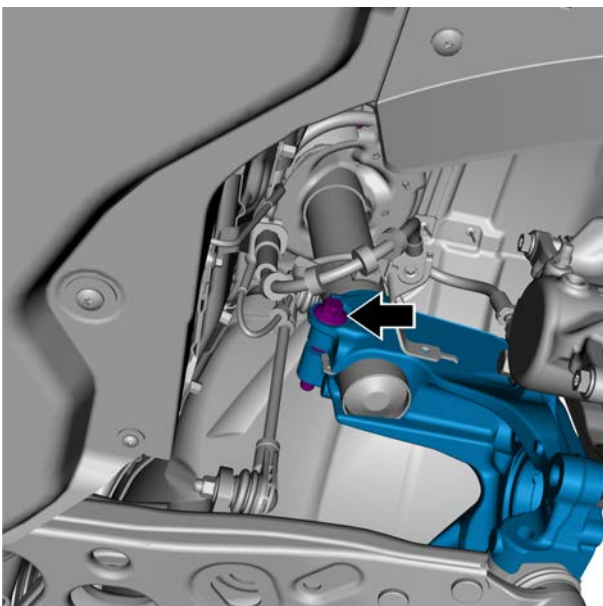


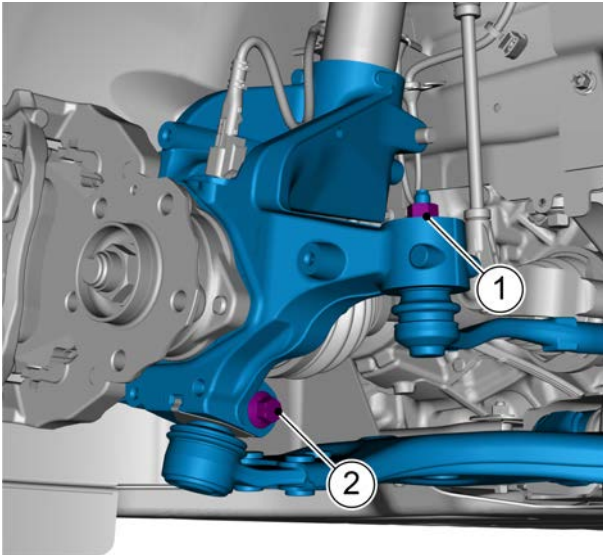
- 2 Insert a suitable tool, turn the tool with a wrench and install the steering knuckle onto the Front shock absorber assembly LH assembly.



- 3 Install front left steering knuckle assembly, install and tighten new fixing bolts.

Torque: 90 Nm + 90° (metric system) 66.6 lb-ft+90° (Imperial System)



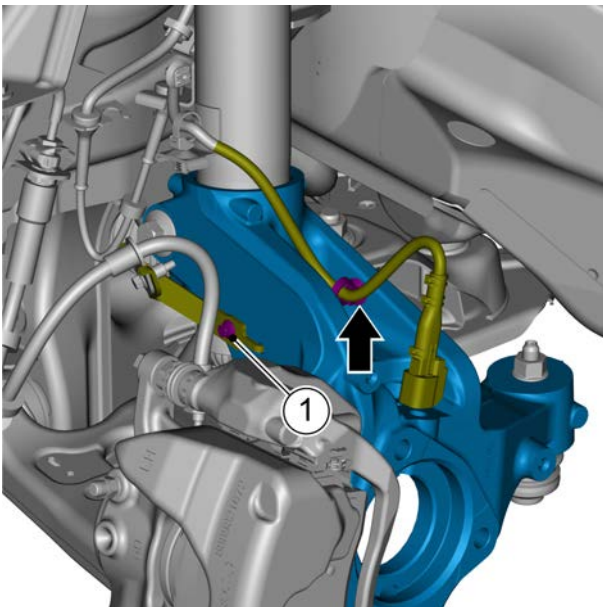


- 4 Install the left outer tie rod of the steering gear and tighten the new fixing nut 1.

Torque: 30 N.m + 90 ° (metric system) 22.1 lb-ft+90° (Imperial System)

- 5 Install front left lower swing arm assembly and tighten the new retaining bolts 2.

Torque: 90 N.m + +75 ° (metric system) 66.4 lb-ft+75° (Imperial System)



- 6 Install the front brake hose bracket LH and tighten the retaining bolt 1.

Torque: 7 N. m (metric system) 5.2 lb-ft (Imperial system)

- 7 Install front left wheel harness sensor harness fixing clip.

- 8 Install front left wheel harness sensor.

- 9 Install front left drive hub assembly.

- 10 Install front left wheel brake protective cover.

- 11 Install the front left constant velocity drive shaft.

- 12 Install the front left brake disc.

- 13 Install the left front brake caliper assembly.

- 14 Install the wheel.

- 15 Lower the vehicle.

- 16 Check the four-wheel alignment data of the vehicle.

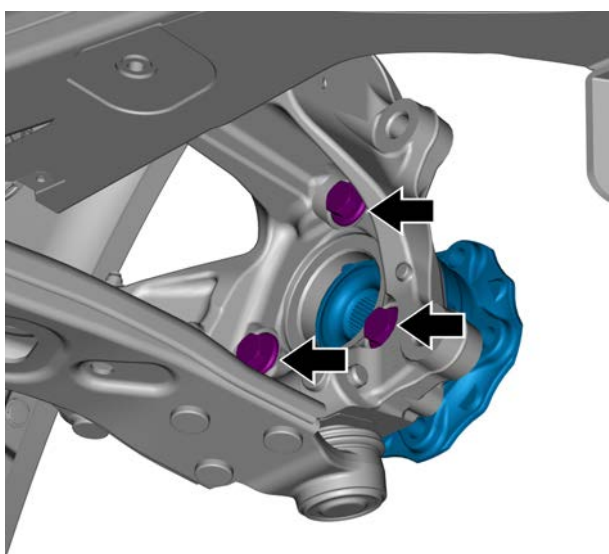
4.2.6.7 Front left drive hub assembly replacement

Removal procedure

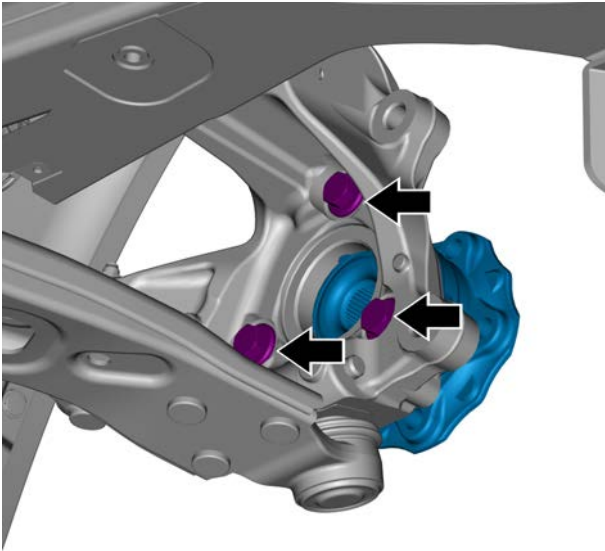
Caution

The removal and assembly methods of front left front drive hub assemblies are similar.

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the Assembly-front brake caliper LH. See [replacement of Assembly-front brake caliper LH](#).
- 4 Remove the front brake disc LH. See [replacement of front brake disc LH](#).
- 5 Remove front left constant speed drive shaft. See [replacement of front left constant speed drive shaft](#).
- 6 Remove and discard the 3 retaining bolts connecting the front drive hub assembly and the front steering knuckle LH assembly, and remove the front drive hub assembly.



Installation procedure



- 1 Install front left drive hub assembly into the front steering knuckle LH assembly, install and tighten 3 new retaining bolts.

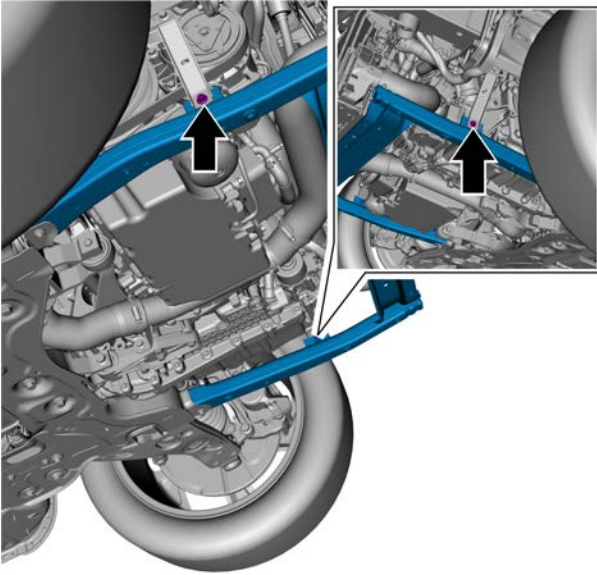
Torque: 90 N.m + 90 ° (metric system) 66.4 lb-ft+90° (Imperial System)

- 2 Install the front left constant velocity drive shaft.
- 3 Install the front left brake disc.
- 4 Install the left front brake caliper assembly.
- 5 Lower the vehicle.

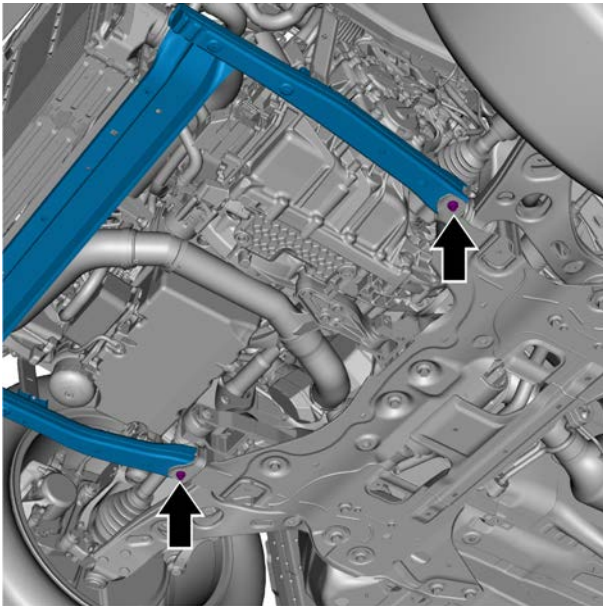
4.2.6.8 Replacement of front suspension lower U-beam

Removal procedure

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the engine fender, see [Engine fender replacement](#).
- 3 Remove front left front wheel housing fender assemblies. See [replacement of front left wheel housing fender assembly](#).
- 4 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).

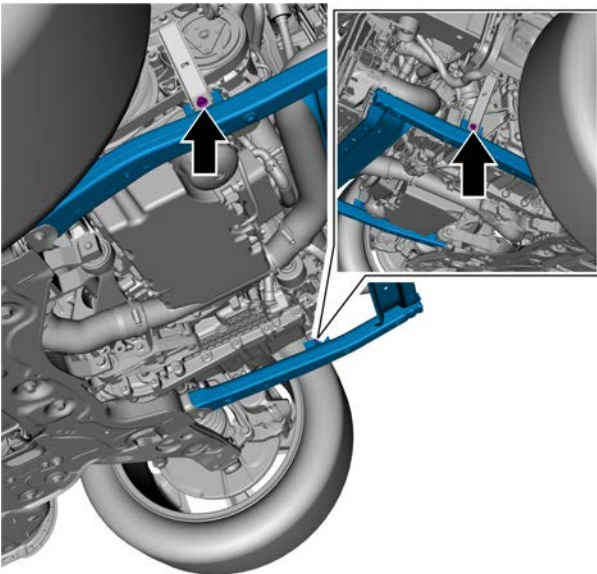
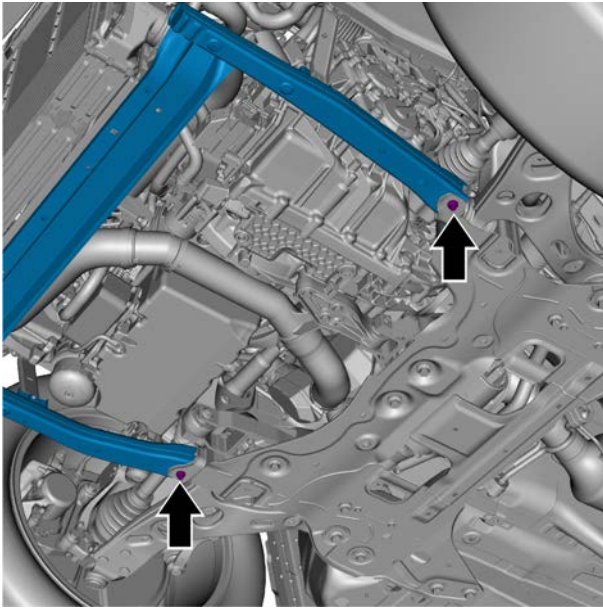


- 5 Remove the retaining bolts between left and right of the front suspension lower U-beam and the support beam of the front suspension lower U-beam.



- 6 Remove the fixing bolts between front left of the front suspension lower U-beam and the sub-chassisframe, and remove the front suspension lower U-beam.

Installation procedure



- 1 Install the lower force transmission path of the front suspension, and tighten the fixing bolts between front left (front left)s and the sub-chassisframe.

Torque: 25 N.m + +140 ° (metric system) 18.4 lb-ft +140° (Imperial System)

- 2 Install and tighten the retaining bolts between left and right of the front suspension lower U-beam and the support beam of the front suspension lower U-beam.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

- 3 Install the front bumper assembly.
- 4 Install the front wheel housing fender assemblies on front lefts.
- 5 Install the engine fender.
- 6 Lower the vehicle.

4.2.6.9 Replacement of front subframe

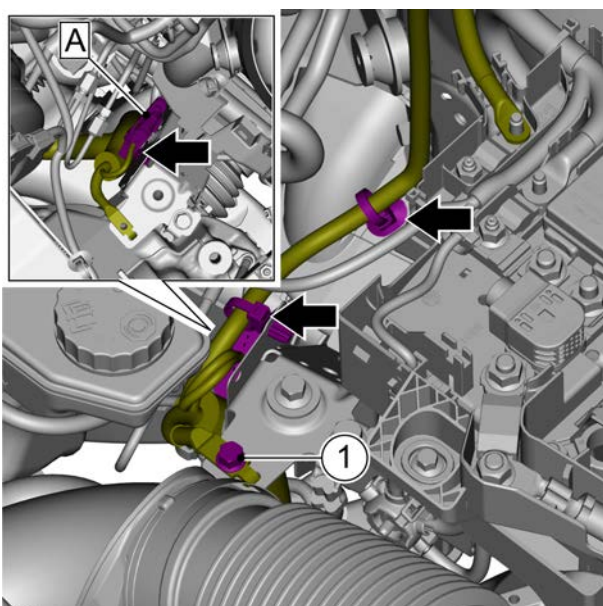
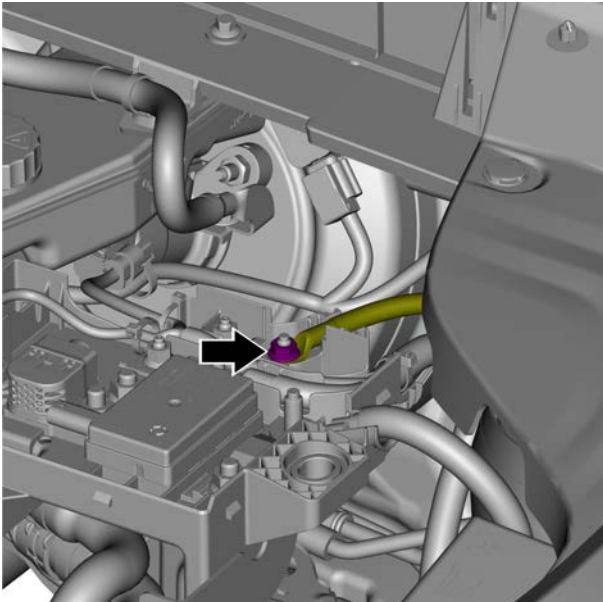
Removal procedure

Warning !

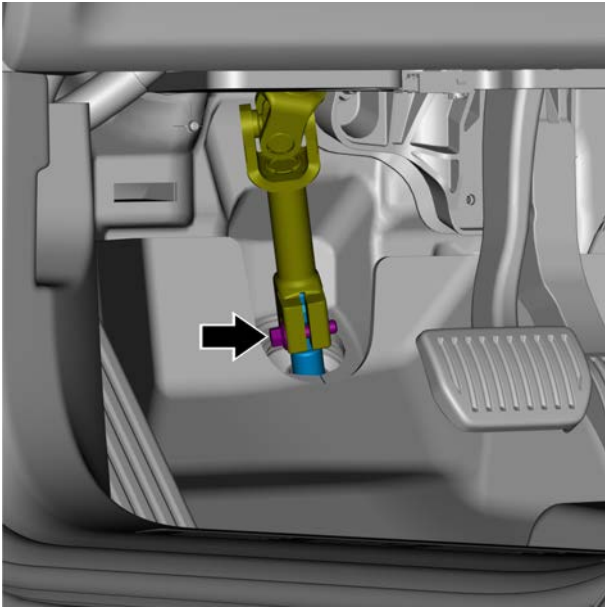
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

- 2 Remove the battery. See [battery replacement \(4G20\)](#).
- 3 Remove the battery bracket. See [battery bracket assembly replacement \(4G20\)](#).
- 4 Lift the vehicle, see [Lift the vehicle](#)
- 5 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 7 Remove the right rear suspension vibration isolation pad assembly of the engine. See [replacement of right rear suspension vibration isolation pad](#).
- 8 Remove the RL suspension vibration isolation pad. See [replacement of RL suspension vibration isolation pad](#).
- 9 Remove fixing nuts of power steering harness.



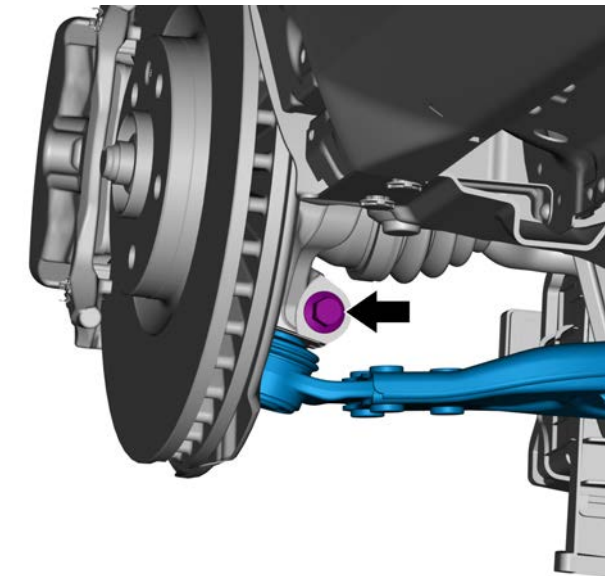
- 10 Remove retaining bolts 1 from the power steering harness.
- 11 Disconnect the fixing clip of power steering harness.
- 12 Disconnect the power steering harness connection plug a.



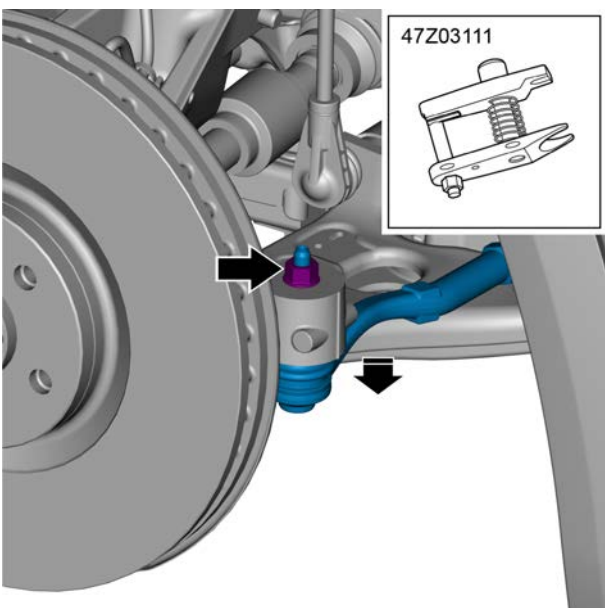
- 13 Remove and discard the retaining bolts on the steering column assembly mechanical and disconnect from the power steering.

Caution

After removing the connecting bolt between the pipe column and the steering gear, it is necessary to lock the steering wheel to prevent the rotation of the steering wheel from damaging the clock spring.

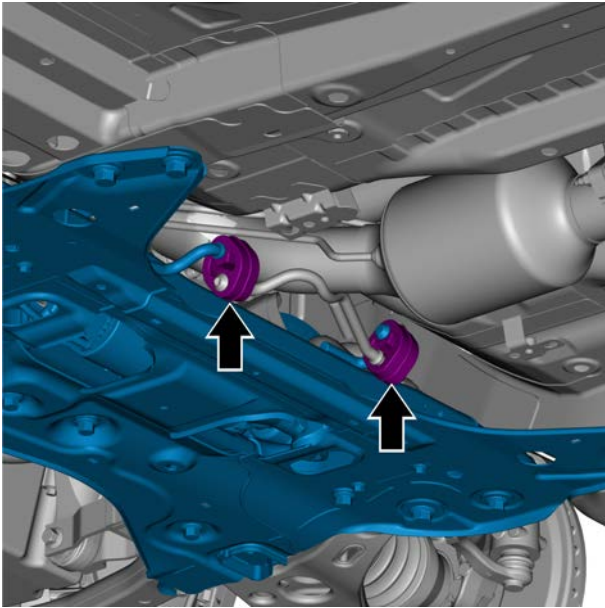


- 14 Remove and discard the front left and right lower arm ball joint fixing locking bolts, and disconnect front left lower arm ball joints from the steering knuckle.

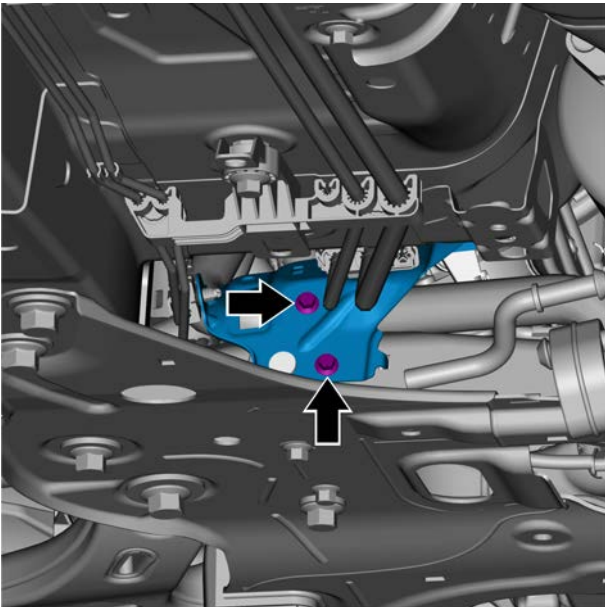


- 15 Remove and discard left and right tie rod ball joint fixing nuts, and disconnect the tie rod ball joint from the steering knuckle.

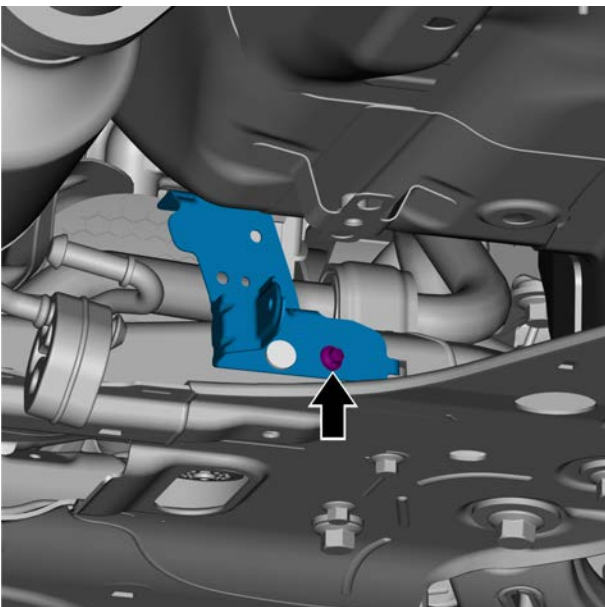
Dedicated tool: 47Z03111



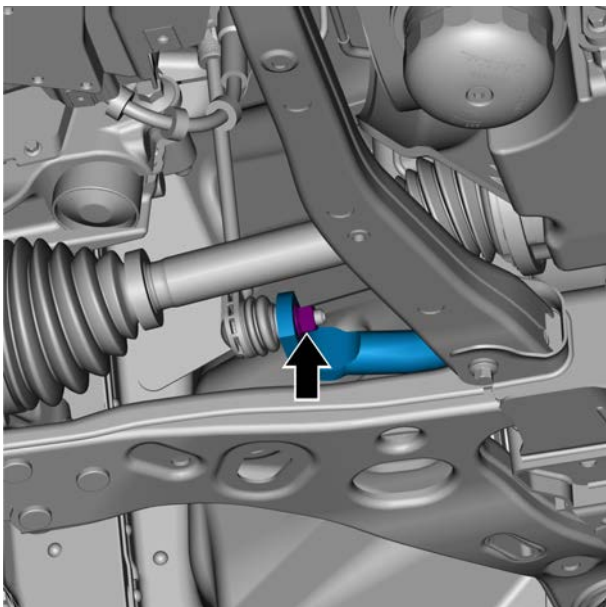
16 Remove left and right exhaust pipe lifting lugs.



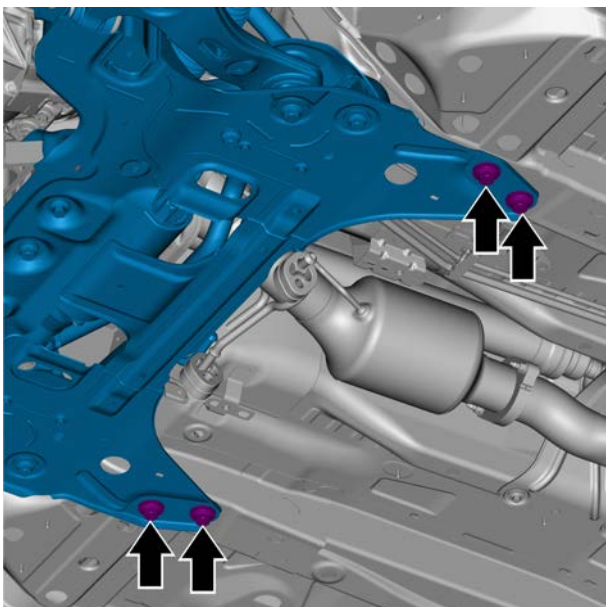
17 Remove 2 fixing bolts between the front sub-chassisframe assembly and the left bracket of the front channel heat shield.



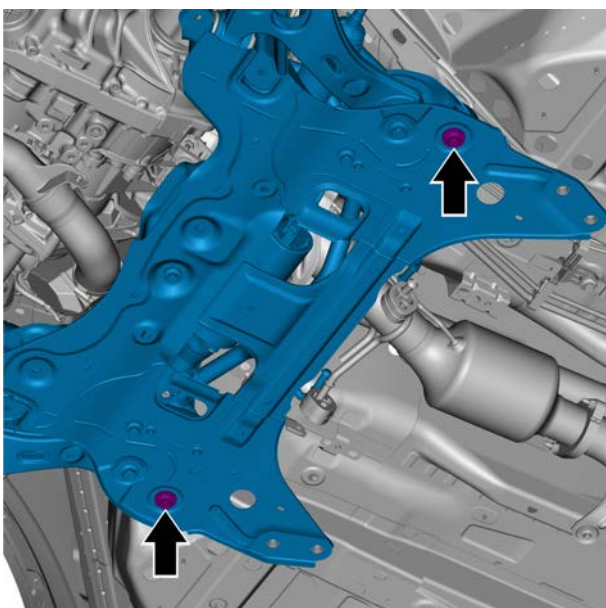
18 Remove the fixing bolts between the front sub-chassisframe assembly and the right front bracket of the heat shield.



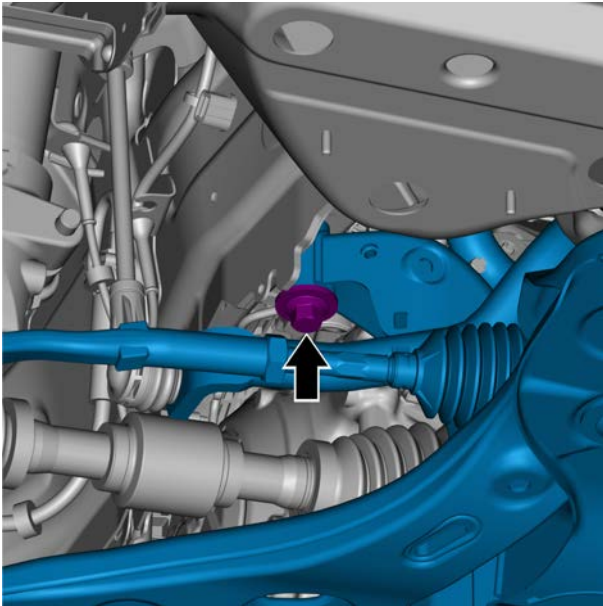
- 19 Remove and discard 1 fixing nut on both sides of the connecting rod between the front suspension stabilizer bar and the front stabilizer bar.



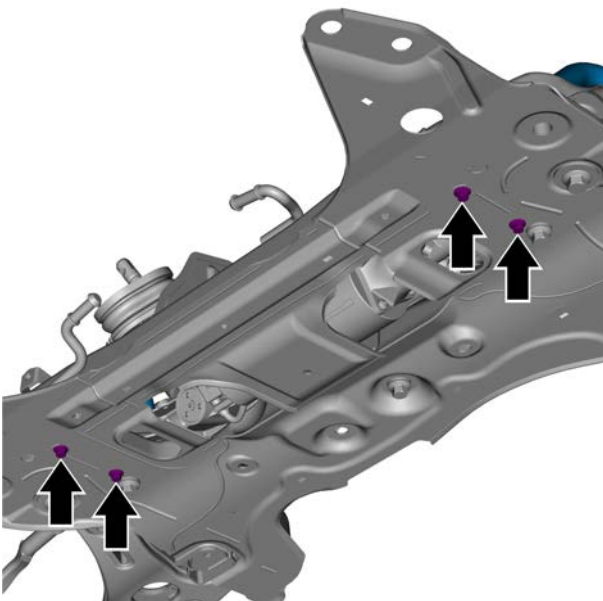
- 20 Support the front sub-chassisframe with a hydraulic jack, and remove and discard the four fixing bolts connecting front left front left (front left)s of the reinforcing plate of the front sub-chassisframe with the body.



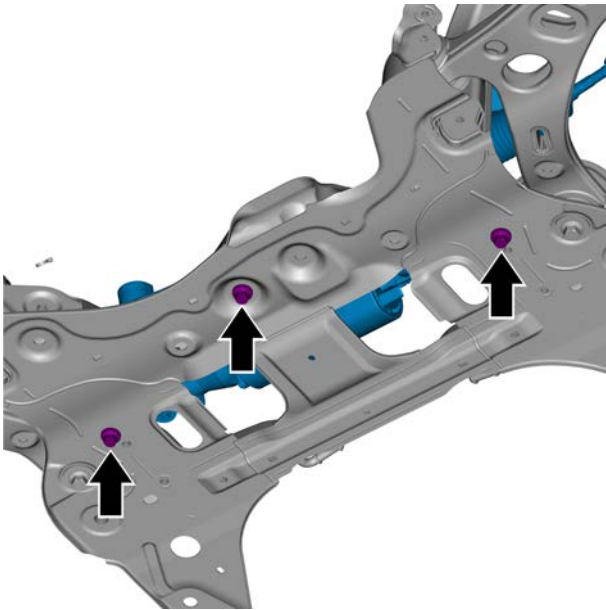
- 21 Remove and discard the two fixing bolts connecting of the Rear-end of the front sub-chassisframe with the body.



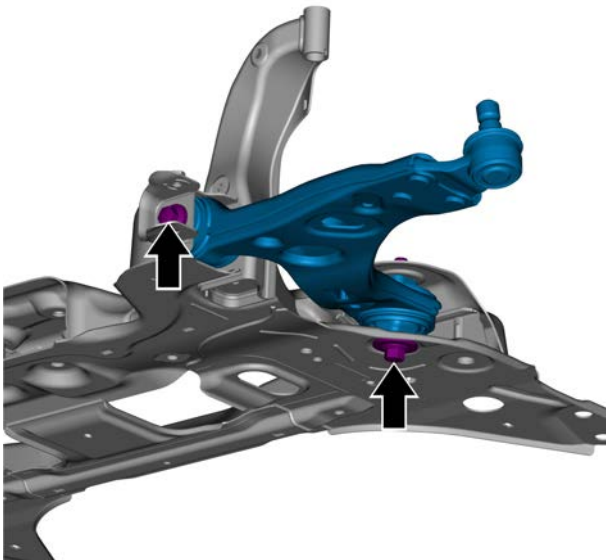
- 22 Remove and discard the two fixing bolts connecting front left front left (front left)s of the Front-end of the front sub-chassisframe with the body.



- 23 Slowly lower the hydraulic jack and remove the sub-chassisframe together with the steering gear assembly, stabilizer bar and front left lower swing arm assembly.
- 24 Remove and discard the 4 fixing bolts from front left front left (front left)s of the stabilizer bar bracket to the sub-chassisframe assembly, and remove the stabilizer bar assembly.



- 25 Remove and discard the 3 retaining bolts of power steering and remove the power steering.

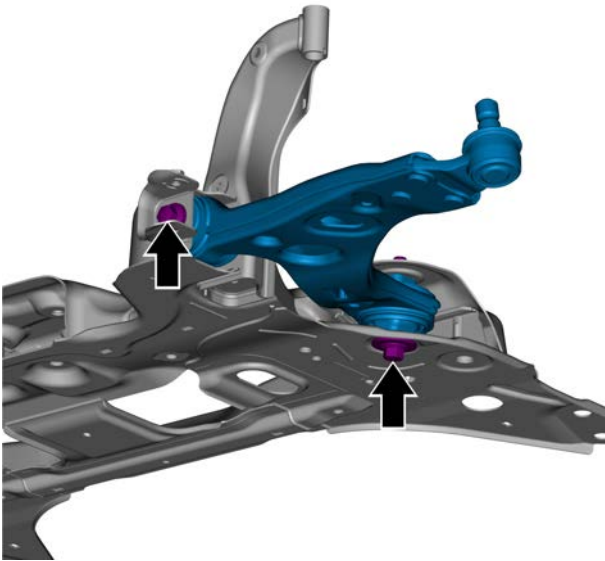


- 26 Remove and discard the 2 fixing bolts of the front suspension left lower swing arm assembly and sub-chassisframe assembly, and take out the front suspension lower swing arm assembly.

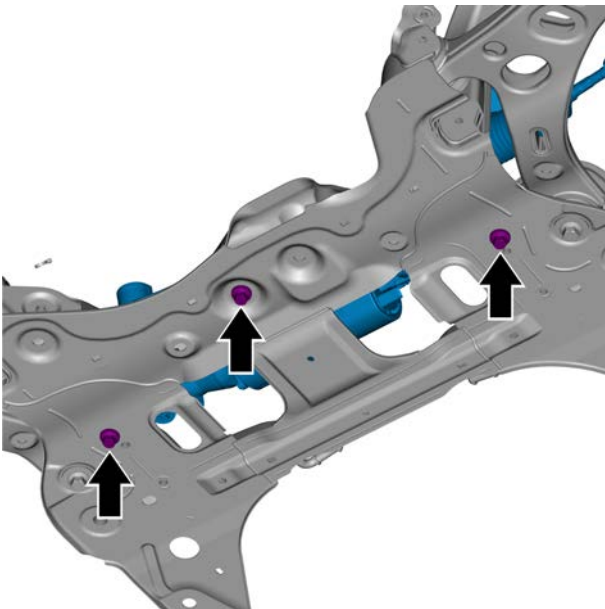
Caution

The removal methods of front left lower swing arm assemblies are similar.

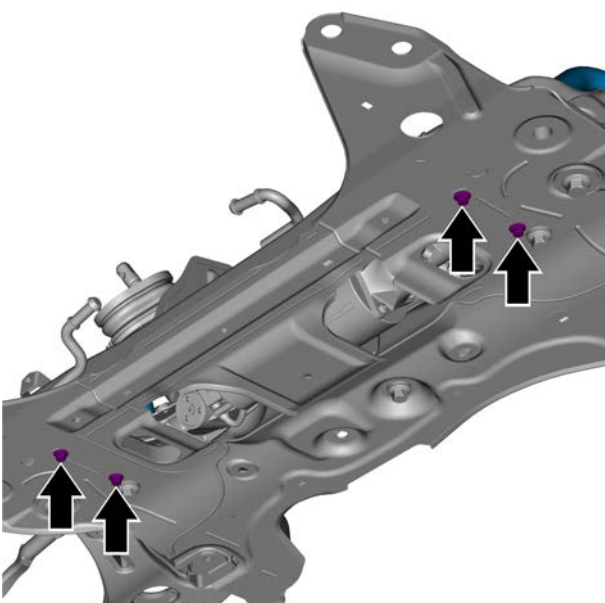
Installation procedure



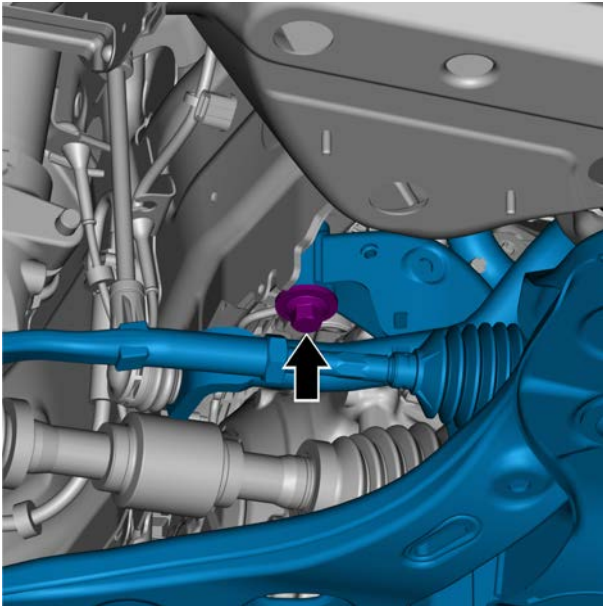
- 1 Install the front suspension lower swing arm assembly, install and tighten 2 new retaining bolts.
Torque: 140 N.m + 90 ° (metric system) 103.3 lb-ft+90° (Imperial System)



- 2 Install power steering, install and tighten 3 new retaining bolts.
Torque: 90 N.m + 90 ° (metric system) 66.4 lb-ft+90° (Imperial System)



- 3 Install the stabilizer bar assembly, install and tighten 4 new retaining bolts.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



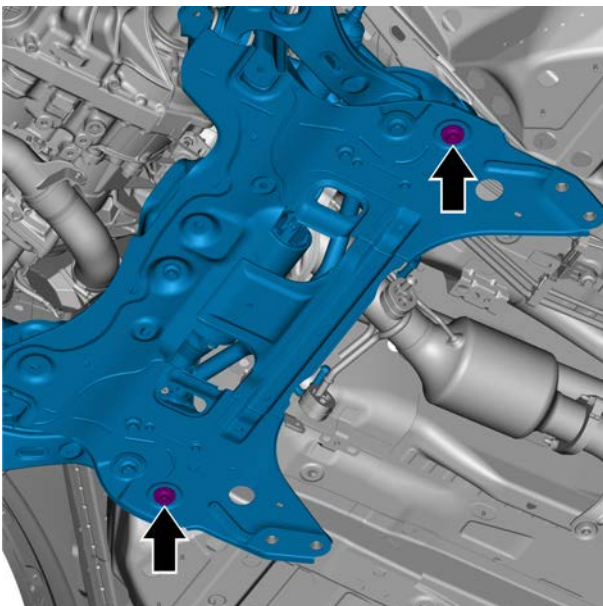
- 4 Use the jack to lift the sub-chassisframe together with the steering gear assembly, stabilizer bar and front left lower swing arm assembly to the installation position, install the tools and tighten the connecting bolts between front left front left (front left)s of the Front-end of the new sub-chassisframe and the body.

Torque: 90 N.m + 90 ° (metric system) 66.4 lb-ft+90° (Imperial System)

Caution

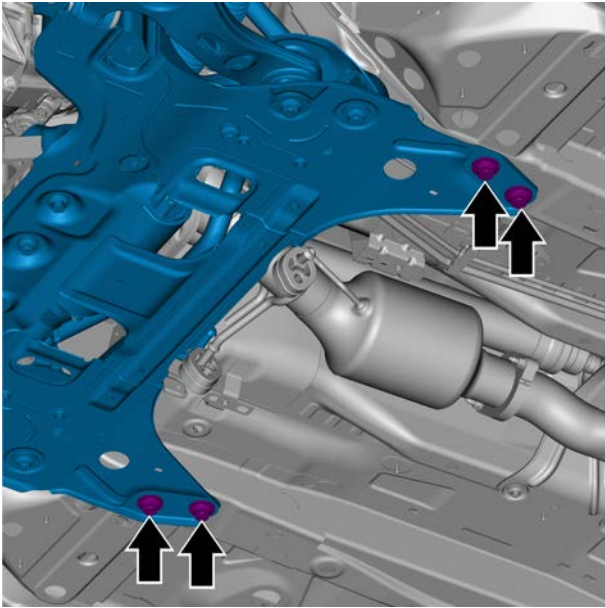
When installing the sub-chassisframe, the 14mm auxiliary locating pin shall be used to locate the locating hole first, and then tighten the four bolts, otherwise the sub-chassisframe assembly may be tilted.

Pre-tighten the fixing bolts at each position of the sub-chassisframe, and fasten the fixing bolts of the sub-chassisframe after the bolt holes are aligned.



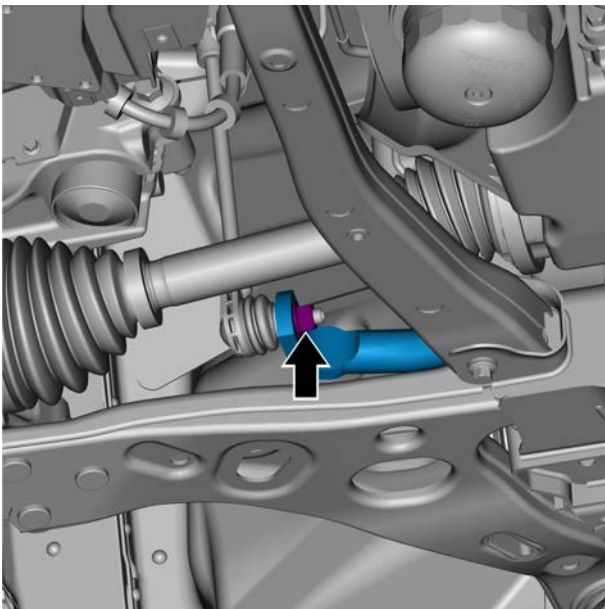
- 5 Install and tighten the fixing bolts connecting front left front left (front left)s of the Rear-end of the new sub-chassisframe with the body.

Torque: 90 N.m + 90 ° (metric system) 66.4 lb-ft+90° (Imperial System)



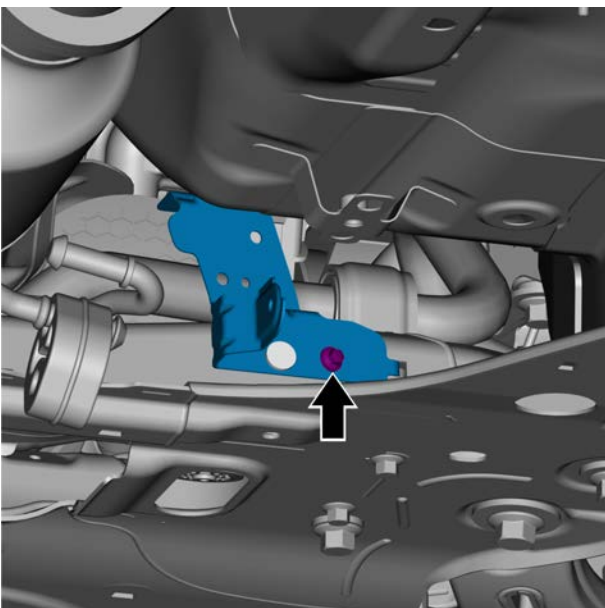
- 6 Install and tighten 4 new fixing bolts connecting front left front left (front left)s of the sub-chassisframe reinforcing plate to the body.

Torque: 140 N.m + 90 ° (metric system) 103.3 lb-ft+90° (Imperial System)



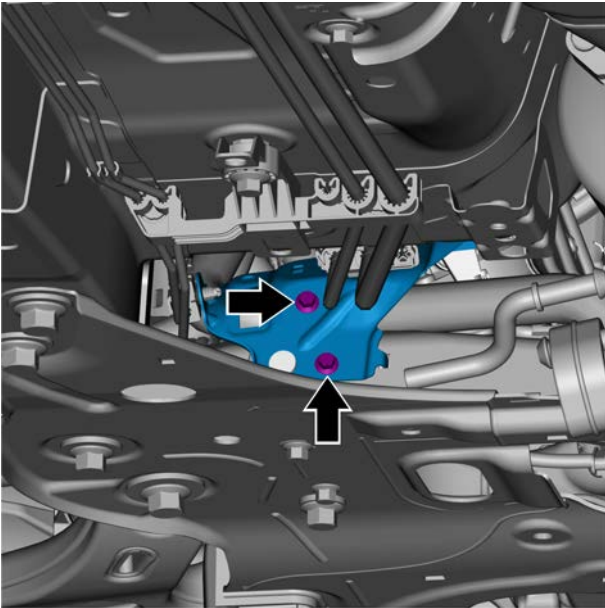
- 7 Install the connecting rods of front suspension stabilizer bars on both sides, and install and tighten new fixing nuts.

Torque: 70 N. m (metric system) 51.6 lb-ft (Imperial system)

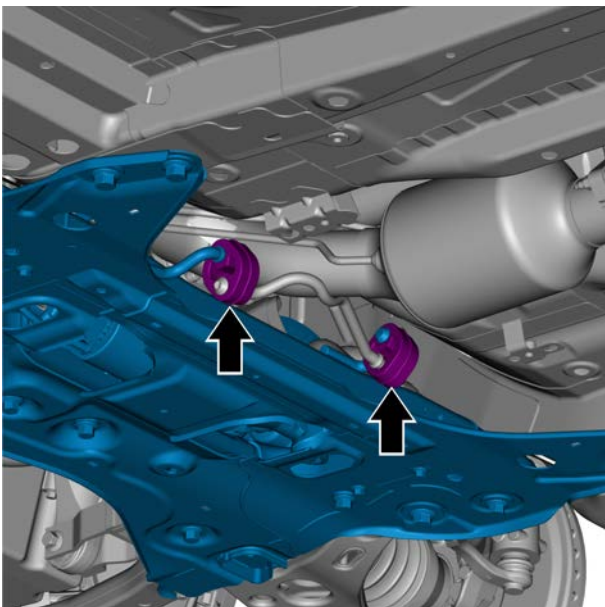


- 8 Install the right bracket of the front channel heat shield, and tighten the retaining bolts.

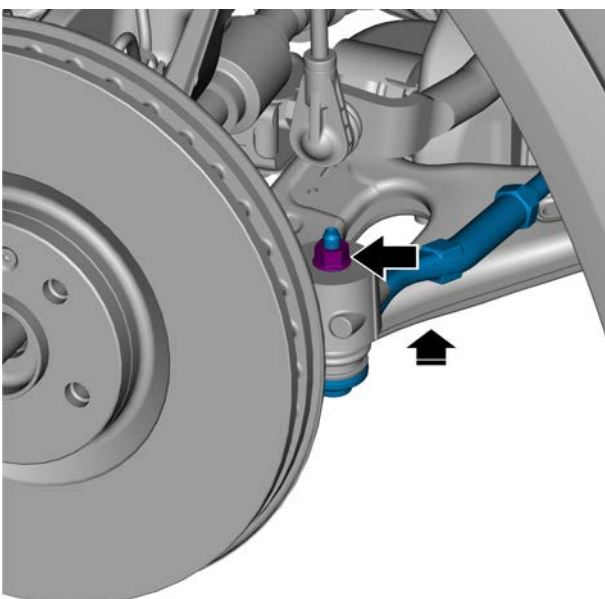
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



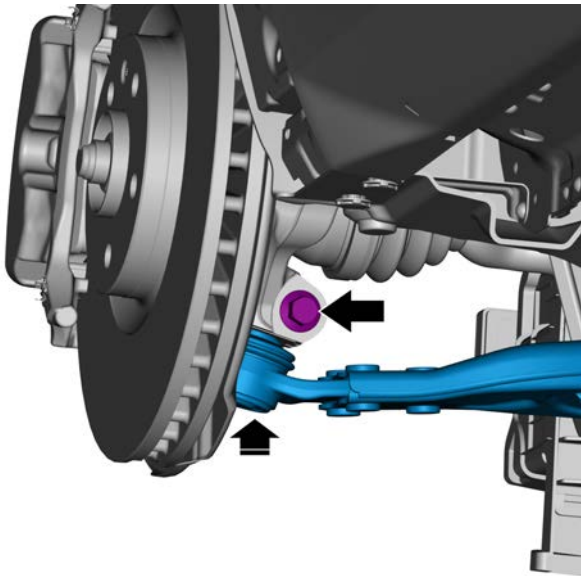
- 9 Install the left support of the front channel heat shield, and tighten 2 retaining bolts.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



- 10 Connect left and right exhaust pipe lifting lugs.

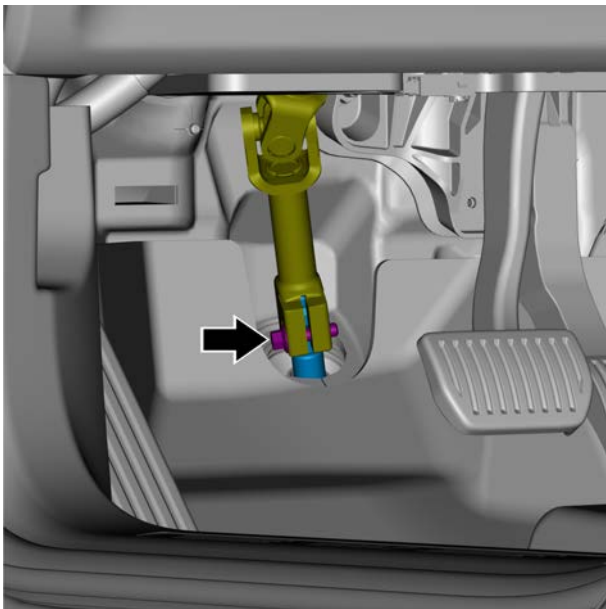


- 11 Install left and right tie rods on the steering knuckle and tighten the new fixing nuts.
Torque: 30 N.m + 90 ° (metric system) 22.1 lb-ft+90° (Imperial System)



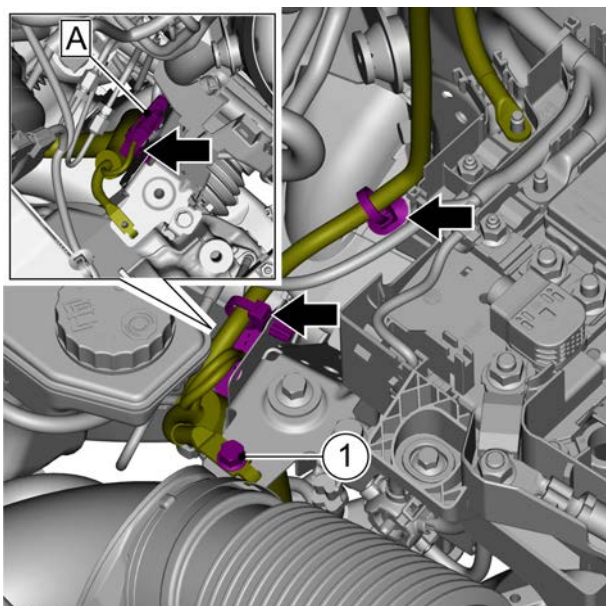
- 12 Place left and right front lower swing arm assemblies at the installation position of the front steering knuckle, install and tighten new retaining bolts.

Torque: 90 N.m + +75 ° (metric system) 66.4 lb-ft+75° (Imperial System)



- 13 Install the steering column assembly mechanical onto the power steering, install and tighten new retaining bolts.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

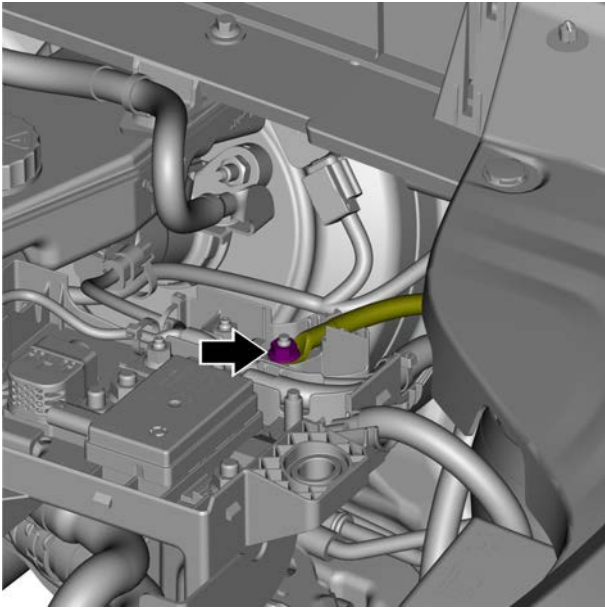


- 14 Install power steering harness connection plug a.

- 15 Install fixing clip of power steering harness.

- 16 Install retaining bolts 1 of power steering harness.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

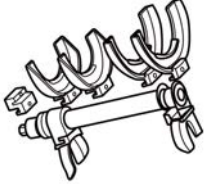
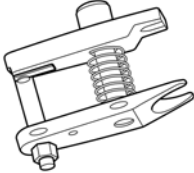


- 17 Install fixing nuts of power steering harness.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 18 Install the front suspension lower U-beam.
- 19 Install the front bumper assembly.
- 20 Install the battery bracket.
- 21 Install the battery heat shield.
- 22 Install the coil spring rear suspension LH vibration isolation pad assembly.
- 23 Install the right rear suspension vibration isolation pad assembly.
- 24 Install the front left and right wheel.
- 25 Lower the vehicle.
- 26 Connect the negative battery cable.
- 27 Check the four-wheel alignment data of the vehicle.

4.2.7 Special tools and equipment

4.2.7.1 Special tool

Serial No.	Illustration	Tool number	Name
1		47Z03114	Shock absorber spring removal tool
2		47Z03111	Ball head removal tool

4.2.7.2 Equipment

Torque wrench
Dial indicator with magnetic base
Tire Pressure table
Locator

4.3 Rear suspension

4.3.1 Specification

4.3.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Rear sub-chassisframe and body front point fixing bolts	M12×120×126.35	90 N.m+140°	66.4 lb-ft+140°
Rear sub-chassisframe and body rear point fixing bolts	M12×120×126.35	90 N.m+140°	66.4 lb-ft+140°
Rear longitudinal arm mounting bracket and body retaining bolts	M10×35	50Nm+60°	37 lb-ft+60°
retaining bolts of rear suspension trailing arm assembly and rear trailing arm mounting bracket	M14×85	140Nm+60°	103.6 lb-ft+60°
Rear suspension trailing arm assembly upper point and rear steering knuckle retaining bolt	M14×45	140Nm+30°	103.6 lb-ft+60°
Rear suspension trailing arm assembly lower point and rear steering knuckle retaining bolt	M12×40	90Nm+30°	66.4 lb-ft+30°
Rear sub-chassisframe toe bar assembly and rear sub-chassisframe fixing bolts	M12×70	90Nm+90°	66.4 lb-ft+90°
Rear sub-chassisframe toe bar assembly and rear steering knuckle fixing bolts	M12×75	95~125	70.1~92.2
fixing bolts of rear upper cross arm assembly and rear sub-chassisframe	M12×70	90Nm+90°	66.4 lb-ft+90°
retaining bolts of rear upper cross arm assembly and rear steering knuckle	M12×75	95~125	70.1~92.2
Rear upper cross arm and steering knuckle fixing nut	M12×15.3	95~125	70.1~92.2
Rear suspension lower swing arm assembly and rear sub-chassisframe fixing bolts	M12×85	77~103	57~76.2

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Rear suspension lower swing arm assembly and rear steering knuckle retaining bolts	M12×70	90Nm+90°	66.4 lb-ft+90°
Rear suspension stabilizer bar and rear sub-chassisframe fixing nut	M10×11.4	50~70	36.9~51.6
Rear stabilizer bar connecting rod and stabilizer bar fixing nut	M12×13.8	85~115	62.7~84.8
retaining bolts of rear stabilizer bar connecting rod and steering knuckle	M10×60	50~70	36.9~51.6
retaining bolts of rear suspension lower swing arm assembly and rear shock absorber assembly	M12×70	90Nm+90°	66.4 lb-ft+90°
retaining bolts between mounting bracket on rear shock absorber and vehicle body	M10×35	50 N.m+60°	36.9 lb-ft+60°
retaining bolts of rear hub bearing and steering knuckle	M12×55	230~300	170.2~222
retaining bolts of rear hub bearing and rear drive shaft	M10×65	45 N.m+90°	33.2 lb-ft+90°
Rear caliper to knuckle retaining bolt	M12×50	95~125	70.1~92.2

4.3.2 Description and operation

4.3.2.1 Instructions and Operations

The rear suspension and the front suspension together provide excellent stability, operability and comfort for the vehicle. The main load-bearing parts and moving parts of the rear suspension can withstand the vertical force and torsion force to enhance the anti-roll ability of the rear suspension and the anti-nodding ability of the whole vehicle. The shock absorber accelerates the weakening of the vibration. Coil spring can support and transfer vertical load to diminish the shock of the road.

The rear suspension of this model adopts multi link independent suspension with lateral stabilizer bar, which is mainly composed of the following components: rear longitudinal arm assembly, rear shock absorber assembly, rear suspension coil spring, rear sub-chassisframe assembly, rear suspension upper swing arm assembly, rear suspension lower swing arm assembly, rear stabilizer bar assembly, rear sub-chassisframe toe bar assembly.

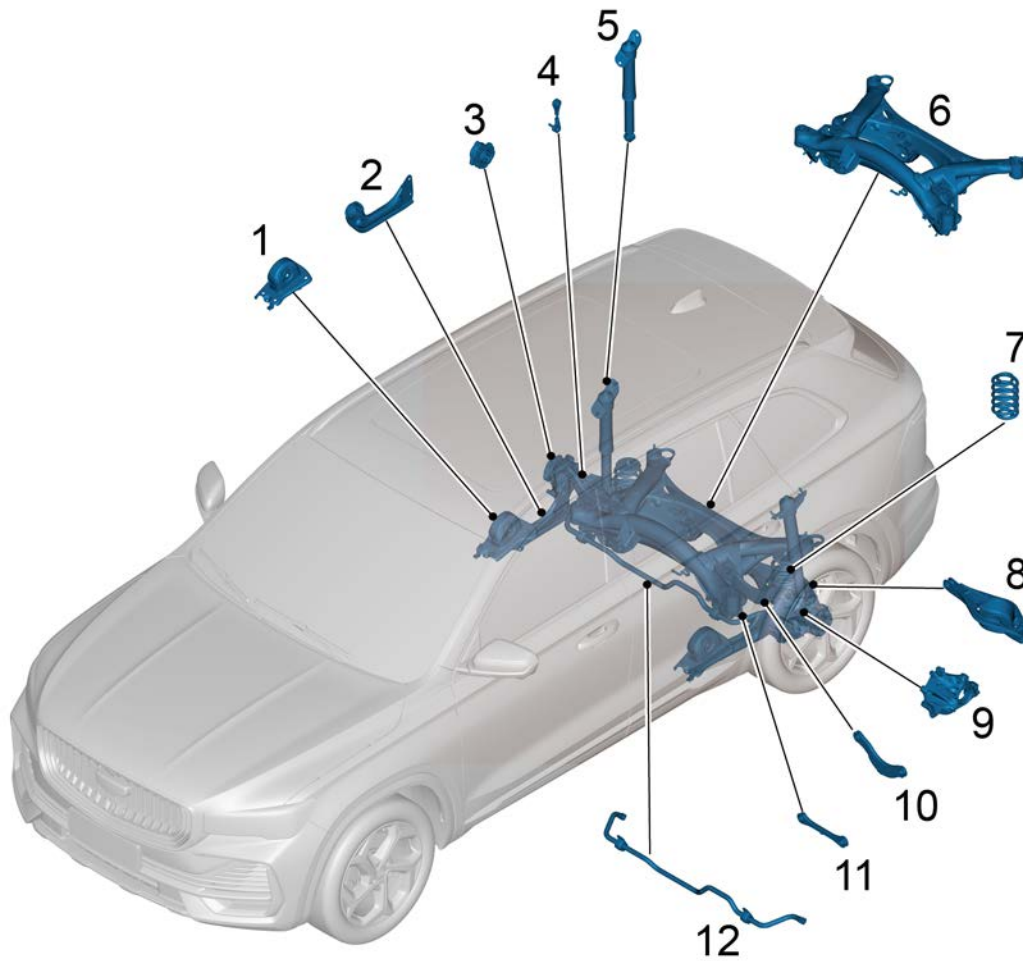
4.3.3 System working principles

4.3.3.1 System Working Principles

See [the operating principle of suspension system components](#).

4.3.4 Component position

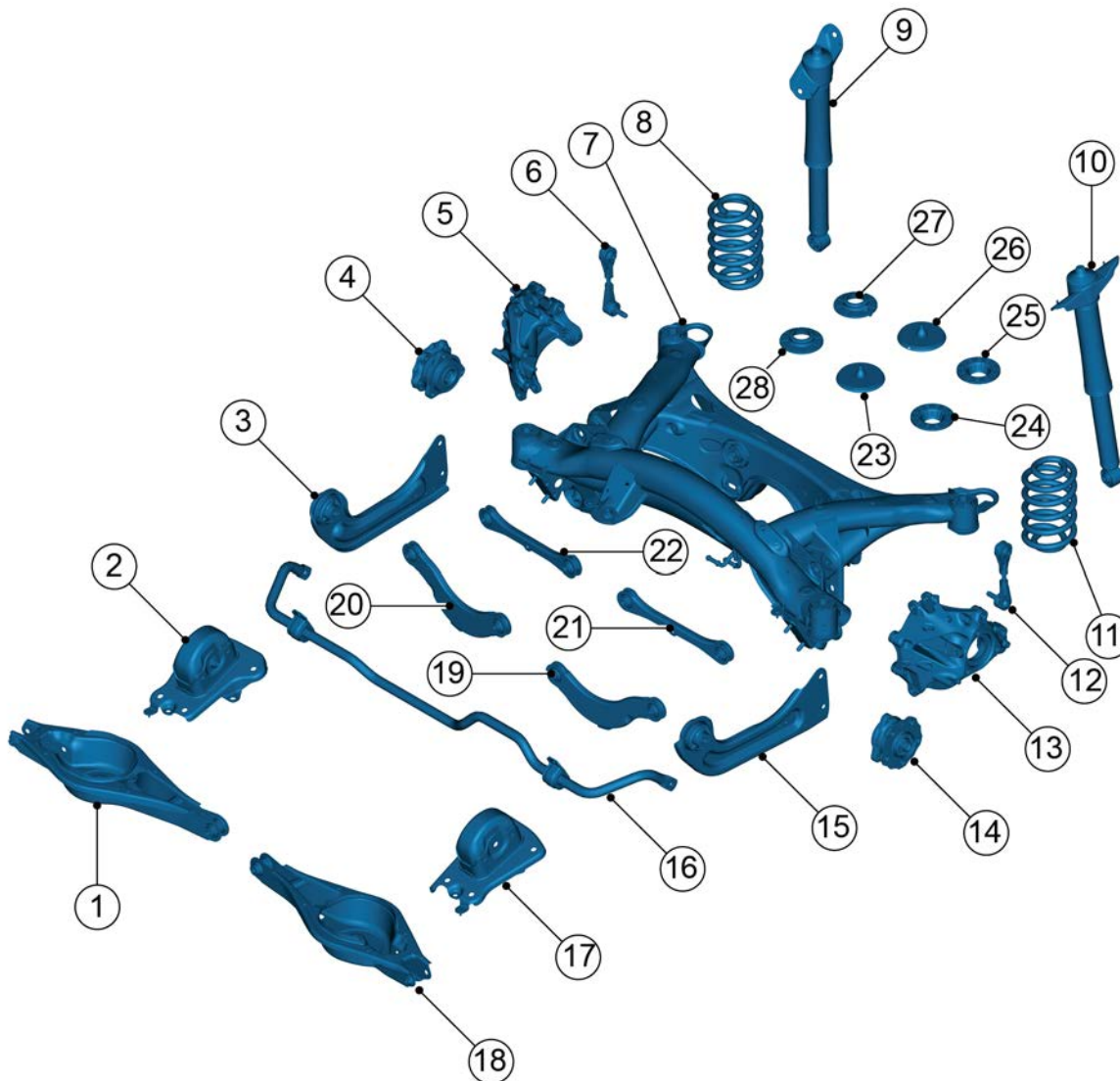
4.3.4.1 Component position



- | | | | |
|----|---|-----|----------------------------------|
| 1. | Rear suspension trailing arm mounting bracket | 7. | Rear suspension coil spring |
| 2. | Rear suspension trailing arm assembly | 8. | Rear lower swing arm |
| 3. | Rear hub bearing | 9. | Rear knuckle |
| 4. | Rear stabilizer bar connecting rod | 10. | Rear upper cross arm assembly |
| 5. | Rear shock absorber assembly | 11. | Rear suspension toe bar assembly |
| 6. | Rear subframe | 12. | Rear stabilizer bar assembly |

4.3.5 Exploded view

4.3.5.1 Exploded view



- | | |
|--|--|
| 1. Lower swing arm assembly of right rear suspension | 15. coil spring rear suspension LH trailing arm assembly |
| 2. Right rear suspension trailing arm mounting bracket | 16. Rear suspension stabilizer bar |
| 3. Rear right suspension trailing arm assembly | 17. RL suspension trailing arm mounting bracket |
| 4. Rear hub bearing | 18. Lower swing arm assembly of RL suspension |
| 5. Rear right steering knuckle assembly | 19. RL upper cross arm assembly |
| 6. Right rear stabilizer bar connecting rod | 20. Rear right upper cross arm assembly |
| 7. Rear sub-chassisframe assembly | 21. RL suspension toe bar assembly |
| 8. Rear suspension coil spring | 22. Rear right suspension toe bar assembly |
| 9. Rear right shock absorber assembly | 23. Coil spring rear suspension RH |
| 10. Rear left shock absorber assembly | 24. Washer on coil spring of rear right suspension |

- | | |
|--------------------------------------|---|
| 11. Rear left suspension coil spring | 25. Washer on coil spring of coil spring rear suspension LH |
| 12. RL stabilizer link | 26. Coil spring rear suspension RH |
| 13. RL steering knuckle assembly | 27. Coil spring rear suspension LH |
| 14. Rear hub bearing | 28. Right rear suspension coil spring lower washer |

4.3.6 Diagnostic message and steps

4.3.6.1 Diagnosis Description

Before troubleshooting the rear suspension, see [description and operation](#) and [system operating principle](#). Understand and be familiar with the working principle of rear suspension, and then start the system diagnosis. This will help to confirm the correct fault diagnosis steps when a fault occurs. More importantly, it can also help to confirm whether the situation described by the customer belongs to normal operation. Any fault diagnosis of rear suspension should start with routine inspection. The routine inspection will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

4.3.6.2 Routine inspection

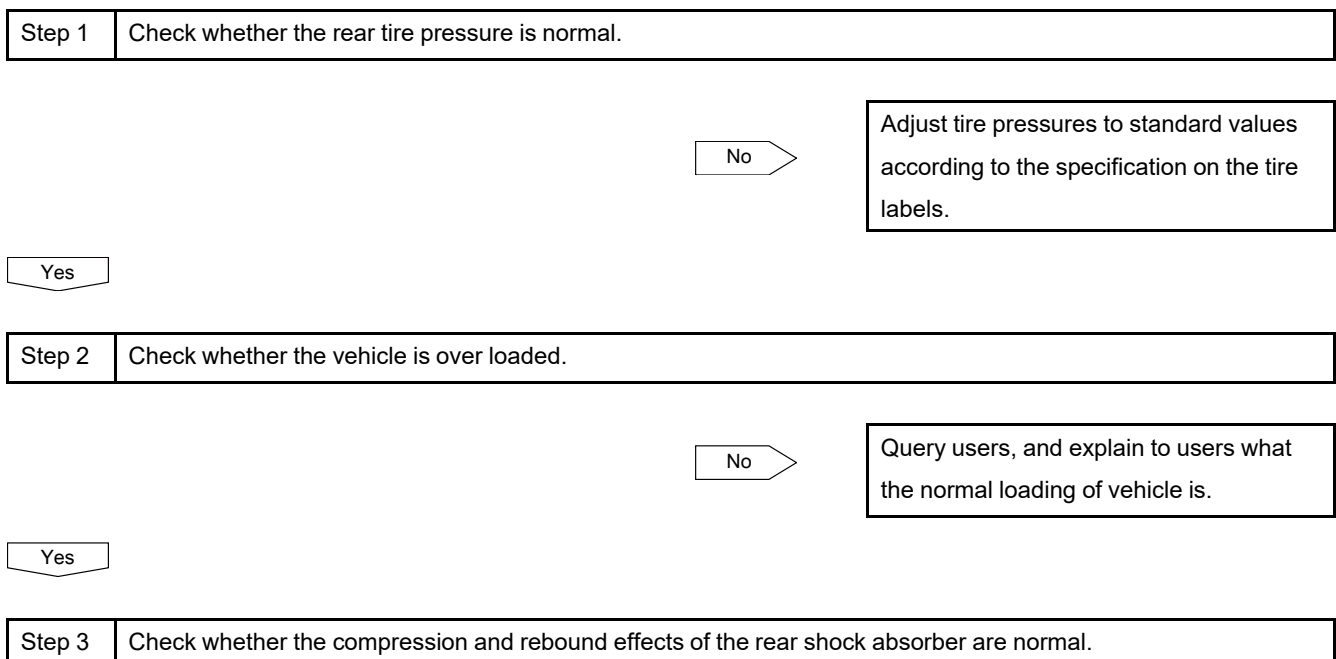
- Confirm trouble symptom

The most difficult situation in trouble shooting is the absence of any symptoms. In this case, the fault described by the user must be thoroughly analyzed. The same or similar conditions and environment when the fault of the distributor's vehicle comes out should be simulated. No matter how experienced and skilled the maintenance personnel is, if they do not confirm the symptoms of the fault, they will ignore some important things in the repair and make wrong guesses in some places. It will make trouble shooting to fail.

- Check the easily accessible or visible system components to find out whether they have obvious damage or conditions that may lead to failure. If so, repair or replace the components.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.
- The connector joints and vibration fulcrum are the main parts that should be thoroughly checked. Vibration method is recommended in case of failure due to vibration.
 - Gently vibrate the potentially faulty sensor part with fingers and check for faults.
 - Gently shake the connector in both vertical and horizontal directions.
 - Gently shake the harness in both vertical and horizontal directions.

4.3.6.3 Inspection of rear shock absorber

Rear shock absorber is too soft



a. Quickly press and release the corner of the bumper closest to the rear shock absorber being tested, and compare the compression and rebound effects with normal similar vehicles.

No

Replace the rear shock absorber, see [replacement of rear shock absorber assembly](#).

Yes

Step 4	System is normal.
--------	-------------------

The rear shock absorber is noisy

Step 1	Check whether the installation of rear shock absorber is normal and check whether all components of the rear shock absorber work normal. (No abnormal condition such as loosening is allowed.)
--------	--

No

Replace the rear shock absorber, see [replacement of rear shock absorber assembly](#).

Yes

Step 2	Check whether the compression and rebound effects of the rear shock absorber are normal.
--------	--

a. Quickly press and release the corner of the bumper closest to the rear shock absorber being tested, and compare the compression and rebound effects with normal similar vehicles.

No

Replace the rear shock absorber, see [replacement of rear shock absorber assembly](#).

Yes

Step 3	System is normal.
--------	-------------------

There is oil leakage in the rear shock absorber

Step 1	Check whether the installation of rear shock absorber is normal and check whether all components of the rear shock absorber work normal. (No abnormal condition such as loosening is allowed.)
--------	--

Next Step

Step 2	Check the sealing condition of rear shock absorber when it is fully extended, and whether the dust cover is damaged, etc.
--------	---

Yes

Replace the rear shock absorber, see replacement of rear shock absorber assembly .
--

No

Step 3	Check whether there is too much oil fluid on the rear Shock Absorber.
--------	---

Yes

Replace the rear shock absorber, see replacement of rear shock absorber assembly .
--

No

Step 4	System is normal.
--------	-------------------

4.3.6.4 Excessive friction check

Check whether the friction of rear suspension is too high according to the following procedures:

Step 1	Support the rear bumper and lift the vehicle as much as possible.
--------	---

Next Step

Step 2	Gently lower the bumper to make the vehicle to restore its normal vehicle front end height.
--------	---

Next Step

Step 3	Measure the distance between ground and the center of bumper.
--------	---

Next Step

Step 4	Press the bumper and then slowly release it to make the vehicle to restore its normal vehicle front end height.
--------	---

Next Step

Step 5	Measure the distance between ground and the center of bumper.
--------	---

Next Step

Step 6	The difference between two measure values should <12.7 mm (0.5 in). If the distance is more than this limitation, check whether coil spring, rear shock absorber, rubber bushing and rear suspension assembly are damaged or worn.
--------	--

4.3.6.5 Ride performance diagnose (too soft or too hard)

Too soft

Step 1	Check whether the rear Shock Absorber is worn. Replace the rear shock absorber assembly if necessary.
--------	---

Next Step

Step 2	Check whether the rear coil spring is snapped or loosed. Replace the rear suspension coil spring if necessary.
--------	--

Too hard

Step 1	Check whether the rear Shock Absorber is installed correctly and whether the rear Shock Absorber conforms to the model. Replace the rear shock absorber assembly if necessary.
--------	--

Next Step

Step 2	Check whether the rear suspension coil spring is installed correctly, and replace the rear suspension coil spring if necessary.
--------	---

4.3.6.6 The body leans or sways when turning

Step 1	It is needed to check whether there is the wear in the rear Shock Absorber and the rear bolt spring retainer. It is important to replace the rear shock absorber assembly if necessary and re-fasten the fixing nut on the rear Shock Absorber.
--------	---

Next Step

Step 2	Check the vehicle for the overload and explain it to the user reasonably.
--------	---

Next Step

Step 3	It is important to check whether the rear coil suspension spring is broken or loose. Replace it if necessary.
--------	---

4.3.6.7 Noise diagnosis

Step 1	Check whether the rear suspension components are worn.
--------	--

Yes

Replace the damaged rear suspension components.

No

Step 2	Check whether the rear stabilizer bar is loose.
--------	---

Yes

Tighten the fixing nut of the rear stabilizer bar.

No

Step 3	Check whether the rear shock absorber assembly and rear coil spring washer are intact, installed in place, damaged, etc?
--------	--

Yes

Replace the damaged components.

No

Step 4	Check whether the installation of rear coil spring is misplaced.
--------	--

Yes

Re-install rear coil spring.

No

Step 5	Find a same model vehicle, and make a comprehensive assessment of whether the noise is normal working noise.
--------	--

Yes

Replace the damaged components.

No

Step 6	Normal system components.
--------	---------------------------

4.3.6.8 The rear height is abnormal

Step 1	It is important to check whether the rear coil suspension spring is broken or loose. Replace it if necessary.
--------	---

Next Step

Step 2	Check whether the vehicle is overloaded, and explain the hazards of it to the user when necessary.
--------	--

Next Step

Step 3	Check whether rear coil spring is correct or too soft. Replace the coil spring originally with genuine Geely parts.
--------	---

4.3.7 Removing and installing

4.3.7.1 Replacement of rear left shock absorber assembly

Removal procedure

Caution

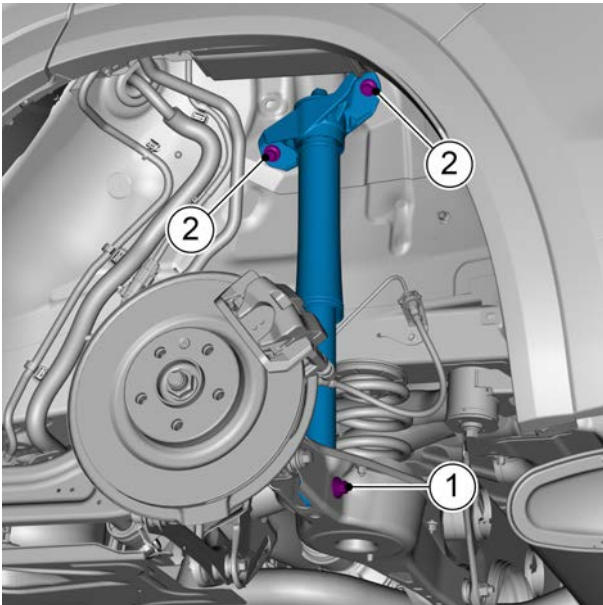
The removal and assembly methods of front RL shock absorber assemblies are similar.

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the splash guard rear wheel arch liner LH. See [replacement of splash guard rear wheel arch liner LH](#).
- 4 Remove the RL suspension guard. See [replacement of RL suspension guard](#).
- 5 Support the rear lower swing arm with a jack.

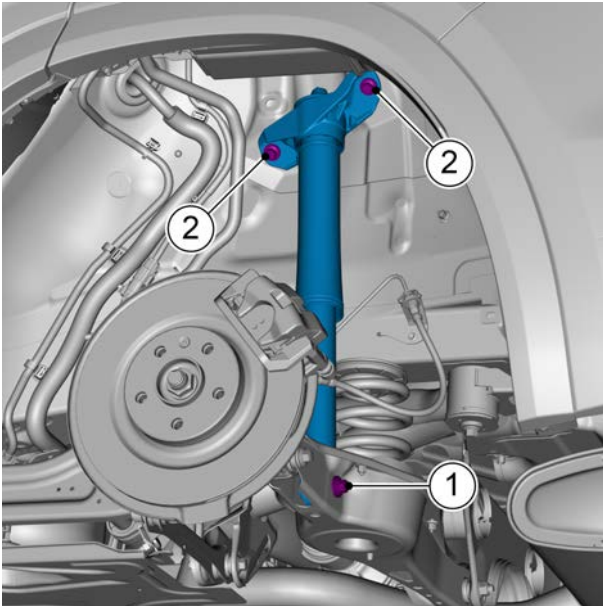
Caution

Before removing the rear shock absorber assembly, use a jack to support the rear lower swing arm slightly upward.

- 6 Remove and discard the retaining bolt 1 connecting the rear suspension lower swing arm assembly and the rear shock absorber assembly.
- 7 Remove and discard the 2 retaining bolts 2 connecting the top of the rear shock absorber assembly to the body.
- 8 Take down the rear shock absorber assembly.



Installation procedure



- 1 Install and tighten 2 retaining bolts 2 connecting the top of the new rear shock absorber assembly to the vehicle body.

Torque: 50 N.m + +60 ° (metric system) 36.9 lb-ft+60° (Imperial System)

- 2 Install and tighten the retaining bolts 1 connecting the new rear shock absorber assembly and the rear suspension lower arm assembly.

Torque: 140 N. m (metric system) 103.3 lb-ft (Imperial system)

- 3 Install the RL wheel cover splash fender assembly.
- 4 Install the RL suspension guard.
- 5 Install the wheel.
- 6 Lower the vehicle.

4.3.7.2 Removal of RL shock absorber assembly

Removal procedure

Caution

The removal methods of front RL shock absorbers are similar.

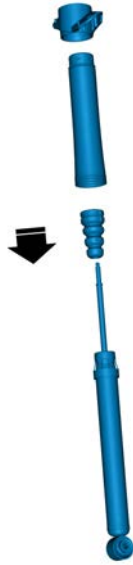
- 1 Remove the rear shock absorber assembly. See [replacement of rear shock absorber assembly](#).
- 2 Remove the cover of the upper support of the rear shock absorber, remove and discard the lock nut.





- 3 Take out the upper support assembly of the rear shock absorber, the buffer block of the rear shock absorber and the dust cover of the rear shock absorber in turn.
- 4 Take out the rear shock absorber.

Installation procedure



- 1 Install the dust cover of the rear shock absorber, the buffer block of the rear shock absorber and the upper support assembly of the rear shock absorber in turn.



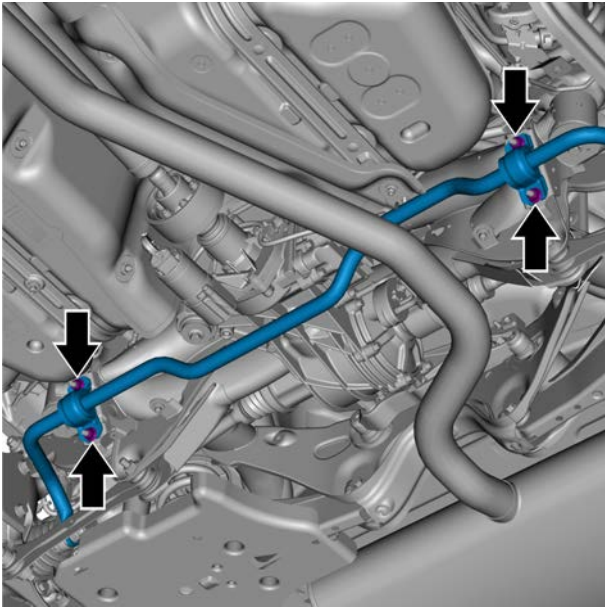
- 2 Install and tighten the new rear shock absorber lock nut.
Torque: 25 N. m (metric system) 19 lb-ft (Imperial system)

- 3 Install the rear shock absorber assembly.
- 4 Install the wheel.
- 5 Lower the vehicle.

4.3.7.3 Rear suspension stabilizer bar replacement

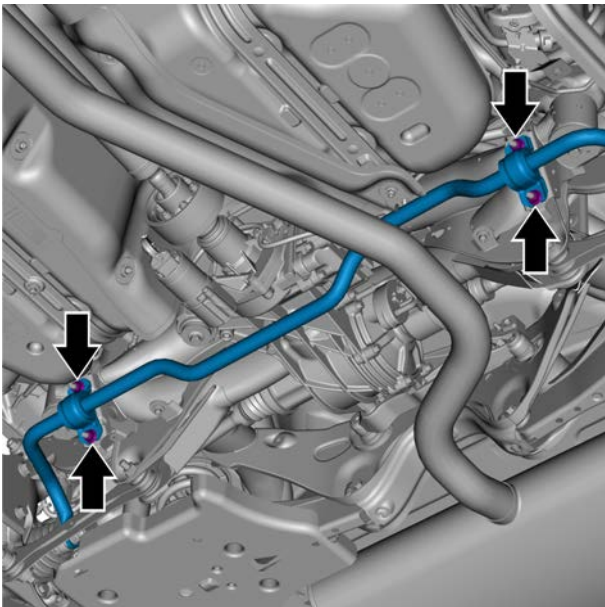
Removal procedure

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove left and right rear stabilizer bar connecting rods.
See [replacement of RL stabilizer bar connecting rod.](#)



- 3 Remove and discard the 4 fixing nuts connecting the rear suspension stabilizer bar and the rear sub-chassisframe.
- 4 Remove the rear suspension stabilizer bar assembly.

Installation procedure



- 1 Install the rear suspension stabilizer bar, install and tighten 4 new fastening nuts.
Torque: 60 N. m (metric system) 44.2 lb-ft (Imperial system)

- 2 Install left and right rear stabilizer bar connecting rods.
- 3 Lower the vehicle.

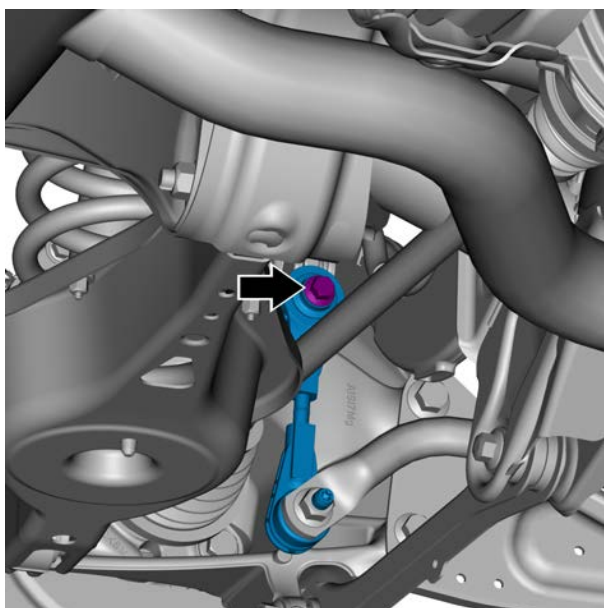
4.3.7.4 Replacement of rear left stabilizer bar connecting rod

Removal procedure

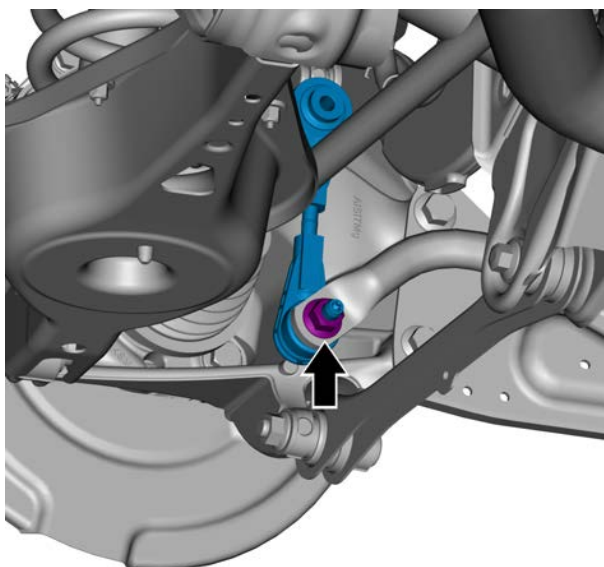
Caution

The removal and assembly methods of front RL stabilizer bar connecting rods are similar.

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the left lower fender apron. See [replacement of left lower fender apron](#).

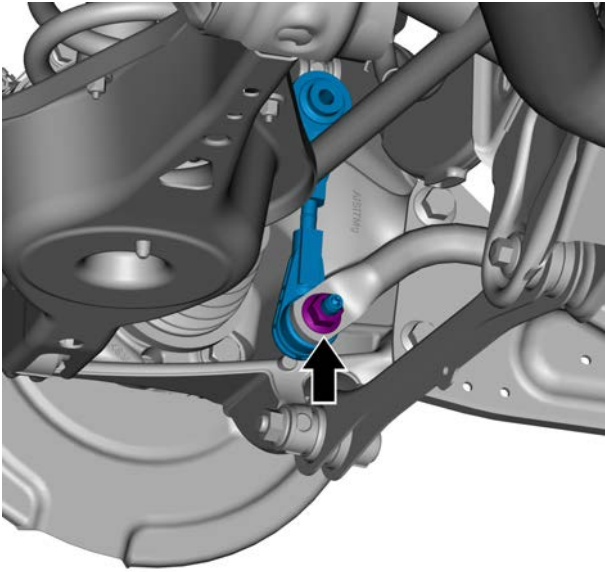


- 3 Remove and discard one retaining bolt connecting the rear stabilizer bar and the RL steering knuckle assembly.



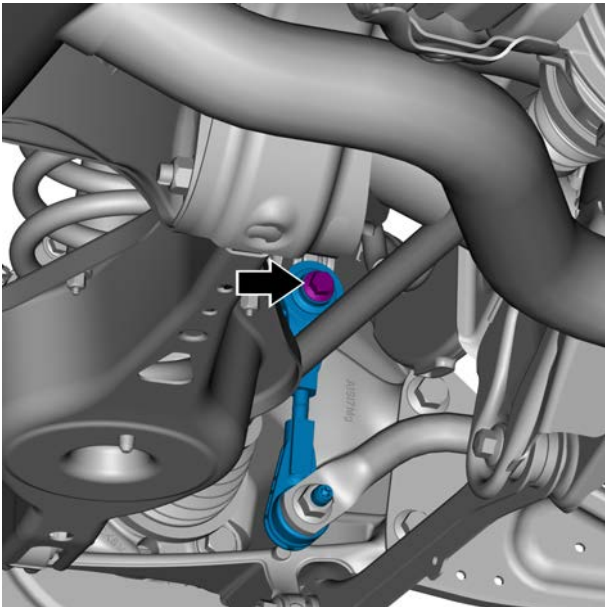
- 4 Remove and discard one fixing nut connecting the rear stabilizer bar and the rear suspension stabilizer bar.
- 5 Take out the stabilizer bar connecting rod.

Installation procedure



- 1 Install the stabilizer bar connecting rod, install and tighten a new fixing nut.

Torque: 100 N. m (metric system) 73.7 lb-ft (Imperial system)



- 2 Install and tighten the retaining bolts between the new rear stabilizer bar connecting rod and the RL steering knuckle assembly.

Torque: 60 N. m (metric system) 44.2 lb-ft (Imperial system)

- 3 Install the lower left fender apron.
- 4 Lower the vehicle.

4.3.7.5 RL suspension lower swing arm assembly replacement

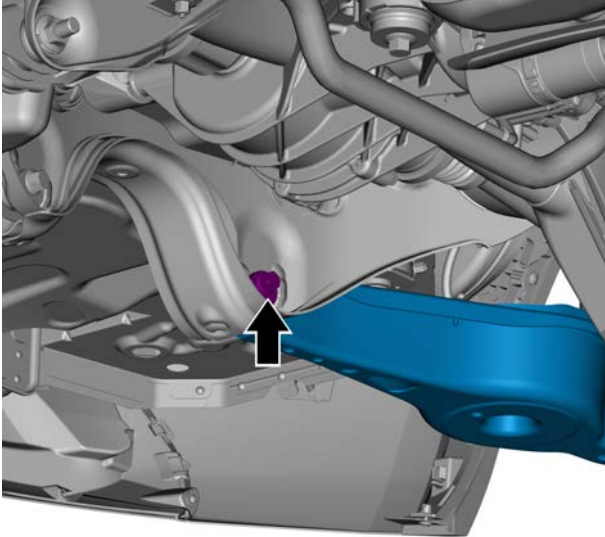
Removal procedure

Caution

The removal and assembly methods of the lower swing arm assembly of front left rear suspension are similar.

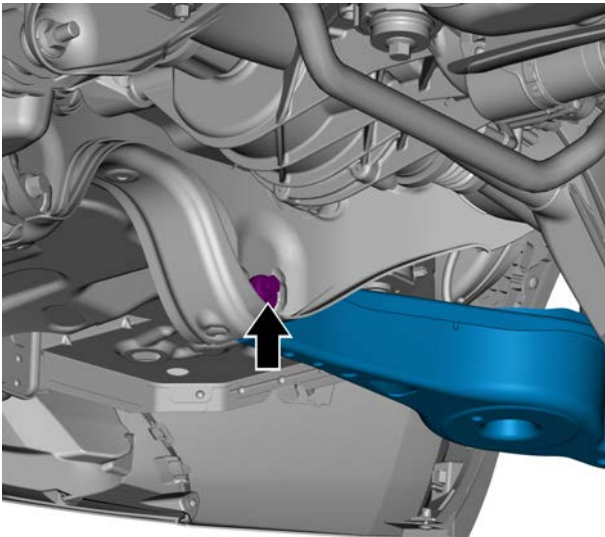
- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).

- 3 Remove the RL suspension guard. See [replacement of RL suspension guard](#).
- 4 Remove the rear left suspension coil spring, refer to replacement of the rear suspension coil spring.
- 5 Remove the exhaust cold end, see [exhaust cold end replacement](#).
- 6 Remove and discard the fixing bolts connecting the RL suspension lower swing arm assembly and the rear sub-chassisframe, and remove the RL suspension lower swing arm assembly.



Installation procedure

- 1 Install the lower swing arm assembly of the RL suspension, and install and tighten new retaining bolts.
Torque: 90 N. m (metric system) 66.4 lb-ft (Imperial system)



- 2 Install the exhaust cold end.
- 3 Install the rear left suspension coil spring.
- 4 Install the RL suspension guard.
- 5 Install the wheel.
- 6 Lower the vehicle.
- 7 Check the four-wheel alignment data of the vehicle.

4.3.7.6 RL steering knuckle assembly replacement

Removal procedure

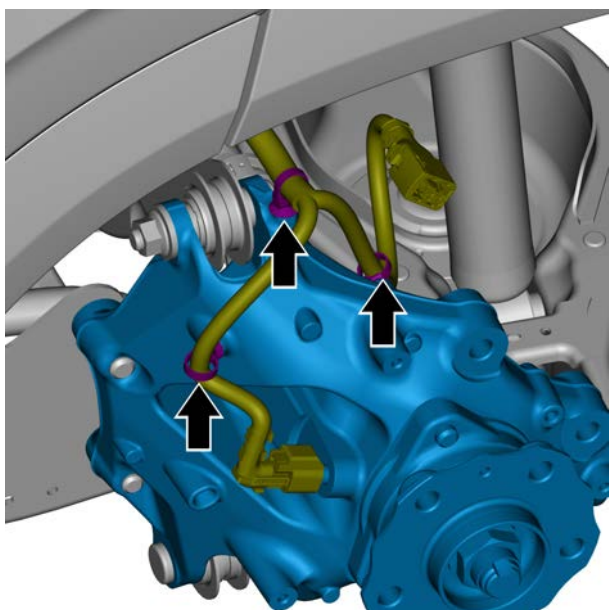
Caution

The removal and assembly methods of front RL steering knuckle assemblies are similar.

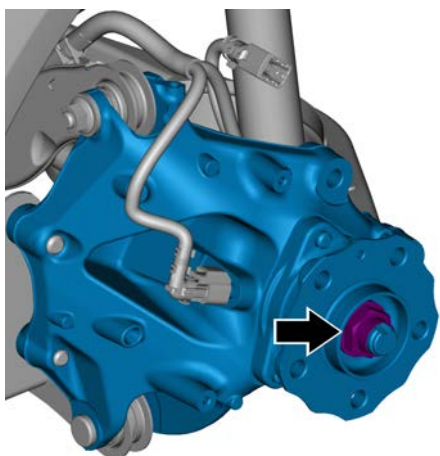
Caution

When there is no special tool to remove the spline bolt of the rear steering knuckle, upper cross arm assembly and toe in rod assembly, be careful when knocking the spline bolt with a hammer to prevent damage or hole expansion of the rear steering knuckle.

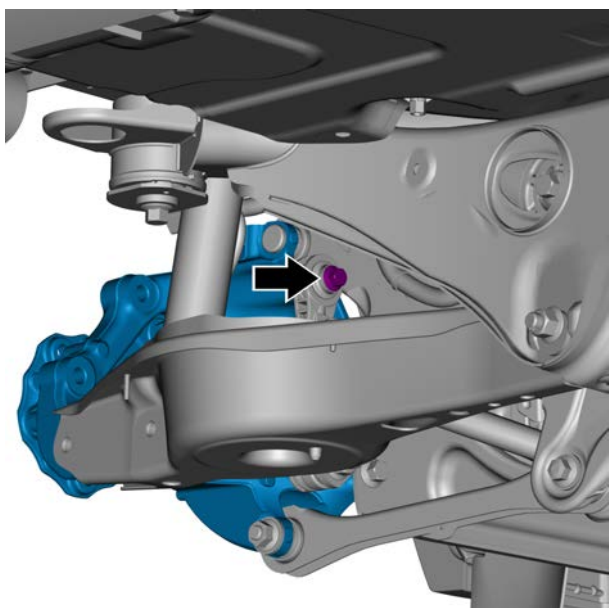
- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the RL suspension guard. See [replacement of RL suspension guard](#).
- 4 Remove the rear left brake caliper body with EPB assembly. See [replacement of rear left brake caliper body with EPB assembly](#).
- 5 Remove the rear brake disc LH. See [replacement of rear brake disc LH](#).
- 6 Remove the Left rear wheel brake protection cover. See [replacement of Left rear wheel brake protection cover](#).
- 7 Remove the wheel speed sensor (rear left). See [replacement of wheel speed sensor \(rear left\)](#).
- 8 Remove the rear suspension coil spring, refer to replacement of the rear suspension coil spring.



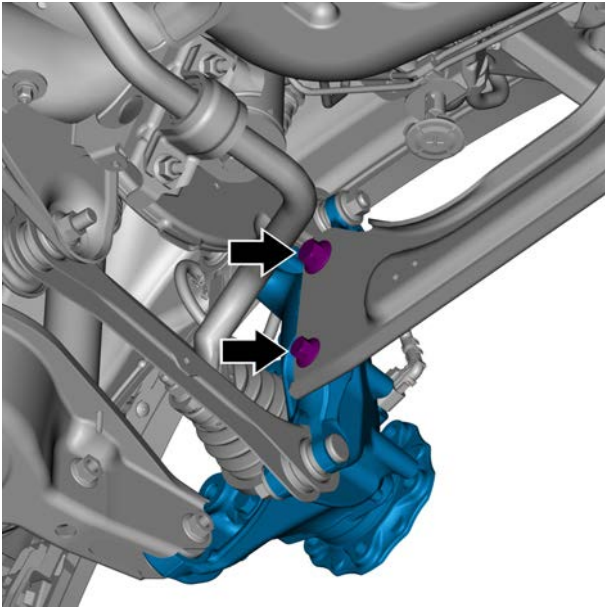
9 Disconnect the harness fixing clip.



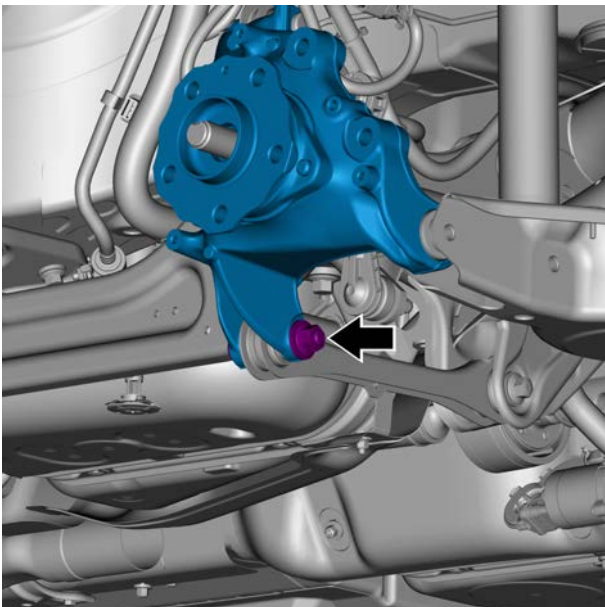
10 Remove and discard the fixing nut of the RL constant speed drive shaft.



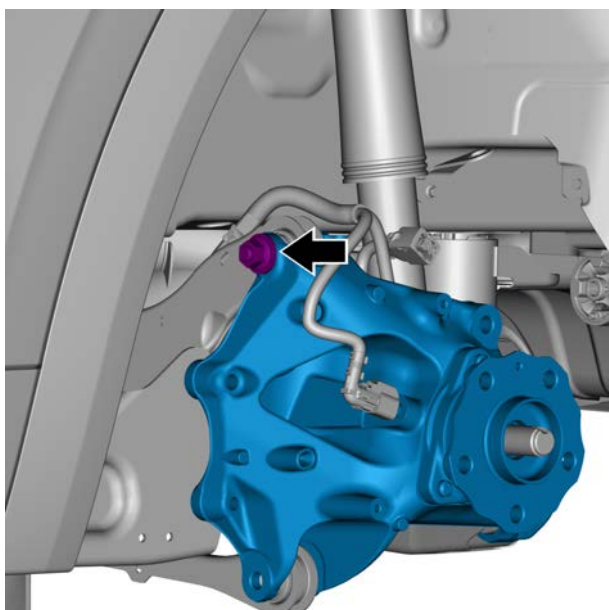
11 Remove and discard the retaining bolts connecting the RL stabilizer bar connecting rod and the RL steering knuckle assembly.



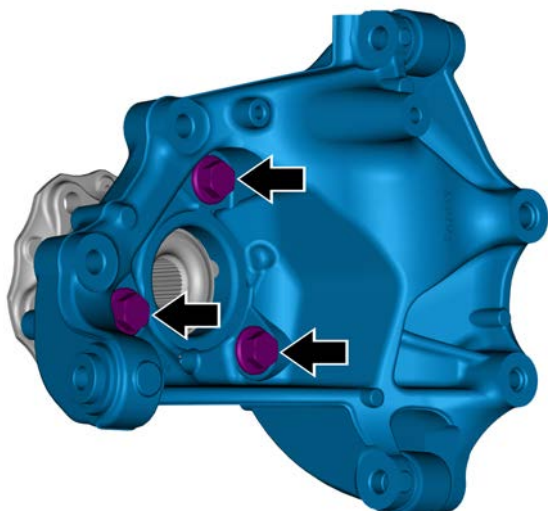
- 12 Remove and discard the retaining bolts connecting the RL suspension trailing arm assembly and the RL steering knuckle assembly.



- 13 Remove and discard the fixing bolts connecting the RL sub-chassisframe toe bar assembly and the RL steering knuckle assembly.

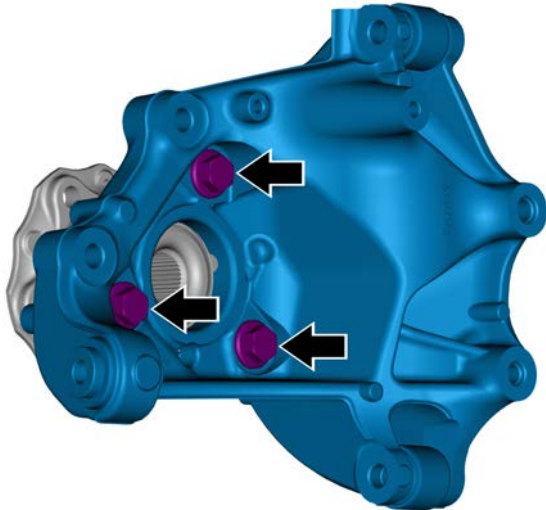


- 14 Remove and discard the retaining bolts connecting the RL upper cross arm assembly and the RL steering knuckle assembly, and take out the RL steering knuckle assembly.



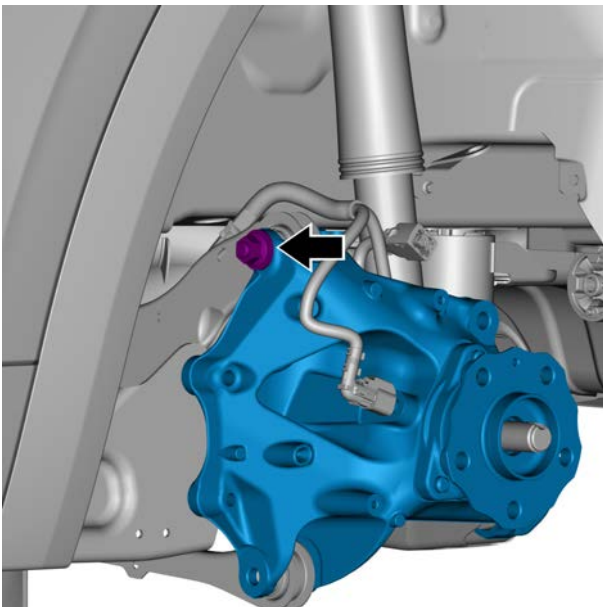
- 15 Remove and discard the 3 retaining bolts of the Rear hub bearing LH and remove the RL steering knuckle assembly.

Installation procedure



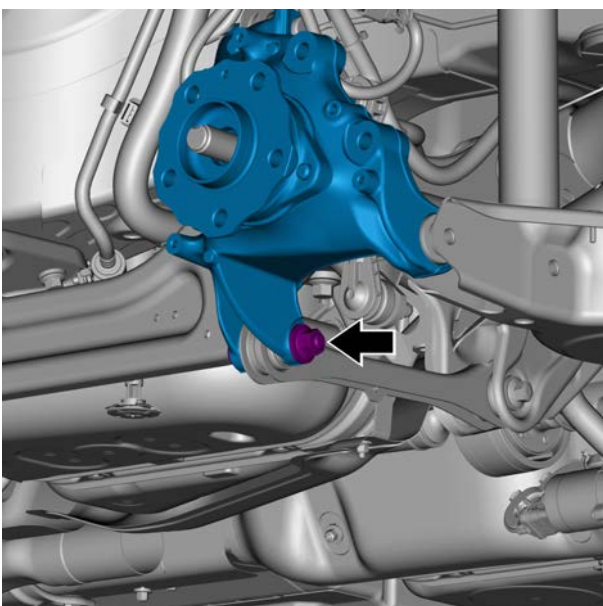
- 1 Install the rear left wheel hub bearing to the rear left steering knuckle assembly, install and tighten 3 new retaining bolts.

Torque: 90 N.m+90° N.m (metric system) 66.4 lb-ft+90 lb-ft (Imperial System)



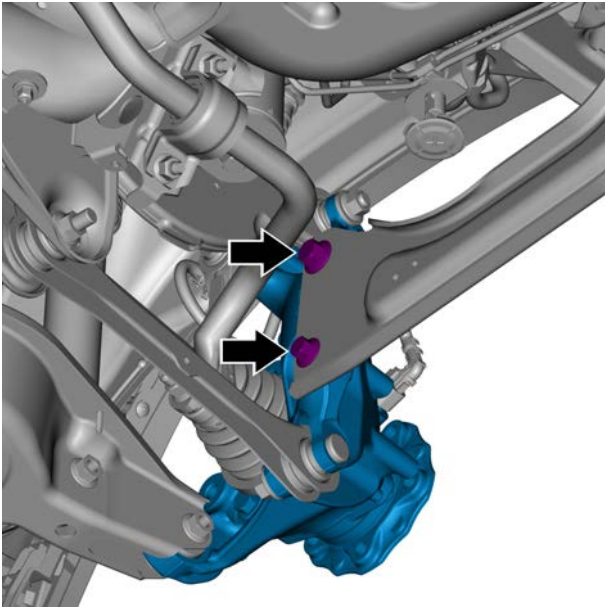
- 2 Connect the RL steering knuckle with the RL constant speed drive shaft, install the RL upper cross arm assembly and connect it with the RL steering knuckle assembly, install and tighten new retaining bolts.

Torque: 110 N. m (metric system) 81.1 lb-ft (Imperial system)



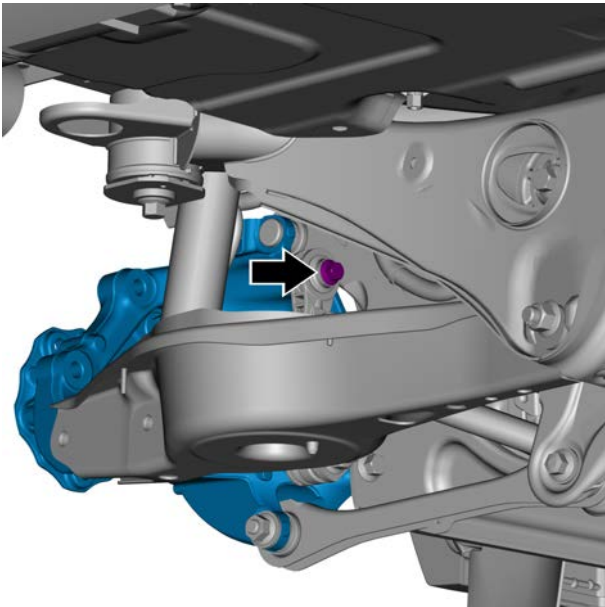
- 3 Install the connection between the RL sub-chassisframe toe bar assembly and the RL steering knuckle assembly, and install and tighten new fixing bolts.

Torque: 110 N. m (metric system) 81.1 lb-ft (Imperial system)



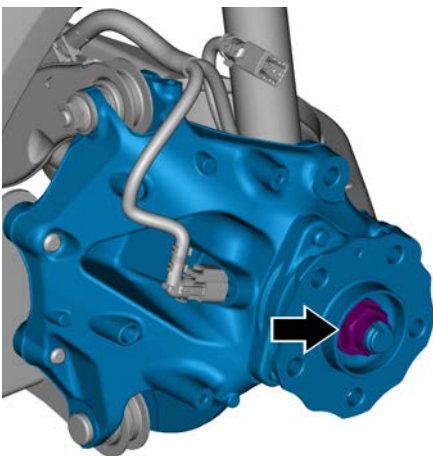
- 4 Install new retaining bolts connecting the RL suspension trailing arm assembly and the RL steering knuckle assembly.

Torque: 90 N.m + 30 ° (metric system) 66.4 lb-ft+30° (Imperial System)



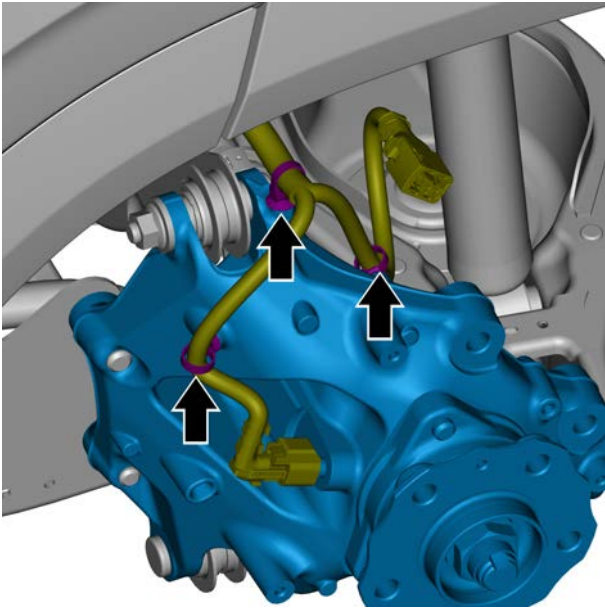
- 5 Install new retaining bolts connecting the RL stabilizer bar and the RL steering knuckle assembly.

Torque: 60 N. m (metric system) 44.2 lb-ft (Imperial system)



- 6 Install a new RL constant speed drive shaft fixing nut and tighten the fixing nut.

Torque: 270 N. m (metric system) 199.1 lb-ft (Imperial system)



7 Install the harness fixing clip.

8 Install the rear suspension coil spring.

9 Install the wheel speed sensor (rear left).

10 Install the rear brake LH protective cover.

11 Install the RL brake disc.

12 Install the rear left brake caliper body with EPB assembly.

13 Install the RL suspension guard.

14 Install the wheel.

15 Lower the vehicle.

16 Check the four-wheel alignment data of the vehicle.

4.3.7.7 Rear left drive hub assembly replacement

Removal procedure

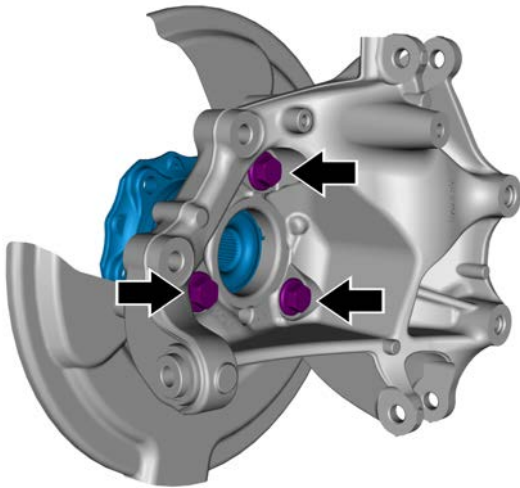
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

The removal and assembly methods of front RL drive hub assemblies are similar.

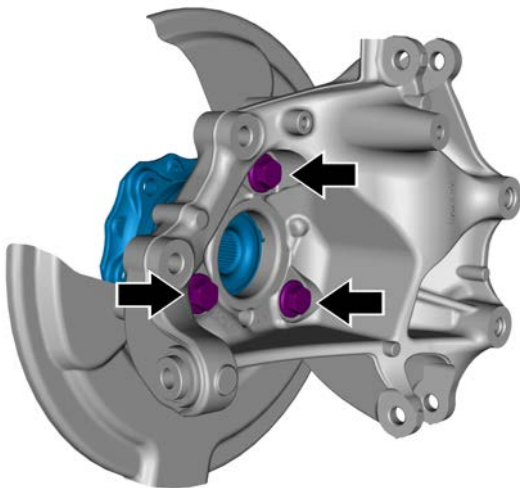
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Lift the vehicle, see [Lift the vehicle](#)
- 3 Remove the wheel, refer to [Replacement of wheel assembly.](#)
- 4 Remove the RL steering knuckle assembly. See [replacement of RL steering knuckle assembly.](#)



- 5 Remove and discard the 3 retaining bolts connecting the RL drive hub assembly and the RL steering knuckle assembly.
- 6 Remove the RL drive hub assembly.

Installation procedure

- 1 Install the RL drive hub assembly, install and tighten 3 new retaining bolts.
Torque: 90 N.m + 90 ° (metric system) 66.4 lb-ft+90° (Imperial System)



- 2 Install the rear left steering knuckle assembly.
- 3 Install the wheel.
- 4 Lower the vehicle.
- 5 Connect the negative battery cable.

4.3.7.8 RL sub-chassisframe toe bar assembly replacement

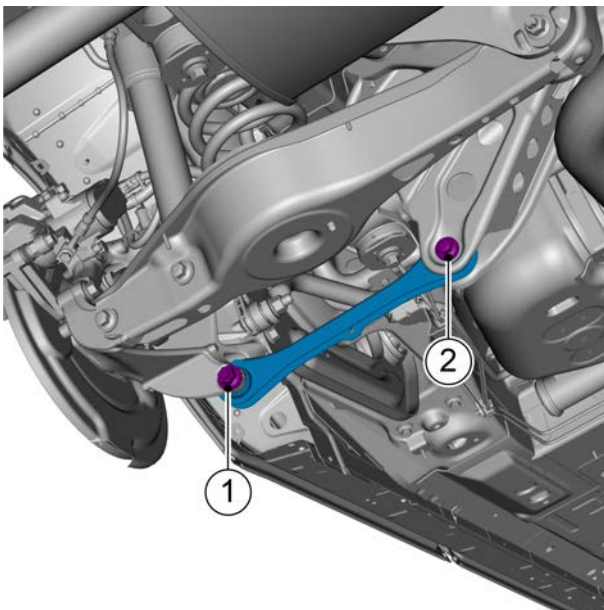
Removal procedure

Caution

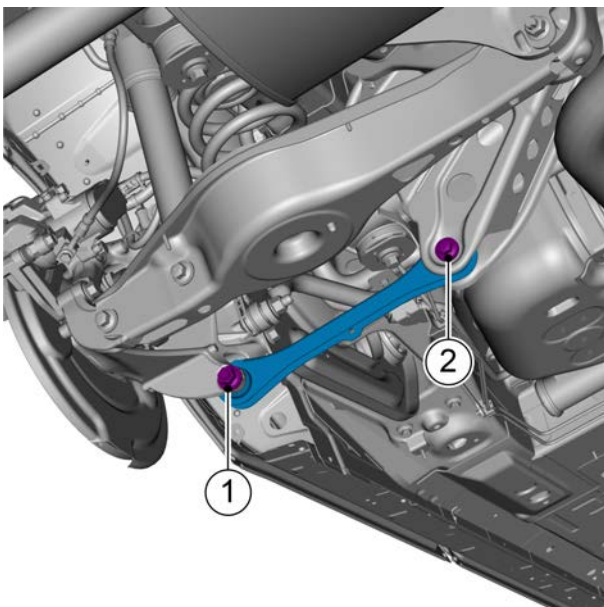
The removal and assembly methods of front RL sub-chassisframe toe bar assemblies are similar.

Caution

When there is no special tool to remove the spline bolt of the rear steering knuckle and toe in rod assembly, be careful when knocking the spline bolt with a hammer to prevent damage or hole expansion of the rear steering knuckle.



- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove and discard the fixing bolts 1 between the RL sub-chassisframe toe bar assembly and the steering knuckle.
- 3 Remove and discard the fixing bolts 2 between the RL sub-chassisframe toe bar assembly and the sub-chassisframe.
- 4 Remove the RL suspension toe bar assembly.

**Installation procedure**

- 1 Place the rear left sub-chassisframe toe bar assembly at the installation position and Pre-tighten the new fixing bolts 1 and 2.
- 2 Tighten retaining bolts 1 and 2.

Bolt 1 torque: 110 N. m (metric system) 81.1 lb-ft (Imperial system)

Bolt 2 torque: 90 N.m + 90 ° (metric system) 66.4 lb-ft +90du (British)

- 3 Lower the vehicle.

4.3.7.9 RL upper cross arm assembly replacement

Removal procedure

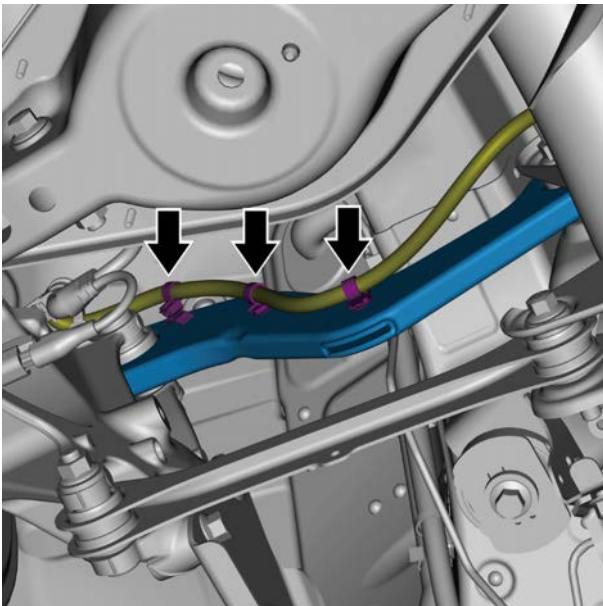
Caution

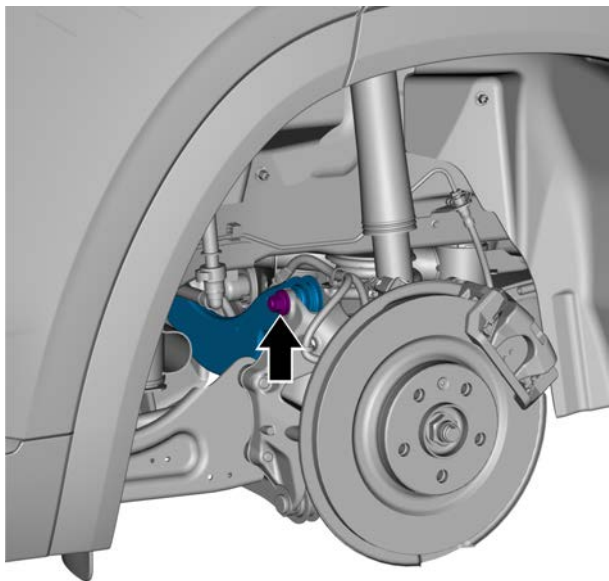
The removal and assembly methods of front RL upper cross arm assemblies are similar.

Caution

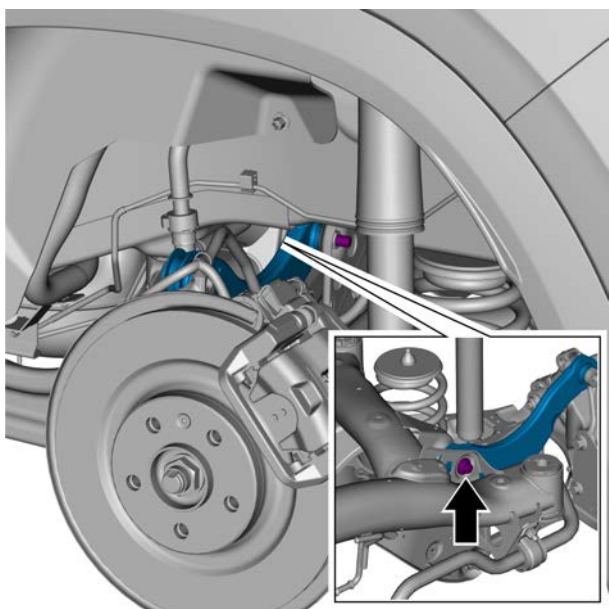
When there is no special tool to remove the spline bolt of the rear steering knuckle and upper cross arm assembly, be careful when knocking the spline bolt with a hammer to prevent damage or hole expansion of the rear steering knuckle.

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the left lower fender apron. See [replacement of left lower fender apron](#).
- 4 Disconnect the wheel speed sensor (RL) harness fixing clip from the RL upper cross arm.



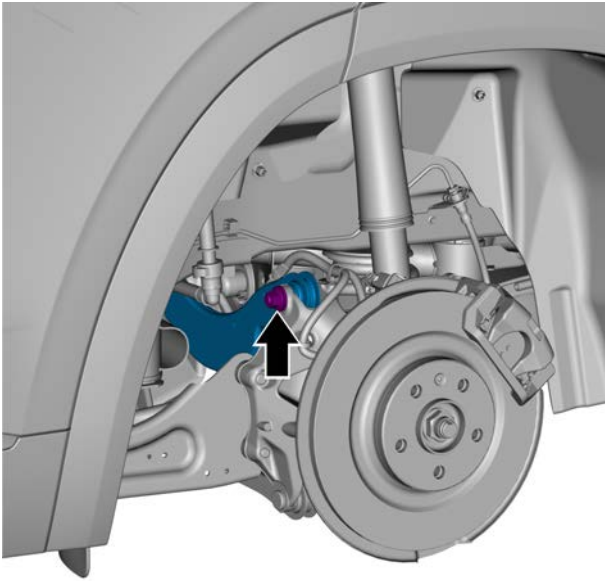


- 5 Remove the bolts connecting the left steering knuckle and the rear steering knuckle and discard them.



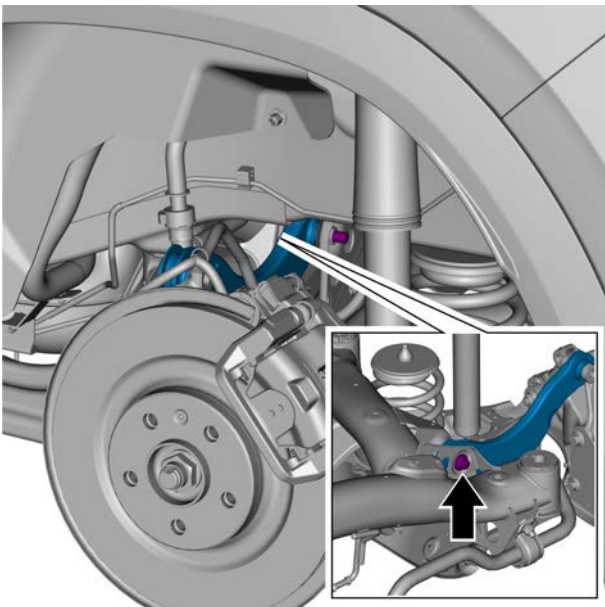
- 6 Remove and discard the fixing bolts connecting the RL upper cross arm assembly and the rear sub-chassisframe, and remove the RL upper cross arm assembly.

Installation procedure



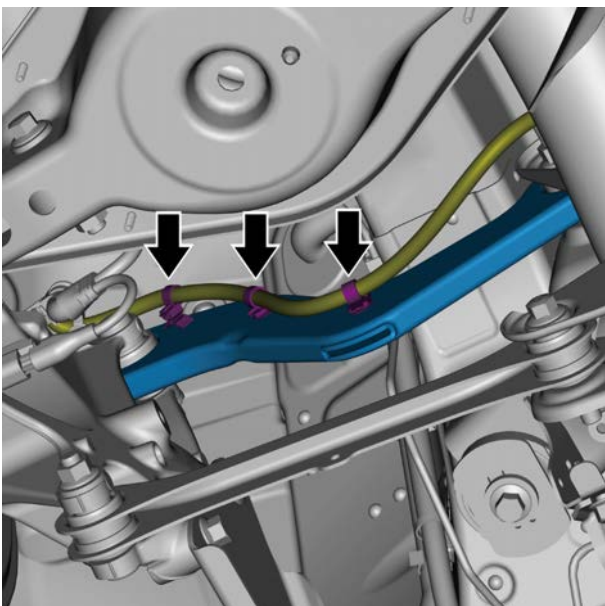
- 1 Place the RL upper cross arm assembly at the installation position and tighten the new retaining bolts connected with the rear steering knuckle.

Torque: 110 N. m (metric system) 81.1 lb-ft (Imperial system)



- 2 Tighten the new fixing bolts connecting the RL upper cross arm assembly and the rear sub-chassisframe.

Torque: 90 Nm + 90° (metric system) 66.4 lb-ft + 90° (Imperial System)



- 3 Fix the wheel speed sensor (RL) harness fixing clip on the RL upper cross arm assembly.

- 4 Install the lower left fender apron.
- 5 Install the wheel.
- 6 Lower the vehicle.
- 7 Check the four-wheel alignment data of the vehicle.

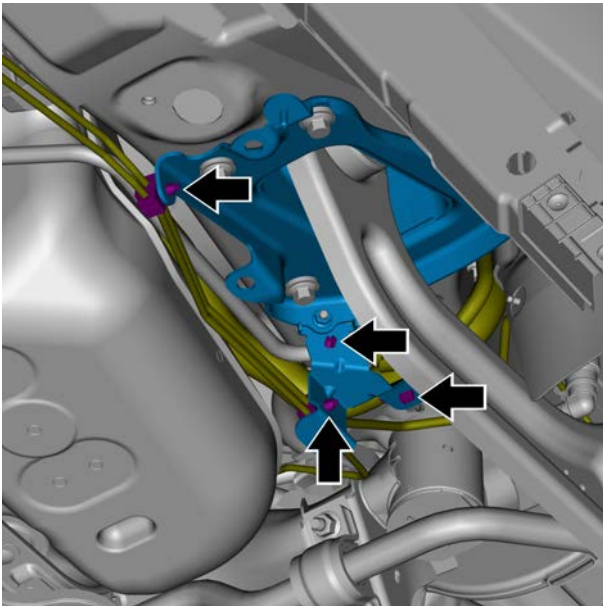
4.3.7.10 coil spring rear suspension LH trailing arm assembly replacement

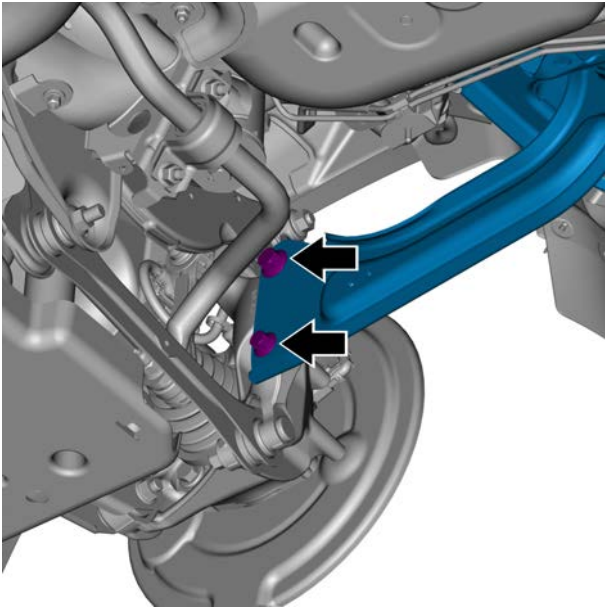
Removal procedure

Caution

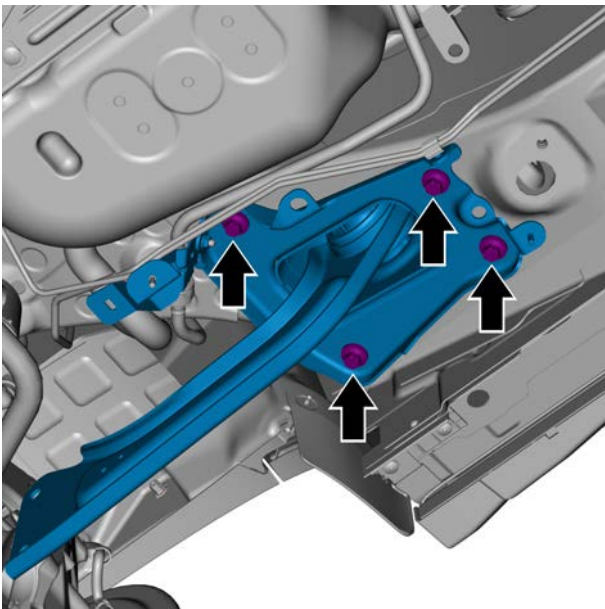
The removal and assembly methods of front RL suspension trailing arm assemblies are similar.

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the left lower fender apron. See [replacement of left lower fender apron](#).
- 4 Disconnect the clip for fixing the brake pipeline and fixing the harness from the bracket.

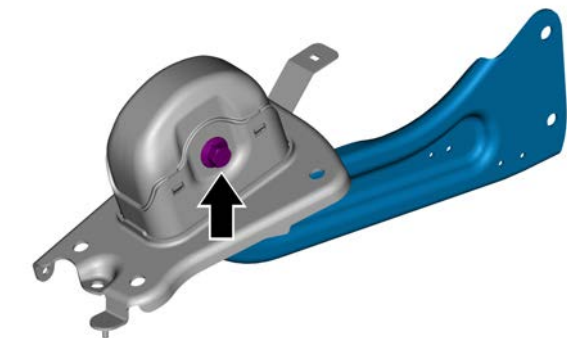




- 5 Remove and discard the 2 retaining bolts connecting the RL suspension trailing arm assembly and the RL steering knuckle assembly.



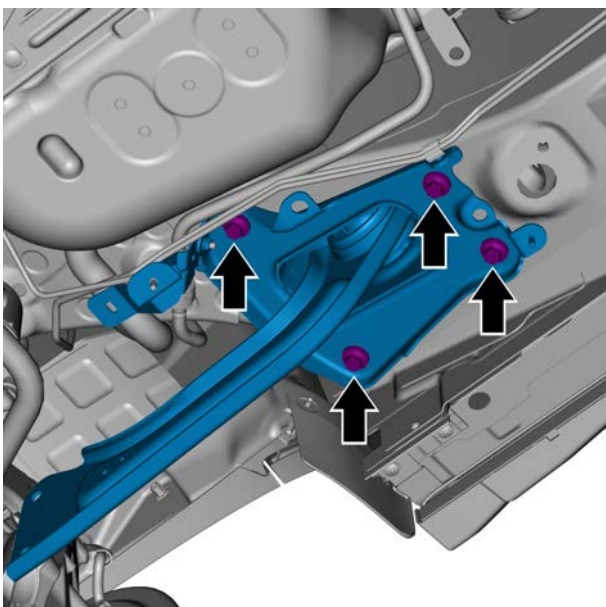
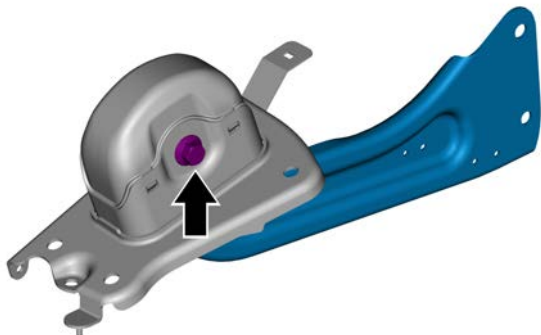
- 6 Remove and discard the 4 retaining bolts connecting the RL suspension trailing arm assembly and the body, and take out the RL suspension trailing arm assembly.



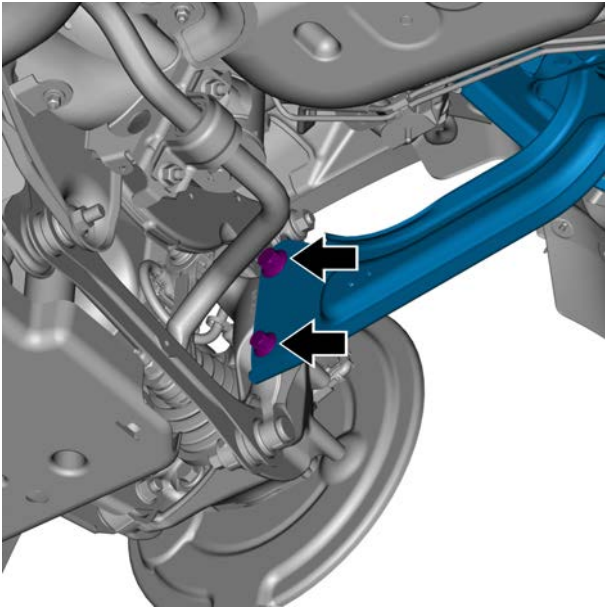
- 7 Remove and discard the retaining bolts connecting the mounting bracket trailing arm LH and the RL trailing arm mounting bracket, and remove the RL suspension trailing arm assembly.

Installation procedure

- 1 Place the trailing arm assembly LH in the RL longitudinal arm mounting bracket and tighten new retaining bolts.
Torque: 140 N.m + 60 ° (metric system) 103.3 lb-ft +60° (Imperial System)

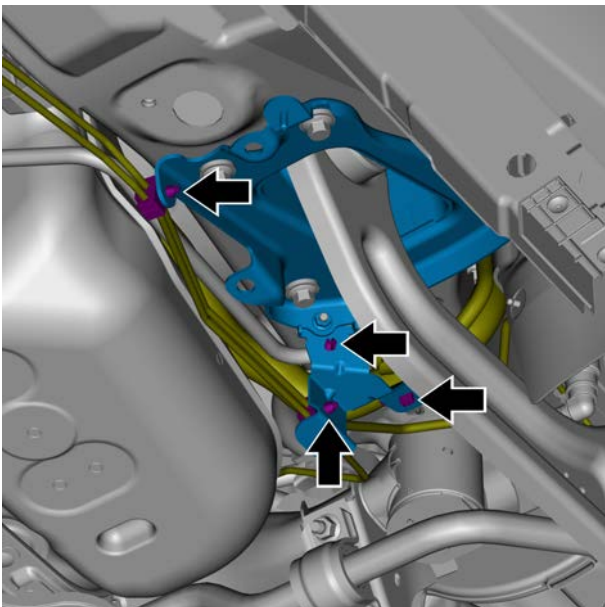


- 2 Install the RL suspension trailing arm assembly and tighten 4 new retaining bolts connected to the body.
Torque: 50 N.m + 60 ° (metric system) 36.9 lb-ft+60° (Imperial System)



- 3 Tighten 2 new retaining bolts connecting the RL suspension trailing arm assembly and the RL steering knuckle assembly.

Torque: 90 N.m + +30 ° (metric system) 66.4 lb-ft+30° (Imperial System)



- 4 Install the clips for fixing the brake pipeline and fixing the harness on the bracket.

- 5 Install the left lower guard of the fuel tank.
- 6 Install the wheel.
- 7 Lower the vehicle.

4.3.7.11 Rear sub-chassisframe replacement

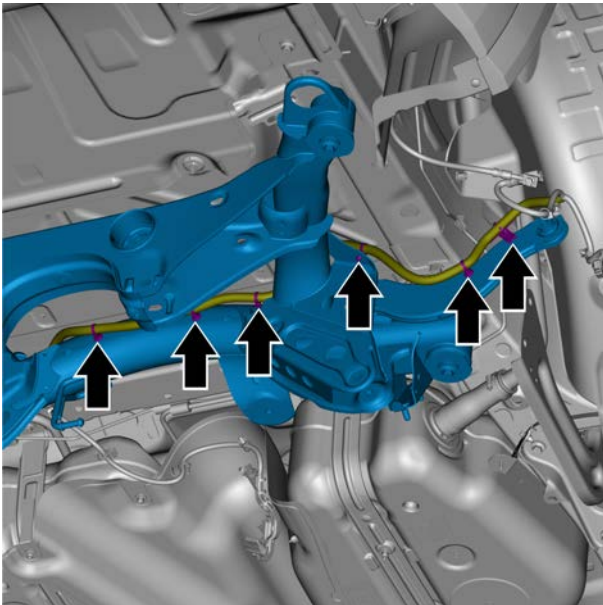
Removal procedure

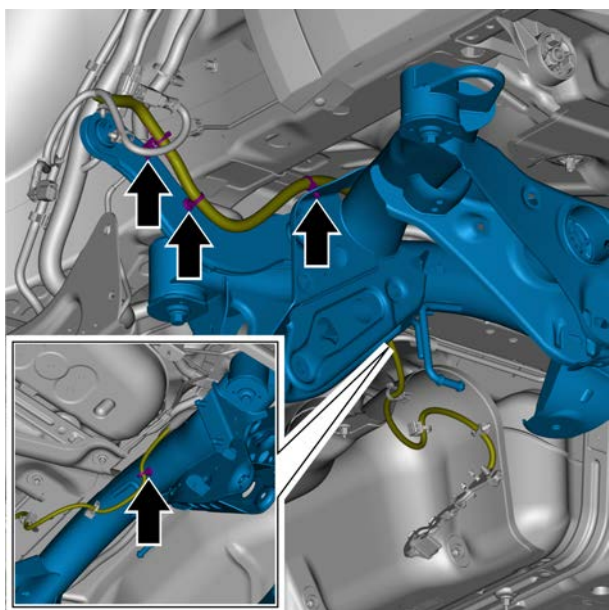
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

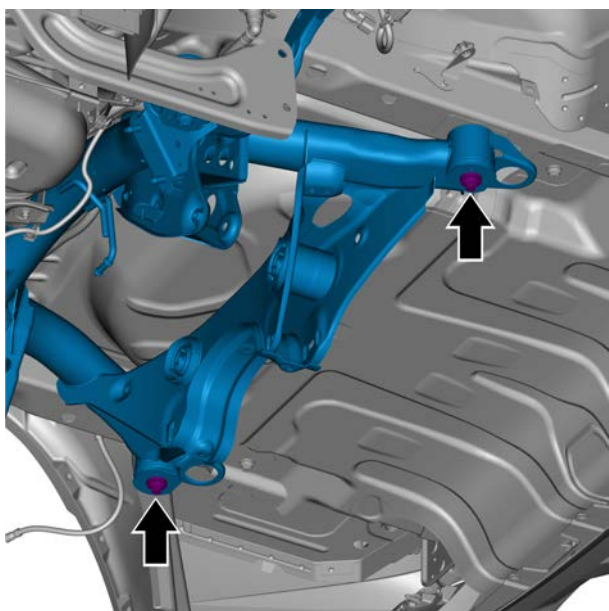
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Lift the vehicle, see [Lift the vehicle](#)
- 3 Remove the wheel, refer to [Replacement of wheel assembly](#).

- 4 Remove the exhaust cold end, see [exhaust cold end replacement](#).
- 5 Remove left and right rear brake caliper body with EPB assembly. See [replacement of front rear brake LH caliper body with EPB assembly](#).
- 6 Remove the rear left and right suspension coil spring, refer to replacement of the rear suspension coil spring.
- 7 Remove the rear suspension stabilizer. See [rear suspension stabilizer replacement](#).
- 8 Remove front left front left (front left) rear sub-chassisframe toe bar assemblies. See [replacement of RL sub-chassisframe toe bar assembly](#).
- 9 Remove left and right rear suspension lower swing arm assemblies. See [replacement of RL suspension lower swing arm assembly](#).
- 10 Remove left and right steering knuckle assemblies. See [replacement of RL steering knuckle assembly \(4WD\)](#).
- 11 Remove the rear final drive with differential assembly. See [rear differential replacement](#).
- 12 Remove the harness fixing clip on the left of the rear sub-chassisframe.

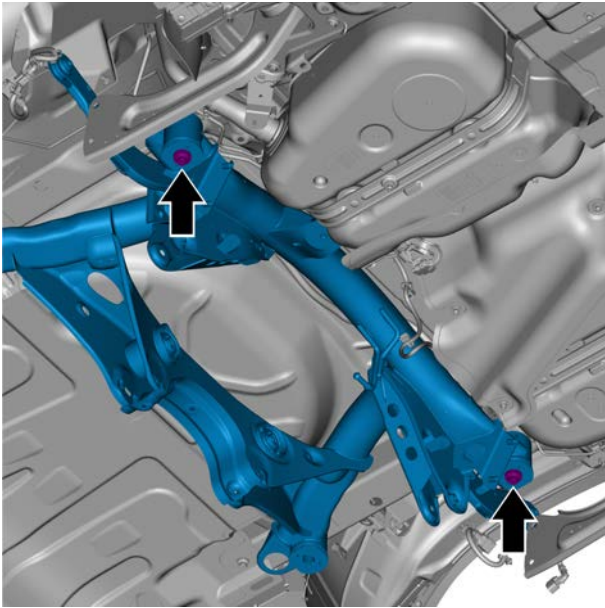




- 13 Remove the harness fixing clip on the right of the rear sub-chassisframe.

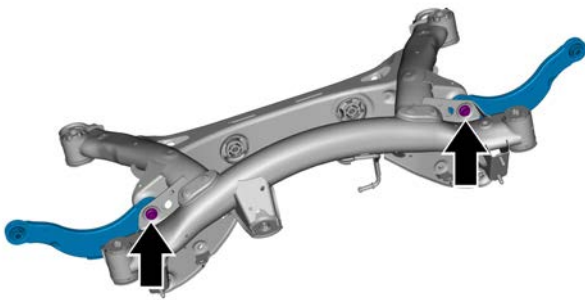


- 14 Drag the rear sub-chassisframe with a hydraulic jack, and remove and discard the two fixing bolts between the rear sub-chassisframe and the rear of the frame.

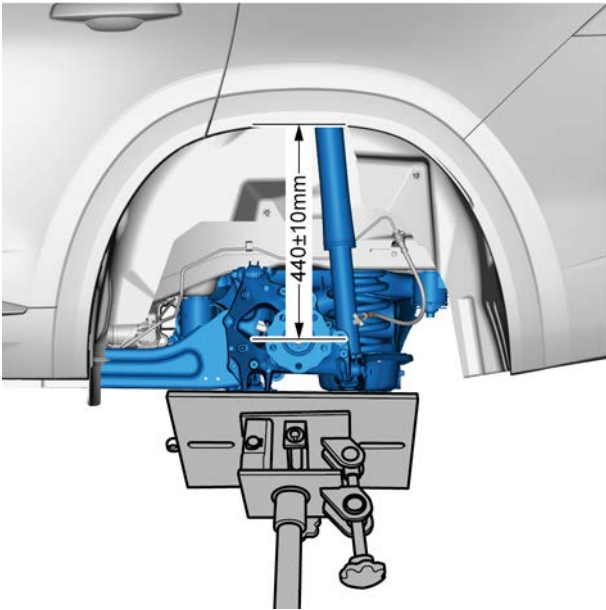


- 15 Remove and discard the 2 fixing bolts between the rear sub-chassisframe and the front of the frame, slowly lower the hydraulic jack and remove the rear sub-chassisframe assembly.

- 16 Remove and discard the retaining bolts of both sides of rear upper cross arm assemblies, and remove left and right rear upper cross arm assemblies.



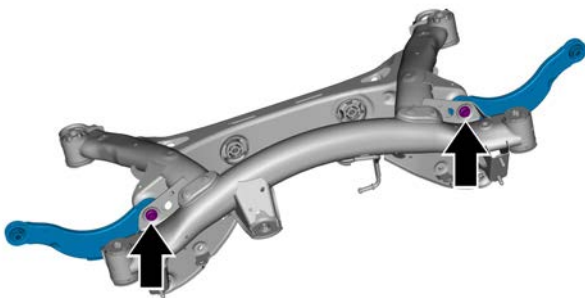
Installation procedure

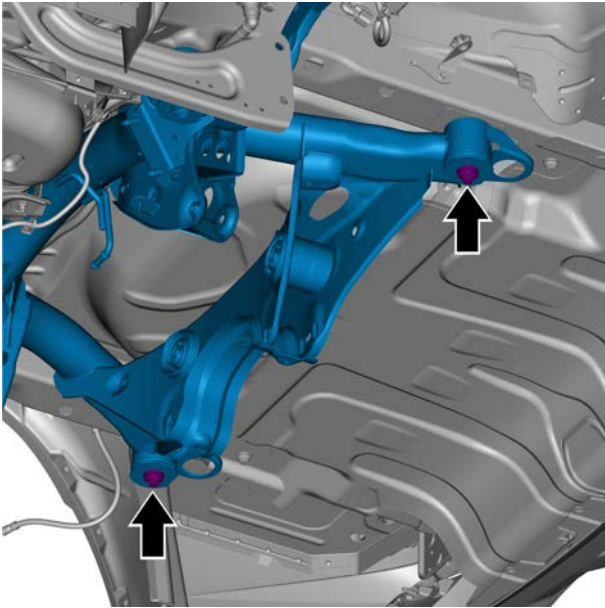


Caution

1. When installing the sub-chassisframe, the 14mm auxiliary locating pin shall be used to locate the locating hole first, and then tighten the fixing bolts, otherwise the sub-chassisframe assembly may be tilted.
 2. Pre-tighten the fixing bolts at each position of the sub-chassisframe, and fasten the fixing bolts of the sub-chassisframe after the bolt holes are aligned.
 3. The tightening sequence of the four fixing bolts of the sub-chassisframe shall be RL, right front, right rear and front left.
 4. When installing front left front left (front left) rear upper cross arms, front left front left (front left) rear knuckle assemblies, front left front left (front left) rear sub-chassisframe toe bar assemblies and front left front left (front left) rear suspension lower swing arm assemblies, use a flat jack to drag the lower swing arm, measure the distance from the rear wheel center to the wheel eyebrow, and tighten the fixing bolts of each component after ensuring the correct driving height of the vehicle.
- 1 Install left and right rear upper cross arm assemblies, and tighten 2 new retaining bolts.

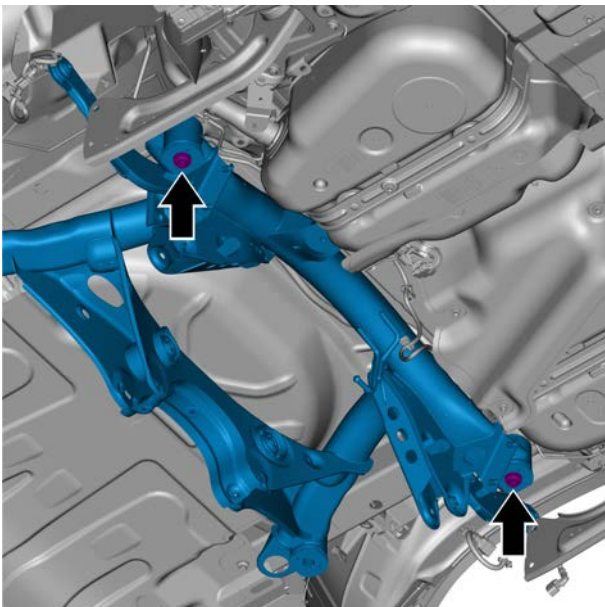
Torque: 90 Nm + 90° (metric system) 66.4 lb-ft + 90° (Imperial System)





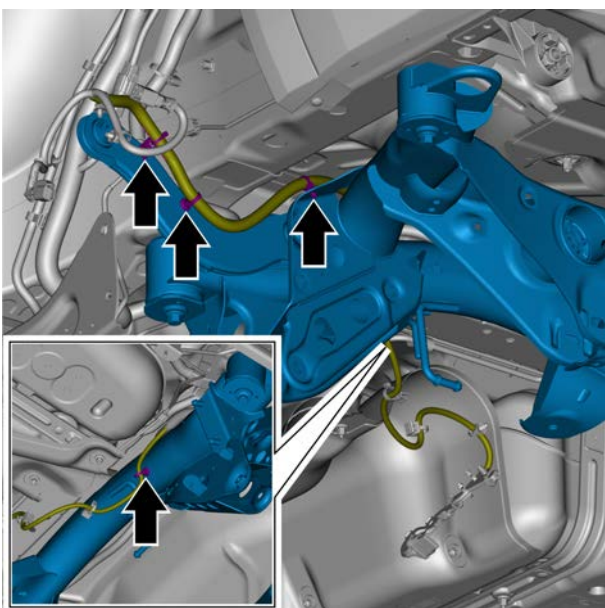
- 2 Drag the rear sub-chassisframe with the hydraulic jack, place the rear sub-chassisframe assembly in the installation position, and fasten one new fixing bolt on front left front left (front left) of the rear of the rear sub-chassisframe and the frame.

Torque: 90 N.m + +140 ° (metric system) 66.4 lb-ft +140° (Imperial System)

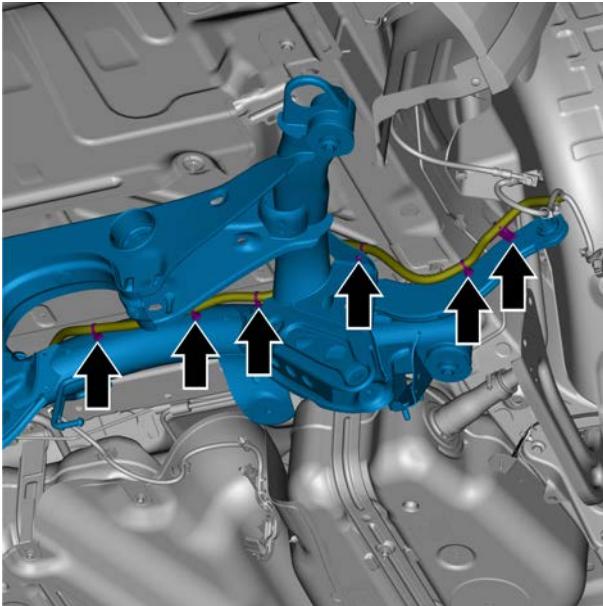


- 3 Tighten one new fixing bolt on front left front left (front left) of the rear sub-chassisframe assembly and the front of the frame, and lower the hydraulic jack.

Torque: 90 N.m + +140 ° (metric system) 66.4 lb-ft +140° (Imperial System)



- 4 Install the harness fixing clip on the right of the rear sub-chassisframe.



- 5 Install the harness fixing clip on the left of the rear sub-chassisframe.

- 6 Install the rear final drive with differential assembly.
- 7 Install left and right rear knuckle assemblies.
- 8 Install front left front left (front left) rear sub-chassisframe toe bar assemblies.
- 9 Install left and right rear suspension lower swing arm assemblies.
- 10 Install the rear suspension coil spring.
- 11 Install the rear suspension stabilizer bar.
- 12 Install the rear brake caliper body with EPB assembly.
- 13 Install the exhaust cold end.
- 14 Install the wheel.
- 15 Lower the vehicle.
- 16 Connect the negative battery cable.
- 17 Check the four-wheel alignment data of the vehicle.

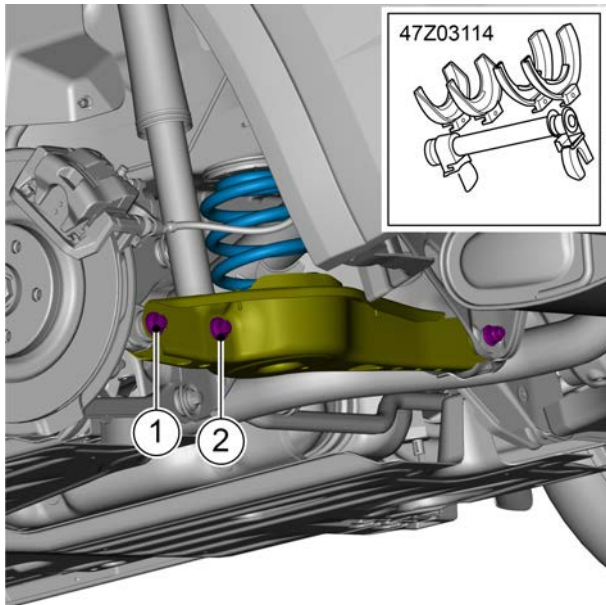
4.3.7.12 Replacement of the coil spring of the rear suspension

Removal procedure

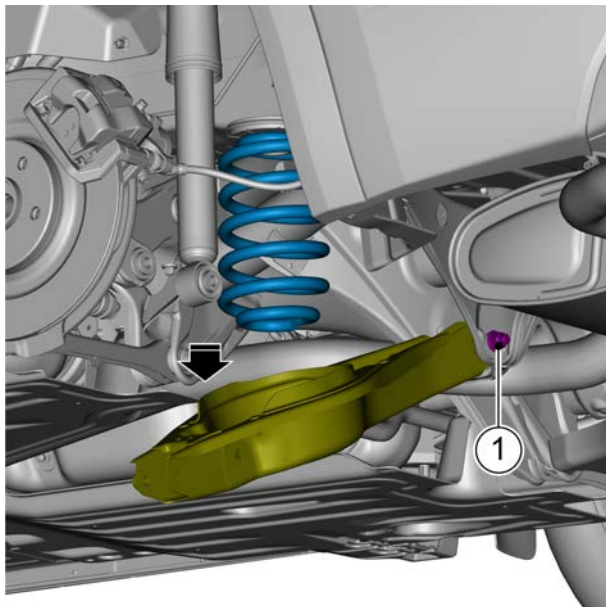
Caution

The removal and assembly methods of front RL suspension coil springs are similar.

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the RL wheel, see [Replacement of wheel assembly](#).
- 3 Remove the RL suspension guard. See [replacement of RL suspension guard](#).

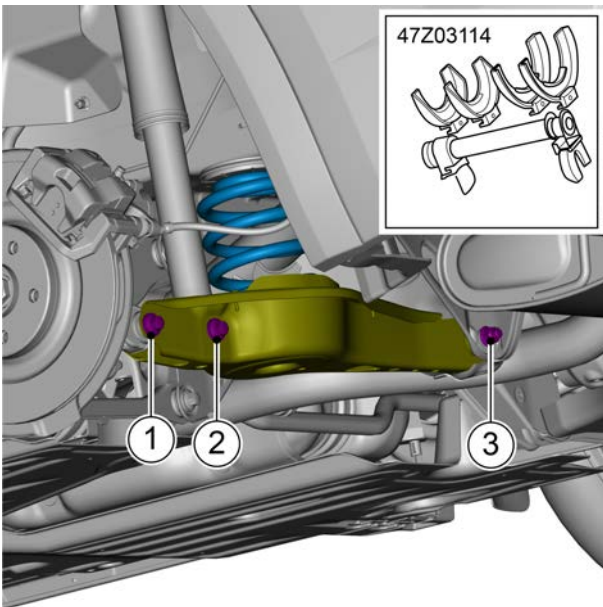
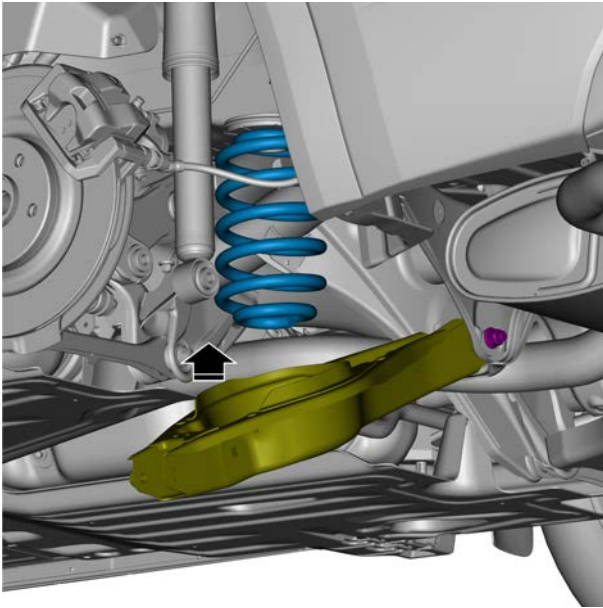


- 4 Use the spring compression tool to compress the coil spring until the coil spring can move freely.
Dedicated tool: 47Z03114
- 5 Remove and discard the retaining bolt 1 connecting the rear suspension lower swing arm assembly and the rear steering knuckle assembly.
- 6 Remove and discard the retaining bolts 2 connecting the rear shock absorber assembly and the lower swing arm assembly of the rear suspension.



- 7 Loosen the adjusting bolt 1 connecting the rear suspension lower swing arm assembly and the rear sub-chassis frame.
- 8 Remove the rear suspension coil spring.

Installation procedure



- 1 Install the rear suspension coil spring.

Caution

The positioning position of the upper end of the coil spring shall be accurately placed in the positioning hole on the vehicle body, and the lower end shall be placed on the cushion.

- 2 Lift up the lower swing arm assembly of the rear suspension.

- 3 Use the spring compression tool to compress the coil spring to the proper position.

Dedicated tool: 47Z03114

- 4 Install new retaining bolts 2 connecting the rear shock absorber assembly and the rear suspension lower arm assembly.

Torque: 140 N. m (metric system) 103.3 lb-ft (Imperial system)

- 5 Install new retaining bolts 1 connecting the rear suspension lower swing arm assembly and the rear steering knuckle assembly.

Torque: 250 N. m (metric system) 184.4 lb-ft (Imperial system)

- 6 Install the adjusting bolt 3 connecting the rear suspension lower swing arm assembly and the rear sub-chassisframe.

Torque: 90 N. m (metric system) 66.4 lb-ft (Imperial system)

- 7 Install the RL suspension guard.

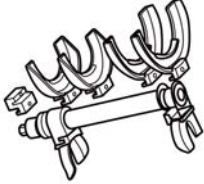
- 8 Install the left rear wheel.

- 9 Lower the vehicle.

- 10 Check the four-wheel alignment data of the vehicle.

4.3.8 Special tools and equipment

4.3.8.1 Special tool

Serial No.	Illustration	Tool number	Name
1		47Z03114	Shock absorber spring removal tool

4.4 Wheels and tires

4.4.1 Specification

4.4.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Wheel bolt	M14x1.5x45	125~155	92.2~114.2

4.4.1.2 Tire size

Specification	Type and parameter
Cold state pressure (front/ rear)	230/230kPa
Rim	18 × 8J aluminum alloy rim 19 × 8J aluminum alloy rim 20 × 8J aluminum alloy rim
Tire size	235/55R18 235/50R19 245/45R20

Inflation pressure conversion table					
kPa	psi	kPa	psi	kPa	psi
140	20	185	27	235	34
145	21	190	28	240	35
155	22	200	29	250	36
160	23	205	30	275	37
165	24	215	31	310	38
170	25	220	32	345	39
180	26	230	34	380	40

4.4.1.3 Front Suspension positioning specification

Caution

The following parameters refer to the technical parameters of the complete vehicle in the state of preparation

Wheel alignment (no load)	Maximum turning angle of front wheel (inner/outer)	36.4°±2.0°/30.5°±2.0°
	Camber angle of front wheel	-36.6'±39'
	Kingpin inclination angle	13.8°±0.5°
	Kingpin caster angle	4.7°±0.5°
	Toe-in of front wheels	13.2'±6'

4.4.1.4 Rear suspension positioning specification

Caution

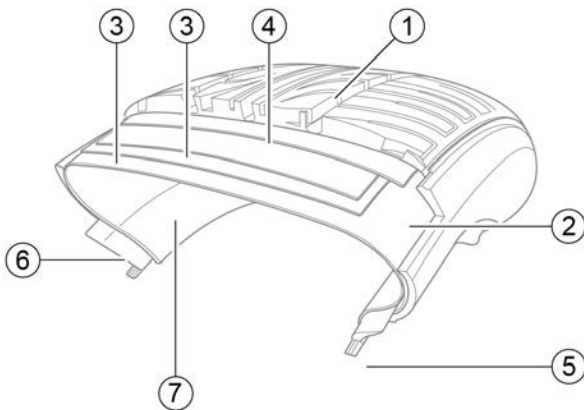
The following parameters refer to the technical parameters of the complete vehicle under a prepared status.

Wheel alignment (no load)	Camber angle of rear wheel	-29.4'±43.8'
	Toe-in of rear wheels	12'±6'

4.4.2 Description and operation

4.4.2.1 Description and operation

The structure of the tire



1. Tread

a. The part of the tyre in contact with the road allows driving, braking and other functions through friction. It should have good wear resistance, puncture resistance, impact resistance, heat dissipation and other performance.

2. Carcass

a. Ply of tyre, and main load-bearing part, it has impact resistance and should have good flexural resistance while driving.

3. Belt

a. A Steel wire ply between tread and carcass, it is intended to protect the carcass, inhibit tread deformation, maintain tread contact with the ground, and improve wear resistance and driving stability.

4. Cap ply

a special ply above the belt, it is intended to restrain the movement of the belt while the tyre is running, prevent the belt from detaching at high speeds and maintain stability of tyre size at high speeds.

5. Bead

a. Hanging rubber wire wrapped to a certain shape (four corners or hexagonal shape), used to attach the tyre to the rim to fix the tyre.

6. Triangle strips

a. The filling material on top of the bead in a tyre to prevent bead dispersion, slow bead impact, and protect the bead from air ingress during molding.

7. Inner liner

a. Part to maintain air tightness of tyre without tyre tube, made of special rubber and can perform the function of a tyre tube.

Meanings of tire side identifications of tires

Meaning of sidewall identification of tire: example: 235/50R19 99V

- 235—Nominal cross-section width (unit: mm)
- 50—Flat rate (depth-width ratio: %)
- R— Radial structure (unit: in)
- 19—Nominal diameter of the road wheel (unit: in)
- 99— Load index
- V—Speed rating (240km/h)

Table of Common Speed Ratings:

Speed rating	Maximum speed (km/h)
S	180
T	190
H	210
V	240
W	270
Y	300
ZR	Above 240

Pressure instructions of tires

Tire pressures have a decisive influence on worn, fault, and damage of tires, thus, the normal pressure must be maintained and the pressure must be checked regularly to drive safely.

– Load capacity of tires corresponds to the inflation pressure. The reasonable pressure of the tire must be determined by the load condition of the tire. Changes in climates and seasons should not be reasons for tire pressure adjustments.

– At the beginning of the use of a new tire, the overall dimension of the tire will be changed for the heating of the yield movement and the tire pressure will be reduced. It is needed to check and adjust the pressure after 24 hours of use or driving for 2,000-3,000km.

– The tire pressure should be increased by 10%-15% when driving at a high speed for a long time.

1. Harm of insufficient pressure

The insufficient pressure will lead to the aggravation of the tire side deformation and the increase of heat production, which will greatly reduce the tire life and bring the following problems and safety risks:

- a. The tire shoulder position is excessively worn.
- b. Increase the possibility of tire bump and bulge.

- c. Delamination is caused by the decrease of adhesive force between various parts of the tire.
- d. Severely insufficient pressure leads to tire side rolling damages.
- e. Too large tire hops cause the abnormal worn between the bead and the road rim and damage the road rim.
- f. Rolling resistance increases and fuel consumption increases.

2. Harm of the excessive pressure

The excessive pressure will reduce the tread grounding area, increase the tire rigidity, and reduce the buffering effect, and will bring the following problems and safety risks:

- a. The tread center is excessively worn.
- b. Increases the risk that the tire broken or even burst when impacted by the external force.
- c. The reduced grounding area leads to reduced steering and controlling performance and risks of drifting and glissades will occur.
- d. Riding comfort is decreased.
- e. Poor riding performance and the long-term driving at the excessive pressure are prone to cause damage to the vehicle chassis

3. Even tire pressures at the same suspension can cause:

- a. The brake force is uneven from left to right.
- b. The steering is running deviation.
- c. The steering and controlling performance are decreased.
- d. The deviation at speed up.
- e. The vehicle is running deviation when driving.

4.4.3 System working principles

4.4.3.1 Wheel alignment

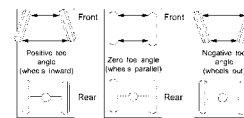
The driver turns the steering wheel to drive the vehicle in the required direction. But, while driving on a straight road, the driver needs to operate the steering wheel continuously to keep the vehicle running in a straight line, or at the turning, a lot of force is required to turn the vehicle. Then the driver will spend a lot of physical strength and endure mental stress. To solve the problem and prevent the early worn of the tires, the tires are installed at the vehicle (or the chassis) according to certain requirements and at certain angles. These angles are collectively known as “wheel alignment”. Alignment is a synthetic noun of angle relations between the front and rear axles, wheels, steering parts, and suspension parts.

If wheel alignment is correct, the steering will be easy. While driving straight, the driver only needs to slightly adjust the steering wheel, and the vehicle will be put in a positive forward position and only a little strength is required to turn. That is to say, if all angle relationships that make up “wheel alignment” are adjusted correctly, the steering will be easy. But if any of them is not adjusted correctly, the following problems will occur: difficult steering, poor steering stability, poor steering return, and shortened tire service life.

The alignment angles of the vehicle include: toe-in, camber angles of the tires, kingpin caster angle, kingpin inclination, steering angle, included angle, thrust angle, grinding wheel radius, and others. The above angles and dimensions depend on the suspension system, the tire drive system (front engine front-wheel drive or rear-engine, rear-wheel drive; two-wheel drive; or four-wheel drive), and the steering system. By adjusting these factors, driving performance and steering stability can achieve the optimum status. Besides, the service life of the parts can be extended.

Usually, the only angle recommended for adjustment during maintenance is the toe-in value.

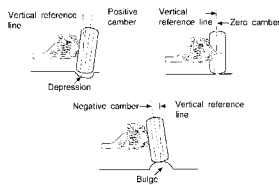
1. Toe-in



The toe-in is used for measuring the distance of the wheels moving forward or off the center line of the vehicle. The toe-in can be understood as the comparison between the distance of the front part of two wheels and the rear part of the same wheels. If the wheels are completely parallel, the two measured values should be equivalent and the toe-in angle is zero. If the front wheels incline inward toward the center line, the toe-in angle is said to be positive. If the wheels incline outward, the toe-in angle is said to be negative. The positive and negative toe-in angles are commonly referred to as the toe-in and toe-out of the front wheels.

The toe-in is used for compensating the tendency of the tires to roll inward and outward due to the camber angle and surface resistance, so as to ensure the straight-line running of the vehicle.

2. Camber angle



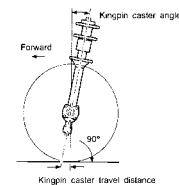
The camber angle is the angle of inclination of the tires relative to the vertical reference line. When the top of a tire inclines outward, the camber angle can be said to be positive. When the top of a tire inclines inward, the camber angle can be said to be negative. The setting of the camber angle may influence the control of the vehicle direction and tire wear.

The design of suspension and steering devices aims at reducing the tire tread wear and transferring the traction to the greatest extent by keeping the wheels perpendicular to the ground and driving in a straight line.

Inappropriate camber angle setting will cause excessive tire wear or uneven wear. Excessive positive camber angle will lead to wear on the outside wall of the tire tread. When the load on the outside wall of the tread is higher than that on the inside wall, uneven wear will occur.

Excessive negative camber angle will lead to wear on the inside wall of the tire tread. When the load on the inside wall of the tread is higher than that on the outside wall, uneven wear will occur.

3. Kingpin caster angle



The kingpin caster angle is the angle at which the kingpin axis slopes forward or backward. The kingpin caster angle is obtained by measuring the angle between the steering axis and the vertical line by observing from the side. Inclining backward from the vertical line is called a positive kingpin caster angle, and inclining forward is called a negative kingpin caster angle. The center line of the steering axis intersects with the ground at a point, and the tire has a central point of contact with the road, the distance between these two points is called scrub radius. The kingpin caster angle can produce the stability of driving in a straight line: If the vehicle is provided with a positive kingpin caster angle, when the wheel turns to the left, the left journal tends to sink. (This is due to the fact that the journal rotates along the steering axis, and the axis is inclined.) But because the journal is fixed on the wheel assembly and the ground stops it moving downward. So the journal will not move downward, but the left steering knuckle is forced to move upward. The vehicle body is thus lifted slightly. Upon the completion of the steering and after releasing of the steering wheel, the lifted body weight forces the steering knuckle down again. The journal then returns to the original driving-forward position.

4.4.4 Diagnostic message and steps

4.4.4.1 Diagnosis Description

See [description and operation](#) and [wheel alignment](#) before diagnosing wheel and tire faults. Understand and be familiar with the working principle of wheel and tire, and then start the system diagnosis. This will help to confirm the correct fault diagnosis steps when a fault occurs. More importantly, it can also help to confirm whether the situation described by the customer belongs to normal operation. Any fault diagnosis of wheel and tire should start with visual inspection, which will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

4.4.4.2 Visual Check

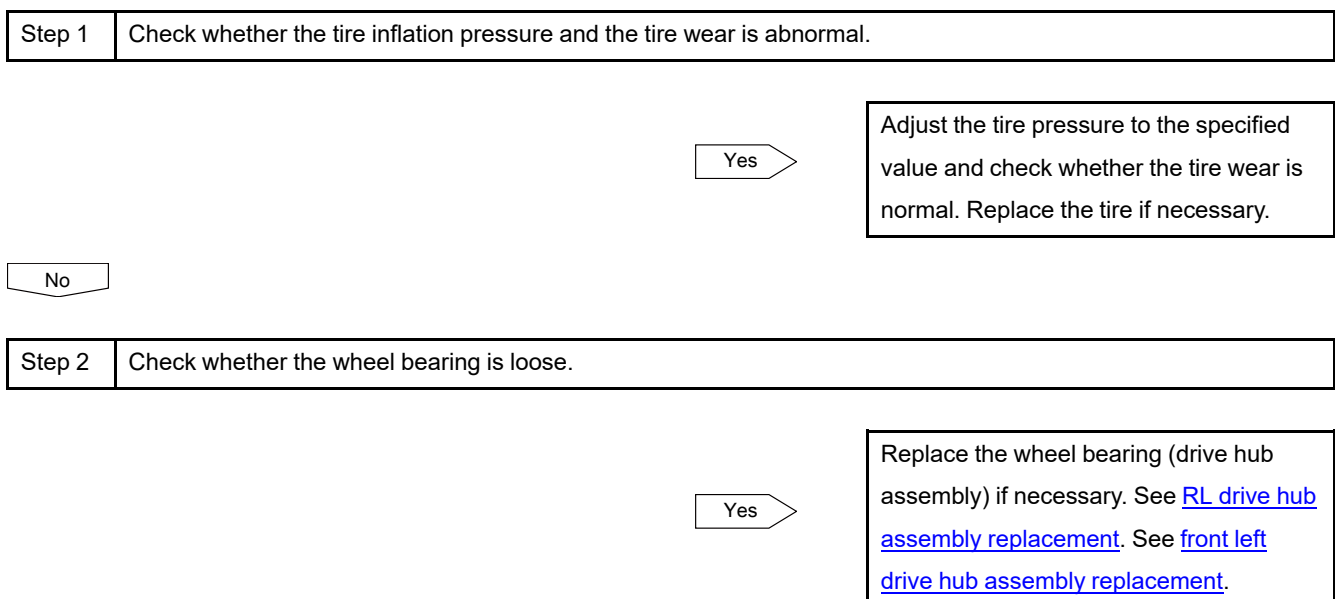
- Check after market devices that may affect the operation of wheels and tires to ensure that these devices cannot affect wheels and tires.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage or situation that may cause a fault; if so, repair the fault components.
- Check for the following circumstances:
 - Obvious tire and wheel run-out.
 - Obvious drive axle run-out.
 - Incorrect tire pressure.
 - Incorrect vehicle front end height.
 - Wheel curve or damage.
 - Scarps on tires or wheels.
 - Abnormal or excessive tire wear.
 - Defects in tires, including tread distortion and separation caused the collision and slight indentation of tire side wall, are normal, which do not affect the driving quality.

If the above phenomena exist, clean, repair or replace the corresponding parts.

4.4.4.3 Preliminary inspection before tire positioning

Caution

Before positioning the tire, the following check steps must be performed. Otherwise it may result in new faults due to inaccurate positioning.



No

Step 3 Check whether the ball joint of the left lower swing arm assembly of the front suspension and the ball joint of the left outer tie rod of the steering gear and the ball joint of the swing arm assembly lower LH front suspension and the ball joint of the right outer tie rod of the steering gear are loose?

Yes

If necessary, replace the fastening nuts of the front swing arm assembly and the lower right swing arm assembly. See [front suspension left lower swing arm assembly replacement](#).
Or replace the left outer tie rod of steering gear and the right outer tie rod of steering gear. Refer to Replacement of Steering Gear Outer left Pull Rod.

No

Step 4 Check whether the tire and wheel run-out number are abnormal.

Yes

Measure and correct the wheel run-out value.

No

Step 5 Check whether the vehicle front end height is abnormal.

Yes

Correct the vehicle front end before adjusting toe-in.

No

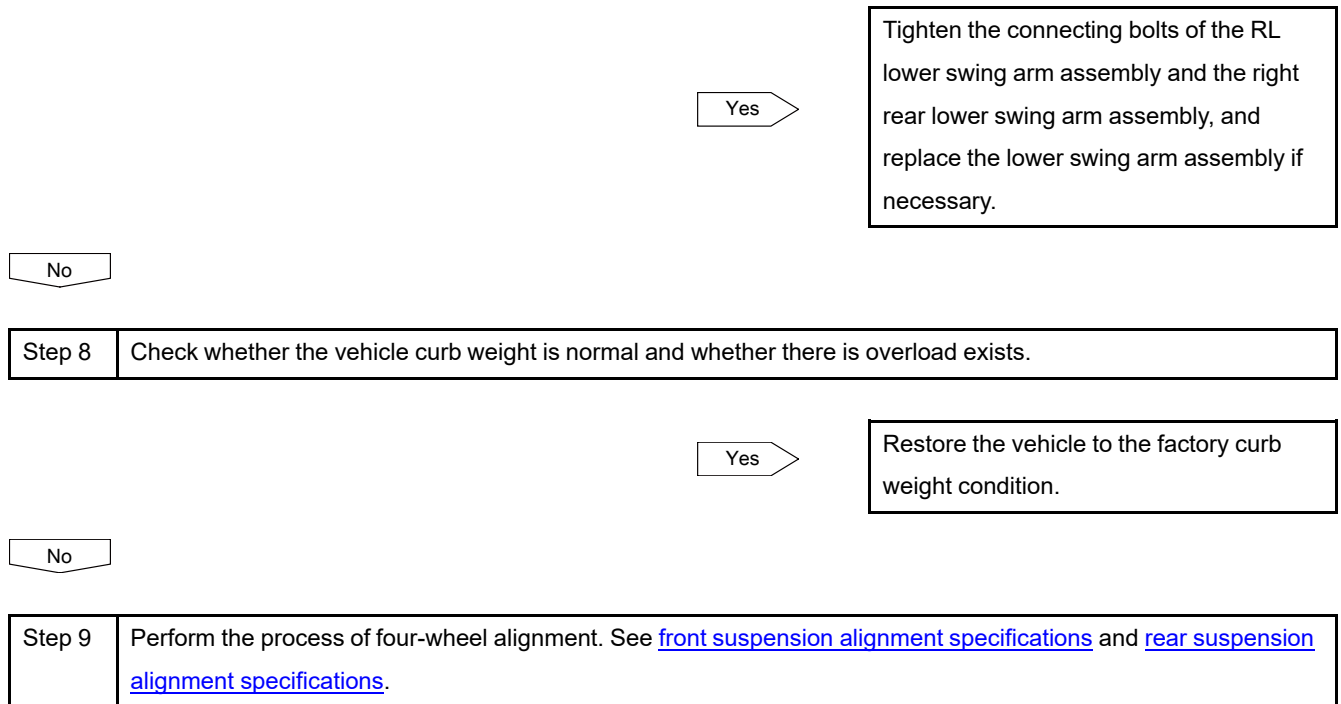
Step 6 Check whether the Front shock absorber assembly LH assembly is installed incorrectly?

Yes

Replace the Front shock absorber assembly LH assembly. See [Front shock absorber assembly LH assembly replacement](#).

No

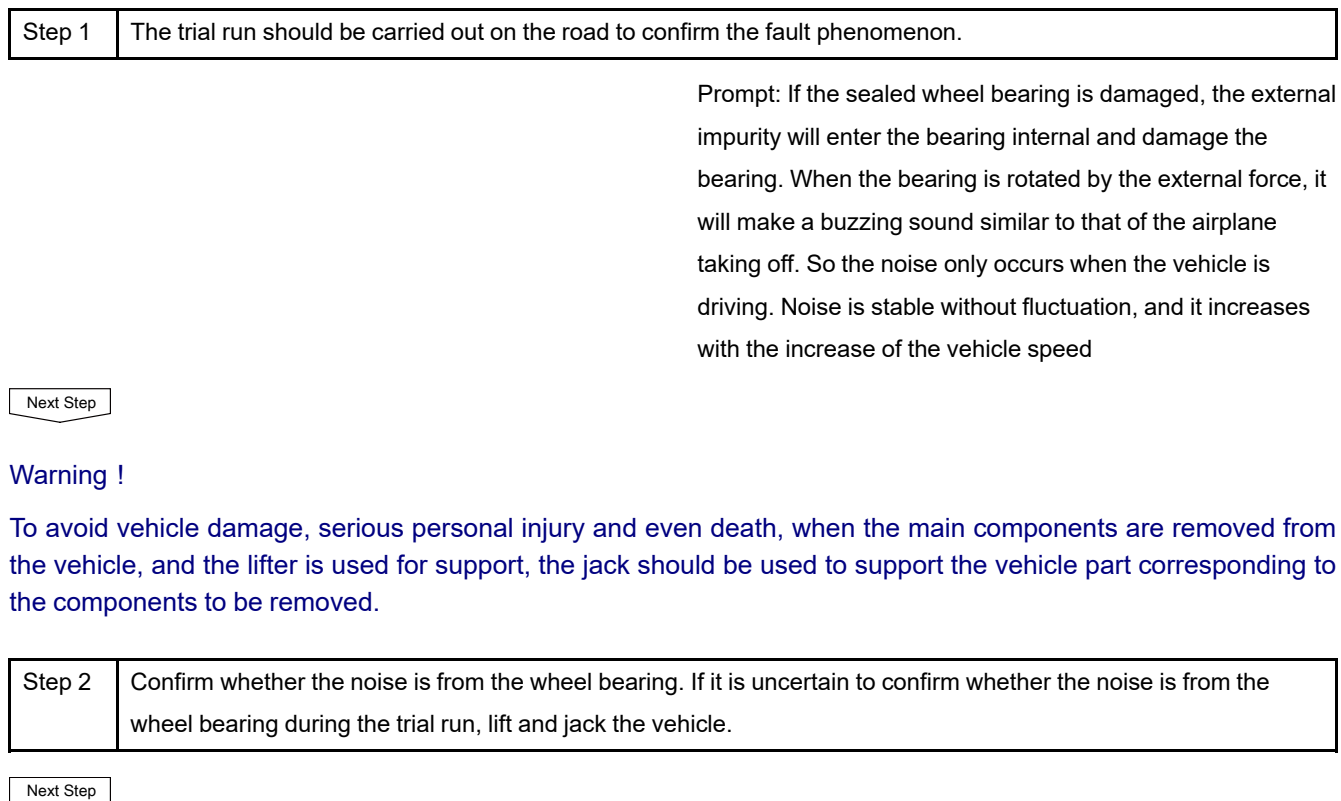
Step 7 Check whether the lower arm assembly of the RL suspension and the lower arm assembly of the right rear suspension are loose?



4.4.4.4 Wheel bearing diagnosis

Warning !

Test the vehicle in safe conditions and comply with all traffic regulations. Do not try any operation that may endanger the control of the vehicle. In case of violation of the above safety instructions, it may result in the serious accident to people and damage to the vehicle



Step 3	Check whether the wheel is bent.
--------	----------------------------------

Yes

Replace the wheel. See [wheel assembly replacement](#).

No

Step 4	Check whether the wheel is imbalance.
--------	---------------------------------------

Yes

Dynamic rebalance the wheel.

Warning !

At the time of rotating the wheel with hand, the hand must hold the rotating tire. In case of an incorrect position, it may result in personal injury.

Next Step

Step 5	Rotate the tire and wheel assembly. Listen whether noise exists in the wheel bearing.
--------	---

Yes

Replace the wheel bearing (drive hub assembly) if necessary. See [RL drive hub assembly replacement](#). See [front left drive hub assembly replacement](#).

No

Step 6	Shake the wheel with hand to check whether the wheel bearing is loose.
--------	--

Yes

Replace the wheel bearing (drive hub assembly) if necessary. See [RL drive hub assembly replacement](#). See [front left drive hub assembly replacement](#).

No

Step 7	Make a comprehensive comparison test with the same type and normal vehicle to confirm whether the noise belongs to the normal working noise.
--------	--

4.4.4.5 Wheel vibration diagnosis

Tire dynamic balancing

Tire dynamic balancing is the easiest procedure to be checked. If the vehicle vibrates at high speeds, dynamic balance should be done first. First, double-sided dynamic balance is performed under the vehicle to correct the imbalance of the tire and wheel assemblies. The final balance on the vehicle can correct the imbalance of the brake disc or hubcap. If the balancing operation fails to eliminate the vibration at high speed, or if the vibration occurs at low speed, the run-out is probably the cause of vibration.

Run-out

Tires, wheels, or the way the wheels are connected to the vehicle can cause a run-out. To detect the possibility of a wheel run-out, refer to the following wheel run-out diagnostic procedure.

Warning !

Test the vehicle in safe conditions and comply with all traffic regulations. Do not try any operation that may endanger the control of the vehicle. In case of violation of the above safety instructions, it may result in the serious accident to people and damage to the vehicle

Step 1	Making road test of vehicle to confirm fault symptoms and whether the vibration described by the distributor belongs to fault.
--------	--

No

Replace the wheel. See wheel assembly replacement .

Yes

Step 2	Determine if the vehicle speed is above 65 km/h when vibration occurs.
--------	--

No

Go to Step 5.

Yes

Step 3	Perform tire dynamic balancing under the vehicle and vehicle road test to confirm whether the fault exists.
--------	---

No

Trouble is removed.

Yes

Step 4	Perform final balance on vehicle and vehicle road test to confirm whether the fault exists.
--------	---

No

Trouble is removed.

Yes

Step 5	Check the free end face and radial run-out value of the wheel (standard value: 1.0mm /0.0394 in) for whether they are conforming to the specified value.
--------	--

No

Go to Step 8.

Yes

Step 6	Check whether the vehicle transmission system is unbalancing.
--------	---

Thoroughly inspect the drive axle and CV joint.

No

Replace the damaged components.

Yes

Step 7	Check the run-out of wheel hub flange (standard value:0.26mm/0.0102 in) for whether the run-out value is conforming to specified value.
--------	---

No

Replace the wheel bearing (drive hub assembly) if necessary. See [RL drive hub assembly replacement](#). See [front left drive hub assembly replacement](#).

Yes

Step 8	Remove the wheel assembly to remove the tire from the assembly and measure the run-out value of wheel (standard value: 0.3mm/0.01 in) for whether it is conforming to the specified value.
--------	--

No

Replace the wheel. See [wheel assembly replacement](#).

Yes

Step 9	Replace tire(s).
--------	------------------

Next Step

Step 10	Confirm that the trouble is removed.
---------	--------------------------------------

4.4.4.6 Inspection of wheel run-out

Use a dialgauge to measure the wheel run-out above and below the vehicle, but guarantee the installation surface correct. Measurement both with and without tires are available. Measure the radial and end face run-out inside and outside the wheel rim flange. Fix a dial indicator beside the wheel and tire assembly, and slowly rotate the wheel for a circle to record the dialgauge reading. In the case, the measured value is larger than the following specifications and the wheel balance cannot eliminate the vibration, replace the wheel.

Aluminous wheel

Radial run-out: 0.3 mm (0.01 in)

End face run-out: 0.3 mm (0.01 in)

4.4.4.7 Diagnosis of abnormal wheel wear

There are many reasons behind the abnormal or premature tire wear, including incorrect inflation pressure, no regular tire transposition, bad driving habits or incorrect wheel alignment. If readjustment of wheel alignment is needed due to tire wear, make sure to adjust toe-in to approach zero as long as the specification is permitted.

If the following situation occurs, make transposition to tires:

- a. Front tire wear is different from rear tire.

- b. There is difference in wear condition of front left and front right tires.
- c. There is difference in wear condition of rear left and rear right tires.

If the following situation occurs, check wheel alignment:

- a. There is difference in wear condition of front left and front right tires.
- b. Tread of any of front tires is worn unevenly.
- c. There is feather-shaped scratch on one side of the pattern strip or pattern block of front tire tread.

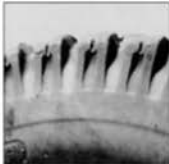
Several typical tire wear conditions are shown as following:



Shoulder wear Intermediate wear One-sided wear



Feather wear



Annular groove wear

1. Middle wear

Reasons:

The tire pressure is too high for a long time, the tire tread is too wide and the rim is too narrow. The wear of the tire is mainly borne by the middle of the tread.

2. Shoulder wear

Reasons:

The tire pressure is low for a long time, or the vehicle is overloaded, the tire tread is too narrow and the rim is too wide, and the tire wear is mainly borne by both sides of the tread.

3. Unilateral wear:

Reasons:

The toe in of the front wheel does not meet the standard, the camber angle of the wheel is too large or too small, the car turns sharply frequently, and the wheels have not been transposed for a long time.

4. Tire side wall feather worn pattern:

Reasons:

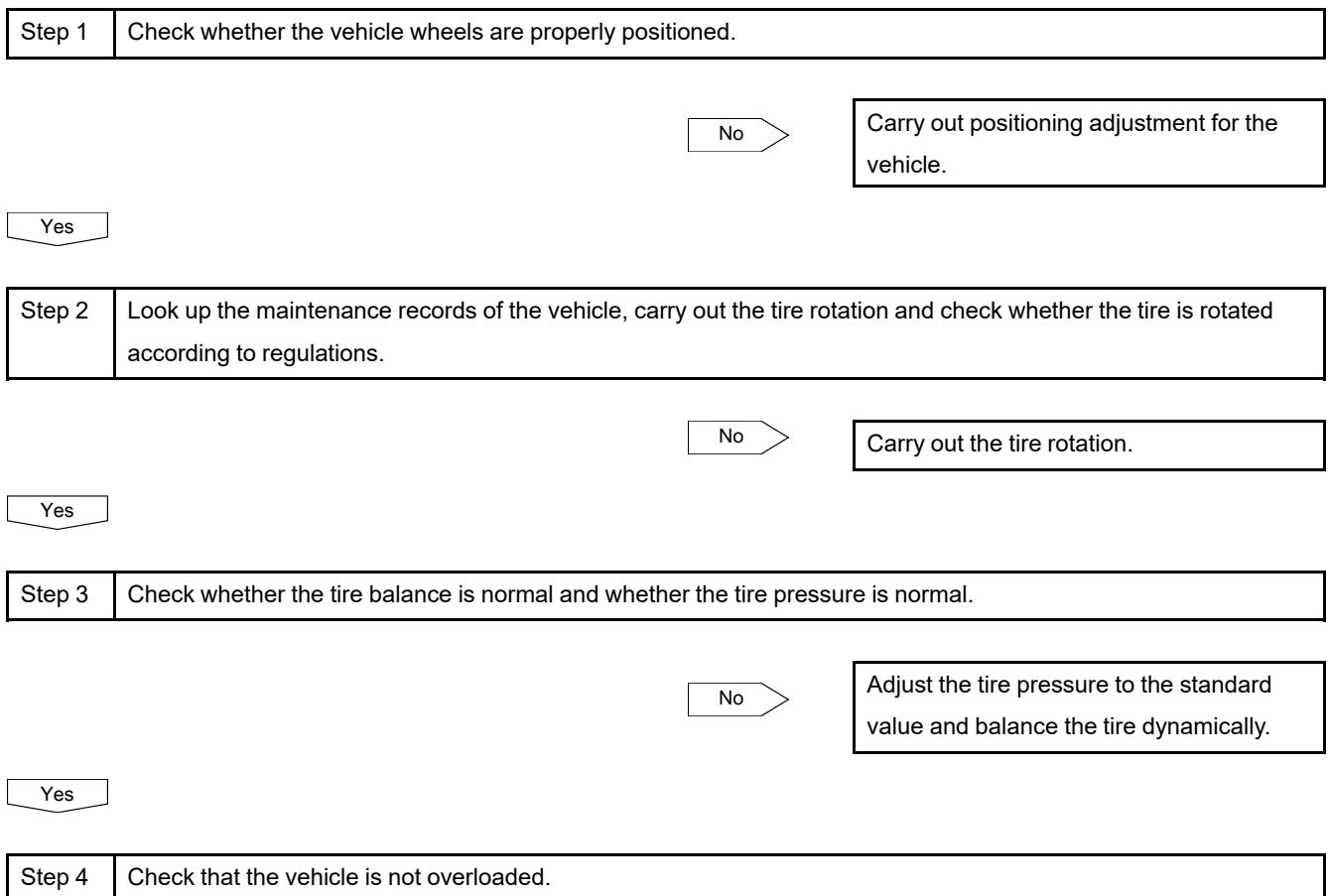
The tire pressure is low, the load is too large, the wheel hub bearing is worn and loose, and the front wheel alignment parameters are incorrect.

4. Annular groove wear:

Reasons:

Insufficient tire pressure, wheel imbalance, steel ring deformation, excessive toe in, loose connection of steering rod and incorrect wheel alignment parameters.

4.4.4.8 Diagnosis of excessive tire wear



No

Explain to the user the importance of maintaining a reasonable load.

Yes

Step 5 Check whether the coil spring is working properly.

No

Replace the coil spring. See [Front shock absorber assembly LH assembly replacement](#).

Yes

Step 6 Check whether the Front shock absorber assembly LH assembly works normally?

No

Replace the faulty parts. See [Front shock absorber assembly LH assembly replacement](#).

Yes

Step 7 Check whether the left lower arm assembly of front suspension and the right lower arm assembly of front suspension work normally? (There should be no bending, loosening and other faults)

No

Replace the left lower arm assembly of the front suspension and the right lower arm assembly of the front suspension. See [front suspension left lower swing arm assembly replacement](#).

Yes

Step 8 Check whether the wheel bearing is working properly. (There should be no wear, looseness and other faults)

No

Replace the wheel bearing (drive hub assembly) if necessary. See [RL drive hub assembly replacement](#). See [front left drive hub assembly replacement](#).

Yes

Step 9 Check whether the ball joint of the left lower swing arm assembly of the front suspension and the ball joint of the left outer tie rod of the steering gear and the ball joint of the swing arm assembly lower LH front suspension and the ball joint of the right outer tie rod of the steering gear work normally? (There should be no wear or looseness and other faults)

No

Replace the left lower arm assembly of the front suspension and the right lower arm assembly of the front suspension.
Tighten the nut. If necessary, replace the left outer tie rod and the right outer tie rod of the steering gear. See [the replacement of the left outer tie rod of the steering gear](#).

Yes

Step 10	Check whether the wheel run-out is normal. Refer to Wheel Run-out Value Check.
---------	--

No

Reassemble the tire and replace the tire or wheel if necessary. See [wheel assembly replacement](#).

Yes

Step 11	Confirm that the trouble is removed.
---------	--------------------------------------

4.4.4.9 Diagnosis of side swing when the vehicle is driving

Step 1	Check whether the tire balance is normal and whether the tire pressure is normal.
--------	---

No

Adjust the tire pressure to the standard value and balance the tire dynamically.

Yes

Step 2	Check whether the vehicle wheels are properly positioned.
--------	---

No

Re-align the wheels.

Yes

Step 3	Check whether the wear of tire is normal.
--------	---

No

Replace tire(s). Notice: The wheels of vehicle should be positioned immediately after replacement of tyres.

Yes

Step 4	Check whether the hub run out is normal.
--------	--

No

Measure the hub flange runout and replace the hub if necessary. See replacement of front hub See replacement of rear hub unit

Yes

Step 5 Check whether the steering tie rod ball joint is functioning properly. (There should be no wear or looseness and other faults)

No

Tighten the nut and replace the steering tie rod ball joint if necessary. See tie rod and ball joint replacement

Yes

Step 6 Check whether the ball joint of the left lower swing arm assembly of the front suspension and the ball joint of the swing arm assembly lower LH front suspension work normally? (There should be no wear or looseness and other faults)

No

If necessary, replace the fastening nuts of the front swing arm assembly and the lower right swing arm assembly.

Yes

Step 7 Check for excessive wheel runout.

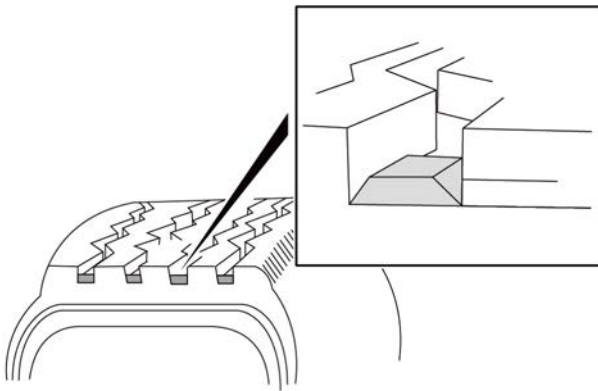
No

Measure wheel runout, reassemble wheels and tyres, and replace damaged parts if necessary.

Yes

Step 8 Confirm that the trouble is removed.

4.4.4.10 Tire wear indicator



4.4.4.11 Calibration for radial tire running deviation

1. Fault definition:

In the process of straight driving at a certain speed, the vehicle deviates from the original driving direction to the left or right without any external force on the steering wheel.

2. Criteria for judging vehicle running deviation:

(a) When a vehicle is running in a straight line at a certain speed, in order to maintain its original driving direction, a force must be applied to the steering wheel to prevent it from rotating clockwise or counterclockwise.

(b) When the vehicle is running in a straight line at a certain speed, the vehicle deviates from the original driving direction to the left or right after releasing the steering wheel (usually refers to the situation where the vehicle is traveling 100 m (3940 in) and deviates from the original driving direction by more than 1 m (39.4 in)).

Caution

Before calibration of the running deviation, the vehicle shall be inspected for basic items.

- a. Check the front and rear wheel brakes for dragging.
- b. Check whether the tire wear degree of the same suspension differs too much.
- c. Check that the tire pressures of the same suspension differ too much.

Please adjust it to the normal state before vehicle for road test to confirm whether the fault is eliminated. If there is any abnormality in the above.

3. Calibration procedure:

Test the vehicle in safe conditions and comply with all traffic regulations. Do not try any operation that may endanger the control of the vehicle. Violating the above safety instructions may cause serious personal injury and damage the vehicle.

Step 1 Vehicle for road test to judge whether the vehicle deviates.

No

Explain the definition of running deviation to customers. According to different road conditions, vehicles may have the illusion of running deviation in a short period of time.

Yes

Step 2 Check that the front wheel toe-in numbers of the vehicle are correct.

No

Re-adjust the front wheel toe-in value of the vehicle and make alignment adjustments if necessary. Refer to adjustment of front wheel toe-in

Yes

Step 3 Check that the wheel alignment of the vehicle meets the specified numbers.

No

Adjust the wheel alignment.

Yes

Step 4 Check that all locating parameters of the vehicle conform to the specifications in comparison of the values in the specification table.

No

Go to Step 10.

Yes

Step 5 Conduct the left tire transposition procedure.

- A. Replace the front left wheel assembly with the rear left wheel assembly.
- B. Vehicle for road test.
- C. Whether the vehicle is still deviating.

No

System is normal.

Yes

Step 6 Conduct the left tire transposition procedure.

- A. Replace front left wheel assembly with the Left rear wheel assembly, and replace the left tire.
- B. Vehicle for road test.
- C. Whether the vehicle is still deviating.

No

System is normal.

Yes

Step 7 Conduct the right tire transposition procedure.

- A. Replace the right front wheel assembly with the right rear wheel assembly.
- B. Vehicle for road test.
- C. Whether the vehicle is still deviating.

No

System is normal.

Yes

Step 8 Check for excessive wheel runout.

- A. Replace the right front wheel assembly with the right rear wheel assembly, and replace the right tire.
- B. Vehicle for road test.
- C. Whether the vehicle is still deviating.

No

Measure wheel runout, reassemble wheels and tyres, and replace damaged parts if necessary.

Yes

Step 9 Return to the first step of diagnosis.

Next Step

Step 10 Check that all locating parameters of the vehicle conform to the specifications in comparison of the values in the specification table.

No

Go to Step 10.

Step 11 Check the vehicle frame and suspension system components for damage such as bending.

4.4.5 Removing and installing

4.4.5.1 Wheel Assembly Replacement

Removal procedure

Caution

The removal and assembly procedures of the four-wheel assemblies are similar.

- 1 Take out the special tool from the vehicle tool in the trunk and remove the wheel bolt trim cover.

Caution

1. Place the vehicle on level ground.
2. Place the steering wheel of the vehicle with the front wheels facing the front.



- 2 Cross pre loosen the five-wheel bolts fixing the tire.

Caution

To keep the wheels balanced, mark the wheel's corresponding position before removing the tyre.



- 3 Raise the vehicle so that the tires are off the ground.
- 4 Remove the wheel bolts.
- 5 Remove the wheel.

Installation procedure



- 1 Tighten the wheel bolts in the sequence shown in the figure and Pre-tighten them.
- 2 Lower the vehicle.
- 3 Tighten the wheel bolts in the sequence shown in the figure.

Torque: 140 N. m (metric system) 105 lb-ft (Imperial system)

4.4.5.2 Toe-in adjustment of front wheels

- 1 Check toe-in setting at both ends.
Equipment: wheel alignment system.

Caution

Make sure the vehicle is parked on a level plane.

Make sure all wheels are at the right ahead position.

Before positioning, check whether the four-wheel tire pressure is consistent and at the normal value.

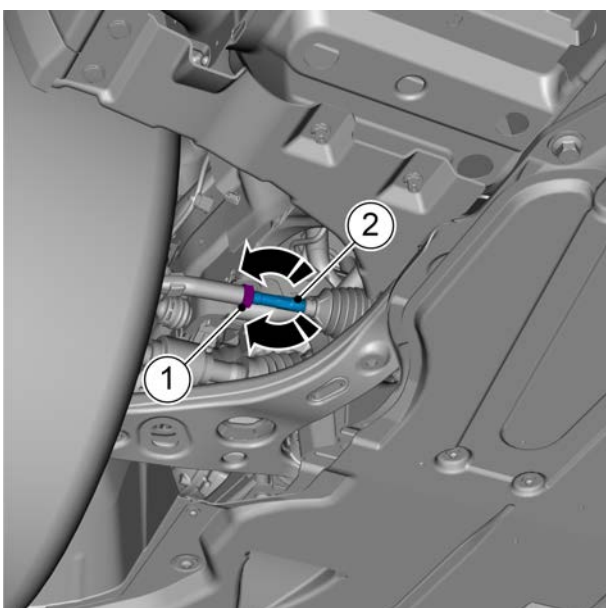
Check whether the ball joints of all parts are normal.

- 2 Lift the vehicle, see [Lift the vehicle](#)
- 3 Loosen the fixing nuts 1 at left and right ends of the steering gear outer pull rod.

Caution

The removal and adjustment methods of left and right ends are the same.

- 4 Turn tie rod 2 clockwise or counterclockwise with the same amount of rotation to adjust the toe in setting of front wheels at both ends. See wheel and tire maintenance data for parameters.
- 5 Tighten the lock nut 1 of the steering gear outer pull rod.



4.4.5.3 Rear wheel toe in adjustment

Caution

The removal and adjustment methods of left and right ends are the same.

- 1 Check toe-in setting at both ends.
Equipment: wheel alignment system.

Caution

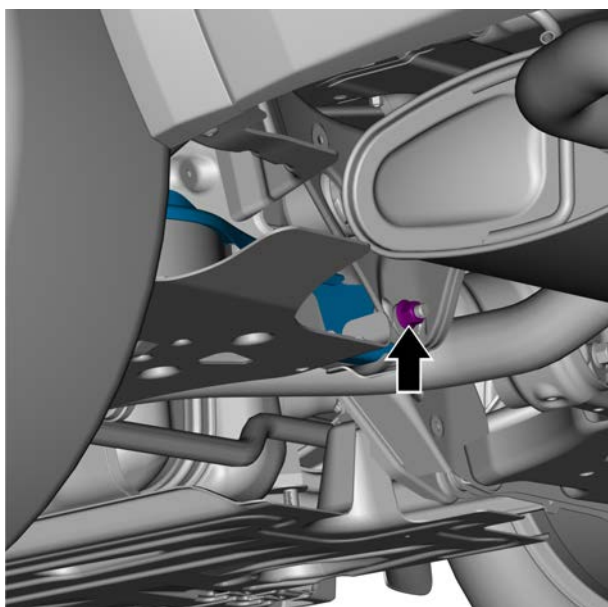
Make sure the vehicle is parked on a level plane.

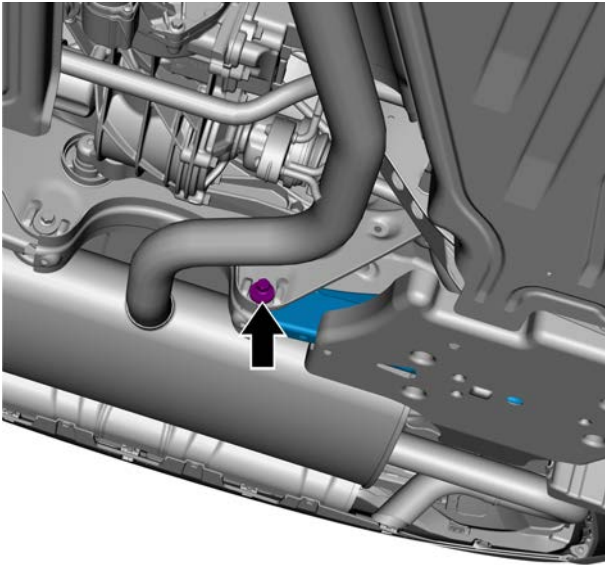
Make sure all wheels are at the right ahead position.

Before positioning, check whether the four-wheel tire pressure is consistent and at the normal value.

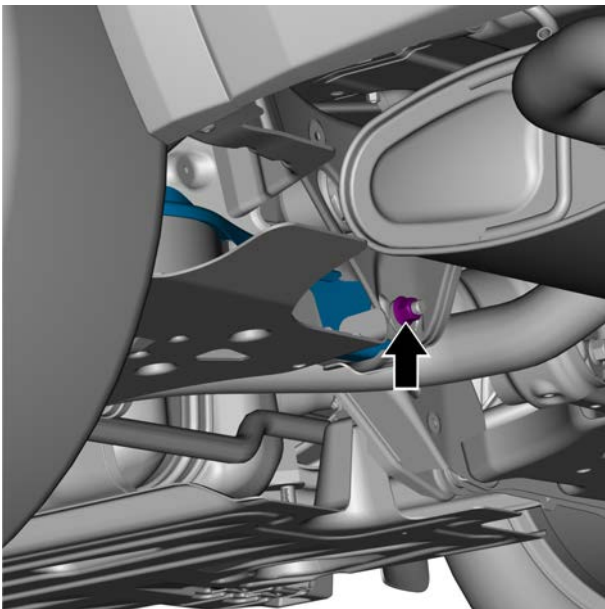
Check whether the ball joints of all parts are normal.

- 2 Lift the vehicle, see [Lift the vehicle](#)
- 3 Loosen the toe in adjusting nut of the lower swing arm assembly of the RL suspension of the vehicle.





- 4 Turn the adjusting bolt clockwise or counterclockwise to adjust the toe in setting of the rear wheel. See the wheel and tire maintenance data for parameters.



- 5 Tighten the toe in adjusting nut of the lower swing arm assembly of the RL suspension.
Torque: 90 N. m (metric system) 66.4 lb-ft (Imperial system)

4.4.5.4 Rear suspension camber adjustment

- 1 Check the rear wheel toe in setting.

Equipment: wheel alignment system.

Caution

Make sure the vehicle is parked on a level plane.

Ensure that the four tire pressures are consistent and within the standard value before adjustment.

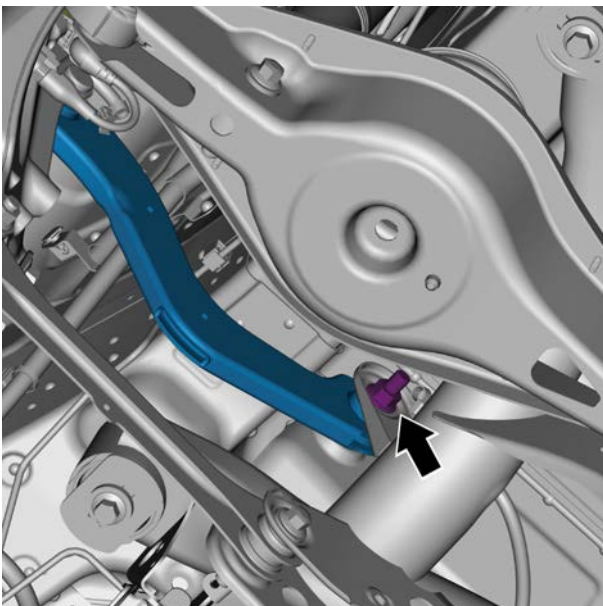
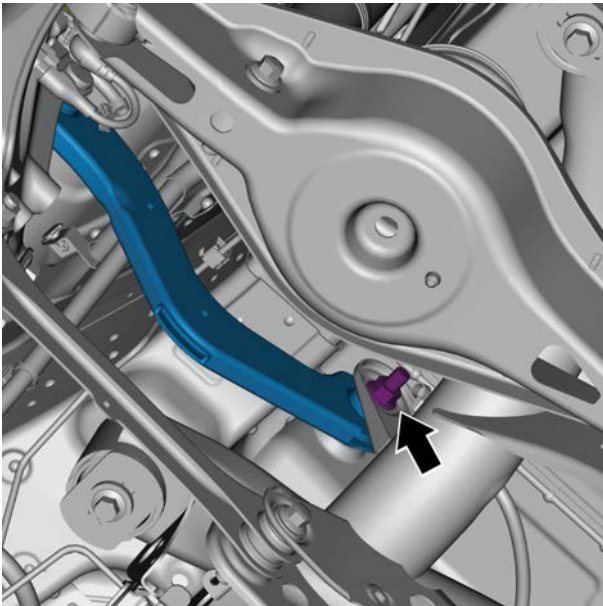
Before positioning, check whether the four-wheel tire pressure is consistent and at the normal value.

Check whether the ball joints of all parts are normal.

- 2 Loosen the fastening nut connecting the rear upper cross arm and the rear sub-chassisframe.

Caution

The removal and adjustment methods of left and right ends are the same.



- 3 Rotate the fixing bolts of the upper cross arm and the rear sub-chassisframe until the camber angle of the rear suspension is at the normal value. See [the rear suspension maintenance data for parameters](#).

- 4 Tighten and lock the nut

Torque: 250 N. m (metric system) 184.4 lb-ft (Imperial system)

Driveline/shaft

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5.3.6.5 Replacement of drive shaft	5-37

5.1 Warnings and precautions

5.1.1 Warnings and precautions

5.1.1.1 Warnings and precautions

Warning about assistant driving

Caution

When the technician is checking the fault parts reported for repair, the vehicle should be driven by the assistant. Otherwise, it may lead to personal injury.

Warnings regarding battery disconnection

Caution

Before maintaining any electrical components, the power supply mode button must be in the OFF position, and all electrical loads must be "OFF" unless otherwise stated in the operating procedures. If tools or equipment are easily accessible to exposed live electrical terminals, disconnect the negative battery cable. Violating these safety instructions may result in personal injury or damages to the vehicle or vehicle components.

Warnings regarding road test

Warning !

Under the premise of ensuring safety, test the vehicle on the road in accordance with all traffic laws. Do not try any operation that may endanger the control of the vehicle. Violating the above safety instructions may cause serious personal injury and damage to the vehicle.

Notice of engine lifting

Caution

When lifting or supporting the engine for whatever reason, do not hold the jack under the engine or any sheet metal parts. Lifting engine in an incorrect way will cause damage to the components.

5.2 Differential

5.2.1 Specification

5.2.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Power takeoff bracket and engine retaining bolt	M8×40	18 N.m+90°	13.3 lb-ft+90°
Power takeoff bracket and power takeoff retaining bolt	M10×40	50 N.m+120°	36.9 lb-ft+120°
retaining bolts of power takeoff and transmission	M10×40	20 N.m+45°	14.7 lb-ft+45°
Rear differential (front) retaining bolt	M12×110	68~92	50.2~67.9
Rear differential (rear) retaining bolt	M12×80×87.8	68~92	50.2~67.9

5.2.2 Description and operation

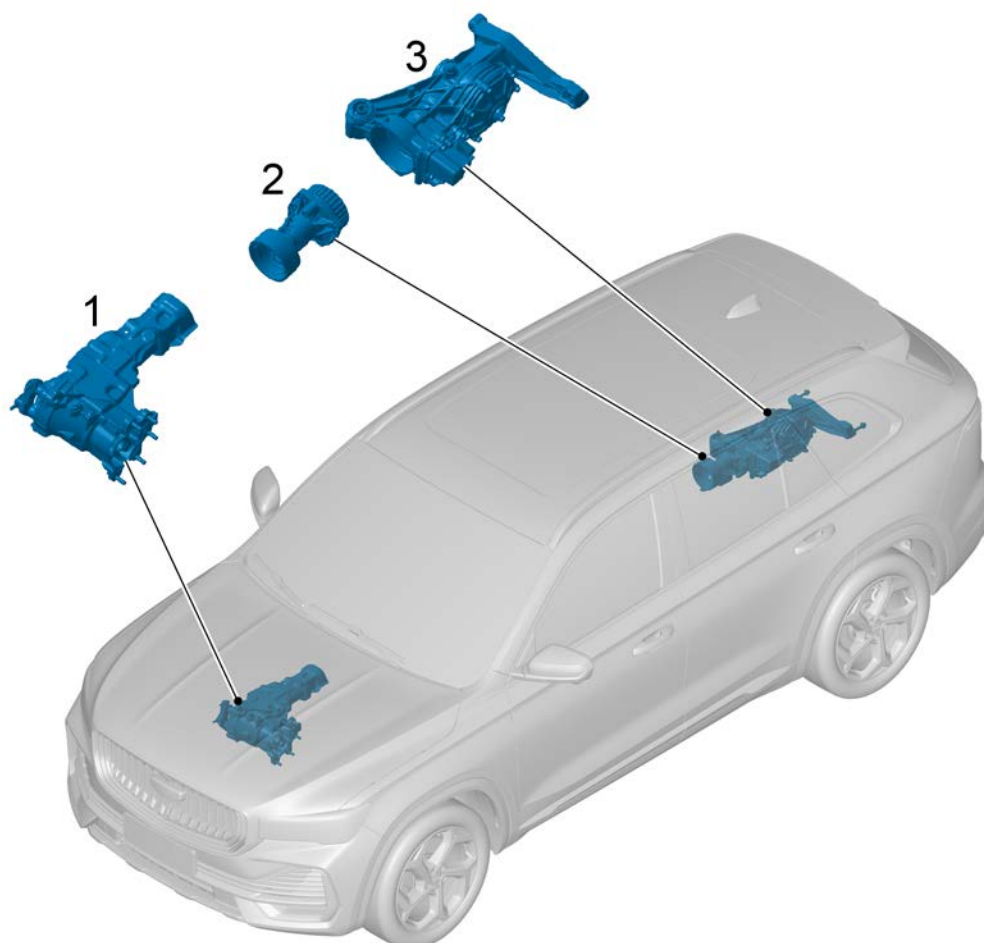
5.2.2.1 Description and operation

The vehicle has only one driving mode: AWD 4WD. The four-wheel drive mode can have better off-road and handling performance at any time, and can prolong the service life of tires.

The drive system of this vehicle is timely four-wheel drive, which does not require human operation. The system can intelligently switch between two-wheel drive mode and four-wheel drive mode according to vehicle operating conditions.

5.2.3 Component position

5.2.3.1 Component position



1. Power takeoff
2. Differential electronic module
3. Rear final drive with differential assembly

5.2.4 Diagnostic information and procedures

5.2.4.1 Diagnosis Description

Before diagnosing differential system faults, refer to [Description and Operation](#). Understand and be familiar with working principles of differential system before starting system diagnosis. This helps to determine the correct fault diagnosis steps when a fault occurs. More importantly, it also helps to determine whether the situation described by the customer is normal operation. Any fault diagnosis of the differential system should start with the "visual inspection". The "visual inspection" will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

5.2.4.2 Visual Check

- Check the after market devices that may affect the operation of the differential system to ensure that these devices cannot affect the differential system.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage or situation that may cause a fault; if so, repair the fault components.

5.2.5 Removing and installing

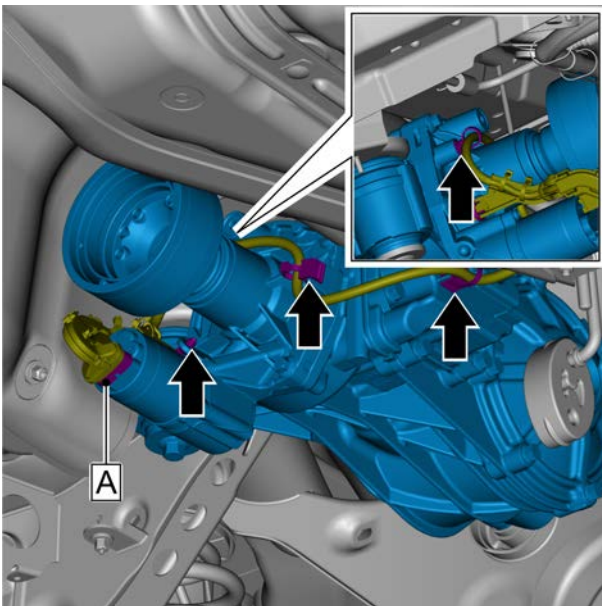
5.2.5.1 Rear differential replacement

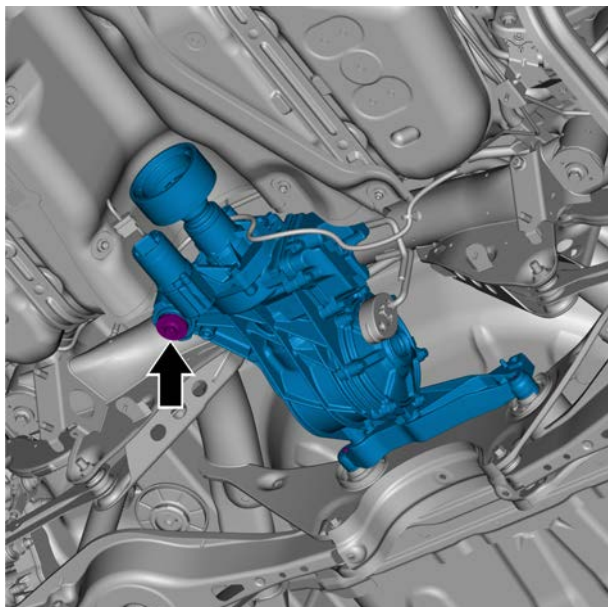
Removal procedure

Warning !

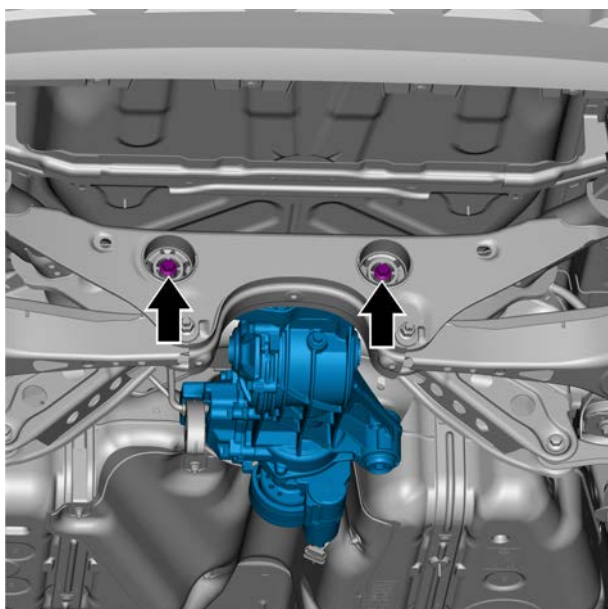
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Lift the vehicle, see [Lift the vehicle](#)
- 3 Remove the exhaust cold end, see [exhaust cold end replacement](#).
- 4 Remove the drive shaft, see [drive shaft replacement](#).
- 5 Remove the rear suspension stabilizer. See [rear suspension stabilizer replacement](#).
- 6 Remove left and right rear constant speed drive shafts. See [replacement of left and right constant speed drive shaft](#).
- 7 Disconnect the fixing clip of differential electronic module harness.
- 8 Disconnect the differential electronic module harness connector A.





- 9 Drag the rear differential with a hydraulic jack and remove the retaining bolts at the front.

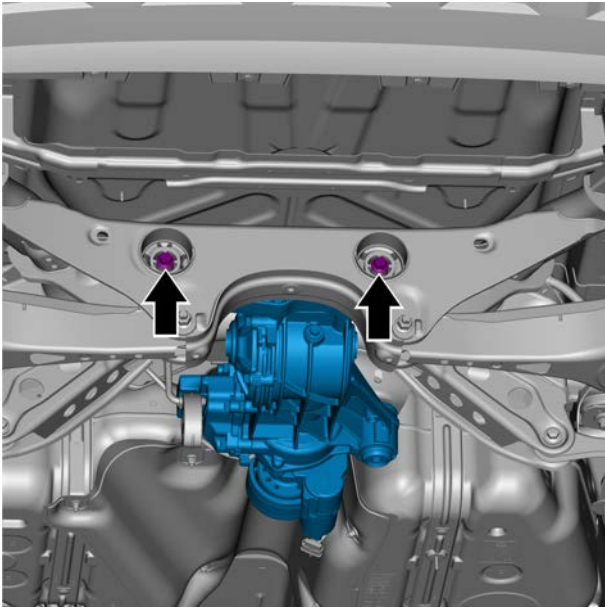


- 10 Remove the 2 retaining bolts at the rear of the rear differential, slowly lower the hydraulic jack and remove the rear differential.

Caution

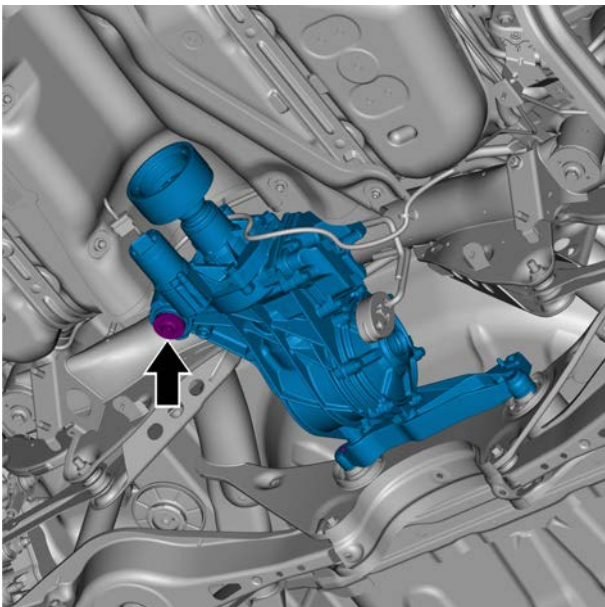
The rear differential shall not tilt more than 45 ° under any circumstances.

Installation procedure



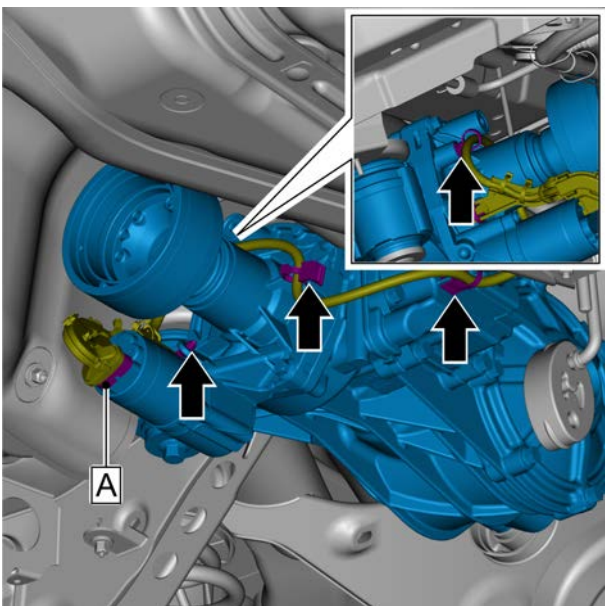
- 1 Drag the rear differential with the hydraulic jack to the installation position, and tighten the two retaining bolts at the rear of the rear differential.

Torque: 80 N. m (metric system) 59 lb-ft (Imperial system)



- 2 Install retaining bolts at the front of the rear differential and tighten them.

Torque: 80 N. m (metric system) 59 lb-ft (Imperial system)



- 3 Install differential electronic module harness connector A.
- 4 Install fixing clip of differential electronic module harness.

- 5 Install left and right rear constant speed drive shafts.

Caution

The oil seal protection tooling shall be used when assembling the rear drive half shaft and the rear main reducer

- 6 Install the rear suspension stabilizer bar.
- 7 Install the drive shaft.

Caution

When installing the drive shaft, the white spot at the Rear-end shall fall within the two white lines on the rear main reducer flange.

- 8 Install the exhaust cold end.
- 9 Lower the vehicle.
- 10 Connect the negative battery cable.

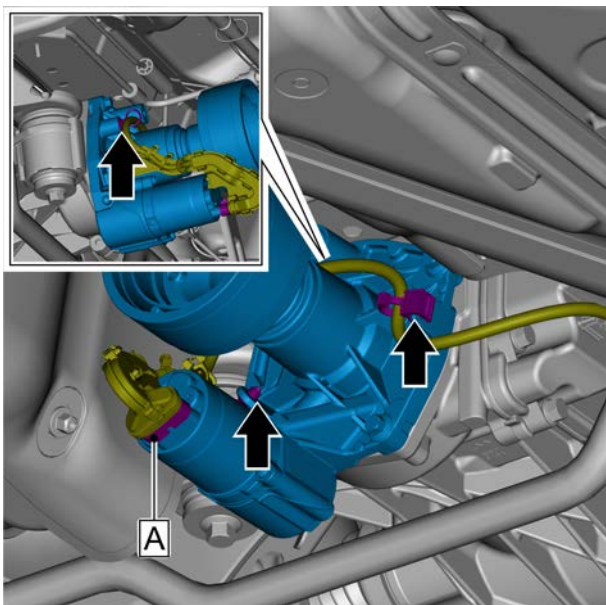
5.2.5.2 Differential electronic module replacement

Removal procedure

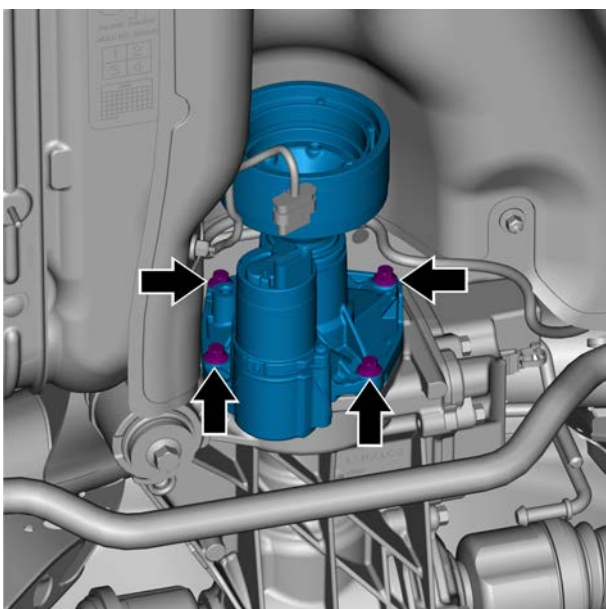
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Support vehicles, see [Support Vehicles](#)
- 3 Remove the exhaust cold end, see [exhaust cold end replacement.](#)
- 4 Remove the drive shaft, see [drive shaft replacement.](#)



- 5 Disconnect the fixing clip of differential electronic module harness.
- 6 Disconnect the differential electronic module harness connector A.

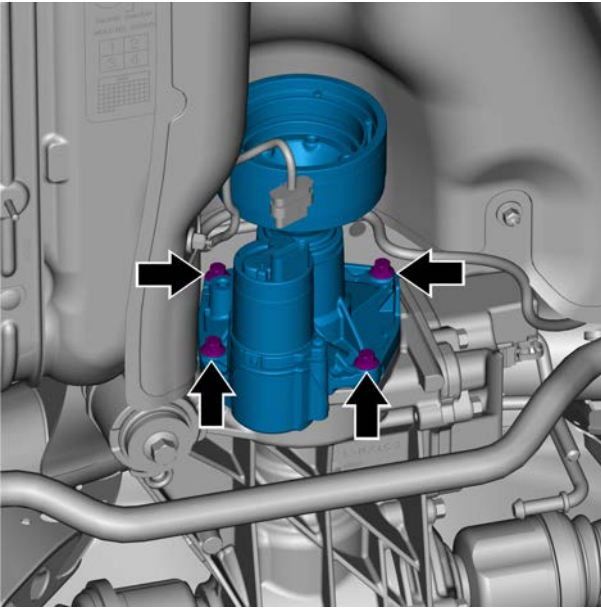


- 7 Remove 4 retaining bolts of differential electronic module and remove differential electronic module.

Caution

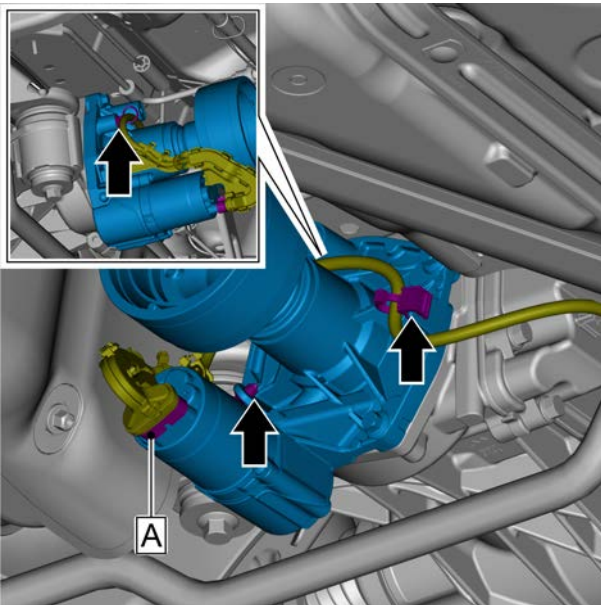
Lubrication oil flows out during removal. Collect the lubrication oil with appropriate tools.

Installation procedure

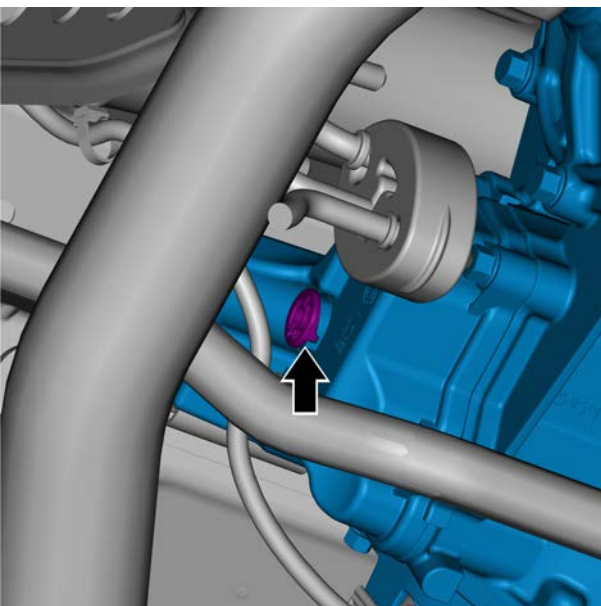


- 1 Install the differential electronic module and tighten 4 retaining bolts.

Torque: 29 N. m (metric system) 21.4 lb-ft (Imperial system)



- 2 Install differential electronic module harness connector A.
- 3 Install fixing clip of differential electronic module harness.



- 4 Open the oil filler bolt and add lubrication oil. Just when the lubrication oil flows out, tighten the oil filler bolt

- 5 Replacing the differential electronic module requires software to exhaust or automatic exhaust.

Caution

Test run is required after replacement: ignite and start the vehicle, drive in a straight line at a speed of about 20km/h, hold the accelerator, drive for 10 minutes, park and turn off the engine, and repeat the above 4-5 times after ignition.

- 6 Install the exhaust silencer assembly.
- 7 Install the drive shaft.
- 8 Lower the vehicle.
- 9 Connect the negative battery cable.
- 10 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

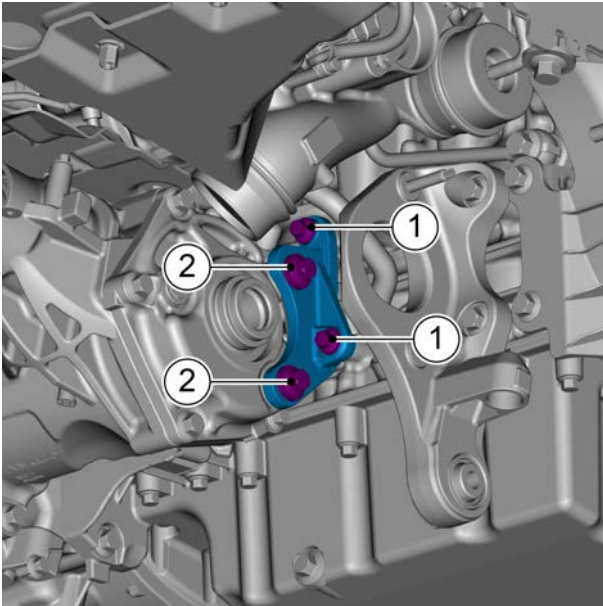
5.2.5.3 Replacement of power takeoff

Removal procedure

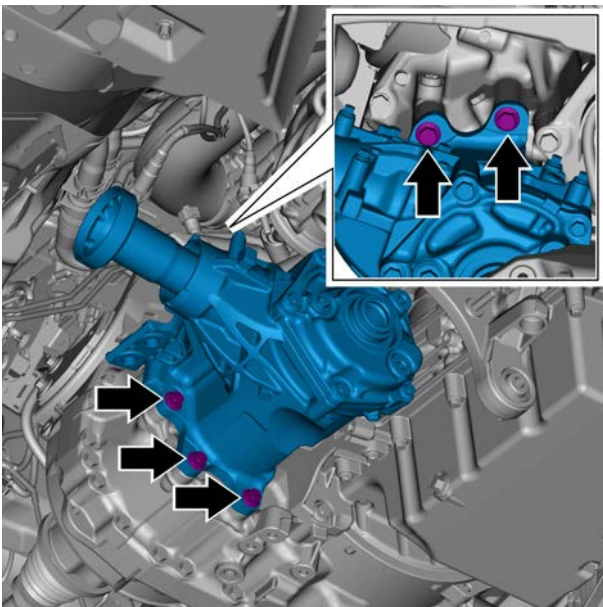
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Support vehicles, see [Support Vehicles](#)
- 3 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 4 Remove the front right constant speed drive shaft. See [replacement of front right constant speed drive shaft](#).
- 5 Remove the intercooler intake pipe assembly. See [intercooler intake pipe assembly replacement](#).
- 6 Remove the exhaust cold end, see [exhaust cold end replacement](#).
- 7 Remove front subframe, refer to [replacement of front subframe](#).
- 8 Remove the drive shaft, see [drive shaft replacement](#).
- 9 Remove VEP4 catalytic converter. See [replacement of VEP4 catalytic converter](#).



- 10 Remove 2 retaining bolts 1 connecting the power takeoff bracket and the engine.
- 11 Remove 2 retaining bolts 2 connecting the power take-off bracket and the power take-off.



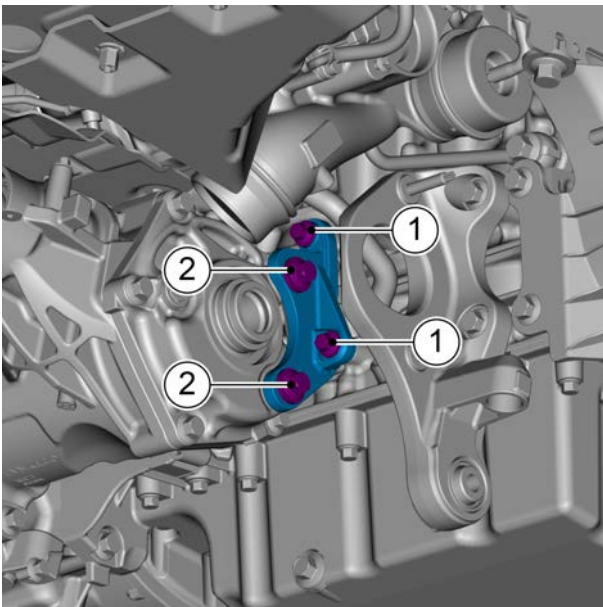
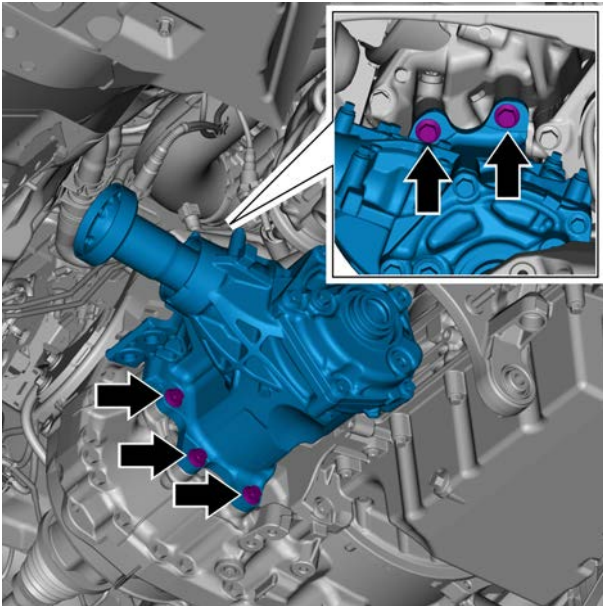
- 12 Remove 5 retaining bolts of the power take-off and remove the power take-off.

Caution

The power takeoff shall not be inclined by 45 ° under any circumstances.

New retaining bolts shall be replaced every time.

Installation procedure



- 1 Install the power take-off and tighten 5 retaining bolts.

Torque: 20 N.m +45° (metric system) 14.7 lb-ft (imperial system)

Caution

Grease the spline before installing the power take-off.

- 2 Tighten 2 retaining bolts 1 connecting the power take-off bracket and the engine.

Torque: 18 N.m + 90 ° (metric system) 13.3 lb-ft +90° (Imperial System)

- 3 Install the power take-off bracket and tighten the 2 retaining bolts 2 connected with the power take-off.

Torque: 50 N.m + +120 ° (metric system) 36.9 lb-ft+120° (Imperial System)

- 4 Install the catalytic of the catalytic converter.
- 5 Install the drive shaft.
- 6 Install the front subframe.
- 7 Install the exhaust cold end.
- 8 Install the intercooler intake pipe assembly.
- 9 Install the front right constant velocity drive shaft.
- 10 Install the wheel.
- 11 Lower the vehicle.
- 12 Connect the negative battery cable.
- 13 Check the four-wheel alignment data of the vehicle.

5.3 Drive shaft system

5.3.1 Specification

5.3.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Fixing screws of drive shaft and rear final drive	M8×40	25~35	18.4~25.8
Fixing screw of drive shaft and power take-off	M8×40	25~35	18.4~25.8
retaining bolts of front support of drive shaft and lower underbody	M8×25	20~28	14.8~20.7
Drive shaft front support and drive shaft retaining bolt	M8×12	20~28	14.8~20.7
retaining bolts of rear support of drive shaft and lower underbody panel	M8×25	20~28	14.8~20.7
Drive shaft rear support and drive shaft retaining bolt	M8×12	20~28	14.8~20.7

5.3.2 Description and operation

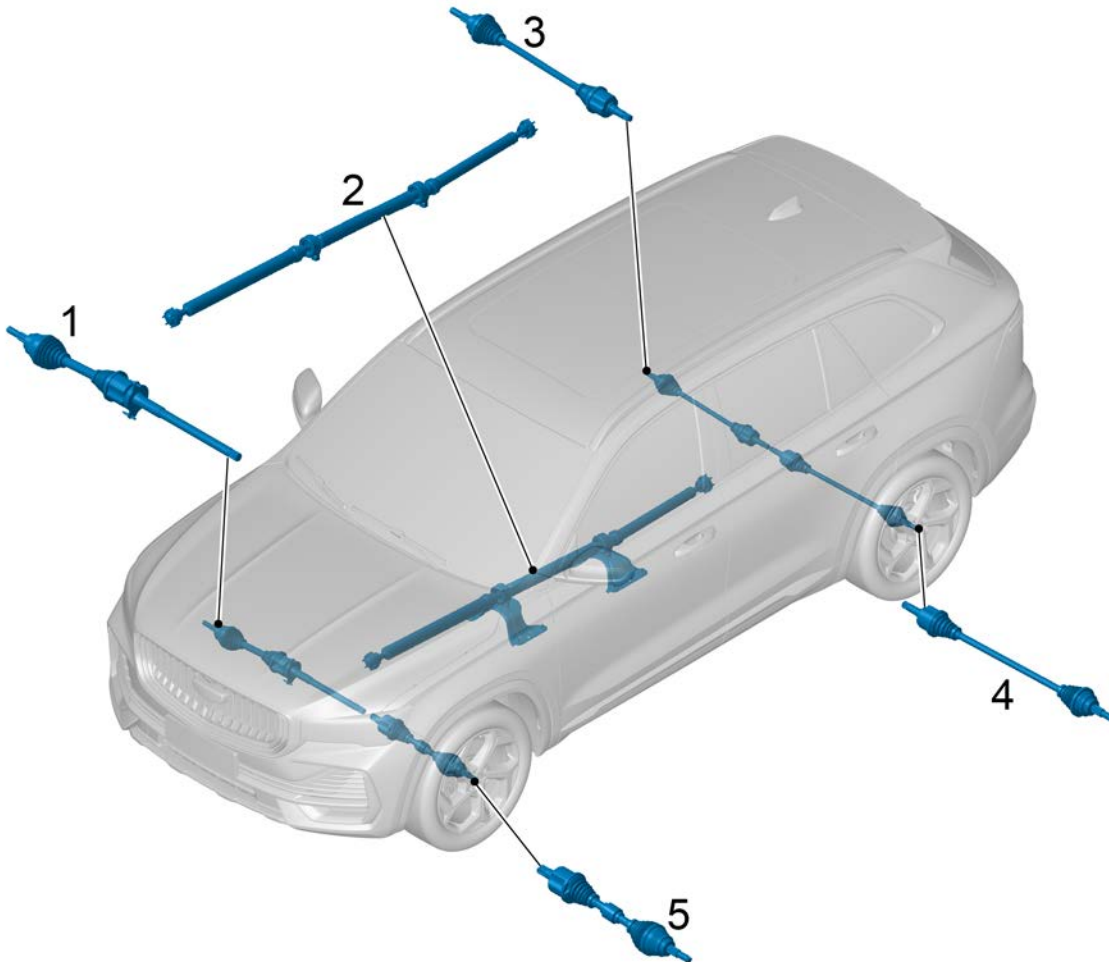
5.3.2.1 Description and operation

The vehicle is equipped with one drive mode model: AWD timely four-wheel drive. The vehicle drive shaft system consists of a drive shaft, a left front constant velocity drive shaft, a right front constant velocity drive shaft, a left rear constant velocity drive shaft and a right rear constant velocity drive shaft.

The constant speed drive shaft is the shaft that connects the differential with the drive wheels. The constant speed drive shaft is a shaft that transmits torque between the transmission and the drive hub assembly. Its inner and outer ends are respectively provided with a universal joint, which is respectively connected with the reducer gear and the inner ring of the drive hub assembly through the spline on the universal joint. The constant speed drive shaft is used to transfer power between the differential and the drive wheel.

5.3.3 Component position

5.3.3.1 Component position



1. Front right constant velocity drive shaft

2. Drive shaft

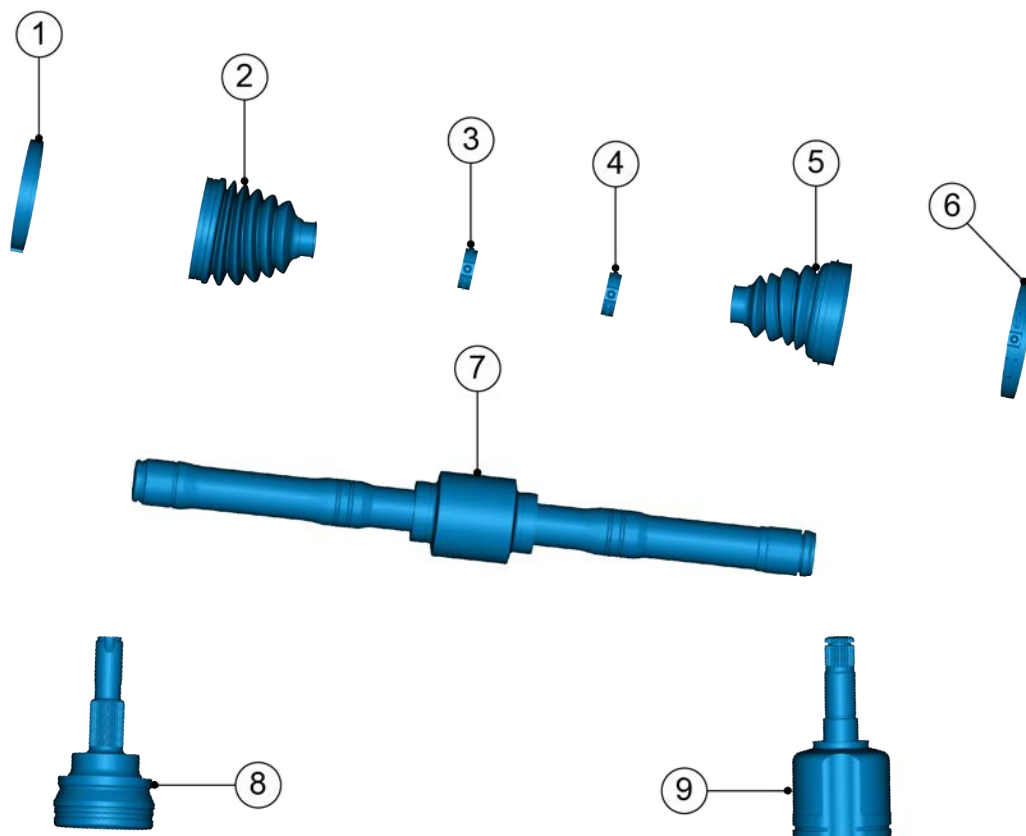
3. Rear right constant velocity drive shaft

4. Rear left constant velocity drive shaft

5. Front left constant velocity drive shaft

5.3.4 Exploded view

5.3.4.1 Exploded view



1. Large clamp

2. Front shaft outer joint cover

3. Small clamp

4. Small clamp

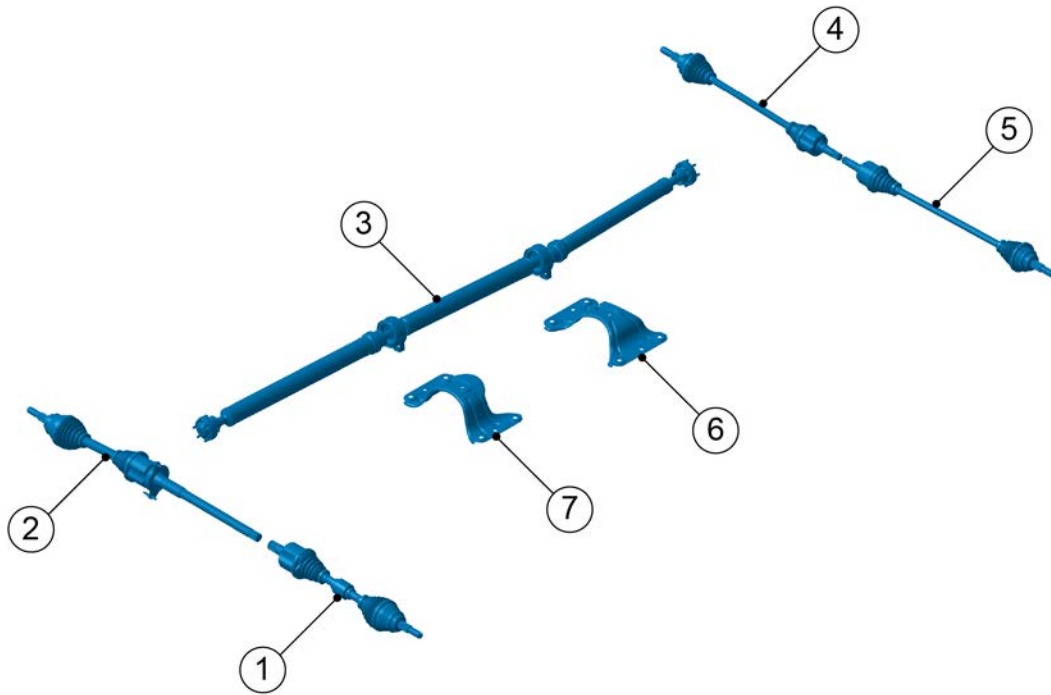
5. Front shaft inner joint cover

6. Large clamp

7. Drive shaft

8. Front shaft outer joint

9. Front shaft inner joint



1. Left constant velocity drive shaft assembly
2. Right constant velocity drive shaft assembly
3. Drive shaft
4. Rear right constant velocity drive shaft

5. Rear left constant velocity drive shaft
6. Drive shaft intermediate support
7. Drive shaft intermediate support

5.3.5 Diagnostic information and procedures

5.3.5.1 Diagnosis Description

Before diagnosing drive shaft system faults, refer to [Description and Operation](#). Understand and be familiar with working principles of drive shaft system before starting system diagnosis. This helps to determine the correct fault diagnosis steps when a fault occurs. More importantly, it also helps to determine whether the situation described by the customer is normal operation. Any fault diagnosis of the drive shaft system should start with the "visual inspection". The "visual inspection" will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

5.3.5.2 Visual Check

- Check the after market devices that may affect the operation of the drive shaft system to ensure that these devices cannot affect the drive shaft system.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage or situation that may cause a fault; if so, repair the fault components.

5.3.5.3 Failure Symptom Table

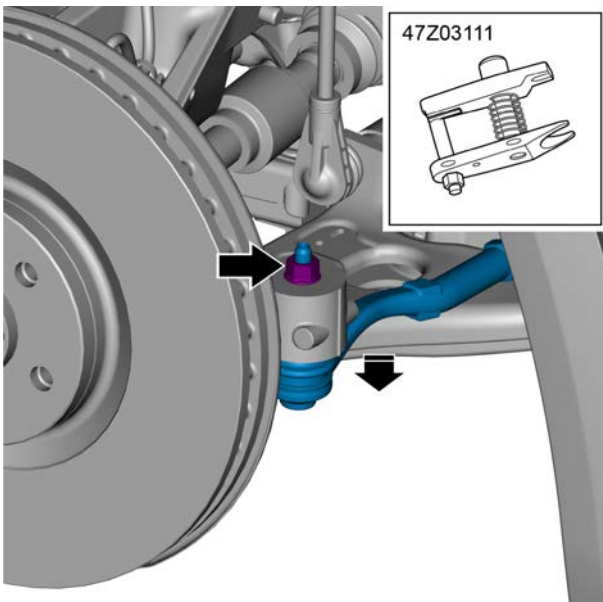
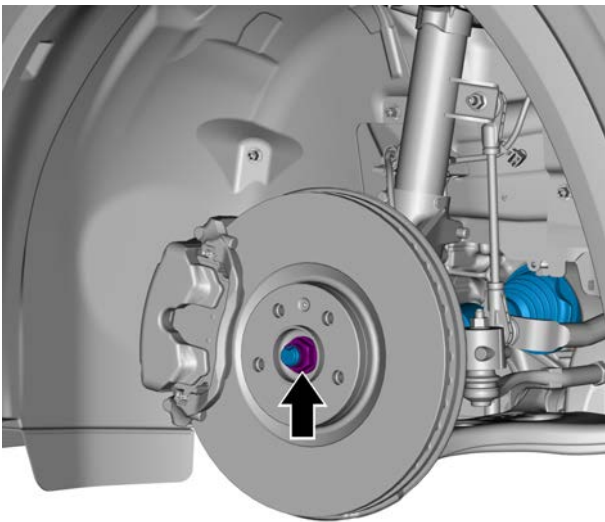
Symptom	Suspected parts	Replacement
Noise	<ol style="list-style-type: none"> 1. Fixed rzeppa constant velocity universal joint (wear) 2. Movable three-ball-pin constant velocity universal joint (wear) 3. Dust cover at both ends (Whether the corrugation edges are squeezed and rubbed) 	See removal and assembly of drive shaft .
Oil leak	<ol style="list-style-type: none"> 1. Fixed end dust cover (broken) 2. Collapsible end dust cover (broken) 	

5.3.6 Removing and installing

5.3.6.1 Replacement of the Front Left Constant Velocity Drive Shaft

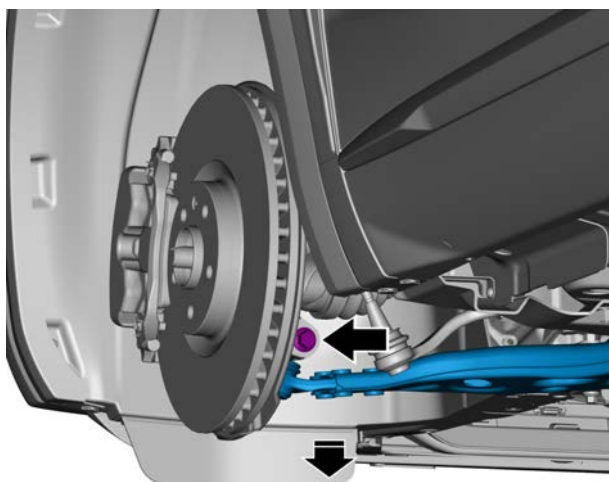
Removal procedure

- 1 Support vehicles, see [Support Vehicles](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the engine fender, see [Engine fender replacement](#).
- 4 Remove the fixing nut connecting front left constant speed drive shaft assembly and front left drive hub assembly.

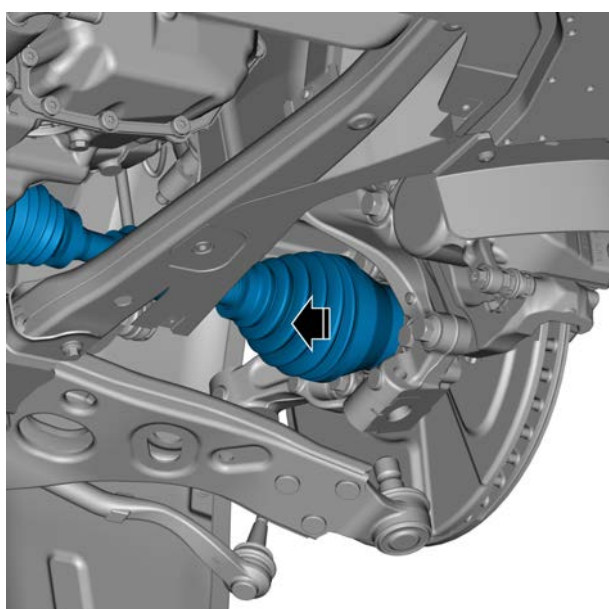


- 5 Remove the fixing nut of the left outer tie rod ball joint of the steering gear, and disconnect the left outer tie rod ball joint of the steering gear from the front steering knuckle LH assembly.

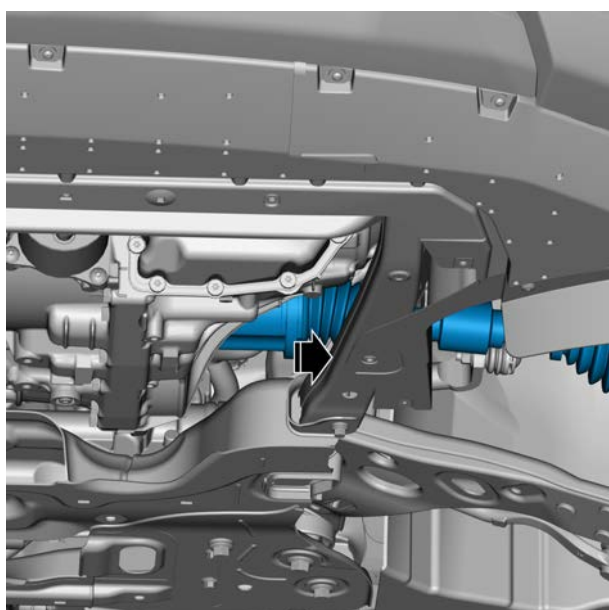
Dedicated tool: 47Z03111



- 6 Remove the retaining bolts of the left lower swing arm assembly of the front suspension and disconnect the left lower swing arm assembly of the front suspension from the front steering knuckle LH assembly.

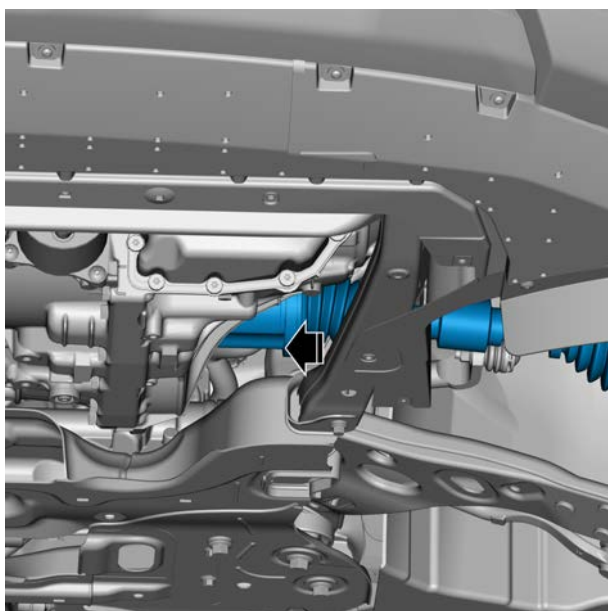


- 7 Disconnect the left constant speed drive shaft from front left drive hub assembly.



- 8 Use a suitable tool to separate the connection between the constant speed drive shaft and the transmission, pull out the constant speed drive shaft and remove it.

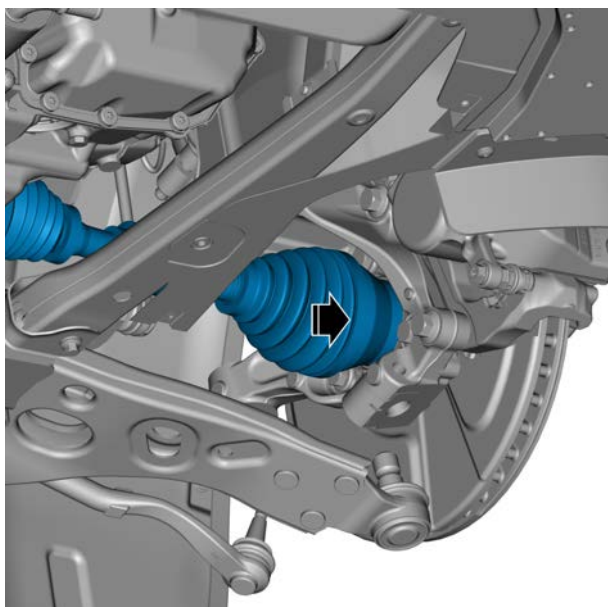
Installation procedure



- 1 Install the front left constant velocity drive shaft into the transmission.

Caution

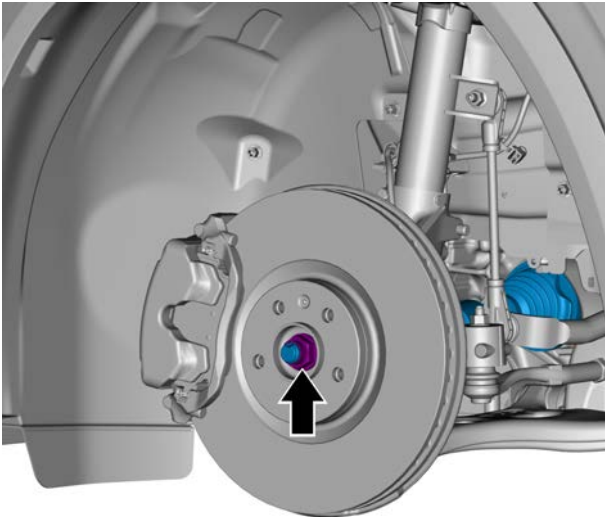
Do not damage the transmission fluid seal.



- 2 Install front left constant speed drive shaft onto front left drive hub assembly.

Caution

When installing, align the spline with the spline groove.

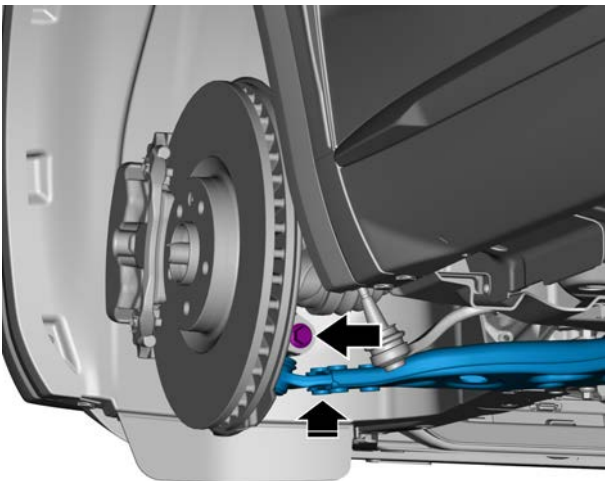


- 3 Tighten the fixing nuts between front left constant speed drive shaft and front left drive hub assembly.

Torque: 270 N. m (metric system) 199.1 lb-ft (Imperial system)

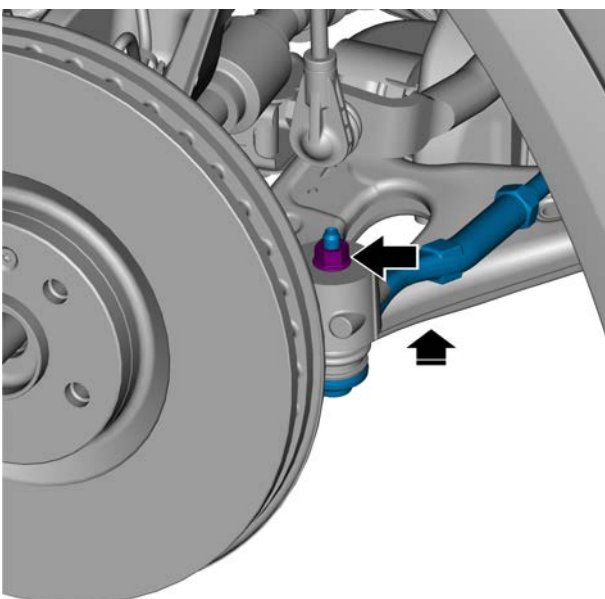
Caution

When installing the rotating nut of front left drive hub assembly of the drive shaft, an assistant is required to step on the brake to prevent front left drive hub assembly from rotating.



- 4 Install the ball joint of the left lower control arm of the front suspension on the front steering knuckle LH assembly, and tighten the retaining bolts.

Torque: 250 N. m (metric system) 184.4 lb-ft (Imperial system)



- 5 Install the tie rod with ball joint on the front steering knuckle LH assembly and tighten the fixing nut.

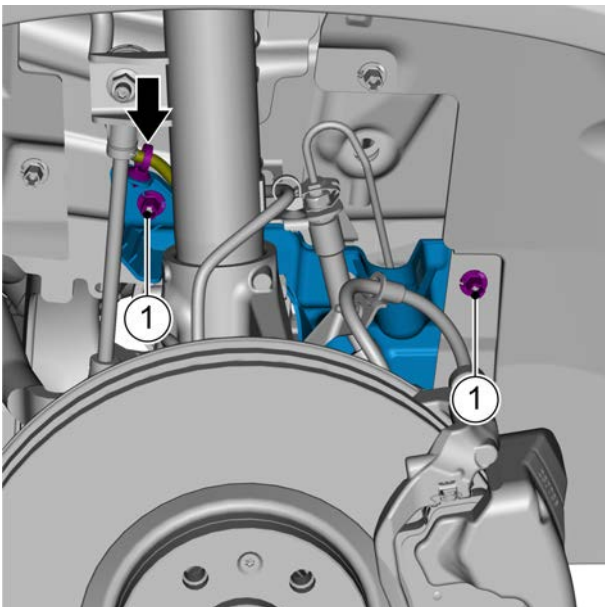
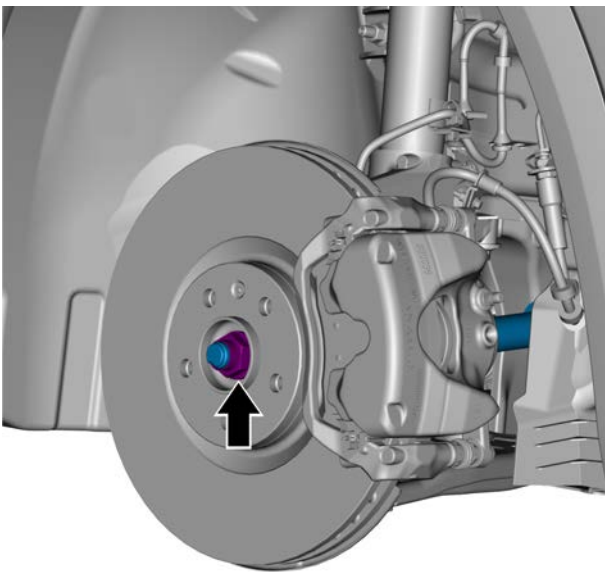
Torque: 120 N. m (metric system) 88.5 lb-ft (Imperial system)

- 6 Install the engine fender.
- 7 Install the wheel.
- 8 Connect the negative battery cable.

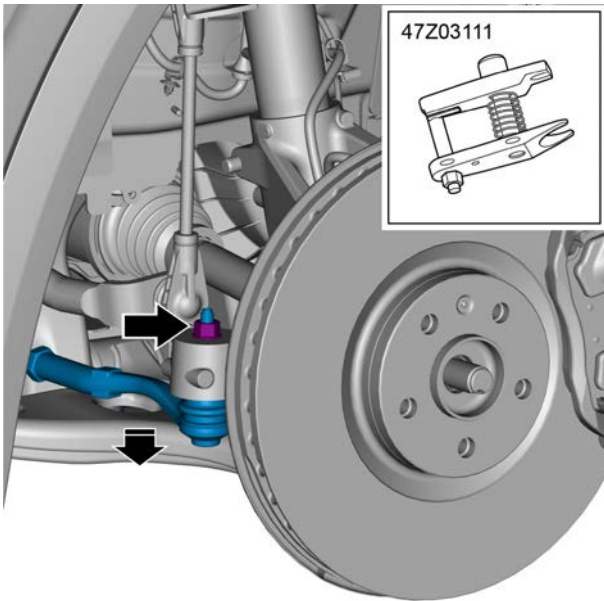
5.3.6.2 Replacement of the Front Right Constant Velocity Drive Shaft

Removal procedure

- 1 Support vehicles, see [Support Vehicles](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the engine fender, see [Engine fender replacement](#).
- 4 Remove the fixing nut connecting the front right constant speed drive shaft assembly and the front right drive hub assembly.

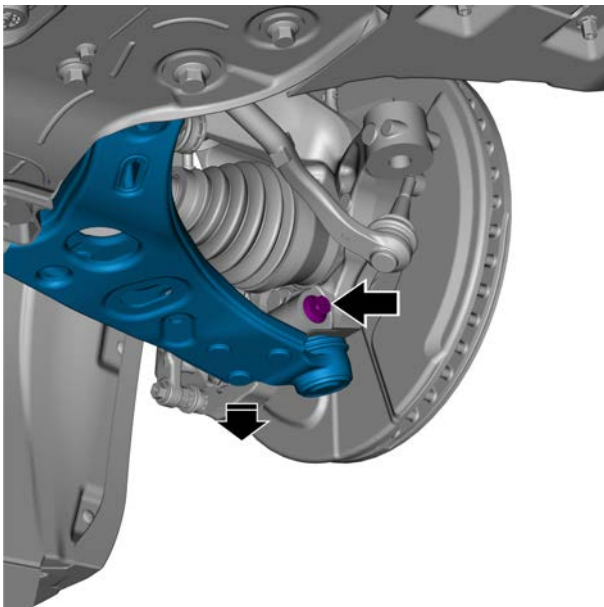


- 5 Disconnect the fixing clip of wheel speed sensor (front right) harness.
- 6 Remove 2 plastic fixing nuts 1 of the splash guard of the right front wheel housing, and remove the splash guard of the right front wheel housing.

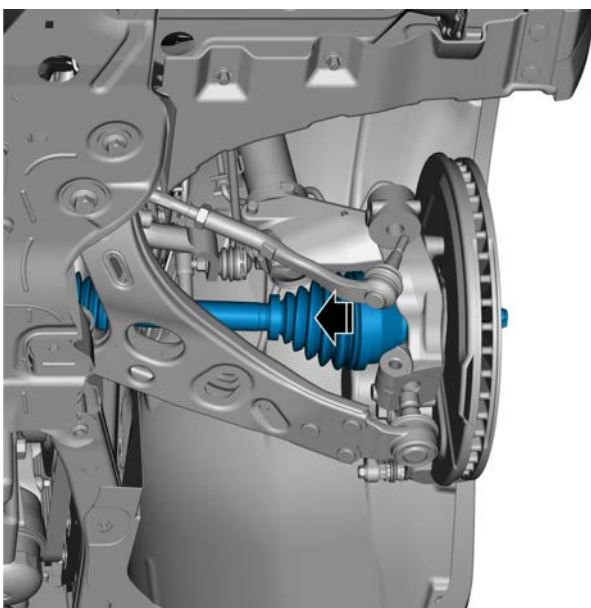


- 7 Remove the fixing nut of the right outer tie rod ball joint of the steering gear, and disconnect the right outer tie rod ball joint of the steering gear from the right front steering knuckle assembly.

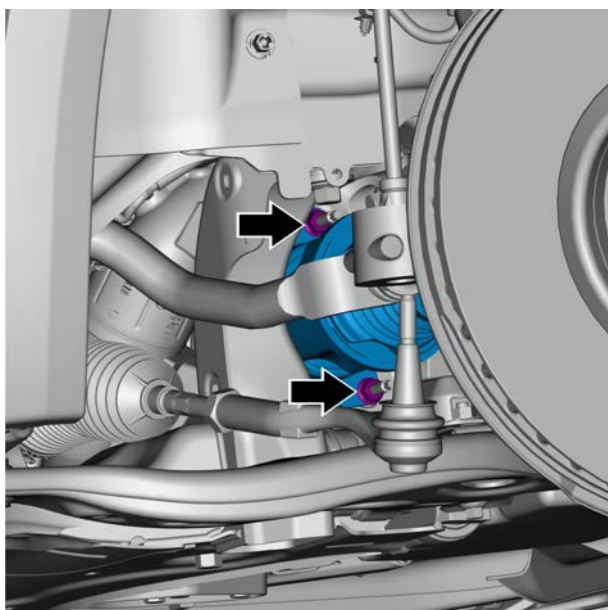
Dedicated tool: 47Z03111



- 8 Remove the retaining bolts of the swing arm assembly lower LH front suspension and disconnect the swing arm assembly lower LH front suspension from the right front steering knuckle assembly.



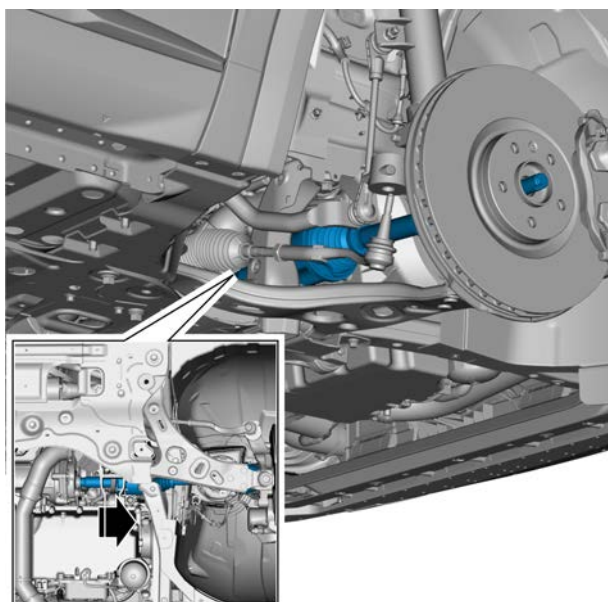
- 9 Disconnect the front right constant speed drive shaft from the front right drive hub assembly.



- 10 Remove 2 fixing nuts connecting the front right constant speed drive shaft assembly and the bracket.

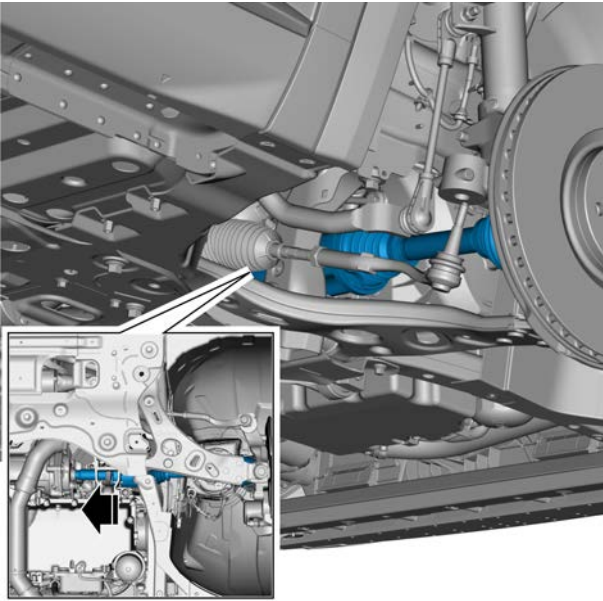
Caution

Another worker is required to remove the right front constant speed drive shaft. Do not pull the right front constant speed drive shaft connection.

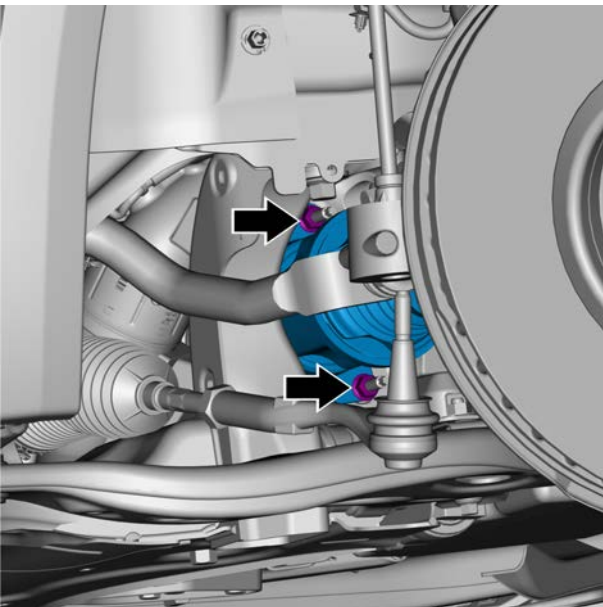


- 11 Use a suitable tool to separate the connection between the front right constant speed drive shaft and the transmission, pull out the front right constant speed drive shaft and remove it.

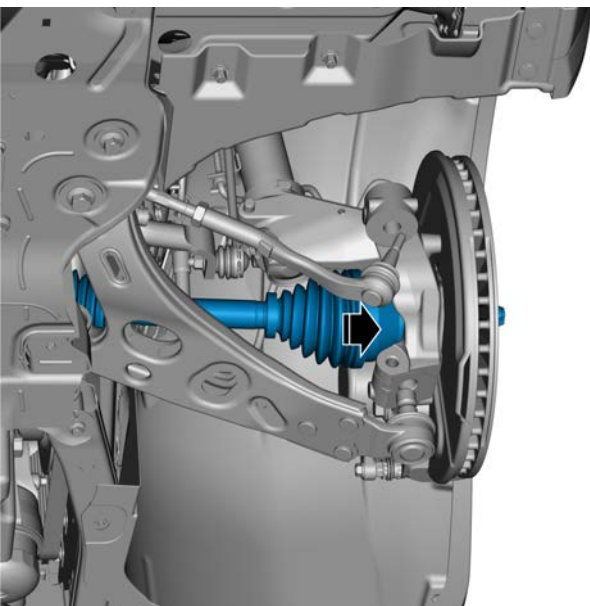
Installation procedure



- 1 Install the front right constant speed drive shaft to the transmission.



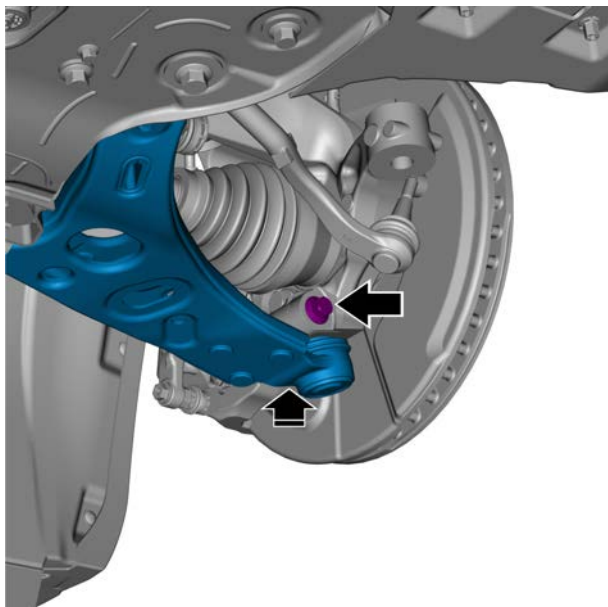
- 2 Install 2 fixing nuts connecting the front constant velocity drive shaft assembly RH and the bracket.
Torque: 30 N. m (metric system) 22.1 lb-ft (Imperial system)



- 3 Install the front right constant speed drive shaft onto the front right drive hub assembly.

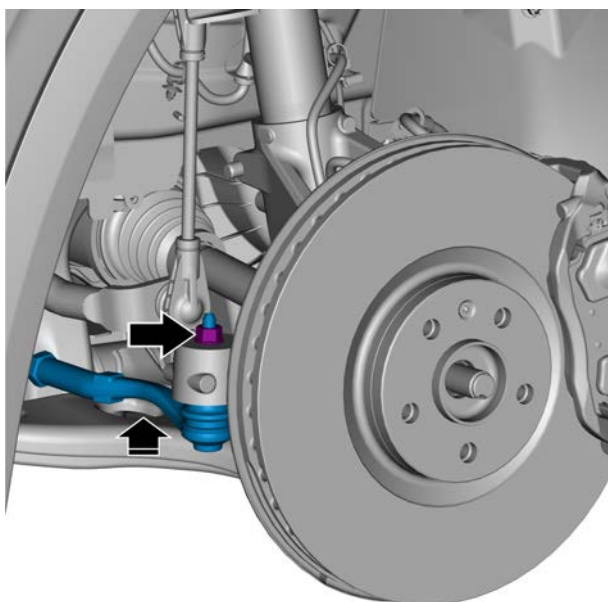
Caution

When installing, align the spline with the spline groove.



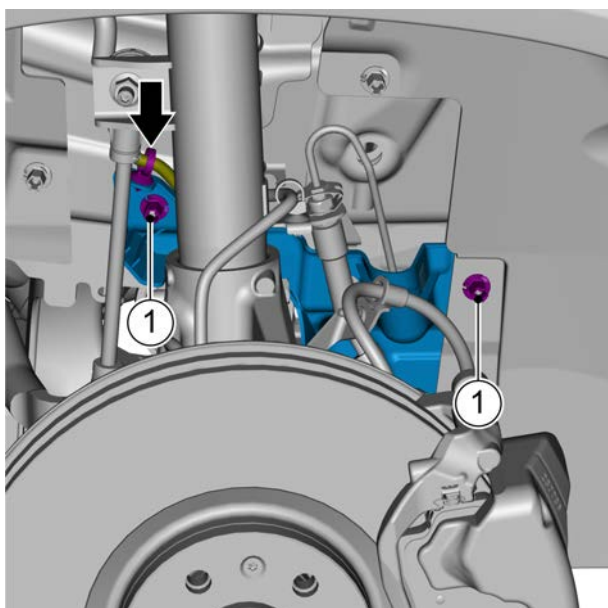
- 4 Install the right lower control arm of the front suspension on the right front steering knuckle assembly, and tighten the retaining bolts.

Torque: 250 N. m (metric system) 184.4 lb-ft (Imperial system)

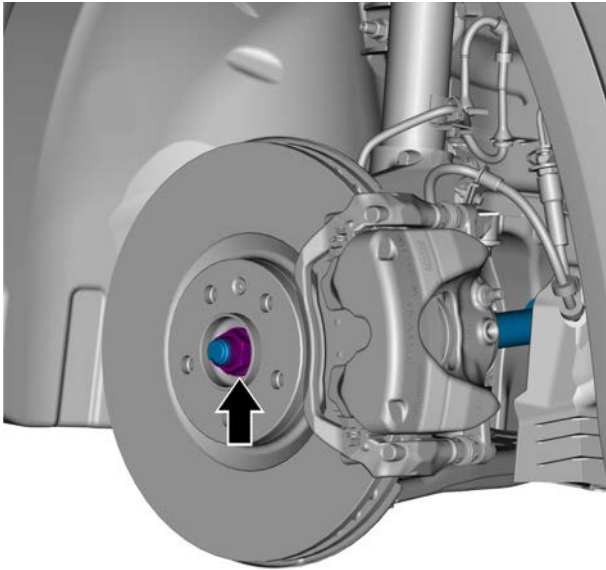


- 5 Install the right outer tie rod ball joint of the steering gear on the right front steering knuckle assembly, and tighten the fixing nut.

Torque: 120 N. m (metric system) 88.5 lb-ft (Imperial system)



- 6 Install the splash guard of the right front wheel housing, and tighten 2 plastic fixing nuts 1.
- 7 Install fixing clip of wheel speed sensor (front right) harness.



- 8 Tighten the fixing nuts between the front right constant speed drive shaft and the front right drive hub assembly.
Torque: 270 N. m (metric system) 199.1 lb-ft (Imperial system)

Caution

When installing the rotating nut of the front right drive hub assembly of the constant speed drive shaft, an assistant is required to step on the brake to prevent the front right drive hub assembly from rotating.

- 9 Install the engine fender.
- 10 Install the wheel.
- 11 Lower the vehicle.

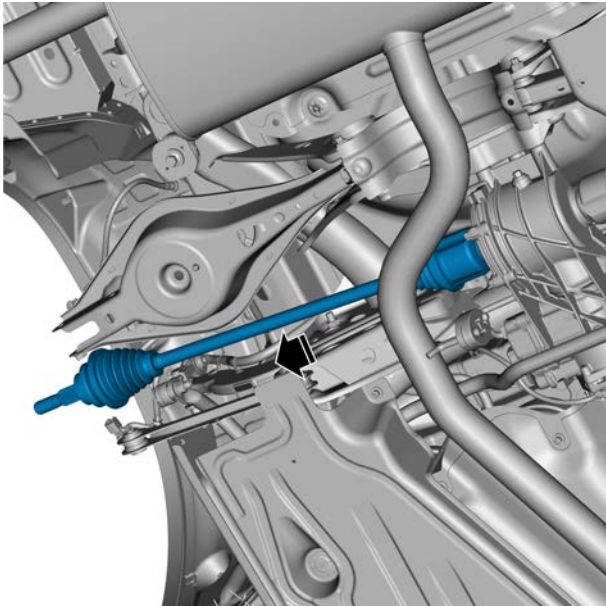
5.3.6.3 Replacement of RL constant velocity drive shaft

Removal procedure

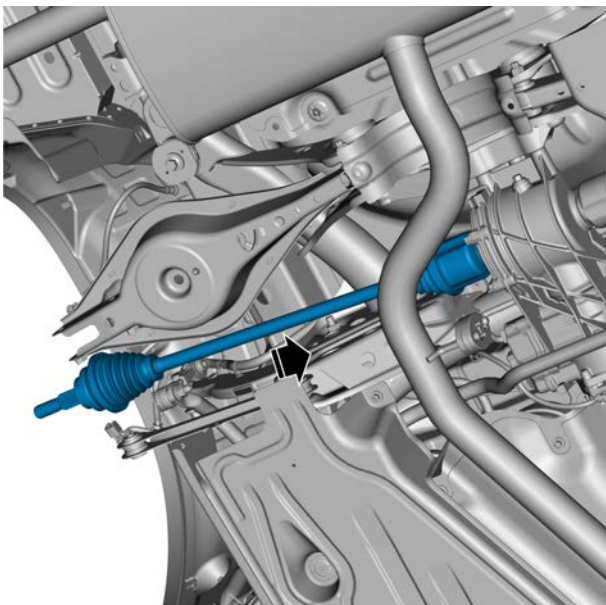
Caution

The removal and assembly methods of front RL constant speed drive shafts are similar.

- 1 Support vehicles, see [Support Vehicles](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).



- 3 Remove the RL steering knuckle assembly. See [replacement of RL steering knuckle assembly](#).
- 4 Use a suitable tool to separate the connection between the drive shaft and the rear final drive with differential assembly, and remove the RL constant speed drive shaft.



Installation procedure

- 1 Install the rear left constant velocity drive shaft.

- 2 Install the rear left steering knuckle assembly.
- 3 Install the wheel.
- 4 Lower the vehicle.
- 5 Check the four-wheel alignment data of the vehicle.

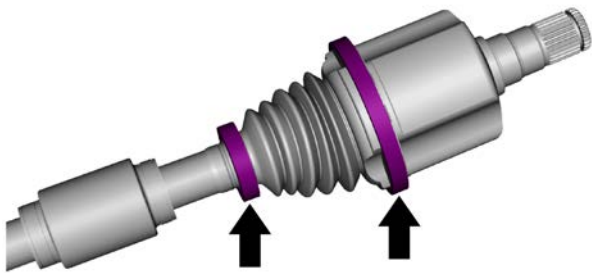
5.3.6.4 Replacement of Constant Velocity Drive Shaft Components

Removal procedure

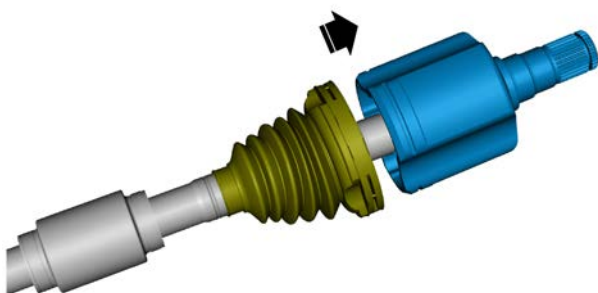
Caution

The removal and assembly methods of front RL constant speed drive shafts are similar.

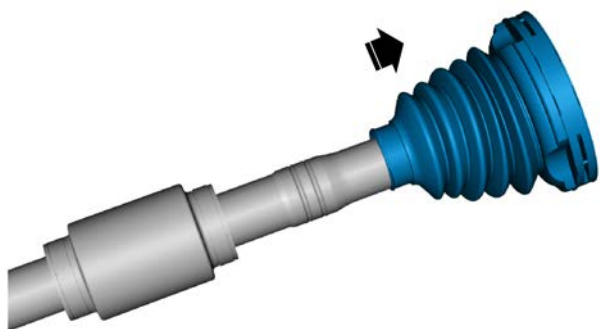
- 1 Support vehicles, see [Support Vehicles](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the constant speed drive shaft. See [replacement of front left constant speed drive shaft](#).
- 4 Tighten and fix the drive shaft with Bench Vise to facilitate removal.
- 5 Loosen the dust cover clamp of the three ball pin CV joint with a screwdriver.
- 6 Separate the dust cover from the three ball pin CV joint.



- 7 Rub off the old grease.
- 8 Take out the three ball pin constant velocity universal joint.



- 9 Remove the snap ring on the drive shaft and remove the three ball joint.
- 10 Remove the dust cover on the drive shaft.



Inspection procedure

- 1 Check whether the dust cover is damaged.
- 2 Check and confirm that there is no excessive clearance in the radial direction of the three ball pin constant velocity universal joint.
- 3 Check and confirm that the three ball pin constant velocity universal joint slides smoothly in the thrust direction.

Installation procedure

Caution

When assembling the three ball pin type constant velocity universal joint, an appropriate amount of long-term lubricating grease meeting the requirements shall be filled and assembled according to the marks.

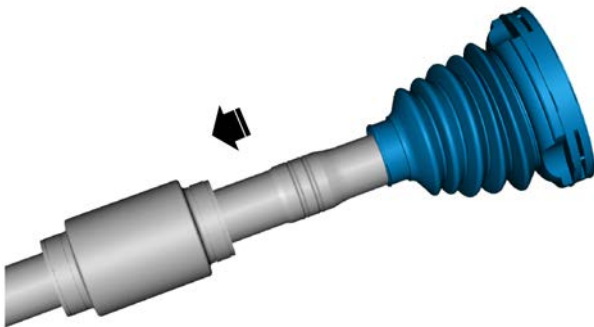
Keep both ends of the spline shaft clean, the dust cover should be intact and the clamp should be installed properly.

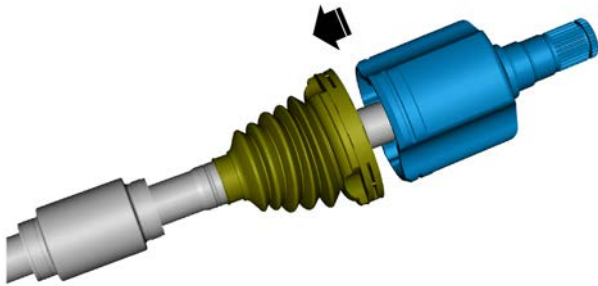
Three-ball pin constant velocity universal joint and the differential should be assembled in place with the ring-opening side facing downward. If necessary, it can be knocked with a rubber hammer.

The amount of lithium base grease (No. 2) injected into the movable three ball pin constant velocity universal joint is 130-140g.

Check the ABS sensor signal, and check and adjust the front wheel alignment if necessary.

- 1 Install the three ball joint and install the snap ring.
- 2 Install the dust boot.





- 3 Install the three ball pin CV joint onto the propeller shaft.
- 4 Fill the three ball pin constant velocity joint with grease.

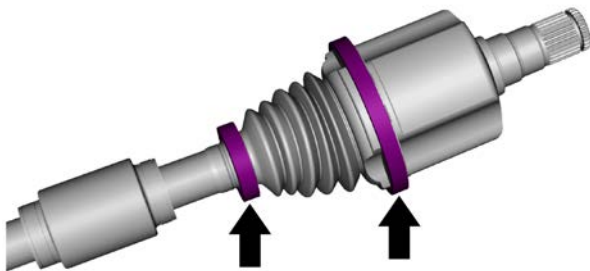
Caution

(1) When assembling the three-ball pin constant velocity universal joint and the fixed rzepa constant velocity universal joint, a suitable amount of qualified long-acting grease should be refilled. The marks should be followed.

(2) Three-ball pin constant velocity universal joint and the differential should be assembled in place with the ring-opening side facing downward. If necessary, it can be knocked with a rubber hammer.

(3) The amount of lithium base grease (No. 2) injected into the movable three ball pin constant velocity universal joint is 130-140g.

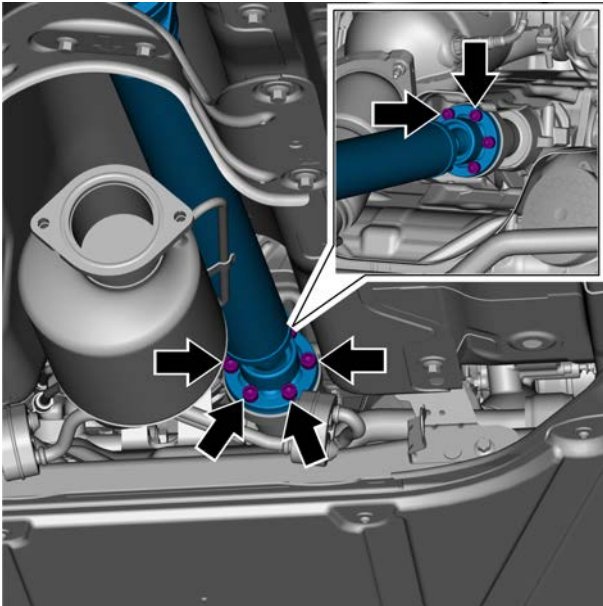
- 5 Move the dust cover to the installation position.
- 6 Clamp the dust cover clamp of three ball pin constant velocity universal joint with clamp pliers.



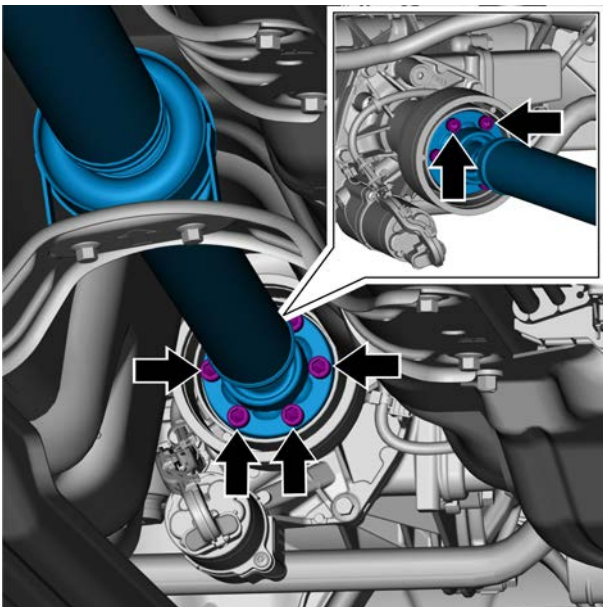
5.3.6.5 Replacement of drive shaft

Removal procedure

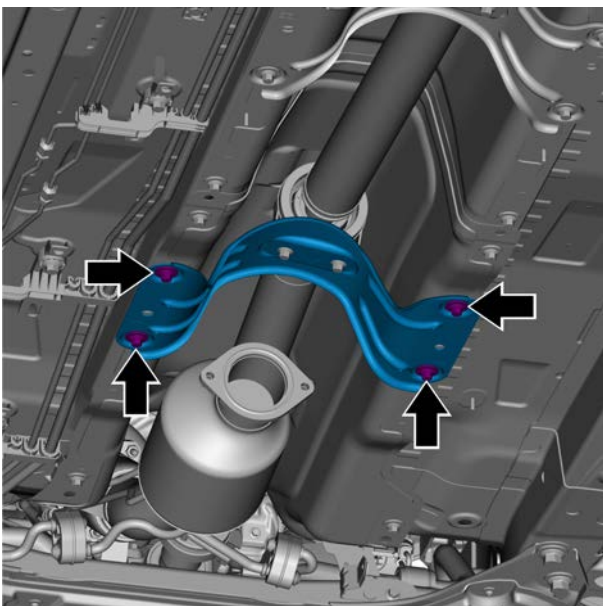
- 1 Support vehicles, see [Support Vehicles](#)
- 2 Remove the exhaust cold end, see [exhaust cold end replacement](#).



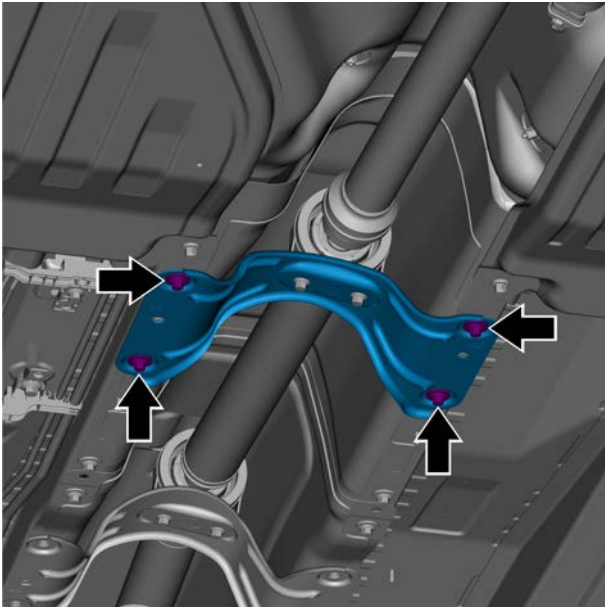
- 3 Remove the 6 retaining bolts connecting the drive shaft and the power take-off.



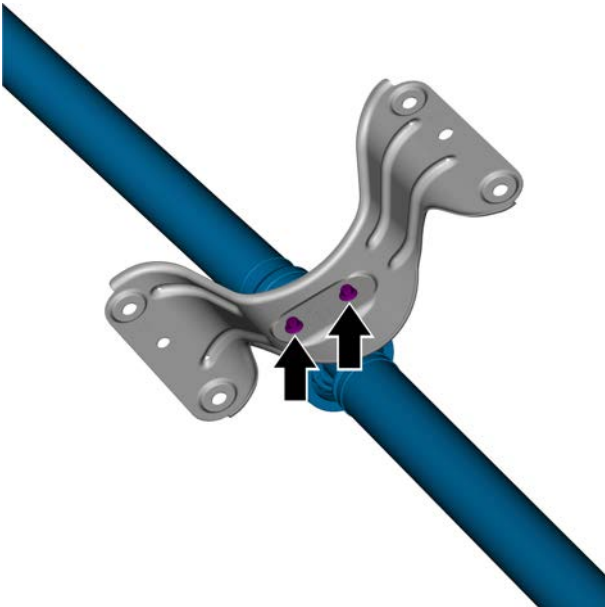
- 4 Remove 6 retaining bolts connecting the drive shaft and the rear differential.



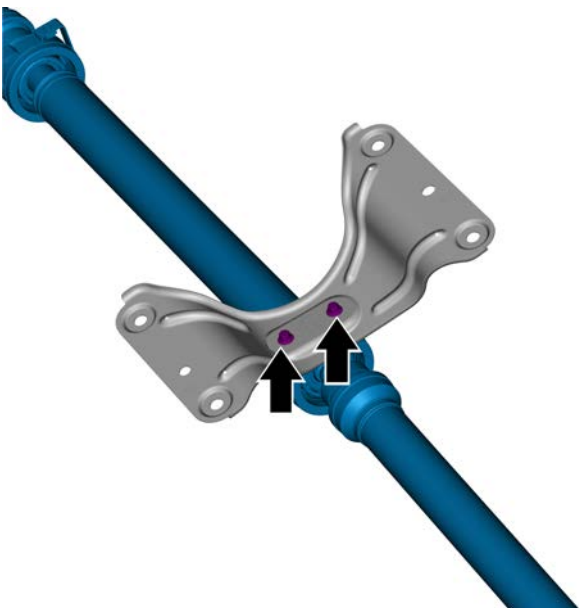
- 5 Remove the 4 retaining bolts connecting the drive shaft intermediate support to the vehicle body.



- 6 Remove the 4 retaining bolts connecting the middle support of the drive shaft and the vehicle body, and take out the drive shaft.



- 7 Remove 2 retaining bolts connecting the middle support of the drive shaft and the drive shaft.

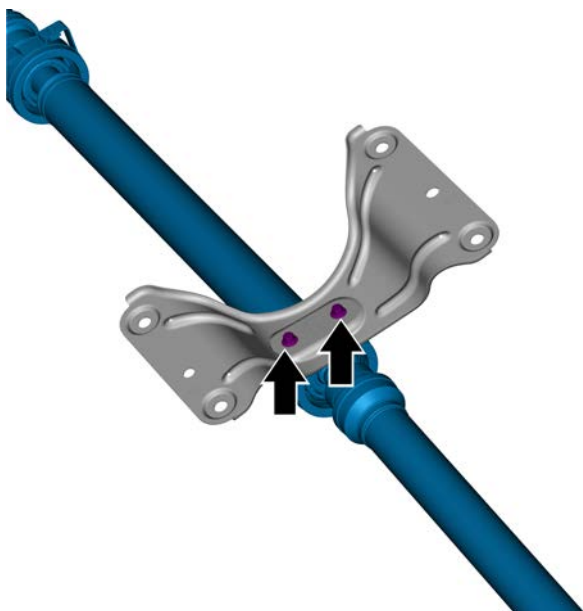


- 8 Remove the 2 retaining bolts connecting the middle support of the drive shaft and the drive shaft, and remove the drive shaft.

Installation procedure

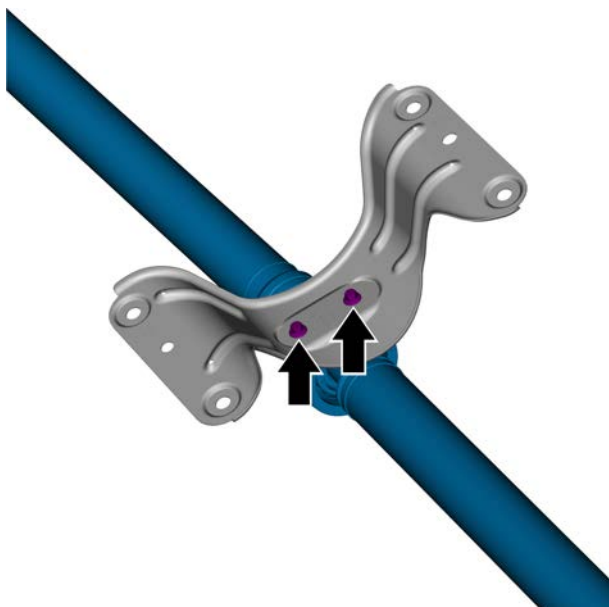
- 1 Install the middle support of the drive shaft and tighten the 2 retaining bolts connected with the drive shaft.

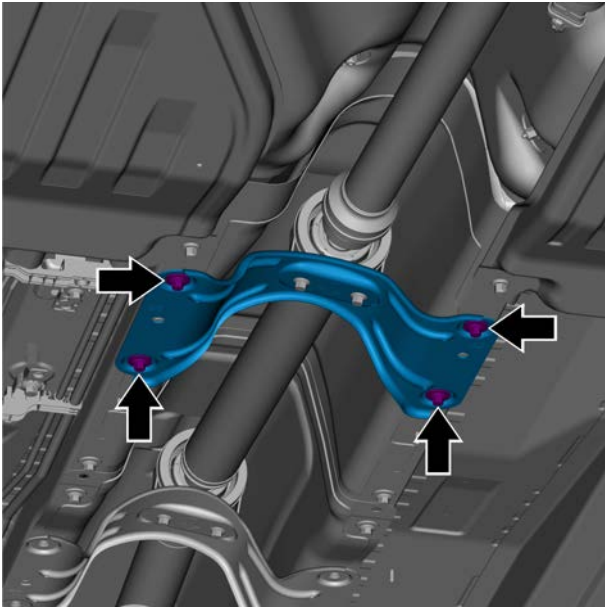
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



- 2 Install the middle support of the drive shaft and tighten the 2 retaining bolts connected with the drive shaft.

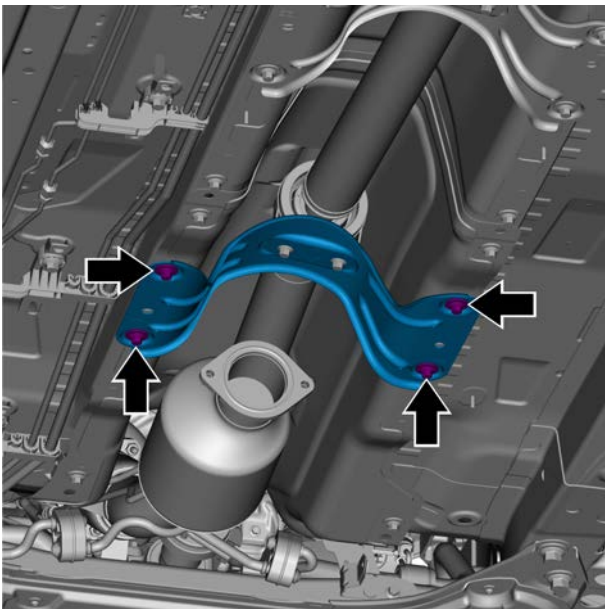
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)





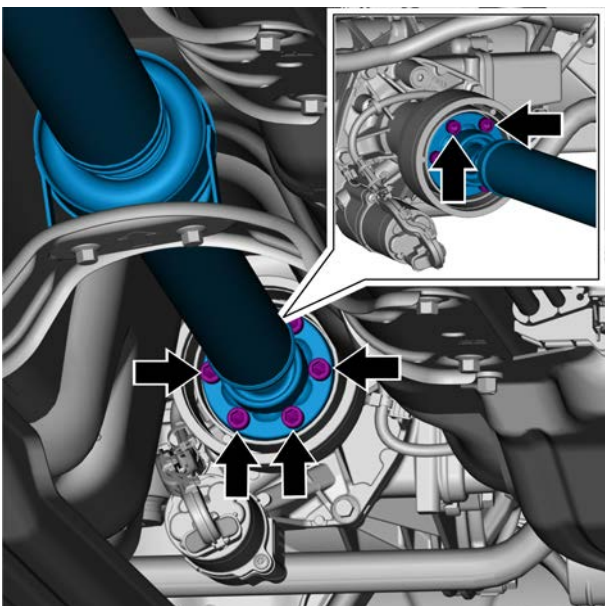
- 3 Place the drive shaft at the installation position, and tighten the 4 retaining bolts connecting the drive shaft middle support and the vehicle body.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



- 4 Tighten the 4 retaining bolts connecting the middle bracket of the drive shaft to the vehicle body.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



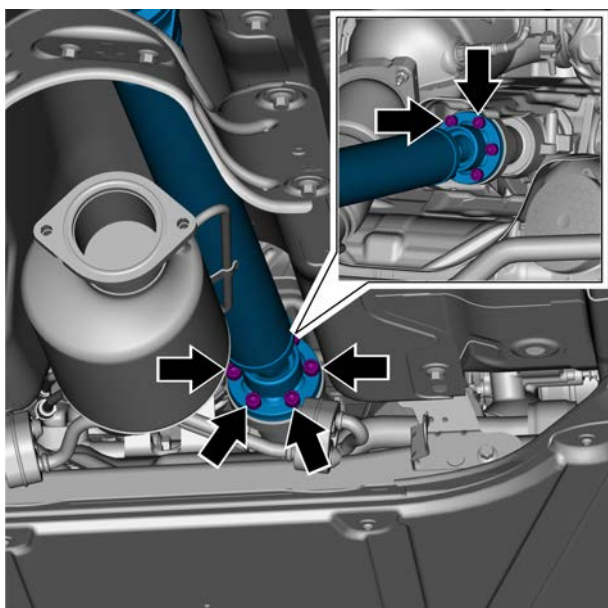
- 5 Tighten 6 retaining bolts connecting the drive shaft and the rear differential.

Torque: 30 N. m (metric system) 22.1 lb-ft (Imperial system)

Caution

When installing the drive shaft, the white spot at the Rear-end shall fall within the two white lines on the rear main reducer flange.

6Two retaining bolts shall be tightened diagonally.



- 6 Tighten the 6 retaining bolts connecting the drive shaft and the power take-off.

Torque: 30 N. m (metric system) 22.1 lb-ft (Imperial system)

Caution

Two retaining bolts shall be tightened diagonally.

- 7 Install the exhaust cold end.
- 8 Lower the vehicle.

Brake System

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6.1 Warnings and precautions

6.1.1 Warnings and precautions

6.1.1.1 Warnings and precautions

Warning regarding the treatment of components of VDDM system

Warning !

Some components of the VDDM cannot be repaired in isolation. Attempts to remove or disconnect some system components can result in personal injury or abnormal operation of system. Only those components that are permitted to be removed and installed can be repaired.

Warning about brake dust

Warning !

When wheel brake components are repaired, please avoid the following operations:

- a. Do not clean wheel brake components with a dry brush or compressed air.

Some models or brake components of after-sales installation may contain fibers that can be mixed with the dust. Inhaling fiber-containing dust can seriously damage the body. Please clean any dust on the brake components with the wet cloth.

Warning about brake fluid

Warning !

The composition of brake fluid is polyethylene glycol, which is prone to absorbing humidity and moisture. Please do not use the brake fluid in the open containers that may be contaminated with water and use improper or contaminated brake fluid, which may cause system fault, loss of control and personal injury.

Warning about the irritation of brake fluid

Warning !

Brake fluid is irritating to skin and eyes. Once contacted, the following measures should be taken:

- a. Eye contact - flush thoroughly with water.
- b. Skin contact-wash with soap and water.

Warning about brake pipe replacement

Caution

When replacing the brake pipe, please install and fix it carefully, and be sure to use the correct fasteners, otherwise it may cause damage to the brake pipe and brake system and thus cause personal injury.

Notice of filling the braking system with brake fluid

Caution

When the brake fluid is added to the brake master cylinder tank, only the brake fluid from the clean, sealed brake fluid container can be used in line with DOT4. The use of the non-recommended brake fluid can lead to contamination and damage to rubber seals or rubber pads within hydraulic brake system components.

Notes to Brake Calipers

Caution

When the brake caliper is removed, a steel wire should be used to hang the brake caliper to avoid damage to the brake pipe.

6.2 Front brake

6.2.1 Specification

6.2.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Brake disc to hub bearing retaining screw	M6×16	8.5~11.5	6.3~8.5
Brake disc to drive hub assembly retaining screw	M6×16	8.5~11.5	6.3~8.5
Bolt securing front steering knuckle LH protection assembly to front left brake cover	M6×12	8.5~11.5	6.3~8.5
RL fender to RL steering knuckle assembly retaining bolt	M6×12	8.5~11.5	6.3~8.5
Bolt fixing front steering knuckle LH assembly to front left brake caliper assembly	M14×50	170~230	125.4~169.6

6.2.1.2 Front disc brake parts specification

4WD: 18 inch disc brake parts specification

Application	Part specification	
	Metric (mm)	Imperial system (in)
Thickness for scrapping of front brake disc	27	1.063
Front Brake Disc Thickness-New	30	1.18
Front brake pad standard thickness	12	0.47
Front brake pad minimum thickness	2	0.07874
Allowable end face runout of front brake disc	Core: if the lateral runout is ≥ 0.15 mm, replace the brake disc (both sides); If the circumferential thickness difference is ≥ 0.02 mm, replace the brake disc (both sides); New parts: lateral runout < 0.06mm	Core: if the lateral runout is ≥ 0.0059 in, replace the brake disc (both sides); if the circumferential thickness difference is ≥ 0.000787 in, replace the brake disc (both sides); New part: lateral runout < 0.00236 in

6.2.2 Description and operation

6.2.2.1 Instructions and Operations

Front disc brake system composition:

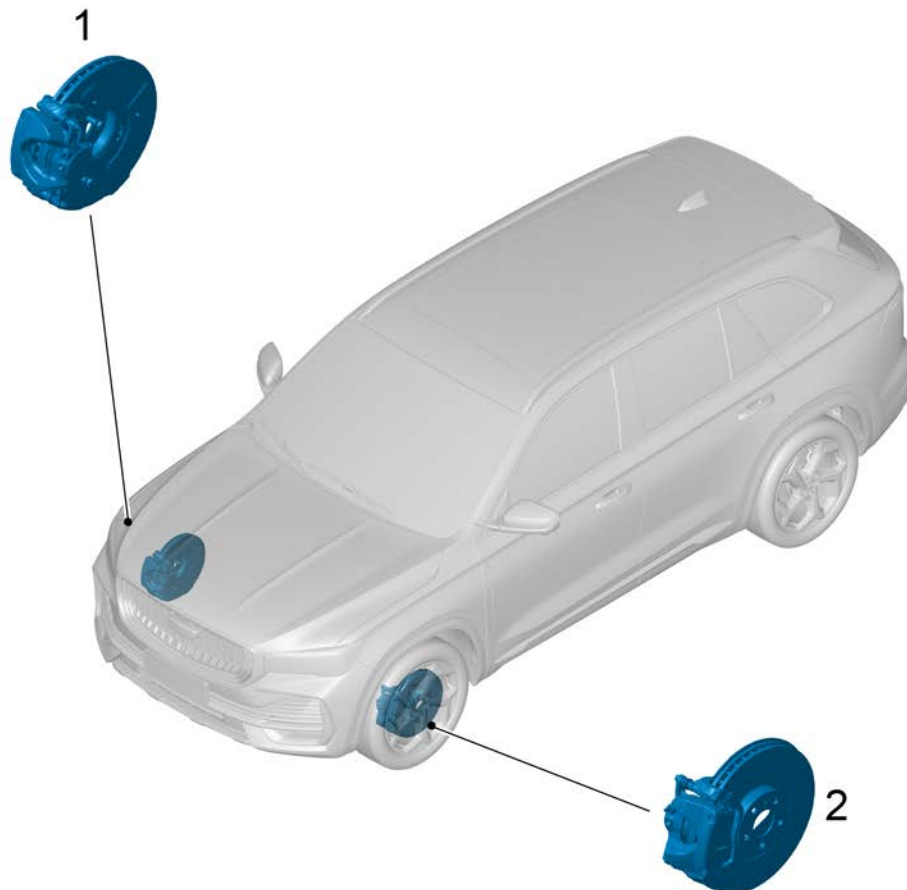
- Front brake friction plate components with spring plate: apply the mechanical output force from the hydraulic pressing Tong on the friction surface of the brake disc.
- Guide plate of front brake friction plate components with spring plate: it is located between disc brake pad and brake pad mounting bracket to keep the brake pad moving smoothly and eliminate noise.
- Brake disc: use the mechanical output force of the front brake belt spring plate friction plate components acting on the friction surface of the brake disc to slow down the speed of the tire and wheel assembly and brake the vehicle.
- Brake caliper: receive the liquid pressure from the brake master cylinder, convert the liquid pressure into mechanical output force and act on the inner brake pad; the brake caliper piston returns automatically when the master cylinder returns.
- Brake caliper and front brake friction plate components bracket with spring plate: it is used to fix the front brake friction plate assembly with spring plate and brake caliper in place, and maintain the correct matching position with the hydraulic brake caliper. When the mechanical output force acts on the inner brake pad, the brake pad will slide.
- Floating brake caliper: Used for installing the hydraulic brake caliper and fix the brake caliper in place and maintain the correct matching position with the brake caliper bracket. When there is the mechanical output force acted, the brake caliper, and the brake pad slide relatively.

Operation of the front disc brake system:

The mechanical output force from the piston of the hydraulic brake caliper acts on the inner brake pad. When the piston pushes the inner brake pad outward, the brake caliper housing simultaneously pulls the outer front brake with spring disc friction plate components inward, to evenly distribute the output force. The front brake with spring disc friction plate components acts the output force on the friction surfaces on both sides of the brake disc, to slow down the speed of tire and wheel assembly. Whether the functions of front brake belt spring plate, friction plate assembly guide plate and brake caliper floating pin are normal is very important for evenly distributing power.

6.2.3 Component position

6.2.3.1 Component position

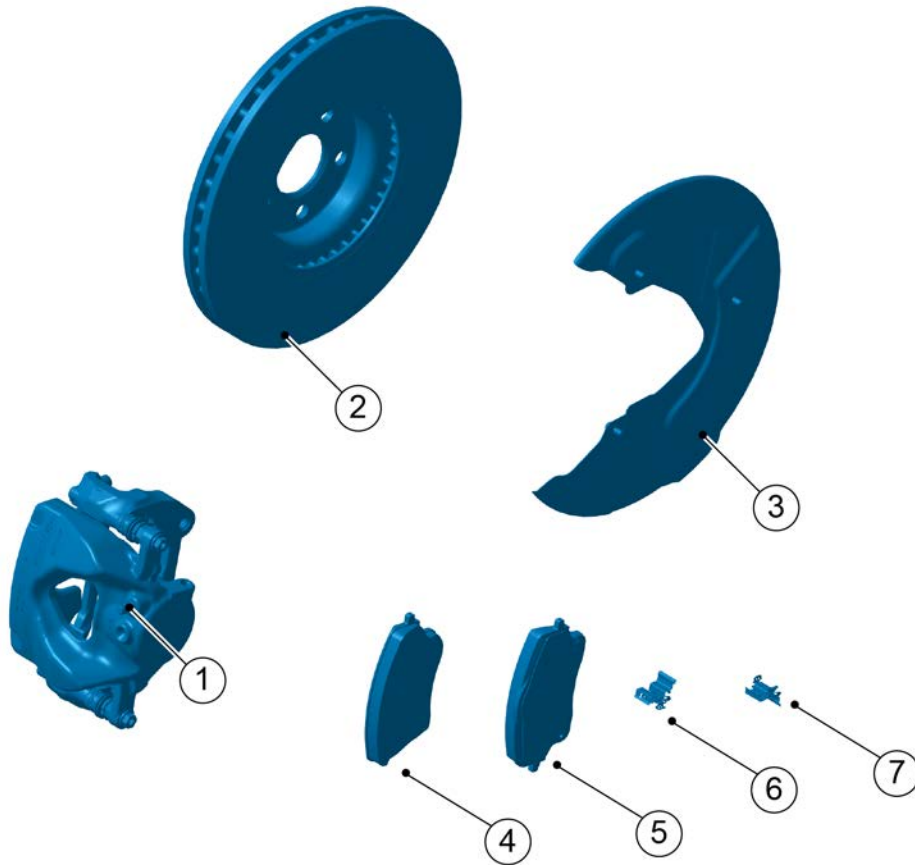


1. Right front brake assembly

2. Left front brake assembly

6.2.4 Exploded view

6.2.4.1 Exploded view



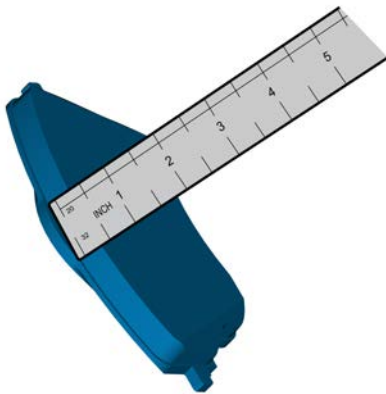
1. Front brake caliper assembly
2. Front brake disc
3. Front wheel brake protective cover
4. Front brake outer brake pad

5. Front brake inner brake pad
6. Return spring
7. Return spring

6.2.5 Diagnostic information and procedures

6.2.5.1 Brake pad inspection

1. Regularly check the brake pad and measure the friction material. Replace the brake pad if it exceeds the specification.
2. If replacement is needed, the complete set of disc brake pads must be replaced.
3. Check whether the friction surface of disc brake pads is subject to crack, break or damage.



Front brake pad

Standard thickness: 12mm

Minimum thickness: 2mm

rear brake pad

Standard thickness: 11mm

Minimum thickness: 2mm

6.2.5.2 Inspection of brake caliper

1. Check whether the brake caliper shell is cracked, severely worn, and damaged. If the above conditions occur, the brake caliper needs to be replaced.
2. Check whether the seal ring of the brake caliper piston dust cover is cracked, broken, chipped, aging, and not properly installed in the brake caliper body. If any of the above conditions occur, replace the brake caliper.
3. Check whether there is brake fluid leakage around the seal ring of the brake caliper piston dust cover and on the disc brake pads. If there are signs of brake fluid leakage, replace the brake caliper.
4. Check whether the brake caliper piston can enter the brake caliper cylinder smoothly and the stroke is complete. The movement of the brake caliper piston in the brake caliper cylinder should be smooth and uniform. If the brake caliper piston is catching or it is difficult to reach the bottom, the brake caliper needs to be replaced.

6.2.5.3 Inspection of brake pad guide

- Check the brake pad guide for missing, serious corrosion and bending of installing projecting tongue.
- In case any above conditions is discovered, the brake pad guide needs replacement. Guarantee that the brake pads move smoothly on the disc brake pad guide without any obstruction.

6.2.5.4 Inspection of floating pin of brake caliper

Check whether the following conditions are in the floating brake caliper:

- Catching
- Stuck
- Jacket cracking or damage
- Jacket missing

If any above conditions happen, the caliper and dust cover sealing ring need to be replaced.

6.2.5.5 Brake disc surface and wear inspection

Use industrial alcohol or allowed equivalent brake cleaner to clean the friction surface of the brake disc.

Check whether the friction surface of brake disc suffers from the following conditions:

- Serious corrosion and/or pitting
- Slight surface corrosion
- Cracks and/or burn spots
- Serious blue discoloration
- Deep scratch on friction surface of brake disc

If one or more of the above conditions occur on the friction surface of the brake disc, the brake disc needs to be refinished or replaced.

If the brake disc rusts due to long-term parking of the vehicle and causes the problem of brake jitter, it can be solved by processing the disc on the brake disc surface to make the thickness difference of the brake disc within 0.008mm.

Caution

After surface finishing or replacement of brake disc, the brake pads also require replacement.

6.2.5.6 Brake disc thickness measurement

1. Clean the friction surface of brake disc with industrial alcohol or similar brake cleaner.
2. Use a micrometer to measure and record the minimum thickness of 4 or more position points evenly distributed along the circumference of the brake disc. Make sure that the measurement is only conducted in the contact area of the brake pad lining surface, and the distance between the micrometer and the outer edge of the brake disc must be equal each time.
3. If the brake disc thickness exceeds the specification, surface finishing or replacement should be made for the brake disc.

Caution

After surface finishing or replacement of brake disc, the brake pads also require replacement.

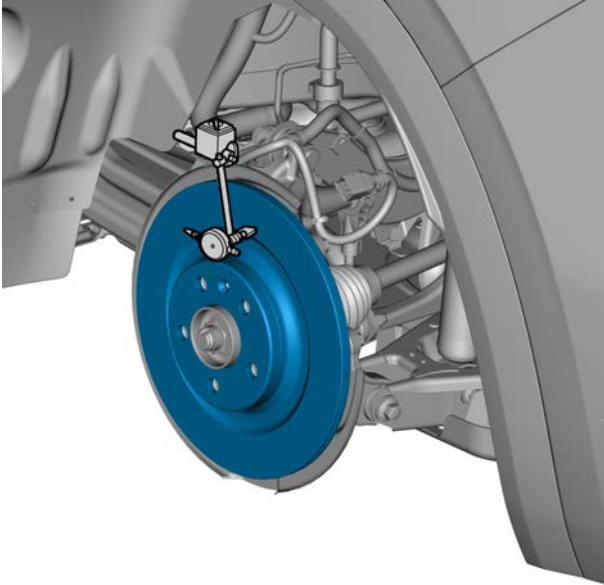
6.2.5.7 Measurement of end face run-out value upon the assembly of brake disc

Caution

When removing the brake disc from the wheel hub, remove the rust or dirt on the mating surface of the wheel hub and the brake disc, otherwise it may lead to excessive lateral runout of the brake disc after assembly, resulting in brake runout.

1. Remove the brake disc from the vehicle. See [brake disc replacement](#).
2. Clean the friction surface of brake disc with industrial alcohol or similar brake cleaner.
3. Install the brake disc to the hub.
4. Install the nut by hand and tighten the nut with a wrench.

5. Install the dial gauge base to the steering knuckle and place the dial gauge measuring head so that it contacts the friction surface of the brake disc at 90 ° and is 13 mm (metric) 0.5 in (British) from the outer edge of the brake disc.
6. Turn the brake disc until the dial gauge reading reaches the minimum, and then set the dial gauge to zero.



7. Turn the brake disc until the dial gauge reads the maximum.
8. Mark and record the LRO.
9. Compare the lateral runout of the brake disc after assembly with the standard value.
Standard value of new parts: less than 0.06 mm (metric) and 0.0024 in (British)
Core standard value: less than 0.15 mm (metric system) 0.0059 in (Imperial System)
10. If the end face runout of the brake disc exceeds the specification after assembly, check the runout of the hub. If the hub runout is normal and the thickness of the brake disc is within the specified range, the surface of the brake disc shall be trimmed to ensure the correct flatness.

6.2.6 Removing and installing

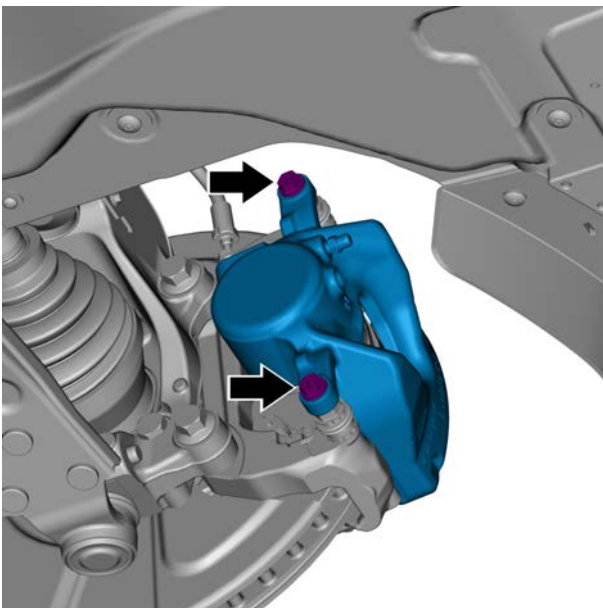
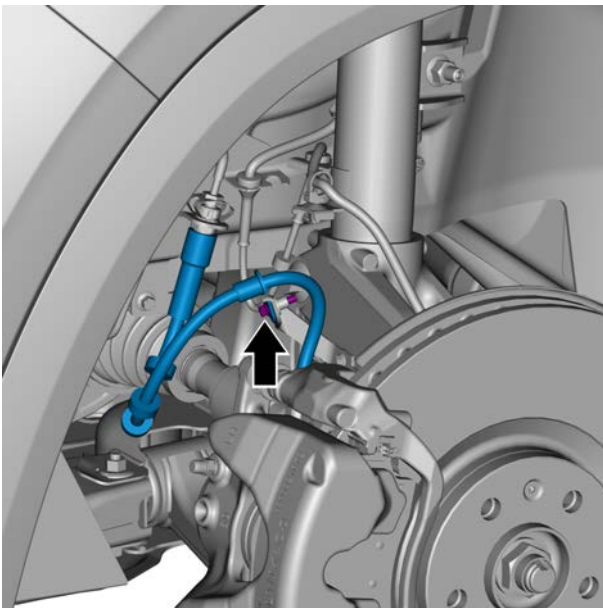
6.2.6.1 Replacement of front left brake friction plate components

Removal procedure

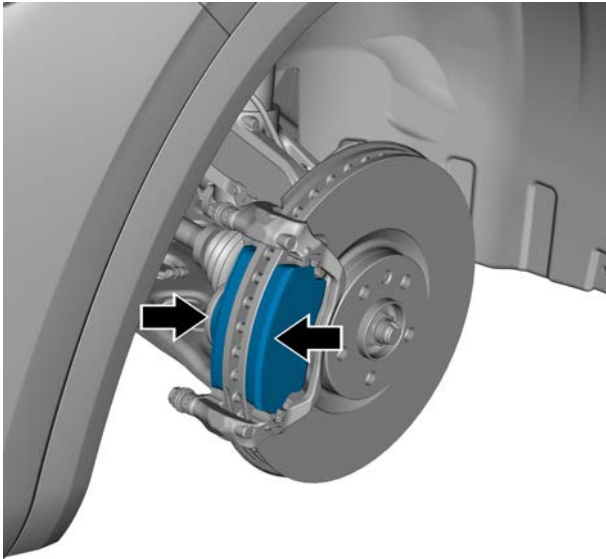
Caution

The removal and assembly methods of front left front brake friction plate components are similar.

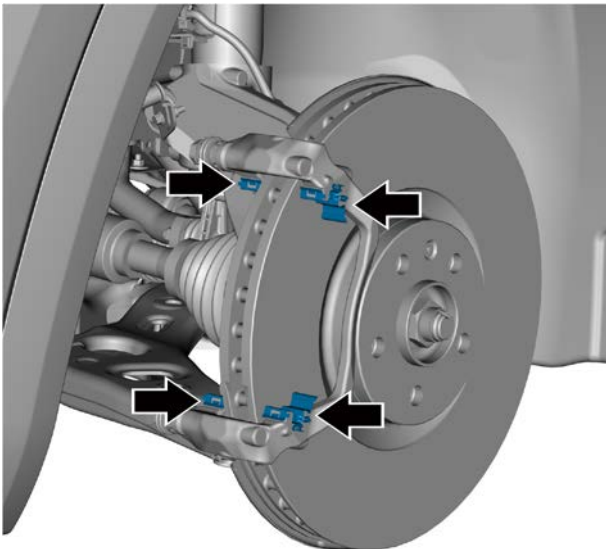
- 1 Support vehicles, see [Support Vehicles](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the intermediate connection point of the front brake hose. Failure to remove this point will cause deformation of the caliper joint of the brake hose.



- 4 Remove the 2 retaining bolts fixing the brake caliper, remove front left brake caliper body, and safely hang it in a suitable position while avoiding pulling the brake hose.

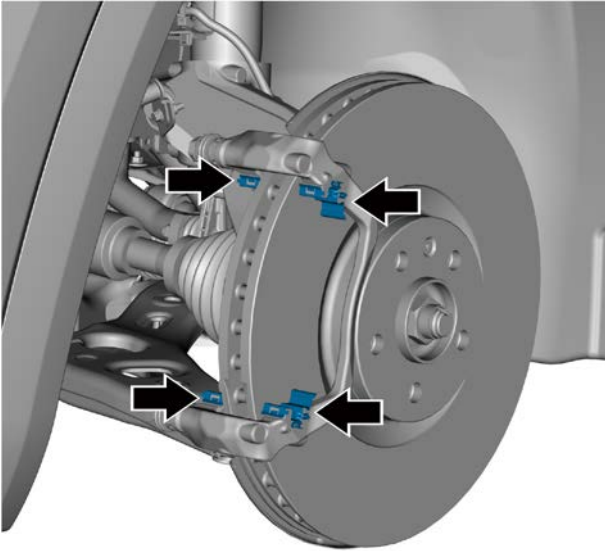


- 5 Take front left brake friction plate components out of the front brake caliper bracket.



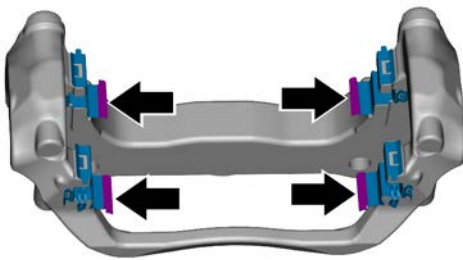
- 6 Remove the return spring.

Installation procedure



- 1 Install the return spring.

- 2 Before installing front left brake friction plate components, grease the spring plate support back plate.



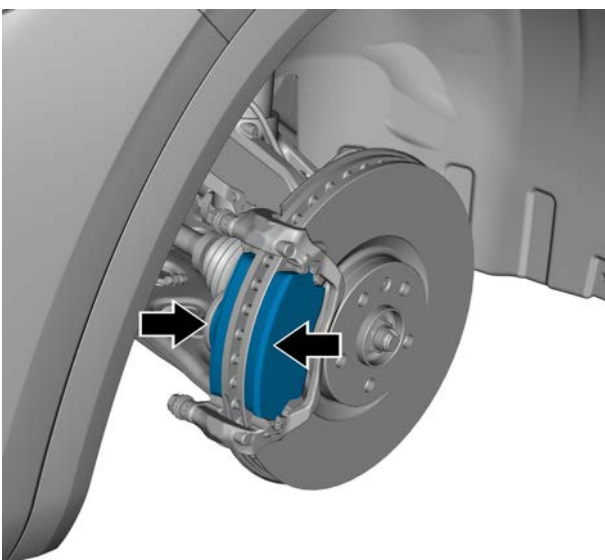
- 3 Install front left brake friction plate components onto the brake caliper bracket.

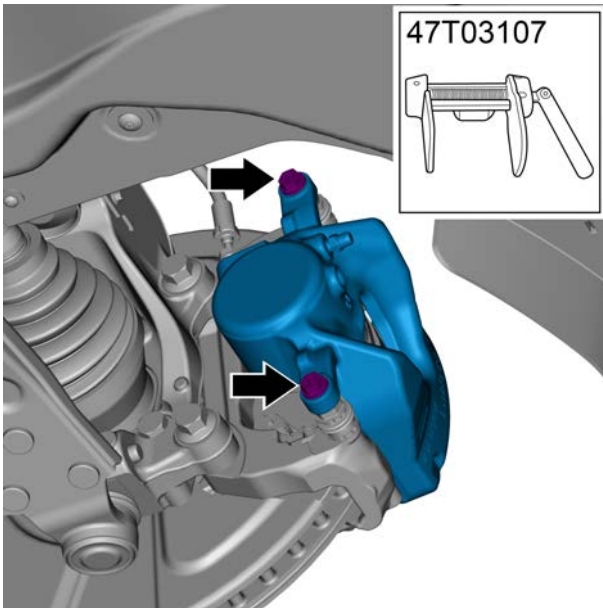
Caution

When installing front left brake friction plate components, the metal pad with wear prompt shall be installed on the inside.

If the friction plate and silencing plate have glue, tear off the plastic protective film.

Avoid plastic deformation of spring plate and interference between spring plate and brake disc during installation





- 4 Use the piston resetting tool to reset the brake caliper piston.

Dedicated tool: 47T03107

Caution

When pulling the brake caliper downward and installing the lower fixing bolts, be careful not to damage the piston dust-proofing seal.

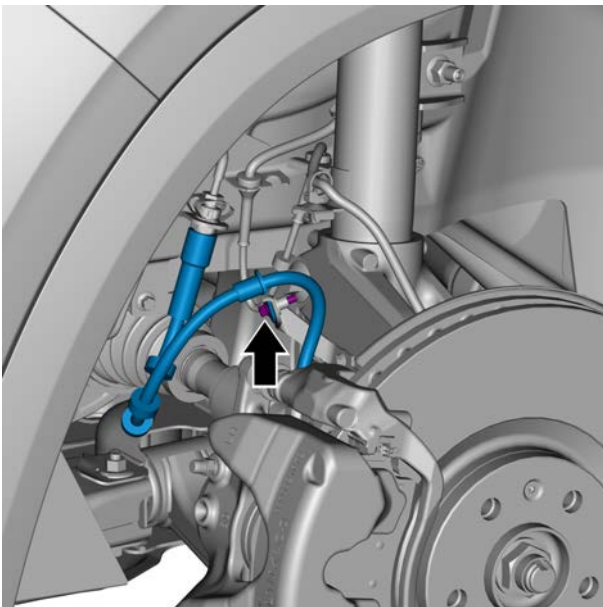
During installation, the piston dust cover shall not be damaged, detached or drawn into the piston between the friction plates. If the dust cover is slightly curled, it shall be pulled back to restore it to its normal state

- 5 Install the brake caliper, and tighten bolts.

Torque: 34.5 N. m (metric system) 25.4 lb-ft (Imperial system)

- 6 Fasten the middle connection point of the front brake hose.

Torque: 7 N. m (metric system) 5.2 lb-ft (Imperial system)



- 7 After installation, press the brake pedal repeatedly for several times.

- 8 Check the brake fluid level and keep it at the max line.

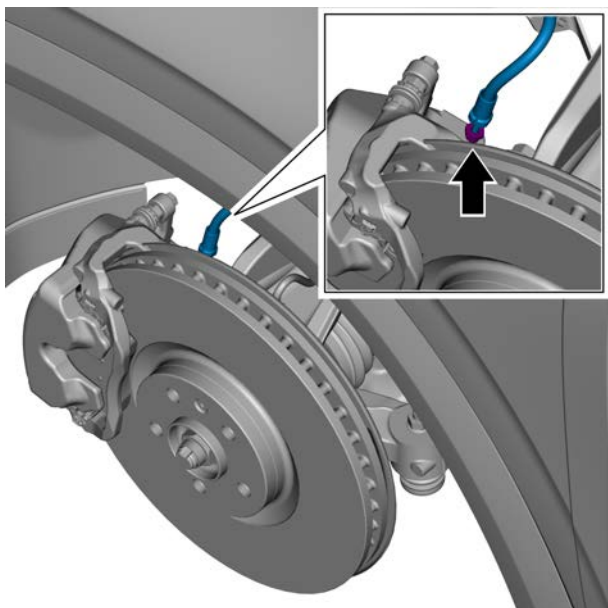
6.2.6.2 Replacement of left front brake caliper assembly

Removal procedure

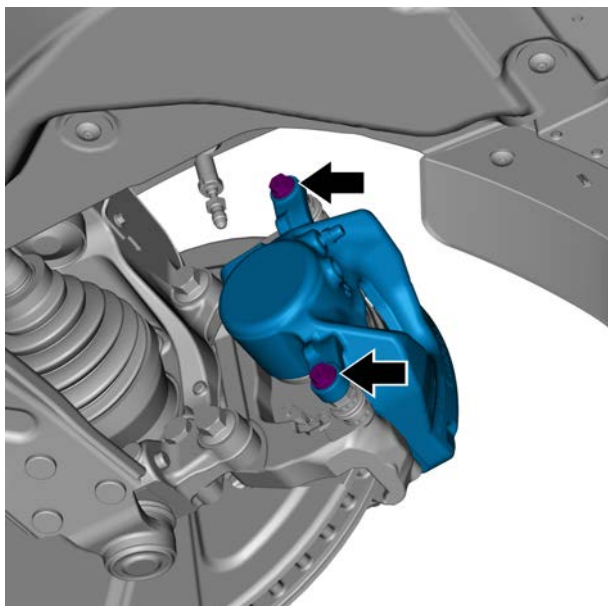
Caution

The removal and assembly methods of front left front brake caliper assemblies are similar.

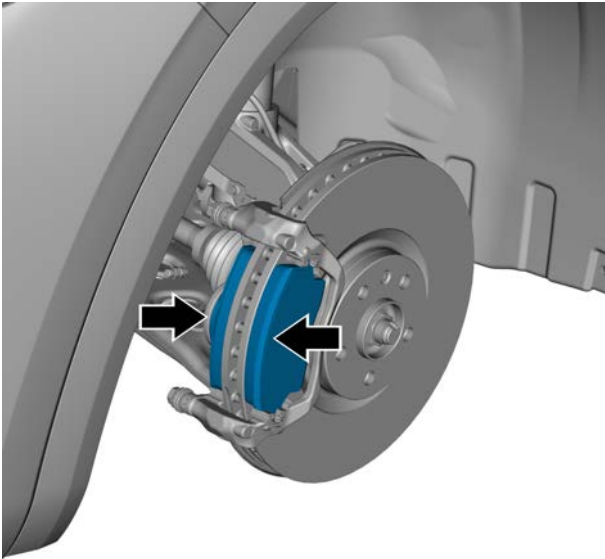
- 1 Support vehicles, see [Support Vehicles](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).



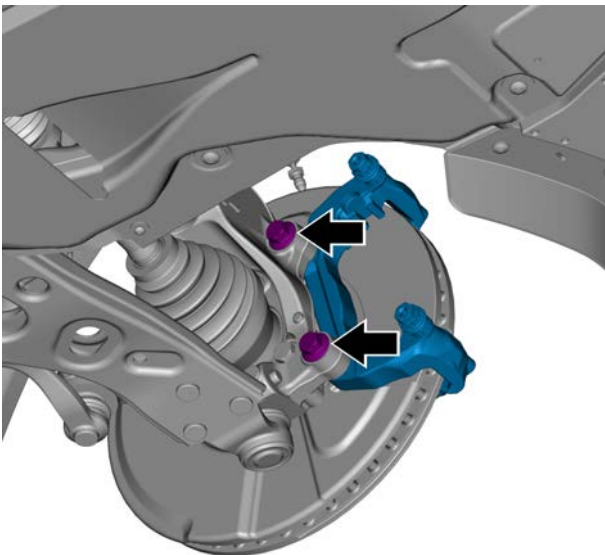
- 3 Drain the brake fluid.
- 4 Remove the brake hose oil inlet bolt of the brake caliper and plug the brake caliper oil inlet and brake hose to prevent brake fluid loss or contamination.



- 5 Remove 2 retaining bolts of the brake caliper and remove the brake caliper.

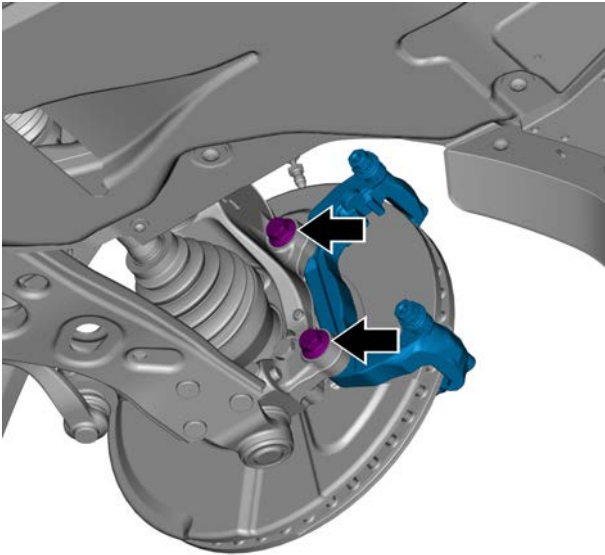


6 Take out the brake friction plate components.



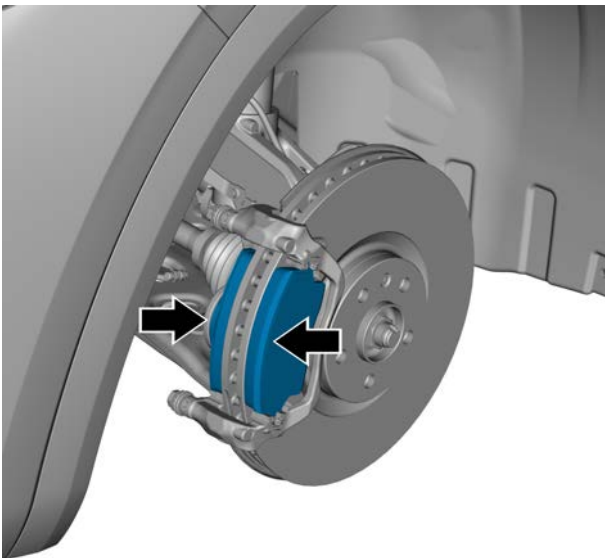
7 Remove 2 retaining bolts from the brake caliper bracket and take out the brake caliper bracket.

Installation procedure



- 1 Install the brake caliper bracket and tighten the 2 retaining bolts of the brake caliper bracket.

Torque: 200 N. m (metric system) 147.5 lb-ft (Imperial system)

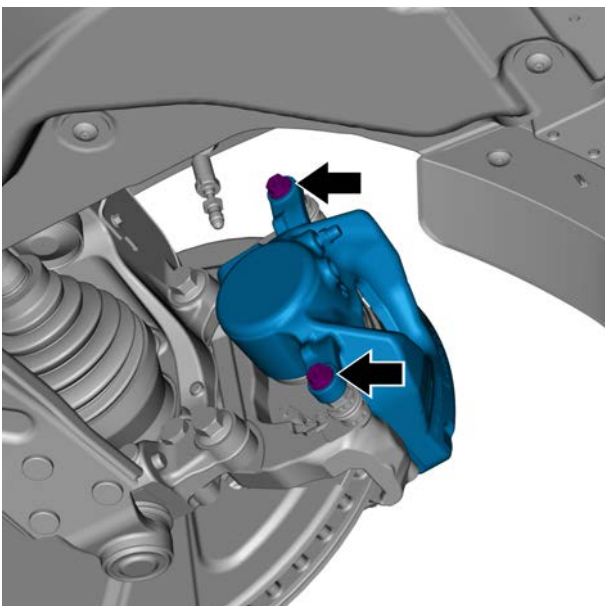


- 2 Install the brake friction plate components.

Caution

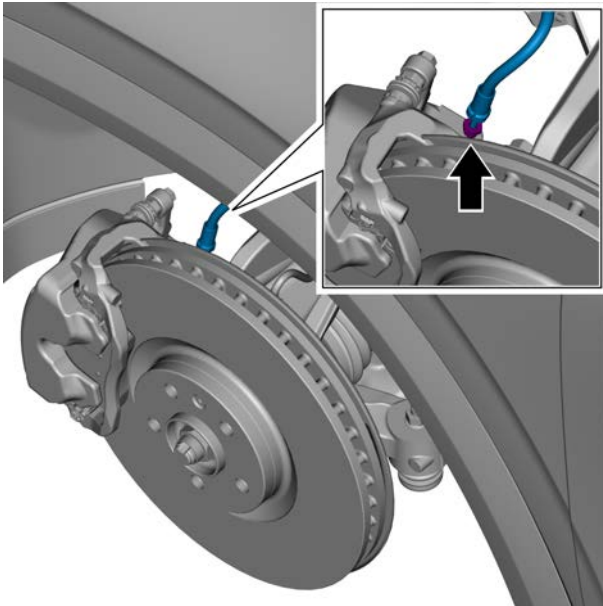
When installing the brake pads, the pads with wear metal reminders are installed inside.

Note: before installing the brake pad, grease the position of the spring plate support back plate.



- 3 Install and tighten 2 retaining bolts of the brake caliper.

Torque: 34.5 N. m (metric system) 25.4 lb-ft (Imperial system)



- 4 Install front left brake hose connector Bolt.

Caution

When assembling front left brake hose, the connector shall be Pre-tightened by hand, then hold the brake hose by hand, and tighten the torque with an open-ended wrench to prevent the brake hose from changing shape.

Torque: 17 N. m (metric system) 12.5 lb-ft (Imperial system)

- 5 Install the front wheel.
- 6 Lower the vehicle.
- 7 Add clean brake fluid to the master cylinder reservoir until it is flush with the max line of the reservoir.
- 8 Bleed the brake system, [see Discharge and filling procedure of brake fluid.](#)
- 9 Check whether the brake fluid leaks.

6.2.6.3 Replacement of front left brake disc

Removal procedure

Caution

The removal and assembly methods of front left front brake disc LHs are similar.

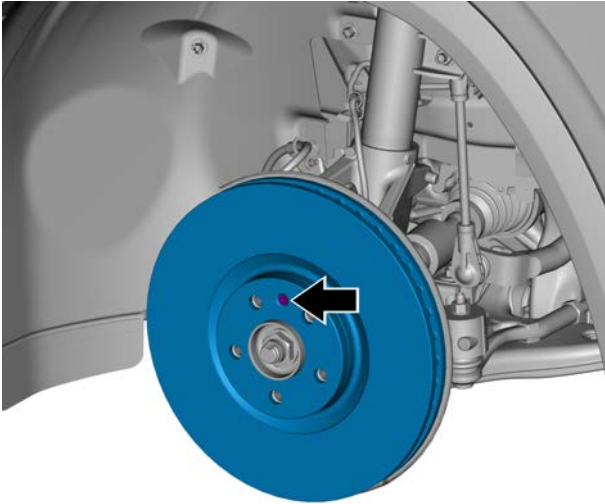
- 1 Support vehicles, see [Support Vehicles](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly.](#)
- 3 Remove front left brake with spring plate friction plate components. See [replacement of front left brake with spring plate friction plate assembly.](#)

- 4 Remove the front brake caliper assembly, refer to replacement of front left brake caliper assembly.

Caution

Remove the brake caliper. No need to remove the brake hose of brake caliper. One steel wire shall be used to hang the brake caliper to avoid any damage to the brake hose.

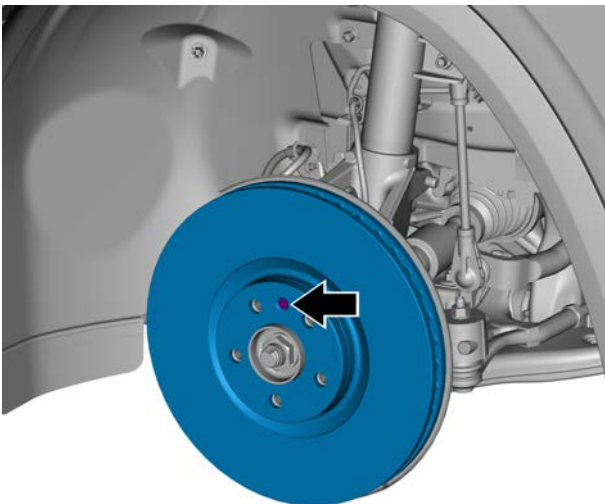
- 5 Remove the retaining bolts of the front brake disc LH and remove front left brake disc LH.



Installation procedure

- 1 Install front left brake disc LH and tighten the retaining bolts of front left brake disc LH.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

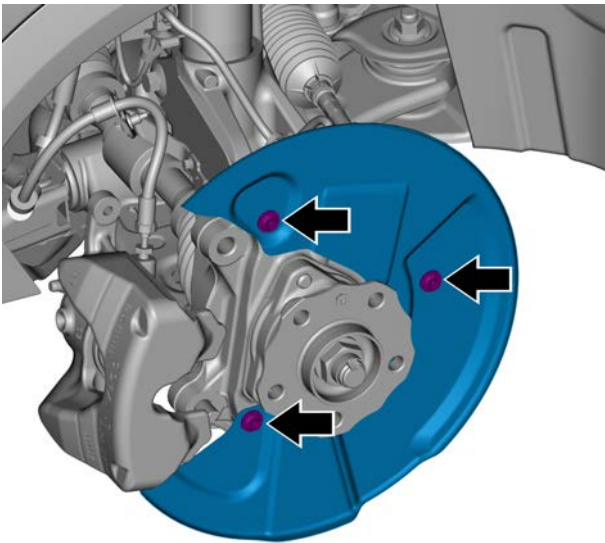


- 2 Install the front brake caliper assembly.
- 3 Install the brake friction plate components.
- 4 Install the front wheel.
- 5 Lower the vehicle.

6.2.6.4 Replacement of front left wheel brake protective cover

Removal procedure

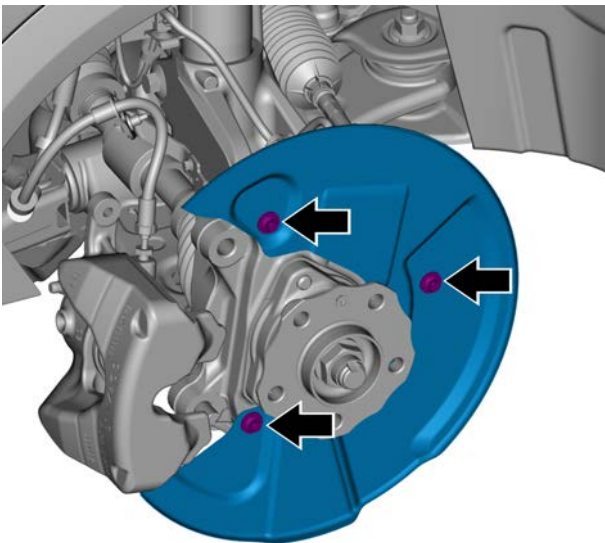
- 1 Support vehicles, see [Support Vehicles](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the Assembly-front brake caliper LH. See [replacement of Assembly-front brake caliper LH](#).
- 4 Remove the front brake disc LH. See [replacement of front brake disc LH](#).
- 5 Remove the 3 retaining bolts of the brake protective cover and remove the brake protective cover.



Installation procedure

- 1 Install and tighten 3 retaining bolts of the brake protective cover.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 2 Install the front brake disc.
- 3 Install the brake friction plate components.

- 4 Install the front brake caliper assembly.
- 5 Install the front wheel.
- 6 Lower the vehicle.

6.3 Rear brake

6.3.1 Specification

6.3.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Rear caliper to knuckle retaining bolt	M12×50	95~125	70.1~92.2
rear brake disc and rear hub bearing retaining bolts	M6×16	8.5~11.5	6.3~8.5
Rear wheel brake dust cover and rear knuckle	M6×12	8.5~11.5	6.3~8.5

6.3.1.2 Specifications of the rear disc brake parts

4WD: 16-inch rear disc brake parts specification

Application	Part specification	
	Metric (mm)	Imperial system (in)
Thickness for scrapping of rear brake disc	9	0.35
Rear Brake Disc Thickness-New	12	0.47
rear brake pad standard thickness	11	0.43
rear brake pad minimum thickness	2	0.07874
Allowable end face runout of rear brake disc	Core: if the lateral runout is $\geq 0.15\text{mm}$, replace the brake disc (both sides);If the circumferential thickness difference is $\geq 0.02\text{mm}$, replace the brake disc (both sides);New parts: lateral runout $< 0.06\text{mm}$	Core: if the lateral runout is $\geq 0.0059\text{in}$, replace the brake disc (both sides);If the circumferential thickness difference is $\geq 0.02\text{mm}$, replace the brake disc (both sides);New part: lateral runout $< 0.0024\text{in}$

6.3.2 Instructions and operations

6.3.2.1 Instructions and Operations

Disc brake system composition:

– Brake friction plate components with spring plate: the brake friction plate components with spring plate acts the mechanical output force from the hydraulic pressing caliper on the friction surface of the brake disc. The spring plate is located between the disc brake pad and the brake pad mounting bracket to keep the brake pad moving smoothly and eliminate noise.

– Brake disc: Slow down the speed of tire and wheel assemblies using the mechanical output force applied by the disc brake pad to the friction surface of the brake disc to realize the brake of the vehicle.

– The brake caliper with EPB assembly: It receives the fluid pressure of the brake master cylinder and transforms the fluid pressure into mechanical output force to act on internal brake pad; when the master cylinder returns, the brake caliper piston automatically returns and the brake caliper is integrated with electric parking brake (EPB) motor which can be controlled by brake parking switch to achieve electric parking.

– Brake caliper and brake pad support: it is used to fix the disc brake pad and brake caliper in place and maintain the correct matching position with the hydraulic brake caliper. When the mechanical output force acts on the brake pad, the brake pad will slide.

– Floating brake caliper: Used for installing the hydraulic brake caliper and fix the brake caliper in place and maintain the correct matching position with the brake caliper bracket. When there is the mechanical output force acted, the brake caliper, and the brake pad slide relatively.

Rear disc brake system operation:

The mechanical output force from the hydraulic brake caliper piston is acted on the internal brake pad. When the piston pushes and presses the internal brake pad outward, the brake caliper shell pulls the external brake pad inward at the same time to evenly distribute the output force. The brake pad acts the output force on the friction surface of two sides of the brake disc to slow down the speed of tire and wheel assemblies. Normal functions of the brake guide and the floating brake caliper are important for the uniform distribution of the brake force.

The operation of releasing EPB under when the power is off:

When the power is off, the brake parking switch cannot control the parking brake releasing function. The operations of releasing EPB under when the power is off are as follows:

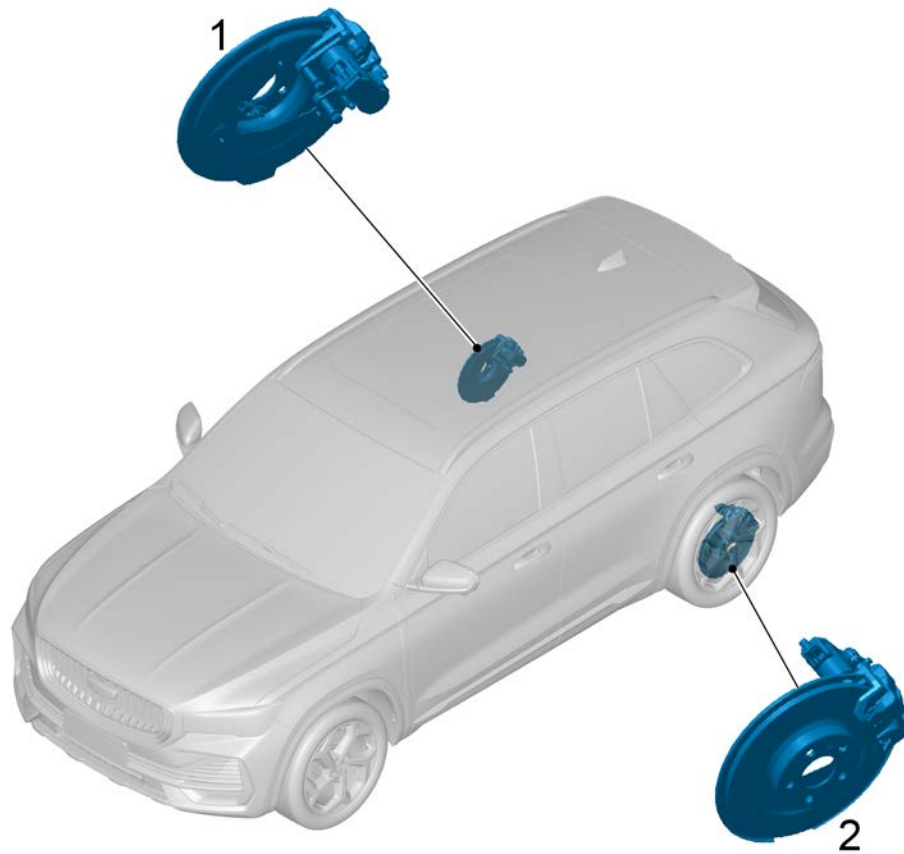
a. Remove the EPB motor from the brake caliper.

b. Open the rear cover plate of the EPB motor and use a dedicated spanner to rotate the push rod in the actuator motor and release the brake calipers.

c. After releasing, when the power is on, use a diagnostic instrument to reset EPB brake calipers.

6.3.3 Component position

6.3.3.1 Component position

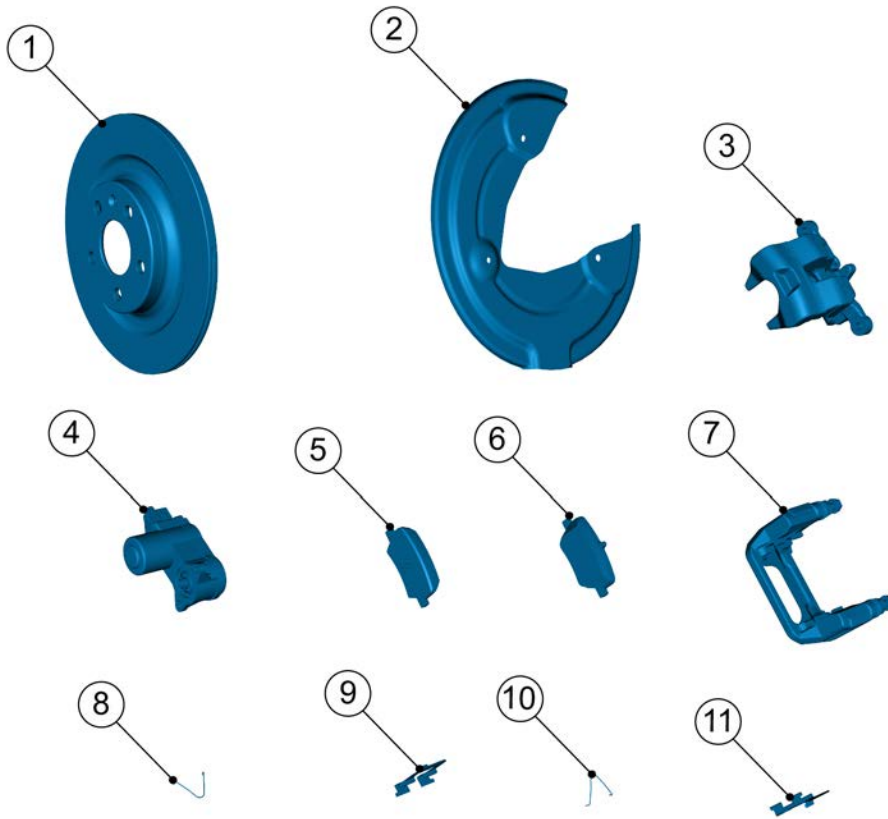


1. Right rear brake assembly

2. Left rear brake assembly

6.3.4 Exploded view

6.3.4.1 Exploded view



- | | | | |
|----|-------------------------------------|-----|----------------------------|
| 1. | rear brake disc | 7. | rear brake caliper bracket |
| 2. | Rear wheel brake protective cover | 8. | Splayed spring |
| 3. | Rear left brake caliper housing | 9. | Brake pad spring |
| 4. | Brake caliper motor (parking brake) | 10. | Splayed spring |
| 5. | rear brake outer brake pad | 11. | Brake pad spring |
| 6. | rear brake inner brake pad | | |

6.3.5 Diagnostic information and procedures

6.3.5.1 Diagnostic information and procedures

See [brake pad inspection](#).

6.3.5.2 EPB release operating instructions

Warning !

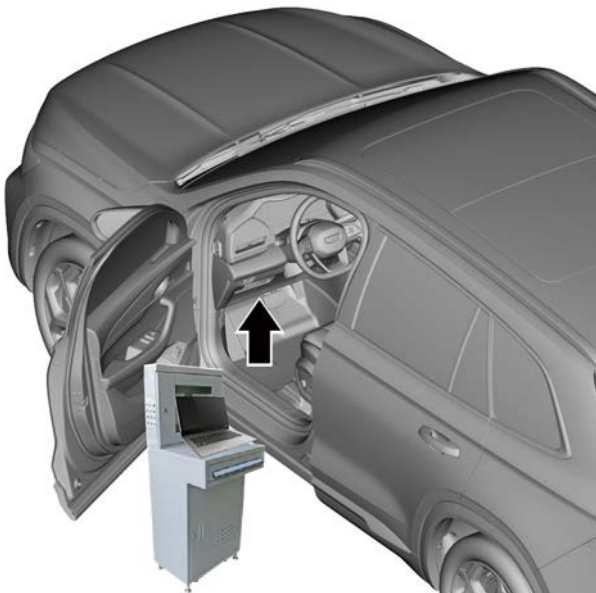
When the EPB is released, the vehicle will lose the parking function. In order to avoid vehicle damage and serious personal injury, please do not perform this operation on the road with slope.

When replacing the parts of the rear brake system or when the EPB shall be released under special circumstances, please See the following two operation methods:

1. Manual operation

- Release: press and hold the EPB key until the ignition is turned off. Meanwhile, turn off the ignition and release the EPB key.
- EPB reset: pull down the parking brake switch when the vehicle is stationary.

2. Operation using diagnostic procedures



Release:

1. Connect the diagnostic apparatus.
2. Turn the start switch to power mode ON.
3. Operate the diagnostic instrument, enter the EPB system and release the parking brake.
4. Turn the start switch to power mode OFF.

EPB reset:

1. Turn the start switch to power mode ON.
2. Use the diagnostic instrument to reset the replaced EPB and clear the fault code at the same time.
3. Turn the start switch to power mode OFF.

6.3.6 Removing and installing

6.3.6.1 Replacement of the Rear Left Brake Belt Spring Plate Friction Lining Assembly

Removal procedure

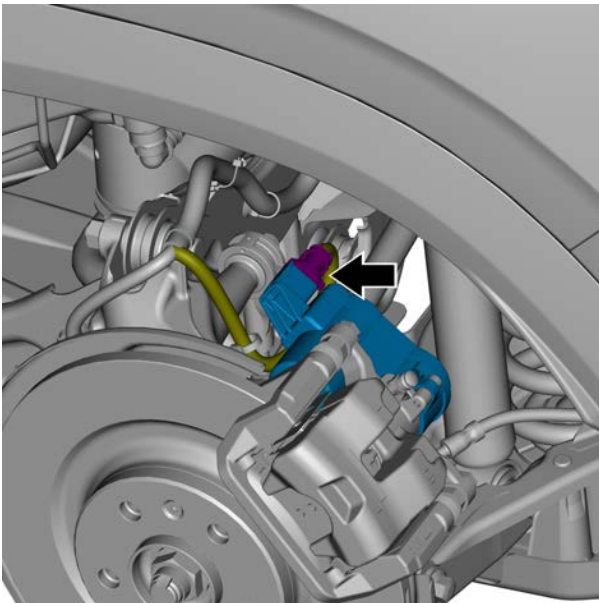
Warning !

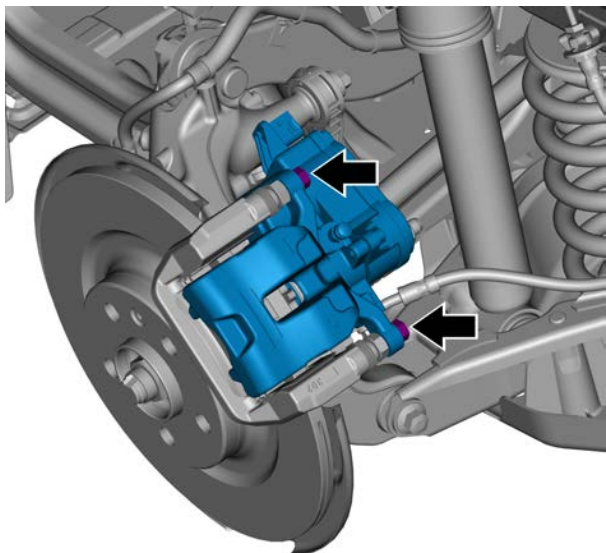
See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

The removal and assembly methods of front rear brake LH friction plate components with spring plate are similar.

- 1 Release the brake caliper motor (parking brake), see [the EPB release operation instructions](#).
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Support vehicles, see [Support Vehicles](#)
- 4 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 5 Disconnect the harness connector of brake caliper motor (parking brake).

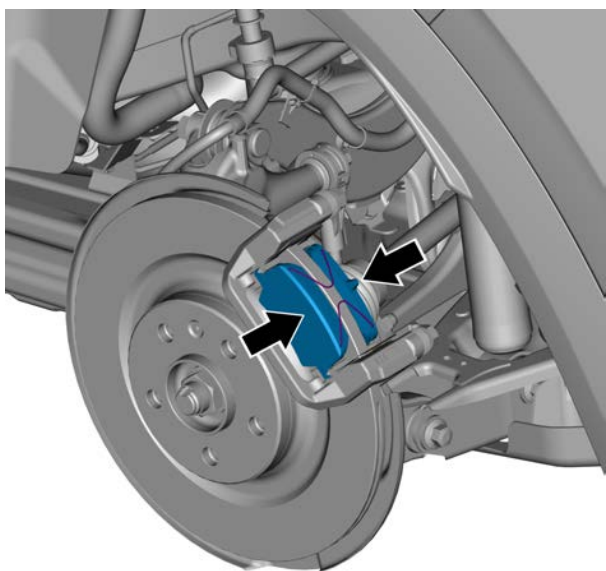




- 6 Remove 2 retaining bolts from the brake caliper. After the caliper body is removed, hang it safely in a suitable position and avoid pulling the brake hose.

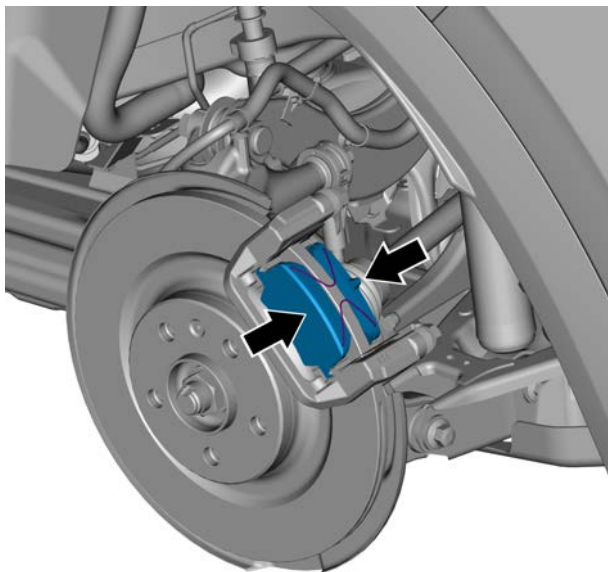
Caution

While removing bolts, use an open spanner to fix inside nuts to prevent them from rotating.

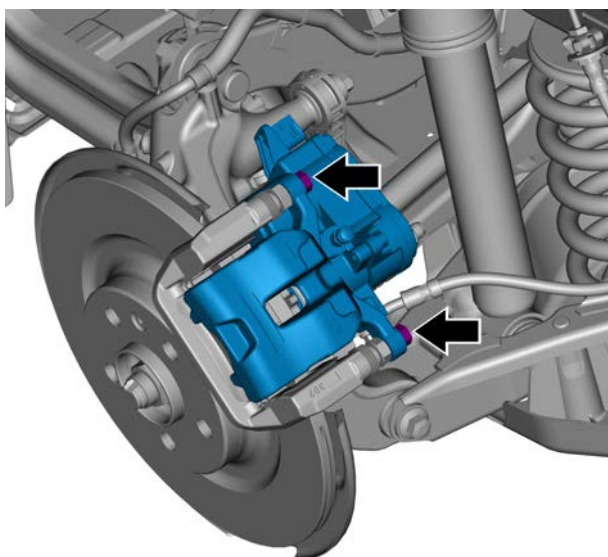


- 7 Remove the splayed spring and remove the rear brake friction plate components with spring plate.

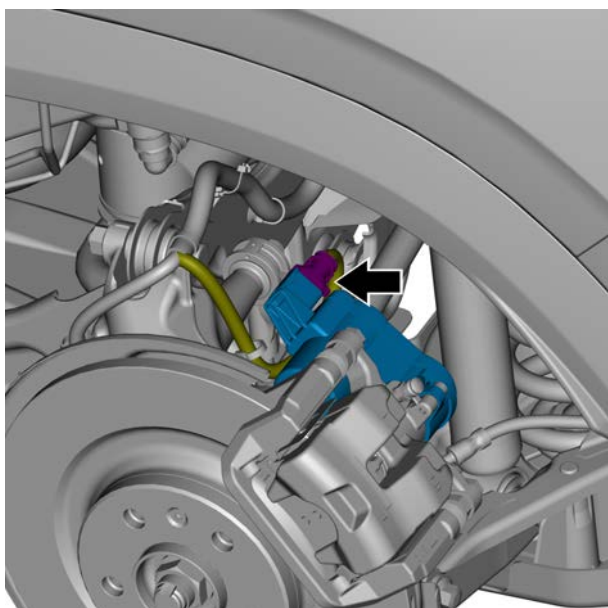
Installation procedure



- 1 Install the friction plate components with brake spring plate on the brake caliper support and install the splayed spring.



- 2 Install the brake caliper and tighten 2 retaining bolts.
Torque: 40 N. m (metric system) 30 lb-ft (Imperial system)



- 3 Connect the harness connector of brake caliper motor (parking brake).

- 4 Install the wheel.
- 5 Lower the vehicle.
- 6 Check whether the brake fluid is at the max position. If not, add brake fluid.
- 7 Connect the negative battery cable.
- 8 Reset the brake caliper motor (parking brake).

6.3.6.2 Replacement of RL brake caliper EPB assembly

Removal procedure

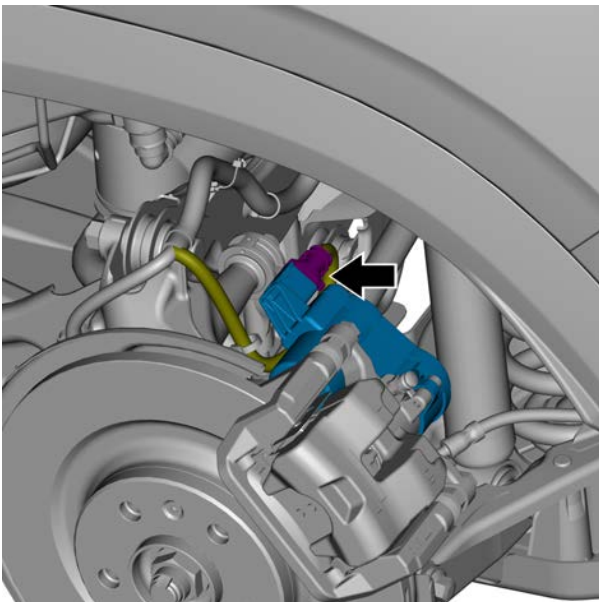
Warning !

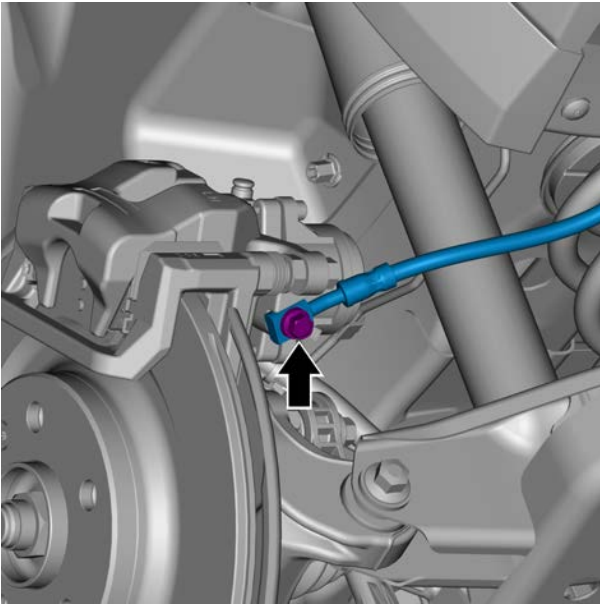
See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

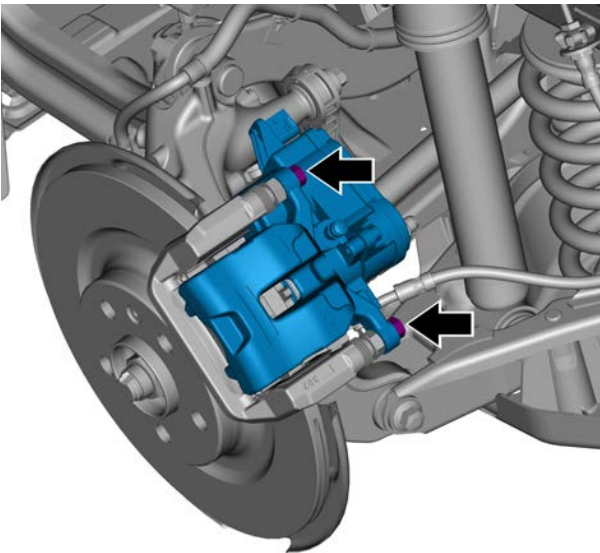
The removal and assembly methods of front rear brake LH caliper body with EPB assembly are similar.

- 1 Release the EPB motor, see the [EPB release operating instructions](#).
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Support vehicles, see [Support Vehicles](#)
- 4 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 5 Disconnect the EPB harness connector.

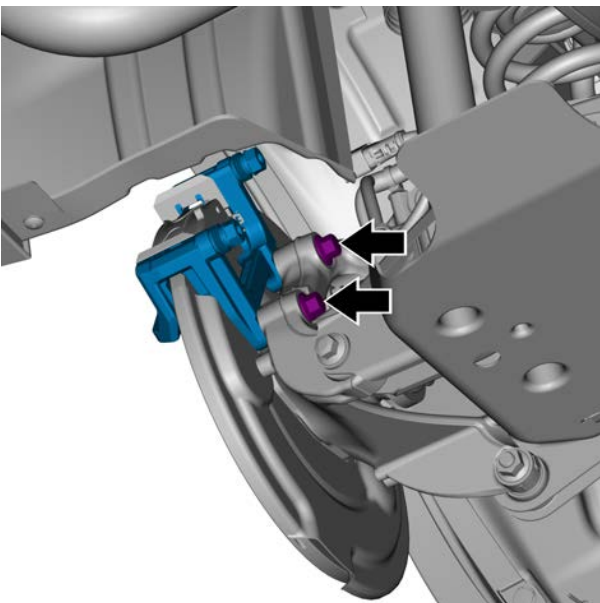




- 6 Remove the oil inlet bolt of the brake hose of the rear brake LH caliper body with EPB assembly, and plug the oil inlet and brake hose of the rear brake LH caliper body with EPB assembly to prevent the loss or pollution of brake fluid.

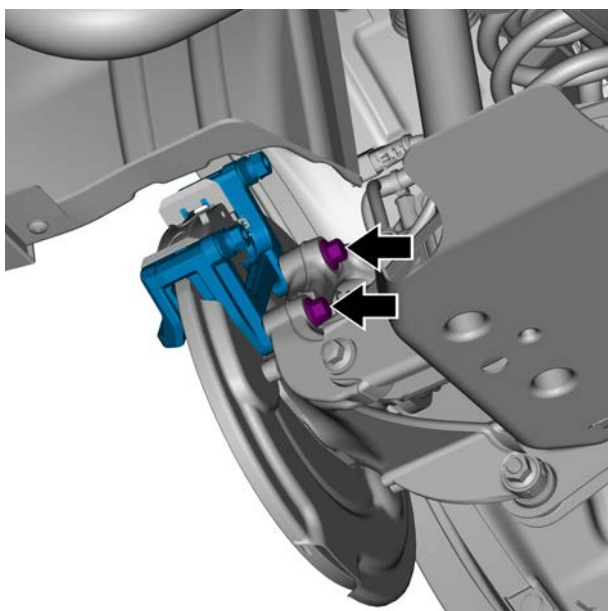


- 7 Remove 2 retaining bolts of the rear left brake caliper body with EPB assembly, and remove the rear left brake caliper body with EPB assembly.



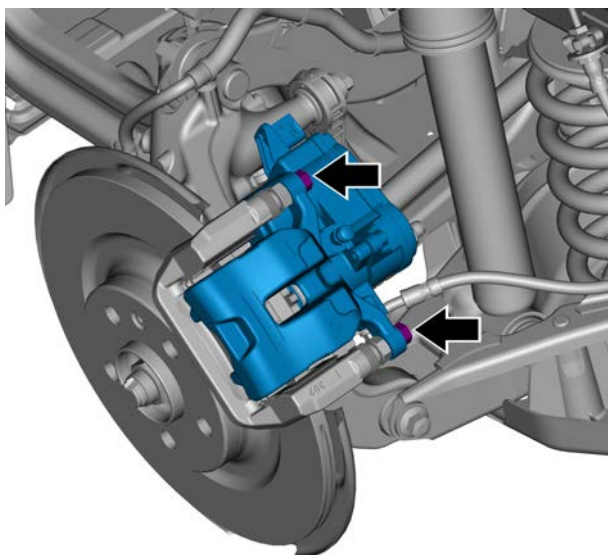
- 8 Remove 2 retaining bolts from the brake caliper bracket and take out the rear brake caliper bracket.

Installation procedure



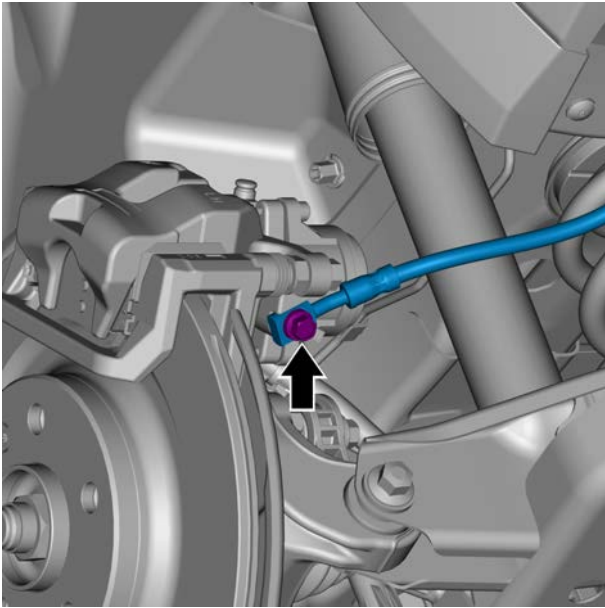
- 1 Install the rear brake caliper bracket and tighten 2 retaining bolts.

Torque: 110 N. m (metric system) 80 lb-ft (Imperial system)

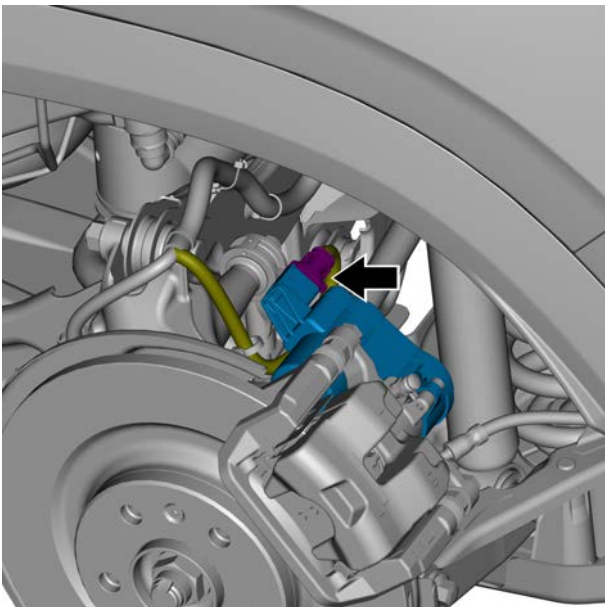


- 2 Install the rear left brake caliper body with EPB assembly and tighten 2 retaining bolts.

Torque: 40 N. m (metric system) 30 lb-ft (Imperial system)



- 3 Install the oil inlet hose of the rear brake LH caliper body with EPB assembly and tighten the oil inlet bolt.
Torque: 42 N. m (metric system) 31 lb-ft (Imperial system)



- 4 Connect the harness connector of EPB.

- 5 Install the rear wheels.
- 6 Lower the vehicle.
- 7 Add clean brake fluid to the master cylinder reservoir until it is flush with the max line of the reservoir.
- 8 Bleed the brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#)
- 9 Connect the negative battery cable.
- 10 Reset the EPB motor.

6.3.6.3 Replacement of the rear left brake disc

Removal procedure

Caution

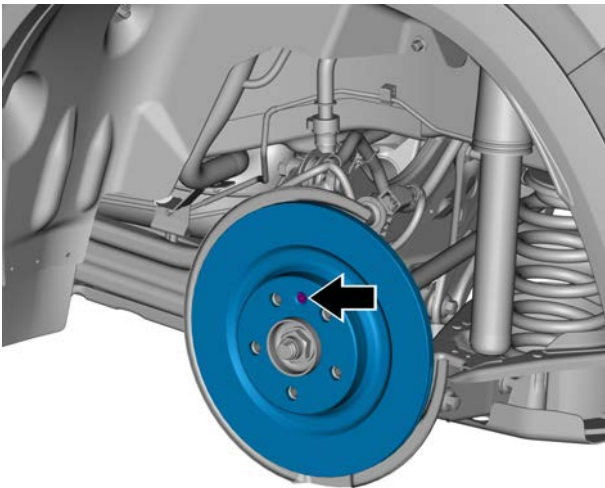
The removal and assembly methods of front rear brake disc LHs are similar.

- 1 Support vehicles, see [Support Vehicles](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the rear left brake caliper body with EPB assembly. See [replacement of rear left brake caliper body with EPB assembly](#).

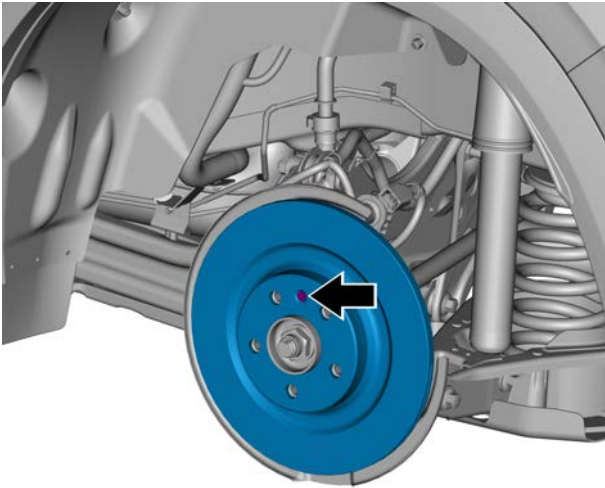
Caution

When removing the brake caliper, it is not necessary to remove the brake hose. Use appropriate tools to support the brake caliper to avoid damaging the brake hose.

- 4 Remove the retaining bolts of the rear brake disc LH and remove the rear brake disc LH.



Installation procedure



- 1 Install the rear brake disc and tighten 1 fastening screw of the rear brake disc.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 2 Install the left rear brake caliper assembly.
- 3 Install the rear wheels.
- 4 Lower the vehicle.

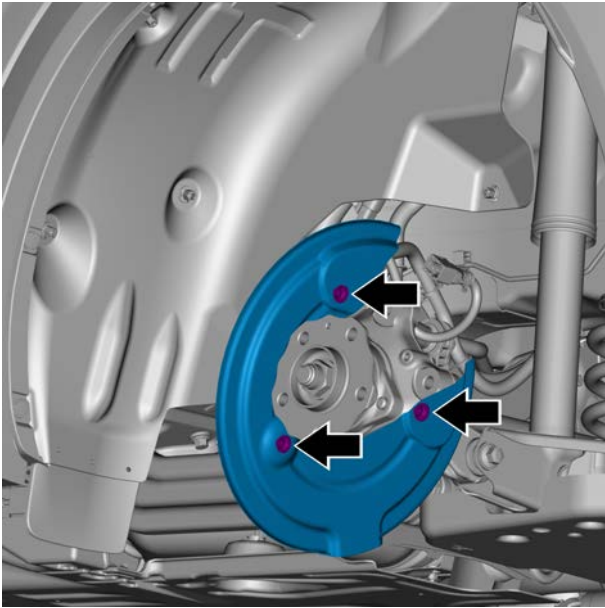
6.3.6.4 Left rear wheel brake guard replacement

Removal procedure

Caution

The removal and assembly method of front left brake protective covers is similar.

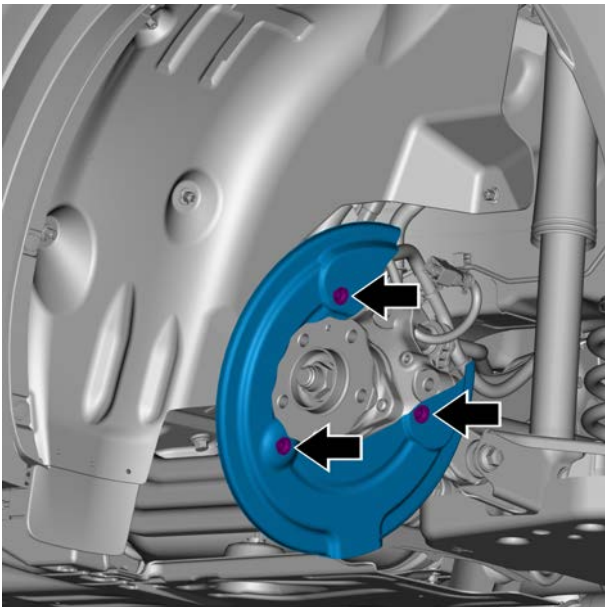
- 1 Support vehicles, see [Support Vehicles](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove the rear left brake caliper body with EPB assembly. See [replacement of rear left brake caliper body with EPB assembly](#).
- 4 Remove the rear brake disc LH. See [replacement of rear brake disc LH](#).



- 5 Remove 3 retaining bolts from the Left rear wheel brake protective cover.
- 6 Remove the rear left brake dust cover.

Installation procedure

- 1 Install the rear wheel brake dust cover and tighten 3 retaining bolts.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 2 Install the RL brake disc.
- 3 Install the left brake caliper assembly.
- 4 Install the rear wheels.
- 5 Lower the vehicle.

6.4 Hydraulic brake

6.4.1 Specification

6.4.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Install the retaining bolts of the front brake hose bracket to the steering knuckle	M5×20	5.9~8.1	4.4~6
Front brake hose to hose bracket retaining bolt	M5×20	5.9~8.1	4.4~6
Brake pedal to body fixing nut	M8×8	20~28	14.8~20.7
Brake master Cylinder 1 brake hard pipe joint to master cylinder	M12	14~21	10.3~15.5
Brake master cylinder No. 1 brake hard pipe joint to VDDM	M12	12~18	8.8~13.2
Brake master Cylinder 2 brake hard pipe joint to master cylinder	M12	14~21	10.3~15.5
Brake master cylinder No. 2 brake hard pipe joint to VDDM	M12	12~18	8.8~13.2
Front right No. 1 brake hard pipe joint to VDDM	M12	12~18	8.8~13.2
Rear left No. 1 brake hard pipe joint to VDDM	M10	12~18	8.8~13.2
RL No. 1 brake hard pipe joint to left middle brake hard pipe	M10	12.8~19.2	9.5~14.2
Right rear No. 1 brake hard pipe joint to right middle brake hard pipe	M10	12.8~19.2	9.5~14.2
Left rear brake hard pipe joint to left middle brake hard pipe	M10	12.8~19.2	9.5~14.2
Right rear brake hard pipe joint to right middle brake hard pipe	M10	12.8~19.2	9.5~14.2
Rear right No. 1 brake hard pipe joint to VDDM	M12	12~18	8.8~13.2

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
front left brake hard pipe joint to VDDM	M10	12~18	8.8~13.2
front left brake hard pipe joint to brake hose	M10	11.2~16.8	8.2~12.4
Right front brake hard pipe joint to brake hose	M10	11.2~16.8	8.2~12.4
retaining bolts of front left brake hose and Assembly-front brake caliper LH	M10	14~20	10.4~14.8
retaining bolts of front right brake hose and front right brake caliper assembly	M10	14~20	10.4~14.8
Left rear brake hard pipe joint to brake hose	M10	11.2~16.8	8.2~12.4
Right rear brake hard pipe joint to brake hose	M10	11.2~16.8	8.2~12.4
Retaining bolt of underfloor support	M8x25	20~28	14.8~20.7
retaining bolts of rear brake LH hose and rear brake LH caliper body with EPB assembly	M10	38~46	28~34
retaining bolts of right rear brake hose and right rear brake caliper body with EPB assembly	M10	38~46	28~34

6.4.2 Instructions and operations

6.4.2.1 Instructions and Operations

Hydraulic brake system includes the following parts:

Brake pedal:

Receive, enlarge, and transmit the input force of the brake system.

Brake pedal push rod:

Transmit the enlarged brake pedal input force to the vacuum booster.

Vacuum booster:

The brake system input force is enlarged through the brake pedal and transmitted by the brake pedal push rod to the vacuum booster, and applied to the hydraulic brake master pump after powered by the vacuum booster. The vacuum booster uses the vacuum source for power to reduce the control force applied by the driver to the brake pedal.

Vacuum hose:

The vacuum source that is needed for transmitting the vacuum booster.

Brake master cylinder tank:

The brake fluid used by the hydraulic brake system is provided inside.

Brake master pump:

Convert the mechanical input force into hydraulic output pressure, and the hydraulic output pressure is distributed to two hydraulic oil ways to supply oil for diagonal wheel brake oil way.

Brake rigid tube and brake hose:

Transfer brake fluid through the hydraulic brake system parts.

Brake cylinder:

Convert the hydraulic input pressure into a mechanical output force.

System operation

The mechanical force from the brake pedal is converted by the master pump to oil pressure, after the adjustment of the hydraulic electronic control unit, and is transferred to the brake cylinder through the brake rigid tube and brake hose. The brake cylinder converts the oil pressure into the mechanical force to make the brake pad press the brake disc to conduct the brake of the vehicle.

Brake system fault indicator light

When the brake fluid surface is too low and the brake system fails, the combination instrument will light the brake system fault indicator.

Brake vacuum inspection

1. Disconnect the vacuum pipe at the outlet of the vacuum pump and connect the vacuum gauge.
2. Start the engine and run it at idle speed.

The hydraulic braking system adopts vacuum booster. During operation, press the brake pedal to push the brake master cylinder, and the pressure of the brake fluid in the master cylinder increases. It enters the brake caliper of each wheel through the oil pipe to push the piston of the brake caliper to stretch out, so as to realize the transmission of foot braking force to the wheel brake and push the wheel brake to apply braking.

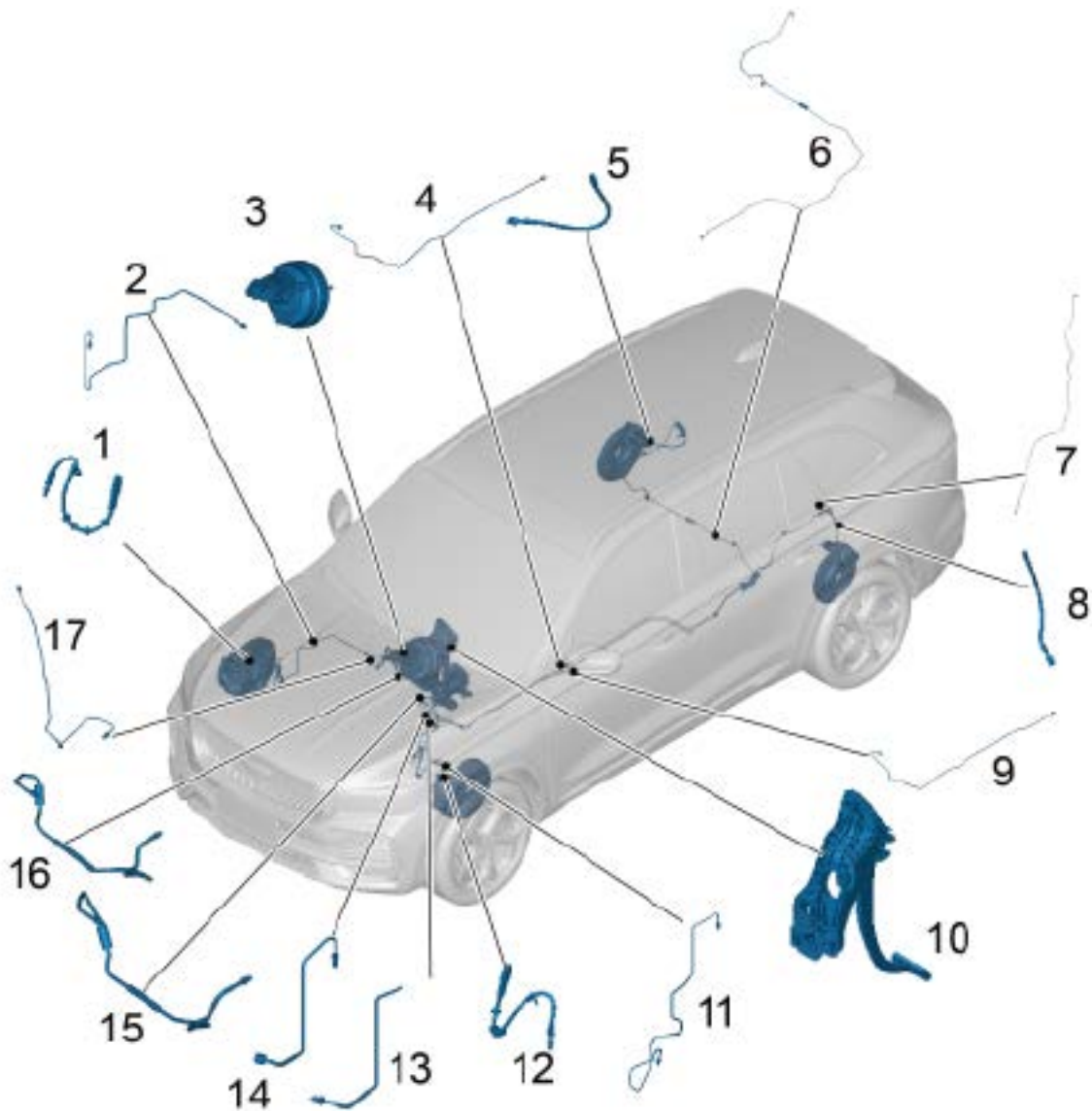
When the brake pedal is released, the master cylinder piston returns under the action of oil pressure and return spring, and the brake caliper piston and wheel brake actuator return to release the brake on the wheel.

Brake assist is mainly to provide auxiliary braking force to help the driver who cannot apply enough braking force during emergency braking, so as to maximize the braking performance of the vehicle.

The actuator part of the hydraulic braking system includes 12 two position solenoid valves, 1 motor, 2 pumps and 2 accumulators. Among them, 12 two position solenoid valves include 2 high-pressure on-off valves, 2 pilot valves, 4 liquid inlet valves and 4 liquid outlet valves.

6.4.3 Component position

6.4.3.1 Component position



- | | | | |
|----|--|-----|------------------------------------|
| 1. | Right front brake hose assembly | 10. | Brake pedal assembly |
| 2. | Right front brake hard pipe | 11. | Front left brake hard pipe |
| 3. | Assembly-vacuum booster with brake master cylinder | 12. | Front left brake hose |
| 4. | Left middle brake hard pipe | 13. | Left rear brake pipe 1 |
| 5. | Right rear brake hose assembly | 14. | Right rear brake pipe 1 |
| 6. | Right rear brake hard pipe | 15. | Brake master cylinder brake pipe 1 |
| 7. | Left rear brake hard pipe | 16. | Brake master cylinder brake pipe 2 |

- 8. Rear left brake hose
- 9. Right middle brake hard pipe
- 17. Right front brake pipe 1

6.4.4 Diagnostic information and procedures

6.4.4.1 Diagnostic completed notice

- Be careful when replacing various parts, because it may affect the performance of the brake system and cause driving hazards. Standard parts should be taken.
- When the brake system is maintained, it is very important to keep the parts and the site clean.
- If brake fluid leakage is found, the components must be removed. If any abnormalities are found, new components should be replaced.
- When removing the brake components, wrap the connection part of the brake pipe to prevent dust, soil, and other impurities from entering the pipe.
- When removing or installing the brake pipe, do not damage or distort the brake pipe.
- When installing the brake pipe or brake hose, make sure that there is no twist or bend.
- The brake hose must be kept away from absorber oil, grease, etc.
- After installing the brake pipe and brake hose, make sure that they do not interfere with other components.
- Do not allow brake fluid to adhere to painted surfaces such as the body. If brake fluid leaks onto the painted surface, remove it immediately.

6.4.4.2 Failure Symptom Table

Symptom	Suspected parts	Treatment measures
The brake warning indicator is always on; the instrument text reminds that the brake fluid level is too low, please check	1. Brake fluid	Check the brake fluid.
	2. Brake fluid level sensing	Check the brake fluid level sensing.
	3. Brake fluid level sensor harness	Check the harness connector of brake fluid level sensor.
	4. Meter	Check instrument
The brake system is noisy	1. Brake pads (broken, twisted, stained, smooth)	Check the brake pads.
	2. Brake caliper bracket fixing bolt (loose)	Check the retaining bolts of the brake caliper bracket.
	3. Brake caliper fixing bolt (loose)	Check the retaining bolts of the brake caliper.
	4. Brake disc (with scratch marks)	Check the brake disc.
	5. Brake pad guide (loose)	Check the brake pad guide.
	6. Floating pin of brake caliper (worn)	Check the brake caliper floating pin.
Brake deviation	1. Piston (fixed, stuck)	Check the brake calipers.
	2. Brake disc (with scar and oil stain)	Check the brake disc.
	3. Brake pads (broken, twisted or oily)	Check the brake pads.
	4. Brake pipe, hose (twisted, distorted)	Check the brake hard pipe and hose.
The brake pedal is too hard	1. Hydraulic brake booster system (vacuum leakage, failure)	Check the hydraulic vacuum booster.
	2. Brake pipe, hose (twisted, distorted)	Check the brake hard pipe and hose.
	3. Brake vacuum pipe (vacuum leakage)	Check the brake vacuum pipe
The brake pedal is too soft	1. Brake fluid leakage in the brake system	Check the brake system for brake fluid leakage.
	2. Air in the brake system	Brake system exhaust.

Symptom	Suspected parts	Treatment measures
	3. Brake pads (broken, twisted, excessively worn or oily)	Check the brake pads.
	4. Brake master cylinder (internal leakage)	Check the brake master cylinder.
Brake pedal too low	1. Brake fluid leakage in the brake system	See brake pedal too low .
	2. Air in the brake system	
	3. Brake master cylinder (internal leakage)	
Insufficient braking force	1. Brake fluid leakage in the brake system	See insufficient braking force .
	2. Air in the brake system	
	3. Brake master cylinder (internal leakage)	
	4. Brake pads (broken, twisted, excessively worn or oily)	
	5. Brake pads (broken, twisted, excessively worn or oily)	
	6. Vacuum booster vacuum line	
	7. Vacuum booster	

6.4.4.3 Brake pedal too low

Caution

Be careful not to splash the brake fluid on the paint surface; otherwise, the paint will be damaged. If the brake fluid splashes on the paint surface, immediately wipe it with a dry cloth and clean it with water.

Step 1	Check the brake fluid.
--------	------------------------

- A. Check whether the brake fluid is insufficient.
- B. Confirm whether the inspection is insufficient.

No

Add the specified brake fluid to the max position.

Yes

Step 2	Check the brake system for leakage.
--------	-------------------------------------

- A. Check the brake fluid reservoir, brake master cylinder, brake slave cylinder, ABS assembly and brake pipeline connector for leakage.
- B. Confirm whether the check is normal.

No

Repair or replace abnormal parts.

Yes

Step 3	Exhaust the brake system.
--------	---------------------------

- A. Bleed the brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#)
- B. Confirm whether the exhaust of the brake system is completed

Yes

Trouble is removed.

No

Step 4 Replace vacuum booster with brake master cylinder assembly.

- A. Replace the assembly-vacuum booster with brake master cylinder, see [replacement of assembly-vacuum booster with brake master cylinder](#).

Next Step

Step 5 Trouble is removed.

6.4.4.4 Insufficient braking force

Caution

Be careful not to splash the brake fluid on the paint surface; otherwise, the paint will be damaged. If the brake fluid splashes on the paint surface, immediately wipe it with a dry cloth and clean it with water.

Step 1 Check the brake fluid.

- A. Check whether the brake fluid is insufficient.
- B. Confirm whether the inspection is insufficient.

No

Add the specified brake fluid to the max position.

Yes

Step 2 Check the brake system for leakage.

- A. Check the brake fluid reservoir, brake master cylinder, brake slave cylinder, ABS assembly and brake pipeline connector for leakage.
- B. Confirm whether the check is normal.

No

Repair or replace abnormal parts.

Yes

Step 3 Check the brake pads for excessive wear.

- A. Check the brake pad for excessive wear, see [brake pad inspection](#).
- B. Confirm whether the check is normal.

No

Replace the rear left brake friction plate components with spring plate. See [replacement of rear left brake friction plate assembly with spring plate](#).

Yes

Step 4 Check whether the brake disc is normal.

- A. Check the brake disc for excessive wear, see [brake disc surface and wear inspection](#).
- B. Confirm whether the check is normal.

No

Replace the brake disc, see [front brake disc LH replacement](#).

Yes

Step 5 Check whether the brake booster is normal.

- A. Check whether the brake booster is normal. See [air tightness inspection of brake booster](#).
- B. Confirm whether the check is normal.

No

Repair the vacuum pipeline and brake booster of brake booster, and replace relevant parts if necessary.

Yes

Step 6 Exhaust the brake system.

- A. Bleed the brake system, see [brake master cylinder with reservoir assembly replacement](#).
- B. Bleed the brake system

Yes

Trouble is removed.

No

Step 7 Replace the brake master cylinder.

- A. Replace the brake master cylinder, see [brake master cylinder with fluid reservoir assembly replacement](#).

Next Step

Step 8 | Trouble is removed.

6.4.4.5 Air tightness inspection of brake booster

1. Turn off the engine, and then press the brake pedal once every 5s to change the vacuum pressure to atmospheric pressure. Then press the brake pedal to the bottom and start the engine. When the vacuum air pressure reaches the standard, confirm that the gap between the brake pedal and the floor is shortened.
2. Start the engine and idle for about 1min. Stop the engine when there is vacuum in the booster. Press the brake pedal normally to change the vacuum pressure to atmospheric pressure. Confirm that the distance between the brake pedal and the floor increases slowly.
3. Press the brake pedal while the engine is running, and then press and hold the pedal to turn off the engine. The pedal stroke shall not change after depressing the pedal for 30s.

6.4.4.6 After sales troubleshooting instructions on hard brake pedal when the vehicle is started after long-term parking

Phenomenon identification

When starting the vehicle in the morning (or after parking for a long time), you need to step on the brake pedal again before starting the vehicle.

Cause of occurrence

When starting the vehicle, the brake light switch signal needs to be input to the engine ECU. Due to long-term parking and the engine has not been started, the vacuum in the booster is attenuated, and the boosting effect is reduced. Gently stepping on the pedal cannot trigger the brake light switch signal, so it is necessary to step on the brake pedal again when starting.

Reasons for vacuum degree attenuation in vacuum booster:

- After parking, the user has the habit of stepping on the brake pedal. After stepping on the brake pedal twice, the vacuum in the booster will be significantly reduced.
- In the area with large temperature difference, the tightness of the sealing rubber of the vacuum system is reduced, resulting in more attenuation of the vacuum degree the next day.

Treatment measures

1. Only after the vehicle has been placed for a long time, it is necessary to step on the brake pedal again when starting; the vacuum booster meets the requirements when the vehicle is running normally. This situation will not affect driving and safety, and no claim will be made.
2. If the vacuum sealing performance of vacuum system parts (vacuum tubes, etc.) exceeds the technical requirements, it shall be handled according to the regular after-sales process.

Warm tips ~ how to avoid

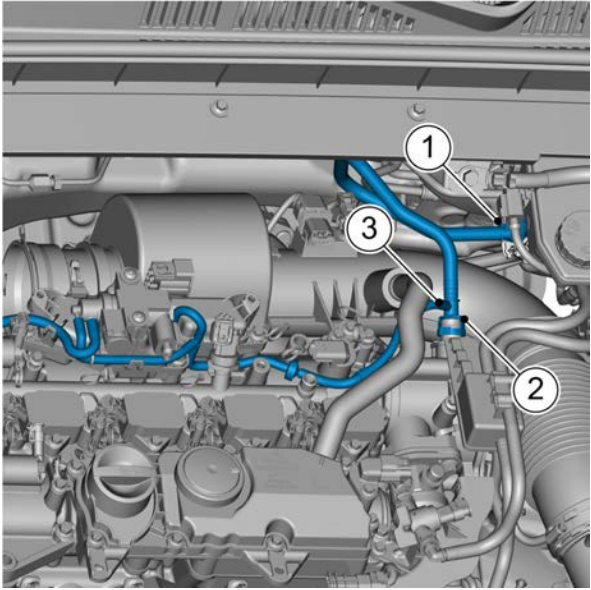
1. After the vehicle stops safely after flameout, do not put your foot on the brake pedal or unconsciously step on the brake pedal for many times.
2. The vehicle shall not be placed outdoors for a long time in the area with large temperature difference, because the vacuum leakage in the booster is faster than usual.

When the customer reports that the brake pedal is hard when starting the vehicle, the following steps can be followed:

- a. First, ask the customer if he has the habit of stepping on the brake pedal after flameout. If he steps on the brake pedal after flameout, it will consume the vacuum in the vacuum system, resulting in the decline of power assistance effect. The pedal will harden when starting the vehicle next time. This is a normal phenomenon and does not need maintenance.

b. If the customer does not have the above habits, and only feels hard when stepping on the brake pedal when starting the vehicle for the first time, and there are no other abnormal phenomena (for example, starting the vehicle after parking for a few hours, there is no pedal hard problem under normal braking), it can be preliminarily judged that there is slow leakage in the vacuum system.

c. After making the preliminary judgment described in 2 above, the slow leakage problem of vacuum system can be investigated according to the following steps:

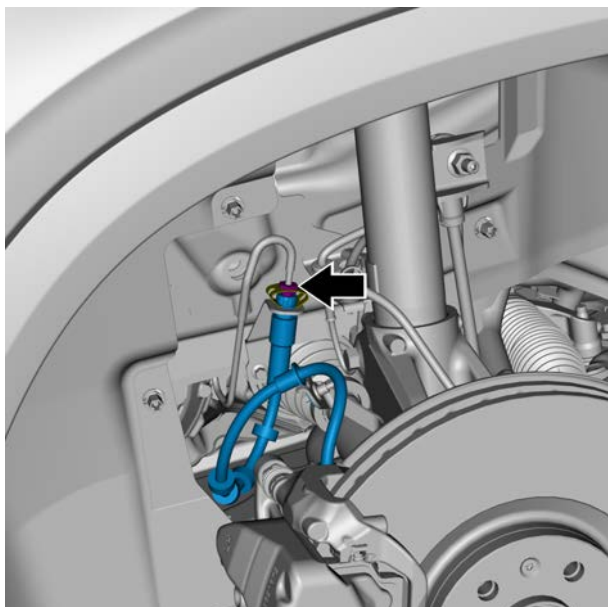
	Step a	Check whether the positions of interfaces 1 and 2 in the figure are loose. If they are loose, proceed to step B; if not, proceed to step 3.
	Step b	Reassemble the vacuum pipe, start the engine for 1 minute and stop for 3 h to check whether the fault is eliminated. If the fault is eliminated, it can be caused by poor assembly of the locking vacuum pipe (generally, the leakage at this position will be fast). If it is not eliminated, restart the engine and proceed to step C.
	Step c	Disconnect the interface 3 and connect the vacuum gauge on the brake vacuum pipe orifice to check whether the vacuum system of the brake system has leakage. Start the engine for 30s and check whether the vacuum degree drops after shutdown. If it drops rapidly, proceed to step d; If there is no change or little change in vacuum, proceed to step e.
	Step d	It can be determined that there is leakage in the brake vacuum system. Replace the brake vacuum pipe to confirm whether the fault can be eliminated; If the leakage of locking brake vacuum pipe is eliminated, the vacuum pipe shall be returned to the factory for claim by the vacuum pipe supplier; e. if the troubleshooting cannot be continued, follow the steps.
	Step e	Disconnect the interface 3, connect the vacuum gauge on the vacuum pipeline of the engine system, and check the sealing condition of the vacuum pipeline of the engine system. If there is a slow leakage of the system vacuum (leakage rate < 5kpa/s), it is confirmed that the check valve cannot be closed due to the micro leakage of the power system, which leads to the slow leakage of the whole vacuum system after parking. The brake vacuum pipe can be replaced.

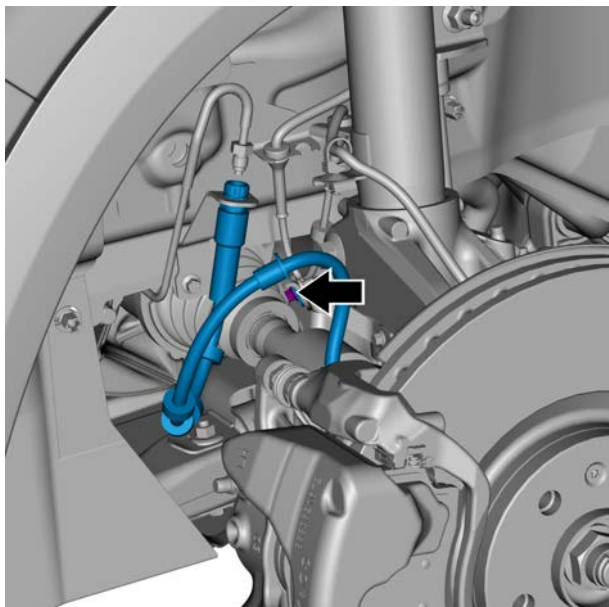
6.4.5 Removing and installing

6.4.5.1 Replacement of the front left brake hose

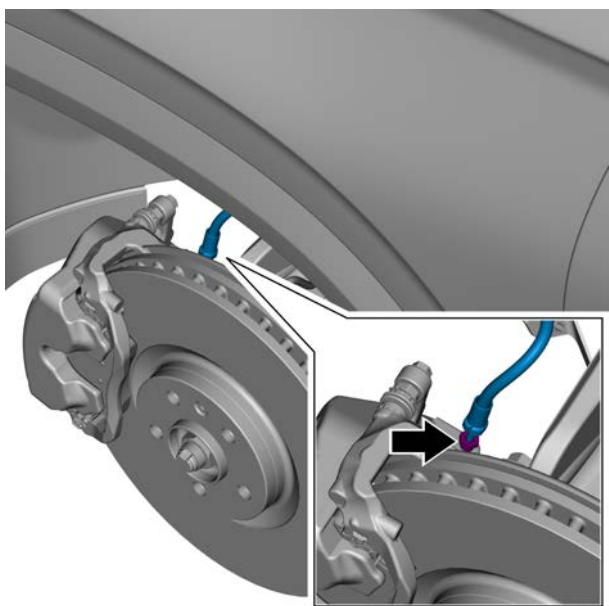
Removal procedure

- 1 Drain the brake fluid.
- 2 Support vehicles, see [Support Vehicles](#)
- 3 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 4 Remove the connecting nut between front left brake hose and the brake hard pipe, and pull out the spring stopper.



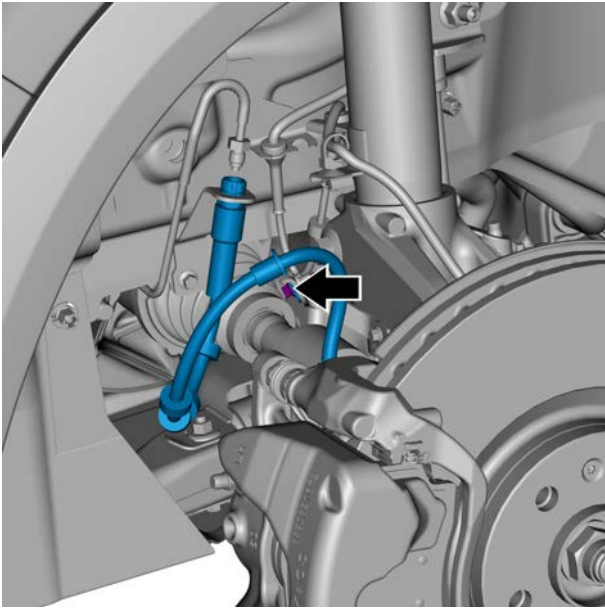


- 5 Remove retaining bolts from the front brake hose bracket LH.



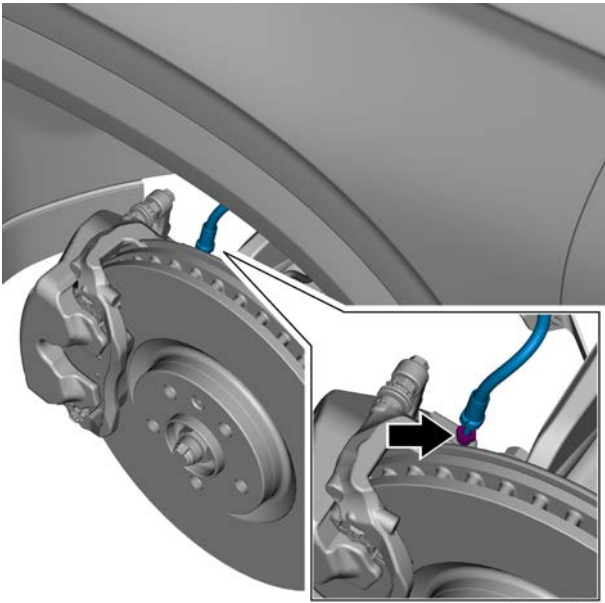
- 6 Remove the bolts connecting front left brake hose to the Assembly-front brake caliper LH.

Installation procedure



- 1 Install the front brake hose bracket LH and tighten the bolts.

Torque: 7 N. m (metric system) 5.2 lb-ft (Imperial system)

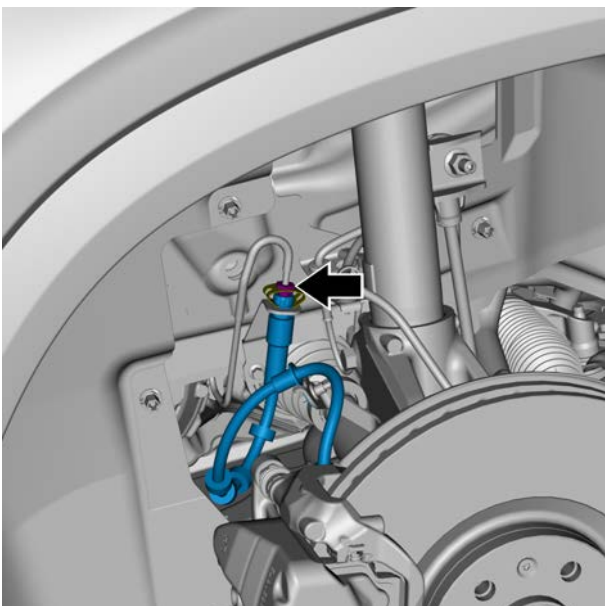


- 2 Install front left brake hose and tighten the bolts.

Torque: 17 N. m (metric system) 12.5 lb-ft (Imperial system)

Caution

When assembling front left brake hose, the connector shall be Pre-tightened by hand, then hold the brake hose by hand, and tighten the torque with an open-ended wrench to prevent the brake hose from changing shape.



- 3 Connect front left brake hose and the brake hard pipe, tighten the nut and clip in the spring stopper.

Torque: 14 N. m (metric system) 10.3 lb-ft (Imperial system)

- 4 Install the wheel.
- 5 Add clean brake fluid to the master cylinder reservoir to the max line of the reservoir.
- 6 Bleed the brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#).
- 7 Check whether the brake fluid leaks.

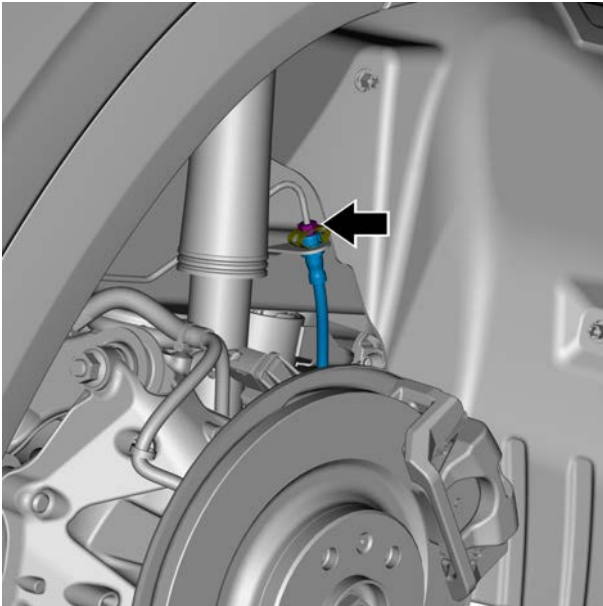
6.4.5.2 Replacement of rear right brake hose

Removal procedure

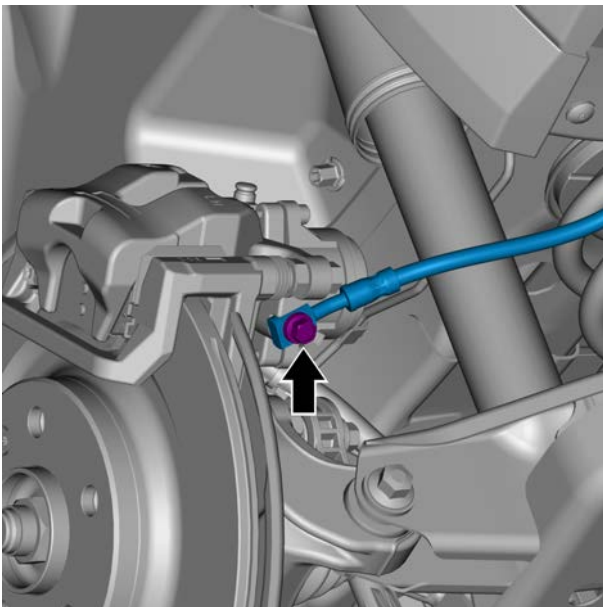
Caution

The removal and assembly methods of front rear brake LH hoses are similar.

- 1 Drain the brake fluid.
- 2 Support vehicles, see [Support Vehicles](#)
- 3 Remove the wheel, refer to [Replacement of wheel assembly](#).

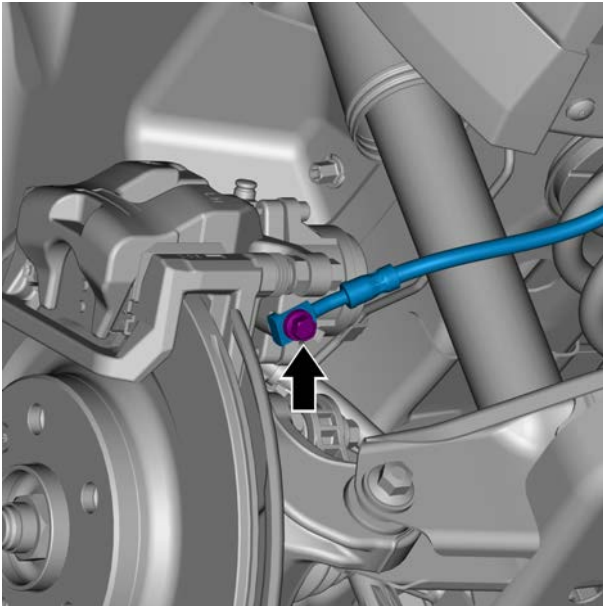


- 4 Remove the connecting nut between the rear brake LH hose and the brake hard pipe, and pull out the spring stopper.



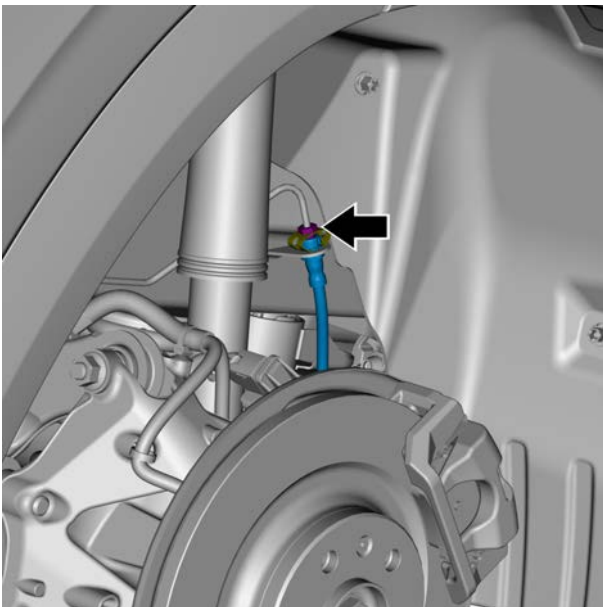
- 5 Remove the hollow bolt of the rear brake LH hose, disconnect the brake hose from the rear brake LH caliper body with EPB assembly, and remove the rear brake LH hose.

Installation procedure



- 1 Install the rear brake LH hose to the rear brake LH caliper body with EPB assembly, and tighten the hollow bolt of the brake hose.

Torque: 42 N. m (metric system) 31 lb-ft (Imperial system)



- 2 Clip in the spring stopper, connect the rear brake LH hose and the brake hard pipe, and tighten the nut.

Torque: 14 N. m (metric system) 10.3 lb-ft (Imperial system)

- 3 Install the wheel.
- 4 Add clean brake fluid to the master cylinder reservoir to the max line of the reservoir.
- 5 Bleed the brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#).
- 6 Check whether the brake fluid leaks.

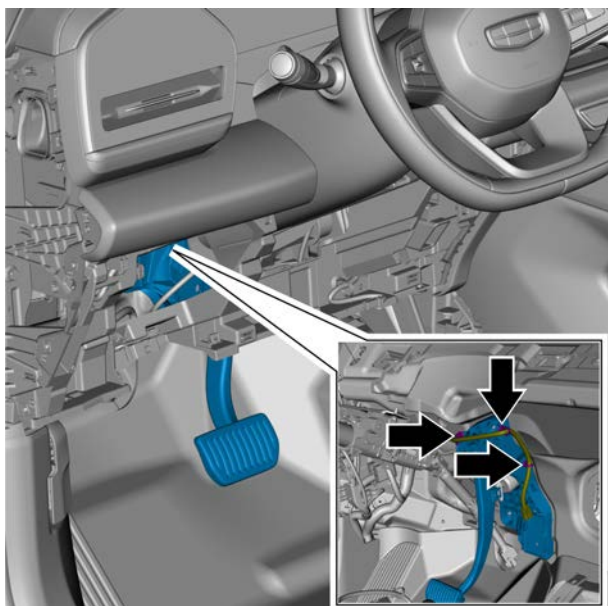
6.4.5.3 Replacement of brake pedal assembly

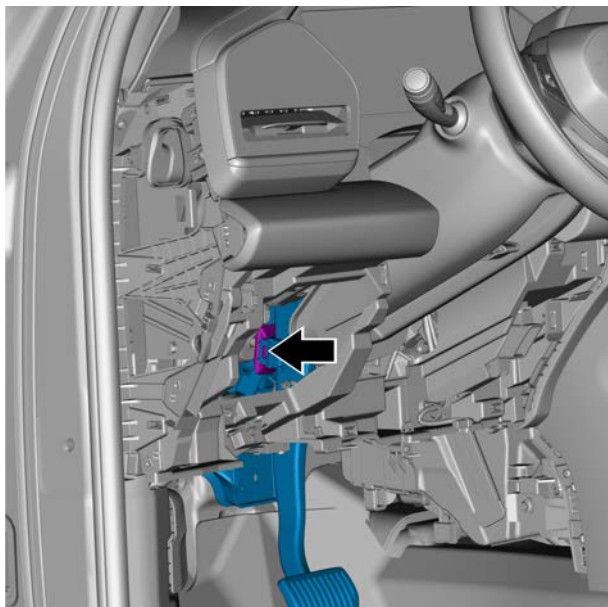
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove left lower fender apron of the instrument panel, refer to Replacement of left lower fender apron of the instrument panel.
- 3 Remove the left air duct of the front foot, see [the replacement of the left air duct of the front foot](#).
- 4 Remove the accelerator pedal sensor, see [accelerator pedal sensor replacement](#).
- 5 Remove the brake light switch, see [brake light switch replacement](#).
- 6 Disconnect the harness fixing clip on the brake pedal assembly



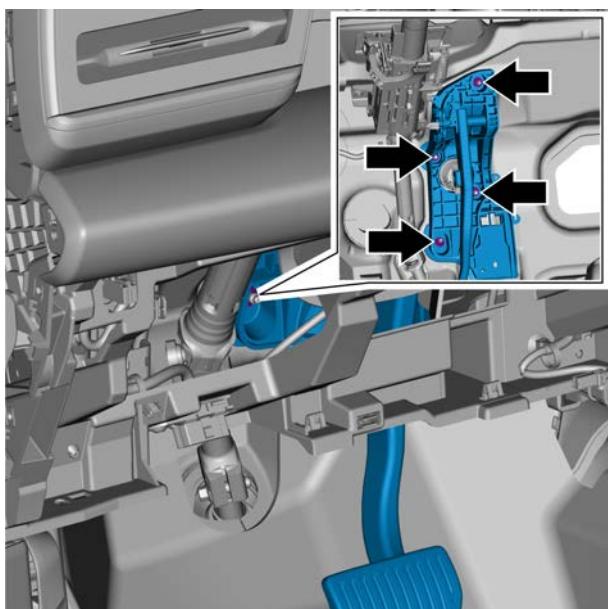


- 7 Disconnect the ball joint push rod connecting the vacuum booster with the brake master cylinder assembly and the brake pedal assembly bracket.

Caution

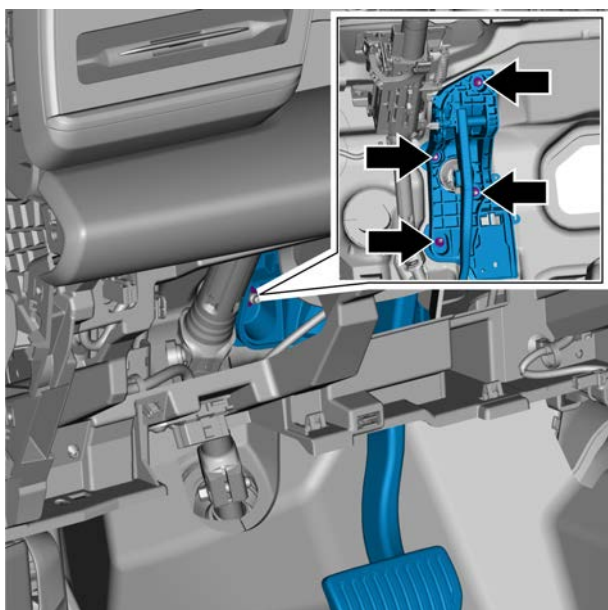
Each time the ball joint push rod is removed, the lining in the pedal needs to be replaced.

Each time the lining in the pedal is replaced, grease shall be applied to the lining

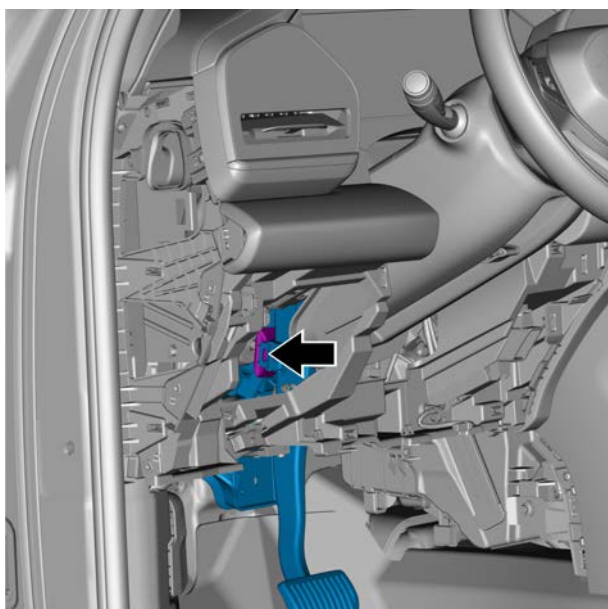


- 8 Remove 4 fixing nuts connecting the brake pedal assembly and the vehicle body, and remove the brake pedal assembly.

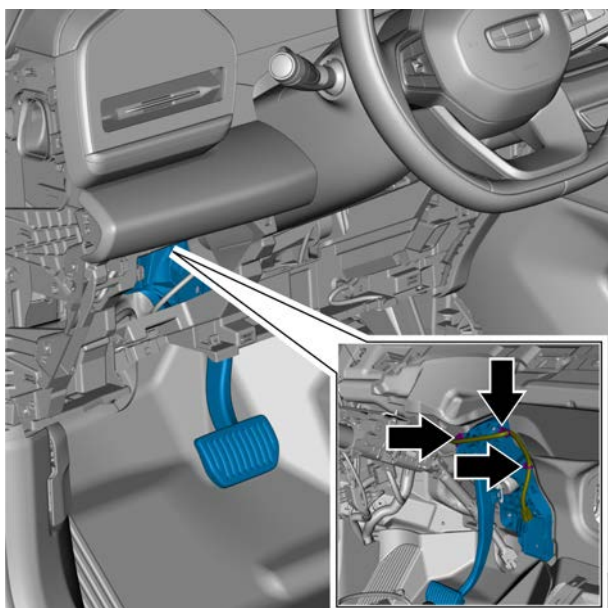
Installation procedure



- 1 Install 4 fixing nuts connecting the brake pedal to the vehicle body.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



- 2 Clip the push rod of the vacuum booster ball joint into the brake pedal bracket.



- 3 Install the harness fixing clip to the pedal assembly.

- 4 Install brake lamp switch.
- 5 Install the accelerator pedal sensor.
- 6 Install the left air duct of the front foot blower.
- 7 Install left lower fender apron of the dashboard.
- 8 Connect the negative battery cable.

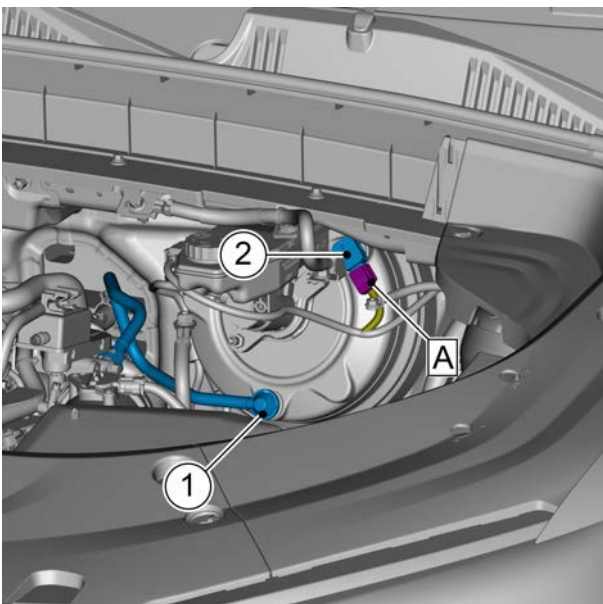
6.4.5.4 Assembly-vacuum booster with brake master cylinder

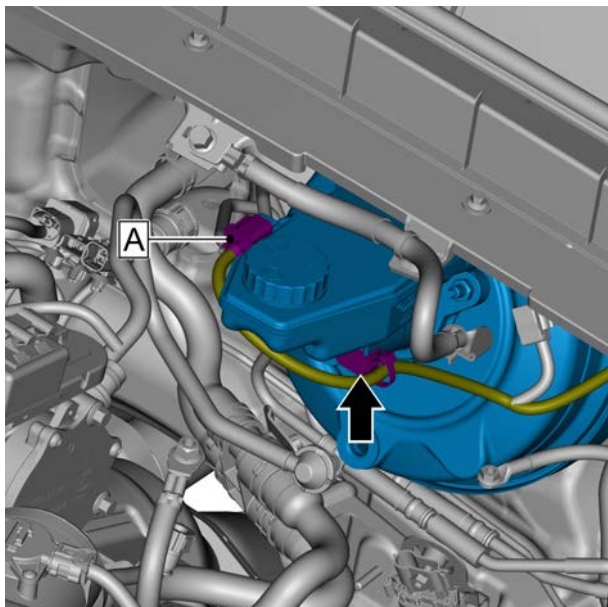
Removal procedure

Warning !

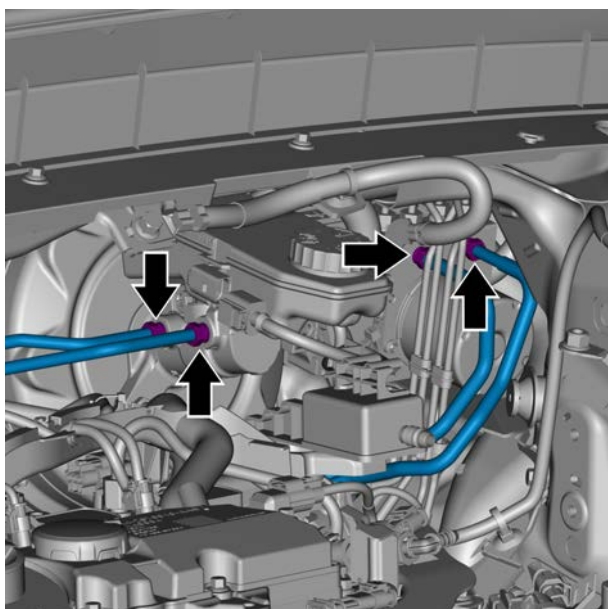
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the battery, refer to [Replacement of battery](#).
- 3 Remove the battery bracket assembly. Refer to [battery bracket assembly replacement](#).
- 4 Remove the upper outlet pipe of air filter. See [replacement of upper outlet pipe of air filter](#).
- 5 Remove the lower left baffle assembly, see [Replacement of the lower left baffle assembly](#).
- 6 Remove the left lower guard assembly of the dashboard, see the [Replacement of left lower guard assembly of the dashboard](#).
- 7 Remove the brake light switch, see [brake light switch replacement](#).
- 8 Exhaust the brake fluid.
- 9 Disconnect the vacuum booster connecting hose 1 and the vacuum booster.
- 10 Disconnect the harness connector A of the brake vacuum sensor.
- 11 Disconnect the brake vacuum sensor 2 from the vacuum booster.

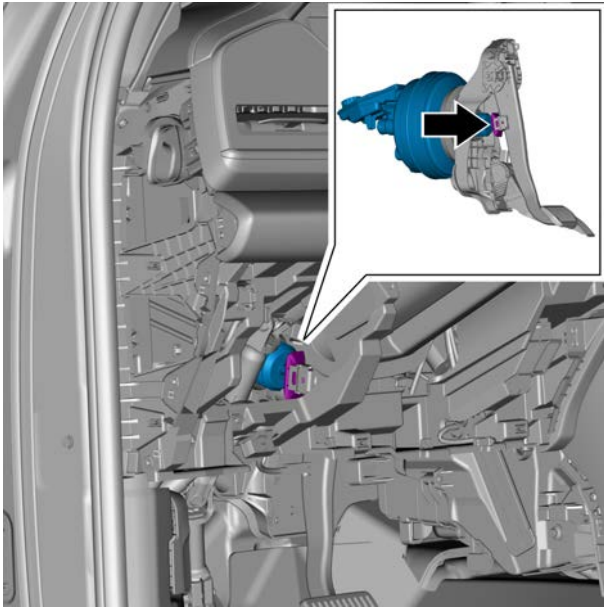




- 12 Disconnect harness connector A of brake liquid level sensor.
- 13 Disconnect the fixing clip of brake fluid level sensor harness.



- 14 Remove 2 retaining bolts of brake hard pipe on the brake master cylinder.
- 15 Remove the 2 retaining bolts of the brake hard pipes on the vehicle dynamic domain master, and remove the 2 brake hard pipes.



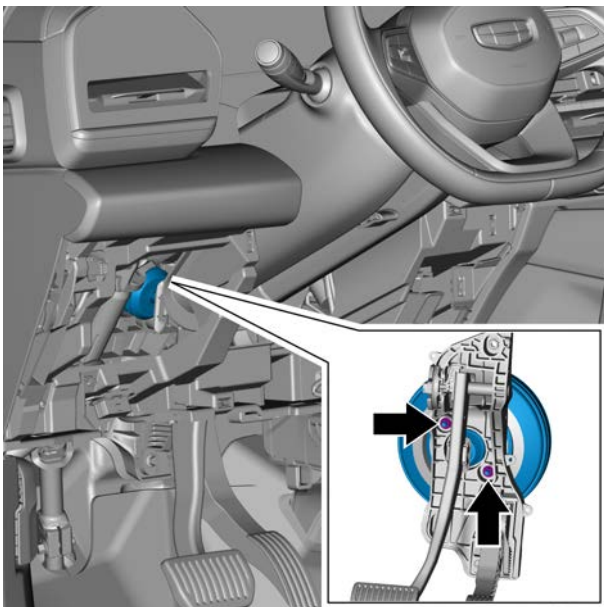
- 16 Disconnect the ball joint push rod connecting the vacuum booster with the brake master cylinder assembly and the brake pedal bracket.

Caution

Each time the ball joint push rod is removed, the lining in the pedal needs to be replaced.

Each time the lining in the pedal is replaced, grease shall be applied to the lining.

When removing the connecting clip between the brake pedal arm and the vacuum booster, when pulling the brake pedal arm hard, it is necessary to prevent the pedal arm from being raised too much and damaging the pedal angle sensor due to inertia or the operator's failure to respond in time after the connection point is suddenly removed



- 17 Remove 2 fixing nuts shared by the assembly-vacuum booster with brake master cylinder and brake pedal.
- 18 Extract the assembly-vacuum booster with brake master cylinder from the engine compartment side.

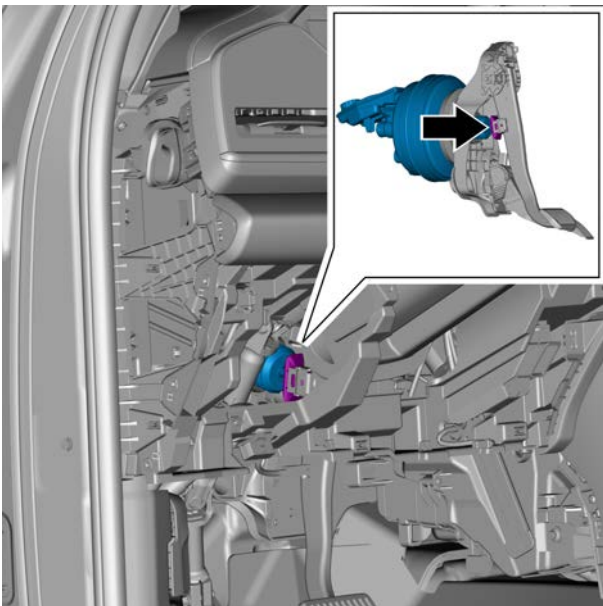
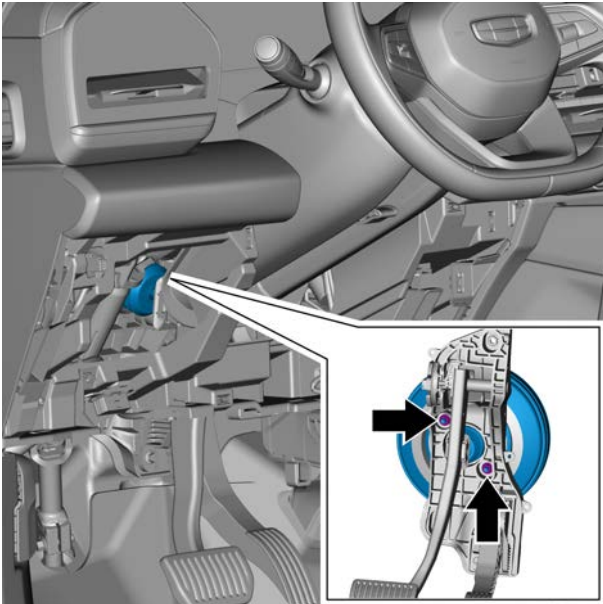
Installation procedure

Caution

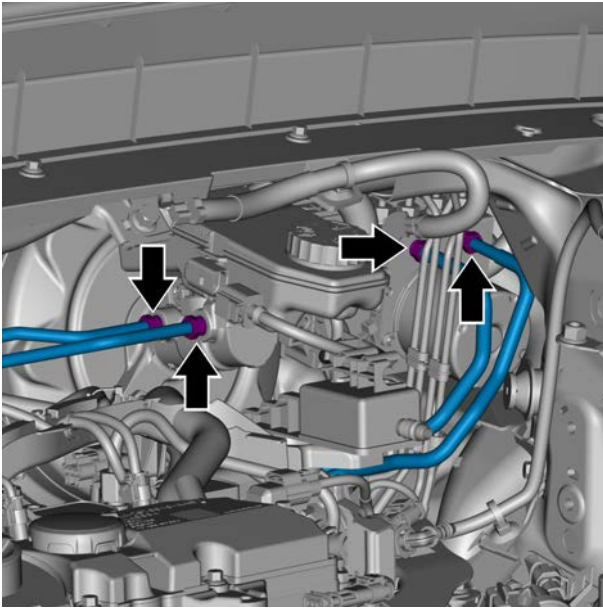
When installing the brake hard pipeline, the joint shall be Pre-tightened by hand, and then the torque shall be tightened with an open-ended wrench to prevent thread damage.

- 1 Install 2 fixing nuts shared by assembly-vacuum booster with brake master cylinder and brake pedal.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



- 2 Clip the push rod of the vacuum booster ball joint into the brake pedal bracket.

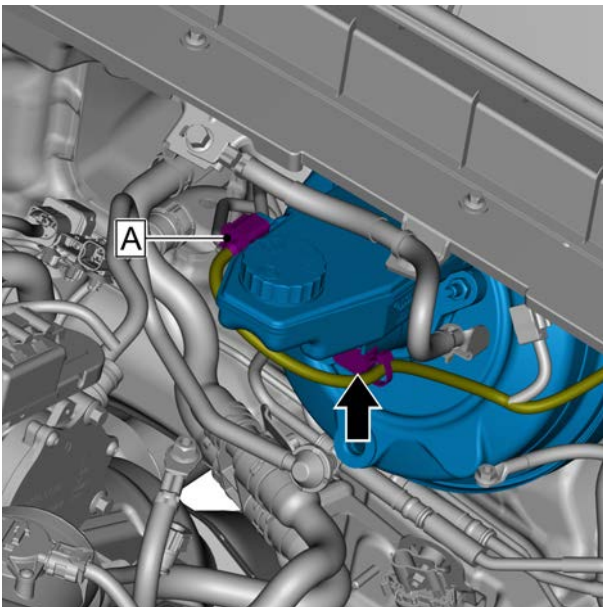


- 3 Place the hard brake pipe at the installation position and tighten the 2 retaining bolts of the hard brake pipe on the brake master cylinder.

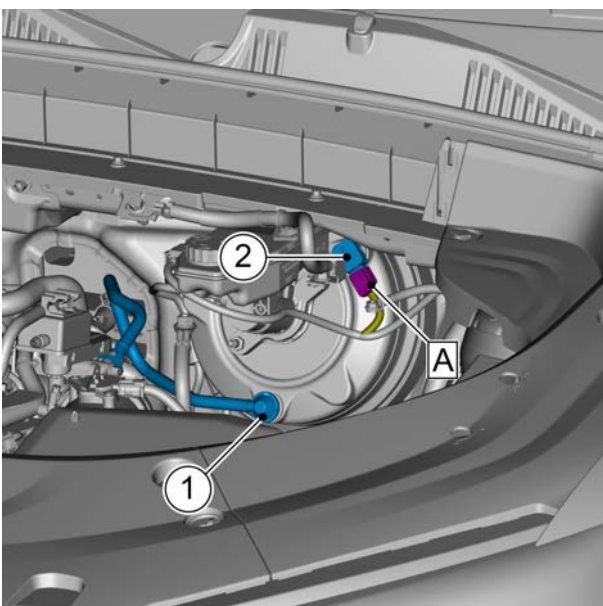
Torque: 17.5 N. m (metric system) 12.9 lb-ft (Imperial system)

- 4 Tighten 2 retaining bolts of the brake hard pipe on the vehicle dynamic domain master.

Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



- 5 Install brake fluid level sensor harness connector A.
- 6 Install fixing clip of brake fluid level sensor harness.



- 7 Connect the vacuum booster connecting hose 1.
- 8 Install the brake vacuum sensor 2 to the vacuum booster.
- 9 Install harness connector A of brake vacuum sensor.

- 10 Install brake lamp switch.
- 11 Install the upper outlet pipe of the air filter.
- 12 Install the battery bracket.
- 13 Install the battery heat shield.
- 14 Install the left lower fender apron assembly of the dashboard.
- 15 Install the lower left foot shield assembly.
- 16 Add clean brake fluid to the master cylinder reservoir until it is flush with the max line of the reservoir.
- 17 Check the brake fluid for leaks.
- 18 Bleed the brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#)
- .
- 19 Connect the negative battery cable.
- 20 Close the engine compartment cover.
- 21 Check the air tightness of the brake booster. See [brake booster air tightness inspection](#).

6.4.5.5 Replacement of the front left brake hose

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

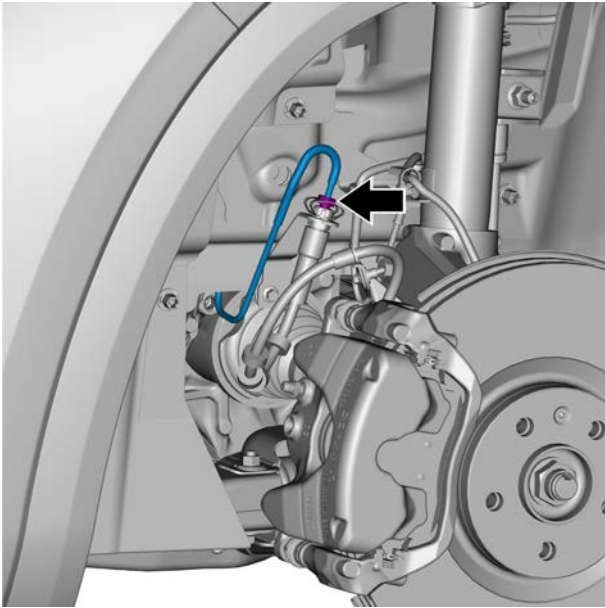
Warning !

Do not bend the brake pipe. Otherwise, it may cause brake failure and accident.

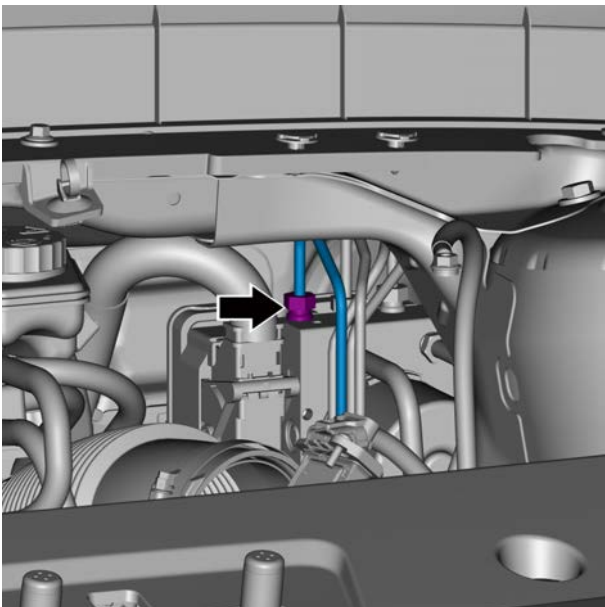
Caution

Do not spill brake fluid on the paint. Otherwise, the paint surface may be damaged.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the battery. See [battery replacement \(4G20\)](#).
- 3 Remove the battery bracket. See [battery bracket assembly replacement \(4G20\)](#).
- 4 Drain the brake fluid.
- 5 Remove the front left wheel, see [Replacement of wheel assembly](#).



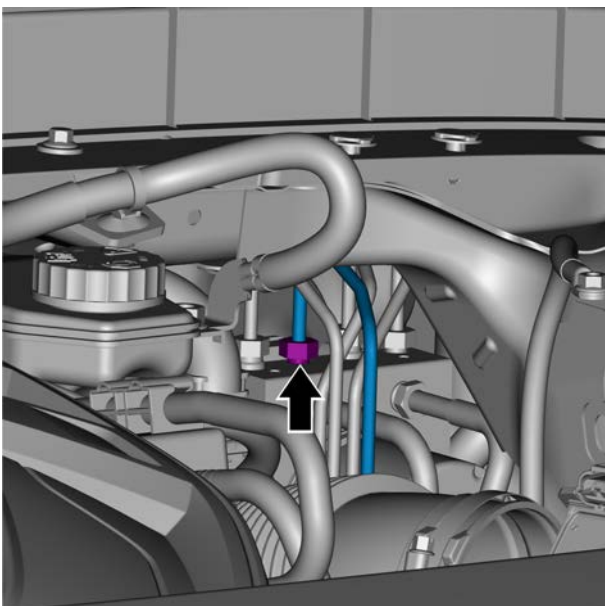
- 6 Remove the connecting nut between front left brake hose and the brake hard pipe, and pull out the spring stopper.



- 7 Remove the fixing nut on the right brake pipe of the vehicle.

Caution

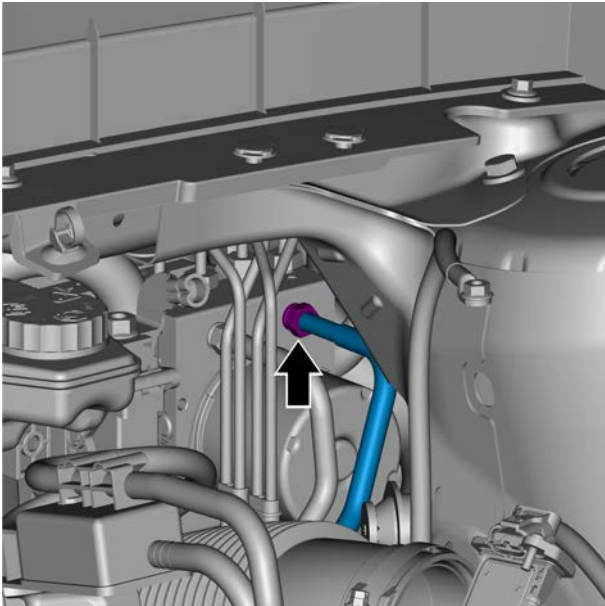
Plug the rear right No. 1 brake hard pipe and the oil pipe port of vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



- 8 Remove the connector nut of front left brake hard pipe from the vehicle dynamic domain master, and wipe off the overflowing brake fluid immediately.

Caution

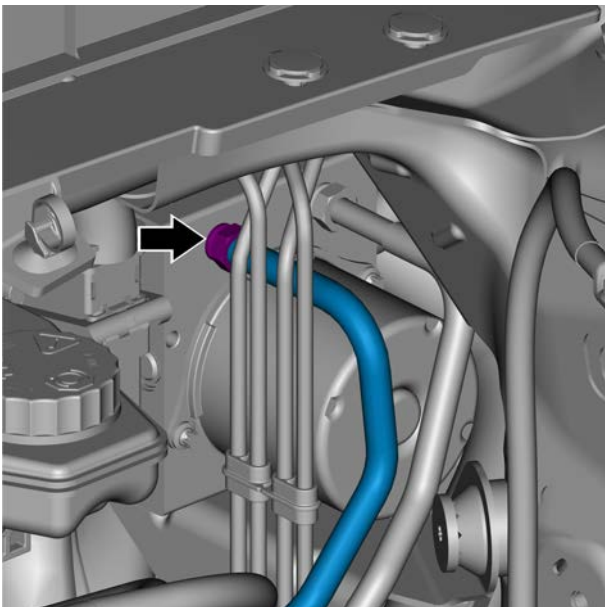
Plug the connecting pipe orifice between front left brake hard pipe and the vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



- 9 Remove the brake hard pipe fixing nut of No. 1 brake hard pipe of brake master cylinder fixed on the vehicle dynamic domain master.

Caution

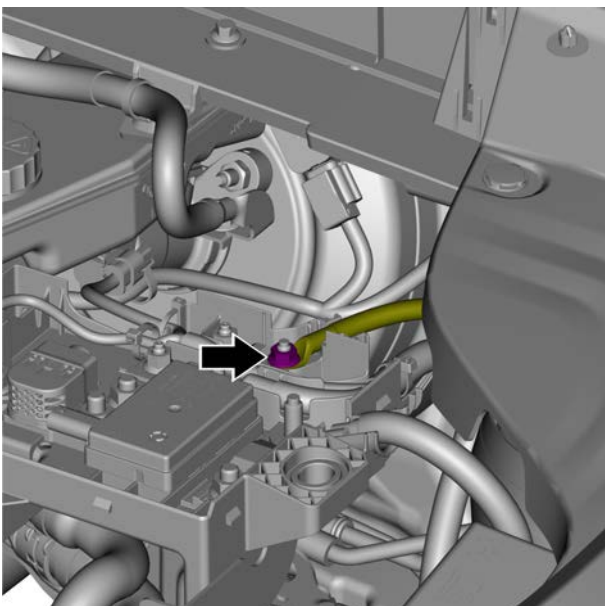
Plug the No. 1 hard pipe of the brake master cylinder and the oil pipe port of the vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



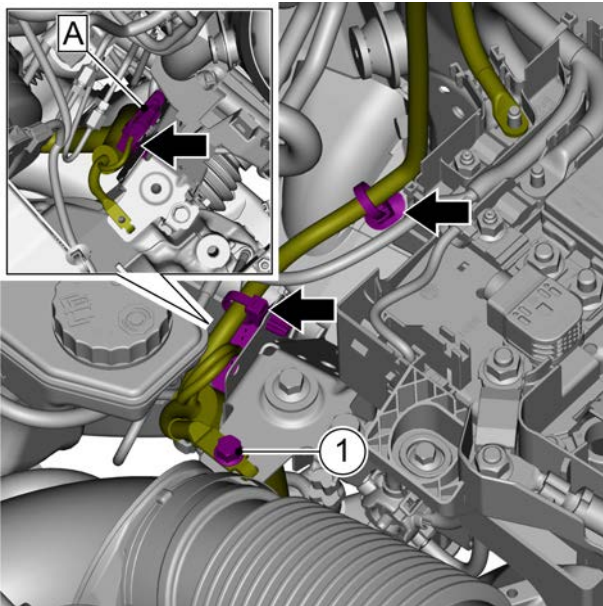
- 10 Remove the brake hard pipe fixing nut of No. 2 brake hard pipe of brake master cylinder fixed on the vehicle dynamic domain master.

Caution

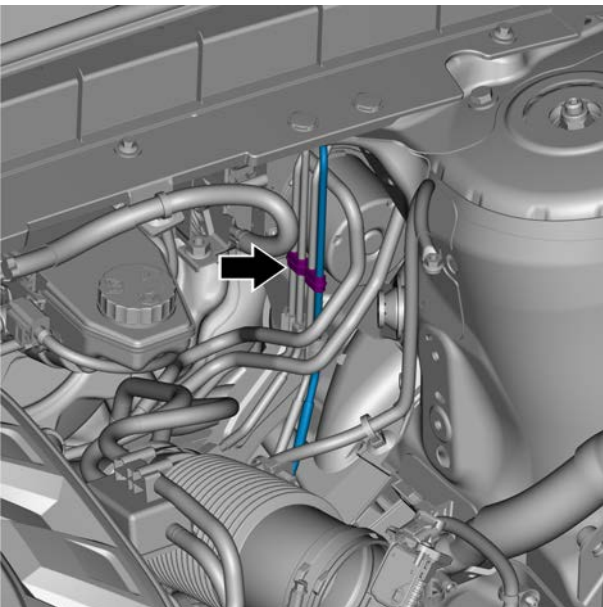
Plug the No. 2 hard pipe of the brake master cylinder and the oil pipe port of vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



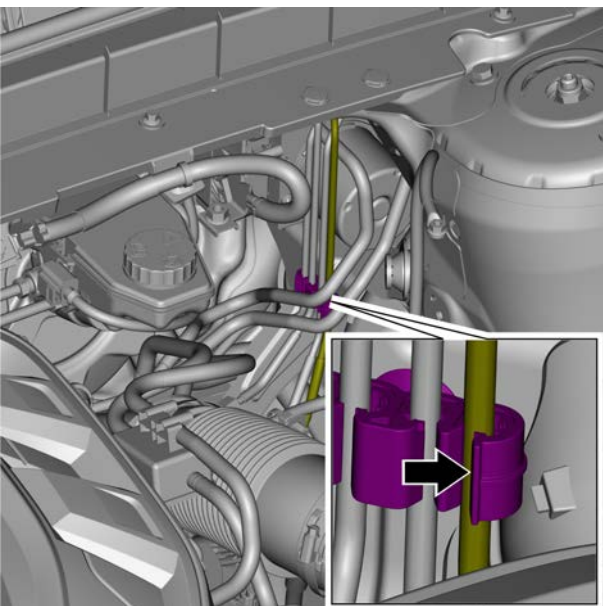
- 11 Remove fixing nuts of power steering harness.



- 12 Remove retaining bolts 1 from the power steering harness.
- 13 Disconnect the fixing clip of power steering harness.
- 14 Disconnect the power steering harness connection plug a.



- 15 Remove the four-hole pipe clamp.



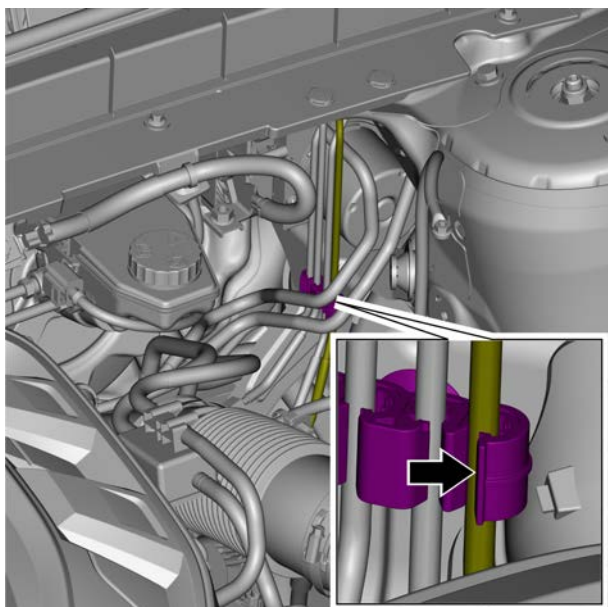
- 16 Disconnect front left brake hard pipe from the four-hole pipe clamp and remove front left brake hard pipe.

Installation procedure

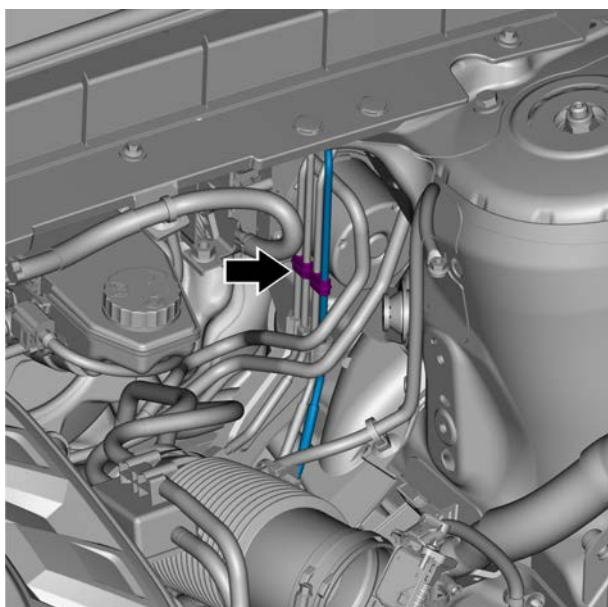
Caution

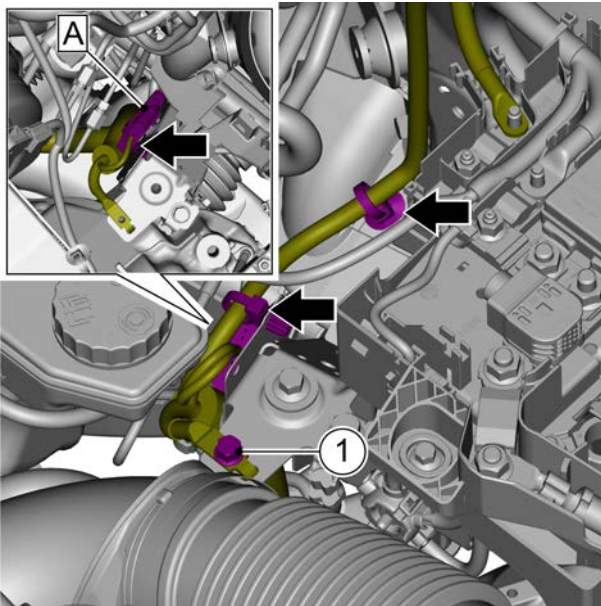
When installing the brake hard pipeline, the joint shall be Pre-tightened by hand, and then the torque shall be tightened with an open-ended wrench to prevent thread damage.

- 1 Install front left brake hard pipe and clip front left brake hard pipe into the four-hole pipe clamp.

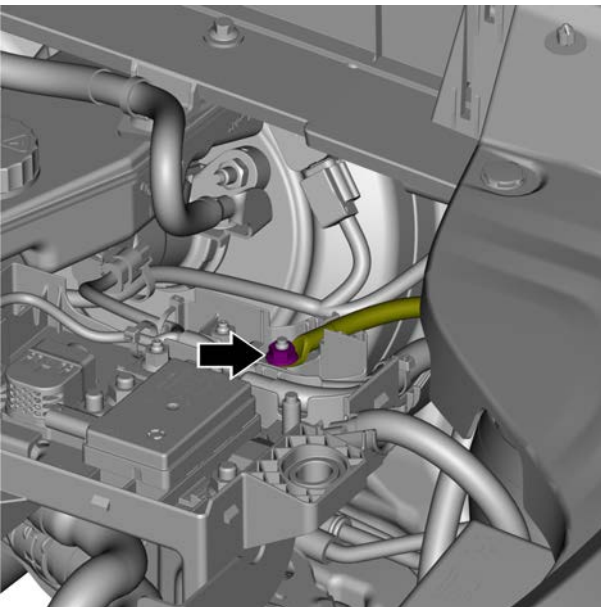


- 2 Install the four-hole pipe clamp.

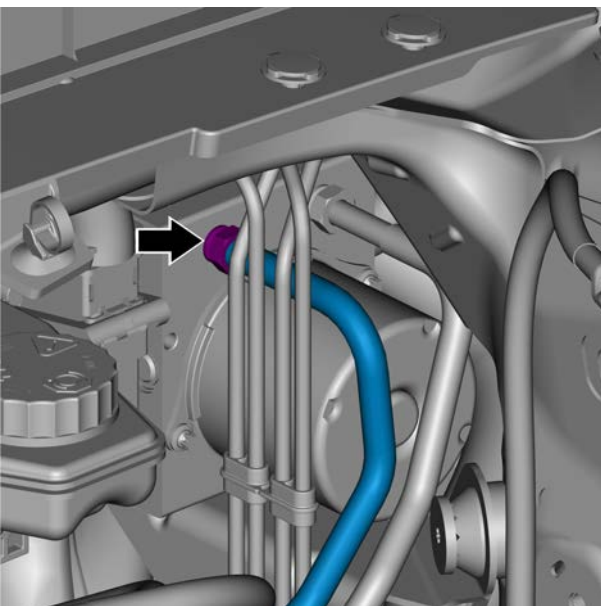




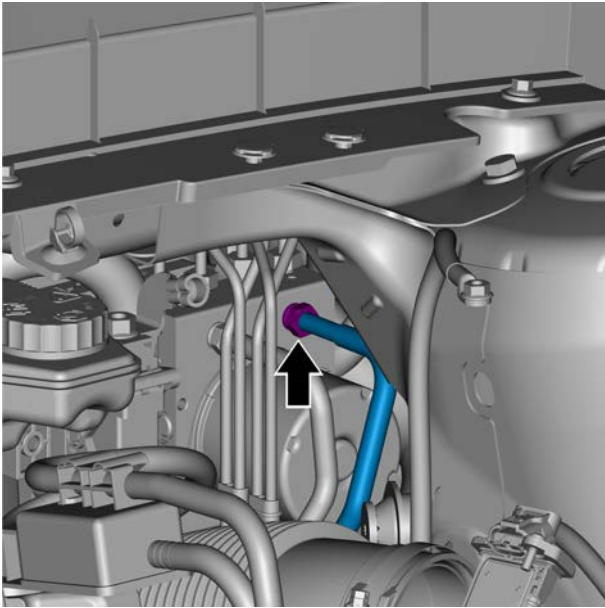
- 3 Install power steering harness connection plug a.
- 4 Install fixing clip of power steering harness.
- 5 Install retaining bolts 1 of power steering harness.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 6 Install fixing nuts of power steering harness.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

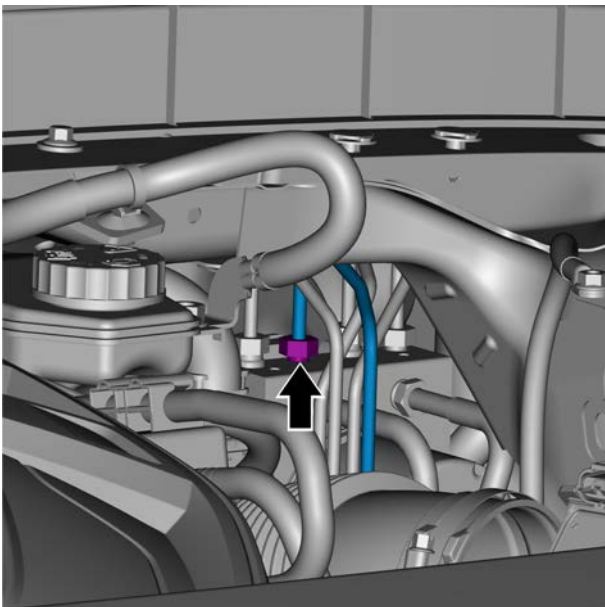


- 7 Install the brake hard pipe fixing nut of No. 2 brake hard pipe of brake master cylinder fixed on the vehicle dynamic domain master.
Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



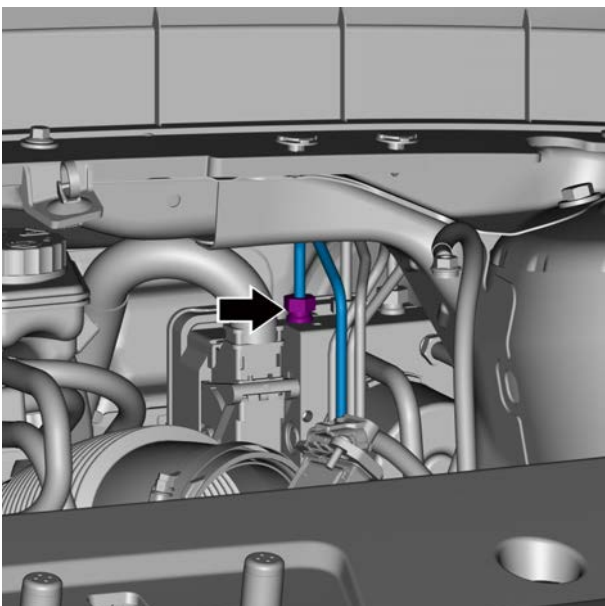
- 8 Install the brake hard pipe fixing nut of No. 1 brake hard pipe of brake master cylinder fixed on the vehicle dynamic domain master.

Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



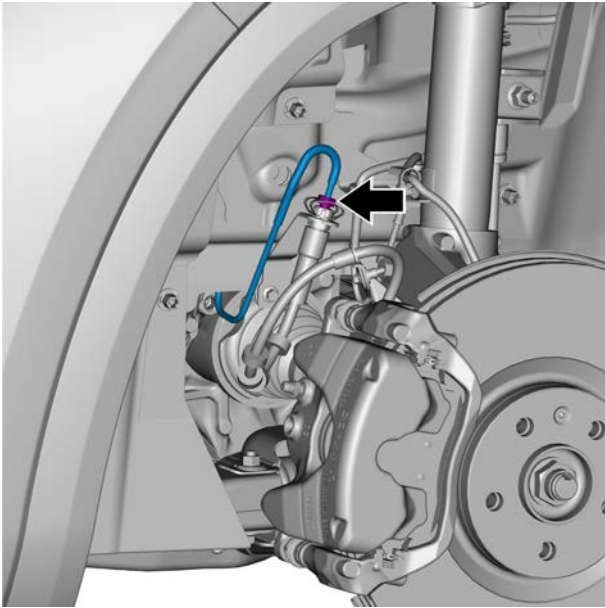
- 9 Install the connector nut of front left brake hard pipe.

Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



- 10 Install the brake hard pipe fixing nut of No. 1 rear right brake hard pipe fixed on the vehicle dynamic domain master.

Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



- 11 Clip in the spring stopper, connect front left brake hose and the brake hard pipe, and tighten the nut.

Torque: 14 N. m (metric system) 10.3 lb-ft (Imperial system)

- 12 Install the battery bracket.
- 13 Install the battery heat shield.
- 14 Add clean brake fluid to the brake fluid reservoir until it is flush with the max line of the reservoir.
- 15 Check the brake fluid for leaks.
- 16 Bleed the brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#)
- 17 Install the left front wheel.
- 18 Connect the negative battery cable.
- 19 Close the engine compartment cover.

6.4.5.6 Replacement of the front right brake hard pipe

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

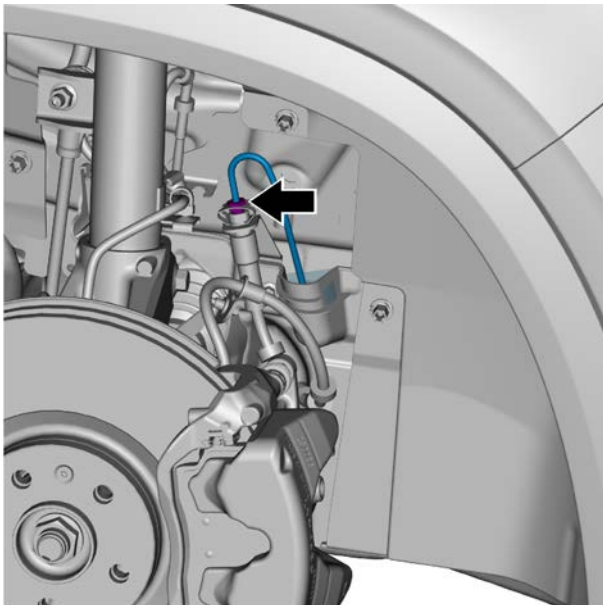
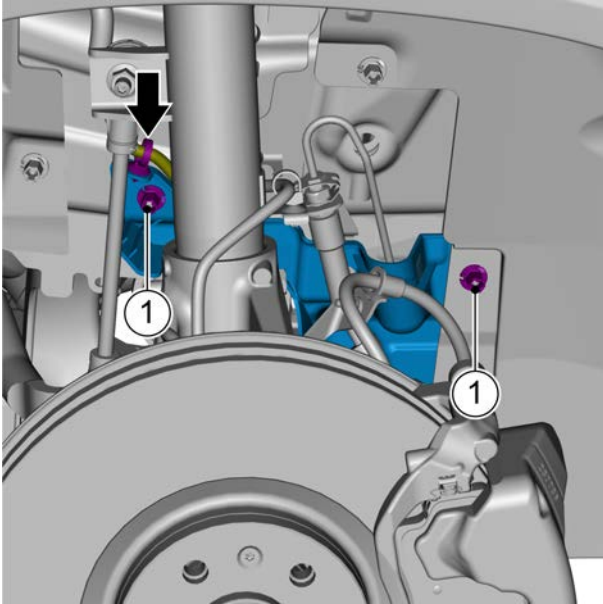
Warning !

Do not bend the brake pipe. Otherwise, it may cause brake failure and accident.

Caution

Do not spill brake fluid on the paint. Otherwise, the paint surface may be damaged.

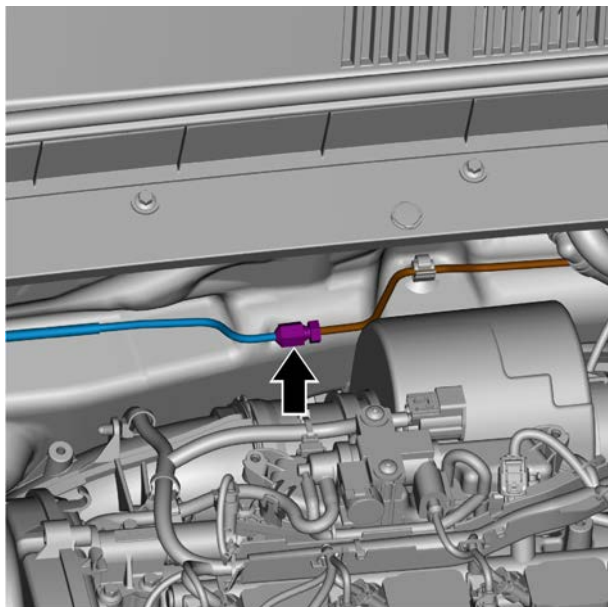
- 1 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).



- 2 Remove the front right wheel, see [wheel assembly replacement](#).
- 3 Remove the engine fender, see [Engine fender replacement](#).
- 5 Disconnect the fixing clip of wheel speed sensor (front right) harness.
- 6 Remove 2 plastic fixing nuts 1 of the splash guard of the right front wheel housing, and remove the splash guard of the right front wheel housing.

- 5 Remove the connecting nut between the right front brake hose and the brake hard pipe, and pull out the spring stopper.

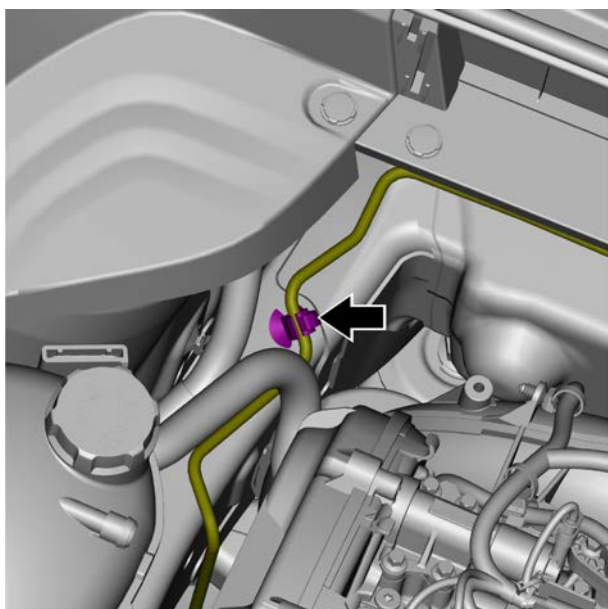
- 6 Exhaust the brake fluid.



- 7 Remove the joint nut between the right front brake hard pipe and the right front No. 1 brake hard pipe, and wipe off the overflowing brake fluid immediately.

Caution

Plug the connecting pipe orifice between the right front brake hard pipe and the right front No. 1 brake hard pipe to prevent the loss and pollution of brake fluid.



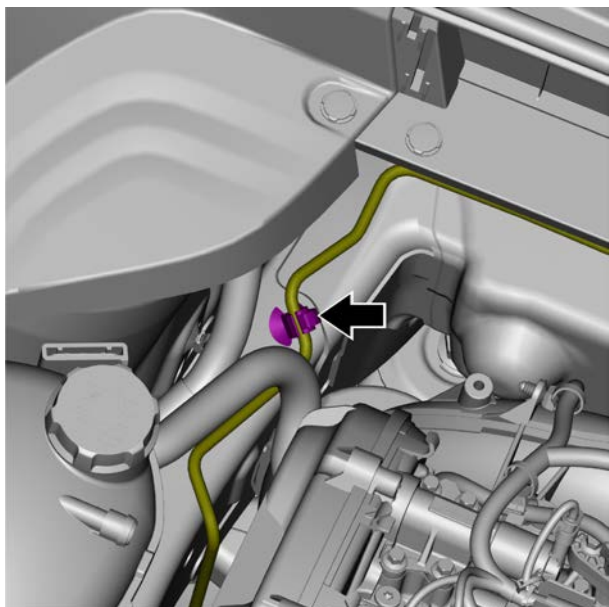
- 9 Disconnect the right front brake hard pipe from the single hole pipe clamp and remove the right front brake hard pipe.

Installation procedure

Caution

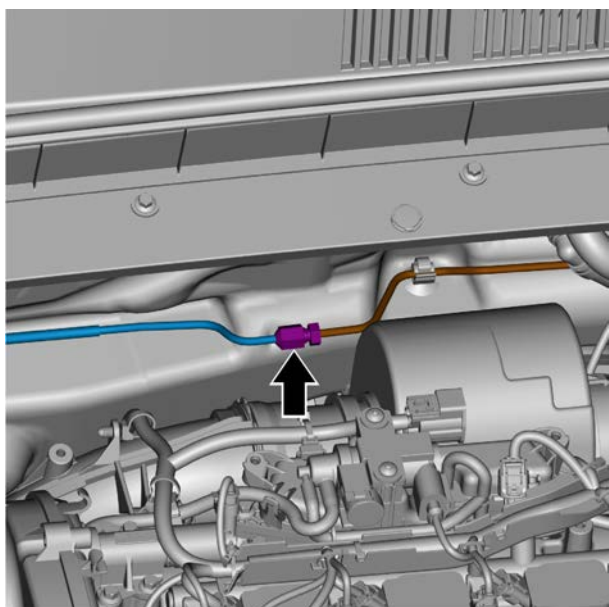
When installing the brake hard pipeline, the joint shall be Pre-tightened by hand, and then the torque shall be tightened with an open-ended wrench to prevent thread damage.

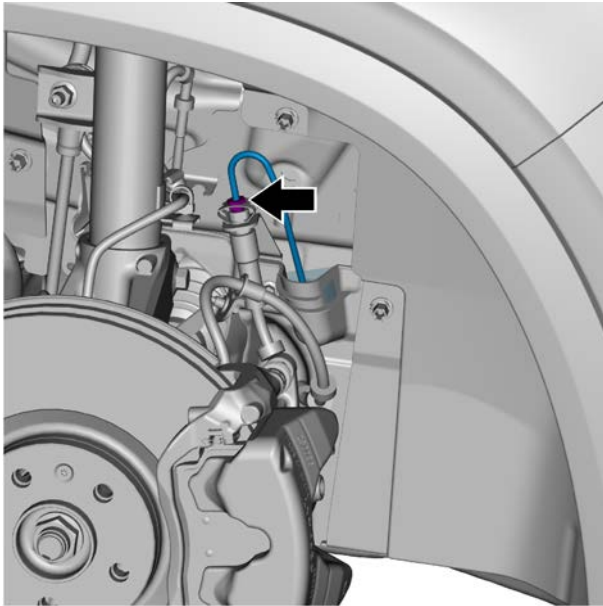
- 1 Install the right front brake hard pipe and clip the right front brake hard pipe into the single hole pipe clamp.



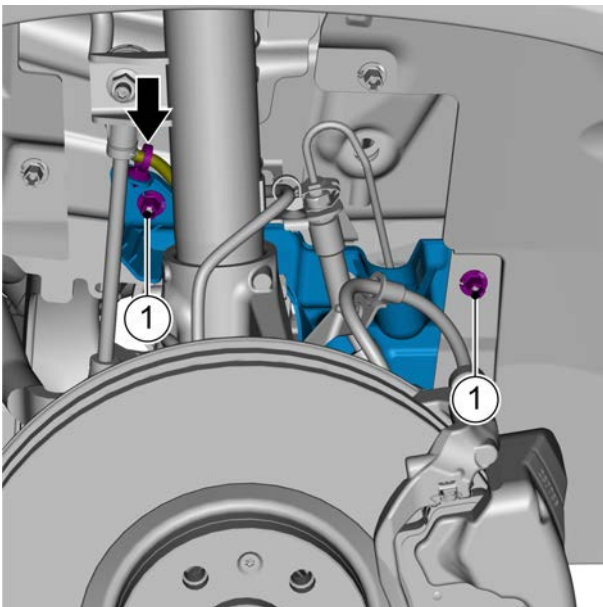
- 2 Install the joint nut between the right front brake hard pipe and the right front No. 1 brake hard pipe.

Torque: 16 N. m (metric system) 11.8 lb-ft (Imperial system)





- 3 Clip in the spring stopper, connect the right front brake hose and the brake hard pipe, and tighten the nut.
Torque: 14 N. m (metric system) 10.3 lb-ft (Imperial system)



- 4 Install the splash guard of the right front wheel housing and tighten 2 plastic fixing nuts 1.
- 5 Install the wheel speed sensor (front right) harness to the fixing card.

- 6 Install the engine fender.
- 7 Add clean brake fluid to the brake fluid reservoir until it is flush with the max line of the reservoir.
- 8 Check the brake fluid for leaks.
- 9 Bleed the brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#)
- 10 Install the front right wheel.
- 11 Engine trim cover assembly.
- 12 Close the engine compartment cover.

6.4.5.7 Replacement of the rear left brake hard pipe

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

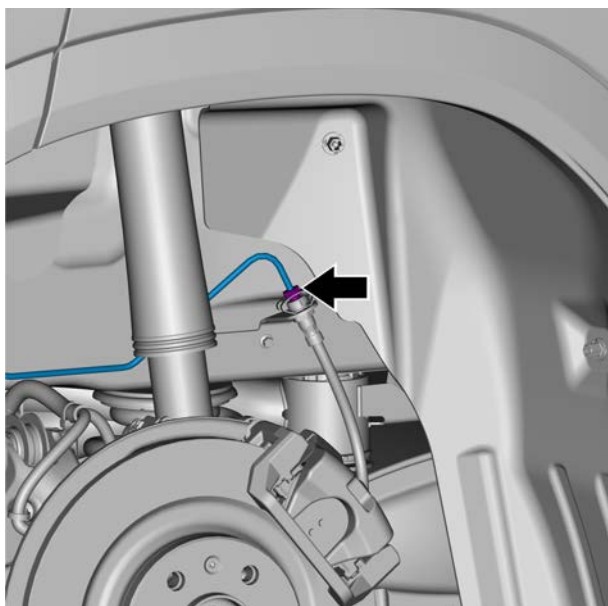
Warning !

Do not bend the brake pipe. Otherwise, it may cause brake failure and serious accident.

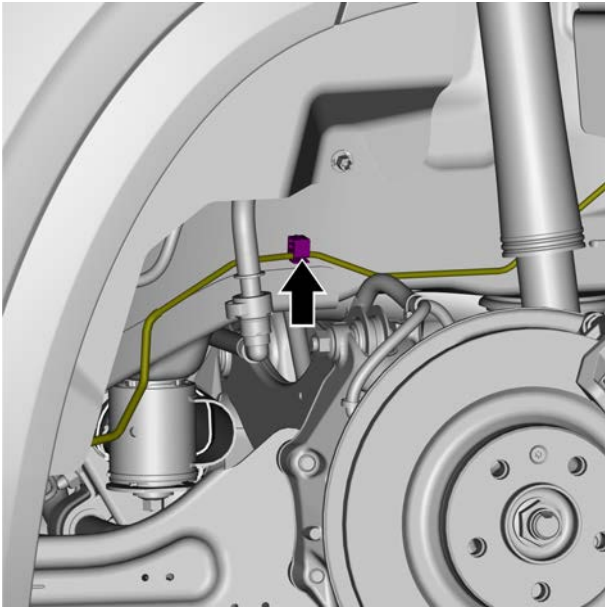
Caution

Do not spill brake fluid on the paint. Otherwise, the paint surface may be damaged.

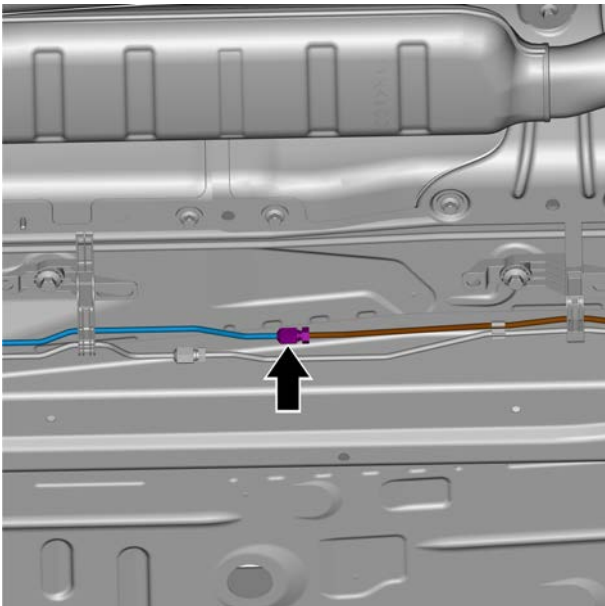
- 1 Remove the RL wheel, see [Replacement of wheel assembly](#).
- 2 Remove the connecting nut between the rear brake LH hose and the brake hard pipe, and pull out the spring stopper.



- 3 Exhaust the brake fluid.



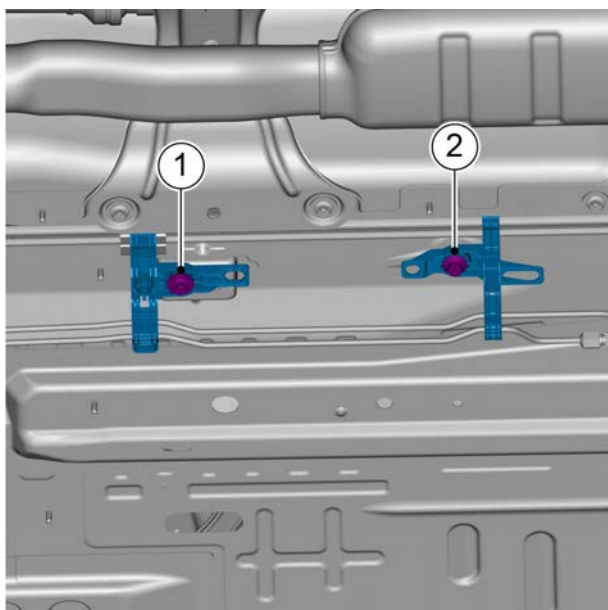
- 4 Disconnect the hard pipe from the fixing clip of the Left rear brake hard pipe.



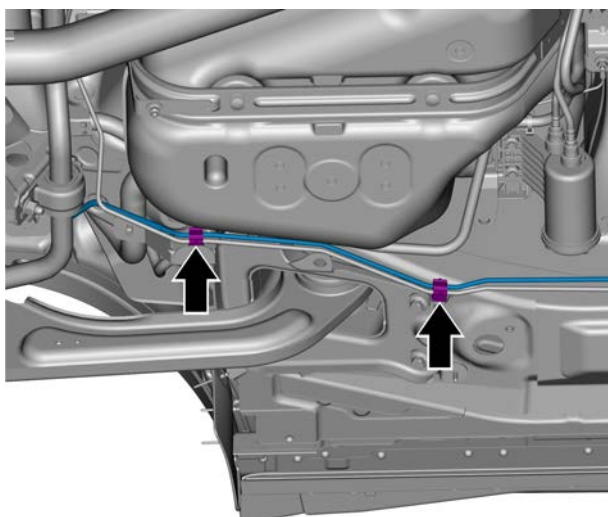
- 5 Support vehicles, see [Support Vehicles](#)
- 6 Remove the left lower fender apron. See [replacement of left lower fender apron](#).
- 7 Disconnect the connecting connector Between the Left rear brake hard pipe and the left middle brake hard pipe.

Caution

Plug the connecting pipe orifice between the Left rear brake hard pipe and the left middle brake hard pipe to prevent the loss and pollution of brake fluid.



- 8 Remove the retaining bolt 1 of the lower floor support and
- 9 remove the lower floor support.
Remove the retaining bolt 2 of the fuel line assembly pipe clamp and remove the fuel line assembly pipe clamp.

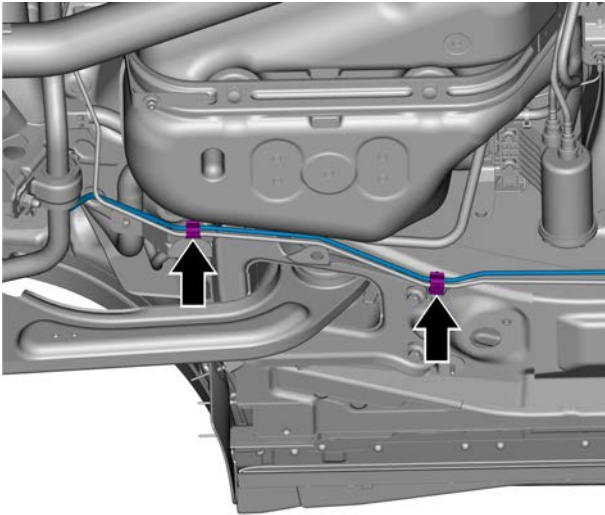


- 10 Disconnect the Left rear brake hard pipe from the double hole pipe clamp and remove the Left rear brake hard pipe.

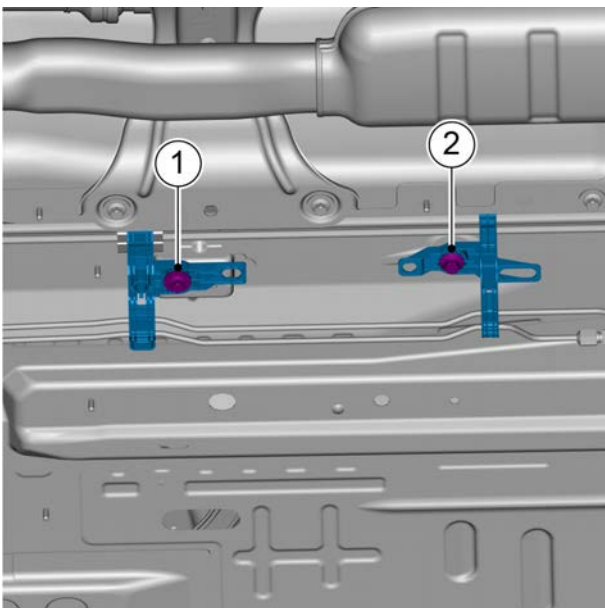
Installation procedure

Caution

When installing the brake hard pipeline, the joint shall be Pre-tightened by hand, and then the torque shall be tightened with an open-ended wrench to prevent thread damage.



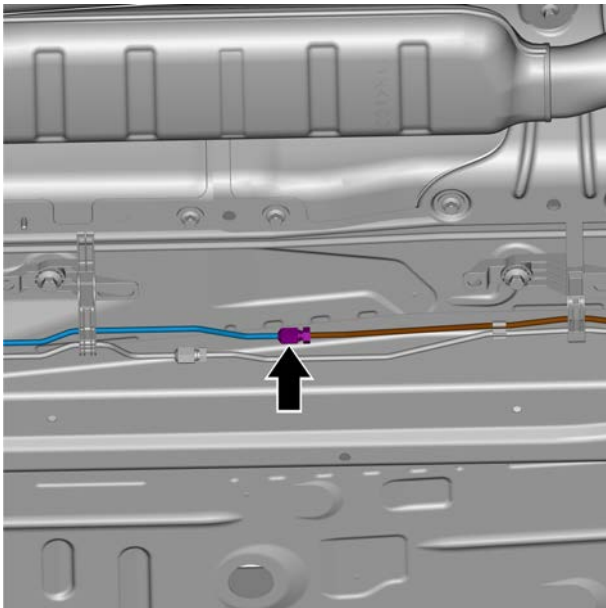
- 1 Install the Left rear brake hard pipe and clip the Left rear brake hard pipe into the double hole pipe clamp.



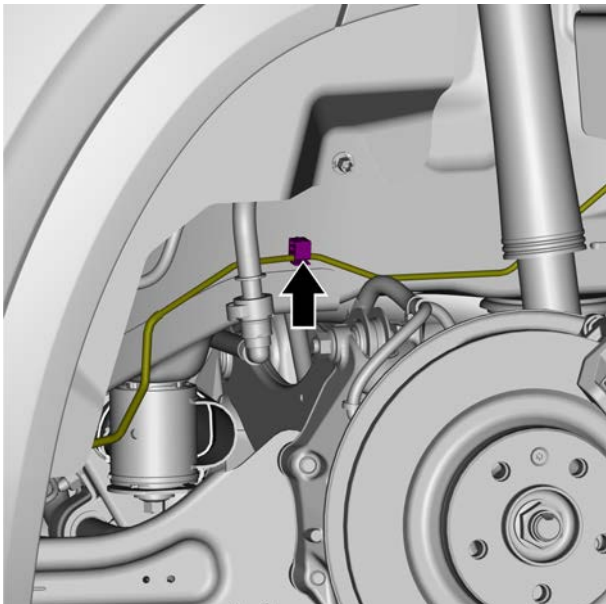
- 2 Install the underfloor bracket and retaining bolt 1, and install the fuel pipe assembly pipe clamp and retaining bolt 2.

Bolt 1 torque: 24 N·m (metric system) 17.7 lb-ft (Imperial system)

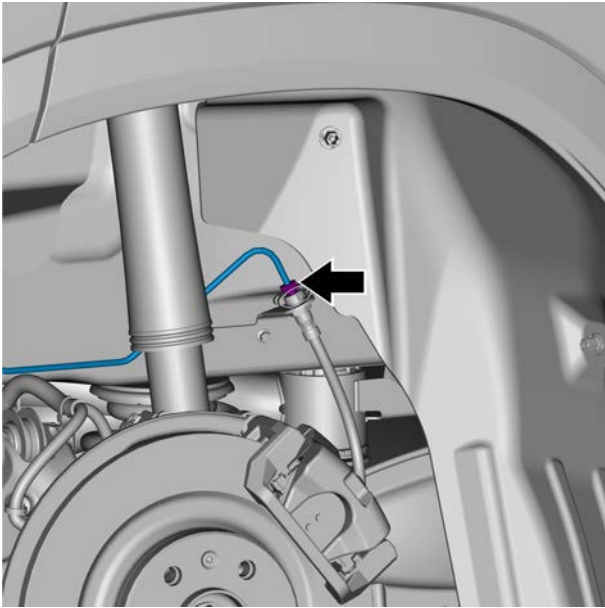
Bolt 2 torque: 30 N·m (metric system) 22.1 lb-ft (Imperial system)



- 3 Connect the connecting joint between the Left rear brake hard pipe and the left middle brake hard pipe.
Torque: 16 N. m (metric system) 11.8 lb-ft (Imperial system)



- 4 Lower the vehicle.
- 5 Clip the Left rear brake hard pipe into the fixing clip.



- 6 Clip in the spring stopper, connect the rear brake LH hose and the brake hard pipe, and tighten the nut.

Torque: 14 N. m (metric system) 10.3 lb-ft (Imperial system)

- 7 Add clean brake fluid to the brake fluid reservoir until it is flush with the max line of the reservoir.
- 8 Check the brake fluid for leaks.
- 9 Bleed the brake system, [see Discharge and filling procedure of brake fluid](#)
[Discharge and filling procedure of brake fluid.](#)
- 10 Install the wheel.
- 11 Support the vehicle and install the lower left fender apron.
- 12 Lower the vehicle.

6.4.5.8 Replacement of rear right brake hard pipe

Removal procedure

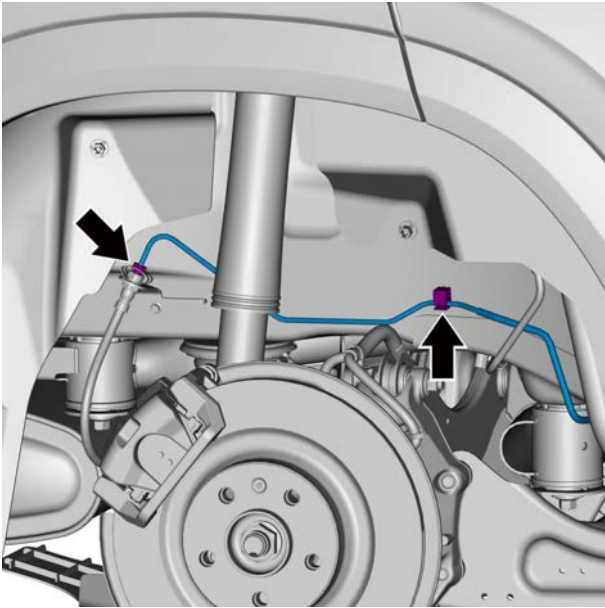
Warning !

Do not bend the brake pipe. Otherwise, it may cause brake failure and serious accident.

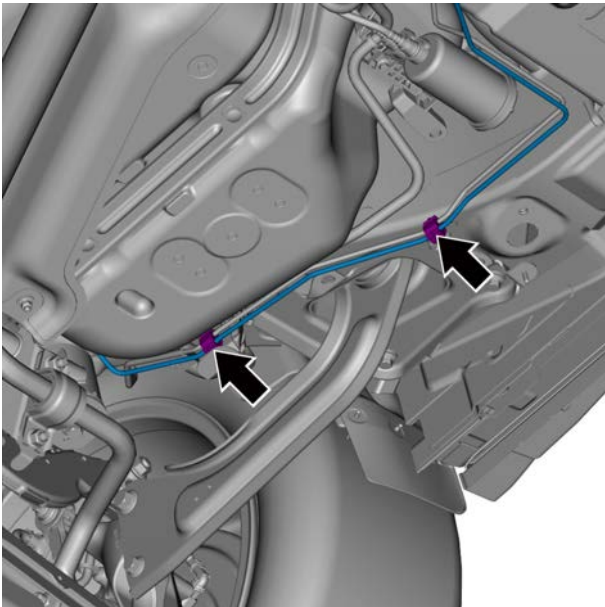
Caution

Do not spill brake fluid on the paint. Otherwise, the paint surface may be damaged.

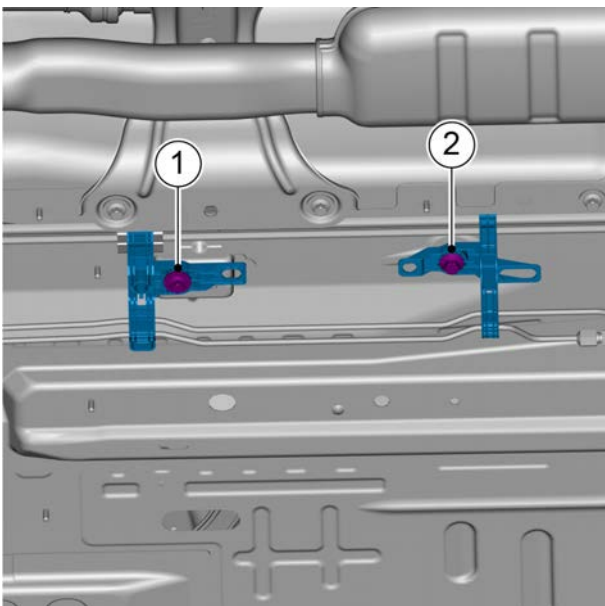
- 1 Drain the brake fluid.
- 2 Support vehicles, see [Support Vehicles](#)
- 3 Remove the right rear wheel, see [wheel assembly replacement](#).
- 4 Remove the left lower fender apron. See [replacement of left lower fender apron](#).
- 5 Remove the right lower fender apron, see [replacement of right lower fender apron](#).



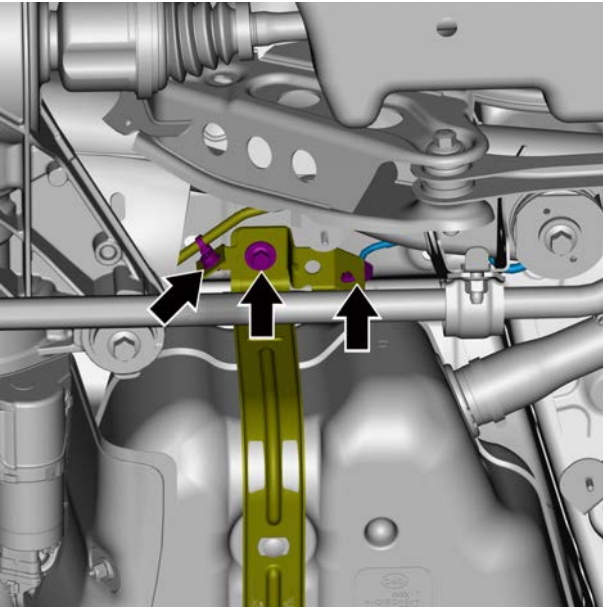
- 5 Remove the connecting nut between the rear brake LH hose and the brake hard pipe, and pull out the spring stopper.
- 6 Disconnect the fixing clip of the right rear brake hard pipe.



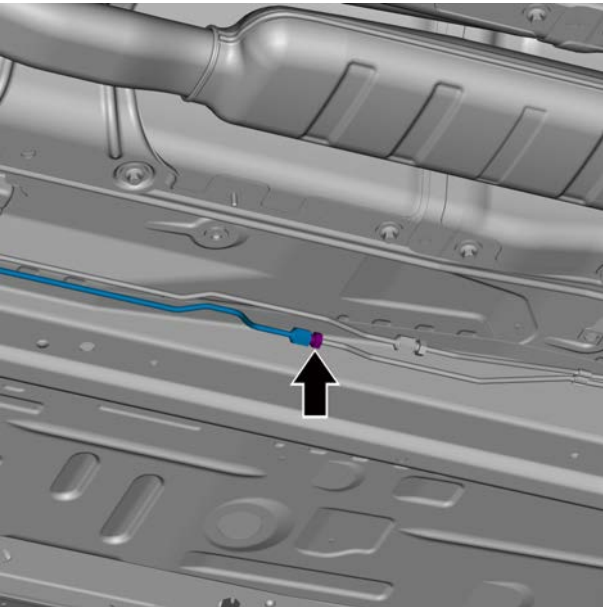
- 7 Disconnect the right rear brake hard pipe from the fixing clip.



- 8 Remove the retaining bolt 1 of the lower floor support and
 - 9 remove the lower floor support.
- Remove the retaining bolt 2 of the fuel line assembly pipe clamp and remove the fuel line assembly pipe clamp.



- 10 Remove retaining bolts of fuel tank strap and disconnect 2 fixing clips.

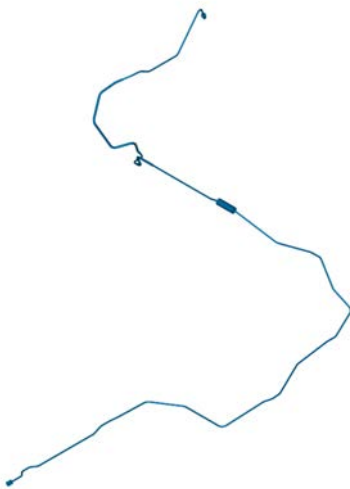


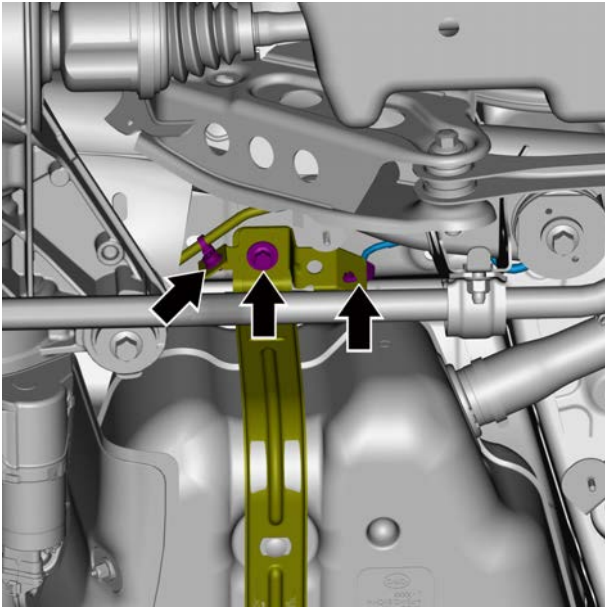
- 11 Remove the connecting nut between the right rear brake hard pipe and the right middle brake hard pipe.

Caution

Plug the connecting pipe orifice between the right rear brake hard pipe and the right middle brake hard pipe to prevent the loss and pollution of brake fluid.

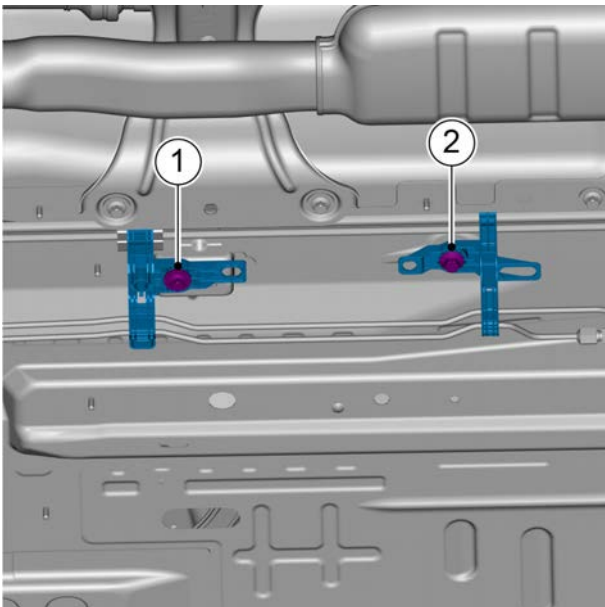
- 12 Remove the right rear brake hard pipe.





- 3 Install the fuel tank strap and 1 retaining bolt, and install 2 fixing clips.

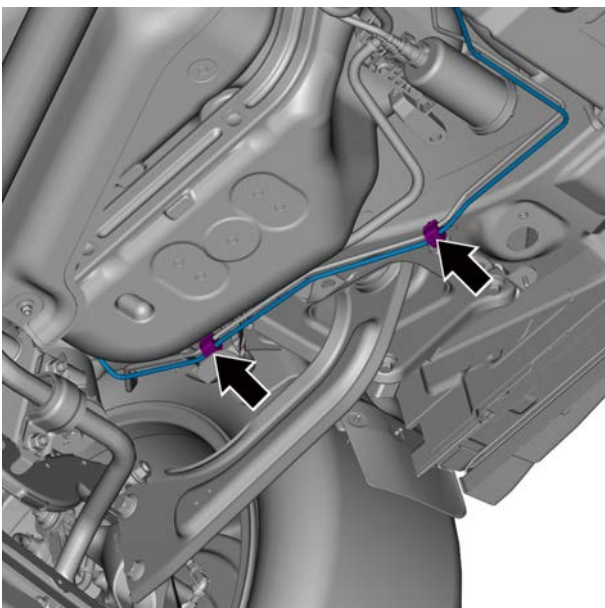
Torque: 30 N·m (metric system) 22.1 lb-ft (Imperial system)



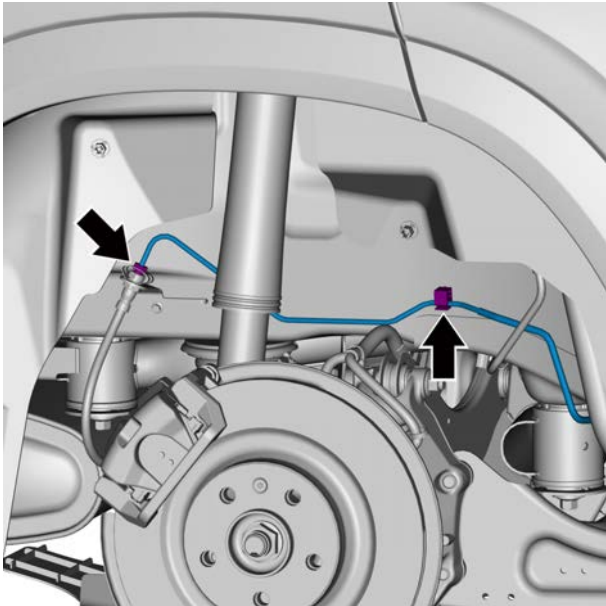
- 4 Install the underfloor bracket and retaining bolt 1, and install the fuel pipe assembly pipe clamp and retaining bolt 2.

Bolt 1 torque: 24 N·m (metric system) 17.7 lb-ft (Imperial system)

Bolt 2 torque: 30 N·m (metric system) 22.1 lb-ft (Imperial system)



- 5 Install the right rear brake hard pipe onto the fixing clip.



- 6 Install the brake hard pipe into the fixing clip.
- 7 Clip in the spring stopper, connect the right rear brake hose and the brake hard pipe, and tighten the nut.
Torque: 14 N. m (metric system) 10.3 lb-ft (Imperial system)

- 8 Install the lower right fender apron.
- 9 Install the lower left fender apron.
- 10 Install the wheel.
- 11 Lower the vehicle.
- 12 Add clean brake fluid to the brake fluid reservoir to the max line of the reservoir.
- 13 Bleed the brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#)
- 14 Check whether the brake fluid leaks.

6.4.5.9 Left middle brake hard pipe replacement

Removal procedure

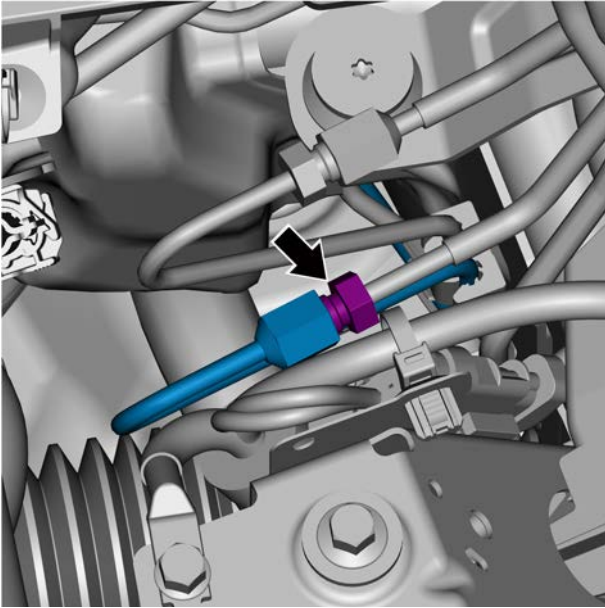
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

The removal and assembly methods of front left middle brake hard pipes are similar.

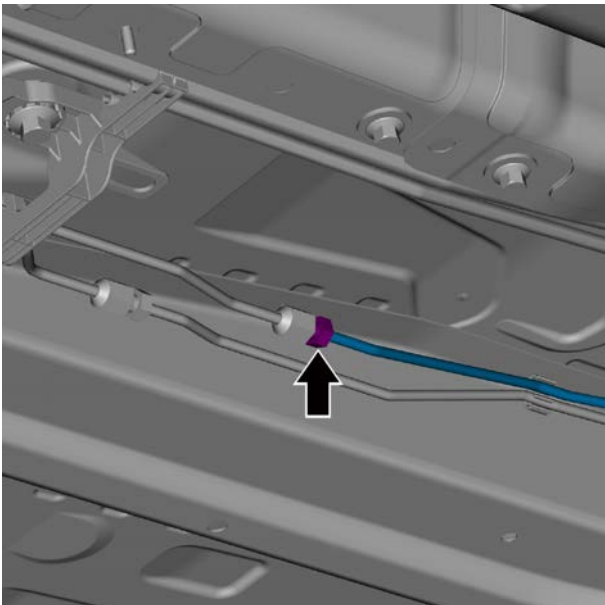
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Drain the brake fluid.
- 3 Remove the battery bracket. See [battery bracket assembly replacement \(4G20\).](#)



- 4 Remove the connecting nut between the RL No. 1 brake hard pipe and the left middle brake hard pipe.

Caution

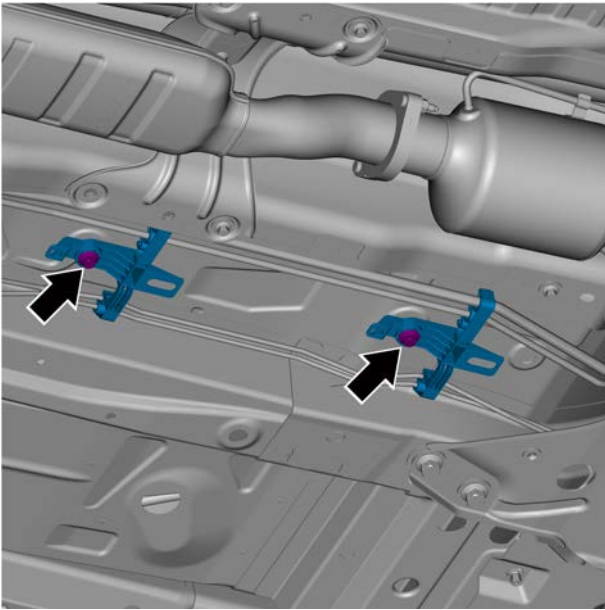
Plug the connecting pipe orifice between the RL No. 1 brake hard pipe and the left middle brake hard pipe to prevent the loss and pollution of brake fluid.



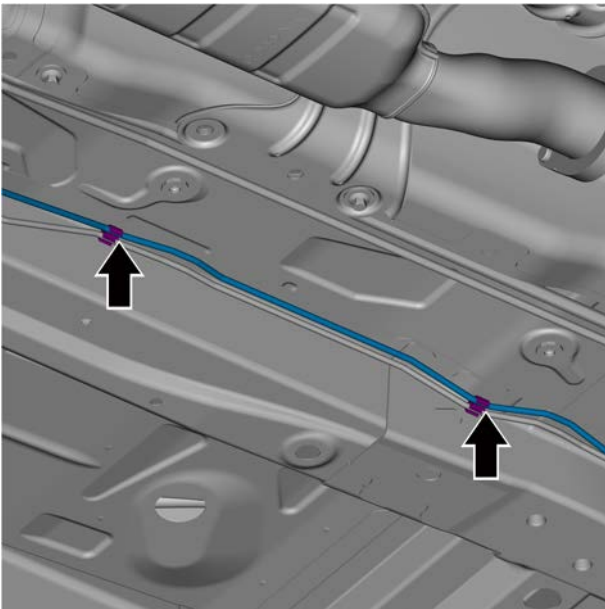
- 5 Support vehicles, see [Support Vehicles](#)
- 6 Remove the engine fender, see [Engine fender replacement](#).
- 7 Remove front subframe, refer to [replacement of front subframe](#).
- 8 Disconnect the connecting nut between the Left rear brake hard pipe and the left middle brake hard pipe.

Caution

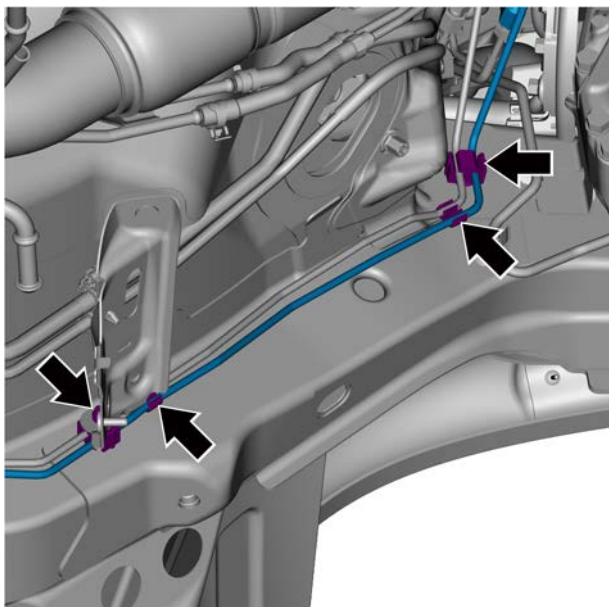
Plug the connecting pipe orifice between the Left rear brake hard pipe and the left middle brake hard pipe to prevent the loss and pollution of brake fluid.



- 9 Remove 2 retaining bolts of 2 underfloor fuel pipe supports and remove 2 underfloor fuel pipe supports.



- 10 Disconnect the left middle brake hard pipe from the pipe clamp.



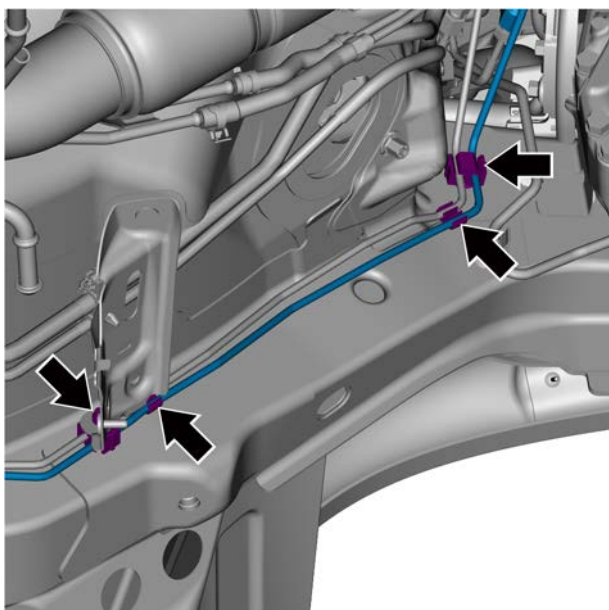
- 11 Disconnect the left middle brake hard pipe from the pipe clamp and remove the left middle brake hard pipe.

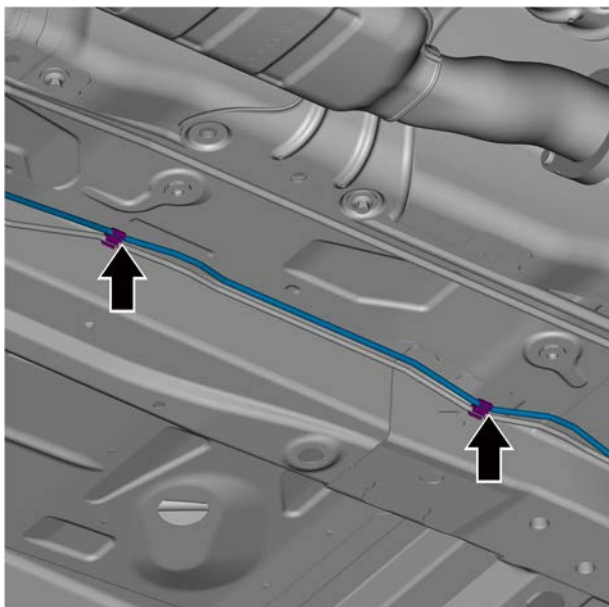
Installation procedure

Caution

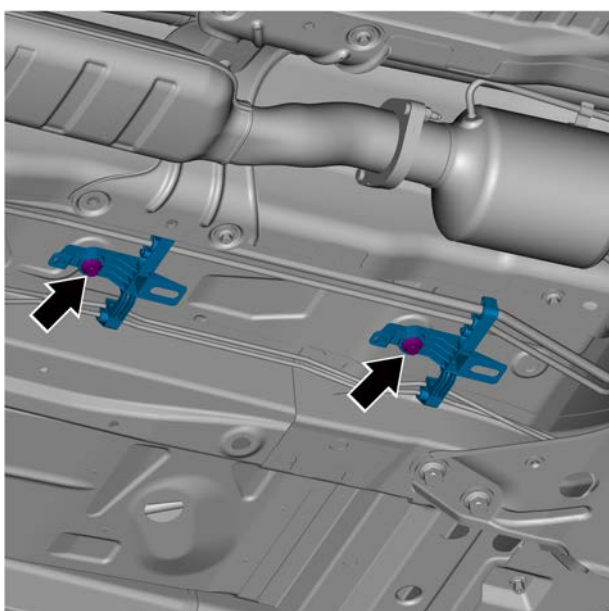
When assembling the rear left No. 1 brake hard pipe, the joint shall be pre-tightened by hand and then tightened with an open-ended wrench to prevent thread damage.

- 1 Install the left middle brake hard pipe and clip the left middle brake hard pipe into the pipe clamp.



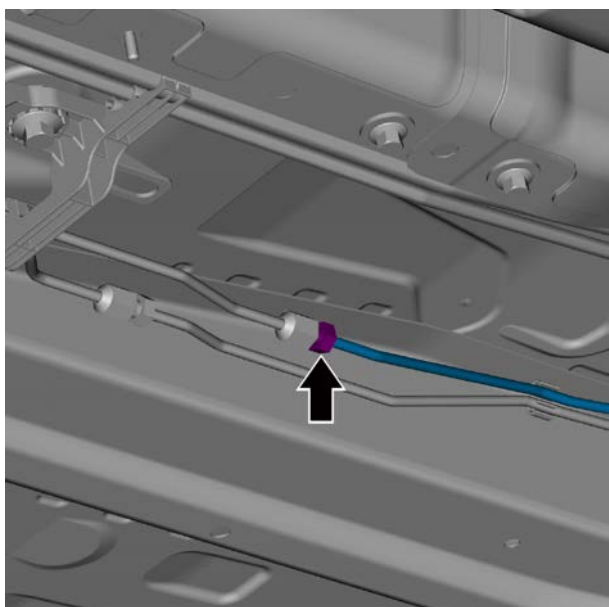


- 2 Clip the left middle brake hard pipe into the pipe clamp.



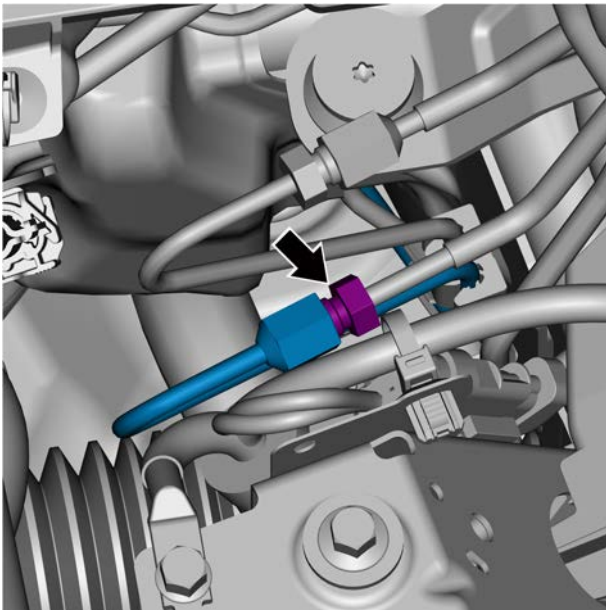
- 3 Install 2 underfloor fuel pipe supports and 2 retaining bolts.

Torque: 30 N. m (metric system) 22.1 lb-ft (Imperial system)



- 4 Connect the connecting nut between the Left rear brake hard pipe and the left middle brake hard pipe and tighten it.

Torque: 16 N. m (metric system) 11.8 lb-ft (Imperial system)



- 5 Install the front subframe.
- 6 Install the engine fender.
- 7 Lower the vehicle.
- 8 Connect the connecting nut between the RL No. 1 brake hard pipe and the left middle brake hard pipe and tighten it.

Torque: 16 N. m (metric system) 11.8 lb-ft (Imperial system)

- 9 Add clean brake fluid to the master cylinder reservoir to the max line of the reservoir.
Bleed the hydraulic brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#).
- 10 Check for leaks.
- 11 Install the battery bracket.
- 12 Connect the negative battery cable.

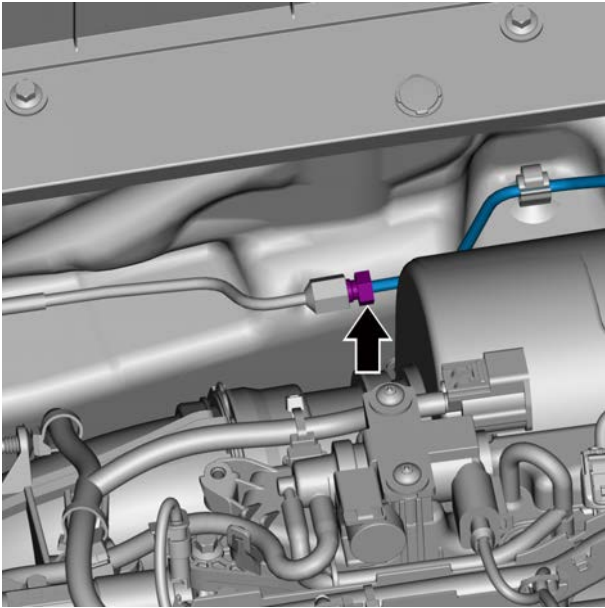
6.4.5.10 Replacement of the right front No. 1 brake pipe

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

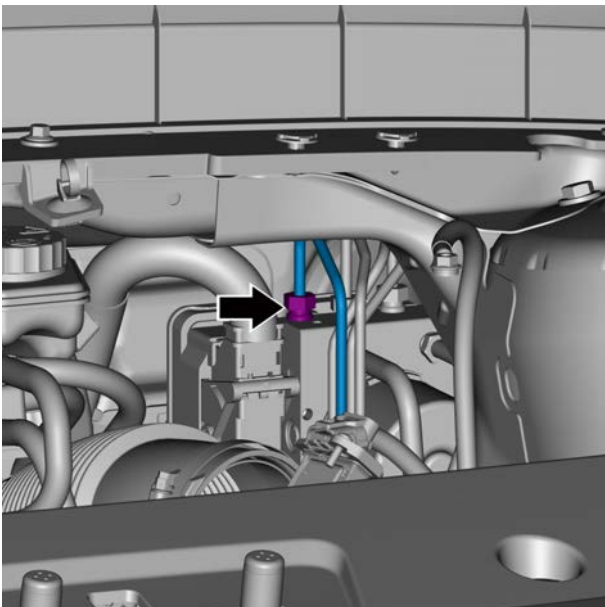
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Drain the brake fluid.
- 3 Remove the battery bracket. See [battery bracket assembly replacement \(4G20\)](#).
- 4 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 5 Remove the wheel, refer to [Replacement of wheel assembly](#).



- 6 Remove the connecting nut between the front right No. 1 brake hard pipe and the front right brake hard pipe.

Caution

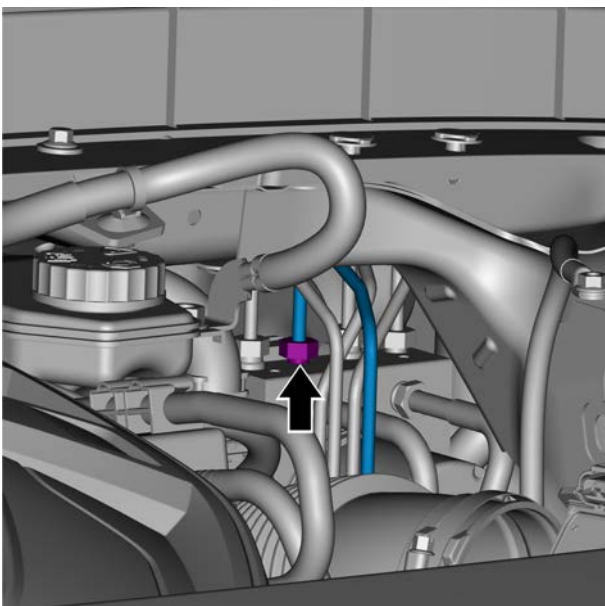
Plug the connecting pipe orifice between the front right No. 1 brake hard pipe and the front right brake hard pipe to prevent the loss and pollution of brake fluid.



- 7 Remove the fixing nut on the right brake pipe of the vehicle.

Caution

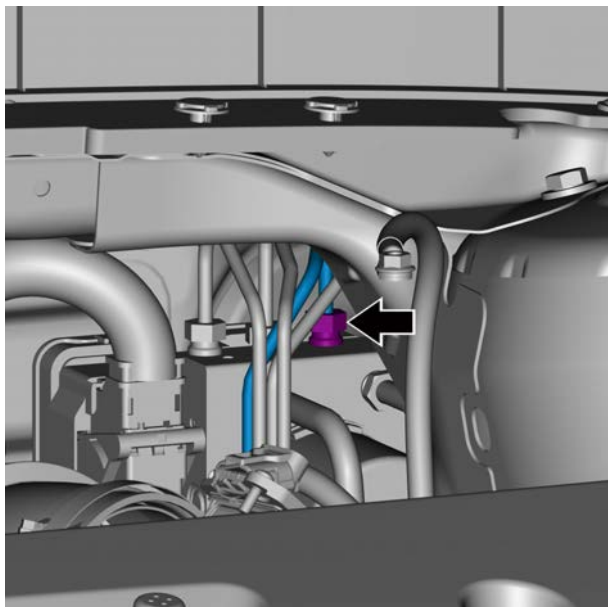
Plug the rear right No. 1 brake hard pipe and the oil pipe port of vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



- 8 Remove the connector nut of front left brake hard pipe from the vehicle dynamic domain master, and wipe off the overflowing brake fluid immediately.

Caution

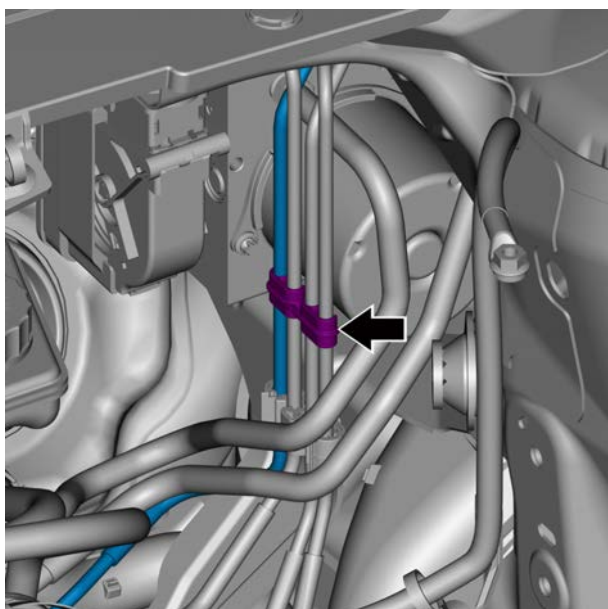
Plug the connecting pipe orifice between front left brake hard pipe and the vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



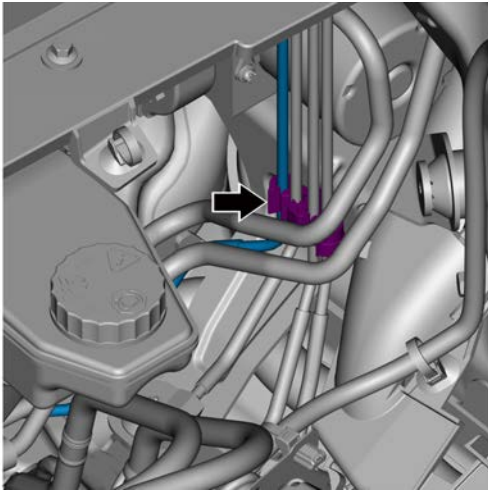
- 9 Remove the connector nut of No. 1 front right brake hard pipe from the vehicle dynamic domain master, and wipe off the overflowing brake fluid immediately.

Caution

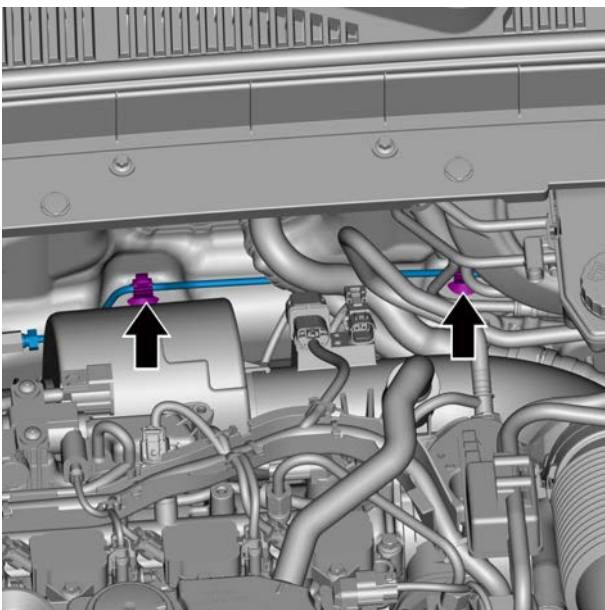
Plug the front right No. 1 brake hard pipe and the oil pipe port of the vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



- 10 Remove the four-hole pipe clamp.



- 11 Disconnect the front right No. 1 brake hard pipe from the 4-hole pipe clamp.



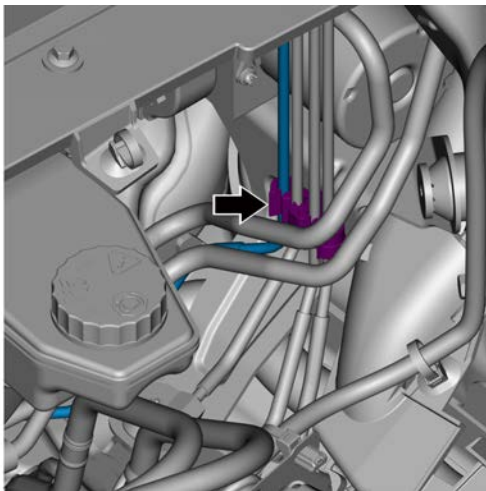
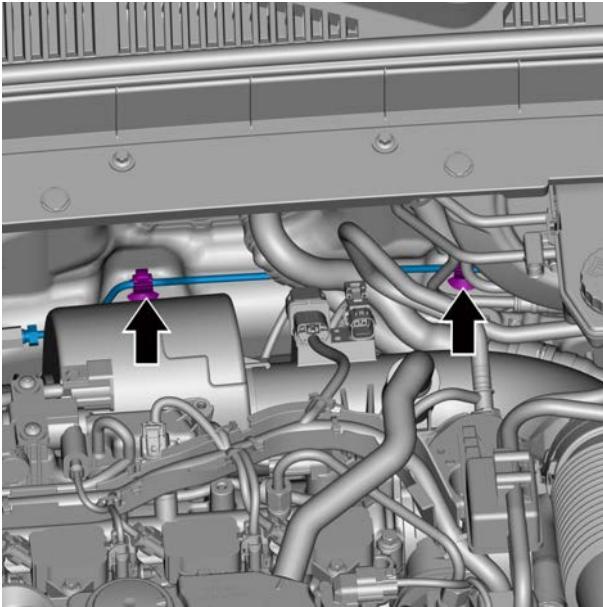
- 12 Disconnect the connection between the front right No. 1 brake hard pipe and the pipe clamp, and remove the front right No. 1 brake hard pipe.

Installation procedure

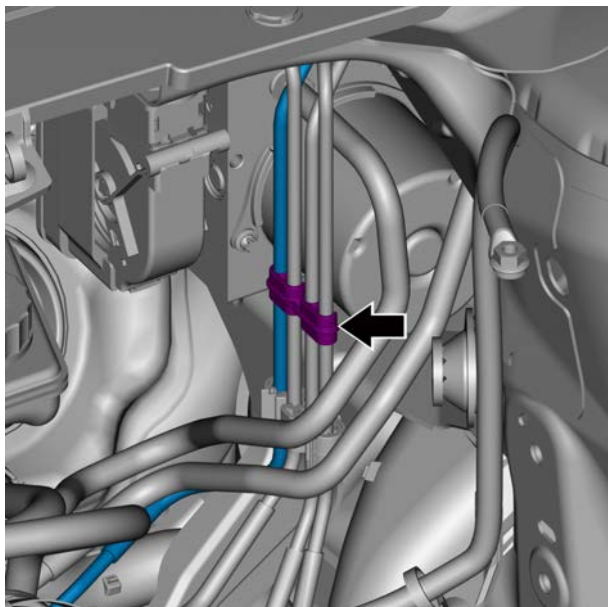
Caution

When assembling the front right No. 1 brake hard pipe, the joint shall be pre-tightened by hand and then tightened with an open-ended wrench to prevent thread damage.

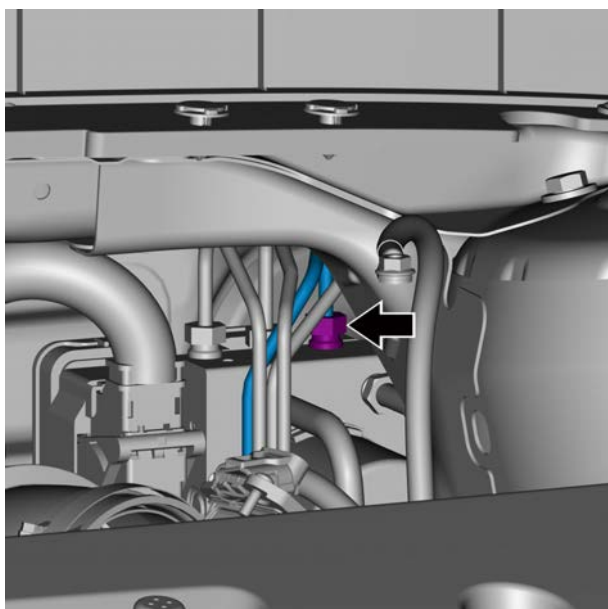
- 1 Install the front right No. 1 brake hard pipe, and clip the front right No. 1 brake hard pipe into the pipe clamp.



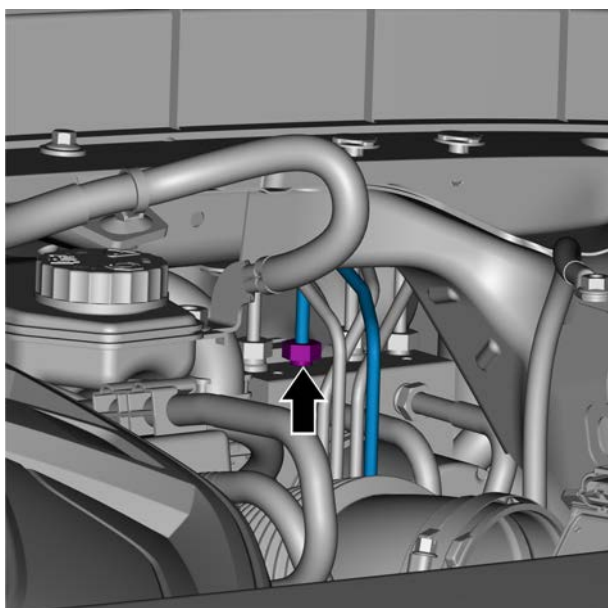
- 2 Install the front right No. 1 brake hard pipe onto the 4-hole pipe clamp.



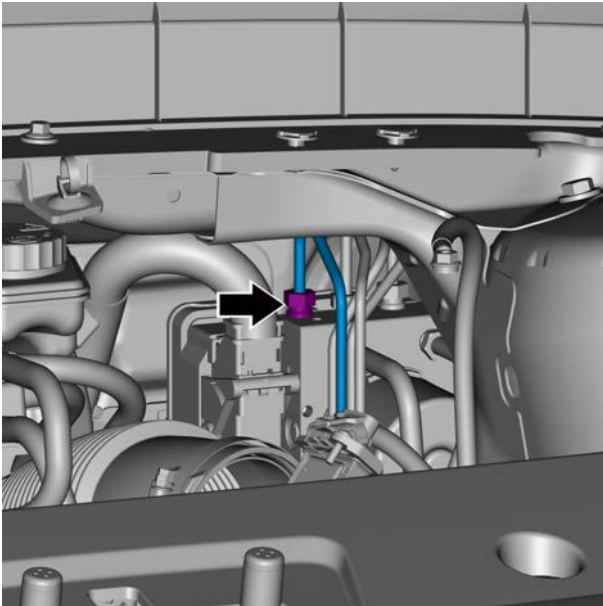
- 3 Install the 4-hole pipe clamp.



- 4 Install the connector nut of the front right No. 1 brake hard pipe located on the vehicle dynamic domain master.
Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)

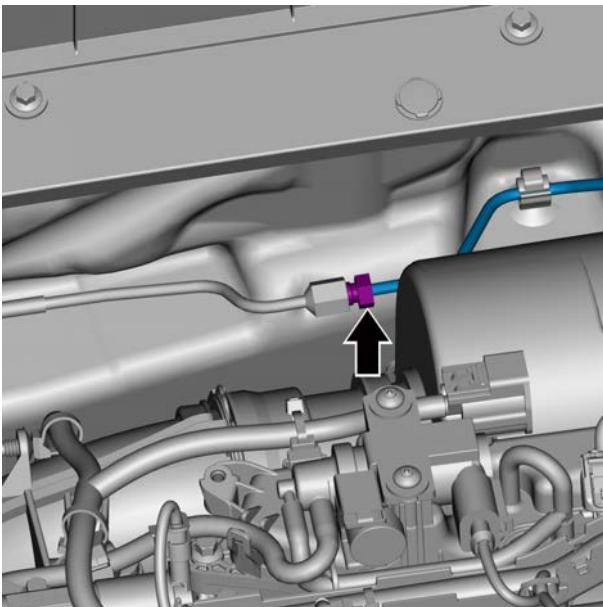


- 5 Install the connector nut of front left brake hard pipe.
Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



- 6 Tighten the brake hard pipe fixing nut of No. 1 brake hard pipe of brake master cylinder fixed on the master of vehicle dynamic domain.

Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



- 7 Install the connecting nut between the front right No. 1 brake hard pipe and the front right brake hard pipe.

Torque: 16 N. m (metric system) 11.8 lb-ft (Imperial system)

- 8 Add clean brake fluid to the master cylinder reservoir to the max line of the reservoir.
- 9 Bleed the hydraulic brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#)
- .
- 10 Check for leaks.
- 11 Install the battery bracket.
- 12 Install the engine trim cover assembly.
- 13 Install the wheel.
- 14 Connect the negative battery cable.

6.4.5.11 Replacement of the left rear No. 1 brake pipe

Removal procedure

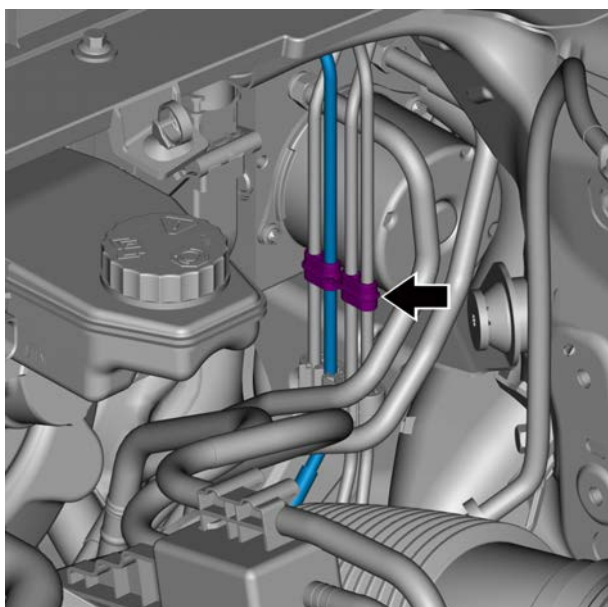
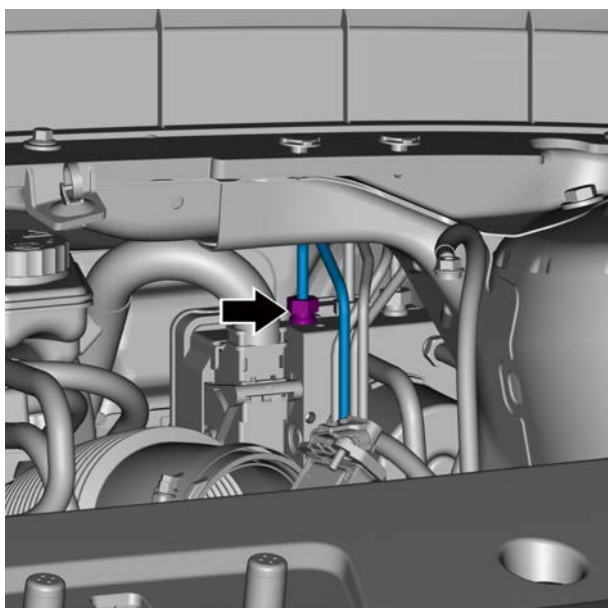
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

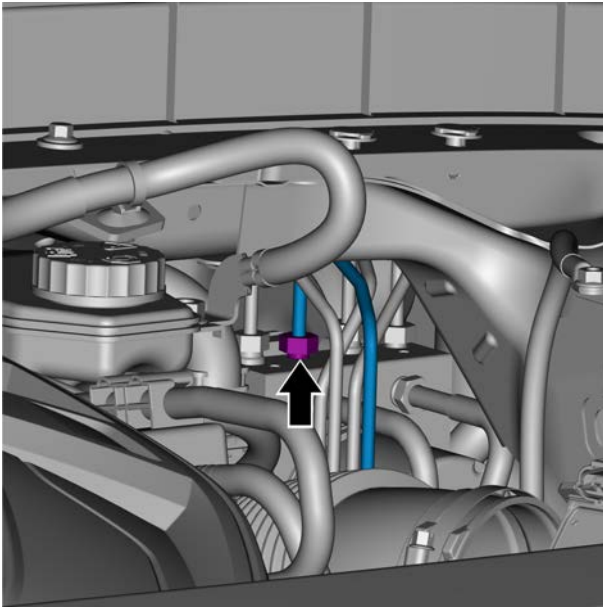
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 3 Drain the brake fluid.
- 4 Remove the battery bracket. See [battery bracket assembly replacement \(4G20\)](#).
- 5 Remove the fixing nut of the RL No. 1 brake hard pipe fixed on the vehicle dynamic domain master.

Caution

Plug the rear left No. 1 brake hard pipe and the oil pipe port of vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



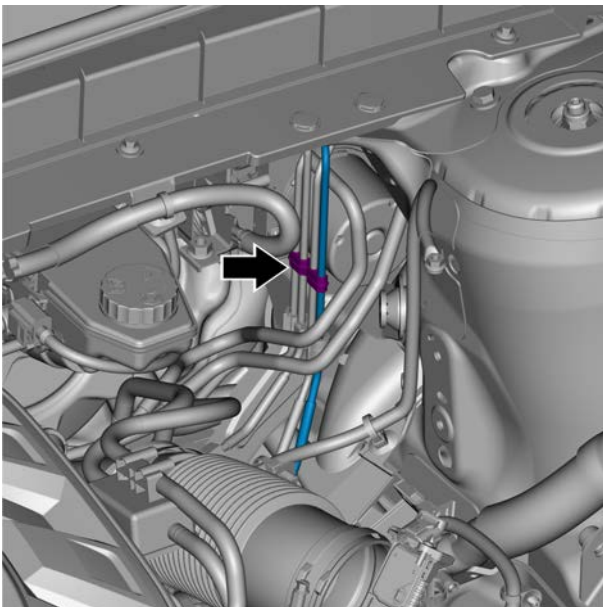
- 6 Remove the 4-hole pipe clamp.



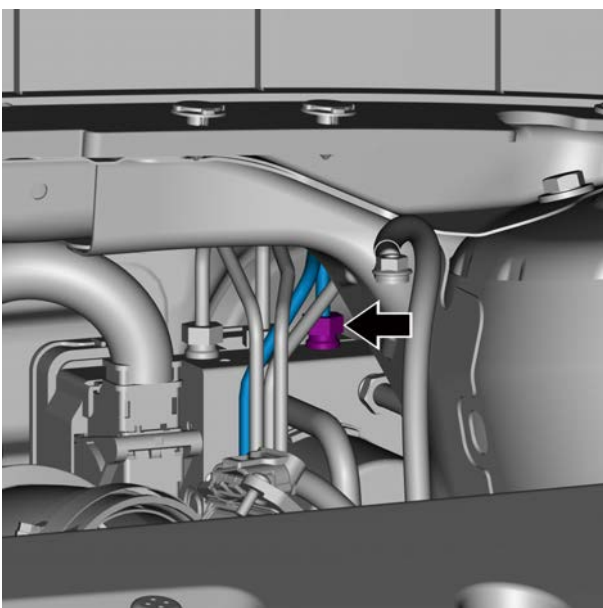
- 7 Remove the connector nut of front left brake hard pipe from the vehicle dynamic domain master, and wipe off the overflowing brake fluid immediately.

Caution

Plug the connecting pipe orifice between front left brake hard pipe and the vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



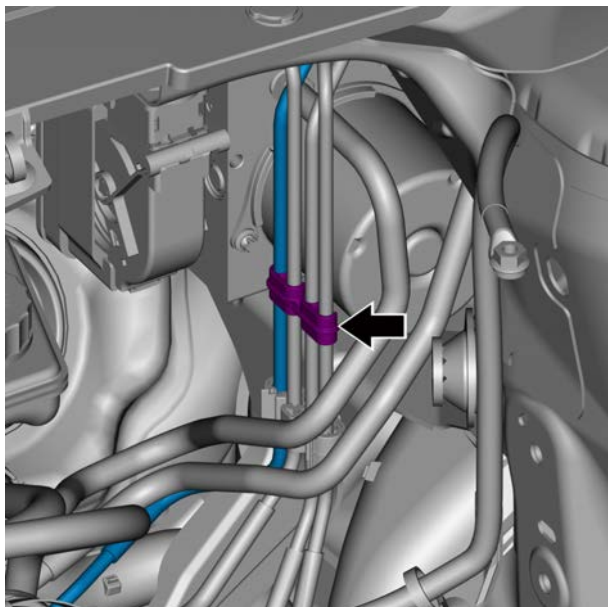
- 8 Remove the four-hole pipe clamp.



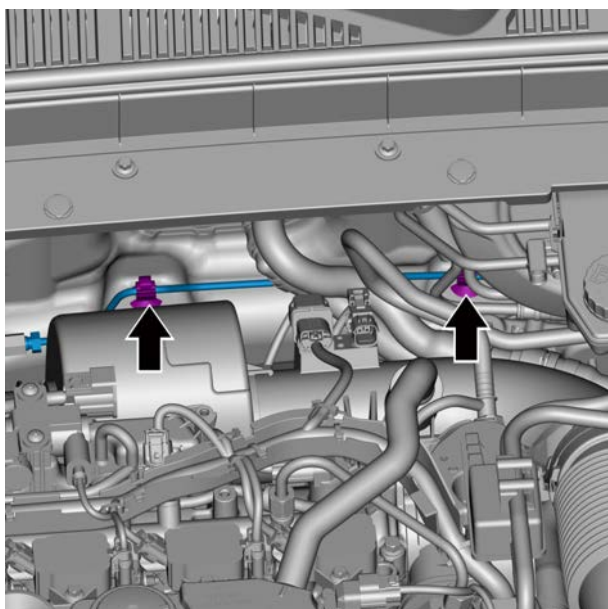
- 9 Remove the connector nut of No. 1 front right brake hard pipe from the vehicle dynamic domain master, and wipe off the overflowing brake fluid immediately.

Caution

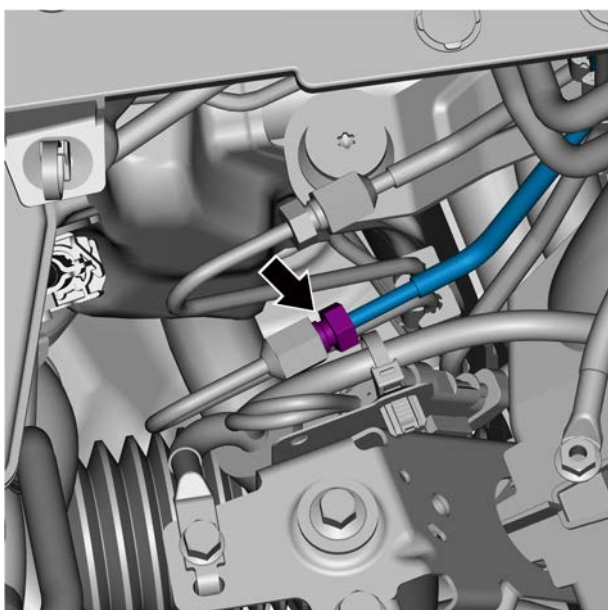
Plug the front right No. 1 brake hard pipe and the oil pipe port of vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



10 Remove the four-hole pipe clamp.



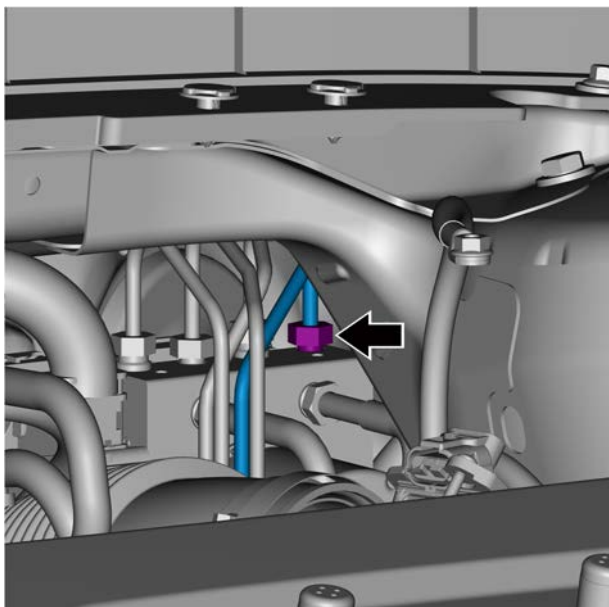
11 Remove the 2 clips of the front right No. 1 brake hard pipe.



12 Remove the connecting nut between the RL No. 1 brake hard pipe and the left middle brake hard pipe.

Caution

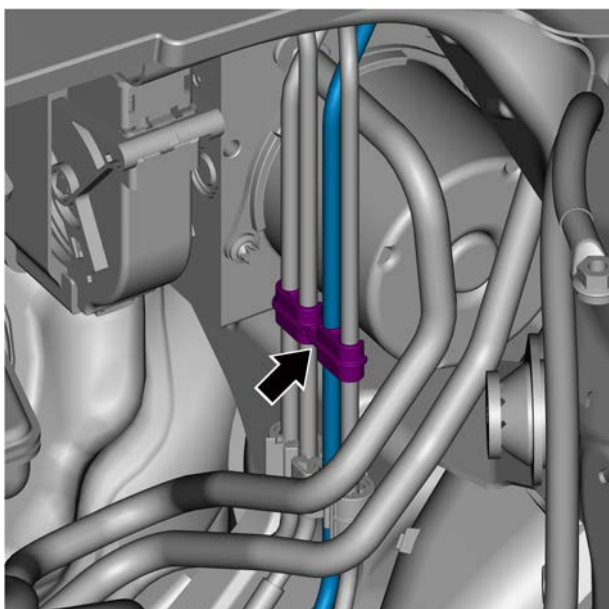
Plug the connecting pipe orifice between the RL No. 1 brake hard pipe and the left middle brake hard pipe to prevent the loss and pollution of brake fluid.



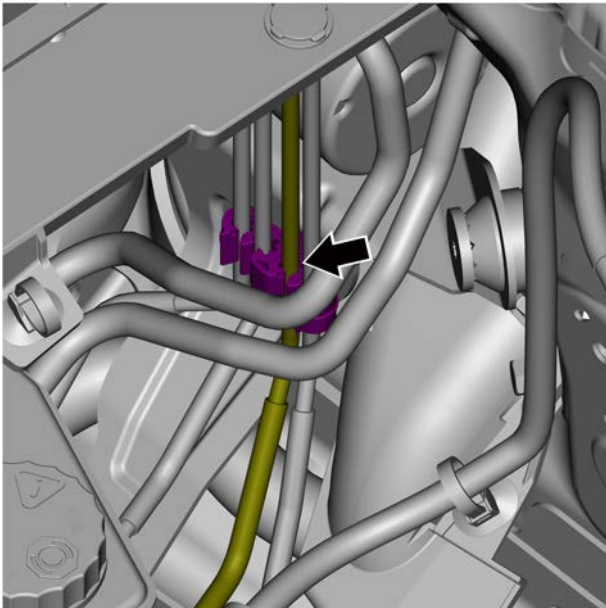
- 13 Remove the fixing nut of the RL No. 1 brake hard pipe fixed on the vehicle dynamic domain master.

Caution

Plug the rear left No. 1 brake hard pipe and the oil pipe port of vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



- 14 Remove the 4-hole pipe clamp.



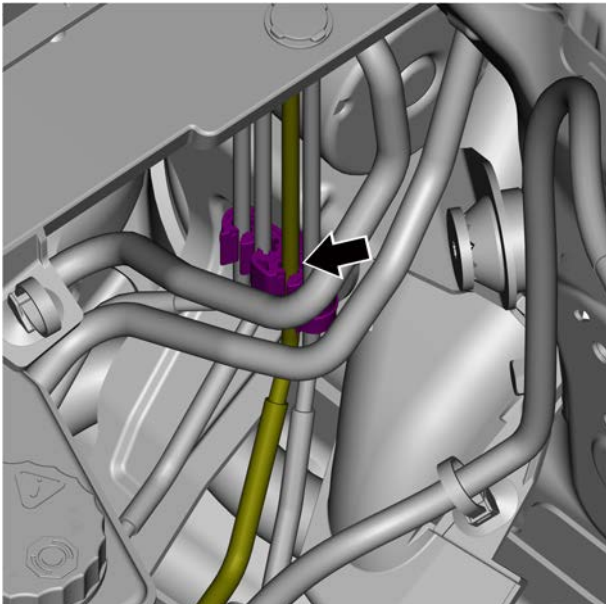
- 15 Disconnect the rear left No. 1 brake hard pipe from the four-hole pipe clamp and remove the rear left No. 1 brake hard pipe.

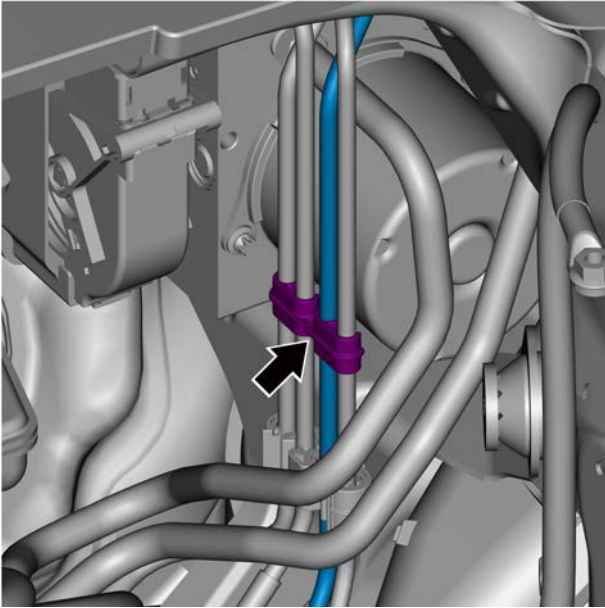
Installation procedure

Caution

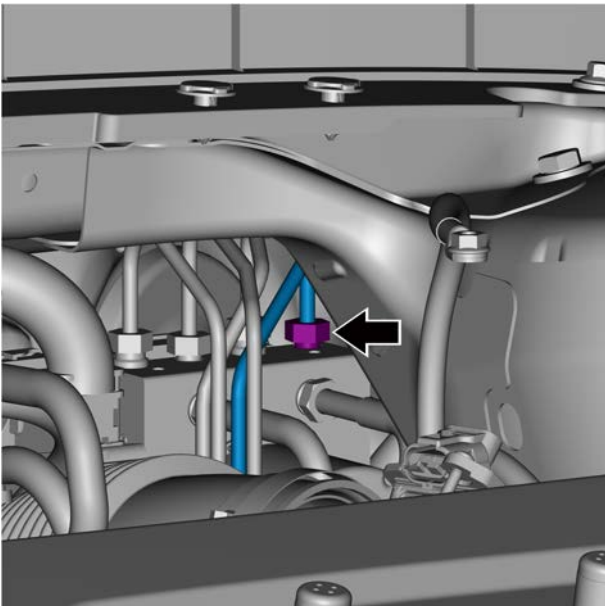
When assembling the rear left No. 1 brake hard pipe, the joint shall be pre-tightened by hand and then tightened with an open-ended wrench to prevent thread damage.

- 1 Install the rear left No. 1 brake hard pipe, and clip the rear left No. 1 brake hard pipe into the four-hole pipe clamp.

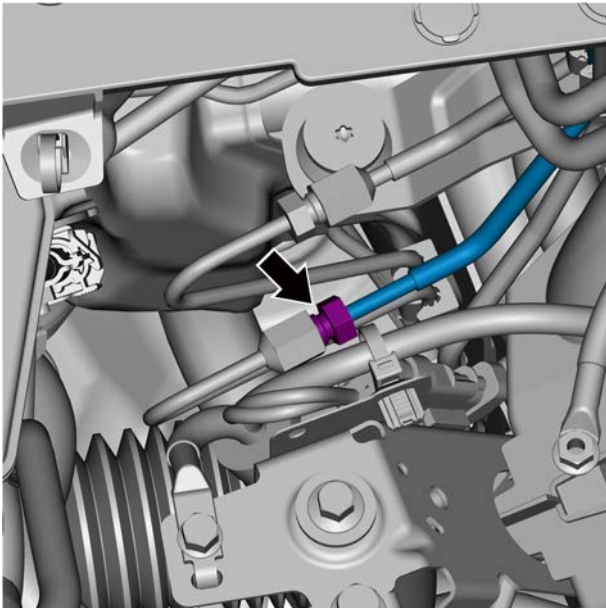




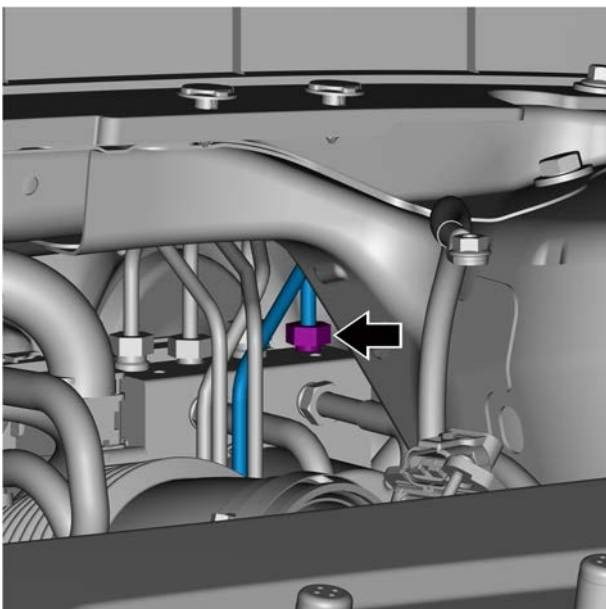
2 Install the four-hole pipe clamp.



3 Pre-tighten the fixing nut of the RL No. 1 brake hard pipe fixed on the vehicle dynamic domain master.

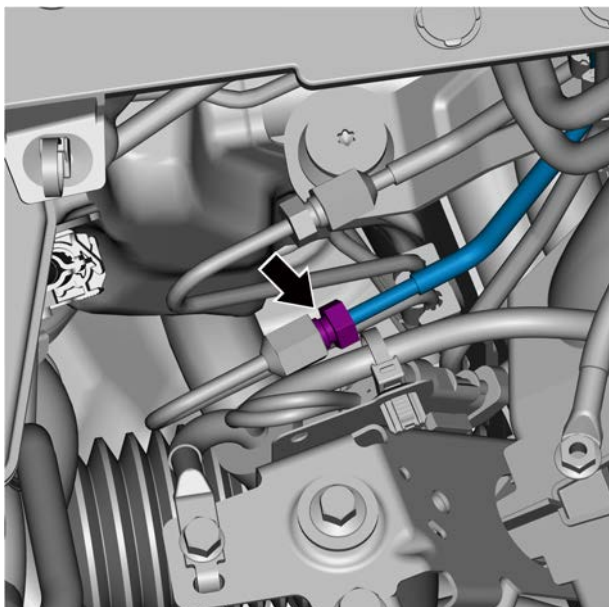


- 4 Pre-tighten the connecting nut between the RL No. 1 brake hard pipe and the left middle brake hard pipe.

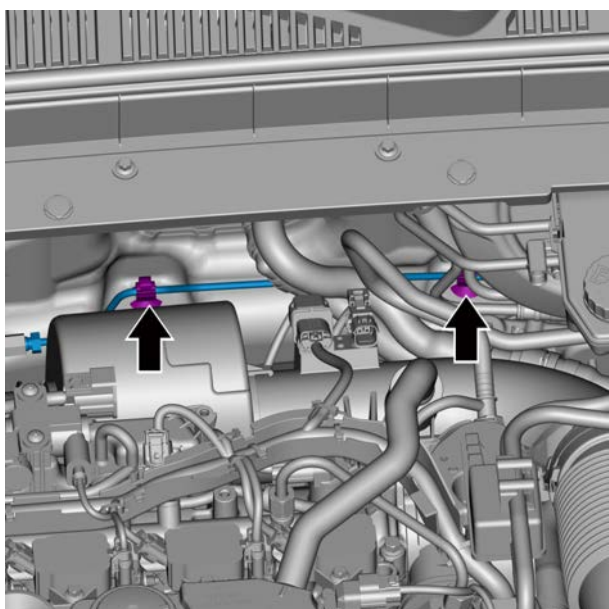


- 5 Tighten the brake hard pipe fixing nut of No. 1 brake hard pipe of brake master cylinder fixed on the vehicle dynamic domain master.

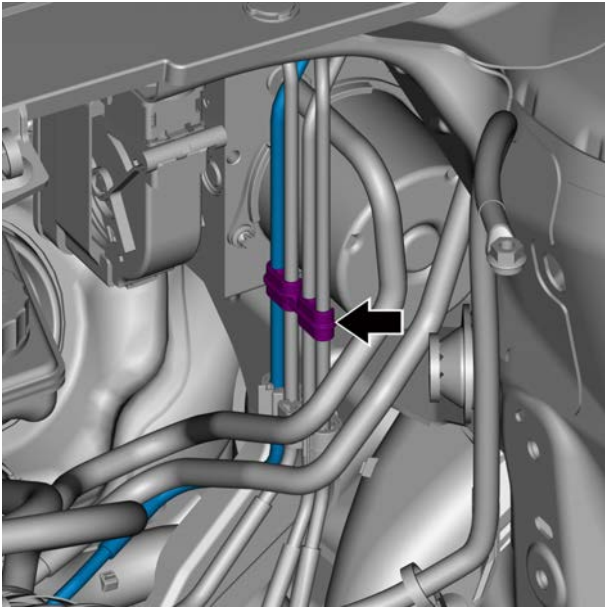
Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



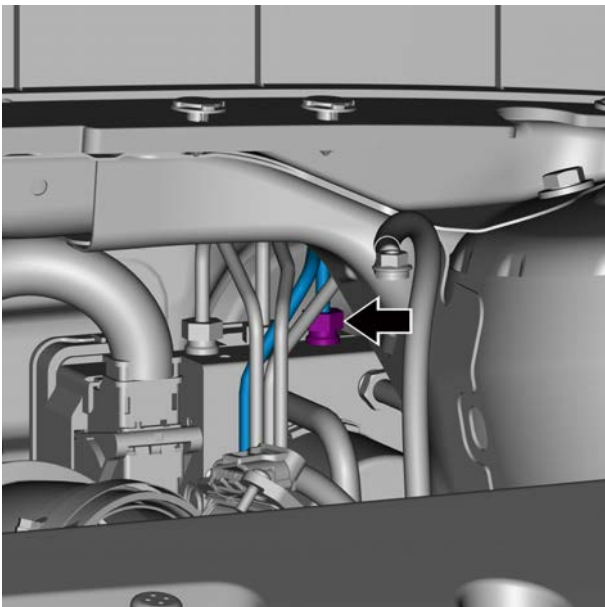
- 6 Tighten the connecting nut between the RL No. 1 brake hard pipe and the left middle brake hard pipe.
Torque: 16 N. m (metric system) 11.8 lb-ft (Imperial system)



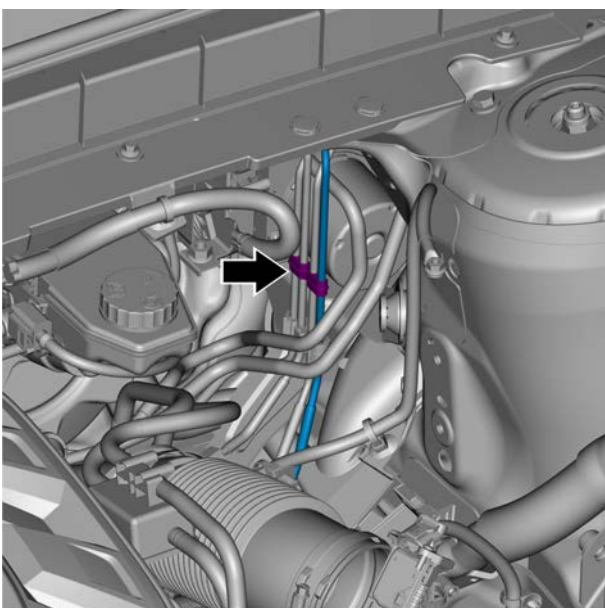
- 7 Install the 2 clips of the front right No. 1 brake hard pipe.



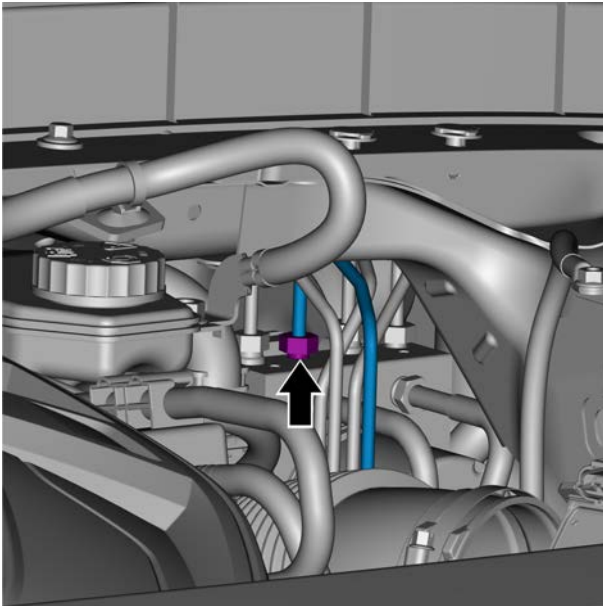
- 8 Install the four-hole pipe clamp.



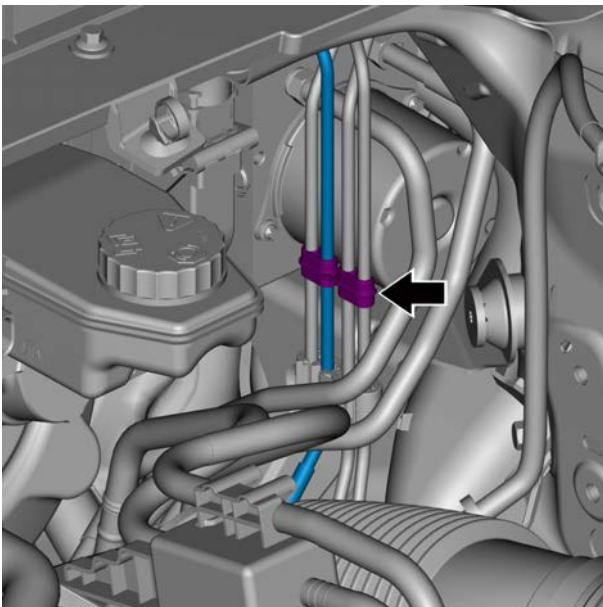
- 9 Install the connector nut of the front right No. 1 brake hard pipe located on the host of the vehicle dynamic domain.
Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



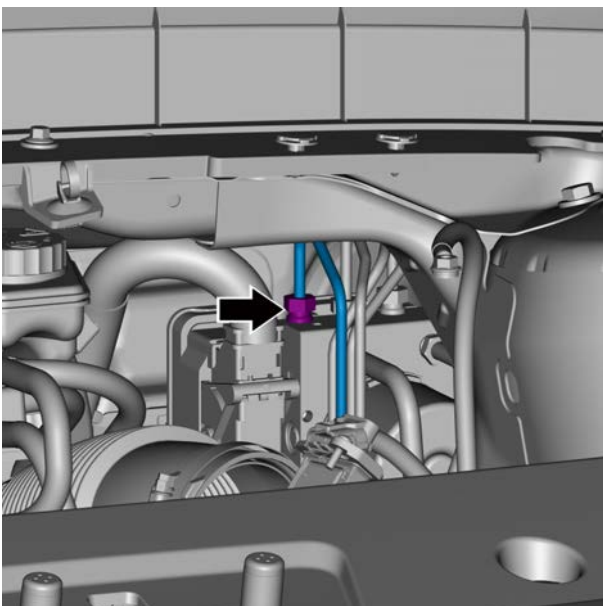
- 10 Install the four-hole pipe clamp.



- 11 Install the connector nut of front left brake hard pipe.
Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



- 12 Install the four-hole pipe clamp.



- 13 Tighten the brake hard pipe fixing nut of No. 1 brake hard pipe of brake master cylinder fixed on the vehicle dynamic domain master.
Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)

- 14 Add clean brake fluid to the master cylinder reservoir to the max line of the reservoir.
- 15 Bleed the hydraulic brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#)
- .
- 16 Check for leaks.
- 17 Install the battery bracket.
- 18 Connect the negative battery cable.

6.4.5.12 Replacement of right rear No. 1 brake pipe

Removal procedure

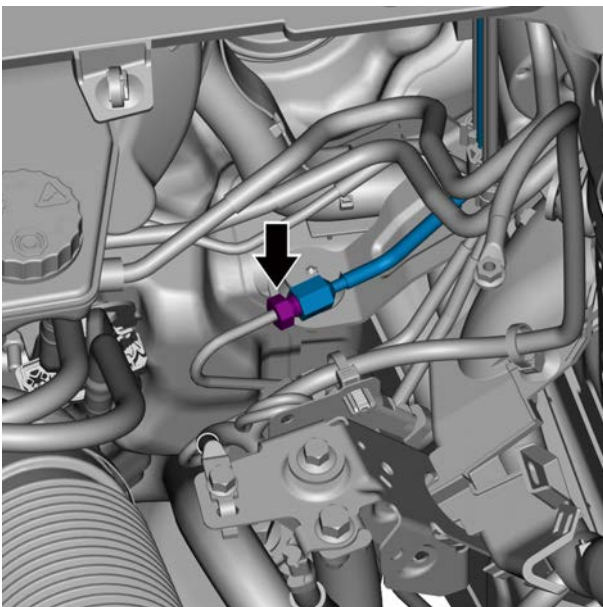
Warning !

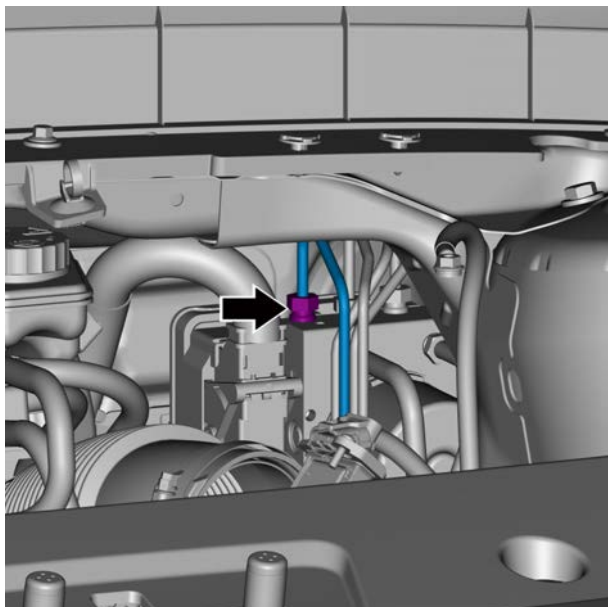
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 3 Drain the brake fluid.
- 4 Remove the battery bracket. See [battery bracket assembly replacement \(4G20\)](#).
- 5 Remove the connecting nut between the rear right No. 1 brake hard pipe and the middle right brake hard pipe.

Caution

Plug the connecting pipe orifice between the rear right No. 1 brake hard pipe and the middle right brake hard pipe to prevent the loss and pollution of brake fluid.

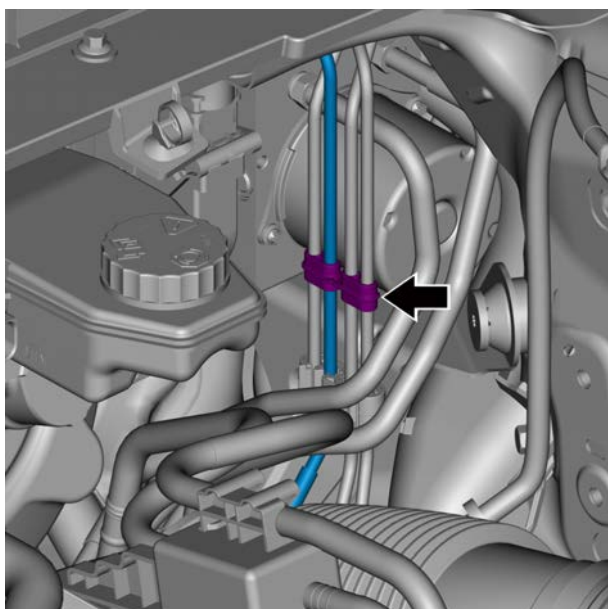




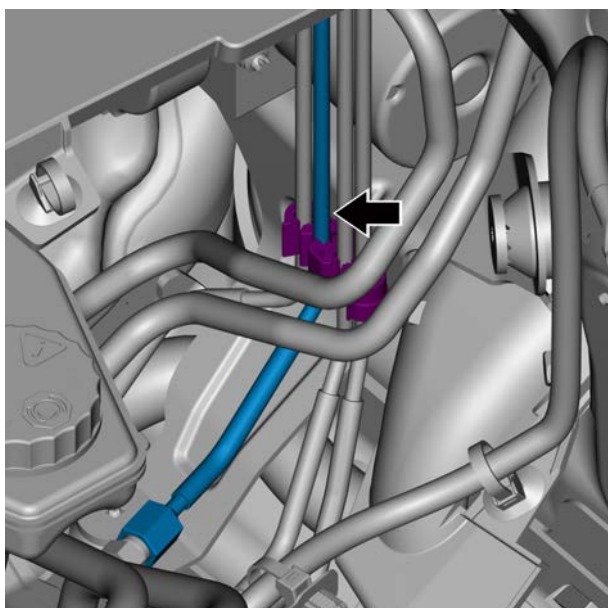
- 6 Remove the fixing nut on the right brake pipe of the vehicle.

Caution

Plug the rear right No. 1 brake hard pipe and the oil pipe port of vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



- 7 Remove the 4-hole pipe clamp.



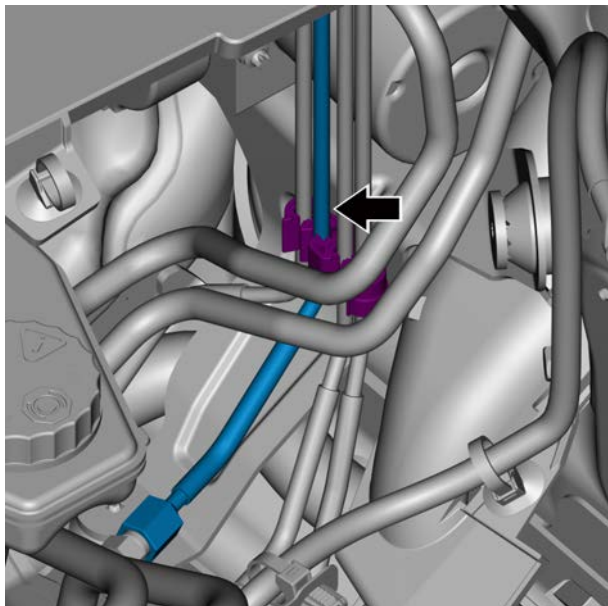
- 8 Disconnect the rear right No. 1 brake hard pipe from the four-hole pipe clamp and remove the rear right No. 1 brake hard pipe.

Installation procedure

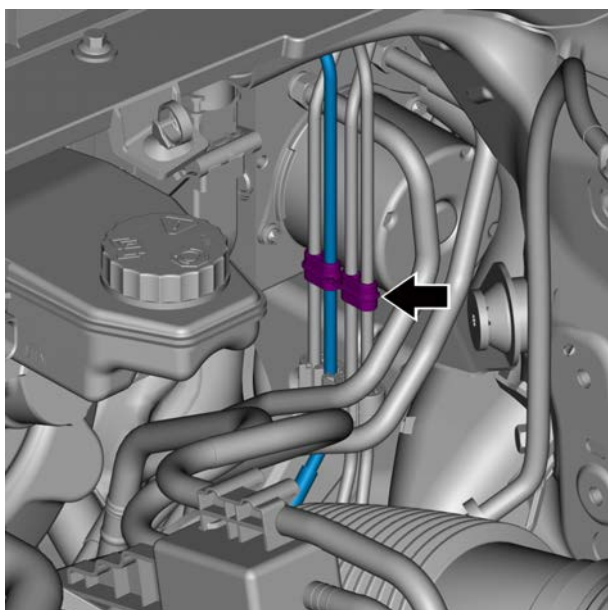
Caution

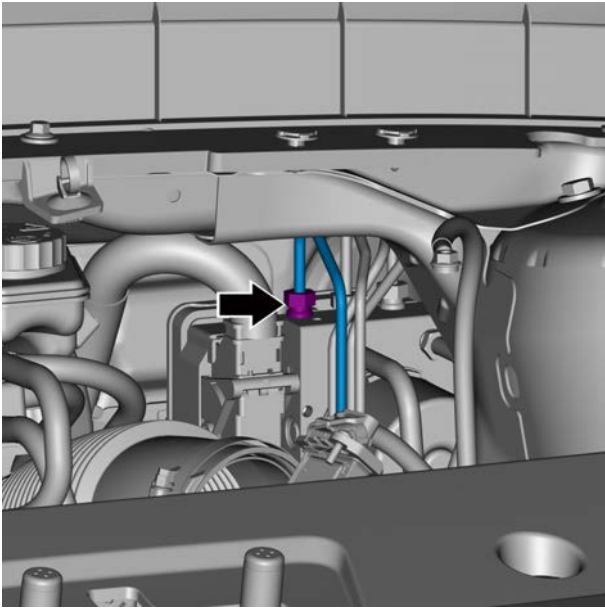
When assembling the rear right No. 1 brake hard pipe, the joint shall be pre-tightened by hand and then tightened with an open-ended wrench to prevent thread damage.

- 1 Install the rear right No. 1 brake hard pipe, and clip the rear right No. 1 brake hard pipe into the four-hole pipe clamp.

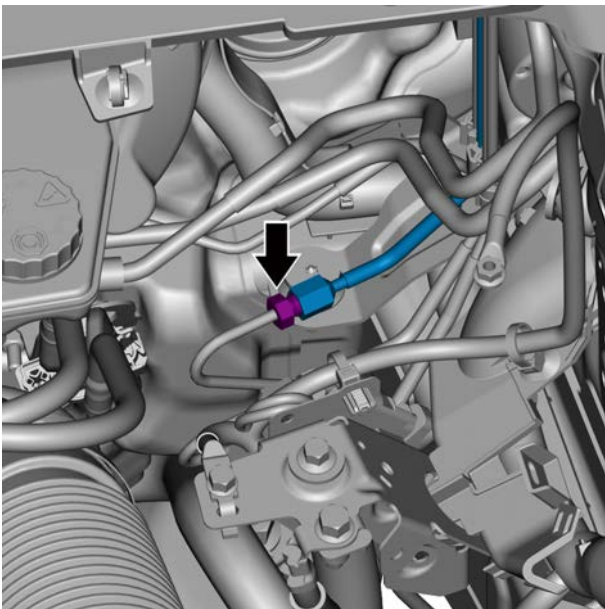


- 2 Install the four-hole pipe clamp.

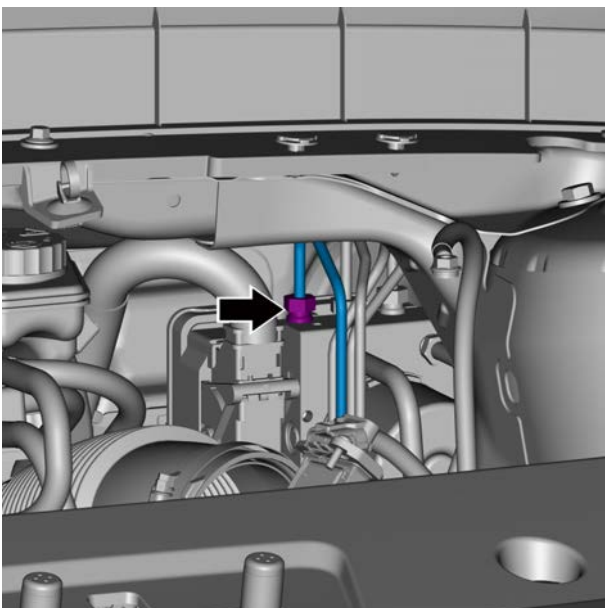




- 3 Pre-tighten the brake hard pipe fixing nut of No. 1 rear right brake hard pipe fixed on the vehicle dynamic domain master.

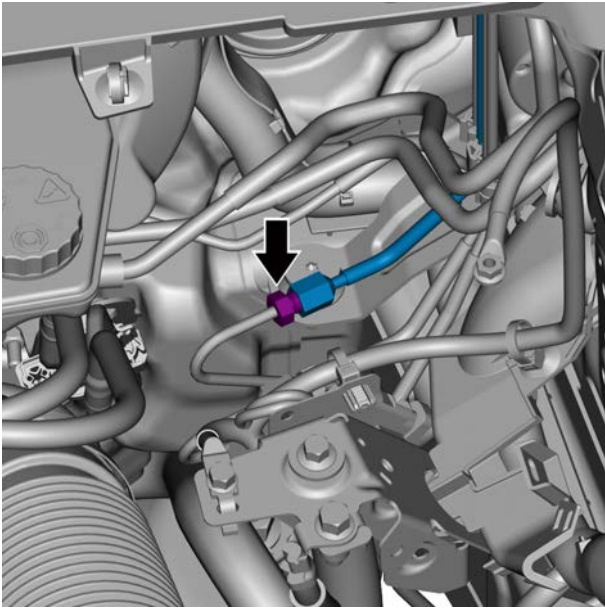


- 4 Pre-tighten the connecting nut between the right rear No. 1 brake hard pipe and the right middle brake hard pipe.



- 5 Tighten the brake hard pipe fixing nut of No. 1 rear right brake hard pipe fixed on the vehicle dynamic domain master.

Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



- 6 Tighten the connecting nut between the rear right No. 1 brake hard pipe and the middle right brake hard pipe.
Torque: 16 N. m (metric system) 11.8 lb-ft (Imperial system)

- 7 Add clean brake fluid to the master cylinder reservoir to the max line of the reservoir.
- 8 Bleed the hydraulic brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#)
- .
- 9 Check for leaks.
- 10 Install the battery bracket.
- 11 Install the engine trim cover assembly.
- 12 Connect the negative battery cable.

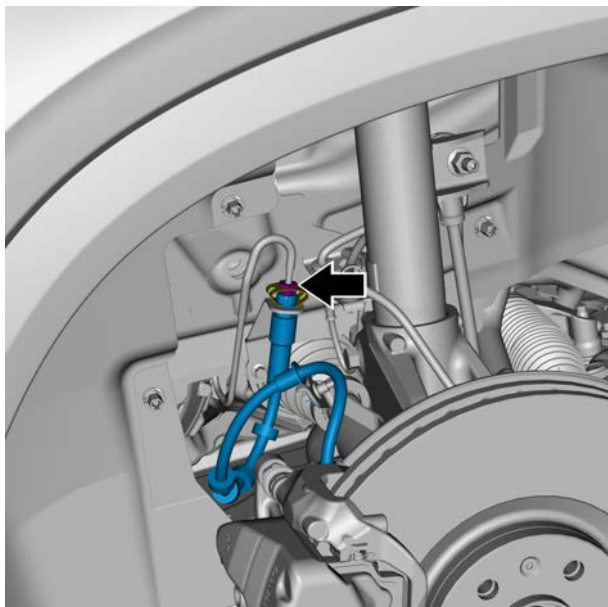
6.4.5.13 Replacement of No. 1 Rigid Pipe of Brake Master Cylinder

Removal procedure

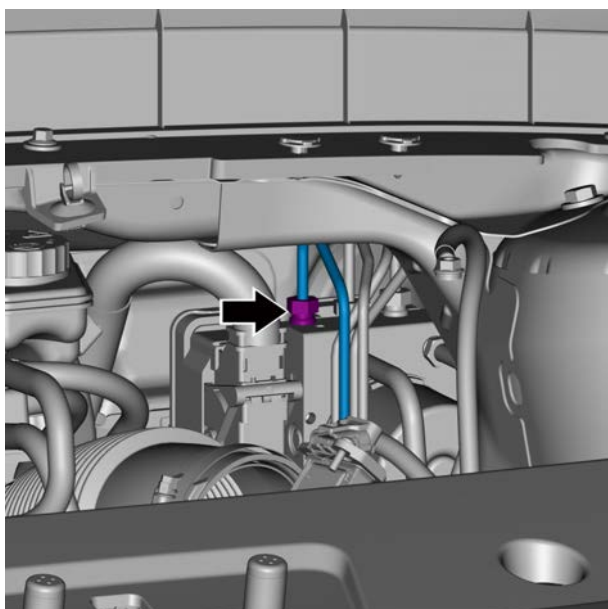
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover.](#)
- 3 Drain the brake fluid.
- 4 Remove the battery bracket. See [battery bracket assembly replacement \(4G20\).](#)
- 5 Remove the wheel, refer to [Replacement of wheel assembly.](#)



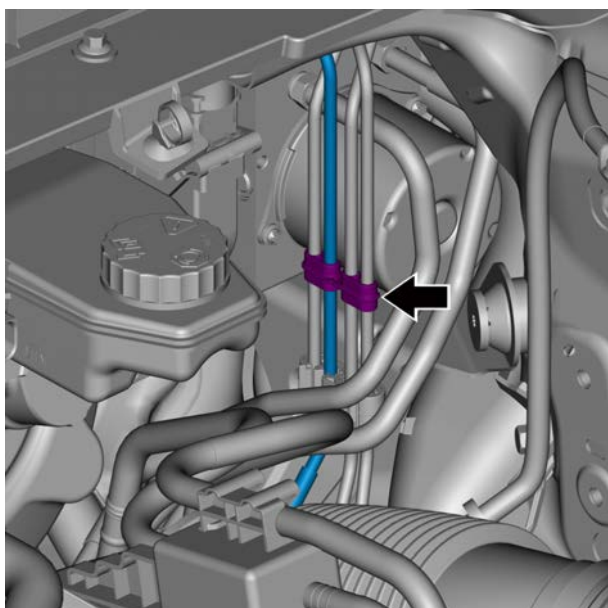
- 6 Remove the connecting nut between front left brake hose and the brake hard pipe, and pull out the spring stopper.



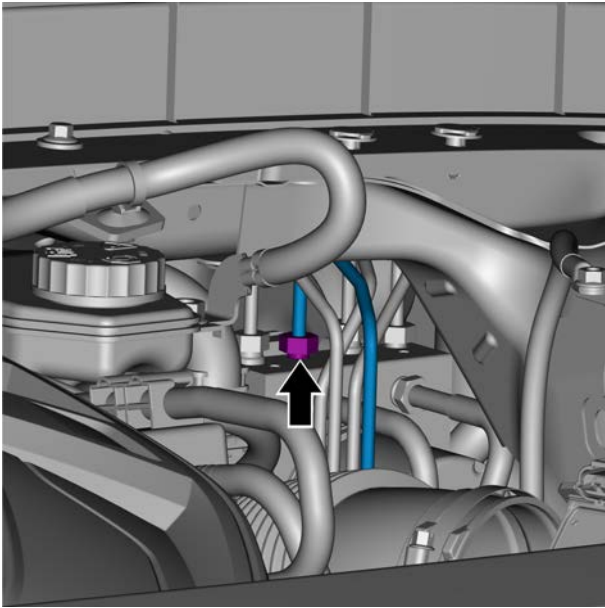
- 7 Remove the fixing nut fixing the rear right No. 1 brake hard pipe to the vehicle dynamic domain master.

Caution

Plug the rear right No. 1 brake hard pipe and the oil pipe port of vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



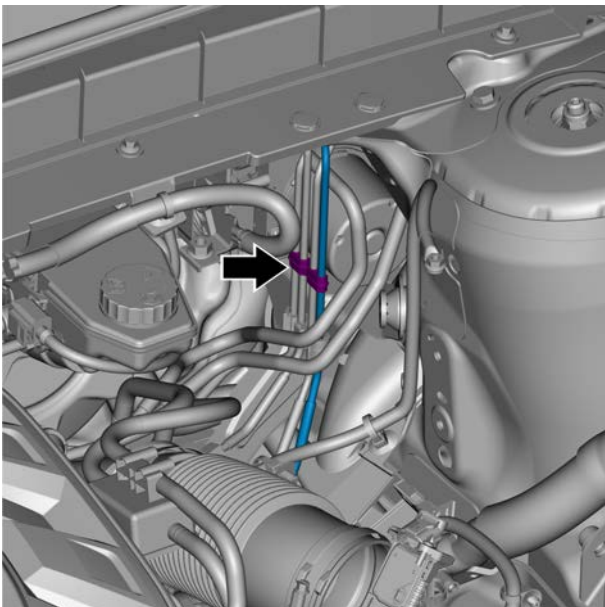
- 8 Remove the 4-hole pipe clamp.



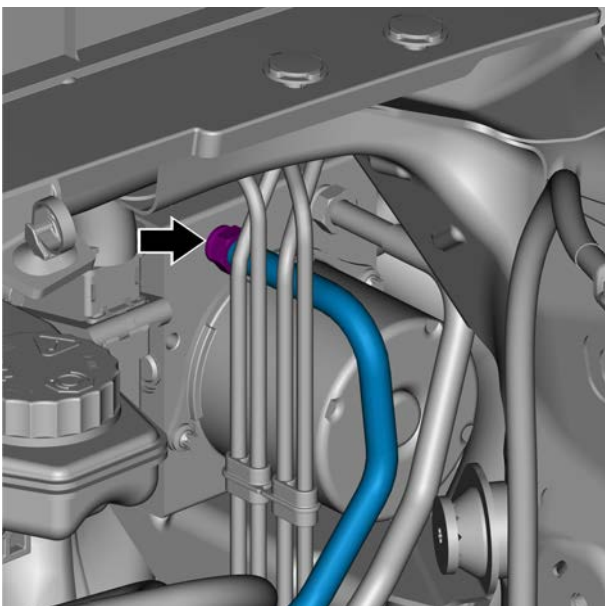
- 9 Remove the connector nut of front left brake hard pipe from the vehicle dynamic domain master, and wipe off the overflowing brake fluid immediately.

Caution

Plug the connecting pipe orifice between front left brake hard pipe and the vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



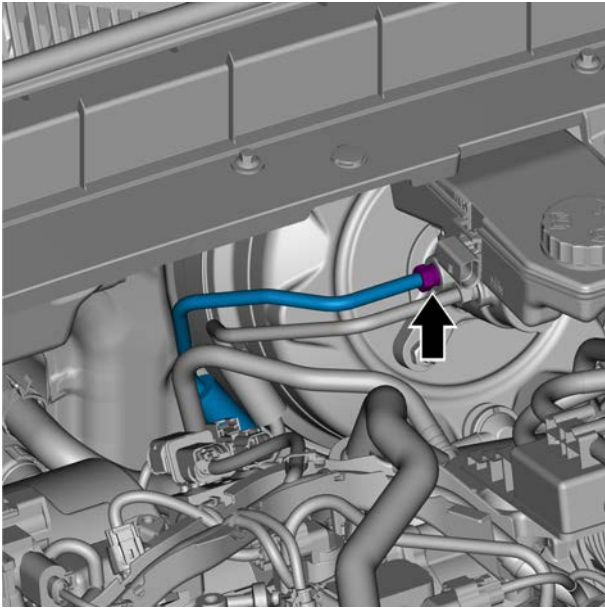
- 10 Remove the four-hole pipe clamp.



- 11 Remove the brake hard pipe fixing nut of No. 2 brake hard pipe of brake master cylinder fixed on the vehicle dynamic domain master.

Caution

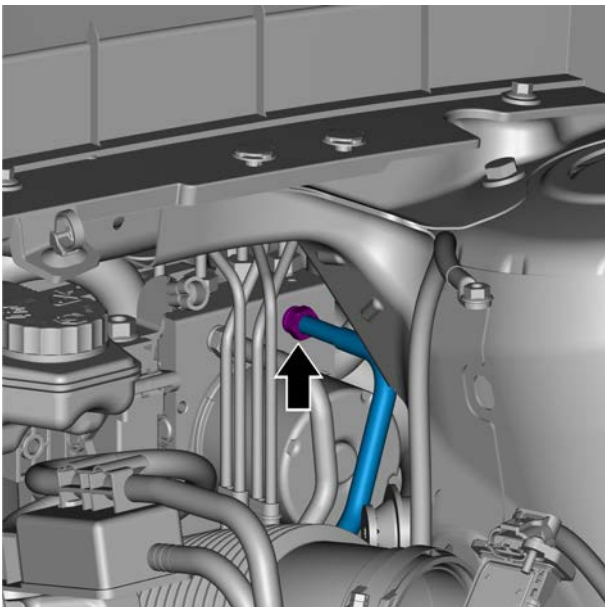
Plug the No. 2 hard pipe of the brake master cylinder and the oil pipe port of vehicle dynamic domain master to prevent the loss and pollution of brake fluid.



- 12 Remove the connecting nut between No. 1 brake hard pipe of brake master cylinder and brake master cylinder.

Caution

Plug the No. 1 hard pipe of brake master cylinder and the oil pipe port of brake master cylinder to prevent the loss and pollution of brake fluid.



- 13 Remove the fixing nut of the brake hard pipe 1 of the brake master cylinder fixed on the vehicle dynamic domain master, and remove the brake hard pipe 1 of the brake master cylinder.

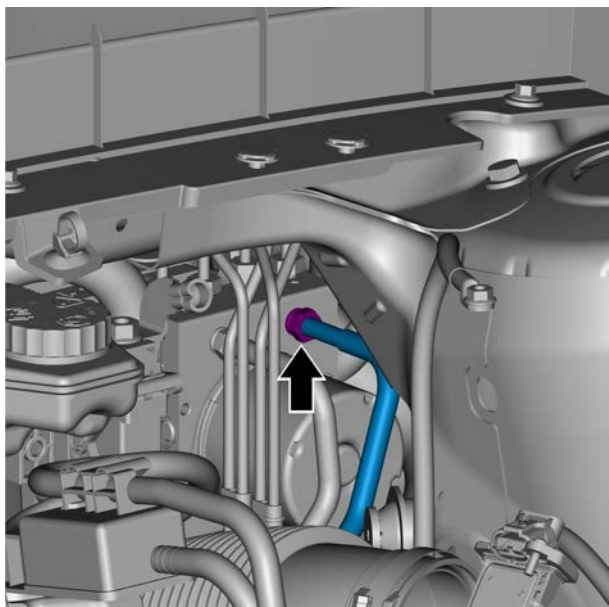
Caution

Plug the No. 1 hard pipe of the brake master cylinder and the oil pipe port of vehicle dynamic domain master to prevent the loss and pollution of brake fluid.

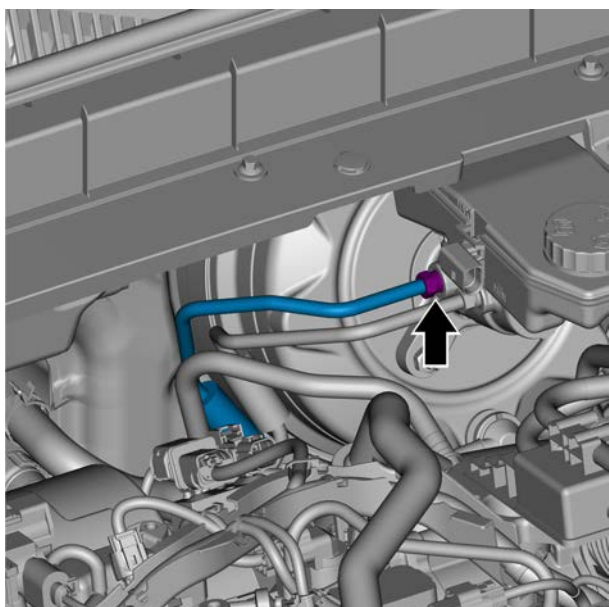
Installation procedure

Caution

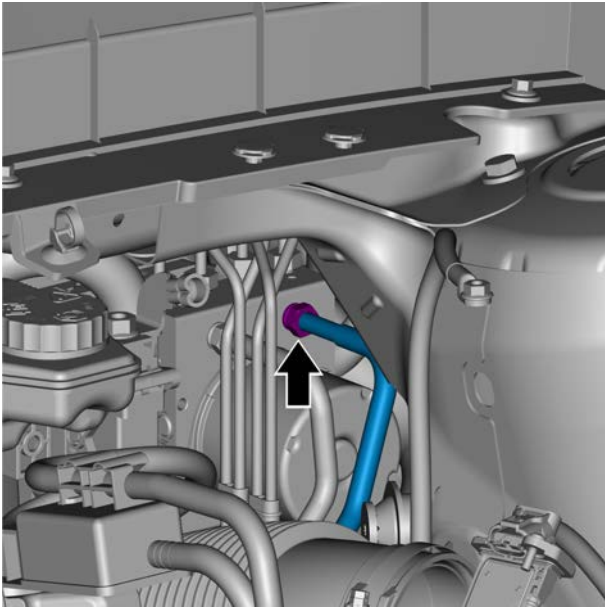
During the assembly of No. 1 hard pipe of brake master cylinder, the joint shall be pre-tightened by hand and then tightened with an open-ended wrench to prevent thread damage.



- 1 Install No. 1 hard pipe of brake master cylinder, and pre-tighten the fixing nut of No. 1 hard pipe of brake master cylinder fixed on the vehicle dynamic domain master.

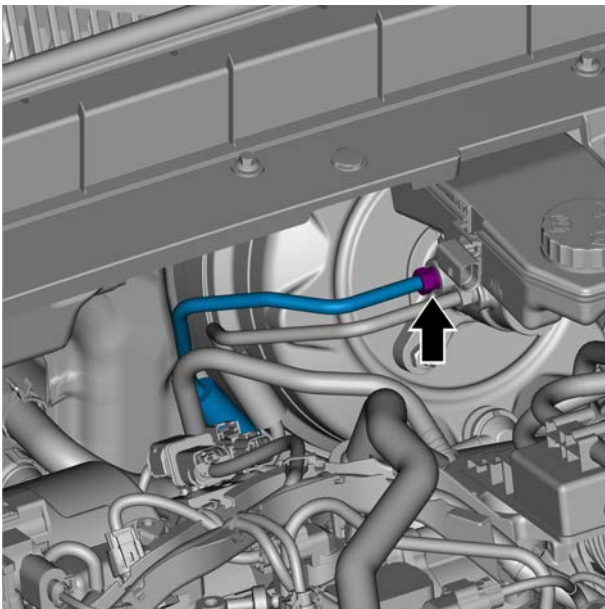


- 2 Pre-tighten the connecting nut between No. 1 brake hard pipe of brake master cylinder and brake master cylinder.



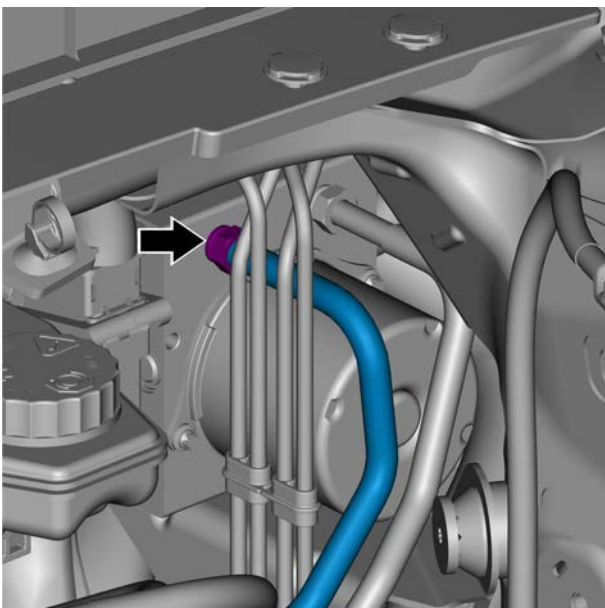
- 3 Tighten the brake hard pipe fixing nut of No. 1 brake hard pipe of brake master cylinder fixed on the vehicle dynamic domain master.

Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



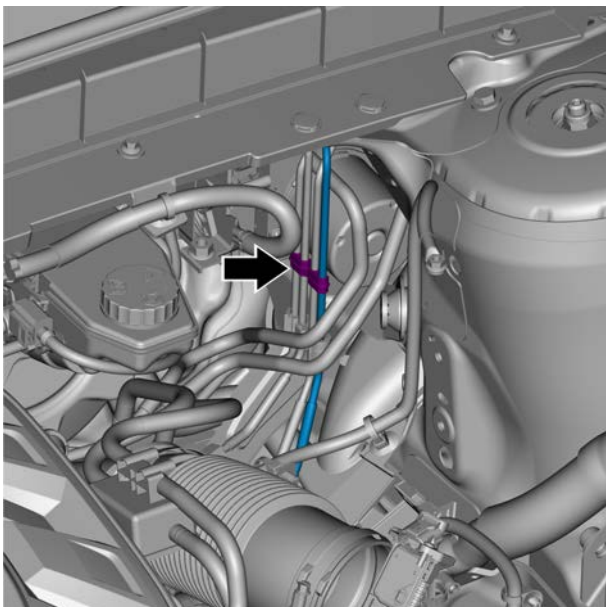
- 4 Tighten the fixing nut connecting the No. 1 hard pipe of the brake master cylinder and the brake master cylinder.

Torque: 17.5 N. m (metric system) 12.9 lb-ft (Imperial system)

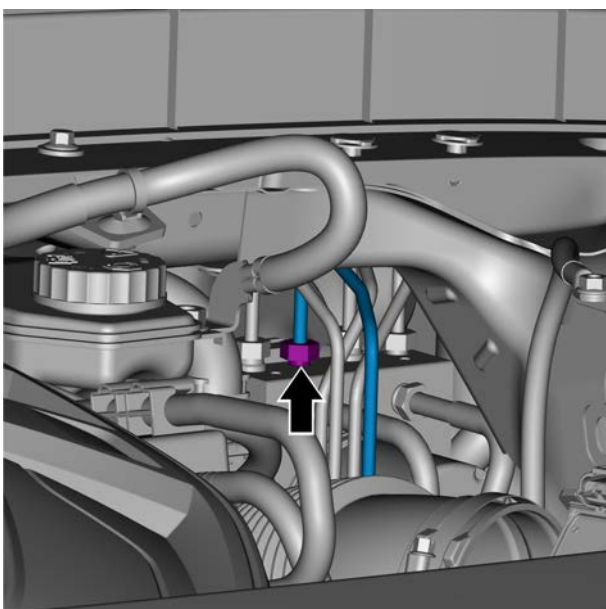


- 5 Install the brake hard pipe fixing nut of No. 2 brake hard pipe of brake master cylinder fixed on the vehicle dynamic domain master.

Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)

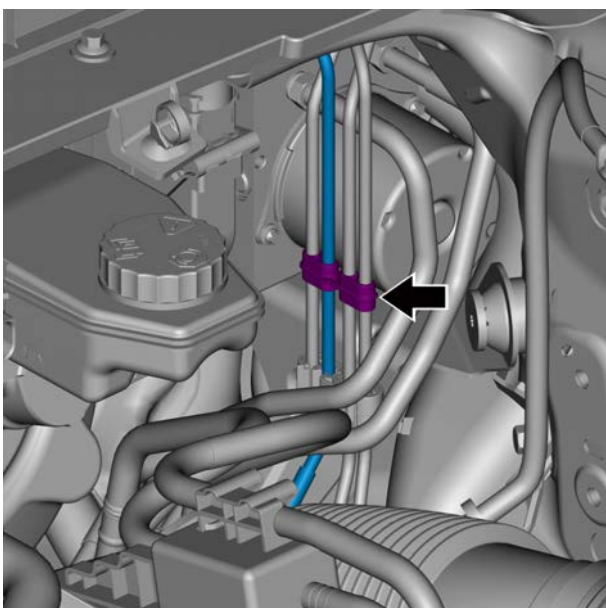


- 6 Install the four-hole pipe clamp.

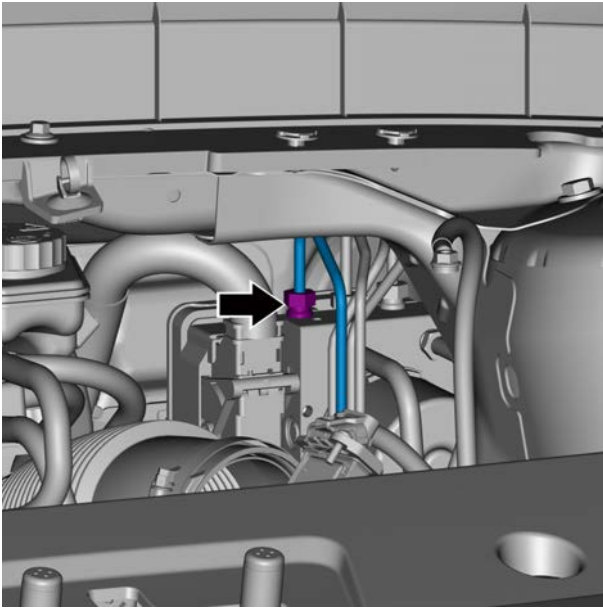


- 7 Install the joint nut between front left brake hard pipe and the vehicle dynamic domain master.

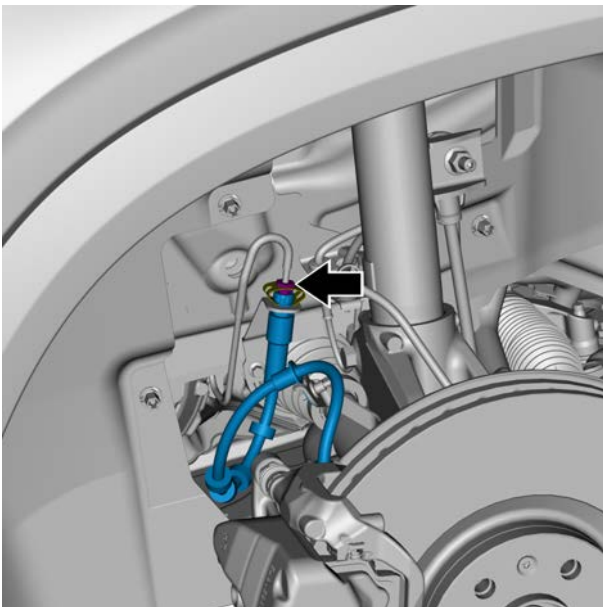
Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



- 8 Install the 4-hole pipe clamp.



- 9 Install the fixing nut fixing the rear right No. 1 brake hard pipe to the vehicle dynamic domain master.
Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



- 10 Install the connecting nut between front left brake hose and the brake hard pipe, and install the spring stopper.
Torque: 14 N. m (metric system) 10.3 lb-ft (Imperial system)

- 11 Add clean brake fluid to the master cylinder reservoir to the max line of the reservoir.
- 12 Bleed the hydraulic brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#)
- .
- 13 Check for leaks.
- 14 Install the battery bracket.
- 15 Install the engine trim cover assembly.
- 16 Install the wheel.
- 17 Connect the negative battery cable.

6.4.5.14 Replacement of No. 2 Rigid Pipe of Brake Master Cylinder

Removal procedure

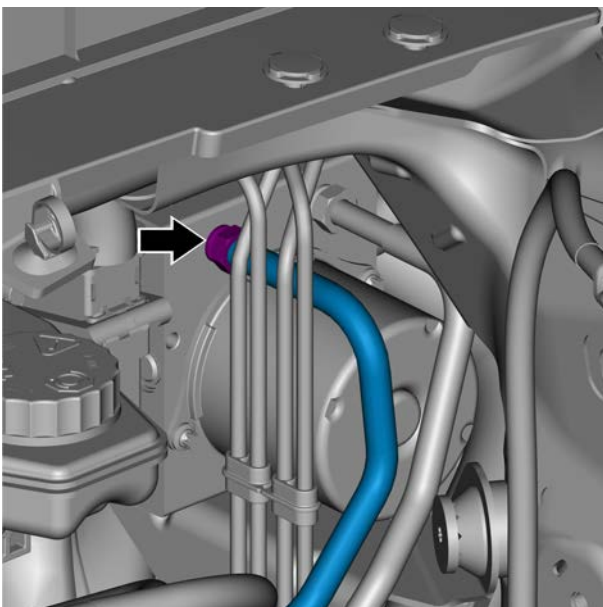
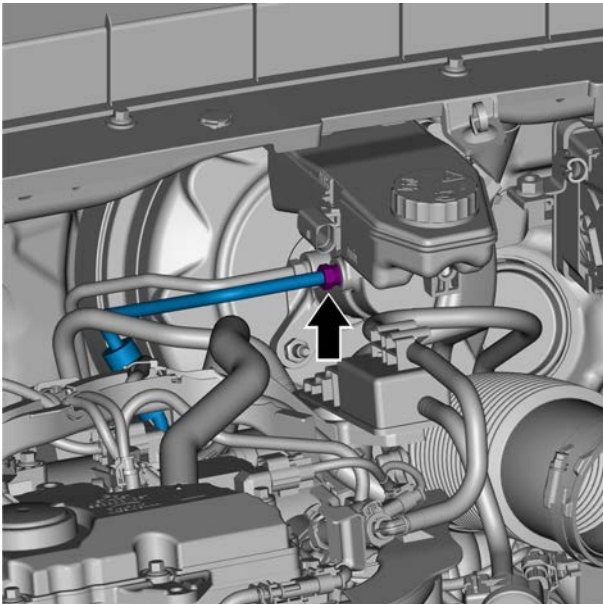
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the assembly-engine trim cover, see [Replacement of assembly-engine trim cover](#).
- 3 Drain the brake fluid.
- 4 Remove the battery bracket. See [battery bracket assembly replacement \(4G20\)](#).
- 5 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 6 Remove the connecting nut between No. 2 brake hard pipe of brake master cylinder and brake master cylinder.

Caution

Plug the No. 2 hard pipe of brake master cylinder and the oil pipe port of brake master cylinder to prevent the loss and pollution of brake fluid.



- 7 Remove the fixing nut of the brake hard pipe 2 of the brake master cylinder fixed on the vehicle dynamic domain master, and remove the brake hard pipe 2 of the brake master cylinder.

Caution

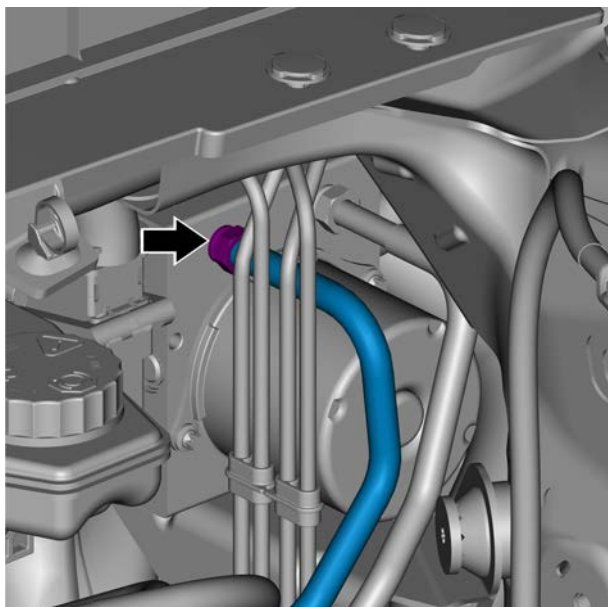
Plug the No. 2 hard pipe of the brake master cylinder and the oil pipe port of vehicle dynamic domain master to prevent the loss and pollution of brake fluid.

Installation procedure

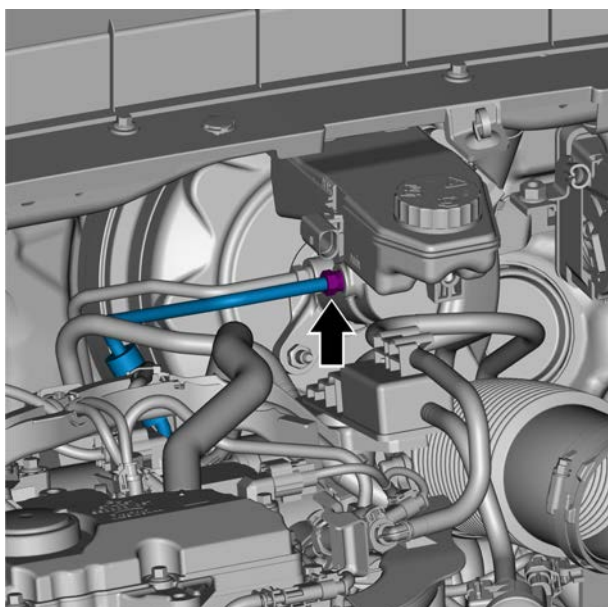
Caution

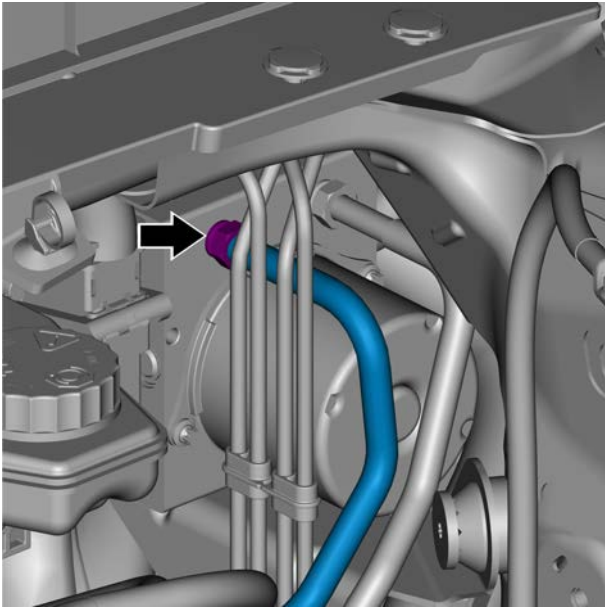
During the assembly of No. 2 hard pipe of brake master cylinder, the joint shall be pre-tightened by hand and then tightened with an open-ended wrench to prevent thread damage.

- 1 Install No. 2 hard pipe of brake master cylinder, and pre-tighten the fixing nut of No. 2 hard pipe of brake master cylinder fixed on the vehicle dynamic domain master.



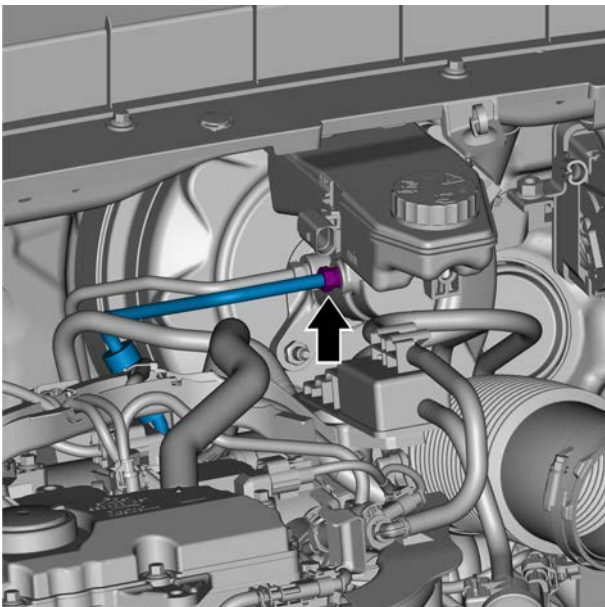
- 2 Pre-tighten the connecting nut between No. 2 brake hard pipe of brake master cylinder and brake master cylinder.





- 3 Tighten the brake hard pipe fixing nut of No. 2 brake hard pipe of brake master cylinder fixed on the vehicle dynamic domain master.

Torque: 15 N. m (metric system) 11 lb-ft (Imperial system)



- 4 Tighten the fixing nut connecting the No. 2 hard pipe of the brake master cylinder and the brake master cylinder.

Torque: 17.5 N. m (metric system) 12.9 lb-ft (Imperial system)

- 5 Add clean brake fluid to the master cylinder reservoir to the max line of the reservoir.
- 6 Bleed the hydraulic brake system, see [Discharge and filling procedure of brake fluid](#)
- 7 Check for leaks.
- 8 Install the battery bracket.
- 9 Install the engine trim cover assembly.
- 10 Install the wheel.
- 11 Connect the negative battery cable.

6.5 Parking system

6.5.1 Specification

6.5.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Brake caliper motor (parking brake) to brake caliper retaining bolt	M6x1.0	8~11	5.9~8.1

6.5.2 Instructions and operations

6.5.2.1 Instructions and Operations

The parking system of this model adopts electronic parking (EPB) and automatic parking system (AUTOHOLD).

Electronic parking (EPB)

Electronic parking (EPB) is mainly composed of parking brake switch, brake caliper motor and vehicle dynamic domain master (VDDM). The parking brake switch sends a parking or release signal to the vehicle dynamic domain master (VDDM), which commands front left rear brake caliper motors to perform corresponding actions to realize the parking and release functions.

Automatic parking system (AUTOHOLD)

AUTOHOLD is an intelligent braking system, which realizes the control of the four wheel brakes through the extended function of VDDM, and is connected with the electronic parking system (EPB). When the vehicle is temporarily stopped and needs to be restarted in a short time, the temporary parking in this case is completed by the brake controlled by VDDM, the VDDM control module measures the levelness of the body and wheel torque through its sensors, determines the tendency of the vehicle to slip, and implements an

6.5.2.2 Release of electric parking brake

EPB manual release

When the start switch is in the ON position or the engine is started, press the brake pedal and press the parking brake switch, the EPB release is completed, and the electronic parking brake system (EPB) status indicator is off.

EPB automatic release

Start the engine, fasten the safety belt, the EPB has been pulled up, the shift lever is in driving gear, gently press the accelerator pedal sensor, the EPB will be released automatically, and the status indicator of the electronic parking brake system (EPB) will go out.

EPB manual parking

Pull down the parking brake switch when the vehicle is stationary, the manual parking is completed, and the status indicator of electronic parking brake system (EPB) is on.

appropriate braking force on the wheels to keep the vehicle stationary. This braking force can just prevent the movement of the vehicle, and it will not be too large, so that when you step on the accelerator again, there won't be serious forward movement. When the temporary parking exceeds a certain time limit, the brake system is switched to the rear wheel parking brake (EPB is turned on) instead of the previous four-wheel hydraulic brake. When the vehicle is about to move forward, the system will detect the pedaling force of the accelerator to determine whether to release the brake.

After using this function, the driver can park the car without operating the parking brake switch during temporary parking, and there is no need to operate the gear lever frequently, which simplifies the operation and improves the driving comfort, it also reduces the potential safety hazard caused by accidental "slipping" when the driver forgets to operate the parking brake switch during temporary parking. However, in order to reduce the wear of the transmission system, save fuel and protect the environment, try to switch the gear lever to the "N" gear when temporarily parking.

6.5.3 System working principles

6.5.3.1 System Working Principles

When the electronic parking system operates, first set the power mode to ON, and control the EPB to work by collecting pedal signals and parking brake switch signals, to control the piston of parking rear wheel brake caliper to achieve the purpose of parking braking.

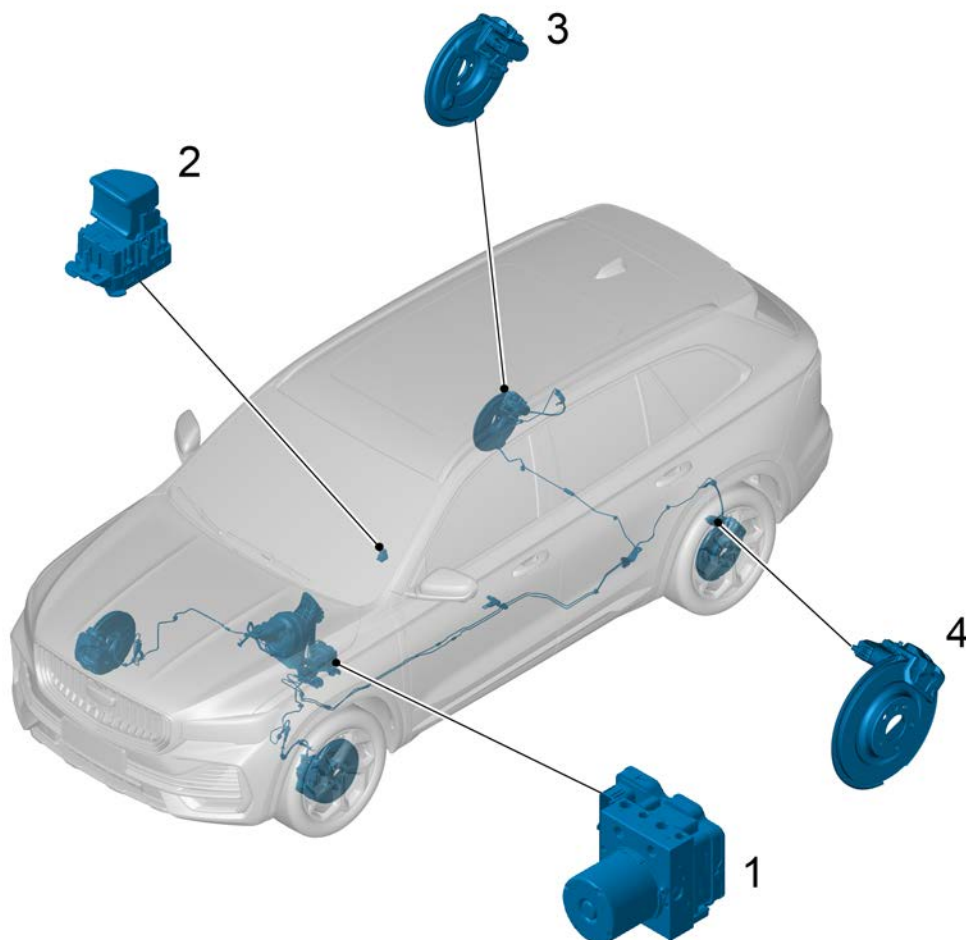
Electric parking system has the functions stated in the following table

Mode	Condition	Value	Description
Manual clamping	Parking brake switch status	Pull up the parking brake switch manually to input the parking signal	When the vehicle is stationary, pull up the parking brake switch manually. After the system checks the pull up signal of the parking brake switch, execute the caliper clamping command.
	Vehicle status	Stationary	
	Road grade	Judge the clamp force according to the grade	
	Caliper status	Release and has no mechanical fault	
Manual release	Ignition switch status	ON	When the vehicle is stationary, by manually pressing the parking brake switch, the system checks the parking brake switch release signal and executes the caliper release command.
	Vehicle status	Stationary	
	Parking brake switch status	Press the parking brake switch manually to release the parking brake	
	Brake status	Step brake pedal down and input the brake signal	
	Caliper status	Parking and has no mechanical fault	
Automatically parking	Ignition switch status	Switch On to OFF	When the vehicle is stationary, ignition power supply will switch from ON to OFF and the EPB will automatically clamp and conduct parking brake.
	Engine status	Run to OFF	
	Vehicle status	Stationary	
	Road grade	Judge the clamp force according to the grade	
	Caliper status	Release and has no mechanical fault	
Shift P lock	Ignition switch status	ON	When the vehicle is stationary after the driver drives to a certain grade and the gear is switched into P, the system will execute P-Lock function and conduct clamp parking.
	Engine status	Operation	
	Vehicle status	Stationary	
	Transmission gears	P gear	
	Road grade	Judge the clamp force according to the grade	
	Caliper status	Release and has no mechanical fault	

Mode	Condition	Value	Description
Automatically release	Ignition switch status	ON	Judge the driver intention and release EPB to assist the driver in driving away through detecting accelerator pedal, engine speed, engine torque, grade and other signals.
	Engine status	Operation	
	Vehicle status	Stationary	
	Transmission gears	D or R gear	
	Accelerator pedal status	Related matters will be subject to the grade	
	Whether the driver is in the car	Close main driver door and fasten seat belt	
	Road grade	Judge the release time according to grade	
	Caliper status	Parking and has no mechanical fault	
RAR	Vehicle status	Stationary	The system will confirm whether the vehicle slides the slope through monitoring wheel speed pulse signal. When the system detects wheel speed pulse, it will automatically activate the RAR function with maximum clamp force.
	Caliper status	Parking and has no mechanical fault	
	Wheel speed sensor	Receive wheel speed pulse signal	
Emergency release	Ignition switch status	Switch ON/ACC to OFF	Press down the parking brake switch and switch the ignition power supply from ON/ACC to OFF gear, and the calipers will not automatically clamp.
	Vehicle status	Stationary	
	Parking brake switch status	Press the parking brake switch manually to release the parking brake	

6.5.4 Component position

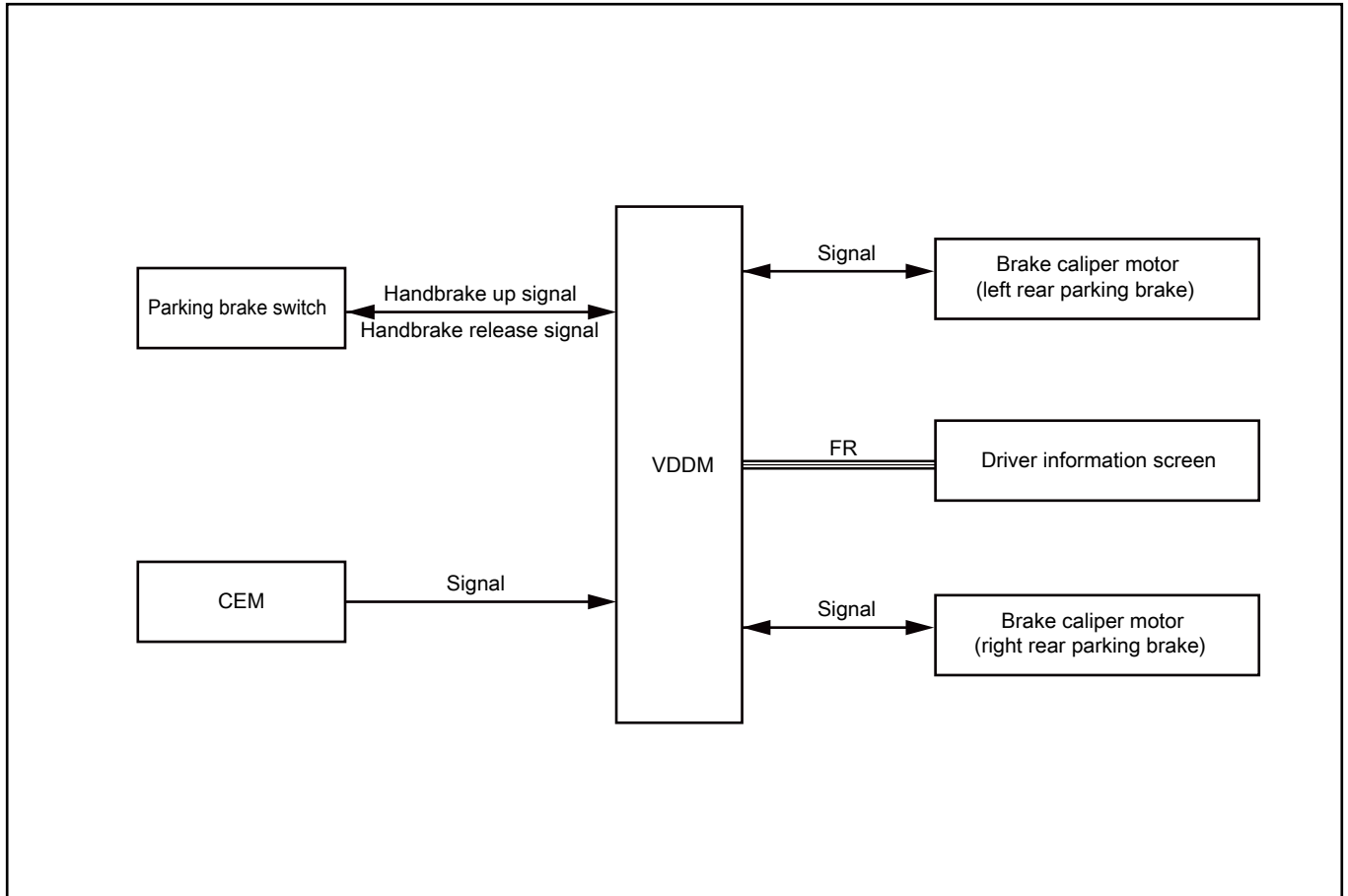
6.5.4.1 Component position



- | | |
|--|--|
| <ul style="list-style-type: none"> 1. Vehicle dynamic domain master (VDDM) 2. Parking brake switch | <ul style="list-style-type: none"> 3. Rear right brake caliper body with EPB assembly 4. The rear left brake caliper with EPB assembly |
|--|--|

6.5.5 Electrical schematic diagram

6.5.5.1 Electrical schematic diagram



6.5.6 Diagnostic information and procedures

6.5.6.1 Diagnosis Description

The fault code can be read through the data connector of the vehicle (DTC diagnostic interface). Using the Data sheet of vehicle dynamic domain master (VDDM) block and reading the data table of the intelligent measuring instrument, the function of reading switch and sensor's data can be performed without removing any parts. Reading data table is the first step in trouble shooting and one of the ways to reduce diagnostic time.

6.5.6.2 Routine inspection

- Confirm trouble symptom

The most difficult situation in trouble shooting is the absence of any symptoms. In this case, the fault described by the user must be thoroughly analyzed. The same or similar conditions and environment when the fault of the distributor's vehicle comes out should be simulated. No matter how experienced and skilled the maintenance personnel is, if they do not confirm the symptoms of the fault, they will ignore some important things in the repair and make wrong guesses in some places. It will make trouble shooting to fail.

- Check the easily accessible or visible system components to find out whether they have obvious damage or conditions that may lead to failure. If so, repair or replace the components.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.
- The connector joints and vibration fulcrum are the main parts that should be thoroughly checked. Vibration method is recommended in case of failure due to vibration.
 - 1 Gently vibrate the potentially faulty sensor part with fingers and check for faults.
 - 2 Gently shake the connector in both vertical and horizontal directions.
 - 3 Gently shake the harness in both vertical and horizontal directions.

6.5.7 Removing and installing

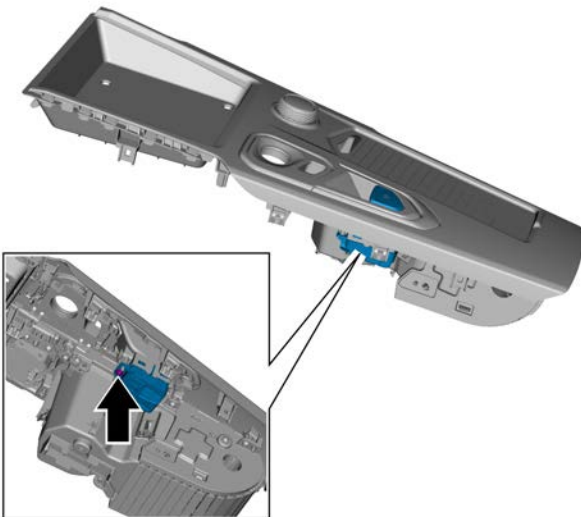
6.5.7.1 Parking brake switch

Removal procedure

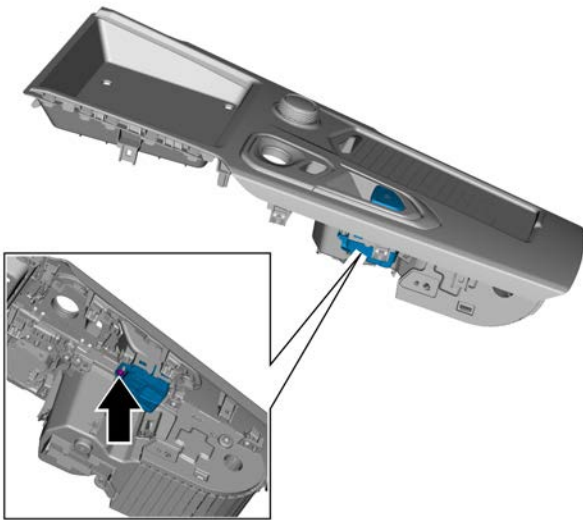
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the shift panel assembly, see [Replacement of the shift panel assembly](#).
- 3 Remove the fixing screws of the parking brake switch.
- 4 Remove the shift brake switch assembly from the parking brake panel.



Installation procedure



- 1 Install the parking brake switch to the shift panel assembly and tighten the fixing screws.

Torque: 1.5 N. m (metric system) 1.1 lb-ft (Imperial system)

- 2 Install the shift panel assembly.
- 3 Connect the negative battery cable.

6.5.7.2 Brake caliper motor (rear left parking brake) replacement

Removal procedure

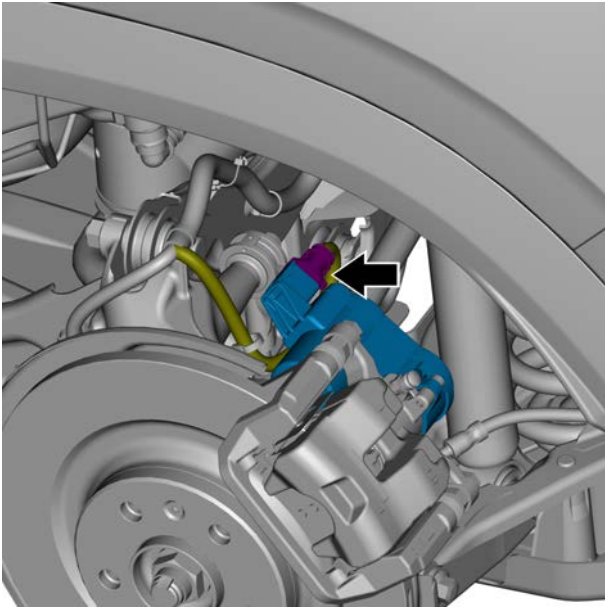
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

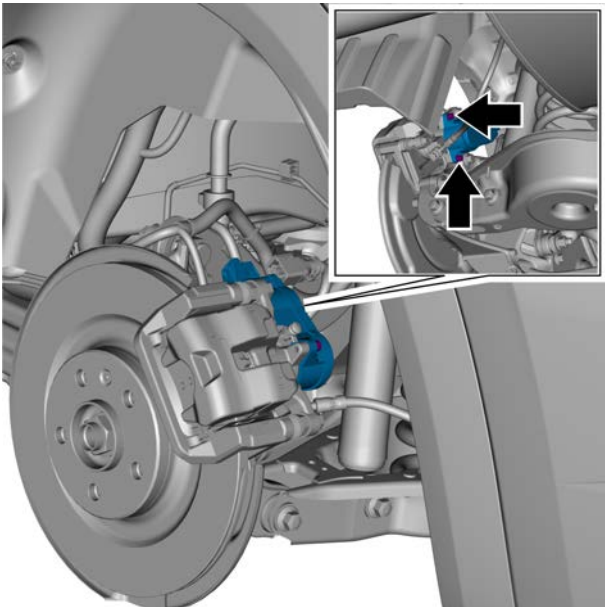
Caution

The removal and assembly methods of front left rear brake caliper motors (parking brake) are similar.

- 1 Use the diagnostic instrument to perform the replacement procedure of the rear brake belt spring plate friction plate components.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Support vehicles, see [Support Vehicles](#)
- 4 Remove the wheel, refer to [Replacement of wheel assembly.](#)

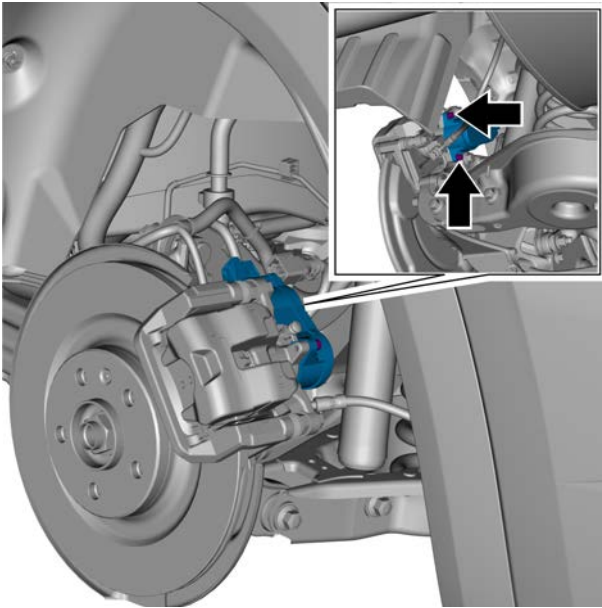


- 5 Disconnect the harness connector of brake caliper motor (parking brake).



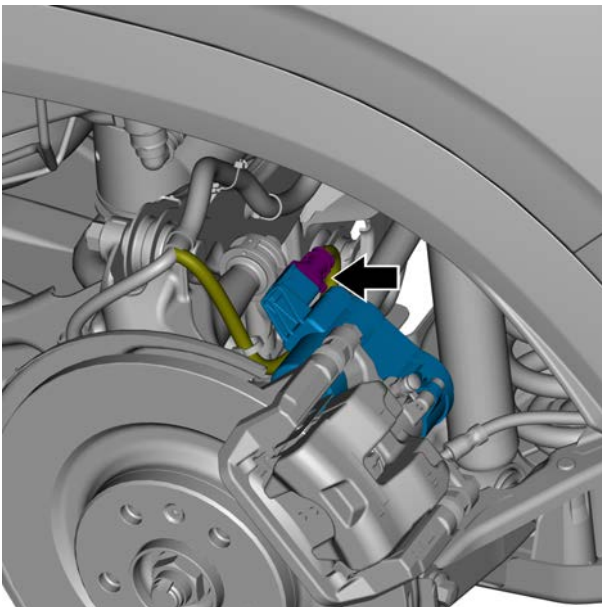
- 6 Remove the retaining bolts of the brake caliper motor (RL parking brake), and remove the brake caliper motor (RL parking brake).

Installation procedure



- 1 Install the brake caliper motor (parking brake) and tighten the retaining bolts.

Torque: 9.5 N. m (metric system) 7 lb-ft (Imperial system)



- 2 Install the harness connector of brake caliper motor (parking brake).

- 3 Install the wheel.
- 4 Lower the vehicle.
- 5 Connect the negative battery cable.
- 6 Use the diagnostic instrument to perform the replacement procedure of the rear brake belt spring plate friction plate components.

6.6 ABS/TCS/EBD/VDDM

6.6.1 Specification

6.6.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
retaining bolts of VDDM controller unit and VDDM module support	M10×16	15.3~20.7	11.3~15.3
VDDM module bracket and body fixing screws	M6×38.5	11~15	8.1~11.1
retaining bolt from front wheel speed sensor to front steering knuckle LH assembly	M6×20	8.5~11.5	6.3~8.5
Rear wheel speed sensor to rear left steering knuckle assembly retaining bolt	M6×20	8.5~11.5	6.3~8.5

6.6.1.2 Wheel speed sensor technical specifications

Wheel speed sensor	Description
Sensor type	Active wheel speed sensor
Operating frequency	1Hz-2500Hz
Operating temperature	-40 °C to 115 °C
Working voltage	4.5V-20V
Clearance value with signal panel	Front axle: 0.2-1.565mm (0.0079in-0.0620in)
	Rear axle: 1-2.5mm (0.0395in-0.0975in)

6.6.2 Instructions and operations

6.6.2.1 Instructions and Operations

The braking system of this model adopts double pipe hydraulic braking system and is equipped with anti-lock braking system (ABS), electronic braking force distribution system (EBD), brake assist system (BA), traction control system (TCS), vehicle dynamic domain master (VDDM), uphill assist (HAC), hill descent contr (HDC), emergency braking double flash (HAZ) and automatic parking system (AUTOHOLD), provide excellent braking performance, operability, stability and safety for the driver under the condition of each bicycle.

Anti-lock braking system (ABS)

The main function of anti-lock braking system (ABS) is to improve the braking performance of the whole vehicle, improve driving safety, and prevent wheel locking (i.e. stop rolling) during braking, so as to ensure that the driver can control the direction during braking and prevent rear wheel sideslip. Its working principle is: during emergency braking, when the wheel speed sensor installed on each wheel finds that a wheel is locked, the ABS computer immediately controls the corresponding solenoid valve to release the pressure of the wheel brake cylinder and restore the rotation of the wheel, to prevent wheel locking. The working process of ABS is actually a cyclic working process of "locking loosening locking loosening", which makes the vehicle always in the gap rolling state of critical locking, effectively overcome the vehicle deviation caused by wheel locking during emergency braking, and prevent the occurrence of vehicle body out of control.

The anti-lock braking system (ABS) consists of the following components:

1. Hydraulic electronic control unit (HECM)

Caution

There is a rubber damping pad between the mounting bolt and the bracket of the Hydraulic electronic control unit. The function of the rubber damping pad is to protect the hydraulic electronic control unit from the influence of vehicle vibration. The hydraulic electronic control unit cannot be disassembled and should be replaced as an assembly.

The hydraulic electronic control unit (HECM) controls system functions and detects faults. When the start and stop switch is turned on and the DTC of anti-lock braking system does not appear, the system energizes the relay to provide the solenoid valve and the pump with battery positive voltage. The hydraulic electronic control unit (HECM) continuously detects the state of the wheels and controls the slip rate of the wheels to maintain a certain range, to maintain the stability of the

vehicle. The hydraulic control pipeline adopts a diagonal split configuration, so that the oil of the master cylinder flows all the way to the left front wheel and the right rear wheel, and the other oil flows to the right front wheel and the left rear wheel. The diagonal branch circuit is isolated in hydraulic control, so that when one main brake circuit leaks or fails, the other circuit can ensure continuous braking capability. The hydraulic electronic control unit (HECM) consists of the following main components:

- ABS control module
- ABS pump and its relay
- Inlet valve, each inlet valve controls one wheel
- Drain valves, each drain valve controls one wheel
- Electromagnetic coil relay

2. Wheel speed sensor

The wheel speed sensor is a Hall-type speed sensor. As the wheel rotates, the ABS control module uses the wheel speed signal to calculate the wheel speed. The wheel speed sensor can be replaced separately, but the signal disc (ring gear) is located on the hub bearing and replaced together with the hub bearing.

3. Brake lamp switch

When the brake pedal is depressed, the brake lamp is turned on, and the brake signal is sent to the ABS control module at the same time.

4. ABS warning indicator

Located on the instrument cluster, it will light up to notify the driver that the ABS is malfunctioning. When the following events occur, the instrument panel combination instrument will start and turn on the ABS warning indicator:

- The ABS control module detects that there is a fault in the ABS system. The combination instrument receives a request to turn on the information from the ABS control module through the CAN bus. The combination instrument performs the self-test at the beginning of each ignition cycle, and the indicator light turns on for about 3s.
- - The combination instrument performs a self-check test at the beginning of each ignition cycle, and the indicator turns on for about 3s.
- -The combination instrument detects that the communication with the ABS control module is lost.

Electronic brake force distribution system (EBD)

The electronic braking force distribution system (EBD) is actually an auxiliary function of ABS, which can improve the

efficiency of ABS. When braking, the four brake wheel cylinders of the vehicle will work, but due to the variation of road conditions and the transfer of the center of gravity of the vehicle during deceleration, the grip between the four wheels and the ground will be different, and the braking force of each wheel will be different under no-load and full load. Under these conditions, EBD automatically monitors the grip between each wheel and the ground, reasonably distributes the braking force of the front and rear wheels, and gives full play to the working efficiency of the braking system. With the assistance of the EBD system, the braking system has exerted the maximum work efficiency, which significantly shortens the braking distance, and keeps the vehicle stable when braking, which improves driving safety, and the vehicle can better maintain its stable function when turning and braking, which increases the safety of cornering.

Hydraulic brake assist system(BA)

Brake assist system (BA) can judge the driver's braking action, increase the braking force and shorten the braking distance in case of emergency braking. According to the strength and speed of the driver stepping on the brake pedal, it automatically judges whether it is emergency braking, and then reasonably applies the appropriate auxiliary braking force, to provide an effective, reliable and safe braking, to avoid the vehicle unable to brake in time due to the insufficient braking force applied by the driver on the brake pedal in the case of emergency braking.

Traction control system (TCS)

The function of traction control system (TCS) is to enable the vehicle to obtain the best traction under various driving conditions. The traction control module detects the speed of four wheels and steering-angle sensors. When the vehicle accelerates, if the speed difference between the driving wheel and the non-driving wheel is detected to be too large, the traction control module will immediately judge that the driving force is too large, and immediately send a signal to the engine ECM to reduce the fuel supply of the engine and reduce the driving force, to reduce the slip rate of the driving wheel. The traction control module can also understand the driver's steering intention through the steering-angle sensor, and then use left and right wheel speed sensors to detect the speed difference between left and right wheels, to judge whether the vehicle steering degree is consistent with the driver's intention. If understeer or oversteer is detected, the traction control module will immediately send a command to reduce the driving force to realize the driver's steering intention. The traction control system can also prevent the idling of the driving wheel when the vehicle is driving on slippery roads such as snow, so that the vehicle can start and accelerate smoothly. Especially

on the snow or muddy road, the traction control system can well control the acceleration performance of the vehicle and prevent the vehicle from moving sideways or swinging its tail due to the slip of the driving wheel.

Vehicle dynamic domain system

Vehicle dynamic domain system is a further expansion of the functions of anti-lock braking system (ABS) and traction control system (TCS). On this basis, yaw rate sensor, lateral collision sensor and steering-angle sensor are added. The control unit judges the running state of the vehicle through the signals of these sensors, and then sends commands. VDDM can actively detect and analyze vehicle driving conditions and timely correct driver errors. VDDM is particularly sensitive to vehicle oversteer or understeer. When it is found that the vehicle turns or turns too fast on a slippery road, resulting in understeer or oversteer, it will throw its tail, when the sensor feels sliding, the system will quickly apply braking force to one or more wheels to restore the adhesion of the wheels, adjust the posture of the car when turning, and keep the car on the original road, which greatly improves the stability and safety of the car when turning. The system will also work with the engine ECM. When the electronic system judges that the driving wheel slips, it will automatically reduce the air intake of the throttle valve and reduce the engine speed, to reduce the power output. Brake the slipping driving wheel, so as to reduce the slip and maintain the most appropriate power output between the tire and the ground grip. At this time, no matter how to supply oil, the driving wheels will not slip.

Uphill assist (HAC)

The HAC function enables the driver to prevent the vehicle starting on the uphill slope from sliding after releasing the brake pedal. The HAC function can maintain the brake pressure applied by the driver, leaving up to two seconds for the driver to move his foot from the brake pedal to the accelerator, and then the brake pressure will be automatically released.

Hill Descent Control (HDC)

Under the condition of no driver interference, the vehicle can descend the steep slope at a constant speed by limiting the engine torque and braking the vehicle.

Emergency braking double flash (HAZ)

When the vehicle brakes hard, the brake light and double flash start to flash to warn the rear vehicle that the vehicle in front of the vehicle encounters problems and prevent the rear vehicle from rear collision.

Automatic parking system (AUTOHOLD)

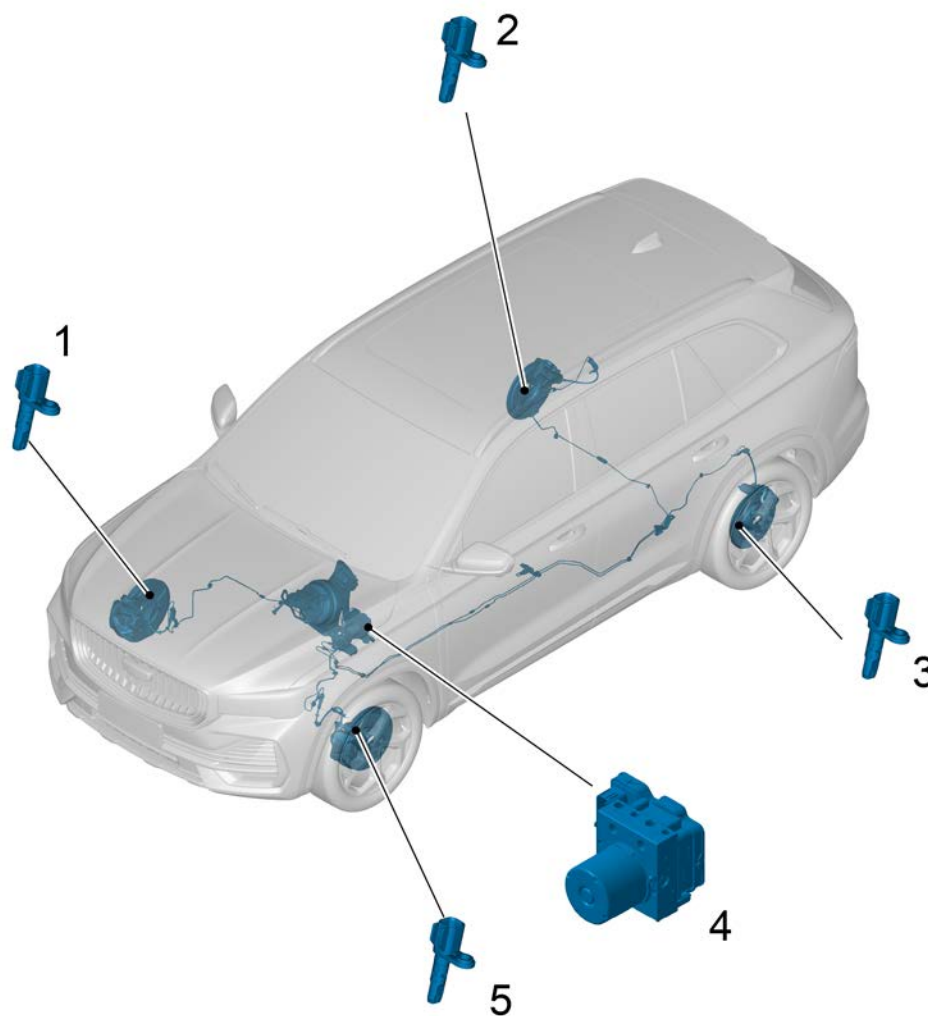
AUTOHOLD is an intelligent braking system, which realizes the control of the four wheel brakes through the extended

function of VDDM, and is connected with the electronic parking system (EPB). When the vehicle is temporarily stopped and needs to be restarted in a short time, the temporary parking in this case is completed by the brake controlled by VDDM, the VDDM control module measures the levelness of the body and wheel torque through its sensors, determines the tendency of the vehicle to slip, and implements an appropriate braking force on the wheels to keep the vehicle stationary. This braking force can just prevent the movement of the vehicle, and it will not be too large, so that when you step on the accelerator again, there won't be serious forward movement. When the temporary parking exceeds a certain time limit, the brake system is switched to the rear wheel parking brake (EPB is turned on) instead of the previous four-wheel hydraulic brake. When the vehicle is about to move forward, the system will detect the pedaling force of the accelerator to determine whether to release the brake.

After using this function, the driver can park the car without operating the parking brake switch during temporary parking, and there is no need to operate the gear lever frequently, which simplifies the operation and improves the driving comfort, it also reduces the potential safety hazard caused by accidental "slipping" when the driver forgets to operate the parking brake switch during temporary parking. However, in order to reduce the wear of the transmission system, save fuel and protect the environment, try to switch the gear lever to the "N" gear when temporarily parking.

6.6.3 Component position

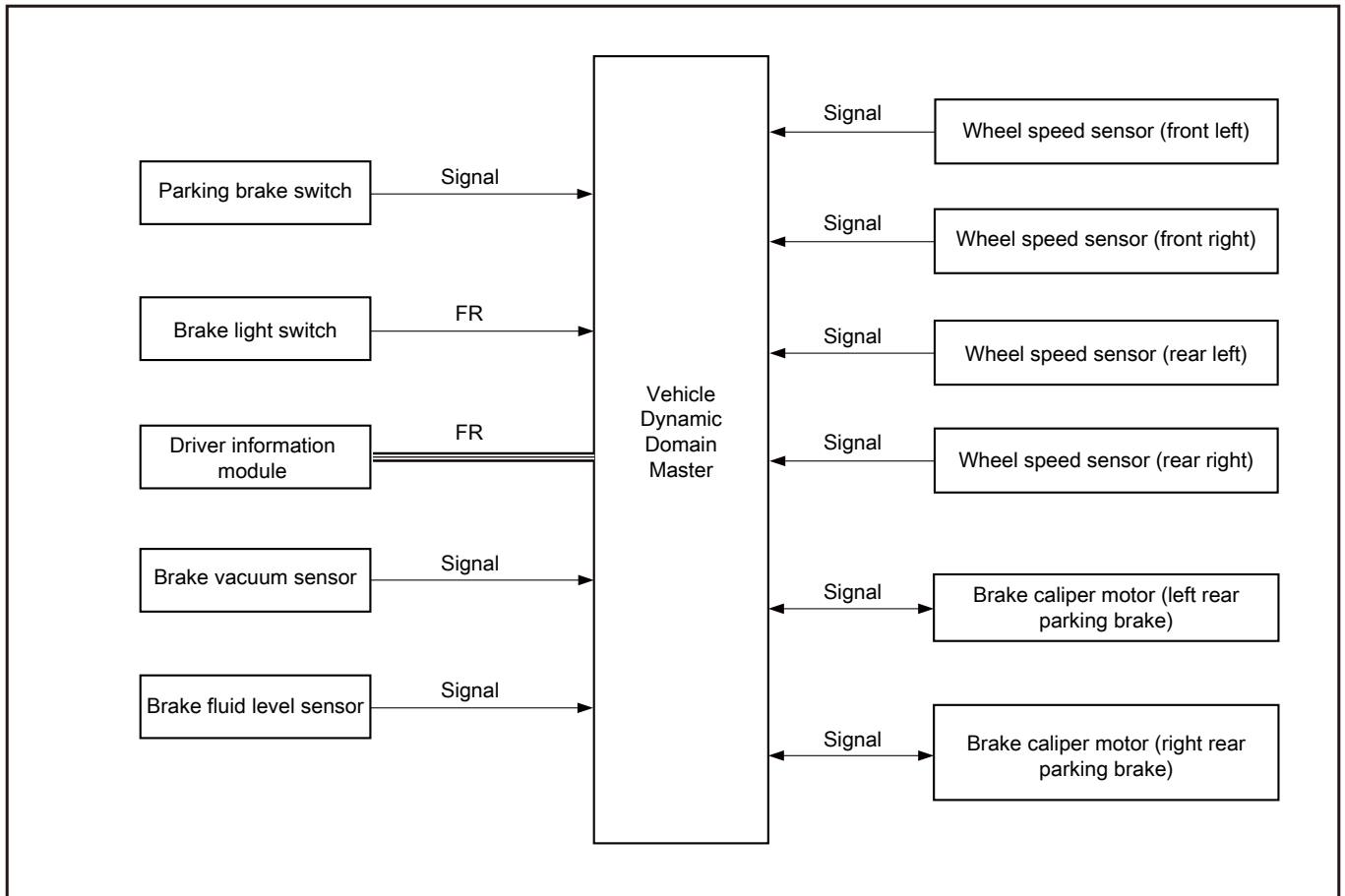
6.6.3.1 Component position



- | | |
|-------------------------------------|---|
| 1. Wheel speed sensor (front right) | 4. Vehicle dynamic domain master (VDDM) |
| 2. Wheel speed sensor (rear right) | 5. Wheel speed sensor front left |
| 3. Wheel speed sensor (rear left) | |

6.6.4 Electrical schematic diagram

6.6.4.1 Electrical schematic diagram



6.6.5 Diagnostic information and procedures

6.6.5.1 Diagnosis Description

The fault code can be read through the data connector of the vehicle (DTC diagnostic interface), and through the data table of the Intelligent measuring instrument, the functions of switch and sensor can be performed without removing any parts. Reading data table is the first step in trouble shooting and one of the ways to reduce diagnostic time.

6.6.5.2 Routine inspection

- Confirm trouble symptom

The most difficult situation in trouble shooting is the absence of any symptoms. In this case, the fault described by the user must be thoroughly analyzed. The same or similar conditions and environment when the fault of the distributor's vehicle comes out should be simulated. No matter how experienced and skilled the maintenance personnel is, if they do not confirm the symptoms of the fault, they will ignore some important things in the repair and make wrong guesses in some places. It will make trouble shooting to fail.

- Check the easily accessible or visible system components to find out whether they have obvious damage or conditions that may lead to failure. If so, repair or replace the components.
- The connector joints and vibration fulcrum are the main parts that should be thoroughly checked. Vibration method is recommended in case of failure due to vibration.
 - Gently vibrate the potentially faulty sensor part with fingers and check for faults.
 - Gently shake the connector in both vertical and horizontal directions.
 - Gently shake the harness in both vertical and horizontal directions.

6.6.6 Removing and installing

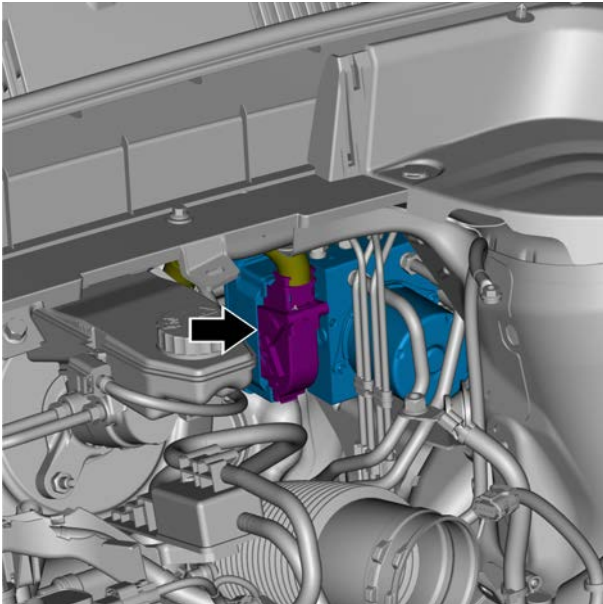
6.6.6.1 Replacement of vehicle dynamic domain master

Removal procedure

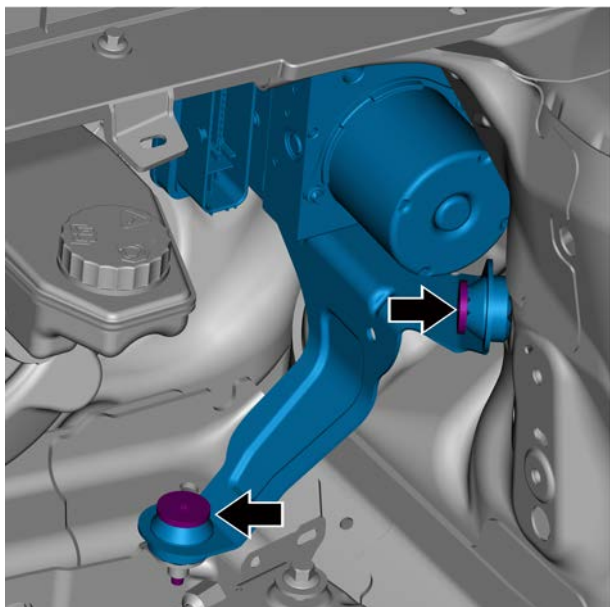
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the battery, refer to [Replacement of battery.](#)
- 4 Remove the battery bracket assembly. Refer to [battery bracket assembly replacement.](#)
- 5 Drain the brake fluid.
- 6 Press the plug pin, pull up the lock and disconnect the harness connector on the vehicle dynamic domain master.



- 7 Remove the rear right No. 1 brake hard pipe. See [the replacement of rear right No. 1 brake hard pipe.](#)
- 8 Remove No. 2 hard pipe of brake master cylinder. See [replacement of No. 2 hard pipe of brake master cylinder.](#)
- 9 Remove No. 1 hard pipe of brake master cylinder. See [replacement of No. 1 hard pipe of brake master cylinder.](#)
- 8 Remove front left brake hard pipe. See [the replacement of front left brake hard pipe.](#)
- 10 Remove the front right No. 1 brake hard pipe. See [the replacement of front right No. 1 brake hard pipe.](#)
- 11 Remove the rear left No. 1 brake hard pipe. See [the replacement of rear left No. 1 brake hard pipe.](#)



- 12 Disconnect the brake hard pipe bracket on the bracket of vehicle dynamic domain master.
- 13 Remove 2 retaining bolts 1 from the vehicle dynamic domain master bracket and remove the vehicle dynamic domain master.



- 14 Remove the retaining bolts of the vehicle dynamic domain master and remove the vehicle dynamic domain master from the vehicle dynamic domain master bracket.

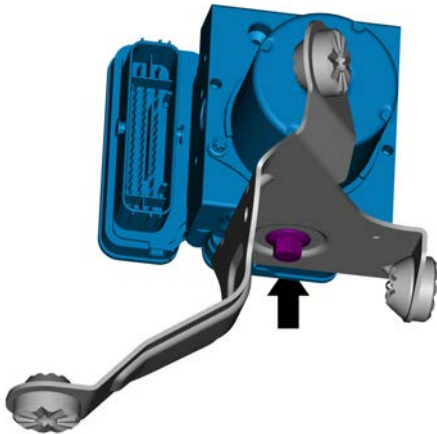
Installation procedure

Caution

When installing the brake hard pipeline, the joint shall be Pre-tightened by hand, and then the torque shall be tightened with an open-ended wrench to prevent thread damage.

- 1 Install the vehicle dynamic domain master to the vehicle dynamic domain master bracket, and tighten the fixing nuts.

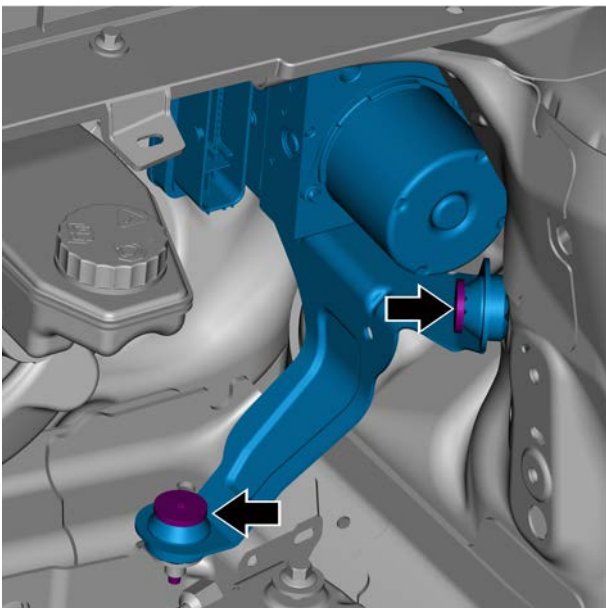
Torque: 18 N. m (metric system) 13.3 lb-ft (Imperial system)



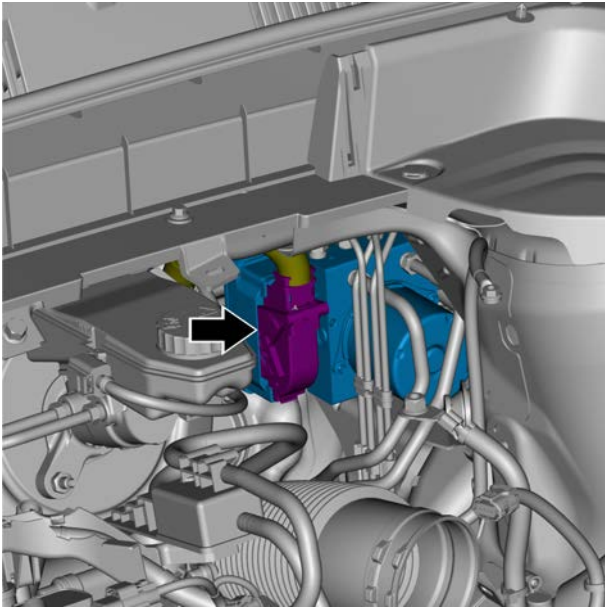
- 2 Install the vehicle dynamic domain master and tighten 2 retaining bolts.

Torque: 13 N. m (metric system) 9.6 lb-ft (Imperial system)

- 3 Install the brake hard pipe bracket on the vehicle dynamic domain master bracket.



- 4 Install the rear left No. 1 brake hard pipe.
- 5 Install the front right No. 1 brake hard pipe.
- 6 Install front left brake hard pipe.
- 7 Install No. 1 hard pipe of brake master cylinder.
- 8 Install No. 2 hard pipe of brake master cylinder.
- 9 Install the rear right No. 1 brake hard pipe.



- 10 Connect the harness connector on the vehicle dynamic domain master.

- 11 Add clean brake fluid to the master cylinder reservoir until it is flush with the max line of the reservoir.
- 12 Bleed the hydraulic brake system, see Discharge and filling procedure of brake fluid [Discharge and filling procedure of brake fluid](#)
- 13 Check the brake system for leaks.
- 14 Install the battery bracket.
- 15 Install the battery heat shield.
- 16 Connect the negative battery cable.
- 17 If you need to use the diagnostic program, select the corresponding module under the [software] tab, and complete the software brushing operation according to the steps prompted by the diagnostic program.
- 18 Close the engine compartment.

6.6.6.2 Wheel speed sensor front left replacement

Removal procedure

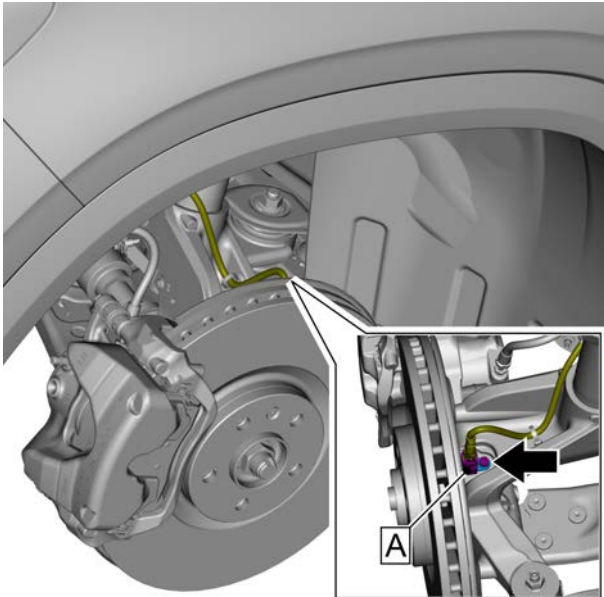
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

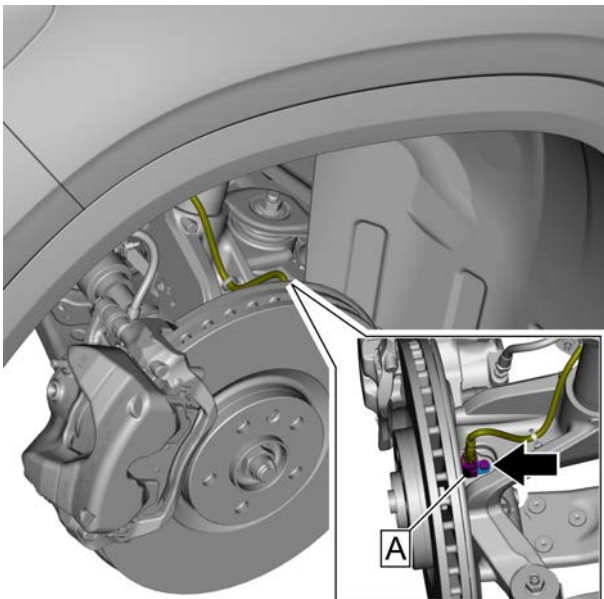
The removal and assembly methods of left and wheel speed sensors (front right) are similar.

- 1 Open the engine compartment cover.



- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the wheel, refer to [Replacement of wheel assembly.](#)
- 4 Disconnect the front wheel speed sensor harness connector A.
- 5 Remove the retaining bolts of the front wheel speed sensor and remove the wheel speed sensor (front left).

Installation procedure



- 1 Install the wheel speed sensor (front left) and tighten the retaining bolts.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 2 Connect the front wheel speed sensor harness connector A.

- 3 Install the front wheel.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

6.6.6.3 Wheel speed sensor (rear left) replacement

Removal procedure

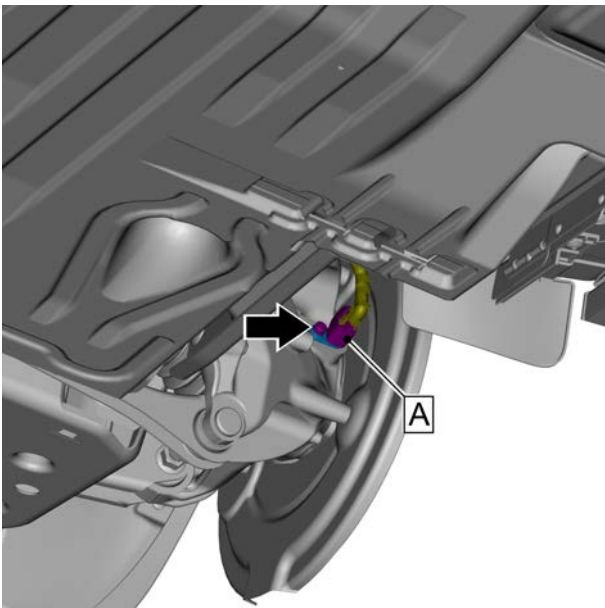
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

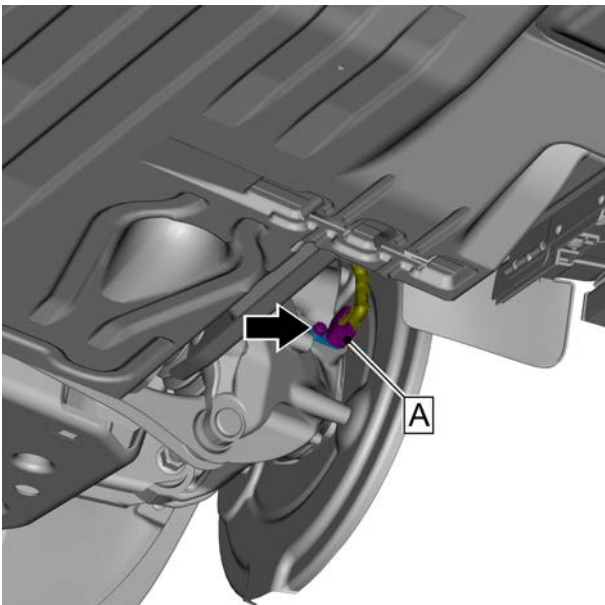
Caution

The removal and assembly methods of left and wheel speed sensors (rear right) are similar.

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 4 Disconnect harness connector A of wheel speed sensor (rear left).
- 5 Remove retaining bolts of wheel speed sensor (rear left).
Wheel speed sensor (rear left).

**Installation procedure**

- 1 Install the wheel speed sensor (rear left), and tighten the retaining bolts.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 2 Connect the wheel speed sensor (rear left) harness connector A.



- 3 Install the rear wheels.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

6.6.7 Special tools and equipment

6.6.7.1 Equipment

Torque wrench
Fault diagnosis instrument

6.7 Tire Pressure Monitoring System (TPMS)

6.7.1 Specification

6.7.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Tire pressure sensor fixing screw	-	1.2~1.6	0.9~1.2

6.7.2 Instructions and operations

6.7.2.1 Instructions and Operations

This tire pressure monitoring system detects the tire pressure by radio waves and sensor technology. Remind the driver to check the tire pressure by lighting the tire pressure monitoring system status indicator. When the tire is cold and inflated to the tire pressure recommended by the tire pressure label, each tire (including spare tire) shall check the tire pressure once a month.

If the tire pressure monitoring system status indicator is always on, it indicates that one or more tires have abnormal tire pressure. At this moment, it is necessary to park the vehicle as soon as possible, inspect tire pressure and inflate the tire to correct pressure value. The tire pressure when the vehicle is cold has been indicated on the tire pressure label attached to the vehicle. The tire pressure monitoring system of the vehicle can remind the abnormal tire pressure, but it cannot replace the normal tire maintenance. The tires need to be checked and transposed regularly.

TPMS system consists of the following components:

- TPMS sensor (one per wheel) (spare tire is not included)
- Tire pressure monitoring system status indicator
- RF receiver (integrated in TCAM)
- Central electronic module (CEM)

TPMS sensor

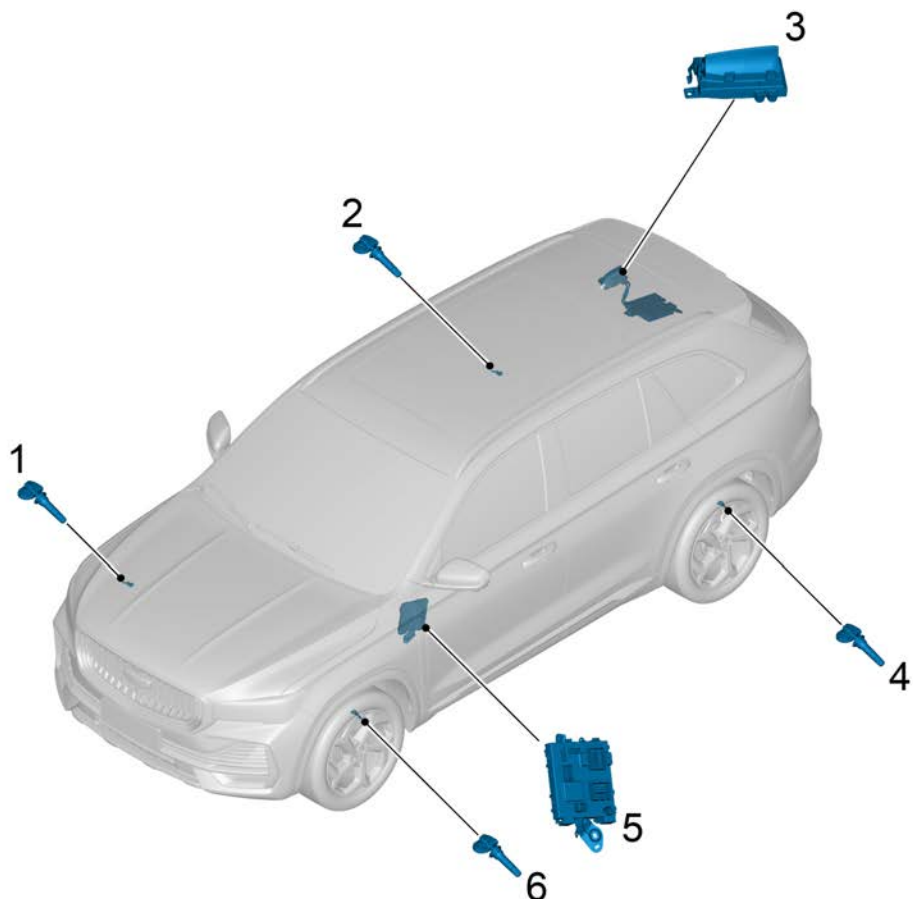
Each tire is fitted with a TPMS sensor, which is attached to the wheel rim through the tyre valve. TPMS sensor regularly sends information about tire alignment, pressure, and temperature parameters to the TCAM.

Tire pressure monitoring system status indicator

- When the alarm of high tire temperature, tire leakage and low sensor electricity is activated, the corresponding alarm tire begins to flash, accompanied by sound alarm, and the text prompt interface pops up.
- Low tire pressure alarm- when the low tire pressure alarm is activated, the corresponding alarm tire starts to flash, and the tire pressure monitoring system status indicator continues to illuminate until the alarm is eliminated, accompanied by an audible alarm, and a text prompt interface pops up. After the cold inflation reaches the standard tire pressure value, the low tire pressure alarm is released.
- System fault alarm - when the system fault alarm is activated, the corresponding alarm tire starts to flash, and the tire pressure monitoring system status indicator flashes for 60 seconds and remains on until the alarm is eliminated, accompanied by an audible alarm, and a text prompt interface pops up.

6.7.3 Component position

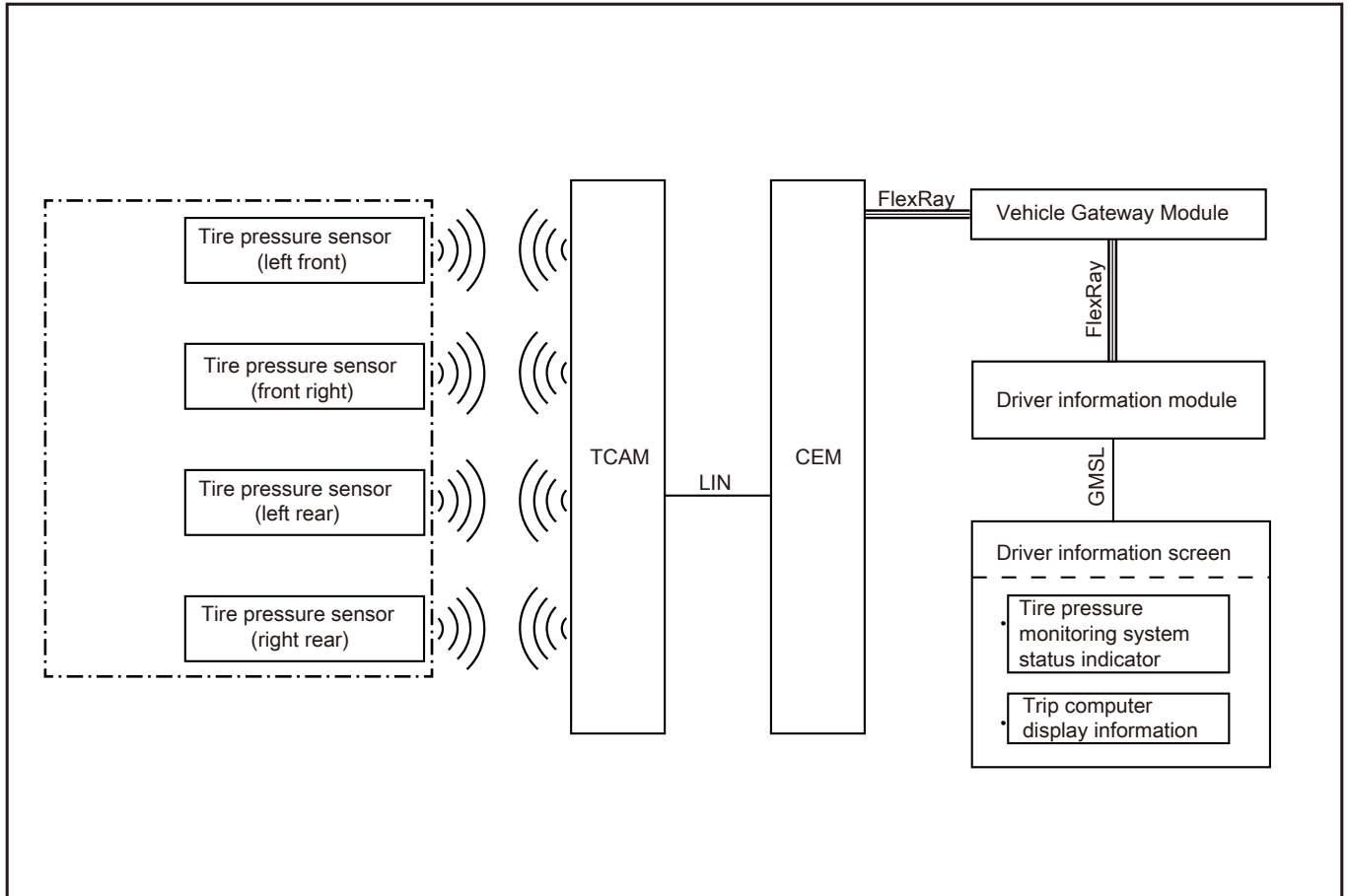
6.7.3.1 Component position



- | | |
|--|---|
| 1. Front right tire pressure monitoring sensor | 4. Rear left tire pressure monitoring sensor |
| 2. Rear right tire pressure monitoring sensor | 5. CEM |
| 3. TCAM | 6. Front left tire pressure monitoring sensor |

6.7.4 Electrical schematic diagram

6.7.4.1 Electrical schematic diagram



6.7.5 Diagnostic information and procedures

6.7.5.1 Diagnosis Description

See [description and operation](#) before troubleshooting the TPMS. Understand and be familiar with the working principle of TPMS, and then start system diagnosis. This will help to confirm the correct fault diagnosis steps when a fault occurs. More importantly, it can also help to confirm whether the situation described by the customer belongs to normal operation. Any fault diagnosis of TPMS should start with visual inspection, which will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

6.7.5.2 Visual Check

- Confirm customer's fault before repair.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage or there is a situation that may cause a fault.
 - Check whether tire pressure is normal.
 - Whether there are obvious mechanical or electrical damage signs.

Repair or replace the component if any faults are found.

- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

Common fault phenomena

Fault phenomenon	diagnostic method	Diagnostic results	Treatment method
Sensor module damaged	Visual inspection	The sensor module has obvious scratches, shell or colloid cracking	Replace the sensor
Valve stem damage	Visual inspection	Deformation and fracture of valve stem	Replace the sensor
Gasket damage	Visual inspection	Gasket cracking	Replace the sensor
Tire pressure not displayed	Trigger sensor with hand tool	The sensor can be triggered normally	Check whether interference devices are installed on the vehicle
		The sensor cannot be triggered	Replace the sensor
	Visual inspection	Sensor installation error	Reinstall the sensor
Tire pressure error alarm	Check whether the tire temperature and pressure are abnormal according to the alarm information	Tire pressure and temperature are normal	Replace the sensor
Leak	Visual inspection	Gasket damage	Replace the sensor
	Check the mounting torque of the mounting nut	Torque not up to standard	Reinstall the sensor

6.7.5.3 Learning of sensor

The automatic learning function can automatically recognize and confirm the tire pressure sensor of the vehicle without external intervention.

1. The vehicle speed condition for activating the automatic learning function is 30km/h.

2. When the vehicle stays for more than 19 minutes, the automatic learning function will start after re-IGN-ON. When the vehicle speed reaches 30km / h, the automatic positioning function and automatic learning function are started together for 10 minutes until the four-wheel pressure is displayed on the instrument. After the completion of the automatic learning function, for automatic positioning function, CEM will automatically judge the installation positions of all sensors in the tire and the position information will be recorded in CEM.

Sensor	Sensor wheel position
Sensor 1	front left
Sensor 2	Right front
Sensor 3	Right rear
Sensor 4	RL

6.7.6 Removing and installing

6.7.6.1 TPMS control unit

Remove TPMS control unit, see [central electronic module replacement](#).

6.7.6.2 Tire pressure sensor replacement

Removal procedure

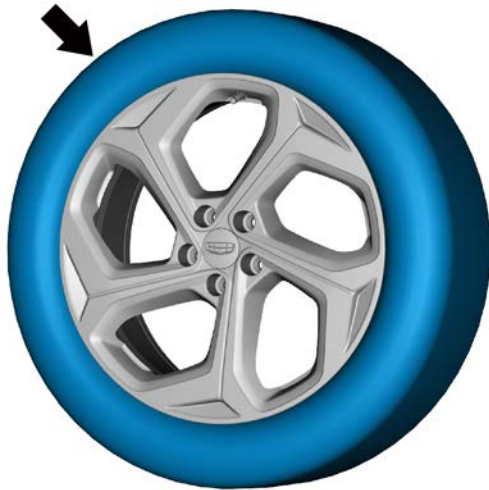
Caution

The removal and assembly methods of front and rear tire pressure sensors are similar.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove wheels. See [wheel assembly replacement](#).
- 3 Remove tire(s).

Caution

When removing the tires, please be careful not to bump against the tire pressure sensor to avoid damage.



- 4 Remove 1 retaining bolt of tire pressure sensor.
- 5 Remove the tire pressure sensor.



Installation procedure

- 1 Install the tire pressure sensor.

Caution

Apply lubricant when installing the sensor to prevent friction and scratches or the correct position of the rim from being snapped. The contact surface between the rim valve hole and the tire pressure sensor gasket should be flat.

- 2 Tighten 1 retaining bolt of tire pressure sensor.

Torque: 1.4 N. m (metric system) 1 lb-ft (Imperial system)

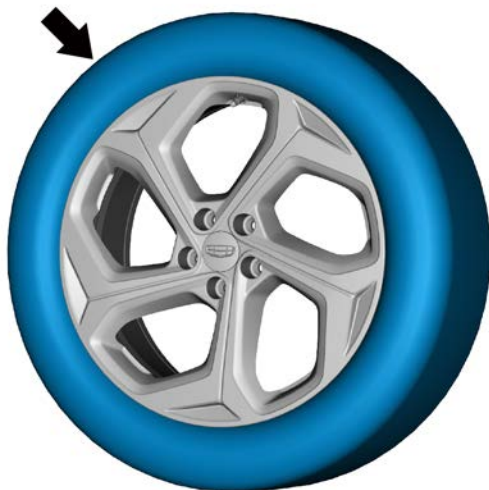
Caution

- Before installing the tire pressure sensor, clean the rim valve hole. The contact surface between the rim valve hole and the tire pressure sensor gasket should be flat. The edges of the holes on the inner and outer sides of the hub should not be damaged or have burr, make sure there is a good seal at the junction of the tire pressure sensor and the hub hole.
- The removed valve can not be used again.

- 3 Install tire(s).

Caution

- Please be careful not to bump the tire pressure sensor to avoid damage when installing the tire.
- Installation test: The tires is installed and disassembled 4 times from the rim at 12 o'clock, 3 o'clock, 6 o'clock, 9 o'clock and other different directions of the rim.
- Check the locking state of the valve core, inflate according to the tire pressure requirements, and check the tightness of the valve and installation.



- 4 Install the wheel.
- 5 Connect the negative battery cable.
- 6 For TPMS system matching, see [sensor learning](#).

6.7.7 Special tools and equipment

6.7.7.1 Equipment

Torque wrench
Fault diagnosis instrument

Operation of steering system

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7.1 Warnings and precautions

7.1.1 Warnings and precautions

7.1.1.1 Warnings and precautions

Notices for power steering system(EPS)

Caution

When the ignition switch is in the ON position, there is demand for steering power. The power steering system provides power and the hand feel should be continuous, smooth, and without shaking and caught throughout the journey.

It is forbidden to make the vehicle slide with a stalled engine because the absence of steering power is likely to cause safety accidents. It is forbidden to adjust the height of power steering column during driving.

The power steering column w/c intermediate shaft is an assembly, which is not allowed to be disassembled for maintenance. It is a complete replacement assembly.

Notices for the steering wheel

Caution

The duration of the steering wheel in the steering limit position should not exceed 5s, otherwise the motor may be damaged.

Matters needing attention in fault diagnosis of electric power assist

Caution

Since the fault diagnosis code (DTC) is stored in the backup storage of the control module, the code in the storage must be cleared after maintenance.

Refer to the fault code diagnosis table, write down the displayed fault code, and deal with the fault.

7.2 Power Steering

7.2.1 Specification

7.2.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
fixing bolts of power steering and sub-chassisframe	M12×90	90 N.m+90°	66.4 lb-ft+90°
retaining bolts from steering gear heat shield to power steering	M5×12	4.2~5.8	3.1~4.3
Fixing nut from left outer tie rod of steering gear to front steering knuckle LH assembly	M10	30 N.m+90°	22.1 lb-ft+90°
Connecting nut of left outer tie rod and inner tie rod components of steering gear	M14	68~92	50.1~67.9
Connection between inner tie rod components and power steering	M16	90~110	66.3~81.1
retaining bolt from steering column assembly mechanical to power steering input shaft	M8×30	20~28	14.8~20.7
retaining bolts from steering column assembly mechanical to instrument panel beam assembly	M8×14×18.35	20~28	14.8~10.6

7.2.2 Instructions and operations

7.2.2.1 Instructions and Operations

Warning !

See "warning about additional protection system" in "warnings and notices".

Caution

See "caution of steering wheel at steering limit position" in "Warnings and notices".

Caution

Before the steering column assembly and assembly box with track rod of steering gear are disconnected, the wheels should be maintained at the front side direction and the steering column should be located on the locked position. When the above components are disconnected, front wheel tires and wheels should not be moved and the steering wheel should not be rotated. Otherwise, some components may be oriented in mistake during installation and the airbag clock spring will be deviated from the central position, thus causing the damage of the airbag clock spring.

Caution

The steering column has not only a steering function, but also a safety protection function. To ensure the energy absorption function of the steering column, specified screws, bolts and nuts should be used and tightened to specified torque. When the vehicle suffers from front collision, energy absorption column will collapse and reduce the driver injury odds.

Power steering system:

Power Steering:

The power steering is fixed on the front sub-chassisframe assembly through bolts. The power steering adopts the rack and pinion steering gear with electronic power. When the steering wheel is rotated, the movement of the steering wheel is transmitted to the input shaft of the power steering through the steering column assembly. The input shaft meshes with the rack through the gear on it and converts the left and right rotation movement of the steering wheel into the reciprocating linear movement of the rack, so that the rack moves left and right. It is transmitted to the inner and outer tie rods, and then to the steering knuckle. The steering knuckle turns the wheel, to realize vehicle steering. power steering system control module: collect torque sensor, vehicle speed and engine speed signals, determine the size and direction of steering power, and drive the motor to assist steering operation. The motor provides steering auxiliary power according to the

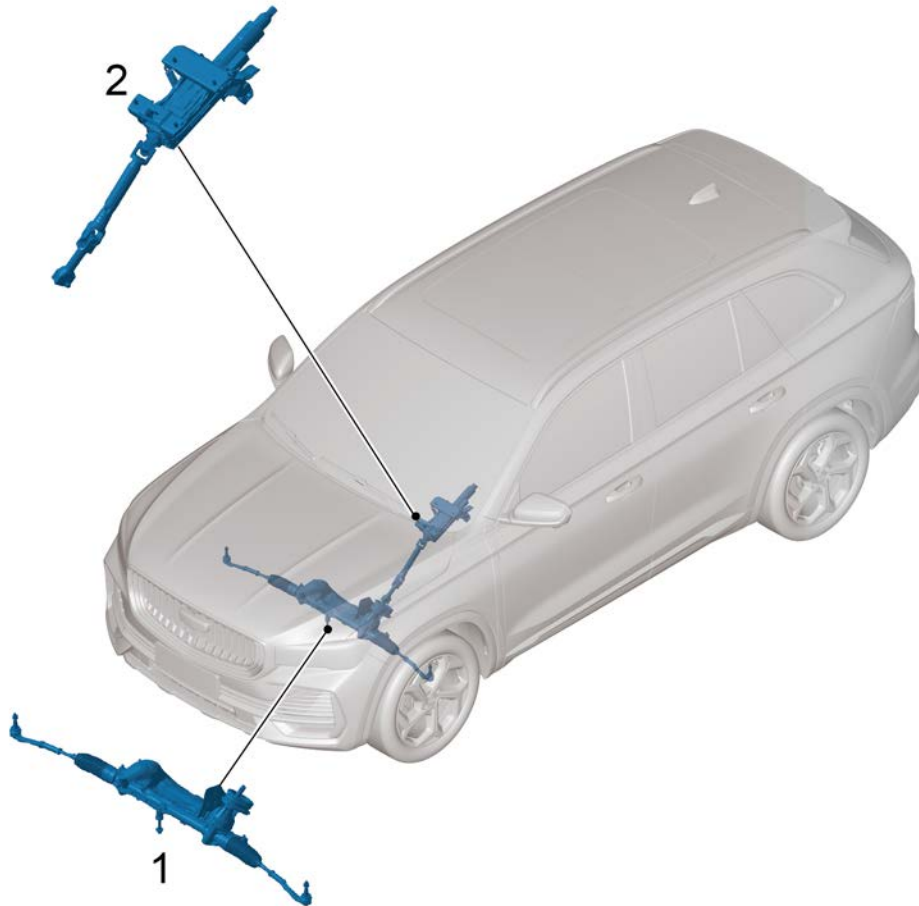
needs of the steering system. The torque sensor detects the torque of the steering wheel and the direction of rotation.

7.2.2.2 System Working Principles

The power steering system is a power steering system in which the electric motor directly provides power, and the power is controlled by the electronic control unit. When the driver turns the steering wheel, the steering control unit generates auxiliary power according to the detected torque voltage signal and the steering angle. The vehicle speed determines the power effect of the electric motor. The purpose is to ensure that the vehicle drives easily at low speed and stably and reliably at high speed. When the vehicle is not rotating, the motor does not work.

7.2.3 Component position

7.2.3.1 Component position

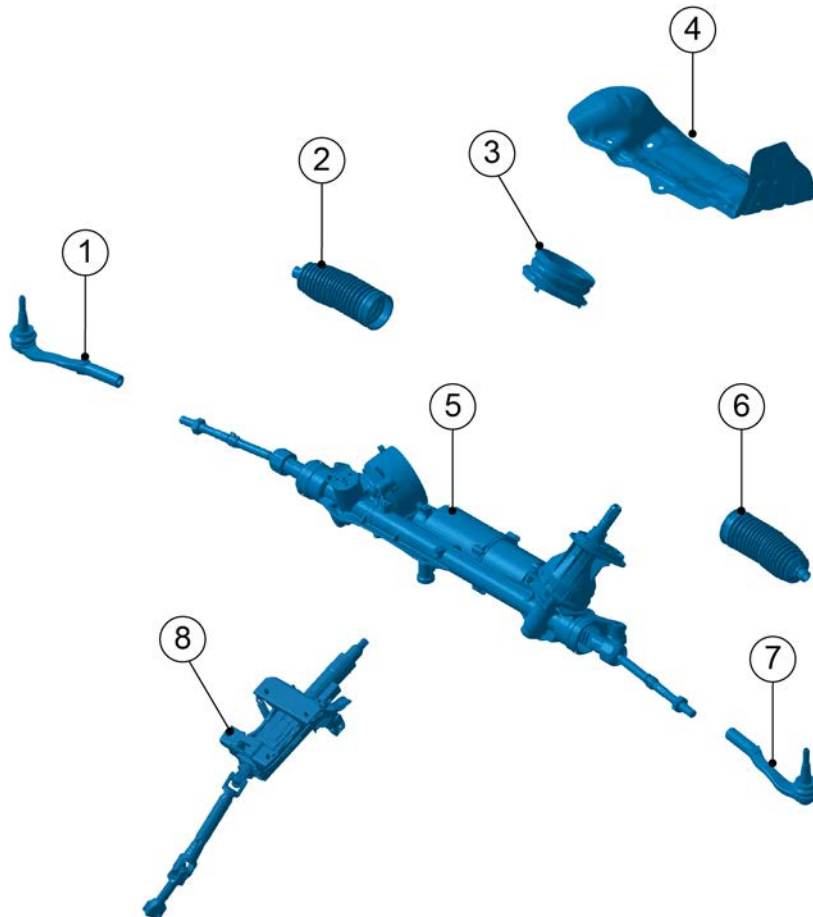


1. Power Steering

2. Steering column assembly mechanical

7.2.4 Exploded view

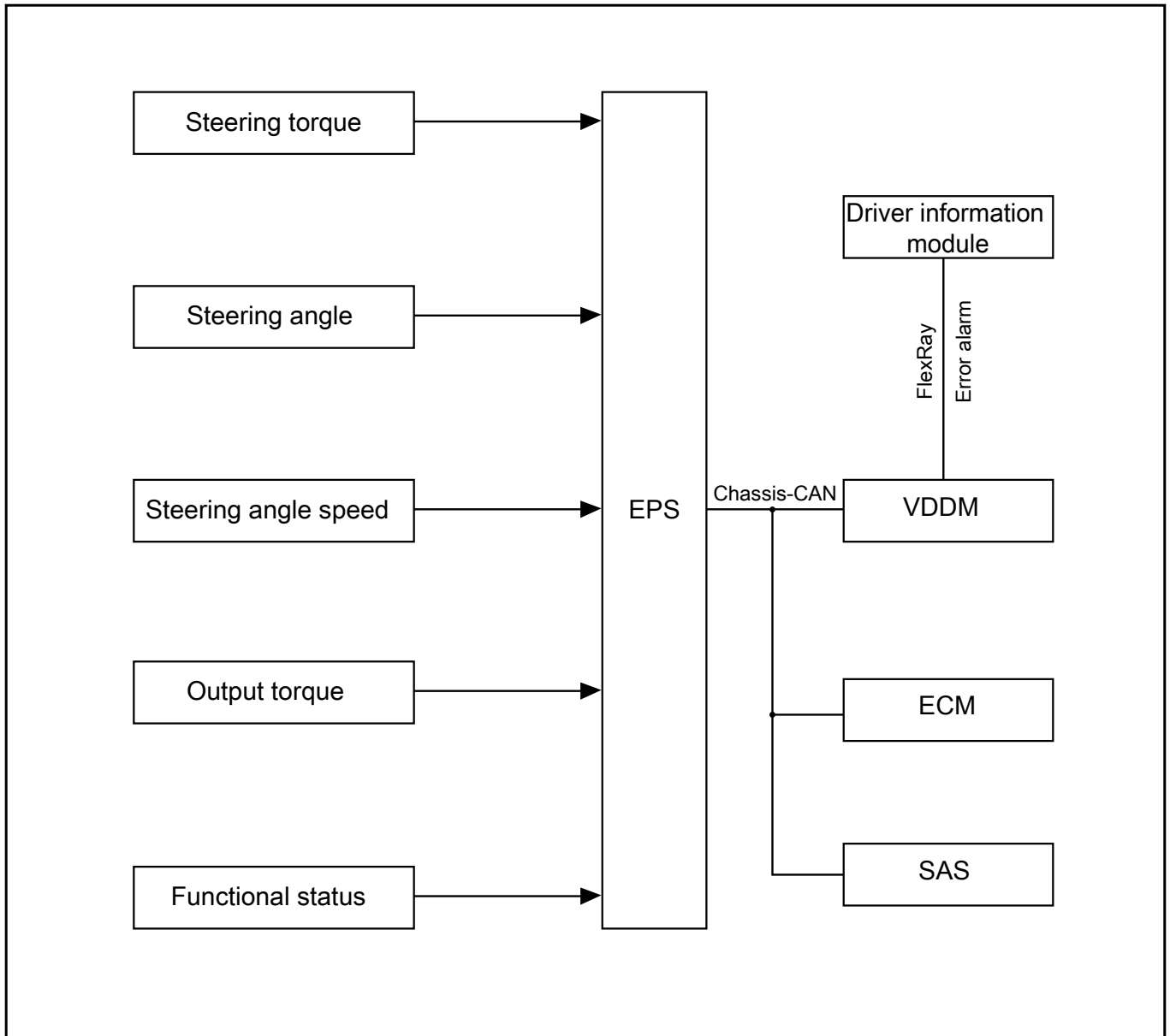
7.2.4.1 Exploded view



- | | | | |
|----|--|----|--|
| 1. | Steering gear right outer pull rod | 5. | Power steering body |
| 2. | Corrugated pipes as-steering gear components | 6. | Corrugated pipes as-steering gear components |
| 3. | Steering gear dust cover | 7. | Steering gear left outer tie rod |
| 4. | Steering gear heat shield | 8. | Steering column assembly mechanical |

7.2.5 Electrical schematic diagram

7.2.5.1 Electrical schematic diagram



7.2.6 Diagnostic information and procedures

7.2.6.1 Diagnosis Description

Before diagnosing the fault of power steering system, refer to the description and operation and system working principle. Understand and be familiar with the working principles of power steering system, and then start the system diagnosis. This will help to confirm the correct fault diagnosis steps when the fault occurs. More importantly, it also helps to confirm whether the situation described by the distributor is normal to operation. Any fault diagnosis of electric steering power system should start with visual inspection and it will guide maintenance personnel to take logical step to conduct fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

7.2.6.2 Visual Check

- Confirm customer's fault before repair.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage or there is a situation that may cause a fault.
 - Check whether tire pressure is normal.
 - Whether there are obvious mechanical or electrical damage signs.
 - Check whether the clamping bolts of the movable connector of the steering column assembly mechanical are loose, whether the retaining bolts on the mounting bracket of the steering column assembly mechanical are loose, and confirm whether the torque mark identification and the bolt surface have removal marks.

Repair or replace the component if any faults are found.

- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.
- Confirm whether EPS insurance is normal.

7.2.7 Removing and installing

7.2.7.1 Steering gear left outboard pull rod replacement

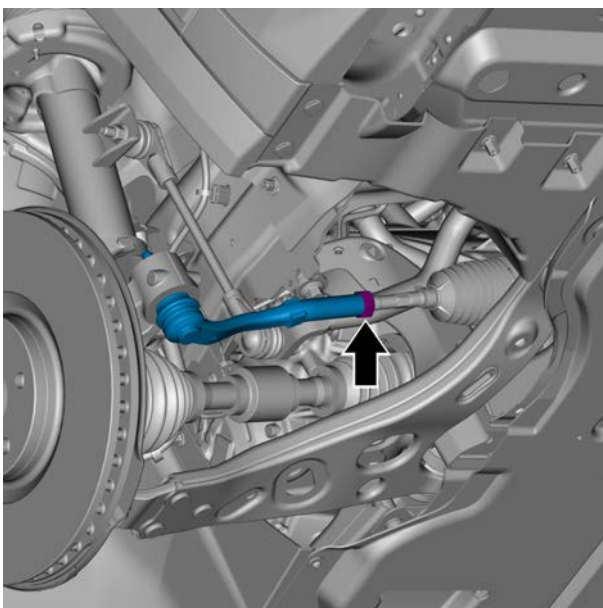
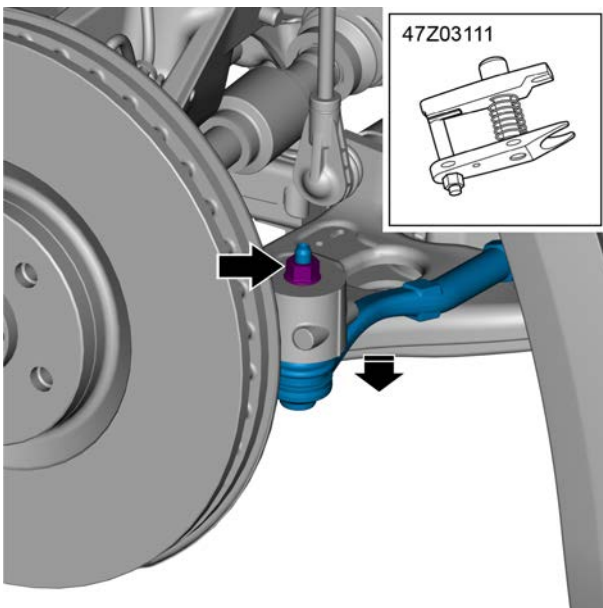
Removal procedure

Caution

The removal and assembly methods of the outer pull rod of front left steering gears are similar.

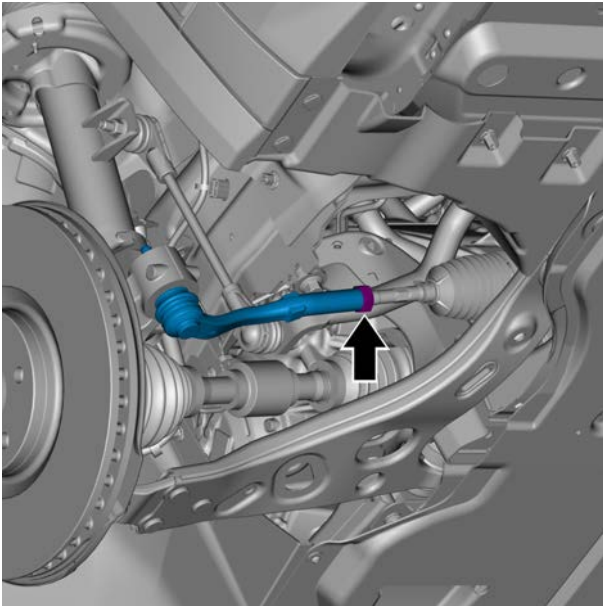
- 1 Support vehicles, see [Support Vehicles](#)
- 2 Remove the wheel, refer to [Replacement of wheel assembly](#).
- 3 Remove and discard the fixing nut of the left outer tie rod of the steering gear, and disconnect the left outer tie rod of the steering gear from the front steering knuckle LH assembly.

Dedicated tool: 47Z03111

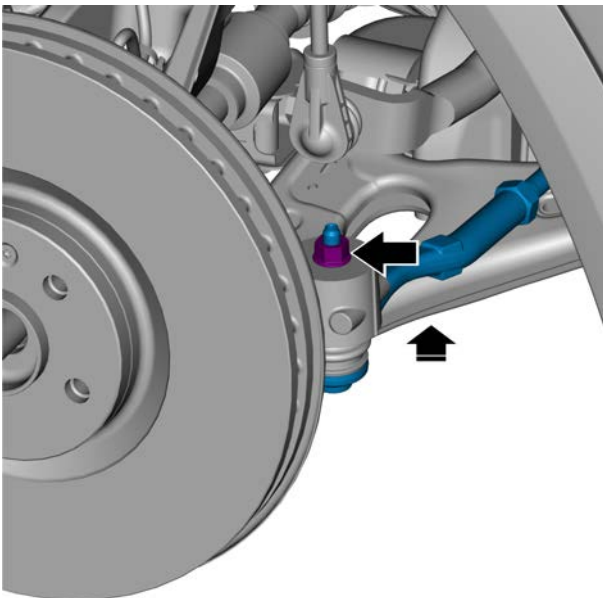


- 4 Loosen the adjusting nut of the left outer tie rod of the steering gear and screw out the left outer tie rod of the steering gear.

Installation procedure



- 1 Install the left outer tie rod of the steering gear onto the inner tie rod components, and tighten the adjusting nut.
Torque: 80 N. m (metric system) 59 lb-ft (Imperial system)



- 2 Install the left outer tie rod of the steering gear on the front steering knuckle LH assembly, and tighten the new fixing nut.
Torque: 30 N.m + 90 ° (metric system) 22.1 lb-ft+90° (Imperial System)

- 3 Install the wheel.
- 4 Lower the vehicle.
- 5 Check the four-wheel alignment data of the vehicle.

7.2.7.2 Replacement of steering bellows components

Removal procedure

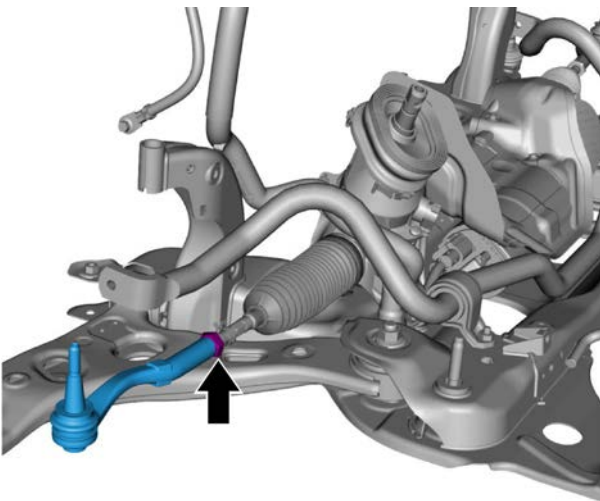
Caution

The removal and assembly methods of corrugated pipes components of front left steering gear are similar.

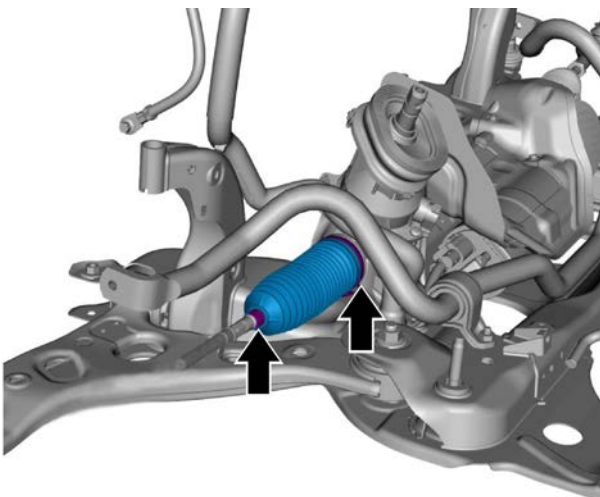
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

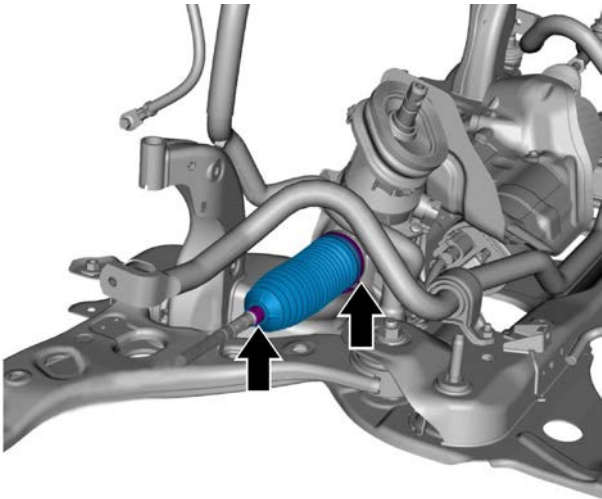
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove front subframe, refer to [replacement of front subframe.](#)
- 3 Loosen the adjusting nut of the left outer tie rod of the steering gear and screw out the left outer tie rod of the steering gear.



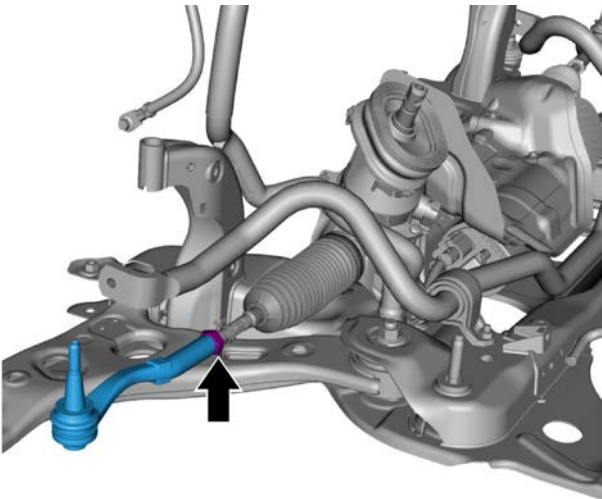
- 4 Remove the steering bellows components retaining clamp.
- 5 Remove the steering bellows components.



Installation procedure



- 1 Install the steering bellows components.
- 2 Install steering bellows components retaining clamp.



- 3 Install the left outer tie rod of the steering gear onto the inner tie rod components, and tighten the adjusting nut.
Torque: 80 N. m (metric system) 59 lb-ft (Imperial system)

- 4 Install the front subframe
- 5 Connect the negative battery cable.
- 6 Check the four-wheel alignment data of the vehicle.

7.2.7.3 Replacement of inner tie rod components

Removal procedure

Caution

The removal and assembly methods of front left inner tie rod components are similar.

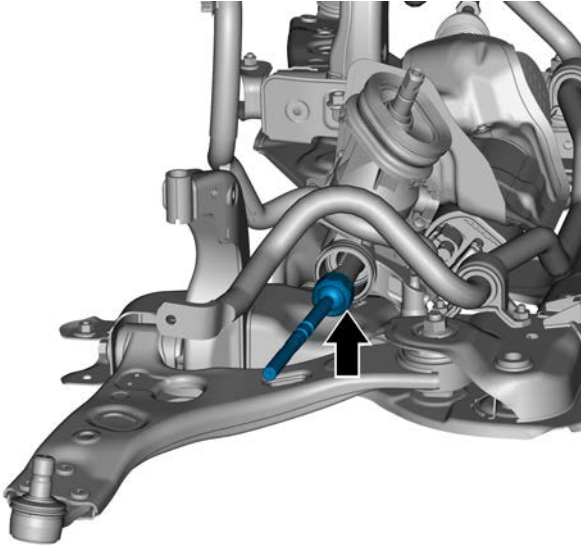
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove front subframe, refer to [replacement of front subframe.](#)
- 3 Remove the steering gear corrugated pipes components. See [replacement of steering gear corrugated pipes assembly.](#)
- 4 Remove the connection between the inner tie rod components and power steering, and remove the inner tie rod components.

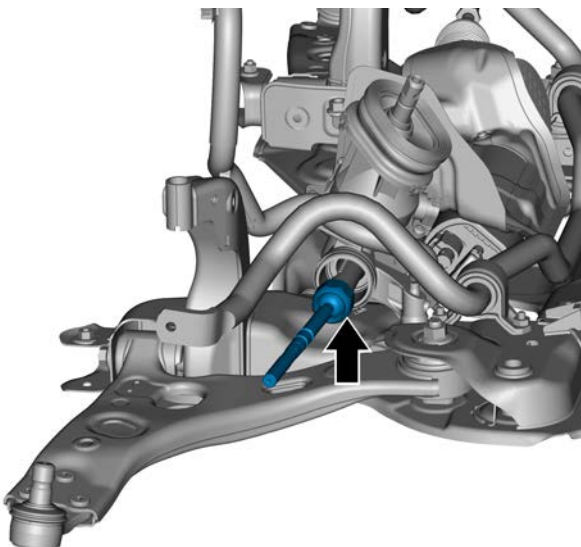
Caution

When removing the inner tie rod components, fix the power steering end with a suitable tool to avoid damaging the steering gear.



Installation procedure

- 1 Place the inner tie rod components in the installation position and fasten the inner tie rod components.
Torque: 100 N. m (metric system) 73.7 lb-ft (Imperial system)



- 2 Install the steering bellows components.
- 3 Install the front subframe.
- 4 Connect the negative battery cable.
- 5 Check the four-wheel alignment data of the vehicle.

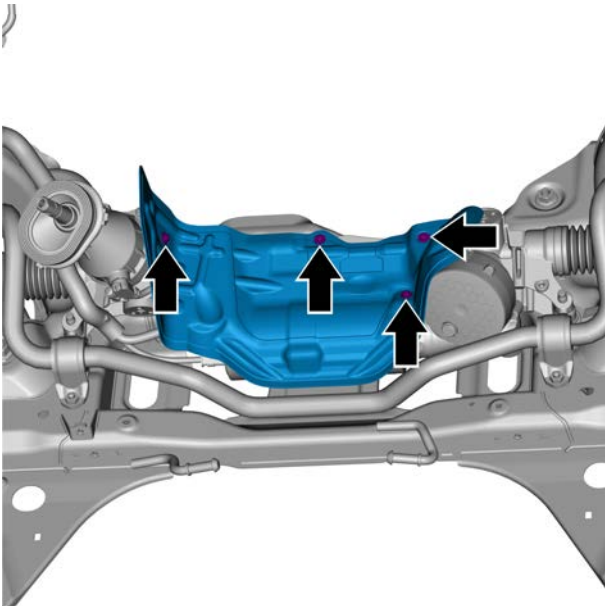
7.2.7.4 Replacement of power steering

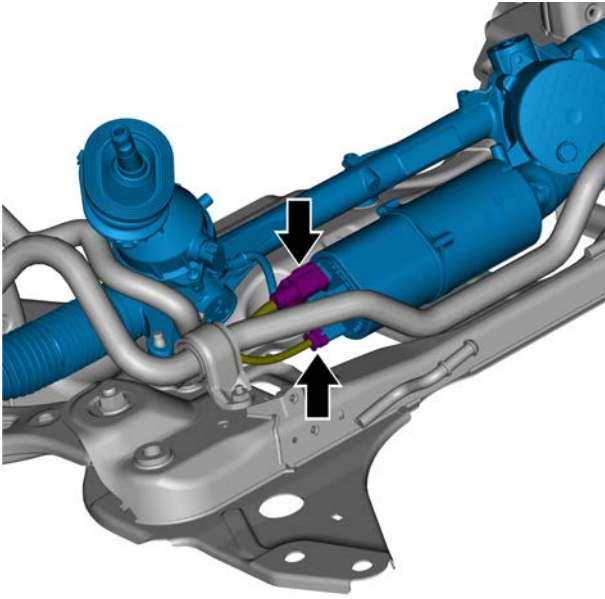
Removal procedure

Warning !

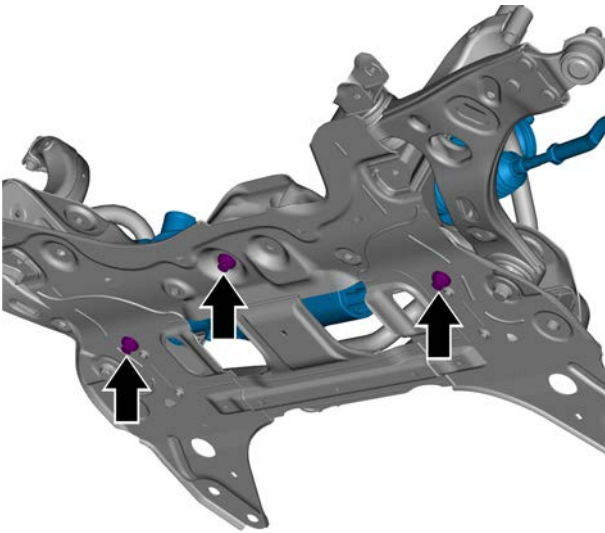
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Support vehicles, see [Support Vehicles](#)
- 3 Remove the wheel, refer to [Replacement of wheel assembly.](#)
- 4 Remove front subframe, refer to [replacement of front subframe.](#)
- 5 Remove 4 retaining bolts from the steering gear heat shield.



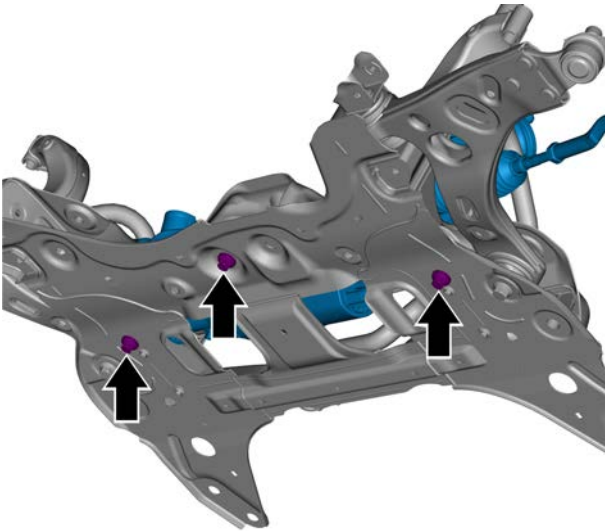


- 6 Disconnect the power steering harness connector.



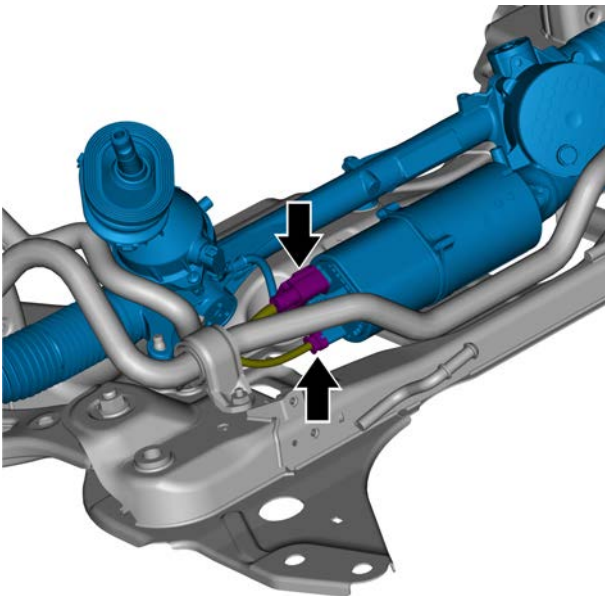
- 7 Remove and discard the 3 retaining bolts of power steering. Remove the power steering.

Installation procedure

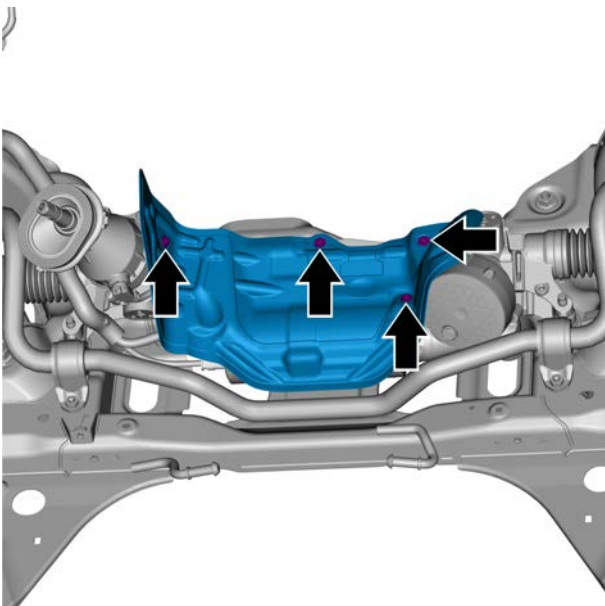


- 1 Install the power steering on the front sub-chassisframe and tighten 3 new fixing bolts.

Torque: 90 N.m + 90 ° (metric system) 66.4 lb-ft+90° (Imperial System)



- 2 Connect the power steering harness connector.

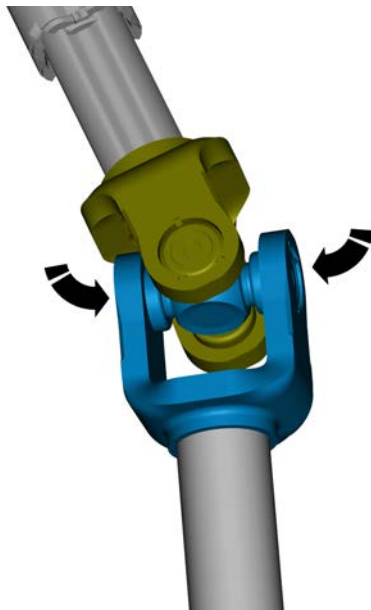


- 3 Install 4 retaining bolts onto the steering gear heat shield
Torque: 5 N. m (metric system) 3.7 lb-ft (Imperial system)

- 4 Install the front subframe.
- 5 Install the wheel.
- 6 Connect the negative battery cable.
- 7 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

7.2.7.5 Check of intermediate shaft universal joint

- 1 Secure one end of the upper and lower intermediate shaft universal joint and twist the other end of the upper and lower intermediate shaft universal joints in clockwise and counterclockwise.
- 2 The maximum torsional clearance is 15°. If it exceeds the range, the steering column assembly mechanical needs to be replaced.



7.2.7.6 Replacement of steering column assembly mechanical

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

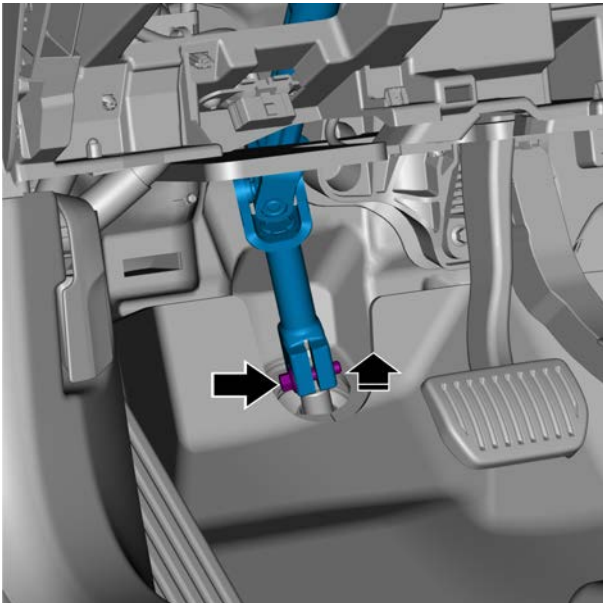
Caution

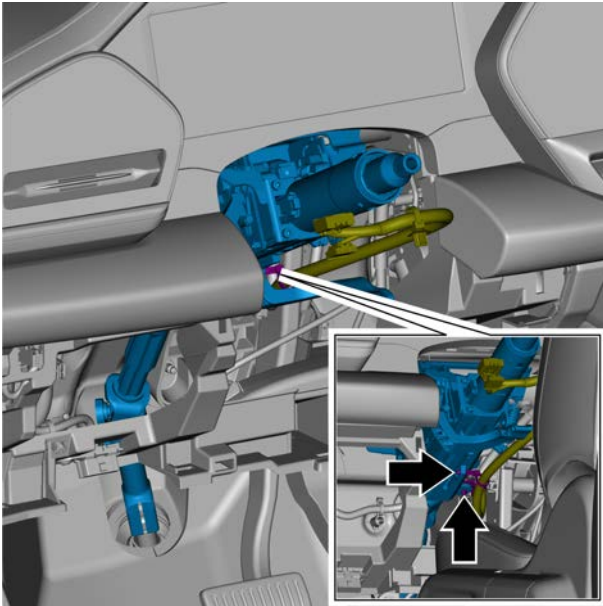
Wait for at least 60s after the battery is started and the safety belt is disconnected.

Adjust the steering wheel to the right direction on level ground.

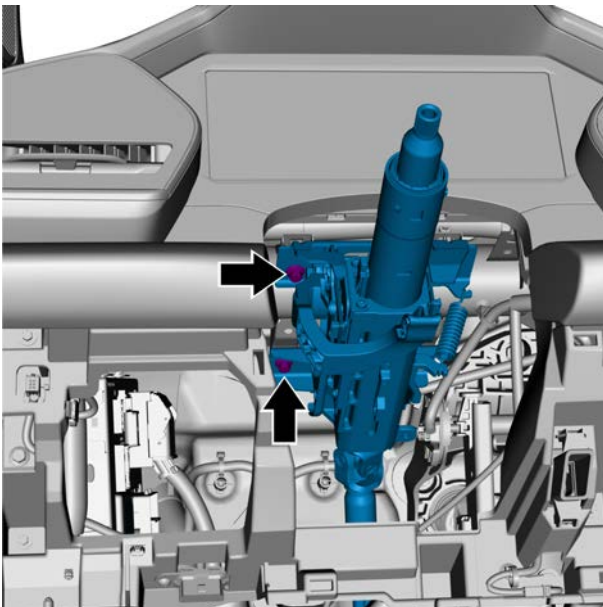
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the steering column upper cover assembly. See [replacement of steering column upper cover assembly](#).

- 4 Remove the steering column lower cover assembly. See [replacement of steering column lower cover](#).
- 5 Remove the front airbag (driver), see the [Replacement of the front airbag \(driver\)](#).
- 6 Remove the steering wheel assembly, see the [Replacement of the steering wheel assembly \(Type 1\)](#), the [Replacement of the steering wheel assembly \(Type 2\)](#).
- 7 Remove the steering wheel module, see the [Replacement of the steering wheel module](#).
- 8 Remove left lower fender apron of the instrument panel, refer to Replacement of left lower fender apron of the instrument panel assembly.
- 9 Remove the lower left baffle assembly, see [Replacement of the lower left baffle assembly](#).
- 10 Remove and discard the retaining bolts of the universal joint of the steering column assembly mechanical, and disconnect the intermediate shaft assembly from the input shaft of the assembly-PAS steering box with track rod.

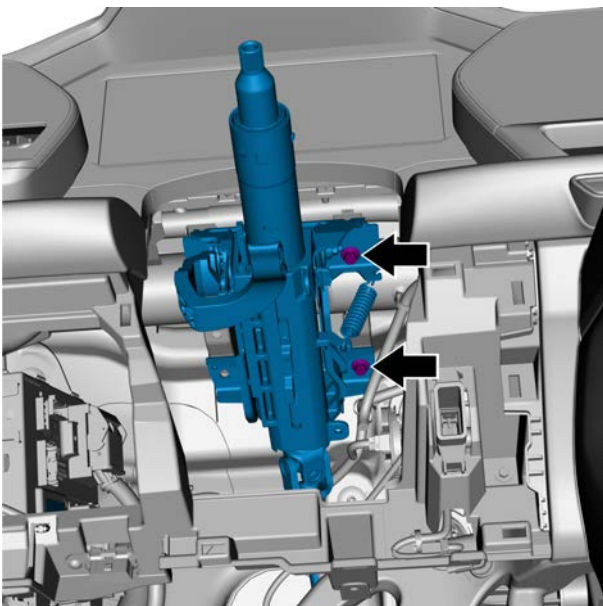




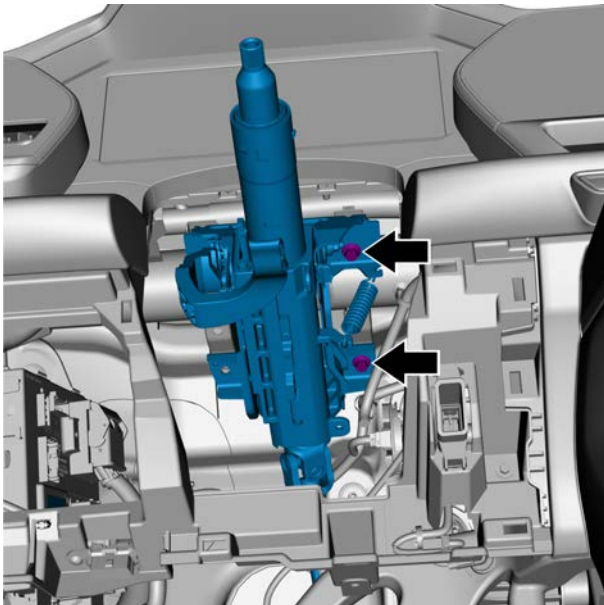
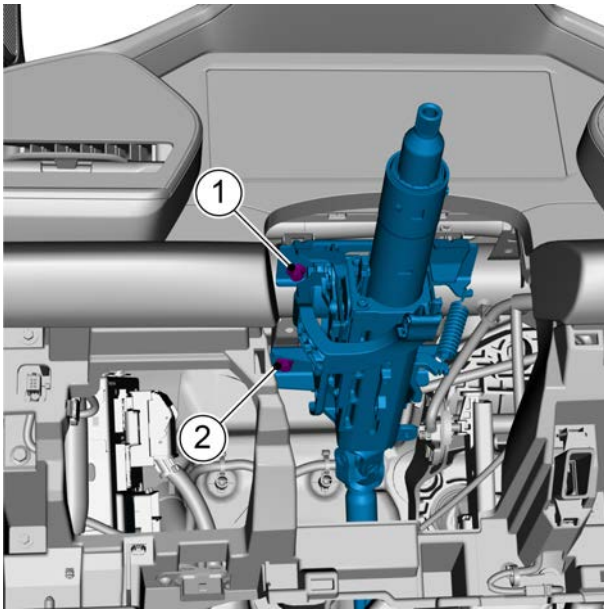
- 11 Disconnect the clip on the instrument panel harness.



- 12 Remove 2 retaining bolts connecting the left bracket of the steering column and the instrument cross beam.



- 13 Remove 2 retaining bolts connecting the right bracket of the steering column assembly mechanical and the instrument cross beam. Remove the steering column assembly mechanical.



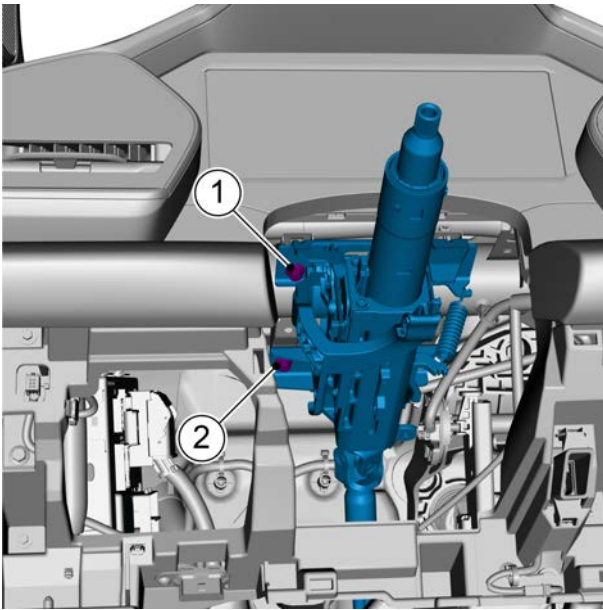
Installation procedure

- 1 Pre-tighten the retaining bolt 1 connecting the left bracket of the steering column assembly mechanical and the instrument cross beam.
- 2 Install retaining bolts 2 connecting the left bracket of the steering column assembly mechanical and the instrument cross beam.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

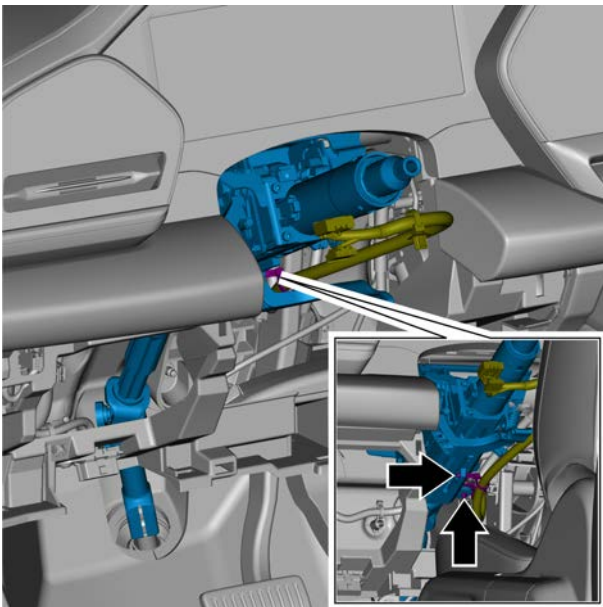
- 3 Install 2 retaining bolts connecting the right bracket of the steering column assembly mechanical and the instrument cross beam.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

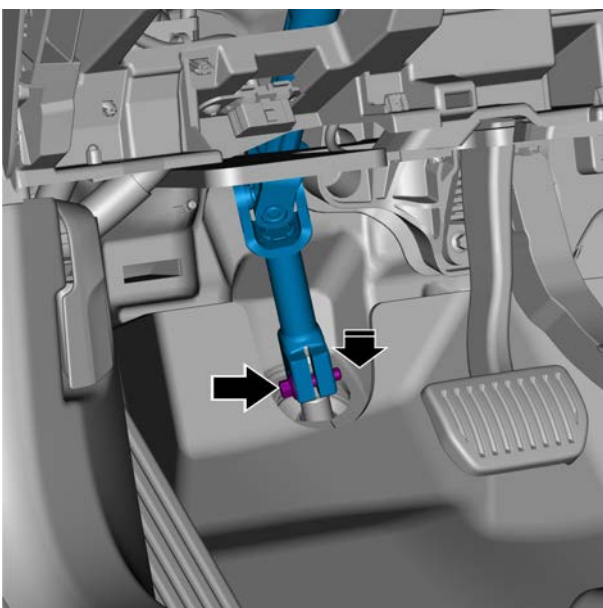


- 4 Retighten the retaining bolt 1 connecting the left bracket of the steering column assembly mechanical and the instrument cross beam.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



- 5 Install the instrument panel harness clip.



- 6 Install the steering column assembly mechanical with intermediate shaft assembly into the power steering input shaft, install and tighten new retaining bolts.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

- 7 Install the steering wheel module.
- 8 Install the steering wheel assembly.
- 9 Install the upper and lower shield of the steering column.
- 10 Install driver airbag.
- 11 Install left lower fender apron of the instrument panel.
- 12 Install the lower left foot shield assembly.
- 13 Connect the negative battery cable.

7.3 Steering wheel

7.3.1 Specification

7.3.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Steering wheel assembly to steering column assembly mechanical retaining bolt	M12×30×36.07	50~70	36.8~51.6

7.3.2 Instructions and operations

7.3.2.1 Instructions and Operations

Caution

See "warning about additional protection system" in "warnings and notices".

Caution

See "caution of steering wheel at steering limit position" in "Warnings and notices".

Operating conditions of steering wheel heating

1. The vehicle is in non-dyno mode
2. Sufficient power (when the engine of the fuel vehicle needs to be started, the battery of the pure electric vehicle needs sufficient power and the driving mode is non eco mode)
3. Steering wheel heating on
4. The ambient temperature in the vehicle is lower than the heating target temperature of the steering wheel set by the user (when the ambient temperature is greater than the heating target temperature, the heating will be turned off automatically after 100s)

Caution

The above four conditions need to be met Meanwhile.

Three ways to start the steering wheel heating function

1. Manual opening (the user opens it by manipulating the physical switch for heating or the soft switch on the multimedia touch screen):
 - The user selects the front steering wheel heating interface or switch, and clicks the steering wheel heating icon or switch to activate the steering wheel heating function.
 - When the steering wheel heating is activated, the heating gear is in gear 3.
 - By clicking the steering wheel heating icon, the heating gear will be set according to the "3-2-1-stop" cycle.
 - After the heating temperature of the steering wheel reaches the temperature set in the target gear, the steering wheel heating system will automatically control the temperature fluctuation to maintain the temperature of the steering wheel in the target gear.
 - When the driver manually turns on or off the heating function, the automatic heating function of the steering wheel will be automatically set to off until the next driving cycle (usually understood as the restart of the vehicle engine).
2. Automatic start (when certain conditions are met, the vehicle will start automatically):
 - The temperature in the car is lower than 0 °C.

- Sufficient power (when the engine of the fuel vehicle needs to be started, the battery of the pure electric vehicle needs sufficient power and the driving mode is non eco mode).

- The steering wheel automatic heating on setting is in the "on" state (the default setting of the vehicle is "on", that is, after each vehicle restart, it will be automatically initialized to "on" on the HMI screen).

- If the power is insufficient, the automatic heating on setting of the steering wheel will be displayed as "off" on the HMI screen.

- The automatic start is successful, and the steering wheel is heated according to gear 3 by default.

- The automatic start is successful, and the user can adjust the heating gear through the operation of manual start.

- The automatic startup is successful. The user can turn off the automatic startup through the operation of manual startup. During this driving cycle, the steering wheel heating will not turn on automatically. However, at the next driving cycle, the HMI will initialize the automatic opening and set it to the "on" state.

3. App remote start (the vehicle shall have the function of APP remote start):

- Vehicles with app remote start function can use mobile app to remotely start the steering wheel heating function.

- No matter whether the engine is started or the high voltage is powered on, the mobile app can issue a start command.

- After the app remote start steering wheel heating command is issued, if the vehicle engine is not started / high voltage is not powered on, the vehicle will automatically start the engine / high voltage. After the engine is started and / high voltage is powered on, the steering wheel heating function will be officially started.

- The app control interface needs to display whether the steering wheel heating system is working. If it is not successfully started, there shall be a message prompt. Meanwhile, the relevant heating icon shall be in the setting state that the steering wheel heating is not started.

- When the remote heating function ends, the APP needs to prompt that the heating function has stopped.

- Remote heating working time: if the steering wheel heating is a request from APP, APP can adjust the heating time.

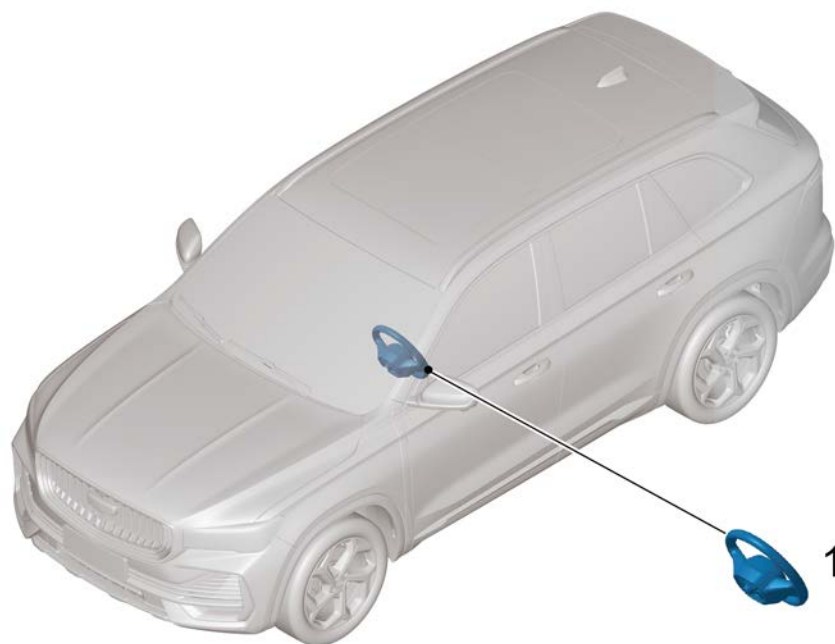
- The fuel vehicle is 1-15MINS and the BEV is 1-30MINS.

- 8MINS is the default recommended value. If the user sets it to be less than 8mins, the app needs to pop up a prompt message of "less than 8MINS, the heating effect may not be ideal". After the time set by the customer arrives, the vehicle automatically turns off the steering wheel heating and automatically turns off the engine / High-pressure.

- APP remote to turn off steering wheel heating.

7.3.3 Component position

7.3.3.1 Component position



1. Steering wheel assembly

7.3.4 Diagnostic information and procedures

7.3.4.1 Diagnosis Description

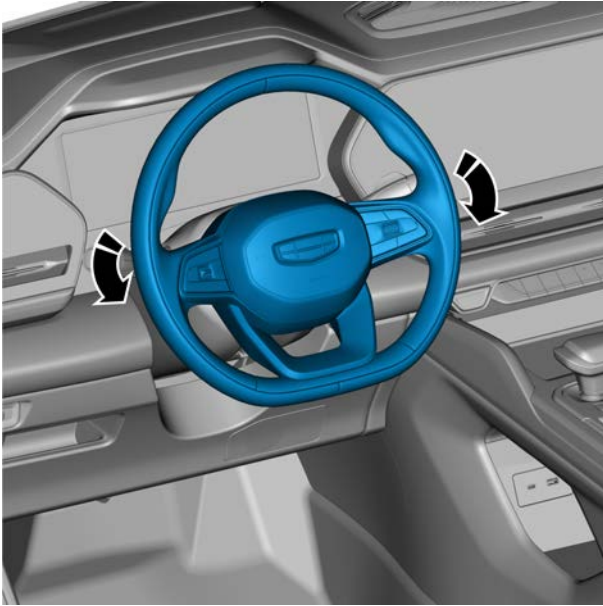
See [description and operation](#) before troubleshooting the steering wheel assembly and steering column assembly mechanical. Understand and be familiar with the working principle of steering wheel and power steering column assembly, and then start system diagnosis. This will help to confirm the correct fault diagnosis steps when the fault occurs. More importantly, it can also help to confirm whether the situation described by the customer belongs to normal operation. Any fault diagnosis of steering wheel and steering column should start with routine inspection. The routine inspection will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

7.3.4.2 Routine inspection

- Confirm customer's fault before repair.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage or there is a situation that may cause a fault.
 - Check whether tire pressure is normal.
 - Whether there are obvious signs of mechanical damage.
 - Whether the tightening bolts of the movable coupling head of the power steering column assembly shaft are loose, whether the fixing bolts on the mounting bracket of the power steering strut assembly are loose, and whether there are any removal marks on the surface of the torque mark and the nut.

Repair or replace the component if any faults are found.

- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.



7.3.5 Removing and installing

7.3.5.1 Check of free clearance of the steering wheel assembly

- 1 Park the car with the tires straight ahead.

Caution

The free clearance of the vehicle cannot be adjusted. Under the normal condition of the upper, lower and intermediate shaft universal joint, replace the power steering gear with tie rod assembly.

- 2 Feel whether there is a gap between the upper and lower shafts while rotating. If there is a gap, the steering column assembly shall be replaced.

Maximum free rotation: 15 °

7.3.5.2 Replacement of steering wheel assembly (type I)

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the steering column cowl lower. See [replacement of steering column cowl lower](#).
- 3 Remove the front airbag (driver), see the [Replacement of the front airbag \(driver\)](#).



- 4 Disconnect the steering wheel assembly harness connector.



- 5 Remove and discard the retaining bolts fixing the steering wheel assembly.

Caution

The wheel is in front of the vehicle, and mark the connection between the steering wheel assembly and the steering column assembly mechanical with a marker pen.

- 6 Remove the steering wheel.

Caution

After the steering wheel assembly is removed, it is forbidden to turn the clock spring to prevent damage to the clock spring.

Installation procedure



- 1 With the front wheels facing the front, install the steering wheel assembly. Align the installation marks made with a marker before removing the steering wheel assembly.
- 2 Install and tighten the new steering wheel assembly retaining bolts.

Torque: 60 N. m (metric system) 44.2 lb-ft (Imperial system)

- 3 Connect the steering wheel assembly harness connector.

- 4 Install the front airbag (driver).
- 5 Install the steering column lower shield assembly.
- 6 Connect the negative battery cable.

7.3.5.3 Replacement of steering wheel assembly (type II)

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

Remove the airbag 90 s after the cathode pole of the battery is disconnected.

- 1 The wheels are facing forward and the steering wheel is in the upright position.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the front airbag (driver), see the [Replacement of the front airbag \(driver\)](#).
- 4 Disconnect the steering wheel assembly harness connector A.
- 5 Remove and discard the retaining bolts fixing the steering wheel assembly.

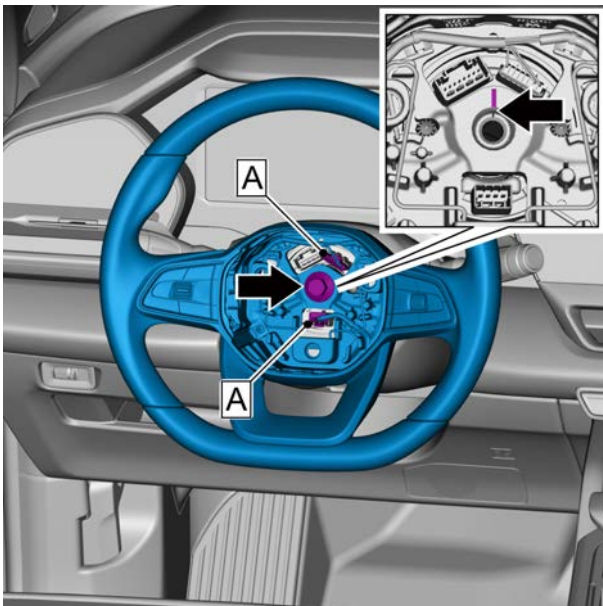
Caution

At this time, the wheel is in front of the vehicle. Mark the connection between the steering wheel assembly and the steering column assembly mechanical with a marker pen.

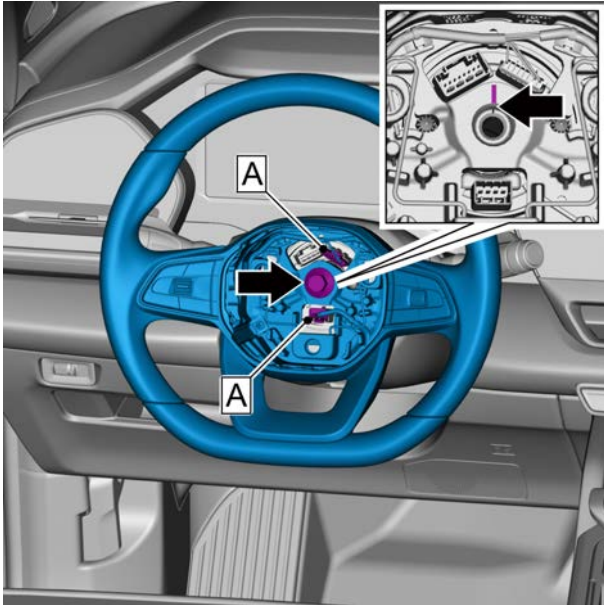
- 6 Remove the steering wheel.

Caution

After removing the steering wheel assembly, do not rotate the clock spring to avoid damage to the clock spring.



Installation procedure



1 With the front wheels facing the front, install the steering wheel assembly. Align the installation marks made with a marker before removing the steering wheel assembly.

2 Install and tighten the new steering wheel assembly retaining bolts.

Torque: 60 N. m (metric system) 44.2 lb-ft (Imperial system)

3 Connect the steering wheel assembly harness connector A.

4 Install the front airbag (driver).

5 Connect the negative battery cable.

Heating, ventilation and air conditioning system

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8.1 Warnings and precautions

8.1.1 Warnings and precautions

8.1.1.1 Warnings and precautions

Warning !

Refrigerant-related work should be carried out in a well-ventilated environment, and refrigerant vapor should not be inhaled. Avoid inhaling air conditioning refrigerant R-134a (tetrafluoroethane) and lubrication oil vapor or mist. Contacting with them will irritate the eyes, nose and throat. Work in a well-ventilated area. When removing the R-134a from the A/C system, certified maintenance equipment that meets the requirements (R-134a regenerative equipment) should be used. In case of accidental fluid discharge from the system, the working area must be ventilated before the maintenance continues. Other health and safety information can be obtained from refrigerant and lubricant manufacturers.

Warning !

The cathode terminal of the battery shall be disconnected before repairing the electrical system. It is forbidden to conduct welding or vapor cleaning operations on or near vehicles equipped with air-conditioning pipes or components.

Precautions about air-conditioning refrigerants

Warning !

1. Skin contact may cause frostbite.
2. The instructions provided by the manufacturer must be followed. While working, wear appropriate goggles and protective gloves.

A/C refrigerant operations to be avoided

Warning !

1. Do not store refrigerants in the places exposed to sunlight or heat sources.
2. R-134a and open fire will turn into toxic gas after high temperature.
3. When filling, do not stand the refrigerant bottle upside down and keep the valve upward to ensure that the refrigerant is filled in the form of gas.
4. Do not expose the refrigerant bottle to frost and snow.
5. Do not drop the refrigerant bottle.
6. Never discharge the refrigerant directly into the atmosphere under any circumstances.
7. Refrigerants such as R134a (tetrafluoroethane) and R12 (dichlorodifluoromethane) should not be mixed for use.

Precautions about lubricants for air conditioning system

Warning !

It is required to use only lubricants of the types and grades specified by the compressor manufacturer. Lubricants of different types and grades must not be mixed, otherwise the compressor will be damaged. Lubrication oil is easy to absorb water, so the contact duration between lubrication oil and air should be reduced as much as possible.

Warning !

- It is forbidden to use water, corrosive solvents or flammable and explosive solvents to clean the A/C system. It is recommended to use R-141b, heptane and other cleaner.
- Add lubricant in strictly according to the specified filling amount. Pay attention to the fact that lubricating oil hinders heat exchange, and excessive amount will seriously reduce the air conditioning effect; in general, there is no need to add lubricating oil, because the lubricant has been filled by the compressor manufacturer.
- Lubrication oil is easy to absorb water, so the contact duration between lubrication oil and air should be reduced as much as possible.
- Before filling, check the quality of the lubricant in the pipeline. If severe blackening or carbon particles is found, the entire air-conditioning system should be thoroughly cleaned and all lubricant should be replaced.
- Lubrication oil should be filled from the compressor exhaust port before vacuuming.

8.2 A/C system

8.2.1 Specification

8.2.1.1 Maintenance Data

Components	Item	Parameter
Compressor	Refrigerant charge	550g
	Refrigerant type	R134a
	Compressor type	Variable displacement
	Compressor oil specification	PS OIL

8.2.1.2 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Fixing screws of left A/C vent panel assembly and instrument panel frame	ST4.8×19	2.2~2.8	1.6~2.1
Screw fixing the front foot blowing air duct on the air conditioner host	ST4.8×16	1.3~1.7	0.9~1.2
retaining bolts for connecting A/C compressor and engine	-	20~28	14.8~20.7
Fixing nut for connecting the A/C high-pressure pipe assembly and condenser	M8×8	20~28	14.8~20.7
Fixing nut for connecting the low-pressure pipe assembly of air conditioner and the high/low pressure pipe assembly	M6×7.3	8.5~11.5	6.3~8.5
Connecting and retaining bolts between high/low pressure assembly pipe and vehicle body	M6×35	8.5~11.5	6.3~8.5
Fixing nut for connecting A/C low-pressure pipe assembly and condenser	M8×8	20~28	14.8~20.7
High/low pressure assembly pipe and expansion valve connection fixing nut	M6×7.3	8.5~11.5	6.3~8.5
A/C compressor and engine fixing screw	M8	20~28	14.8~20.7

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Rear console switch module retaining screws	PF4×16	1.3~1.7	1~1.3
Temperature control module retaining screws	PF	1.3~1.7	1~1.3

8.2.2 Instructions and operations

8.2.2.1 Instructions and Operations

Compressor

A/C compressor is driven by the engine crankshaft driving the compressor clutch belt pulley through the transmission belt. When the electromagnetic clutch coil is not powered, compressor belt pulley rotates freely without driving the compressor shaft. When the clutch coil is powered, the clutch disc and the hub are pushed to the pulley, and the magnetic force integrates the clutch disc with the belt pulley to drive the compressor shaft. The compressor has a unique lubrication system.

The compressor is shut down in the following cases:

1. Throttle body fully open: accelerator pedal opening > 99.6%.
2. The engine speed is too high or too high.
3. Ambient Temperature Low: temperature < 3 °C.
4. The engine coolant temperature is too high: when the water temperature is greater than 5 °C, the compressor can be turned on after a delay of 8s after starting. Until 115 °C, it will be turned off because the water temperature is too high. When the water temperature drops to 112 °C, it will be turned on again.
5. The refrigerant pressure is too high or too low.

Caution

Do not hit, fall or turn the compressor upside down. If the compressor is hit or upside down, use the hand to rotate the compressor clutch 5 to 6 times to circulate the lubrication oil deposited in the cylinder, otherwise, sudden rotation will cause valve damage and adversely affect durability.

Condenser, liquid receiver dryer

The high temperature and high pressure refrigerant vapor from the air conditioner compressor flows into the condenser. The condenser is made of aluminum tubes and cooling fins that can rapidly transfer heat. The cooling fins condense the high temperature and high pressure refrigerant vapor into a medium-temperature and high-pressure liquid through heat dissipation. Fluid reservoir dryer is located on the left side of the condenser and welded into one with the condenser. The internal structure of the fluid reservoir dryer is designed to ensure that the medium temperature and high pressure gas-liquid mixing refrigerant enters and the medium temperature and high pressure liquid refrigerant comes out of the fluid reservoir dryer.

There is desiccant that absorbs the moisture of the refrigeration system inside the receiver dryer, and the desiccant cannot be reused. When leakage occurs due to the following reasons, the reservoir dryer core cannot be repaired but can only be replaced.

- a. Piercing
 - b. Damaged sealing area
 - c. The outside air has entered the system for quite a long time
- #### Sunlight sensor

The sun sensor, rain and light sensor are integrated and installed on the upper side of the front windshield. Sun light sensor is a light energy sensor, which can measure the heat generated by the sunlight hitting the vehicle and provide more compensation parameters for the Temperature control module. The Temperature control module can automatically adjust the air volume and the mixing ratio of cold/hot air in real time according to the illumination intensity outside the vehicle and the working condition demand of air conditioning inside the vehicle, so that all passengers can get the most comfortable feeling.

A/C temperature sensor and ambient temperature sensor (exterior rearview mirror)

Ambient temperature (exterior rearview mirrors) and Air Conditioner temperature sensors affect the automatic control of the inside air temperature: these sensors are all temperature sensitive thermistors, and the resistance of the sensors is inversely proportional to the temperature. The temperature control module sets the internal and external circulation motor, cooling and heating temperature, wind direction motor and blower motor resistance according to the resistance value information to control the A/C temperature.

The housing of Air Conditioner temperature sensor is connected to the aspirator through a hose pipe. The air that flows out of the air conditioner creates a slight vacuum at the end of the aspirator hose. This kind of vacuum causes the air in the vehicle to flow through the Air Conditioner temperature sensor, which improves the accuracy of the vehicle compartment temperature detected by the sensor.

The ambient temperature sensor (exterior rear-view mirror) is located on the right rear-view mirror. The temperature control module uses this sensor to obtain the ambient air temperature information. Using this information, the temperature control module will display the external temperature on the instrument.

Interior air-conditioning unit

The indoor A/C host is located in the instrument panel and is composed of blower motor, air distribution damper motor, temperature control damper motor, recirculation damper motor, blower motor resistance, A/C filter, heater core, evaporator, expansion valve, various air deflection dampers and ventilation ducts.

1. Blower motor

Caution

Do not use the fan wheel of the blower motor as the bearing surface when placing the blower motor.

To prevent damage to the fan wind turbine blades, it is forbidden to touch the fan wind turbine.

The blower consists of these components:

- Permanent magnet motor
- Squirrel cage fan

The change of blower speed at different speeds depends on the blower motor control module controlled by the blower motor speed control device.

Under most operating conditions, outside air enters the vehicle in the following ways:

- When the blower motor works, it sucks in the outside air
- The vehicle moves forward and presses into the outside air

The blower motor blows air along the following route:

- Through the evaporator core
- Through the heater core
- Enter the occupant compartment

2. Heater core

The heater core is the main component of the A/C heating system, which is located in the A/C host. When the engine is running, the engine coolant flows into the heater core from the engine, and the heater core emits the heat of the coolant. When removing the heater core, it is necessary to drain the engine coolant. During installation, confirm that the heater core pipeline is well assembled.

3. Evaporator and expansion valve

The evaporator is located on the inner right of the air-conditioning host. Before removing the evaporator, you need to discharge the refrigerant first, and then disassemble and disassemble the air-conditioning host. One end of the expansion valve is connected to the intake and exhaust pipes of the evaporator, and the other end is connected to the intake and exhaust pipes of the A/C compressor. In the liquid pipeline,

the expansion valve forms a restriction on the high-pressure liquid refrigerant, so that the refrigerant becomes a low-pressure liquid when it flows to the evaporator.

The refrigerant is cooled and dehumidified before entering the vehicle. The liquid refrigerant evaporators in the evaporator. By absorbing the heat of the evaporator air flow, the temperature in the vehicle decreases, the liquid refrigerant is transformed into gas, and the water in the air will condense on the outer surface of the evaporator core to form water outflow.

The evaporator is equipped with a temperature sensor. The sensor measures the surface temperature of the heat sink on the evaporator. If the temperature is lower than the limit value, the compressor stops working to prevent the evaporator from freezing.

Refrigerant R-134a and lubricating oil

Refrigerants have the following functions in the A/C system:

1. Absorb heat
2. Carry heat
3. Release heat

The R-134a refrigerant is used on the vehicle, which is non-toxic, flame retardant, transparent, colorless liquefied gas.

Before performing maintenance work that requires opening of the refrigeration system pipes or components, you should refer to the instructions for the disposal of refrigerant pipes and pipe joints as well as the instructions for maintaining chemical stability. According to the various compressors of the vehicle models, the lubrication oil of the specified grade should be used. The following matters should be noticed :

- The refrigeration oil must be brand new, and no waste lubrication oil containing moisture/dust/metal scraps shall be used;
- Excessive lubrication oil is not allowed to be added to the system, otherwise it will affect the cooling capacity of the cooling system;
- When the system is replaced, the refrigerant should be discharged slowly so that the lubrication oil does not spurt out with the refrigerant.
- For the replacement of compressor in a new system, there is no need to add lubrication oil, which has been filled by the compressor manufacturer.
- The quality of lubrication oil in the pipeline should be checked before filling. If serious blackening or carbon particle precipitation is found, the whole air conditioning system should be thoroughly cleaned and blown, fluid reservoir dryer should be replaced, and all lubrication oil should be replaced; it is prohibited to use water, corrosive solvent or flammable and explosive solvent to clean the A/C system. Heptane and other cleaners are recommended to thoroughly clean and dry the A/C system.

Be sure to observe the instructions for the following repairs:

- Refrigerant recovery and regeneration
- Add lubrication oil
- Drain the cooling system
- Refill the cooling system

Caution

It is required to use only lubricants of the types and grades specified by the compressor manufacturer. Lubricants of different types and grades must not be mixed, otherwise the compressor will be damaged. Lubrication oil is easy to absorb water, so the contact duration between lubrication oil and air should be reduced as much as possible.

A certain amount of lubrication oil of the same type should be added or poured out when components of the A/C system are replaced. Generally, it can be carried out according to the following recommended values:

A/C lubrication oil filling volume:

Item	Filling volume	Unit	Remarks
Sudden loss of refrigerant	10-20	ml	-
Replacement of Condenser	15	ml	-
Evaporator replacement	10	ml	-
Replace all pipelines	10	ml	-
Single line replacement	0-5	ml	-

Item	Filling volume	Unit	Remarks
Refrigerant and lubrication oil volume of the whole system	130	ml	-
Compressor replacement	-40	ml	When the compressor is supplied by the manufacturer, it will carry a large amount of lubrication oil (more than the amount of lubrication oil in the whole A/C system). Therefore, it is unnecessary to replenish lubrication oil after the replacement of compressor, while a certain amount of lubrication oil must be discharged from the new compressor before installation.

A/C High-pressure pipe, A/C low-pressure pipe

The vehicle uses high-pressure pipes and low-pressure pipes (air-conditioning hard pipes and/or hoses) of the air conditioner to connect the air conditioner's refrigeration system and form a closed system. Refrigerant and lubricating oil flow in this closed system to complete the working cycle of the refrigerant. The rigid pipe of the air conditioner is composed of aluminum tubes and corresponding joints, and the air conditioner hose is composed of rubber hoses and corresponding joints.

A/C pressure sensor

The A/C pressure sensor measures the pressure of the A/C high-pressure pipeline. When the air conditioner is refrigerating, it transmits the pressure signal of the A/C system according to the refrigerant pressure value in the pipeline, and turns on or off the engine cooling fan and compressor to realize the pressure protection of the A/C system.

8.2.2.2 A/C and refrigeration system inspection

General inspection

The operation efficiency and service life of air conditioning (A/C) system depend on the chemical stability of the refrigerating system. When the refrigerating system is contaminated with foreign matters (such as dust, air, or moisture), contaminants can change the stability of the refrigerant and refrigerant oil. It also affects the relationship between pressure and temperature, reduces work efficiency, and can lead to system components corrosion and abnormal worn of components.

Please check the A/C system as follows:

- Before opening the plug, clean the oil at and around the plug to reduce the possibility of oil entering the system.
- After the joint is disconnected, the two sides of joints are sealed by cap, plug or tape to prevent oil, foreign matter and moisture from entering.
- Keep all tools clean and dry, including manifold pressure gauge components and all replacements.
- Add refrigerant oil with clean and dry conveying device and container to ensure that the refrigerant oil is not polluted.
- Minimize exposure time of A/C system interior to air during operation.
- A/C system interior must be emptied and refilled after exposed to the air. All service parts are dried and sealed before leaving the factory. These sealed parts can only be opened when they are about to be installed. Before unpacking, all parts should be kept at room temperature to prevent moisture in the air from condensing on the parts and entering the system, and resealed as soon as possible.

Caution

Do not store refrigerants in the places exposed to sunlight or heat sources.

Never discharge the refrigerant directly into the atmosphere under any circumstances.

Do not mix refrigerants, such as R-134a (tetrafluoroethane) and R-12 (dichlorodifluoromethane).

It is required to use refrigerant oil of the types and grades specified by the compressor manufacturer. Refrigerant oil of different types and grades must not be mixed, otherwise the compressor will be damaged.

Refrigeration oil is easy to absorb water, so the contact time between refrigeration oil and air shall be minimized.

Quick inspection of refrigeration circuit

Caution

In some cases, refrigerant lines and A/C components can be extremely hot or cold. Take extra care when checking refrigerant lines or A/C components and touching them. Failure to follow this instruction may result in personal injury.

The A/C line from the compressor to the condenser shall be hot.

The A/C pipeline from the condenser to the expansion valve shall be warm and not as hot as the above A/C pipeline.

The temperature difference between the cooling air inlet and cooling vent of the condenser is determined by measuring the temperature. Depending on the ambient temperature, the temperature difference shall be greater than 20 °C. If the temperature difference is less than 20 °C, check whether there is any foreign matter or damage on the heat sink of the condenser and whether the engine cooling fan operates normally.

The A/C line between the expansion valve and the evaporator shall be cold from the installation point of the expansion valve. Depending on the climate, the surface of the A/C pipeline may also freeze.

The A/C line between the evaporator and the compressor shall be cold.

1. Test the temperature of Evaporator core output pipeline, and prepare the following work during measurement:
 - Open all windows.
 - Set the air distribution to the face vent position and open the vent doors of all vents.
 - Turn on the external circulation mode.

- Select the lowest blower wind speed setting.
- Select the lowest temperature setting.

2. Connect the temperature sensor to the output pipeline of the evaporator core. The installation position of the temperature sensor shall be as close to the evaporator core as possible.

Caution

Temperature measurement cannot be performed with a non-contact thermometer because surface temperature radiation can cause incorrect measurement results.

3. Turn on the air conditioner. After 3min, measure the surface temperature of the evaporator core output pipeline.

4. If the measured temperature is 5-10 °C, the A/C system is normal. If the temperature is too high, the cooling of the A/C system is insufficient. Carry out the next inspection. Frequent faults of refrigeration system and their causes:

- Poor or no refrigeration

If the A/C pipeline or drying bottle is blocked or obstructed, the location of the blockage or obstruction can be found by comparing the temperature of the surface of the A/C pipeline or drying bottle. Where there is a blockage or difference in temperature.

- The refrigeration performance drops suddenly (the refrigeration performance returns to normal after the compressor stops for about 5min)

This is because there is water in the system, causing the expansion valve to freeze. In order to ensure that the moisture is completely removed from the refrigerant circuit, extract the air and moisture in the system to the greatest extent, the repeated vacuum pumping method shall be adopted, that is, after the first vacuum pumping, it shall be pumped continuously for more than 10min.

Pressure inspection of refrigeration system

1. Park the vehicle indoors or in a shady place. Open the window to ventilate the vehicle.
2. Install the A/C inspection and maintenance equipment, and connect the high/low pressure pipe of the equipment to the high/low pressure pipe of the A/C system of the measured vehicle.
3. Let the A/C system run for about 5~10min under refrigeration condition.
4. Measure the readings of the high-pressure and low-pressure pipelines of the vehicle's air-conditioning system.

The standard pressure values are as follows:

	High pressure	Low pressure
Normal value	1.4-1.75MPa	0.25-0.35MPa

8.2.2.3 A/C refrigeration system leakage test

Leakage test of refrigeration system

When you suspect that the system is leaking refrigerant, test whether the refrigerant is leaking. When the repair operation you perform affects the pipeline or plug, you shall also perform the leakage test. Leakage usually occurs at the refrigerant plug or interface. The causes of leakage usually include the following faults:

- Improper installation torque of parts.
- The sealing ring is damaged.
- Leakage of refrigeration pipe system components.
- The A/C system shall have appropriate pressure to detect leakage, at least 340 kPa. However, compressed air cannot be filled into the system, otherwise the moisture, dust or other impurities in the air will increase the burden of desiccant or pollute the system. There are several methods to check the leakage of refrigeration system.

Electronic leak detection

1. Use an electronic leak detector to carefully check the whole pipeline of the refrigeration system.

Caution

The electronic leak detector is sensitive to windshield washer fluid, solvents, cleaning agents and some vehicle adhesives. The surface shall be wiped clean to avoid inaccurate reading. Ensure that all surfaces are dry to avoid damaging the electronic leak detector.

2. Move at the speed of 25 ~ 50mm/s and detect each joint for a whole circle.
3. The probe tip is within 6mm from the detection surface.
4. Do not block the air inlet.
5. The sound will change from 1 ~ 2 sound per second if leakage is detected. Adjust the balance control to keep the alarm sound at 1 ~ 2 sounds per second.
6. Even if a leak has been detected, all of the following parts shall be tested:
 - Evaporator and connecting pipeline interface.
 - Condenser and connecting pipeline interface.
 - Compressor and connecting pipeline interface.
 - All plugs and interfaces.
 - Test the high/low pressure service ports / service valves.

- Brazing and electric welding parts.

Fluorescent dye leak detection

Some vehicles have marks of refrigerant oil and refrigerant at the air-conditioning pipeline joint, which may be left for the convenience of installing the air-conditioning pipeline and lubricating the spring locking interface of the air-conditioning pipeline. When it is suspected that there is leakage in the connector, clean the parts and use R-134a electronic leak detector to confirm whether there is leakage. The leakage point can be accurately located by the bright yellow and green light of the tracer. Since there may be more than one leak, each part shall usually be inspected.

1. Fill 100g fluorescent tracer into the A/C refrigerant system.
2. Stop the vehicle after operating the A/C system for 15min.
3. Use ultraviolet light to check all parts of the A/C system and determine the leakage point.
4. If leakage is found, recover the refrigerant with fluorescent tracer, repair or replace the leaking parts, and refill the refrigerant with fluorescent tracer into the A/C system.
5. Use an oily solvent to remove any traces of fluorescent tracers from lines or components.
6. Operate the A/C system for a few minutes and use the ultraviolet lamp again to check all parts of the A/C system to confirm that the fault is eliminated.

Vacuum leak detection

1. Recover the refrigerant and vacuum the system (about 30min).

If the A/C system is evacuated with refrigerant charged, part of the refrigerant will remain in the refrigerant oil of the compressor. The remaining refrigerant will still evaporate and cause the reading on the pressure gauge to increase slightly (up to 2 divisions) during the leakage test, but the increase in pressure does not mean that the A/C system has leakage.

2. Close the manual valves of the high/low pressure gauges on the refrigerant recovery and filling machine.
3. Observe the low-pressure gauge on the refrigerant recovery filler.
 - If the reading on the meter increases by more than 2 kPa, it indicates that the system has leakage. It is necessary to fill about 300g of refrigerant for leakage inspection. See fluorescent dye leak detection.

- If there is no leakage in the system, continue the filling procedure.

8.2.2.4 Recovery and filling of air conditioner refrigerant

The operation efficiency and service life of air conditioning (A/C) system depend on the chemical stability of the refrigerating system. When the refrigerating system is contaminated with foreign matters (such as dust, air, or moisture), contaminants can change the stability of the refrigerant and PS OIL compressor oil. It also affects the relationship between pressure and temperature, reduces work efficiency, and can lead to internal corrosion and abnormal worn of components. please operate as follows to ensure the chemical stability of the system:

1. Before the joint is opened, clean the oil at and around the joint to reduce the possibility of oil entering the system.
2. After the joint is disconnected, the two sides of joints are sealed by cap, plug or tape to prevent oil, foreign matter and moisture from entering.
3. Keep all tools clean and dry, including manifold pressure gauge components and all replacements.
4. Add PS OIL refrigerant oil with clean, dry conveyors and containers to ensure that the refrigerant oil is as free from moisture as possible.
5. Minimize exposure time of A/C system interior to air during operation.
6. A/C system interior must be emptied and refilled after exposed to the air. All repair parts are dried and sealed before delivery. These sealed parts should only be opened when the installation is about to begin. Before unpacking, all parts should be kept at room temperature to prevent moisture in the air from condensing on the parts and entering the system, and resealed as soon as possible.

1. Procedures for discharge, adding of lubrication oil, emptying and filling of A/C system.

Warning !

Refer to “Warning of inhaling R-134a” in the “Warnings and Notice”. Other health and safety information is available from refrigerant and lubrication oil manufacturers.

Warning !

Refer to “Warning regarding goggles and gloves” in the “Warnings and Notice”

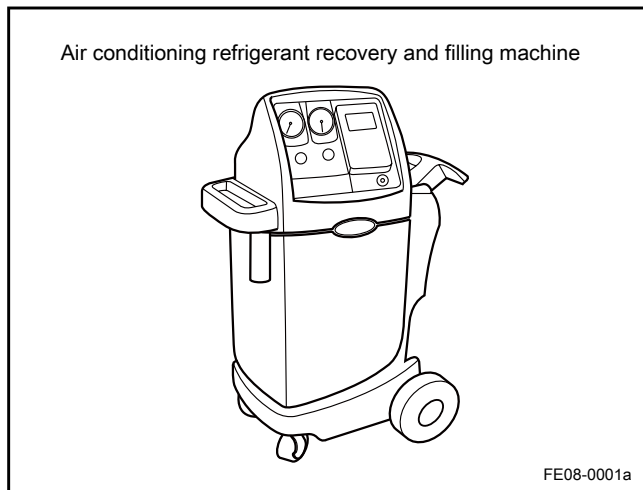
The discharge, adding of lubrication oil, emptying and filling of A/C system can be completed by one connection of filling

machine. The refrigerant is filtered during both recovery and emptying to ensure that the refrigerant pumped into the A/C system is clean and dry.

1. R-12 filling machine is prohibited to fill R-134a system. The refrigerants and refrigerant oil of the two systems are not compatible and should never be mixed. Even small amounts are not allowed. Mixing with residual refrigerants can damage the equipment.
2. Reducing joints are prohibited to ensure internal sealing of the system.

2. Installation and maintenance of filling machine

There are many types of filling machine. All filling machines perform various tasks such as A/C system discharge, refrigerant recovery, system emptying, refrigerant oil rationing and refrigerant refilling. Refer to the operation instructions of filling machine and master the initial installation and maintenance procedures.



3. Function of control panel

The operator can control and monitor the operation process with the control button and indicator light on the filling machine. For details, please refer to the operation instrument of filling machine. Operation instrument should include:

1. Main power supply switch: The main power switch supplies power to the control panel.
2. Display screen: The display shows the programmed vacuuming time and the weight of the refilled refrigerant. Refer to the operation instrument of manufacturer and know the detailed program information
3. Low pressure side manifold pressure gauge: this gauge shows the pressure of system low pressure side.
4. High pressure side manifold pressure gauge: this gauge shows the pressure of system high pressure side.

5. Control panel: It includes control buttons to control various operation functions.
6. Low pressure side valve: this valve is used to connect the low pressure side of A/C system and filling machine.
7. Humidity indicator light: This indicator light indicates whether the refrigerant is moist or not.
8. High pressure side valve: this valve is used to connect the high pressure side of A/C system and filling machine.

Refrigerant recovery

Warning !

Use only refrigerant tanks specially designed for filling machine. The anti- overcharge mechanism of filling machine is specifically calibrated for the use of this refrigerant tank. The tank valve of the refrigerant tank is also specially manufactured for the device.

1. Check the high pressure side and low pressure side gauges on the control panel of the filling machine to ensure that there is pressure in the A/C system. If there is no pressure, there is no recyclable refrigerant in the system.
2. Open high pressure side and low pressure side valves.
3. Open the gas and liquid valves on the refrigerant tank.
4. Drain refrigerant oil from oil separator.
5. Close the drain valve.
6. Connect the filling machine to an appropriate power outlet.
7. Switch on the main power supply switch.

Caution

Do not mix used refrigerant oil with new oil refrigerant. Used refrigerant oil may contain precipitated aluminum or other foreign matters. Be sure to use a new refrigerant oil when the A/C system is refilled. Scrap used refrigerant oil correctly.

Caution

Some of the PS OIL lubrication oil in the A/C system may be recycled along with the refrigerant. The amount of recovered lubrication oil is variable. The filling machine can separate the lubrication oil from the refrigerant so that the amount of lubrication oil recovered can be determined. Add equal amount of lubrication oil when the system is refilled. Refer to the operation instrument of manufacturer and know the detailed method of filling machine.

8. Start the recovery process. Refer to the operation instrument of manufacturer and know the detailed method of filling machine.
9. Wait for 5 minutes, and then check the low pressure side pressure gauge on the control panel. If the A/C system maintains vacuum, the recovery is completed.

Caution

If the control panel indicator light indicates that the refrigerant tank is full during the recovery period. After the filling machine is closed, install an empty tank to store the refrigerant required for the subsequent steps. Do not use other types of refrigerant tanks.

10. If the number starts from zero on the low pressure side pressure gauge, there are still refrigerants in the system. Recycle the remaining refrigerant. Repeat this step until the system can maintain vacuum for 2 minutes.

Emptying

The refrigerant tank of filling machine must be filled with adequate R-134a refrigerant for filling. Check the amount of refrigerant in the tank. If the refrigerant is less than 3.6kg (8lb), add a new refrigerant to the refrigerant tank. For details, please refer to the operation instrument of filling machine and know the method of adding refrigerant.

1. Check whether the high pressure side and low pressure side hoses are connected to the A/C system and open the high pressure side and low pressure side valves on the control panel of the filling machine.
2. Open the gas and liquid valves on the refrigerant tank.

Caution

Refer to the operation instrument of manufacturer and know the detailed method of filling machine. The system must be emptied before new refrigerants or recycled refrigerants can be refilled.

3. Start the vacuum pump and begin the emptying procedure. During the recovery process, non-condensable gases (mostly air) are discharged automatically from the tank. You will hear the sound of pressure relief.

Caution

Replace vacuum pump oil frequently. Refer to the operation instrument of manufacturer and know the detailed method of filling machine.

4. Check the system for leakage. Refer to the operation instrument of manufacturer and know the detailed method of filling machine.

6. Lubrication oil filling and replenishment for A/C system

Lubrication oil discharged from the A/C system during recovery must be replenished.

1. Use graduated bottled PS OIL lubrication oil specifically for the R-134a system.
2. Refer to the operation instructions of manufacturer, and know the detailed method of filling machine and add appropriate amount of PS OIL lubrication oil to the system.
3. When the required amount of oil is filled, switch off the valve.

Caution

Keep the cap on the lubrication oil bottle tightly to prevent moisture or contaminants from entering the lubrication oil. This operation requires a certain degree of vacuum in the A/C system. Do not open the lubrication oil filling valve when there is positive pressure in the A/C system, otherwise it will cause the lubrication oil to flow back through the vent of the oil bottle. When filling or replenishing lubrication oil, the oil level should not be lower than the fluid pipe, otherwise air will enter the A/C system.

Filling

Caution

Empty the A/C system before filling.

1. Close the low pressure side valve on the control panel.
2. Close the high pressure side valve on the control panel.
3. Refer to the operation instrument of manufacturer and know the detailed method of filling machine.
4. Fill the necessary refrigerant into the A/C system to ensure that the unit of measurement is correct (i. e., kilogram, kilogram or pound).
5. Start filling.

8. Refrigerant filling has been successfully completed

1. Close the high and low pressure side valves on the control panel of the filling machine. Both valves should be closed.
2. Start the vehicle and the A/C system.
3. Keep the drive motor running until the readings on the high pressure side and low pressure side gauge are stable.
4. Compare readings with system specifications.
5. Check the evaporator outlet temperature to ensure that the operation of A/C system is in accordance with system specifications.

6. Keep A/C running.
7. Close the high pressure side quick joint valve.
8. Disconnect the high pressure side hose on the vehicle.
9. Open the high pressure side and low pressure side valves on the control panel. The system will quickly inhale the refrigerant in the two hoses through the low pressure side hoses.
10. Close the low pressure side quick joint valve.
11. Disconnect the low pressure side hose on the vehicle.

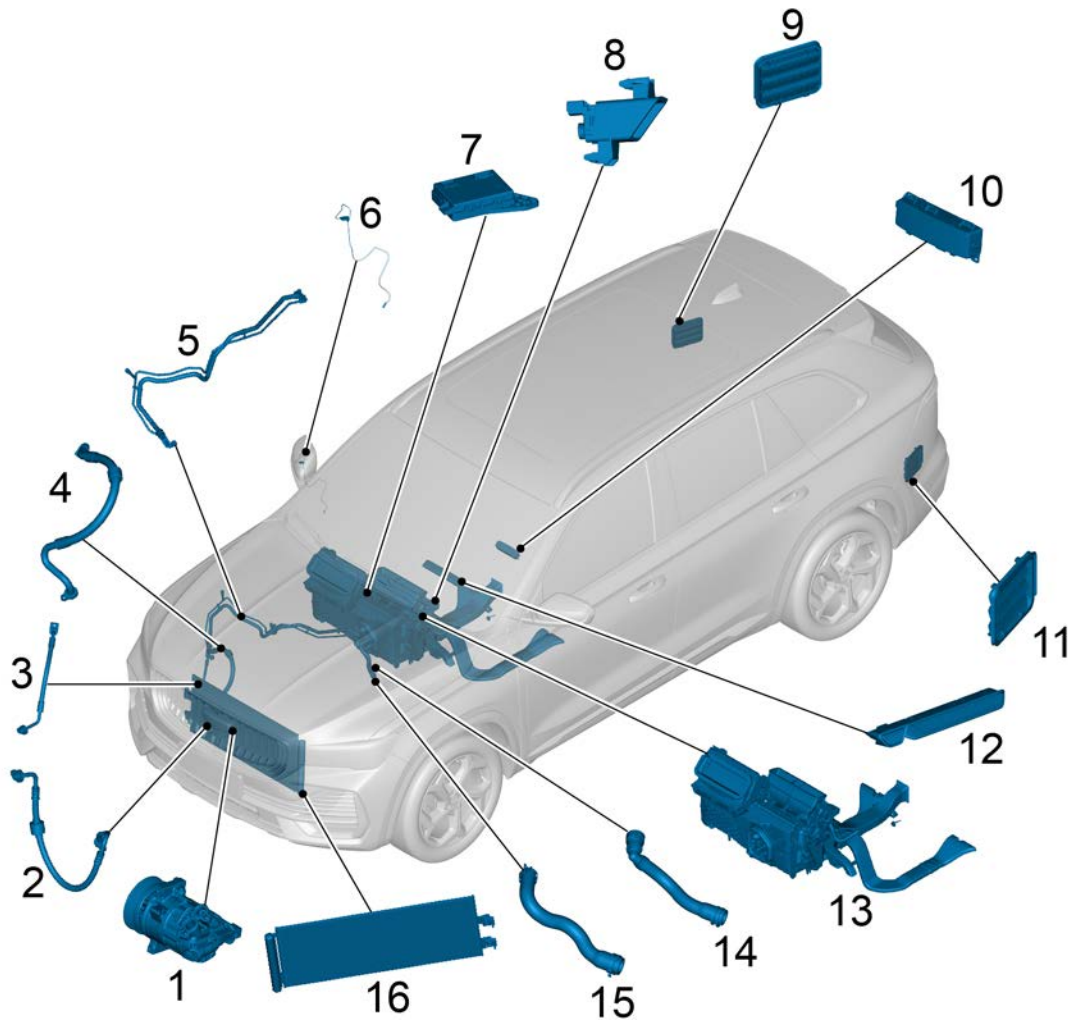
9. The refrigerant filling is unsuccessful

Sometimes the refrigerant entering the A/C system does not reach the total filling volume. There are two reasons:

1. The pressure of the refrigerant tank of the filling machine is similar to that of the A/C system, which will cause the filling process to be too slow. Refer to the operation instrument of manufacturer and know the detailed method of filling machine.
2. There is not enough refrigerant in the refrigerant tank to refill. it is necessary to recover some of filled refrigerant from the vehicle. empty the A/C system, add refrigerant to the refrigerant tank and refill it. Refer to the operation instrument of manufacture rand know the use of filling machine.

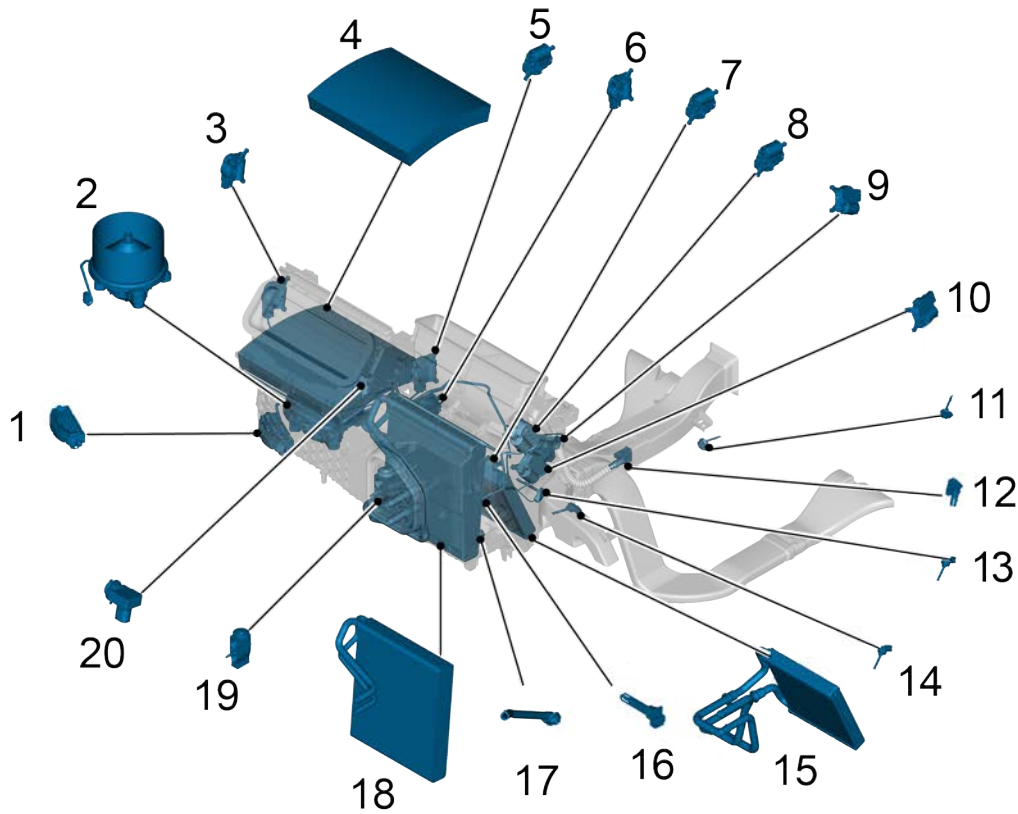
8.2.3 Component position

8.2.3.1 Component position



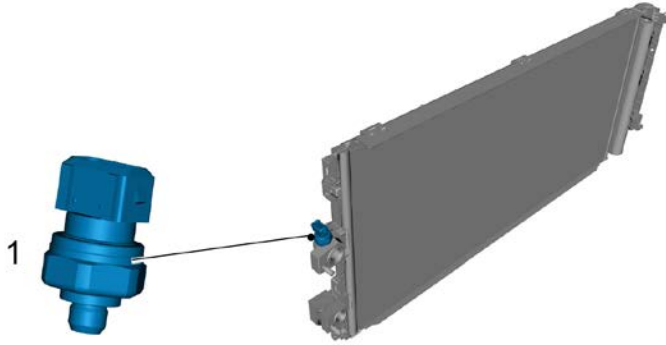
- | | | | |
|----|---|-----|-------------------------------------|
| 1. | A/C compressor | 9. | Right pressure release valve |
| 2. | A/C high pressure pipe assembly | 10. | Rear console switch module |
| 3. | Condenser outlet pipe assembly | 11. | Left pressure release valve |
| 4. | A/C low pressure pipe assembly | 12. | Central console switch module |
| 5. | Rear air conditioning high/low pressure pipe assembly | 13. | Air-conditioning unit assembly |
| 6. | Ambient temperature sensor (outside rearview mirror) | 14. | Air conditioning heater outlet pipe |
| 7. | Temperature control module | 15. | Air conditioning heater inlet pipe |
| 8. | A/C temperature sensor | 16. | Condenser assembly |

8.2.3.2 Structural location diagram of the A/C master device assembly



- | | |
|---|---|
| 1. Blower motor resistance | 11. Internal temperature sensor (left vent) |
| 2. Blower motor | 12. A/C temperature sensor |
| 3. Recirculation damper motor | 13. Internal temperature sensor (heating) |
| 4. Air conditioning filter assembly (driving cab) | 14. Internal temperature sensor (left air duct of front blowing foot) |
| 5. Air distribution damper motor (front) | 15. Heater core |
| 6. Temperature control damper motor (right) | 16. Evaporation temperature sensor |
| 7. Temperature control damper motor (rear) | 17. Drain pipe assembly |
| 8. Defroster damper motor | 18. Evaporator core assembly |
| 9. Air distribution damper motor (rear) | 19. Expansion valve |
| 10. Temperature control damper motor (left) | 20. Air quality sensor (AQS) |

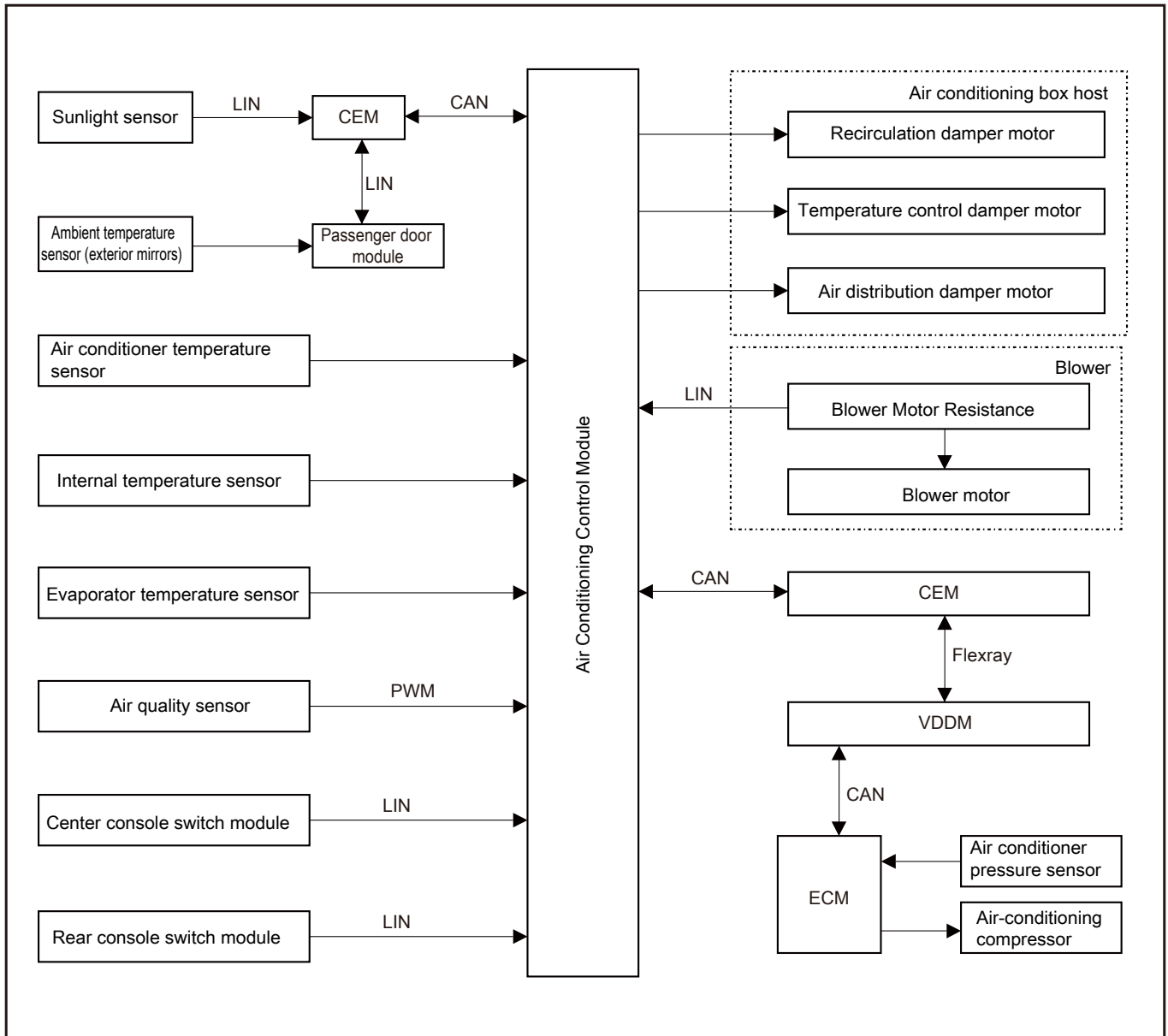
8.2.3.3 A/C pressure sensor



1. A/C pressure sensor

8.2.4 Electrical schematic diagram

8.2.4.1 Schematic diagram of A/C control system



8.2.5 Diagnostic information and procedures

8.2.5.1 Diagnosis Description

See [description and operation](#) before troubleshooting the automatic air conditioner. Understand and be familiar with the working principle of Automatic A/C, and then start system diagnosis. This will help to confirm the correct fault diagnosis steps when a fault occurs. More importantly, it can also help to confirm whether the situation described by the customer belongs to normal operation. Any fault diagnosis of the Automatic A/C should start with routine inspection. The routine inspection will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

8.2.5.2 Routine inspection

- Check after-sales installations that may affect the performance of the A/C system.
- Check A/C system components and lines that are easily accessible or can be seen to find out if there is any obvious damage or there is a situation that may cause a fault.
- Check the A/C system pipeline that is easy to be seen or can be seen to find out whether there is A/C system leakage.

8.2.6 Removing and installing

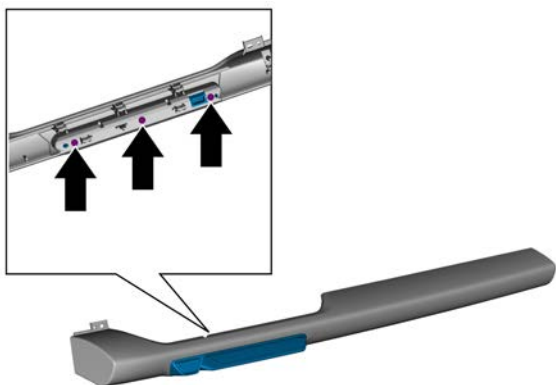
8.2.6.1 Center console switch module assembly replacement

Removal procedure

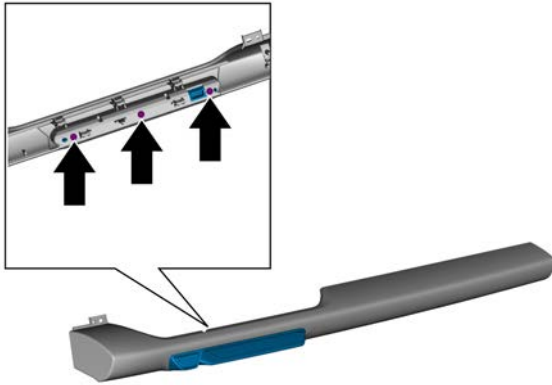
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the right cladding panel assembly, see [Replacement of the right cladding panel assembly](#).
- 4 Remove 3 screws from the center console switch module.
- 5 Remove the center console switch module.



Installation procedure



- 1 Install the center console switch module.
- 2 Install the 3 screws of the center console switch module.
Torque: 1.5 N.m (metric system) 1.1 lb-ft (imperial system)

- 3 Install the right cladding panel assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

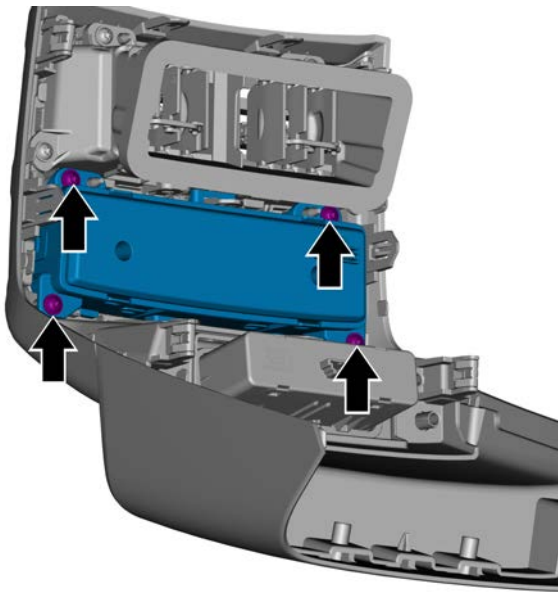
8.2.6.2 Rear console switch module replacement

Removal procedure

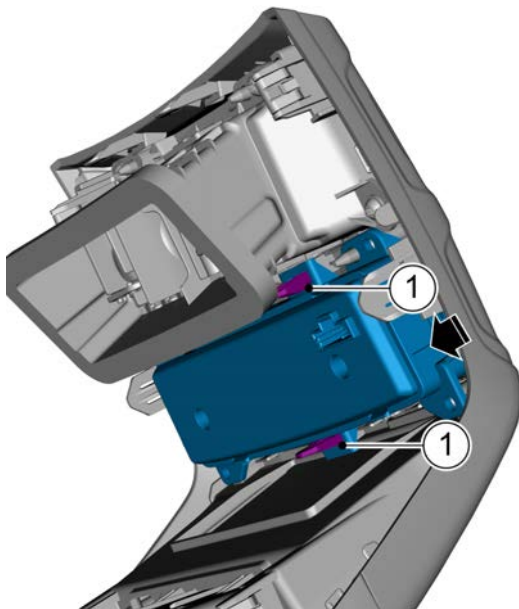
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rear panel assembly of the sub-dashboard, see [Replacement of the rear panel assembly of the sub-dashboard \(Type 2\)](#).

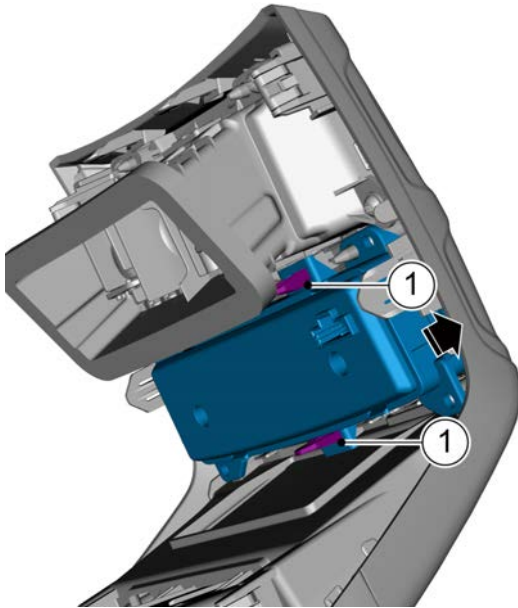


- 3 Remove 4 fixing screws from the rear console switch module.

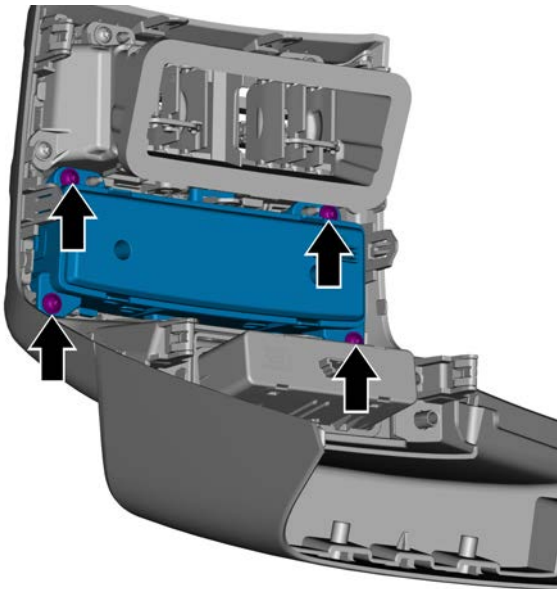


- 4 Disconnect the two connecting clips 1 between the rear console switch module and the assembly-panel console rear end, and remove the rear console switch module.

Installation procedure



- 1 Install the rear console switch module assembly onto the assembly-panel console rear end, and ensure that the two clips 1 are fully in place.



- 2 Install the rear console switch module and tighten the retaining bolts.
Torque: 1.5 N. m (metric system) 1.1 lb-ft (Imperial system)

- 3 Install the rear panel assembly of the console.
- 4 Connect the negative battery cable.

8.2.6.3 Replacement of evaporator core assembly

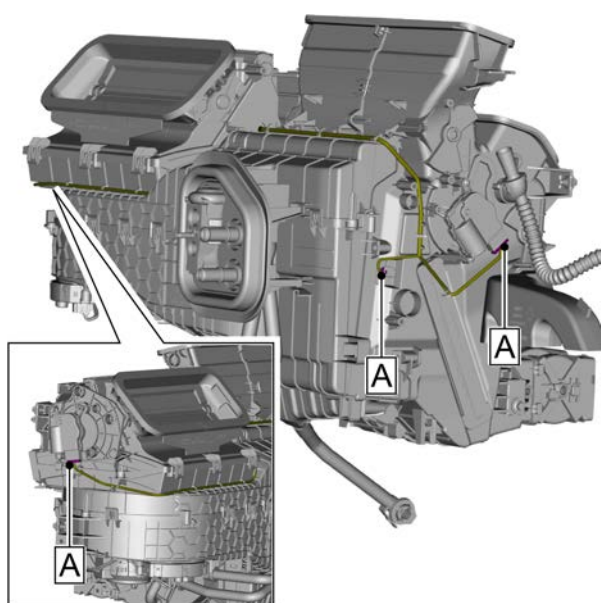
Removal procedure

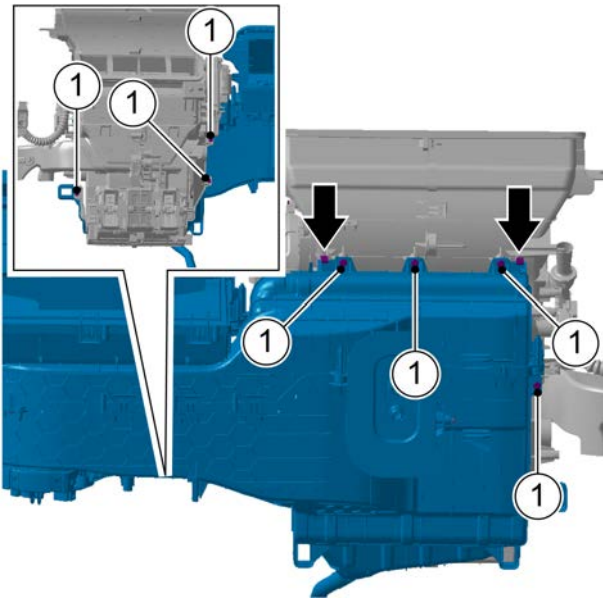
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

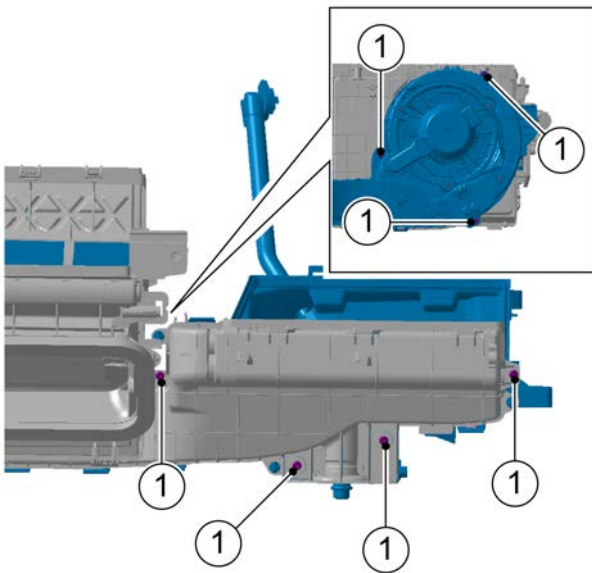
- 1 Open the engine compartment cover.
- 2 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

- 4 Recover the refrigerant. See [A/C refrigerant recovery and filling](#).
- 5 Remove console moulding assembly, refer to [replacement of console moulding assembly](#).
- 6 Remove dashboard assembly, refer to [replacement of dashboard assembly](#).
- 7 Remove the instrument panel beam assembly. See [instrument panel beam assembly replacement](#).
- 8 Remove the expansion valve. See [expansion valve replacement](#).
- 9 Remove A/C master device assembly, refer to [Replacement of A/C assembly](#).
- 10 Remove the heater core assembly. See [replacement of heater core assembly](#).
- 11 Disconnect connector A of air conditioner host.
- 12 Disconnect the harness from the air conditioner host.

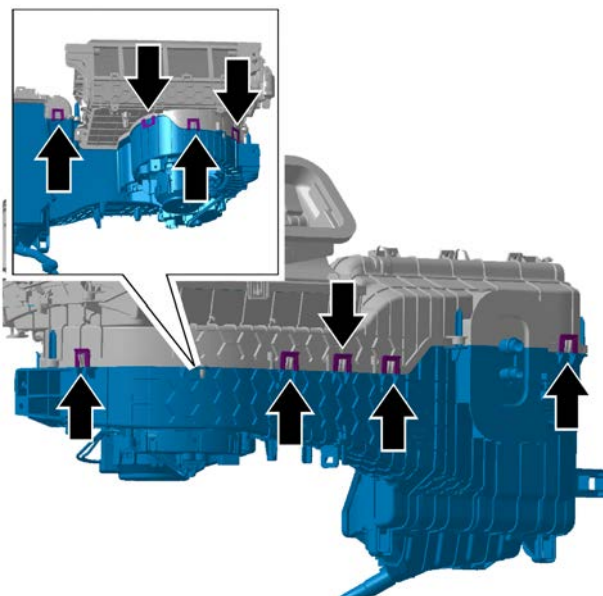




- 13 Remove 7 fixing screws 1 from the front housing of the A/C unit.
- 14 Disconnect the fixing card and remove the front housing of the A/C host.



- 15 Remove 7 fixing screws 1 from the lower housing of the A/C unit.



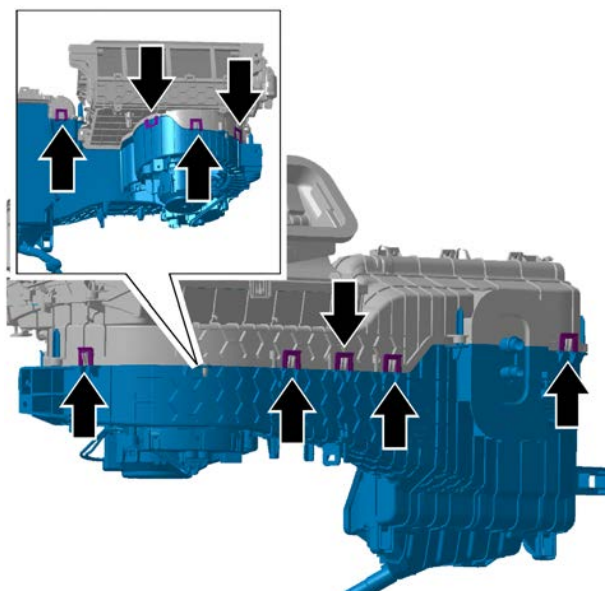
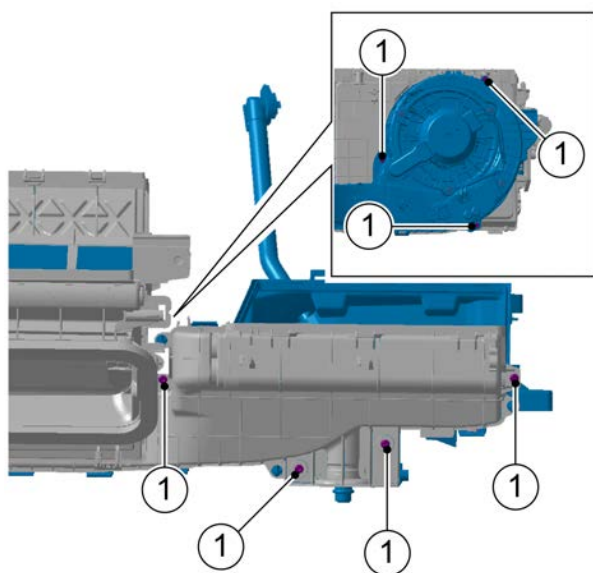
- 16 Remove the evaporator core assembly and remove the fixed clamp.

Installation procedure

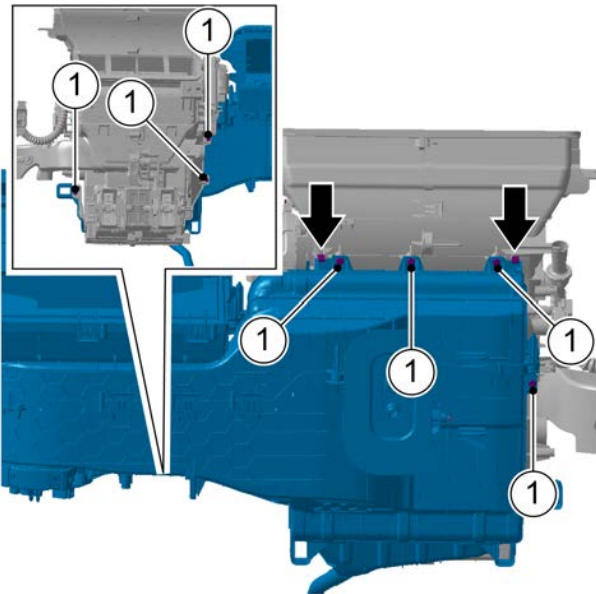
Caution

If the A/C system is replaced with a new Evaporator core, add 40 ± 5 ml compressor lubrication oil to the system; if it is only for maintenance and removal, there is no need to add compressor lubrication oil.

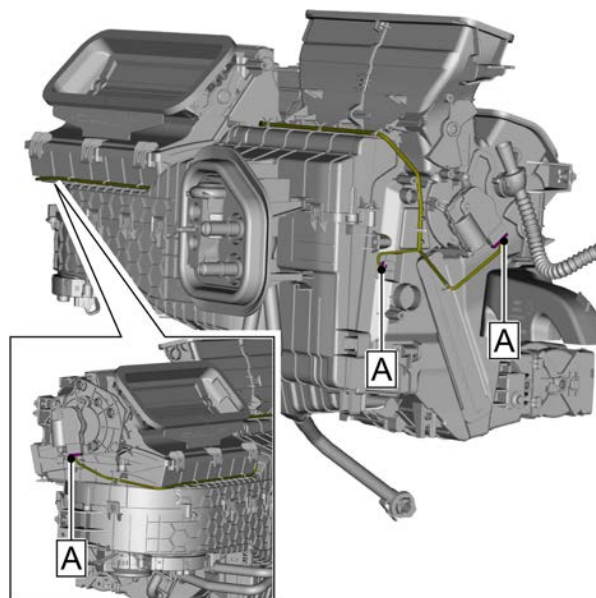
- 1 Install the evaporator core assembly.
- 2 Install the lower housing of the A/C host, install and tighten the 7 fixing screws 1 on the lower housing.



- 3 Install the retaining card.



- 4 Install the front housing of the A/C unit and lock the fixing clip A.
- 5 Install and tighten 7 fixing screws 1 on the front housing of the A/C host.



- 6 Connect the harness to the air conditioner host.
- 7 Connect the air conditioner host connector.

- 8 Install the heating core.
- 9 Install the expansion valve.
- 10 Install air-conditioning assembly.
- 11 Install the cross beam of instrument panel.
- 12 Install the console assembly.
- 13 Install the console assembly.
- 14 Operate the A/C refrigerant charging procedure, see [A/C refrigerant recovery and charging](#).
- 15 Connect the negative battery cable.
- 16 Fill the coolant.
- 17 Close the engine compartment cover.

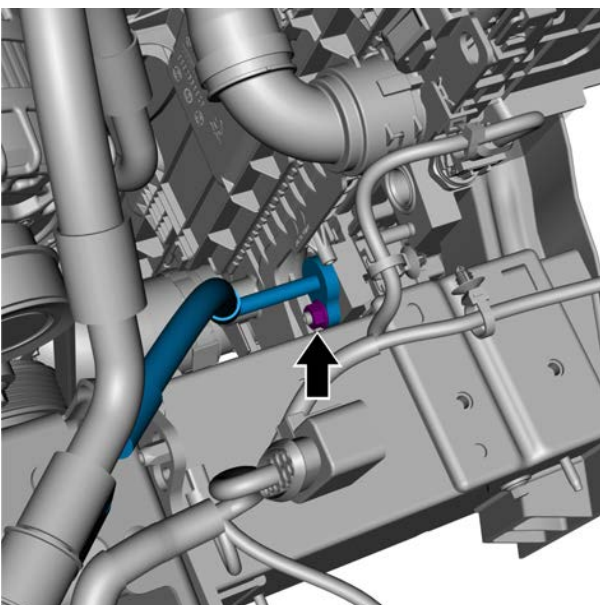
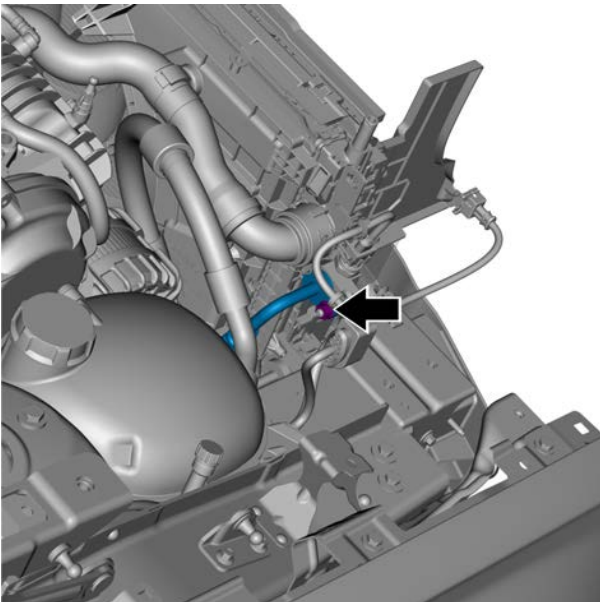
8.2.6.4 Condenser assembly replacement

Removal procedure

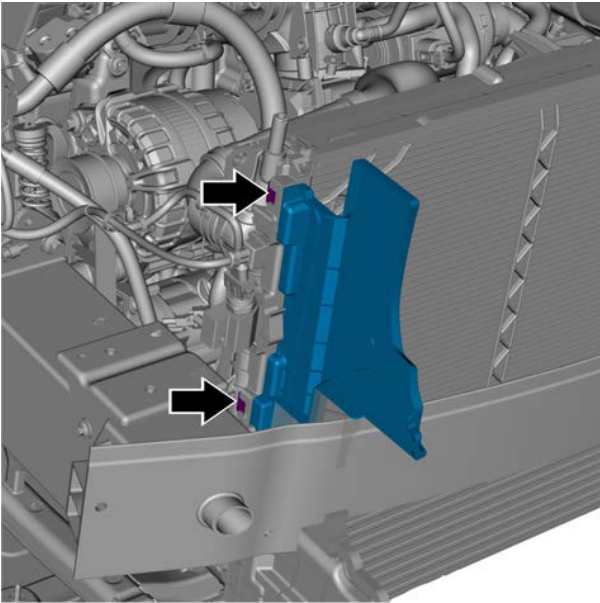
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

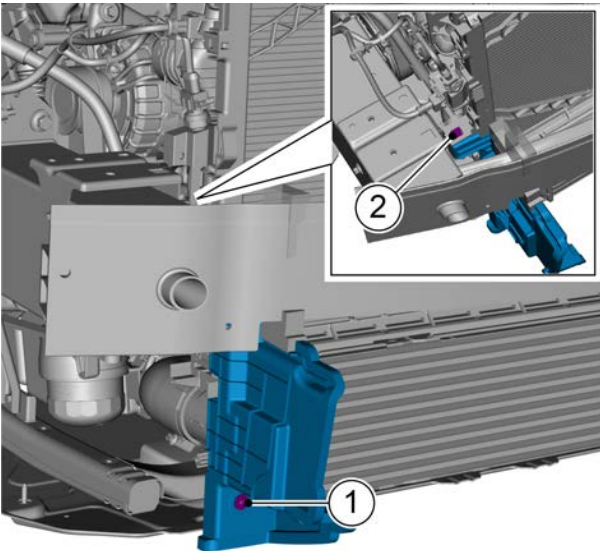
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Recover the refrigerant. See [A/C refrigerant recovery and filling](#).
- 4 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 5 Remove the front-end module assembly, see the [Replacement of the front-end module assembly](#).
- 6 Remove the fixing nut connecting the A/C high-pressure pipe assembly and the condenser, and disconnect the A/C high-pressure pipe assembly from the condenser.



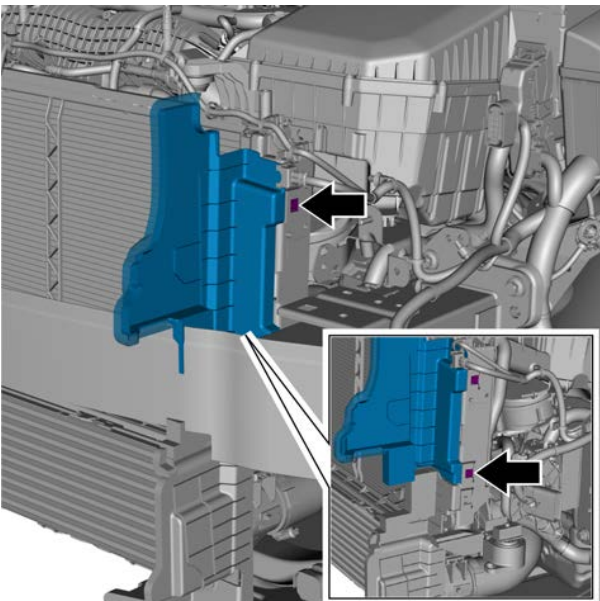
- 7 Remove the fixing nut connecting the condenser outlet pipe assembly and the condenser assembly, and disconnect the connection between the condenser outlet pipe assembly and the condenser assembly.



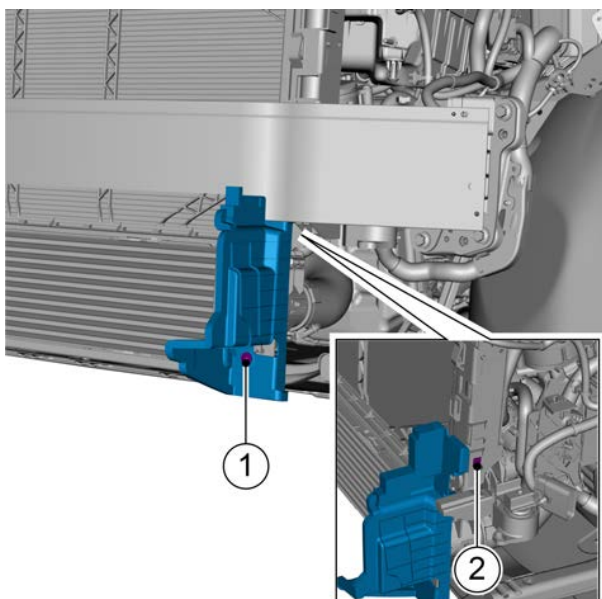
- 8 Disconnect the fixing clip of the upper right air deflector of the radiator and remove the upper right air deflector of the radiator.



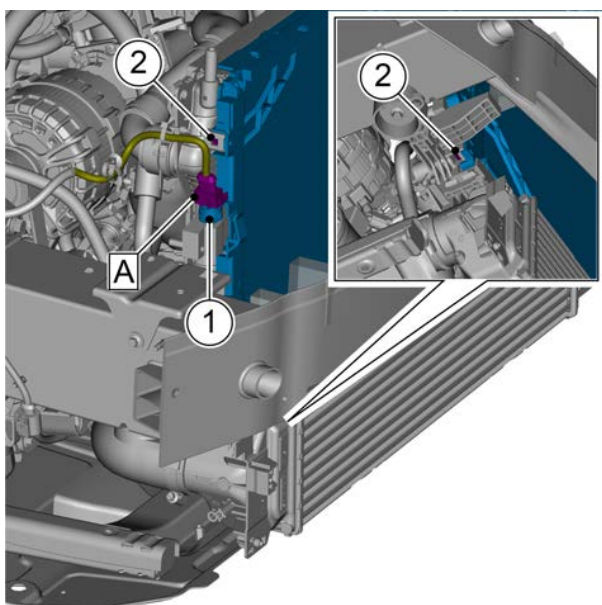
- 9 Remove fixing screws 1 from the lower right air deflector of the radiator.
- 10 Disconnect the fixing clip 2 of the lower right air deflector of the radiator and remove the lower right air deflector of the radiator.



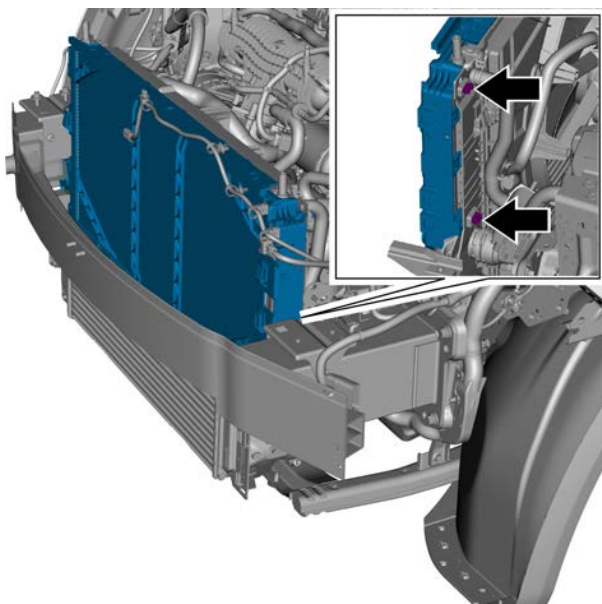
- 11 Disconnect the fixing clip of the left upper air deflector of the radiator and remove the left upper air deflector of the radiator.



- 12 Remove fixing screws 1 from the lower left air deflector of the radiator.
- 13 Disconnect the fixing clip 2 of the left lower air deflector of the radiator and remove the left lower air deflector of the radiator.



- 14 Disconnect the pressure sensor harness connector A.
- 15 Remove pressure sensor 1.
- 16 Disconnect the fixing clip 2 on the right of the condenser.



- 17 Disconnect the fixing clip on the left of the condenser and remove the condenser assembly.

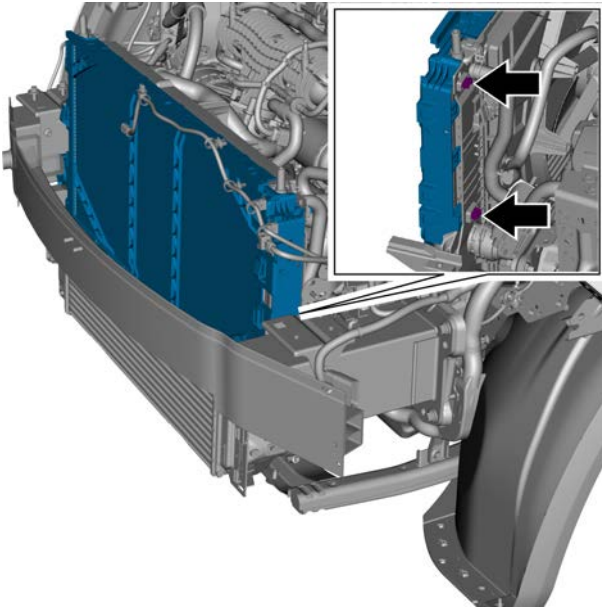
Installation procedure

Caution

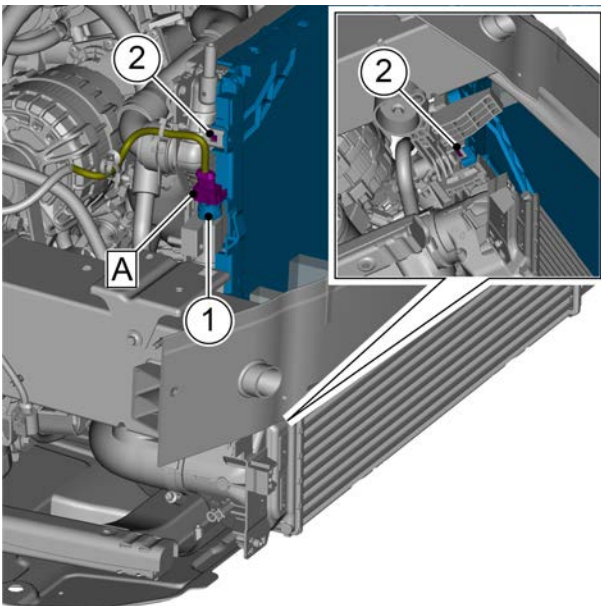
All O-rings involved in the installation process must be replaced with new ones. When installing the air-conditioning pipe, insert the pipe joint completely before tightening the nut to prevent damage to the O-ring and pipe joint.

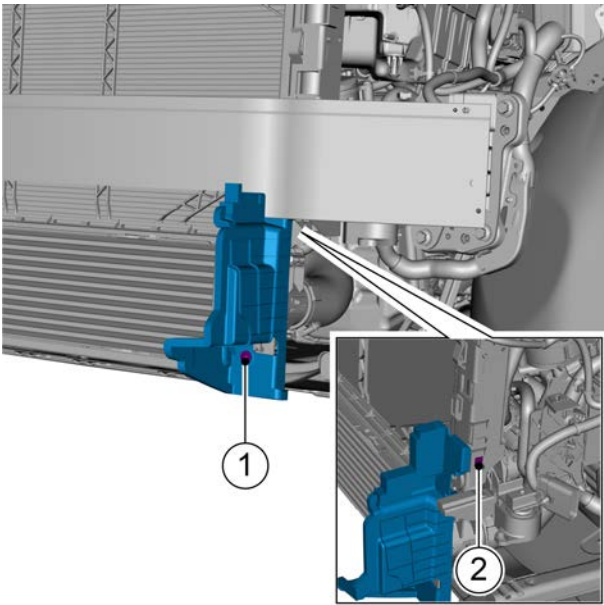
20ml lubrication oil shall be added to replace the condenser assembly.

- 1 Place the condenser assembly in the installation position and install the fixing card on the left of the condenser assembly.



- 2 Install the fixing clip 2 on the right of the condenser assembly.
- 3 Install pressure sensor 1.
- 4 Connect the pressure sensor harness plug a.

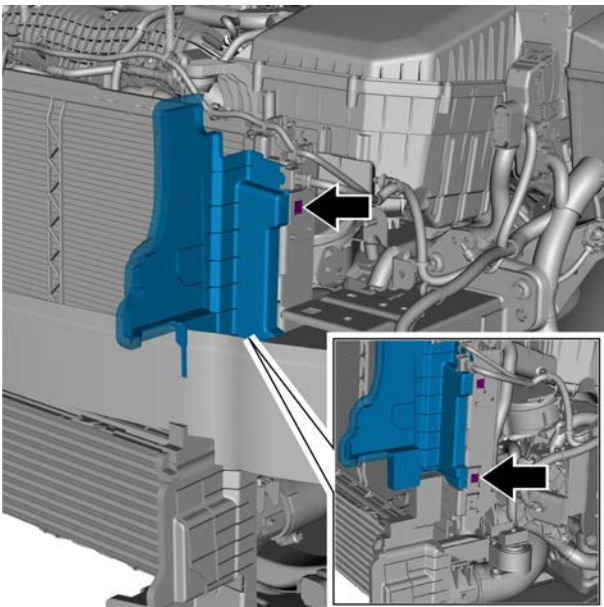




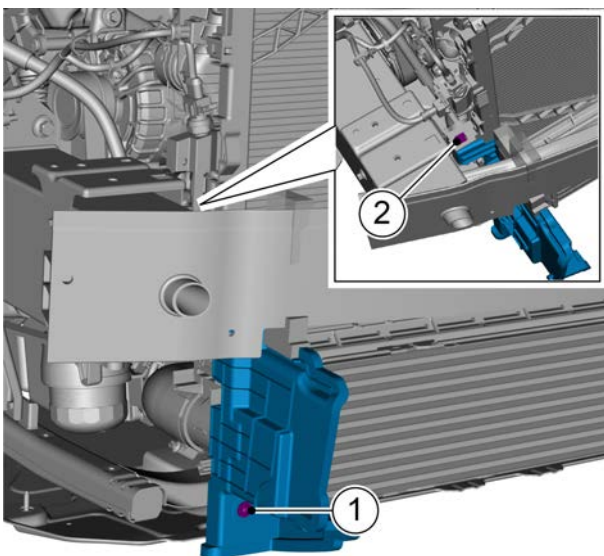
5 Install the lower left air deflector of the radiator and fix the fixing card 2.

6 Install fixing screws 1 onto the left lower air deflector of the radiator and tighten the fixing screws

Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)



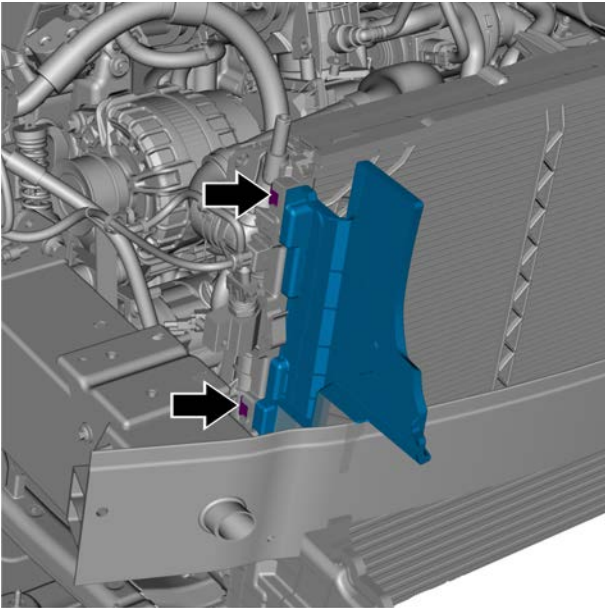
7 Install the upper left air deflector of the radiator and fix the fixing card.



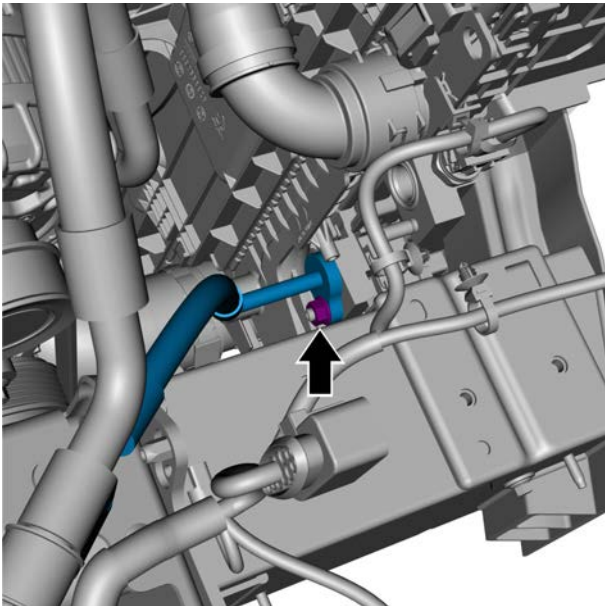
8 Install the lower right air deflector of the radiator and fix the fixing card 2.

9 Install the fixing screw 1 of the lower right air deflector of the radiator, and tighten the fixing screw.

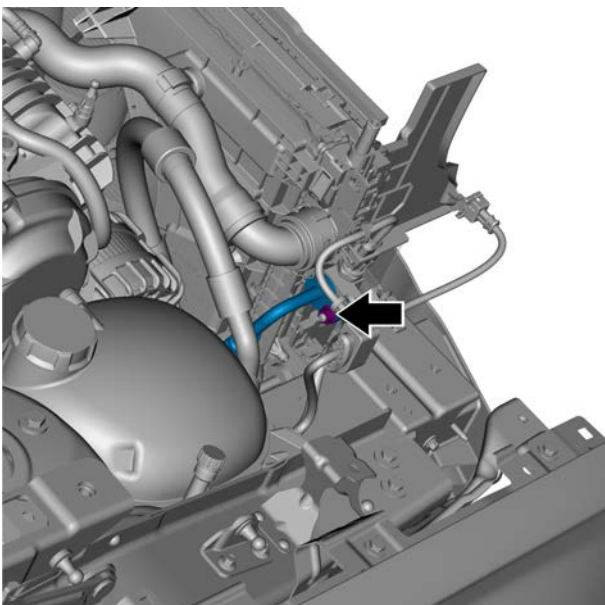
Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)



- 10 Disconnect the fixing clip of the upper right air deflector of the radiator and remove the upper right air deflector of the radiator.



- 11 Connect the condenser outlet pipe assembly and the condenser, and tighten the fixing nuts.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



- 12 Connect the A/C high-pressure pipe assembly and the condenser, and tighten the fixing nuts.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

- 13 Install the front-end module assembly.
- 14 Install the front bumper assembly.
- 15 Execute the charging procedure A/C refrigerant.
- 16 Connect the negative battery cable.
- 17 Close the engine compartment cover.

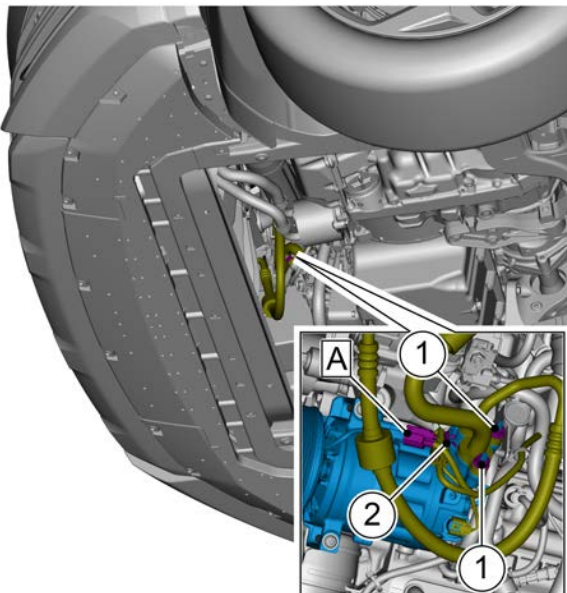
8.2.6.5 Compressor assembly replacement

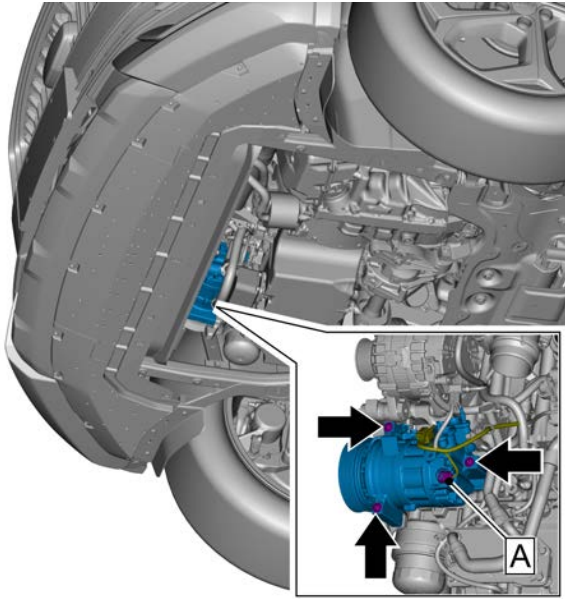
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Recover the refrigerant. See [A/C refrigerant recovery and filling](#).
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Support vehicles, see [Support Vehicles](#)
- 5 Remove the engine fender, see [Engine fender replacement](#).
- 6 Remove the intercooler intake pipe assembly. See [intercooler intake pipe assembly replacement](#).
- 7 Remove the driving belt, refer to replacement of the driving belt.
- 8 Disconnect A/C compressor clutch harness connector A
- 9 Remove the two fixing nuts 1 connecting the A/C refrigeration pipeline to the compressor, and disconnect the A/C refrigeration pipeline from the compressor.
- 10 Disconnect the wire harness fixing clip 2.





- 11 Disconnect harness connector A.
- 12 Remove the 3 retaining bolts connecting the compressor to the engine and remove the compressor.

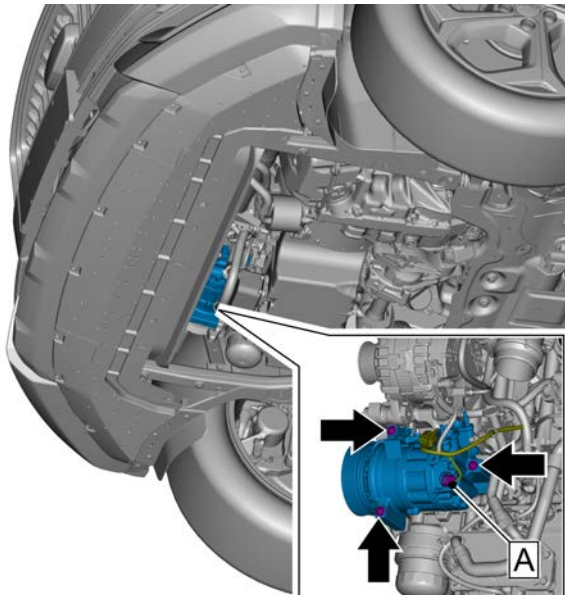
Installation procedure

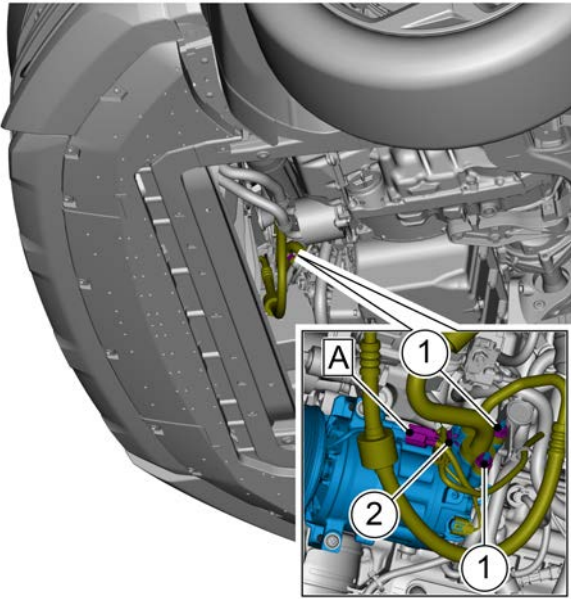
Caution

All O-rings involved in the installation process must be replaced with new ones. When installing the air-conditioning pipe, insert the pipe joint completely before tightening the nut to prevent damage to the O-ring and pipe joint.

Replace the new compressor with 20ml compressor lubrication oil.

- 1 Install the compressor and tighten the 3 retaining bolts connecting the compressor and the engine assembly.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)
- 2 Install A/C harness connector A.





- 3 Connect the A/C refrigeration pipeline to the compressor and tighten 2 fixing nuts 1.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

- 4 Install the wire harness fixing clip 2.
- 5 Connect A/C compressor clutch harness connector A.

- 6 Install the drive belt.
- 7 Install the intercooler intake pipe assembly.
- 8 Install the engine fender.
- 9 Lower the vehicle.
- 10 Connect the negative battery cable.
- 11 Operate the filling procedure of A/C refrigerant, see [A/C refrigerant recovery and filling](#).
- 12 Close the engine compartment cover.

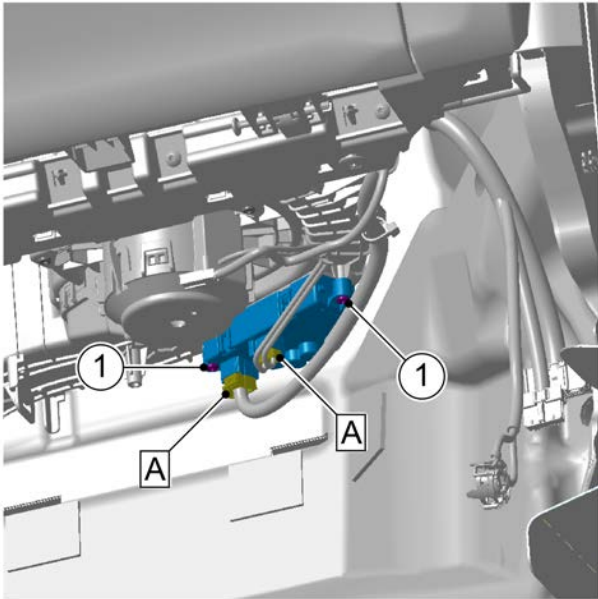
8.2.6.6 Blower motor resistance

Removal procedure

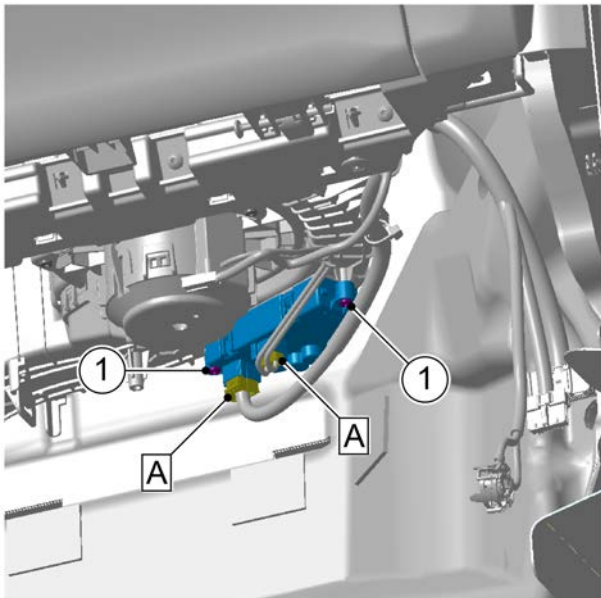
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the lower right foot assembly, see [Replacement of the lower right foot assembly](#).



- 4 Disconnect the blower motor resistance harness connector A.
- 5 Remove 2 fixing screws 1 of the blower motor resistor and remove the blower motor resistor.



Installation procedure

- 1 Install the blower motor resistor and 2 fixing screws 1 of the blower motor resistor.
Torque: 2 N. m (metric system) 1.5 lb-ft (Imperial system)
- 2 Connect blower motor resistance harness connector A.

- 3 Install the assembly-toe board lower RH.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

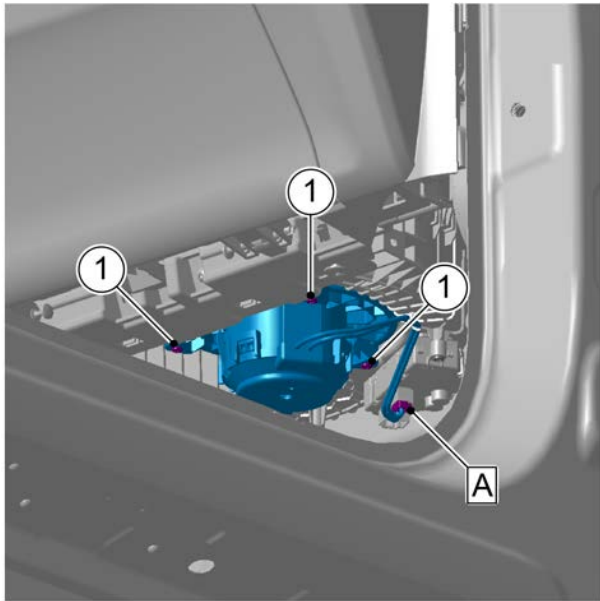
8.2.6.7 Blower motor replacement

Removal procedure

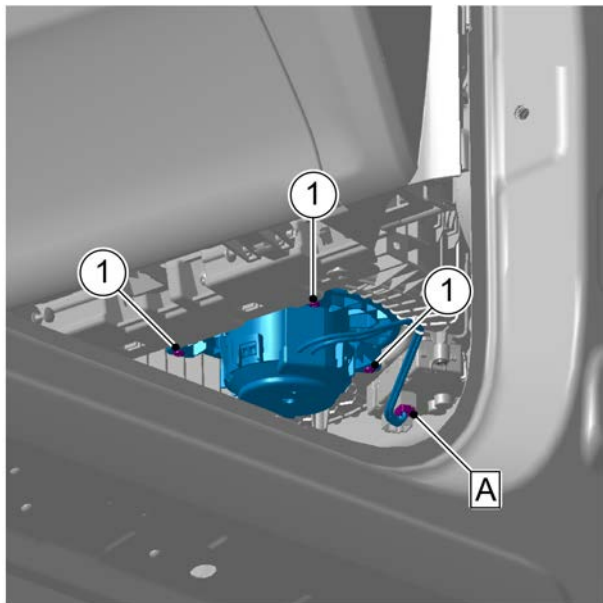
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)



- 2 Remove the lower right foot assembly, see [Replacement of the lower right foot assembly](#).
- 3 Disconnect the blower motor harness connector A.
- 4 Remove 3 fixing screws 1 from the blower motor.
- 5 Remove the blower motor.



Installation procedure

- 1 Install the blower motor.
- 2 Install three screws 1 of the blower motor.
- 3 Connect blower motor harness connector A.

CautionSecure the harness connection: “Connect, Click, and Confirm.”

- 4 Install the assembly-toe board lower RH.
- 5 Connect the negative battery cable.

8.2.6.8 Recirculation damper motor replacement

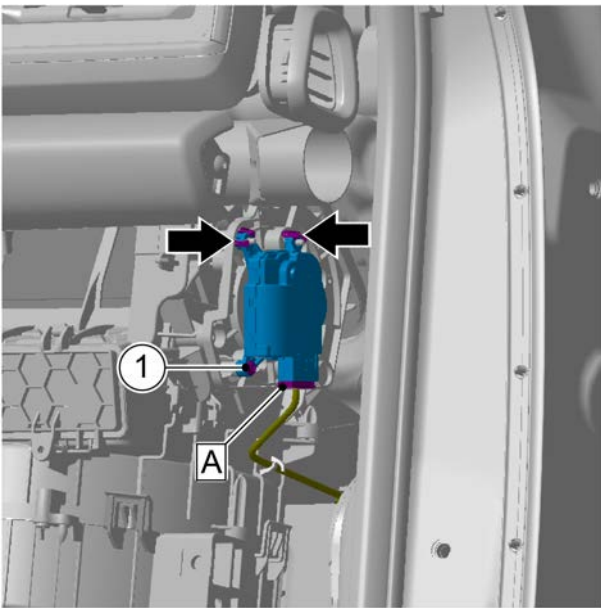
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

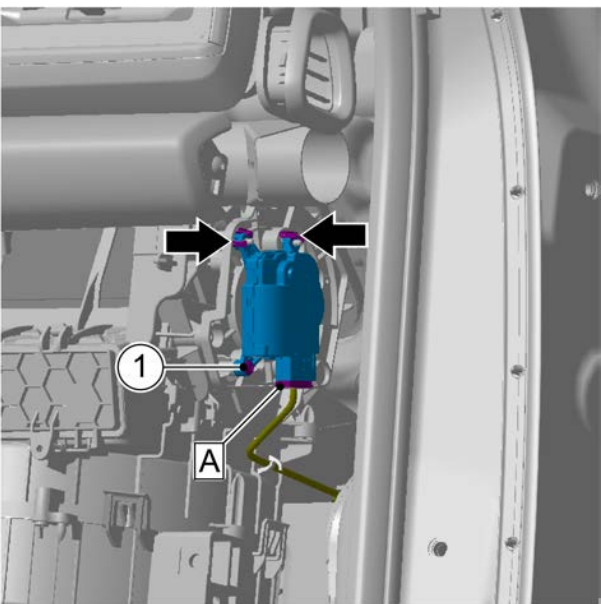
- 1 Open the engine compartment cover.

- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the exterior cover of the glove box, see [Replacement of the exterior cover of the glove box](#).
- 4 To disassemble the glove box frame assembly, see the [Replacement of the glove box frame assembly \(Type 1\)](#) and the [Replacement of the glove box frame assembly \(Type 2\)](#).
- 5 Remove the parking aid module (360), see [parking aid module \(360\) replacement](#).
- 6 Remove one fixing screw 1 from the recirculation damper motor bracket.
- 7 Disconnect the recirculation damper motor harness connector A.
- 8 Disconnect the fixing clip of recirculation damper motor and remove the recirculation damper motor.



Installation procedure

- 1 Place the recirculation damper motor in the installation position and install the fixing card.
- 2 Install and tighten 1 fixing screw 1 on the fixing bracket of recirculation damper motor.
- 3 Connect the recirculation damper motor harness connector A.
- 4 Install the parking aid module (360).
- 5 Install the glove box frame assembly.



- 6 Install the exterior cover of the glove box.
- 7 Connect the negative battery cable.
- 8 Close the engine compartment cover.

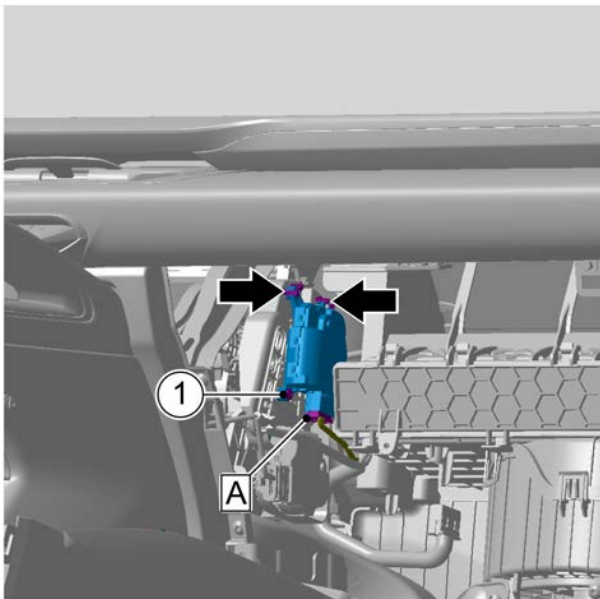
8.2.6.9 Replacement of air distribution damper motor (front)

Removal procedure

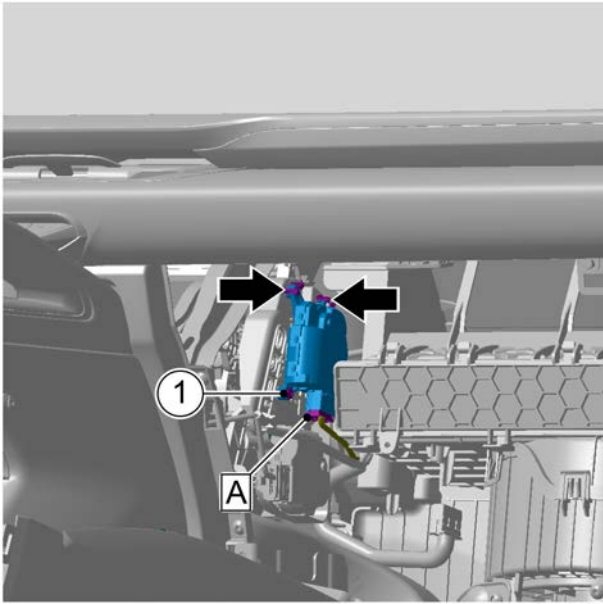
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the exterior cover of the glove box, see [Replacement of the exterior cover of the glove box](#).
- 4 To disassemble the glove box frame assembly, see the [Replacement of the glove box frame assembly \(Type 1\)](#) and the [Replacement of the glove box frame assembly \(Type 2\)](#).
- 5 Remove the fixing screw 1 on the air distribution damper motor (front) and disengage the fixing clip.
- 6 Disconnect harness connector A of air distribution damper motor (front).
- 7 Disconnect the fixing clip of the air distribution damper motor (front), and remove the air distribution damper motor (front).



Installation procedure



- 1 Place the air distribution damper motor (front) in the installation position and install the fixing card.
- 2 Connect the air distribution damper motor (front) harness connector A.
- 3 Install the air distribution damper motor (front), install and tighten the fixing screw 1 on the air distribution damper motor (front).

- 4 Install the glove box frame assembly.
- 5 Install the exterior cover of the glove box.
- 6 Connect the negative battery cable.
- 7 Close the engine compartment cover.

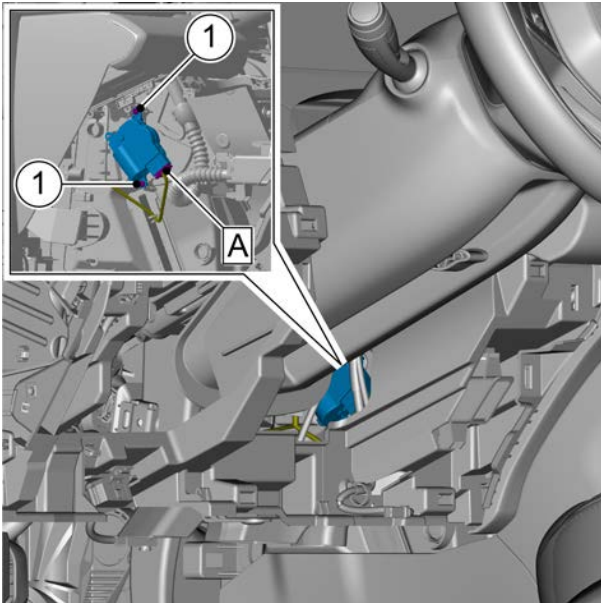
8.2.6.10 Temperature control damper motor (left) replacement

Removal procedure

Warning !

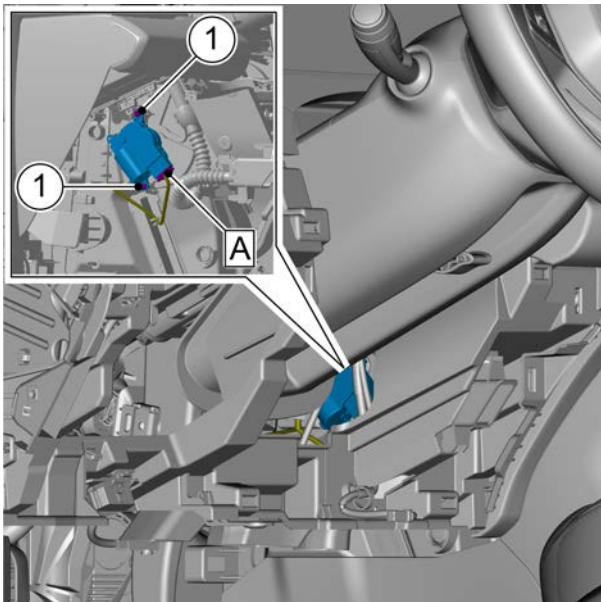
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the lower left baffle assembly, see [Replacement of the lower left baffle assembly](#).
- 4 Remove the internal temperature sensor (left air duct of front blowing foot). See [internal temperature sensor \(left air duct of front blowing foot\)](#).
- 5 Remove the left air duct of the front foot, see [the replacement of the left air duct of the front foot](#).



- 6 Remove 2 fixing screws 1 from the temperature control damper motor (left).
- 7 Disconnect the temperature control damper motor (left) harness connector A, and remove the temperature control damper motor (left).

Installation procedure



- 1 Connect the temperature control damper motor (left) harness connector A.
- 2 Install the temperature control damper motor (left), install and tighten the two fixing screws 1 of the temperature control damper motor (left).

- 3 Install the left air duct of the front foot blower
- 4 Install the internal temperature sensor (left air duct of front blowing foot).
- 5 Install the lower left foot shield assembly.
- 6 Connect the negative battery cable.
- 7 Close the engine compartment cover.

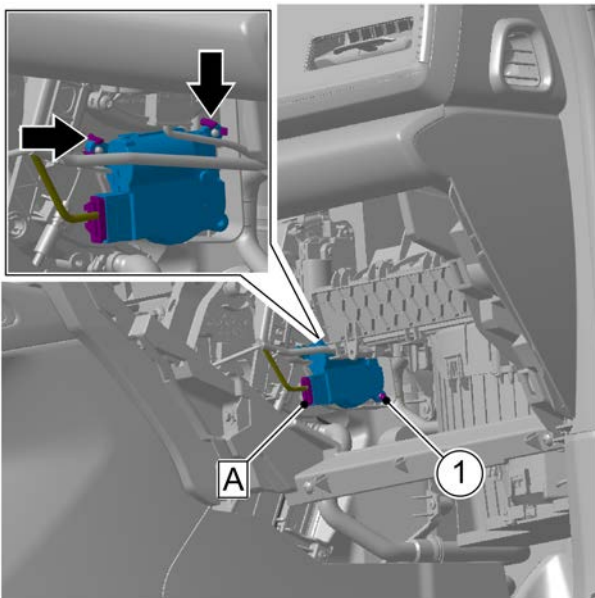
8.2.6.11 Temperature control damper motor (right) replacement

Removal procedure

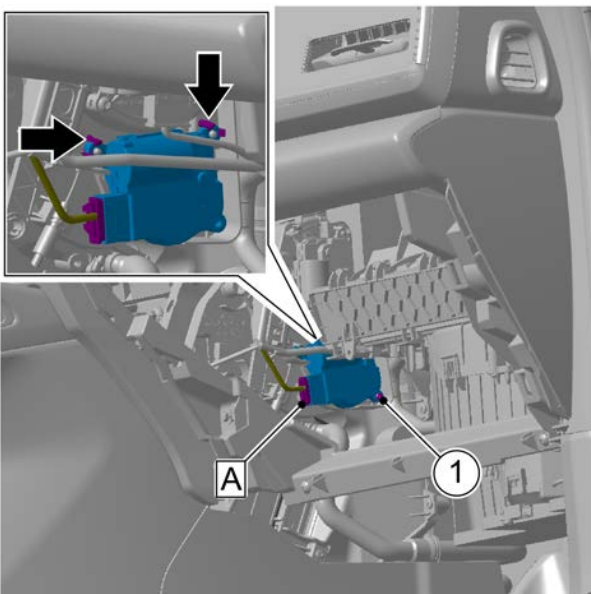
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the lower right foot assembly, see [Replacement of the lower right foot assembly](#).
- 4 Remove the right air duct of front foot blower. See [replacement of right air duct of front foot blower](#).
- 5 Remove the temperature control module, see [temperature control module replacement](#).
- 6 Remove the fixing screw 1 of the temperature control damper motor (right) and disengage the fixing card.
- 7 Disconnect the temperature control damper motor (right) harness connector A.
- 8 Disconnect the fixing card of temperature control damper motor (right) and remove the temperature control damper motor (right).

**Installation procedure**

- 1 Place the temperature control damper motor (right) in the installation position and install the fixing card.
- 2 Connect the temperature control damper motor (right) harness connector A.
- 3 Install the temperature control damper motor (right), install and tighten one fixing screw 1 of the temperature control damper motor (right).



- 4 Install the temperature control module.
- 5 Install the right air duct of the front foot blower.
- 6 Install the assembly-toe board lower RH.
- 7 Connect the negative battery cable.
- 8 Close the engine compartment cover.

8.2.6.12 Replacement of air distribution damper motor (rear)

Removal procedure

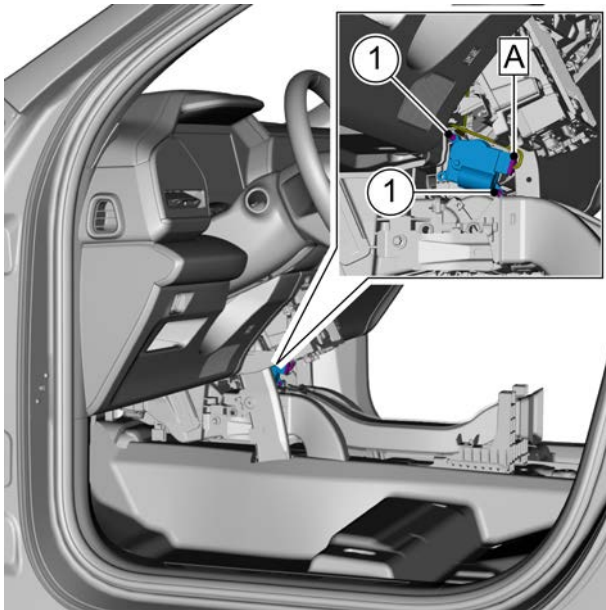
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove console moulding assembly, refer to [replacement of console moulding assembly.](#)
- 4 To disassemble the infotainment host, see the [Replacement of the infotainment host.](#)
- 5 Remove the middle and lower guard assembly of the dashboard, see the [Replacement of the lower guard assembly of the dashboard.](#)
- 6 Remove 2 fixing screws 1 from the air distribution damper motor (rear).
- 7 Disconnect the harness connector A of the air distribution damper motor (rear), and remove the air distribution damper motor (rear).



Installation procedure



- 1 Connect harness connector A of air distribution damper motor (rear).
- 2 Install the air distribution damper motor (rear), install and tighten the two fixing screws 1 of the air distribution damper motor (rear).

- 3 Install the middle lower fender apron assembly of the dashboard.
- 4 Install the infotainment control unit.
- 5 Install the console assembly.
- 6 Connect the negative battery cable.
- 7 Close the engine compartment cover.

8.2.6.13 Replacement of heater core assembly

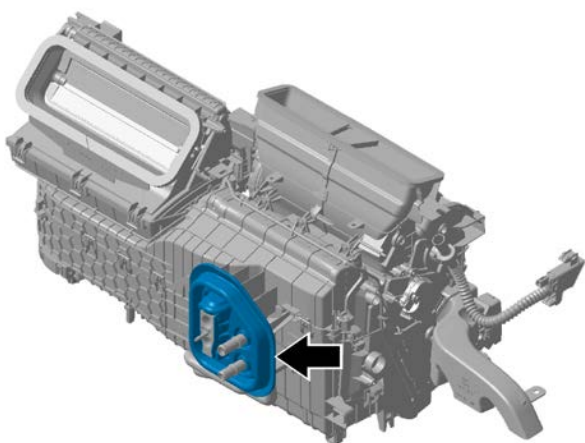
Removal procedure

Warning !

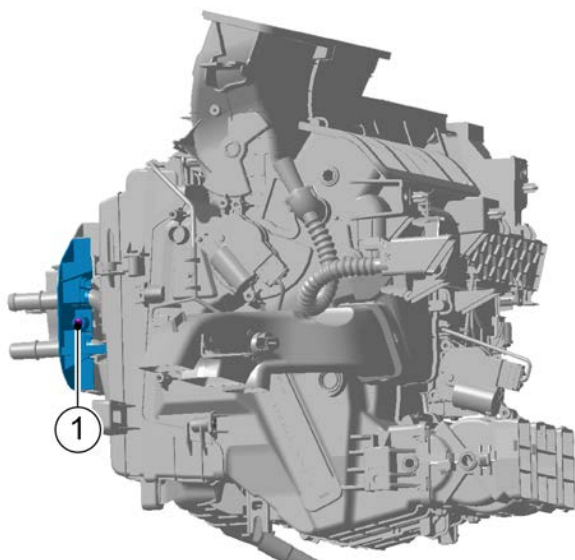
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Drain the engine coolant, refer to [Draining and filling of engine coolant](#).
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 4 Recover the refrigerant. See [A/C refrigerant recovery and filling](#).
- 5 Remove console moulding assembly, refer to [replacement of console moulding assembly](#).
- 6 Remove dashboard assembly, refer to [replacement of dashboard assembly](#).
- 7 Remove the instrument panel beam assembly. See [instrument panel beam assembly replacement](#).
- 8 Remove A/C master device assembly, refer to [Replacement of A/C assembly](#).

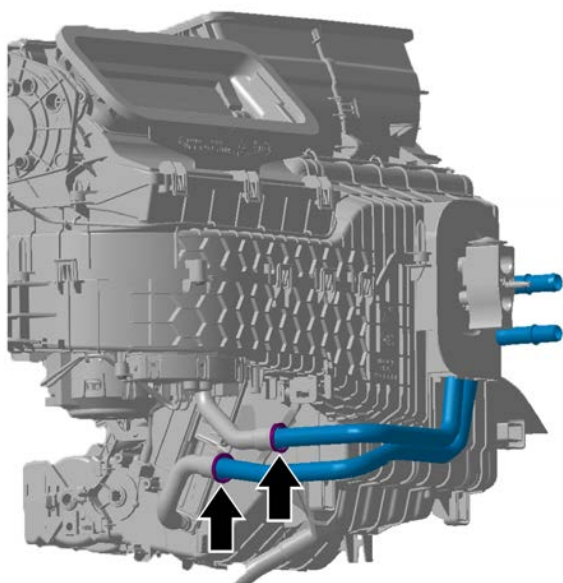
- 9 Remove the sealing sponge on the expansion valve.

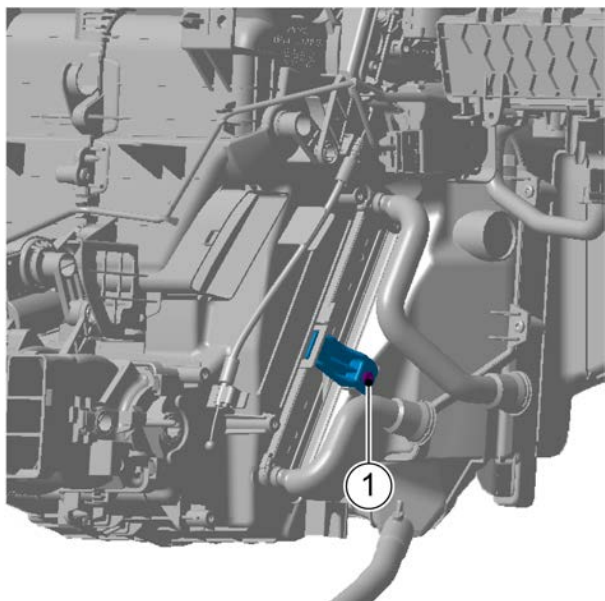


- 10 Remove the fixing screw 1 on the heating pipeline platen and remove the platen.



- 11 Remove the fastening clamp and disconnect the pipeline from the heater core assembly.

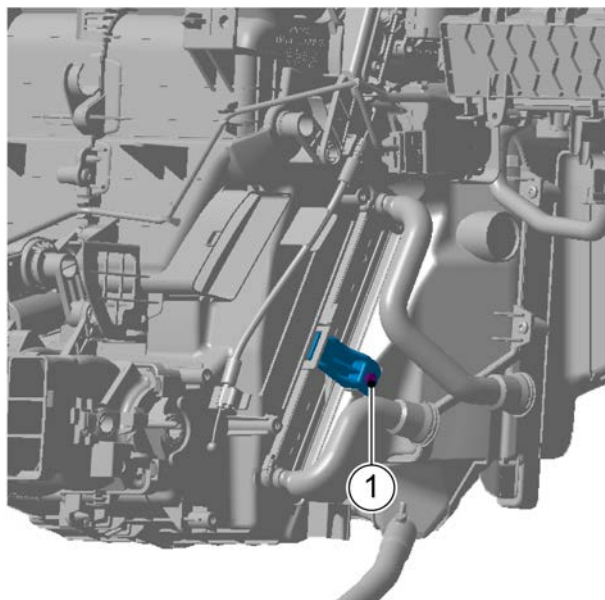


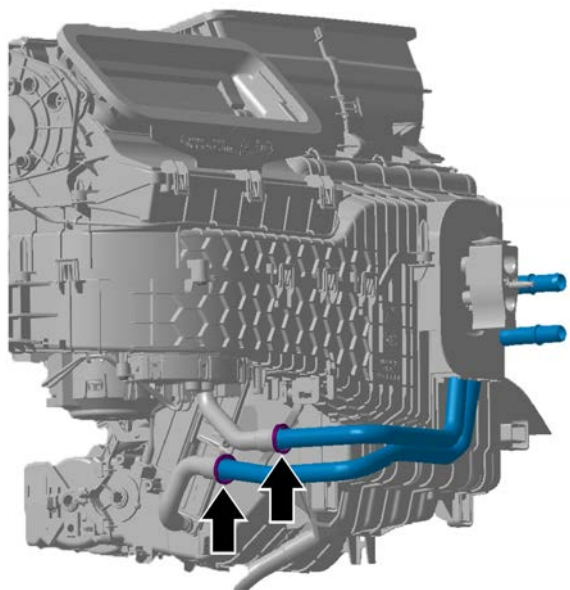


- 12 Remove the fixing screw 1 on the heater core platen and remove the platen.
- 13 Take out the heater core assembly.

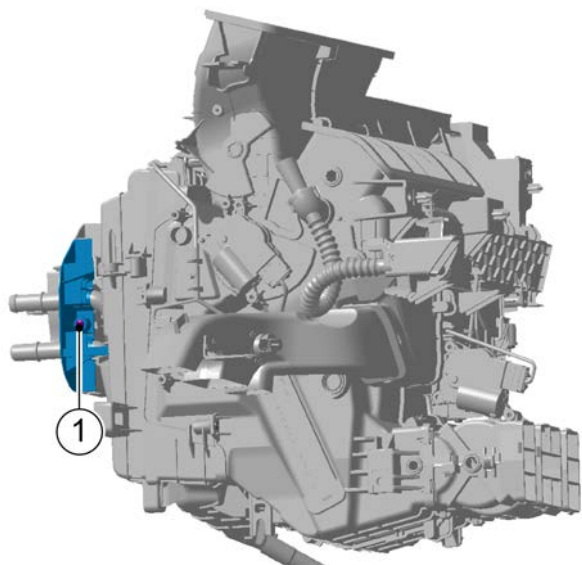
Installation procedure

- 1 Install the heater core assembly.
- 2 Install the fixing screw 1 on the heater core platen.

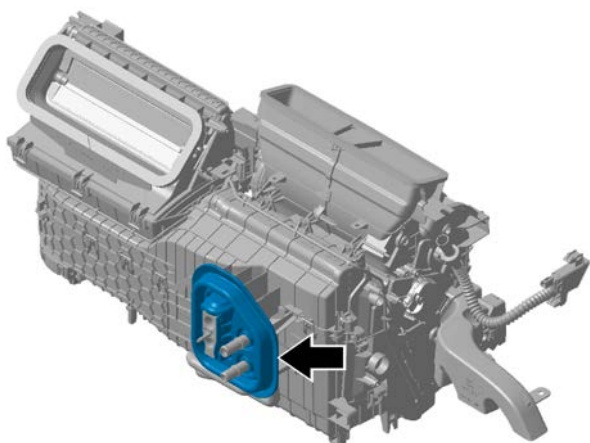




- 3 Connect the pipeline with the heating core and install the fastening clamp.



- 4 Install the fixing screw 1 on the heating pipeline platen and tighten it.



- 5 Install the expansion valve sealing sponge.

- 6 Install air-conditioning assembly.
- 7 Install the cross beam of instrument panel.
- 8 Install the console assembly.
- 9 Install the console assembly.
- 10 Execute the charging procedure A/C refrigerant.
- 11 Connect the negative battery cable.
- 12 Fill the coolant.
- 13 Close the engine compartment cover.

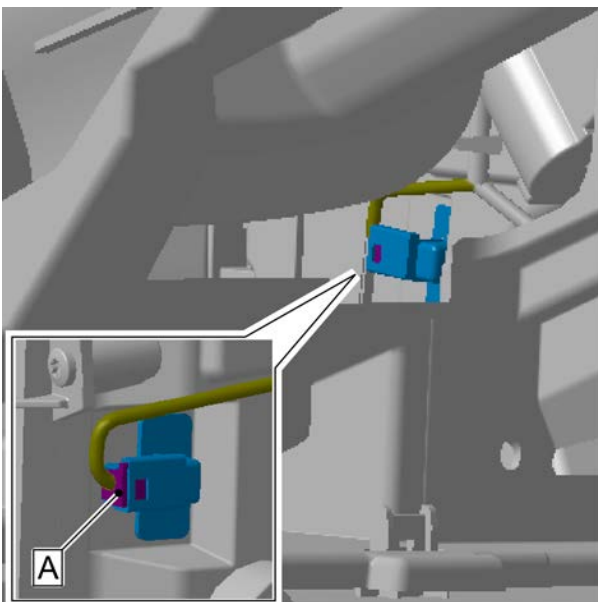
8.2.6.14 Replacement of evaporator temperature sensor

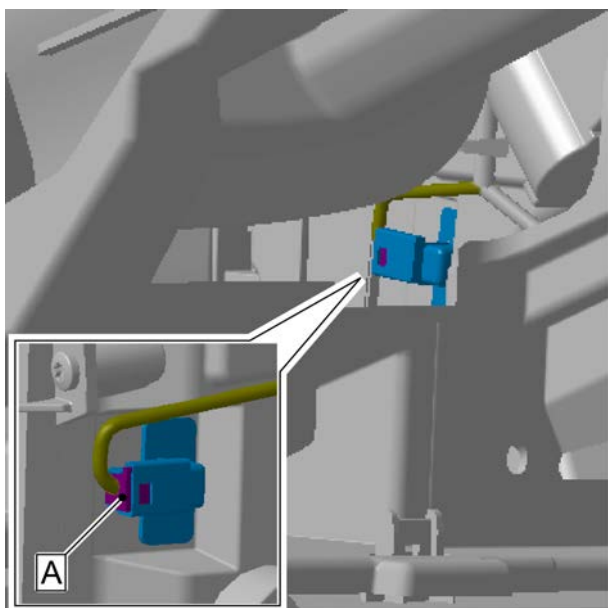
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the lower left baffle assembly, see [Replacement of the lower left baffle assembly.](#)
- 3 Remove the left air duct of the front foot, see [the replacement of the left air duct of the front foot.](#)
- 3 Remove the lower cowl of the steering column, see the [Replacement of the lower cowl of the steering column.](#)
- 4 Remove the left lower guard assembly of the dashboard, see the [Replacement of left lower guard assembly of the dashboard.](#)
- 5 Disconnect evaporation temperature sensor harness connector A.
- 6 Draw out the evaporator temperature sensor.





Installation procedure

- 1 Assemble the evaporator temperature sensor to the A/C master device assembly.
- 2 Connect evaporator temperature sensor harness connector A

- 3 Install the left lower fender apron assembly of the dashboard.
- 4 Install the lower shield of the steering column.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

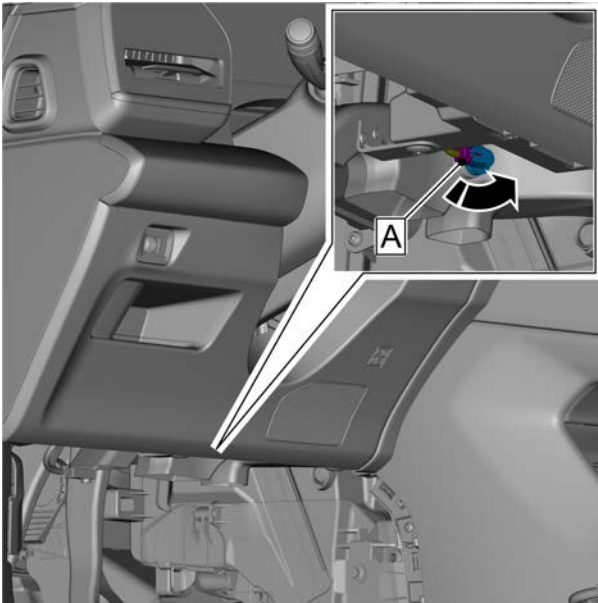
8.2.6.15 Replacement of internal temperature sensor (left air duct of front blowing foot)

Removal procedure

Warning !

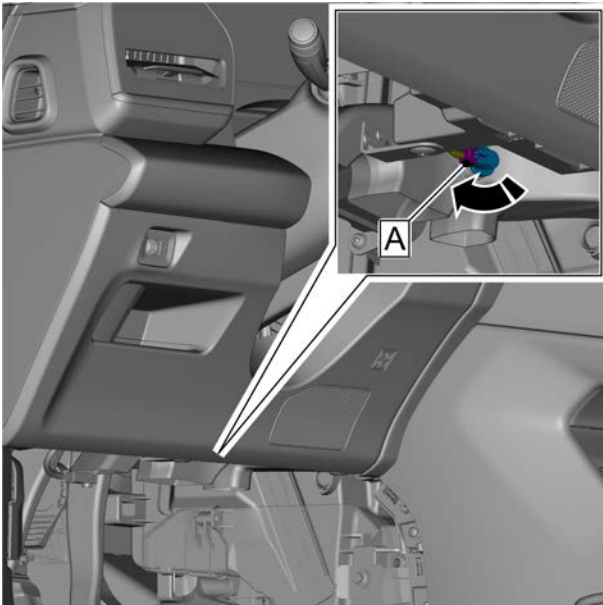
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the lower left baffle assembly, see [Replacement of the lower left baffle assembly](#).



- 4 Disconnect harness connector A of internal temperature sensor (left air duct of front blowing foot).
- 5 Rotate the sensor counterclockwise and extract the internal temperature sensor (left air duct of front blowing foot).

Installation procedure



- 1 Assemble the internal temperature sensor (left air duct of front blowing foot) on the left air duct of front blowing foot, rotate clockwise and install it in place.
- 2 Connect harness connector A of internal temperature sensor (left air duct of front blowing foot).

- 3 Install the lower left foot shield assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

8.2.6.16 Replacement of air-conditioning unit assembly

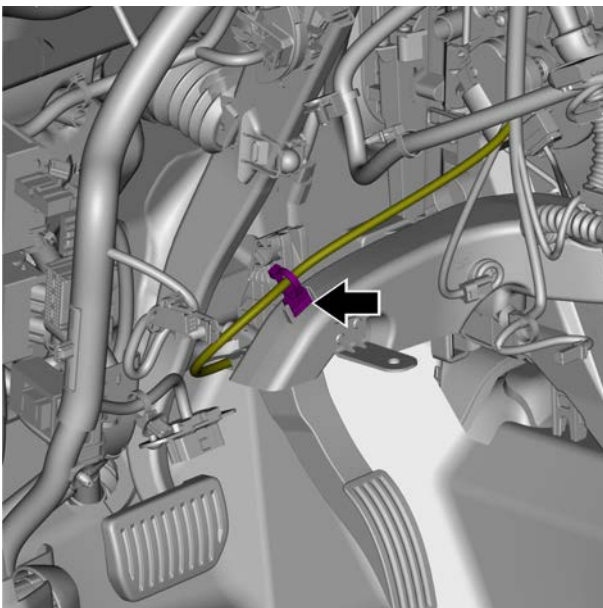
Removal procedure

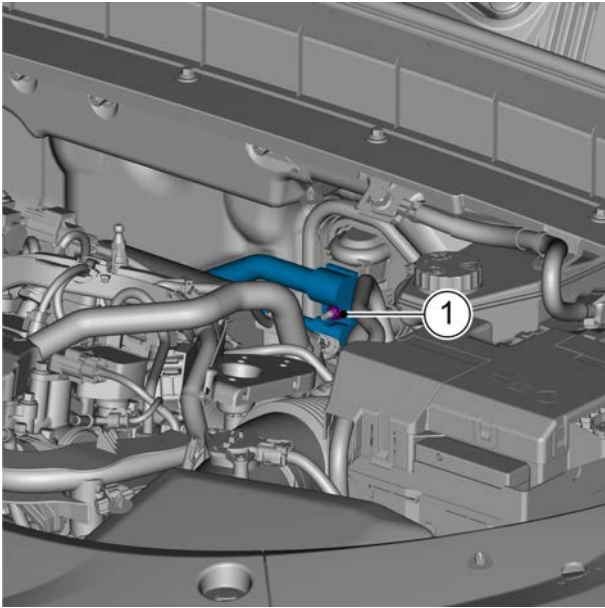
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

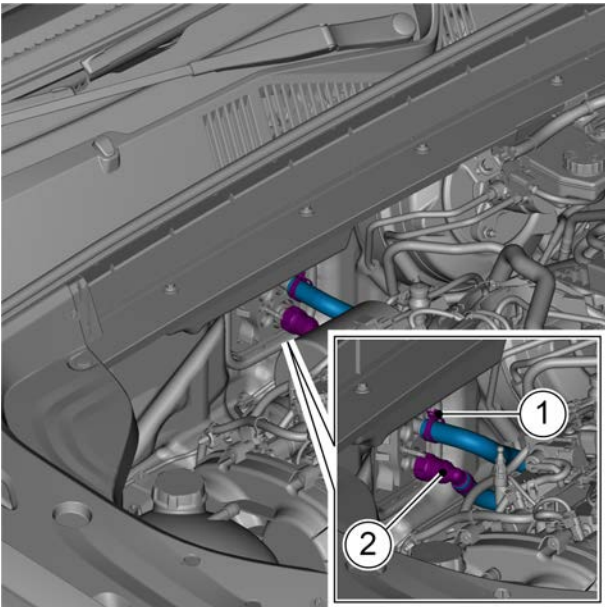
- 1 Open the engine compartment cover.

- 2 Discharge coolants, refer to [discharge and filling of engine coolant](#).
- 3 Recover the refrigerant. See [A/C refrigerant recovery and filling](#).
- 4 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 5 Remove console moulding assembly, refer to [replacement of console moulding assembly](#).
- 6 Remove dashboard assembly, refer to [replacement of dashboard assembly](#).
- 7 Remove the instrument panel beam assembly. See [instrument panel beam assembly replacement](#).
- 8 Remove the right air duct of front foot blower. See [replacement of right air duct of front foot blower](#).
- 9 Remove the front end blowing duct of the sub-dashboard, see the [Replacement of the front end blowing duct of the sub-dashboard](#).
- 10 Remove the left air duct of the rear foot. See [the replacement of the left air duct of the rear foot](#).
- 11 Remove the right air duct of the rear foot. See [the replacement of the left air duct of the rear foot](#).
- 12 Remove the internal temperature sensor (left air duct of front blowing foot). See [replacement of internal temperature sensor \(left air duct of front blowing foot\)](#).
- 13 Disconnect the harness fixing clip.

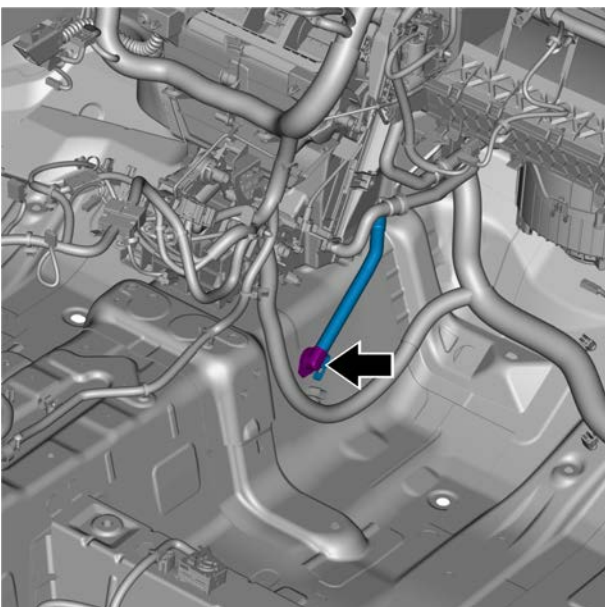




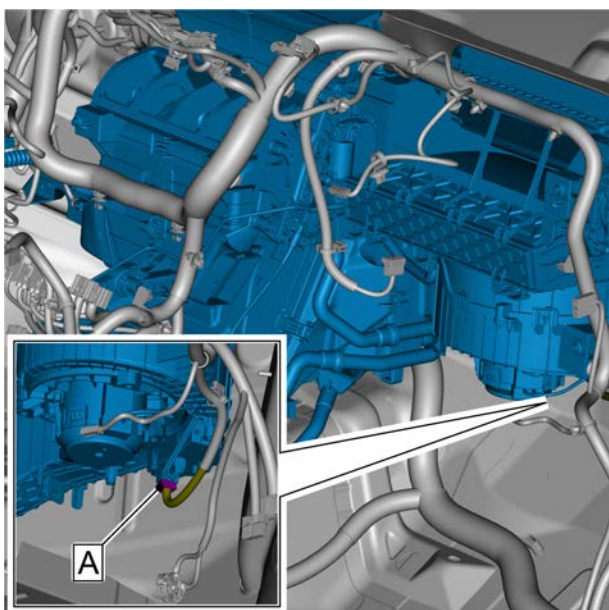
- 14 Remove the fixing nut 1 connecting the A/C refrigeration pipeline and the A/C master device assembly, and disconnect the A/C refrigeration pipeline from the A/C master device assembly.



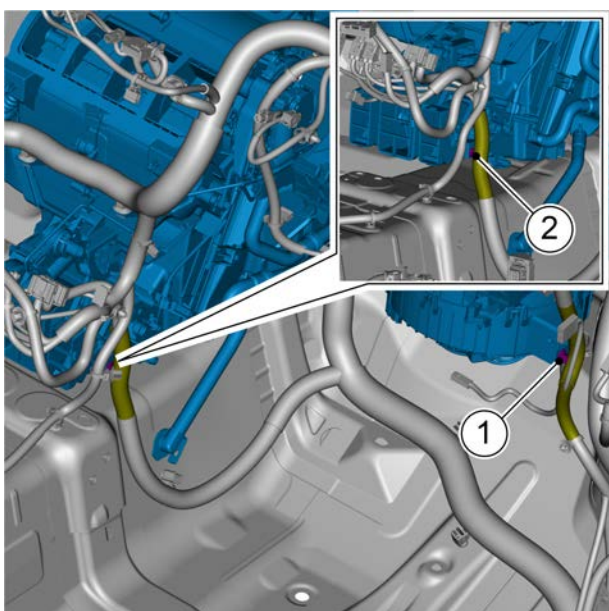
- 15 Remove the fastening hoop 1 and disconnect the connection between the air-conditioning heating pipeline outlet pipe and the air-conditioning host assembly.
- 16 Disconnect the quick connector 2 and disconnect the A/C warm air inlet pipe from the A/C master device assembly.



- 17 Disconnect the connection between the drainage pipe assembly of the A/C master device assembly and the underbody sheet metal.

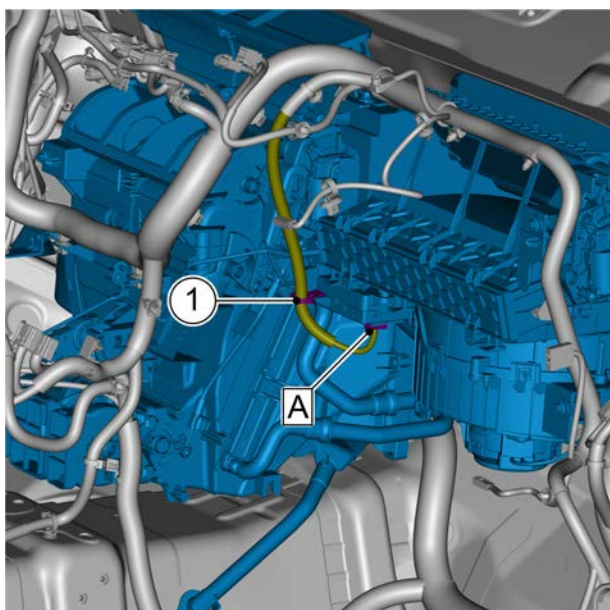


18 Disconnect harness connector A of blower motor resistance.



19 Disconnect the harness fixing clip 1.

20 Disconnect the harness fixing clip 2.

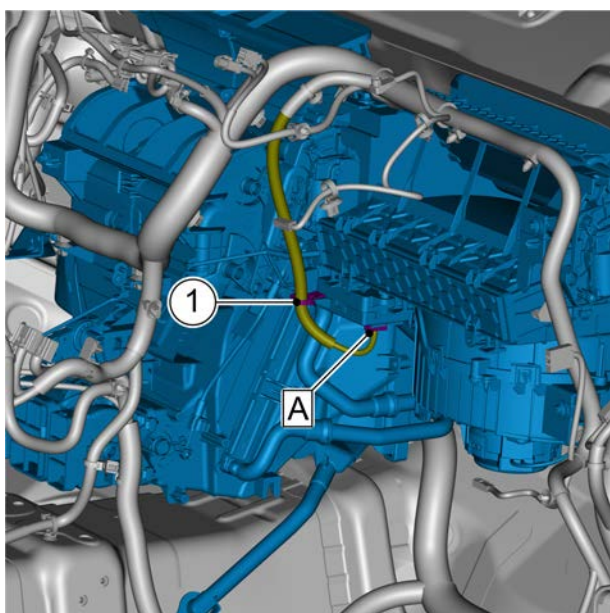


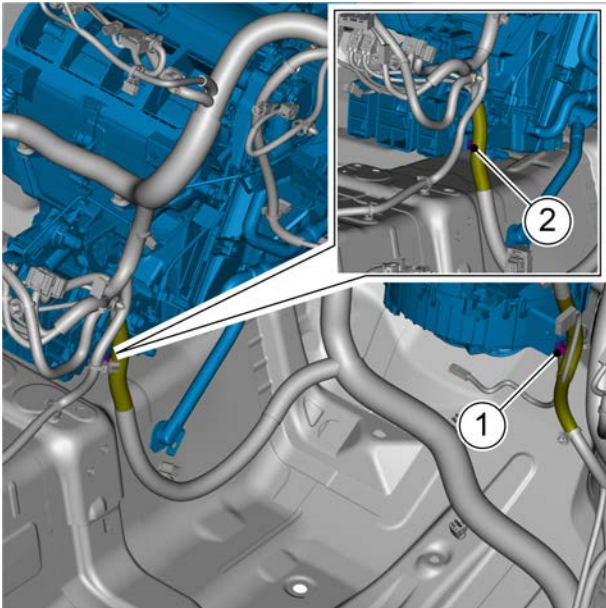
- 21 Disconnect the harness connector A of the temperature control module and the harness fixing card 1.

- 22 Take off the air-conditioning unit assembly.

Installation procedure

- 1 Install the air conditioner host assembly.
- 2 Install harness connector A of temperature control module.

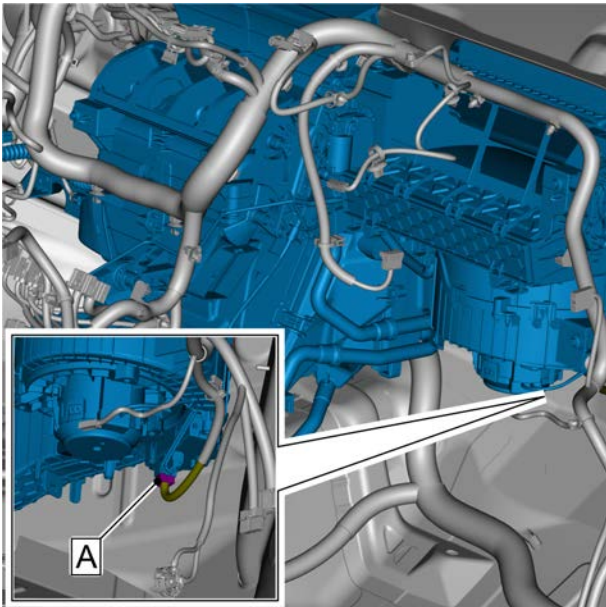


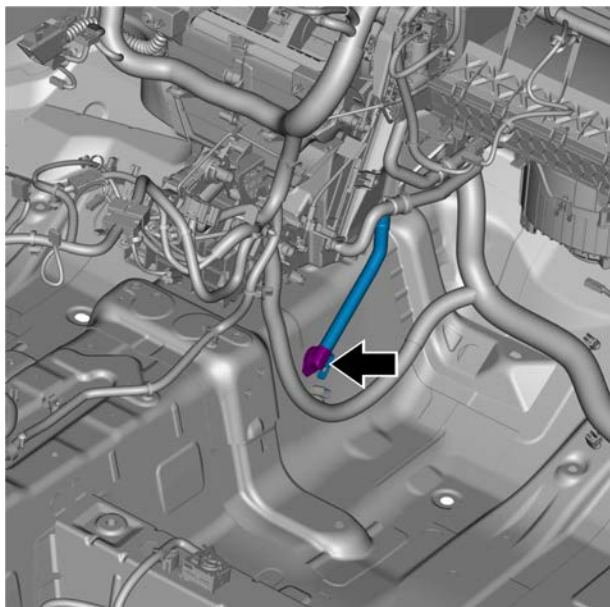


3 Install the wire harness fixing clip 1.

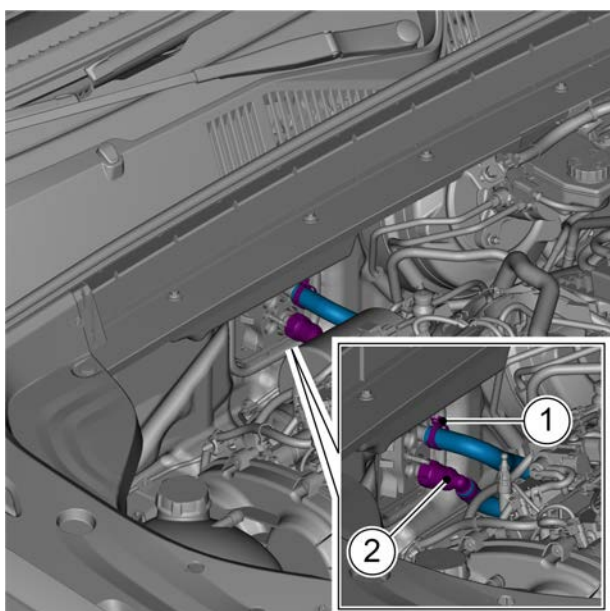
4 Install the wire harness fixing clip 2.

5 Install harness connector A of blower motor resistance.

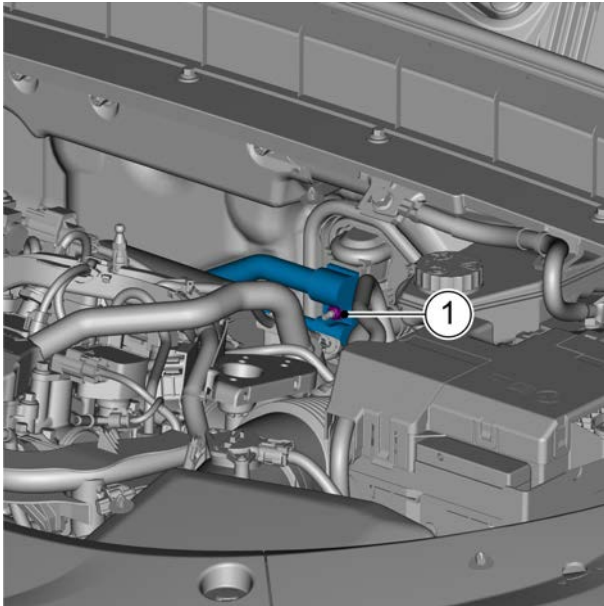




- 6 Connect the A/C master device assembly drain pipe assembly to the underbody sheet metal.



- 7 Connect the quick connector 2 of the A/C warm air inlet pipe assembly with the A/C master device assembly.
- 8 Connect the A/C warm vent pipe assembly with the A/C master device assembly and tighten the hoop 1.



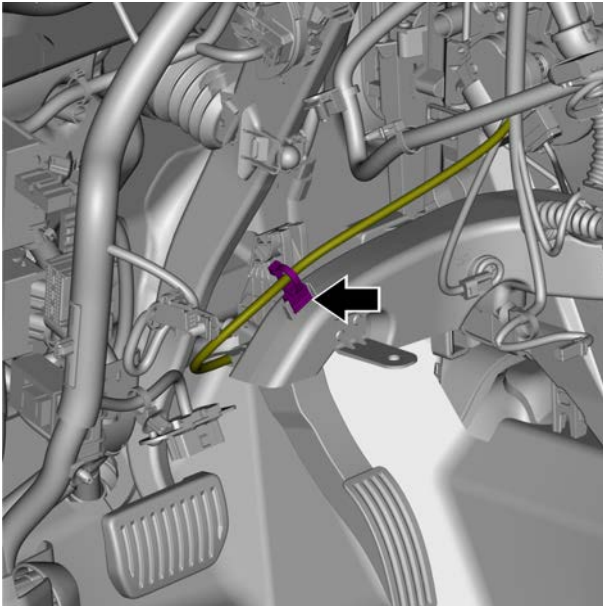
- 9 Connect the air-conditioning refrigeration pipeline with the air-conditioning host assembly, install and tighten the fixing nuts between the air-conditioning refrigeration pipeline and the air-conditioning host assembly.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

Caution

Pay attention to the following items when adding lubrication oil to the A/C system:

- The refrigeration oil must be brand new, and no waste lubrication oil containing moisture/dust/metal scraps shall be used.
- Excessive lubrication oil is not allowed to be added to the system, otherwise it will affect the cooling capacity of the cooling system.
- When the system is replaced, the refrigerant should be discharged slowly so that the lubrication oil does not spurt out with the refrigerant.
- The new system does not need to be filled with lubrication oil to replace the new compressor. It has been filled by the compressor manufacturer, but 20ml lubrication oil needs to be removed from the compressor. If all A/C pipelines are replaced, add 15ml lubrication oil of the same model appropriately.
- The quality of lubrication oil in the pipeline should be checked before filling. If serious blackening or carbon particle precipitation is found, the whole air conditioning system should be thoroughly cleaned and blown, fluid reservoir dryer should be replaced, and all lubrication oil should be replaced; it is prohibited to use water, corrosive solvent or flammable and explosive solvent to clean the A/C system. Heptane and other cleaners are recommended to thoroughly clean and dry the A/C system.

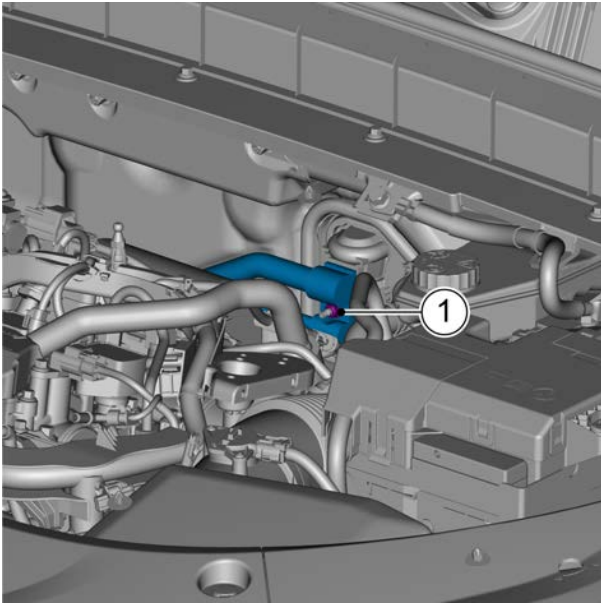


10 Install the harness fixing clip.

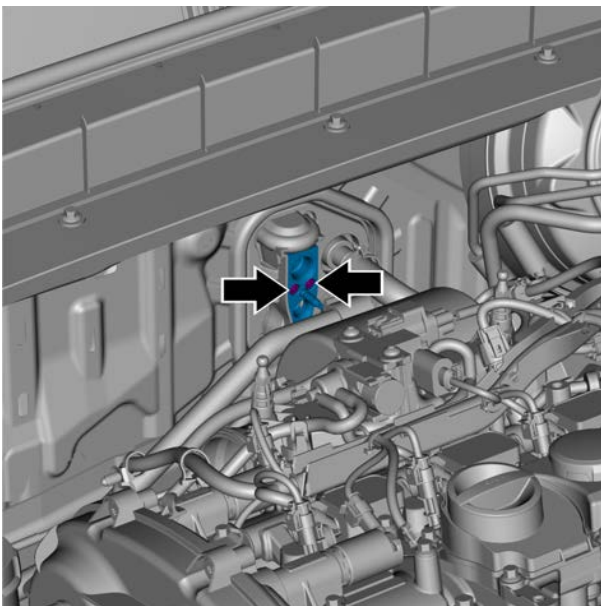
- 11 Install the internal temperature sensor (left air duct of front blowing foot).
- 12 Install the right air duct of the front foot blower.
- 13 Install the front section of the console air channel.
- 14 Install the left air duct of the rear foot blower.
- 15 Install the right air duct of the rear foot blower.
- 16 Install the cross beam of instrument panel.
- 17 Install the console assembly.
- 18 Install the console assembly.
- 19 Connect the negative battery cable.
- 20 Add refrigerant.
- 21 Fill the coolant.
- 22 Close the engine compartment cover.

8.2.6.17 Replacement of expansion valve

Removal procedure



- 1 Operate the recovery procedure of A/C refrigerant, see [A/C refrigerant recovery and filling](#).
- 2 Remove the fixing nuts between the A/C high/low pressure pipe assembly and the expansion valve.

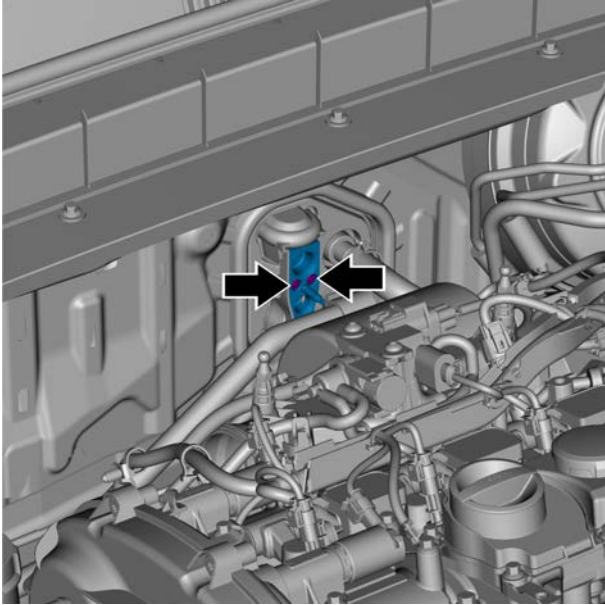


- 3 Remove the 2 hexagon socket bolts connecting the expansion valve and the A/C master device assembly, and remove the expansion valve.

Installation procedure

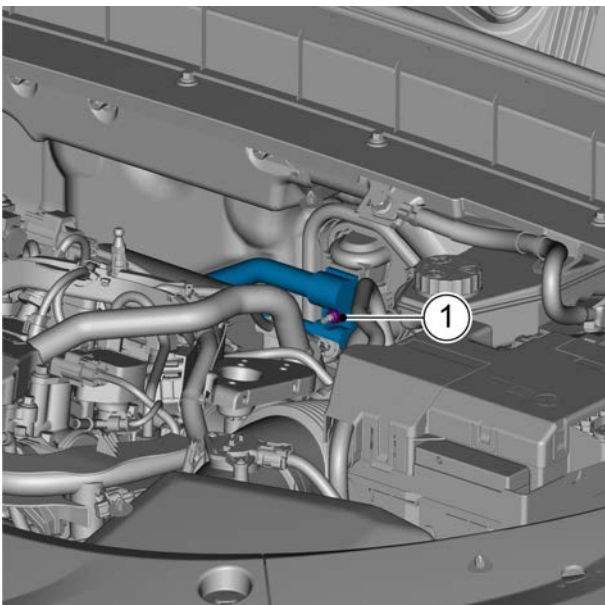
Caution

All O-rings involved in the installation process must be replaced with new ones. When installing the air-conditioning pipe, insert the pipe joint completely before tightening the nut to prevent damage to the O-ring and pipe joint.



- 1 Install the expansion valve, install and tighten the 2 hexagon socket bolts connecting the expansion valve and the A/C master device assembly.

Torque: 4.5 N·m (metric system) 3.3 lb-ft (Imperial system)



- 2 Connect the A/C refrigeration pipeline with the A/C master device assembly, install and tighten the nuts.

Torque: 10 N·m (metric system) 7.4 lb-ft (Imperial system)

- 3 Execute the charging procedure A/C refrigerant.

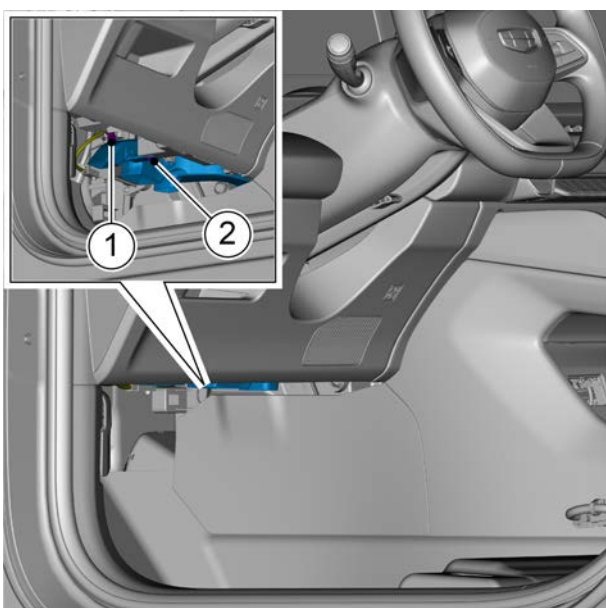
8.2.6.18 Replacement of left air duct of front foot blower

Removal procedure

Warning !

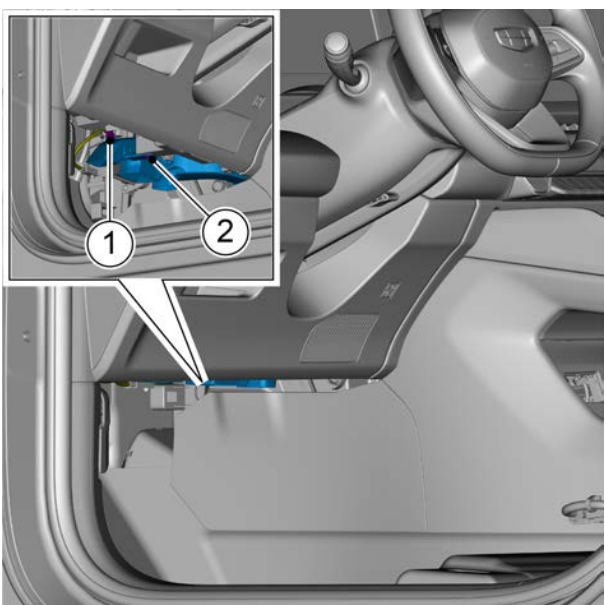
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the lower left baffle assembly, see [Replacement of the lower left baffle assembly](#).
- 4 Remove the internal temperature sensor (left air duct of front blowing foot). See [internal temperature sensor \(left air duct of front blowing foot\)](#).
- 5 Remove the fixing clip 2 of the left air duct of the front foot blower.
- 6 Disconnect the harness fixing clip 1 and remove the front foot blowing air duct.

**Installation procedure**

- 1 Install the harness fixing clip 1 and the front foot blowing air duct.
- 2 Install the fixing clip 2 of the left air duct of the front foot blower.

Torque: 1.5 N. m (metric system) 1.1 lb-ft (Imperial system)



- 3 Install the internal temperature sensor (left air duct of front blowing foot).
- 4 Install the lower left foot shield assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

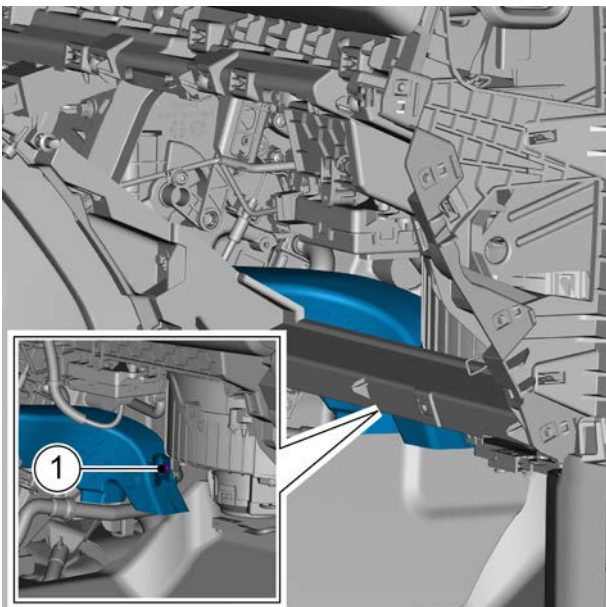
8.2.6.19 Replacement of right air duct of front foot blower

Removal procedure

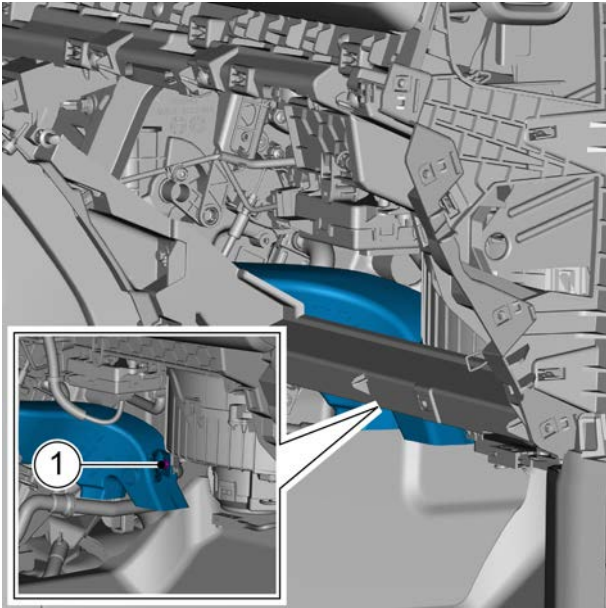
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the lower right foot assembly, see [Replacement of the lower right foot assembly](#).
- 4 Remove the exterior cover of the glove box, see [Replacement of the exterior cover of the glove box](#).
- 5 To disassemble the glove box frame assembly, see the [Replacement of the glove box frame assembly \(Type 1\)](#) and the [Replacement of the glove box frame assembly \(Type 2\)](#).
- 6 Remove 1 fixing screw from the right foot blowing air duct assembly.
- 7 Remove the right foot blowing air duct assembly.



Installation procedure



- 1 Install the right foot blowing air duct assembly.
- 2 Install one fixing screw on the right foot blowing air duct assembly.

Torque: 1.5 N. m (metric system) 1.1 lb-ft (Imperial system)

- 3 Install the assembly-toe board lower RH.
- 4 Install the glove box frame assembly.
- 5 Install the exterior cover of the glove box.
- 6 Connect the negative battery cable.
- 7 Close the engine compartment cover.

8.2.6.20 Replacement of left air duct of rear foot blower

Removal procedure

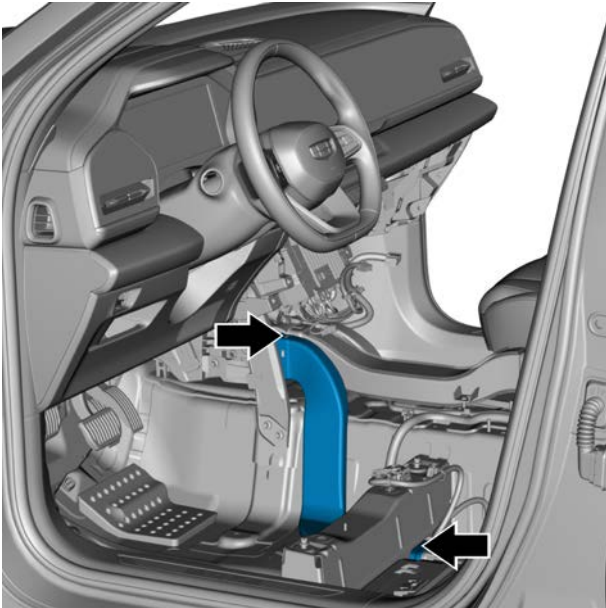
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

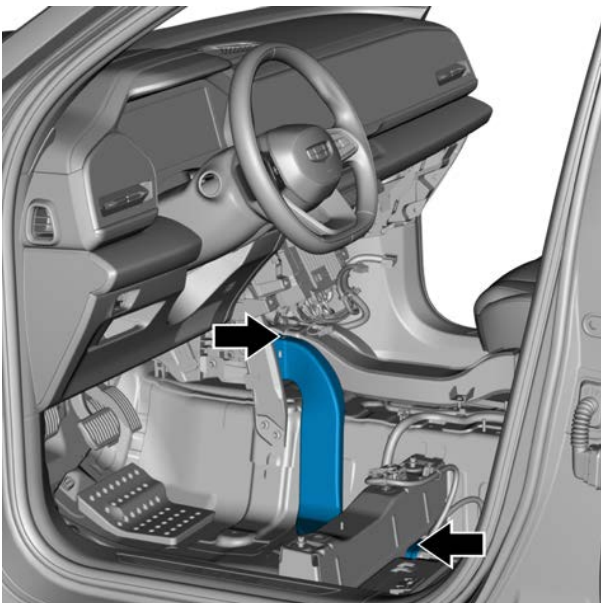
Caution

The removal and assembly methods of the left air duct and the right air duct of the rear foot are similar.

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the driver seat assembly, see [Replacement of the driver seat assembly.](#)
- 4 Remove console moulding assembly, refer to [replacement of console moulding assembly.](#)



- 5 Remove the left vent of the rear foot. See [the replacement of the left vent of the rear foot](#).
- 6 Support the carpet on the driver's side and remove the left air duct of the rear foot.



Installation procedure

- 1 Install the rear foot blowing left air duct and reset the carpet on the driver's side.

- 2 Install the left vent of the rear foot blower.
- 3 Install the console assembly.
- 4 Install the driver seat assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

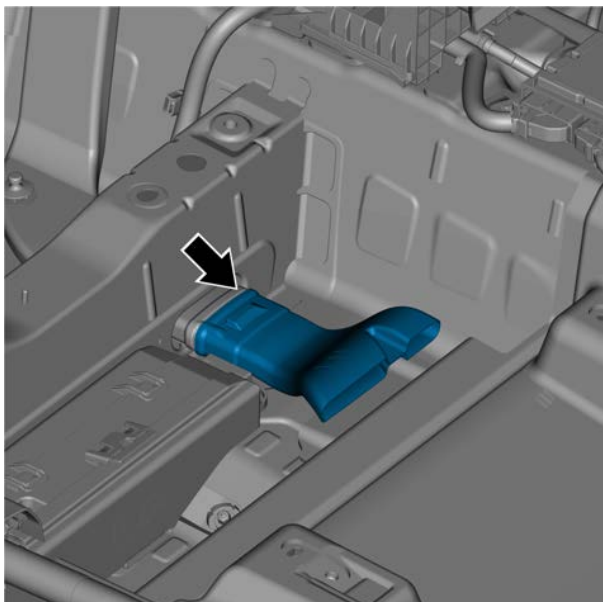
8.2.6.21 Replacement of left vent of rear foot blower

Removal procedure

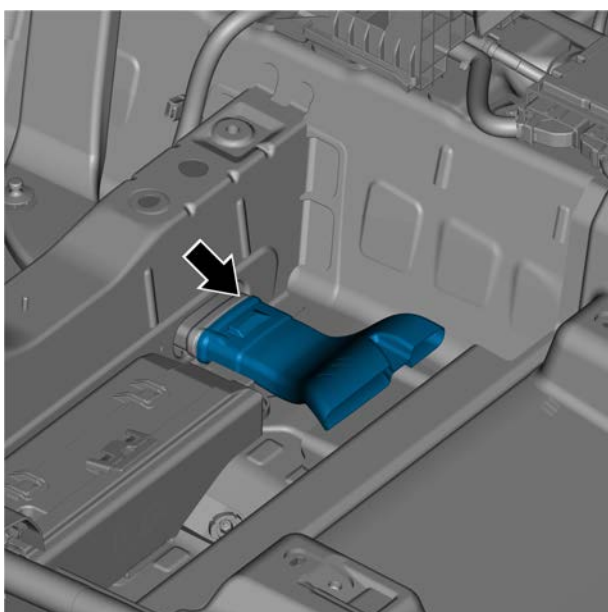
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the driver seat assembly, see [Replacement of the driver seat assembly](#).
- 4 Support the carpet on the driver's side and remove the left vent of the rear foot.

**Installation procedure**

- 1 Install the left vent of the rear foot blower and reset the carpet on the driver's side.



- 2 Install the driver seat assembly.
- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

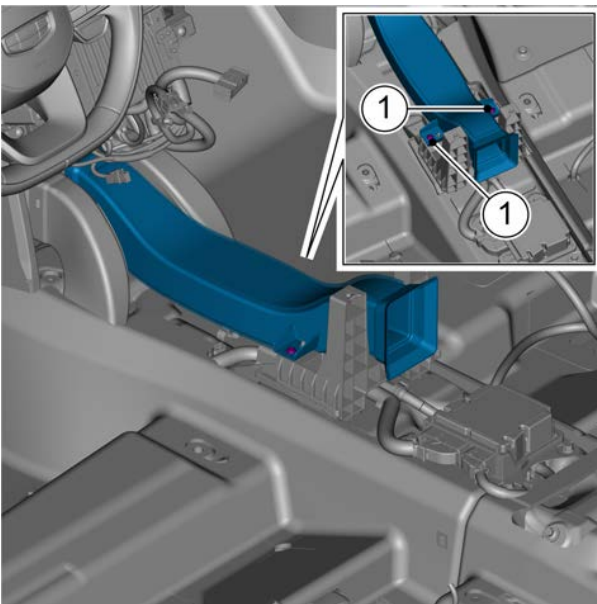
8.2.6.22 Replacement of front section of face-blowing air duct of the auxiliary instrument panel

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

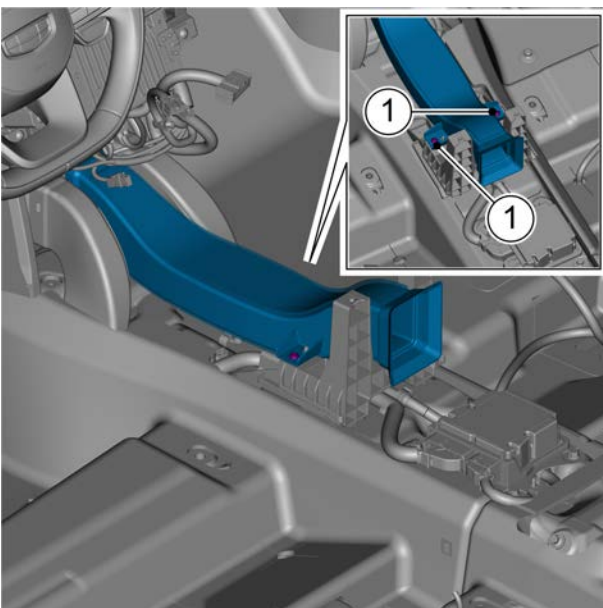
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove console moulding assembly, refer to [replacement of console moulding assembly](#).
- 4 Remove 2 screws 1 from the front section of the center console face blowing air duct.
- 5 Remove the front section of face-blowing air duct of the auxiliary instrument panel



Installation procedure

- 1 Install the front section of the console air channel.
- 2 Install 2 screws 1 on the front section of the center console face blowing air duct.

Torque: 1.5 N. m (metric system) 1.1 lb-ft (Imperial system)

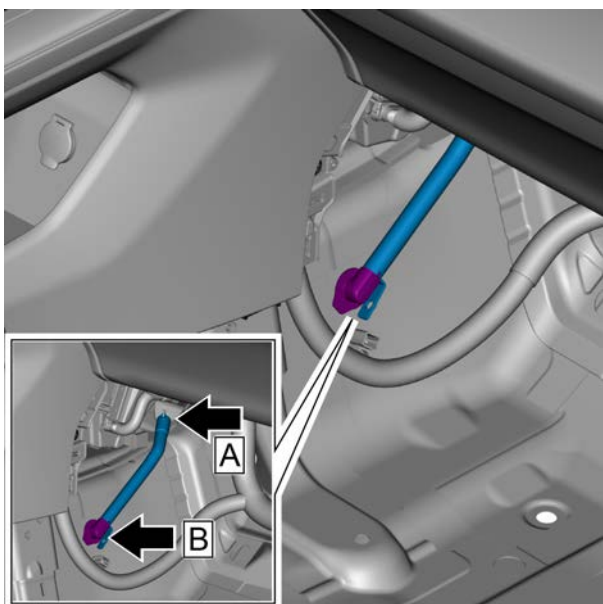


- 3 Install the console assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

8.2.6.23 Replacement of drain pipe assembly

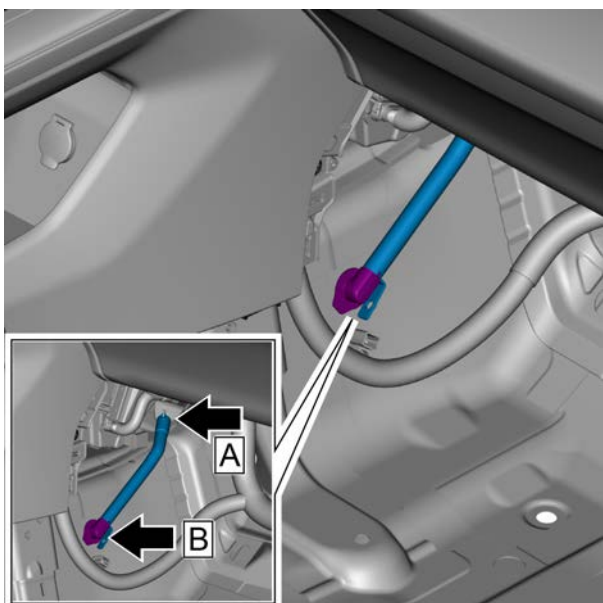
Removal procedure

- 1 Remove the front passenger side extended trim plate assembly, see the [Replacement of the driver side extended trim plate assembly](#).
- 2 Support the occupant side carpet.
- 3 Disconnect the drain pipe a from the air conditioner host.
- 4 Remove the fixing B of the outlet of the drainage pipe and take down the drainage pipe.



Installation procedure

- 1 Install the drain outlet fixing B.
- 2 Connect the drain pipe a with the air conditioner host.

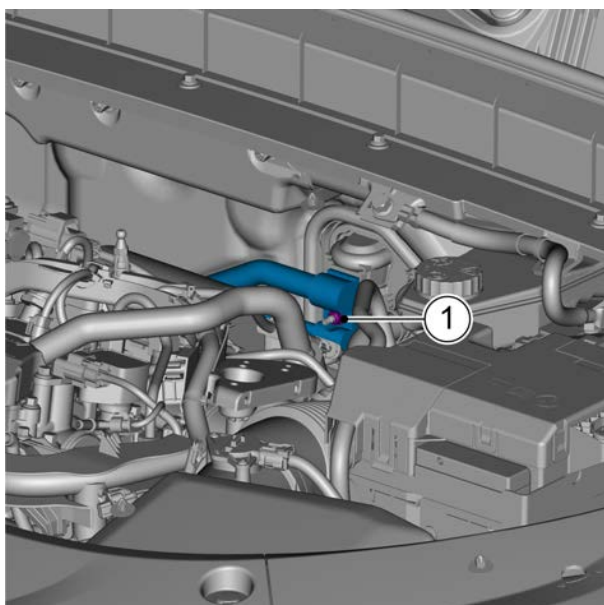


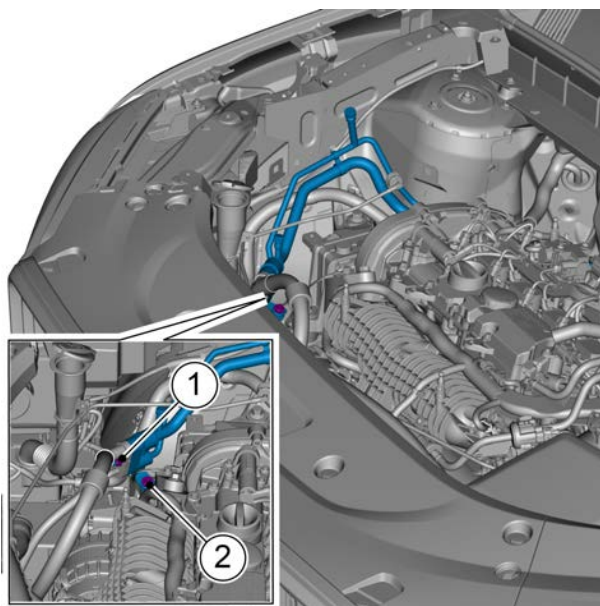
- 3 Reset the occupant side carpet.
- 4 Install the front passenger side extended trim plate assembly.

8.2.6.24 Replacement of A/C high/low pressure pipe assembly

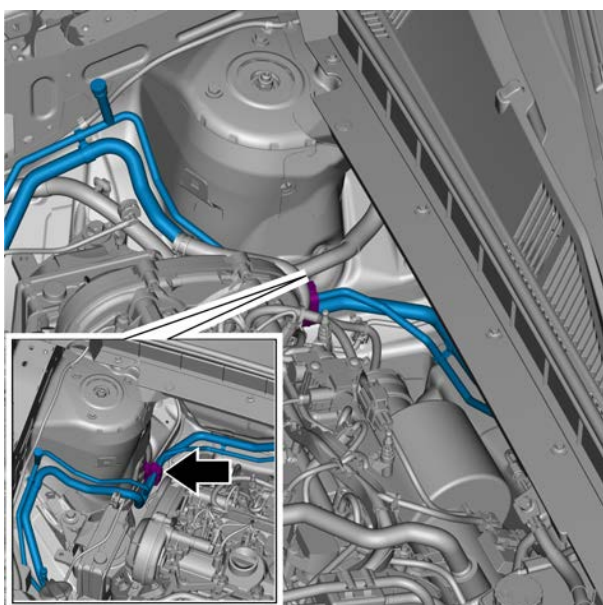
Removal procedure

- 1 Remove engine trim cover, refer to replacement of engine trim cover assembly.
- 2 Remove the right engine compartment trim panel, see [replacement of left engine compartment trim panel](#).
- 3 Recover the refrigerant. See [A/C refrigerant recovery and filling](#).
- 4 Remove the expansion tank, see [replacement of expansion tank](#).
- 5 Remove the fixing nut 1 connecting the A/C high/low pressure pipe assembly and the A/C master device assembly.



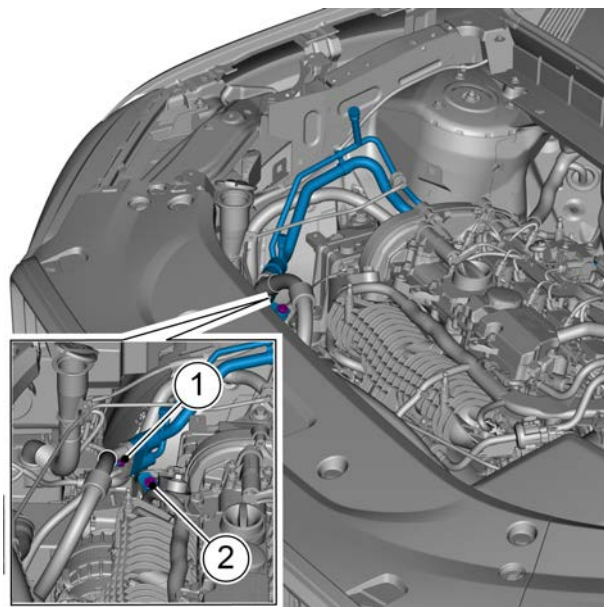
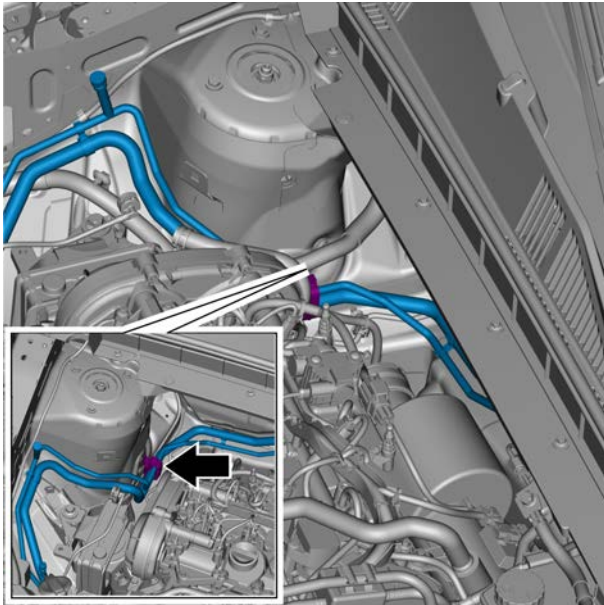


- 6 Remove the fixing nut 1 connecting the A/C high/low pressure pipe assembly and the A/C low-pressure pipe assembly.
- 7 Remove the bolts 2 connecting the front bracket of the A/C high/low pressure pipe assembly and the vehicle body.



- 8 Remove the fixing clip of the A/C high/low pressure pipe assembly and remove the A/C high/low pressure pipe assembly.

Installation procedure



Caution

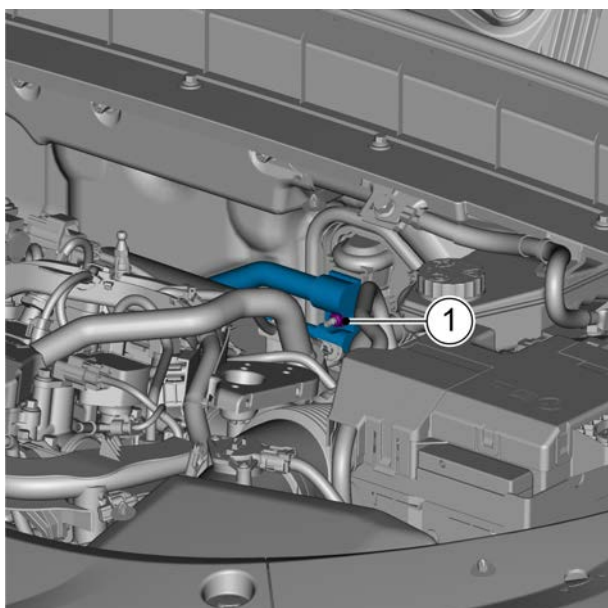
All O-rings involved in the installation process must be replaced with new ones. When installing the air-conditioning pipe, insert the pipe joint completely before tightening the nut to prevent damage to the O-ring and pipe joint.

- 1 Install the low & high pressure pipe assembly of air conditioner.
- 2 Install the fixing clip of the A/C high/low pressure pipe assembly.
- 3 Tighten the bolts 2 connecting the front bracket of the A/C high/low pressure pipe assembly and the vehicle body.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 4 Connect the A/C high/low pressure pipe assembly with the A/C low-pressure pipe, and tighten the nut 1.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

Caution

When replacing pipes in the air conditioning system:

- If all air-conditioning pipe are replaced, 15ml compressor lubrication oil needs to be added.
- If only any air-conditioning pipeline is replaced, there is no need to add additional compressor lubrication oil.



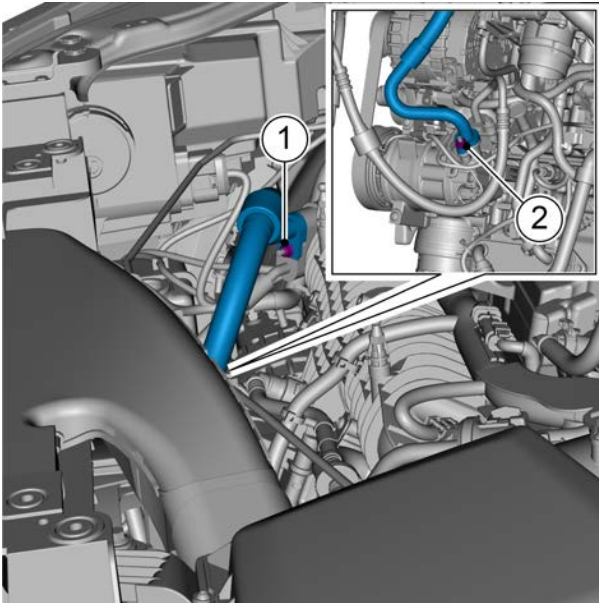
- 5 Connect the A/C high/low pressure pipe assembly with the A/C master device assembly, and tighten the nut 1.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 6 Install the expansion tank.
- 7 Execute the charging procedure of A/C refrigerant.
- 8 Install the right engine compartment trim panel.
- 9 Install the engine trim cover

8.2.6.25 Replacement of A/C low-pressure pipe assembly

Removal procedure

- 1 Open the engine compartment cover.
- 2 Remove the engine fender, see [Engine fender replacement](#).
- 3 Recover the refrigerant. See [A/C refrigerant recovery and filling](#).
- 4 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).



- 5 Remove the fixing nut 1 connecting the A/C low-pressure pipe assembly and the high/low pressure pipe.
- 6 Remove the fixing nut 2 connecting the A/C low-pressure pipe assembly and the A/C compressor, and remove the A/C low-pressure pipe assembly.

Installation procedure

Caution

All O-rings involved in the installation process must be replaced with new ones. When installing the air-conditioning pipe, insert the pipe joint completely before tightening the nut to prevent damage to the O-ring and pipe joint.

- 1 Connect the A/C high-pressure pipe assembly with the A/C low-pressure pipe, and tighten the fixing nut 1.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

Caution

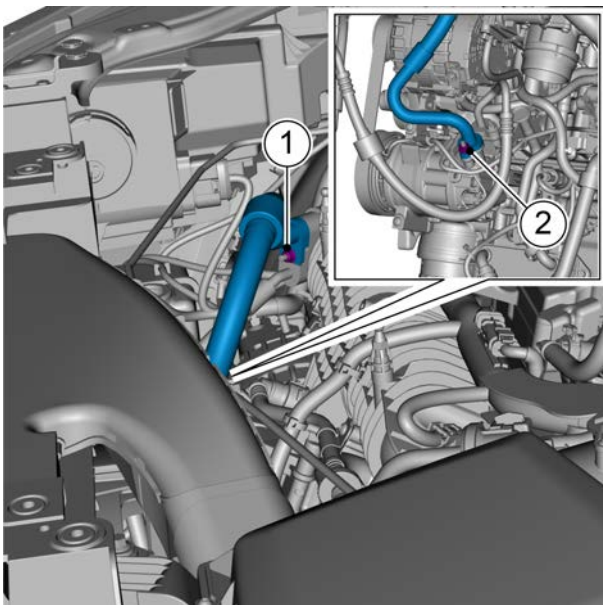
When replacing pipes in the air conditioning system:

- If all air-conditioning pipe are replaced, 15ml compressor lubrication oil needs to be added.
- If only any air-conditioning pipeline is replaced, there is no need to add additional compressor lubrication oil.

- 2 Connect the A/C low-pressure pipe assembly with the A/C master device assembly, and tighten the fixing nut 2.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

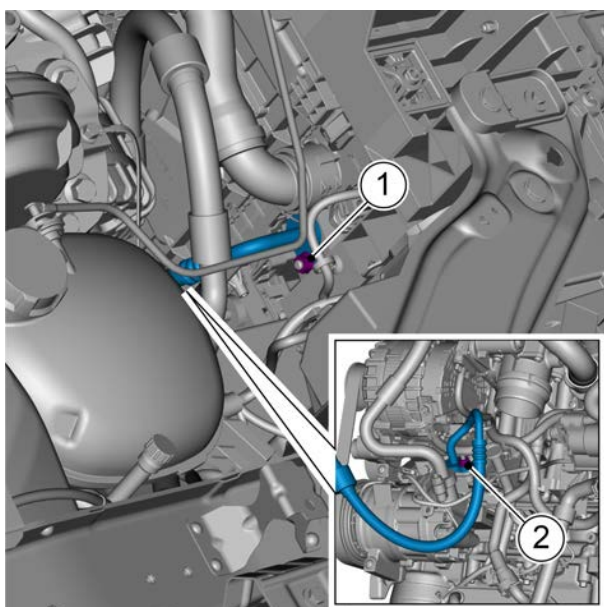
- 3 Execute the charging procedure of A/C refrigerant.
- 4 Install the front engine bay trim plate.
- 5 Install the engine fender.



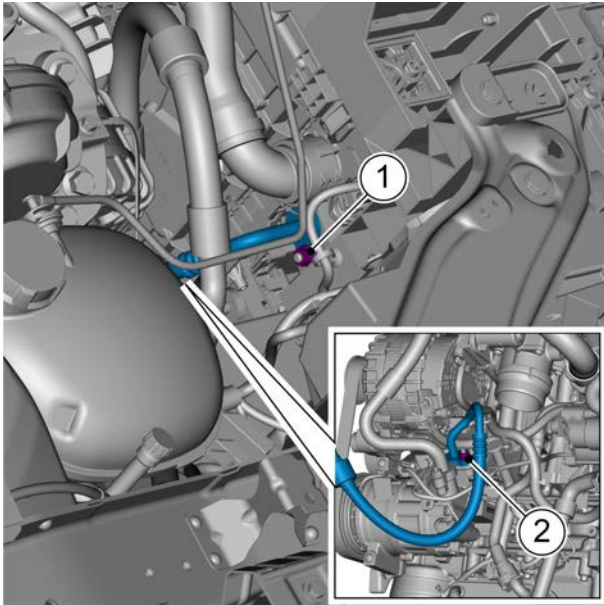
8.2.6.26 Replacement of A/C High-pressure pipe assembly

Removal procedure

- 1 Open the engine compartment cover.
- 2 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 3 Remove the engine fender, see [Engine fender replacement](#).
- 4 Recover the refrigerant. See [A/C refrigerant recovery and filling](#).
- 5 Remove the fixing nut 1 connecting the A/C high pressure pipe assembly and the condenser.
- 6 Remove the fixing nut 2 connecting the A/C high-pressure pipe assembly and the A/C compressor, and remove the A/C high-pressure pipe assembly.



Installation procedure



Caution

All O-rings involved in the installation process must be replaced with new ones. When installing the air-conditioning pipe, insert the pipe joint completely before tightening the nut to prevent damage to the O-ring and pipe joint.

- 1 Connect the A/C high-pressure pipe assembly with the A/C compressor, and tighten the fixing nut 2.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

Caution

When replacing pipes in the air conditioning system:

- If all air-conditioning pipe are replaced, 15ml compressor lubrication oil needs to be added.
- If only any air-conditioning pipeline is replaced, there is no need to add additional compressor lubrication oil.

- 2 Connect the A/C high-pressure pipe assembly with the condenser, and tighten the fixing nut 1.

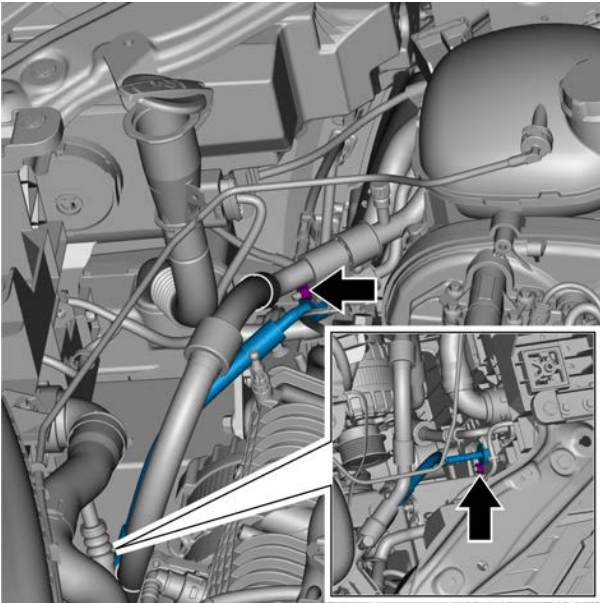
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

- 3 Execute the charging procedure of A/C refrigerant.
- 4 Install the front engine bay trim plate.
- 5 Install the engine fender.
- 6 Close the engine compartment cover.

8.2.6.27 Replacement of the condenser outlet pipe

Removal procedure

- 1 Open the engine compartment cover.
- 2 Remove the engine fender, see [Engine fender replacement](#).
- 3 Recover the refrigerant. See [A/C refrigerant recovery and filling](#).
- 4 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).



- 5 Remove the fixing nut connecting the condenser outlet pipe assembly and the condenser.
- 6 Remove the fixing nut connecting the condenser outlet pipe assembly and the air conditioner high/low pressure pipe assembly, and remove the condenser outlet pipe assembly.

Installation procedure

Caution

All O-rings involved in the installation process must be replaced with new ones. When installing the air-conditioning pipe, insert the pipe joint completely before tightening the nut to prevent damage to the O-ring and pipe joint.

- 1 Connect the condenser outlet pipe assembly with the air conditioner high/low pressure pipe assembly, and tighten the fixing nuts.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

Caution

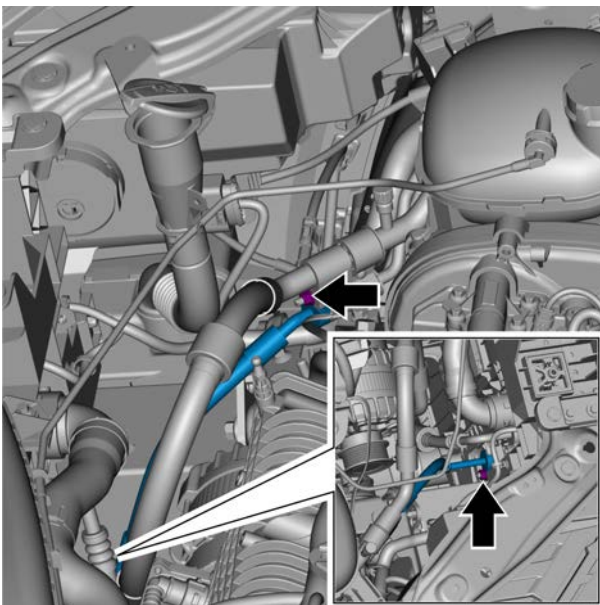
When replacing pipes in the air conditioning system:

- If all air-conditioning pipe are replaced, 15ml compressor lubrication oil needs to be added.
- If only any air-conditioning pipeline is replaced, there is no need to add additional compressor lubrication oil.

- 2 Connect the condenser outlet pipe assembly with the condenser and tighten the fixing nuts.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

- 3 Execute the charging procedure of A/C refrigerant.
- 4 Install and remove the front engine compartment trim panel.



- 5 Install the engine fender.
- 6 Close the engine compartment cover.

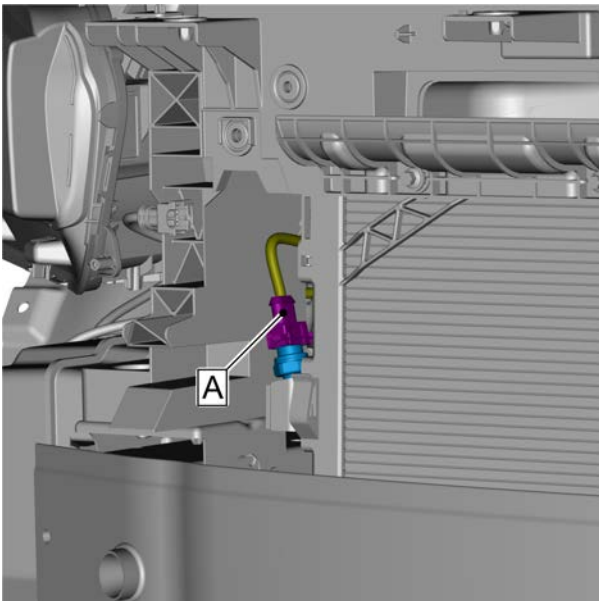
8.2.6.28 Replacement of A/C pressure sensor

Removal procedure

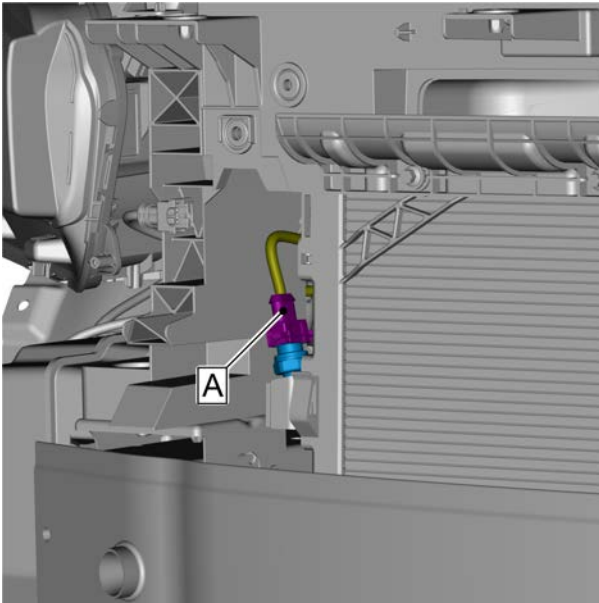
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Recover the refrigerant. See [A/C refrigerant recovery and filling](#).
- 4 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 5 Remove the horn (woofer) and see the [Replacement of the horn \(woofer\)](#).
- 6 Disconnect A/C pressure sensor harness connector.
- 7 Remove the A/C pressure sensor.



Installation procedure



- 1 Install and fasten the A/C pressure sensor.

Caution

When tightening, pay attention to check whether the sealing ring is intact.

- 2 Connect A/C pressure sensor harness connector A.

- 3 Install the horn (woofer).
- 4 Install the front bumper assembly.
- 5 Execute the charging procedure of A/C refrigerant.
- 6 Connect the negative battery cable.
- 7 Close the engine compartment cover.

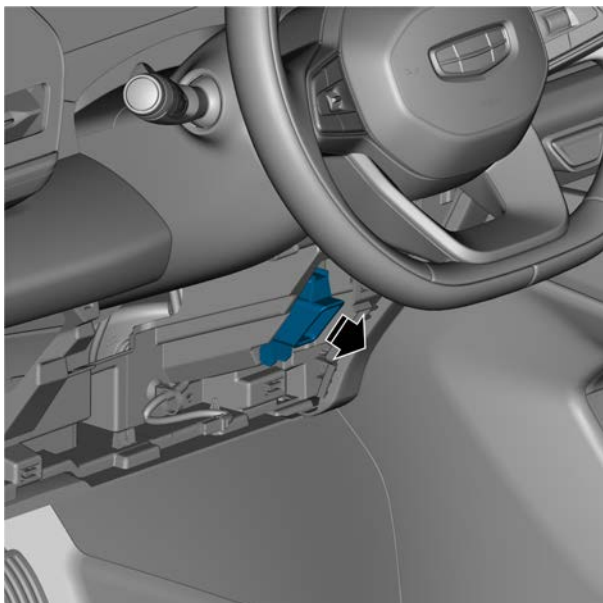
8.2.6.29 A/C temperature sensor replacement

Removal procedure

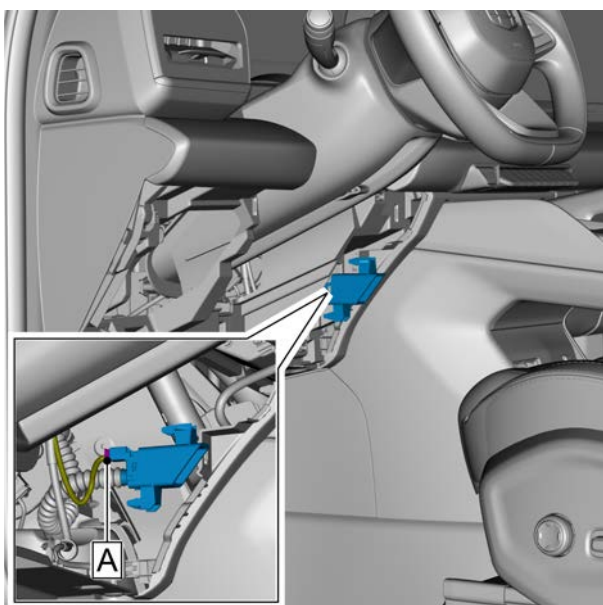
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

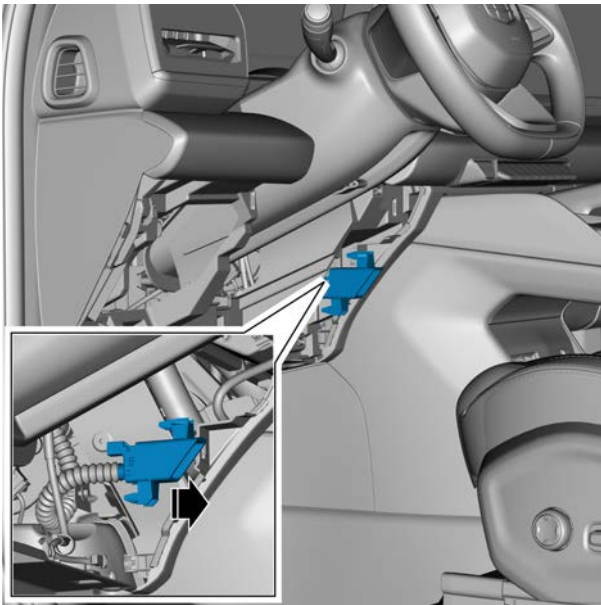
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove assembly of left lower fender apron of dashboard. See [instrument panel lower left guard assembly replacement](#).



- 4 Remove the A/C temperature sensor bracket.



- 5 Disconnect the A/C temperature sensor harness connector A.

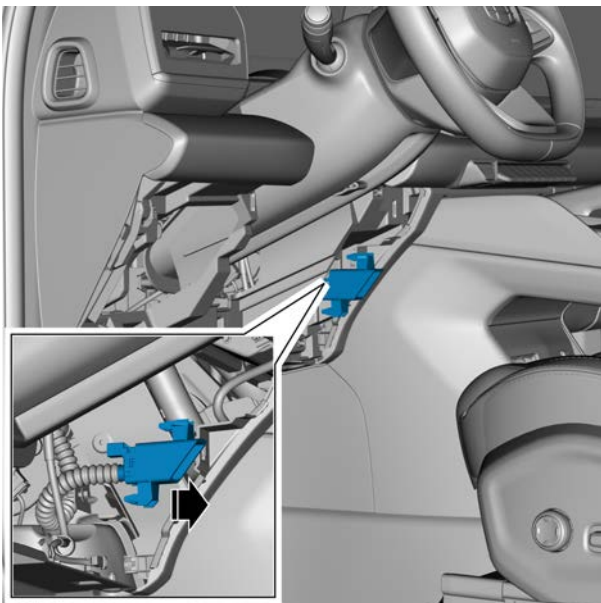


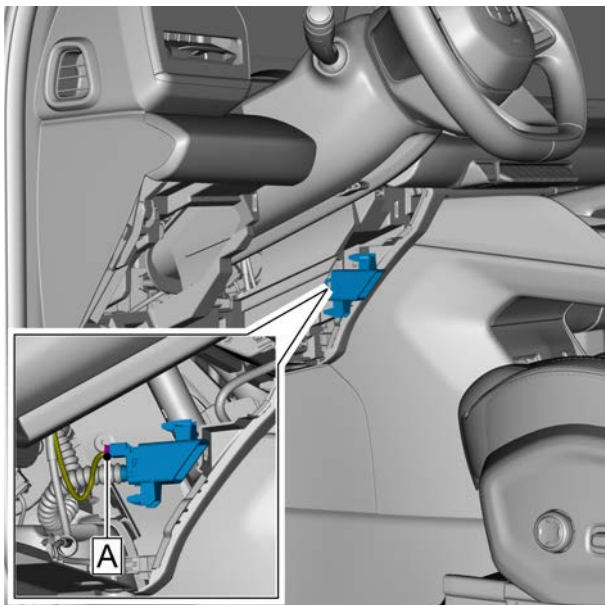
- 6 Remove the connection between the A/C temperature sensor duct and the sensor.

- 7 Remove the A/C temperature sensor.

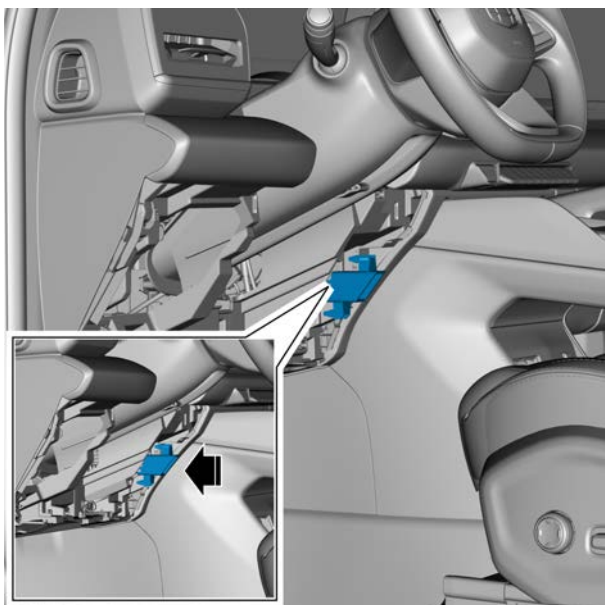
Installation procedure

- 1 Install the A/C temperature sensor.
- 2 Install the A/C temperature sensor duct.





- 3 Install A/C temperature sensor harness connector A.



- 4 Install the A/C temperature sensor bracket.

- 5 Install the left lower fender apron assembly of the dashboard.
- 6 Connect the negative battery cable.
- 7 Close the engine compartment cover.

8.2.6.30 Left pressure release valve replacement

Removal procedure

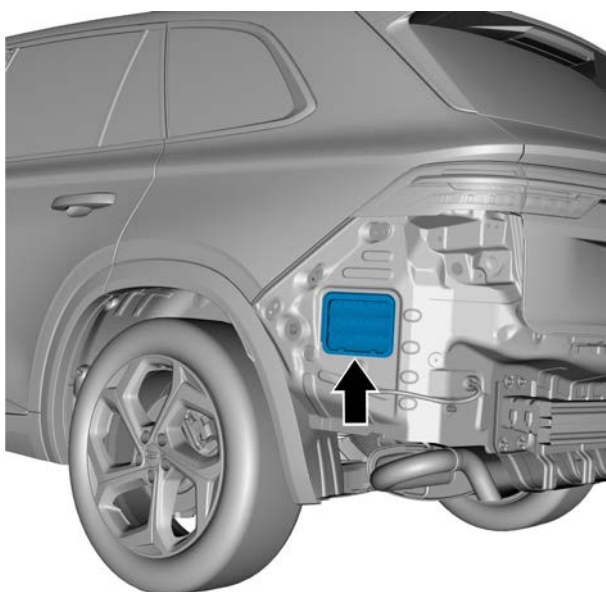
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

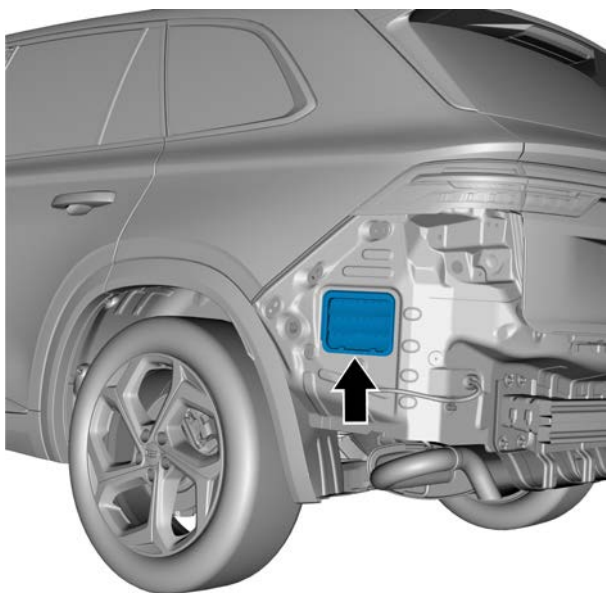
Caution

The removal and assembly methods of front left pressure relief valves are similar.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rear bumper assembly, see [Replacement of the rear bumper assembly \(Type 1\)](#), [Replacement of the rear bumper assembly \(Type 2\)](#).
- 3 Disconnect the left pressure relief valve from the vehicle body and remove the left pressure relief valve.



Installation procedure



1 Install the left pressure relief valve.

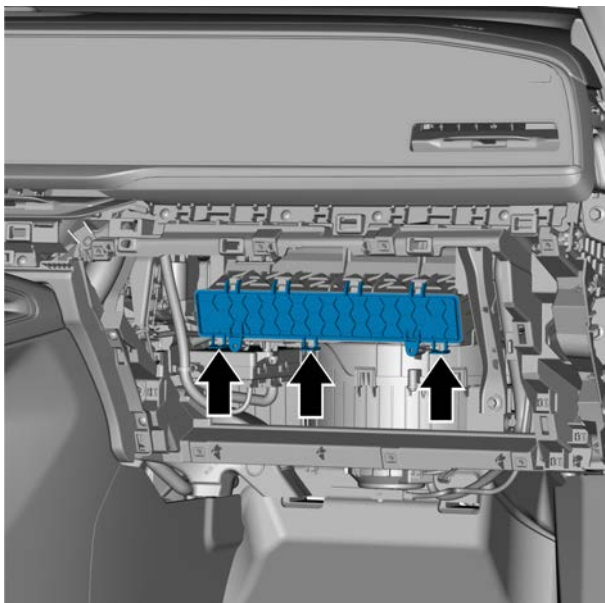
2 Install the rear bumper assembly.

3 Connect the negative battery cable.

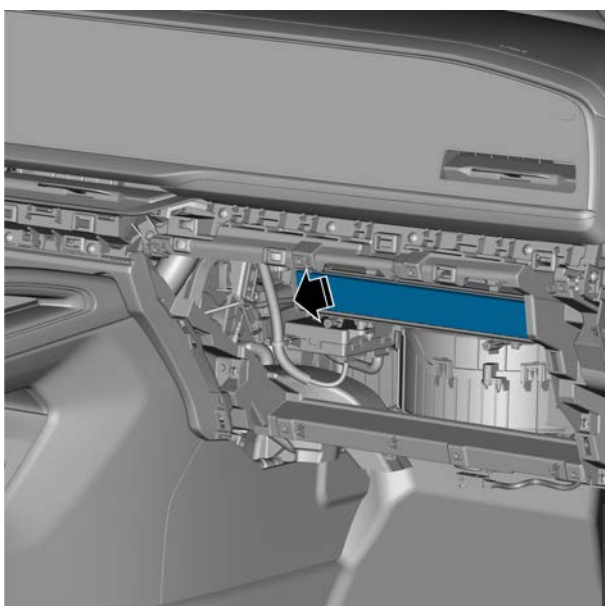
8.2.6.31 Replacement of air conditioning filter assembly (driving cab)

Removal procedure

- 1 To disassemble the glove box frame assembly, see the [Replacement of the glove box frame assembly \(Type 1\)](#) and the [Replacement of the glove box frame assembly \(Type 2\)](#).

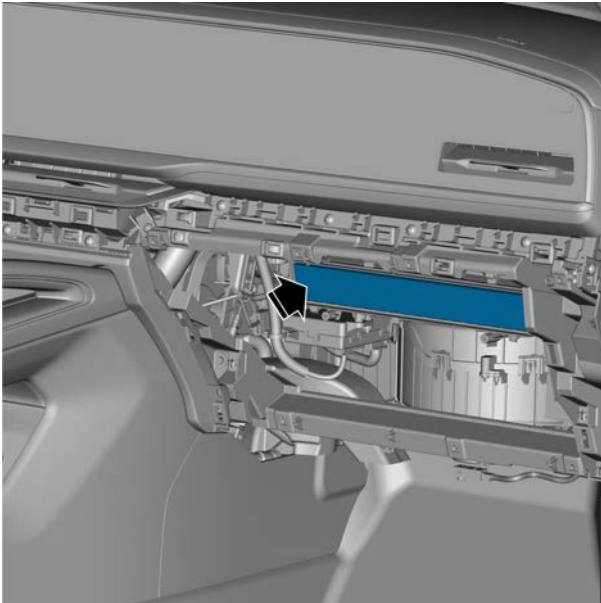


- 2 Remove the cover plate of the A/C filter element.



- 3 Extract the air conditioning filter assembly (driving cab).

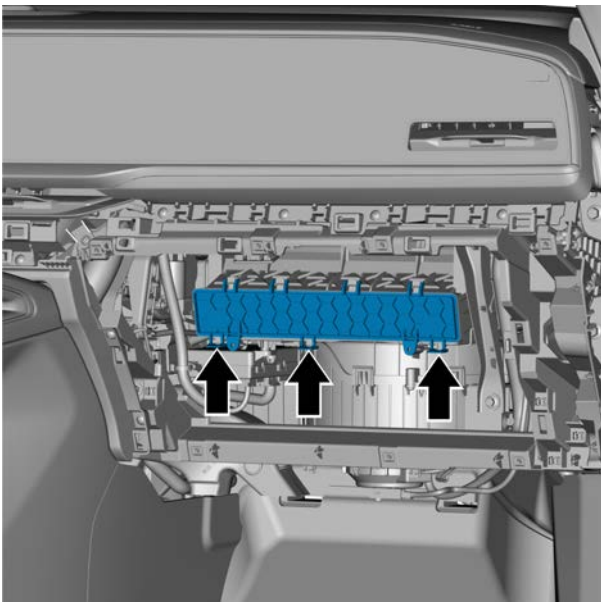
Installation procedure



- 1 Install the air conditioning filter assembly (driving cab).

Caution

During installation, confirm the orientation of the air conditioning filter assembly (driving cab), and do not install it upside down.



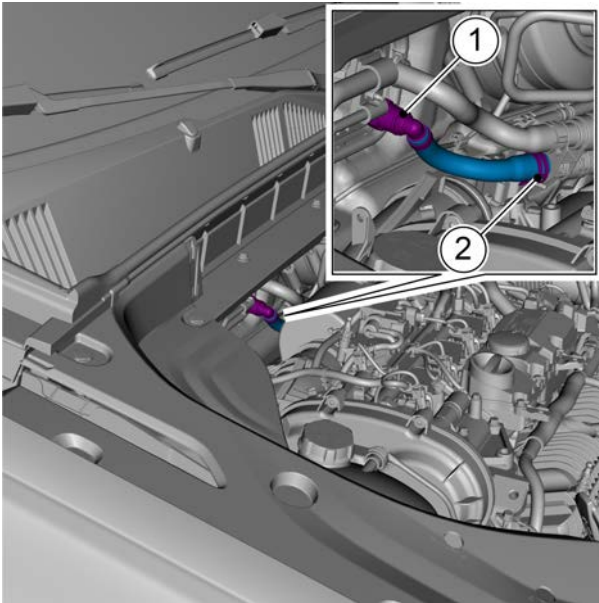
- 2 Install the cover plate of the air conditioning filter element.

- 3 Install the glove box frame assembly.

8.2.6.32 Replacement of the air-conditioning heater inlet pipe

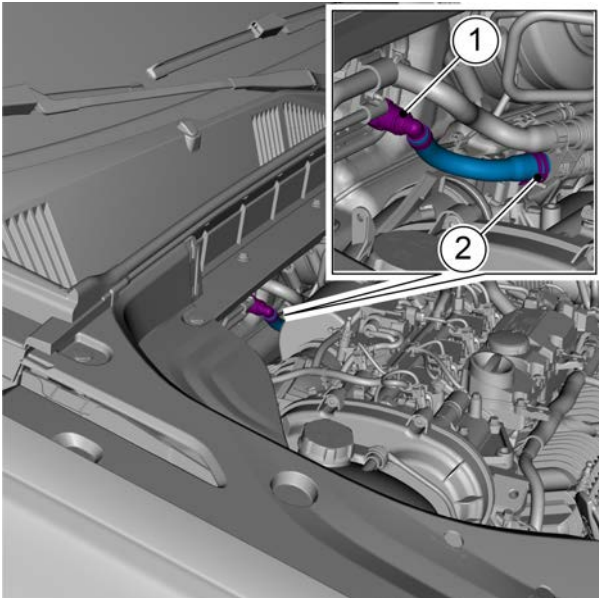
Removal procedure

- 1 Open the engine compartment cover.
- 2 Discharge coolants, refer to [discharge and filling of engine coolant](#).
- 3 Remove engine trim cover, refer to replacement of engine trim cover assembly.



- 4 Disconnect the quick connector 1 connecting the A/C warm air inlet pipe and the A/C master device assembly.
- 5 Remove the fastening hoop 2, disconnect the connection between the air-conditioning warm air inlet pipe and the transition joint, and remove the air-conditioning warm air inlet pipe.

Installation procedure



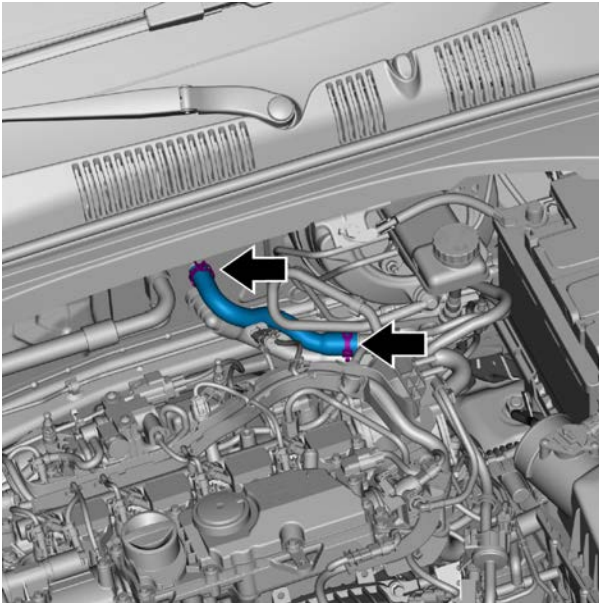
- 1 Connect the A/C heating inlet pipe and the transition joint, and install the fastening hoop 2.
- 2 Connect the A/C warm air inlet pipe 1 and the A/C master device assembly.

- 3 Install the engine trim cover
- 4 Fill the coolant.
- 5 Close the engine compartment cover.

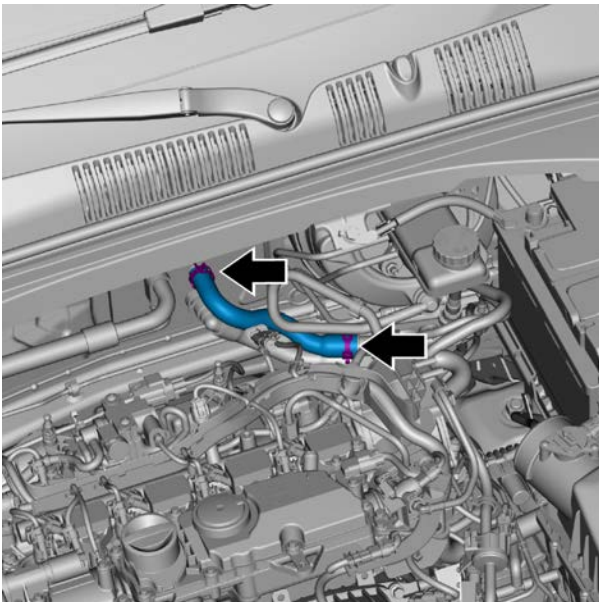
8.2.6.33 Replacement of the air-conditioning heater outlet pipe

Removal procedure

- 1 Open the engine compartment cover.
- 2 Discharge coolants, refer to [discharge and filling of engine coolant](#).
- 3 Remove engine trim cover, refer to replacement of engine trim cover assembly.



- 4 Remove the fastening hoop and disconnect the A/C warm vent pipe from the A/C master device assembly.
- 5 Remove the fastening hoop, disconnect the connection between the air-conditioning warm vent pipe and the transition joint, and remove the air-conditioning warm vent pipe.



Installation procedure

- 1 Connect the A/C heating outlet pipe to the transition joint and install the fastening hoop.
- 2 Connect the air-conditioning warm vent pipe with the air-conditioning host assembly, install the fastening hoop, and install the fixing pipe clamp of the water pipe.

- 3 Install the engine trim cover
- 4 Fill the coolant.
- 5 Close the engine compartment cover.

8.2.6.34 Ambient temperature sensor (exterior mirror) replacement

Removal procedure

Remove the ambient temperature sensor (exterior rear-view mirror), see [exterior rear-view mirror \(left\) replacement](#).

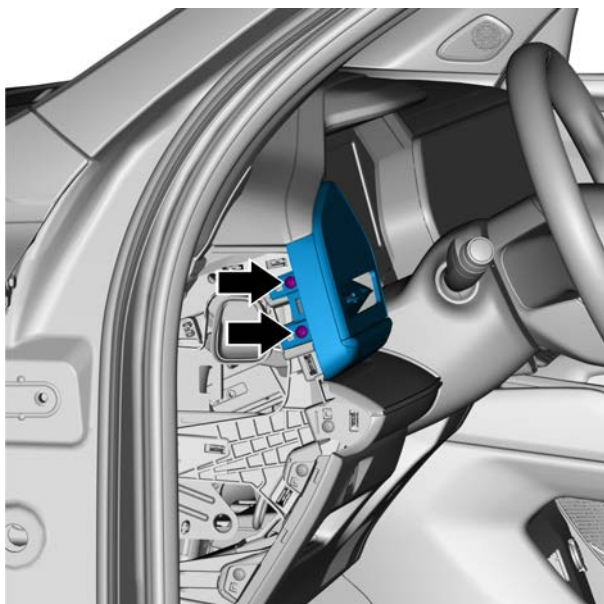
8.2.6.35 Instrument Panel left air outlet assembly replacement

Removal procedure

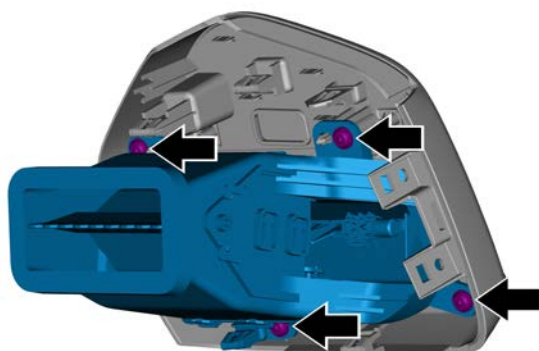
Warning !

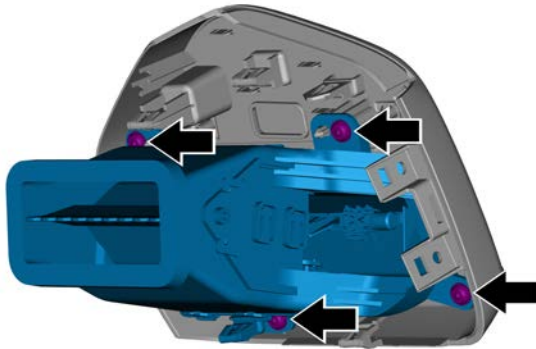
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the dashboard driver side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 3 Remove the 2 fixing screws of the left air outlet assembly of the instrument panel.
- 4 Remove the vent assembly LH of the instrument panel and the left A/C vent panel assembly.



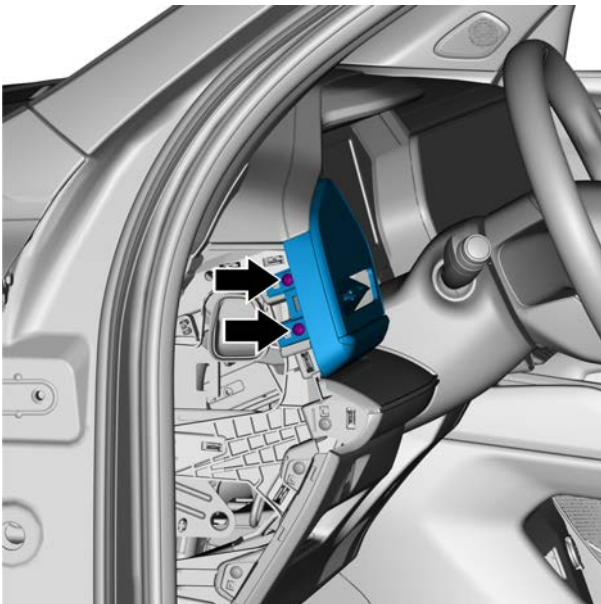
- 5 Remove 4 retaining bolts from the left A/C vent panel assembly and remove the vent assembly LH.

**Installation procedure**



- 1 Install the left A/C vent panel assembly, and tighten 4 fixing screws.

Torque: 1.5 N·m (metric system) 1.1 lb-ft (Imperial system)



- 2 Install the vent assembly LH of the instrument panel, and tighten 2 fixing screws.

Torque: 2.5 N·m (metric system) 1.8 lb-ft (Imperial system)

- 3 Install the driver side end cover assembly of the dashboard.
- 4 Connect the negative battery cable.

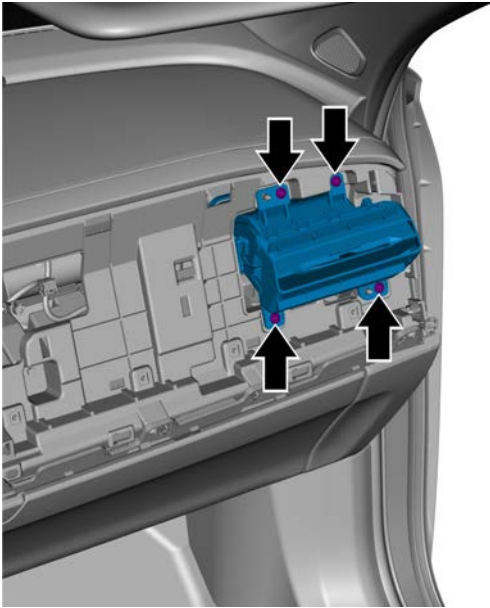
8.2.6.36 Replacement of the right air assembly outlet of the instrument panel

Removal procedure

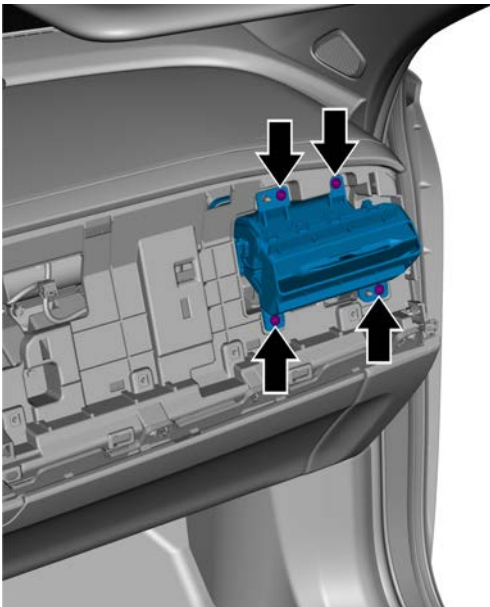
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the central console displayer, see [Replacement of the central console displayer](#).



- 3 Remove the 4 fixing screws of the right air outlet assembly of the instrument panel.
- 4 Remove the air outlet assembly of the instrument panel.



Installation procedure

- 1 Install vent assembly RH of dashboard.
- 2 Install the 4 fixing screws of the right air outlet assembly of the instrument panel.

Torque: 1.5 N·m (metric system) 1.1 lb-ft (Imperial system)

- 3 Install central console displayer replacement.
- 4 Connect the negative battery cable.

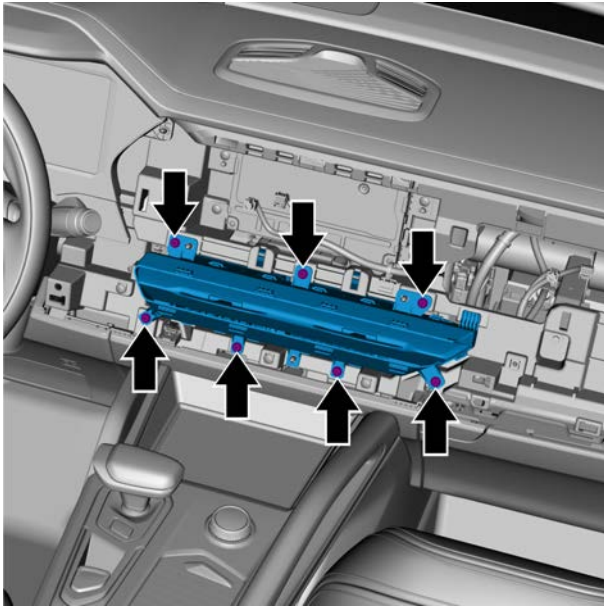
8.2.6.37 Middle air outlet assembly of the dashboard

Removal procedure

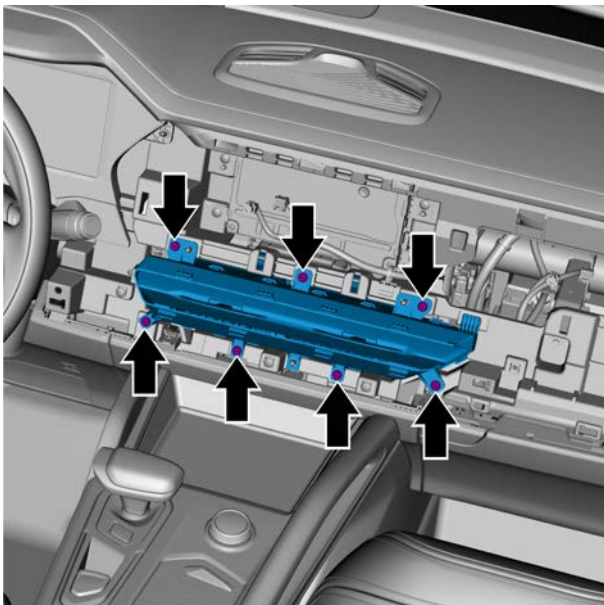
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).



- 2 Remove the central console displayer, see [Replacement of the central console displayer](#).
- 3 Remove the 7 fixing screws of the air outlet assembly in the middle of the dashboard.
- 4 Remove the middle air outlet assembly of the dashboard.



Installation procedure

- 1 Install vent assembly middle of dashboard.
- 2 Install the 7 fixing screws of the air outlet assembly in the middle of the instrument panel.

Torque: 1.5 N·m (metric system) 1.1 lb-ft (Imperial system)

- 3 Install the central console displayer.
- 4 Connect the negative battery cable.

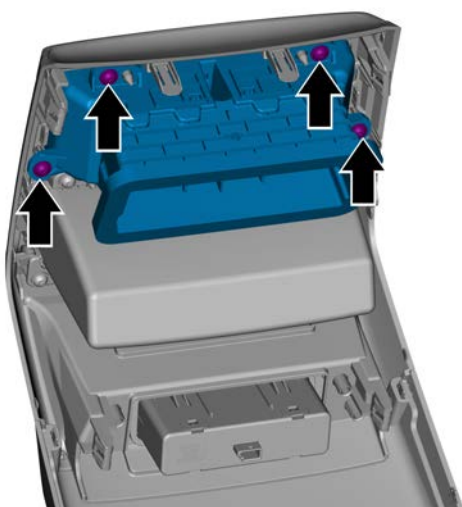
8.2.6.38 Replacement of the rear vent assembly console

Removal procedure

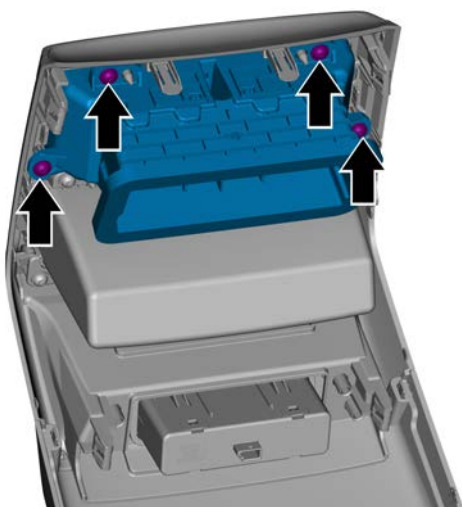
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the assembly-panel console rear end. See [replacement of assembly-panel console rear end \(type I\)](#) and [replacement of assembly-panel console rear end \(type II\)](#).
- 3 Remove the 4 retaining bolts of the rear vent assembly console, and remove the rear vent assembly console.

**Installation procedure**

- 1 Install the rear vent of the center console, and tighten 4 retaining bolts.



- 2 Install the rear panel assembly of the console.
- 3 Connect the negative battery cable.

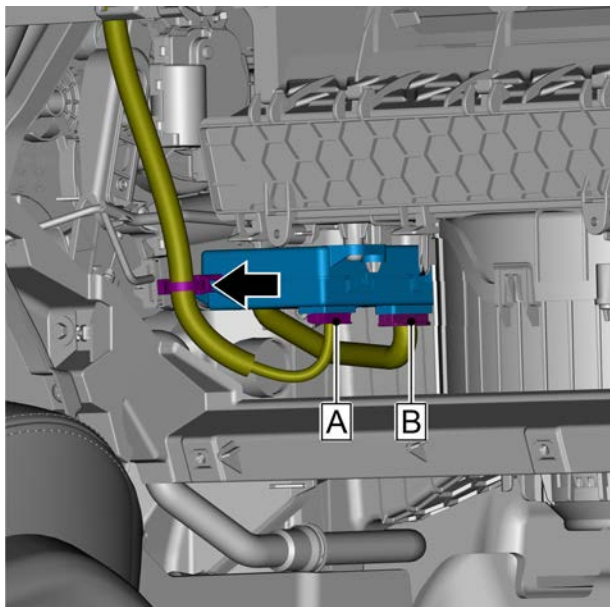
8.2.6.39 Temperature control module replacement

Removal procedure

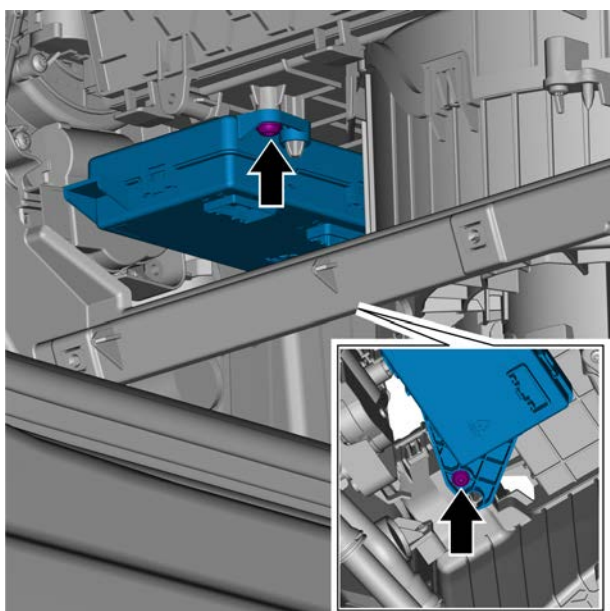
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the exterior cover of the glove box, see [Replacement of the exterior cover of the glove box](#).
- 4 To disassemble the glove box frame assembly, see the [Replacement of the glove box frame assembly \(Type 1\)](#) and the [Replacement of the glove box frame assembly \(Type 2\)](#).
- 5 Remove the right air duct of front foot blower. See [replacement of right air duct of front foot blower](#).

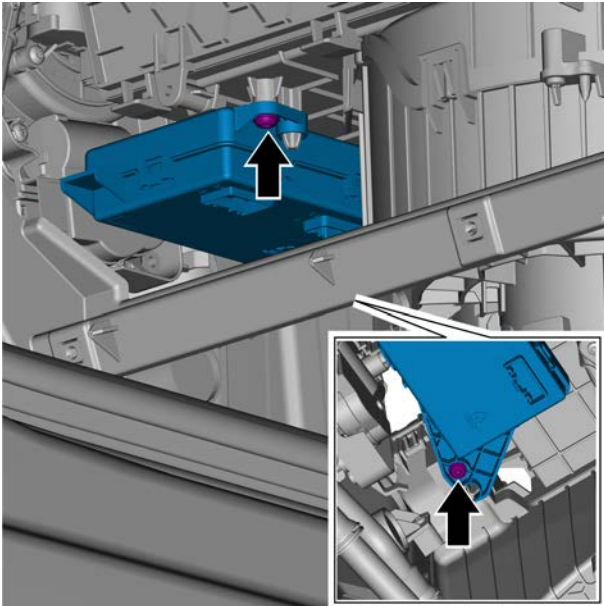


- 6 Disconnect the temperature control module harness fixing card.
- 7 Disconnect the temperature control module harness connector A.
- 8 Disconnect the temperature control module harness connector B.



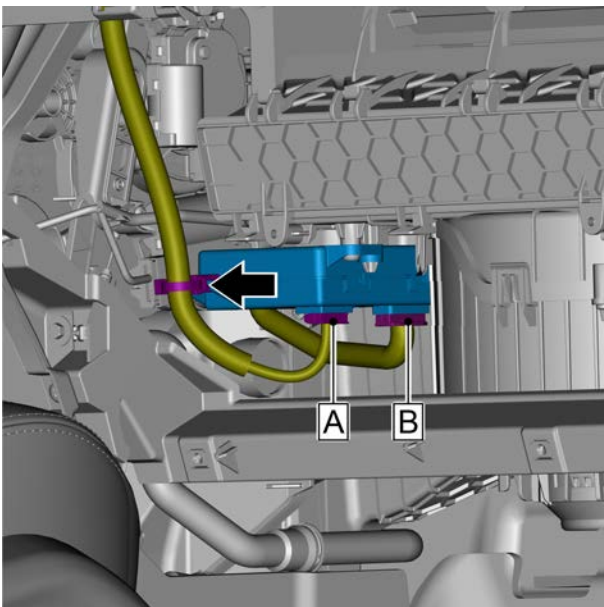
- 9 Remove 2 fixing screws of the temperature control module and remove the temperature control module.

Installation procedure



- 1 Place the temperature control module in the installation position and tighten 2 fixing screws.

Torque: 1.5 N·m (metric system) 1.1 lb-ft (Imperial system)



- 2 Fix the temperature control module harness fixing card.
- 3 Install temperature control module harness connector B.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 4 Install temperature control module harness connector A.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 5 Install the right air duct of the front foot blower.
- 6 Install the glove box frame assembly.
- 7 Install the exterior cover of the glove box.
- 8 Connect the negative battery cable.
- 9 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 10 Close the engine compartment cover.

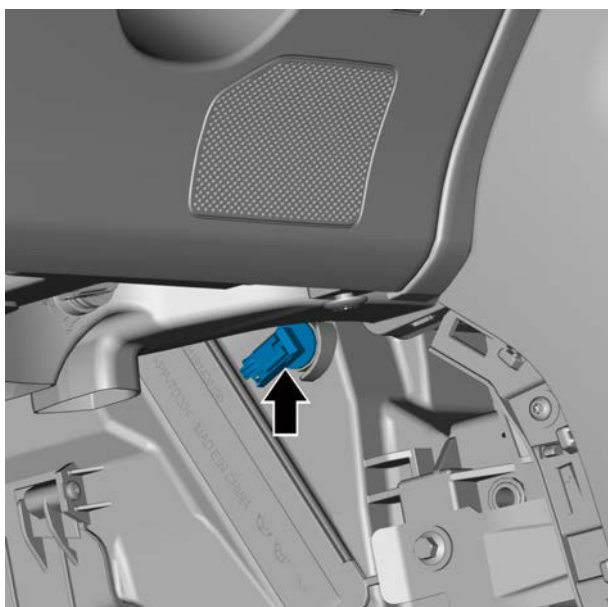
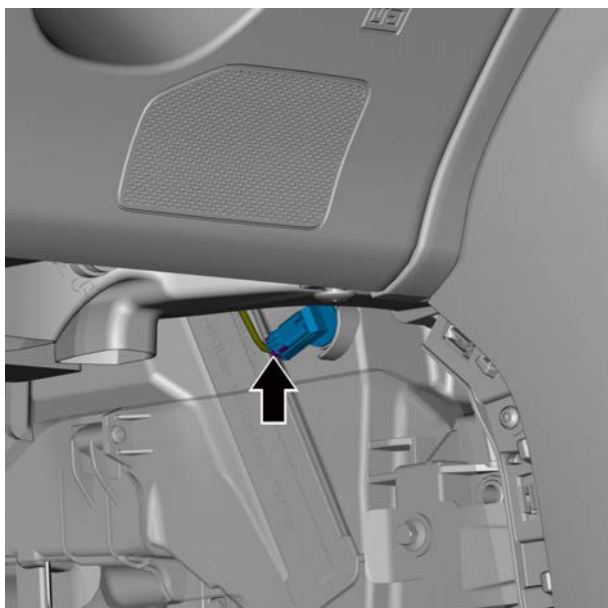
8.2.6.40 Internal temperature sensor (heating) replacement

Removal procedure

Warning !

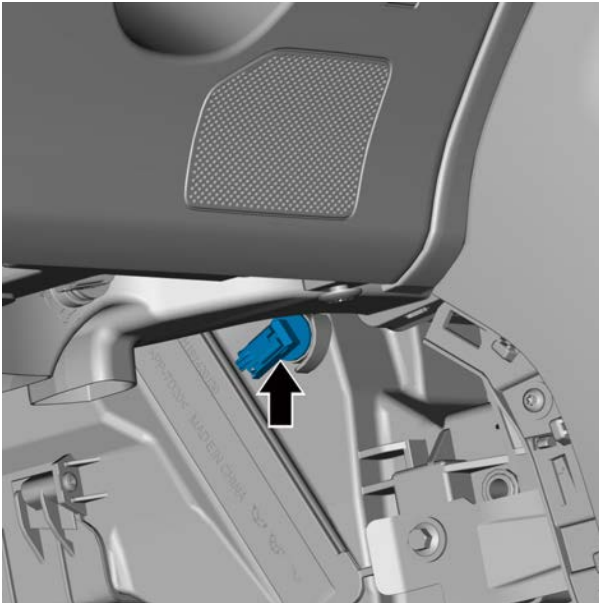
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the lower left baffle assembly, see [Replacement of the lower left baffle assembly](#).
- 4 Disconnect the internal temperature sensor (heating) harness connector.

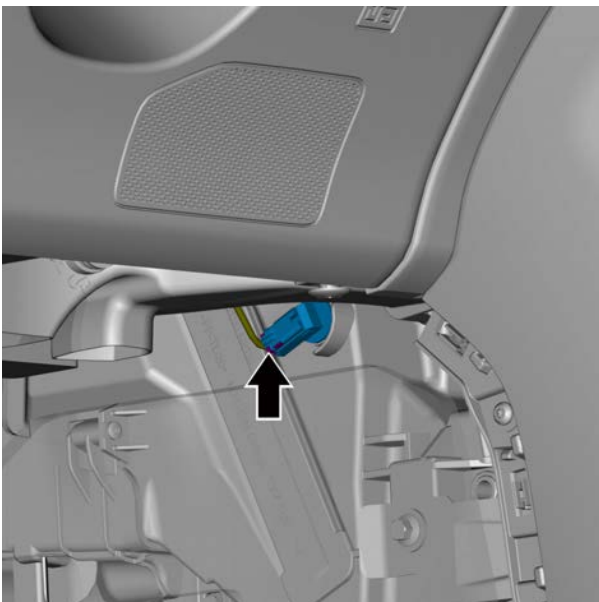


- 5 Remove the internal temperature sensor (heating).

Installation procedure



- 1 Install the internal temperature sensor (heating).



- 2 Connect the internal temperature sensor (heating) harness connector.

- 3 Install the lower left foot shield assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

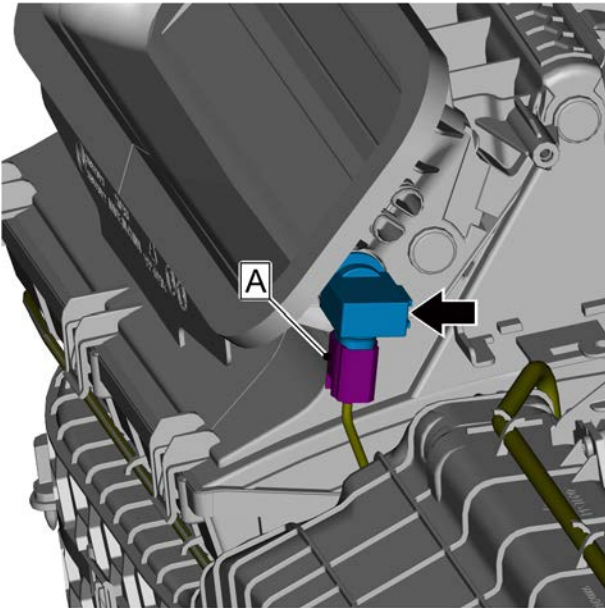
8.2.6.41 Air quality sensor (AQS) replacement

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

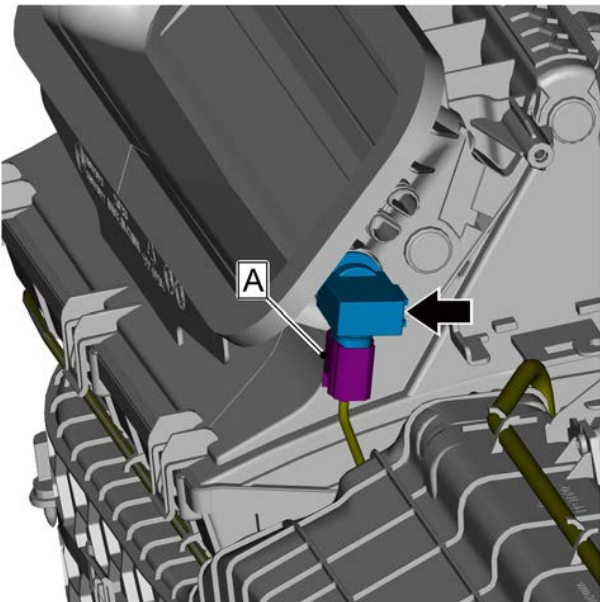
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove A/C master device assembly, refer to [Replacement of A/C assembly](#).



- 3 Disconnect harness connector A of air quality sensor (AQS).
- 4 Remove the air quality sensor (AQS).

Installation procedure

- 1 Install the air quality sensor (AQS).
- 2 Connect harness connector A of air quality sensor (AQS).



- 3 Install air-conditioning assembly.
- 4 Connect the negative battery cable.

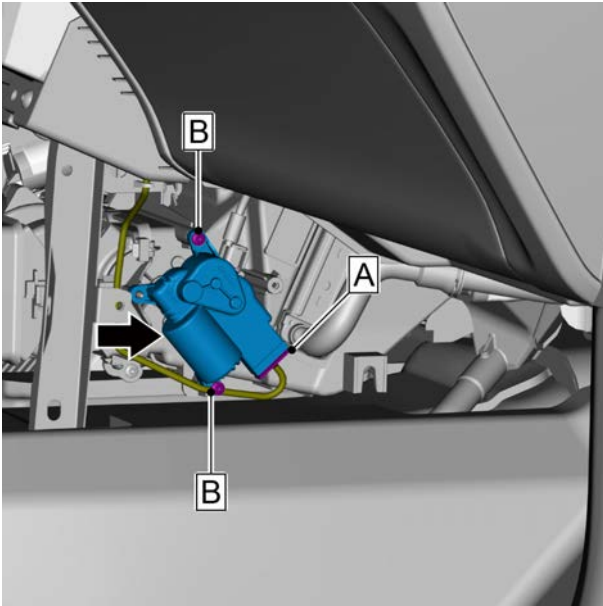
8.2.6.42 Replacement of temperature control damper motor (rear)

Removal procedure

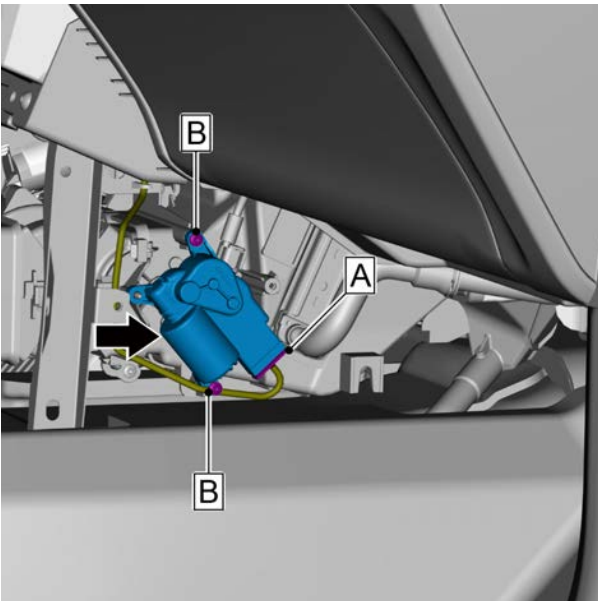
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).



- 2 Remove console moulding assembly, refer to [replacement of console moulding assembly](#).
- 3 Disconnect harness connector A of temperature control damper motor (rear).
- 4 Remove 2 fixing screws B of temperature control damper motor (rear).
- 5 Remove the temperature control damper motor (rear).



Installation procedure

- 1 Install the temperature control damper motor (rear).
- 2 Install 2 fixing screws B of temperature control damper motor (rear).
- 3 Connect the temperature control damper motor (rear) harness connector A.

- 4 Install the console assembly.
- 5 Connect the negative battery cable.

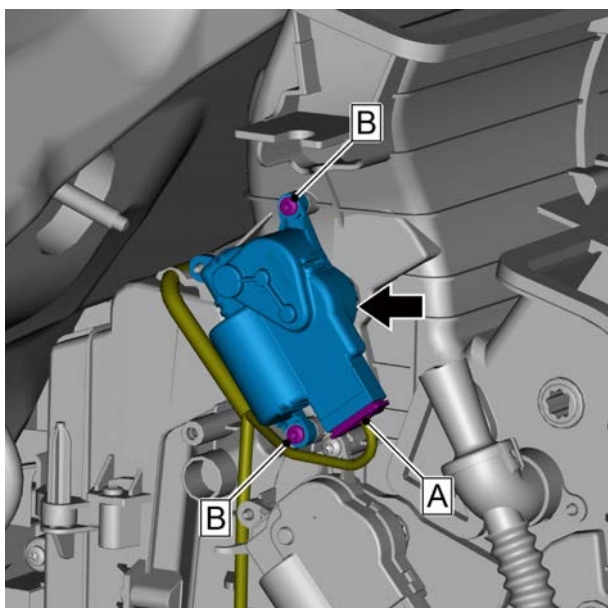
8.2.6.43 Defroster damper motor replacement

Removal procedure

Warning !

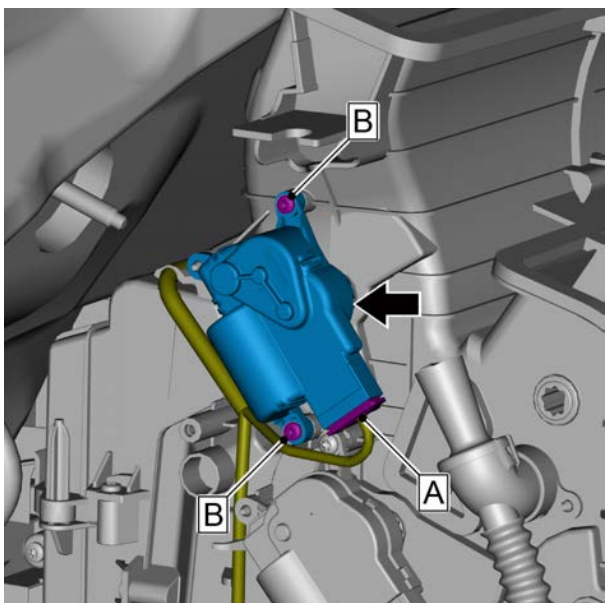
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).



- 2 Remove dashboard assembly, refer to [replacement of dashboard assembly](#).
- 3 Disconnect defroster damper motor harness connector A.
- 4 Remove 2 fixing screws B of defroster damper motor.
- 5 Remove the defroster damper motor.

Installation procedure



- 1 Install the defroster damper motor.
- 2 Install 2 fixing screws B of defroster damper motor.
- 3 Connect defroster damper motor harness connector A.

- 4 Install the console assembly.
- 5 Connect the negative battery cable.

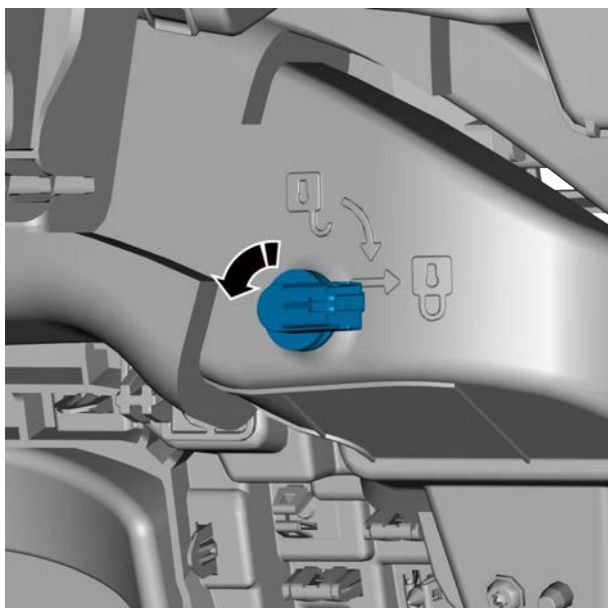
8.2.6.44 Replacement of internal temperature sensor (left vent)

Removal procedure

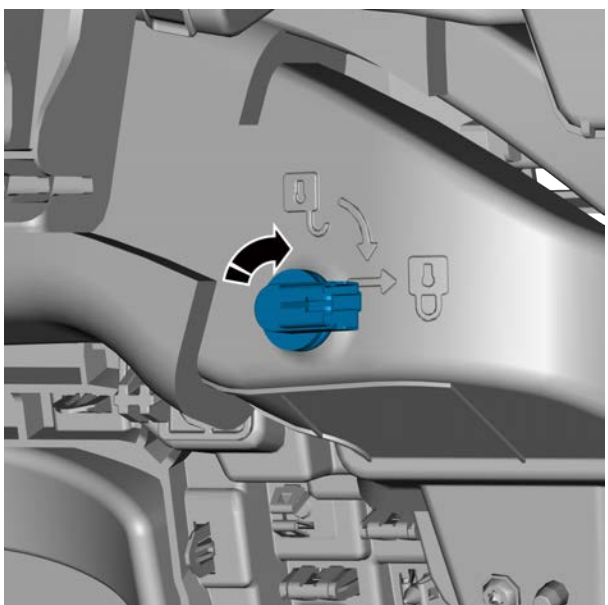
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove dashboard assembly, refer to [replacement of dashboard assembly](#).
- 3 Remove the internal temperature sensor (left vent).

**Installation procedure**

- 1 Install the internal temperature sensor (left vent).



- 2 Install the console assembly.
- 3 Connect the negative battery cable.

8.2.7 Special tools and equipment

8.2.7.1 Equipment

Fluorescent agent
Electronic leak detector
Torque wrench
Refrigerant recovery and filling machine for automobile air conditioner

Safety protection device

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9.1 Warnings and precautions

9.1.1 Warnings and precautions

9.1.1.1 Warnings and precautions

Warnings about Supplemental Restraint System (SRS)

Warning !

This vehicle is equipped with auxiliary restraint system. The following conditions will happen if the correct operation procedure is not followed.

- Auxiliary restraint system opens unexpectedly.
- The system does not work when the airbag is needed for protection.

Warning !

Following criteria should be strictly followed to avoid the occurrence of above conditions

- See the auxiliary restraint system component view to determine if you are performing service operations on, around or on the auxiliary restraint system components.
- If you are performing maintenance operations on the SRS components, around it, or on its circuit, you should release the SRS. Refer to "warnings regarding battery negative cable disconnection" in "Warnings and Notices".

Warning regarding high temperature of deployed airbag modules

Warning !

After deployment, the metal surfaces of the auxiliary restraint system components may be very hot. To avoid fire and personal injury:

- There should be sufficient cooling time before touching any metal surface of the SRS components.
- Do not place inflated SRS components next to any combustibles.

Warning about the clock spring of the SRS

Warning !

Incorrect installation of the steering wheel module (SWM) (clock spring assembly) will damage the internal spiral coil of the clock spring, which may cause coil fault and cause the front airbag (passenger) to work improperly, resulting in personnel injury.

Warnings regarding scrap of safety system

Warning !

In order to prevent the accidental deployment of the airbag and cause personal injury, the undeployed airbag shall not be disposed of as conventional workshop waste. If the sealed container damages in the process of scrap, some of the substances contained in the non-deployed modules may cause serious illness or personal injury. Use the deployment procedure to safely discard the undeployed airbag.

Warning on airbag patch and storage

Warning !

When transporting undeployed airbags:

- Do not carry the wires or connectors on the airbag for handling.
- Make sure that the airbag opening is not facing you or other people.

Warning !

When storing an undeployed airbag, make sure that the Safety airbag opening is not facing the surface where the airbag is placed. The airbag opening should not be downward. It is prohibited to place any object on the airbag. There should be enough space around the airbag for the expansion of airbag, otherwise it will hurt people. It is forbidden to immerse the undeployed airbag in water or contact other liquids.

The unexpanded airbag should be prohibited from nearing fire or high temperatures area to avoid the accident expansion of the airbag and hurting people.

Warnings about handling the supplementary restraint system impact sensor and supplementary restraint system module

Warning !

Do not impact or shake the auxiliary restraint system collision sensor and auxiliary restraint system module. Before powering up the collision sensor and auxiliary restraint system module, ensure that the collision sensor and auxiliary restraint system module have been firmly fixed. Failure to follow the correct installation procedures may cause the auxiliary restraint system to mis-explode or have no effect when it shall explode, cause personal injury.

9.2 Supplementary Restraint System

9.2.1 Specification

9.2.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Bolt - connection between the impact sensor (B-pillar) and the inner lower end of B-pillar	M6×25×28	8.5~11.5	6.3~8.5
Bolt - connection between collision sensor (front) and vehicle body	M6×25×28	8.5~11.5	6.3~8.5
Bolt - connection between front airbag (passenger) and instrument crossbeam	M5×16	3.7~5.3	2.7~3.9
Bolt - connection between front airbag (passenger) and instrument panel	M6×7.5	8.5~11.5	6.3~8.5
Bolt - connection between curtain airbag and vehicle body	-	8.5~11.5	6.3~8.5
Bolt - auxiliary restraint system module to body connection	M6×14	8.5~11.5	6.3~8.5

9.2.2 Instructions and operations

9.2.2.1 Instructions and Operations

Caution

Airbags can only provide auxiliary protection for the occupants in the event of a collision when the seat belt is properly fastened. When driving or riding a vehicle, it is necessary to fasten the safety belt. Only when the safety belt is fastened, the auxiliary restraint system can better provide auxiliary protection in case of collision.

Structure composition

The auxiliary restraint system consists of the following components:

- Airbag warning indicator of combination instrument
- Auxiliary restraint system module (SRS)
- Left impact sensor (front)
- Right impact sensor (front)
- Left impact sensor (B-pillar)
- Right impact sensor (B-pillar)
- Passenger inspection detection sensor
- Front airbag (driver)
- Front airbag (passenger)
- Front left side airbag
- Front right side airbag
- Crash side curtain (left)
- Crash side curtain (right)
- Top Column Module
- Seat belt pretensioner (front left)
- Seat belt pretensioner (front right)
- Safety belt pretensioner (left of the second-row seat)
- Seat belt pretensioner (right of the second-row seat)

Description

Auxiliary restraint system is a passive safety system. The auxiliary restraint system is distributed on the steering wheel, the instrument panel, the side of the front seat back and the roof rail. In addition to the airbag, the vehicle is equipped with a safety belt pretension limiter. In case of vehicle collision, it will tighten the safety belt, to slow down the reduction of the distance between the occupant and the airbag while the airbag is deployed. Each airbag has a squib circuit, which is controlled by the auxiliary restraint system module. The airbag is deployed when the auxiliary restraint system module detects that the impact force of the collision is large enough. The auxiliary restraint system module continuously diagnoses and monitors

the electrical components of the auxiliary restraint system. When a circuit fault is detected, the auxiliary restraint system module stores a fault diagnosis code and turns on the airbag warning light to notify the driver. The steering column is of energy absorption type. When front side collision happens, it can be shrunk to reduce the driver injury odds.

The auxiliary restraint system module receives signals from sensors to determine the severity of the collision. When the signal value is greater than the set value in the memory, the auxiliary restraint system module issues an ignition command to deploy the corresponding inflation module of the auxiliary restraint system.

After the supplementary restraint system module (SRS) confirms the collision signal, it will send the collision output signal. CEM and EMS will continuously receive the impact output signals and respectively perform unlocking and fuel cutoff function.

9.2.3 System working principles

9.2.3.1 System Working Principles

Airbag fault alarming indicator

If a fault is detected, the auxiliary restraint system module will store a diagnostic trouble code (DTC) and command the instrument cluster to turn on the airbag warning indicator through the Flexray bus. After the vehicle is started, SRS will continuously detect each circuit. If there is a fault, the auxiliary restraint system module will communicate with the combination instrument through Flexray bus, and the airbag warning indicator will light up. If there is any fault in the auxiliary restraint, it may prevent deployment of airbags, or cause the deployment of airbags when a collision does not reach the set severity level. If the airbag alarming indicator is turned on, please go to a Geely authorized service station for troubleshooting. Before completing fault repair, the airbag indicator will not go out.

Note

The auxiliary restraint system module (SRS) has a reserve power supply, which can still make the airbag deploy smoothly after losing the battery voltage during the collision. Disconnect the cathode cable of the battery for more than 90 s and empty the reserve power supply before the maintenance of the auxiliary restraint system.

The supplementary restraint system module (SRS) is a micro-processor, which is the control center of the supplementary restraint system. When the vehicle collides, the auxiliary restraint system module compares the signal from the sensor with the value in the memory. When the generated signal value exceeds the stored value, the auxiliary restraint module issues an ignition command (current signal) to each ignition circuit to deploy the airbag. When the airbag is deployed, the auxiliary restraint system module will record the status of the auxiliary restraint system and turn on the airbag indicator on the combination instrument. After the car is started, the auxiliary restraint system module will continuously diagnose and monitor the electrical components and circuits of the auxiliary restraint system. If the auxiliary restraint system module detects a fault, it will store a fault diagnosis code, and light the airbag warning light to inform the driver that there is a fault.

Impact sensor (front) (left / right)

The impact sensor is used to enhance the performance of the auxiliary restraint system and transmit the acceleration signal in front of the vehicle to the auxiliary restraint system module (SRS). The frontal collision sensor can help to determine the severity of a frontal collision of vehicle. SRS utilizes measured

acceleration value to make calculation, and to compare the calculation value with the value in the storage. When the generated calculated value exceeds the stored value, the auxiliary restraint system module sends an ignition command (current signal) to the front airbag ignition circuit, so as to deploy the front airbag and safety belt pretensioner.

Right impact sensor (B-pillar)

The impact sensor (B pillar) transmits the vehicle side acceleration signal to the supplementary restraint system module (SRS). The B-pillar collision sensor can determine the severity of the side collision of the vehicle. SRS utilizes measured acceleration value to make calculation, and to compare the calculation value with the value in the storage. When the generated calculated value exceeds the stored value, the auxiliary restraint system module will send an ignition command (current signal) to the front side airbag, side airbag and curtain airbag to deploy the front side airbag, front seat belt pretensioner, second row seat belt pretensioner and curtain airbag (if equipped).

Front occupant identification sensor

The front occupant identification sensor is located in the seat cushion of the front seat assembly to sense whether there are people in the front seat position; it is a piezoresistive sensor, which senses the pressure through the change of resistance. When there are people in the front row of seats and the safety belt is not worn, the warning light of the front seat belt not fastened in the combination instrument will be on.

Front airbag (driver), front airbag (passenger)

The front airbag (driver) and the front airbag (passenger) module include a shell, an inflatable airbag, an ignition device and a gas generator. When the impact force on the front (side / rear) surface of the vehicle is large enough to reach the set point explosion threshold, the auxiliary restraint system module will send an ignition command (current signal), and the current flows through the igniter to detonate the gas generator, to quickly produce a large amount of gas. The gas generated in the reaction quickly inflates the airbag. Once the airbag is filled with gas, it will quickly deflate through the vent of the airbag.

Seat belt pretensioner

The safety belt pretensioner (front left), the safety belt pretensioner (front left), the safety belt pretensioner (front left) and the safety belt pretensioner (front left) all have a safety belt pretensioner. The safety belt pretensioner includes a shell, an ignition device and a gas generator. The igniter is part of the

seatbelt pretensioner deployment loop. When the impact force on the front (side / rear) surface of the vehicle is large enough to reach the set point explosion threshold, the auxiliary restraint system module will send an ignition command (current signal), and the current flows through the igniter to detonate the gas generator, to quickly produce a large amount of gas. The gas generated by this reaction will quickly retract and act on the rear seat belt retractor, to quickly tighten the safety belt.

Front left side airbag and front right side airbag

Front left side airbag and front right side airbag are located on backrests of the driver seat and the passenger seat respectively. The front side airbag module includes airbag, ignition blasting device and gas generator. The igniter is part of the front side airbag module deployment circuit. When the frontal (side/rear) collision of the vehicle is large enough and the collision reaches the set point explosion threshold, the auxiliary restraint system module will issue an ignition command to the frontal ignition circuit to deploy the airbag. Current flows through the igniter, blasting the gas generator to generate a lot of gas rapidly. The gas generated in the reaction quickly inflates the side airbag. Once the side airbag is filled with gas, it will quickly deflate through the vent of the airbag.

Crash side curtain (left), crash side curtain (right)

The anti-collision side curtain (left) and the anti-collision side curtain (right) are located on front left roof rails respectively, extending from the A-pillar to the C-pillar. The side curtain airbag module on the roof of the vehicle includes curtain airbag, ignition blasting device and gas generator. The igniter is part of the deployment circuit of side curtain airbag on the roof side member of the vehicle. When the frontal (side/rear) collision of the vehicle is large enough and the collision reaches the set point explosion threshold, the auxiliary restraint system module will issue an ignition command to the frontal ignition circuit to deploy the airbag. Current flows through the igniter, blasting the gas generator to generate a lot of gas rapidly. The gas generated in the reaction quickly inflates the Air curtain. Once the curtain airbag is filled with gas, it will quickly deflate through the air vent of the curtain airbag.

Top Column Module

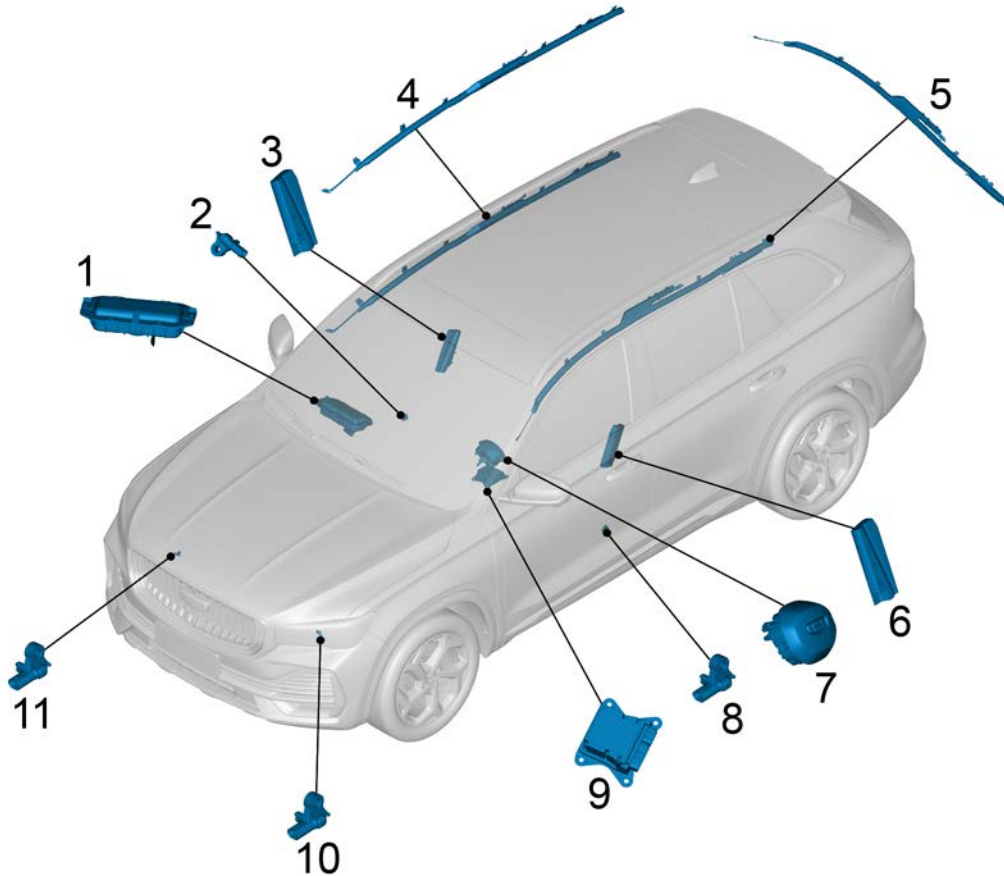
The airbag clock spring is integrated with the steering wheel module and is located under the steering wheel. The steering wheel harness is connected between the driver's airbag and the clock spring. When the steering wheel rotates, the harness connector And grounding connector on the driver's airbag maintain continuous electrical contact.

Steering column

The steering column is a collapsing energy absorbing steering column. When a frontal collision happens to the vehicle, the driver may contact the steering wheel directly, or to load the collision force to the steering wheel and the steering column through an inflated airbag. The steering column will shrink downwards and absorb part of collision energy, so as to help reduce bodily injury to the driver. After collision, it is necessary to check whether there is damage to the steering wheel or the steering column.

9.2.4 Component position

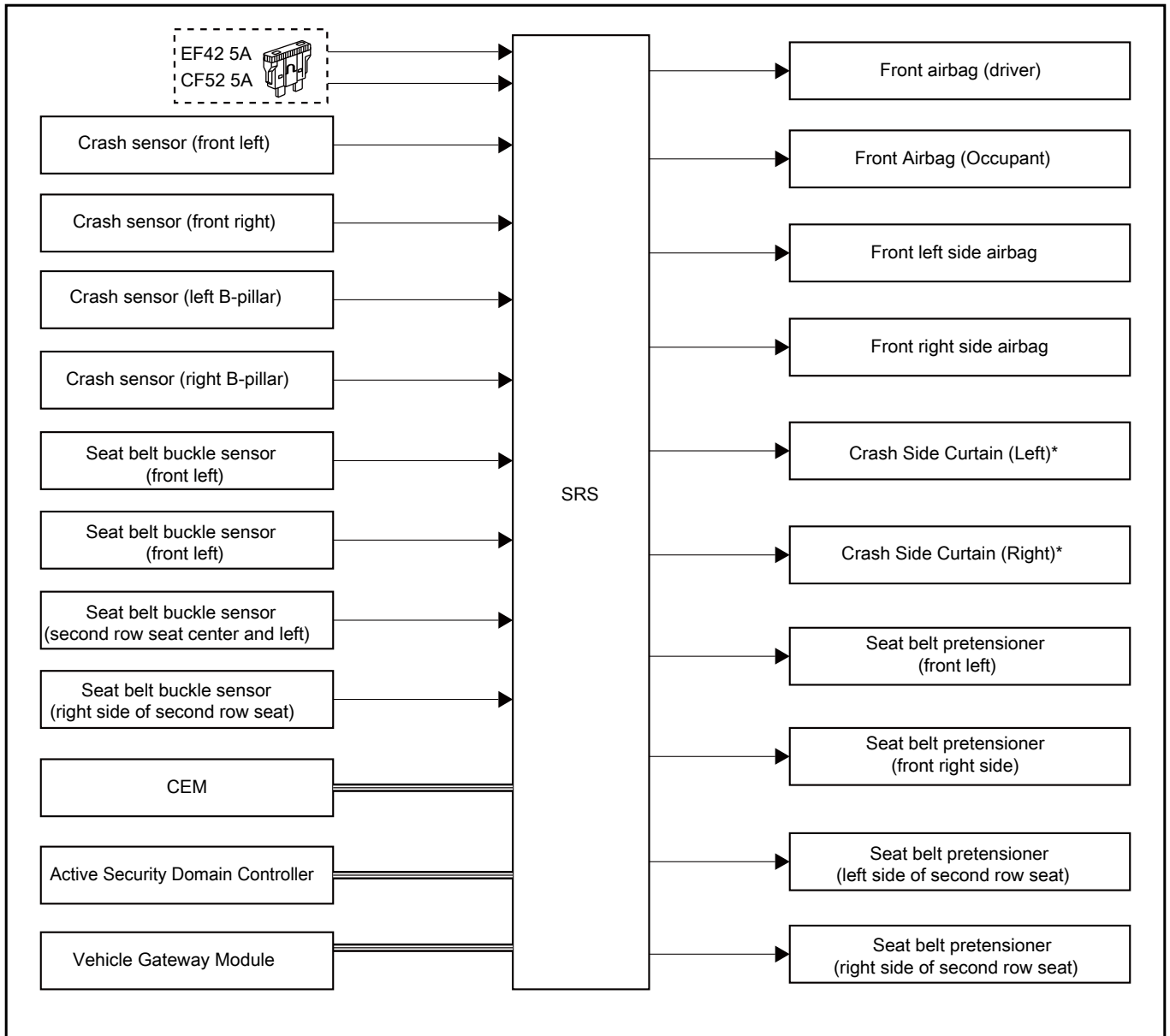
9.2.4.1 Component position



- | | | | |
|----|-----------------------------------|-----|--------------------------------------|
| 1. | Front airbag (passenger) | 7. | Front airbag (driver) |
| 2. | Collision sensor (right B-pillar) | 8. | Collision sensor (left B-pillar) |
| 3. | Front right side airbag | 9. | Supplemental restraint system module |
| 4. | Crash side curtain (right) | 10. | Impact sensor (front left) |
| 5. | Crash side curtain (left) | 11. | Impact sensor (front right) |
| 6. | Front left side airbag | | |

9.2.5 Electrical schematic diagram

9.2.5.1 Electrical schematic diagram



9.2.6 Diagnostic information and procedures

9.2.6.1 Diagnosis Description

Refer to Instructions and Operations. Familiarize yourself with system functions and operation procedures before starting system diagnosis. This helps to determine the correct troubleshooting steps when a trouble occurs. More importantly, it also helps to determine whether the situation described by the customer is normal.

9.2.6.2 Routine inspection

– Confirm faults symptoms.

The most difficult situation during diagnostic completed is that no symptoms appear. Under the circumstances, the fault described by the user must be thoroughly analyzed. Then it is needed to simulate the same or similar conditions and environments when the customer’s vehicle fault occurs. No matter how experienced and skilled the maintenance personnel is, if the fault symptoms are not confirmed before diagnostic completed, something important during repair will be missed and some wrong guess will be made, which will result in diagnostic completed unable to proceed.

– Check system components that are easily accessible or can be seen to find out if there is any obvious damage or there is a situation that may cause a malfunction.

– Pivot for connector joint and vibration should be the main part subject to a thorough examination. If the fault is caused by vibration, the vibration method is recommended.

a. Gently vibrate the possible fault part with fingers, and check whether the fault occurs.

b. Gently shake the connector in both vertical and horizontal directions.

c. Gently shake the harness in both vertical and horizontal directions.

9.2.6.3 SRS component maintenance strategy

SRS component name	Condition	Measures to be taken		
		Items that shall be replaced	Inspection items - damaged parts shall be replaced	
			Frontal collision	Side impact / rollover
Front airbag (driver)	Detonation	A. Front airbag (driver) B. Impact sensor (front) C. Supplemental restraint system module	Steering wheel A. Visually inspect the steering wheel for deformation. B. Check whether the internal harness and connector of the steering wheel are damaged and whether the terminal is deformed. C. Install the front airbag (driver) into the steering wheel, check and confirm that the installation position is correct and aligned with the steering wheel. D. Check the steering wheel for excessive play. E. If damaged, replace the damaged parts.	

SRS component name	Condition	Measures to be taken		
		Items that shall be replaced	Inspection items - damaged parts shall be replaced	
			Frontal collision	Side impact / rollover
			Steering wheel module (clock spring): A. Visually inspect the steering wheel module for damage. B. Check the connector And harness for damage. C. Check the steering wheel for abnormal noise or hysteresis. D. If damaged, replace the damaged parts.	\
	Not detonated		Front airbag (driver) A. Remove the front airbag (driver), and check whether the airbag housing, harness, connector, terminal and steering wheel module (clock spring) are damaged. B. Install the front airbag (driver) into the steering wheel, check and confirm that the installation position is correct and aligned with the steering wheel. C. If damaged, replace the damaged parts.	\
			Steering wheel A. Visually inspect the steering wheel for deformation. B. Check whether the internal harness and connector of the steering wheel are damaged and whether the terminal is deformed. C. Install the front airbag (driver) into the steering wheel, check and confirm that the installation position is correct and aligned with the steering wheel. D. Check the steering wheel for excessive play. E. If damaged, replace the damaged parts.	\

SRS component name	Condition	Measures to be taken		
		Items that shall be replaced	Inspection items - damaged parts shall be replaced	
			Frontal collision	Side impact / rollover
			Steering wheel module (clock spring): A. Visually inspect the steering wheel module for damage. B. Check the connector And harness for damage. C. Check the steering wheel for abnormal noise or hysteresis. D. If damaged, replace the damaged parts.	
			Impact sensor (front) A. Remove the impact sensor (front) and check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed. B. Check the impact sensor (front) and bracket for obvious damage (dents, cracks, deformation). C. Install the impact sensor (front) and check that the installation position is correct. D. If damaged, replace the damaged parts.	
Front airbag (passenger)	Detonation	A. Front airbag (passenger) B. Impact sensor (front) C. Supplemental restraint system module D. the instrument panel assembly		
	Not detonated		Front airbag (passenger): A. Remove the front airbag (passenger), and check whether the airbag housing, harness, connector And terminal are damaged. B. Install the front airbag (passenger) to the instrument panel, check and confirm that the installation position is correct. C. If damaged, replace the damaged parts.	

SRS component name	Condition	Measures to be taken		
		Items that shall be replaced	Inspection items - damaged parts shall be replaced	
			Frontal collision	Side impact / rollover
		\	Impact sensor (front) A. Remove the impact sensor (front) and check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed. B. Check the impact sensor (front) and bracket for obvious damage (dents, cracks, deformation). C. Install the impact sensor (front) and check that the installation position is correct. D. If damaged, replace the damaged parts.	\
		\	Instrument panel assembly: A. Visually inspect the instrument panel for damage. B. If damaged, replace the instrument panel assembly.	\
Front left side airbag	Detonation	A. Driver's seat with airbag assembly B. Impact sensor (B-pillar) C. Supplemental restraint system module	\	\
	Not detonated	\	\	Front left side airbag: A. Check the driver's seat back for obvious damage (dent, crack, deformation). B. Check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed. C. If damaged, replace the damaged parts.

SRS component name	Condition	Measures to be taken		
		Items that shall be replaced	Inspection items - damaged parts shall be replaced	
			Frontal collision	Side impact / rollover
		\	\	Impact sensor (B-pillar) A. Remove the impact sensor (B-pillar) and check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed. B. Check the impact sensor (B-pillar) and bracket for obvious damage (dents, cracks, deformation). C. Install the impact sensor (B-pillar) and check whether the installation position is correct. D. If damaged, replace the damaged parts.
Front right side airbag	Detonation	A. Occupant's seat with airbag assembly B. Impact sensor (B-pillar) C. Supplemental restraint system module	\	\
	Not detonated	\	\	Front right side airbag: A. Check the occupant's seat back for obvious damage (dents, cracks, deformation). B. Check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed. C. If damaged, replace the damaged parts.

SRS component name	Condition	Measures to be taken		
		Items that shall be replaced	Inspection items - damaged parts shall be replaced	
			Frontal collision	Side impact / rollover
		\	\	<p>Impact sensor (B-pillar)</p> <p>A. Remove the impact sensor (B-pillar) and check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed.</p> <p>B. Check the impact sensor (B-pillar) and bracket for obvious damage (dents, cracks, deformation).</p> <p>C. Install the impact sensor (B-pillar) and check whether the installation position is correct.</p> <p>D. If damaged, replace the damaged parts.</p>
Crash side curtain (left)	Detonation	<p>A. Crash side curtain (left)</p> <p>B. Impact sensor (B-pillar)</p> <p>C. Supplemental restraint system module</p>	\	<p>A. Check the A, B and C pillars on the impact side for obvious damage (dent, crack and deformation).</p> <p>B. Check the ceiling and interior trim on the impact side for obvious damage (dents, cracks, deformation).</p> <p>C. Check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed.</p> <p>D. If damaged, replace the damaged parts.</p>

SRS component name	Condition	Measures to be taken		
		Items that shall be replaced	Inspection items - damaged parts shall be replaced	
			Frontal collision	Side impact / rollover
	Not detonated	\	\	<ul style="list-style-type: none"> A. Check the A, B and C pillars on the impact side for obvious damage (dent, crack and deformation). B. Check the ceiling and interior trim on the impact side for obvious damage (dents, cracks, deformation). C. Check the crash side curtain (left) for obvious damage (cracking, etc.). D. Check the impact sensor (B-pillar) and bracket for obvious damage (dents, cracks, deformation). E. Check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed. F. If damaged, replace the damaged parts.
Crash side curtain (right)	Detonation	<ul style="list-style-type: none"> A. Crash side curtain (right) B. Impact sensor (B-pillar) C. Supplemental restraint system module 	\	<ul style="list-style-type: none"> A. Check the A, B and C pillars on the impact side for obvious damage (dent, crack and deformation). B. Check the ceiling and interior trim on the impact side for obvious damage (dents, cracks, deformation). C. Check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed. D. If damaged, replace the damaged parts.

SRS component name	Condition	Measures to be taken		
		Items that shall be replaced	Inspection items - damaged parts shall be replaced	
			Frontal collision	Side impact / rollover
	Not detonated	\	\	<ul style="list-style-type: none"> A. Check the A, B and C pillars on the impact side for obvious damage (dent, crack and deformation). B. Check the ceiling and interior trim on the impact side for obvious damage (dents, cracks, deformation). C. Check the crash side curtain (right) for obvious damage (cracking, etc.). D. Check the impact sensor (B-pillar) and bracket for obvious damage (dents, cracks, deformation). E. Check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed. F. If damaged, replace the damaged parts.
Seat belt pretensioner	Detonate, someone is seated	<ul style="list-style-type: none"> A. Safety belt assembly B. Height adjustment C. Seat belt buckle sensor D. Supplemental restraint system module 	<ul style="list-style-type: none"> A. Check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed. B. Check the inside of the B-pillar for deformation or damage. C. Check the impact sensor (front) and bracket for obvious damage (dents, cracks, deformation). D. If damaged, replace the damaged parts. 	<ul style="list-style-type: none"> A. Check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed. B. Check the inside of the B-pillar for deformation or damage. C. Check the impact sensor (B-pillar) and bracket for obvious damage (dents, cracks, deformation). D. If damaged, replace the damaged parts.
	Detonate, no one seated	<ul style="list-style-type: none"> A. Safety belt assembly B. Supplemental restraint system module 	<ul style="list-style-type: none"> D. If damaged, replace the damaged parts. 	<ul style="list-style-type: none"> D. If damaged, replace the damaged parts.

SRS component name	Condition	Measures to be taken		
		Items that shall be replaced	Inspection items - damaged parts shall be replaced	
			Frontal collision	Side impact / rollover
	Not detonated, someone seated		<p>A. Remove the seat belt pretensioner.</p> <p>B. Check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed.</p> <p>C. Check whether the webbing is damaged and whether the anchor is loose.</p> <p>D. Check whether the retractor operates smoothly.</p> <p>E. Check the height adjuster and seat belt buckle sensor for damage.</p> <p>F. Check the inside of the B-pillar for deformation or damage.</p> <p>G. If the inside of the B-pillar is damaged, replace the seat belt pretensioner assembly.</p> <p>H. If damaged, replace the damaged parts.</p>	<p>A. Remove the seat belt pretensioner.</p> <p>B. Check whether the harness and connectors of SRS related components are damaged and whether the terminals are deformed.</p> <p>C. Check whether the webbing is damaged and whether the anchor is loose.</p> <p>D. Check whether the retractor operates smoothly.</p> <p>E. Check the height adjuster and seat belt buckle sensor for damage.</p> <p>F. Check the inside of the B-pillar for deformation or damage.</p> <p>G. If the inside of the B-pillar is damaged, replace the seat belt pretensioner assembly.</p> <p>H. If damaged, replace the damaged parts.</p>

Warning !

After the collision, the damaged body structure needs to be repaired first before replacing any SRS components.

After replacing any SRS component, use the diagnostic instrument to check and confirm that there is no fault in the SRS system (no fault code is set, the warning indicator is not on, etc.), otherwise diagnose as required.

Do not repair or modify any SRS components.

The auxiliary restraint system module shall be replaced after any airbag is detonated, the safety belt pretensioner is detonated, or the control unit records the collision related fault code.

Throughout the life of the auxiliary restraint system module, the same auxiliary restraint system module shall always be installed on the vehicle on which it is originally installed and is not allowed to be used in other vehicles.

The airbag, auxiliary restraint system module and impact sensor have high-precision structures, so extra care shall be taken in the process of handling, installation, removal and replacement. Components accidentally fall to the ground or impact shall be scrapped.

9.2.7 Removing and installing

9.2.7.1 Supplementary restraint system module replacement

Removal procedure

Warning !

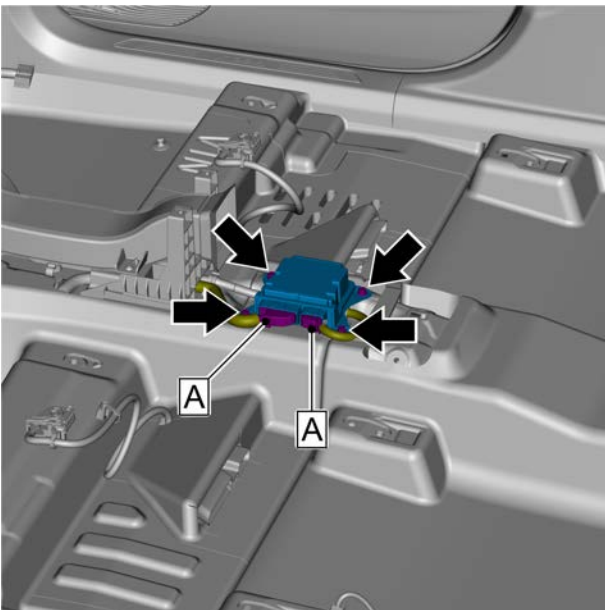
See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

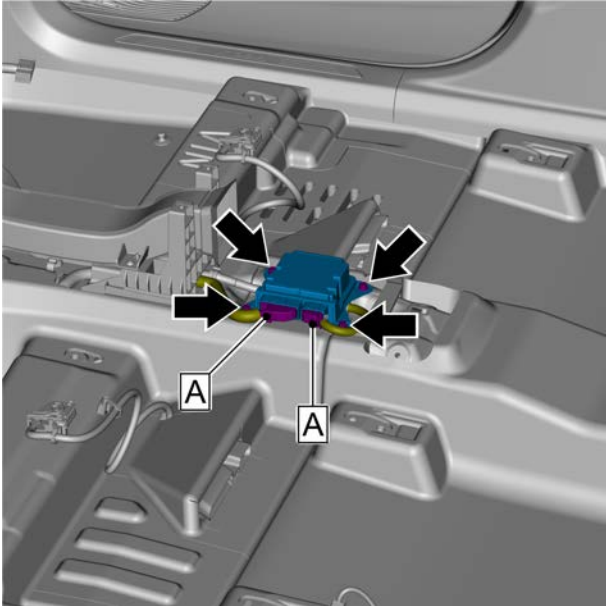
Before operating any auxiliary restraint system components, wait at least three minutes after disconnecting the battery to fully discharge the ECU capacitance.

Before removing or installing the auxiliary restraint system module, touch the body ground to release its own static electricity.

- 1 Open the engine hood.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove console moulding assembly, refer to [replacement of console moulding assembly](#).
- 4 Disconnect the auxiliary restraint system module harness connector A.
- 5 Remove the 4 auxiliary restraint system fixing modules.



Installation procedure



- 1 Place the auxiliary restraint system module at the installation position and tighten the 4 retaining bolts of the auxiliary restraint system module.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 2 Connect auxiliary restraint system module harness connector A.

CautionSecure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the console assembly.
- 4 Connect the negative battery cable.
- 5 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

9.2.7.2 Front airbag (driver) replacement

Removal procedure

Warning !

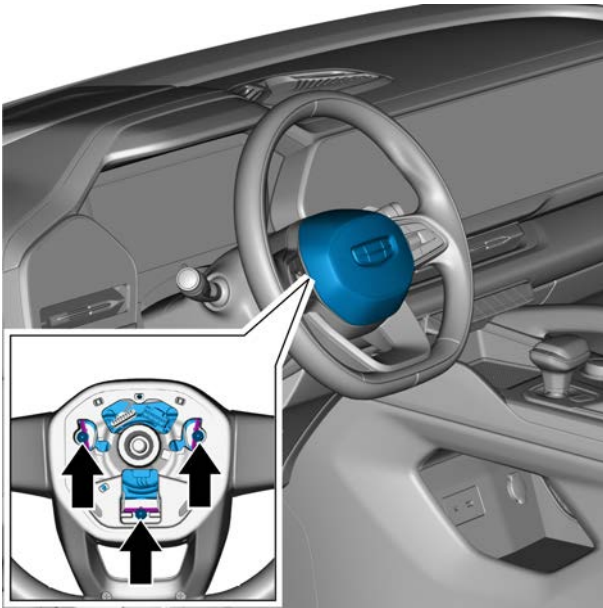
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)

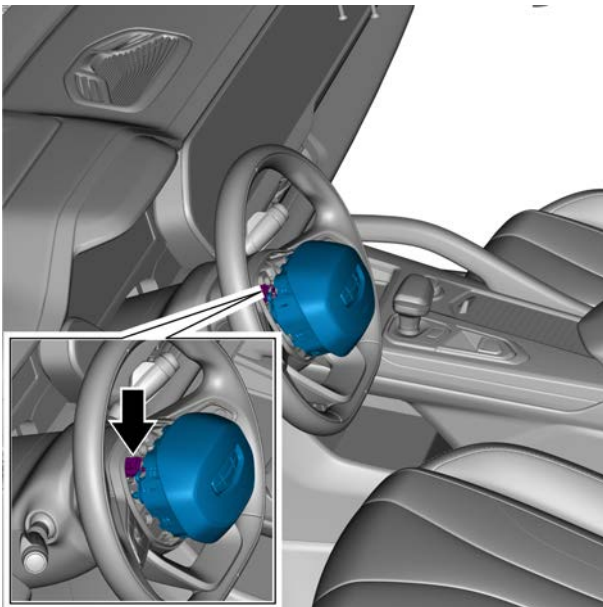
Warning !

During the maintenance of the airbag, it is necessary to disconnect the negative electrode of the battery at least 90s before other operations

- 2 Remove the steering column lower cover assembly. See [replacement of steering column lower cover.](#)



- 3 Insert the removal tool from the upper end of the steering column into the three removal holes at the arrow as shown in the figure, hold the circlip to disengage it, and disconnect the airbag from the bottom of the steering wheel.



- 4 Disconnect the front airbag (driver) harness connector
And remove the front airbag (driver).

Caution

Ensure parts are handled with care during maintenance.

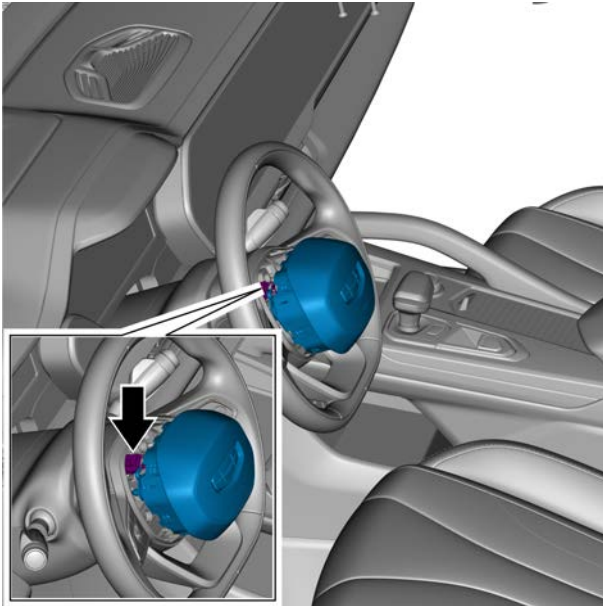
Be sure to operate on the side of the airbag, not on the front.

Do not use pneumatic or electric service tools.

Be sure to place the airbag facing up.

Do not decompose the airbag.

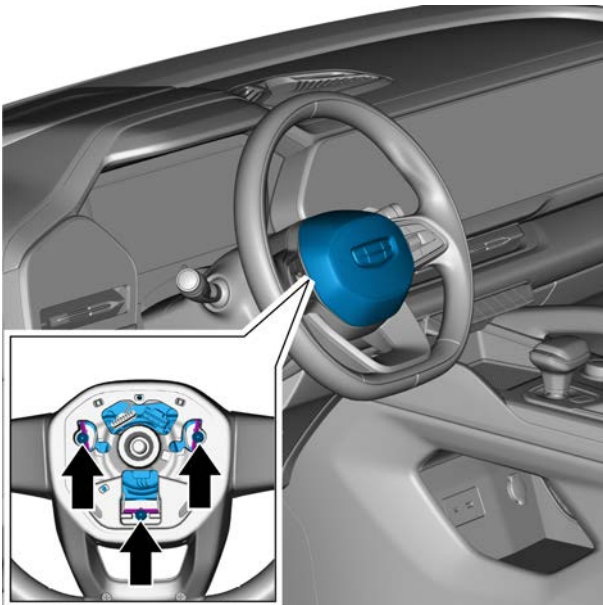
Installation procedure



- 1 Connect the front airbag (driver) harness connector.

Caution

Secure the harness connection: “Connect, click, and Confirm.”



- 2 Clip in the front airbag (driver).

Caution

Confirm that the lapping gap shall be uniform.

- 3 Install the lower shield of the steering column.
- 4 Connect the negative battery cable.

9.2.7.3 Replacement of front airbag (passenger)

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

Warning !

During the maintenance of the airbag, it is necessary to disconnect the negative electrode of the battery at least 90s before other operations

- 2 Remove the instrument panel assembly, refer to replacement of the instrument panel assembly.
- 3 Remove 6 fixing nuts from the front airbag (passenger) and instrument panel assembly, and remove the front airbag (passenger).

Caution

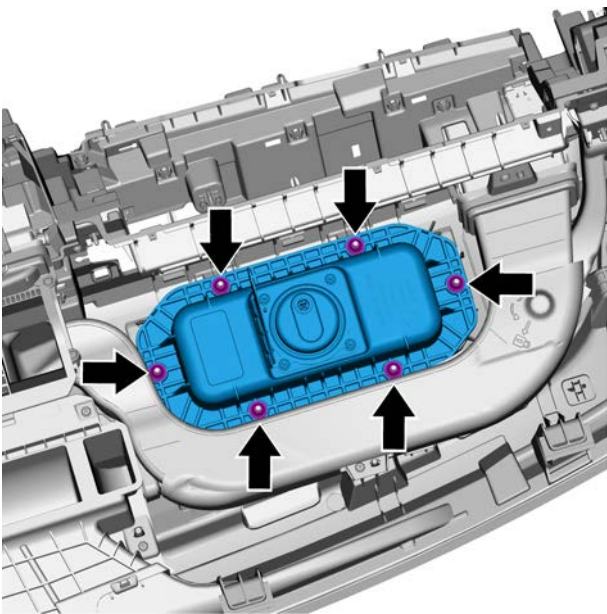
Ensure parts are handled with care during maintenance.

Be sure to operate on the side of the airbag, not on the front.

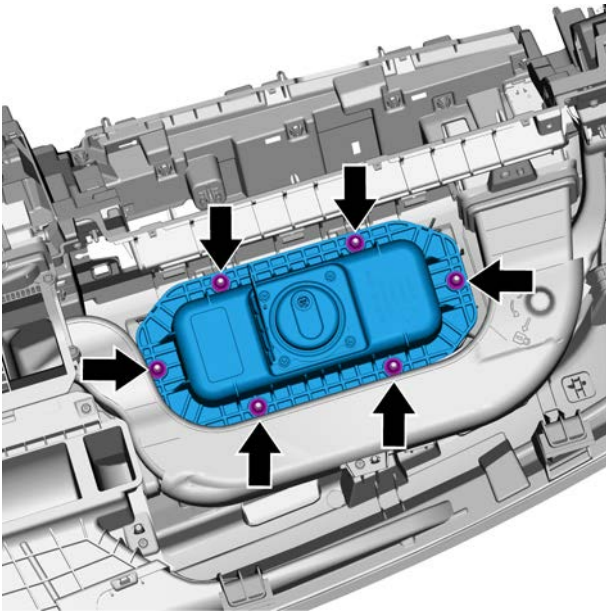
Do not use pneumatic or electric service tools.

Be sure to place the airbag facing up.

Do not decompose the airbag.



Installation procedure



- 1 Place the front airbag (passenger) in the installation position and install the 6 fixing nuts of the front airbag (passenger).

Torque: 4.5 N. m (metric system) 3.3 lb-ft (Imperial system)

- 2 Install the console assembly.
- 3 Connect the negative battery cable.

9.2.7.4 Crash side curtain (left) replacement

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

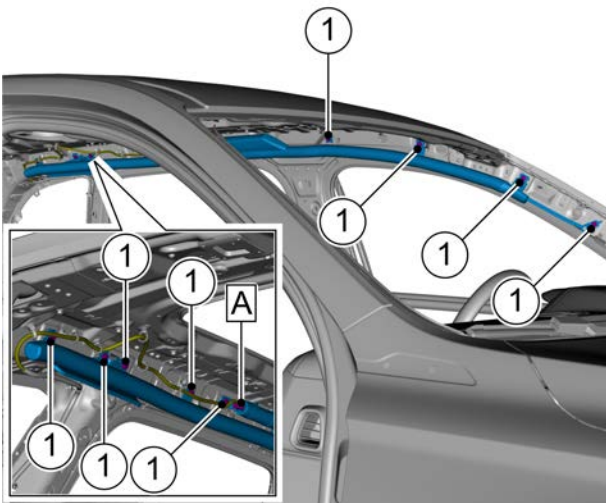
The removal and assembly methods of front left curtain airbag are similar.

- 1 Lower the rear seat backrest.
- 2 Put the front seat back to back to the maximum position.
- 3 Open the engine compartment cover.
- 4 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

Warning !

During the maintenance of the airbag, it is necessary to disconnect the negative electrode of the battery at least 90s before other operations

- 5 Remove the ceiling assembly, see [Replacement of the roof assembly](#).



- 6 Disconnect the anti-collision side curtain (left) harness connector A.
- 7 Remove 9 retaining bolts 1 of the anti-collision side curtain (left), and take down the anti-collision side curtain (left).

Caution

Ensure parts are handled with care during maintenance.

Be sure to operate on the side of the airbag, not on the front.

Do not use pneumatic or electric service tools.

Be sure to place the airbag facing up.

Do not decompose the airbag.

Installation procedure

- 1 Pre assemble the anti-collision side curtain (left) to the side wall, and tighten 9 retaining bolts 1 of the anti-collision side curtain (left).

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

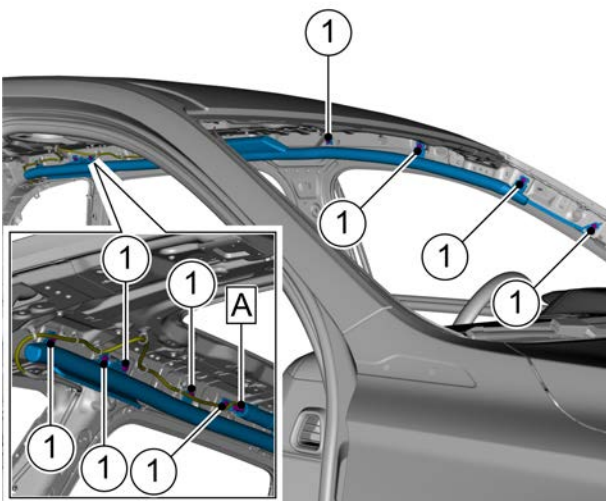
Caution

Check the surface of parts for scratches before assembly.

- 2 Connect the anti-collision side curtain (left) harness connector A.

Caution

Secure the harness connection: “Connect, click, and Confirm.”



- 3 Install the ceiling assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

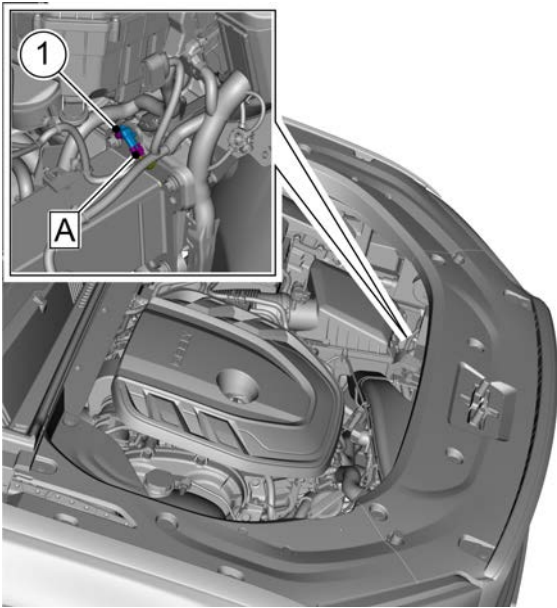
9.2.7.5 Collision sensor (front) replacement

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

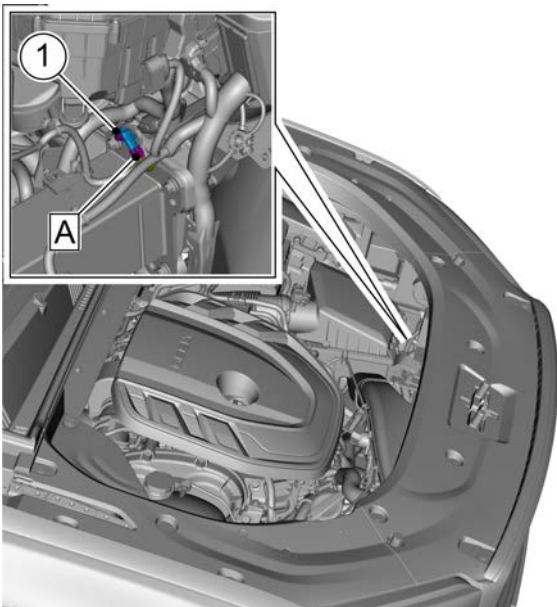
- 1 Open the engine hood.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)



- 3 Disconnect the forward collision sensor harness connector A.
- 4 Remove the impact sensor (front) bolt 1 and remove the impact sensor (front).

Installation procedure

- 1 Install the impact sensor (front) bolt 1.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 2 Connect the collision sensor (front) harness connector A.
Caution
Secure the harness connection: "Connect, click, and Confirm."



- 3 Connect the negative battery cable.
- 4 Close the engine compartment.

9.2.7.6 Collision sensor (B-pillar) replacement

Removal procedure

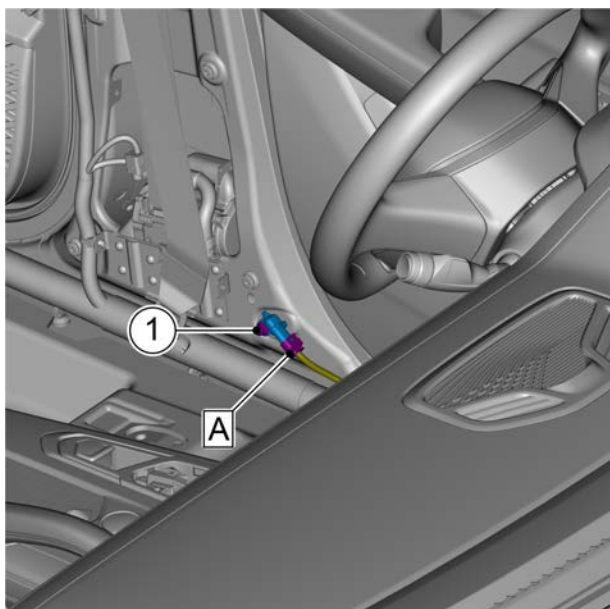
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

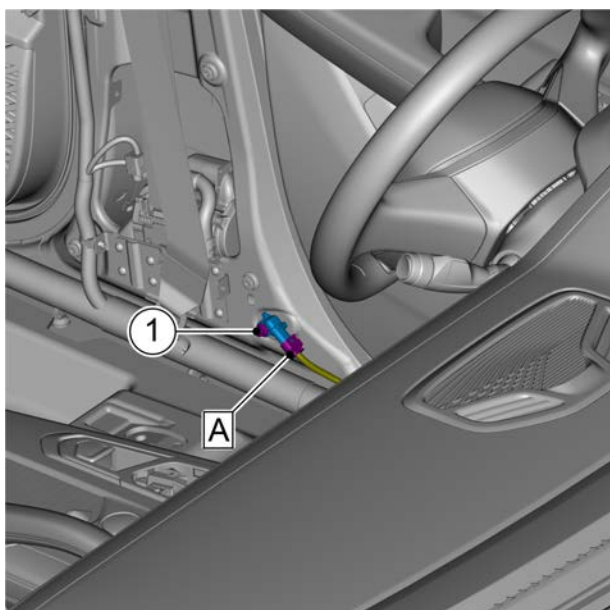
Caution

The removal and assembly methods of front left impact sensors (B-pillar) are similar.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Move the driver's seat forward to the maximum displacement.
- 3 Remove the left B-pillar lower trim panel assembly, refer to [replacement of left B-pillar lower trim panel assembly](#).
- 4 Disconnect the B-pillar collision sensor harness connector A.
- 5 Remove the retaining bolt 1 of the collision sensor (B-pillar) and remove the collision sensor (B-pillar).



Installation procedure



- 1 Install the impact sensor (B-pillar), and tighten the retaining bolt 1 of the impact sensor (B-pillar).
- 2 Connect the B-pillar collision sensor harness connector A.

Caution

Secure the harness connection: “Connect, click, and Confirm.”

- 3 Install the left B-pillar lower trim panel assembly.
- 4 Reset the driver’s seat.
- 5 Connect the negative battery cable.

9.2.8 Special tools and equipment

9.2.8.1 Equipment

Torque wrench

9.3 Pre-tensioned seat belt

9.3.1 Specification

9.3.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Bolt - connection between safety belt pretensioner (front left) and side wall	M10×25×30.65M	34~46	25.1~29.9
The lower end piece of the safety belt pretensioner (front left) is connected with the seat frame	M10	34~46	25.1~29.9
Bolt - connection between safety belt pretensioner (left of the second row seat) and side wall	M10×25×30.65M	34~46	25.1~29.9
Nut - connection between seat belt buckle sensor (middle and left of the second row seat) and the body	M12	41~55	30.2~40.6
Nut - connection between seat belt buckle sensor (right of the second row seat) and the body	M12	41~55	30.2~40.6

9.3.2 Instructions and operations

9.3.2.1 Instructions and Operations

Seat Belt

Seat belts are provided for the front-row seats, middle-row seats, and rear-row seats of the vehicle, which are the main means to protect passengers. In the following situations, seat belts can keep passengers in the passenger compartment and gradually reduce the collision force:

- Front collision
- Rear collision
- Side collision
- Overturn caused collision

Function description of active pre-tensioning safety belt:

1. Clearance elimination function: after the vehicle is started, the driver shall fasten the safety belt, and the active Pre-tightening safety belt will be automatically recovered to eliminate the clearance between the driver and the safety belt webbing, so as to achieve the best protection state.
2. Auxiliary retraction function: after the driver unfastens the safety belt, the active pre-tensioning safety belt will retract the webbing to the initial position (the active pre-tensioning safety belt needs to redefine the initial position every time the vehicle is powered on).
3. Vibration reminder function: when the relevant intelligent driving system sends an alarm signal during vehicle driving, the active Pre-tightening of the safety belt will remind the driver to respond in advance through vibration.
4. Active tightening function: in case of emergency or danger detected by ADAS system during vehicle driving, actively pre-tighten the safety belt to fix the driver on the seat and reduce possible injury to human body. The main working conditions are as follows:
 - Vehicle emergency braking conditions, such as driver emergency braking or automatic emergency braking AEB activation.
 - The vehicle makes an emergency turn or gives way.
 - The vehicle is not controlled, such as severe understeer or oversteer.
 - The vehicle has detected an impending front / rear collision.

Seat belt warning indicator

The seat belt unbelted warning indicator is located on the instrument cluster to remind the driver and occupants to fasten their seat belts.

Child seat protection system

Warning !

There are warning labels on the sun visor of the front occupant. Rear facing children's seats shall not be placed on the seats protected by the air bag. If the air bag is deployed, it will bring great risks to the children facing back.

Please install the child seat on the rear seat. The rear seat is equipped with ISOFIX interface. Install and fix the child safety seat according to the instructions of the child safety seat manufacturer.

9.3.3 System working principles

9.3.3.1 System Working Principles

Safety belt pretensioner (front left), safety belt pretensioner (front right)

The safety belt pretensioner (front left) and the safety belt pretensioner (front right) module include a housing, an ignition device and a gas generator. The igniter is part of the seatbelt pretensioner deployment loop. When the front, side or rear impact force of the vehicle is large enough to reach the set point explosion threshold, the airbag ECU will send an ignition command (current signal), and the current flows through the igniter to detonate the gas generator, to quickly produce a large amount of gas. The gas generated by this reaction will quickly retract and act on the safety belt retraction module, to quickly tighten the safety belt.

Front seat safety belt system

Front-row seat belt system includes the driver and passenger seat belt retractor, passenger identification sensor and two front-row seat belt switches. Passenger identification sensor is applied to check whether passengers are in the seats. If no one is found, turn off the occupant seatbelt warning indicator. Two front seat belt switches are located in the seat buckles, and they are used to control the seat belt alarming indicator and the buzzer.

Seat belt warning indicator

- This vehicle is equipped with the alarm function of driver and front occupant safety belt not fastened, and some models are equipped with the alarm function of rear occupant safety belt not fastened. When the safety belt unfastened alarm is triggered, in addition to the safety belt unfastened warning light on the combination instrument display will be lit in different states, the combination instrument display will also display the seat without safety belt in the form of image.
- When the start switch is in the on position, the airbag ECU (SRS) sends a signal to the combination instrument about the status of the safety belt. If the front seat belt is not fastened, the warning indicator of the combination instrument will light up to remind you to fasten the seat belt.

Rear seat belt system

Rear seat belt system includes the following components:

- The rear seat belt retractor is located in the C-pillar center guard and the rear seat back.
- The lower part of the rear seat belt is fixed on the floor.
- The rear seat belt buckle is fixed on the floor.

Rear occupant seat belt warning and alarm

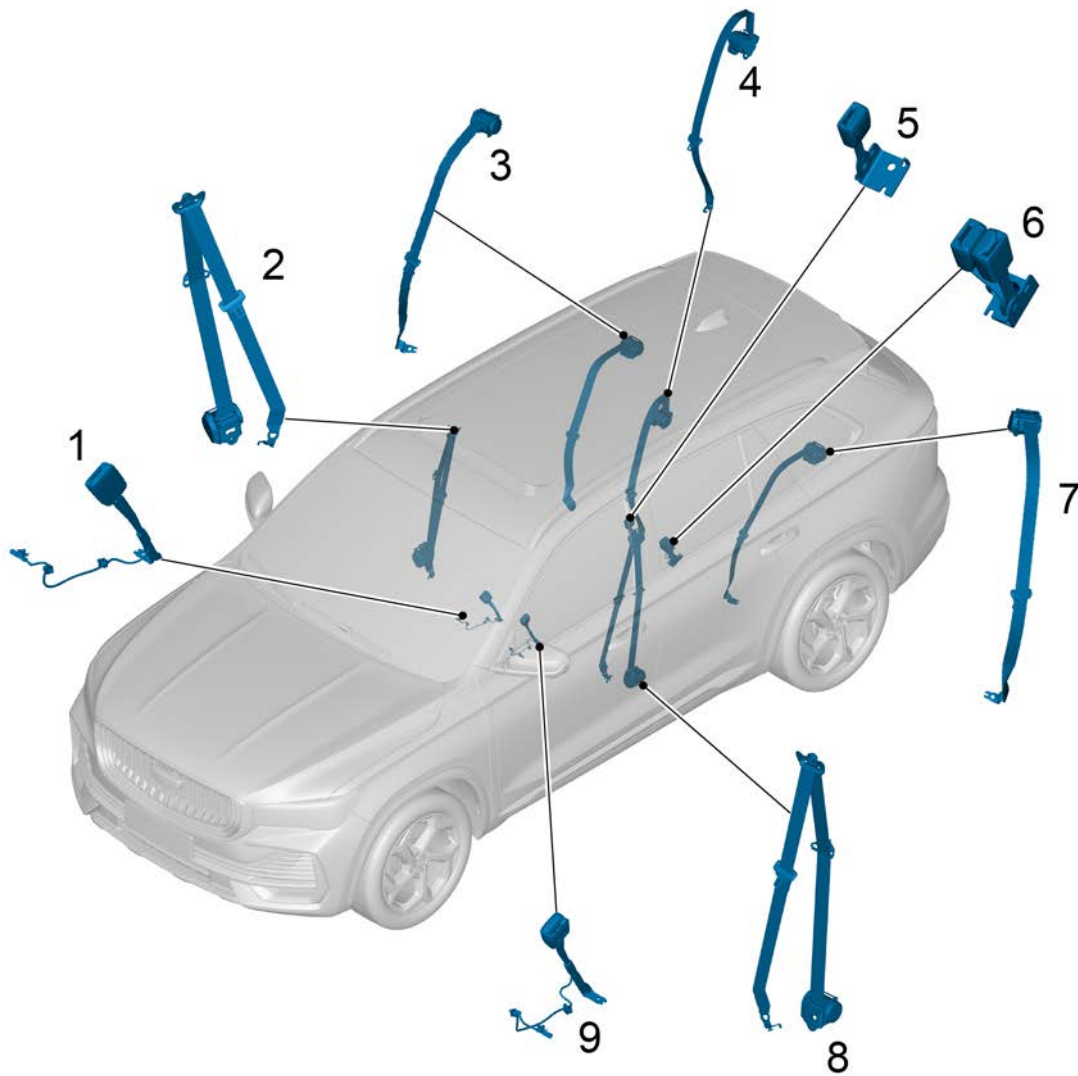
1. When the rear seat occupants are not wearing seat belts, the red seat belt not wearing symbol will be displayed on the rear seat occupants who are not wearing seat belts in

the combination instrument display, and the seat belt not wearing warning indicator will also be on. When the rear occupants fasten their safety belts, the white safety belt fastened symbol will be displayed on the corresponding seat in the rear in the combination instrument display.

2. When the start switch is in the on position or the engine is started, if the rear occupant safety belt is not fastened, the warning indicator will light up to prompt the occupant to fasten the safety belt; when the rear seat belt is unfastened when the vehicle is driving forward at a speed of more than 10 km / h, the warning light will flash and be accompanied by a warning tone. The warning light will not go out and the warning tone will disappear until the unfastened rear seat belt is fastened again or the unfastened state of the seat belt lasts for more than 32 seconds.

9.3.4 Component position

9.3.4.1 Component position

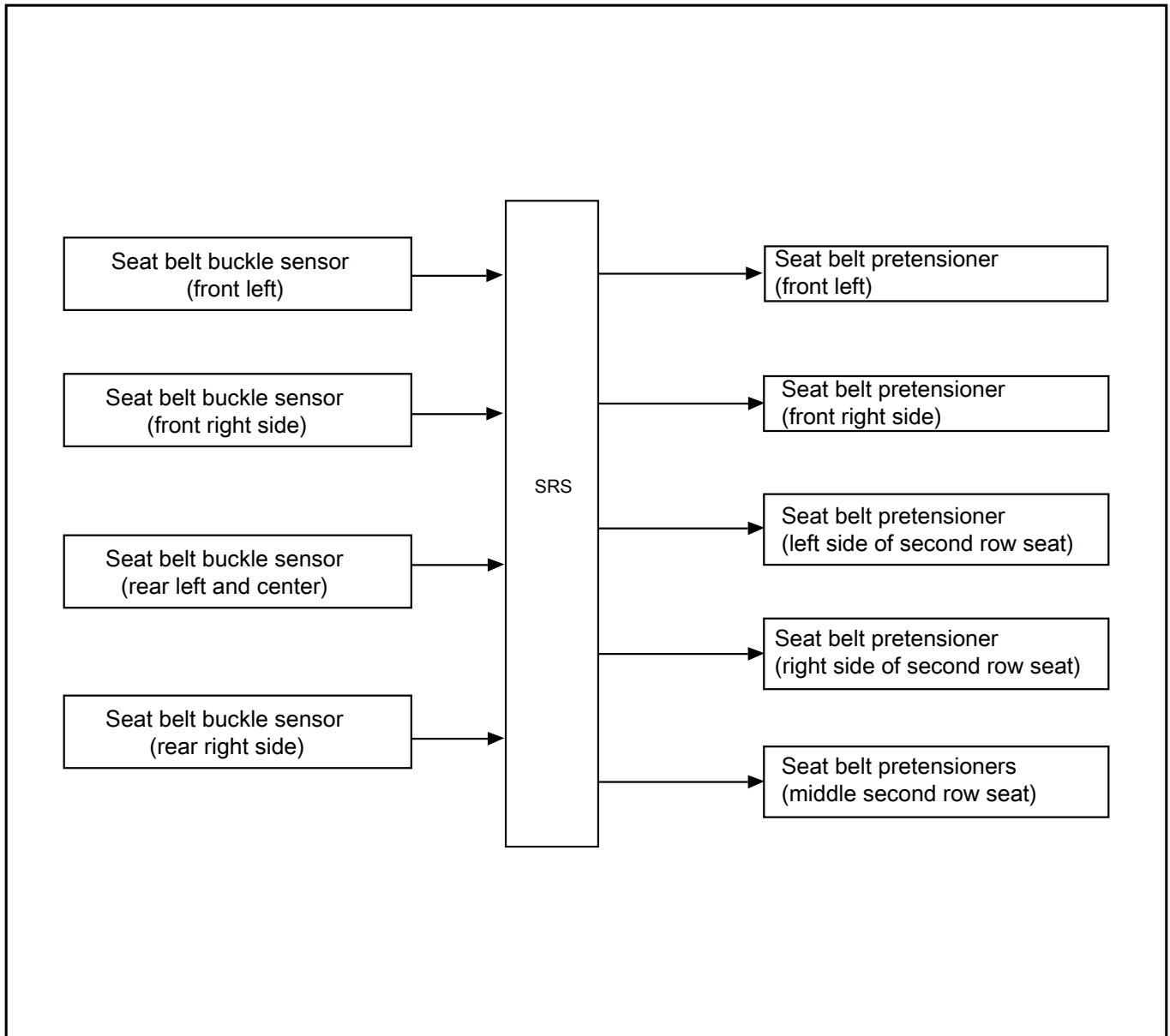


1. Front seat safety belt buckle sensor (right of the second-row seat)
2. Seat belt pretensioner (front right)
3. Seat belt pretensioner (right of the second-row seat)
4. Seat belt pretensioner (middle of second row seat)
5. Seat belt buckle sensor (right of the second row seat)

6. Left seat belt sensor assembly and second row seat belt buckle
7. Safety belt pretensioner (left of the second-row seat)
8. Seat belt pretensioner (front left)
9. Seat belt buckle sensor (front left)

9.3.5 Electrical schematic diagram

9.3.5.1 Electrical schematic diagram



9.3.6 Diagnostic information and procedures

9.3.6.1 Diagnosis Description

Refer to Instructions and Operations. Familiarize yourself with system functions and operation procedures before starting system diagnosis. This helps to determine the correct troubleshooting steps when a trouble occurs. More importantly, it also helps to determine whether the situation described by the customer is normal.

9.3.6.2 Routine inspection

Confirm trouble symptom

The most difficult situation during diagnostic completed is that no symptoms appear. Under such a condition, the fault described by distributors must be completely analyzed. Then simulate the same or similar condition and circumstance when the distributor's vehicle has faults. No matter how experienced and skillful maintenance personnel are, if eliminating faults without confirming fault symptoms, something important will be ignored in the maintenance, and wrong conjectures will be made in some places. It will make trouble shooting to fail.

Check system components that are easily accessible or can be seen to find out if there is any obvious damage or there is a situation that may cause a malfunction.

connector joints and fulcrums of vibration should be the main parts to be checked, and if the fault may be caused by vibration, the vibration method is recommended:

- a. Gently vibrate the possible fault part with fingers, and check whether the fault occurs.
- b. Gently shake the connector in both vertical and horizontal directions.
- c. Gently shake the harness in both vertical and horizontal directions.

Vehicle inspection

Seat belt pretensioner (front left) unfastened alarm:

1. When the driver does not fasten the safety belt, the red safety belt unfastened symbol will be displayed on the driver's seat in the combination instrument display, and the safety belt unfastened warning indicator will also be on.
2. When the driver fasten the safety belt, the white safety belt fastened symbol will be displayed on the driver's seat in the combination instrument display.
3. When the start switch is in the on position or the engine is started, if the driver's safety belt is not fastened, the warning indicator of unfastened safety belt on the display screen of the combination instrument will be on continuously;
4. When the vehicle speed exceeds 10km / h or the forward driving distance exceeds 300m, the warning indicator flashes and is accompanied by a warning tone;
5. When the driver's safety belt is unfastened when the vehicle is driving forward at a speed of more than 10 km / h, the warning indicator will flash and be accompanied by a warning tone. The warning indicator will not go out and the warning tone will disappear until the driver wears the safety belt or the safety belt is unfastened for more than 120 seconds.

Front right seat belt warning and alarm:

1. When the front row occupant seat contains occupants and the front row occupant is not wearing a seat belt, the red seat belt not wearing symbol will be displayed on the front row occupant seat in the combination instrument display, and the seat belt not wearing warning indicator will also be on.
2. When the front row occupants fasten their safety belts, the white safety belt fastened symbol will be displayed on the front row occupant seat in the combination instrument display.
3. When the start switch is in the on position or the engine is started, if the front occupant's safety belt is not fastened, the safety belt not fastened warning indicator on the display screen of the combination instrument will be on continuously;

4. When the vehicle speed exceeds 10km / h or the forward driving distance exceeds 300m, the warning indicator flashes and is accompanied by a warning tone;
5. When the front occupant's safety belt is unfastened when the vehicle is moving forward at a speed of more than 10 km / h, the warning light will flash and accompanied by a warning tone. The warning light will not go out and the warning tone will disappear until the front occupant fasten the safety belt or the safety belt is unfastened for more than 120 seconds.

Rear occupant seat belt warning and alarm:

1. When the rear seat occupants are not wearing seat belts, the red seat belt not wearing symbol will be displayed on the rear seat occupants who are not wearing seat belts in the combination instrument display, and the seat belt not wearing warning indicator will also be on.
2. When the rear occupants fasten their safety belts, the white safety belt fastened symbol will be displayed on the corresponding seat in the rear in the combination instrument display.
3. When the start switch is in the on position or the engine is started, if the rear occupant safety belt is not fastened, the warning indicator will light up to prompt the occupant to fasten the safety belt;
4. When the rear seat belt is unfastened when the vehicle is driving forward at a speed of more than 10 km / h, the warning light will flash and be accompanied by a warning tone. The warning light will not go out and the warning tone will disappear until the unfastened rear seat belt is fastened again or the unfastened state of the seat belt lasts for more than 32 seconds.

9.3.7 Removing and installing

9.3.7.1 Seat belt pretensioner (front left) replacement

Removal procedure

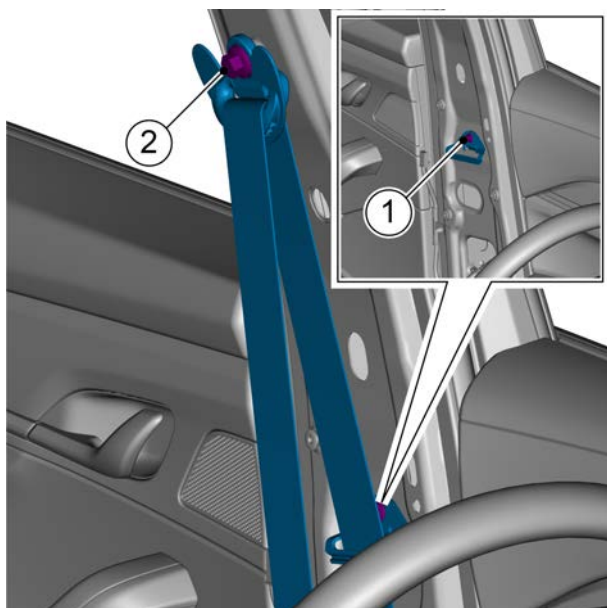
Warning !

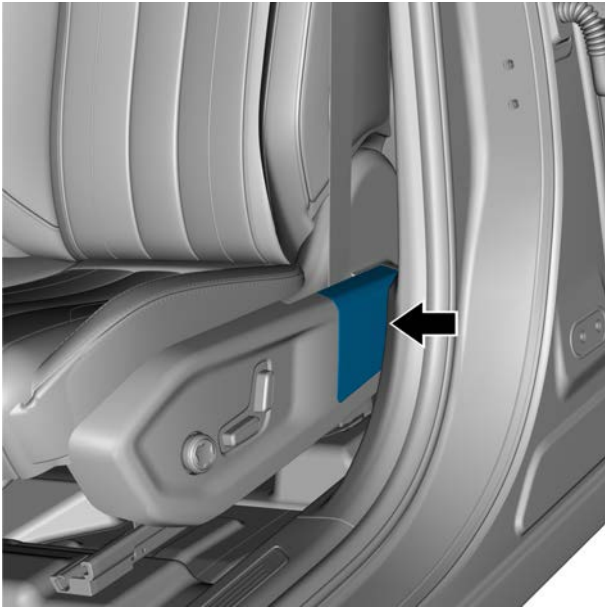
See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

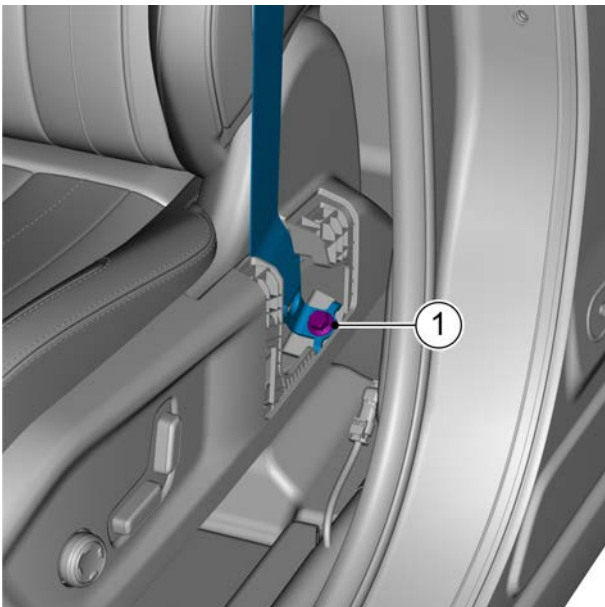
The removal and assembly methods of the front front left safety assemblies are similar.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left B-pillar lower trim panel assembly, refer to [replacement of left B-pillar lower trim panel assembly](#).
- 3 Remove the left and right B-pillar upper trim panel assembly, refer to [replacement of the left B-pillar upper trim panel assembly](#).
- 4 Move the seat forward to the maximum displacement.
- 5 Remove 1 retaining bolt 1 from the seat belt pretensioner (front left) bracket.
- 6 Remove 1 retaining bolt 2 from the upper mounting point of safety belt pretensioner (front left row).

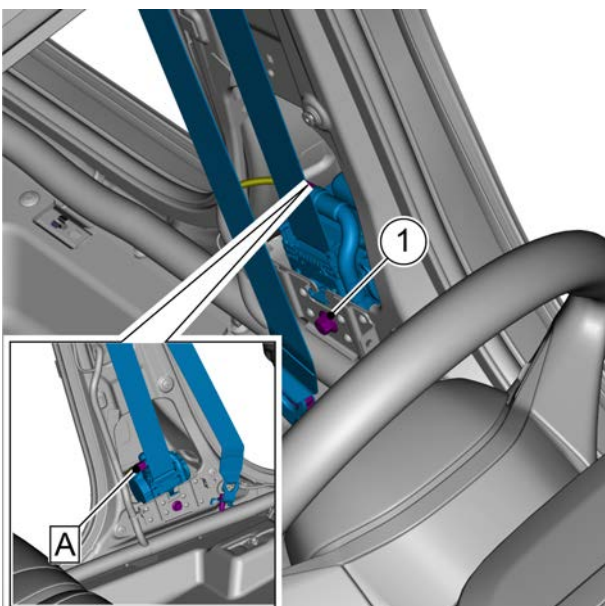




- 7 Remove the exit cover of the seat belt in the front left seat.

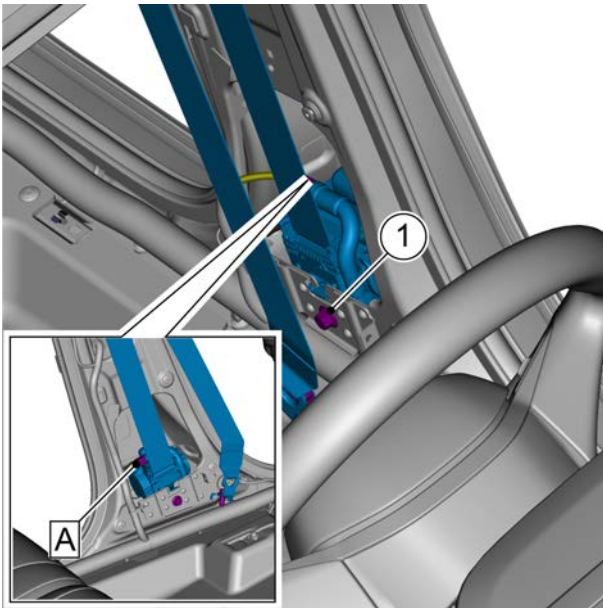


- 8 Remove retaining bolts 1 between the seat belt pretensioner (front left) and the seat assembly.



- 9 Disconnect harness connector A of seat belt pretensioner (Shoulder).
- 10 Remove the retaining bolt 1 between the seat belt pretensioner (front left row) and the lower mounting point, and remove the seat belt pretensioner (front left row).

Installation procedure



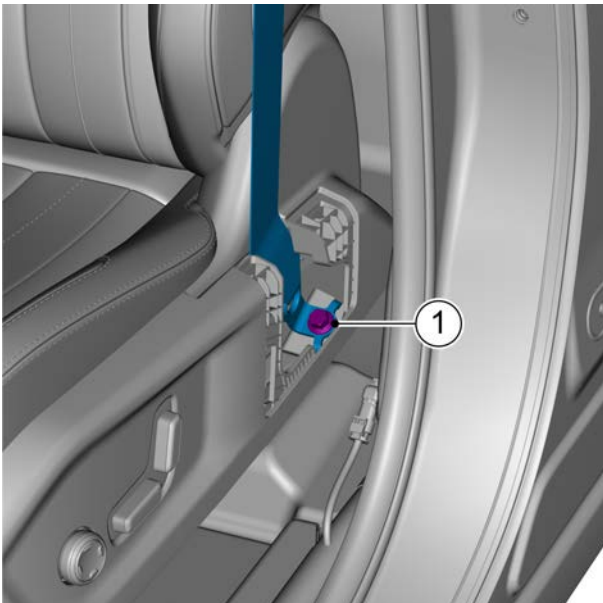
- 1 Place the safety belt tensioner (front left) in the installation position, and tighten the retaining bolt 1 between the safety belt tensioner (front left) and the lower installation point.

Torque: 40 N. m (metric system) 29.5 lb-ft (Imperial system)

- 2 Connect harness connector A of safety belt pretensioner (front left row).

Caution

Secure the harness connection: “Connect, click, and Confirm.”

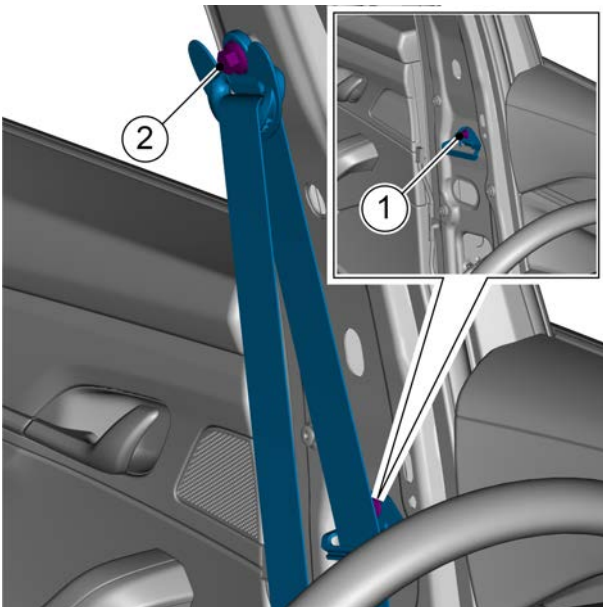


- 3 Install retaining bolts 1 between the seat belt pretensioner (front left) and the seat assembly.

Torque: 40 N. m (metric system) 29.5 lb-ft (Imperial system)



- 4 Install the exit cover of the seat belt in the front left seat.



- 5 Tighten 1 retaining bolt 2 at the upper mounting point of safety belt tensioner (front left row).

Torque: 40 N. m (metric system) 29.5 lb-ft (Imperial system)

- 6 Tighten 1 retaining bolt 1 of the seat belt pretensioner (front left row) bracket.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

Caution

Check whether the safety belt can be pulled out and returned smoothly.

- 7 Install the left B-pillar upper trim panel assembly.
- 8 Install the left B-pillar lower trim panel assembly.
- 9 Move the seat to the proper position.
- 10 Connect the negative battery cable.
- 11 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

9.3.7.2 Seat belt pretensioner (second row seat left) replacement

Removal procedure

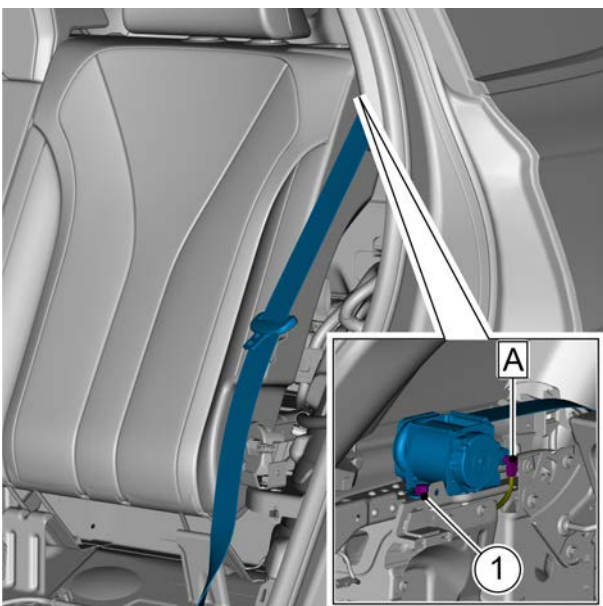
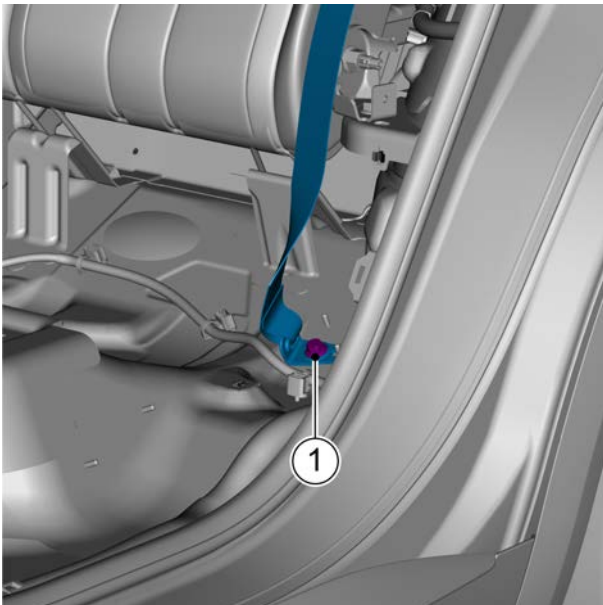
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

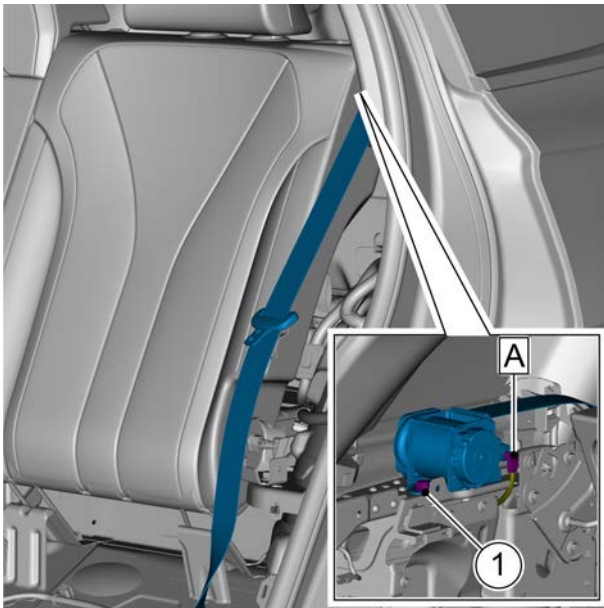
The removal and assembly methods of front left safety belt assemblies of the second row seats are similar.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rear seat cushion. See [replacement of rear seat cushion assembly](#).
- 3 Remove the left trunk side guard assembly. See [the replacement of the left trunk side guard assembly](#).
- 4 Remove the retaining bolt 1 of the lower mounting point of the safety belt tensiometer (left of the second row seat).



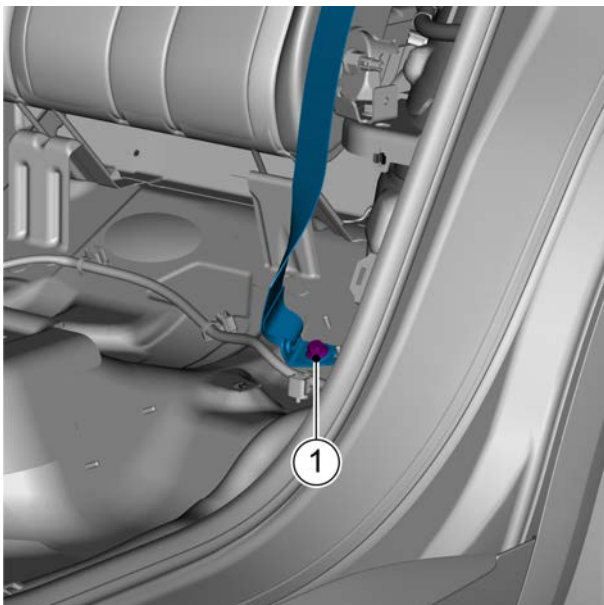
- 5 Remove the harness connector A and retaining bolt 1 of the safety belt tensiometer (left of the second row seat), and remove the safety belt tensiometer (left of the second row seat).

Installation procedure



- 1 Install retaining bolt 1 of safety belt tensioner (left of the second row seat) and connect harness connector A of safety belt tensioner (left of the second row seat).

Torque: 45 N. m (metric system) 33.2 lb-ft (Imperial system)



- 2 Install the lower mounting point of safety belt tensioner (left of the second row seat), and tighten the retaining bolt 1.

Torque: 45 N. m (metric system) 33.2 lb-ft (Imperial system)

- 3 Install the left rear compartment side guard assembly.
- 4 Install the rear-row seat cushions.
- 5 Connect the negative battery cable.

9.3.7.3 Seat belt buckle sensor (front left) replacement

Removal procedure

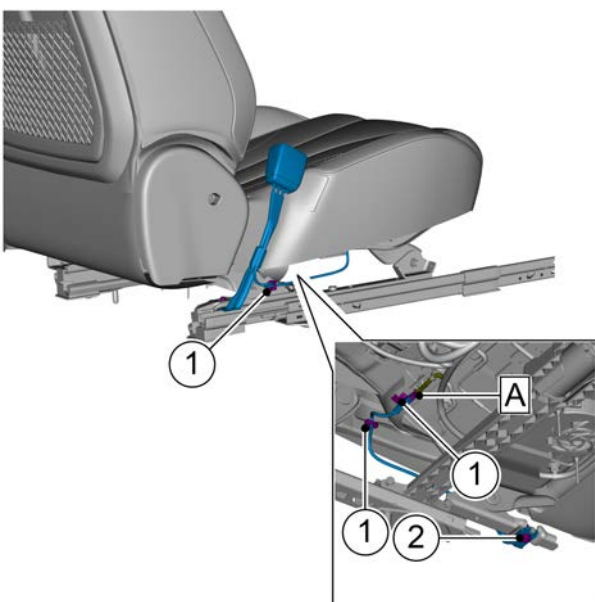
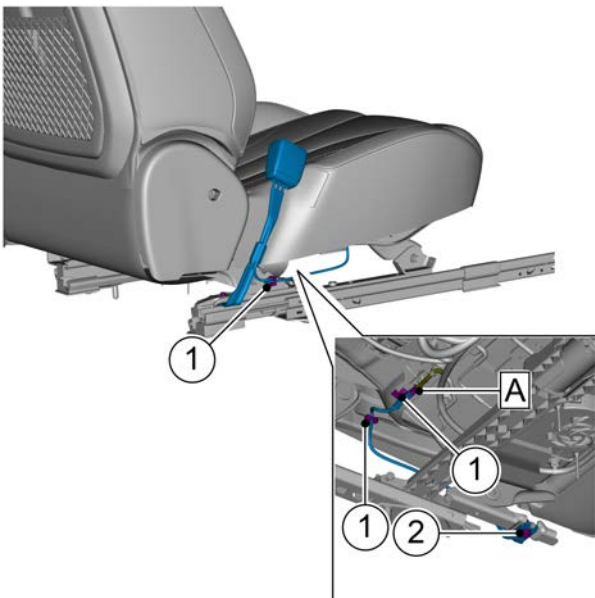
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

The assembly and removal methods of the front front left seat belt buckles are similar.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures..](#)
- 2 Remove the driver seat assembly, see [Replacement of the driver seat assembly](#).
- 3 Disconnect harness connector A of seat belt buckle sensor (front left).
- 4 Remove the harness clip 1 of seat belt buckle sensor (front left).
- 5 Remove the retaining bolt 2 of the seat belt buckle sensor (front left), and remove the seat belt buckle sensor (front left).

**Installation procedure**

- 1 Place the seat belt buckle sensor (front left) in the installation position, install and tighten the retaining bolt 2 of the seat belt buckle sensor front left.

Torque: 45 N. m (metric system) 33.2 lb-ft (Imperial system)

Caution

Ensure that the latch fits smoothly with the base plate.

- 2 Install harness clip 1 of seat belt buckle sensor front left.
- 3 Connect harness connector A of seat belt buckle sensor (front left row).

- 4 Install the driver seat assembly.
- 5 Connect the negative battery cable.

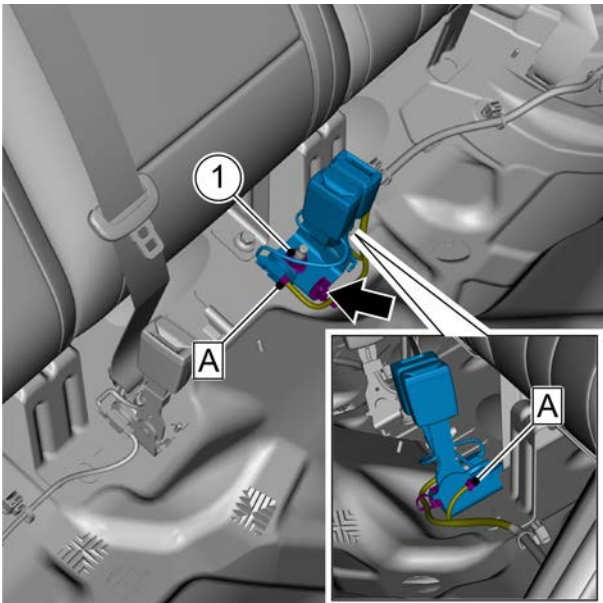
9.3.7.4 Replacement of seat belt buckle sensor (middle and left of the second row seat)

Removal procedure

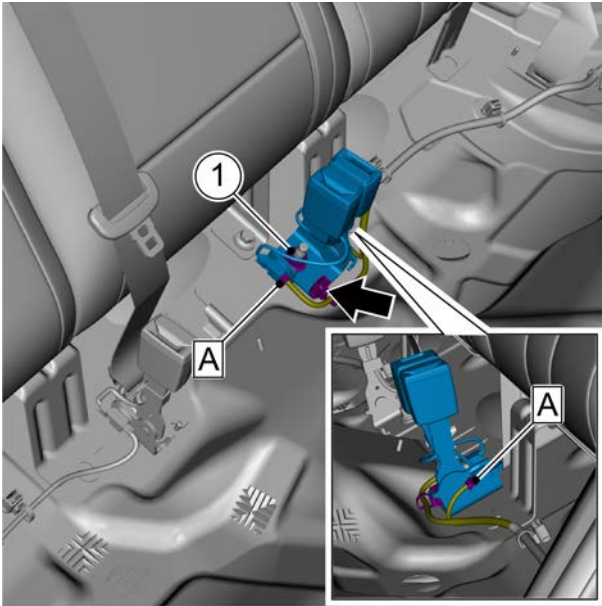
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly](#).
- 3 Disconnect 2 harness connectors A of seat belt buckle sensor (middle and left of the second row seat).
- 4 Disconnect the harness fixing clip.
- 5 Remove the fixing nut 1 of the seat belt buckle sensor (middle and left of the second row seat), and remove the seat belt buckle sensor (middle and left of the second row seat).



Installation procedure



- 1 Place the seat belt buckle sensor (the middle and left of the second row seat) in the installation position, and tighten one fixing nut 1 of the seat belt buckle sensor (the middle and left of the second row seat).

Torque: 48 N. m (metric system) 35.4 lb-ft (Imperial system)

Caution

Ensure that the latch fits smoothly with the base plate.

- 2 Connect 2 harness connectors A of seat belt buckle sensor (middle and left of the second row seat).

- 3 Install the harness fixing clip.
- 4 Install the rear seat cushion assembly.
- 5 Connect the negative battery cable.

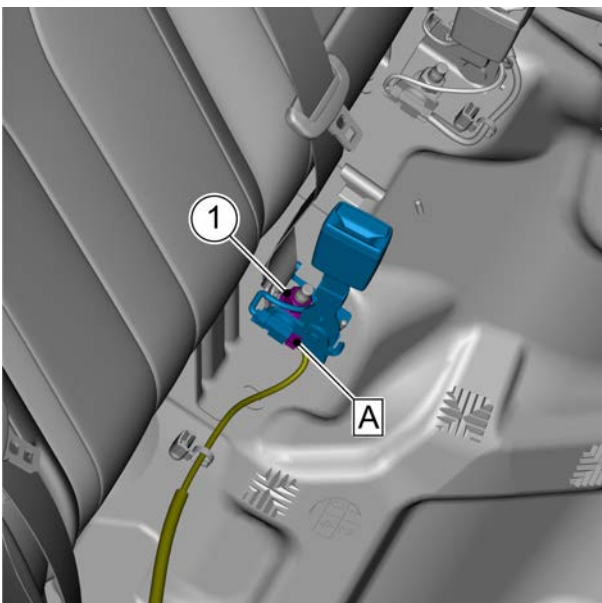
9.3.7.5 Seat belt buckle sensor (right of the second row seat) replacement

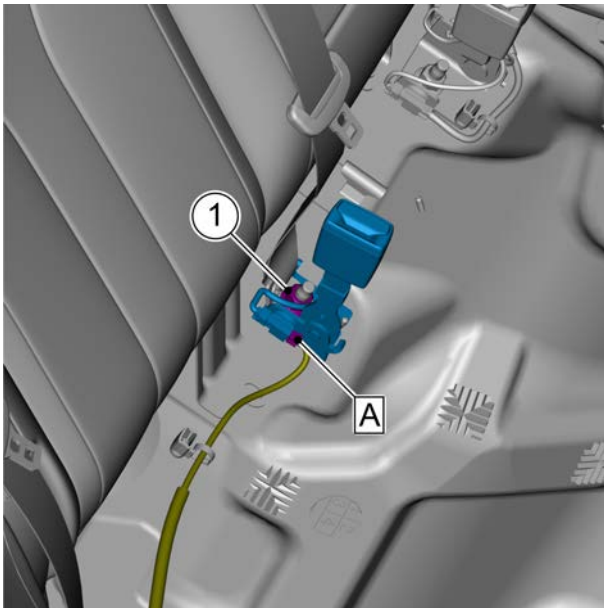
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly](#).
- 3 Disconnect harness connector A of seat belt buckle sensor (right of the second row seat).
- 4 Remove the retaining bolt 1 of the seat belt buckle sensor (right of the second row seat) assembly, and remove the seat belt buckle sensor (right of the second row seat) assembly.





Installation procedure

- 1 Install the seat belt buckle sensor (right of the second row seat) assembly, and tighten the retaining bolt 1 of the seat belt buckle sensor (right of the second row seat).

Torque: 45 N. m (metric system) 33.2 lb-ft (Imperial system)

Caution

Ensure that the latch fits smoothly with the base plate.

- 2 Connect harness connector A of seat belt buckle sensor (right of the second row seat).
- 3 Install the rear seat cushion assembly.
- 4 Connect the negative battery cable.

9.4 Active safety

9.4.1 Instructions and operations

9.4.1.1 Instructions and Operations

Lane Keeping Assist (LKA)

Lane keeping assist (LKA) system consists of lane departure warning (LDW), lane departure assistance (LDP) and lane keeping assistance (LKS). The system uses a front-view camera to identify the lane lines and calculates the distance between the vehicle and the left and right lane lines. When the vehicle deviates from the lane, the system will provide active correction to prevent it from deviating from the lane, or remind the driver to control the vehicle in the lane. Lane keeping assist (LKA) system is available when the operating speed of lane keeping assist is 60 ~ 180 km / h and the lane line is clearly visible. This function is suitable for expressways or similar main roads.

1. Lane Departure Warning (LDW)

The Lane Departure Warning (LDW) warns the driver in the event of an unintentional lane departure of his/her own vehicle. Unintentional lane departure includes lane departure that has already occurred, as well as lane departure that is about to occur.

2. Lane Departure Prevention (LDP)

When the vehicle is approaching the lane line and there is a risk of departure, Lane Departure Prevention (LDP) will actively control the vehicle back to the lane by applying torque to the steering wheel. LDP provides 55-180km / h steering assistance to the driver to prevent the vehicle from deviating from its own lane without the driver's awareness.

3. Lane Keeping Assist (LKS)

Lane Keeping Assist (LKS) actively manipulate the vehicle to stay in the middle of the lane by applying torque to the steering wheel. LKS can only work when it recognizes the left and right lane lines at the same time. LKS provides steering control for the driver by controlling the electronic power steering system (EPS) at 55-180km / h and assists the driver to keep the vehicle in its own lane.

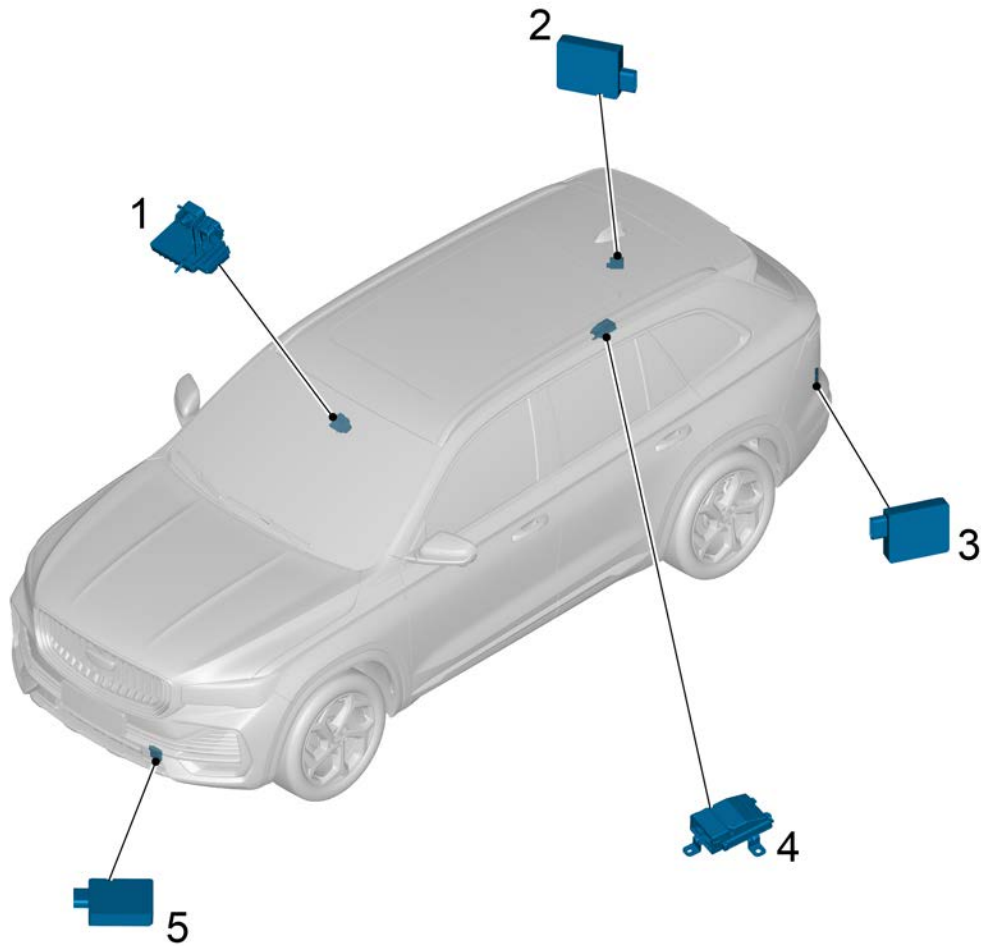
Automatic speed limit control system (LIM)

Using the automatic speed limit control system (LIM), the driving speed cannot exceed the preset speed limit. In the combination instrument display screen, the automatic speed limit control system can be selected through the function menu switching button on the left of the steering wheel. After selection, the automatic speed limit control system enters the

standby state, and the status indicator of the automatic speed limit control system (LIM) lights up in white.

9.4.2 Component position

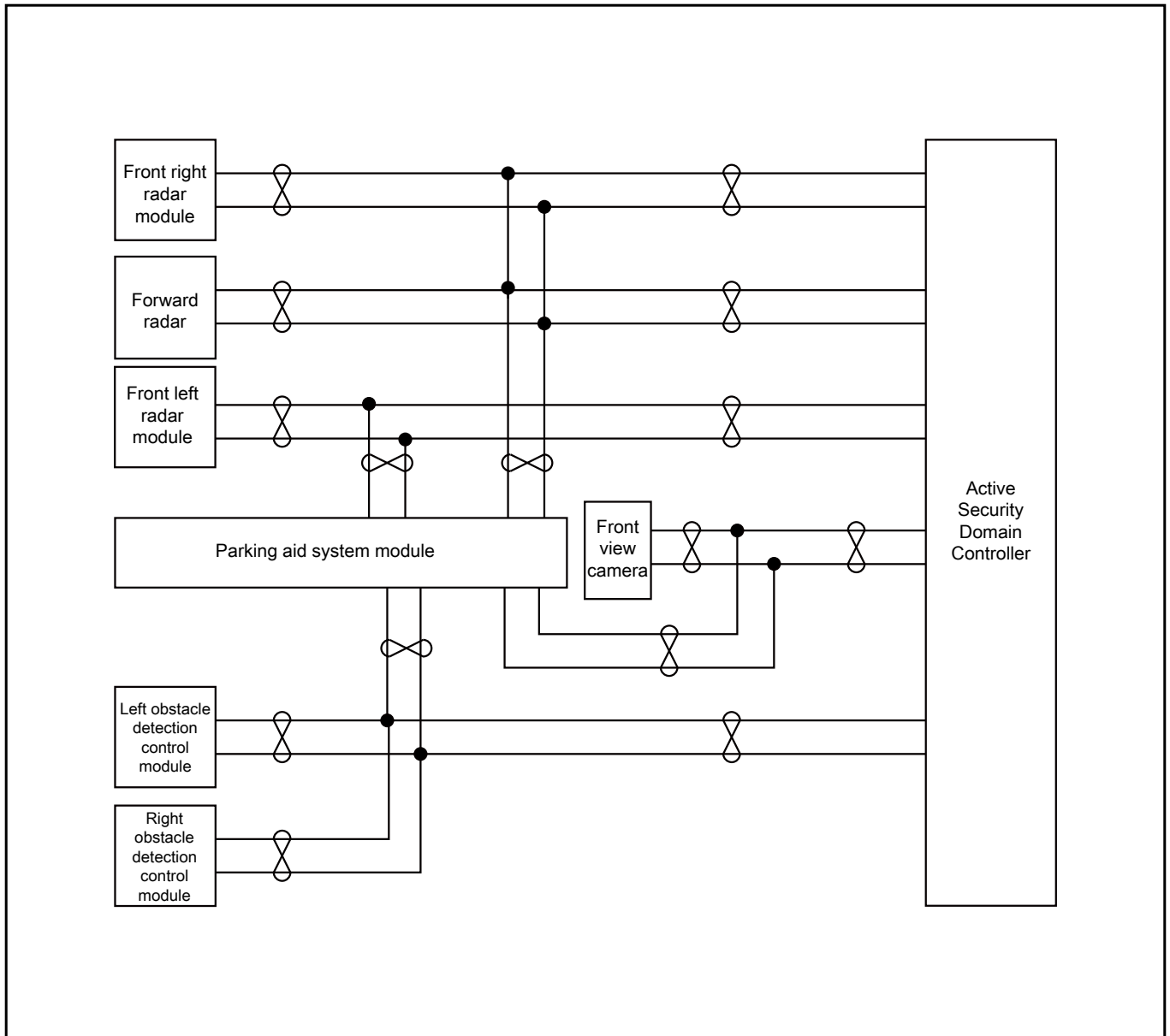
9.4.2.1 Component position



- | | | | |
|----|---|----|-----------------------------|
| 1. | Forward-looking camera | 4. | Active safety domain master |
| 2. | Right obstacle detection and control module | 5. | Forward-looking radar |
| 3. | Left obstacle detection and control module | | |

9.4.3 Electrical schematic diagram

9.4.3.1 Electrical schematic diagram



9.4.4 Diagnostic information and procedures

9.4.4.1 Diagnosis Description

Refer to Instructions and Operations. Familiarize yourself with system functions and operation procedures before starting system diagnosis. This helps to determine the correct troubleshooting steps when a trouble occurs. More importantly, it also helps to determine whether the situation described by the customer is normal.

9.4.4.2 Routine inspection

1. Check after-sale installations that may affect the operation of the active safety system to ensure that they do not affect the operation of the active safety system.
2. Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
3. Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

9.4.5 Removing and installing

9.4.5.1 Right obstacle detection control module replacement

Removal procedure

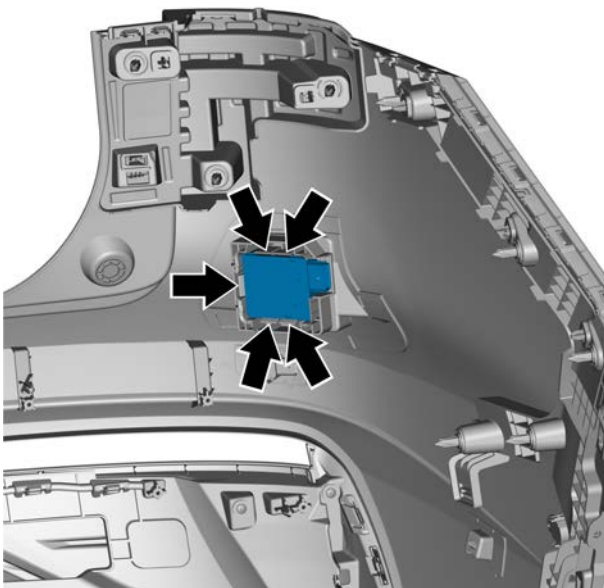
Caution

The removal and assembly methods of front left obstacle detection control modules are similar.

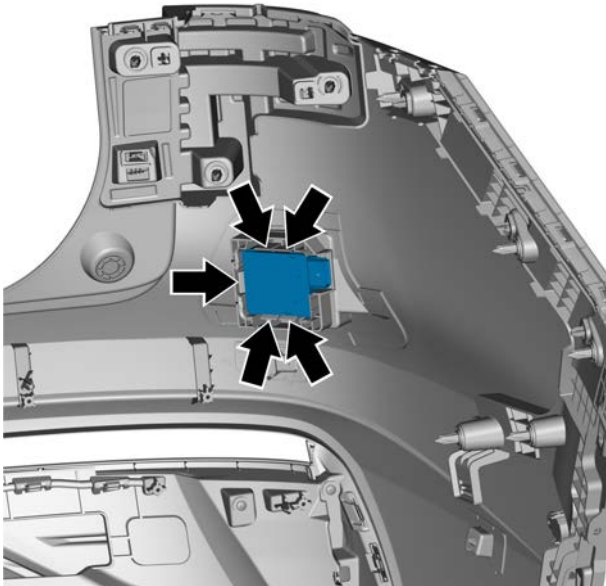
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the rear bumper assembly, see [Replacement of the rear bumper assembly \(Type 2\)](#).
- 4 Remove the right-hand obstacle detection module and remove the obstacle detection module.



Installation procedure



- 1 Install the right obstacle detection control module and fix the right obstacle detection control module fixing card.

- 2 Install the rear bumper assembly.
- 3 Connect the negative battery cable.
- 4 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 5 Close the engine compartment cover.

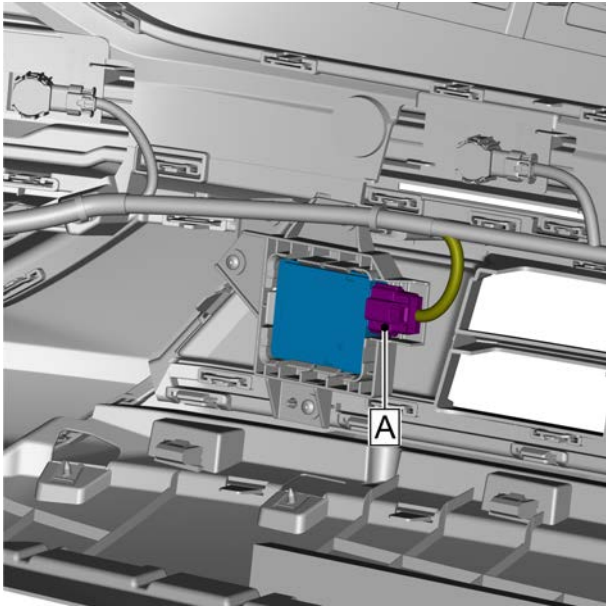
9.4.5.2 Forward radar replacement

Removal procedure

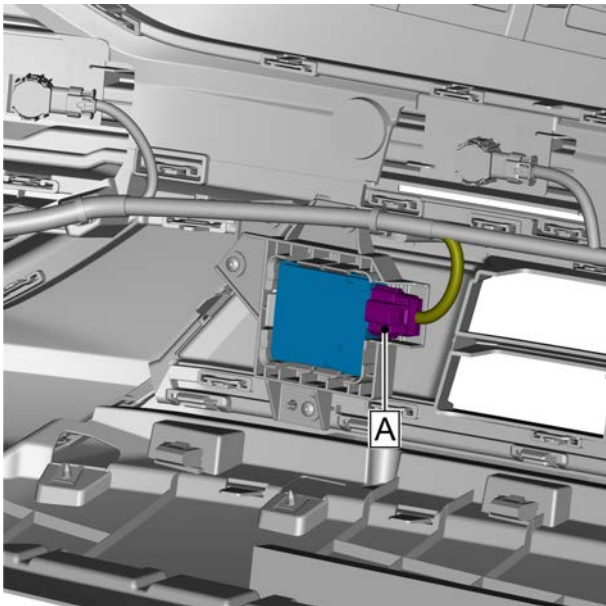
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)



- 3 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 4 Disconnect the forward radar harness connector A and remove the forward radar.



Installation procedure

- 1 Clip forward radar and connect forward radar harness connector A.

Caution

Secure the harness connection: “Connect, click, and Confirm.”

- 2 Install the front bumper assembly.
- 3 Connect the negative battery cable.
- 4 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

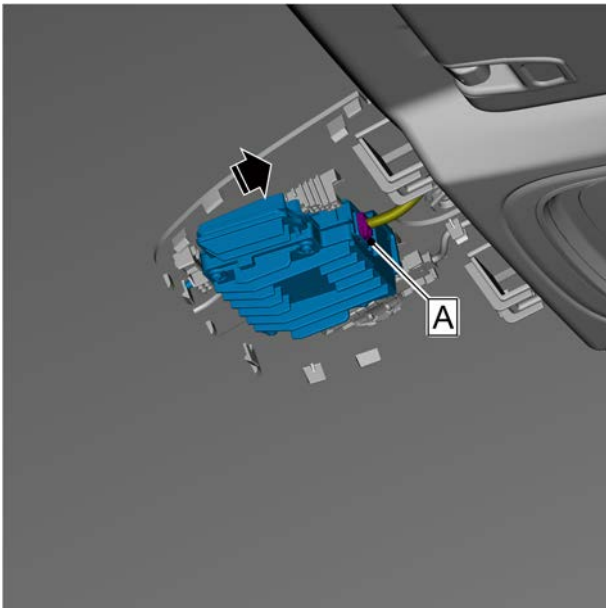
9.4.5.3 Front view camera replacement

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

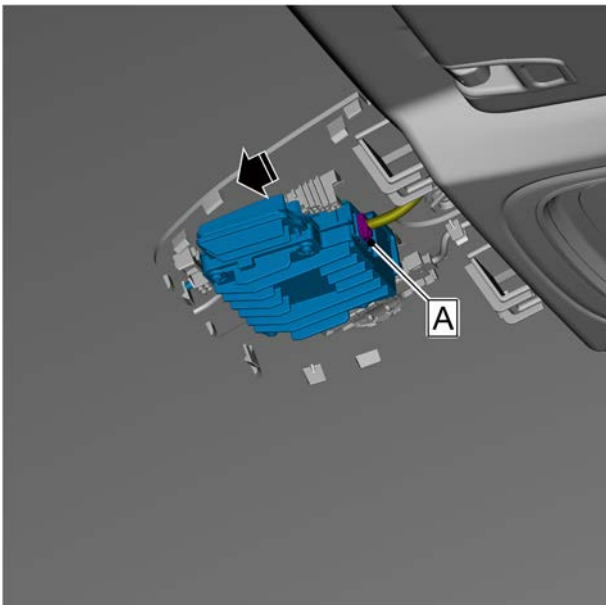
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the interior rearview mirror assembly, see [mechanical dimming interior mirror replacement](#), [interior rearview mirror module replacement](#).
- 4 Disconnect the front view camera harness connector A, disconnect the fixing card upward and remove it.

**Installation procedure**

- 1 Fix the front view camera and connect the front view camera harness connector A.

Caution

Secure the harness connection: "Connect, Click, and Confirm."



- 2 Install the interior rearview mirror assembly.

- 3 Connect the negative battery cable.
- 4 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

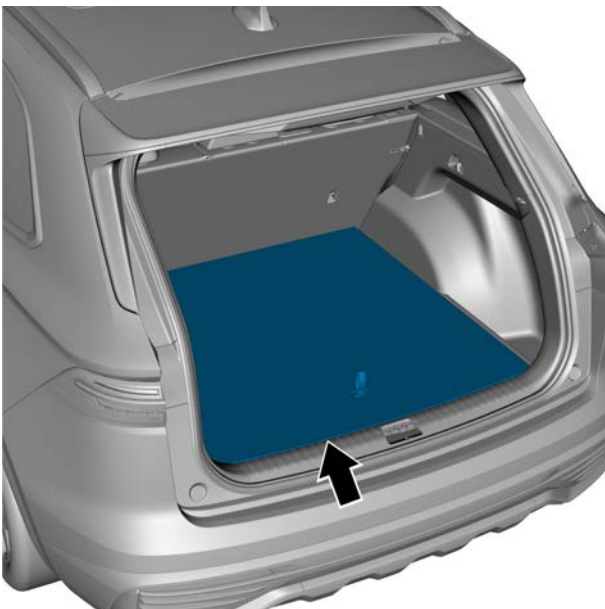
9.4.5.4 Replacement of active security domain controller

Removal procedure

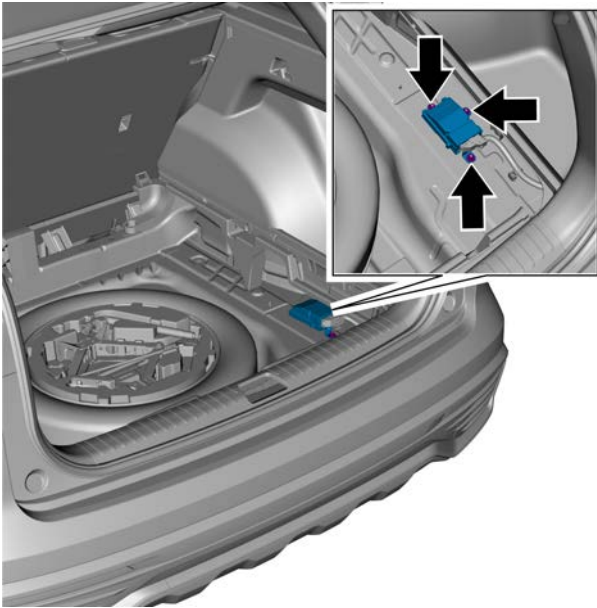
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

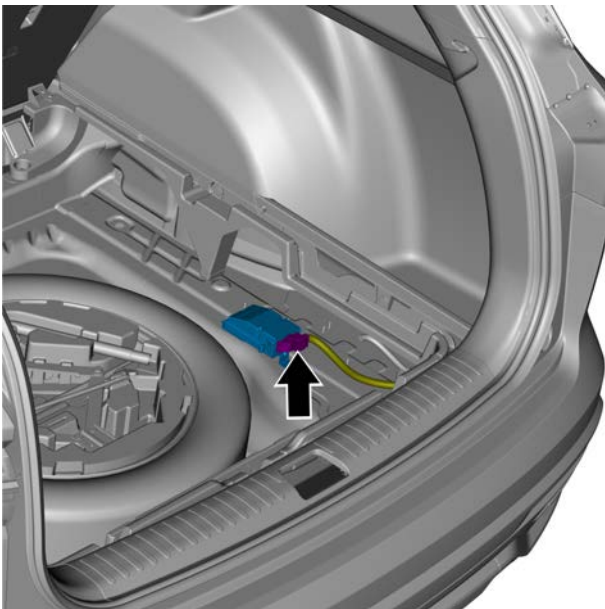
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Take out the luggage compartment carpet assembly.



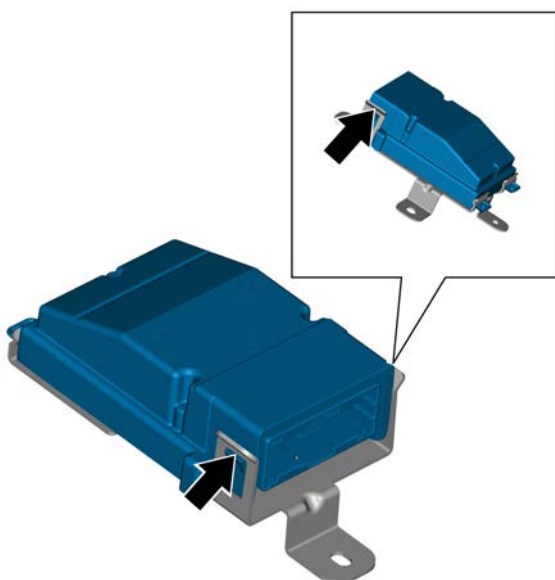
- 3 Take out the luggage compartment storage box.



- 4 Remove the plastic fixing nut of the active security domain controller and take out the active security domain controller.

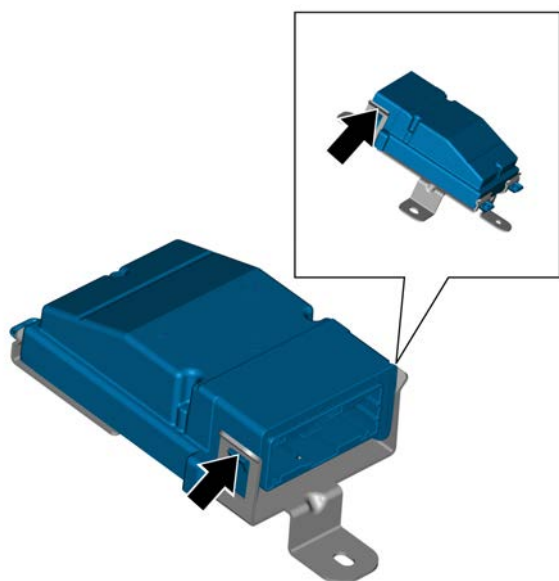


- 5 Disconnect the harness connector of the active security domain controller.

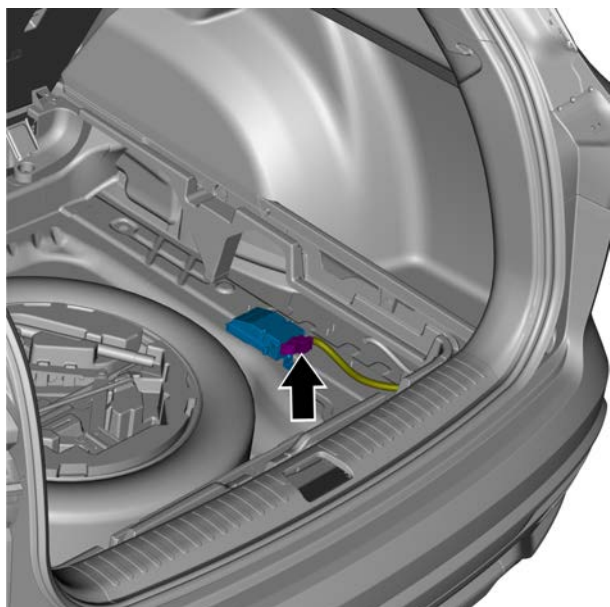


- 6 Disconnect the fixed card of the active security domain controller and take out the active security domain controller.

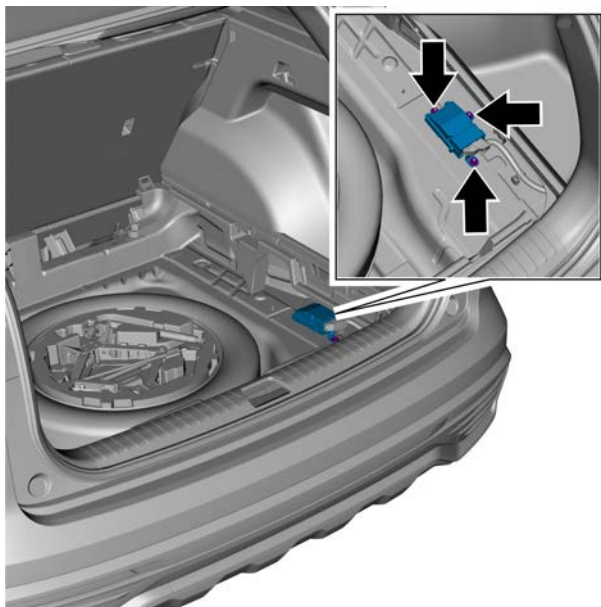
Installation procedure



- 1 Place the active security domain controller in the active security domain controller bracket and install the fixing card.



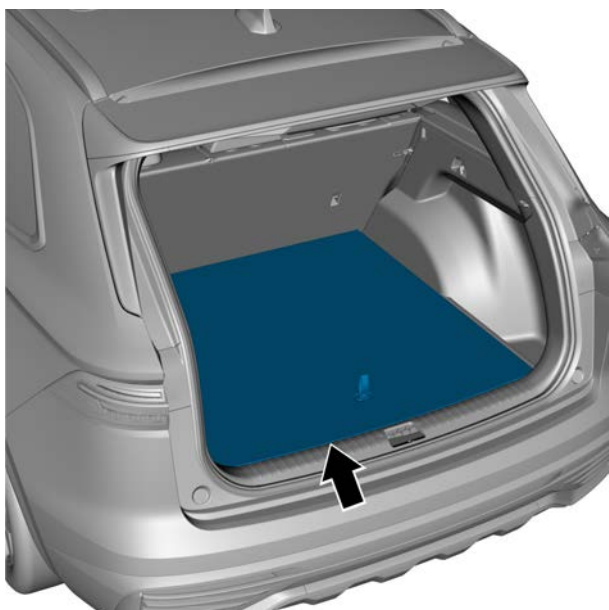
- 2 Install the harness connector of the active security domain controller.



- 3 Place the active security domain controller in the installation position and tighten the plastic fixing nut.
Torque: 3.5 N. m (metric system) 2.6 lb-ft (Imperial system)



- 4 Install the rear compartment auxiliary box.



- 5 Install the luggage compartment carpet assembly.

- 6 Connect the negative battery cable.
- 7 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

Vehicle control system

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10.1 Warnings and precautions

10.1.1 Warnings and precautions

10.1.1.1 Warnings and precautions

Warnings regarding battery disconnection

Warning !

Before servicing any electrical component, the start and stop button power supply mode shall be in the OFF status and all electrical loads must be "OFF (switch-off)" unless otherwise stated in the operating procedure. If tools or equipment are easily accessible to exposed live electrical terminals, disconnect the negative battery cable. Violate these safety instructions may result in personal injury and/or damage to the vehicle or vehicle components.

Warnings regarding road test

Warning !

Road test should be conducted under the premise of ensuring safety and observing all traffic regulations. Do not try any operation that may endanger the control of the vehicle. Violating the above safety instructions can cause serious personal injury and damage the vehicle.

Warning about window quickly lifting

Warning !

When the driver door operates the electric window switch, the fast up/down function makes the window move extremely fast without stopping, which may result in personal injury.

Notices of placing the start and stop button in OFF position when the battery is disconnected

Caution

Be sure to put the start switch in the OFF position, whenever connecting or disconnecting battery cables, battery chargers, or jumper cables. Otherwise, the control module or other electrical compartments may be damaged.

5. Notices of the power system control module and electrostatic discharge

Caution

Do not touch the connector pins or welded parts on the circuit board to prevent electrostatic discharge from damaging the electronic control module on the vehicle.

10.2 Vehicle control system

10.2.1 Specification

10.2.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Bolt-connection of central electronic module bracket to car body	M6×16	8.5~11.5	6.3~8.5
Nut-connection of central electronic module bracket to car body	M6×7.3	8.5~11.5	6.3~8.5

10.2.2 Instructions and operations

10.2.2.1 Instructions and Operations

General

In order to reduce the fault rate of vehicles, implement more effective humanized control. Therefore, the centralized control mode (CEM) is adopted for electrical accessories.

External anti-theft

When the start switch is operated to the "OFF" state, and the doors, rear lift door and engine hood are closed, press the lock button on the intelligent key or touch the sensor area on the driver side or the front passenger side door handle, the turn signal flashes once, the four doors, the rear lift door and the fuel tank cap are locked, after the locking operation is successfully carried out, the anti-theft alarm system will begin the preset defense phase and will enter the fortification state after 1 second. When the anti-theft alarm system enters the alarm state, when someone illegally forcibly opens the car door, rear lift door or engine hood, the turn signal will flicker by a 500ms-on-500ms-off cycle for a duration of 5 minutes; the horn will sound in the cycle of 500ms-on-500ms-off with a maximum duration of 30s as the sound prompt. If all the doors (four doors, hood and rear lift door) are not all closed, after the locking operation is successfully executed, the anti-theft alarm system will enter the reminding phase, the turn signal will flash 3 times and the anti-theft alarm will horn 3 times to remind the driver that some door (four doors, hood and trunk) is not closed. If the four doors and two covers are closed within the reminding period (10 seconds), the reminding status will be suspended. The anti-theft alarm system will be transferred to the alarm state or the alarm release state according to the situation. If the reminding period (10 seconds) ends and the door or cover is still open, the alarm system will enter the alarm state.

Door lock control function

The body control system provides the following central door locking functions:

1. Smart key locking/unlocking

Start and stop button power supply system OFF status, and press the unlock button on the remote control twice within 500ms to unlock four doors, then the turn signal lamp flashes three times for confirmation, and the internal light fades on, with the position lamp on.

Start and stop button power supply system OFF status, and press down the lock button on the remote control once, to lock four doors, then the turn signal lamp flashes for conformation, and the inside lamp fades off, with the position lamp off.

Start-and-stop button power supply system OFF status, and press down the remote locking button for more than 2s, then the electric vehicle windows will switch off automatically, with its signal harness transmitted through LIN

2. Interior central switch unlocking/locking

Press down the central door control switch locking button, then the CEM will drive to unlock the four doors. When the vehicle speed is greater than 15km/h, the central control unlocking command will be disenabled. The inside central control unlocking can be performed only in the anti-theft relief status. If it is in other anti-theft status, it will not respond.

3. Driver side door separate unlocking

Turn the mechanical key to the UNLOCK position, the driver side door will be unlocked separately. Press down remote unlock button once within 1s, the driver side door unlock.

4. Automatic re-locking

30s after the unlock of remote control, if any of the four doors and the trunk door is not opened, it will the doors will be automatically relocked. Inside lamp switch off, and the system enter the alert status.

5. Automatic locking during driving

When the speed increases from 0 to ≥ 20 km/h, the lock of four doors will lock automatically.

6. Automatic unlocking upon collision

When the collision signal is obtained from the CAN bus, CEM will trigger the central control unlock twice within 3s, and the left and right turn signal will continue to flash, and the central control lock will fail. Unless a door is open and the power supply mode is in OFF status, as well as the collision signal is out of date (4s).

7. Automatic unlocking upon flameout

When the door lock is in lock status and the power supply mode is in OFF status, the four-door will unlock automatically.

8. Tailgate unlocking

When the start and stop button is in OFF position, press down the remote control unlock button of tailgate for more than 1s to unlock the tailgate.

9. The back door locks automatically

The back door will be automatically locked 1.5s after it is closed. During the automatic relocking process, the back door will also be unlocked.

10. Disable tailgate unlocking:

When the power supply mode is in ON status and the vehicle speed is faster than 15km/h, the unlocking of tailgate will not be performed.

11. Disable remote command

When the power supply is in ON status, any remote commands other than the unalarm operation and the unlocking of the tailgate will not be executed.

12. Door lock motor overheating protection

The door lock overheating protection function is activated after six consecutive locking or unlocking actions with an interval of not more than 1280 ms. At this point, only the collision automatic unlocking, the other unlock requests can only be executed once, and no other locking/unlocking requests will be executed for 20s.

Driver alarm information

When the driver has some abnormal operation, the body control system will send CAN message to the instrument, and the instrument will produce buzzer warning to remind the driver. It contains the following functions: the light is not OFF warning: the power mode is OFF, the steering module will turn on the headlights or position lights, if the driver side door is open, the car body control system will produce an alarm signal to the instrument, the instrument will give out sound warning.

Comfortable Lighting Control

1. Start follow me home function: click on the multimedia display: Vehicle sets → Lighting → Lighting signal, choose the follow me home function interface to set a timing to turn follow me go home function on. When the vehicle anti-theft is off and follow me home function is not turned off as shown on the multimedia display, the following two ways can activate the follow me home function:

- When the light steering wheel module is in a non-AUTO position, within 10 minutes after the vehicle stalls, turn the light control steering wheel module to the limit in the direction of the arrow, then release it, and the high light flashes once, activating the follow me home function.

- At night, when the light steering wheel module is in the AUTO position, the vehicle automatically activates the follow me home function when the car turns off.

Turn off follow me home function: click on the multimedia display: Vehicle sets → Lighting → Lighting signal, and then click the Turn off under the follow me home setting interface, and you can turn it off. When any of the following conditions are met, follow me home function will be temporarily turned off:

- The startup switch is not turned off.

- Timeout.

- The high beam is turned on or the high beam flashes.

2. Automatic lighting function: when the start switch is in the "ON" position and the steering wheel module is in the AUTO position, the automatic lighting system automatically controls the lighting and closing of the headlamps according to the external light intensity. The automatic lighting system can identify the road conditions of dark and channel lights, and realize the automatic control of position lamps and low beam. When the vehicle enters the channel, the position lamp and low beam will be lit automatically, and after leaving the channel, the position lamp and low beam will be turned off automatically. When the external environment is dark, the system will also light the position lamp and low beam.

3. Turn signal and hazard warning signal: when the power mode is "ON", turn on the turn signal switch, the turn signal flashes, and after the steering is completed, the light switch handle returns automatically and the turn signal is turned off.

4. Interior lamp control: press the left or right overhead console unit (front reading lamp assembly) switch, you can turn on or off the left or right overhead console unit (front reading lamp assembly) separately; press the interior lamp switch, you can turn on or off the front and rear overhead console (rear row interior lamp) at the same time.

5. Emergency brake warning lights: if the speed of the vehicle (CEM is obtained through the CAN bus) decreases rapidly due to emergency braking, all turn signals are activated and flashed; if the rapid speed reduction of the vehicle ends, the hazard alarm flasher function is disabled.

6. Daytime running lights: when the engine is running, the daytime running lights are lit automatically. The low beam is turned on and the daytime running light is turned off automatically. For the configuration of daytime running lights integrated in the headlamps, when the turn signal is working, the daytime running lights on the relevant side of the vehicle will be reduced to the brightness of the front position lamp.

Remote unlock search lamp function

The vehicle is in the anti-theft state, quickly press the lock button on the smart key to activate the car search function twice, the position lamp is on for 25 seconds, the turn signal flashes 6 times, and the horn honks 3 times.

Automatic lamplight

When the power supply mode is in ON status and the steering module is in AUTO position, if the environment light sensor is required to light up, the position lamp relay and the headlamp relay will automatically pull in at the request of the environment light sensor.

When the power supply mode is in ON status and the steering module is in AUTO position, if the ambient light sensor is required to go off, the position lamp relay and the headlamp relay will automatically disconnect with a delay of 2s at the request of the environment light sensor.

When the steering wheel module is in the AUTO position and the power mode exits the ON state, this function will be turned off immediately if the headlamp or position lamp is lit.

Turn signal

Turn signal lamp system will use turn light lamp flash signals to react to various body control request. The requests coming from turn signal lamp system are mainly: left turn signal on and off, right turn signal on and off and warning indicator on and off. Other requests coming from external module are mainly: central door control, diagnosis operation, anti-theft alarm system, emergency brake and collision flash. Collision flash has the highest priority, and alarm lamp has the second highest priority.

1. Collision flash

When the power supply mode is in ON status, if CEM receives the collision signal from the hardware, the front, rear, left and right turn signal will flash at the same time at a frequency of 85 times/min. Press the warning switch button again to cancel the warning flash function.

2. warning indicator

No matter what condition the power mode is in, press the warning switch button and the left and right turn signals will flash at the same time at a frequency of 75 times/min. Press the warning switch button once again and to cancel the warning flash function.

3. Steering prompt

When the power supply is in ON status, turn on the left turn signal, and it will flash at a frequency of 85 times/min. When the power supply is in ON status, turn on the right turn signal, and it will flash at a frequency of 85 times/min.

4. Self-diagnosis of turn signals

In the turning state, the front and rear turn signals are LEDs. When the output current of the turn signals is less than 110mA, it is regarded as a fault (when the LED turn signal

fails, the output waveform of the fault feedback line at the turn signal end is opposite to the output waveform of the CEM switch); other turn signals flash at approximately double the frequency in normal mode. When the alarm is activated, if one of the turn signals is damaged, the turn signals on both sides will flash at a frequency of about 170 times per minute.

5. Lane changing lamp function:

When the turn signal lamp switch is turned on and off between 100ms and 700ms, the corresponding turn signal lamp will flash three times as a lane change signal.

6. Emergency brake warning indicator:

If the vehicle speed (CEM obtains the speed and brake signal through CAN bus) decreases rapidly due to emergency braking, all turn signals will be activated to flash. If the vehicle speed reduction is completed, the hazard warning indicator function will be canceled.

Interior lamp and power saving function

The interior lamp system is mainly divided into two parts: one is the interior lamp control, the other is the power saving control. The interior lamp control is mainly to activate and disable the interior lamps. The power saving control is mainly to open or disable the power saving control relay.

1. Interior lamp:

When one of the following situations occurs, the interior dome lamp will fade in and light up after about 0.7s:

- Any one of the doors opens.
- Switch power supply mode from other gear to OFF state.
- When the power mode is in OFF status, issue an unlock request (including the unlocking of remote control, keyless unlock sensor for door handle, and central locking switch).

When one of the following situations occurs, the indoor ceiling light will fade out and go out after about 1.7s:

- Power supply is in ON status and all of the doors are closed.
- When the power supply is in OFF status and all of the doors are closed, send out unlock request (including the locking of remote control, locking switch for door handle and central locking.)
- When the central control is in unlocking status and power supply mode is in OFF status, close the last door after 15s delay.
- The interior lamp is lighted up for 15s, and there is no condition to activate it.
- Disable all the doors and lock central control.

The conditions when interior dome lamp goes out immediately:

- After the power saving protection is delayed to start for 10min.

Power saving function: When any of the following actions occur, the power saving function will be retimed:

- Alteration of the status of power supply mode.
- Change of the status of any door.
- Issue unlock command (including the unlocking of remote control, keyless unlock sensor for door handle, and central locking switch).
- When the power saving protection is delayed to start for 20min, the power saving protection relay will cut off the power supply output of CEM.

2. Front row foot lamp:

- Any door is open, the front foot lamp is on, and will be closed 3min after the door is closed.
- The power mode is in ON state and the foot lamps are off.
- Lock command, foot lamps go out.
- If any door is open and the foot lamp is on, if the door is still open after 10min, the foot lamp will be turned off, and if in 10min any door opens, the timer will be reset.
- The power mode is in OFF, and all doors are closed and the foot lamps are off.

Heating function

1. Rear defroster heating function:

The voltage signal is obtained from the CAN bus. When the battery voltage is greater than 10.7V and the power supply mode is in ON status, rear defroster heating is allowed to operate. When the detected battery voltage is less than 10.3V, rear defroster heating is not allowed to operate.

The rear defroster heating switch is the inching button switch. Press down the rear defroster heating switch, rear defroster heater will heat for 12 minutes; if the switch is pressed again within the 12 minutes, the defrosting process will stop. Press down the rear defroster heating switch again, and the rear defroster heater will stop heating until 12min after pressing down the rear defroster heating switch for the first time (accumulatively run for 12min). 36min later, the previous heating time will not be regarded into the time accumulation of the next time.

Wiper and washing control

When the power supply mode is in ON status, the wiper and washing can be operated. Mainly including:

- Front wiper point wipe function.
- Low speed function of wiper.
- High speed function of wiper.
- Washing linkage mode of wiper
- Washing function

- Wipe return function.
- Automatic wiper

Folding and opening of electric exterior rearview mirror

1. Folding and opening of the rearview mirror switch: the manual folding and opening of the exterior rearview mirror is realized by operating the main driving side switch of the exterior rearview mirror.
2. The remote control rearview mirror is folded and opened: when the remote control is successfully fortified, the exterior rearview mirror is folded; when the remote control is successfully released, the external rearview mirror is opened.

CAN network management

1. In this model, the wake-up conditions of BAM CEMCAN network:

Wake-up conditions of local network:

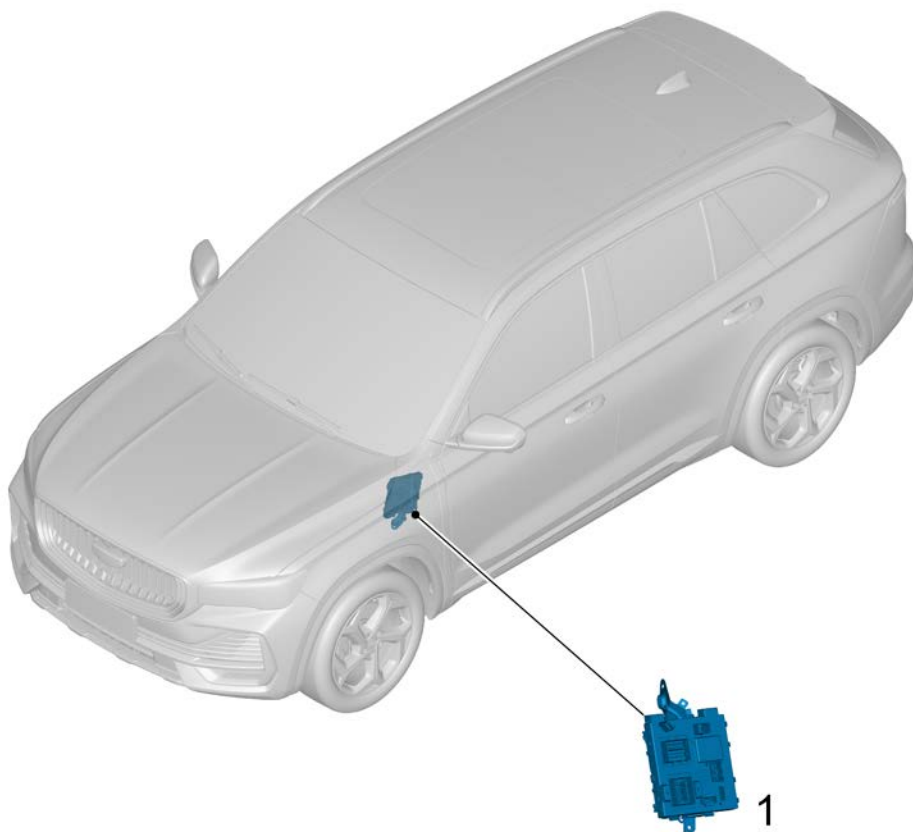
- Power supply mode is in ON status.
- Hazard warning indicator switch is in ON gear.
- Start and stop button status changes.
- Activation of light on alarm.
- Receive smart key command.
- Change of the status of any doors.

Wake-up conditions of remote network:

- There is random CAN signal transmission CEM on the CAN bus.
2. CAN network hibernation condition:
 - Power supply mode is in OFF status.
 - Start and stop button status changes.
 - Turn signal lamp is not activated.
 - Smart key command is not received.
 - Light on alarm function is not activated.
 - No change of any door status.
 - No signal transmission on CAN bus.

10.2.3 Component position

10.2.3.1 Component position



1. Central electronic module (CEM)

10.2.4 Diagnostic information and procedures

10.2.4.1 Diagnosis Description

Before diagnosing the faults of the vehicle control system, see [Description and operation](#). Understand and familiarize yourself with the working principle of the vehicle control system, and then start system diagnosis. This will help to confirm the correct fault diagnosis steps when the fault occurs. More importantly, it can also help to confirm whether the situation described by the distributor is normal operation. Any fault diagnosis of the vehicle control system should start with visual inspection, which will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

10.2.4.2 Routine inspection

- a. Check if there is any after-sales installation that may affect the normal operation of CEM, and confirm that CEM can operate normally.
- b. Check system components that are easily accessible or visible to ensure that there are no obvious damages or conditions that might cause malfunctions.

10.2.5 Removing and installing

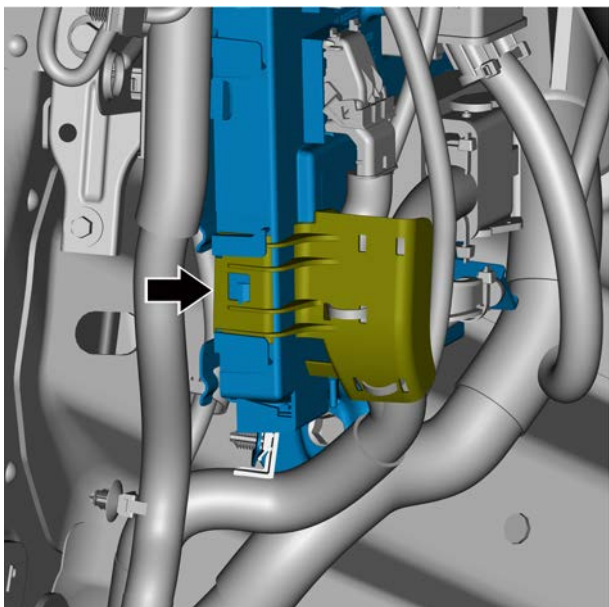
10.2.5.1 Replacement of central electronic module

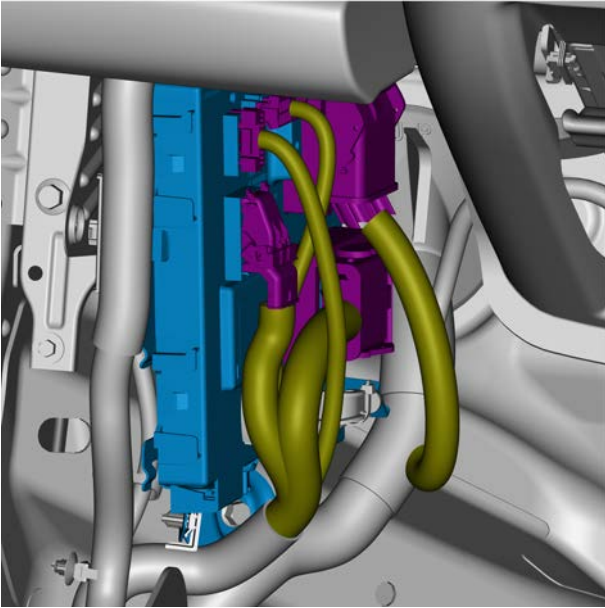
Removal procedure

Warning !

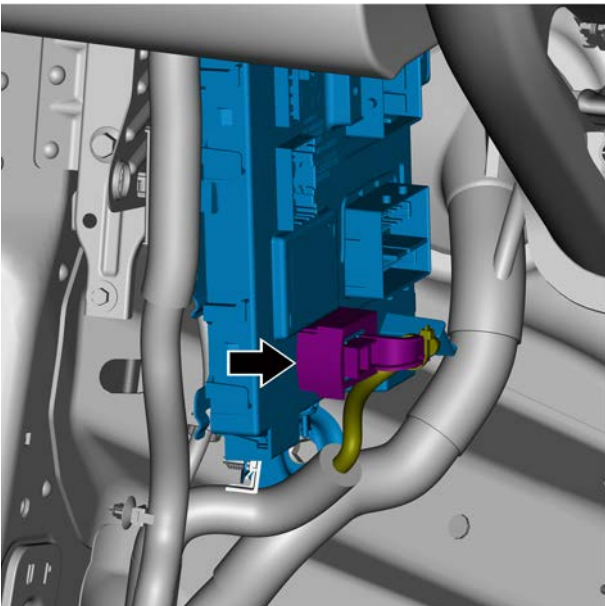
See "warning about disconnecting battery" in [1.1.1.1 Warnings and cautions](#).

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the lower left baffle assembly, see [Replacement of the lower left baffle assembly](#).
- 3 Remove the left lower guard assembly of the dashboard, see the [Replacement of left lower guard assembly of the dashboard](#).
- 4 Remove the central electronic module harness bracket.

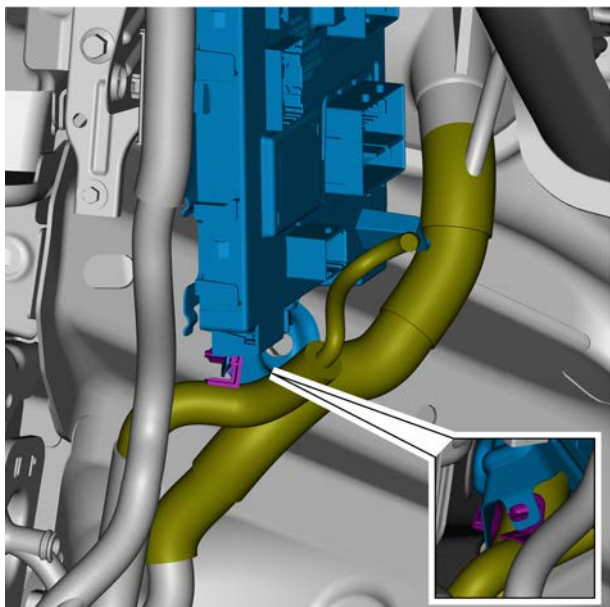




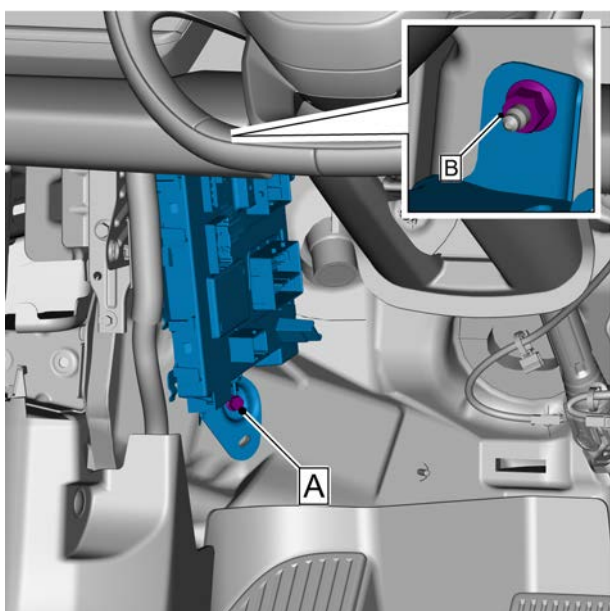
- 5 Disconnect the central electronic module harness connector.



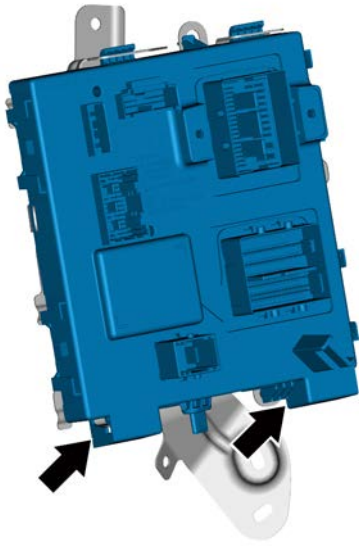
- 6 Disconnect the central electronic module power harness connector.



- 7 Remove the wire harness retaining buckle on the central electronic module bracket.

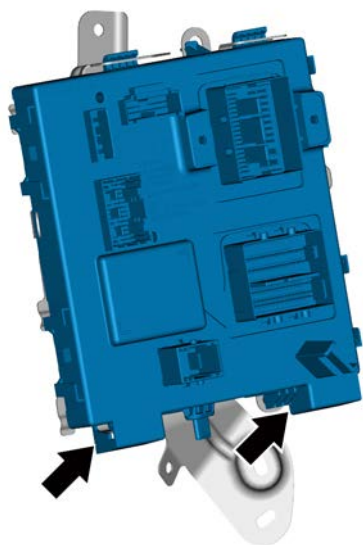


- 8 Remove central electronic module and bracket assembly fixing bolt A and fixing nut B.
- 9 Remove the central electronic module and bracket assembly.

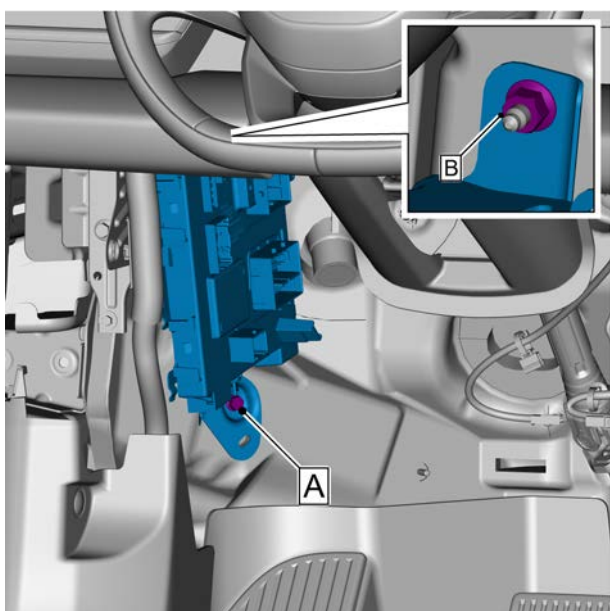


- 10 Remove the central electronic module from the indicated position.

Installation procedure



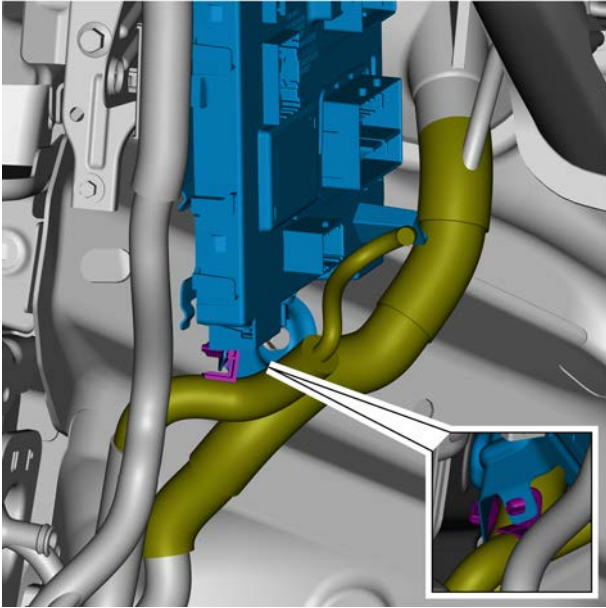
- 1 Install the central electronic module back into the body domain bracket.



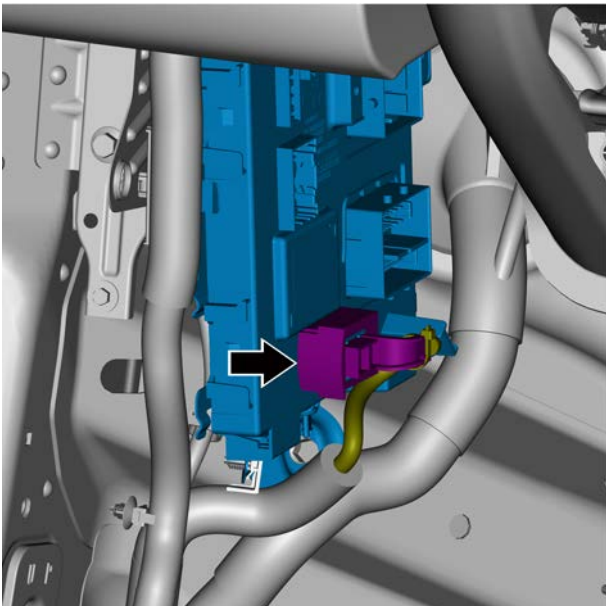
- 2 Install the central electronic module and bracket assembly and fasten bolt A and nut B.

Bolt torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

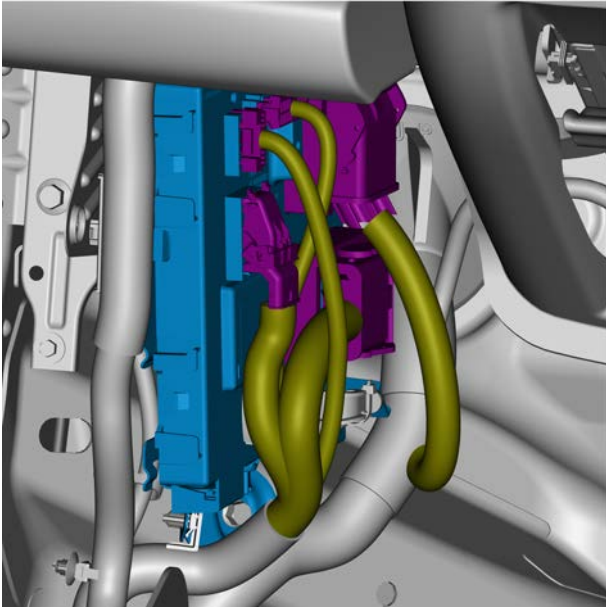
Nut Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



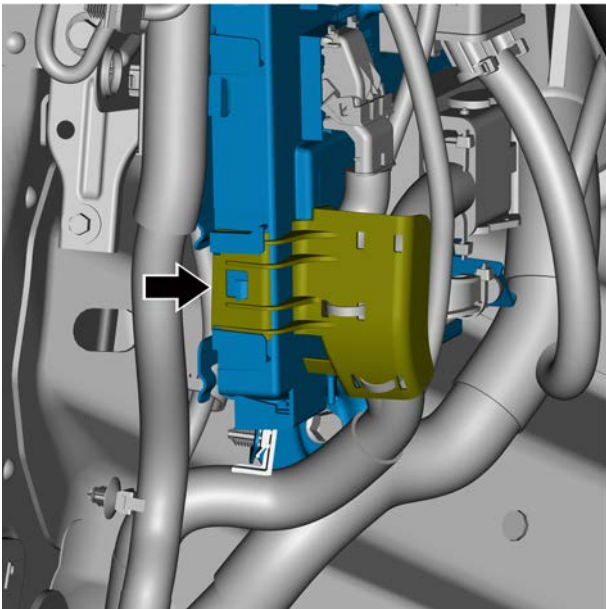
- 3 Install the harness fixing clip.



- 4 Connect the central electronic module power harness connector.



- 5 Connect the central electronic module harness connector.



- 6 Install the central electronic module harness bracket.

- 7 Install the left lower fender apron assembly of the dashboard.
- 8 Install the lower left foot shield assembly.
- 9 Connect the negative battery cable.
- 10 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

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11.18.1.1 Instructions and Operations	11-489		

11.1 Warnings and precautions

11.1.1 Warnings and precautions

11.1.1.1 Warnings and precautions

Warning about vehicle lifting

Warning !

To avoid vehicle damage, serious personal injury and even death, when the main components are removed from the vehicle, and the lifter is used for support, the jack should be used to support the vehicle part corresponding to the components to be removed.

Warnings regarding battery disconnection

Warning !

Before servicing any electrical component, the start and stop button power supply mode shall be in the OFF status and all electrical loads must be "OFF (switch-off)" unless otherwise stated in the operating procedure. If tools or equipment are easily accessible to exposed live electrical terminals, disconnect the negative battery cable. Violation of these safety instructions may damage vehicles or vehicle parts, and may even lead to personal injury.

Warning about cracks in vehicle windows

Warning !

If a window glass is cracked but remains intact, the protective tape should be cross-pasted to the window glass to prevent further damage to the window glass and personal injury.

Warning about window up/down

Warning !

When the driver operates powered window switch, the fast lifting function makes the window move extremely fast and cannot be stopped, which may cause personal injury.

Warning about halogen bulbs

Warning !

Halogen bulb contains high pressure gas. Improper handling can cause the bulb to explode into glass shards. To avoid personal injury: Before replacing the bulb, it is needed to turn off the light switch and make the bulb to cool down. Keep the light switch off until the bulb has been replaced. When replacing the halogen bulb, be sure to wear protective goggles. When holding the bulb, it is important to hold the lamp base only. Avoid contact with glass. Keep the bulb away from dust and moisture. Discard used bulbs correctly. Keep halogen bulbs away from children.

11.2 Audio entertainment system

11.2.1 Specification

11.2.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Screw-fasten the central console displayer and dashboard skeleton	ST4.8×19	2.5~3.5	1.8~2.6
Bolt-fasten infotainment mainframe and dashboard skeleton	ST4.8×19	2.5~3.5	1.8~2.6
Support RL woofer installation (fastener)	PF5×20	0.8~1.2	0.6~0.9
Screw-fasten dashboard loudspeaker and dashboard skeleton	ST4.8×19	2.2~2.8	1.6~2.1
Bolt-fasten antenna amplifier and C-column	M6×16	8.5~11.5	6.3~8.5
Antenna filter (fastener)	M6×16	8.5~11.5	6.3~8.5
Bolt-fasten subwoofer and body coat rack	M6×20	8.5~11.5	6.3~8.5
Nut-fasten subwoofer and body coat rack	M6×7.3	8.5~11.5	6.3~8.5
Screw-fasten emergency backup loudspeaker	PF4×12	0.6~0.8	0.4~0.6
shark fin antenna decorative cover assembly (fastener)	M5×5	2.1~2.9	1.5~2.1
Nut-fasten audio control module and bracket	M6×7.3	8.5~11.5	6.3~8.5
Bolt-fasten vehicle mobile terminal assembly	M6×16	8.5~11.5	6.3~8.5
Nut-RF control module	M6×7.3	2~3	1.5~2.2

11.2.2 Instructions and operations

11.2.2.1 Instructions and Operations

A brief introduction of the system

Support listening to AM/FM switching.

The vehicle multimedia infotainment system is mainly composed of infotainment host, front central console displayer assembly, radio antenna, Bluetooth antenna, loudspeaker (bass, alto, treble, bass, etc.), exterior power amplifier (flagship), microphone, switch buttons and interfaces related to this system on the steering wheel.

It mainly realizes the functions of radio, USB audio and video playback, clock display, Bluetooth phone, information display, vehicle setting, voice control function requirements, reversing video / dynamic reversing auxiliary line / 360image / reversing radar icon display, navigation, air conditioning information display and setting, etc.

Front and rear loudspeaker

There are two configurations for the sound system of this car.

Type 1: use ten loudspeakers: the front door is equipped with two woofers, and the A-pillar trim plate has two door tweeter speakers. The rear door is equipped with two subwoofers and two door tweeters, the dashboard is equipped with a dashboard speaker, and the rear compartment is equipped with a subwoofer.

Type 2: use eight loudspeakers: the front door is equipped with two subwoofers, and the A-pillar trim plate has two door tweeter speakers. The rear door is equipped with two subwoofers and two door tweeters.

Bluetooth phone and Bluetooth Music Logic

Support BT4.0BLE (Bluetooth 4.0, compatible with 2.1 and 3.0, support Bluetooth low power consumption). Includes the interaction of Bluetooth phone HFT (Bluetooth call), Bluetooth music (BluetoothAudio), Bluetooth and smart key information exchange.

HFT (Bluetooth call) is a function that can make a call without directly operating the phone after connecting with the mobile phone through the host MMI. By providing simple HFT operation, it can make a safe call while driving. At the same time, it supports the search and dialing of address book / call records.

If the audio / video remote control profile does not match or there is no corresponding on the side of the Bluetooth audio device, the playback action will not be performed even if the playback function is requested. The specific playback action and display information depend on the Bluetooth device and the playback software on the Bluetooth device.

Navigation

Start navigation

You can start navigation by clicking on the desktop application [Amap] or by clicking the navigation widget, on the home page. You can also evoke navigation by voice.

Search destination

1. Manual 搜索

Click the main interface Search destination button, enter keywords in the search box, select the destination from the search results, and then turn on the navigation.

2. Place a pin on the map

Drag the map, click the selected destination directly on the map, and click [go here] to turn on the navigation.

3. Voicenavigation

After the sound is awakened, the common instructions for voice navigation are as follows:

- How can I get to the Window of the world?
- I'm going to the Geely Building.
- I want to go home
- I want to navigate to the West Lake in Hangzhou
- Find a nearby gas station
- Navigate to National Exhibition and Convention Center
- At the same time, it can also query road conditions, query the remaining time reaching the destination, collection location, surrounding search and other navigation-related questions.
- More features are expected to be discovered by you...

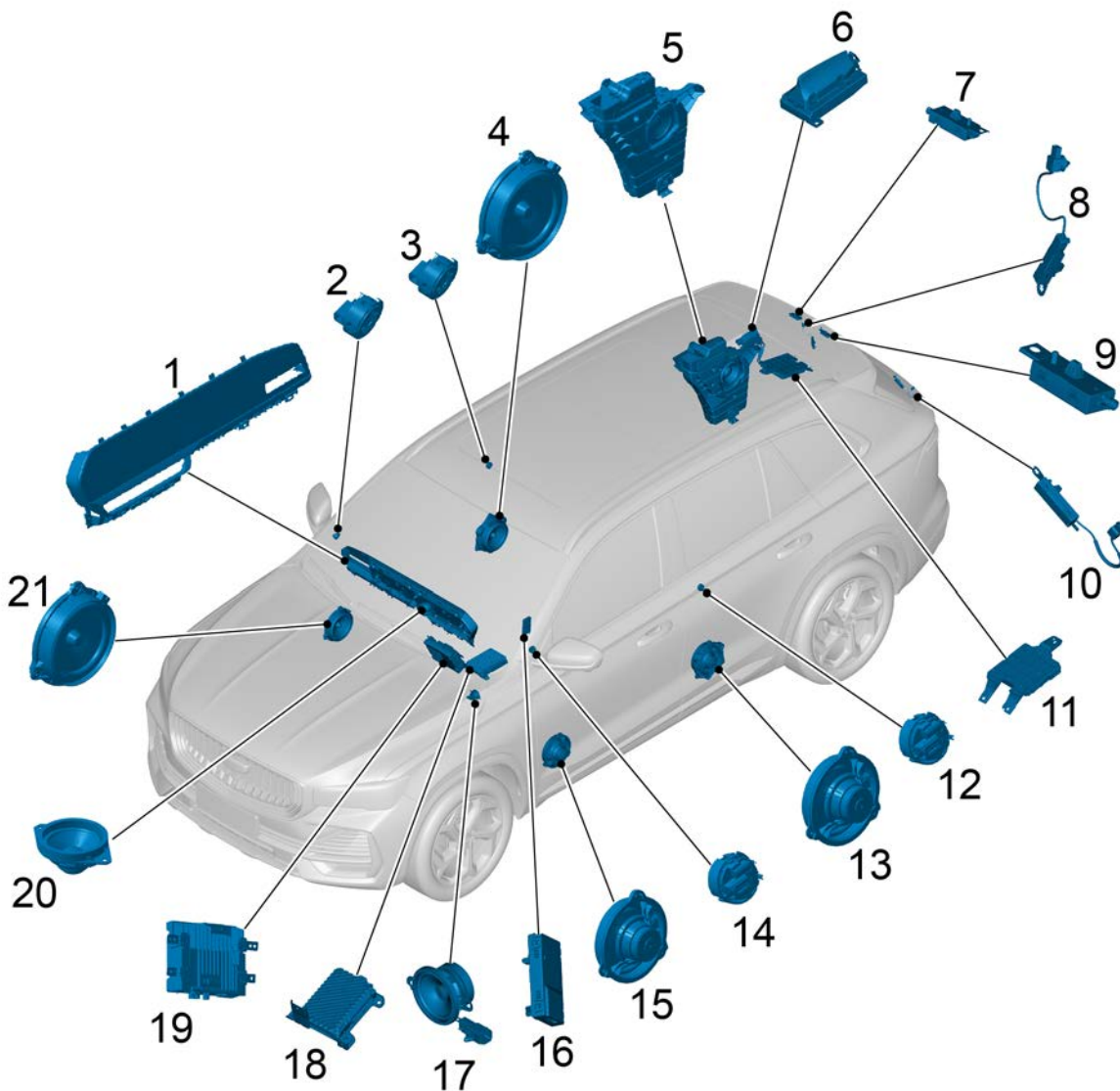
Map update

Tools and settings-offline data-offline maps.

You can download the offline map data of your city and navigate normally without internet when you have offline map data.

11.2.3 Component position

11.2.3.1 Component position (Type 1)



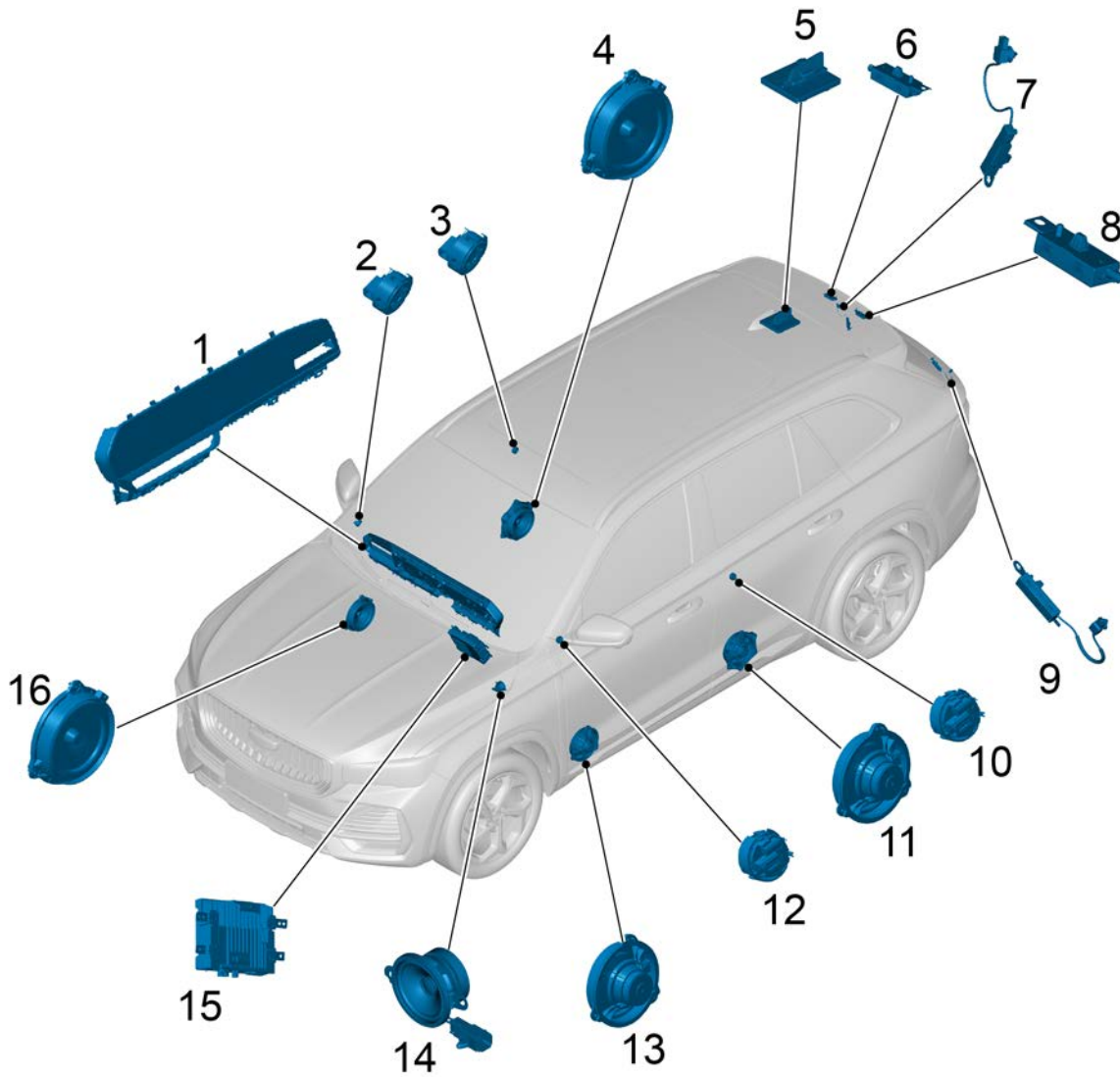
- | | | | |
|----|-------------------------------|-----|------------------------------|
| 1. | Central console displayer | 12. | Doors Tweeter (RL door) |
| 2. | Door tweeter (right A-pillar) | 13. | Woofer (RL door) |
| 3. | Doors Tweeter (RR door) | 14. | Door tweeter (left A-pillar) |
| 4. | Woofer (RR door) | 15. | Woofer (front left door) |
| 5. | Subwoofer | 16. | BLE NFC communication module |
| 6. | Shark fin antenna | 17. | Emergency standby speaker |
| 7. | AM/FM/DAB antenna amplifier | 18. | Audio control module |
| 8. | Grounding circuit rejector | 19. | Infotainment head unit |
| 9. | Window antenna amplifier | 20. | Dashboard speaker |

10. Power circuit rejector

21. Woofer (FR door)

11. Vehicle mobile terminal assembly

11.2.3.2 Component position (Type 2)



1. Central console displayer

9. Power circuit rejector

2. Door tweeter (right A-pillar)

10. Doors Tweeter (RL door)

3. Doors Tweeter (RR door)

11. Woofer (RL door)

4. Woofer (RR door)

12. Door tweeter (left A-pillar)

5. Ternary content addressable memory and interconnected antenna module

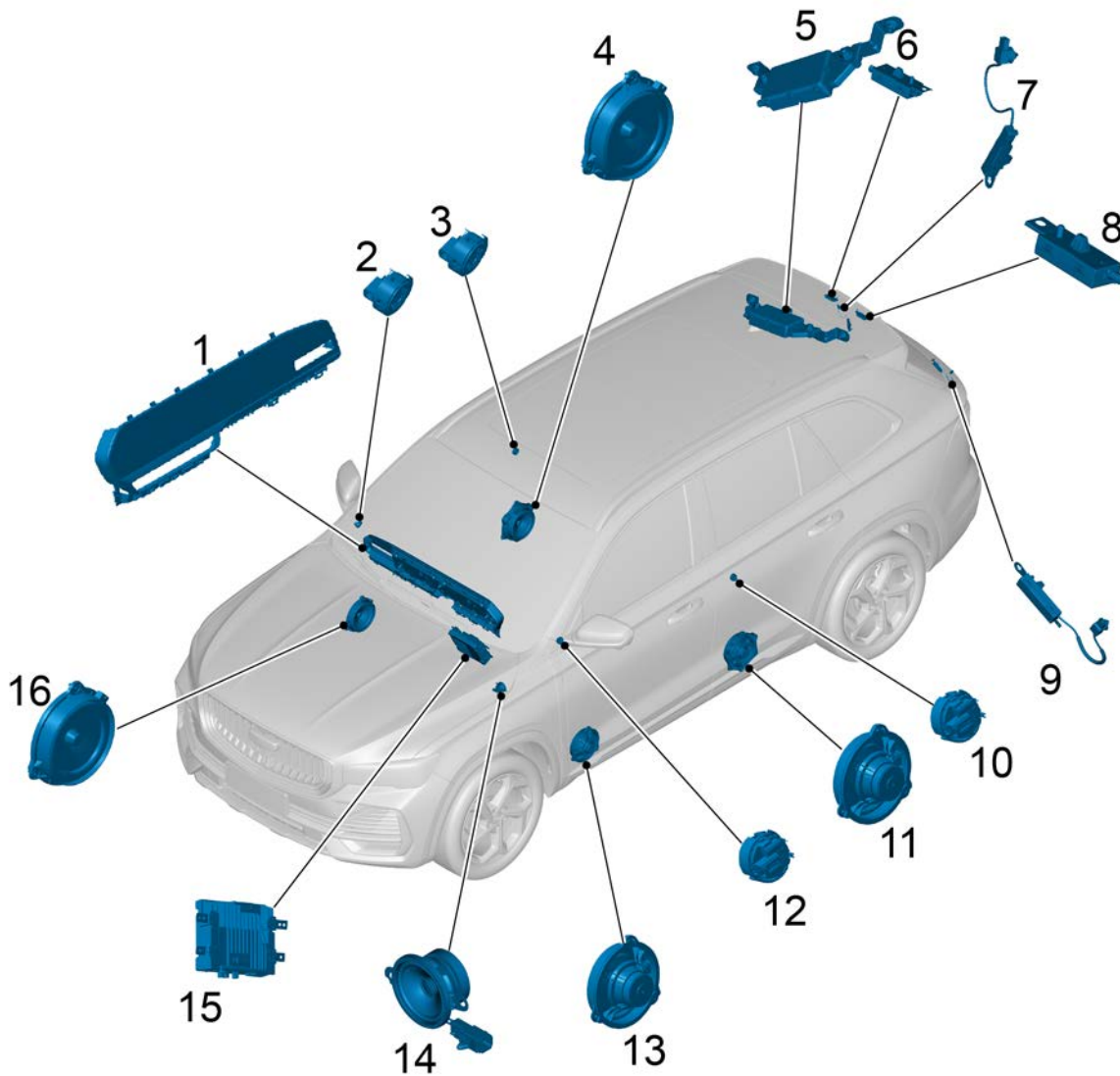
13. Woofer (front left door)

6. AM/FM/DAB antenna amplifier

14. Emergency standby speaker

- | | |
|-------------------------------|----------------------------|
| 7. Grounding circuit rejector | 15. Infotainment head unit |
| 8. Window antenna amplifier | 16. Woofer (FR door) |

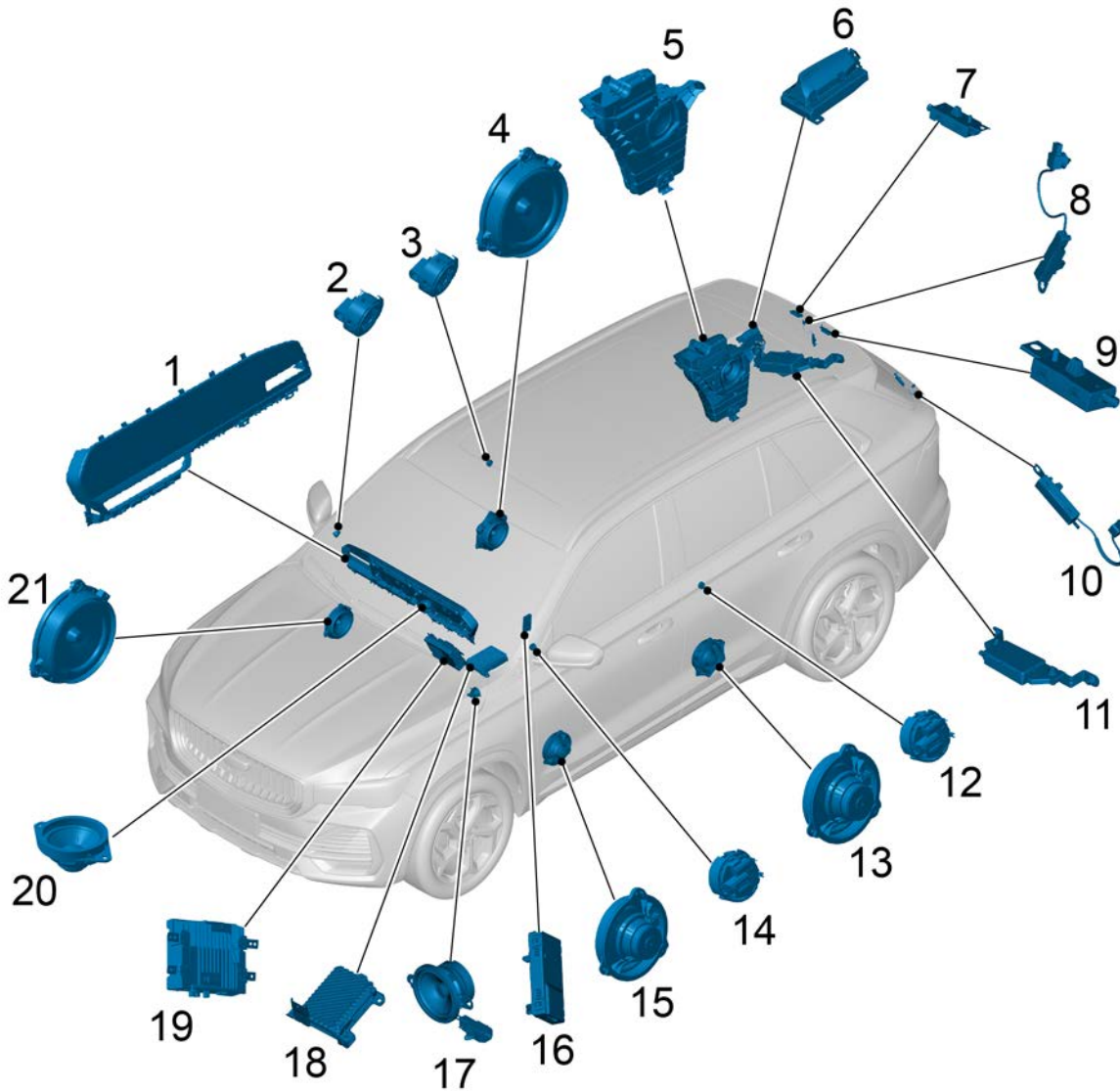
11.2.3.3 Component position (Type 3)



- | | |
|----------------------------------|----------------------------------|
| 1. Central console displayer | 9. Power circuit rejector |
| 2. Door tweeter (right A-pillar) | 10. Doors Tweeter (RL door) |
| 3. Doors Tweeter (RR door) | 11. Woofer (RL door) |
| 4. Woofer (RR door) | 12. Door tweeter (left A-pillar) |
| 5. Radio Frequency Receiver | 13. Woofer (front left door) |
| 6. AM/FM/DAB antenna amplifier | 14. Emergency standby speaker |

- 7. Grounding circuit rejector
- 8. Window antenna amplifier
- 15. Infotainment head unit
- 16. Woofer (FR door)

11.2.3.4 Component position (Type 4)



- 1. Central console displayer
- 2. Door tweeter (right A-pillar)
- 3. Doors Tweeter (RR door)
- 4. Woofer (RR door)
- 5. Subwoofer
- 6. Shark fin antenna
- 7. AM/FM/DAB antenna amplifier
- 8. Grounding circuit rejector
- 9. Infotainment head unit
- 10. Window antenna amplifier
- 11. Woofer (FR door)
- 12. Doors Tweeter (RL door)
- 13. Woofer (RL door)
- 14. Door tweeter (left A-pillar)
- 15. Woofer (front left door)
- 16. BLE NFC communication module
- 17. Emergency standby speaker
- 18. Audio control module
- 19. Infotainment head unit

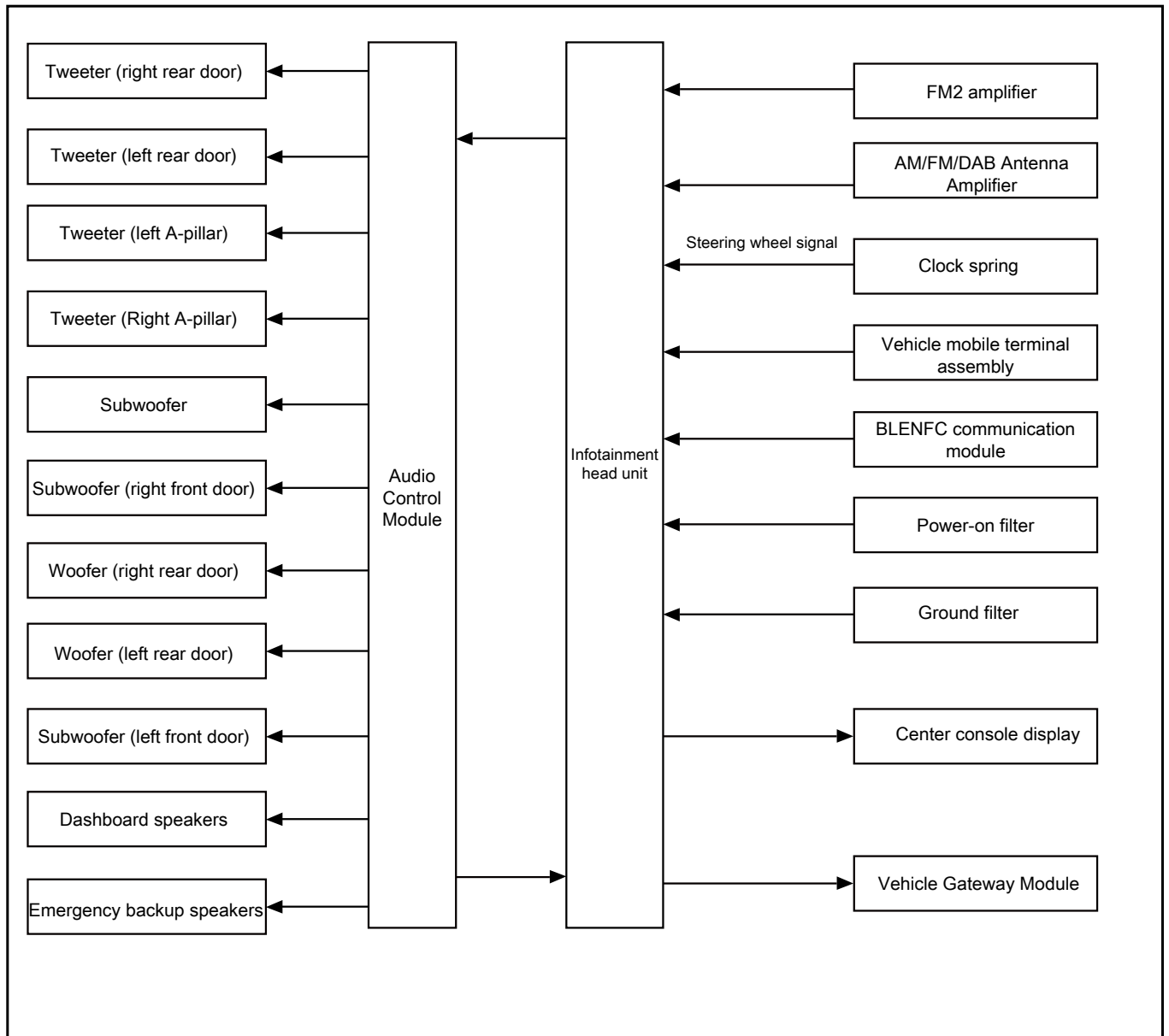
- 9. Window antenna amplifier
- 10. Power circuit rejector
- 11. Radio Frequency Receiver

- 20. Dashboardspeaker
- 21. Woofer (FR door)

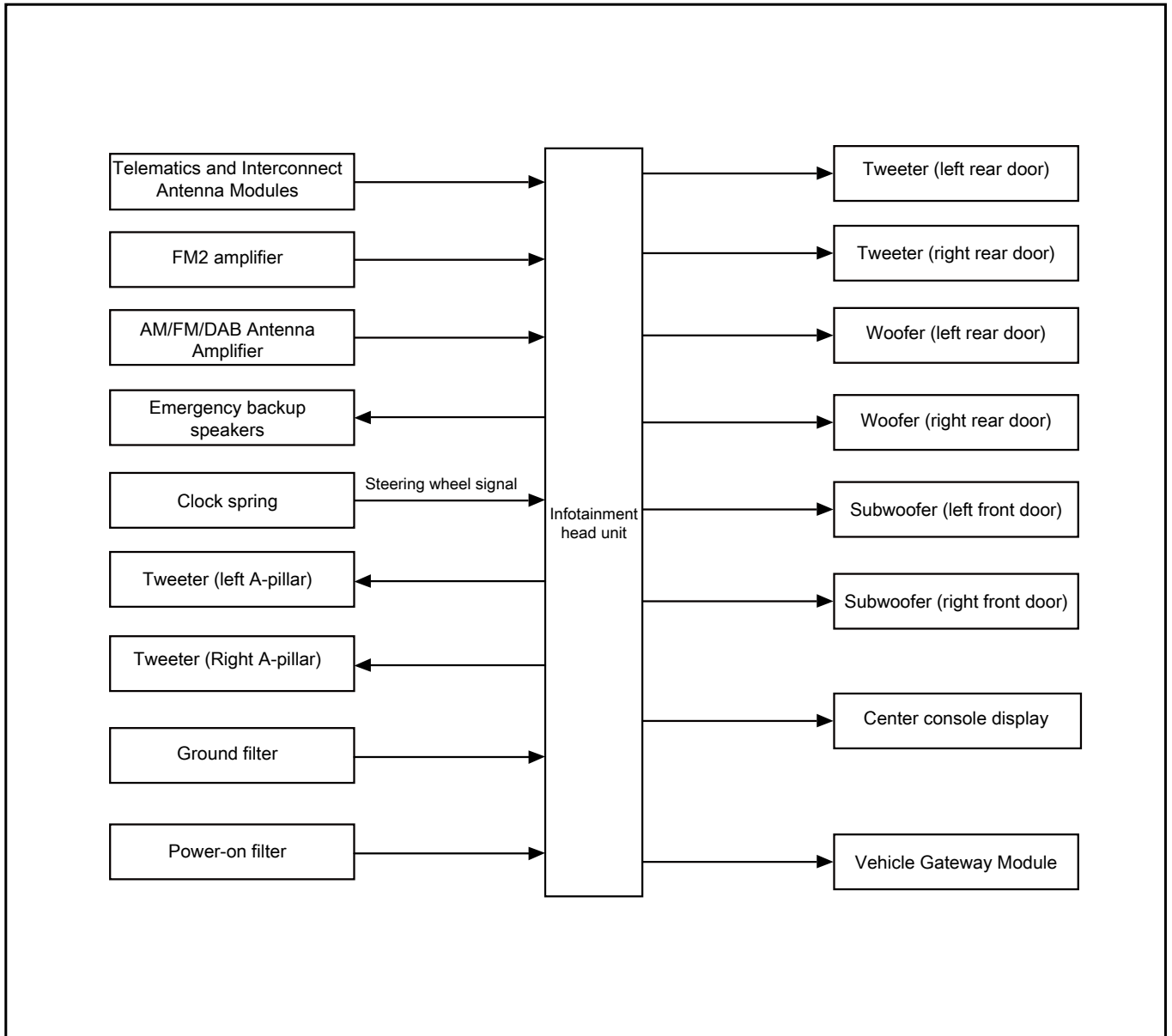
11.2.4 Electrical schematic diagram

11.2.4.1 Electrical schematic diagram

Type I



Type II



11.2.5 Diagnostic information and procedures

11.2.5.1 Diagnosis Description

Before diagnosing the fault of the audio entertainment system, see [Description and operation](#). Understand and be familiar with working principles of Audio Entertainment before starting system diagnosis. This helps to determine the correct fault diagnosis steps when a fault occurs. More importantly, it also helps to determine whether the situation described by the customer is normal operation. Any fault diagnosis of the Audio Entertainment should start with the "visual inspection". The "visual inspection" will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.2.5.2 Visual Check

- Check the after-sales equipment that may affect the operation of the sound system to make sure that these devices do not affect the operation of the sound system.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.
- For faults where all of the speakers are inoperative, focus on areas of the speaker circuit that are prone to short to GND, to facilitate quick removing the fault.
- For the fault of a single speaker inoperative, the distributor may inadvertently use the sound channel shielding function of the host/intelligent vehicle host to make a single sound channel inoperative in the process of use, which is not a fault of the sound system. You can consult the handbook for instructions of sound system.

11.2.6 Removing and installing

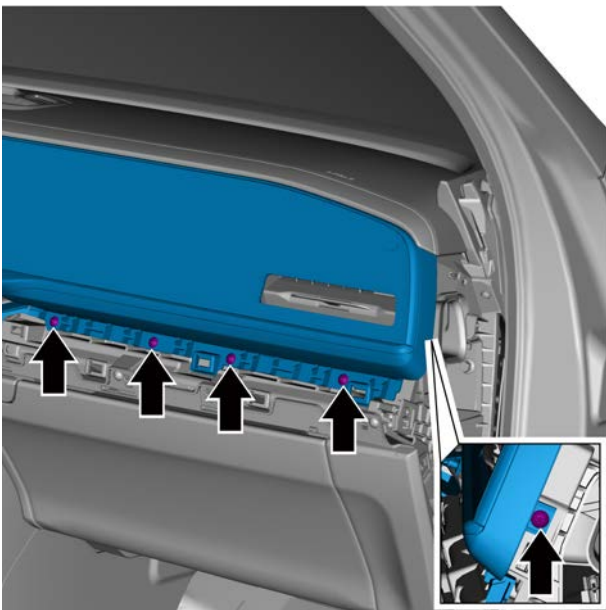
11.2.6.1 Replacement of central console displayer (type 1)

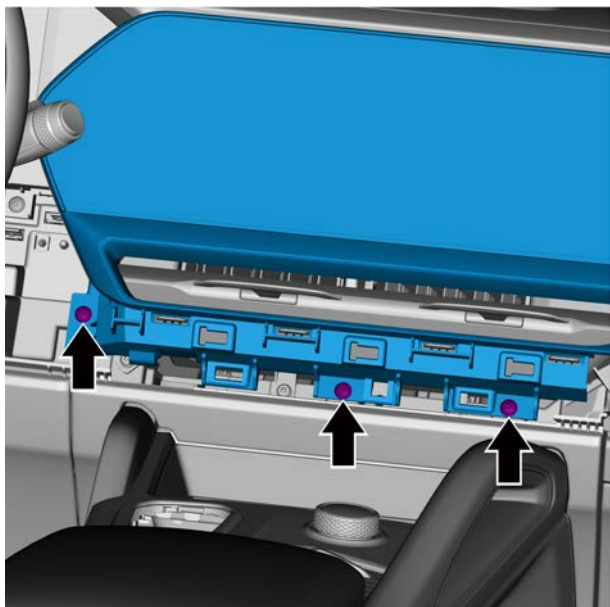
Removal procedure

Warning !

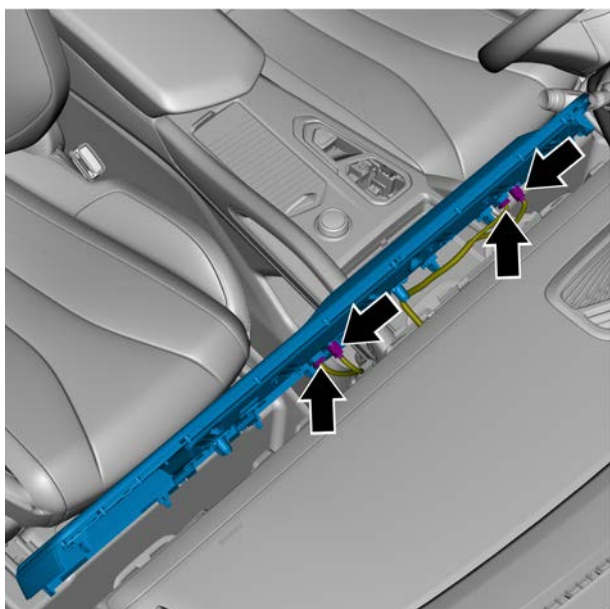
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the dashboard co-pilot side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 4 Remove the right cladding panel assembly, see [Replacement of the right cladding panel assembly](#).
- 5 Remove the 5 retaining screws on the right side of the central console displayer.



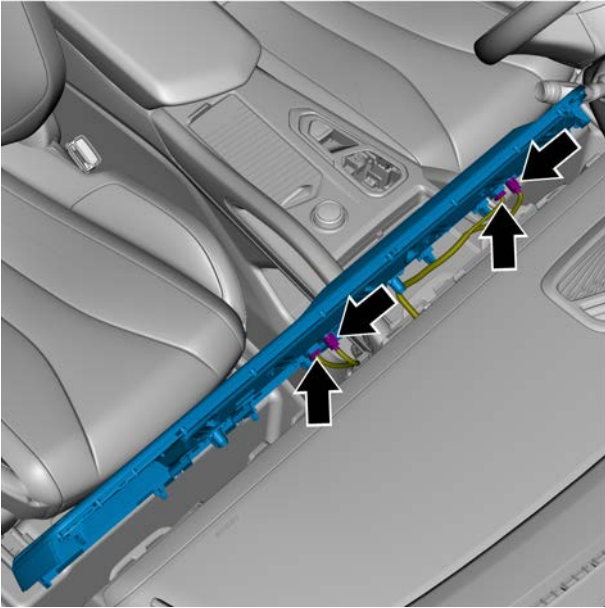


- 6 Remove the 3 retaining screws on the left side of the central console displayer.



- 7 Disconnect the 4 harness connectors of the central console displayer and remove the central console displayer.

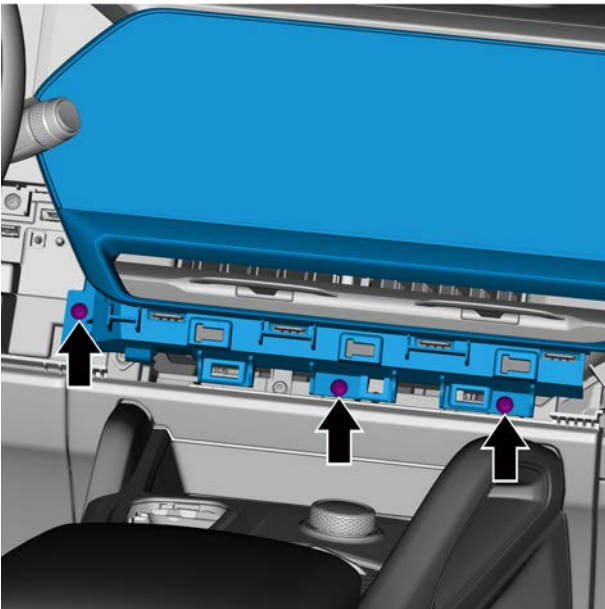
Installation procedure



- 1 Connect 4 harness connectors to the central console displayer.

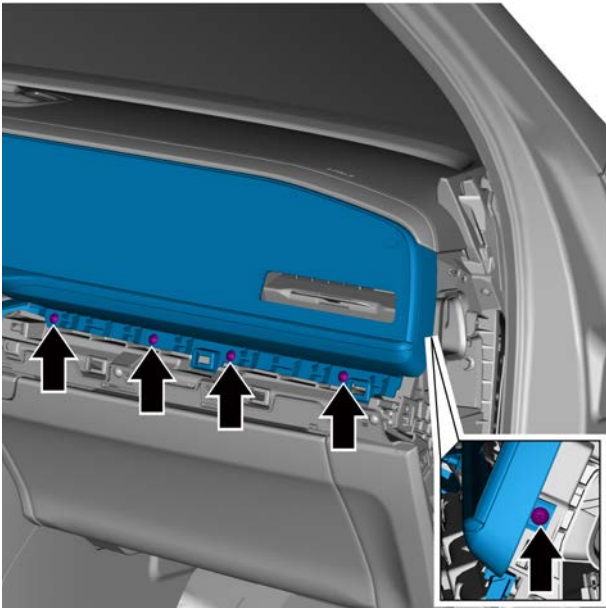
Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install the 3 retaining screws on the left side of the central console displayer.

Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)



- 3 Install the 5 retaining screws on the right side of the central console displayer.

Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)

- 4 Install the right cladding panel assembly.
- 5 Remove the front passenger side end cover assembly of the dashboard.
- 6 Connect the negative battery cable.
- 7 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 8 Close the engine compartment cover.

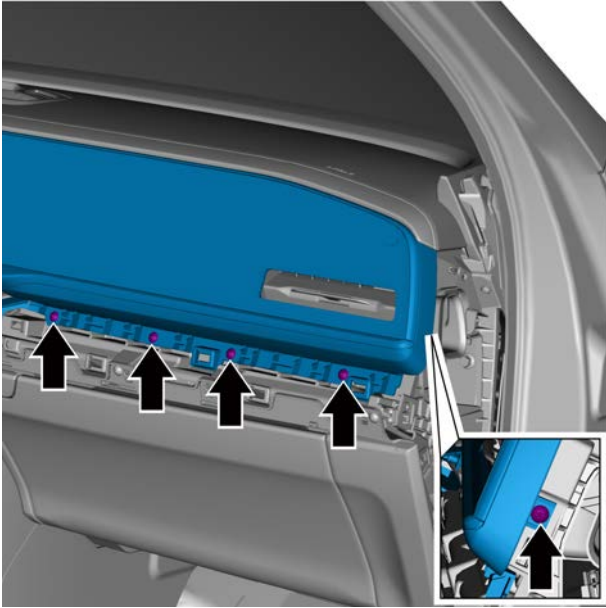
11.2.6.2 Replacement of central console displayer (type 2)

Removal procedure

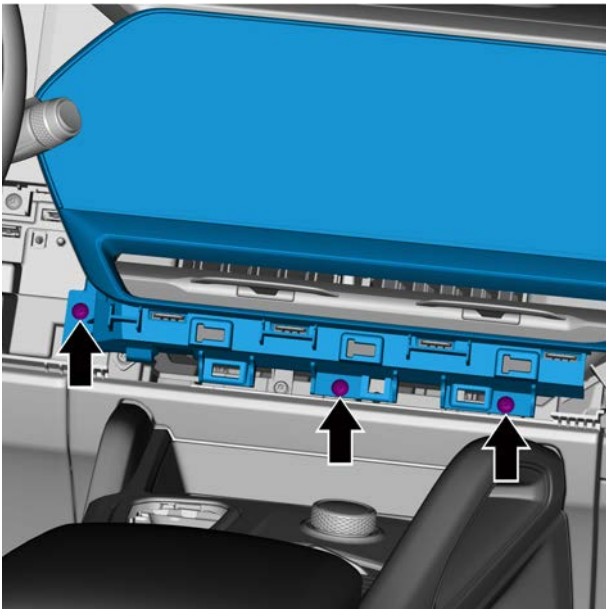
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

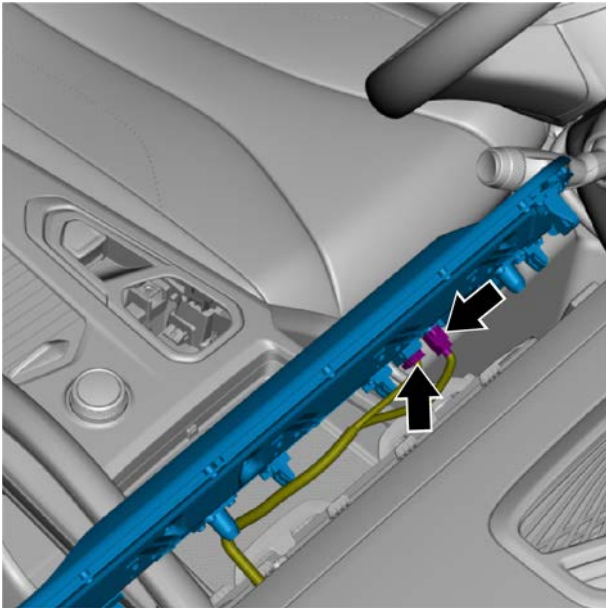
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the dashboard co-pilot side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 4 Remove the right cladding panel assembly, see [Replacement of the right cladding panel assembly](#).



- 5 Remove the 5 retaining screws on the right side of the central console displayer.

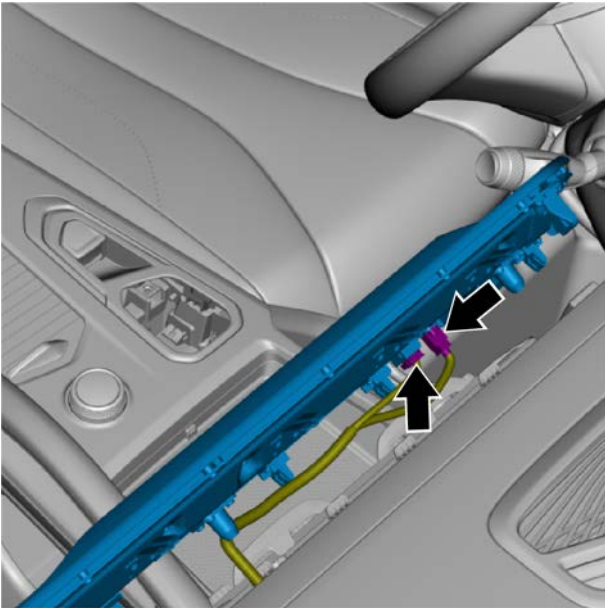


- 6 Remove the 3 retaining screws on the left side of the central console displayer.



- 7 Disconnect the 2 harness connectors of the central console displayer and remove the central console displayer.

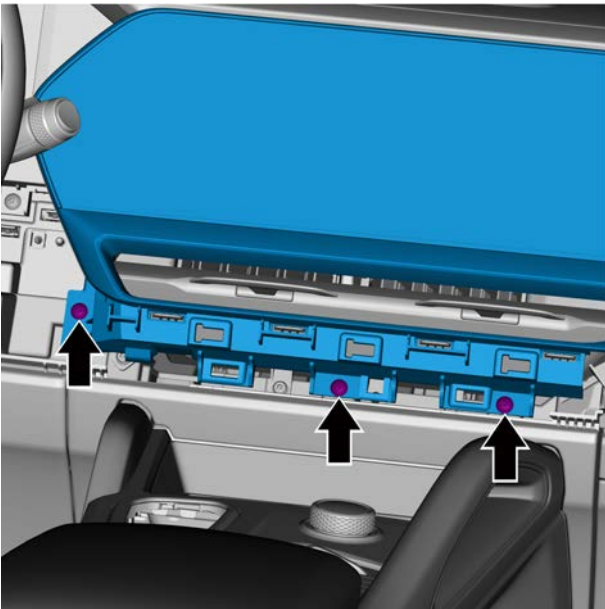
Installation procedure



- 1 Connect 2 harness connectors to the central console displayer.

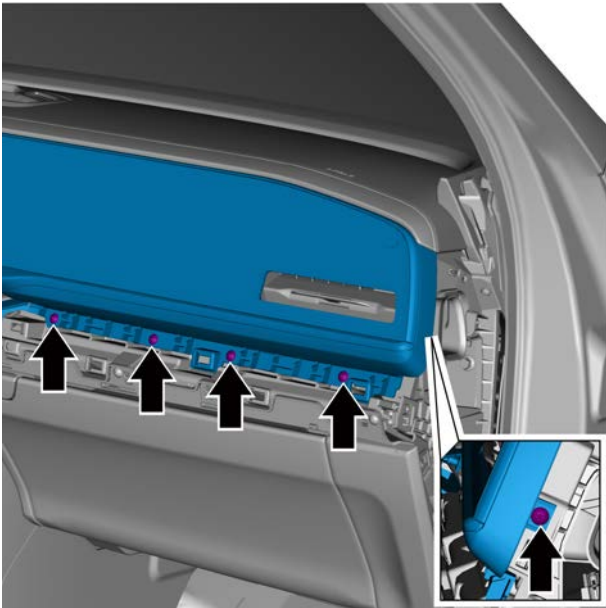
Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install the 3 retaining screws on the left side of the central console displayer.

Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)



- 3 Install the 5 retaining screws on the right side of the central console displayer.

Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)

- 4 Install the right cladding panel assembly.
- 5 Remove the front passenger side end cover assembly of the dashboard.
- 6 Connect the negative battery cable.
- 7 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 8 Close the engine compartment cover.

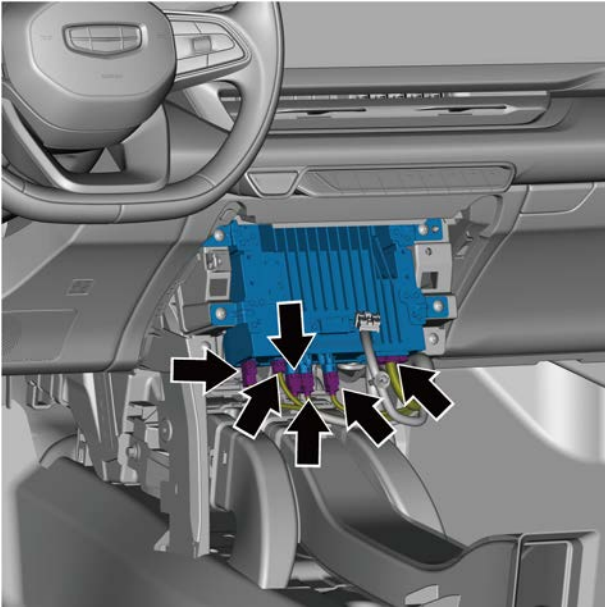
11.2.6.3 Replacement of vehicle infotainment host

Removal procedure

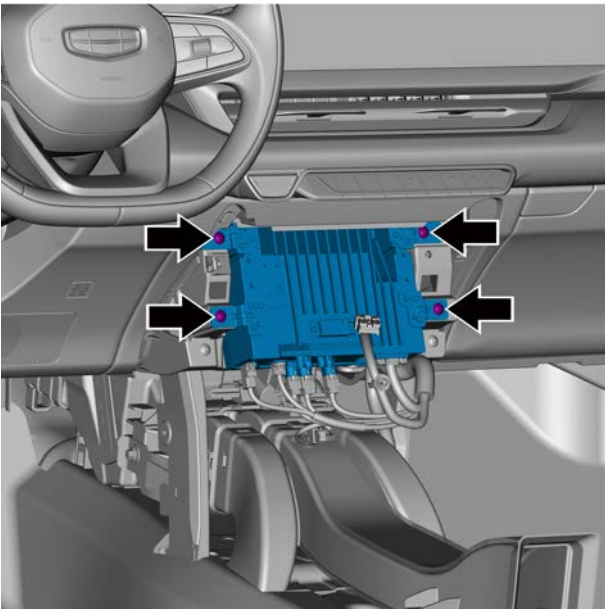
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove console moulding assembly, refer to [replacement of console moulding assembly](#).

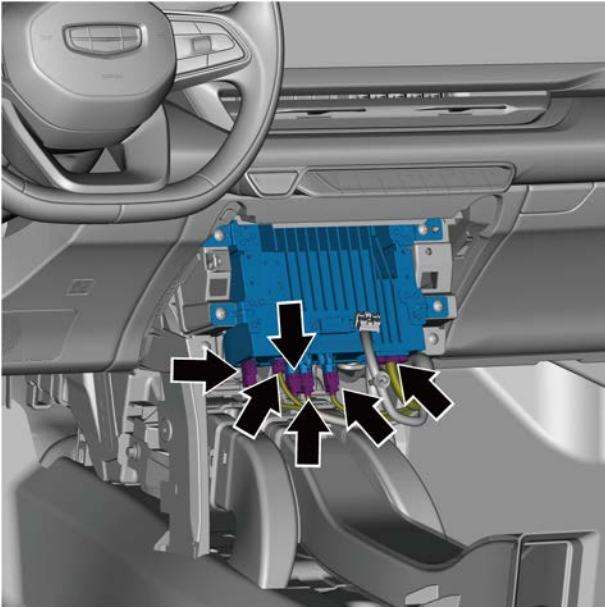


- 4 Disconnect the six harness connectors of the vehicle infotainment host.



- 5 Remove the 4 fixing bolts of the infotainment host and remove the infotainment host.

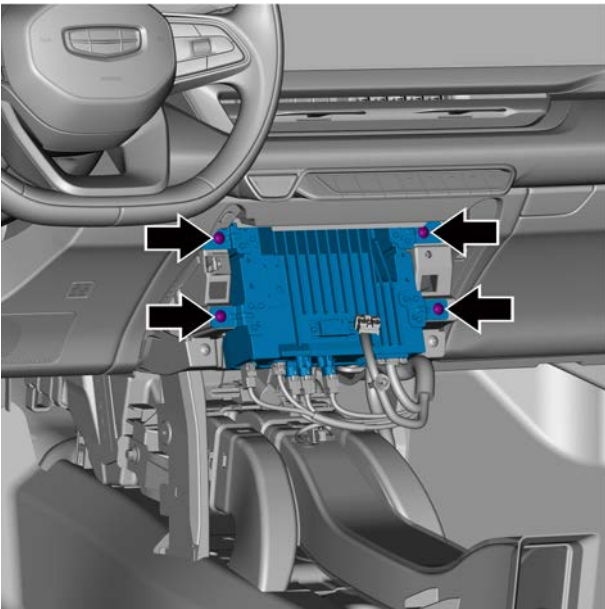
Installation procedure



- 1 Connect the six harness connectors of the vehicle infotainment host.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install infotainment mainframe and fasten the 4 fixing bolts.

Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)

- 3 Install the console assembly.
- 4 Connect the negative battery cable.
- 5 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 6 Close the engine compartment cover.

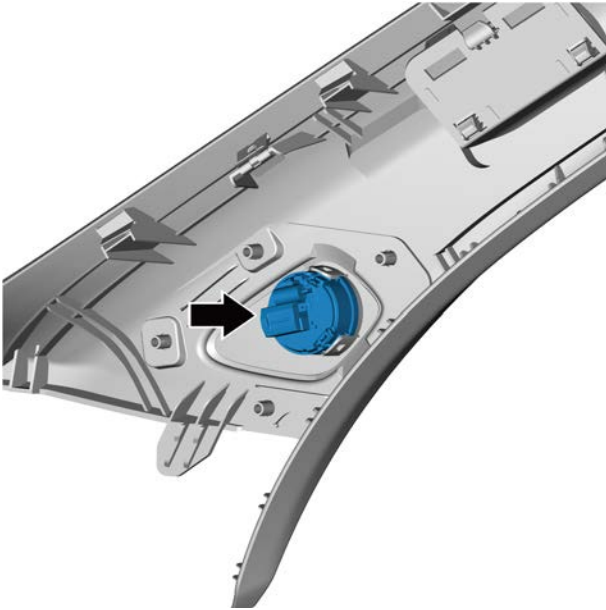
11.2.6.4 Replacement of tweeter for left A-pillar door

Removal procedure

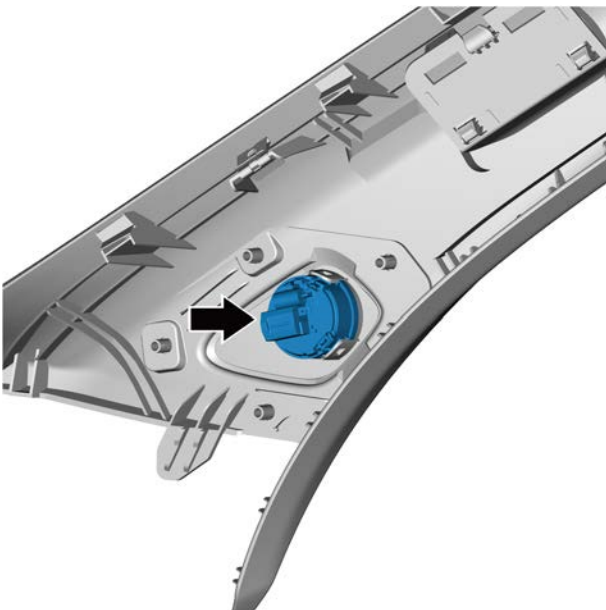
Warning !

See "warning about disconnecting battery" in [1.1.1.1 Warnings and cautions.](#)

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the left A-pillar trim plate assembly, see [Replacement of the left A-pillar trim plate assembly.](#)
- 4 Remove the left A-pillar door tweeter.

**Installation procedure**

- 1 Install the left A-pillar door tweeter.



- 2 Install the left A-pillar upper trim panel assembly.
- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

11.2.6.5 Replacement of front left Door Woofer

Removal procedure

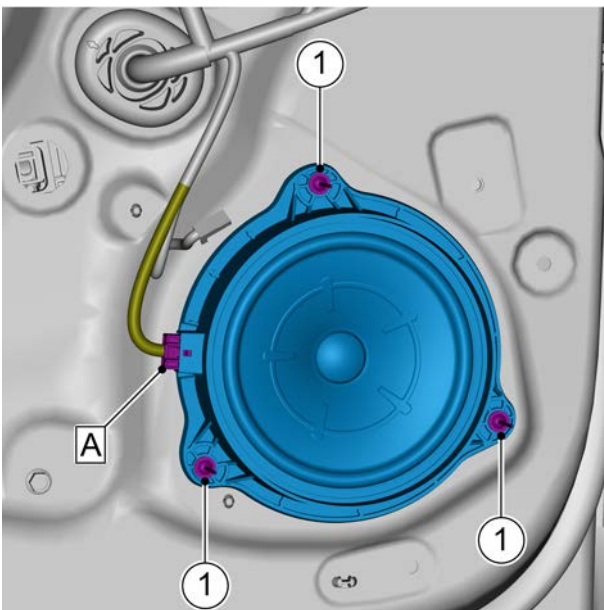
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly](#).
- 4 Disconnect the harness connector A of front left door woofer.
- 5 Remove the 3 fixed rivets 1 of front left door woofer and remove the woofer.

Caution

Rivets cannot be reused and must be replaced after removal.

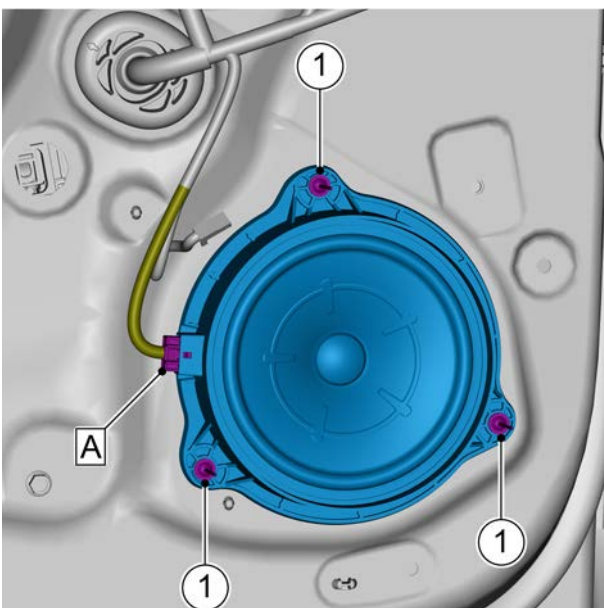


Installation procedure

- 1 Install 3 retaining rivets of front left door subwoofer 1.
- 2 Connect the harness connector A of front left door woofer.

Caution

Secure the harness connection: "Connect, Click, and Confirm."



- 3 Install the assembly-interior trim panel front door LH.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

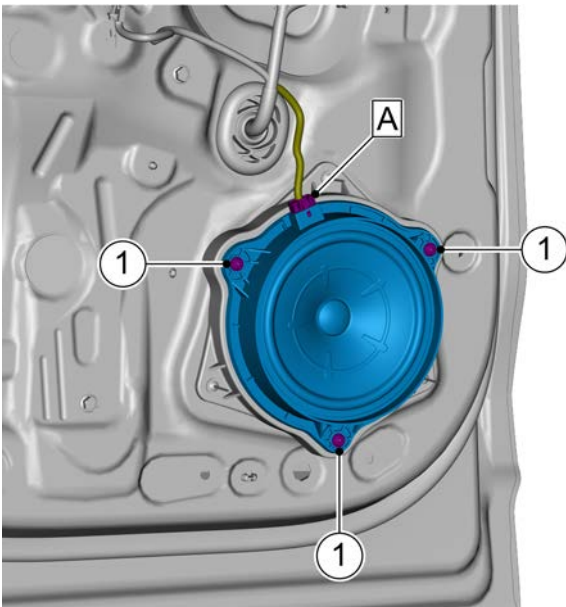
11.2.6.6 Replacement of RL door woofer

Removal procedure

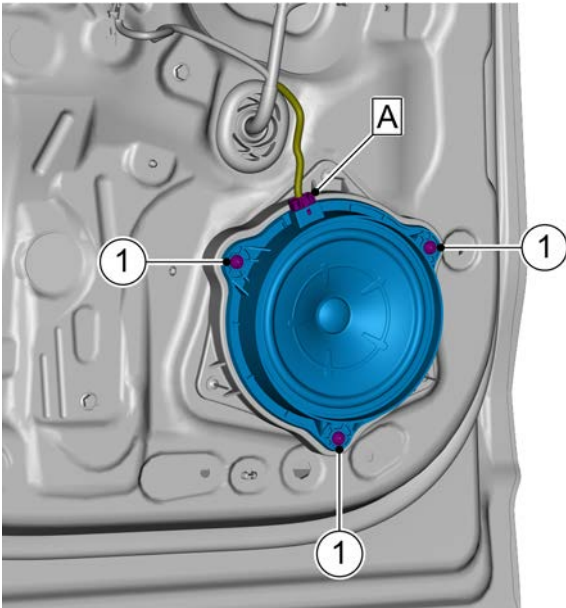
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the RL door interior trim plate assembly, see the [Replacement of the RL door interior trim plate assembly](#).
- 4 Disconnect the harness connector A of RL door woofer.
- 5 Remove the 3 retaining bolts 1 of RL door woofer and remove the woofer.



Installation procedure



- 1 Install 3 retaining bolts 1 of RL door woofer.
Torque: 2.5 N. m (metric system) 1.8 lb-ft (Imperial system)
- 2 Connect the the harness connector A of RL door woofer.
Caution
Secure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the RL door interior trim panel assembly
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

11.2.6.7 Replacement of tweeter of RL door

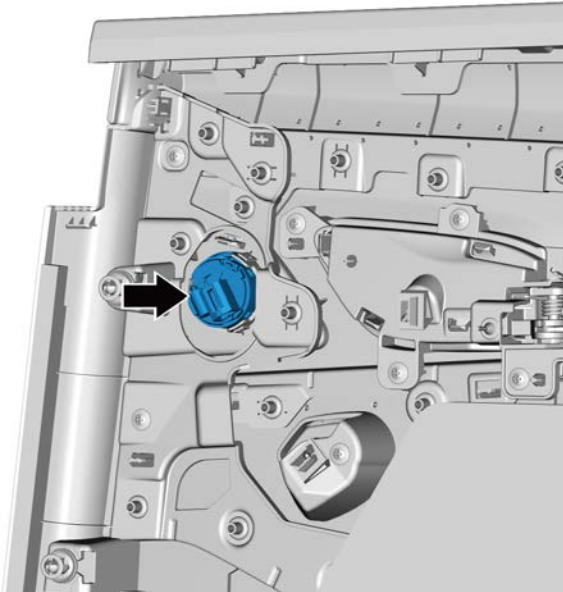
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

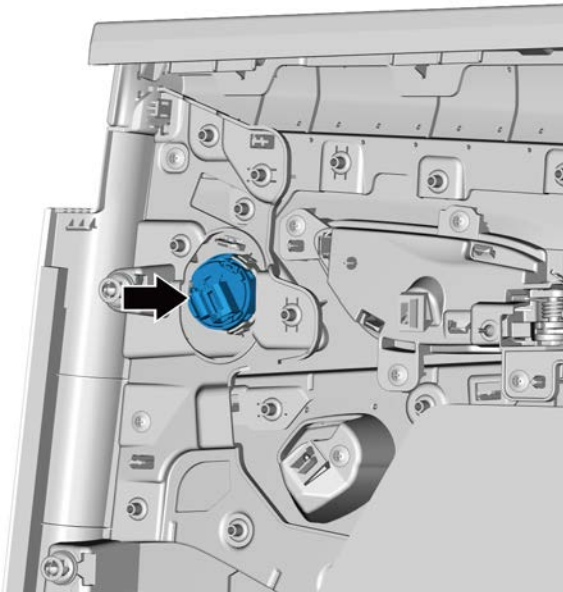
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

- 3 Remove the RL door interior trim plate assembly, see the [Replacement of the RL door interior trim plate assembly](#).
- 4 Remove the RL door tweeter.



Installation procedure

- 1 Install the RL door tweeter.



- 2 Install the RL door interior trim panel assembly
- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

11.2.6.8 Replacement of dashboard speaker

Removal procedure

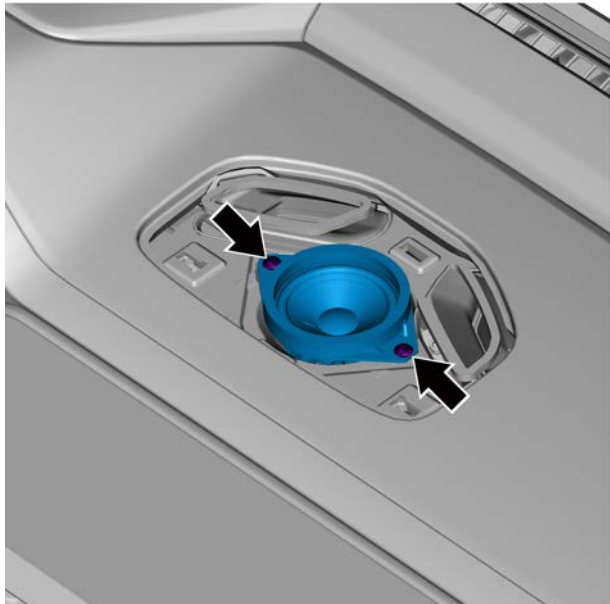
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

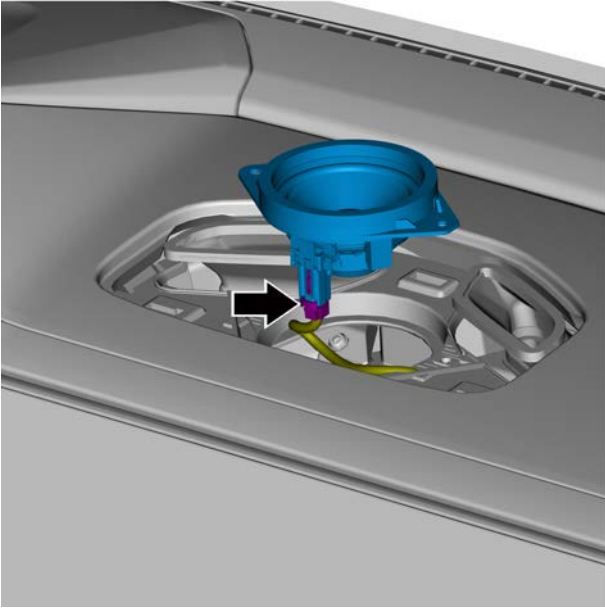
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Pry open the dashboard speaker cover assembly with a plastic crowbar.

Caution

Be careful not to scratch the dashboard

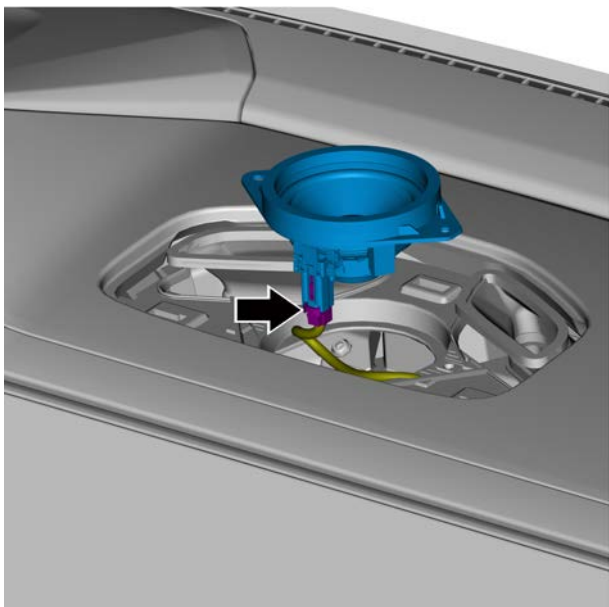


- 4 Remove the 2 retaining screws for the dashboard speakers.



- 5 Disconnect the dashboard speaker harness connector.
- 6 Remove the dashboard speakers.

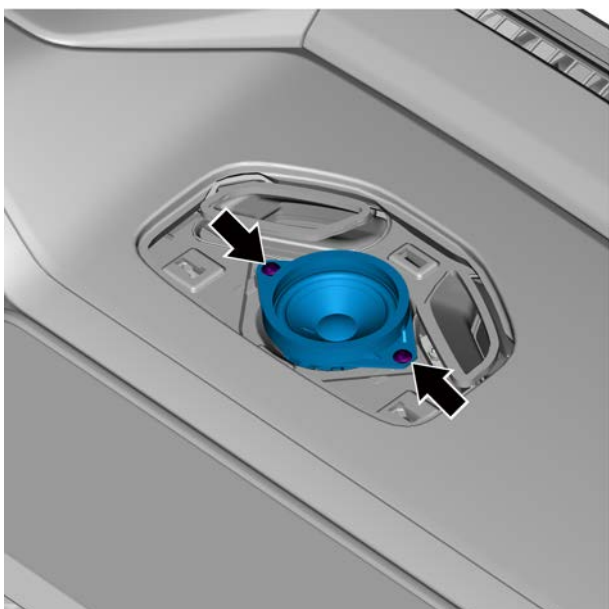
Installation procedure



- 1 Connect the dashboard speaker harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install the 2 retaining screws for the dashboard speakers.

Torque: 2.5 N. m (metric system) 1.8 lb-ft (Imperial system)



- 3 Install the dashboard speaker cover assembly.

- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

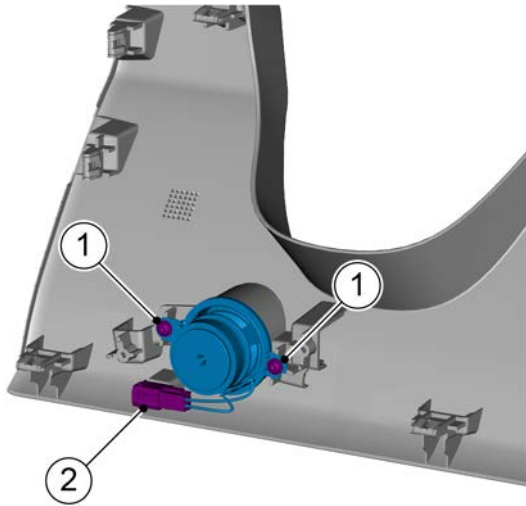
11.2.6.9 Replacement of Emergency Standby Speaker

Removal procedure

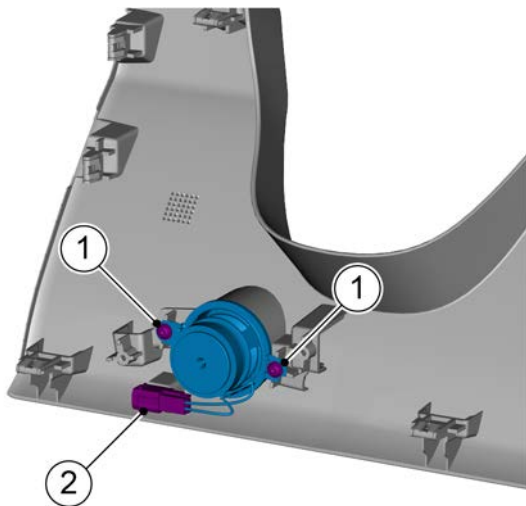
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the left lower guard assembly of the dashboard, see the [Replacement of left lower guard assembly of the dashboard](#).



- 4 Remove 2 retaining screws 1 of emergency backup speakers.
- 5 Remove the emergency backup speaker wire harness clip 2 and remove the emergency backup speaker.



Installation procedure

- 1 Install emergency backup speakers and fasten screw 1.
Torque: 0.7 N. m (metric system) 0.5 lb-ft (Imperial system)
- 2 Install emergency backup speaker harness clip 2.

- 3 Install the left lower fender apron assembly of the dashboard.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

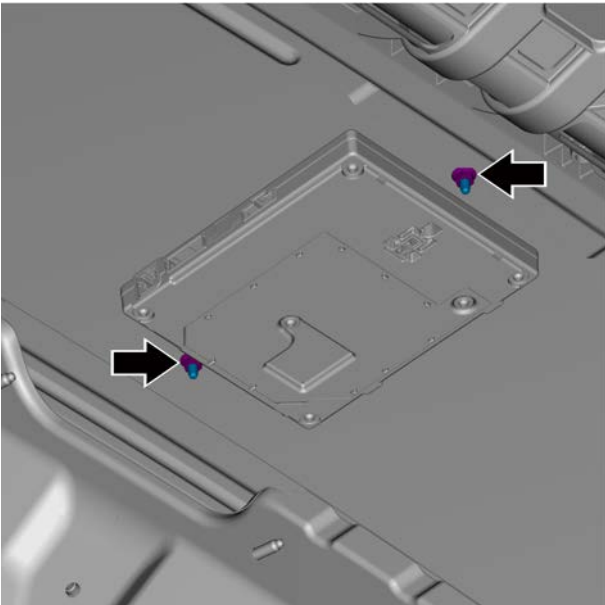
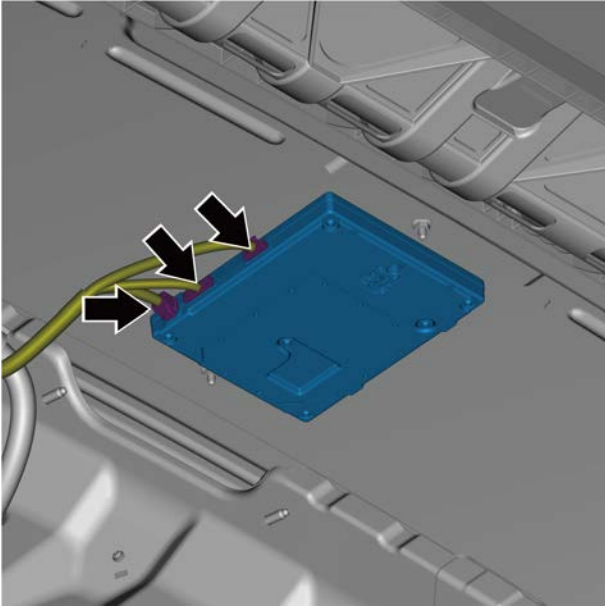
11.2.6.10 Replacement of remote information processing and interconnected antenna module

Removal procedure

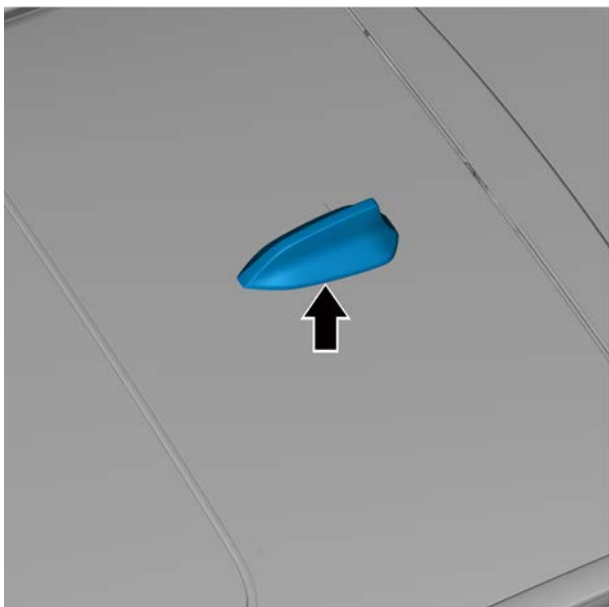
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

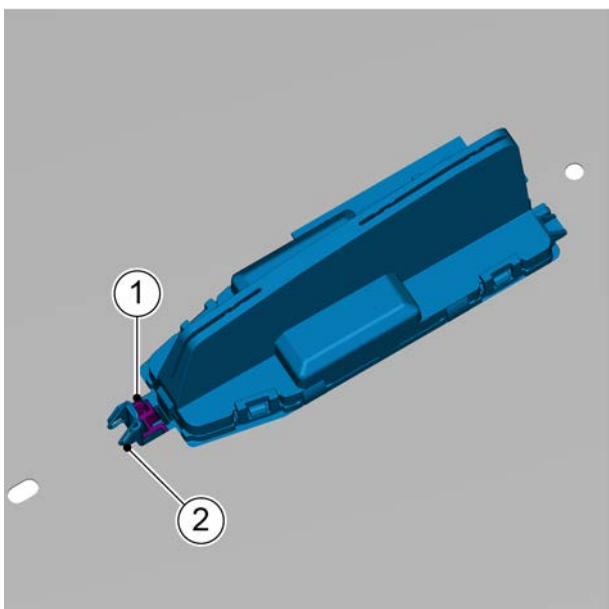
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the ceiling assembly, see [Replacement of the roof assembly](#).
- 4 Disconnect the 3 harness connectors of the remote information processing and interconnected antenna module.



- 5 Remove the 2 retaining nuts of the shark fin antenna trim cover assembly.

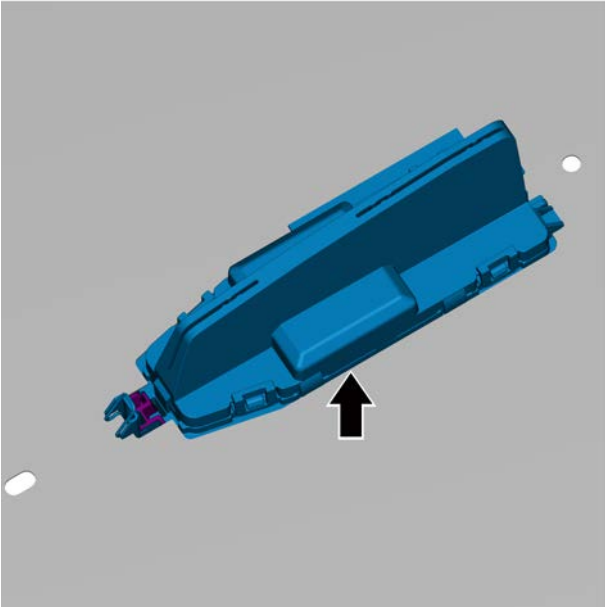


6 Remove shark fin antenna trim cover assembly.

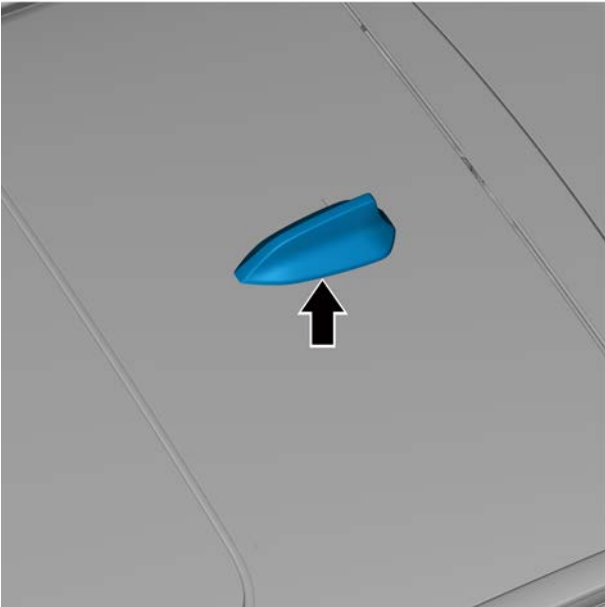


7 Push the fixed buckle 1 down and the fixed buckle 2 inward to remove the remote information processing and interconnected antenna module.

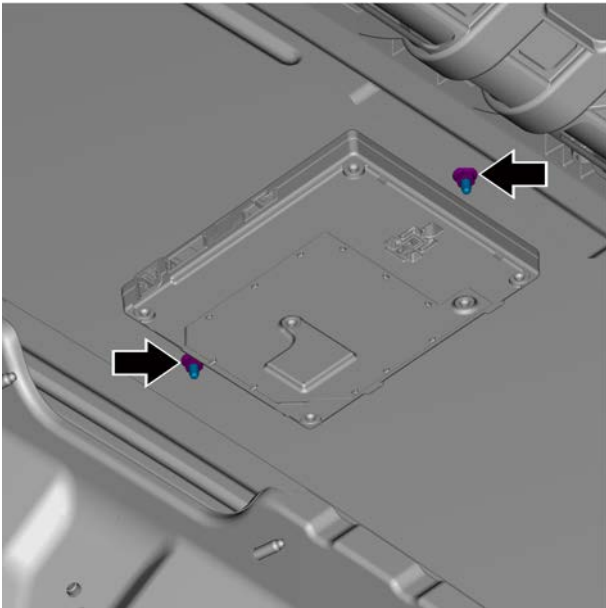
Installation procedure



- 1 Install the remote information processing and interconnected antenna module.

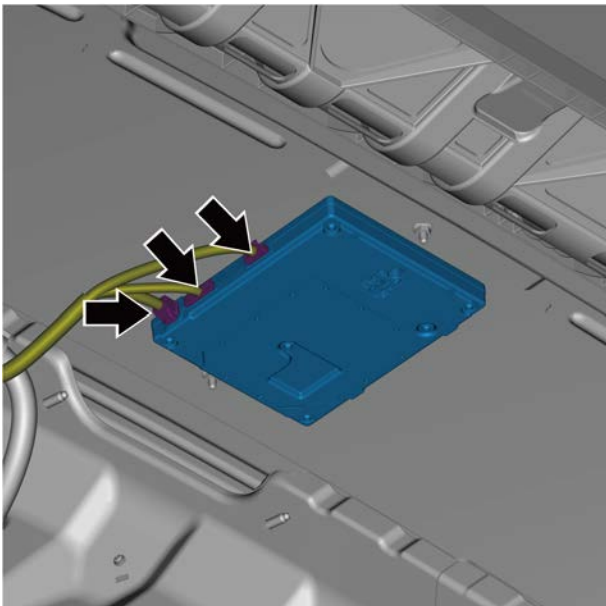


- 2 Apply sealant evenly on the edge of the shark fin antenna decorative cover assembly.
- 3 Install shark fin antenna decorative cover assembly.



- 4 Install and fasten shark fin antenna trim cover assembly with 2 fixing nuts.

Torque: 2.5 N. m (metric system) 1.8 lb-ft (Imperial system)



- 5 Three wire harness connectors are connected to the remote information processing and the interconnected antenna module.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 6 Install the ceiling assembly.
- 7 Connect the negative battery cable.
- 8 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 9 Close the engine compartment cover.

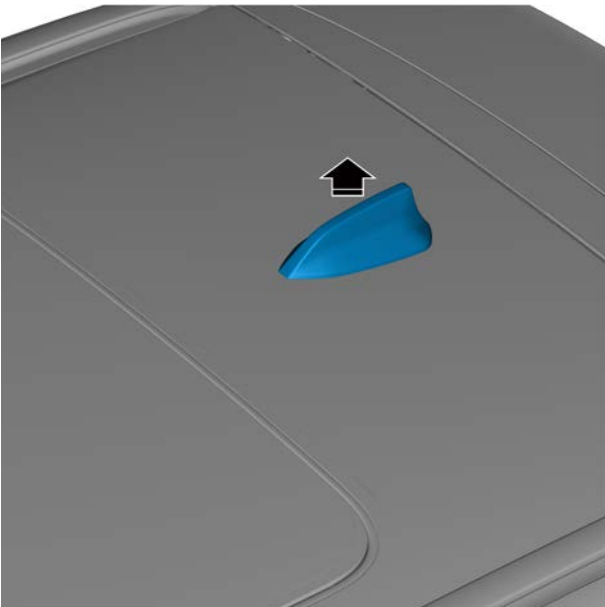
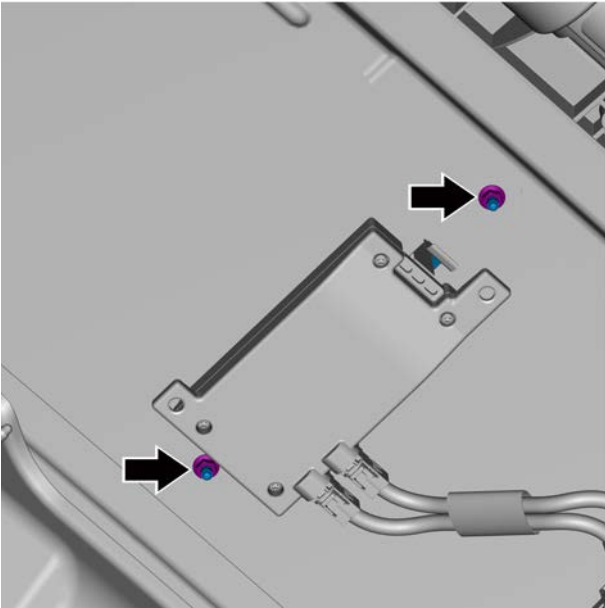
11.2.6.11 Replacement of shark fin antennas

Removal procedure

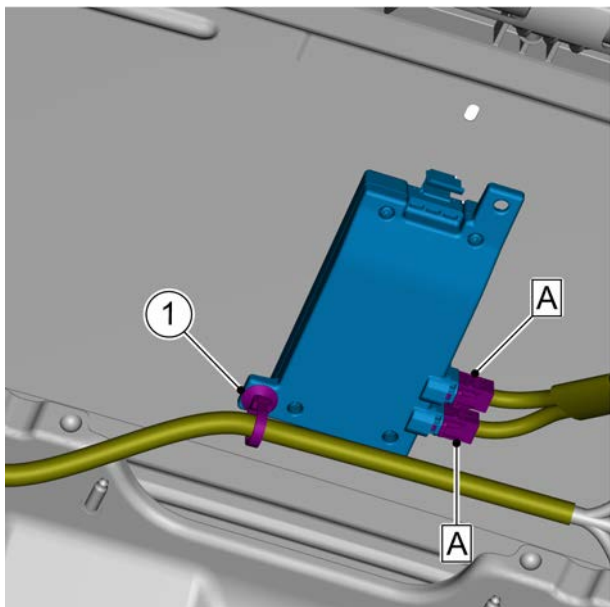
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

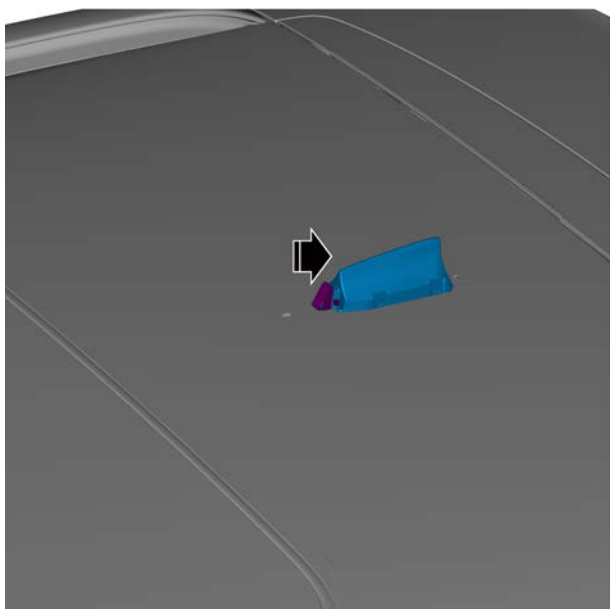
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the ceiling assembly, see [Replacement of the roof assembly](#).
- 4 Remove the 2 retaining nuts of the shark fin antenna trim cover assembly.



- 5 Remove shark fin antenna trim cover assembly.

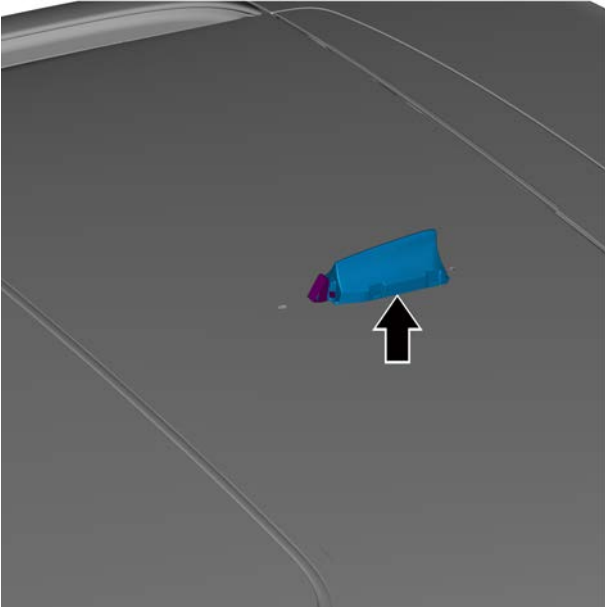


- 7 Disconnect shark fin antenna harness connector A.
- 8 Disconnect the vehicle mobile terminal assembly harness connector fixed buckle 1.

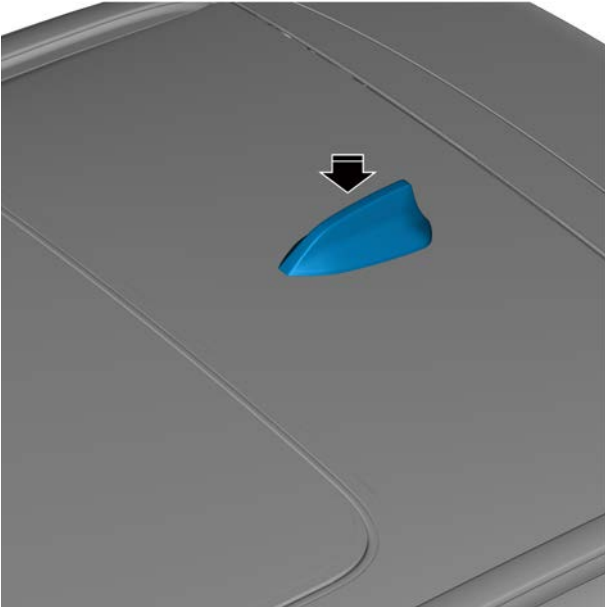


- 9 Push the shark fin antenna fastening buckle in the direction of the arrow.
- 10 Remove the shark fin antennas.

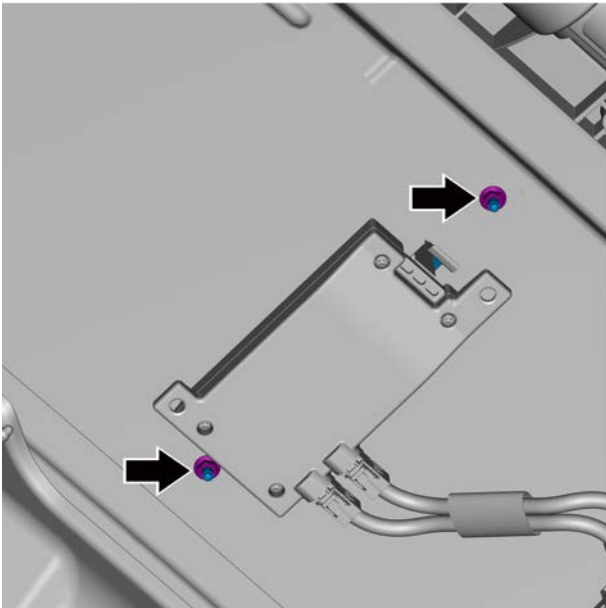
Installation procedure



1 Install the shark fin antennas.

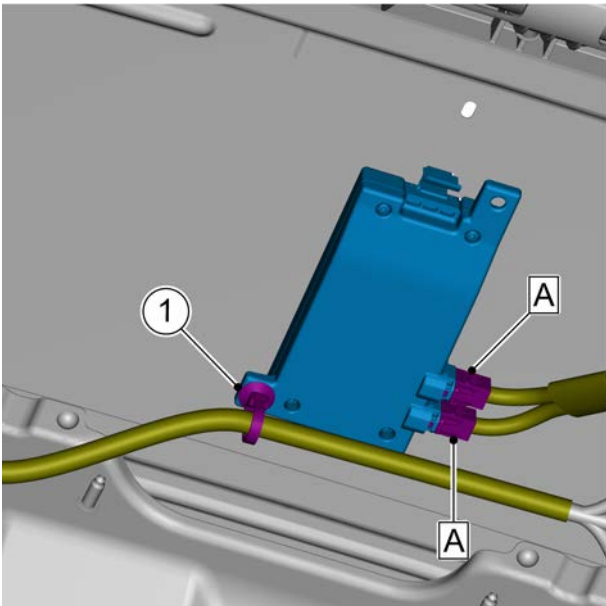


- 2 Apply sealant evenly on the edge of the shark fin antenna decorative cover assembly.
- 3 Install shark fin antenna decorative cover assembly.



- 4 Install and fasten shark fin antenna trim cover assembly with 2 fixing nuts.

Torque: 2.5 N. m (metric system) 1.8 lb-ft (Imperial system)



- 5 Connect shark fin antenna harness connector A.

Caution

Secure the harness connection: "Connect, Click, and Confirm."

- 6 Install the vehicle mobile terminal assembly harness connector fixed buckle 1.

- 7 Install the ceiling assembly.
- 8 Connect the negative battery cable.
- 9 Close the engine compartment cover.

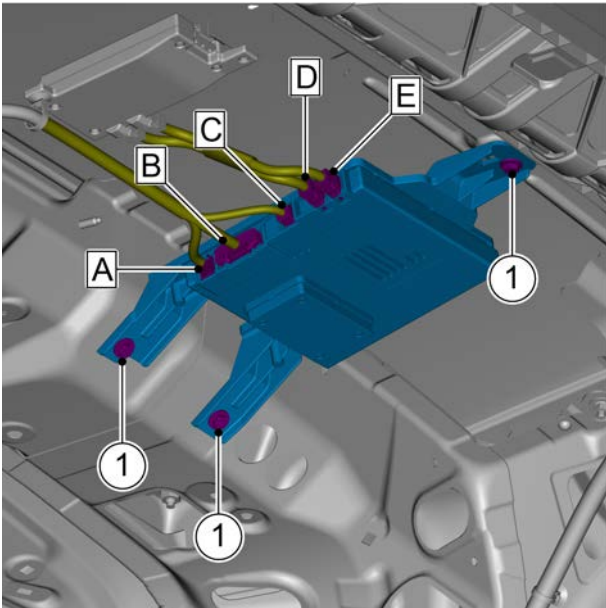
11.2.6.12 Replacement of vehicle mobile terminal assembly

Removal procedure

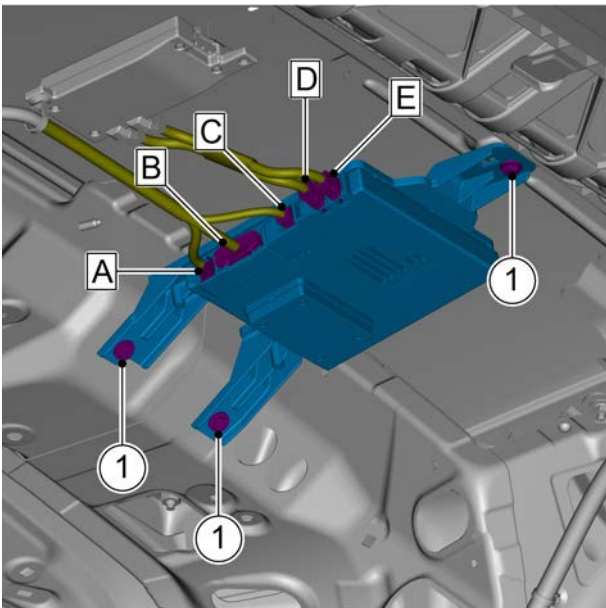
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).



- 3 Remove the ceiling assembly, see [Replacement of the roof assembly](#).
- 4 Disconnect mobile terminal assembly harness connectors A, B, C, D, E.
- 5 Remove the 3 fixing bolts 1 of the vehicle mobile terminal assembly.
- 6 Remove the vehicle mobile terminal assembly.



Installation procedure

- 1 Install 3 fixing bolts 1 of vehicle mobile terminal assembly and fasten them.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 2 Connect the vehicle mobile terminal assembly harness connectors A, B, C, D, E.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the ceiling assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

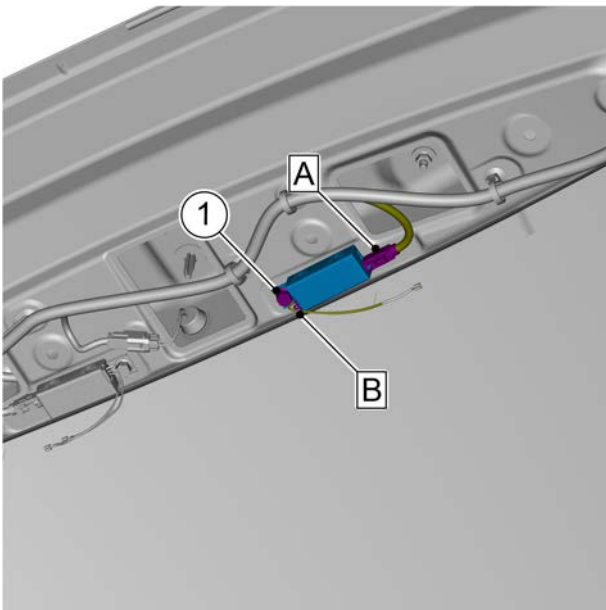
11.2.6.13 Replacement of window antenna amplifier

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

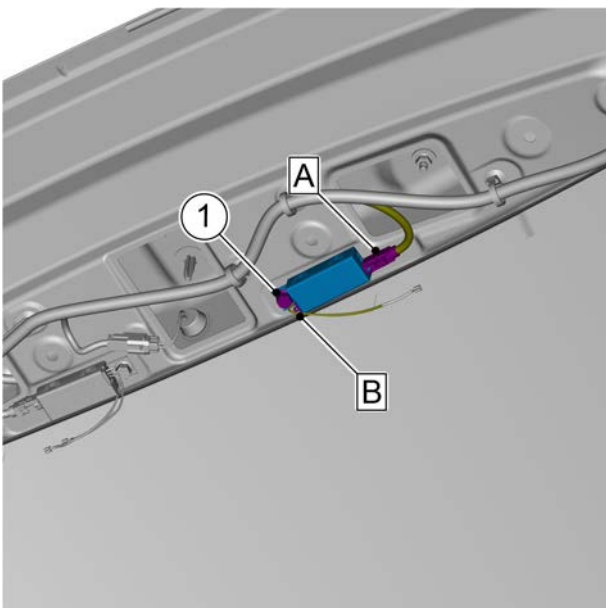
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the tailgate middle upper interior trim panel assembly of the assembly, see [Replacement of the tailgate middle upper interior trim panel assembly](#).
- 4 Disconnect window antenna amplifier harness connectors A and B.
- 5 Remove the window antenna amplifier fixing bolt 1 and remove the window antenna amplifier.

**Installation procedure**

- 1 Install the window antenna amplifier and fasten bolt 1.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 2 Connect window antenna amplifier harness connectors A and B.

Caution

Secure the harness connection: "Connect, Click, and Confirm."



- 3 Install the middle upper interior trim panel assembly of the tailgate.

- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

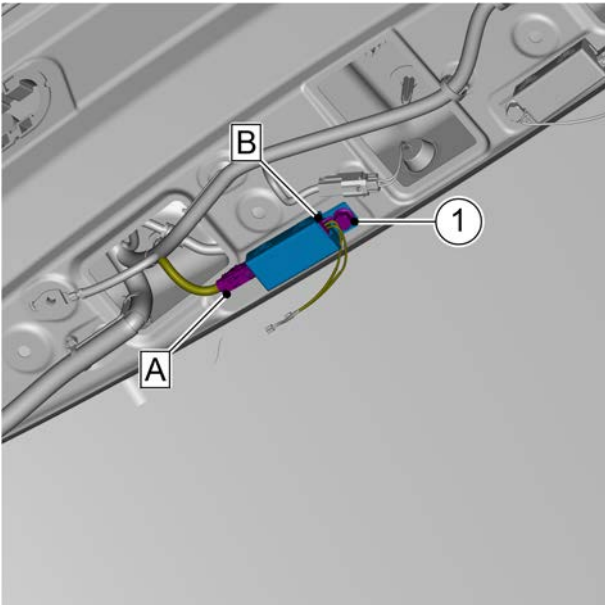
11.2.6.14 Replacement of AM/FM/DAB antenna amplifier

Removal procedure

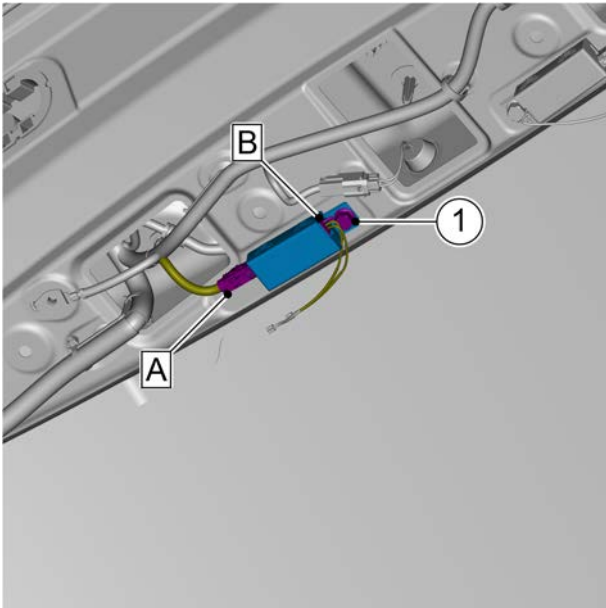
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the tailgate middle upper interior trim panel assembly of the assembly, see [Replacement of the tailgate middle upper interior trim panel assembly](#).
- 4 Disconnect AM/FM/DAB antenna amplifier harness connectors A and B.
- 5 Remove AM/FM/DAB antenna amplifier fixing bolt 1 and remove AM/FM/DAB antenna amplifier.



Installation procedure



- 1 Install AM/FM/DAB antenna amplifier and fasten bolt 1.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 2 Connect AM/FM/DAB antenna amplifier harness connectors A and B.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the middle upper interior trim panel assembly of the tailgate.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

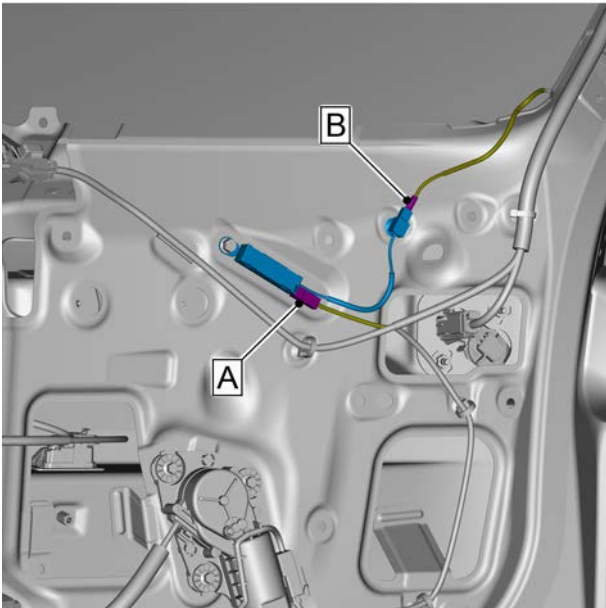
11.2.6.15 + replacement of side coil filter

Removal procedure

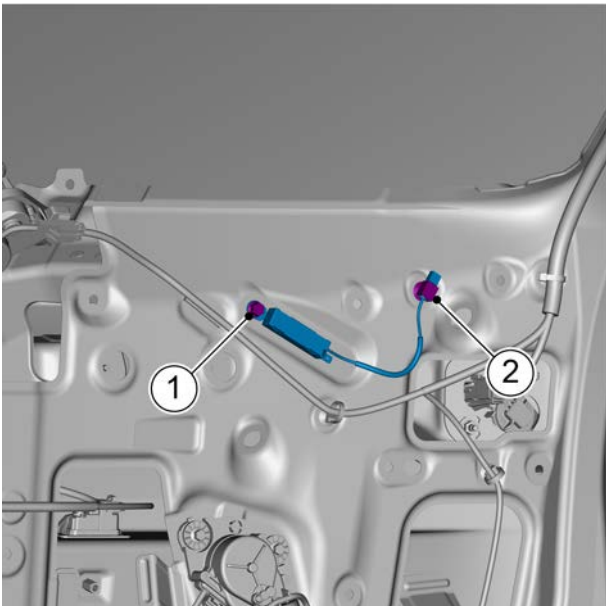
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the tailgate lower interior trim panel assembly of the assembly, see [Replacement of the tailgate lower interior trim panel assembly](#).

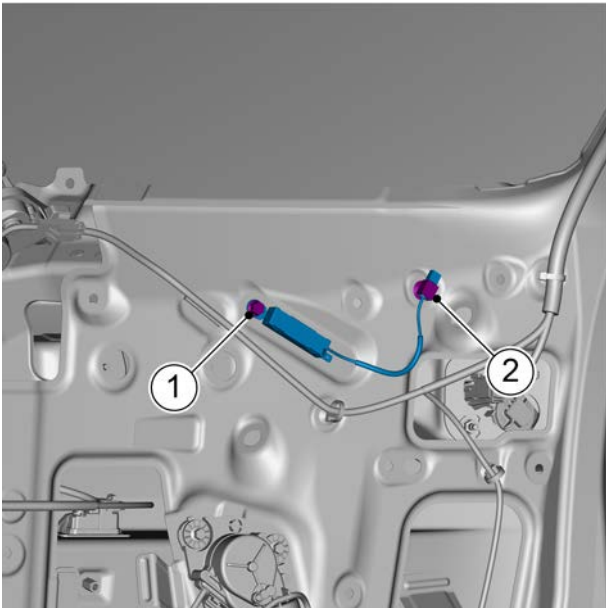


- 4 Disconnect power circuit rejector harness connectors A and B.

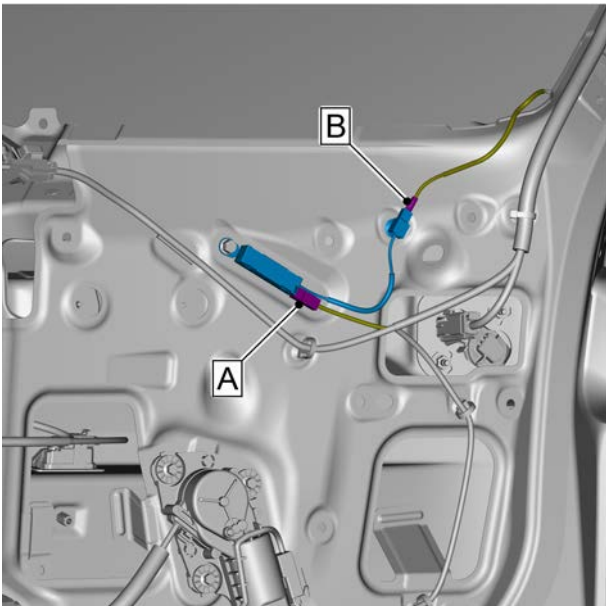


- 5 Remove power circuit rejector fixing bolt 1.
- 6 Remove the power circuit rejector wire harness retaining clip 2 and remove the power circuit rejector.

Installation procedure



- 1 Install power circuit rejector and fasten bolt 1.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 2 Install power circuit rejector harness clip 2.



- 3 Connect power circuit rejector harness connectors A and B.

Caution

Secure the harness connection: "Connect, Click, and Confirm."

- 4 Install the lower trim panel assembly of the tailgate.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

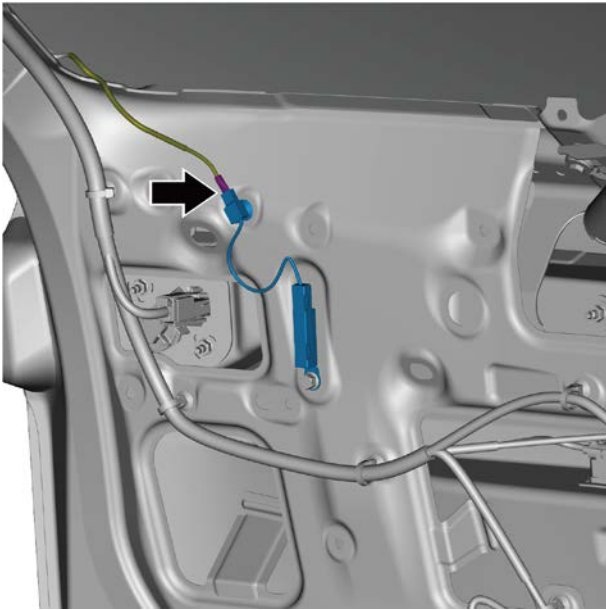
11.2.6.16 Grounding circuit rejector Replacement

Removal procedure

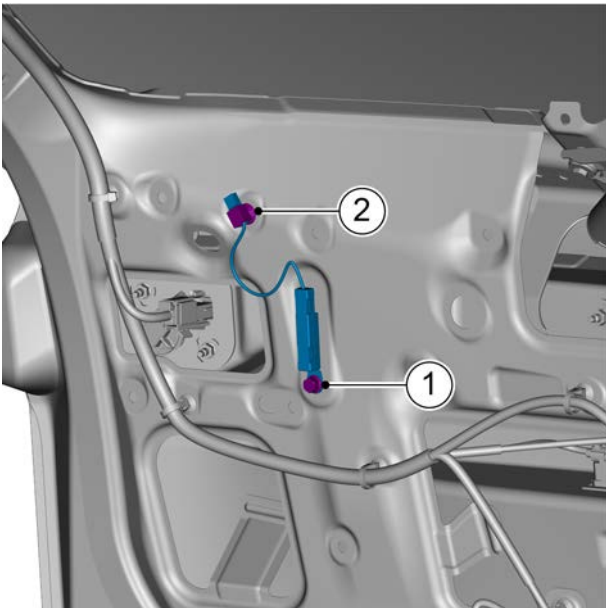
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

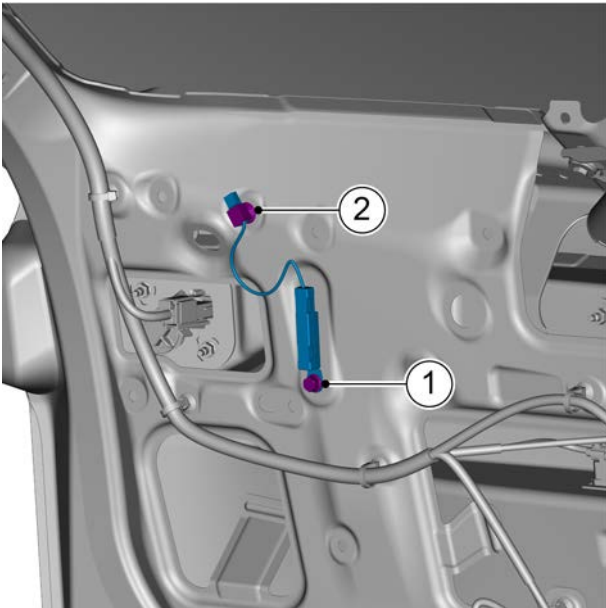


- 3 Remove the tailgate lower interior trim panel assembly of the assembly, see [Replacement of the tailgate lower interior trim panel assembly](#).
- 4 Disconnect the harness connector of ground connection filter.

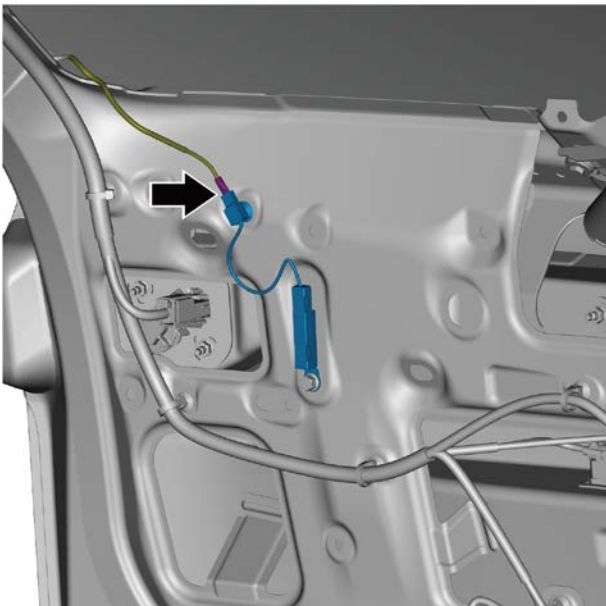


- 5 Remove grounding filter fixing bolt 1.
- 6 Detach the grounding filter harness retaining clip 2 and remove the grounding filter.

Installation procedure



- 1 Install the grounding filter and fasten bolt 1.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 2 Install grounding filter harness clip 2.



- 3 Connect the harness connector of grounding circuit rejector.

Caution

Secure the harness connection: "Connect, Click, and Confirm."

- 4 Install the lower trim panel assembly of the tailgate.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

11.2.6.17 Replacement of auxiliary Woofer

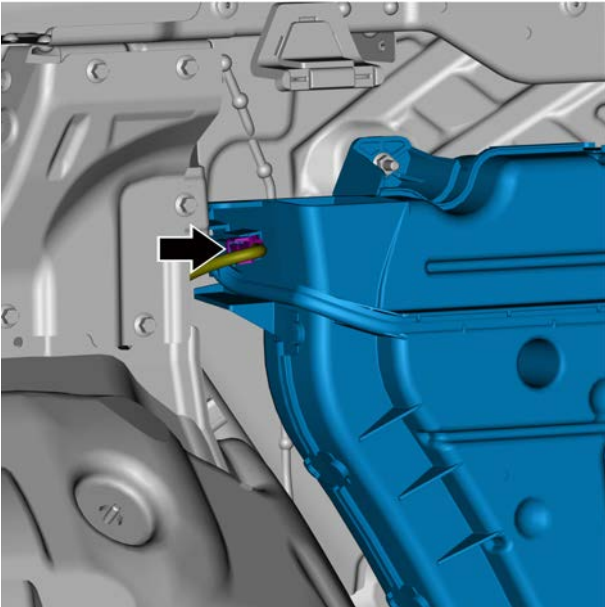
Removal procedure

Warning !

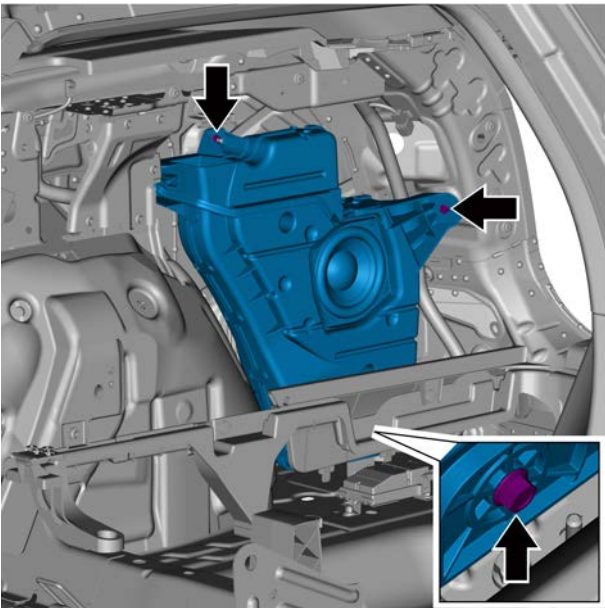
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

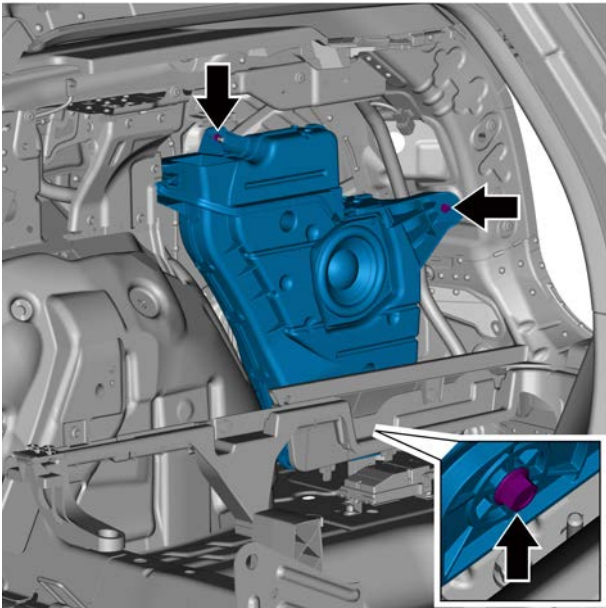
- 3 Remove the rear compartment side fender apron assembly, see [Replacement of the RL compartment side fender apron assembly](#).
- 4 Disconnect harness connector of auxiliary Woofer.



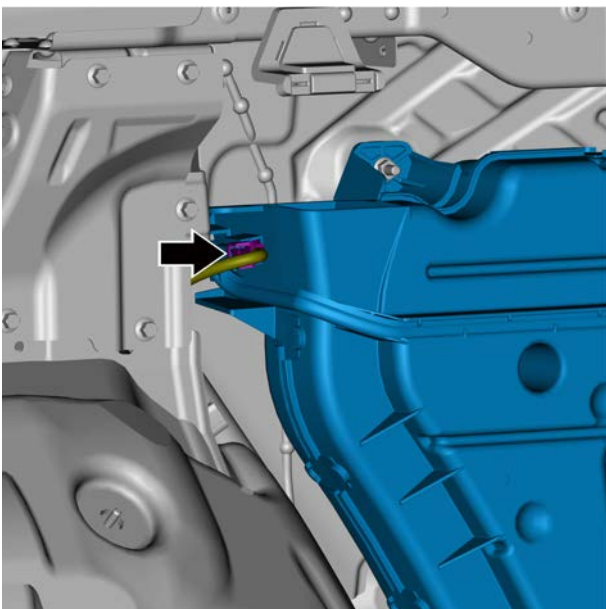
- 5 Remove 2 retaining bolts and 1 retaining nut from subwoofer.
- 6 Remove the auxiliary Woofer.



Installation procedure



- 1 Install subwoofer.
- 2 Tighten 2 retaining bolts and 1 retaining nut of subwoofer.
Bolt torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
Nut Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 3 Connect the harness connector of the subwoofer.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 4 Install the RR compartment side fender apron assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

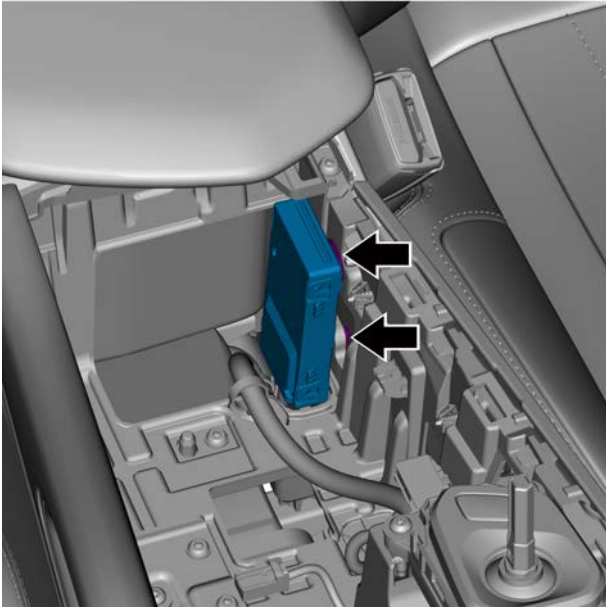
11.2.6.18 Replacement of BLE NFC Communication Module

Removal procedure

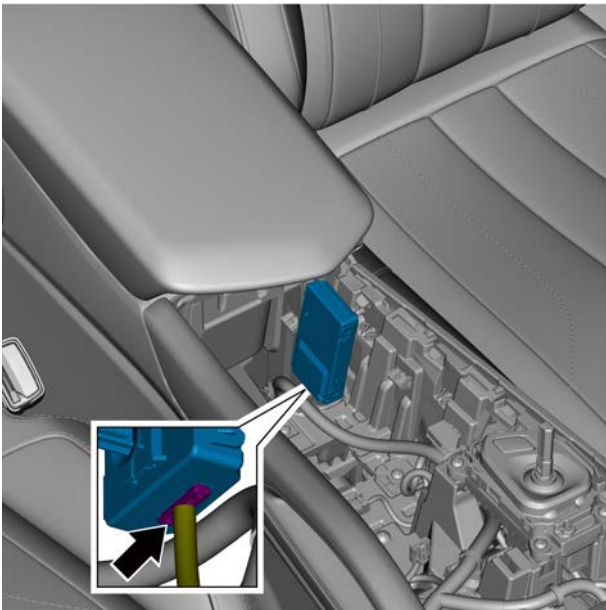
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

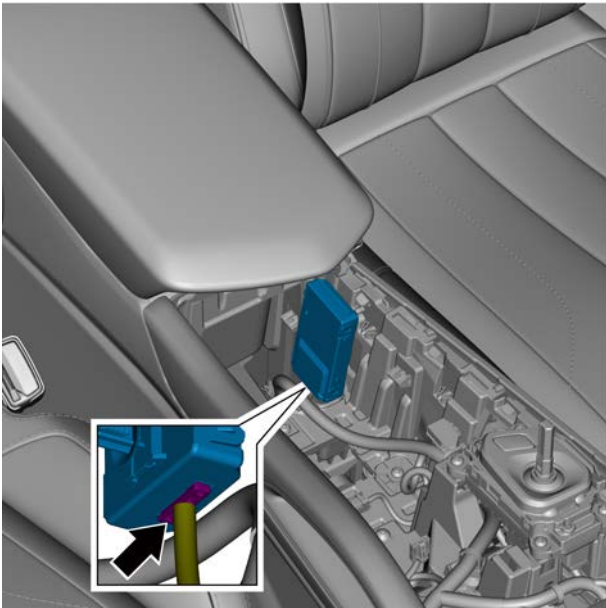


- 2 Remove the shift panel assembly, see [Replacement of the shift panel assembly](#).
- 3 Remove the BLE NFC communication module retaining clip and remove the BLE NFC communication module.



- 4 Disconnect the BLE NFC communication module harness connector and remove the BLE NFC communication module.

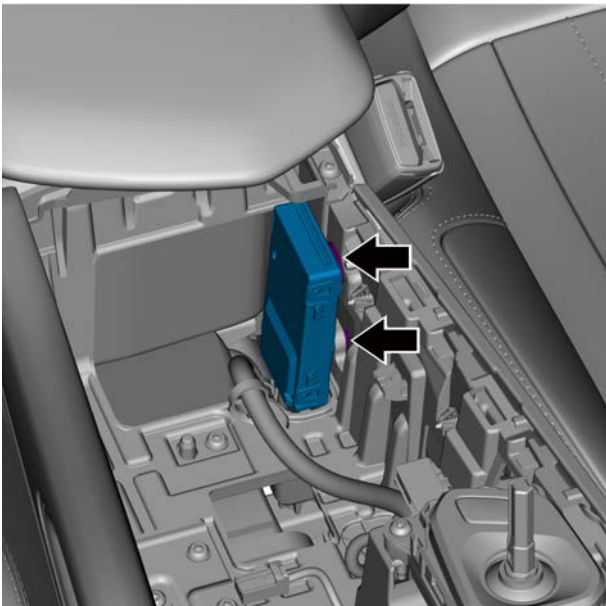
Installation procedure



- 1 Connect the BLE NFC communication module harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install the BLE NFC communication module and clamp securely.

- 3 Install the shift panel assembly.
- 4 Connect the negative battery cable.
- 5 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

11.2.6.19 Microphone replacement

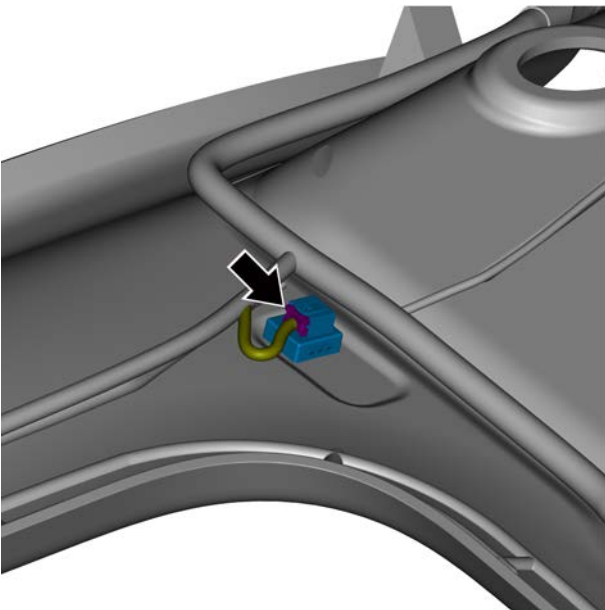
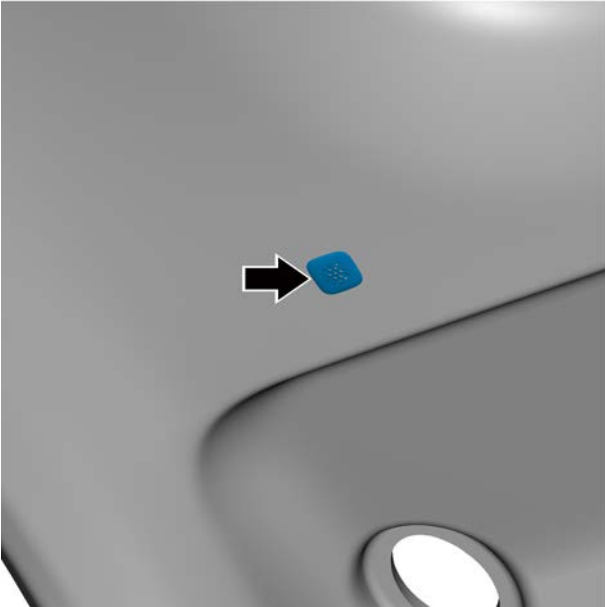
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

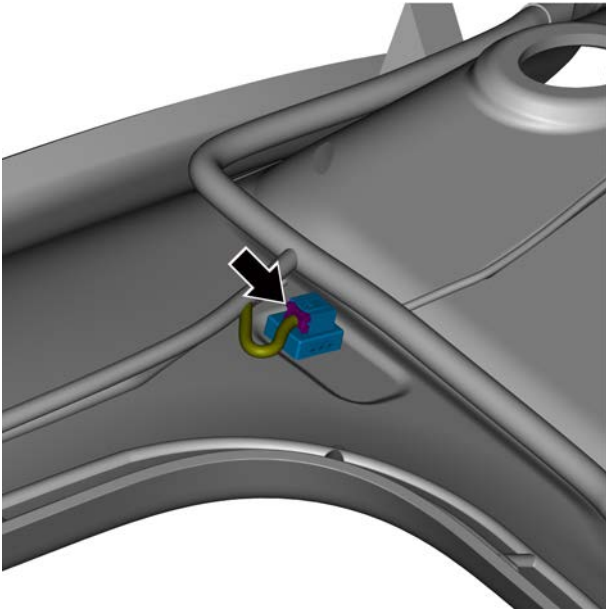
- 1 Open the engine compartment cover.

- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the ceiling assembly, see [Replacement of the roof assembly.](#)
- 4 Remove the microphone mask.



- 5 Disconnect the microphone harness connector and remove the microphone.

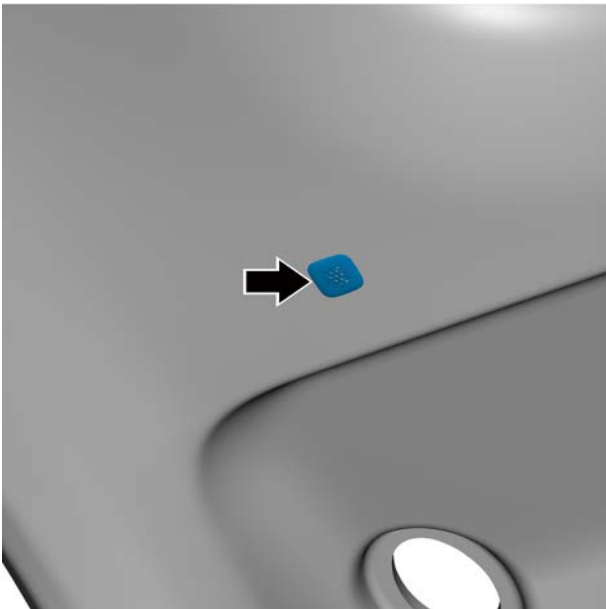
Installation procedure



- 1 Install the microphone and connect the harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install the microphone mask.

- 3 Install the ceiling assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

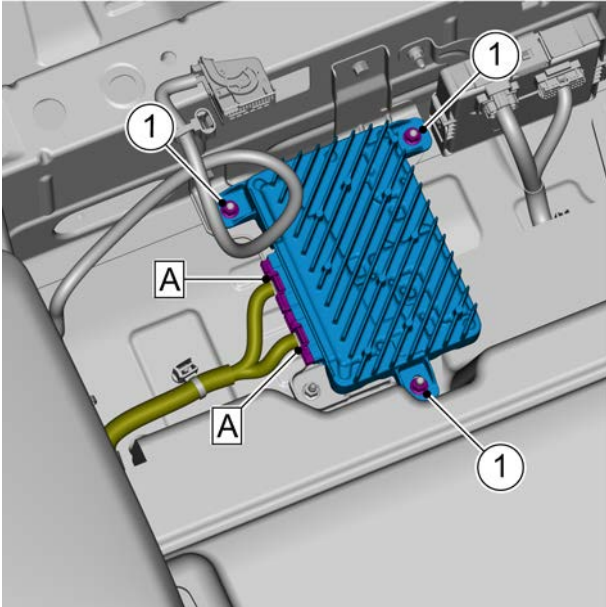
11.2.6.20 Replacement of audio control module

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).



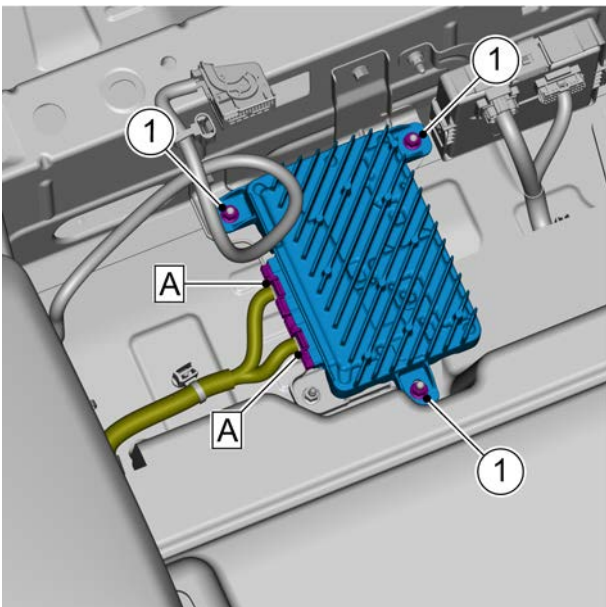
- 3 Disassemble the passenger seat, see [Replacement of the passenger seat](#).
- 4 Remove the FR floor carpet assembly, see [Replacement of the front left floor carpet assembly](#).
- 5 Disconnect audio control module harness connector A.
- 6 Remove the 3 retaining nuts 1 of audio control module.
- 7 Remove the audio control module.

Installation procedure

- 1 Install audio control module and fasten the 3 nuts 1.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 2 Connect the audio control module to harness connector A.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 3 Install the FR floor carpet assembly.
- 4 Install passenger seats.
- 5 Connect the negative battery cable.

- 6 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 7 Close the engine compartment cover.

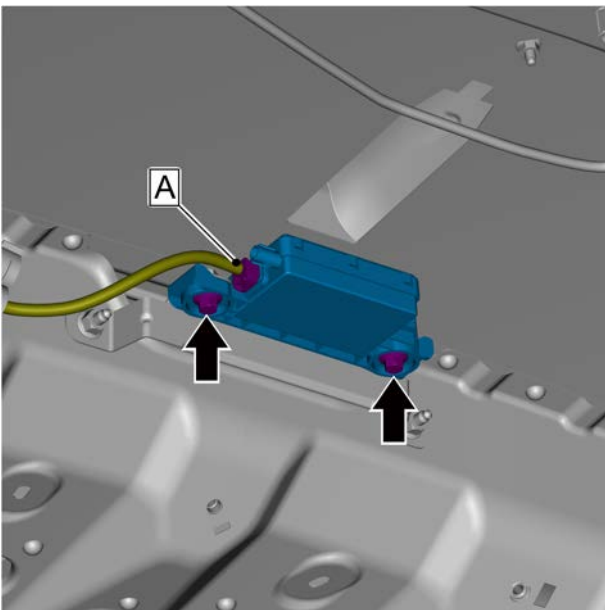
11.2.6.21 Replacement of RF receiver module

Removal procedure

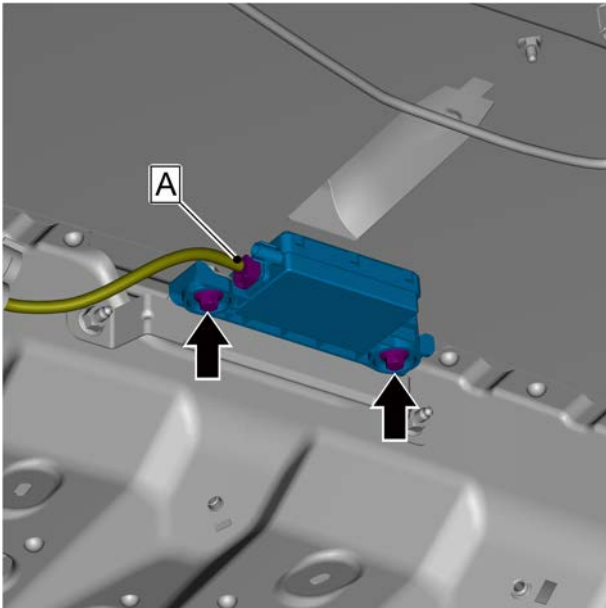
Warning !

See "warning about disconnecting battery" in [1.1.1.1 Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the ceiling assembly, see [Replacement of the roof assembly](#).
- 4 Disconnect the radio frequency receiving module harness connector A.
- 5 Remove the 2 fixing bolts of the RF receiving module and remove the RF receiving module.



Installation procedure



- 1 Install the 2 fixing bolts of RF receiver module and fasten them.

Torque: 2.5 N. m (metric system) 1.8 lb-ft (Imperial system)

- 2 Connect the radio frequency receiving module harness connector A.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the ceiling assembly.
- 4 Connect the negative battery cable.
- 5 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 6 Close the engine compartment cover.

11.3 Lighting system

11.3.1 Specification

11.3.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Bolt-fasten headlamp unit (front left)	M6×20	4.2~5.8	3.1~4.3
Bolt-fasten tailgate limit block and flume	M6×25	8.5~11.5	6.3~8.5
Bolt-fasten left tail lamp and body side panel	M6×25	2.5~3.5	1.9~2.6
Tailgate tail lamp installation fasteners	M6×7.8	2.5~3.5	1.9~2.6
Screw-fasten RL fog lamp and rear bumper	PF5×16	1.7~2.3	1.3~1.7
Nut-fastening rear window brake lamp	M6×7.3	1~2.3	0.74~1.7
Screw-fasten the front left door atmosphere lamp	PF5×16	1.7~2.3	1.3~1.7
Bolt-fastening steering wheel module	M6×20×22.85	5~7	3.7~5.2

11.3.1.2 Bulb Specifications

Part Name	Bulb Name	Bulb Model	Power
Headlamp unit	High beam lamp	LED	-
	Low beam	LED	-
	Daytime running light	LED	-
	Front turn signal lamp	LED	-
	Front position lamp	LED	-
Rear headlamp unit	Brake lamp	LED	-
	Rear turn signal lamp	LED	-
	Rear position lamp	LED	-
	Rear reverse lamp	LED	-
Side turn signal lamp	Side turn signal lamp	LED	-
Rear fog lamp	Rear fog lamp	LED	-
Rear window brake lamp	Rear window brake lamp	LED	-
License plate lamp	License plate lamp	LED	-
Overhead console unit	Reading lamp	LED	-
Rear overhead console	Reading lamp	LED	-
Front row foot space lamp (if equipped)	Front row foot space lamp	LED	-

Part Name	Bulb Name	Bulb Model	Power
Sub-dashboard lower storage box lamp	Sub-dashboard lower storage box lamp	LED	-
Atmosphere lamp (if equipped)	Ambient lamp	LED	-
Luggage compartment lamp	Luggage compartment lamp	LED	-
Glove box lamp	Glove box lamp	LED	-
Sunvisor lamp	Sunvisor lamp	LED	-

11.3.2 Instructions and operations

11.3.2.1 Considerations

Warnings regarding battery disconnection

Warning !

Before maintaining any electrical component, the start and stop button power mode should be in the OFF status and all electrical loads must be “OFF” (switch off) unless otherwise stated in the operational program. If tools or equipment are easily accessible to exposed live electrical terminals, disconnect the negative battery cable. Violation of these safety instructions may damage vehicles or vehicle parts, and may even lead to personal injury.

Caution for the use of battery during inspection

Warning !

When using the battery in the inspection, do not let the positive and negative tester probe get too close, otherwise it will cause a short circuit.

Notices of placing the start and stop button in OFF position when the battery is disconnected

Caution

Be sure to put the starter switch in the OFF position, whenever connecting or disconnecting battery cables, battery chargers, or jumper cables. Otherwise, the control module or other electrical compartments may be damaged.

5. Notices of the power system control module and electrostatic discharge

Caution

Do not touch the connector pins or welded parts on the circuit board to prevent electrostatic discharge from damaging the electronic control module on the vehicle.

11.3.2.2 System description

Exterior lighting

– Position lamp

When the engine is started, the lamp steering wheel module is rotated to the first position and the rear position lamps and daytime running lamps are illuminated. Rotate to the initial position, and the rear position lamp and daytime traffic lamp are turned off.

– Low beam

The lamp steering wheel module rotates to the second position and the low beam is lit. Rotate to the initial position and the lamp is turned off.

– Automatic lighting (if equipped)

The lamp steering wheel module rotates to the AUTO position to activate the automatic lamp function of the headlamps, and the automatic lamp system automatically controls the lamp and closing of the headlamps according to the exterior lamp intensity. The automatic lighting system can identify the road conditions of dark and channel lights, and realize the automatic control of position lamps and low beam. When the vehicle enters the channel, the position lamp and low beam will be lit automatically, and after leaving the channel, the position lamp and low beam will be turned off automatically. When the external environment is dark, the system will also light the position lamp and low beam.

Caution

This system has manual-control- priority function in automatic work mode; the system will exit automatic lamplight mode if there is lamplight signal input.

– Intelligent high beam lamp (if equipped)

The intelligent high beam can be turned on and off through the lamp steering wheel module. In the automatic lamp (that is, AUTO) mode, the lamp steering wheel module is rotated to the intelligent high beam position, the intelligent high beam control system is activated, the knob is automatically returned to the AUTO position, and the intelligent high beam (AHBC) status indicator on the combination instrument is lit, showing white. Once again, rotate the lamp control switch to the intelligent high beam position, the intelligent high beam control system is turned off, and the knob automatically returns to the AUTO position.

– Rear fog lamp

Under the premise of turning on the low beam, press the fog lamp control switch, and then turn on the rear fog lamp. Press the fog lamp control button again, and then turn off the rear fog lamp.

– Backup lamp

The reversing lamps are set to two, which are located in the tail lamps. It will lamp up when the transmission is in reverse. The reserve lamp is operated by a reverse switch connected to the transmission.

– License plate lamp

The license plate lamp is lit when the headlamp or position lamp is on. The license plate lamp is installed above the license plate.

– Lighting show (if equipped)

Click to start playing in the lighting show interface, and the lighting show function is turned on. The lamps outside the car will be lit according to the rhythm of the music being played, and the music currently being played comes from a multimedia sound source. When the lighting show function is turned on, you need to move out of the car to watch.

In the lighting show function on the process, you can turn off the lighting show function at any time, at this time, just click on the interface to stop playing.

– Guest lamp (if equipped)

Click on the multimedia display screen in turn: the Vehicle sets → Lighting → Lighting language, and then turn on the guest lamp function under the guest lamp setting interface. When you approach the vehicle with a valid key, the low beam is lit.

– Guest lighting(if equipped)

Click on the multimedia display screen: Vehicle sets → Lighting → Lighting language, and then turn on the guest lamp lighting language function under the guest lamp setting interface. When the function is turned on, you can also choose among the three lighting language modes of the guest lamp lighting language.

When the vehicle is in a flameout state, the unlock signal is received, and the guest function of headlamp and tail lamp is turned on.

– Exterior rearview mirror floor lamp (if equipped)

When the vehicle unlocks and turns on the follow me home function, the exterior rearview mirror floor lamp is lit.

Headlamp height adjustment

The headlamp height is adjusted by the headlamp height adjustment knob, which is divided into 0, 1, 2 and 3 positions.

The position of the knob can be adjusted according to the load state:

- a.0: there is only the driver in the car.
- b.1: there are only drivers and front row occupants in the car.
- c.2: the car is full and the rear compartment is fully loaded.
- d. There is only the driver in the car, and the rear compartment is fully loaded.

Caution

When adjusting the headlamp height, do not dazzle the driver on the opposite side.

Daytime running light

Turn on Daytime Running Lights

After starting, when the low beam is off, the daytime driving lamp is turned on.

Turn off Daytime Running Lights

The low beam is turned on and the daytime running light is turned off automatically.

The daytime driving lamps are integrated inside the headlamps, and when the turn signal is working, the daytime driving lamps on the relevant side of the vehicle will be reduced to the brightness of the front position lamps.

Overhead console unit (front reading lamp assembly)

Overhead console unit (front reading lamp assembly) operation

Press the left or right overhead console unit (front reading lamp assembly) switch, you can turn on or off the left or right overhead console unit (front reading lamp assembly) separately; press the interior lamp button, you can turn on or off the front and rear overhead console (rear row interior lamp) at the same time.

Caution

When using the front reading lamp assembly door function to turn on the front left and FR reading lamp assembly, the corresponding lamp can be turned off by pressing down the front left or FR reading lamp assembly button.

When the four doors are locked, the front reading lamp assembly will be lit automatically when the guest lamp function is unlocked and triggered at night. If the door is not opened at this time, the front reading lamp assembly will be lit continuously, and if locked with a smart key or touched by the door handle, the front reading lamp assembly will be turned off.

After unlocking the four doors with a smart key or touching the door handle, if any door is opened (excluding the back door) before the front reading lamp assembly is extinguished, the front reading lamp assembly will be lit continuously from the time when the door is opened. After the engine starts, all four doors are closed and the front reading lamp assembly will go out quickly. If the start switch is in mode ON, and all four doors are closed, the front reading lamp assembly will go out slowly. If the start switch is in mode OFF and all four doors are closed, the front reading lamp assembly will go out slowly after 30 seconds. The front reading lamp assembly door control function can be turned off in the multimedia display

Caution

Avoid using the overhead console unit (front reading lamp assembly) when driving at night. Bright lighting may affect drivers' driving and cause traffic accidents.

Interior lamp door control function

The door control function of interior lamps is on by default. If you want to turn it off, you can click on the multimedia display screen in turn: Vehicle settings → Lighting → Door control lamps → Off.

1. Turn on

- In the low beam environment, when the four doors and the rear tailgate are closed, when the start switch is turned off, the interior lamps brighten gradually.
- In the low lighting environment, when the four doors and the back door are closed, when the guest lamp function is unlocked and triggered, the car lamps will be lit automatically.
- In the low lighting environment, when the door control function is turned on, when any door is opened, the interior lamps brighten gradually.

2. Turn off

- When the four doors and back doors are closed, after starting the vehicle, the interior lamps gradually go out.
- When the four doors and the rear tailgate are closed, when the lock order is received during the flameout, the interior lamps will gradually go out.
- Start switch in mode ON, interior lamps will fade out when all doors are closed and some doors are unlocked.
- If the start switch is in mode OFF and all four doors are closed, the interior lamp will go out slowly after 30 seconds.

Rear overhead console (rear interior lamp)

Press the RL or RR overhead console (rear interior lamp) switch to turn on or off the corresponding rear overhead console (rear interior lamp).

Long press the RL or RR overhead console (rear interior lamp) switch to adjust the brightness of the rear overhead console (rear interior lamp).

Caution

If the rear overhead console (rear interior lamp) switch is on, turn off the rear overhead console (rear interior lamp) switch after leaving the vehicle, so as not to drain the vehicle battery.

Atmosphere lamp (if equipped)

Caution

When the brightness of the atmosphere lamp mode interface is adjusted to 0 position in the multimedia display screen, the atmosphere lamp will not be lit.

Door atmosphere lamps are installed on the driver side and the front passenger side door trim plate.

Ambient lamp setting

Click on the multimedia display screen in turn: Vehicle sets → Lighting → Atmosphere lamp, and click the atmosphere lamp mode under this interface to open the atmosphere lamp mode setting menu. Guest atmosphere lamps and farewell atmosphere lamps can also be turned on or off under this interface.

Atmosphere lamp mode

You can select custom mode or driving mode association from the atmosphere lamp mode settings menu.

- Custom mode: after selecting the custom mode, you can set the light mode of the atmosphere lamp to solid color or breathing. When choosing a solid color, the color and brightness of the atmosphere lamp can be customized.
- Driving mode association: after selecting the driving mode association, the light mode of the atmosphere lamp will be associated with the selected driving mode.

Glove box lamp

After the glove box is opened, the glove box lamp will be lit, and the glove box will go out automatically after closing the glove box.

Foot lamp (if equipped)

The foot lamp is located on the lower panel of the dashboard above the feet of the driver and the front row occupants.

1. Activation

- When the door lamp is on, the foot lamp is on.
- When the vehicle is driving at night, the foot lamps are turned on, and the brightness can be adjusted according to the level of backlight.

2. Disabling

- When the door lamp is turned off, the foot lamp will be turned off.
- When the vehicle is not driving at night, the foot lamps are turned off.

Luggage compartment lamp

When the rear tailgate opens, the RL compartment lamp lights up automatically.

Follow Me Home

Start follow me home function

Click on the multimedia display in turn: Vehicle sets → Lighting → Lighting signal, and choose to start follow me home at any time in the follow me home function setting interface.

When the vehicle anti-theft is off and follow me home function is not turned off as shown on the multimedia display, the following two ways can activate the follow me home function:

- When the light steering wheel module is in a non-AUTO position, within 10 minutes after the vehicle stalls, turn the light control steering wheel module to the limit in the direction

of the arrow, then release it, and the high light flashes once, activating the follow me home function.

– At night, when the light steering wheel module is in the AUTO position, the vehicle automatically activates the follow me home function when the car turns off.

Turn off follow me home function

On the multimedia display, click: Vehicle sets → Lighting → Lighting signal, and then click Off under the Follow me home setting interface to turn off Follow me home.

When any of the following conditions are met, follow me home function will be temporarily turned off:

- The startup switch is not turned off.
- Timeout.
- The high beam is turned on or the high beam flashes.

Follow me home timing

Click on the multimedia display in turn: Vehicle sets → Lighting → Lighting signal, and select the timing time under the Followme home settings interface according to your needs. The optional timing time is 30 seconds, 60 seconds and 90 seconds. When Follow me home is activated, the timer is the pre-selected timing time. Before this timer expires, if any of the doors (including the rear tailgate) are opened, the timer will be reset to 180 seconds, and if all the doors (including the back door) are closed, the timer will be reset to the pre-selected timing.

11.3.2.3 Instructions for Vehicle Light Adjustment

Equipment and site preparation

- 1. Tools: Phillips screwdriver and Allen wrench.
- 2. Tape measure or laser range finder (electronic ruler).
- 3. Site: The dark environment site should be level, sized to allow vehicle entry, with the headlight reference center at least 10m away from the screen.
- 4. Test screen: thick white paper or white wall (the width of the test screen should be greater than the vehicle width by no less than 2m to facilitate the observation of light patterns).

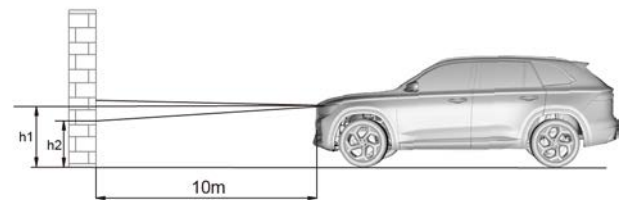
Vehicle preparation

- Tire pressure shall be inflated to the full load pressure specified in the technical conditions of complete vehicle.
- 2. Vehicle is refilled with fuel, engine coolant, washer fluid and lubrication oil, and provided with all accessories and tools for the test vehicle (spare tyre, tools, etc.). Refilling means that the fuel tank is filled with no less than 90 percent of its volume.
- 3. A load of 75kg is placed on the driver's seat to simulate the driver's ride.

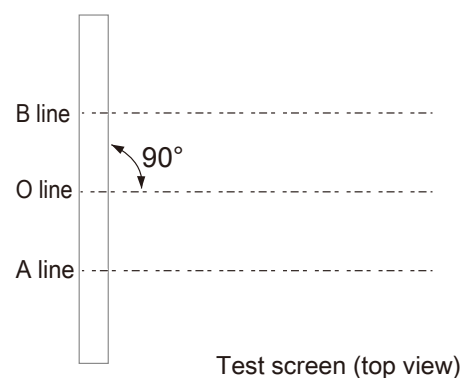
- 5. Prior to measurement, the vehicle should be at a natural standstill state with the vehicle traveling backward for at least one wheel circle distance and then forward for the same distance.
- 6. Make sure the outside cover of the headlamp is clean.
- Start the vehicle.

Light measurement

1. 1. Park the vehicle as shown in the diagram, with a distance L between the headlight reference center and the screen of 10m.



2. 2. For vehicles with manual adjustment of light height, the height switch should be set to "0" gear.
3. 3. Draw Line O, Line A, Line A1, Line A2, Line B, Line B1, and Line B2 on the screen.

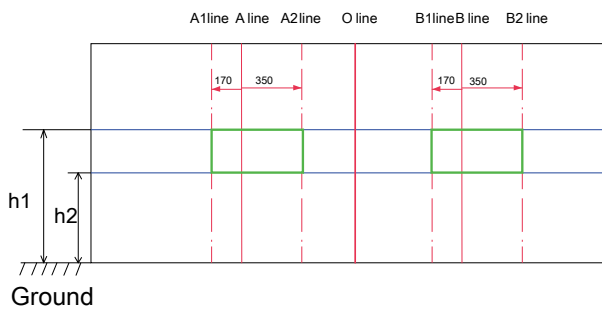


- Line O: Draw a vertical line in the center of the test screen aligned with the center of the vehicle.
- Line A: draw a parallel line on the left side of the Line O, with a distance of reflecting bowl 686.5mm, lens 721.1mm away from the Line O (solid red line).
- Line A1: Draw a line to the left of Line A, parallel to Line A, with a distance of 170mm from Line A (dashed red line).
- Line A2: Draw a line to the right of Line A, parallel to Line A, with a distance of 350mm from Line A (dashed red line).
- Line B: draw a parallel line on the right side of the Line O, reflecting bowl 686.5mm away from the Line O, lens 721.1mm (solid red line).
- Line B1: Draw a line to the left of Line B, parallel to Line B, with a distance of 170mm from Line B (dashed red line).
- Line B2: Draw a line to the right of Line B, parallel to Line B, with a distance of 350mm from Line B (dashed red line).

4. Draw h1 line and h2 line on screen.

- Line H1: draw a horizontal line parallel to the ground, with a distance of reflecting bowl 797 mm, lens 785mm away from the ground.
- Line H2: draw a horizontal line parallel to the ground, with a distance of reflecting bowl 547 mm, lens 535mm away from the ground.

5. The green box shown in the diagram is formed after all lines are completed.



Test screen (face up)

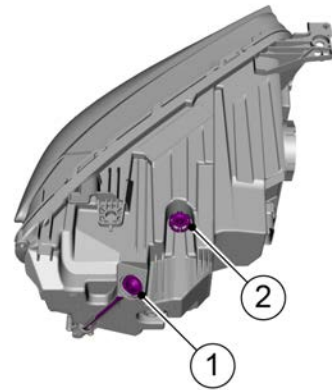
- b.b. Lights on the left: Insert a Phillips screwdriver or Allen wrench into the dimmer port of low beam lamp. Rotate the front headlamp dimming handle 1 to adjust the horizontal (left and right) direction of the front headlamp; rotate the front headlamp dimming handle 2 to adjust the vertical direction of the front headlamp, as shown in the following figure:

Note

Adjust the lights on the right with the same method as that on the left.

Caution

In order to observe the effect of light adjustment, the light on one side may be adjusted while the light on the other side is shielded.



- c. It is required that the turning point for the cut-off of low beam is located within the box, which means that the dimming is completed, as follows.

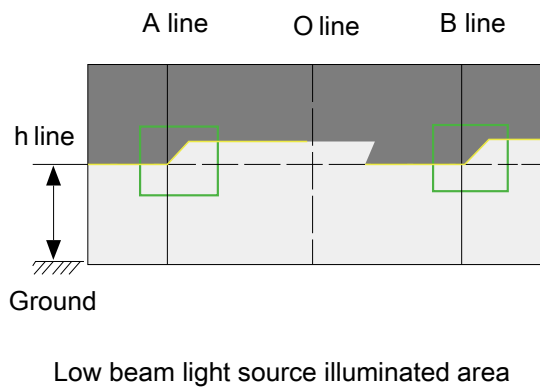
Caution

After commissioning, the light height on left and right sides should be consistent.

Light adjustment

1. 1. Adjustment of low beam lamp

- a. Turn on the low beam lamp.



2. 2. Adjustment of high beam lamps

The front headlamp of this model is a combination of near and far lamp.

Caution

The front headlamp with the integration of near and far lamp only needs to adjust the low beam lamp.

11.3.3 System working principles

11.3.3.1 System Working Principles

Working principles of the headlamp

When the lighting steering wheel module hits the "headlamp" file, the working voltage is output by the lamp steering wheel module wire harness connector to drive the headlamp relay to pull in and light up the headlamp. The power supply voltage of the headlamp is transmitted to the optical axis adjustment switch of the headlamp and the optical axis adjustment motor of the right and left headlamps. At this time, toggle the adjustment switch up and down to adjust the signal voltage of the motor to realize the height adjustment function of the headlamp.

Caution

Too frequent toggling of the key may cause damage or no operation to the motor.

In case CEM (body control module) detects the voltage of the lamp steering module switch harness connector, it indicates that the switch is at "AUTO" (automatic light). At this time, CEM detects signals from the ambient light sensor. If the ambient lighting is not strong, CEM will drive the headlamp relay to pull in through harness connector output voltage and automatically light up the headlamp. In case the ambient lighting is intensified, CEM will cut off the voltage output of the harness connector to realize the automatic switch-off of the headlamp. In case the lamp steering module switch is switched into the high beam position, it will control the grounding to drive the high beam lamp relay to pull in and light up the high beam lamp through the harness connector 1, meanwhile the supply voltage of the high beam lamp is transmitted to the instrument to lighten up the high beam indicator in the instrument.

Caution

The working voltage of the high beam lamp relay comes from the headlamp power supply circuit.

Working principles of the position lamp

When the lamp steering wheel module hits the "position lamp" file, the switch signal drives the position lamp relay suction by outputting the working voltage from the harness connector terminal of the lamp steering wheel module to light up all position lamps, instrument backlight lamps and left and right license plate lamps.

Working principles of the daytime running light

CEM harness connector terminal output working voltage drives the daytime running light relay to pull in to light up the daytime running light. At the same time, the voltage is sent to the instrument to light up the daytime running light indicator.

Working principles of the rear fog lamp

When the current low beam or high beam lamp is turned on, the switch controls the operation of the position lamp relay and transmits the drive power to the rear fog lamp relay. When the rear fog lamp switch is closed, the switch provides the output voltage of the position lamp relay to drive the rear fog lamp relay to turn on the rear fog lamp. At the same time, this voltage is transmitted to the instrument to light the rear fog lamp indicator.

Working principles of the turn signal lamp

The multi-function joystick controls the grounding circuit of the lighting steering wheel module harness connector terminal to drive the pull-in of the rotating lamp relay and transmit the voltage to the left and right turn signal respectively.

Caution

When the hazard warning indicator button is pressed down, CEM outputs the voltage to these two circuits and lights up all turn signal lamps.

Working principles of the brake lamp

The brake lamp is controlled by the brake lamp switch placed on the brake pedal. The working voltage is input to the CEM through the on-off signal inside the switch to light the brake lamp.

Working principles of the reverse lamp

Electron gear shifting harness connector output working voltage drives the reverse lamp relay to pull in and lights up the reverse lamp. The reverse gear information of the instrument is received and displayed through the CAN network.

Working principles of the interior door light

When the front row reading lamp switch is at DOOR, the power supply of the front row reading lamp comes from the CEM harness connector. When the door is open, the grounding circuit of the courtesy switch is connected to light up the front row reading lamp.

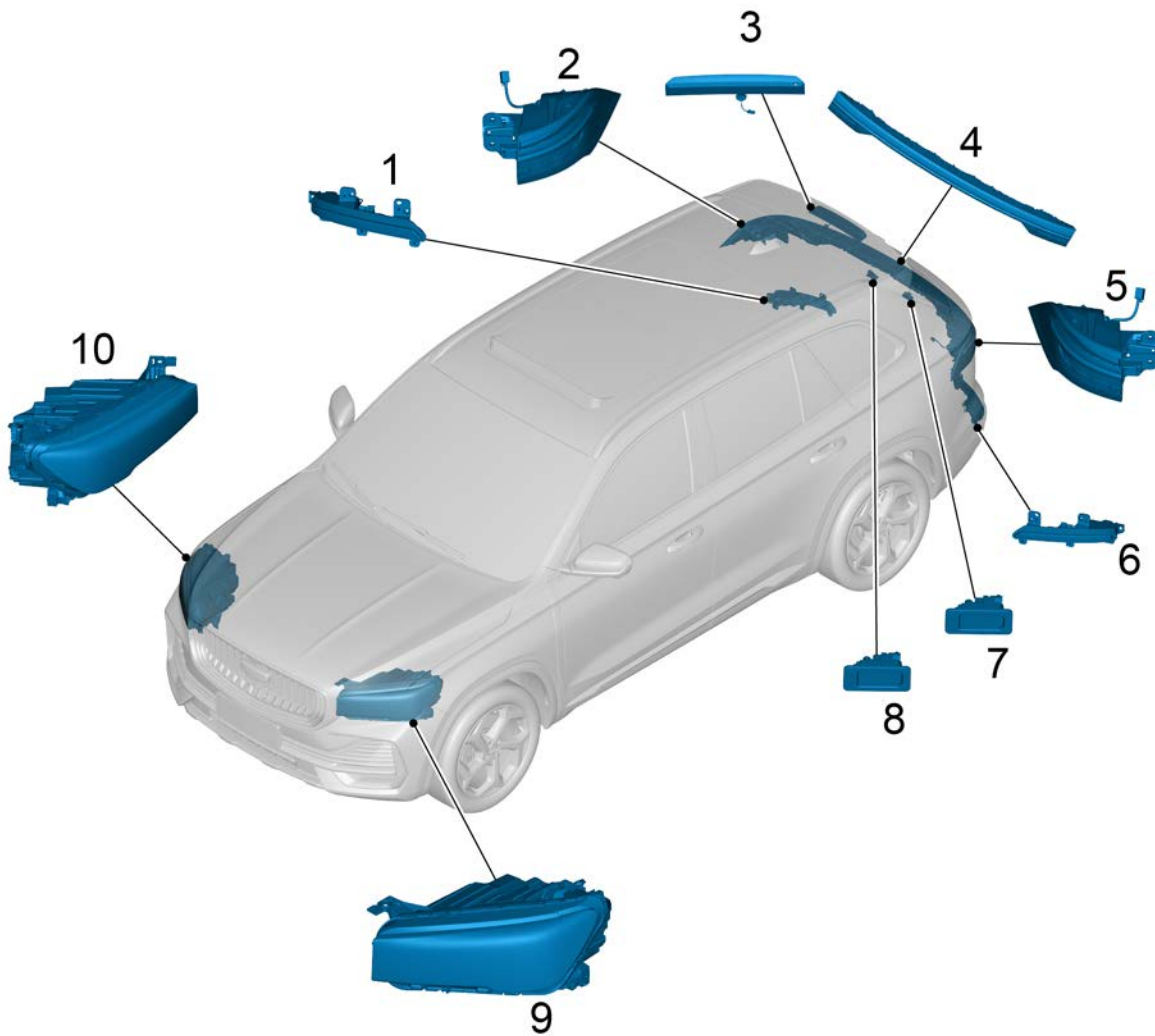
The power supply of the guest lamp comes from the fuse. When approaching the vehicle with a valid key, the low beam is lit.

The power supply of the luggage compartment lamp comes from the fuse. When the luggage compartment door is open, the grounding circuit of the courtesy switch is connected to light up the luggage compartment lamp.

11.3.4 Component position

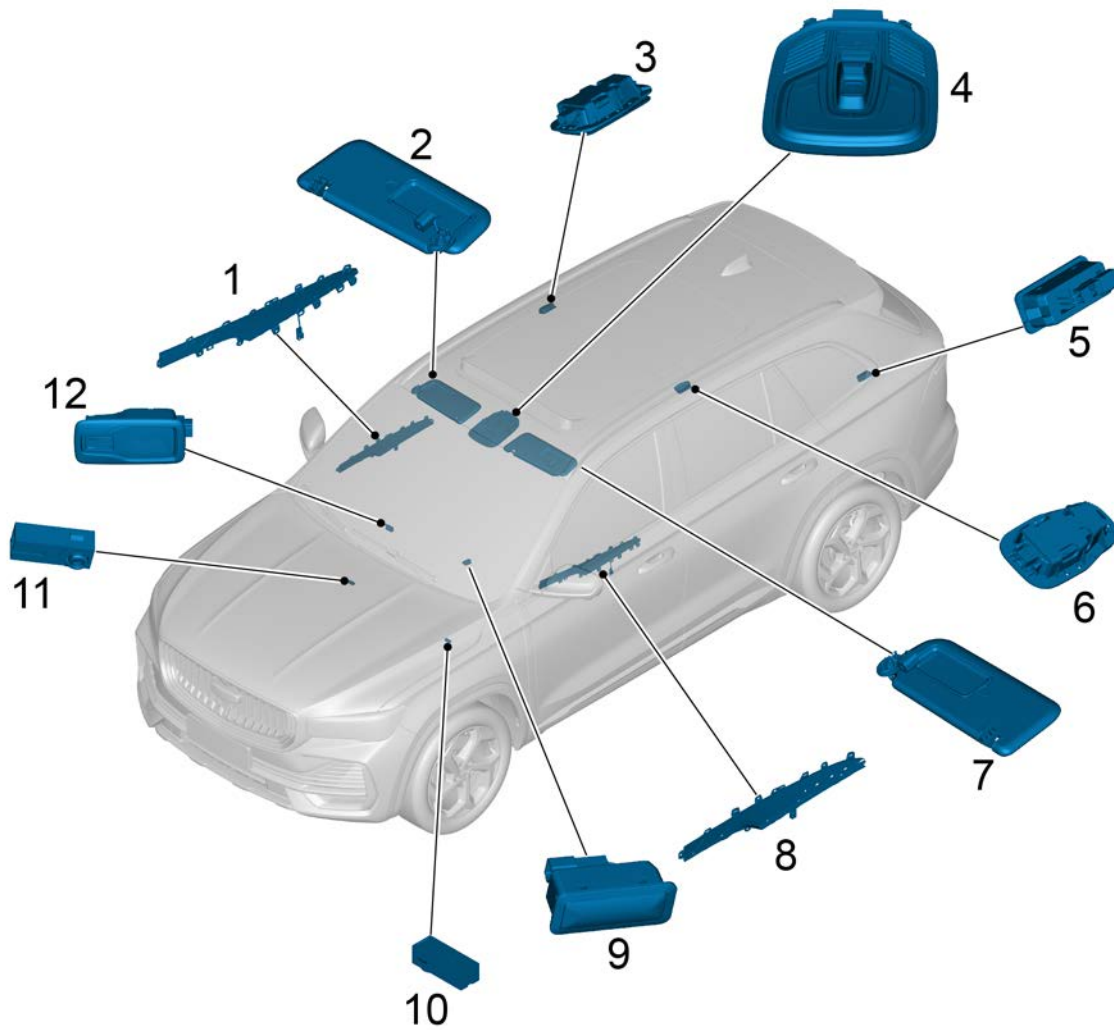
11.3.4.1 Component position

Exterior lighting



- | | |
|---------------------------|-------------------------------|
| 1. Rear fog lamp (right) | 6. Rear fog lamp (left) |
| 2. Right tail lamp | 7. Left license plate lamp |
| 3. Rear window brake lamp | 8. Right license plate lamp |
| 4. Tail lamp (trunk) | 9. Headlamp unit (front left) |
| 5. Left tail lamp | 10. Headlamp unit (FR) |

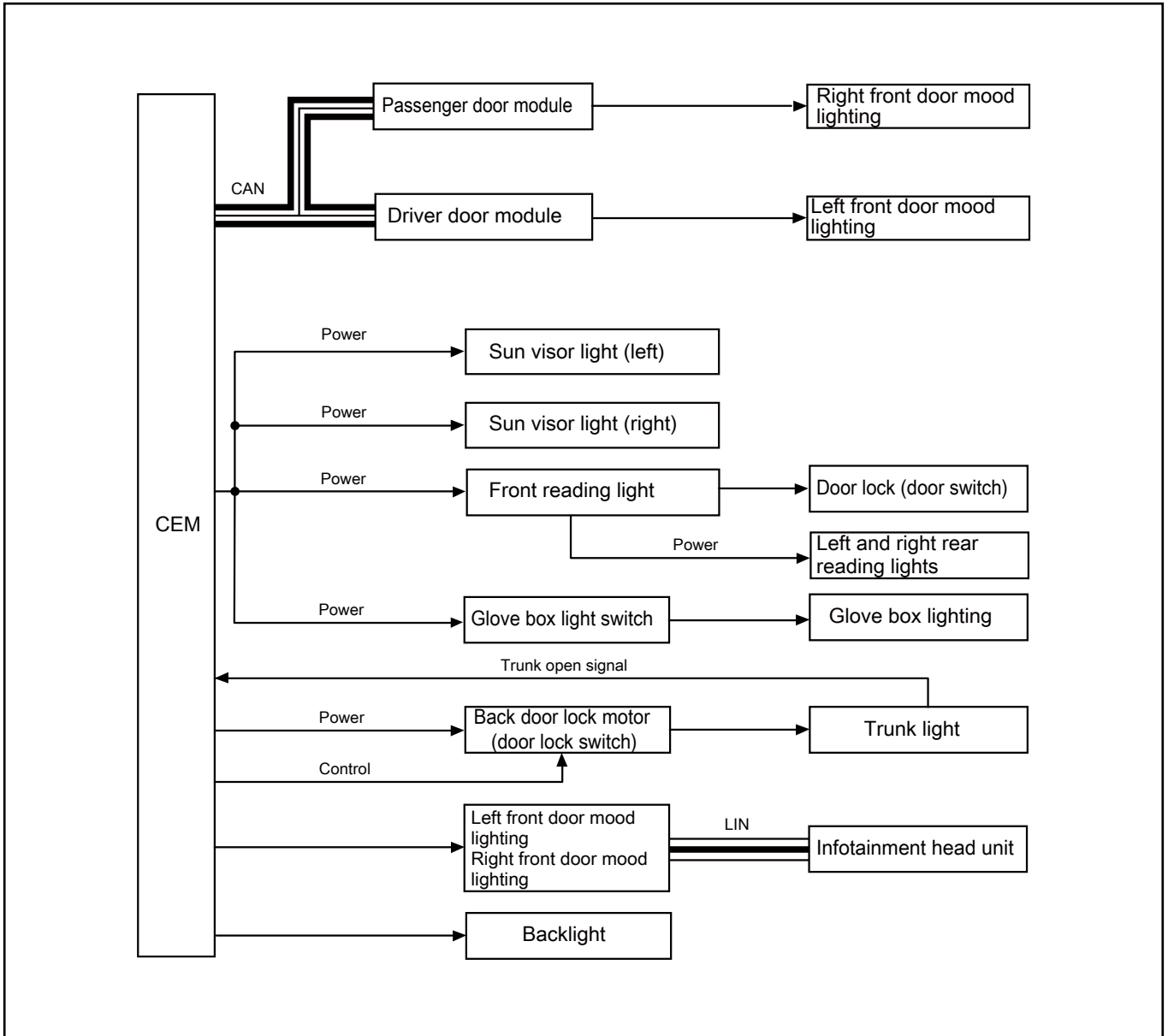
Interior lamp

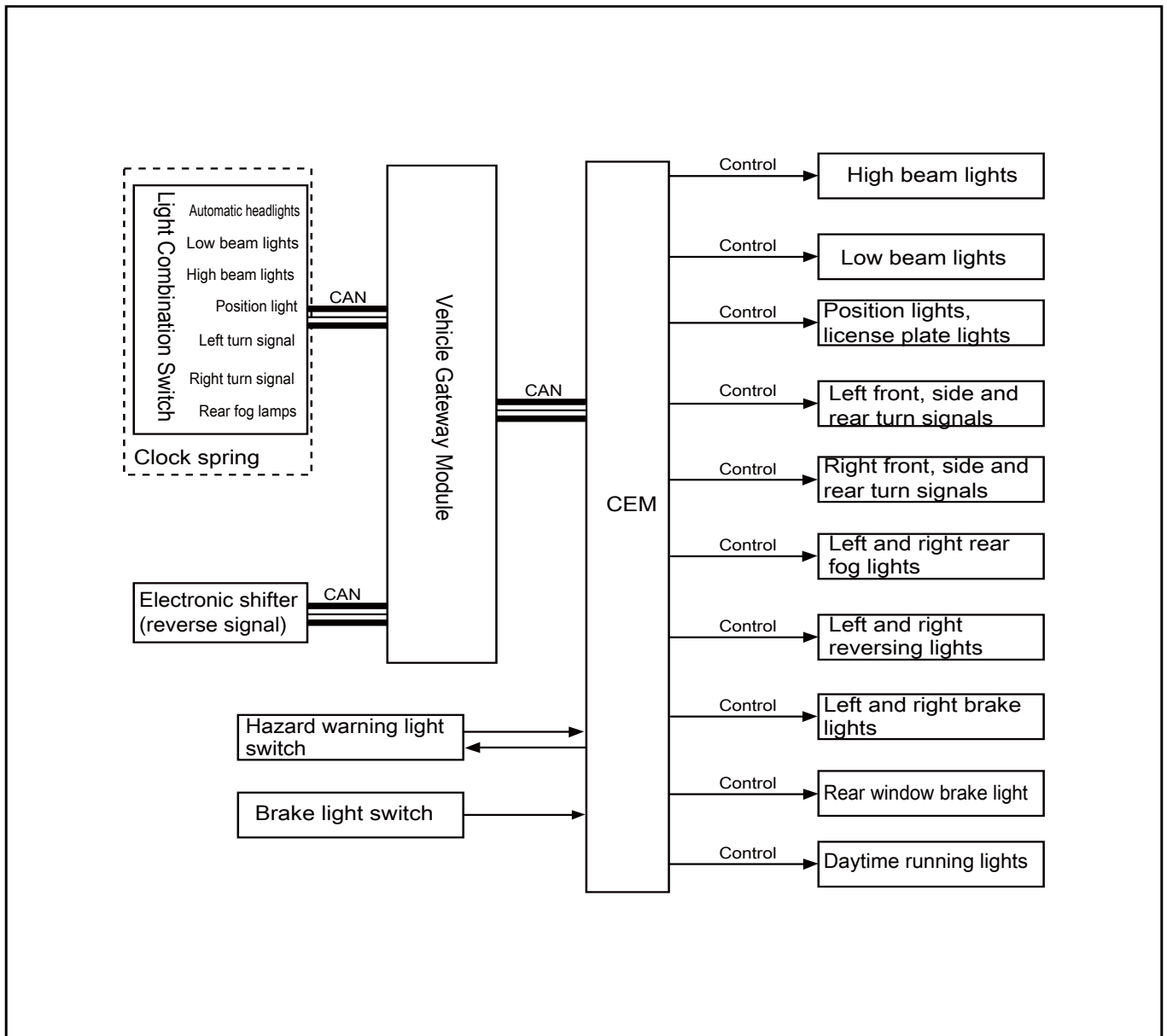


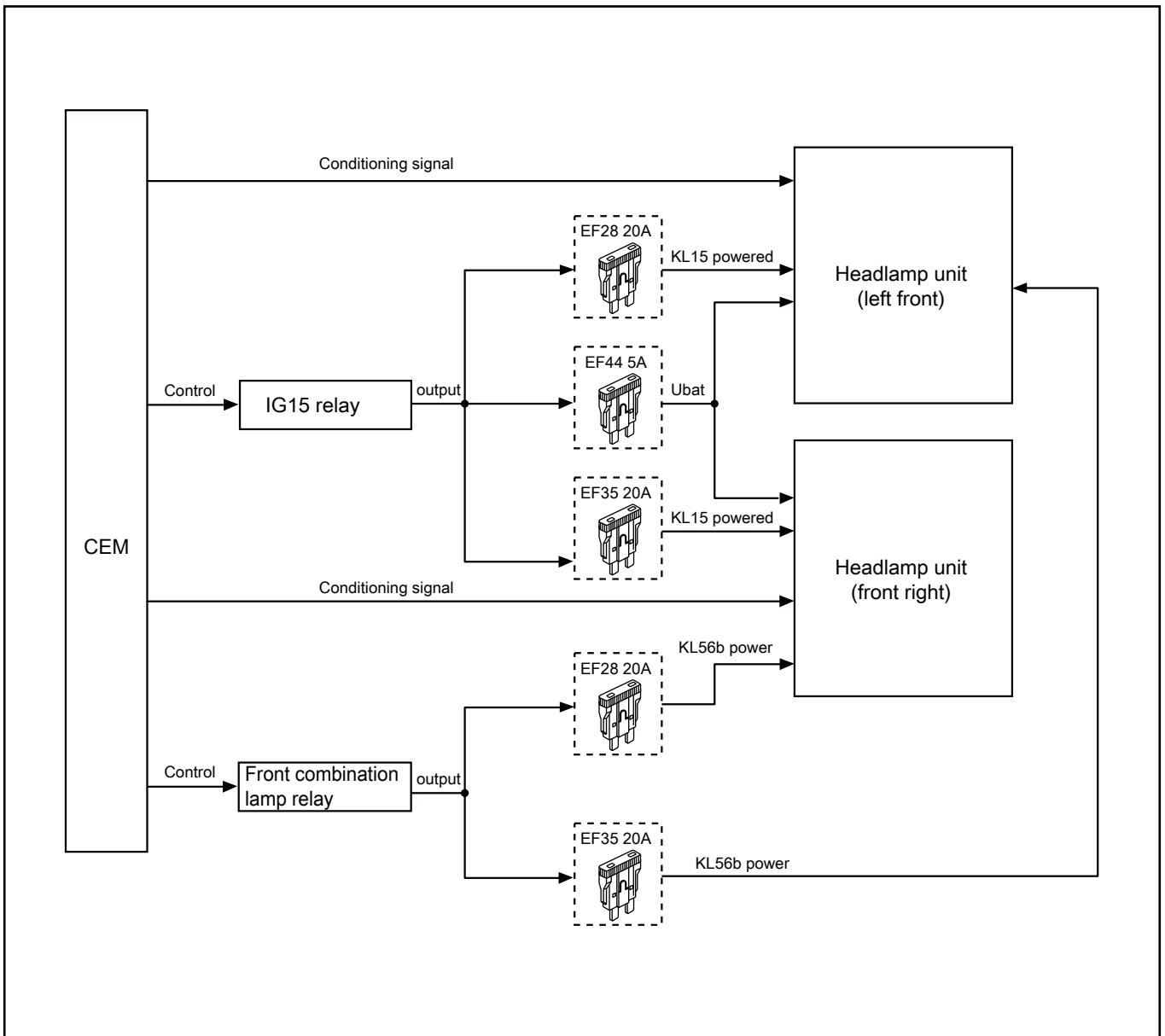
- | | |
|---|------------------------------------|
| 1. FR door atmosphere lamp | 7. Sunvisor lamp (left) |
| 2. Sunvisor lamp (right) | 8. front left door atmosphere lamp |
| 3. Rear overhead console (RR reading lamp assembly) | 9. Foot space multicolor lamp |
| 4. Overhead console unit | 10. Foot space lamp |
| 5. Luggage compartment lamp | 11. Floor console lamp |
| 6. Rear overhead console (RL reading lamp assembly) | 12. Glove box lamp |

11.3.5 Electrical schematic diagram

11.3.5.1 Electrical schematic diagram







11.3.6 Diagnostic information and procedures

11.3.6.1 Diagnosis Description

Before diagnosing the faults of the lamp system, see [Description and operation](#) and the [Working principle of the system](#). Understand and familiarize yourself with the operating principle of the lighting system before starting a system diagnosis, which will help to determine the correct fault diagnostic procedures when a fault occurs. More importantly, it will help to determine whether the situation described by the customer is subject to normal operation. For any fault diagnosis of the lighting system, a visual inspection should be taken as the starting point to guide the repairman to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.3.6.2 Visual Check

- Check the after-sales installation that may affect the operation of the lamp system to ensure that these devices do not affect the operation of the lamp system.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.
- If only one bulb is inoperative, check and repair the power supply or poor contact or open circuit fault at the grounding circuit before replacing the bulb.

11.3.7 Removing and installing

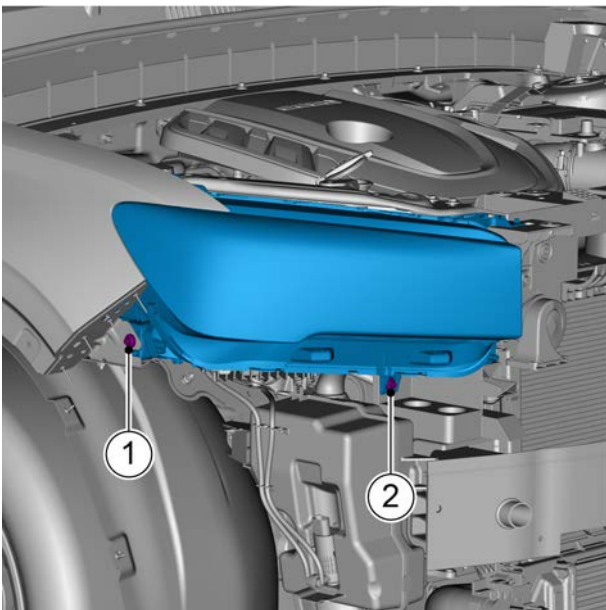
11.3.7.1 Replacement of headlamp unit (FR)

Removal procedure

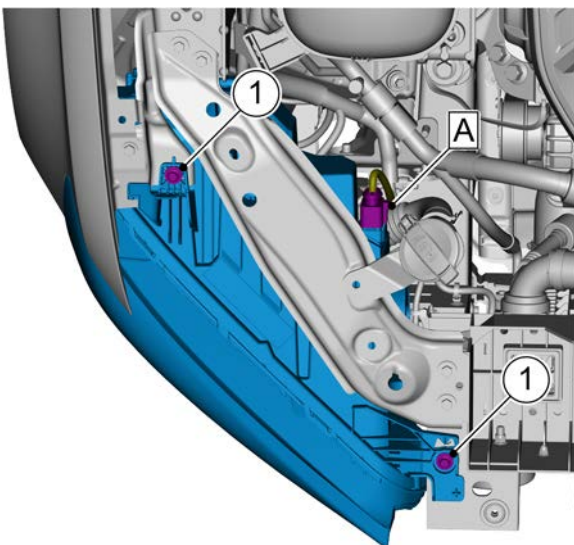
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 4 Remove 1 retaining bolt 1 on the side of the headlamp unit (FR).
- 5 Remove 1 retaining bolt 2 at the front of the headlamp unit (FR).

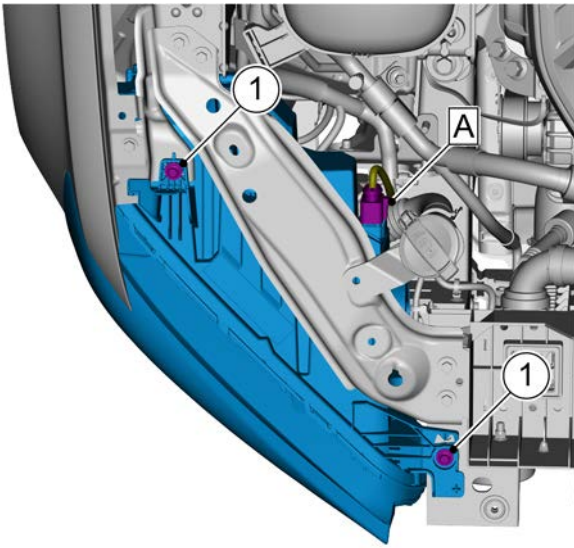


- 6 Disconnect headlamp unit (FR) harness connector A.
- 7 Remove the 2 retaining bolts 1 of headlamp unit (FR).



- 8 Remove the headlamp unit (FR).

Installation procedure



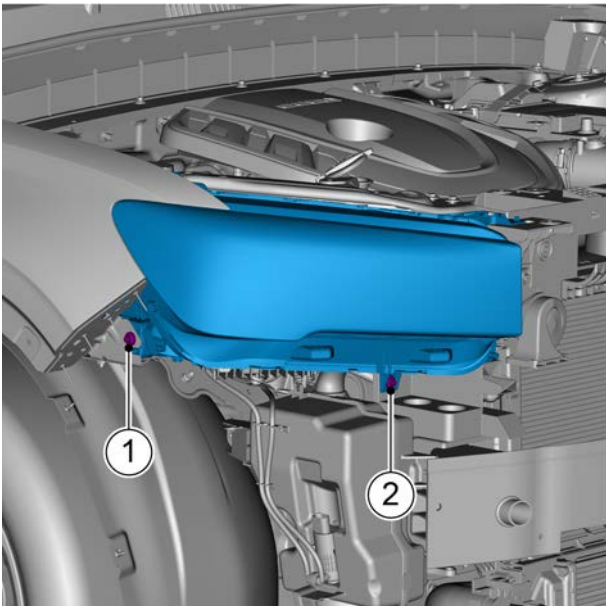
- 1 Install the headlamp unit (FR) on the front bumper and install 2 retaining bolts 1 at the front of the headlamp unit (FR).

Torque: 5 N. m (metric system) 3.7 lb-ft (Imperial system)

- 2 Connect the headlamp unit (FR) harness connector A.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 3 Install 1 fixing bolt 1 on the side of the headlamp unit (FR).

Torque: 5 N. m (metric system) 3.7 lb-ft (Imperial system)

- 4 Install 1 fixing bolt 2 at the front of the headlamp unit (FR).

Torque: 5 N. m (metric system) 3.7 lb-ft (Imperial system)

- 5 Install the front bumper assembly.
- 6 Connect the negative battery cable.
- 7 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 8 Close the engine compartment cover.

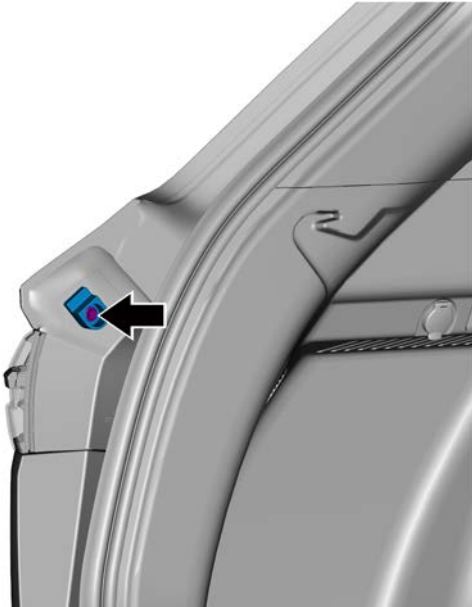
11.3.7.2 Replacement of left tail lamp

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

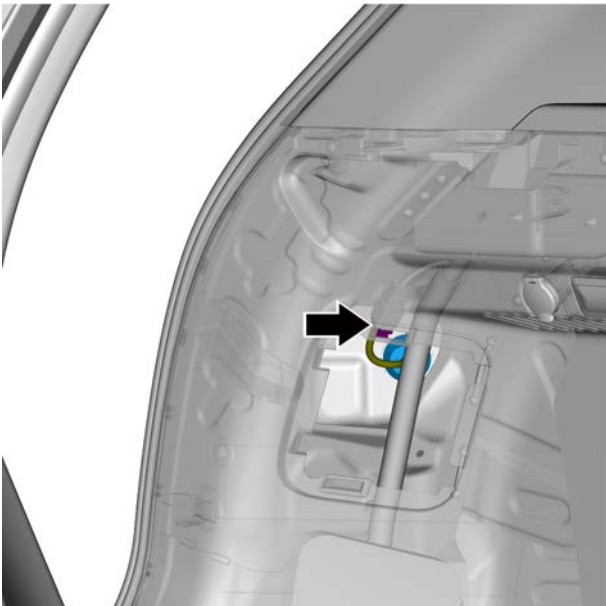
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the body limit block fixing bolts and remove the body limit block.



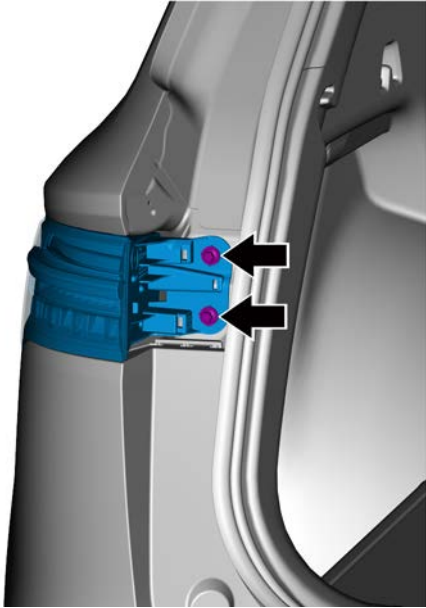
- 4 Remove left tail lamp A trim plate.



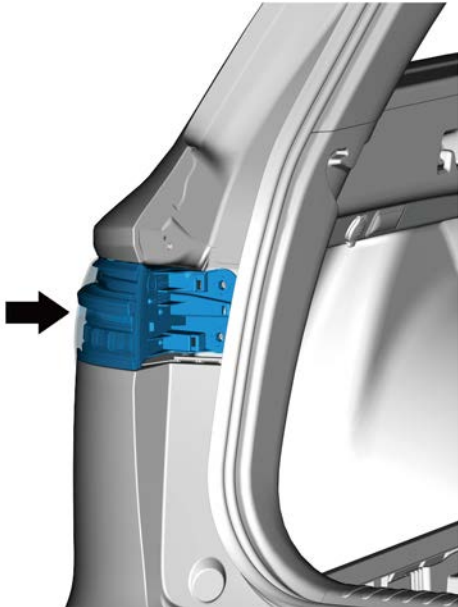
5 Remove the left tail lamp maintenance cover.



6 Disconnect the left tail lamp harness connector.

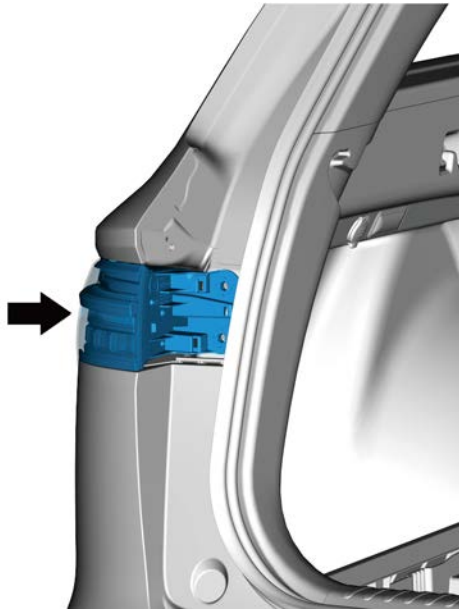


7 Remove the 2 retaining bolts of the left tail lamp.

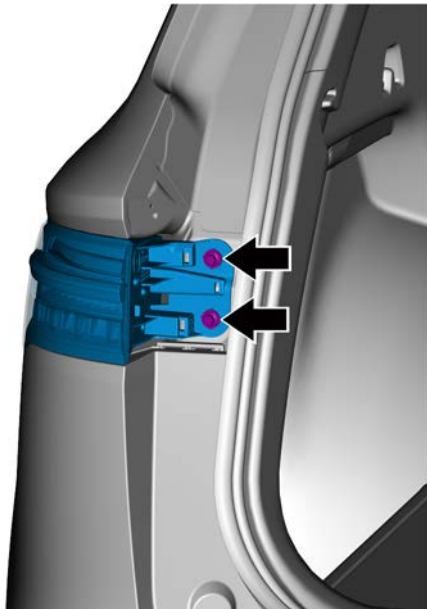


8 Remove the left tail lamp.

Installation procedure

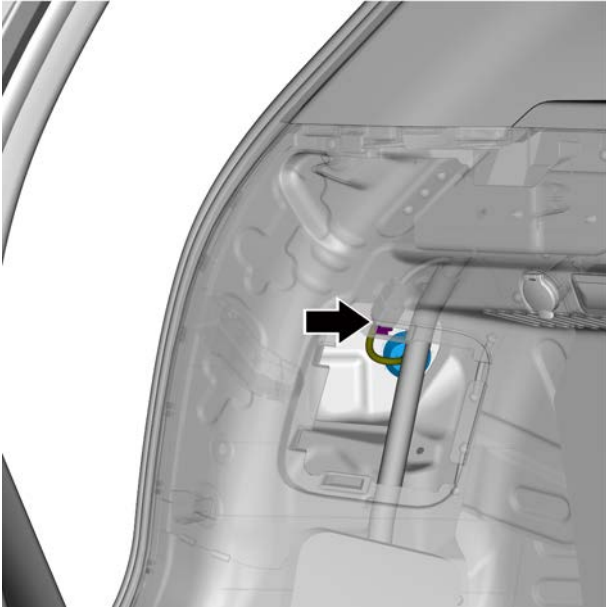


1 Install the left tail lamp.



2 Install 2 fixing bolts of left tail lamp.

Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)



- 3 Connect the left tail lamp harness connector.

Caution

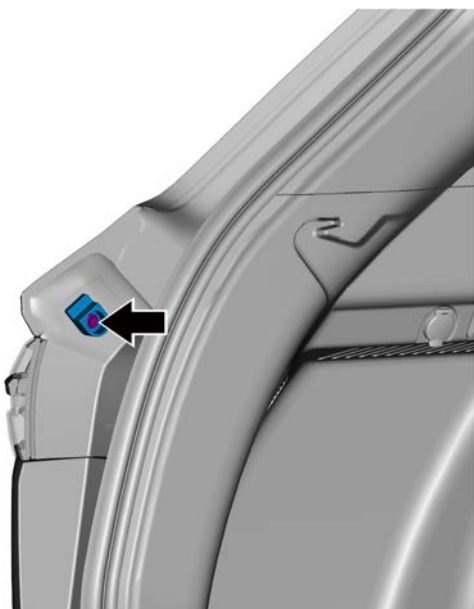
Secure the harness connection: “Connect, Click, and Confirm.”



- 4 Install the left tail lamp maintenance cover.



- 5 Install left tail lamp A trim plate.



- 6 Install the body limit block and fasten the bolts.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 7 Connect the negative battery cable.
8 Close the engine compartment cover.

11.3.7.3 Replacement of tail lamps

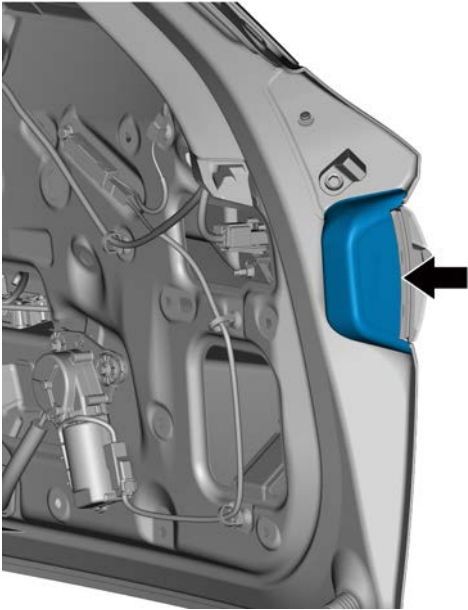
Removal procedure

Warning !

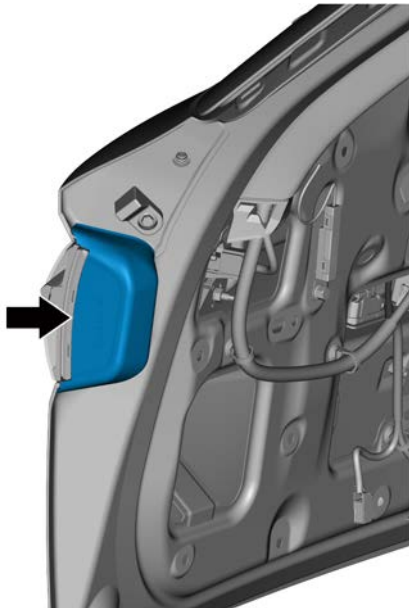
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

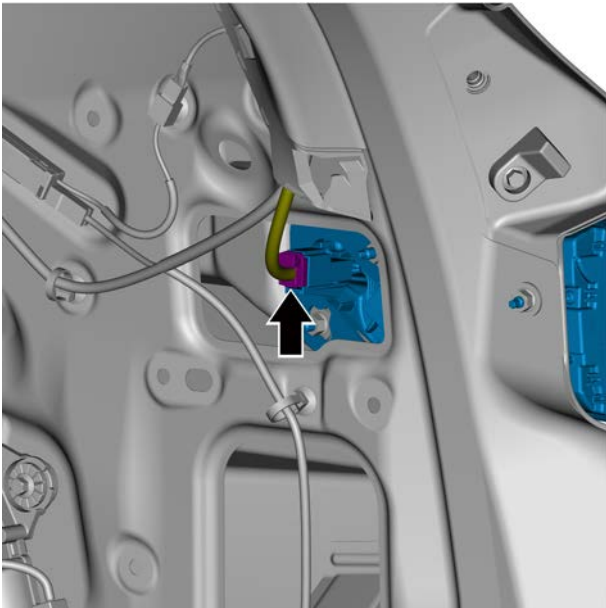
- 3 Remove the tailgate lower interior trim panel assembly of the assembly, see [Replacement of the tailgate lower interior trim panel assembly](#).



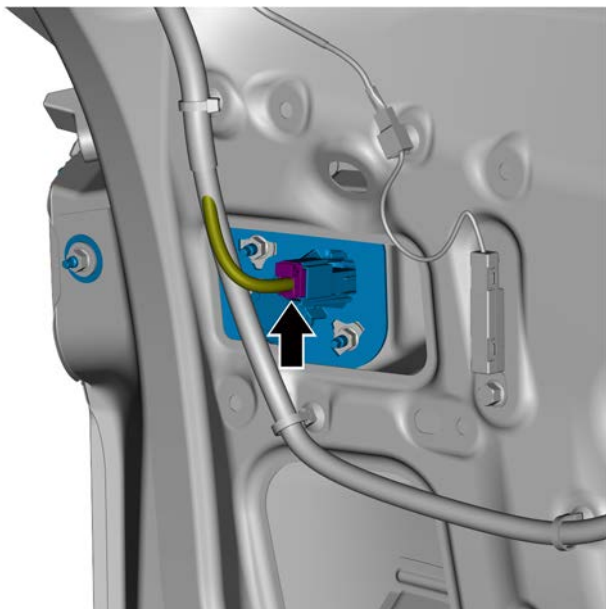
- 4 Remove the B trim plate of the RL bodyside combination lamp.



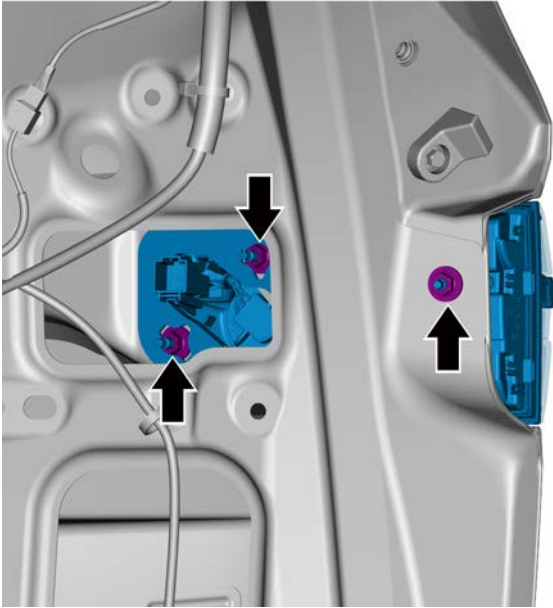
- 5 Remove the B trim plate of the RR bodyside combination lamp.



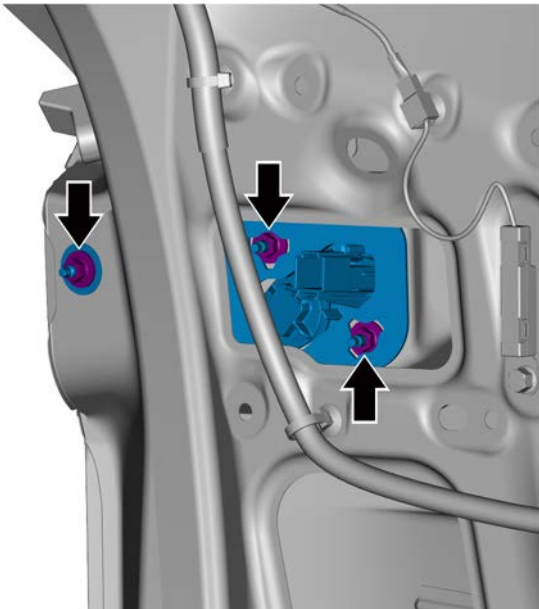
6 Disconnect the tail lamp left side harness connector.



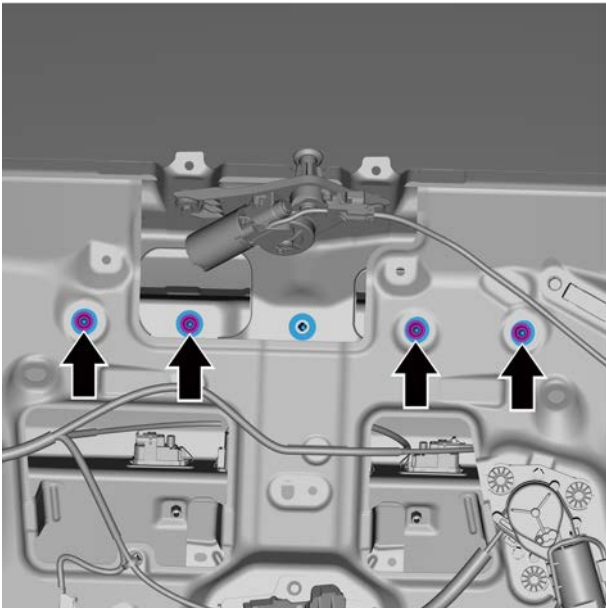
7 Disconnect the tail lamp right side harness connector.



- 8 Remove the 3 retaining nuts on the left side of the tail lamp.



- 9 Remove the 3 retaining nuts on the right side of the tail lamp.



10 Remove the 4 retaining nuts in the middle of the tail lamp.

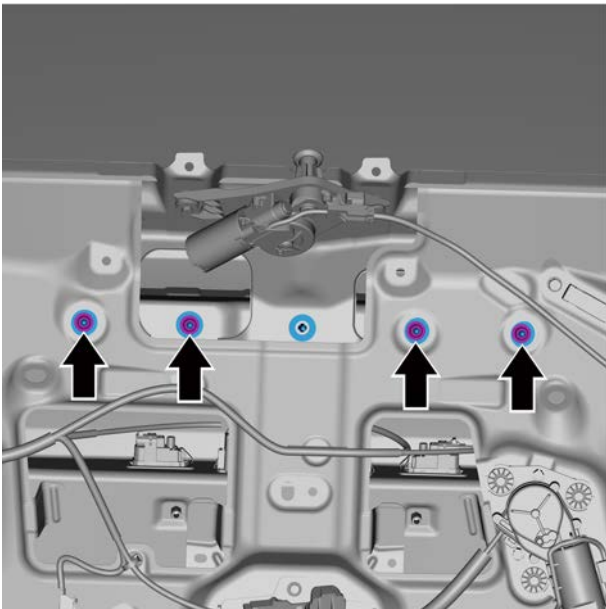


11 Remove the tail lamp.

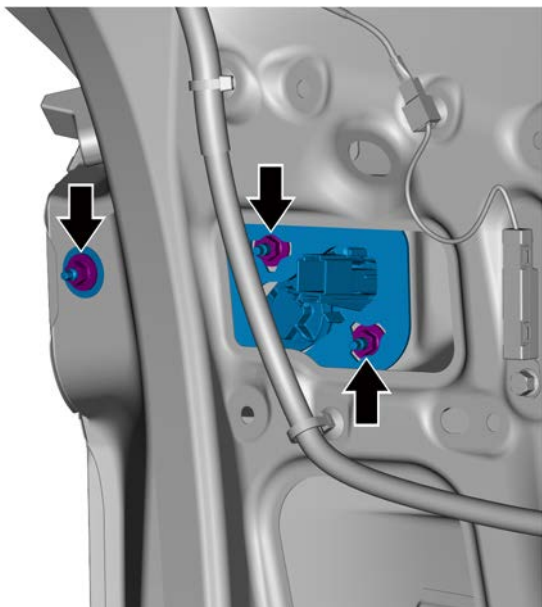
Installation procedure



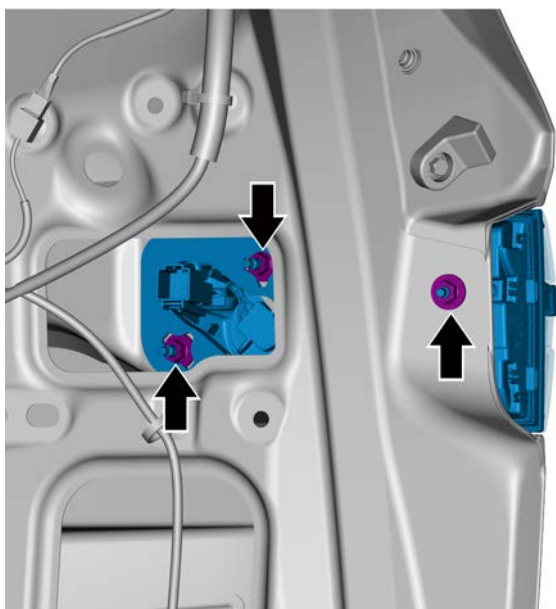
- 1 Install tail lamps.



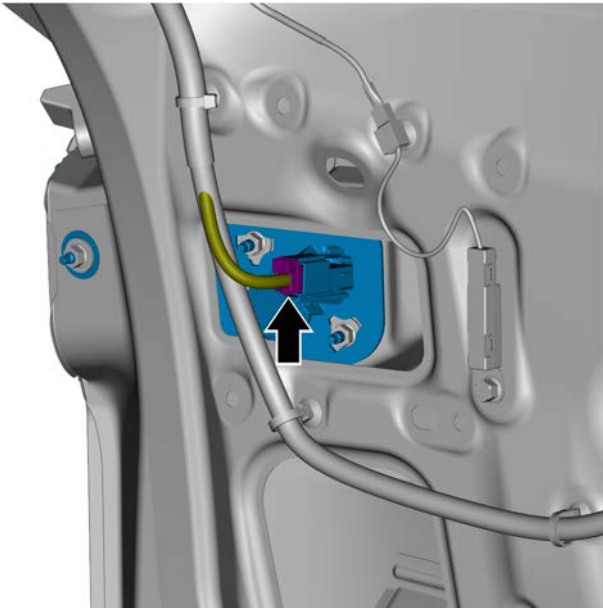
- 2 Install the 4 fixing nuts in the middle of the tail lamp.
Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)



- 3 Install 3 retaining nuts on the right side of the tail lamp.
Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)



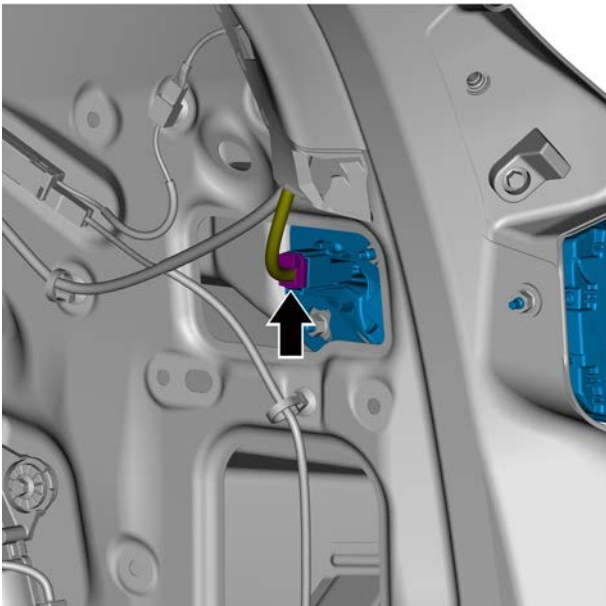
- 4 Install the 3 retaining nuts on the left side of the tail lamp.
Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)



- 5 Connect the harness connector on the right side of the tail lamp.

Caution

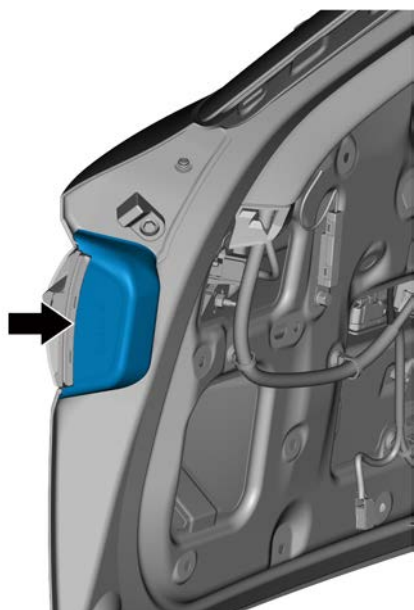
Secure the harness connection: “Connect, Click, and Confirm.”



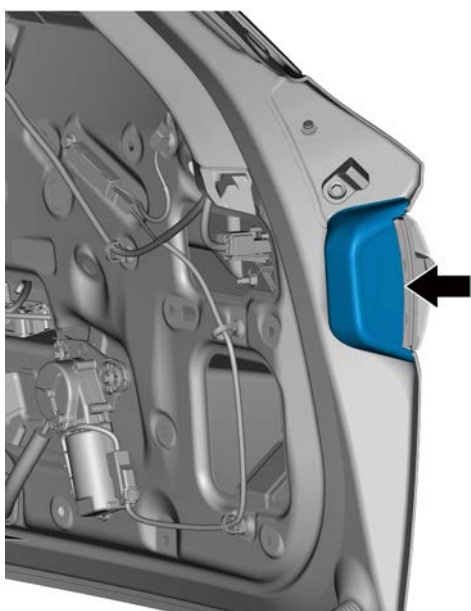
- 6 Connect the harness connector on the left side of the tail lamp.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 7 Install the B trim plate of the RR bodyside combination lamp.



- 8 Install the B trim plate of the RL bodyside combination lamp.

- 9 Install the tailgate trim panel assembly.
- 10 Connect the negative battery cable.
- 11 Close the engine compartment cover.

11.3.7.4 Replacement of license plate lamps

Removal procedure

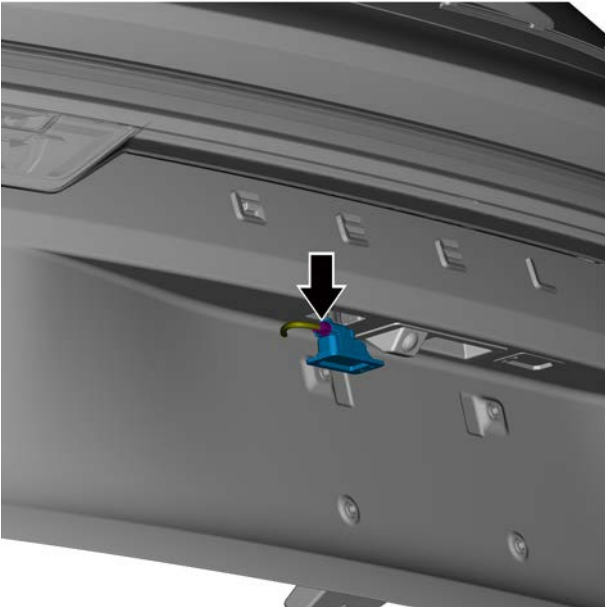
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

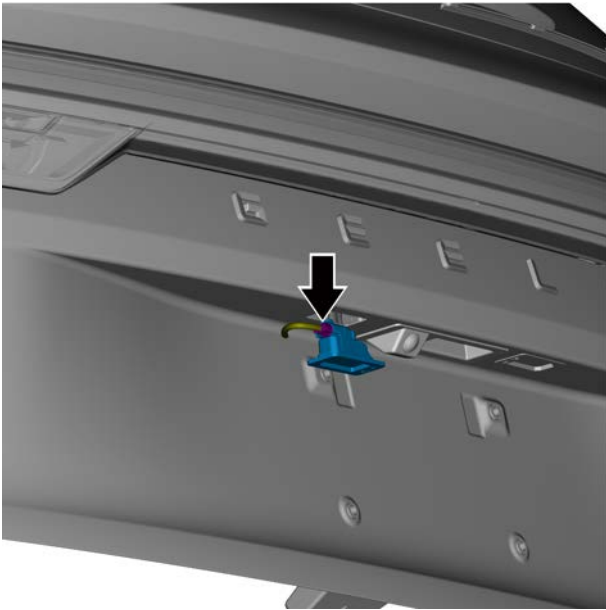


3 Remove the license plate lamp with the appropriate tool.



4 Disconnect the wire harness connector of the license plate lamp and remove the license plate lamp.

Installation procedure



- 1 Connect the license plate lamp harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Connect the license plate lamp card to the installation position and make sure it is installed in place.

- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

11.3.7.5 Replacement of Rear Fog Lamp(left)

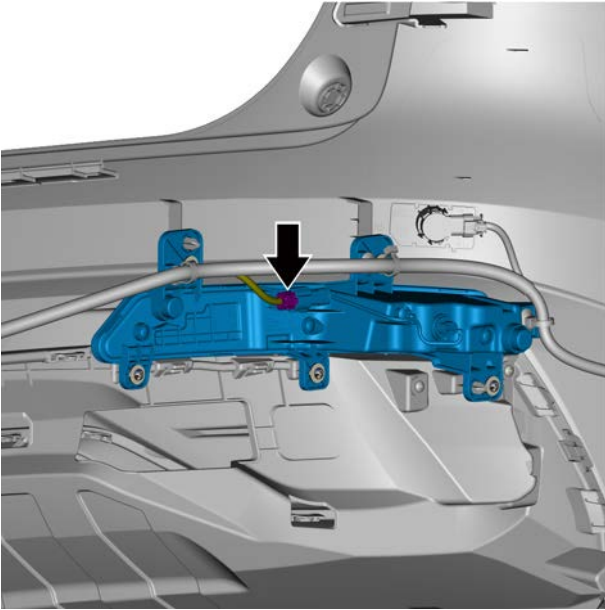
Removal procedure

Warning !

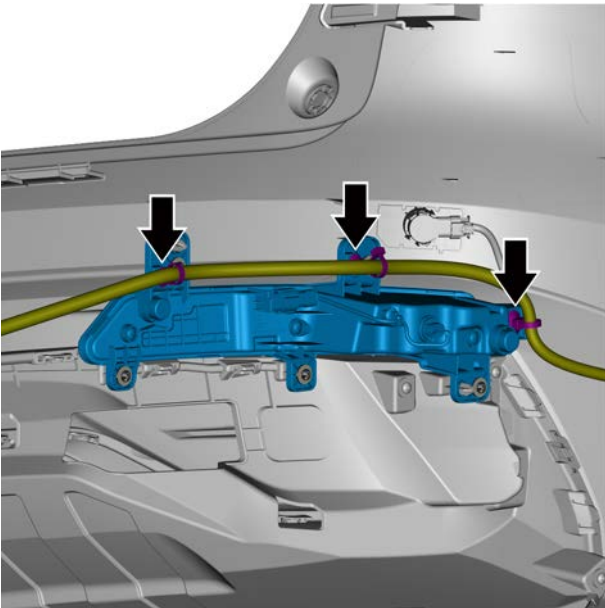
See "warning about disconnecting battery" in [Warnings and cautions](#).

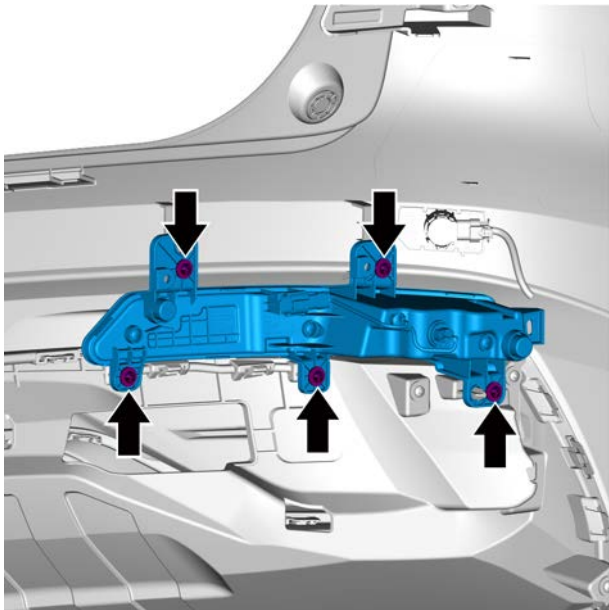
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

- 3 Remove the rear bumper assembly, see [Replacement of the rear bumper assembly \(Type 1\)](#), [Replacement of the rear bumper assembly \(Type 2\)](#).
- 4 Disconnect the harness connector of rear fog lamp(left).



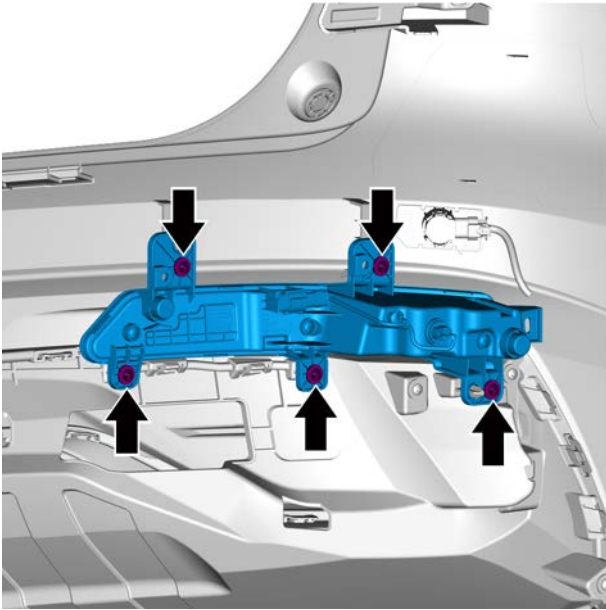
- 5 Remove the rear bumper wire harness retaining clip.



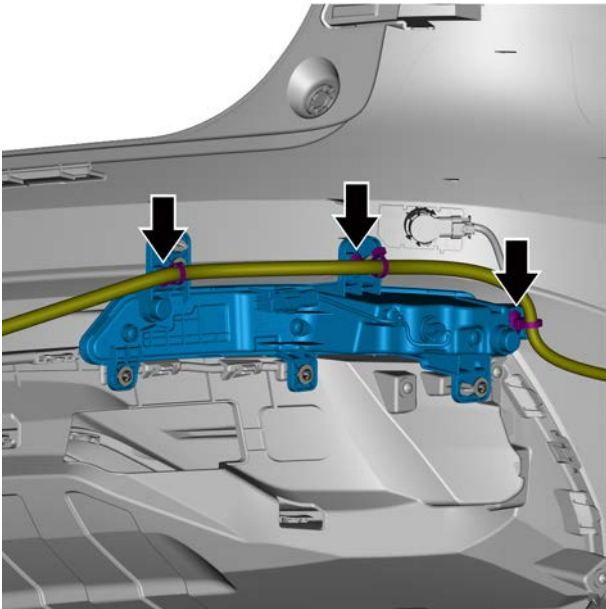


- 6 Remove the 5 retaining bolts of the rear fog lamp (left).
- 7 Remove the rear fog lamp(**left**).

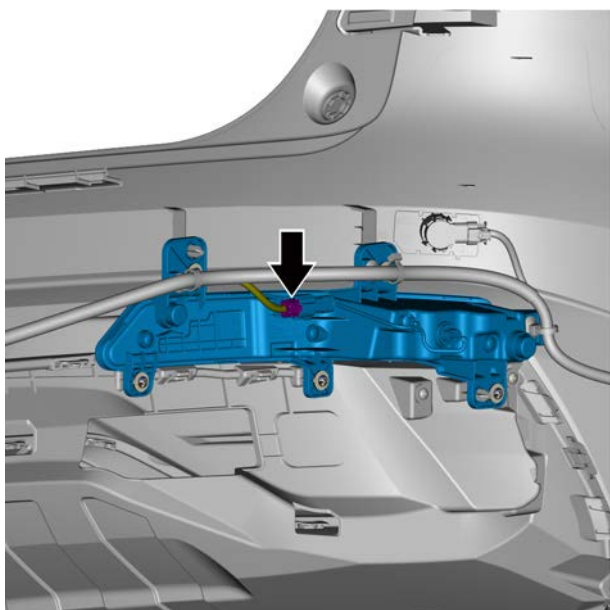
Installation procedure



- 1 Install the rear fog lamp (left) and fasten the 5 fixing bolts of the rear fog lamp (left).
Torque: 2 N. m (metric system) 1.5 lb-ft (Imperial system)



- 2 Install the bumper wire harness retaining clip.



- 3 Connect the rear fog lamp (left) harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 4 Install the rear bumper.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

11.3.7.6 Replacement of rear window brake lamp

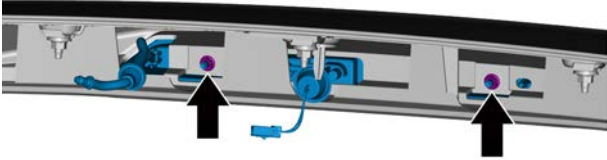
Removal procedure

Warning !

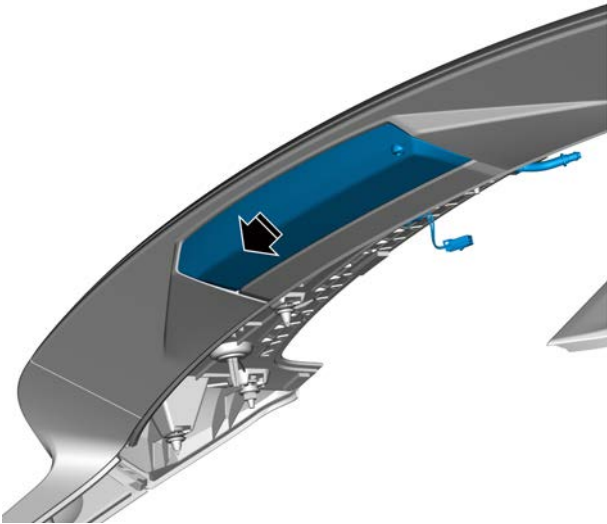
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove spoiler assembly, refer to Replacement of spoiler assembly.

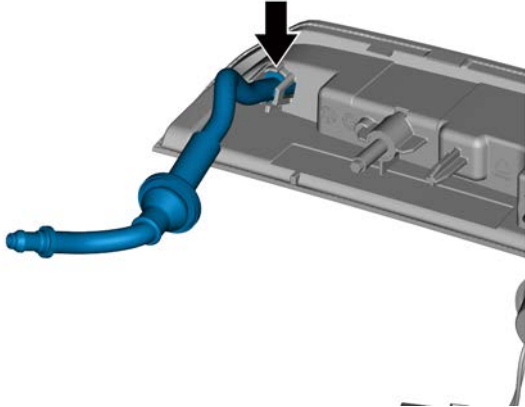
- 4 Remove the 2 retaining nuts of the rear window brake lamp.



- 5 Remove rear window brake lamp and rear wiper windshield washer jet assembly.

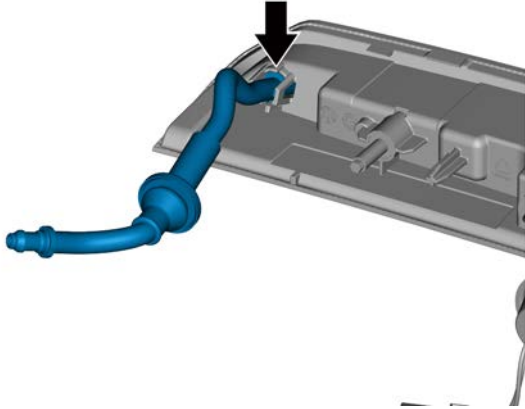


- 6 Remove rear wiper windshield washer jet and hose assembly.

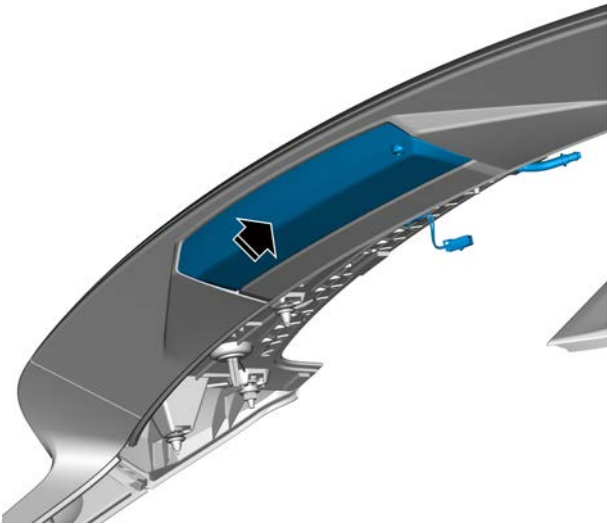


Installation procedure

- 1 Install rear wiper windshield washer jet and hose assembly.

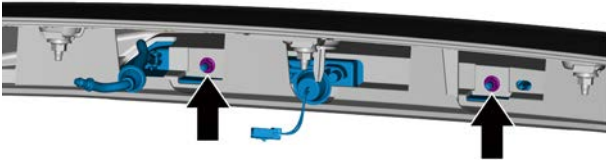


- 2 Install rear window brake lamp and rear wiper windshield washer jet assembly.



- 3 Install 2 fixing nuts of rear window brake lamps.

Torque: 1.7 N. m (metric system) 1.3 lb-ft (Imperial system)



- 4 Install rear spoiler assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

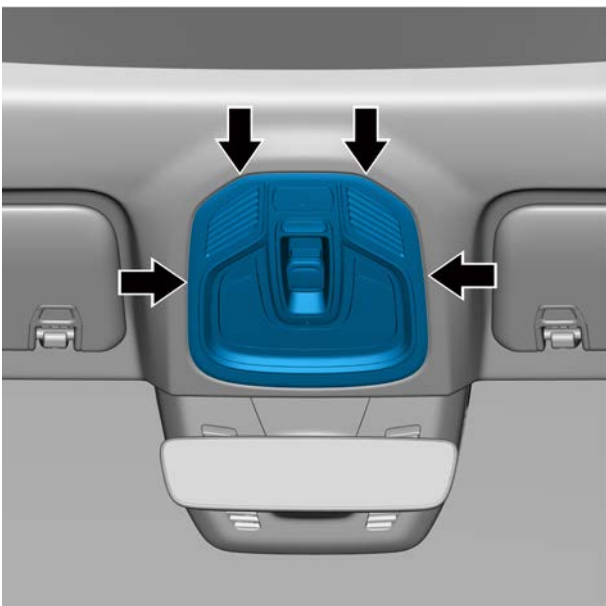
11.3.7.7 Replacement of overhead console unit (Type 1)

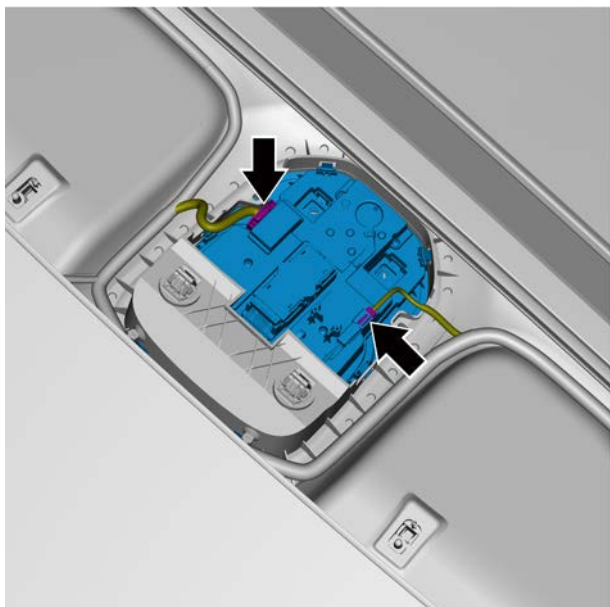
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

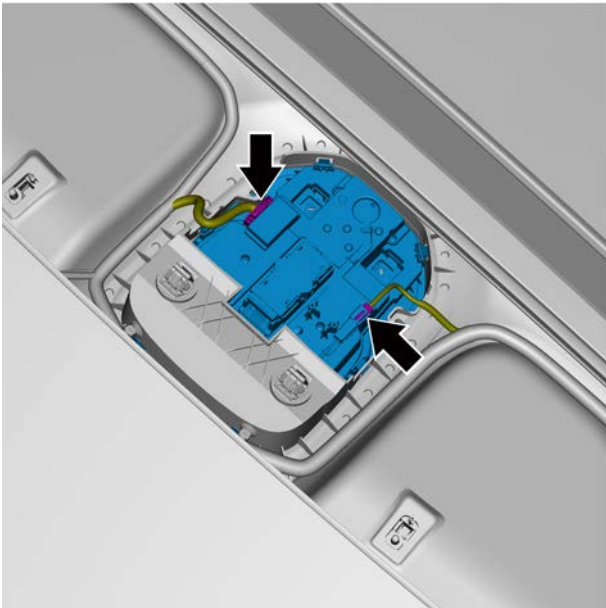
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Slowly pry down the edge with the appropriate tool and remove the overhead console unit.





- 4 Disconnect the overhead console unit harness connector.
- 5 Remove the overhead console unit.

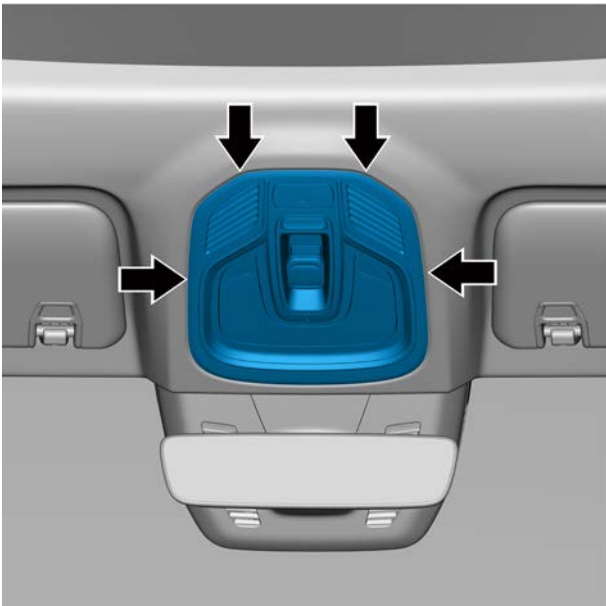
Installation procedure



- 1 Connect the overhead console unit harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install the overhead console unit.

- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

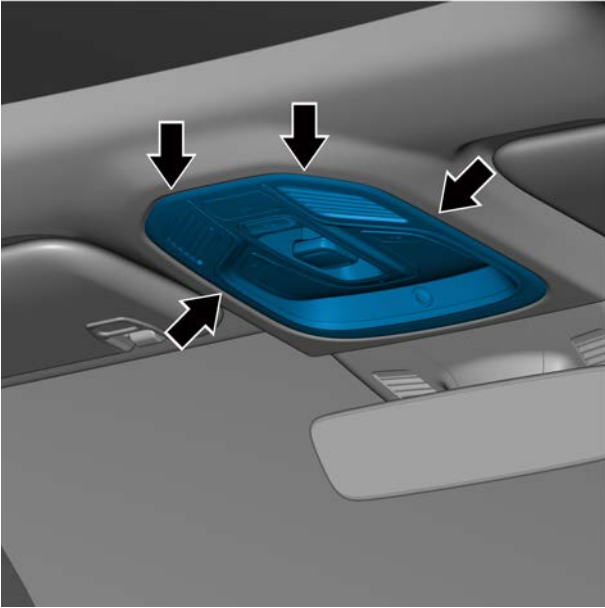
11.3.7.8 Replacement of overhead console unit (Type 2)

Removal procedure

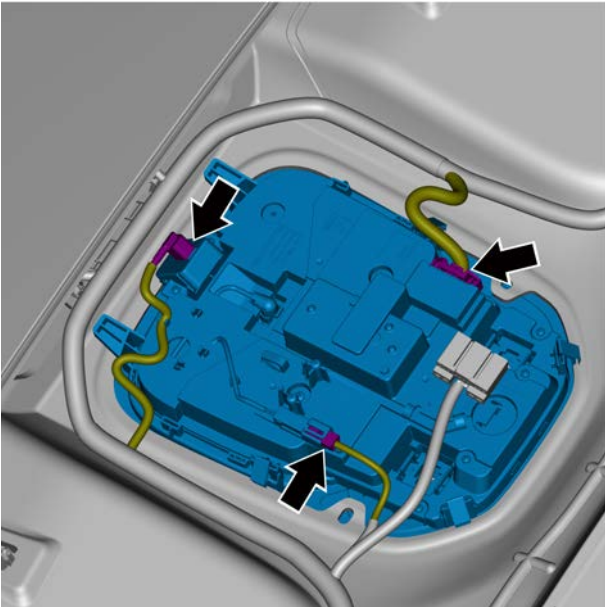
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

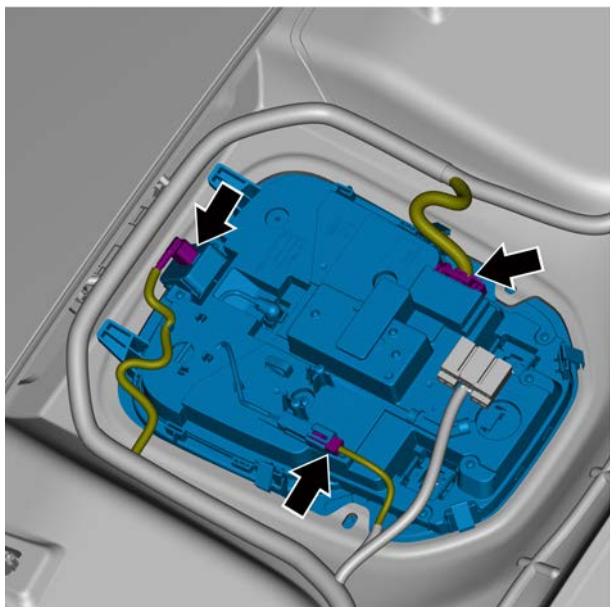


- 3 Slowly pry down the edge with the appropriate tool and remove the overhead console unit.



- 4 Disconnect the overhead console unit harness connector.
- 5 Remove the overhead console unit.

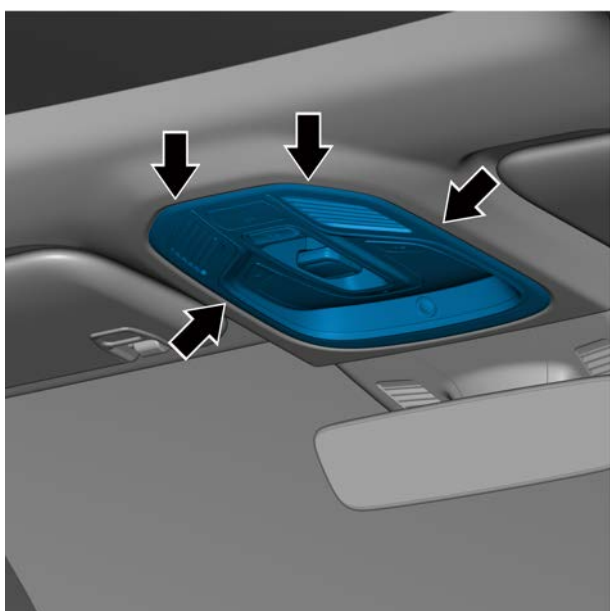
Installation procedure



- 1 Connect the overhead console unit harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install the overhead console unit.

- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

11.3.7.9 Replacement of rear overhead console (rear interior lamp)

Removal procedure

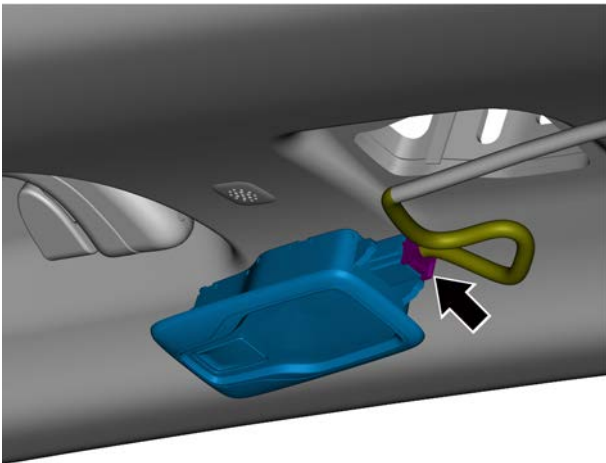
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

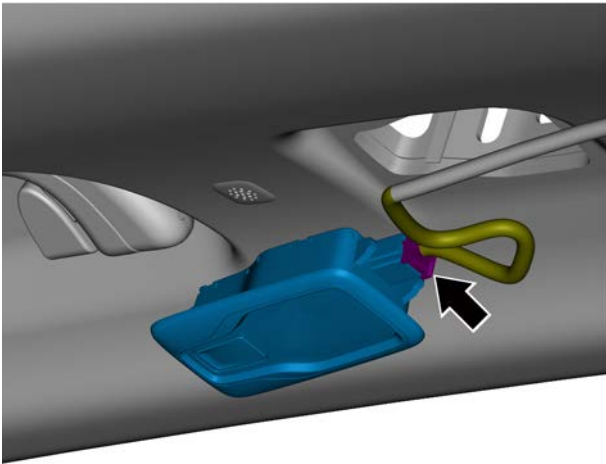


- 3 Remove the rear overhead console (rear interior lamps) with appropriate tools.



- 4 Disconnect the rear overhead console (rear interior lamp) harness connector and remove the rear overhead console (rear interior lamp).

Installation procedure



- 1 Connect the rear overhead console (rear interior lamp) harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Connect the rear overhead console (rear interior lamps) to the installation location and make sure it is in place.

- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

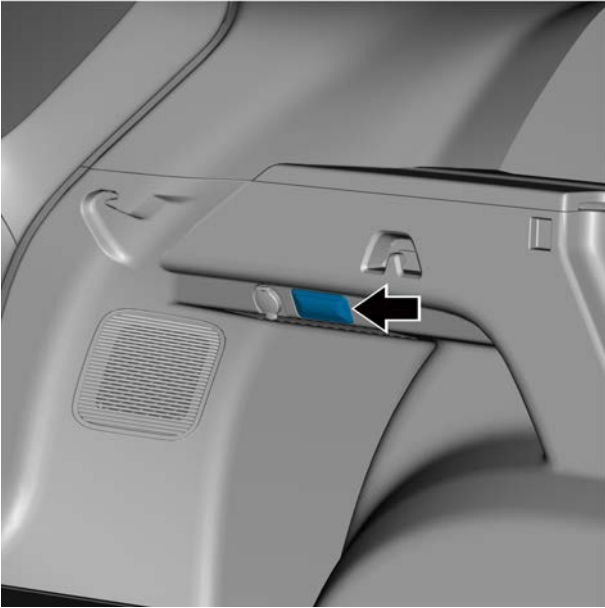
11.3.7.10 Replacement of the luggage compartment lamp

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Open the rear compartment.



- 4 Pry open the rear compartment lamp at the indication with appropriate tool.



- 5 Disconnect the rear compartment lamp harness connector and remove the rear compartment lamp.

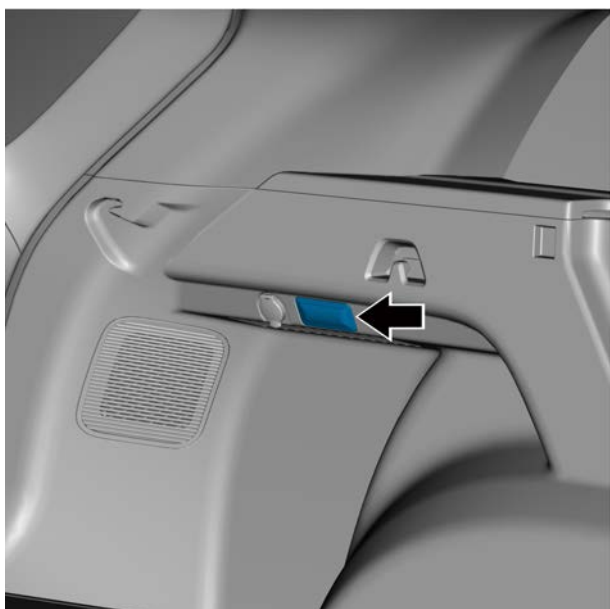
Installation procedure



- 1 Connect the luggage compartment lamp harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install rear compartment lamps and clamp securely.

- 3 Close the rear compartment.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

11.3.7.11 Replacement of floor console lamp

Removal procedure

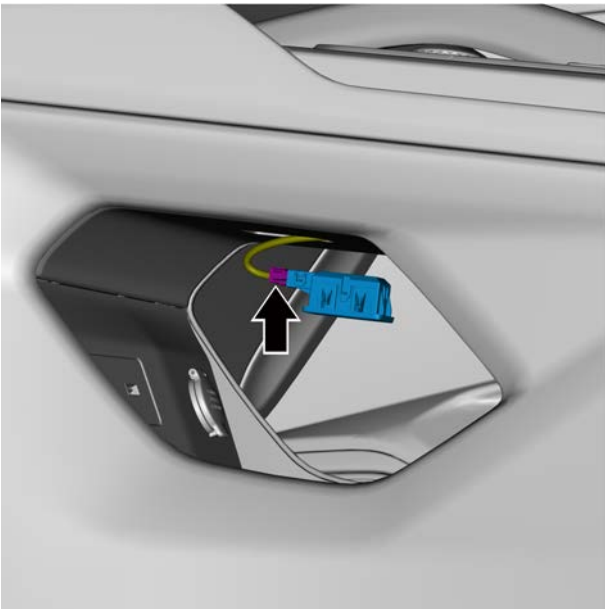
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

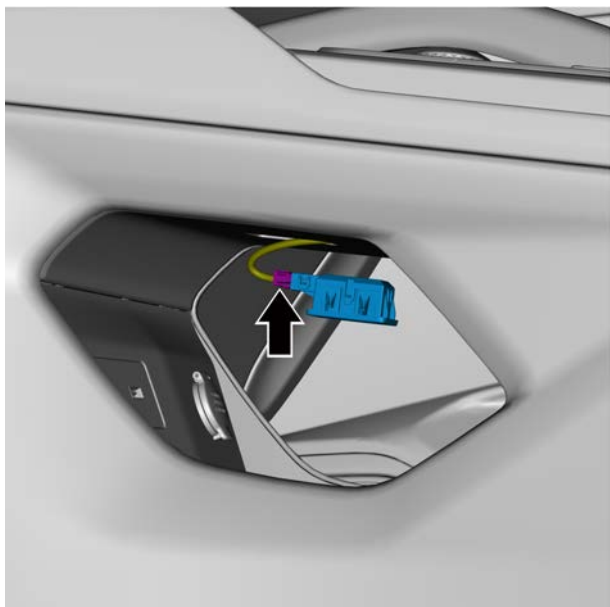


- 3 Pry open the floor console lamp from the indication with the appropriate tool.



- 4 Disconnect the floor console lamp harness connector and remove the floor console lamp.

Installation procedure



- 1 Connect the floor console lamp harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install floor console lamp and clamp securely.

- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

11.3.7.12 Replacement of front left door atmosphere lamp

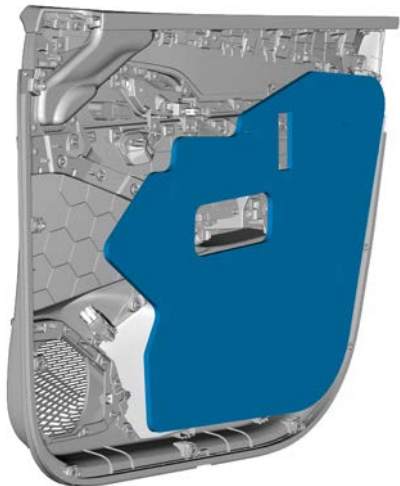
Removal procedure

Warning !

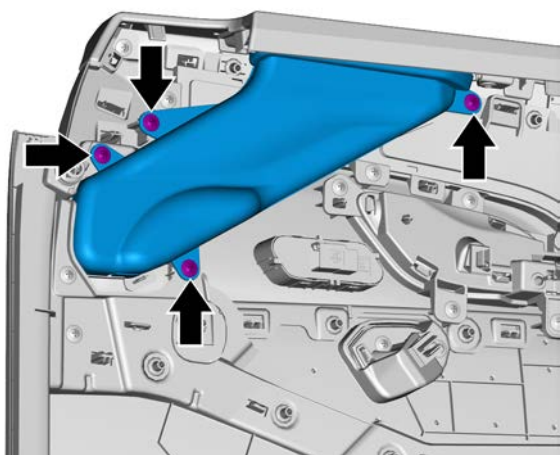
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

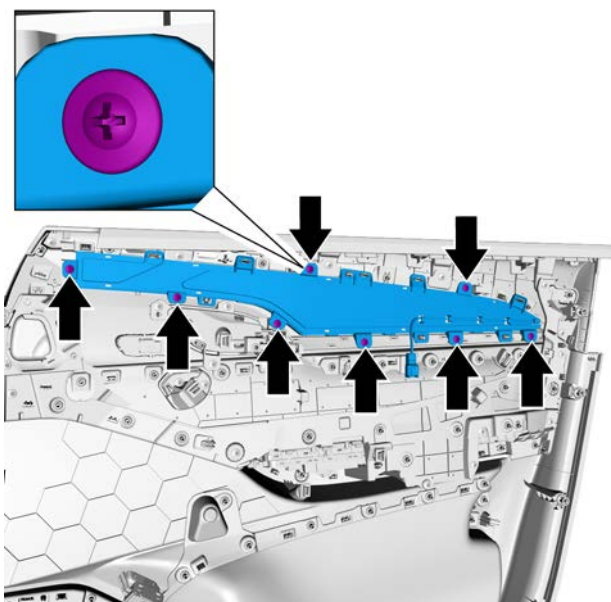
- 3 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly](#).
- 4 Remove the soundproof cotton from the front left door.



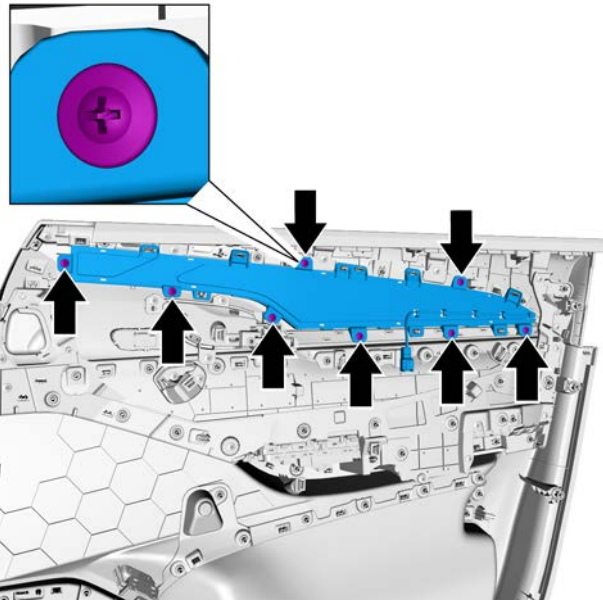
- 5 Remove the front left door side defrost duct into 4 fixing screws and remove the front left door side defrost duct assembly.



- 6 Remove the 8 fixing screws of the front left door atmosphere lamp and remove the front left door atmosphere lamp.

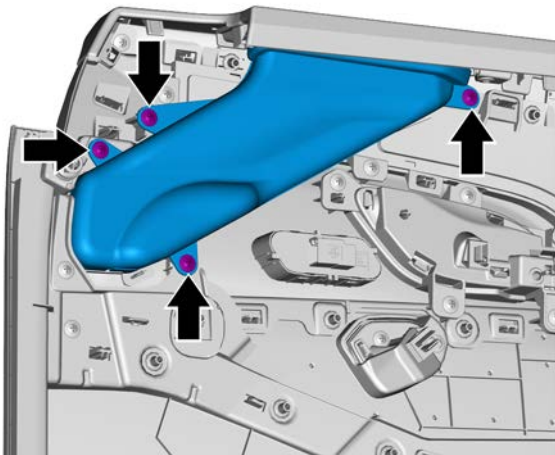


Installation procedure



- 1 Install the front left door atmosphere lamp and fasten the screws.

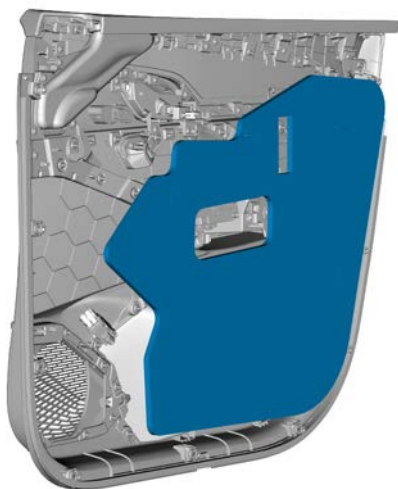
Torque: 2 N. m (metric system) 1.5 lb-ft (Imperial system)



- 2 Install the front left door side defrosting duct assembly and fasten the screws.

Torque: 2 N. m (metric system) 1.5 lb-ft (Imperial system)

- 3 Install soundproof cotton for the front left door.



- 4 Install the assembly-interior trim panel front door LH.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

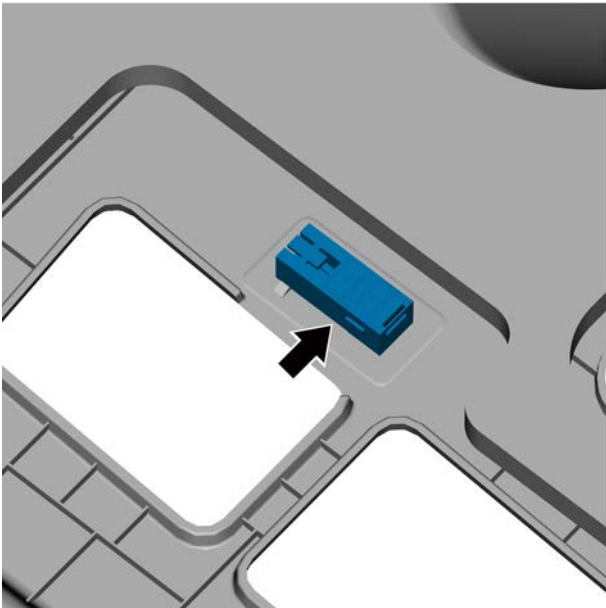
11.3.7.13 Replacement of foot lights

Removal procedure

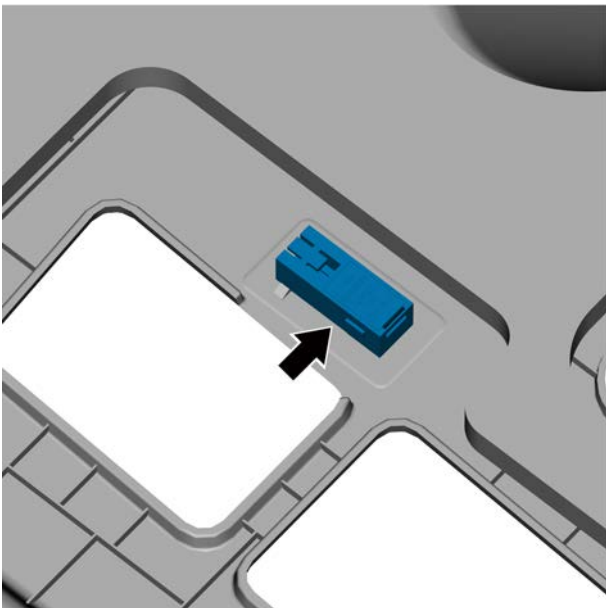
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).



- 3 Remove the lower left baffle assembly, see [Replacement of the lower left baffle assembly](#).
- 4 Remove the foot space lamp.



Installation procedure

- 1 Install foot space lamps.

- 2 Install the lower left foot shield assembly.
- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

11.3.7.14 Replacement of hazard warning indicator switch

See the [Replacement of the center console switch module](#).

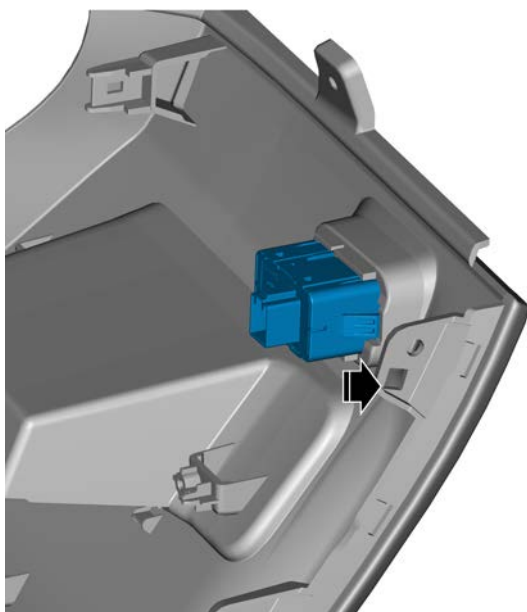
11.3.7.15 Replacement of dashboard switch unit

Removal procedure

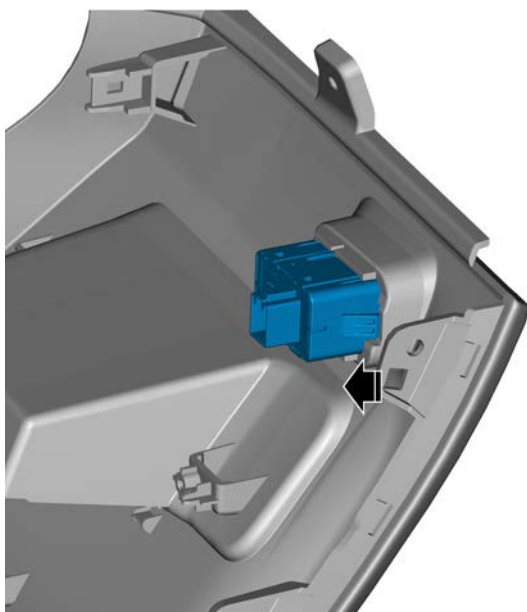
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the left lower guard assembly of the dashboard, see the [Replacement of left lower guard assembly of the dashboard](#).
- 4 Remove the dashboard switch unit.

**Installation procedure**

- 1 Install the dashboard switch unit.



- 2 Install the left lower fender apron assembly of the dashboard.

- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

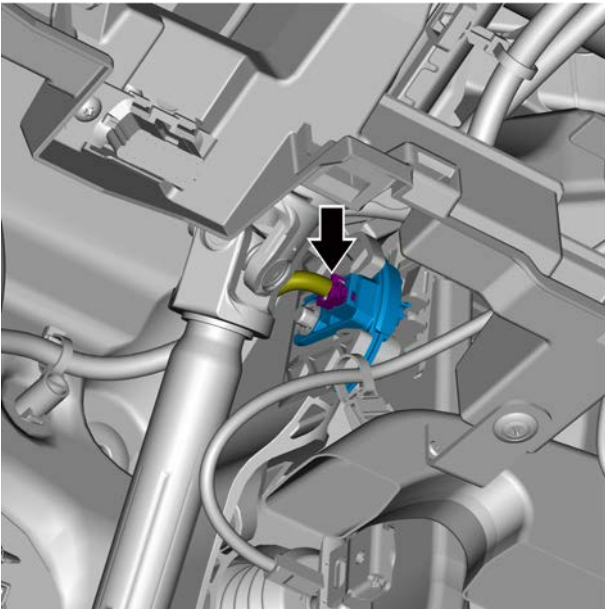
11.3.7.16 Replacement of brake lamp switch

Removal procedure

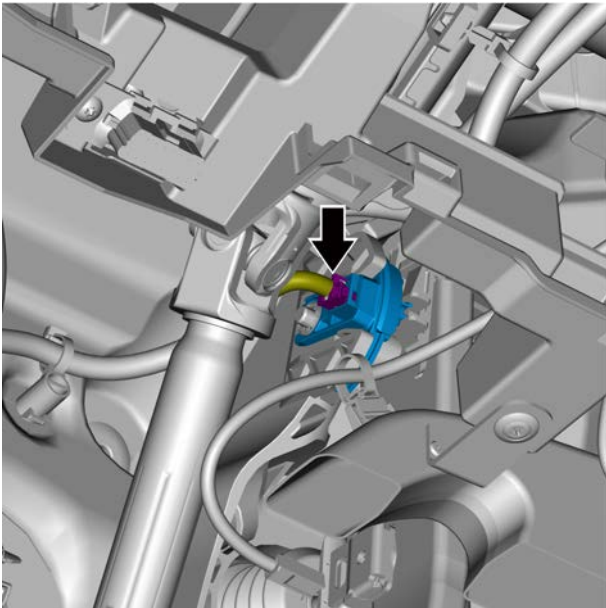
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the lower left baffle assembly, see [Replacement of the lower left baffle assembly](#).
- 4 Remove the left lower guard assembly of the dashboard, see the [Replacement of left lower guard assembly of the dashboard](#).
- 5 Disconnect the brake lamp switch harness connector.
- 6 Remove brake lamp switch.



Installation procedure



- 1 Install brake lamp switch.
- 2 Reverse brake light switch harness connector

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the left lower fender apron assembly of the dashboard.
- 4 Install the lower left foot shield assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.
- 7 Mark the brake lamp switch "0".

11.3.7.17 Replacement of steering wheel module

Removal procedure

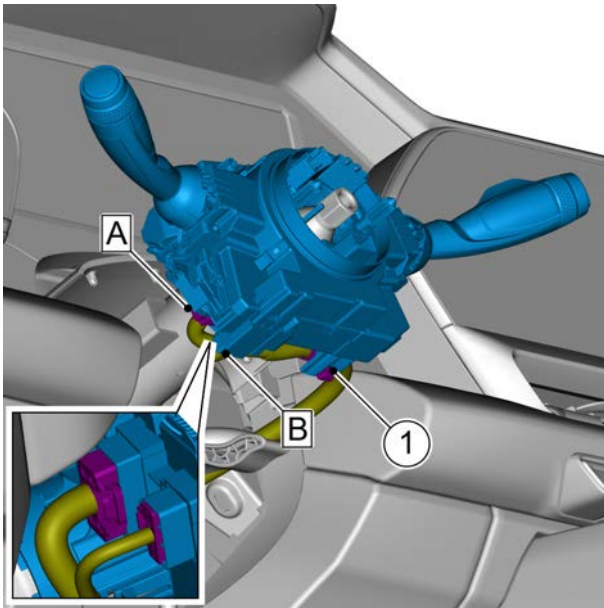
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the steering wheel assembly, see the [Replacement of the steering wheel assembly \(Type 1\)](#), the [Replacement of the steering wheel assembly \(Type 2\)](#).

Caution

Make sure the front wheel is back in alignment before removal, otherwise it will lead to damage to the internal cable of the clock spring and error in the angle output of the steering wheel angle sensor.

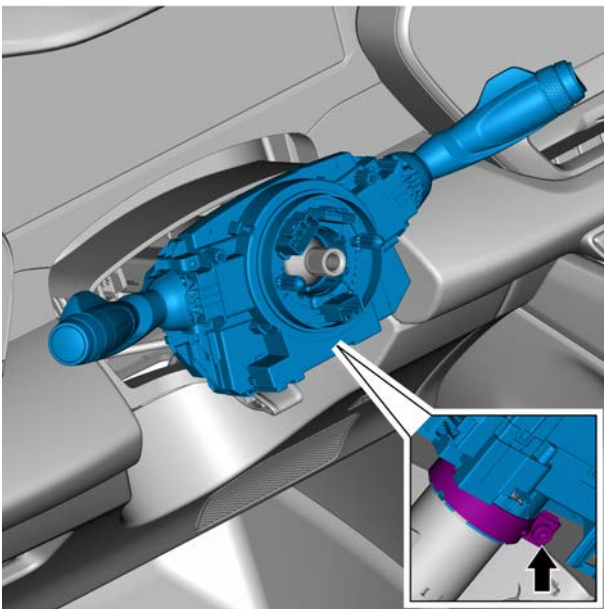


- 4 Disconnect steering wheel module harness connectors A and B and disconnect harness clip 1.

Caution

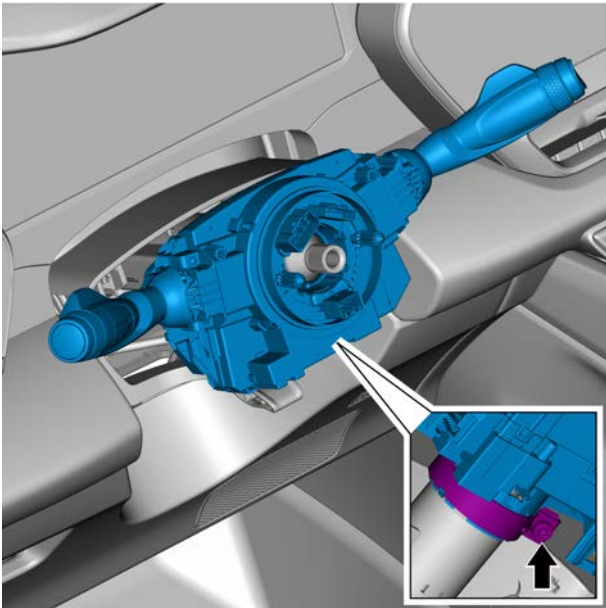
The inner ring of the clock spring should be fixed with a strap before the steering wheel module is separated from the steering string to avoid rotation after removal.

When the removal is complete, make sure that the clock spring is not rotated and that the clock spring transparently observes several vertical stripes on the cable inside the window.



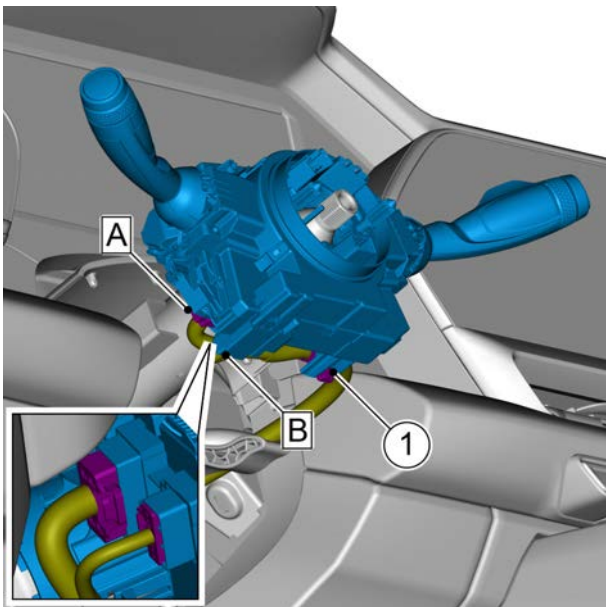
- 5 Use the tool to loosen the steering wheel module clamp retaining bolts.
- 6 Remove the steering wheel module clamp and remove the steering wheel module.

Installation procedure



- 1 Place the steering wheel module clamp on the steering wheel module.
- 2 Use tools to fasten the steering wheel module clamp retaining bolts.

Torque: 6 N. m (metric system) 4.4 lb-ft (Imperial system)



- 3 Connect the steering wheel module harness connectors A and B and install harness clip 1.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 4 Install the steering wheel.
- 5 Connect the negative battery cable.
- 6 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 7 Close the engine compartment cover.

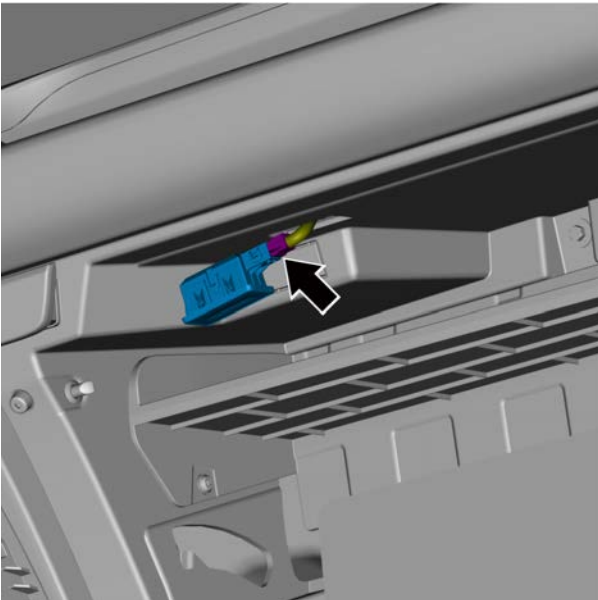
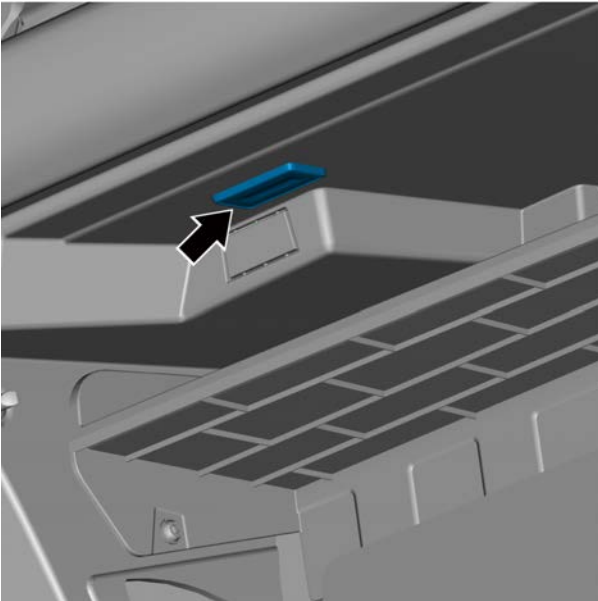
11.3.7.18 Replacement of glove box lamp assembly

Removal procedure

Warning !

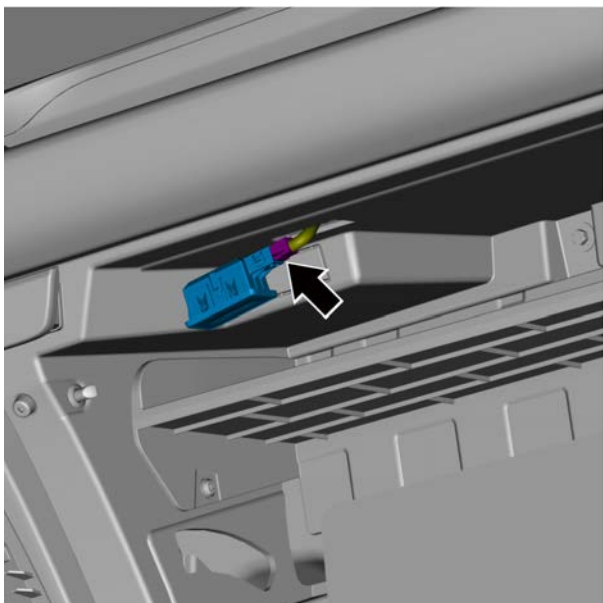
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Open the glove box.
- 4 Remove the glove box lamp assembly.



- 5 Disconnect the glove box lamp harness connector.
- 6 Remove the glove box lamp assembly.

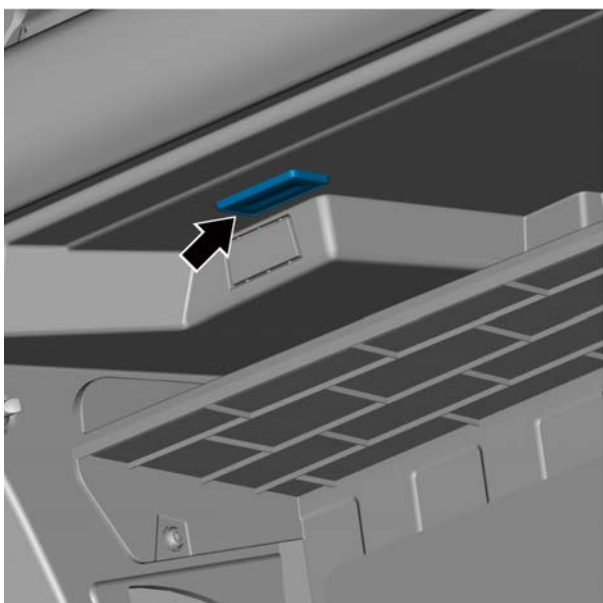
Installation procedure



- 1 Connect the glove box lamp harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install glove box lamp assembly.

- 3 Close the glove box.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

11.4 Glass/windows/rearview mirror

11.4.1 Specification

11.4.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Nut - RL outer body side triangle window (fastener)	M5×6.8	5~7	3.7~5.2
Bolt - fasten the guide rail of the glass elevator of the front left door	M6×12	8.5~11.5	6.3~8.5
Bolt - fasten RL door glass rear run channel assembly and RL door inner panel	M6×12	8.5~11.5	6.3~8.5
Nut-fasten the exterior rearview mirror (left) and front left door	M6×7.3	8.5~11.5	6.3~8.5
Bolt-fasten driver door module and door sheet metal	M5×16	2.2~2.8	1.6~2.1
Bolt-fasten door module (RL) and door sheet metal	M5×16	2.2~2.8	1.6~2.1
Bolt-fasten RL outer triangular window glass	M6×12	8.5~11.5	6.3~8.5

11.4.2 Instructions and operations

11.4.2.1 Instructions and Operations

Description and operation of the window regulator

Caution

Do not leave children, incapacitated adults or pets in vehicles with windows closed and locked. They may cause casualties because the temperature is too high for not opening the doors and windows.

Do not try to test the anti-clamping function with your body, otherwise it will cause personal casualties. When the window is closed and the top of the window glass is less than 4 mm from the window frame, the anti-clamping function may not work.

1. Manual operation

Open: press the window switch down to the manual downshift (position 1) and hold it to open the window.

Close: pull the window switch up to the manual rising gear (position 1) and hold it to close the window.

During the manual opening or closing of the window, if you release the window switch, the window will stop moving.

2. Automatic operation

Open: press the window switch down to the automatic downshift (position 2), then release the switch, and the window opens automatically.

Close: pull the window switch up to the automatic rising gear (position 2), then release the switch, and the window closes automatically.

During the automatic opening or closing of the window, if you press or pull the window switch again, the window will stop moving.

3. Window locking switch

The window lock switch is located on the driver side door and behind the window switch.

Press the switch to disable the switch operation of the rear window. When the lock nut function is enabled, the window lock nut switch indicator is lit, and the rear window can still be opened or closed by the driver side window switch.

To restore the switch operation of the rear window, press the window lock nut switch again to unlock, the window lock nut switch indicator is off, and the lock nut function is turned off.

4. Thermal protection of power windows

If power window is operated repeatedly in a short time, the control switch for the power window may fail to protect the motor service life. After a short period of time, the operation of the electric window can be resumed.

Caution

The waiting time for automatic recovery is long, if you need to operate the window immediately, after the vehicle is powered off and restarted, you can operate the electric window again.

5. Anti-pinch function

In the process of automatic closing, if a block is encountered in the anti-clamping area, the window will automatically stop and return to its original state. If the window is hit hard, this function may work even if no object is caught. If the anti-pinch function does not work properly, the power window needs to perform self-learning.

Caution

In the moment before the window is completely closed (the top of the glass is less than 4 mm from the window frame), if something gets stuck, the anti-pinch function may not work.

Do not try to activate the anti-clamping function by deliberately blocking any part of the body with the window, otherwise it will lead to serious injury or even death.

6. Anti-pinch power window self-learning

In the process of automatic closing, if a block is encountered in the anti-clamping area, the window will automatically stop and return to its original state. If the window is hit hard, this function may work even if no object is caught. If the anti-pinch function does not work properly, the power window needs to perform self-learning.

Window no position self-learning

At this time, the window has no automatic closing function, which can be closed manually or opened automatically / manually.

The self-learning methods are as follows:

- Pull up the window switch until the window is completely closed, continue to pull the window switch and hold it for 3 seconds and then release, at this time the electric window will have automatic closing and anti-clamping function.

Window no position self-learning

At this time, the window has no automatic closing function, which can be closed manually or opened automatically / manually.

The self-learning methods are as follows:

- Pull up the window switch until the window is completely closed, continue to pull the window switch and hold for 3 seconds before release;
- Press the window switch down until the window is fully open, and continue pressing the window switch and hold for 3 seconds before release.
- Pull up the window switch until the window is completely closed, continue to pull the window switch and hold for 3 seconds before release. At this time, the electric window will re-learn the window initialization data and have the function of automatic closing and anti-clamping.

Window position upward offset self-learning

At this point, the window cannot be automatically closed to the fully closed position (when the window glass runs to the fully closed state, the anti-clamping function will be triggered and returned).

The self-learning methods are as follows:

- Pull the window switch up until the window is completely closed, and the window triggers the anti-clamp release switch at the end of the return. Pull up the window switch within 5 seconds until the window is completely closed, and the window triggers the release switch after the anti-clamping return is over.
- Pull up the window switch within 5 seconds until the window is completely closed, continue to pull the window switch and hold it for 3 seconds and then release, at this time the electric window has activated automatic closing and anti-clamping function.

If the electric window still does not work properly after the above operation, please go to Geely Auto service station for maintenance.

7. Function of delayed operation

When the doors are not open, the operation of the window can be maintained through the window switch within 120 seconds after the start switch is turned off.

8. The smart key remotely opens / closes the window

When the start switch is closed, and the fuel filler cap, sunroof, rear tailgate, front engine bay hood and four doors are all closed, press the unlock key on the smart key longer, and the four windows will open at the same time; press the lock button on the smart key longer, and the four windows will close at the same time.

9. Close the window automatically on rainy days (if equipped)

When the vehicle turns off and locks the car fortified, when the sunroof and electric window are open, if it suddenly rains, the vehicle can automatically close the sunroof and electric window.

Caution

If the window / sunroof has not gone through self-learning, the window cannot be closed automatically on rainy days.

Instructions and operation of the exterior rearview mirror

The exterior rearview mirrors are controlled by an electric exterior rearview mirror switch assembly on the driver side door trim. The operation switch selects the rearview mirror that needs to be adjusted, and can be operated in four directions: up, down, left and right. Finally, determine the position that best suits you.

There is a heating element in the mirror glass of the exterior rearview mirror, and the heating element of the exterior rearview mirror will also work when the exterior rear windshield defroster switch is pressed.

Press the exterior rearview mirror/rearview window defrosting button on the center console switch module, the button indicator light is lit, the exterior rearview mirror heating and rearview window defrosting are turned on at the same time, and will be turned off automatically after 5-15 minutes. The time is related to the ambient temperature. The lower the ambient temperature is, the longer the heating time is.

For the purpose of driving safety, do not adjust the exterior rearview mirrors while driving. Do not drive while the exterior rearview mirrors are folded. Unfold and properly adjust the driver side and passenger side exterior rearview mirrors before driving.

Description and operation of interior rearview mirror module

After the engine starts, the interior rearview mirror senses the lamp intensity through the light sensor, triggering the electronic anti-glare function.

If the electronic anti-glare is turned on, the interior rearview mirror automatically prevents the glare according to the incident light from the rear. When the start switch is turned off or the shift lever is in reverse, the electronic anti-glare function turns off automatically.

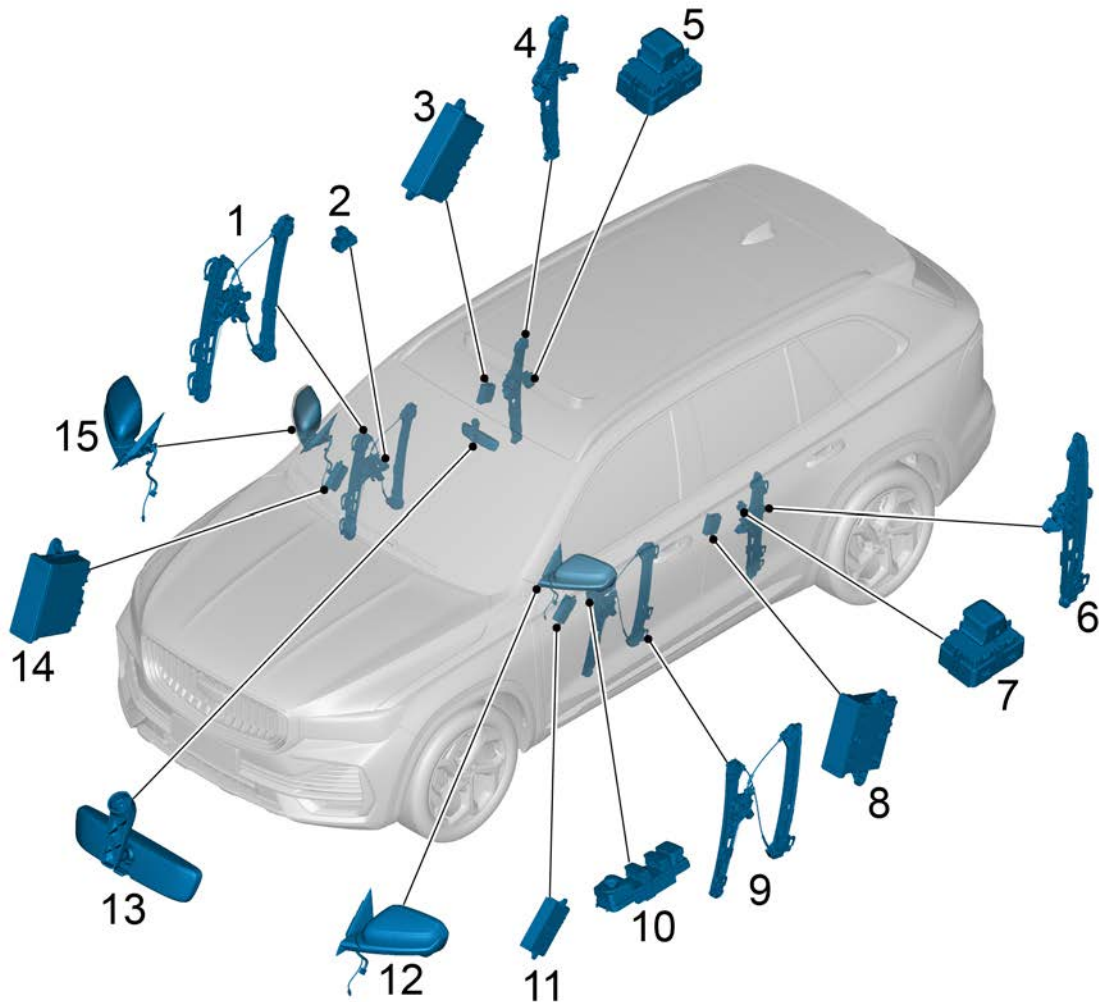
Caution

The electronic anti-glare function works normally when the incident light on the interior rearview mirror is not affected by other objects. It is forbidden to paste labels and install driving recorders in front of the interior rearview mirror so as not to affect the function of the interior rearview mirror.

The interior rearview mirror module is equipped with sensors, do not hang anything on the interior rearview mirror or use glass cleaner, otherwise the interior rearview mirror module may not work properly.

11.4.3 Component position

11.4.3.1 Component position

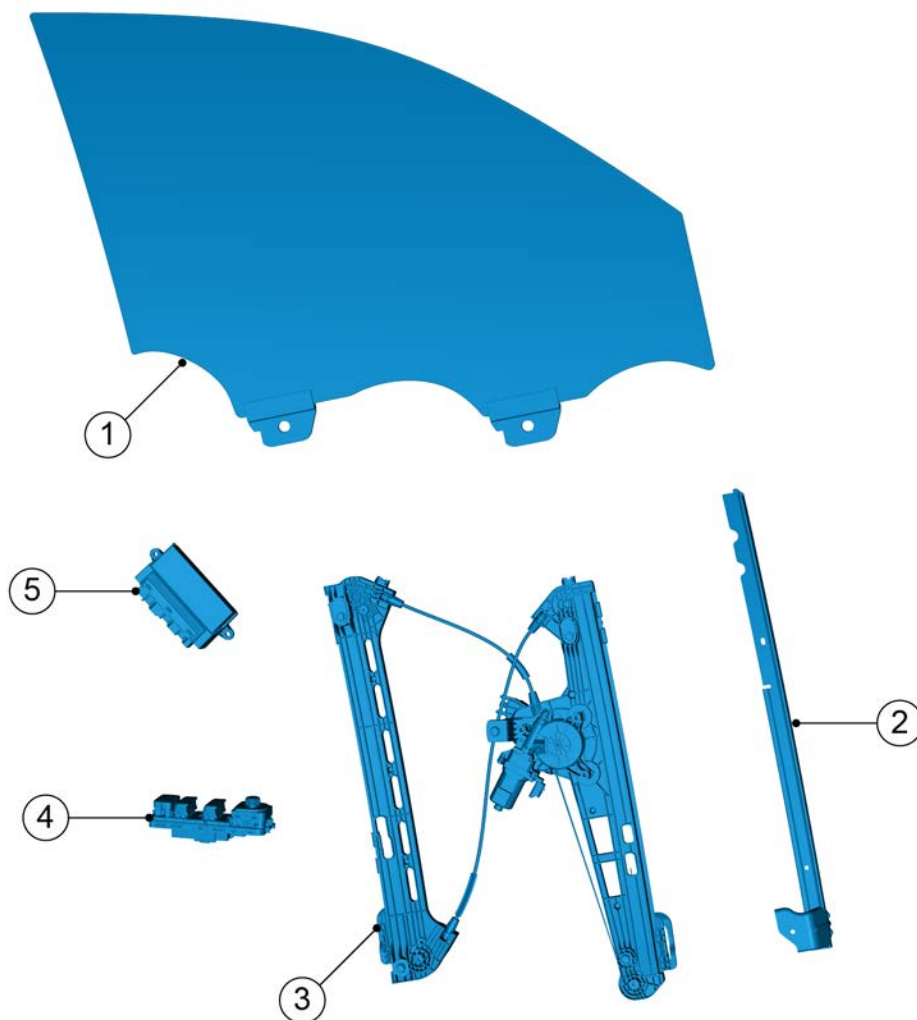


- | | | | |
|----|----------------------------|-----|-----------------------------------|
| 1. | Power window motor (FR) | 9. | Power window motor (front left) |
| 2. | Window control switch (FR) | 10. | Driver door switch |
| 3. | Rear right door module | 11. | Driver door module |
| 4. | Power window motor (RR) | 12. | Exterior rearview mirror (left) |
| 5. | Window control switch (RR) | 13. | Interior rearview mirror assembly |
| 6. | Power window motor (RL) | 14. | Passenger door module |
| 7. | Window control switch (RL) | 15. | Exterior rearview mirror (right) |
| 8. | Rear left door module | | |

11.4.4 Exploded view

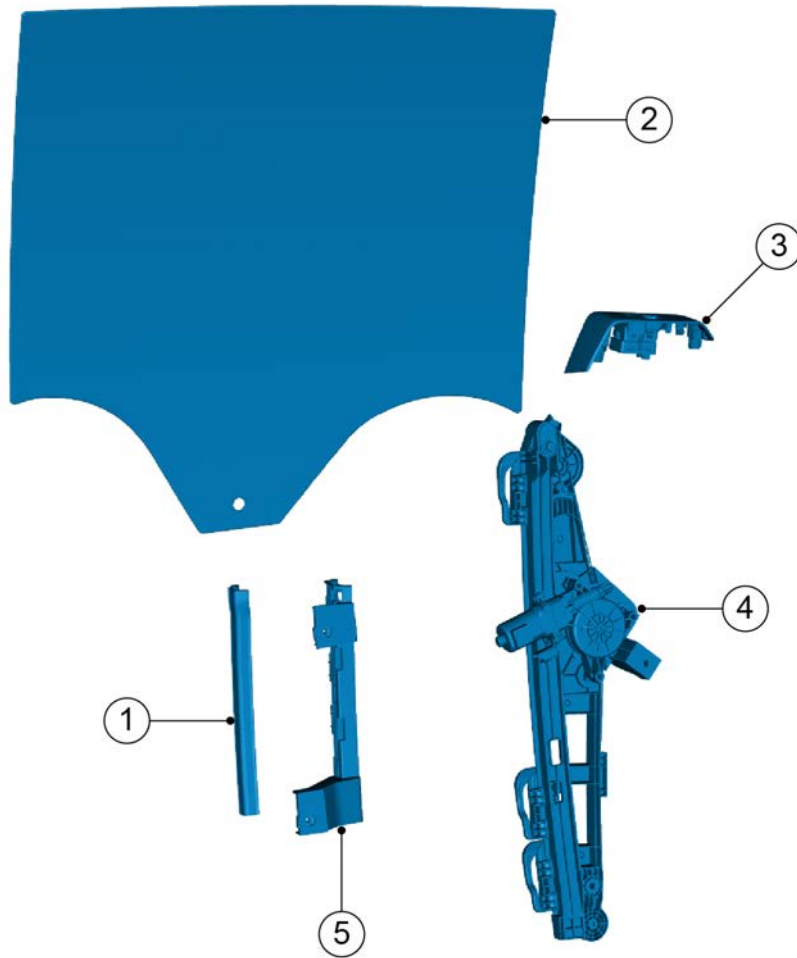
11.4.4.1 Exploded view

front left door



- | | | | |
|----|---|----|--------------------|
| 1. | Front door glass assembly | 4. | Driver door switch |
| 2. | front door glass rear guide rail assembly | 5. | Driver door module |
| 3. | Power window motor (front left) | | |

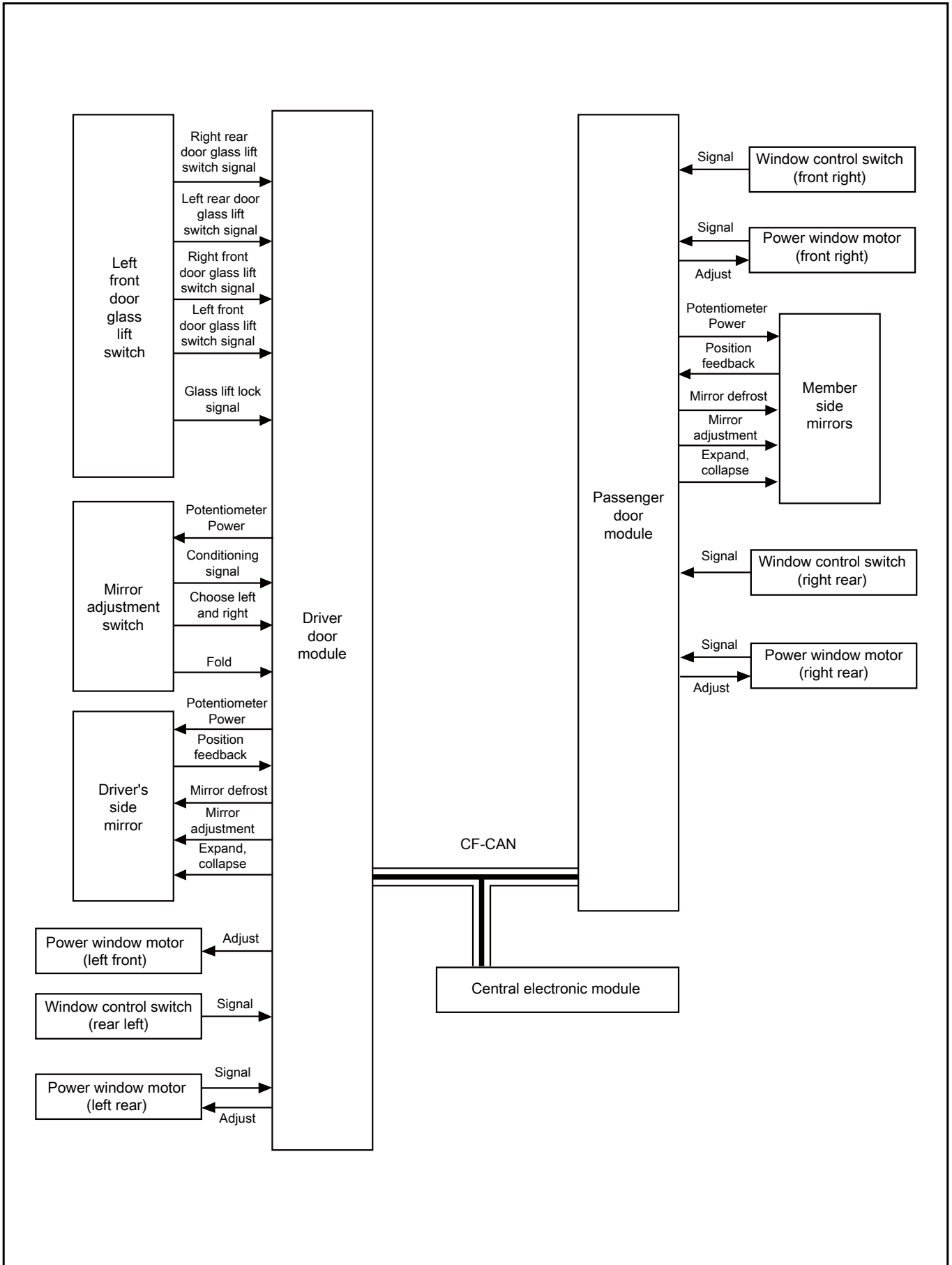
front left door



- | | | | |
|----|---------------------------------------|----|-------------------------------------|
| 1. | Rear door glass guide rail seal strip | 4. | Power window motor |
| 2. | Rear door glass assembly | 5. | Rear door glass guide rail assembly |
| 3. | Window control switch | | |

11.4.5 Electrical schematic diagram

11.4.5.1 Electrical schematic diagram



11.4.6 Diagnostic information and procedures

11.4.6.1 Diagnosis Description

Before diagnosing the fault of glass / window / rearview mirror, see [Description and operation](#). Understand and familiarize yourself with the working principle of the glass/ window/ rear view mirror, and then start system diagnosis. This will help to confirm the correct fault diagnosis steps when the fault occurs. More importantly, it can also help to confirm whether the situation described by the distributor is normal operation. Any fault diagnosis of glass/ window/ rear view mirror should start with routine inspection. The routine inspection will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.4.6.2 Visual Check

- Check for after-sales equipment that may affect glass / window / rearview mirror operation to ensure that these devices do not affect glass / window / rearview mirror operation.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

11.4.7 Removing and installing

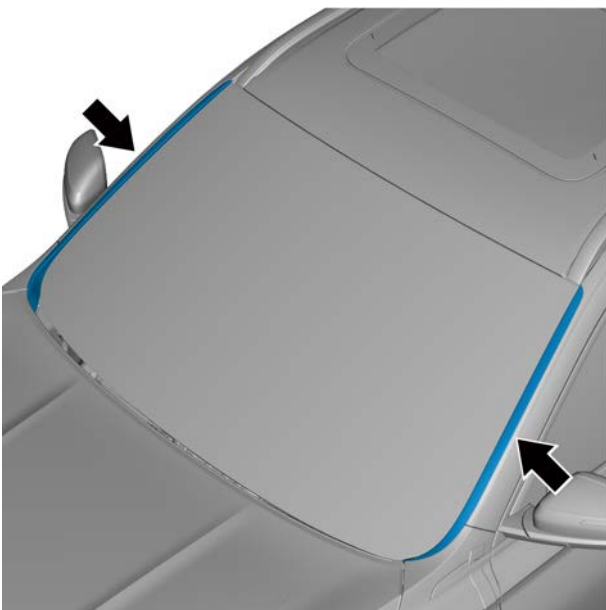
11.4.7.1 Replacement of front window glass assembly (Type 1)

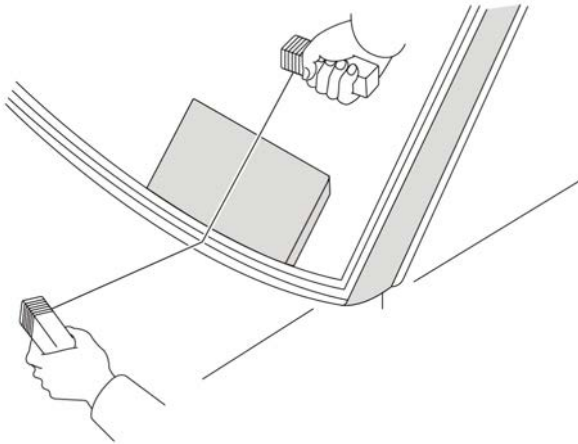
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the front wiper arm assembly, see the [Replacement of the front wiper arm assembly](#).
- 4 Remove ventilation cover assembly (Type 1), see [Replacement of ventilation cover \(Type 1\)](#).
- 5 Open doors.
- 6 Remove A-pillar upper trim panel assembly, refer to replacement of left A-pillar upper trim panel assembly.
- 7 Remove the interior rearview mirror, see the [Replacement of the mechanical anti-glare interior rearview mirror](#) and the [Replacement of the interior rearview mirror module](#).
- 8 Remove the front-looking camera. See the [Replacement of the front-looking camera](#).
- 9 Remove rain and light sensor, see [Replacement of rain water and the light sensor](#).
- 10 Remove the front windshield glass assembly (low configuration) trim on both sides. Paste protective tape on the installation position of the body and the front windshield glass assembly (low configuration).



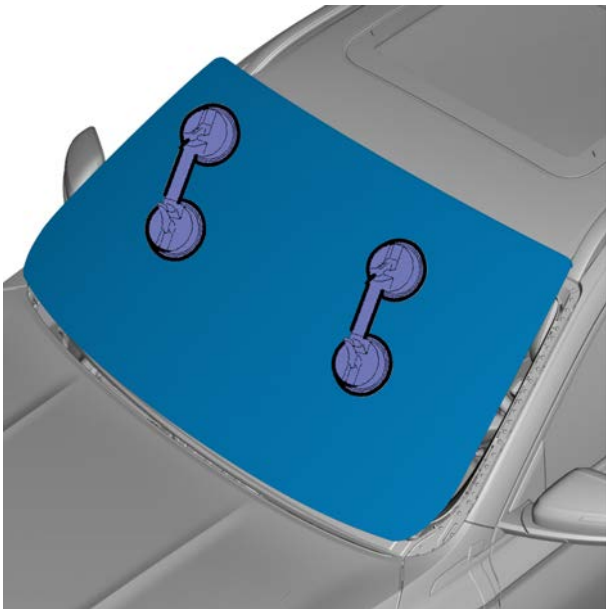


- 11 From the inside of the car, pass the cutting wire through the seam between the car body and the front windshield glass assembly, and tie wood blocks or similar objects on both ends of the cutting wire.

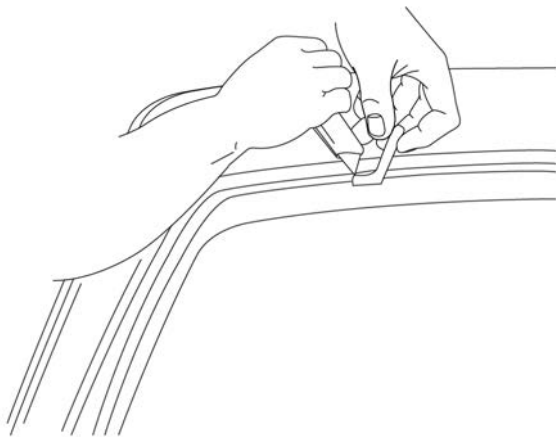
Caution

Tie a piece of wood or similar object at both ends of the cutting wire to prevent the hand from being cut.

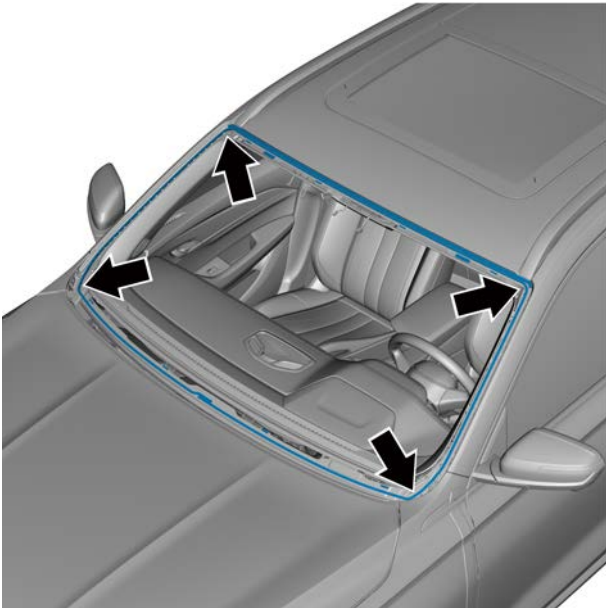
When separating the windshield from the car, be careful not to damage the body paint or interior and exterior decorations.



- 12 Please use the appropriate tool to remove the front windshield glass assembly (low configuration).



- 13 Use a blade or appropriate tool to remove the adhesive from the front windshield glass assembly (low configuration) frame.

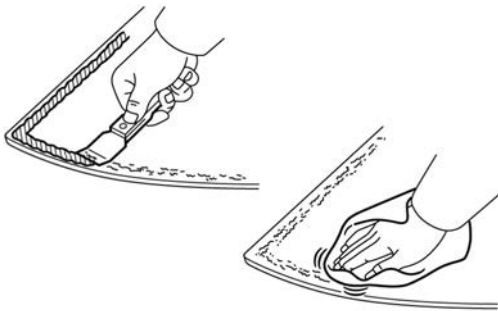


- 14 Use a blade or appropriate tool to remove the adhesive from the body frame.

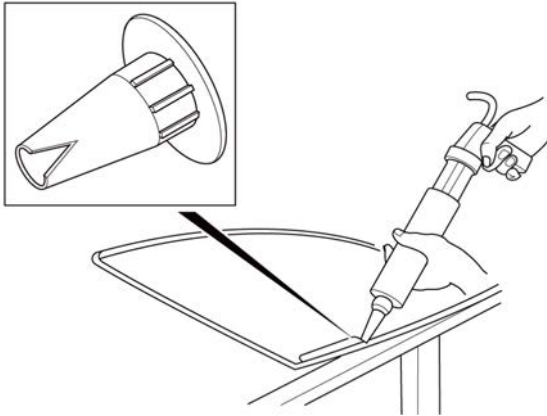
- 15 Clean the joint of the car body and the front windshield glass assembly with a suitable cleaner.

Caution

Do not touch the joint of the car body and the front windshield glass assembly after cleaning.



Installation procedure

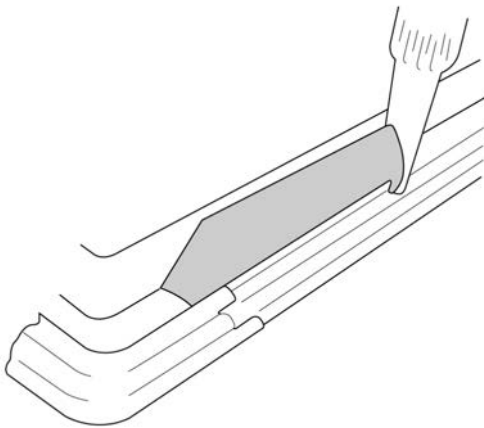


- 1 Place the pre-used front windshield glass assembly (low configuration) on the mounting table. Cut the Geely dedicated glass sealant application nozzle open.

Caution

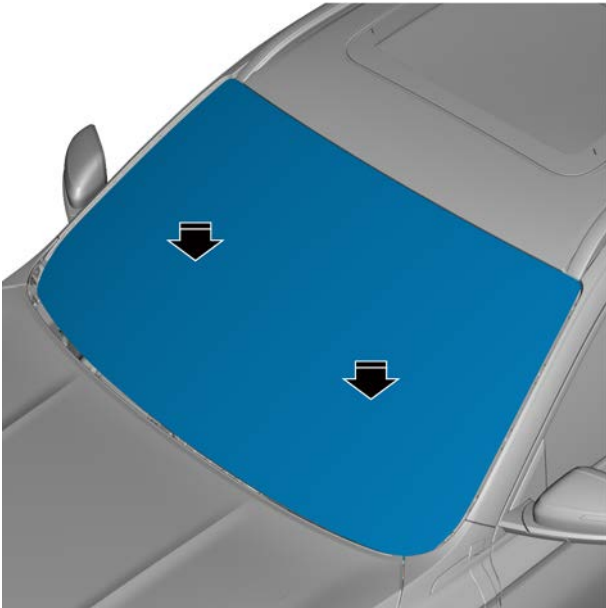
Avoid bumps and scratches in the assembly process.

- 2 Use the Geely dedicated glass sealant nozzle to make the flange edge of the sprayed glass glue reach 8mm (0.3in) wide and 8mm (0.3in) high.



- 3 The flange edge of the glass sealant is evenly and continuously smeared with a sleeve-type leak-filling gun to ensure that the width of the glass sealant is uniform but consistent.





- 4 Install the front windshield glass assembly with appropriate tools and press it gently along the edge of the glass.

Caution

The installation process requires at least two technicians to operate carefully.

- 5 Slightly press the outside surface of glass to ensure that it is solidly installed to the body.

Caution

Check whether the baffle plate of the front windshield is correctly bonded to the body.

Check the clearance between the body and front windshield assembly.

Use 98N (10kgf, 22lbf) or more to press down the glass.

- 6 Where necessary, use a scraper to correct the height or position of painted bonding agents.
- 7 Use protective tapes to fix the windscreen until the painted bonding agents harden.
- 8 Sprinkle water from the outside of the vehicle after bonding agents harden. Check whether water leaks into coaches. If water leaks into coaches, additionally paint bonding agents after water is dried.
- 9 Remove protective tapes.
- 10 Install the front windshield glass assembly trim on both sides.

Caution

Do not move the vehicle within six hours; do not wash the car within three days; the glass delicate sealant will dry thoroughly after two days of use and avoid driving on road surface with potholes before the sealant is dry.



- 11 Install the A-pillar trim panel.
- 12 Install the rainwater and light sensors.
- 13 Install the front-looking camera.

- 14 Install the inner rearview mirror.
- 15 Close the door.
- 16 Install the cowl top cover.
- 17 Install the wiper arm wiper assembly before installation.
- 18 Connect the negative battery cable.
- 19 Close the engine compartment cover.

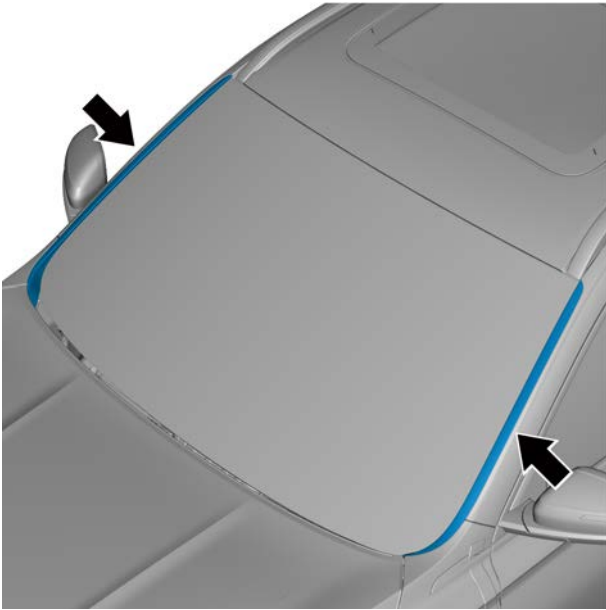
11.4.7.2 Replacement of front windshield glass assembly (Type 2)

Removal procedure

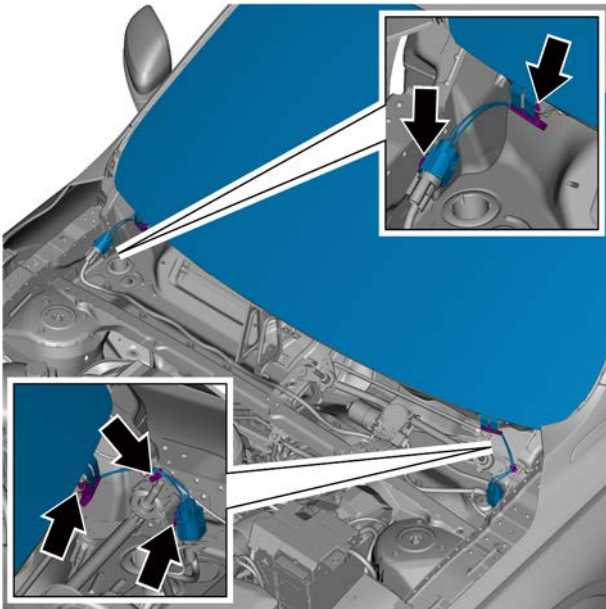
Warning !

See "warning about disconnecting battery" in [1.1.1.1 Warnings and cautions](#).

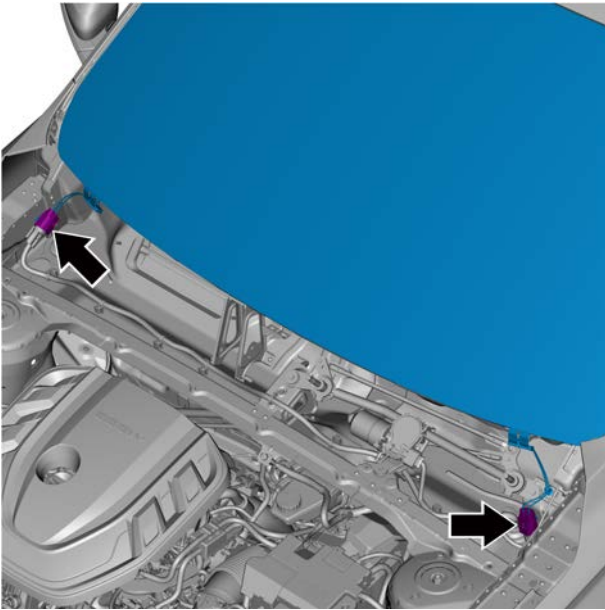
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the front wiper arm assembly, see the [Replacement of the front wiper arm assembly](#).
- 4 Remove plenum mounding assembly, refer to [replacement of plenum mounding assembly\(Type II\)](#).
- 5 Open doors.
- 6 Remove A-pillar upper trim panel assembly, refer to replacement of left A-pillar upper trim panel assembly.
- 7 Remove the interior rearview mirror, see the [Replacement of the mechanical anti-glare interior rearview mirror](#) and the [Replacement of the interior rearview mirror module](#).
- 8 Remove the front-looking camera. See the [Replacement of the front-looking camera](#).
- 9 Remove rain and light sensor, see [Replacement of rain water and the light sensor](#).



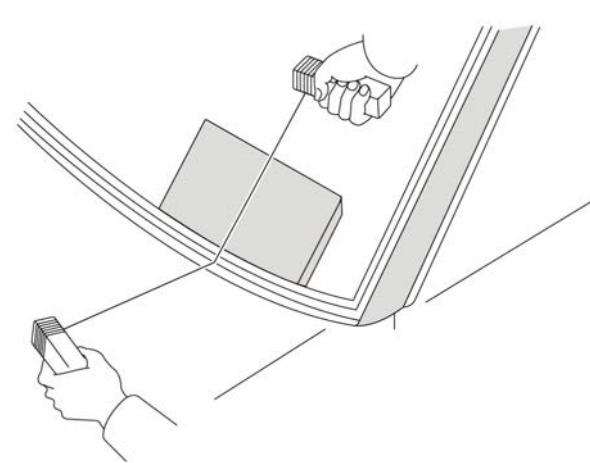
- 10 Remove the front windshield glass assembly trim on both sides. Paste protective tape on the installation position of the body and the front windshield glass assembly.



- 11 Remove the front windshield glass assembly harness retaining clip.



- 12 Disconnect the front windshield glass assembly harness connector.

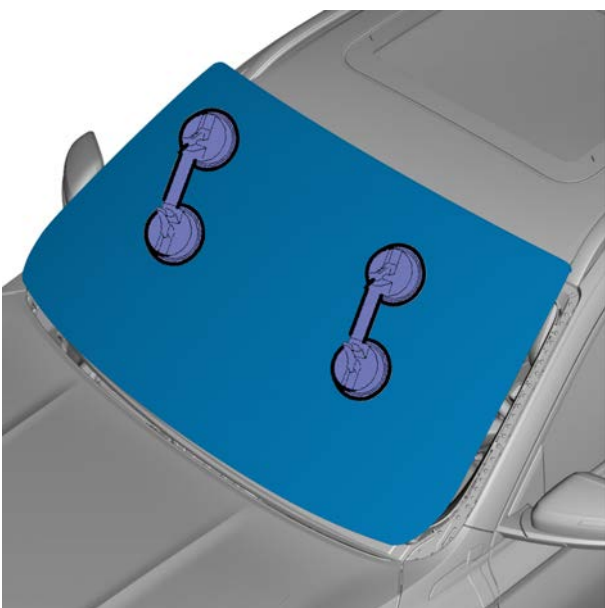


- 13 From the inside of the car, pass the cutting wire through the seam between the car body and the front windshield glass assembly, and tie wood blocks or similar objects on both ends of the cutting wire.

Caution

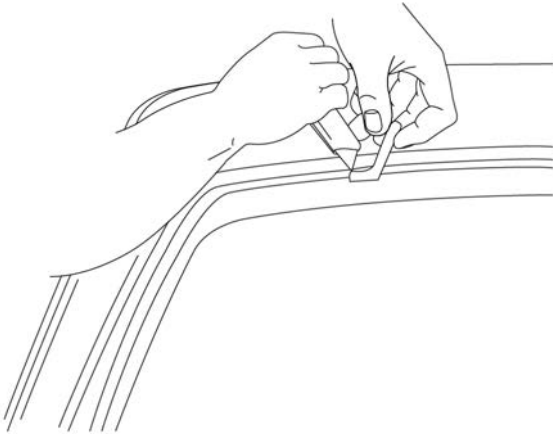
Tie a piece of wood or similar object at both ends of the cutting wire to prevent the hand from being cut.

When separating the windshield from the car, be careful not to damage the body paint or interior and exterior decorations.

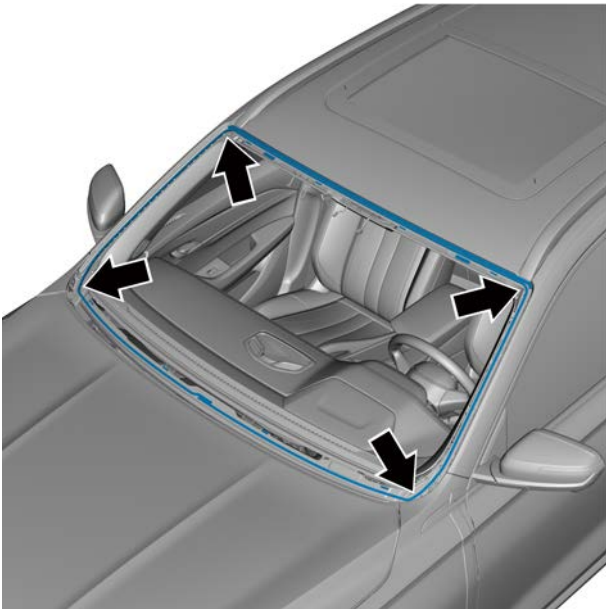


- 14 Please use a sucker to remove the front windshield glass assembly.

- 15 Use a blade or appropriate tool to remove the adhesive from the front windshield glass assembly frame.



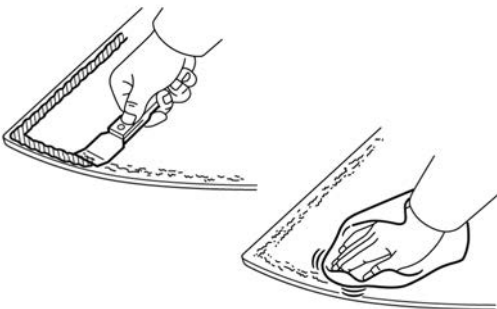
- 16 Use a blade or appropriate tool to remove the adhesive from the body frame.



- 17 Clean the joint of the car body and the front windshield glass assembly with a suitable cleaner.

Caution

Do not touch the joint of the car body and the front windshield glass assembly after cleaning.

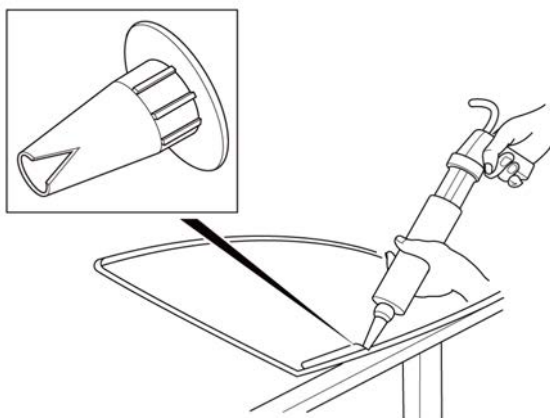


Installation procedure

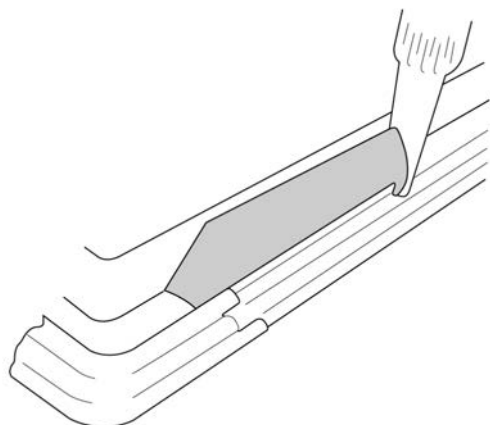
- 1 Place the front windshield glass assembly on the mounting table. Cut the Geely dedicated glass sealant application nozzle open.

Caution

Avoid bumps and scratches in the assembly process.

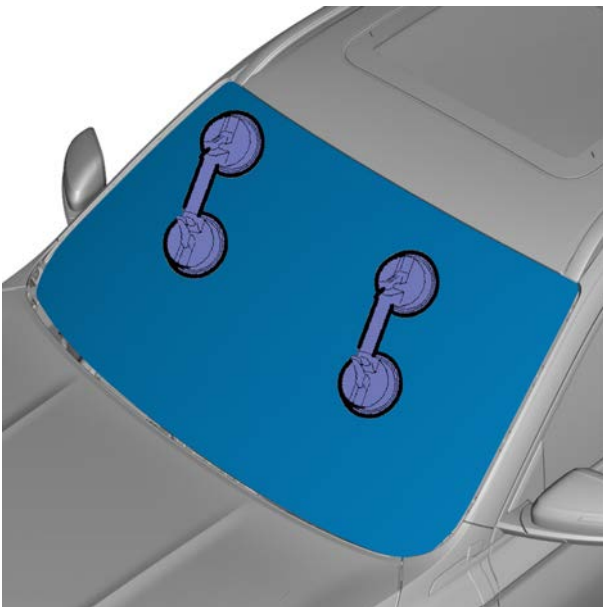


- 2 Use the Geely dedicated glass sealant nozzle to make the flange edge of the sprayed glass glue reach 8mm (0.3in) wide and 8mm (0.3in) high.





- 3 The flange edge of the glass sealant is evenly and continuously smeared with a sleeve-type leak-filling gun to ensure that the width of the glass sealant is uniform but consistent.



- 4 Use a sucker to install the front windshield glass assembly and press it gently along the edge of the glass.

Caution

The installation process requires at least two technicians to operate carefully.

- 5 Slightly press the outside surface of glass to ensure that it is solidly installed to the body.

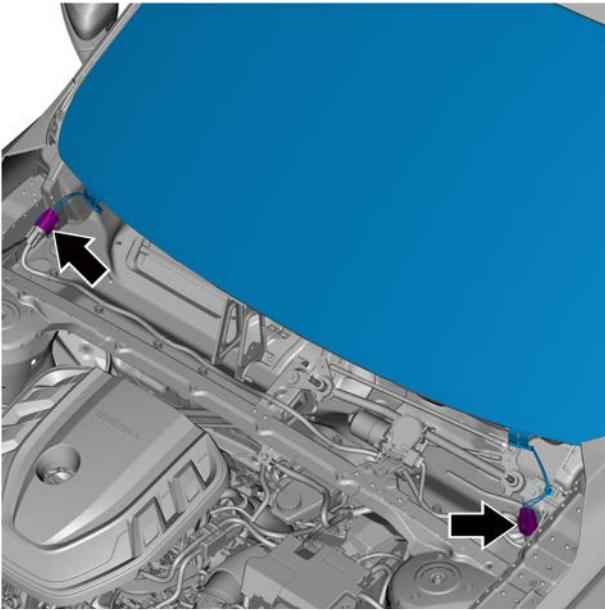
Caution

Check whether the baffle plate of the front windshield is correctly bonded to the body.

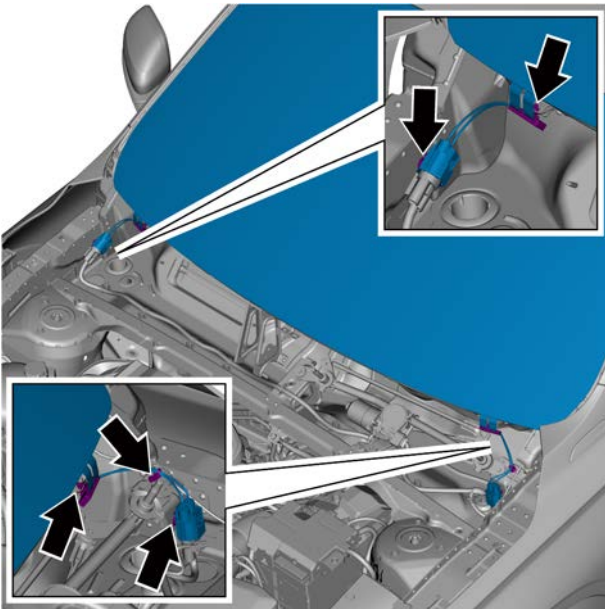
Check the clearance between the body and front windshield assembly.

Use 98N (10kgf, 22lbf) or more to press down the glass.

- 6 Where necessary, use a scraper to correct the height or position of painted bonding agents.
- 7 Use protective tapes to fix the windscreen until the painted bonding agents harden.
- 8 Sprinkle water from the outside of the vehicle after bonding agents harden. Check whether water leaks into coaches. If water leaks into coaches, additionally paint bonding agents after water is dried.
- 9 Remove protective tapes.



- 10 Connect the front windshield glass assembly harness connector.



- 11 Install the front windshield glass assembly harness retaining clip.



- 12 Install the front windshield glass assembly trim on both sides.

Caution

Do not move the vehicle within six hours; do not wash the car within three days; the glass delicate sealant will dry thoroughly after two days of use and avoid driving on road surface with potholes before the sealant is dry.

- 13 Install the A-pillar trim panel.
- 14 Install the rainwater and light sensors.
- 15 Install the front-looking camera.
- 16 Install the inner rearview mirror.
- 17 Close the door.
- 18 Install the cowl top cover.
- 19 Install the wiper arm wiper assembly before installation.
- 20 Connect the negative battery cable.
- 21 Close the engine compartment cover.

11.4.7.3 Replacement of rear windshield glass assembly

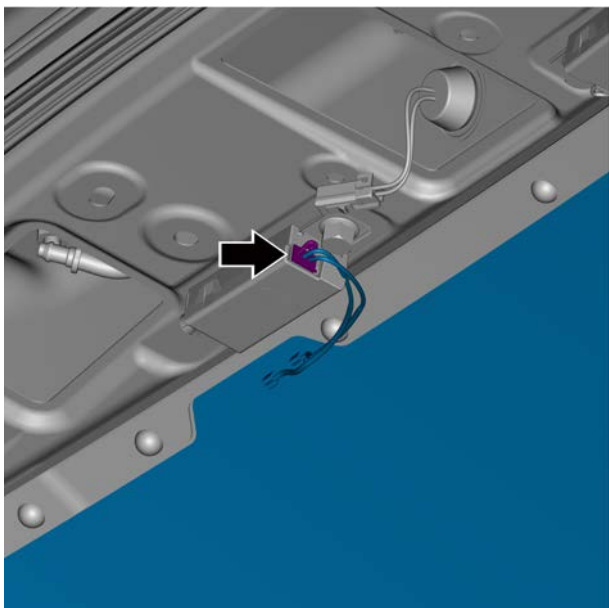
Removal procedure

Warning !

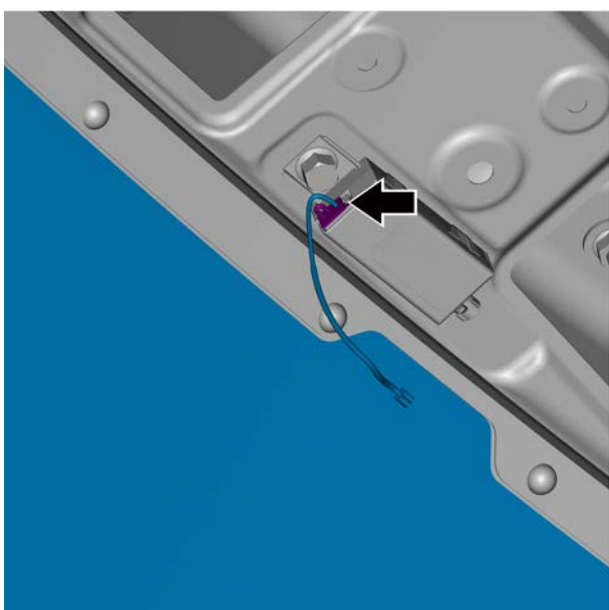
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the rear wiper wiper arm wiper assembly, see the [Replacement of the rear wiper wiper arm wiper assembly](#).
- 4 After removing rear wiper motor, see [Replacement of rear wiper motor](#).
- 5 Remove spoiler assembly, refer to [Replacement of spoiler assembly](#).

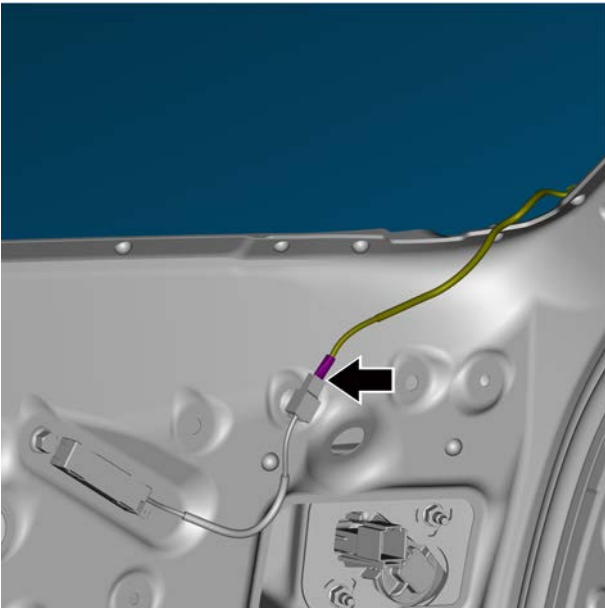
- 6 Remove the tailgate lower interior trim panel assembly of the assembly, see [Replacement of the tailgate lower interior trim panel assembly](#).



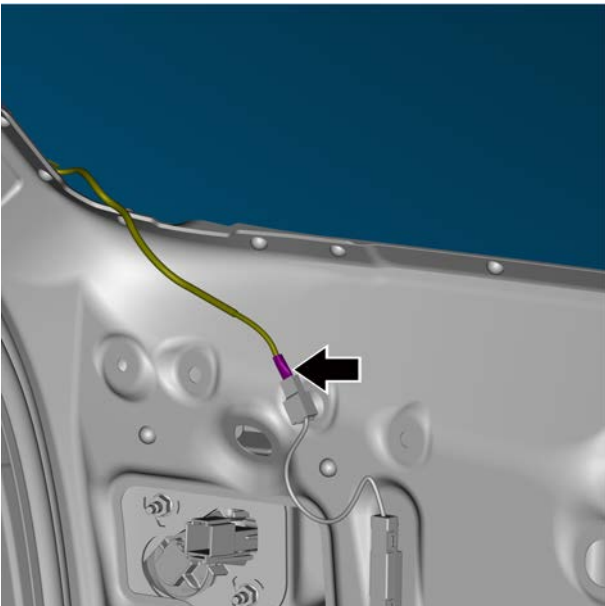
- 7 Disconnect the FM/AM harness connector.



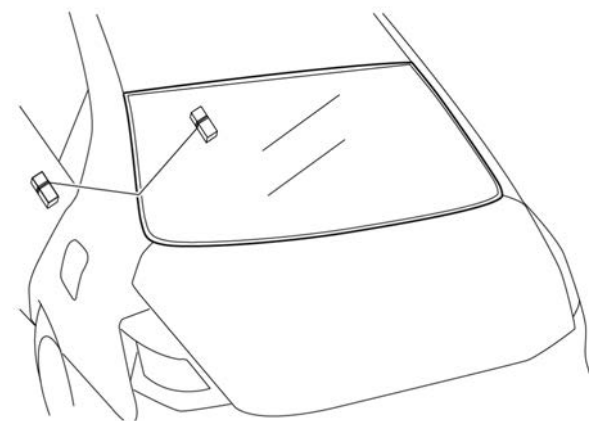
- 8 Disconnect the FM2 harness connector.



- 9 Disconnect power circuit rejector harness connector.



- 10 Disconnect the harness connector of ground connection filter.

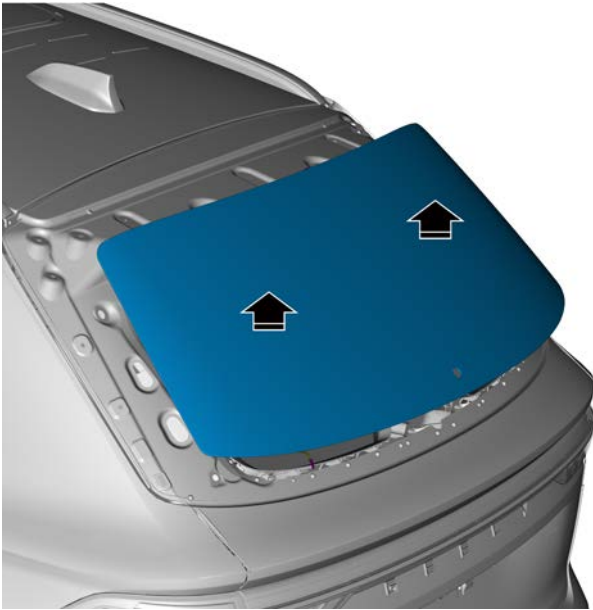


- 11 From the inside of the car, pass the cutting wire through the seam between the body and the rear windshield assembly, and tie wood blocks or similar objects on both ends of the cutting wire.

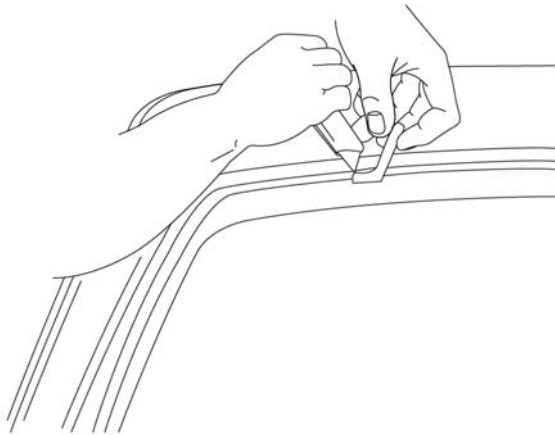
Caution

Tie a piece of wood or similar object at both ends of the cutting wire to prevent the hand from being cut.

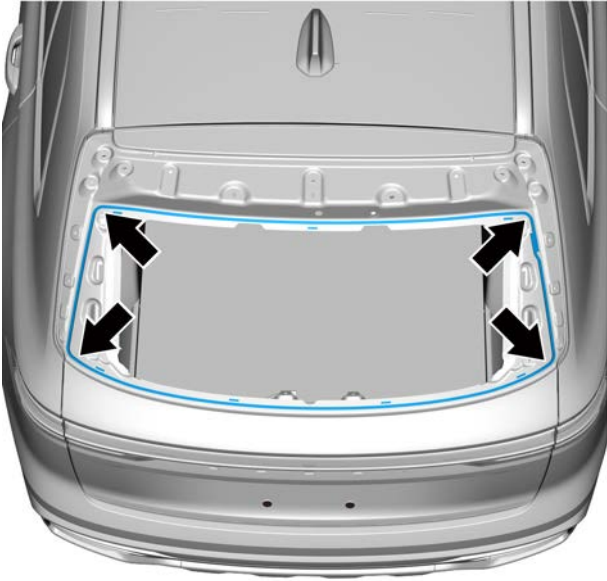
When separating the rear windshield glass assembly from the car, be careful not to damage the body paint or interior and exterior decorations.



- 12 Use the appropriate tool to remove the rear windshield glass assembly.



- 13 Use a blade or appropriate tool to remove the adhesive from the rear windshield glass frame.

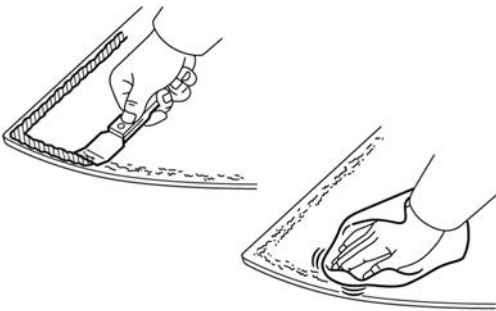


- 14 Use a blade or appropriate tool to remove the adhesive from the body frame.

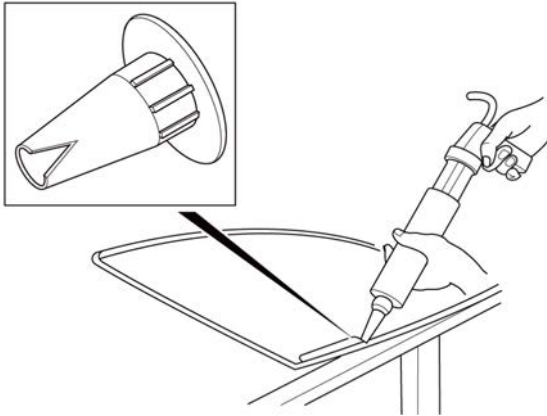
- 15 Clean the joint of the car body and the rear windshield glass assembly with a suitable cleaner.

Caution

After cleaning, you can no longer touch the joint of the car body and the rear windshield glass assembly.



Installation procedure

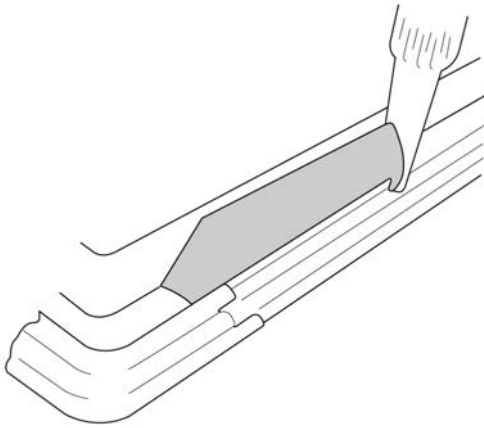


- 1 Place the rear windshield glass assembly on the mounting table. Cut the Geely dedicated glass sealant application nozzle open.

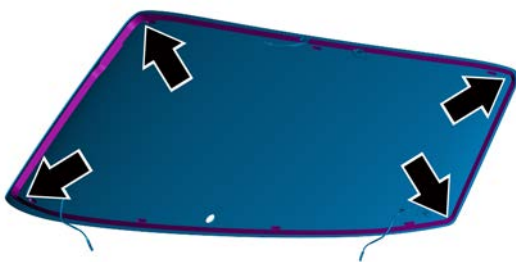
Caution

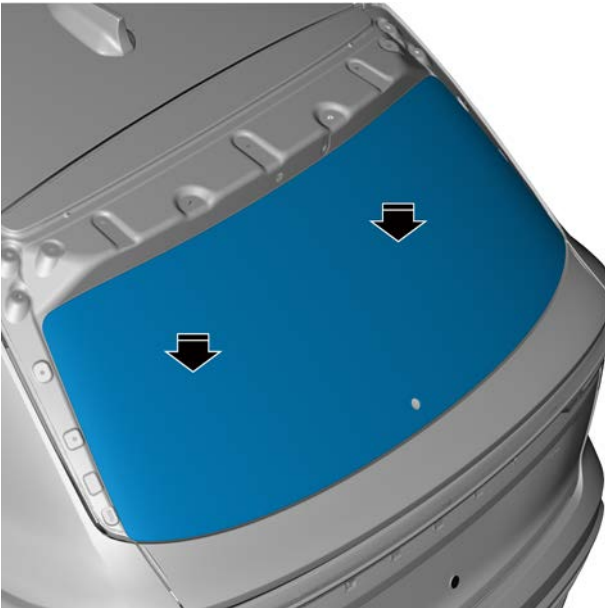
Avoid bumps and scratches in the assembly process.

- 2 Use the Geely dedicated glass sealant nozzle to make the flange edge of the sprayed glass glue reach 8mm wide and 8mm high.



- 3 The sleeve type leak filling gun is used to evenly and continuously smear the flange edge of the glass sealant to ensure the uniform width of the glass sealant.





- 4 Install the rear windshield glass assembly with appropriate tools.

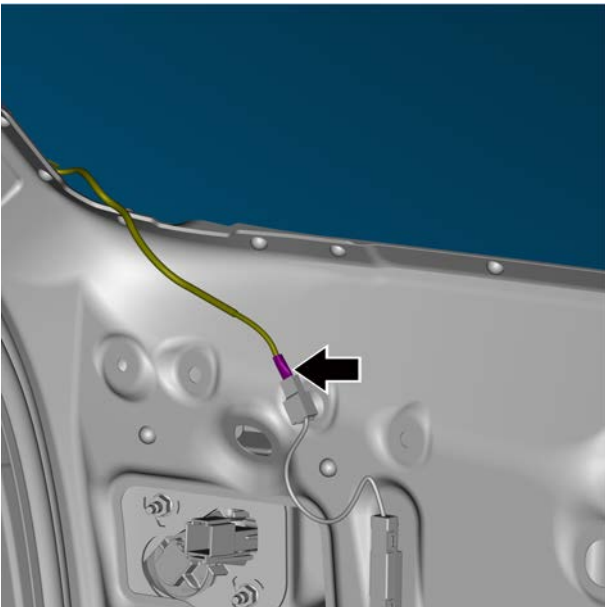
Caution

The installation process requires at least two technicians to operate carefully.

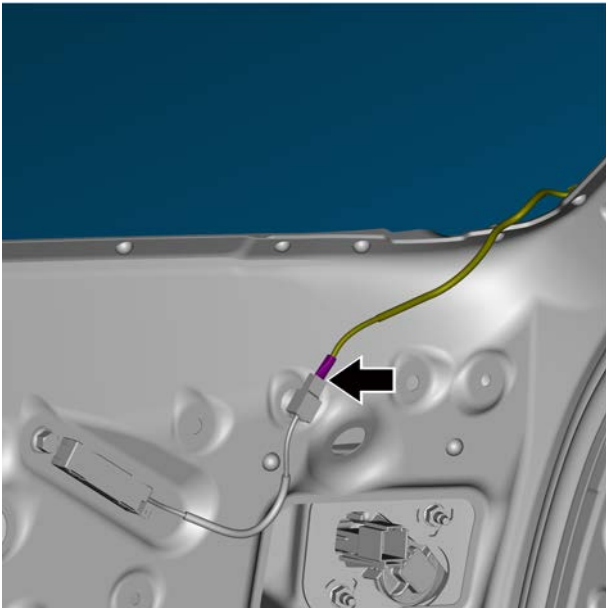
- 5 Press the rear windshield glass assembly, and then glue the tape to the rear windshield glass assembly and the rear windshield glass assembly window frame to secure the rear windshield assembly.
- 6 Wait for the adhesive to harden.
- 7 After the adhesive has hardened, pour water on the rear windshield glass assembly to check for water leakage. If there is a leak, dry the rear windshield glass assembly and plug the leakage area with glass sealant. If the water is still leaking, remove the rear windshield glass assembly and repeat the entire repair procedure.

Caution

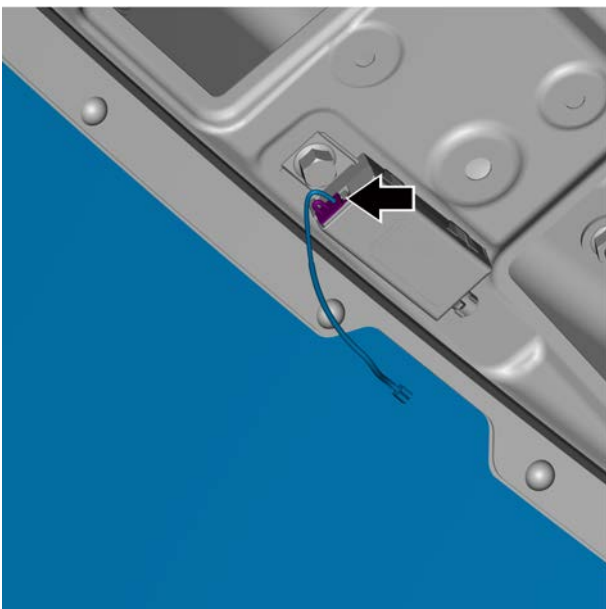
Do not move the vehicle within six hours; do not wash the car within three days; the glass delicate sealant will dry thoroughly after two days of use and avoid driving on road surface with potholes before the sealant is dry.



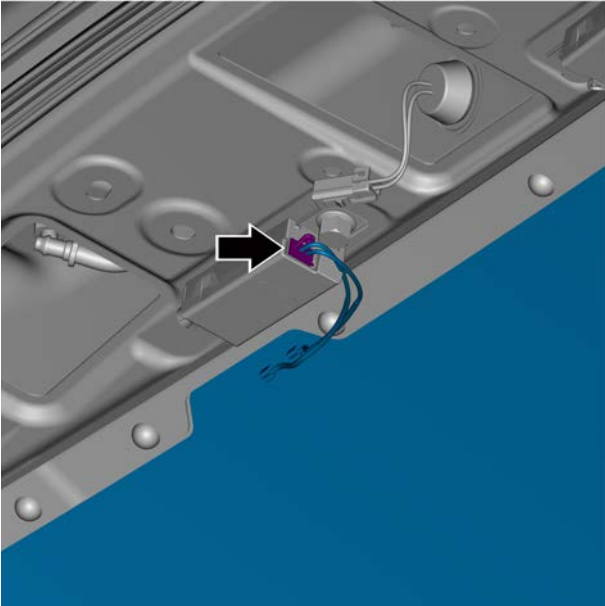
- 8 Connect the harness connector of grounding circuit rejector.



9 Connect power circuit rejector harness connector.



10 Connect the FM2 harness connector.



11 Connect the FM/AM harness connector.

12 Install rear spoiler assembly.

13 Install the lower trim panel assembly of the tailgate.

14 Install the rear wiper motor.

15 Install the rear wiper arm with wiper assembly.

16 Connect the negative battery cable.

17 Close the engine compartment cover.

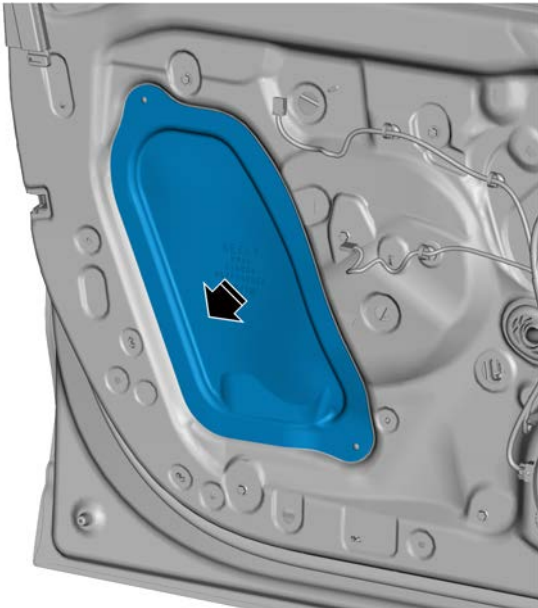
11.4.7.4 Replacement of the front left door glass assembly

Removal procedure

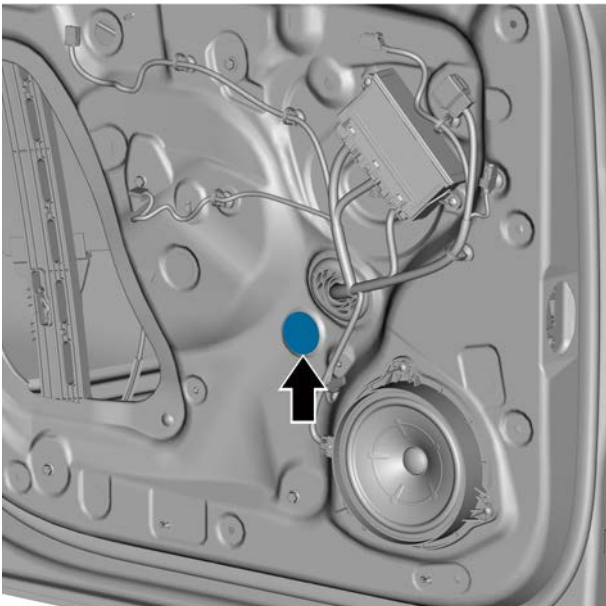
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

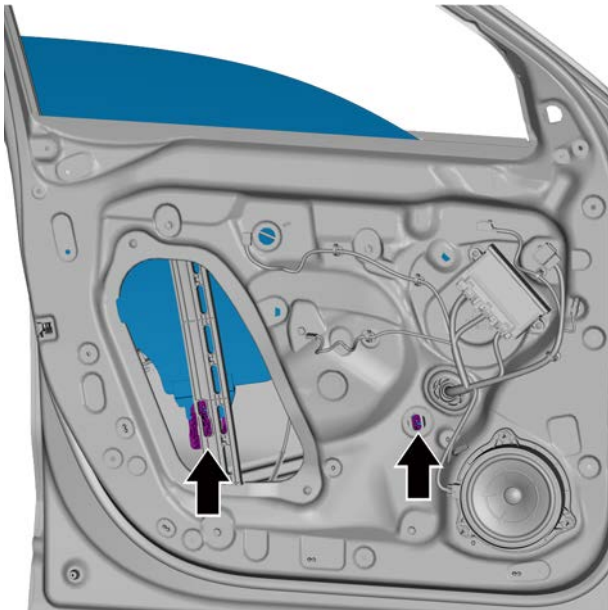
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove interior trim panel assembly of front door, refer to replacement of interior trim panel assembly of front door.
- 4 Remove the water cut inside the front left door, see the [Replacement of the front left door interior weatherstrip](#).
- 5 Remove the front left door exterior weatherstrip, see the [Replacement of the front left door exterior weatherstrip](#).



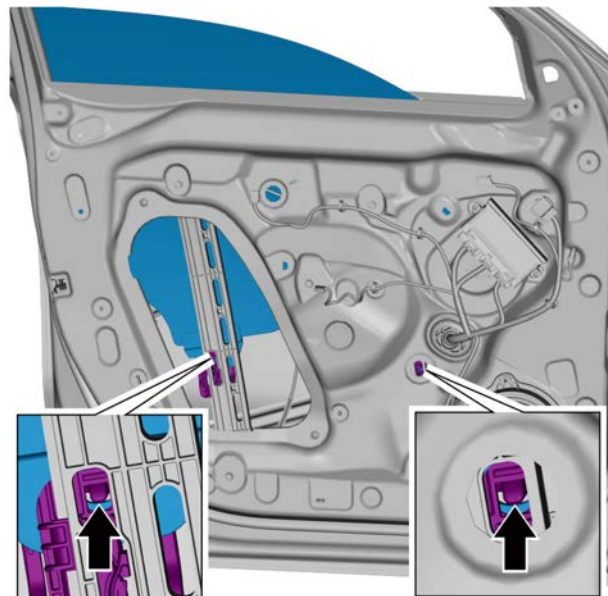
6 Remove the rear waterproof film of the front left door.



7 Remove the blank plug.

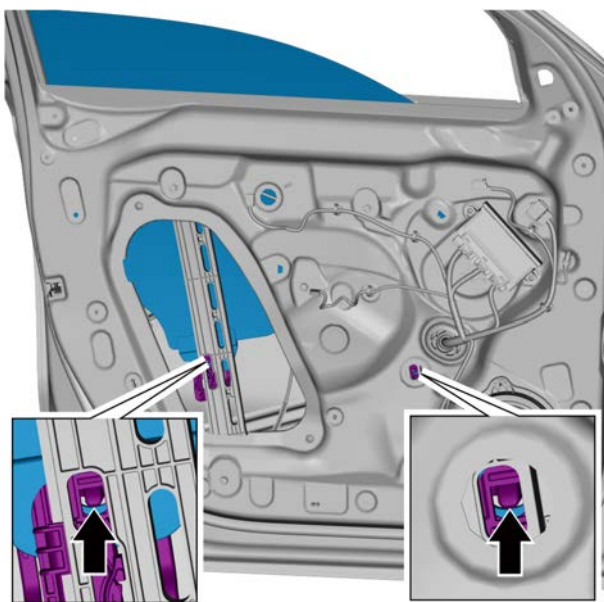


- 8 Lower the front left door glass assembly to the position shown in the picture, at the removal process hole.



- 9 Using a flat head screwdriver, from the outside of the front left door glass assembly, insert the front left door glass assembly bracket to the Y direction, push open the front left door glass assembly bracket clip and lift the front left door glass assembly upward with the left hand, and remove the front left door glass assembly.
- 10 Remove the left front door glass assembly.

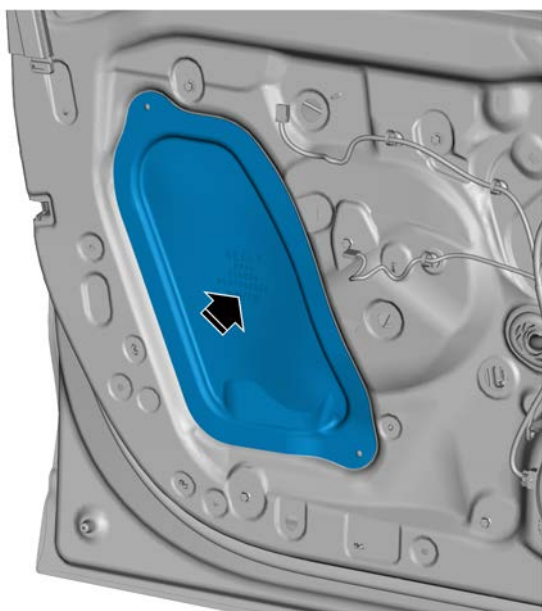
Installation procedure



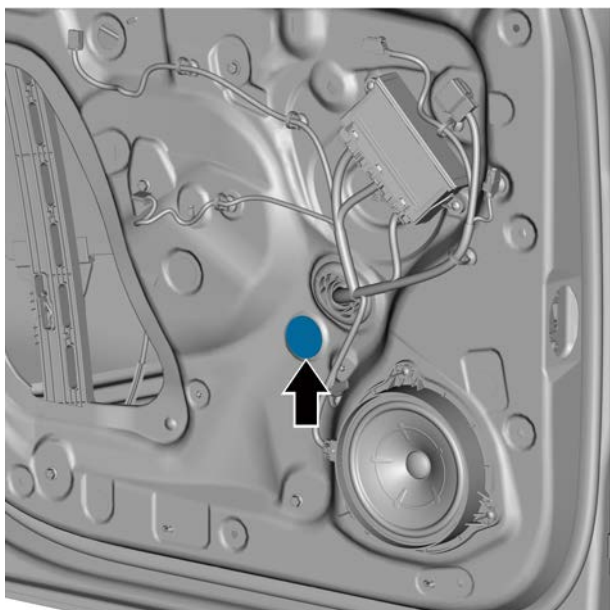
- 1 Install the front left door glass assembly into the front door and clip into the glass assembly slot.

Caution

Avoid bumps and scratches in the assembly process.



- 2 Install the left front door rear waterproof membrane.



- 3 Install the blank plug.

- 4 Install the interior belt line of front left door.
- 5 Install the belt line moulding exterior front door LH.
- 6 Install the front left door interior trim panel assembly.
- 7 Connect the negative battery cable.
- 8 Close the engine compartment cover.

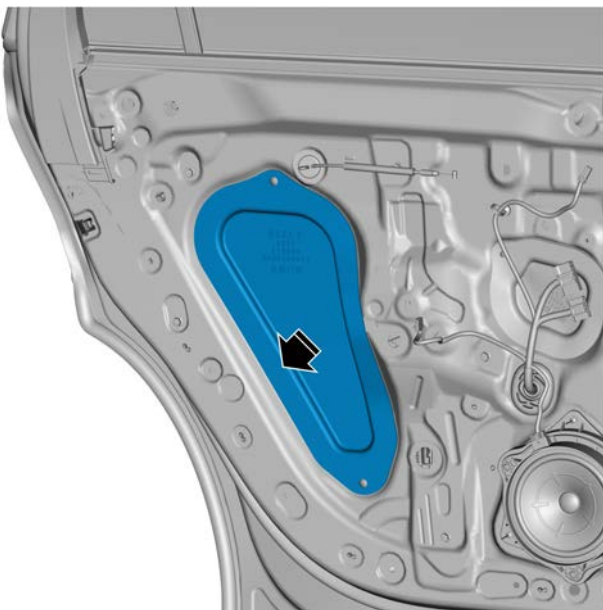
11.4.7.5 Replacement of rear left door glass assembly

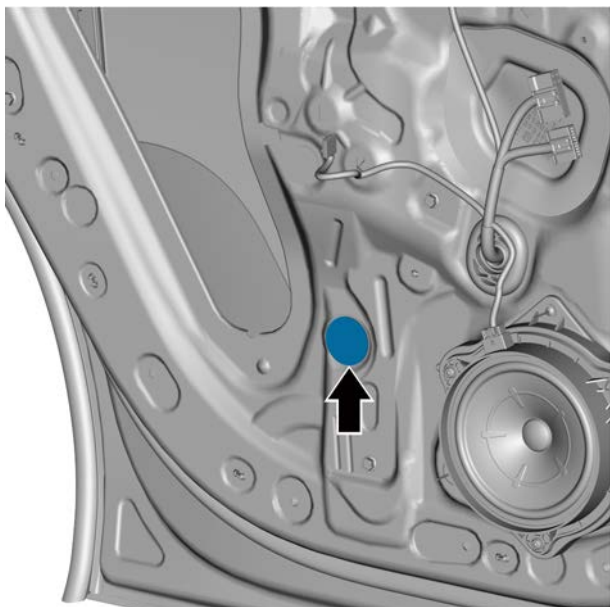
Removal procedure

Warning !

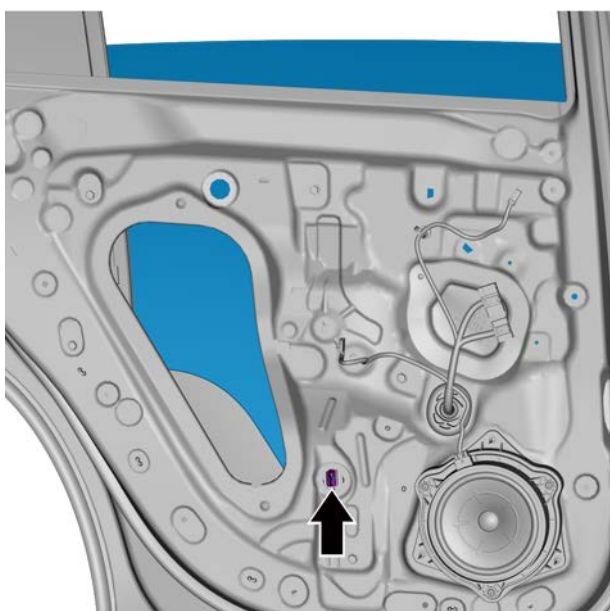
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the RL door interior trim plate assembly, see the [Replacement of the RL door interior trim plate assembly](#).
- 4 Remove the RL door interior weatherstrip, see the replacement of the RL door interior weatherstrip.
- 5 Remove the RL door exterior weatherstrip, see the Replacement of the RL door exterior weatherstrip.
- 6 Remove the RL door glass run channel assembly, see the [Replacement of the RL door glass run channel assembly](#).
- 7 Remove the waterproof film behind the RL door.

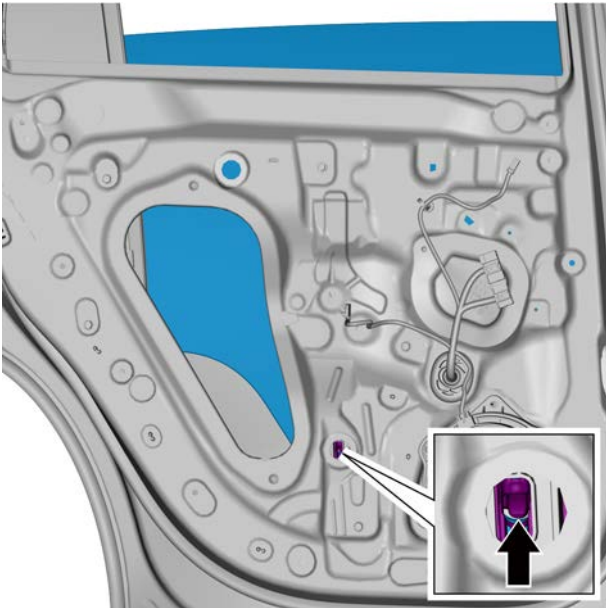




8 Remove the blank plug.

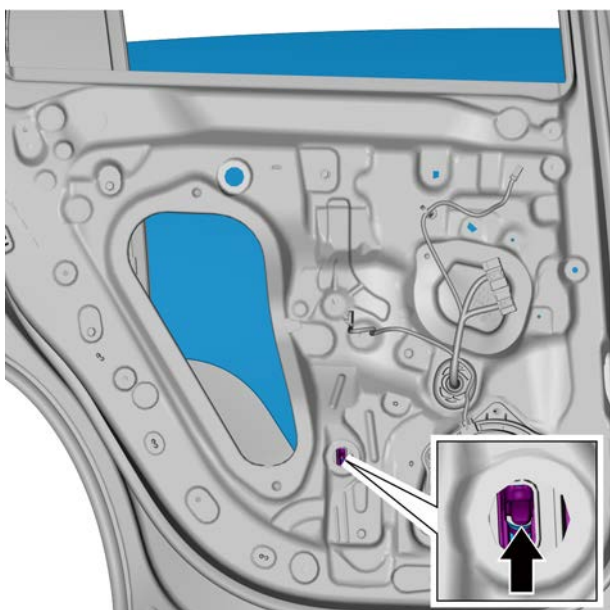


9 Place the RL door glass assembly as shown in the picture at the removal process hole.



- 10 Using a flat head screwdriver, insert the glass bracket from the outside of the glass to the Y direction, lift the glass up with the left hand while opening the glass bracket retaining clip, and remove the glass.
- 11 Remove the RL door glass assembly.

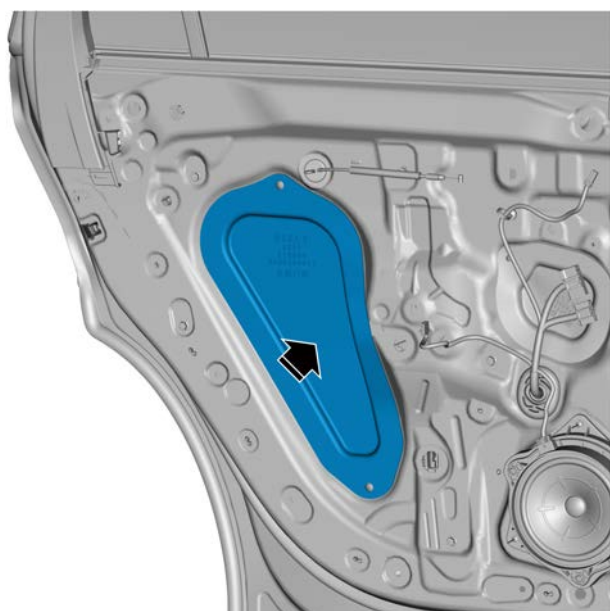
Installation procedure



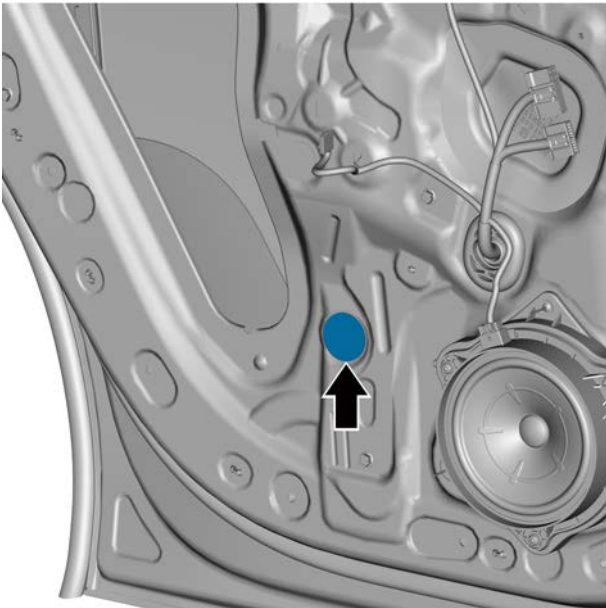
- 1 Install the RL door glass assembly into the front door and clip into the glass assembly slot.

Caution

Avoid bumps and scratches in the assembly process.



- 2 Install the rear left door waterproof membrane.



3 Install the blank plug.

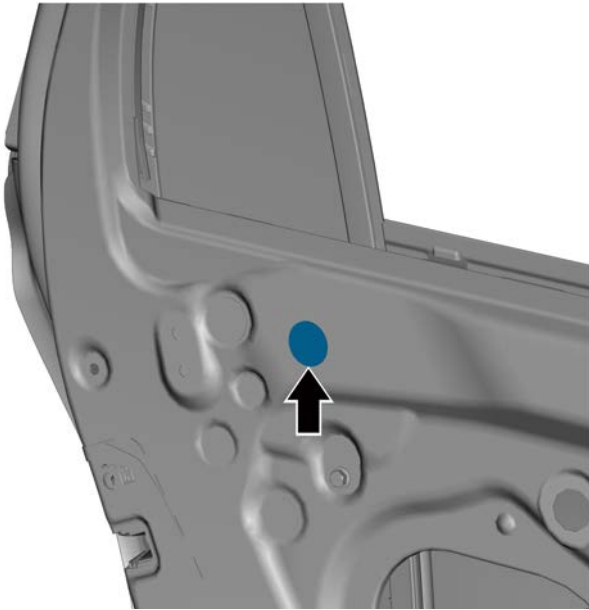
- 4 Install the RL door glass rear run channel assembly.
- 5 Install the RL door interior weatherstrip.
- 6 Install the exterior belt line of RL door.
- 7 Install the RL doors interior trim panel assembly.
- 8 Connect the negative battery cable.
- 9 Close the engine compartment cover.

11.4.7.6 Replacement of RL Exterior Triangular Window

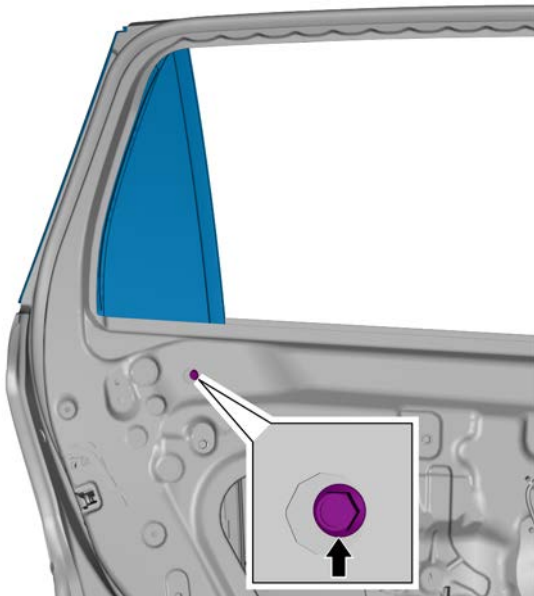
Removal procedure

- 1 Remove the RL door interior trim plate assembly, see the [Replacement of the RL door interior trim plate assembly](#).
- 2 Remove the RL door glass assembly, see the [Replacement of the RL door glass assembly](#).
- 3 Remove the glass run channel of the RL door, see the [Replacement of the the RL door glass run channel](#).

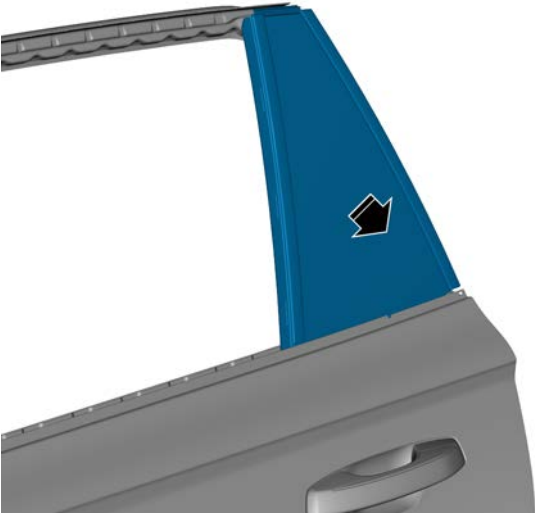
- 4 Remove the blank plug.



- 5 Remove 1 retaining bolt of RL outer triangular window.



- 6 Remove the RL outer triangle window.

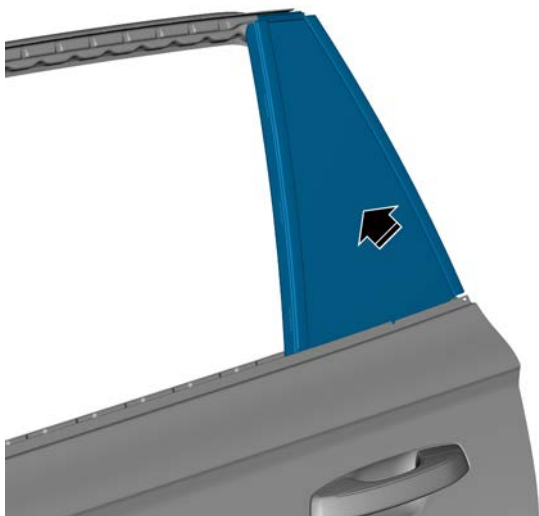


Installation procedure

- 1 Install the RL outer triangle window.

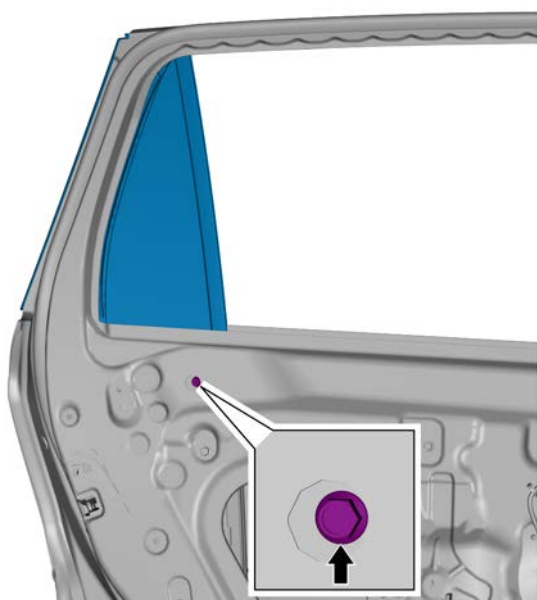
Caution

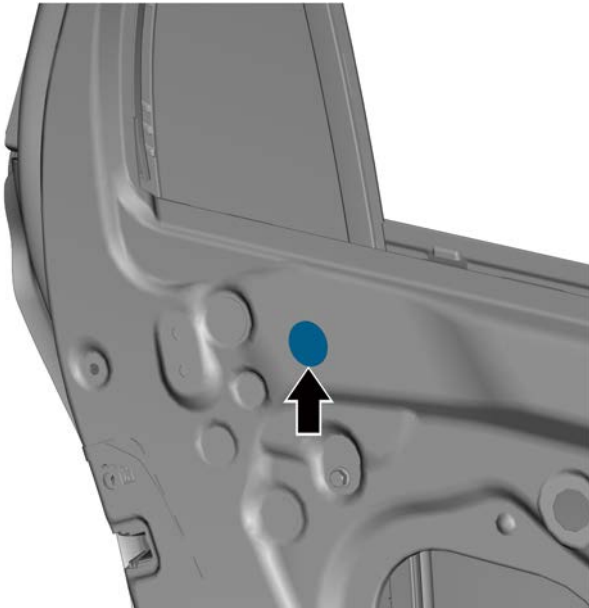
Avoid bumps and scratches in the assembly process.



- 2 Install the 1 fixing bolt of the RL outer triangular window.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)





3 Install the blank plug.

4 Install the RL door glass run channel.

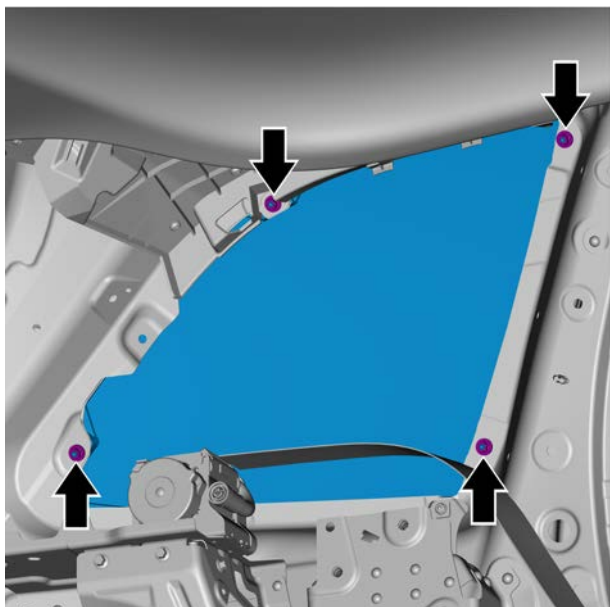
5 Install the left rear doors glass assembly.

6 Install the RL doors interior trim panel assembly.

11.4.7.7 Replacement of triangular window on the side of RL outer body

Removal procedure

- 1 Remove the left C-pillar upper trim panel assembly, refer [to replacement of the left C-pillar upper trim panel assembly](#).
- 2 Remove the lower left trim plate of the rear compartment, see the [Replacement of the lower left trim plate of the rear compartment](#).
- 3 Remove the left D-pillar trim plate assembly, see [left D-pillar trim plate assembly](#).

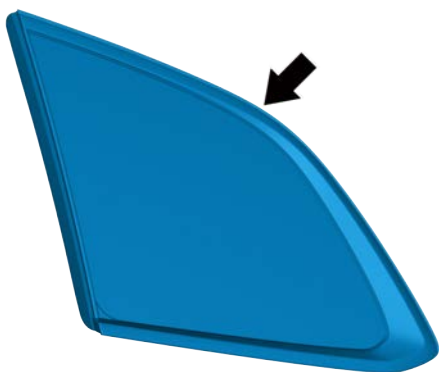


- 4 Remove the 4 retaining nuts of the triangular window on the RL outer body side.

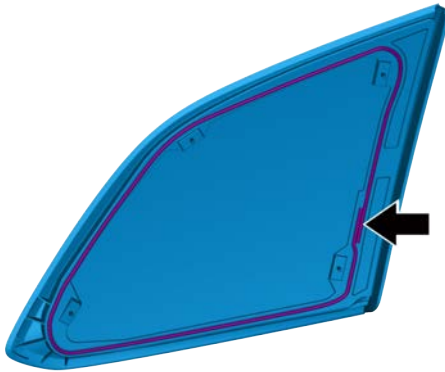
Caution

The triangular window of the RL outer body side is fixed by bolts and butyl glue. After removing the nut, it is necessary to use an electric heating gun to heat it to more than 50 degrees, and soften the butyl glue before removing the RL outer body side triangular window.

- 5 Remove the RL outer body side triangle window.



Installation procedure



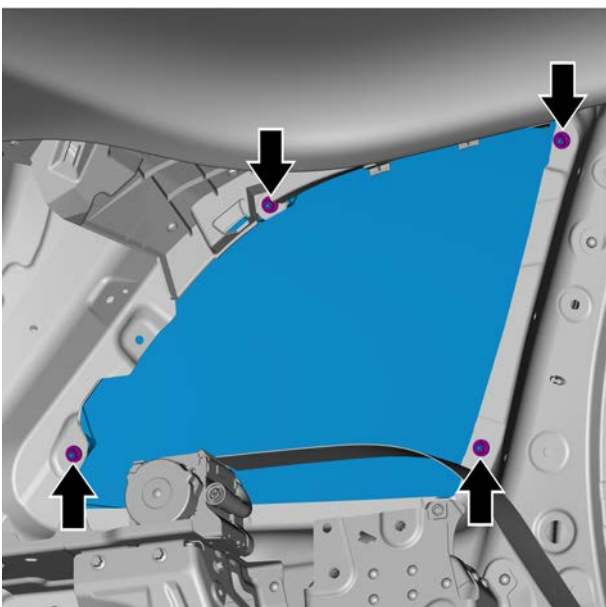
- 1 Geely special butyl glue windshield washer jet is used to make the ejected butyl glue flange edge up to 8mm (0.3in) wide and 8mm (0.3in) high.

The butyl rubber flange edge is evenly and continuously smeared with a sleeve-type leak-filling gun to ensure that the width of the butyl glue is uniform and consistent.

Warning !

When applying sealant, please wear chemical and thermal insulation gloves and correct eye protection equipment. Skin and eyes may be injured.

- 2 Install the RL outer body side triangle window.



- 3 Install the RL outer body side triangular window and fasten 4 nuts.

Torque: 6 N. m (metric system) 4.4 lb-ft (Imperial system)

- 4 Install the left D-pillar upper trim panel assembly.
- 5 Install the lower left trim plate of the rear compartment.
- 6 Install the left C-pillar upper trim panel assembly.

11.4.7.8 Replacement of driver door switch group

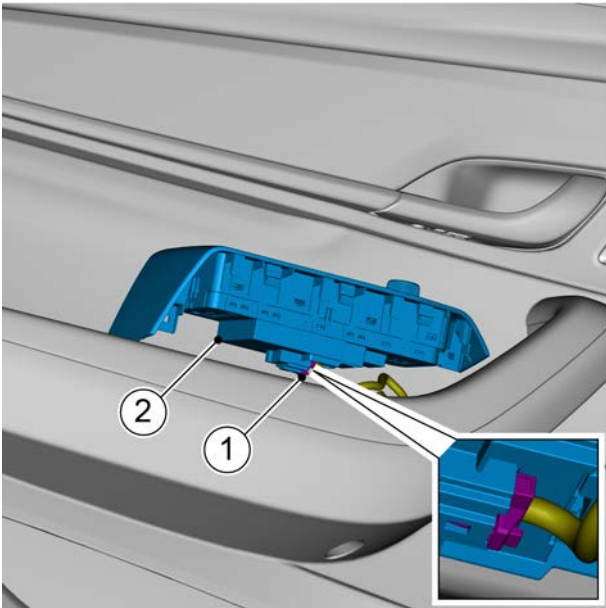
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

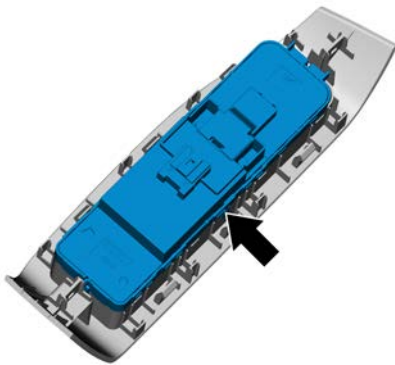
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Open the front left door.
- 4 Use the appropriate tools to remove the driver door switch group.





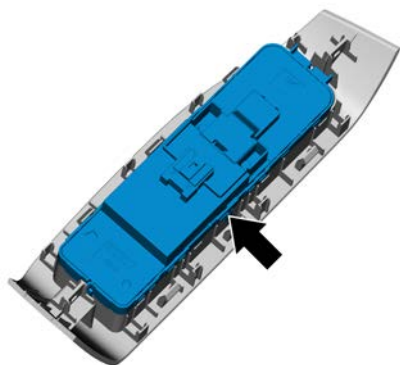
- 5 Disconnect the wire harness connector 1 of the driver door switch group 1 and remove the driver door switch group 2.

- 6 Remove the driver door switch group with appropriate tools.



Installation procedure

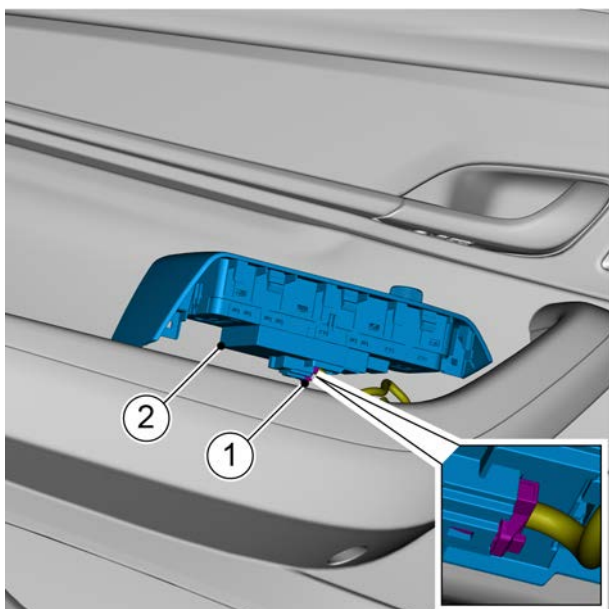
- 1 Install the driver door switch group.



- 2 Connect the harness connector 1 to the driver door switch group. Install the driver door switch group 2.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”





3 Install the driver door switch group.

- 4 Close the front left door.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

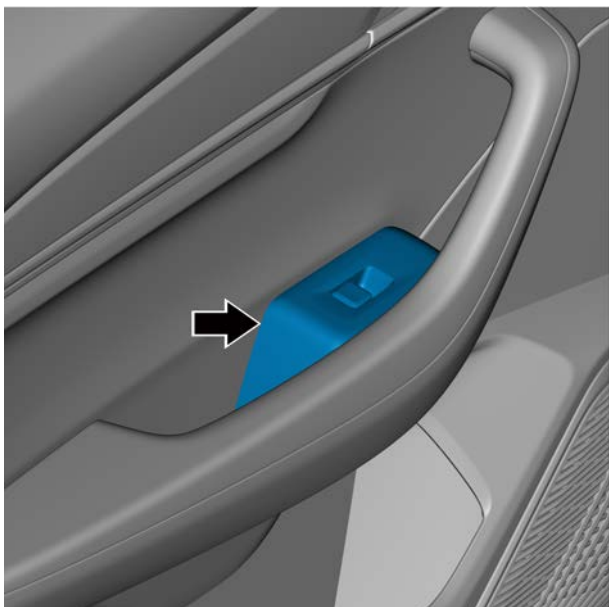
11.4.7.9 Replacement of window control switch (RL)

Removal procedure

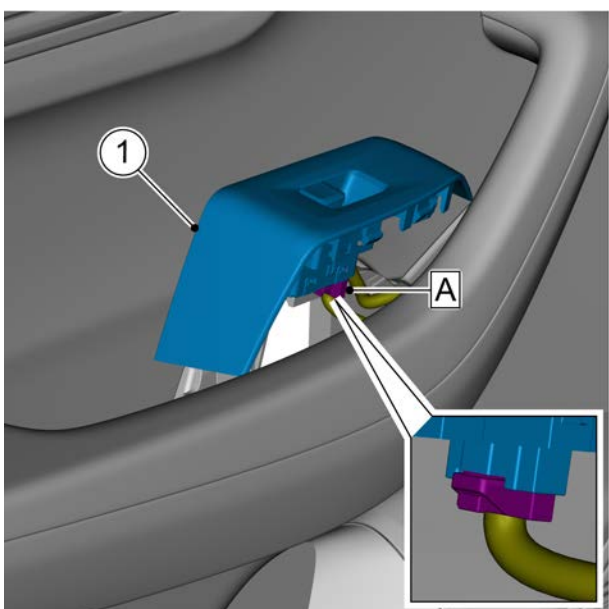
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Open the rear door LH.

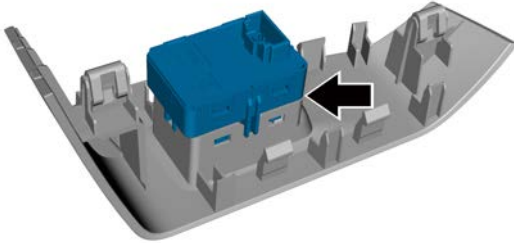


- 4 Remove the RL door glass elevator switch panel assembly with the appropriate tool.



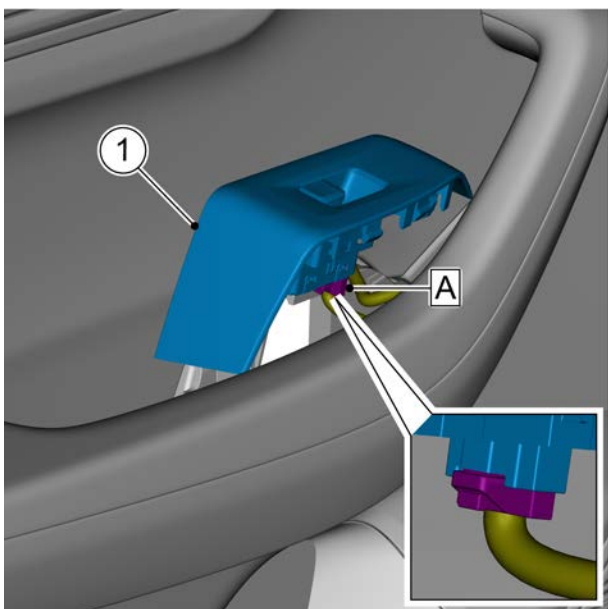
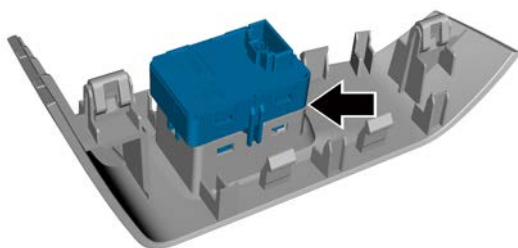
- 5 Disconnect the harness connector A of the RL door glass elevator switch panel assembly and remove the RL door glass elevator switch panel into 1.

- 6 Remove the window control switch (RL) with the appropriate tool.



Installation procedure

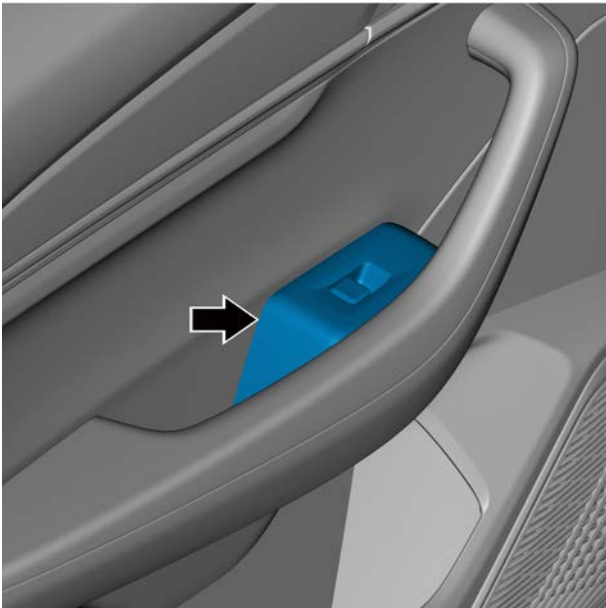
- 1 Install the window control switch (RL).



- 2 Connect harness connector A to the RL door glass elevator switch panel assembly. Install the RL power window panel assembly 1.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



3 Install the RL power window switch.

4 Close the rear door LH.

5 Connect the negative battery cable.

6 Close the engine compartment cover.

11.4.7.10 Replacement of power window motor (front left)

Removal procedure

Warning !

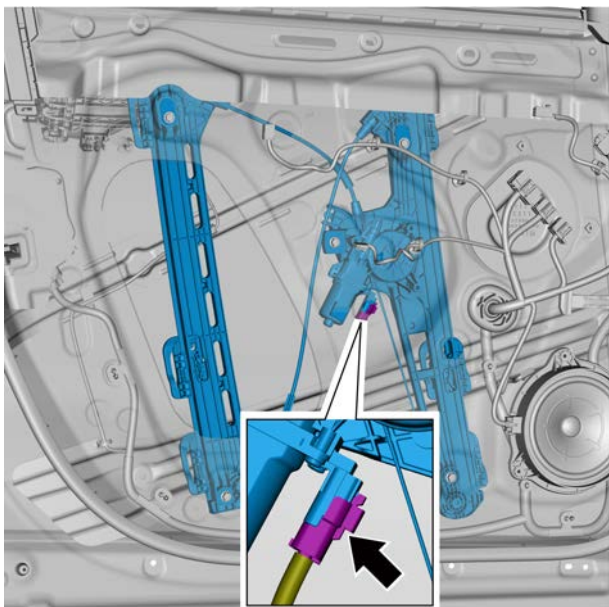
See "warning about disconnecting battery" in [Warnings and cautions](#).

1 Open the engine compartment cover.

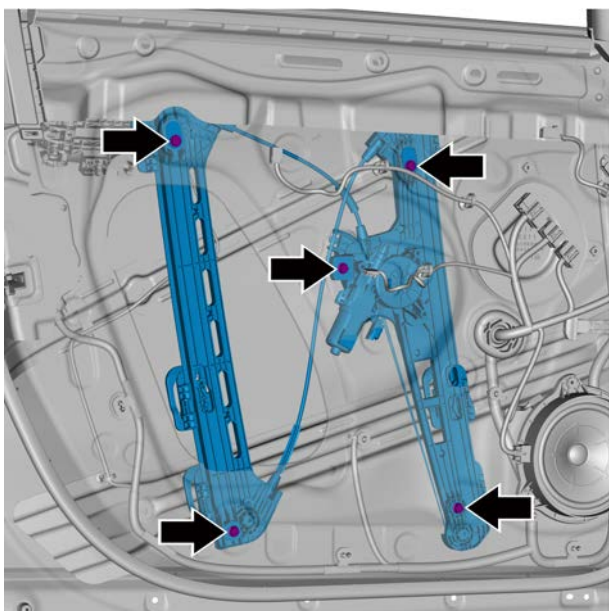
2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

3 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly](#).

4 Remove the front left door glass assembly, see the [Replacement of the front left door glass assembly](#).

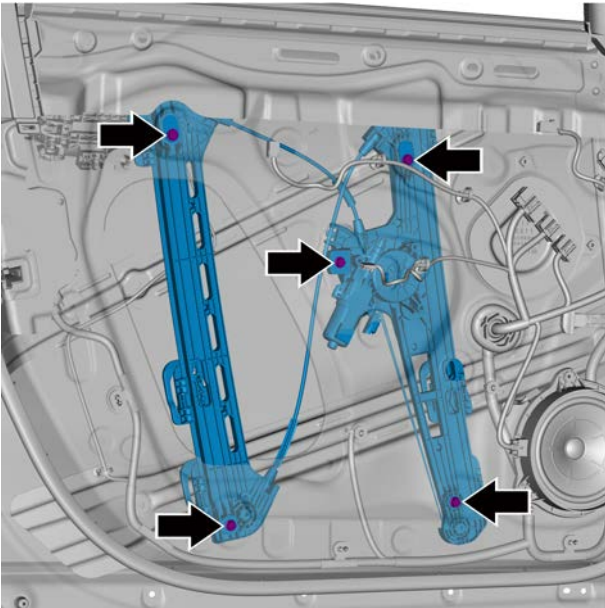


- 5 Disconnect the power window motor (front left) harness connector.



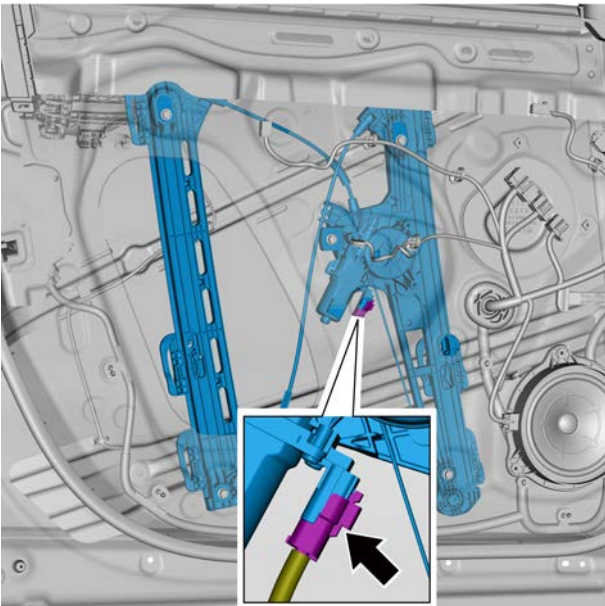
- 6 Remove the 5 retaining bolts of power window motor (front left) and remove the power window motor (front left).

Installation procedure



- 1 Install the power window motor (front left) and fasten the bolts.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 2 Connect the power window motor (front left) harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the front left door glass assembly.
- 4 Install the front left door interior trim panel assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

11.4.7.11 Replacement of power window motor (RL)

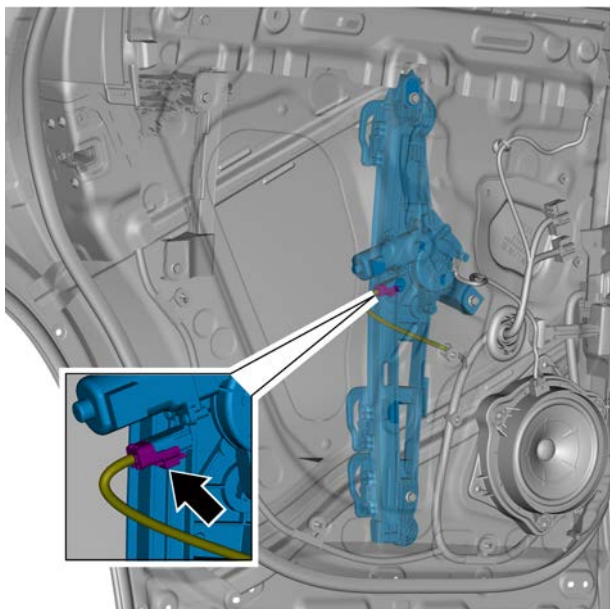
Removal procedure

Warning !

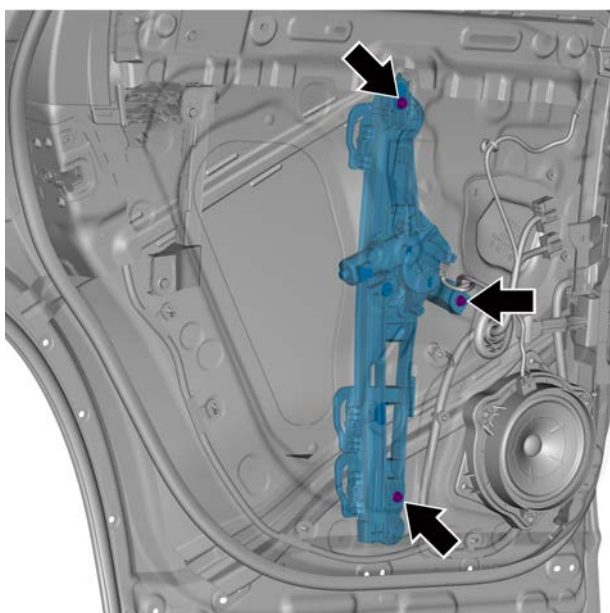
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.

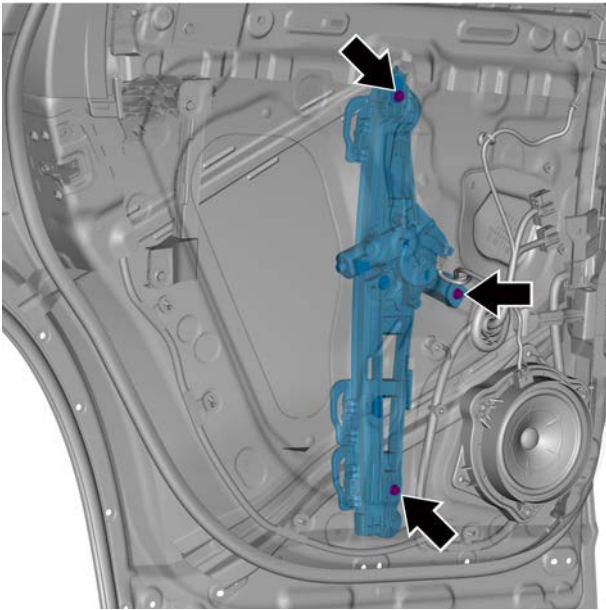
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the RL door interior trim plate assembly, see the [Replacement of the RL door interior trim plate assembly.](#)
- 4 Remove the RL door glass assembly, see the [Replacement of the RL door glass assembly.](#)
- 5 Disconnect the power window motor (RL) harness connector.



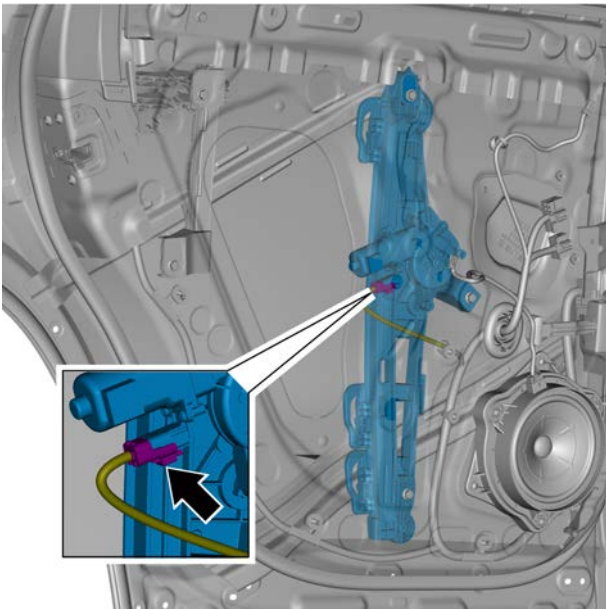
- 6 Remove the 3 retaining bolts of power window motor (RL).



Installation procedure



- 1 Install the power window motor (RL) and fasten the bolts.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 2 Connect the power window motor (RL) harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the left rear doors glass assembly.
- 4 Install the front left door interior trim panel assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

11.4.7.12 Replacement of the glass run channel front door LH

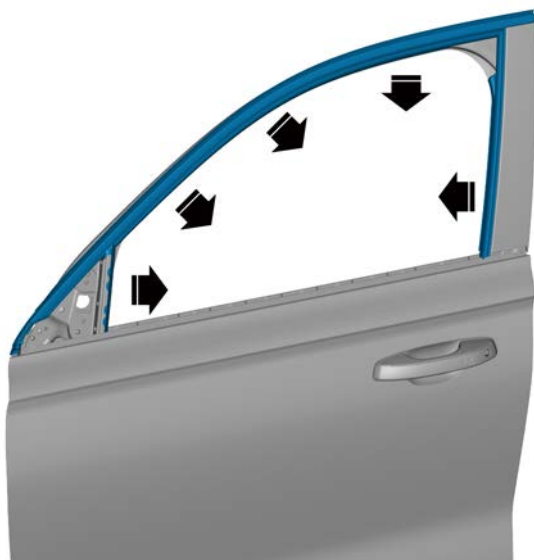
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

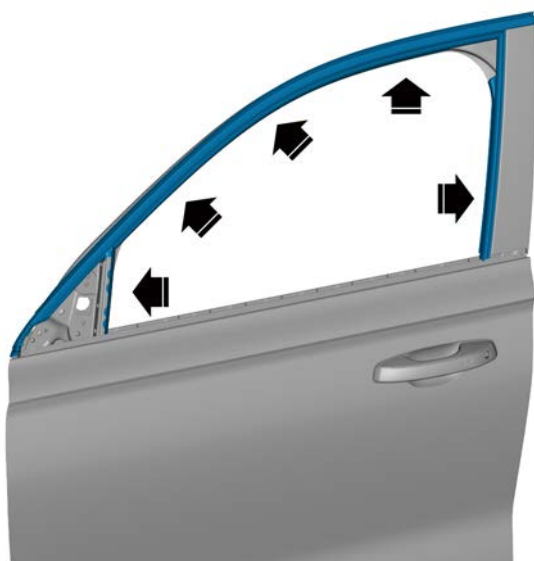
- 1 Open the engine compartment cover.

- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly.](#)
- 4 Remove the front left door glass assembly, see the [Replacement of the front left door glass assembly.](#)
- 5 Remove the front left door B-pillar trim plate, see the [Replacement of the front left door B-pillar trim plate.](#)
- 6 Remove the glass run channel for the front left door.



Installation procedure

- 1 Install the glass run channel front door LH.



- 2 Install the B-pillar trim plate for the front left door.
- 3 Install the front left door glass assembly.

- 4 Install the front left door interior trim panel assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

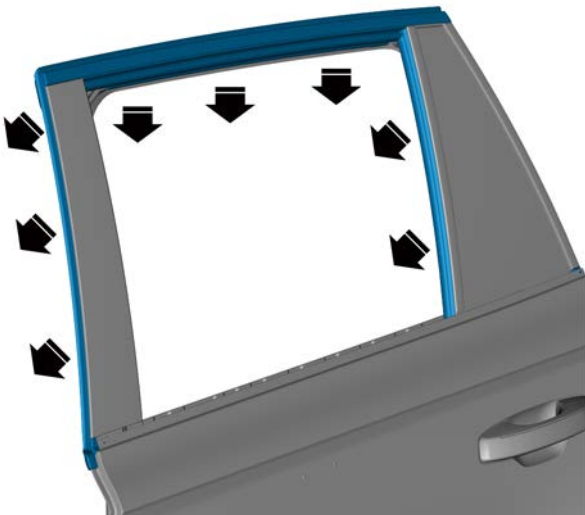
11.4.7.13 Replacement of glass run channel of rear left door

Removal procedure

Warning !

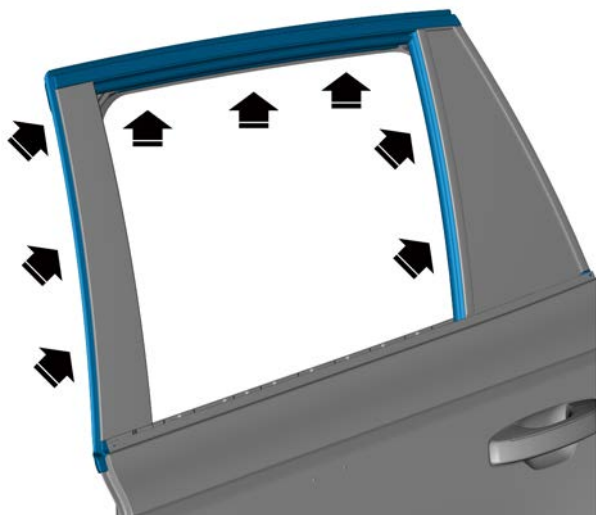
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the RL door interior trim plate assembly, see the [Replacement of the RL door interior trim plate assembly](#).
- 4 Remove the RL door glass assembly, see the [Replacement of the RL door glass assembly](#).
- 5 Remove the RL door B-pillar trim plate, see the [Replacement of the RL door B-pillar trim plate](#).
- 6 Remove the glass run channel for the RL door.



Installation procedure

- 1 Install the RL door glass run channel.



- 2 Install the B-pillar trim plate for the RL door.
- 3 Install the left rear doors glass assembly.
- 4 Install the RL doors interior trim panel assembly
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

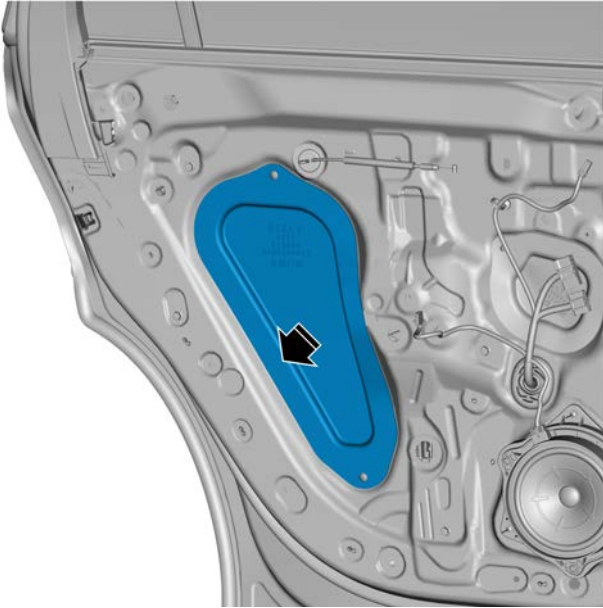
11.4.7.14 Replacement of glass rear run channel assembly for RL door

Removal procedure

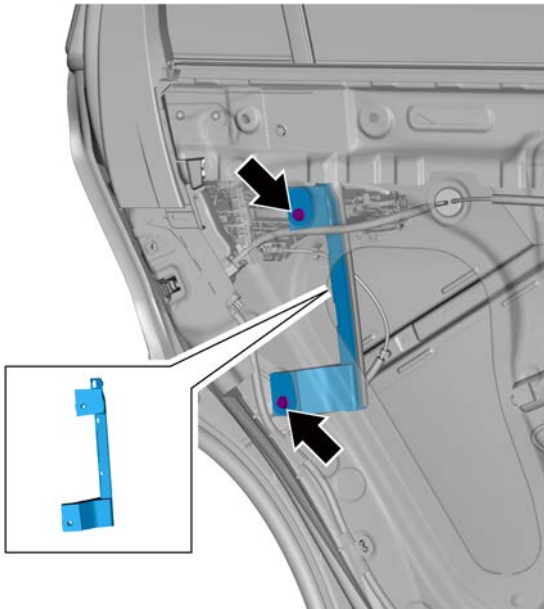
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the RL door interior trim plate assembly, see the [Replacement of the RL door interior trim plate assembly](#).

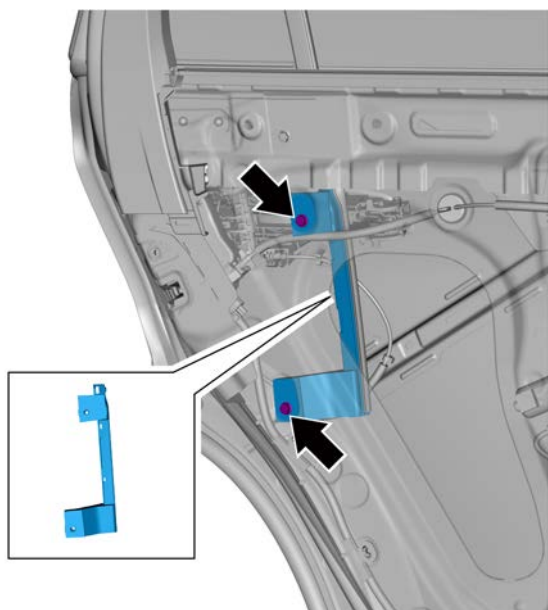


- 4 Uncover the waterproof film at the back of the RL door.



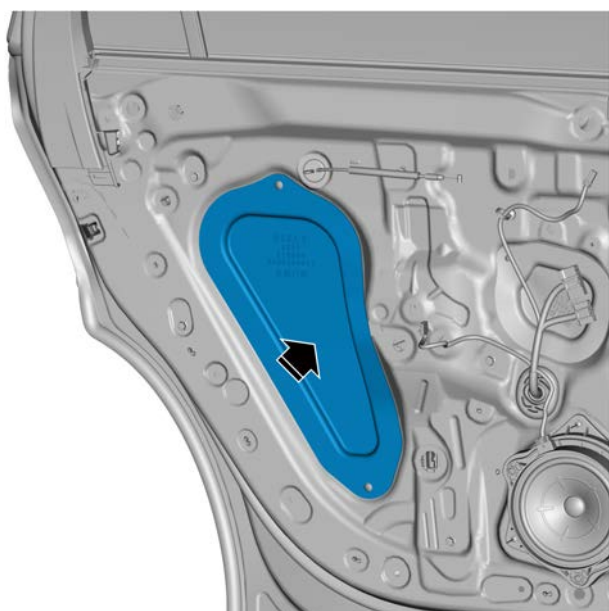
- 5 Remove the 2 fixing bolts of the RL door glass rear run channel assembly and remove the RL door glass rear run channel assembly.

Installation procedure



- 1 Install the RL door glass rear run channel assembly and fasten the 2 retaining bolts.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



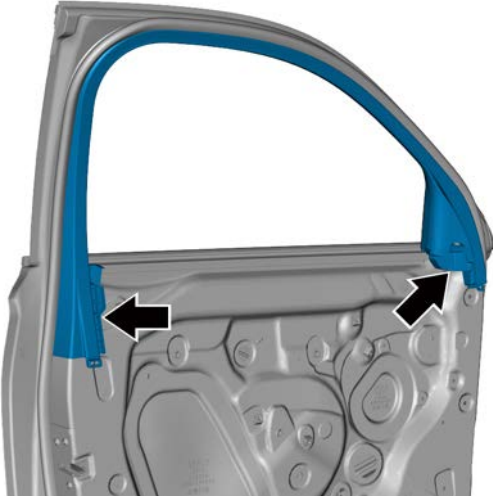
- 2 Install the left rear door rear waterproof membrane.

- 3 Install the front left door interior trim panel assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

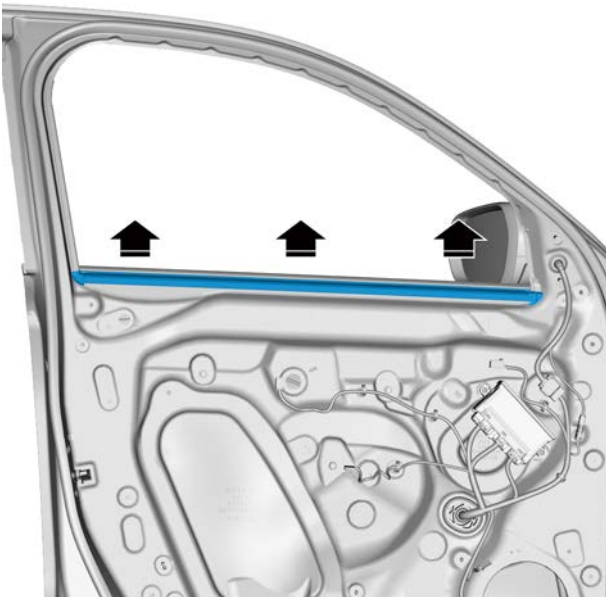
11.4.7.15 Replacement of interior belt line moulding of front left door

Removal procedure

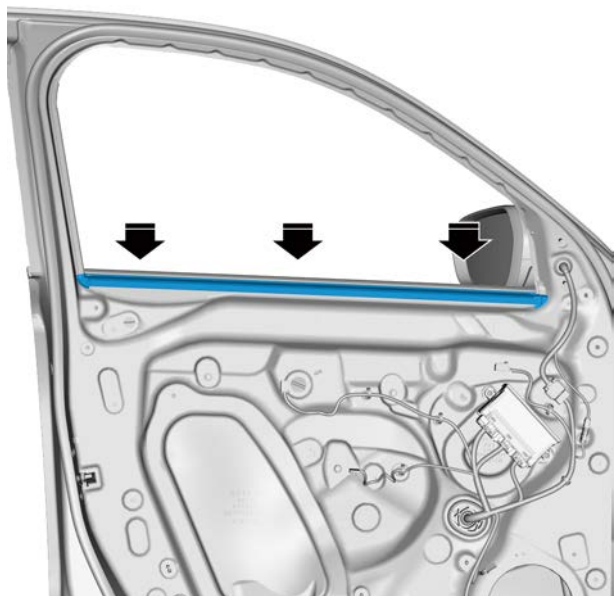
- 1 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly](#).
- 2 Remove the front left door and window frame trim assembly.



- 3 Dismantle the exterior belt line of front left door.

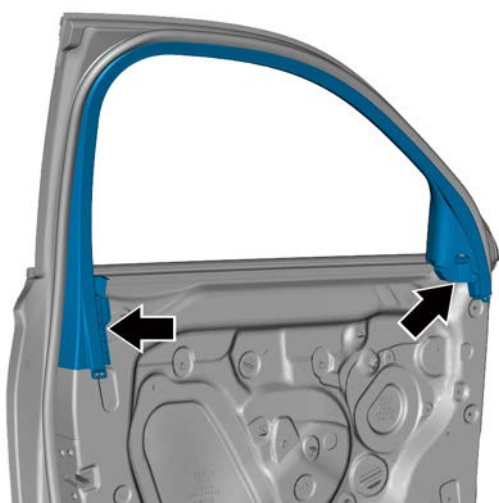


Installation procedure



- 1 Install the interior belt line of front left door.

- 2 Install the front left door and window frame trim assembly.

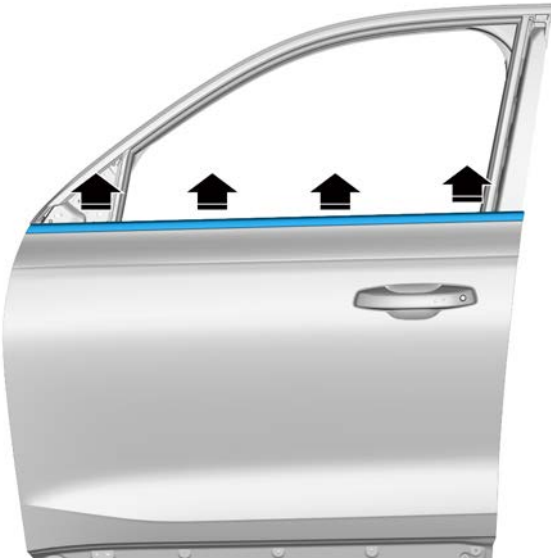


- 3 Install the front left door interior trim panel assembly.

11.4.7.16 Replacement of the external water slot of the front left door

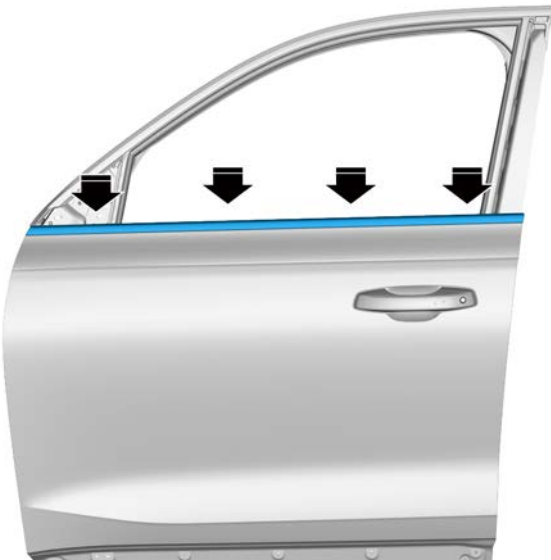
Removal procedure

- 1 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly](#).
- 2 Remove the exterior rearview mirror (left) and see the [Replacement of the exterior rearview mirror \(left\)](#).
- 3 Dismantle the exterior belt line of front left door.



Installation procedure

- 1 Install the interior belt line of front left door.

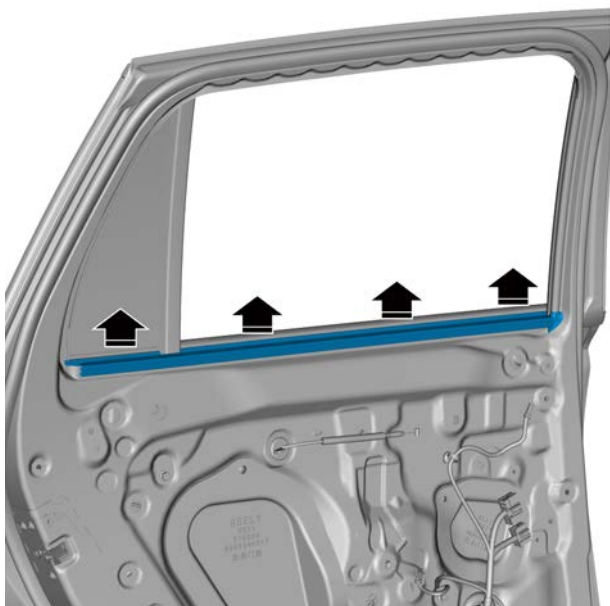


- 2 Install the exterior rearview mirror (left).
- 3 Install the front left door interior trim panel assembly.

11.4.7.17 Replacement of interior belt line moulding of rear left door

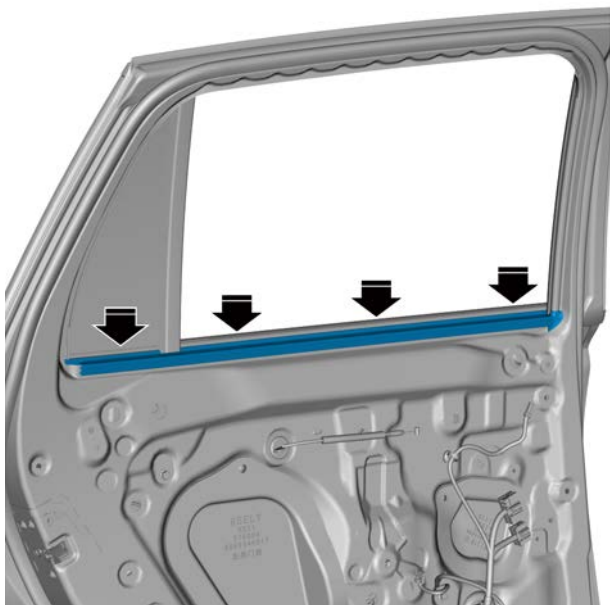
Removal procedure

- 1 Remove the RL door interior trim plate assembly, see the [Replacement of the RL door interior trim plate assembly](#).
- 2 Remove the RL door interior weatherstrip.



Installation procedure

- 1 Install the RL door interior weatherstrip.



- 2 Install the RL doors interior trim panel assembly

11.4.7.18 Replacement of the belt line moulding exterior rear door LH

Removal procedure

- 1 Dismantle the exterior belt line of RL door.



Installation procedure

- 1 Install the exterior belt line of RL door.



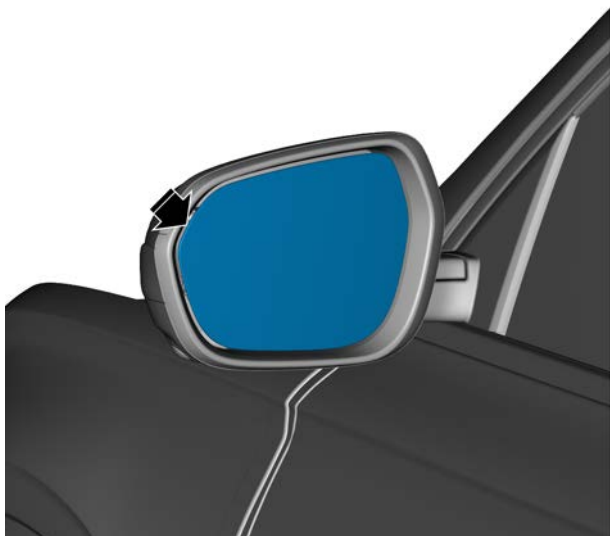
11.4.7.19 Replacement of convex glass of RL rearview mirror (Type 1)

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).



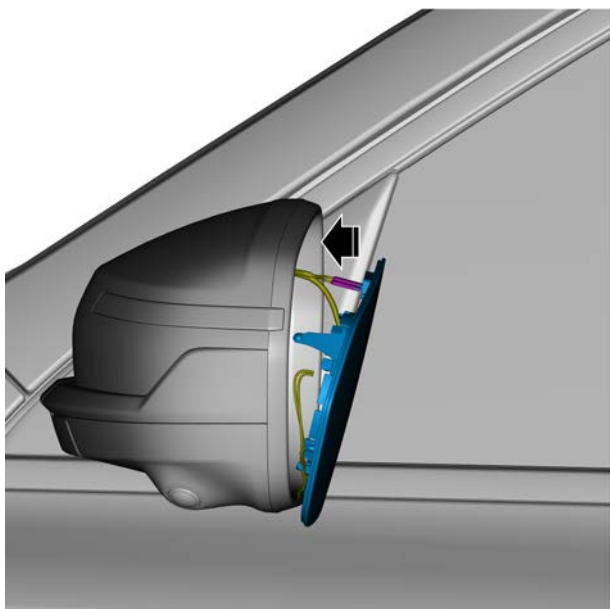
- 3 In the direction shown, use the appropriate tool to pry open the rearview mirror shell and remove the convex glass of the RL rearview mirror.

Caution

Don't scratch your hand.

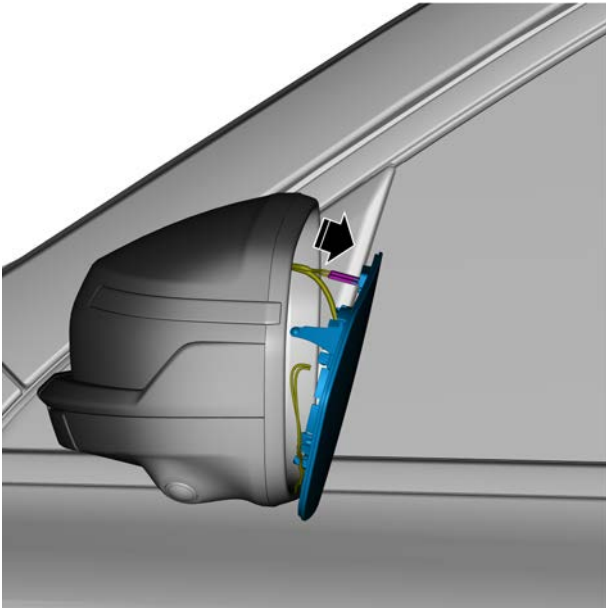
Caution

Be careful not to break the lens.



- 4 Disconnect the 2 defrosting harness connectors on the convex glass of the RL rearview mirror.
- 5 Remove the convex glass of the RL rearview mirror.

Installation procedure



- 1 Connect the 2 defrosting harness connectors on the convex glass of the RL rearview mirror.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install the convex glass of the RL rearview mirror.

Caution

Don't scratch your hand.

Caution

Be careful not to break the lens.

- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

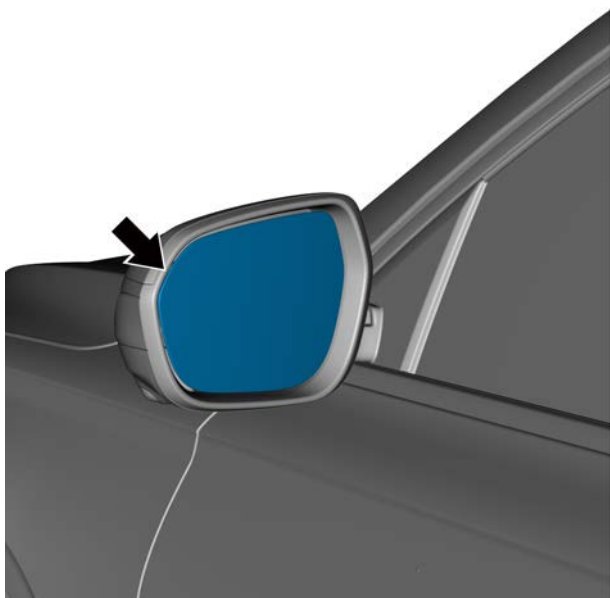
11.4.7.20 Replacement of convex glass of RL rearview mirror (Type 2)

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).



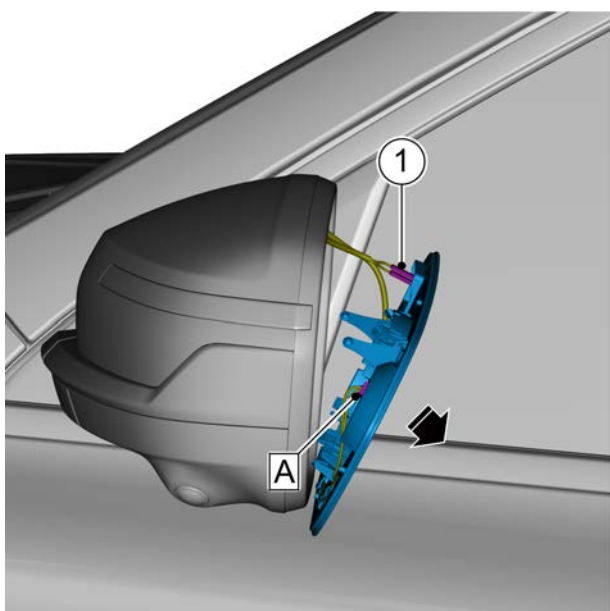
- 3 In the direction shown, use the appropriate tool to pry open the rearview mirror shell and remove the convex glass of the RL rearview mirror.

Caution

Don't scratch your hand.

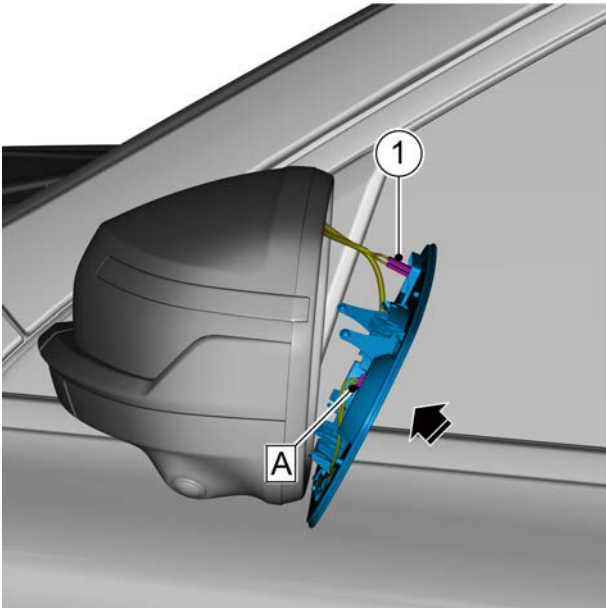
Caution

Be careful not to break the lens.



- 4 Disconnect the 2 defrosting harness connectors 1 on the convex glass of the RL rearview mirror.
- 5 Disconnect blind spot monitoring indicator harness connector A.
- 6 Remove the convex glass of the RL rearview mirror.

Installation procedure



- 1 Connect the 2 defrosting harness connectors 1 on the convex glass of the RL rearview mirror.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 2 Connect blind area monitoring indicator harness connector A.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 3 Install the convex glass of the RL rearview mirror.

Caution

Don't scratch your hand.

Caution

Be careful not to break the lens.

- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

11.4.7.21 Replacement of exterior rearview mirror (left)

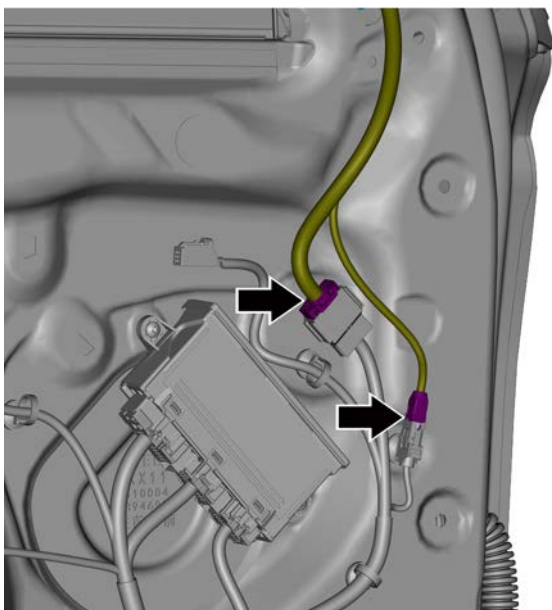
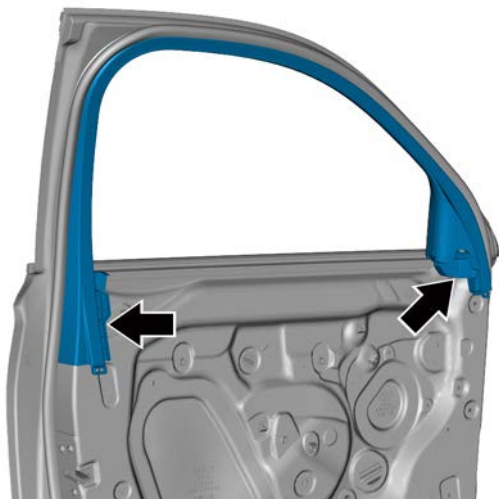
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

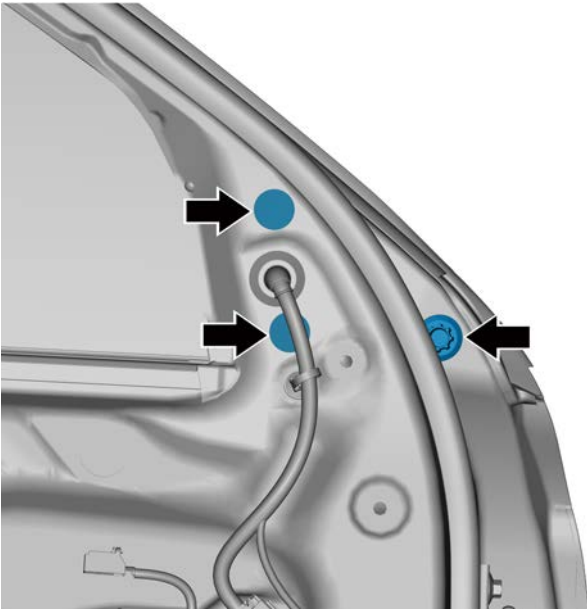
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

- 3 Remove the internal trim panel assembly of the front left door, refer to replacement of the internal trim panel assembly of the front left door.
- 4 Remove the front left door and window frame trim assembly.

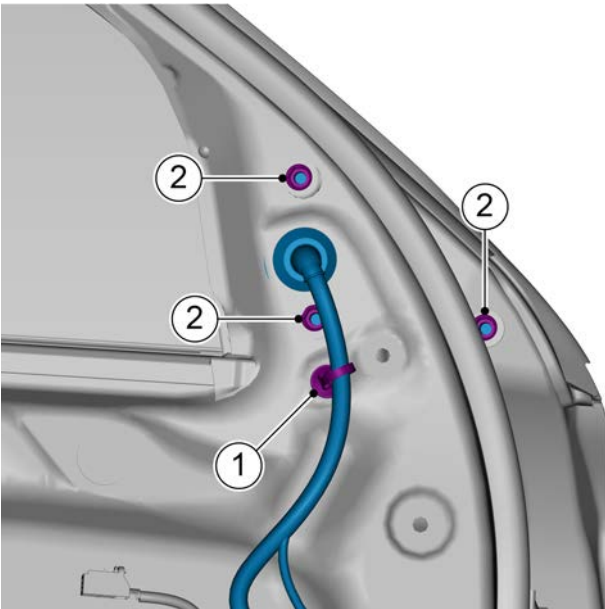


- 5 Disconnect the harness connector on the harness of the exterior rearview mirror (left) harness.

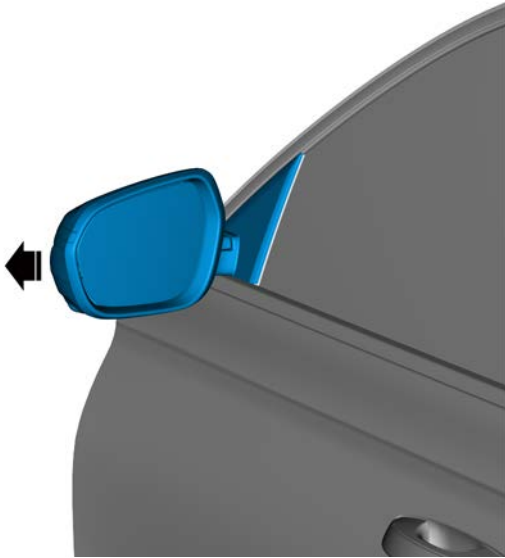
- 6 Remove the exterior rearview mirror (left) nut blank plug



- 7 Remove 3 retaining nuts 2 and 1 retaining clip 1 on the exterior rearview mirror (left).

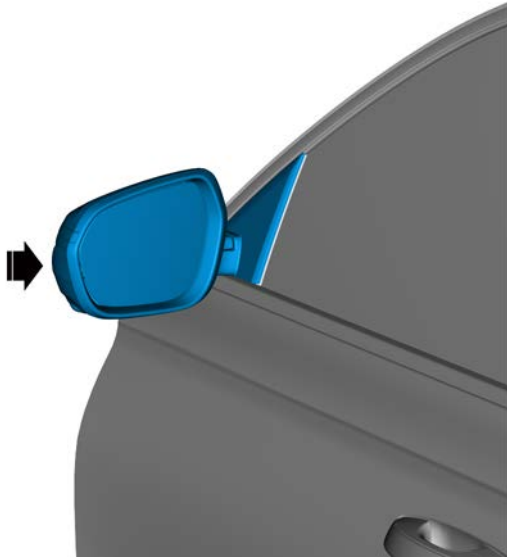


- 8 Remove the exterior rearview mirror (left).



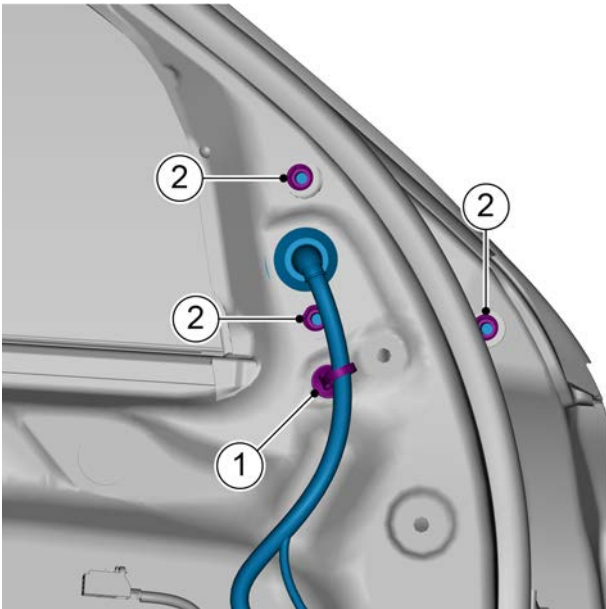
Installation procedure

- 1 Install the exterior rearview mirror (left).

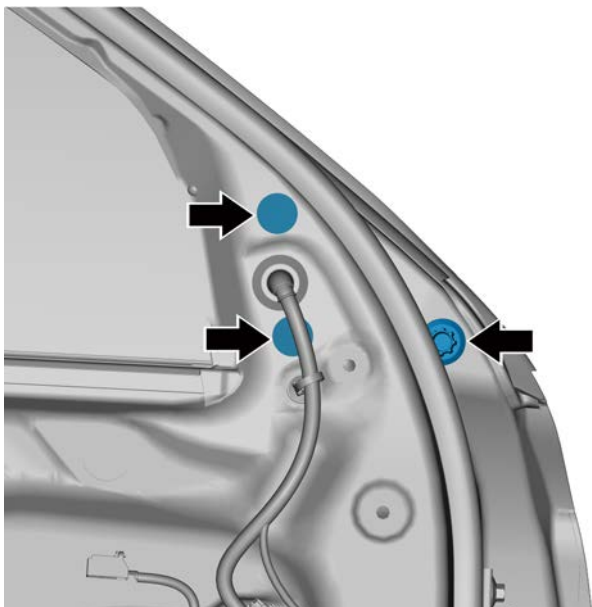


- 2 Install 1 retaining retaining clip 1, install 3 retaining nuts 2 and fasten them.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



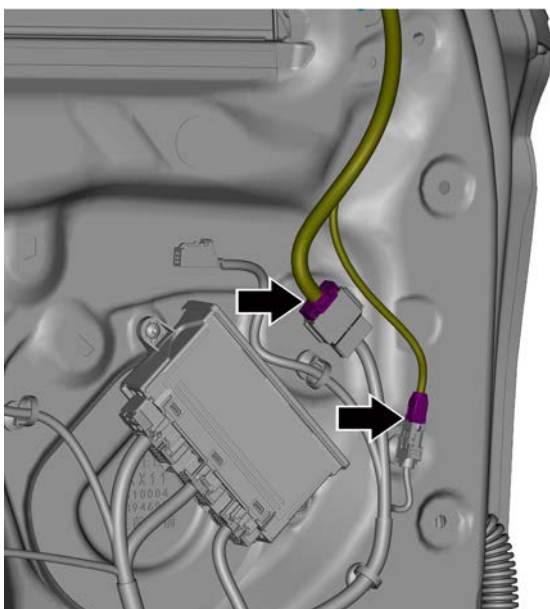
- 3 Install the exterior rearview mirror (left) nut blank plug.



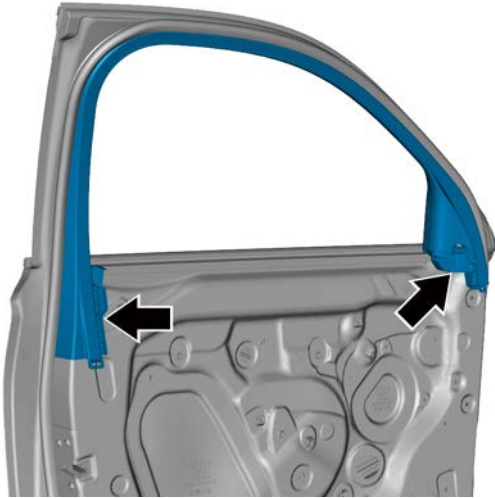
- 4 Connect the harness connector of the exterior rearview mirror (left) harness.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 5 Install the front left door and window frame trim assembly.



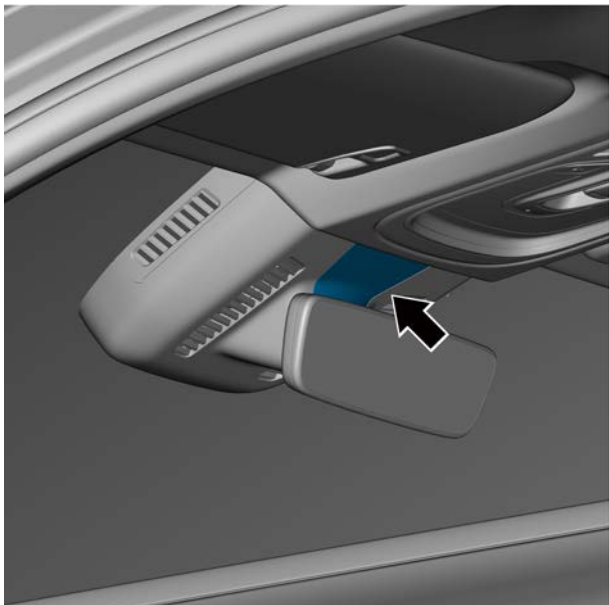
- 6 Install the front left door interior trim panel assembly.
- 7 Connect the negative battery cable.
- 8 Close the engine compartment cover.

11.4.7.22 Replacement of the electric external rearview mirror adjustment switch

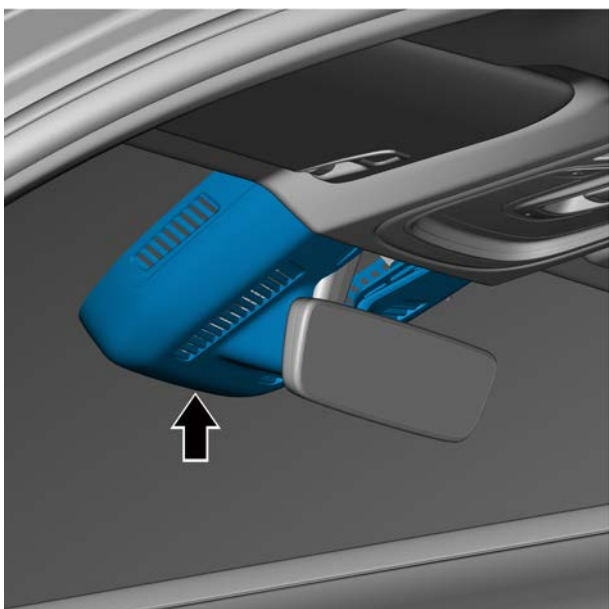
See the [Replacement of the driver door switch group](#).

11.4.7.23 Replacement of mechanical anti-glare interior rearview mirror

Removal procedure



- 1 Remove the rain and light sensor front trim cover.



- 2 Remove the rain and light sensor rear trim cover.



- 3 Rotate the mechanical anti-glare interior rearview mirror base, disassemble mechanical anti-glare interior rearview mirror.

Caution

Be careful not to scratch the glass.

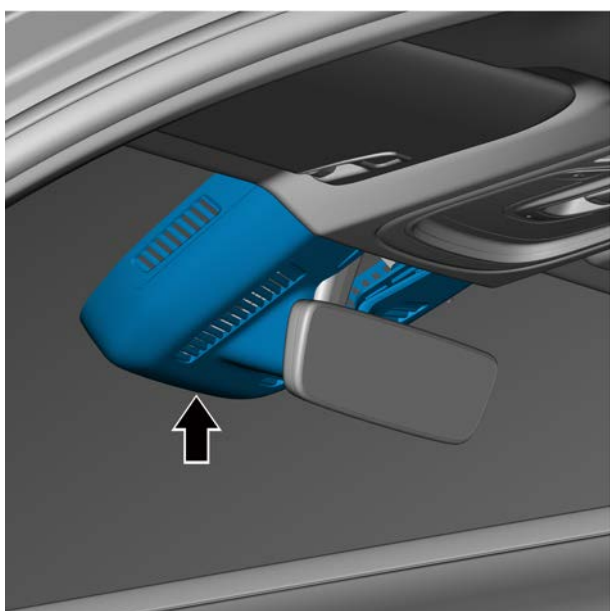
Installation procedure



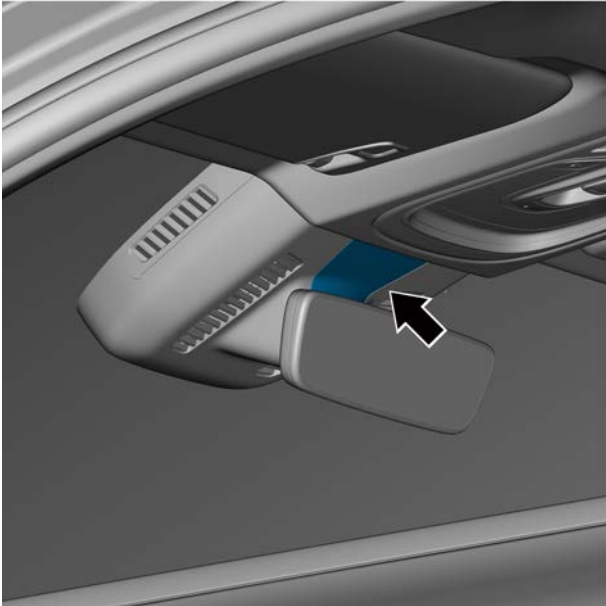
- 1 Clip the mechanical anti-glare interior rearview mirror into the support, and rotate the mechanical anti-glare interior rearview mirror to the fixed position.

Caution

Be careful not to scratch the glass.



- 2 Install the rain and light sensor rear trim cover.



- 3 Install the rain and light sensor front trim cover.

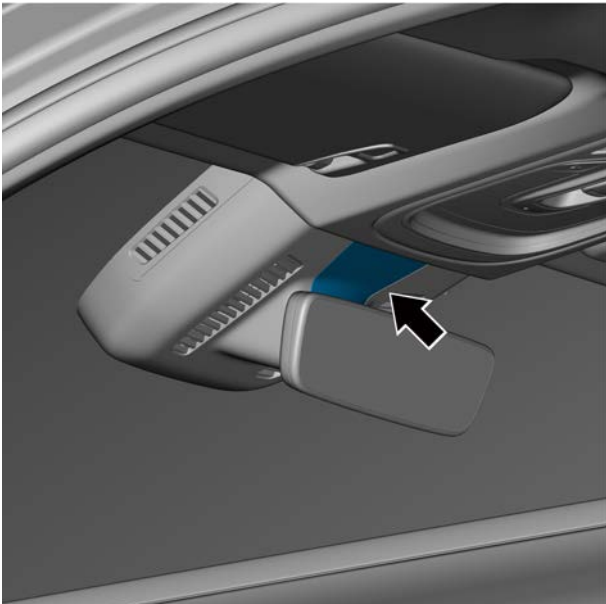
11.4.7.24 Replacement of interior rearview mirror module

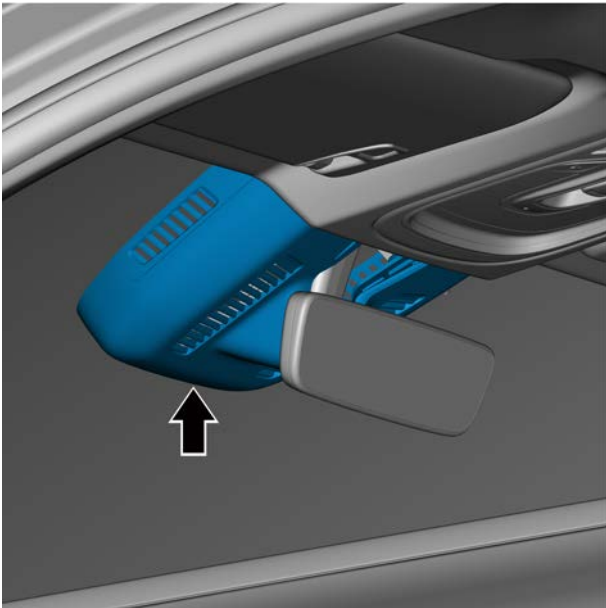
Removal procedure

Warning !

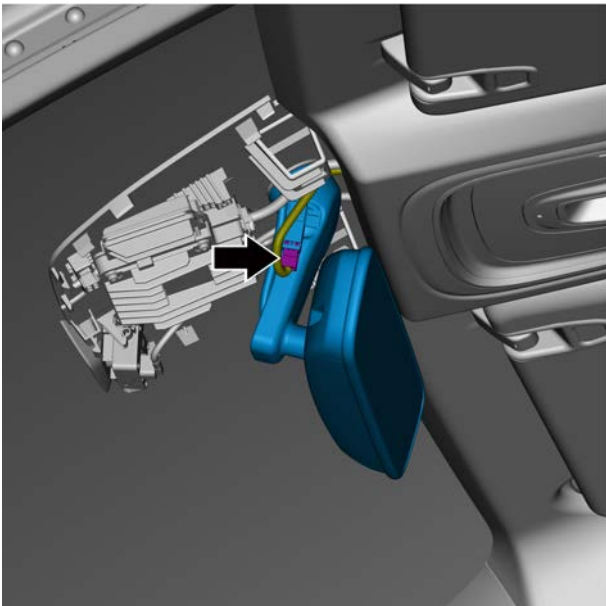
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rain and light sensor front trim cover.

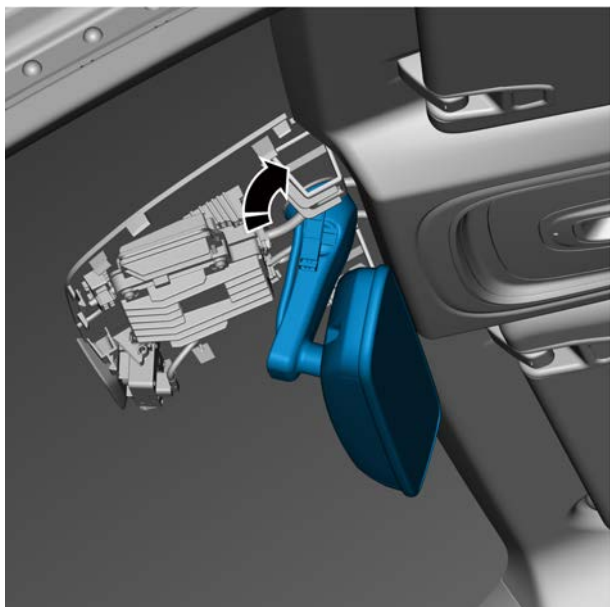




3 Remove the rain and light sensor rear trim cover.



4 Disconnect the harness connector of the interior rearview mirror module.

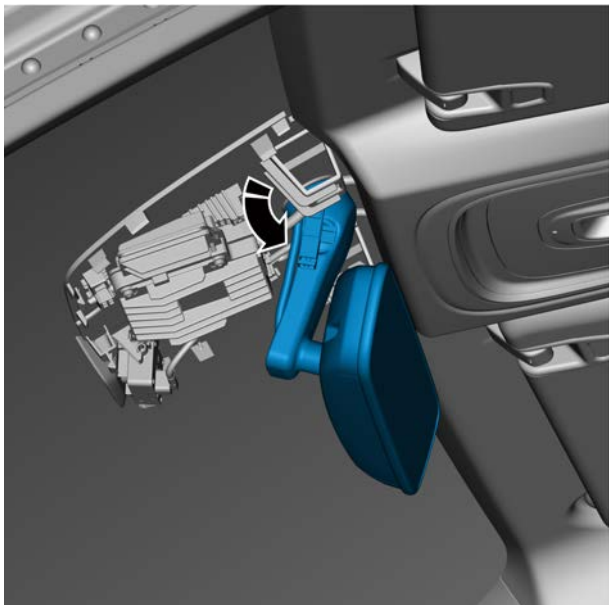


- 5 Rotate the base of the interior rearview mirror module and remove the interior rearview mirror module.

Caution

Be careful not to scratch the glass.

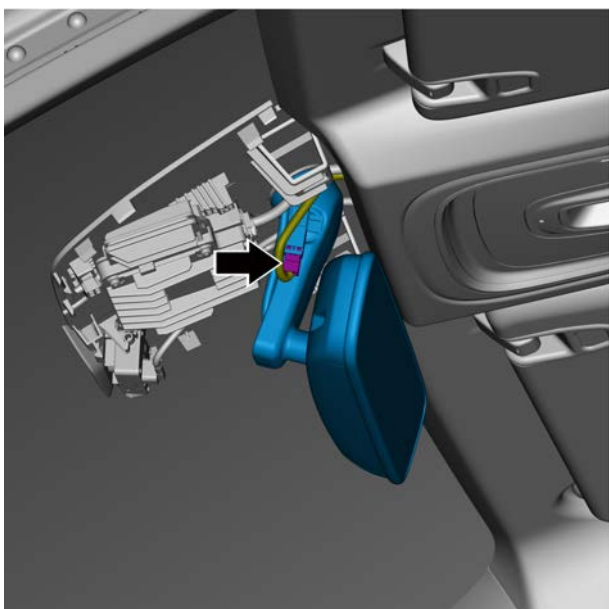
Installation procedure



- 1 Clip the interior rearview mirror module into the support and rotate the interior rearview mirror module to the fixed installation position.

Caution

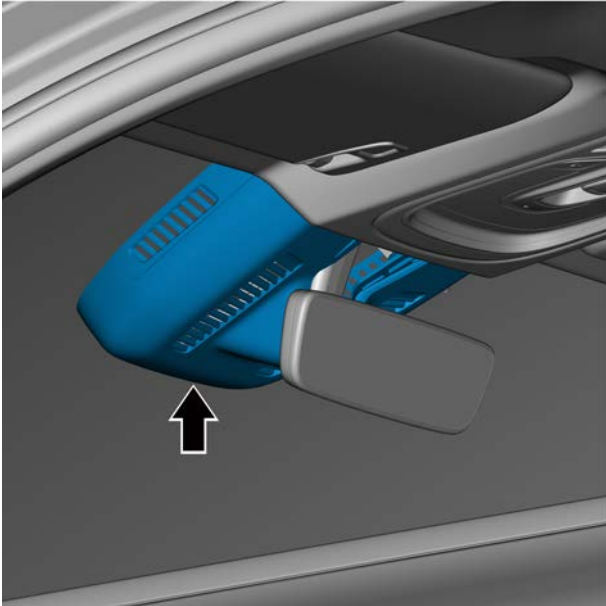
Be careful not to scratch the glass.



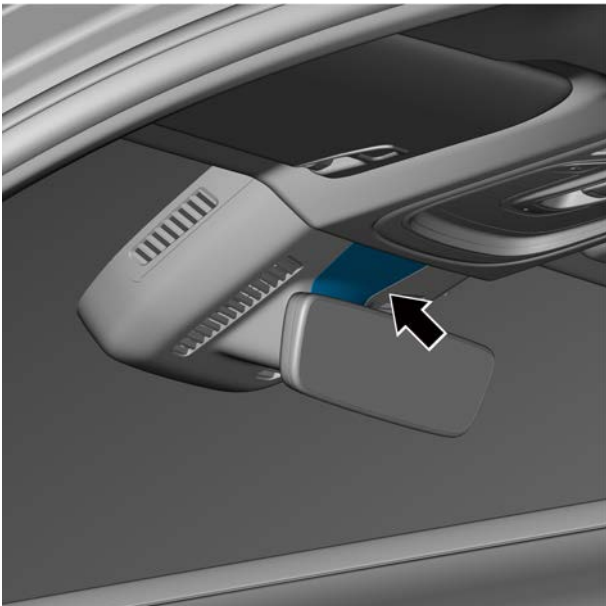
- 2 Connect the interior rearview mirror module harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 3 Install the rain and light sensor rear trim cover.



- 4 Install the rain and light sensor front trim cover.

- 5 Connect the negative battery cable.

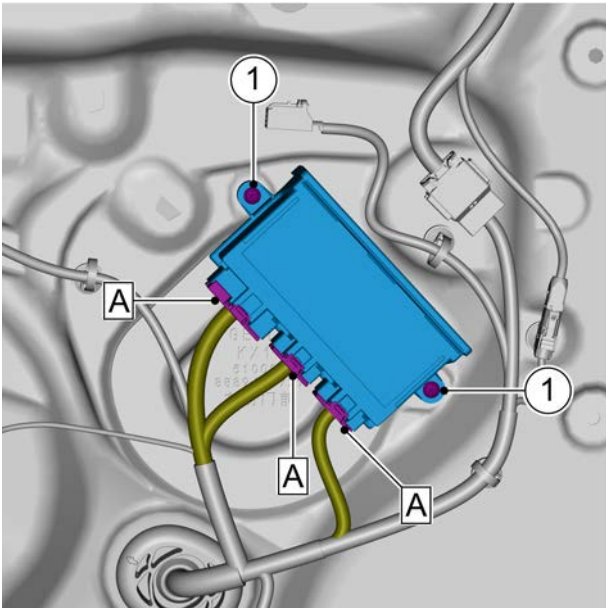
11.4.7.25 Replacement of driver door module

Removal procedure

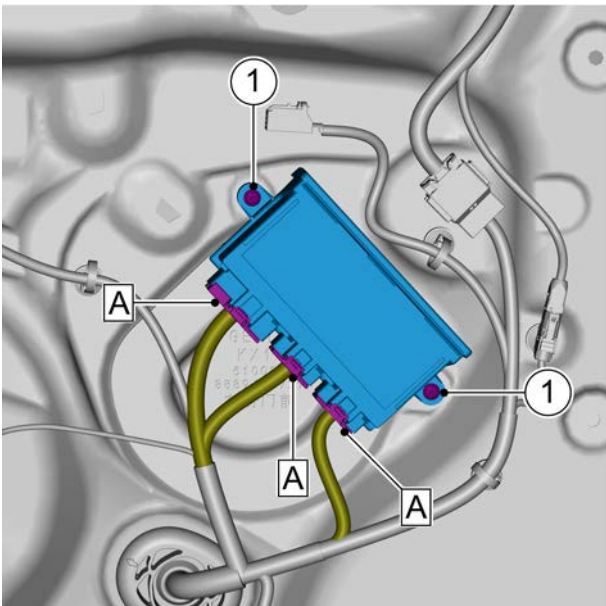
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly](#).



- 4 Disconnect harness connector A on the driver door module.
- 5 Remove 2 retaining bolts 1 and remove the driver door module.



Installation procedure

- 1 Install the driver door module and fasten the retaining bolt 1.

Torque: 2.5 N. m (metric system) 1.8 lb-ft (Imperial system)

- 2 Connect the harness connector A on the driver door module.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the front left door interior trim panel assembly.
- 4 Connect the negative battery cable.
- 5 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 6 Close the engine compartment cover.

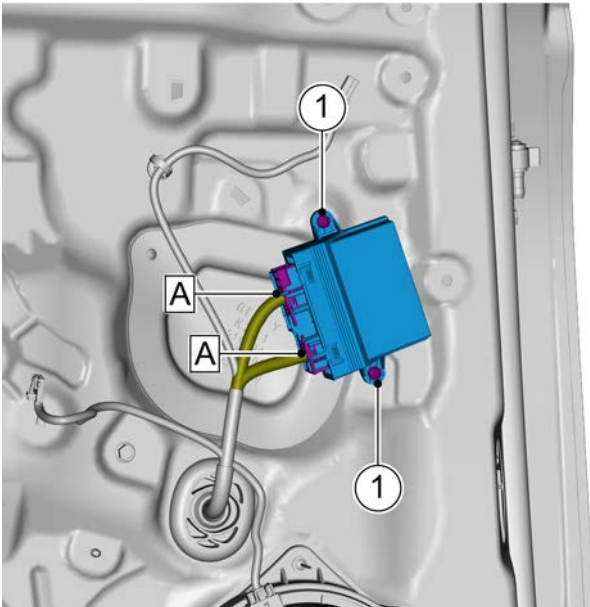
11.4.7.26 Replacement of RL door module

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the RL door interior trim plate assembly, see the [Replacement of the RL door interior trim plate assembly](#).
- 4 Disconnect harness connector A on the RL door module.
- 5 Remove 2 retaining bolts 1 and remove the RL door module.

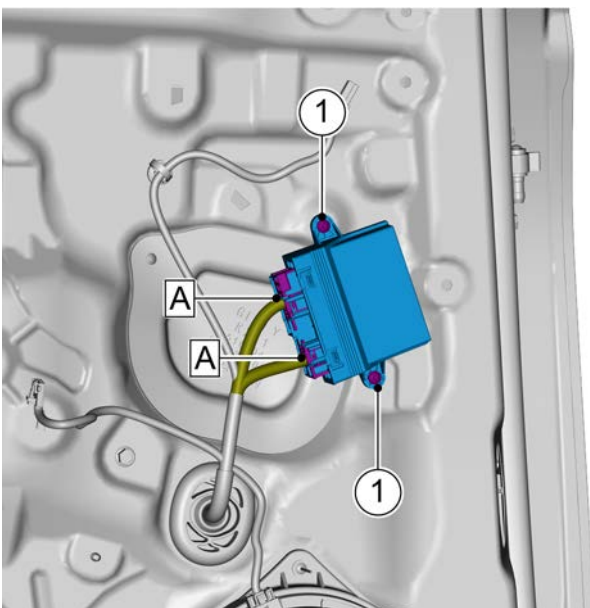
**Installation procedure**

- 1 Install the RL door module and fasten the retaining bolt 1.
Torque: 2.5 N. m (metric system) 1.8 lb-ft (Imperial system)

- 2 Connect harness connector A on the RL door module.

Caution

Secure the harness connection: "Connect, Click, and Confirm."



- 3 Install the RL doors interior trim panel assembly
- 4 Connect the negative battery cable.

- 5 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 6 Close the engine compartment cover.

11.5 Wiper/washing system

11.5.1 Specification

11.5.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Nut - fasten the output shaft of the left wiper arm and wiper linkage mechanism	M10×10	25~35	18.4~25.8
Bolt-fastening front wiper motor and body guide tank	M6×25	8.5~11.5	6.3~8.5
Nut-fastening sprinkler belt washing motor and body stringer	M6×7.8	5~7	3.7~5.2
Nut-fastened wiper arm blade and rear wiper motor	M8×8	11~15	8.1~11.2
Wiper motor and rear door sheet metal assembly after nut fastening	M6×25	8.5~11.5	6.3~8.5

11.5.2 Instructions and operations

11.5.2.1 Instructions and Operations

Wiper/ washer system is composed of the following parts:

- Central electronic module (CEM)
- Wiper steering wheel module
- Front wiper fuse
- Windshield wiper reservoir
- Front wiper electric motor
- Windshield washer pump
- Front wiper arm wiper blade
- Rear wiper arm with wiper assembly
- Rear wiper motor
- Front washer nozzle assembly
- Washer nozzle
- Rain and light sensor

After front wiper switch provides signal to CEM and CEM receives grounding signal of wiper switch, front wiper motor is started. When the wiper switch is in low speed gear, current flows from the low speed brush of the motor into the armature coil, creating a large counter electromotive force, resulting in the motor rotation at low speed. When the wiper switch is in high speed gear, current flows from the high speed brush of the motor into the armature coil, creating a small counter electromotive force, resulting in the motor rotation at high speed. When the wipe washer is switched on, the wiper spray pump is in working status and the wiper motor starts to rotate in low gear. When the wiper switch is switched off, the wiper motor will not stop immediately and continue to turn for a while under the inertia effect of the armature. Meanwhile, the armature generates counter electromotive force, which will generate electric brake on the wiper motor and the motor will stop at the fixed position immediately.

The wiper / windshield washer system is divided into the front wiper / windshield washer system and the rear wiper / windshield washer system. The wiper switch is located on the joystick on the right side of the steering column and integrated on the steering wheel module.

1. Front wiper/washer system

The front wiper / windshield washer system consists of wiper steering wheel module, rain and light sensor function, front wiper motor, wiper arm and wiper blade, glass cleaner, windshield wiper reservoir , window washerpump, hose and windshield washer jet. There is an automatic stop unit in the front wiper circuit, which is composed of a worm gear and a cam plate. Its purpose is to still maintain the circuit complete

temperately after the wiper/washer switch is turned off, and break the circuit until the wiper arm completely returns to the initial position. The wiper system is driven by permanent magnetic motor. The wiper motor is installed on the front wall, connected with the front wiper linkage directly.

The front windshield glass windshield wiper reservoir is installed under the FR headlamp assembly and at the front of the FR fender liner. The window washerpump is fixed on the windshield wiper reservoir , and the window washerpump transports the washing liquid to 2 nozzles through the hose.

2. Rear wiper/washer system

The rear wiper / windshield washer system consists of a glass cleaner, a windshield wiper reservoir , a window washerpump, a hose, a windshield washer jet, a rear wiper motor, a wiper arm, a wiper blade and a wiper steering wheel module. the rear windshield glass windshield wiper reservoir is installed under the FR headlamp assembly and the front of the FR wing plate liner. The window washerpump is fixed on the windshield wiper reservoir , and the window washerpump transports the washing liquid to 1 nozzles through the hose.

Front rain wiper Auto mode

When the ignition state of the vehicle is in the ON position, turn the wiper control handle to the AUTO position and enter the automatic mode to run. The front wiper performs automatic wiping operation. At this time, the wiper control system automatically adjusts the wiping speed according to the rainfall. The sensitivity of rain water can be adjusted by rotating the automatic wiper sensitivity adjustment knob. When the mark refers to the scale bar from wide to narrow, it means that the wiper system senses the sensitivity of rain water from strong to weak.

Switching from low speed to high speed or from high speed to low speed in automatic mode can only be done after the previous wiper reaches the stop position, and when the request for heavy rain signal is received, the wiper will immediately switch to high speed mode.

When the request of rain water and the light sensor switches from high speed or low speed mode to off, the body controller will continue to control the front wiper at low speed until it returns to the stop position. If the wiper is already in the stop position when the request of rain water and the light sensor is turned off, the body controller will immediately turn off the front wiper.

Rear Wiper*



Press switch 1, after wiper intermittent wiper, press switch 2, after wiper continuous wiper, press the button in the middle position, indicating that the wiper stops wiping.

Rain and light sensor function

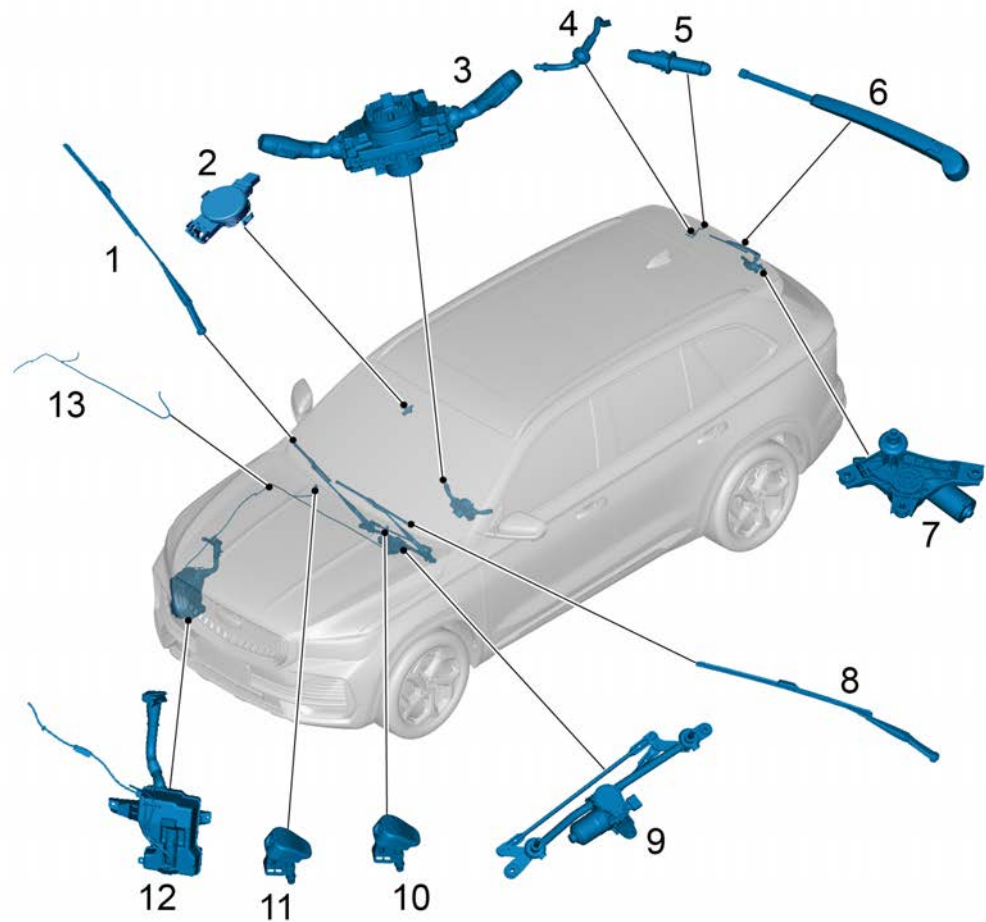
When the rain and light sensor is activated, the rain drops fall in the sensing area to trigger the wiper action. According to the rainfall and the sensitivity of the driver, the sensor sends signals to control the wiper speed through the LIN bus, including intermittent scraping, low-speed continuous scraping and high-speed continuous scraping. The transition between the various modes is smooth, and the phenomenon of sudden fast and slow will not occur.

The rain and light sensor can not recognize the fog, so the defrost must be turned on manually (except for the sensor with automatic defrost function). If the fog condenses into water droplets falling on the sensor sensing area, depending on the set sensitivity, the wiper may produce corresponding action.

The rain and light sensor have an anti-interference mechanism, and exterior disturbances such as traces on the glass, changes in surrounding lamp, strong lamp around, temperature changes, glass surface icing and dust will not cause wiper misoperation or reduce the sensitivity of the sensor. However, it is still necessary to keep rain water and the light sensor area clean.

11.5.3 Component position

11.5.3.1 Component position

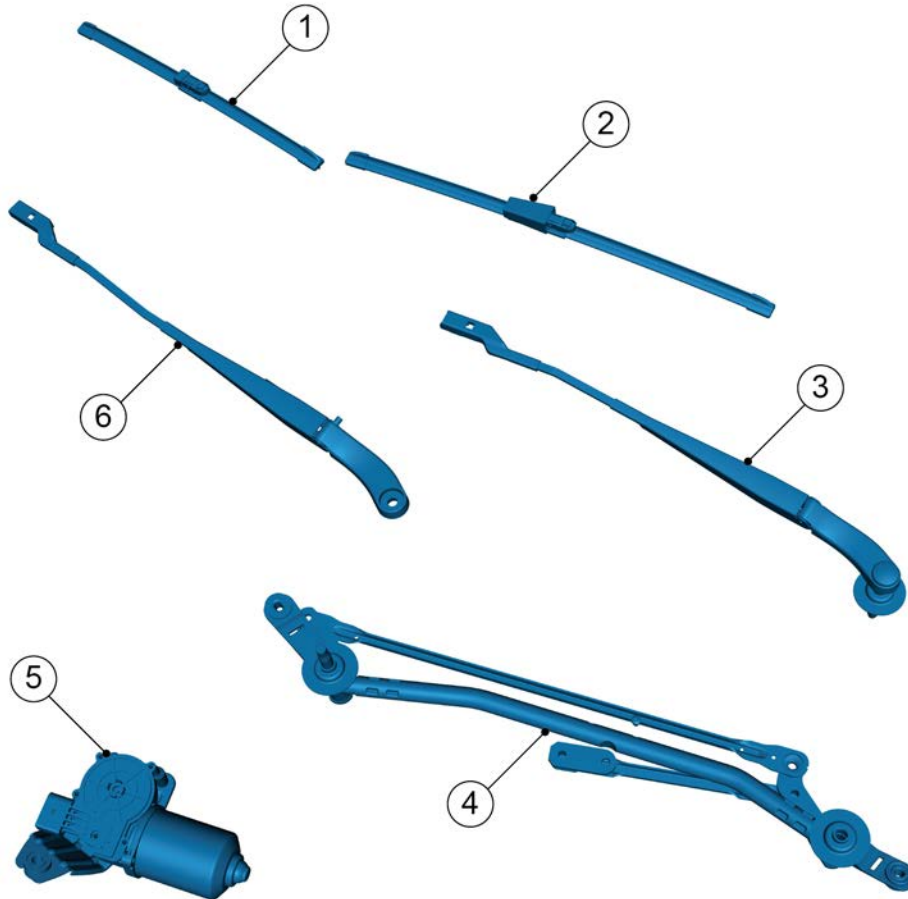


- | | | | |
|----|--|-----|---|
| 1. | Front right wiper arm with wiper assembly | 8. | Front left wiper arm with wiper assembly |
| 2. | Rain and light sensor | 9. | Front wiper motor and connecting rod assembly |
| 3. | Steering wheel module (wiper combination switch) | 10. | Front washer nozzle assembly |
| 4. | Rear washer hose assembly | 11. | Front washer nozzle assembly |
| 5. | Rear washer nozzle assembly | 12. | Windshield wiper reservoir |
| 6. | Rear wiper arm with wiper assembly | 13. | Front windshield washer hose (2) |
| 7. | Rear wiper motor | | |

11.5.4 Exploded view

11.5.4.1 Exploded view

Front wiper mechanism



1. Front wiper assembly

2. Front wiper assembly

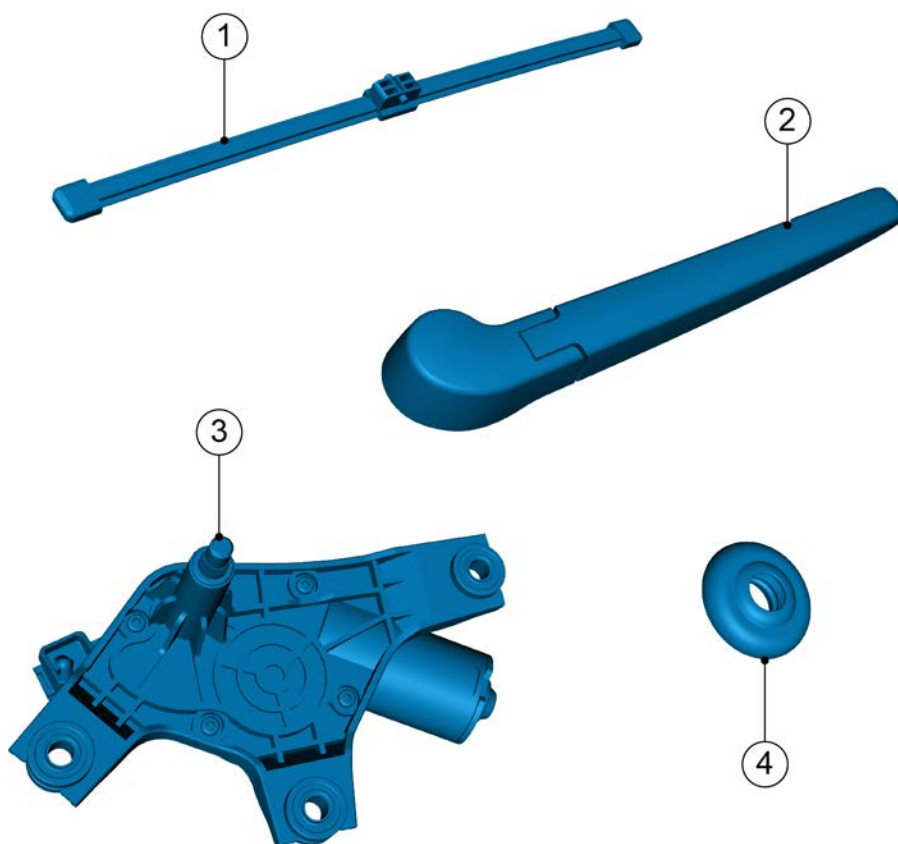
3. Front wiper arm assembly

4. Front wiper connecting rod assembly

5. Front wiper motor assembly

6. Front wiper arm assembly

Rear wiper mechanism



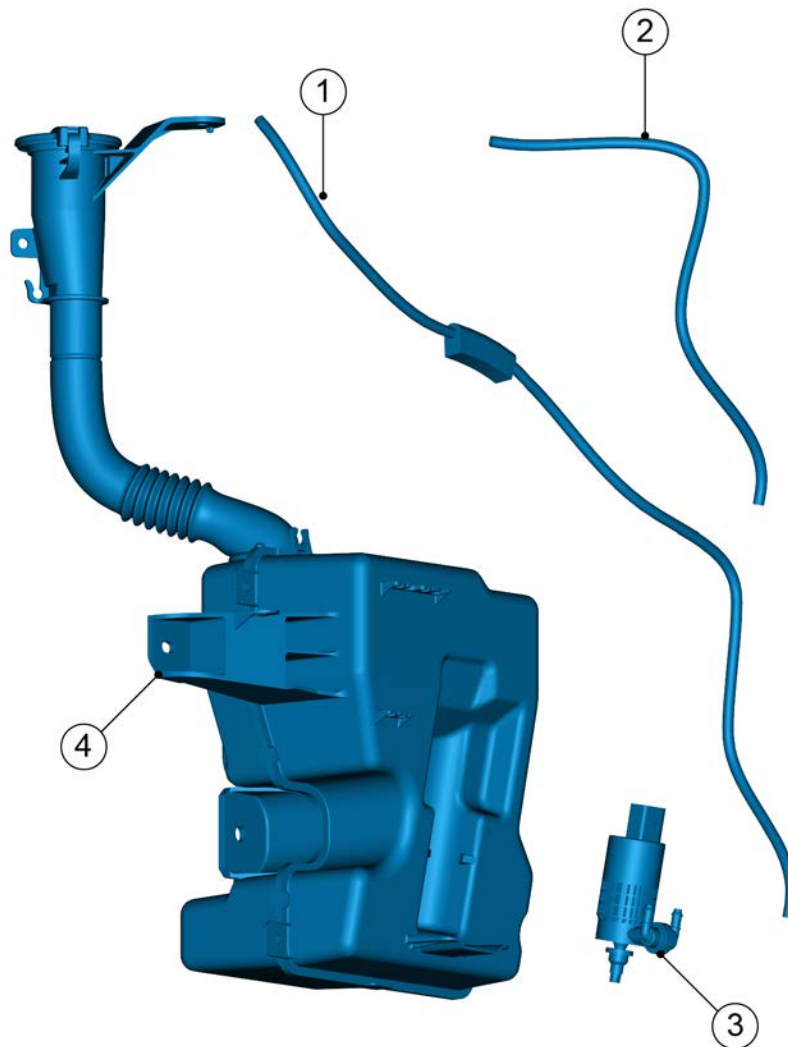
1. Rear wiper assembly

2. Rear wiper arm assembly

3. Rear wiper motor

4. Rear wiper rubber plug

Washer



1. Washer bottle hose

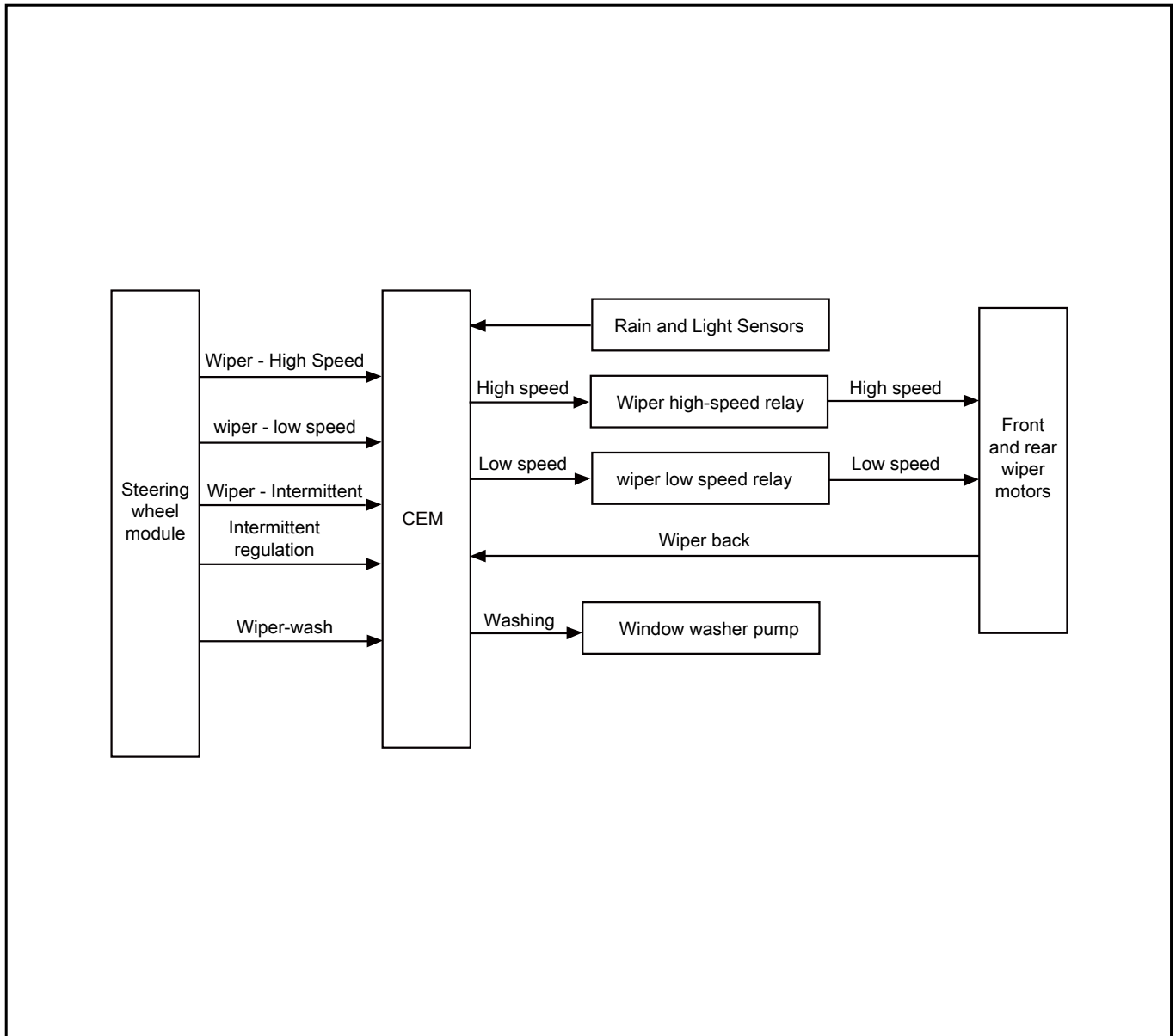
2. Rear washer wash hose

3. Windshield washer pump

4. Windshield wiper reservoir

11.5.5 Electrical schematic diagram

11.5.5.1 Electrical schematic diagram



11.5.6 Diagnostic information and procedures

11.5.6.1 Diagnosis Description

Before diagnosing the fault of the wiper / cleaning system, see [Description and operation](#). Understand and familiarize yourself with working principle of wiper/ cleaning system before starting system diagnosis. This helps to determine the DTC steps when a fault occurs. More importantly, it also helps to determine whether the situation described by the distributor is normal. Any fault diagnosis of wiper/cleaning system should start with visual inspection. The visual inspection will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.5.6.2 Visual Check

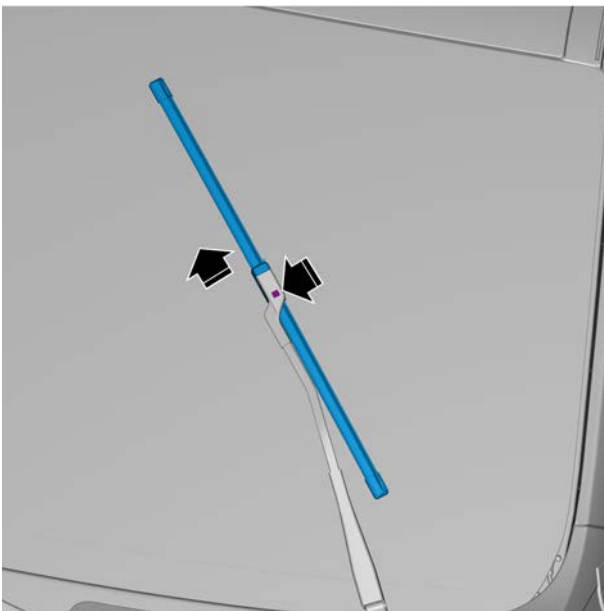
- The check may affect the after-sales installations of wiper/cleaning system operations and it is needed to guarantee that these installations will not affect wiper/cleaning system operations.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.
- Check and confirm that the washer liquid level of washer fluid tank is normal.

11.5.7 Removing and installing

11.5.7.1 Replacement of front wiper blade

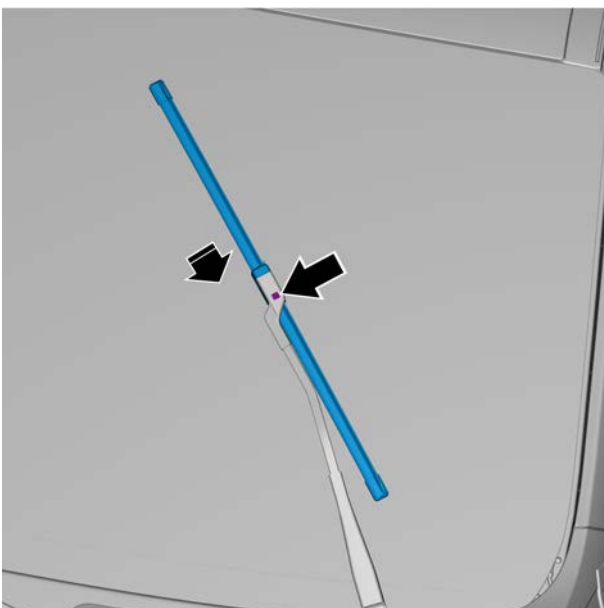
Removal procedure

- 1 You need to run the wiper to repair mode before you can lift the wiper arm assembly.
- 2 Wiper maintenance position before activation. (when the vehicle is stationary and the wiper steering wheel module is in O gear, click on the multimedia display: Vehicle sets → Vehicle basic settings → Wiper, and then turn on or off the front wiper maintenance position function in this interface. After the function is turned on, the wiper automatically moves to the vertical position.)
- 3 Lift the front wiper arm assembly.
- 4 Press the wiper blade retaining clip downward and remove the front wiper blade outward from the front wiper arm.



Installation procedure

- 1 Install the front wiper blade on the wiper arm and press both sides of the front wiper blade in the middle to secure the front wiper blade.
- 2 Gently lower the front wiper arm.

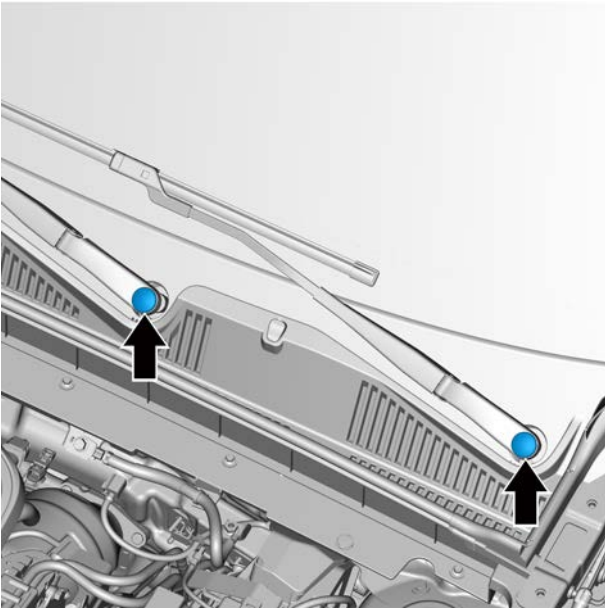


- 3 Close the front wiper repair position before closing.
- 4 Switch the start switch to the ON position, operate the wiper steering wheel module, and the wiper will automatically return to position.

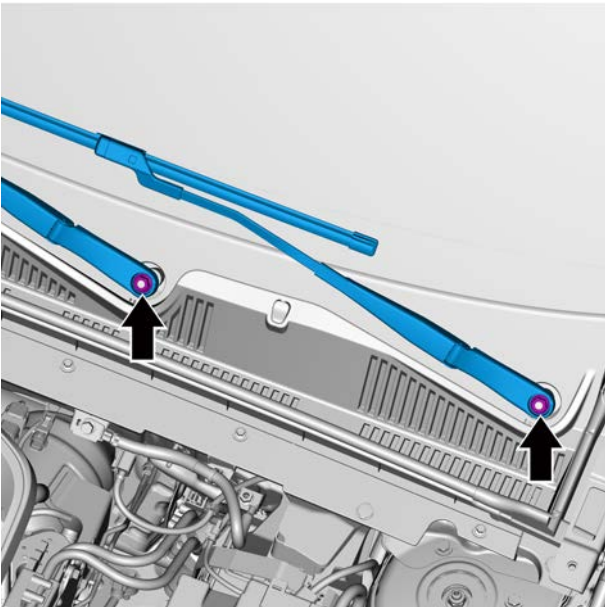
11.5.7.2 Replacement of front wiper arm

Removal procedure

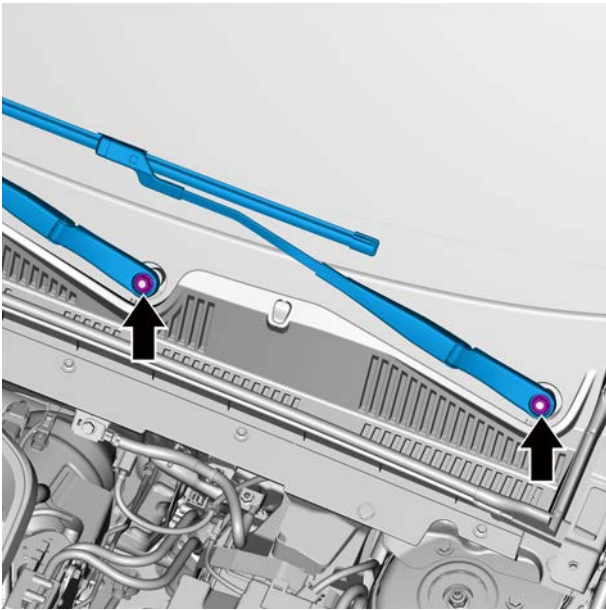
- 1 Open the engine compartment cover.
- 2 Stop the wiper arm assembly in its initial position before the removal.
- 3 Remove the cover on the front wiper arm.



- 4 Remove wiper arm retaining nut.
- 5 Turn up the front wiper arm and remove the front wiper arm.

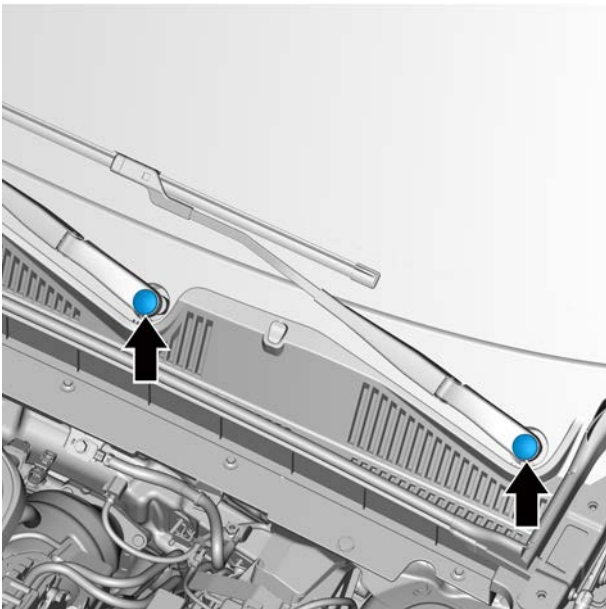


Installation procedure



- 1 Install the front wiper arm, fasten the retaining nut, and turn down the front wiper arm.

Torque: 30 N. m (metric system) 22 lb-ft (Imperial system)



- 2 Install the cover on the front wiper arm nut.

- 3 Close the engine compartment cover.

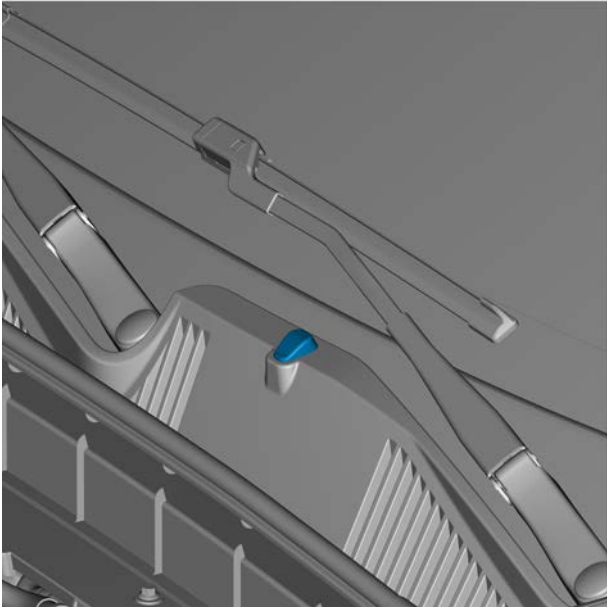
11.5.7.3 Replacement of windshield washer jet assembly of front windshield washer (Type 1)

Removal procedure

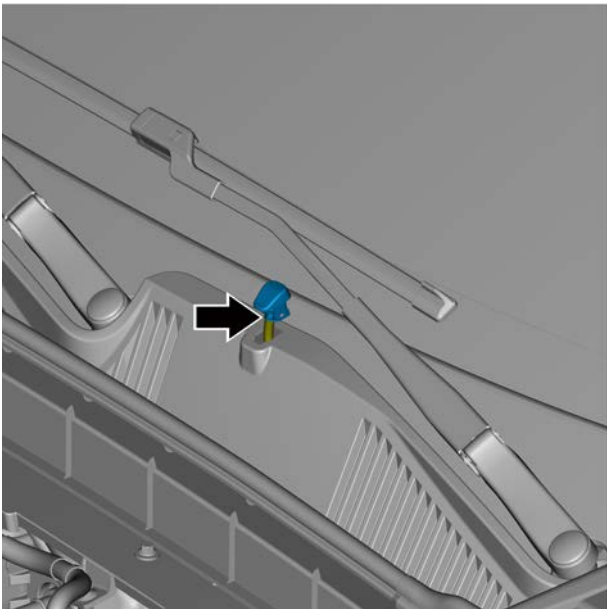
Caution

The following are the replacement steps for the front left windshield washer jet assembly, and the removal method of the FR windshield washer jet assembly is similar to that of the front left.

- 1 Open the engine compartment cover.

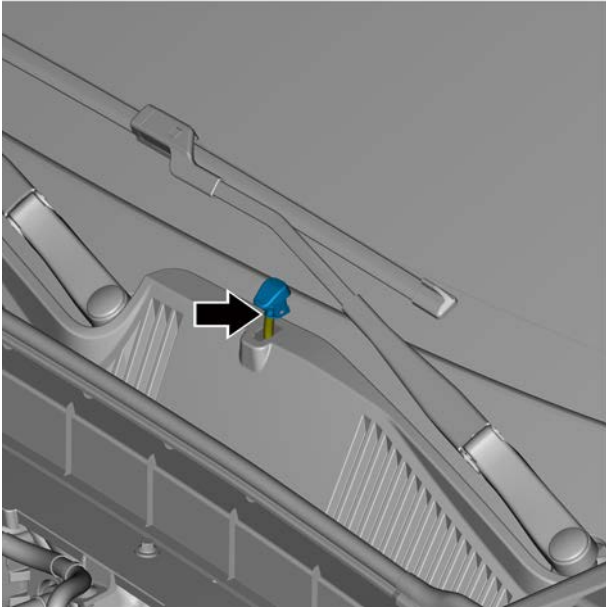


2 Remove the front washer nozzle assembly.

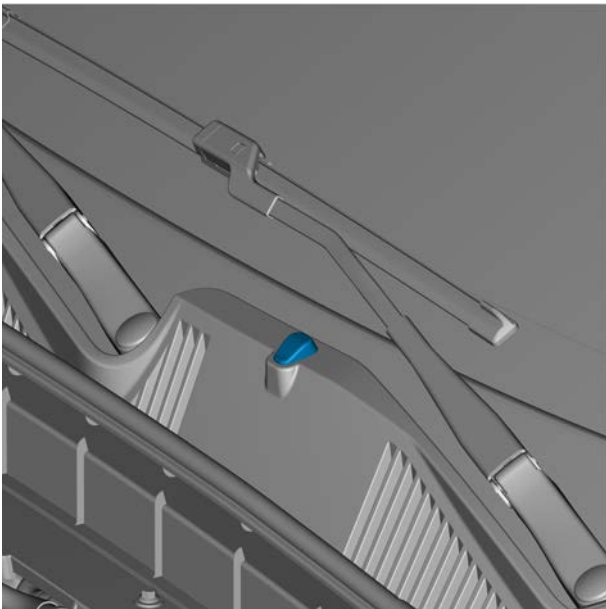


3 Disconnect the water diversion windshield washer jet from the hose and remove the front windshield washer jet assembly.

Installation procedure



- 1 Connect the front windshield washer jet hose.



- 2 Install the front washer nozzle assembly.

- 3 Close the engine compartment cover.

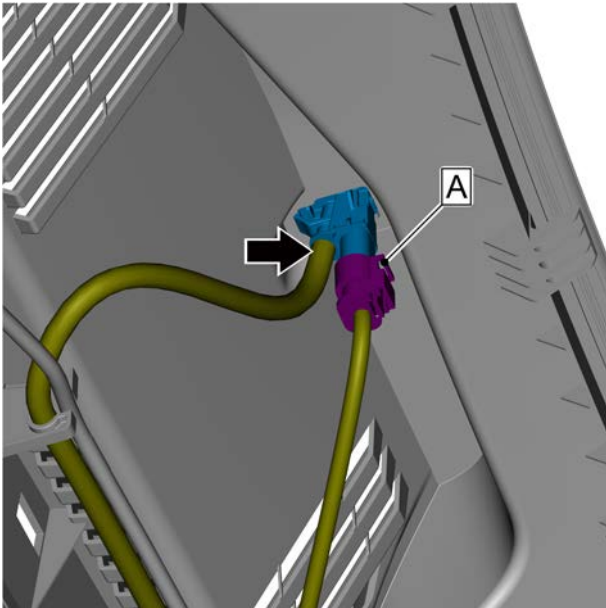
11.5.7.4 Replacement of windshield washer jet assembly of front windshield washer (Type 2)

Removal procedure

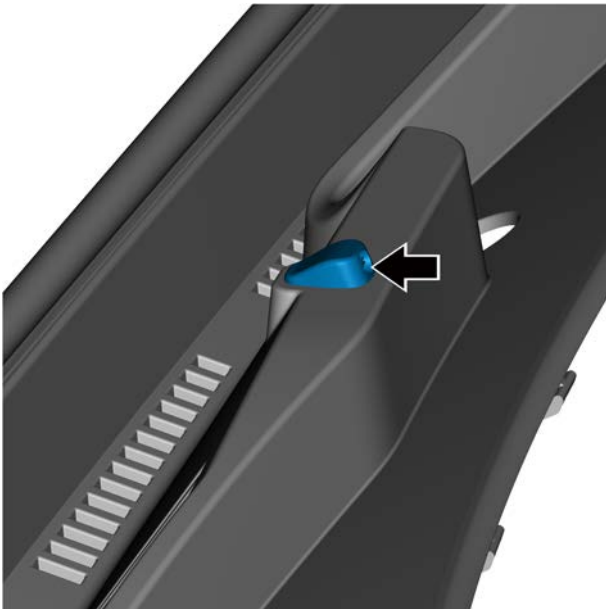
Caution

The following are the replacement steps for the front left windshield washer jet assembly, and the removal method of the FR windshield washer jet assembly is similar to that of the front left.

- 1 Remove plenum mounding assembly, refer to [replacement of plenum mounding assembly\(Type II\)](#).

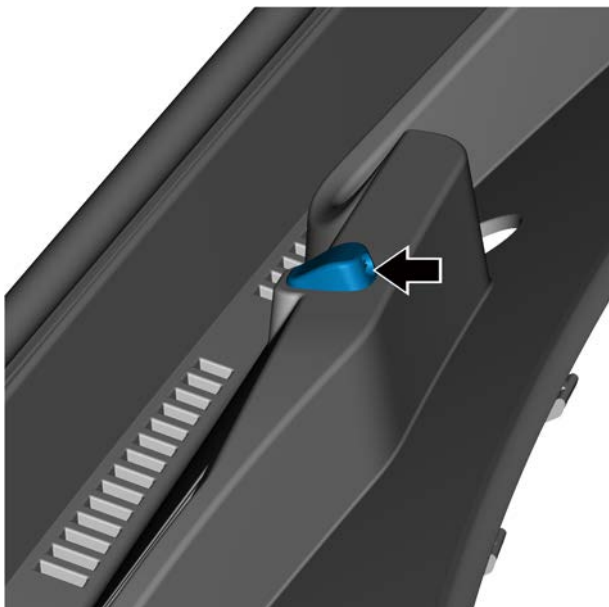


- 2 Disconnect the front windshield washer jet assembly harness connector A.
- 3 Detach the connection between the windshield washer jet assembly and the washing hose.

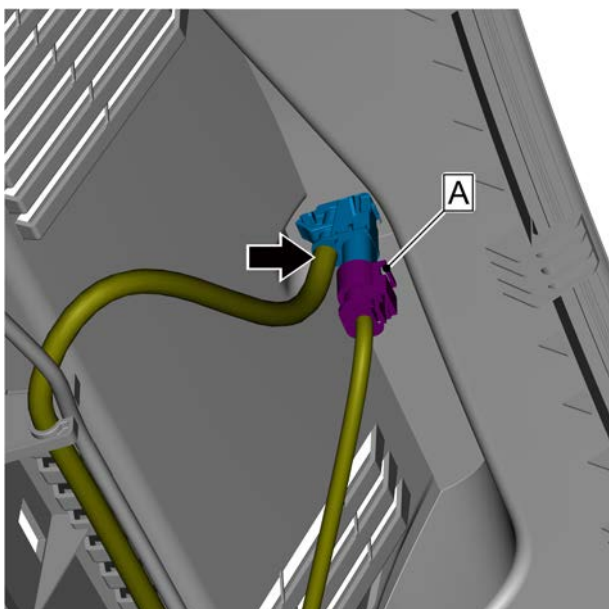


- 4 Remove the front washing windshield washer jet assembly.

Installation procedure



- 1 Install the front washer nozzle assembly.

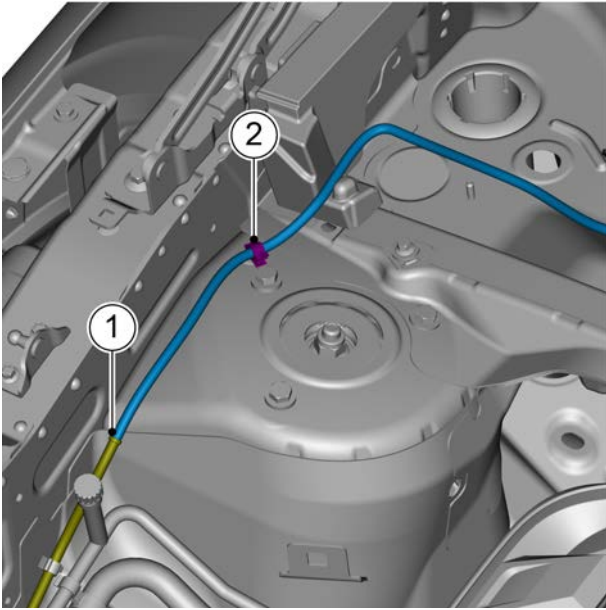


- 2 Connect the front windshield washer jet assembly harness connector A.
- 3 Connect the front windshield washer jet assembly hose.

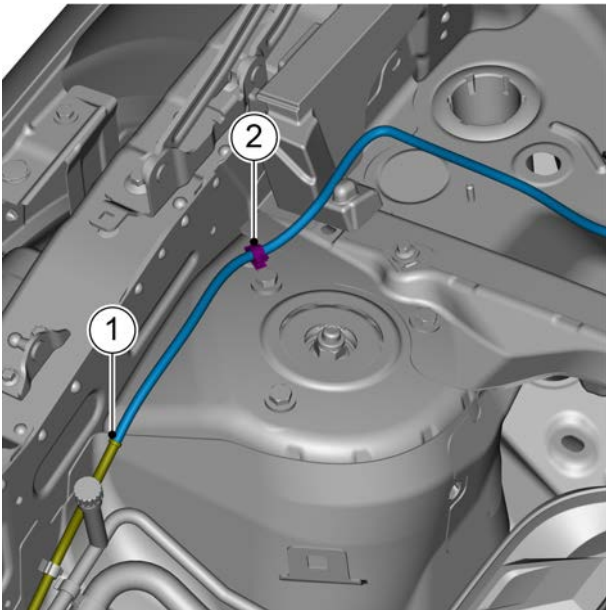
- 4 Install the plenum mounting assembly.

11.5.7.5 Replacement of front windshield washer hose (2)

Removal procedure



- 1 Remove the ventilation cover assembly, see the [Replacement of the ventilation cover \(Type 1\)](#), the [Replacement of the ventilation cover assembly \(Type 2\)](#).
- 2 Disconnect the connection between the front windshield washer hose (2) and the windshield washer hose 1.
- 3 Remove front windshield washer hose (2) retaining clip 2.
- 4 Remove the front windshield washer hose (2).



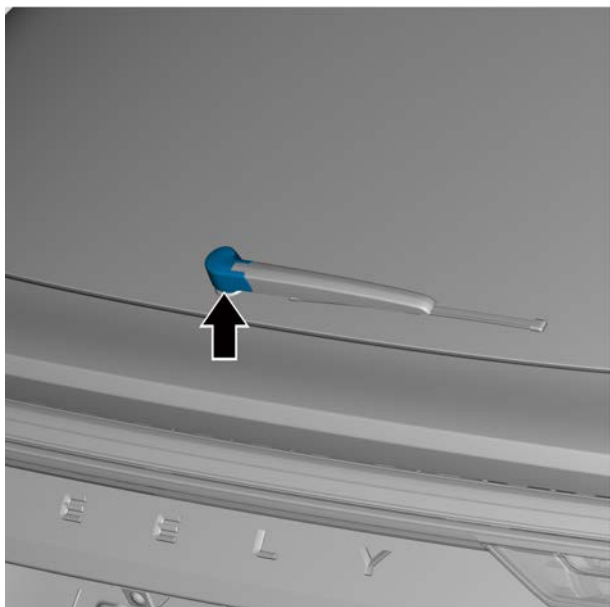
Installation procedure

- 1 Install the windshield washer hose (2) before installation.
- 2 Connect the front windshield washer hose (2) with the windshield washer hose 1.
- 3 Install windshield washer hose (2) retaining clip 2.

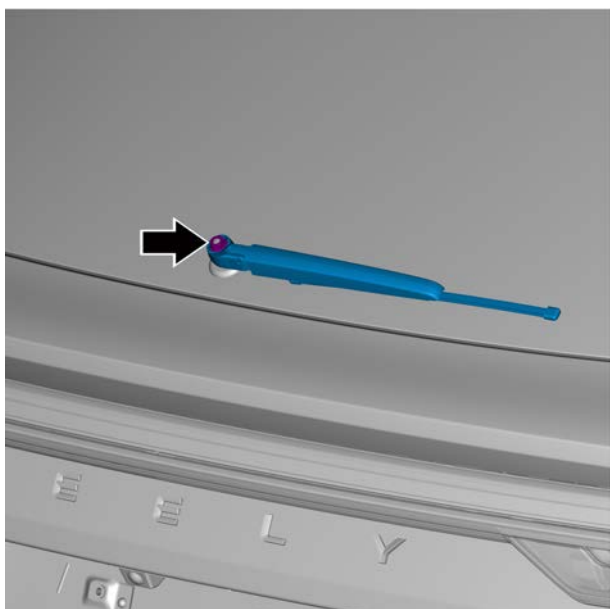
- 4 Install the plenum mounting assembly.

11.5.7.6 Replacement of the rear wiper arm with wiper assembly

Removal procedure



- 1 Remove rear wiper arm with wiper assembly fixing nut cap.



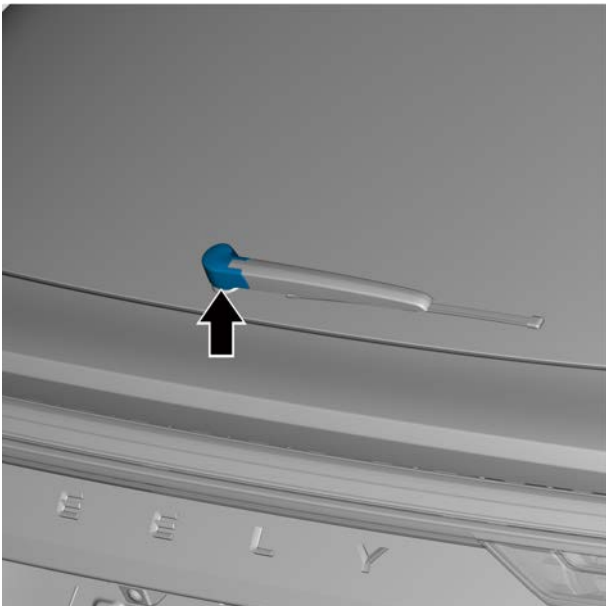
- 2 Remove rear wiper arm with wiper assembly fixing nut.
- 3 Remove rear wiper arm with wiper assembly.

Installation procedure



- 1 Install rear wiper arm with wiper assembly and fasten the nuts.

Torque: 13 N. m (metric system) 9.6 lb-ft (Imperial system)



- 2 Install rear wiper arm with wiper assembly fixing nut cap.

11.5.7.7 Replacement of the rear washer nozzle assembly

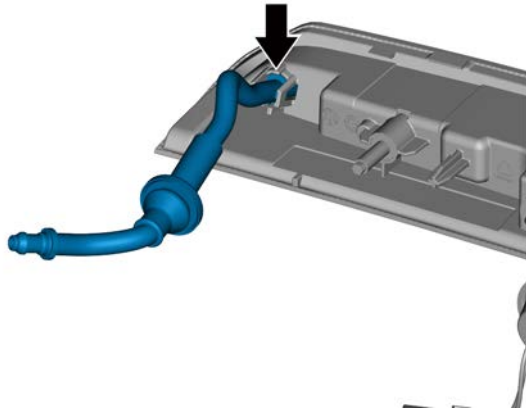
Removal procedure

Warning !

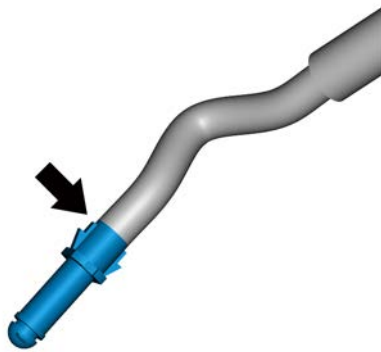
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the rear window brake lamp, see the [Replacement of the rear window brake lamp](#).

- 4 Windshield washer hose assembly and windshield washer jet.

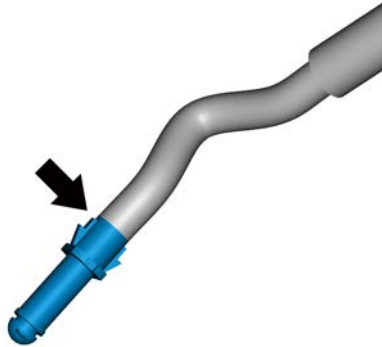


- 5 Remove the connection between the windshield washer jet and hose and remove the rear windshield washer jet.

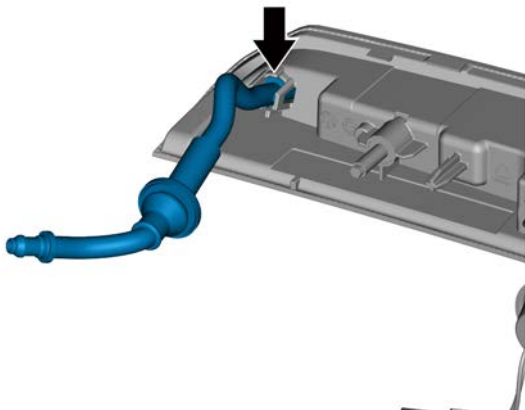


Installation procedure

- 1 Connect the rear windshield washer jet and hose.



- 2 Place the rear windshield washer jet and hose on the rear window brake lamp.



- 3 Install rear window brake lamps.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

11.5.7.8 Replacement of rear washer hose assembly

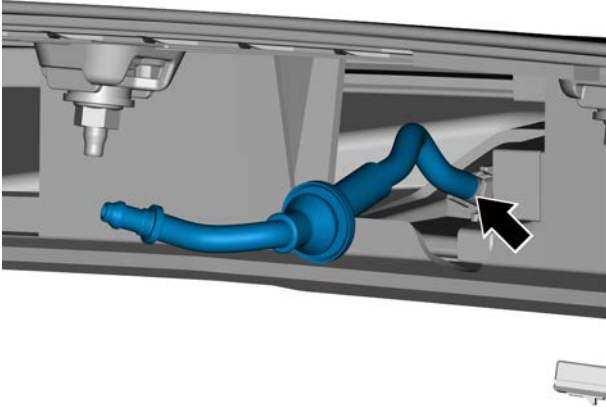
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

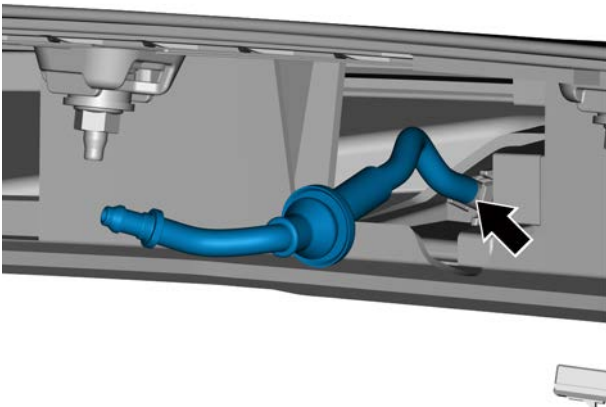
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

- 3 Remove spoiler assembly, refer to [Replacement of spoiler assembly](#).
- 4 Remove rear windshield washer hose assembly.



Installation procedure

- 1 Install rear windshield washer hose assembly.



- 2 Install rear spoiler assembly.
- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

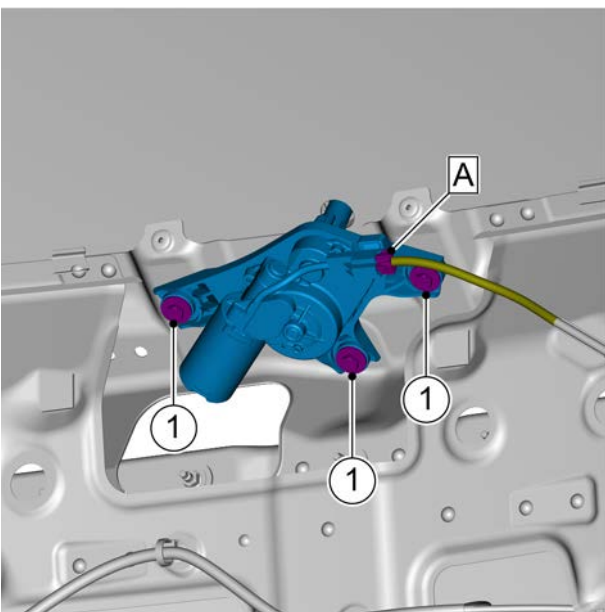
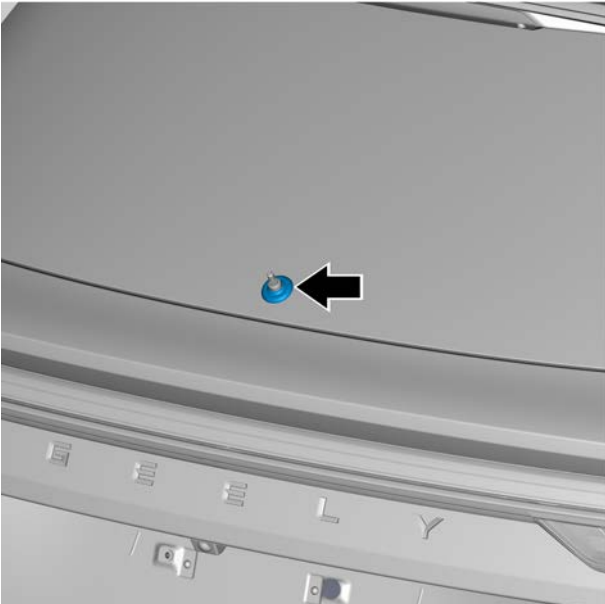
11.5.7.9 Replacement of rear wiper motor

Removal procedure

Warning !

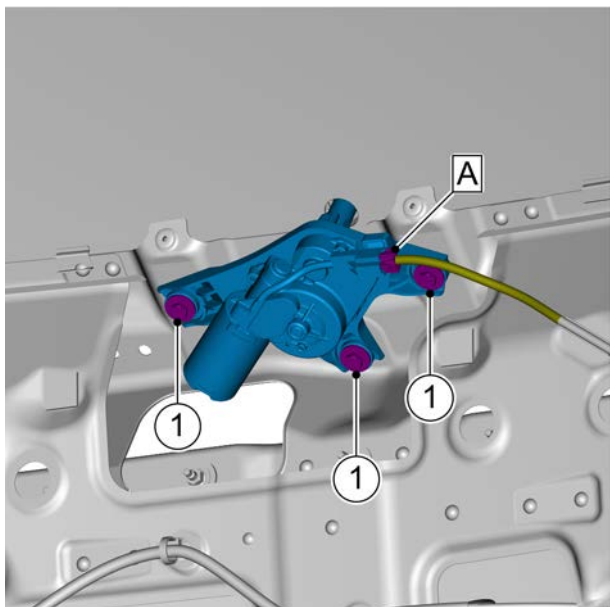
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the rear wiper wiper arm wiper assembly, see the [Replacement of the rear wiper wiper arm wiper assembly](#).
- 4 Remove the tailgate lower interior trim panel assembly of the assembly, see [Replacement of the tailgate lower interior trim panel assembly](#).
- 5 Remove rear wiper rubber plug.



- 6 Disconnect the harness connector A of the rear wiper motor.
- 7 Remove the 3 fixing bolts 1 of the rear wiper motor.
- 8 Remove the rear wiper motor.

Installation procedure



- 1 Install the wiper motor and fasten 3 fixing bolts 1.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)
- 2 Connect harness connector A to the rear wiper motor.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 3 Install rear wiper rubber plug.

- 4 Install the lower trim panel assembly of the tailgate.
- 5 Install the rear wiper arm with wiper assembly.
- 6 Connect the negative battery cable.
- 7 Close the engine compartment cover.

11.5.7.10 Replacement of windshield wiper reservoir

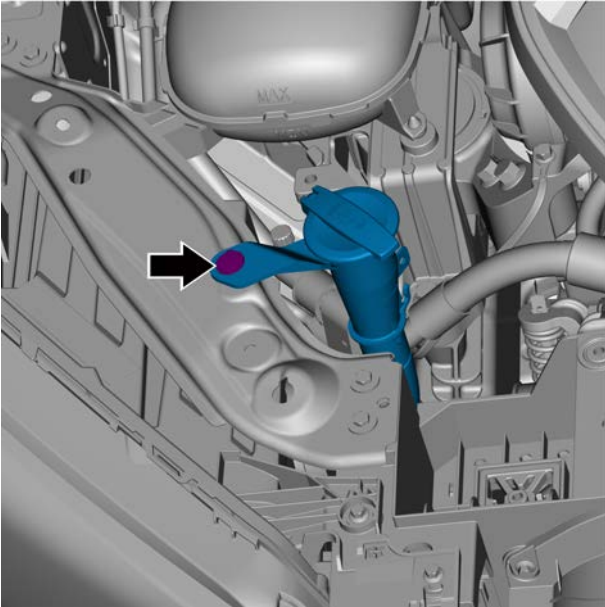
Removal procedure

Warning !

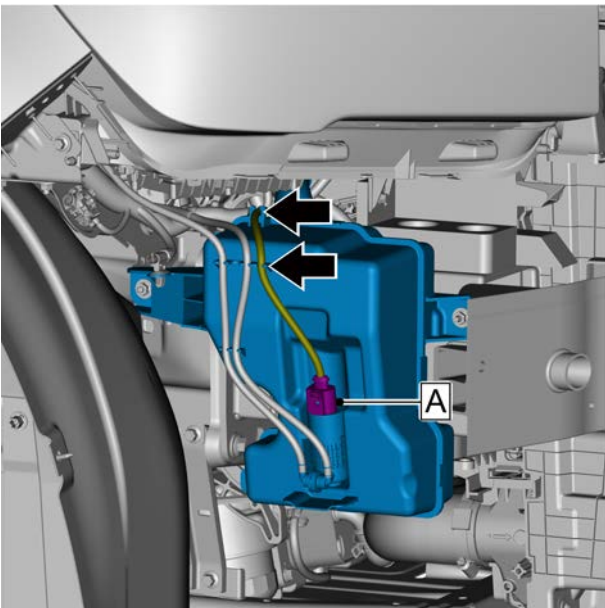
See "warning about disconnecting battery" in [Warnings and cautions](#).

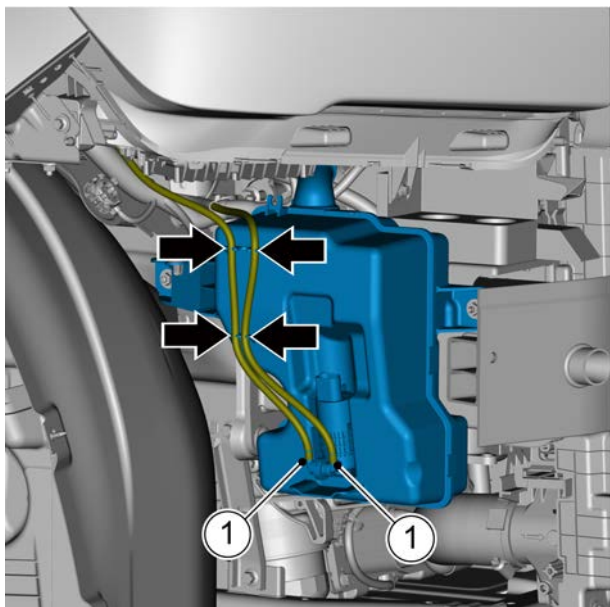
- 1 Open the engine compartment cover.

- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the front bumper assembly, refer to [Front bumper](#)
- 4 Remove the windshield washer filling pipe with cap assembly retaining clip.

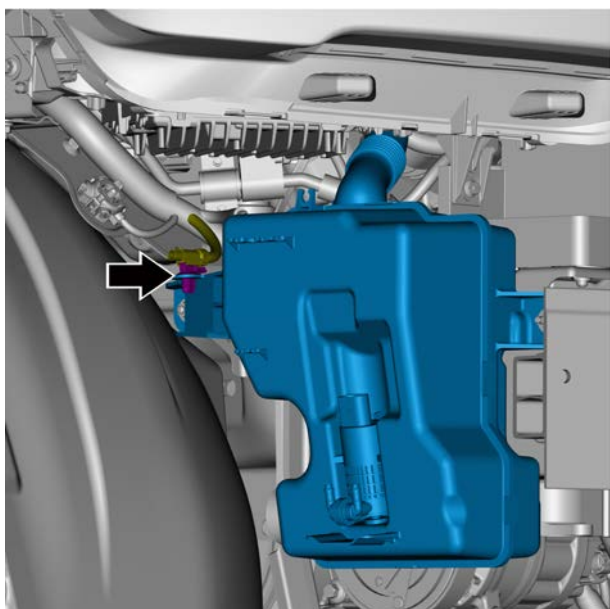


- 5 Disconnect the window washer pump wire harness connector A and remove the wire harness.

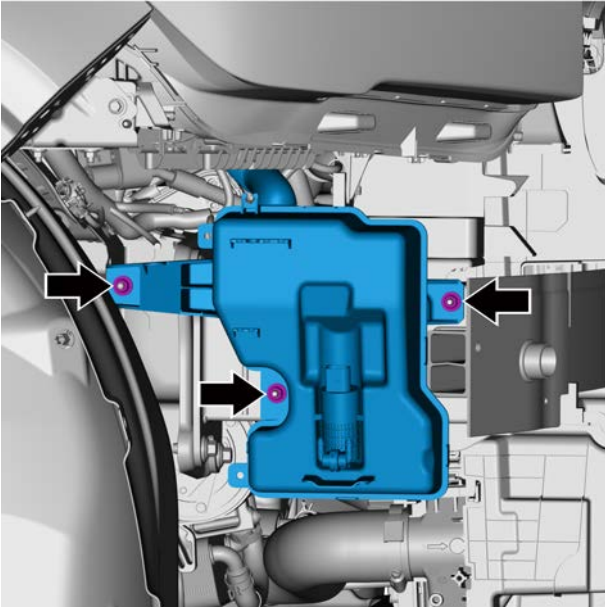




- 6 Disconnect the connection 1 of the windshield washer hose and the window washer pump.
- 7 Remove the washer hose.

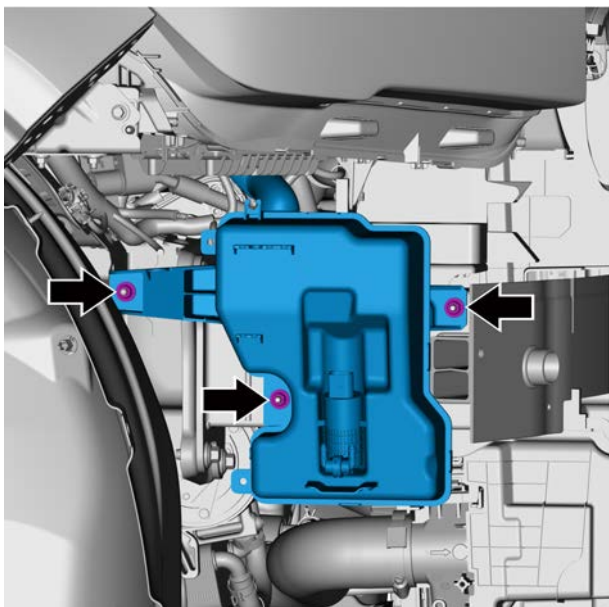


- 8 Discharge washer liquid.
- 9 Disconnect harness fixing buckle

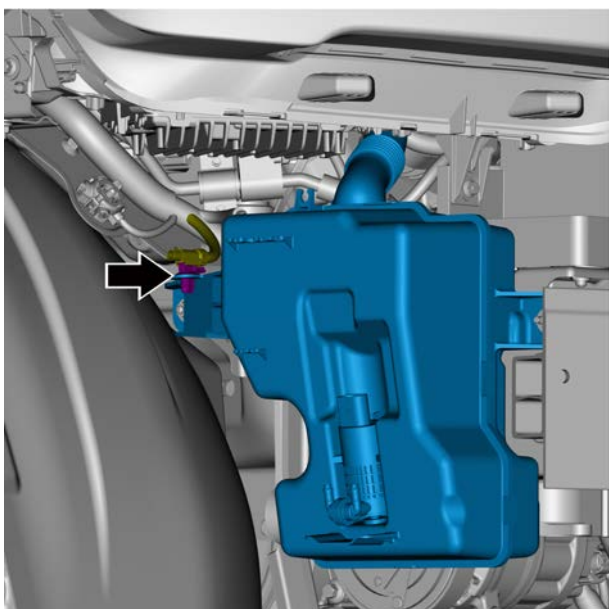


- 10 Remove the 3 retaining nuts of the windshield wiper reservoir .
- 11 Remove the windshield wiper reservoir .

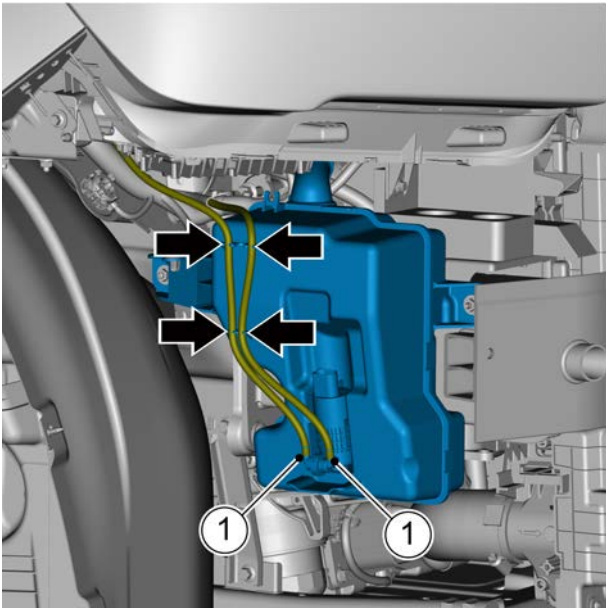
Installation procedure



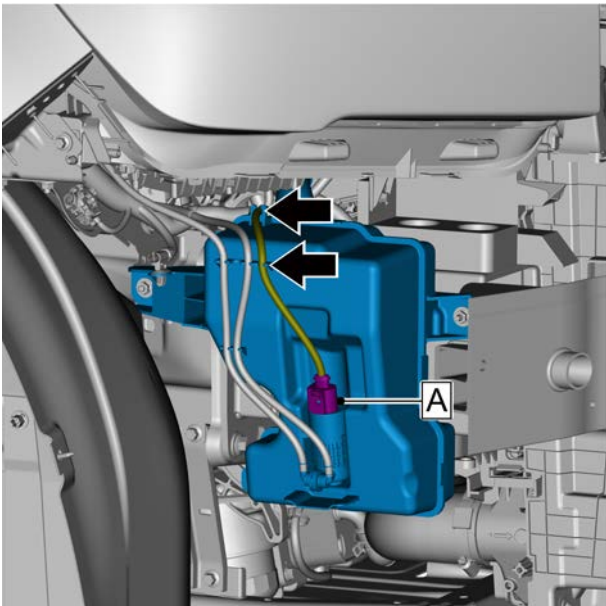
- 1 Install windshield wiper reservoir and fasten 3 nuts.
Torque: 6 N. m (metric system) 4.4 lb-ft (Imperial system)



- 2 Install the harness fixing clip.



- 3 Connect the connection 1 of windshield washer hose and the window washer pump.
- 4 Install the washer hose.

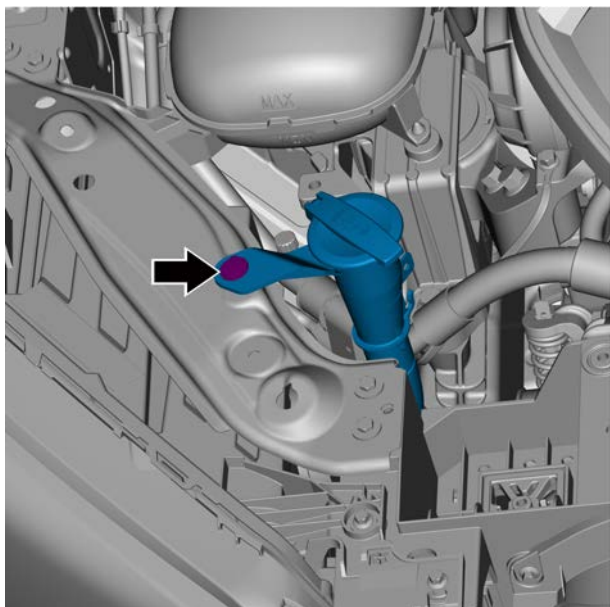


- 5 Connect windshield washer pump harness connector A.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 6 Install the harness.



- 7 Install the windshield washer filling pipe with cap assembly retaining clip.

- 8 Add washer liquid.
- 9 Install the front bumper assembly.
- 10 Connect the negative battery cable.
- 11 Close the engine compartment cover.

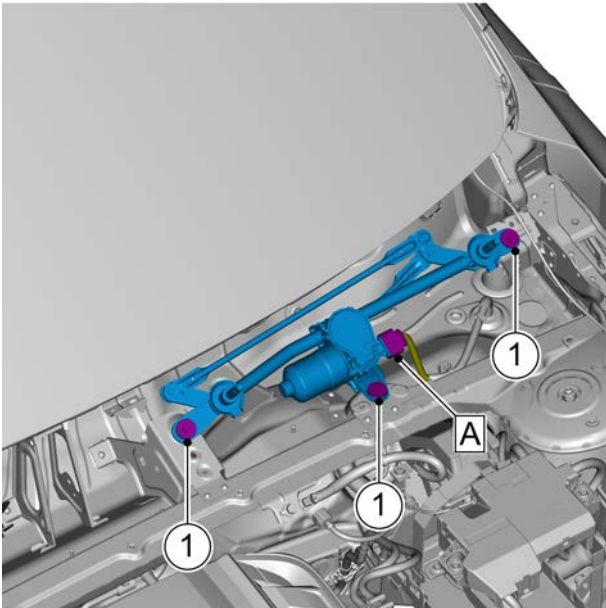
11.5.7.11 Replacement of front wiper motor

Removal procedure

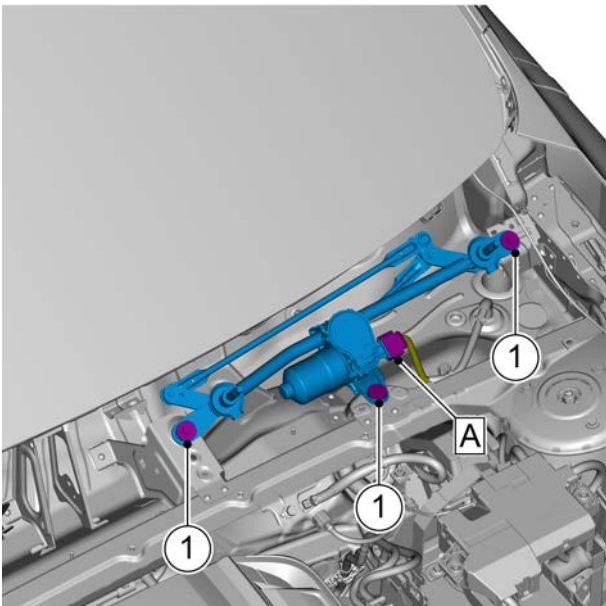
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Before removing the wiper arm, see the [Replacement of the previous wiper arm](#).
- 4 Remove ventilation cover assembly (Type 1), see [Replacement of ventilation cover \(Type 1\)](#).



- 5 Disconnect front wiper motor harness connector A.
- 6 Remove the 3 retaining bolts 1 of the front wiper motor.
- 7 Remove the front wiper motor.



Installation procedure

- 1 Install the front wiper motor and fasten 3 fixing bolts 1.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 2 Connect harness connector A of the front wiper motor.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the plenum mounting assembly.
- 4 Install the front wiper arm.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

11.5.7.12 Replacement of Rainwater and Light Sensor

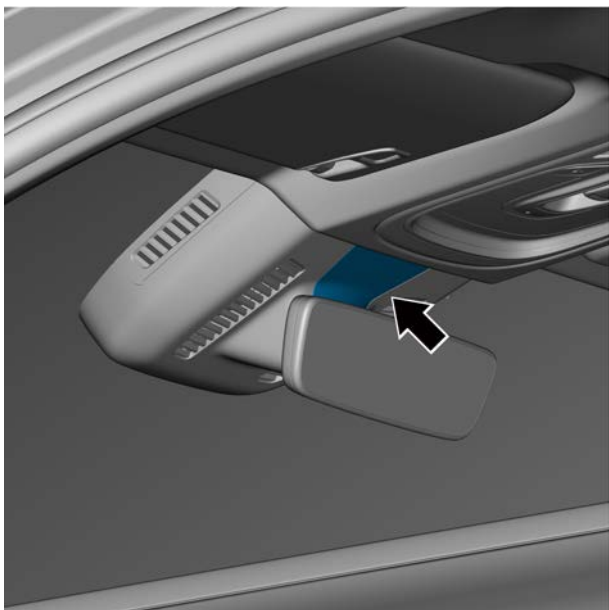
Removal procedure

Warning !

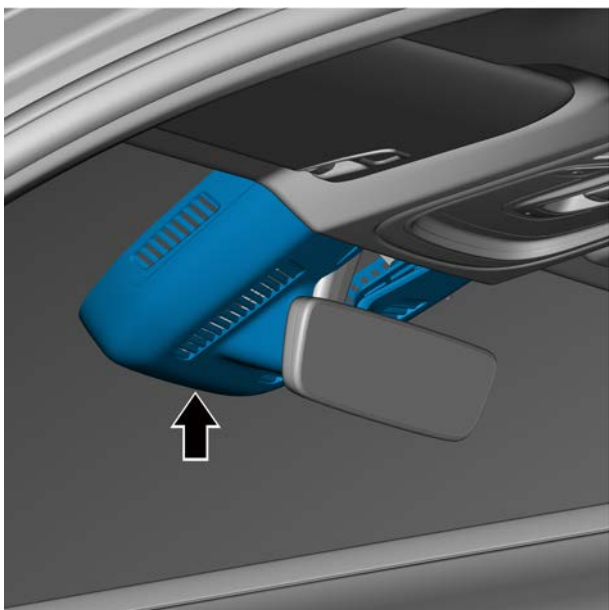
See "warning about disconnecting battery" in [Warnings and cautions](#).

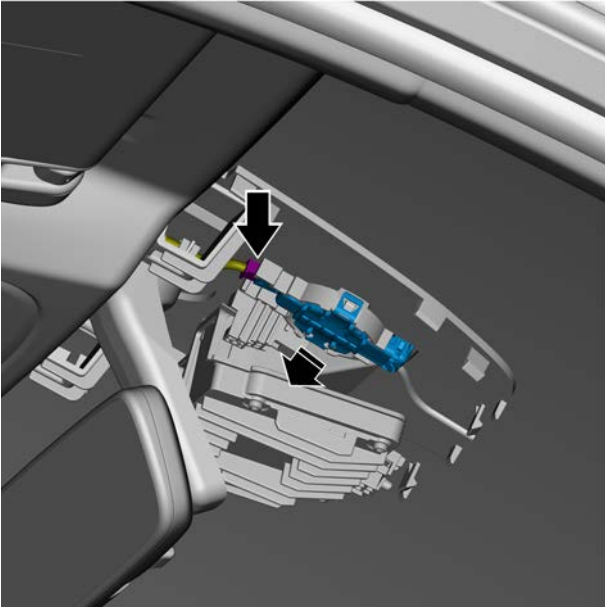
- 1 Open the engine compartment cover.

- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the rain and light sensor front trim cover.



- 4 Remove the rain and light sensor rear trim cover.

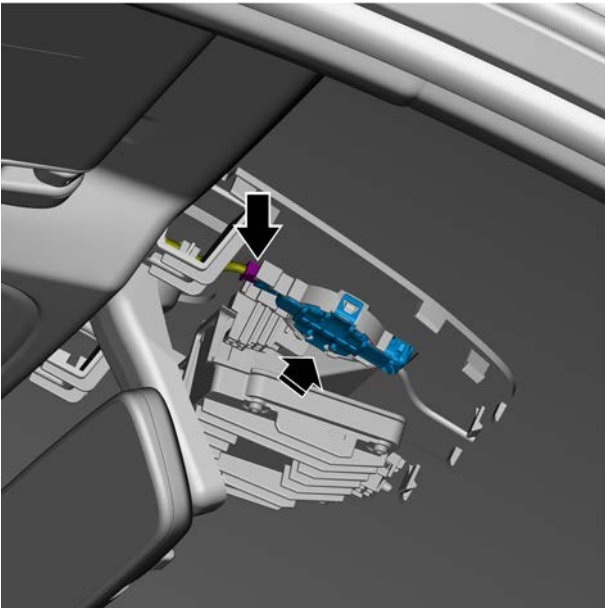




- 5 Remove the rain and light sensor.
- 6 Disconnect the rain and light sensor harness connector and remove the rain and light sensor.

Caution

When the removal is completed, make sure that the glass is clean and free of dust and other sundries.



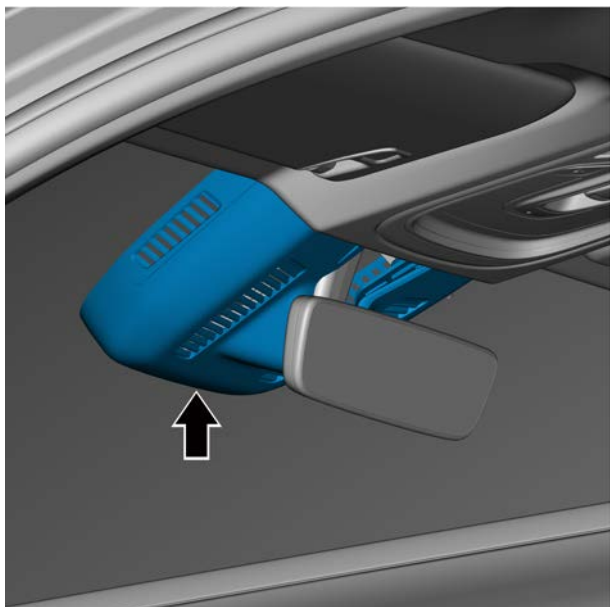
Installation procedure

- 1 Connect the harness connector of rainwater and light sensor.

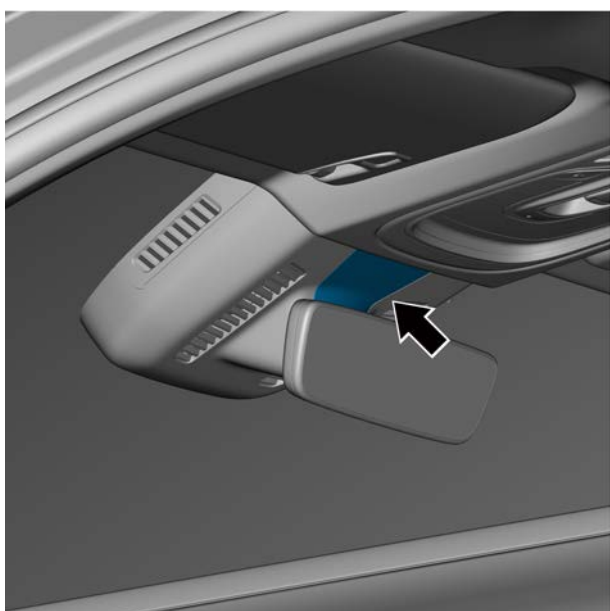
Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 2 Install the rainwater and light sensors.



- 3 Install the rain and light sensor rear trim cover.



- 4 Install the rain and light sensor front trim cover.

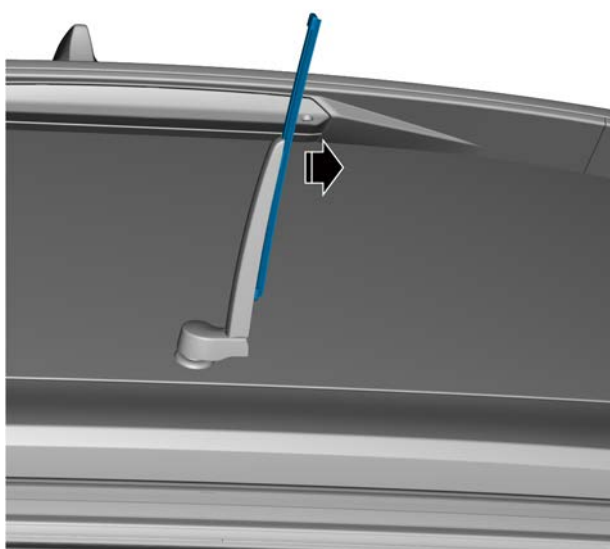
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

11.5.7.13 Replacement of wiper combination switch

See the [Replacement of the steering wheel module](#).

11.5.7.14 Replacement of the rear wiper arm with wiper assembly

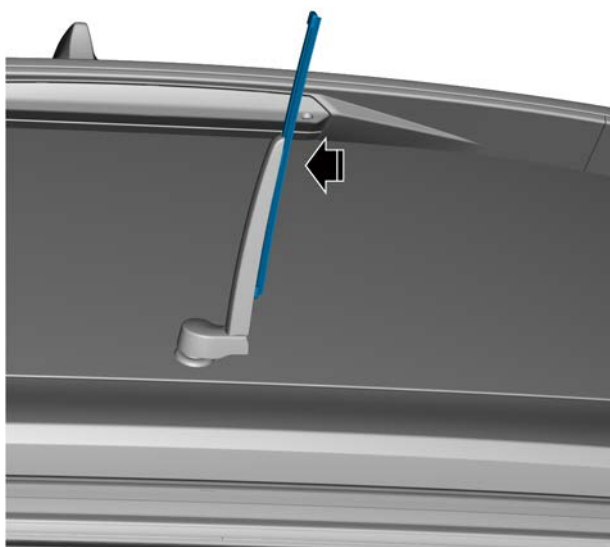
Removal procedure



- 1 Lifting rear wiper arm assembly.
- 2 Remove the rear blade assembly from the rear wiper arm outward in the direction of the arrow.

Installation procedure

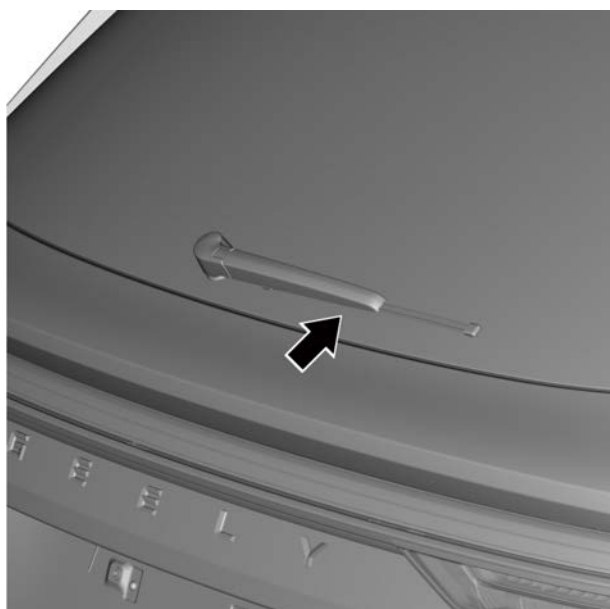
- 1 Install the rear blade assembly on the wiper arm.



- 2 Gently lower the rear wiper arm.

Caution

Don't damage the glass.



11.5.8 Special tools and equipment

11.5.8.1 Equipment

Protective belt
Torque wrench
Wire brush
Lubricating grease
Ohmmeter
Measure lead

11.6 Combination instrument/driver information system

11.6.1 Specification

11.6.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Screw-driver information module (fastener)	ST4.8×19	2.2~2.8	1.6~2.1
Screw-driver information screen (fastener)	ST4.8×19	2.2~2.8	1.6~2.1
Bolt-fasten head-up display and dashboard skeleton	M5×25	5~7	3.7~5.2

11.6.2 Instructions and operations

11.6.2.1 Instructions and Operations

The driving information display module transmits the driving information to the driver information screen through LVDS.

The driver information screen is the window of the vehicle status. Through the driver information screen, the driver can know some important information of the vehicle, such as engine speed, vehicle speed, engine water temperature, fuel meter, various legends and so on.

The driver information system consists of a driving information display module, a driver information screen, a head-up display (if equipped) and a steering wheel switch:

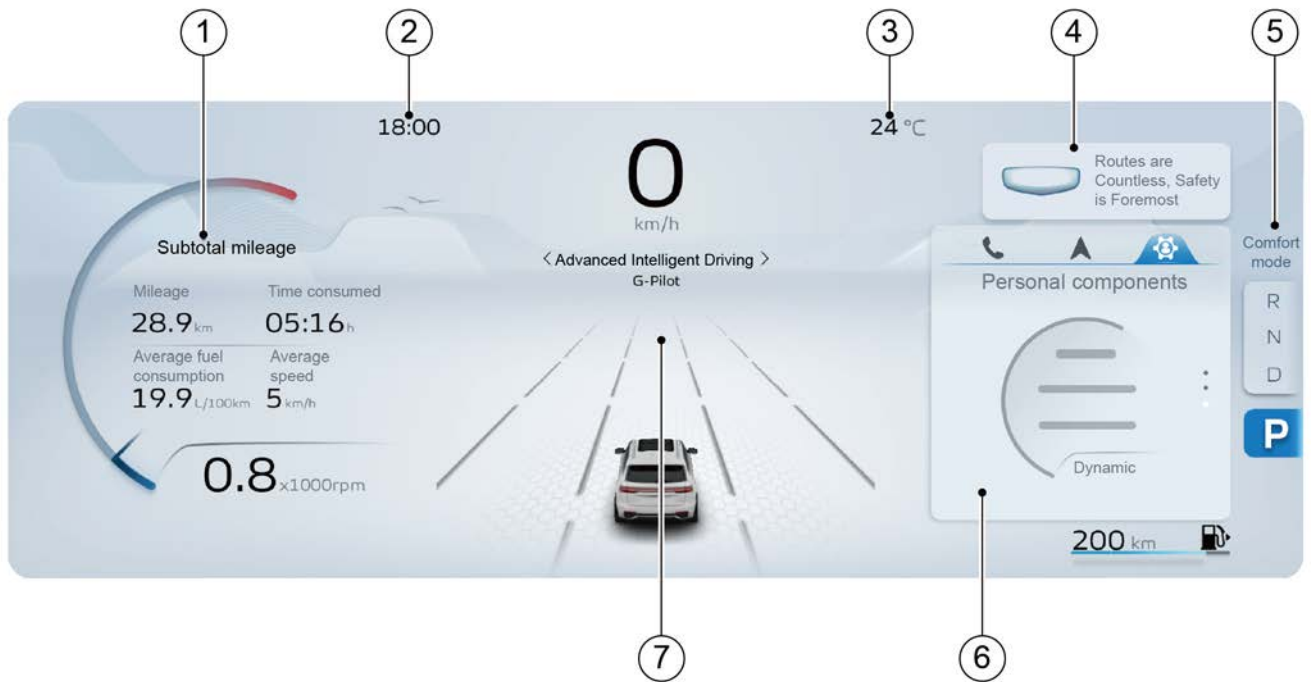
- The driver information screen-the core interaction of the driving function, displays the complete driving information, and cooperates with the steering wheel keys to complete the related operations of smart driving.
- Head-up display-the core driving information is displayed, and the content is displayed according to the switching information of the driving scene, and there is no operation logic.
- Steering wheel switch-the core input of instrument control, which enables users to operate smart driving and entertainment interconnection while keeping driving focused.

Driver information screen overview I



1.	Speedometer	3.	Engine coolant temperature gauge
2.	Fuel gauge	4.	Tachometer

Driver information screen overview II






Serial No.	Function area	Description
1.	Information menu display area	Display subtotal mileage, this mileage, vehicle status, tire status, door opening reminder and seat belt unfastened reminder.
2.	Clock display area	Clock: GPS time is displayed by default. Click: System settings → System → Time setting on the multimedia display screen. In this interface, the system time, time format, date format, automatic setting, time zone and daylight saving time can be set.
3.	Exterior temperature display area	Exterior temperature: the display range is -40 degrees Celsius ~ 85 degrees Celsius.
4.	Notification information display area	Display vehicle notification information, multimedia audio sources, weather, navigation and phone calls and other information.
5.	Driving mode, gear display area	<ul style="list-style-type: none"> • Driving mode: depending on the driver's current choice of driving mode, it is displayed as comfort mode, economic mode, sports mode, intelligent mode, snow mode, off-road mode (if equipped) or not. • Gear display: the current gear of the transmission can be displayed on the display screen. The following gears can be displayed: P, R, N, D, M.







Serial No.	Function area	Description
6.	Menu display area	Display menu functions on the combination instrument, including communication records, maps and navigation, personalized components, warning messages (very prominent).
7.	Current function information display area	Display smart driving function selection information, smart driving function identification information and smart driving function status information.



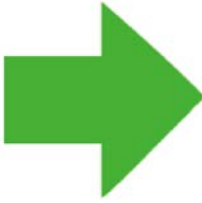



Warning and indicators















Warnings and Indicators Explanation

Name	Description	Image
Position lamp status indicator	Position lamp on	
	Position lamp fault.	
High beam lamp status indicator	High beam on	







Name	Description	Image
High beam lamp fault indicator	High beam lamp fault.	
Low beam lamp status indicator	Low beam lamp on	
Low beam lamp fault indicator	beam lamp fault	
Intelligence high beam control (AHBC) indicator*	Intelligent high beam on	
	Intelligent high beam fault.	
Manual leveling fault indicator	Manual leveling function fault.	







Name	Description	Image
Rear fog lamp working indicator	Rear fog lamp on	
Left Turn indicator	Left turn signal on	
Right Turn indicator	Right turn signal on	
Low speed emergency brake auxiliary system status indicator*	Low speed emergency brake auxiliary system off	
	Low speed emergency brake auxiliary system working	
	Low-speed emergency braking auxiliary system fault.	


Name	Description	Image
Engine emission fault warning indicator	Engine Emission for Fault	
Engine system fault warning indicator	Engine system fault	
Low oil pressure alarming warning indicator	Oil pressure is low	
Airbag failure warning indicator	Auxiliary constraint system fault	
Engine water temperature high warning indicator	High engine water temperature	
Engine start-stop system status indicator *	Engine start-stop system on	







Name	Description	Image
	Engine start-stop system working	
Constant speed cruise control system (CC) status indicator *	The constant speed cruise control system is on standby.	
	The constant speed cruise control system has been activated.	
Automatic emergency braking system (CMSF) failure warning indicator*	Automatic emergency braking system fault.	
Lane Keeping Assist (LKA) status indicator*	Lane maintenance assist system has been activated, but the system has not yet started to adjust	
	Lane maintenance auxiliary system fault.	




Name	Description	Image
Blind area monitoring status indicator *	The rear side medium range radar is working.	
	Always on: temporary failure of rear medium-range radar Flashing: the calibration of the rear medium-range radar is not completed.	
Power steering system (EPS) status indicator	EPS performance loss / temporary weakening	
	EPS fault	
Tire pressure monitoring system status indicator	Always on: the tire pressure of one or more tires is too low. Always on after flashing: fault of tire pressure monitoring system	
Adaptive Cruise Control system (ACC) status indicator *	Adaptive cruise control system is on standby	

Name	Description	Image
	Adaptive cruise control system is unavailable	
	Adaptive cruise control system is activated or in overspeed state	
Advanced Intelligent driving (G-Pilot) status indicator *	Advanced smart driving is on standby.	
	Both horizontal and vertical adjustments are not available.	
	The vertical adjustment is in the active state, and the horizontal adjustment is in the inactive state.	
	Both horizontal and vertical adjustments are activated.	

Name	Description	Image
Electronic stability control system (VDDM) status indicator	<p>Always on: electronic stability control system.</p> <p>Flashing: electronic stability control system working</p>	
VDDM OFF indicator	Electronic stability control system has been shut down.	
Hill descent control (HDC) status indicator	The HDC function is not available for the time being.	
	HDC function has been activated	
	HDC function has been turned on.	
Low fuel alarming warning indicator	Low fuel level	

Name	Description	Image
Brake system status indicator	Brake system fault	
	Electronic brake force distribution function fault, or low brake fluid level, or brake fluid level sensor fault, or electronic assist helplessness *, or hydraulic assist function weakening *	
ABS fault warning indicator	Anti-lock braking system fault.	
Seat belt warning indicator	Seat belt is not fastened, please fasten your seat belt	
Electronic parking brake system(EPB) status indicator	Always on: EPB function is enabled Flashing: EPB working, or EPB system fault	
Automatic parking (AUTOHOLD) status indicator	AUTO HOLD function activation	

Name	Description	Image
Warning level indicator	A serious failure has occurred, which may affect the driving performance of the vehicle.	
	There is a fault warning message / notification, and the corresponding text message appears on the combined instrument display screen.	
Battery Charge Fault warning indicator	Battery charging system fault.	
Automatic speed limit control system (LIM) status indicator *	The automatic speed limit control system is in standby state.	
	Automatic speed limit control system has been activated	
	The automatic speed limit control system has been activated, but the system is in the state of driver takeover.	

Name	Description	Image
Transmission status indicator	Transmission fault	
	Transmission performance degradation	
Brake lamp fault warning indicator	Brake lamp fault	

Caution

It is indicated as optional with *.

11.6.3 System working principles

11.6.3.1 System Working Principles

Fuel gauge

When the start switch is in mode II or the engine starts, the fuel meter shows the amount of fuel remaining in the fuel tank and the mileage that can last.

1. Show the amount of fuel left in the fuel tank

- The fuel meter shows the fuel storage in the tank. When the vehicle is driving on a bend or mountain road, the fuel quantity shown by the fuel meter will be slightly different from the actual fuel storage. On flat ground, when the start switch is in mode II or the engine starts, the fuel meter indicates the actual fuel storage.

- It is reasonable for the fuel to be kept above 1/4 of the fuel tank. If the warning indicator of low fuel level is on, refuel should be done as soon as possible.

- After refueling, the low fuel level warning indicator will go out automatically. If the warning indicator does not go out, please contact Geely Auto service station for maintenance as soon as possible.

- When going uphill or around the corner, due to the flow of fuel in the tank, the low fuel level warning indicator may be on earlier than usual.

Caution

It is easy to cause premature damage to the fuel pump and damage to the ternary catalytic purifier due to engine flameout when the vehicle works at low oil volume for a long time.

2. Show serviceable mileage

- Endurance range is used to display the miles that you can travel with the current fuel in tank. The system calculates the endurance mileage per second, and the value on the interface is updated every 10 seconds.

- The mileage value is calculated according to the fuel consumption per minute. Therefore, due to different road conditions and driving conditions, it is shown that the mileage is different from the actual driving distance. This value is for reference only. After each refueling, the last mileage will be reset.

- When the fuel sensor fails, the interface shows-km; according to driving habits, mileage can be displayed at least 0km, mileage can not be manually cleared.

Engine coolant temperature gauge

When the start switch is in mode II or when the engine starts, the water thermometer indicates the temperature of the engine coolant, and the temperature of the engine coolant varies according to the air temperature and the engine load.

If the engine coolant temperature gauge points to a red or higher-temperature area, you should stop the vehicle and let the engine cool down.

The engine may overheat under rigorous working conditions, such as:

- Long climb in hot weather.
- Slow down or stop after high-speed driving.
- Use A/C system and keep engine idling for a long time in heavy traffic.

Speedometer

The speedometer shows the current speed of the vehicle, in km/h unit, with a maximum scale of 260km/h.

You can drive at high speed on a good road, but for the sake of safety, stability and comfort, the speed on the ordinary road should not be higher than 120 km/h.

Tachometer

The tachometer indicates the engine speed per minute, in rpm units. The tachometer calibration range is 0 rpm~8000rpm, with 6500rpm ~ 8000rpm as the red zone of the tachometer.

It helps choose the right shift gear moment during driving to prevent the engine from overloading or overspeeding.

A high engine speed is apt to cause premature engine and high fuel consumption. In most cases, the engine is more fuel-efficient at low speeds.

Caution

Do not let the engine tachometer pointer reach the red area for a long time, this will cause serious engine damage.

Overspeed alarm

When the speedometer display value of the combined instrument is higher than the set overspeed alarm speed, the buzzer will be activated and “You have exceeded the speed limit, please drive safely!” will be displayed on the combined instrument display screen at the same time. Remind the driver to slow down and drive safely. The speed limit setting range is: 30~235 km/h. If the overspeed alarm is set to 120 km/h, when the speed is greater than 120 km/h, it will alarm to remind the driver to control the speed. When the vehicle speed is less than 117 km/h, the alarm is released.

Click on the multimedia display in turn: Vehicle sets → Driving assistance and safety → Overspeed alarm, under this interface, you can turn on or off the custom speeding alarm function, and you can also set the overspeed alarm value.

This mileage

This mileage shows the driving data information after the last zero clearance, including mileage, time consumption, average fuel consumption and average speed. The driving data included in this mileage are as follows:

- a. Mileage: the display range of this data is 0~9999.9km. On the multimedia display, click: System settings → System → Unit setting, in this interface, you can adjust the mileage unit to km or miles.
- b. Time-consuming: the maximum travel time shown in this data is 99:59. When it is checked that the engine is running, the cumulative travel time is calculated. When the engine is stopped or flamed out, the calculation is suspended.
- c. Average fuel consumption: this value is displayed by default in L/100km. After reset to zero, within 300m of the average fuel consumption shows --(unit). This information can help drivers adjust their driving habits to achieve the desired fuel consumption, and the interface is updated with a frequency of 10 seconds each time. If you want to measure the average fuel consumption in a particular driving cycle, reset the average fuel consumption to zero before starting to measure the fuel consumption. The amount of fuel injected at idle speed will be accumulated into the single fuel consumption. On the multimedia display, click: System settings → System → Unit setting, in this interface, you can adjust the fuel consumption unit to L/100km, km/L, mpg (US) or mpg (UK).
- d. Average speed: the average speed is calculated after the engine starts, and when the vehicle stops or stalls, the calculation is suspended. On the multimedia display, click: System settings → System → Unit setting, in this interface, you can adjust the speed unit to km/h or mph.

Caution

Fuel consumption varies with different driving modes. Please drive in an economical mode for energy saving and environmental protection.

Subtotal mileage

The subtotal mileage shows the driving data information of the vehicle after the last zero clearance, including mileage, time consumption, average fuel consumption and average speed.

The driving data contained in the subtotal mileage are as follows:

- a. Mileage: this display is updated every 0.1km or 0.1mile (depending on the unit setting). The display range is 0~9999.9km. When the maximum value is reached, the mileage display will be recalculated from 0.0. On the

multimedia display, click: System settings → System → Unit setting, in this interface, you can adjust the mileage unit to km or miles.

- b. When it is checked that the engine is running, the cumulative travel time is calculated. When the engine is stopped or flamed out, the calculation is suspended. After the engine is started, time is accumulated on the original basis. The data is updated at a frequency of 60 seconds each time. The displayed maximum travel time is 99:59.
- c. Average fuel consumption: the average fuel consumption after the last zero is displayed by default in L/100km. This information can help drivers adjust their driving habits to achieve the desired fuel consumption. The interface is updated with a frequency of 10 seconds each time. If you want to measure the average fuel consumption in a particular driving cycle, set the average fuel consumption to zero before starting to measure the fuel consumption, and you need to drive a long distance after zero to show the average fuel consumption again. After each ignition, the average fuel consumption uses the value of the last exit. On the multimedia display, click: System settings → System → Unit setting, in this interface, you can adjust the fuel consumption unit to L/100km, km/L, mpg (US) or mpg (UK).
- d. After the engine is started, the average vehicle speed is calculated. When the engine is stopped or flamed out, the calculation is suspended. The display value is updated every 10 seconds. On the multimedia display, click: System settings → System → Unit setting, in this interface, you can adjust the speed unit to km/h or mph.

Caution

Fuel consumption varies with different driving modes. Please drive in an economical mode for energy saving and environmental protection.

Vehicle status

1. Instantaneous fuel consumption: when the vehicle is driving, the instantaneous fuel consumption update frequency is once per second, which is displayed in L/100km. When the engine is running and the speed is less than 2 km/h, the instantaneous fuel consumption is displayed as L/100km. When the vehicle is taxiing without stepping on the accelerator pedal sensor, the instantaneous fuel consumption is displayed as 0. On the multimedia display, click: System settings → System → Unit setting, in this interface, you can adjust the fuel consumption unit to L/100km, km/L, mpg (US) or mpg (UK). The interface can help drivers adjust their driving habits to achieve the desired fuel consumption.

2. Oil level: the oil level can be fed back to the combination instrument through the liquid level sensor, and the current status can be displayed on the combination instrument display screen. When the start switch is in mode II or when the engine starts, switch the instrument combination driving computer interface to check whether the oil level information is normal.

3. Total mileage: shows the total mileage of the vehicle, the total mileage can not be cleared.

Tire state

You can have the pressure and temperature of the tires displayed on the instrument display screen.

On the multimedia display, click: System settings → System → Unit setting, in this interface, you can adjust the pressure unit to bar, PSI, or kPa. The temperature unit can also be adjusted to °C or °F.

- When the alarm of high tire temperature, tire leakage and low sensor electricity is activated, the corresponding alarm tire begins to flash, accompanied by sound alarm, and the text prompt interface pops up.

- High/low tire pressure alarm

When the tire pressure alarm is activated, the corresponding alarm tire begins to flash, the tire pressure monitoring system status indicator continues until the alarm is eliminated, accompanied by a sound alarm, and a text prompt interface pops up “After cold inflation to the standard tire pressure value, the the low tire pressure alarm is lifted”.

- System fault alarm

When the system fault alarm is activated, the corresponding alarm tire begins to flash, and the tire pressure monitoring system status indicator flashes for 60 seconds until the alarm is eliminated, accompanied by a sound alarm, and a text prompt interface pops up.

Caution

Restart the vehicle after flameout, after the combined instrument self-test, if the tire pressure value shows gray, it means that the tire pressure value is the last recorded tire pressure value, and when the vehicle reaches a certain speed, it will display the tire pressure in real time; if the tire pressure monitoring system status indicator is lit, you should pull over in time and contact Geely Auto service station for maintenance as soon as possible!

Energy saving guidance

Considering the current driving conditions, accelerator pedal sensor and brake pedal, the combined instrument shows the position of fuel-saving guide sign.

- When fuel-efficient driving, the guide sign is blue and close to the current speed, such as gentle driving.

- The vehicle will show energy-saving guidance only when it is in economic driving mode.

Driving score

When the start switch is turned off and there is no other alarm, the combined instrument shutdown interface will display a single fuel consumption driving score (the national owner ranking will be conducted for the vehicle driving mileage of about 300m or more): beat the owners of the national XX%.

Open door reminder

If any of the front engine bay hood, four doors and rear doors are not closed correctly, an alarm message will appear on the combined instrument to prevent accidental opening while the vehicle is running.

Head-up display

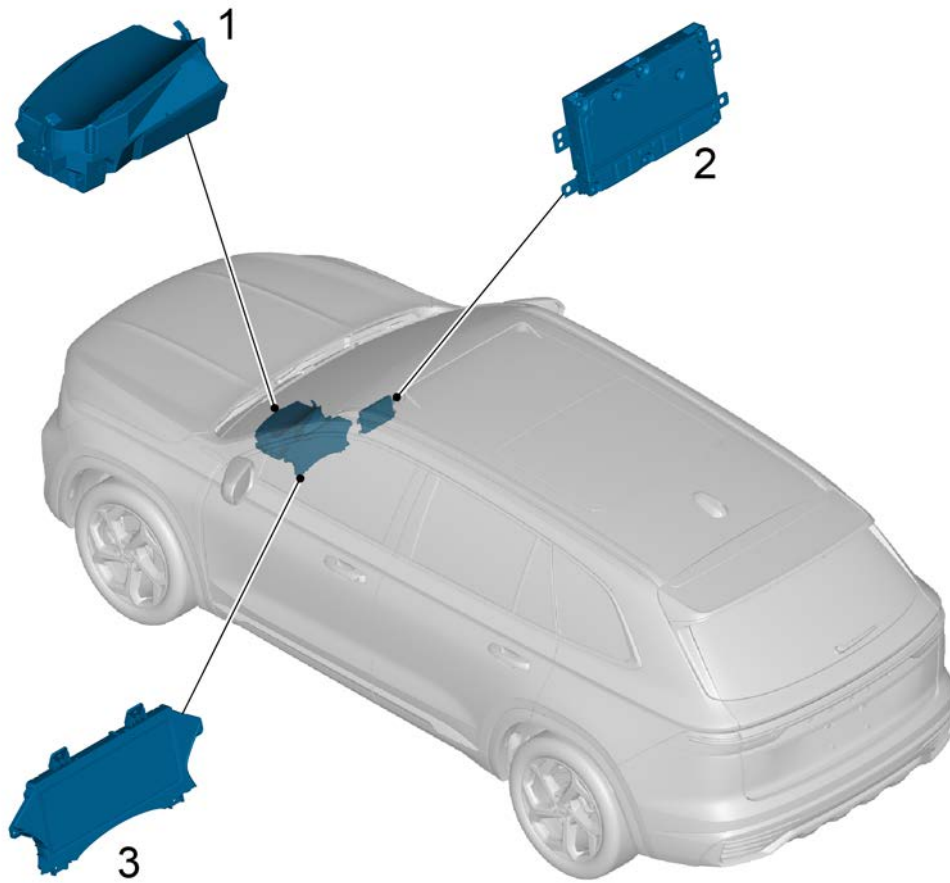
The head-up display is installed in the dashboard in front of the driver. The display area of the head-up display is below the windshield and about 4 meters in front of the window glass, and is represented by a virtual image. The driver can turn it on / off, and can also adjust the up and down position and brightness of the display.

Head-up display has two display modes, AR display mode and 2D display mode.

Within the scope of the head-up display screen, the display of navigation, smart driving system (ADAS) and other information will be in line with the real scene seen by the driver.

11.6.4 Component position

11.6.4.1 Component position

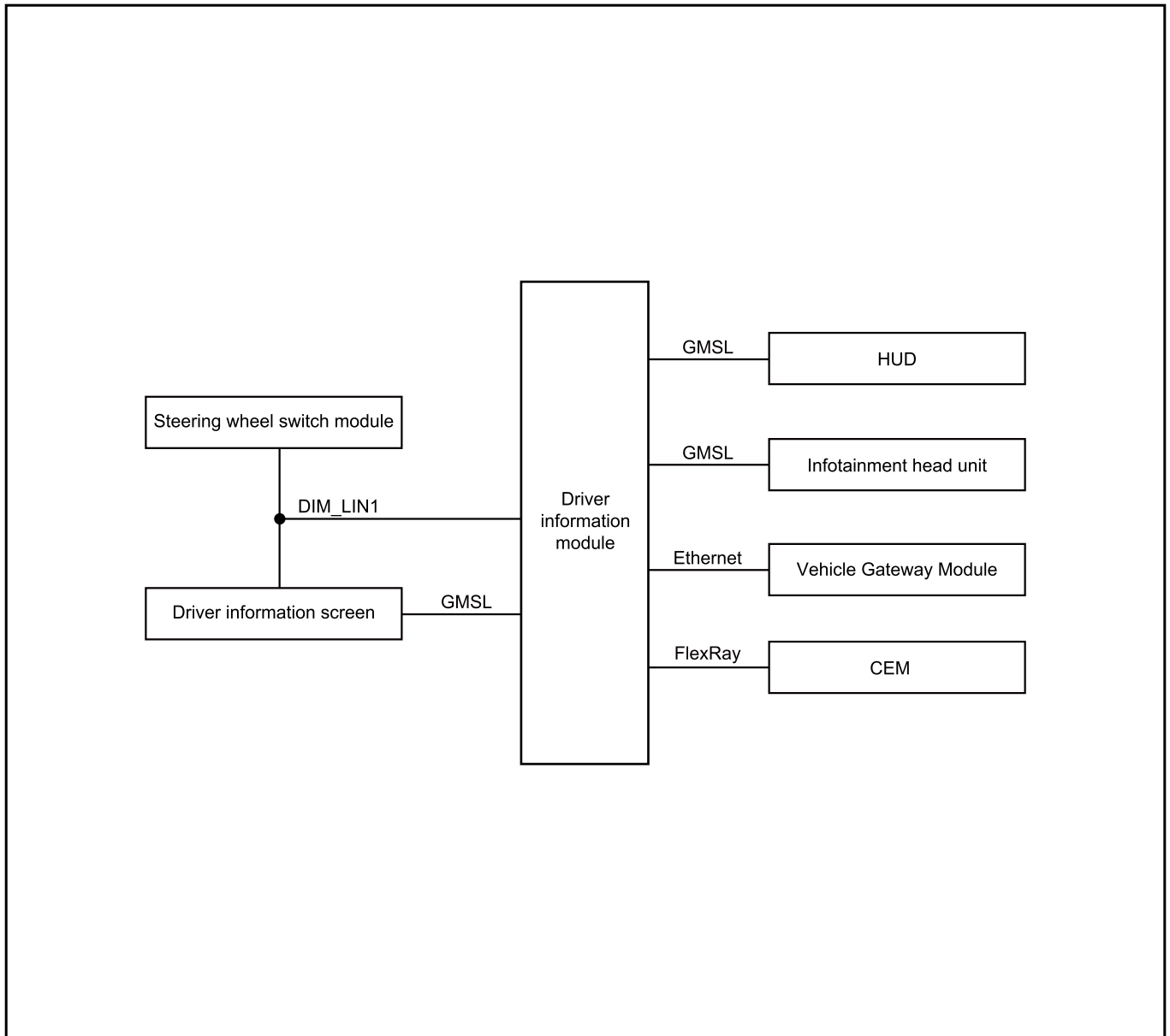


1. Head-up display (if equipped)
2. Driver information module

3. Driver information screen

11.6.5 Electrical schematic diagram

11.6.5.1 Electrical schematic diagram



11.6.6 Diagnostic information and procedures

11.6.6.1 Diagnosis Description

Before diagnosing the fault of the combined instrument / driver information system, refer to the [Description and operation](#) and the [Working principle of the system](#). Understand and familiarize yourself with operating principles of combination instrument/driver information system before starting system diagnosis. This helps to determine the correct fault diagnosis steps when a fault occurs. More importantly, it also helps to determine whether the situation described by the distributor is normal. Any fault diagnosis of combination instrument/driver information system should be started with visual inspection, and then the maintenance personnel are guided for the next diagnosis step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.6.6.2 Visual Check

- Check after-sales installations that may affect the operation of instrument cluster/driver information system. Make sure these installations will have no influence in the operation of instrument cluster/driver information system.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.
- Check and make sure the sensors of various instrument display information are normal.

11.6.7 Removing and installing

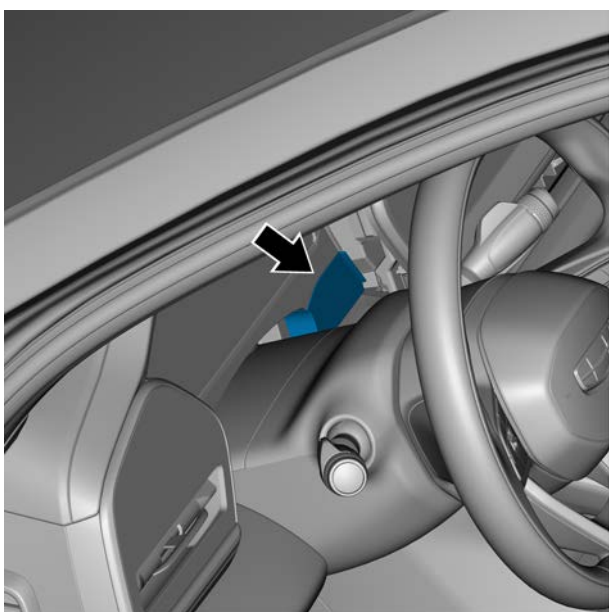
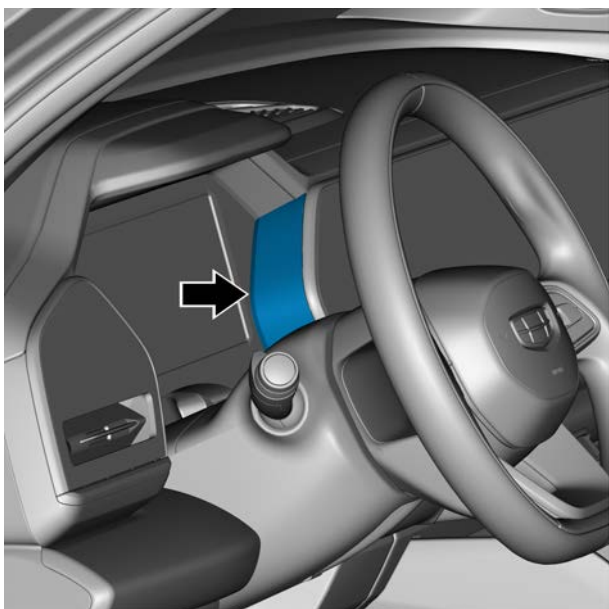
11.6.7.1 Replacement of driver information screen (Type 1)

Removal procedure

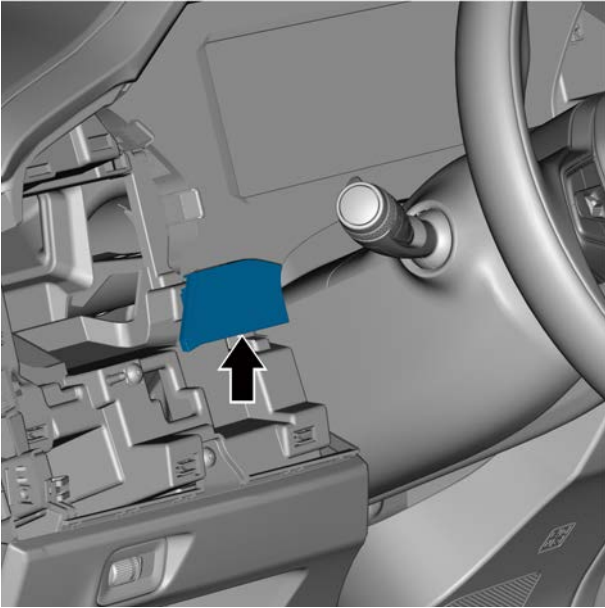
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

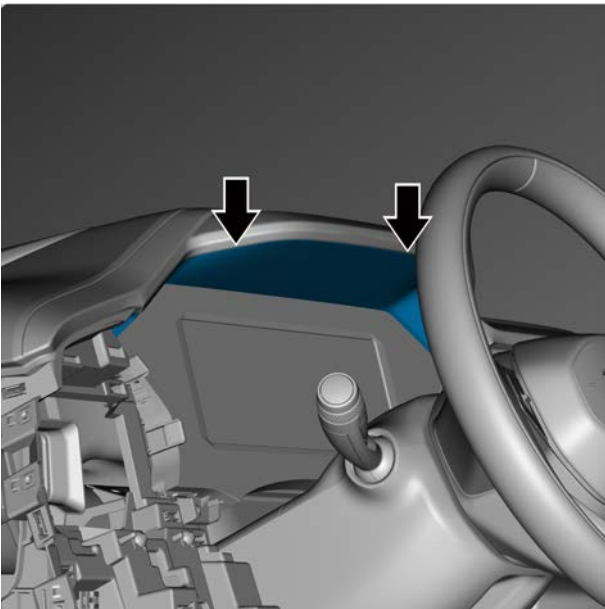
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left air conditioning outlet panel assembly and participate in the [Replacement of the left air conditioning outlet panel assembly](#).
- 3 Remove the central console displayer trim cover.



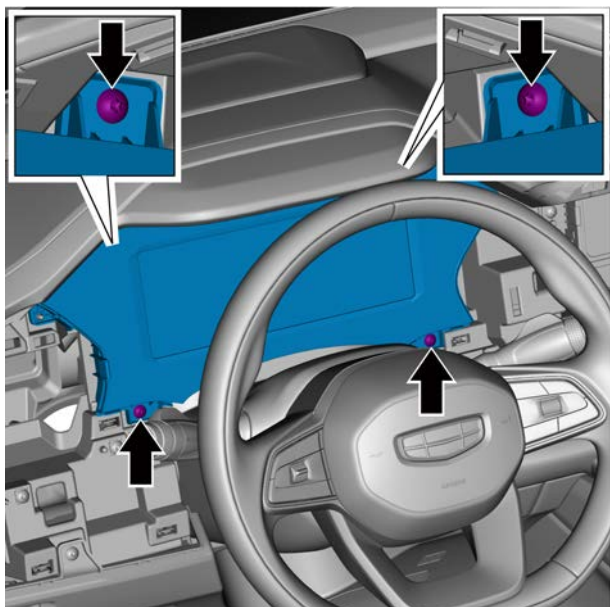
- 4 Remove the right cover assembly of the combined instrument pack mask.



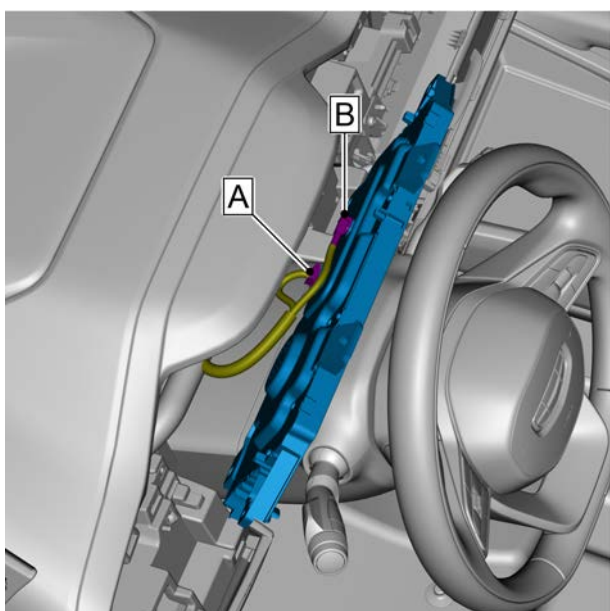
- 5 Remove the left cover of the combined instrument pack mask.



- 6 Remove the brim of the instrument cluster.

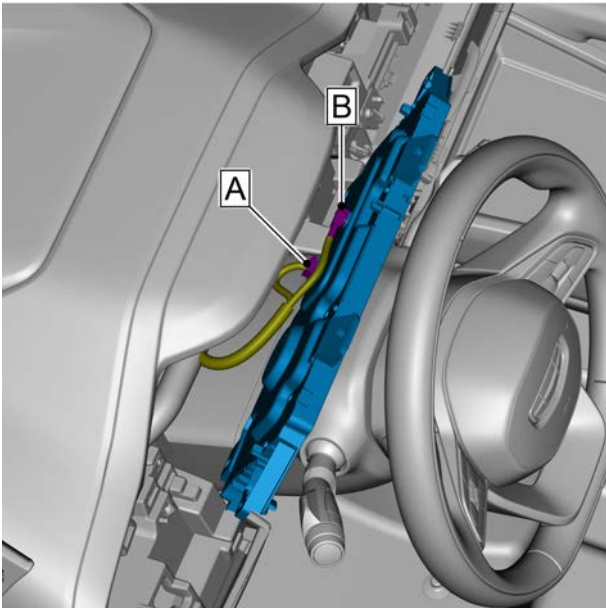


- 7 Remove the 4 retaining screws on the driver information screen.



- 8 Disconnect driver information screen harness connectors A and B and remove driver information screen.

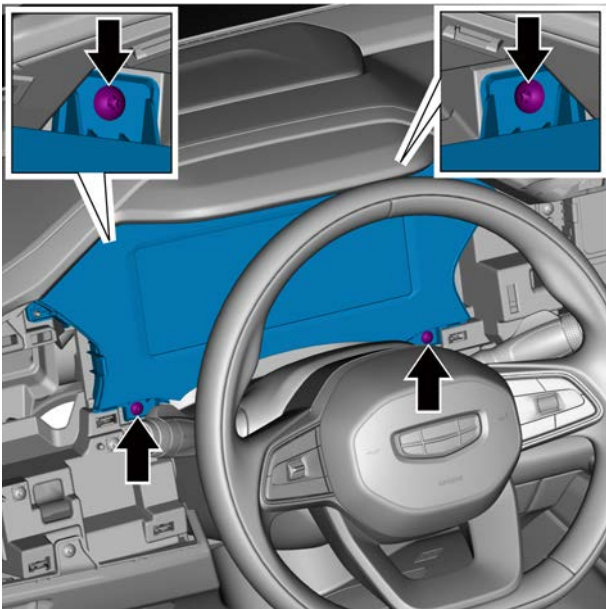
Installation procedure



- 1 Connect driver information screen harness connectors A and B.

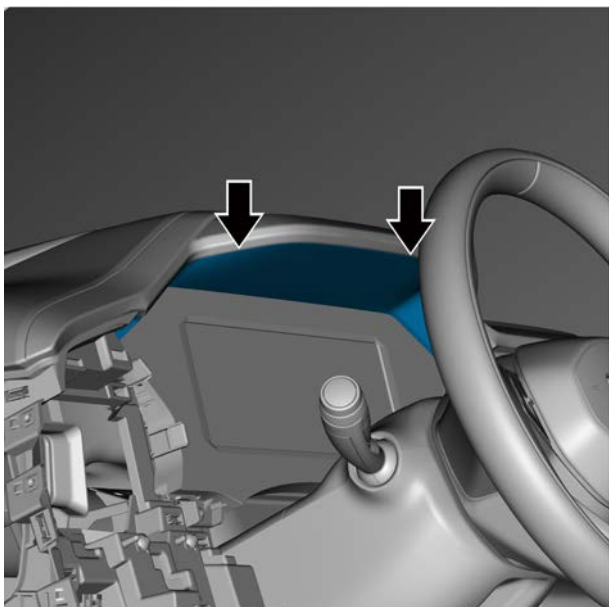
Caution

Secure the harness connection: “Connect, Click, and Confirm.”

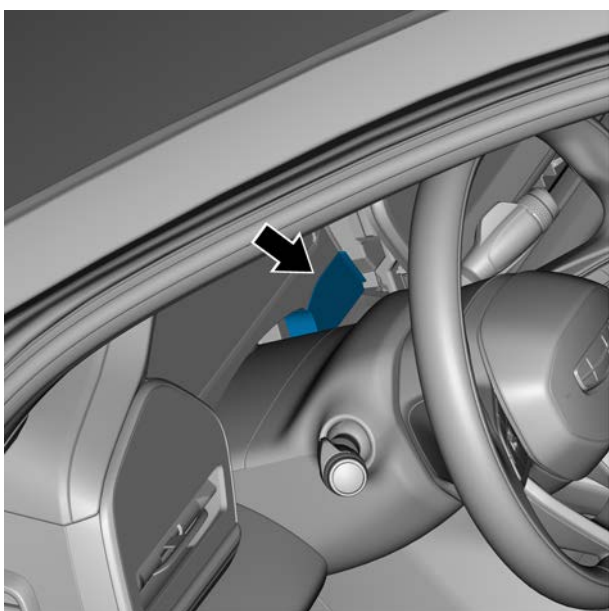


- 2 Install the driver information screen and fasten the 4 screws.

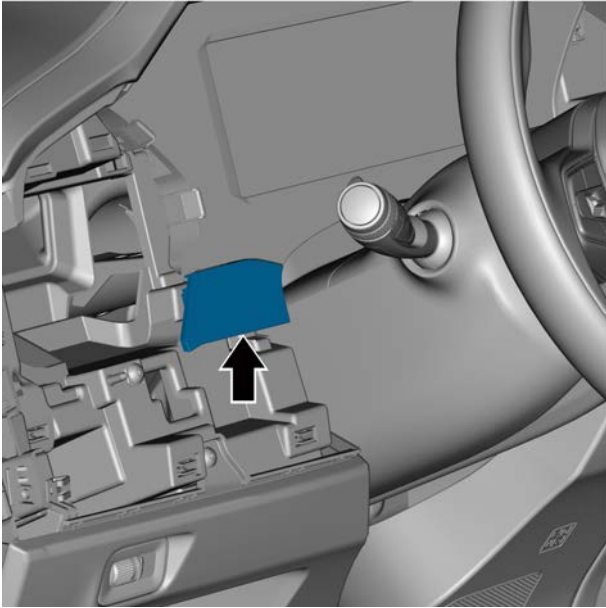
Torque: 2.5 N. m (metric system) 1.8 lb-ft (Imperial system)



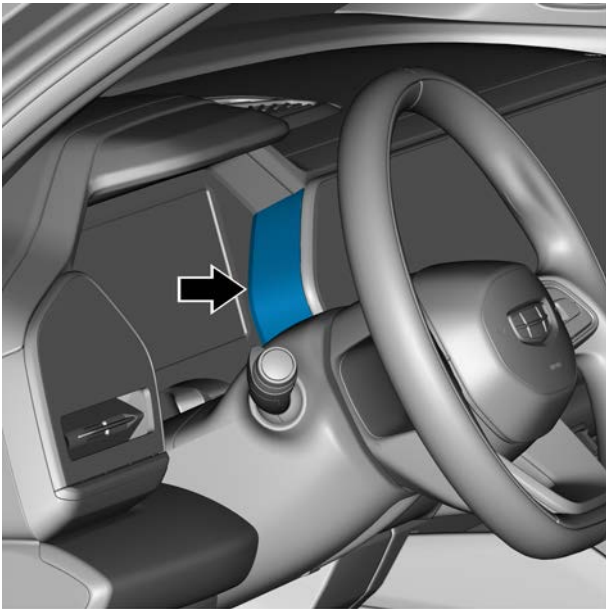
3 Install the brim of the instrument cluster.



4 Install the cover assembly on the right side of the combined instrument pack mask.



- 5 Install the left cover of the combined instrument pack mask.



- 6 Install the central console displayer trim cover.

- 7 Install the left air conditioning outlet panel assembly.
- 8 Connect the negative battery cable.
- 9 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

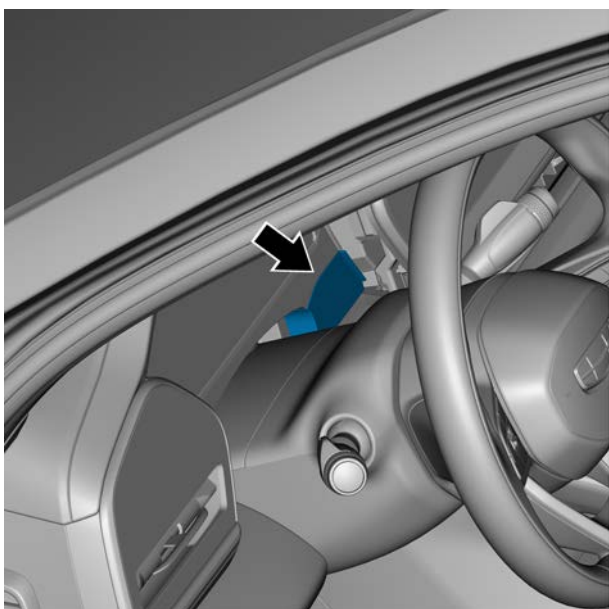
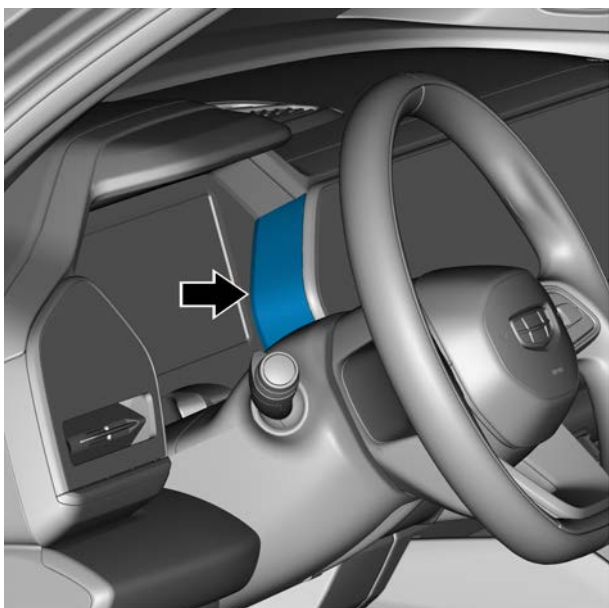
11.6.7.2 Replacement of driver information screen (Type 2)

Removal procedure

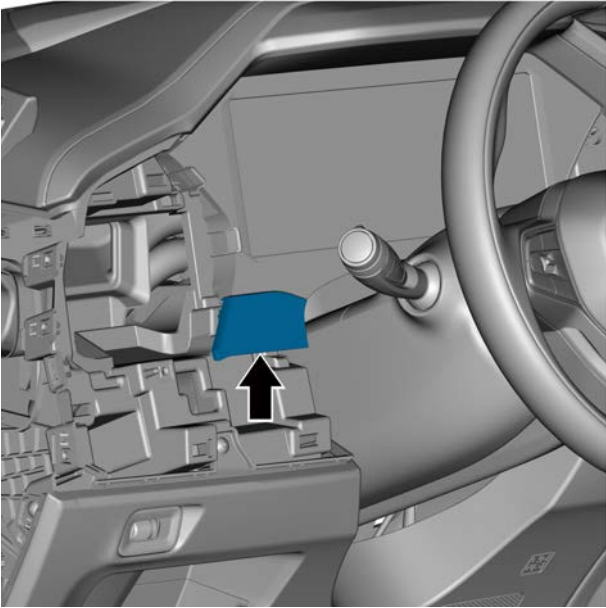
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

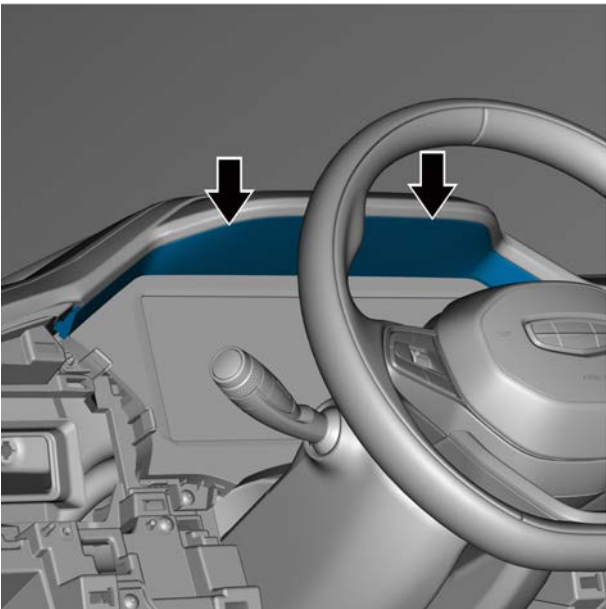
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left air conditioning outlet panel assembly and participate in the [Replacement of the left air conditioning outlet panel assembly](#).
- 3 Remove the central console displayer trim cover.



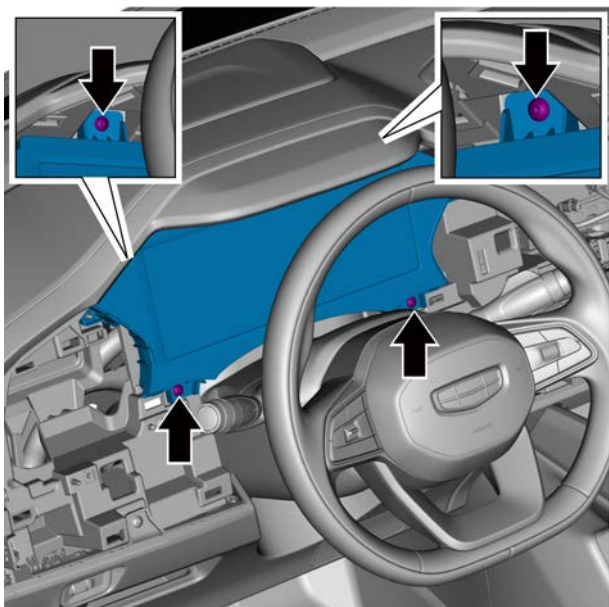
- 4 Remove the right cover assembly of the combined instrument pack mask.



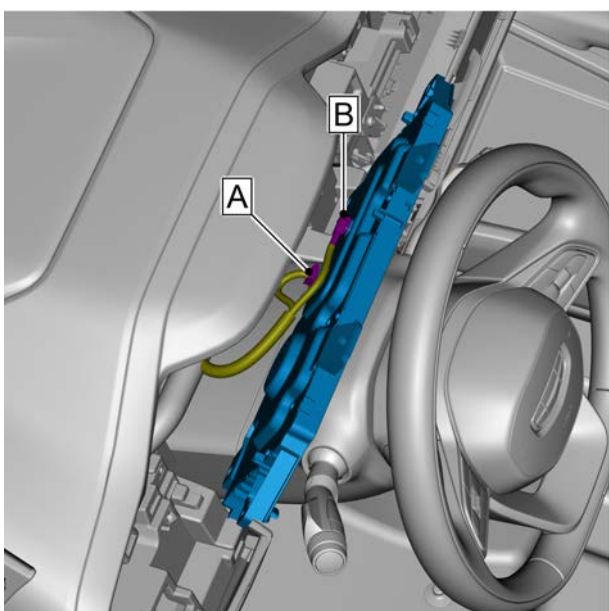
- 5 Remove the left cover of the combined instrument pack mask.



- 6 Remove the brim of the instrument cluster.

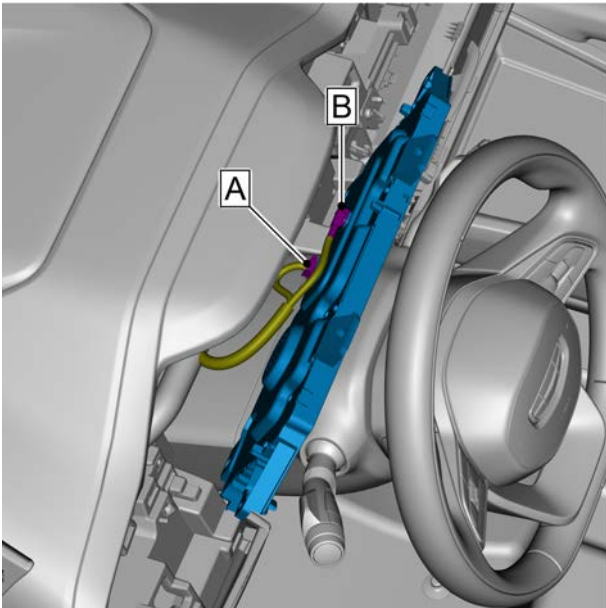


- 7 Remove the 4 retaining screws on the driver information screen.



- 8 Disconnect driver information screen harness connectors A and B and remove driver information screen.

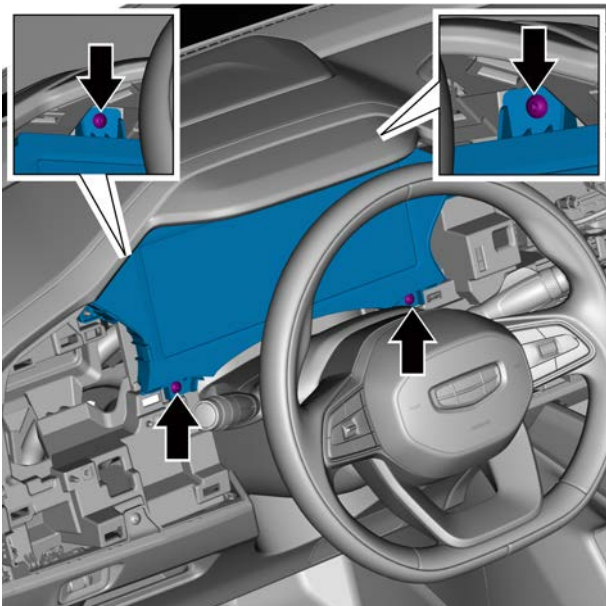
Installation procedure



- 1 Connect driver information screen harness connectors A and B.

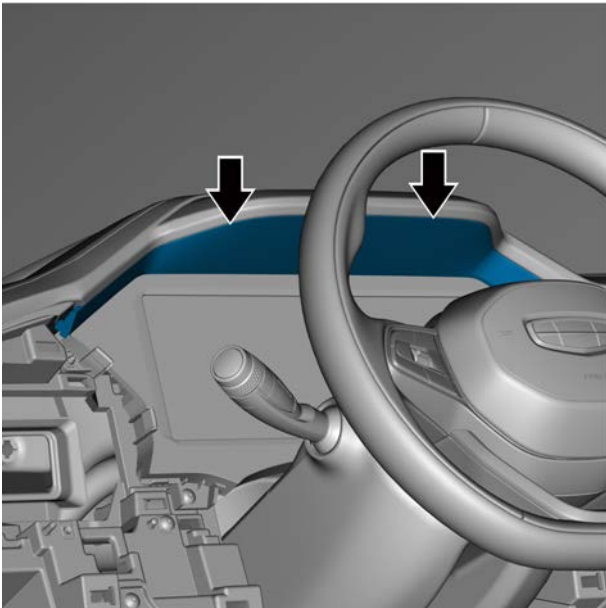
Caution

Secure the harness connection: “Connect, Click, and Confirm.”

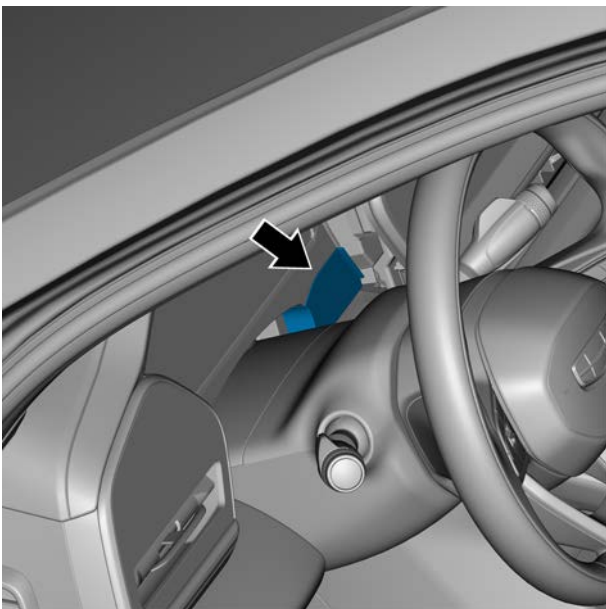


- 2 Install the driver information screen and fasten the 4 screws.

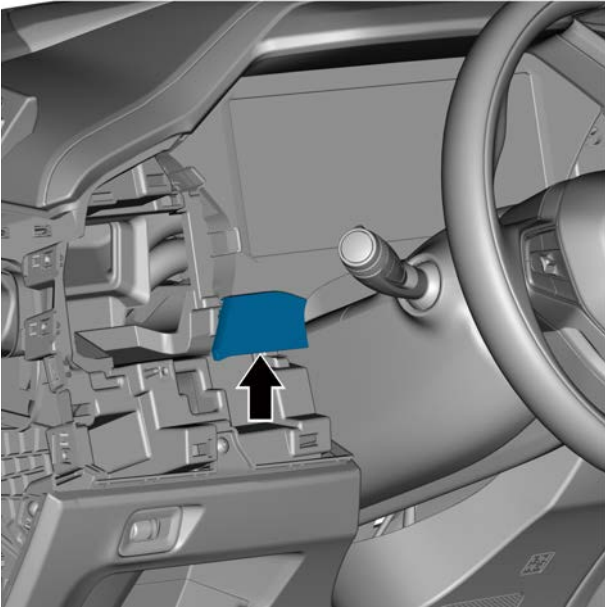
Torque: 2.5 N. m (metric system) 1.8 lb-ft (Imperial system)



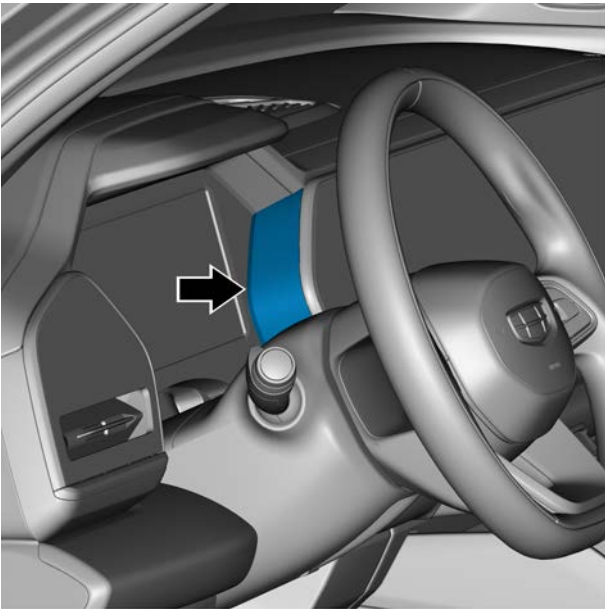
3 Install the brim of the instrument cluster.



4 Install the cover assembly on the right side of the combined instrument pack mask.



- 5 Install the left cover of the combined instrument pack mask.



- 6 Install the central console displayer trim cover.

- 7 Install the left air conditioning outlet panel assembly.
- 8 Connect the negative battery cable.
- 9 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

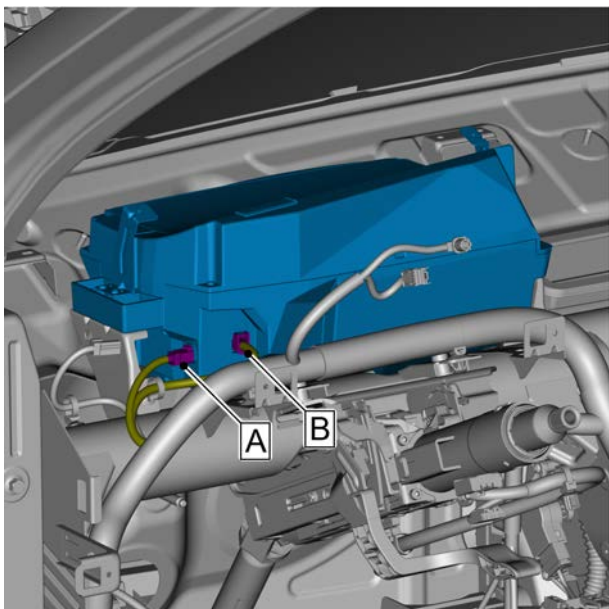
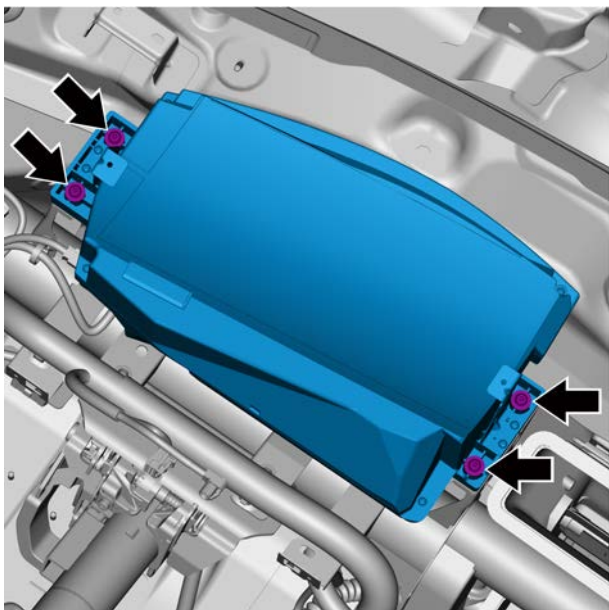
11.6.7.3 Replacement of head-up display

Removal procedure

Warning !

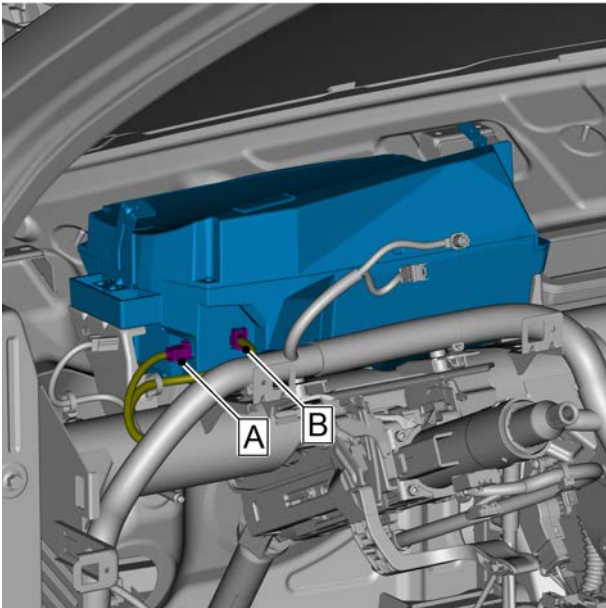
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove dashboard assembly, refer to [replacement of dashboard assembly](#).
- 3 Remove the 4 retaining screws of the head-up display.



- 4 Disconnect head-up display harness connectors A and B and remove head-up display.

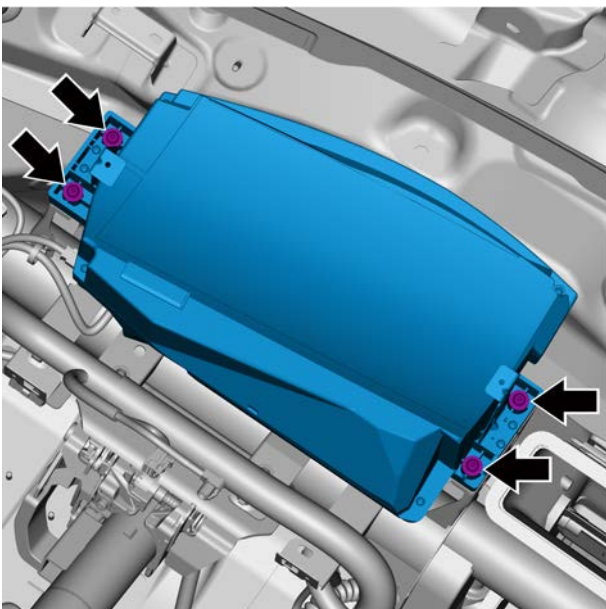
Installation procedure



- 1 Connect head-up display harness connectors A and B.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install head-up display and fasten 4 screws.

Torque: 6 N. m (metric system) 4.4 lb-ft (Imperial system)

- 3 Install the console assembly.
- 4 Connect the negative battery cable.
- 5 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

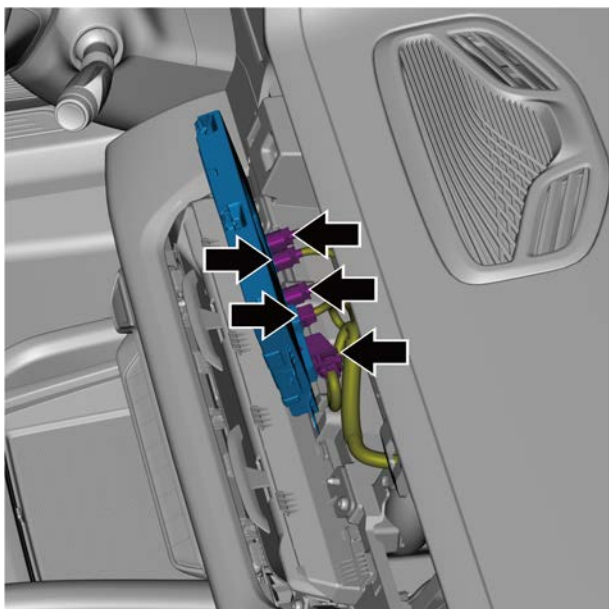
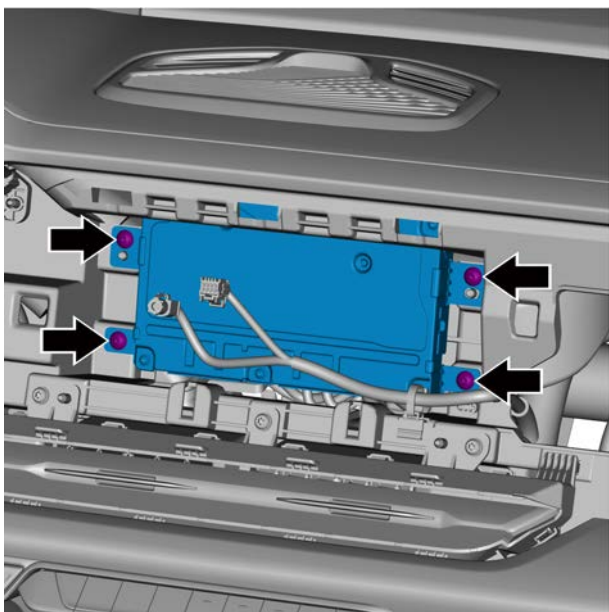
11.6.7.4 Replacement of driver information module

Removal procedure

Warning !

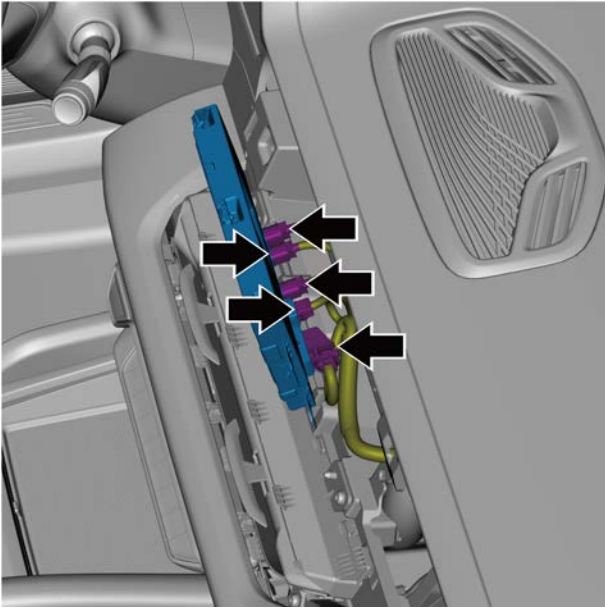
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the central console displayer, see [Replacement of the central console displayer](#).
- 3 Remove the 4 retaining screws of the driver information module.



- 4 Disconnect the 5 harness connectors of the driver information module and remove the driver information module.

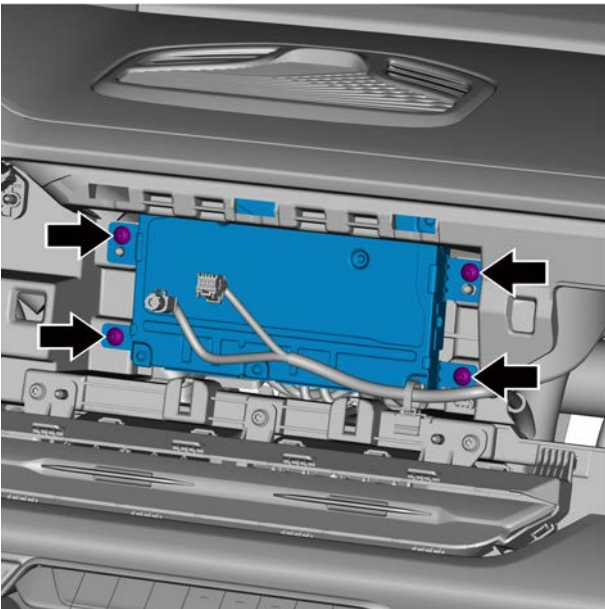
Installation procedure



- 1 Connect 5 harness connectors to the driver information module.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 2 Install driver information module and fasten 4 screws.
Torque: 2.5 N. m (metric system) 1.8 lb-ft (Imperial system)

- 3 Install the central console displayer.
- 4 Connect the negative battery cable.
- 5 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

11.7 Panoramic Sunroof

11.7.1 Specification

11.7.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Bolt-fasten sunroof assembly and sunroof reinforcement frame	M6×16	8~10	5.9~7.4

11.7.2 Instructions and operations

11.7.2.1 Instructions and Operations

The sunroof switch is located on the lamp control panel on the roof of the front room.

Caution

The sunroof switch can still be operated within 2 minutes of vehicle shutdown.

- When the vehicle is running, all occupants should keep their heads, hands and other parts of their body away from the opening of the sunroof, or otherwise the occupants may be injured in emergent brake or unexpected accidents.
- When the sunroof is working, do not put your head and other parts of your body out of the sunroof.
- Make sure that the smart key is not left in the car when you leave the car.
- Do not leave the child alone in the car to avoid serious accidents caused by playing with the sunroof switch.
- When closing the sunroof, make sure that all occupants' heads, hands and other parts of their body are away from the opening of sunroof.
- Do not sit around opening of sunroof.

If children have accident related to sunroof in vehicle, guardian shall bear the responsibility for the accident.

When there is frozen ice on the sunroof, do not open the sunroof so as to avoid damaging the sunroof parts due to overloading of sunroof.

Sunroof operating conditions

Before the sunroof operation, the start switch should be in mode I or mode II.

Temperature requirement

- When the temperature is -20 ~ 85 degrees Celsius: sunroof and sunroof sunshade are fully functional, can be operated normally, respond to intelligent keys and voice commands.
- When the temperature is -30 ~ -20 degrees Celsius: the sunroof only has manual closing function, no anti-clamping function. Do not respond to smart keys and voice commands; sunroof sunshade only manual operation function, no automatic operation function, no anti-clamping function. Do not respond to smart keys and voice commands.

Sunroof opening/closing

Automatic operation of sunroof

After the sunshade curtain is fully opened, push the sunroof switch back to the limit position and release it, and the sunroof glass automatically runs to the maximum open position.

Push the sunroof switch forward to the limit position and release it, and the sunroof glass automatically runs to the completely closed position.

During the automatic operation of the sunroof glass, if you operate the switch in the opposite direction, the sunroof glass will stop running.

Sunroof running fast

Push the sunroof switch back to the limit position twice in a row and release it, and the sunroof glass and the sunshade curtain will open automatically at the same time.

After pushing the sunroof switch forward to the limit position twice in a row, the sunroof glass and the sunroof sunshade will be closed automatically at the same time.

During the rapid operation of the sunroof, press the switch again and the sunroof will stop running.

Sunroof manual operation

When the sunshade curtain of the day window has been fully opened, push the sunroof switch back to the position 1, the sunroof glass will be manually opened, release the sunroof switch and the acquired window glass will stop running.

Push the sunroof switch forward to the position 1, the sunroof glass will be manually closed, release the sunroof switch and the window glass will stop running after tomorrow.

Turn the sunroof on / off through the multimedia display

Click on the multimedia display in turn: Vehicle sets → Vehicle basic settings → Sunroof and sunshade, then select the Sunroof in the interface and click to open or close as needed. During the operation of opening or closing the sunroof, an animated example of the sunroof will also be displayed on the multimedia display screen.

Comfortable position of sunroof

The sunroof glass is in the position of about 70% of the full open stroke, where the noise of the whole vehicle is the least when the vehicle is driving at high speed.

When the speed is more than 5 km/h, open the sunroof through manual / automatic operation mode, the sunroof will first run to a comfortable position, and then open the sunroof through manual / automatic operation mode again, the sunroof glass can run to the fully open position.

Lifting on/off

Flying up opening

Press the end of the sunroof switch up and open the sunroof.

Flying up closing

If the sunroof is in the warped open position, dial down the end of the sunroof switch, and the sunroof is closed.

The sunroof glass can not be suspended through the sunroof switch during the operation of the sunroof on / off, and the sunroof glass will automatically run to the fully warped or completely closed position.

Close sunroof remotely

When the start switch is closed, and the refueling cover, the back door, the front engine bay hood and the four doors are all closed, press the lock key of the smart key for a long time, and the sunroof closes until it is completely closed.

Anti-pinch protection

Tilting anti-pinch

- When the sunroof glass is warped, if you encounter obstacles, the warping action stops.
- When the sunroof glass is closed in the warped position, if you encounter obstacles, the sunroof glass will return to the fully warped position.

Sunroof glass and sunshade curtains

- Sunroof glass or sunroof sunshade when sliding open, if you encounter obstacles, will return to 5mm or to the completely closed position.
- When the sunroof glass or sunshade is sliding and closed, if you encounter an obstacle, it will return to 200mm or to the fully open position.

Caution

When the sunroof is running, if an anti-clamping occurs, the anti-clamping function and automatic operation function will be suspended within 10 seconds (that is, only the sunroof can be operated manually at this time). After 10 seconds, the anti-clamping function and automatic operation function are restored.

Automatically close windows on rainy days * (if equipped)

When the vehicle is flameout and locked and fortified, when the sunroof and electric window are opened, if it suddenly rains, the vehicle can automatically close the sunroof and electric window.

Caution

If the window / sunroof has not gone through self-learning, the window cannot be closed automatically on rainy days.

Ice breaking function

After the window glass / sunroof sunshade has triggered the anti-clamping function once, the ice-breaking function will be activated, and the anti-clamping function will no longer be supported when running the sunroof / sunroof sunshade in the same direction again. After the ice breaking function is activated, the system will only support manual operation, and the automatic operation command of the switch will also be regarded as a manual operation command.

When the following events occur, the ice-breaking function will be removed and the anti-clamping function will be reactivated:

- After 10 seconds, the anti-clamping function and automatic operation function are restored.
- After the next run stops.
- Operate the switch in the opposite direction.
- Remote control operation.

11.7.3 System working principles

11.7.3.1 System Working Principles

The basic structure of automobile electric sunroof is mainly composed of sliding mechanism, driving mechanism, control system, switch and so on. The operation principle of each part of the structure is as follows:

a. Sliding mechanism

The electric sunroof sliding mechanism is mainly composed of guide block, guide pin, connecting rod, bracket, front and rear pillow seats, etc.

b. Driving mechanism

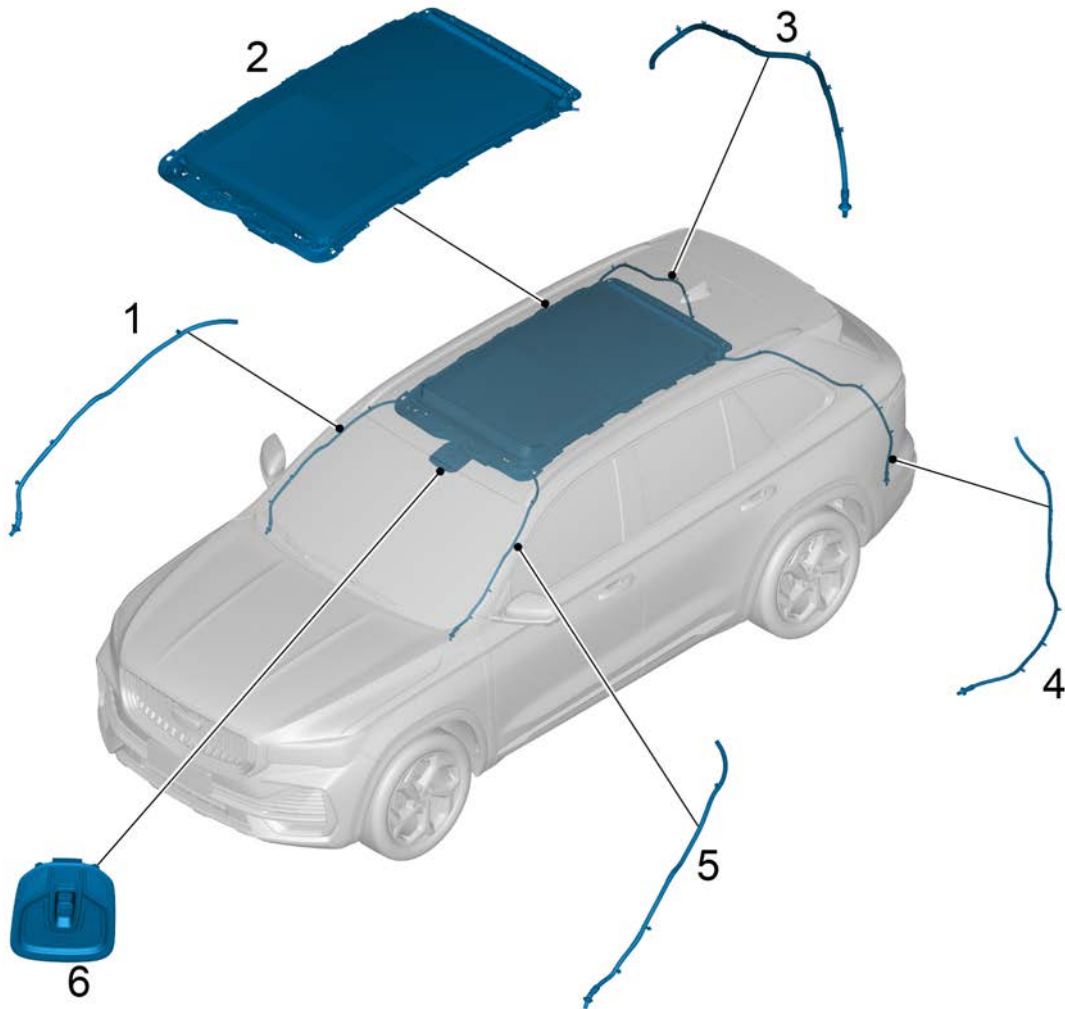
The driving mechanism of electric sunroof is mainly composed of motor, transmission mechanism and sliding screw.

Motor: provides power to the opening and closing of the sunroof through the transmission. The motor can rotate in both directions, that is, by changing the direction of the current to change the rotation direction of the motor, to realize the opening and closing of the sunroof.

Transmission mechanism: the transmission mechanism is mainly composed of worm gear and worm transmission mechanism, intermediate gear transmission mechanism (active intermediate gear, transition intermediate gear) and driving gear. The gear transmission mechanism accepts the power of the motor, changes the rotation direction, and after decelerating and increasing the torque, the power is transmitted to the sliding screw to open and close the sunroof; at the same time, the power is transmitted to the cam, which makes the cam touch the limit switch to open and close. The active intermediate gear and the worm gear are fixed on the same shaft and rotate with the worm gear synchronize; the transition intermediate gear and the driving gear are fixed on the same output shaft and are driven by the active intermediate gear so that the driving gear drives the glass to open and close.

11.7.4 Component position

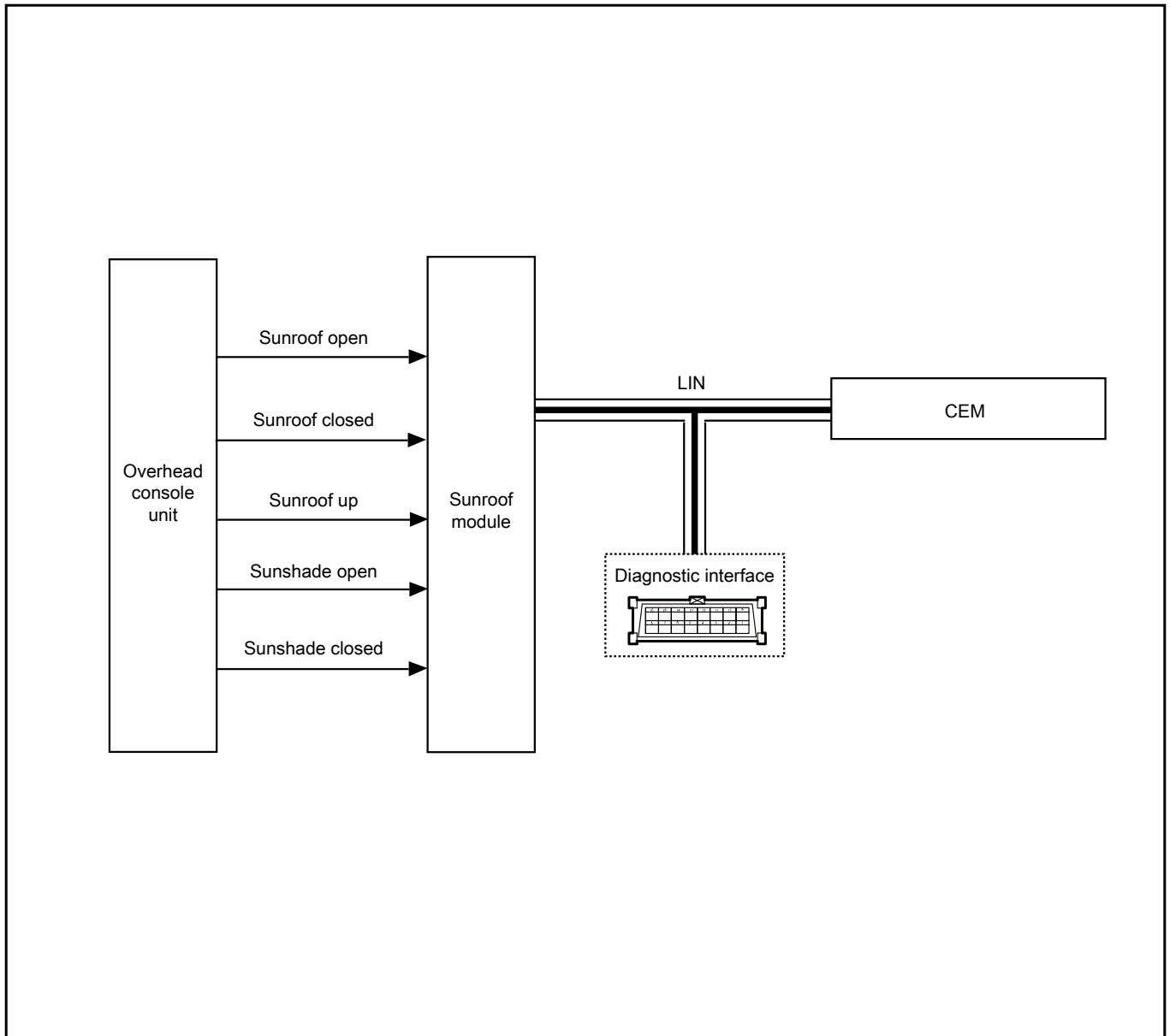
11.7.4.1 Component position



- | | | | |
|----|------------------------------------|----|--|
| 1. | Sunroof front right hose assembly | 4. | Sunroof rear left hose assembly |
| 2. | Sunroof module (panoramic sunroof) | 5. | Sunroof front right hose assembly |
| 3. | Sunroof rear right hose assembly | 6. | Overhead console unit (sunroof switch) |

11.7.5 Electrical schematic diagram

11.7.5.1 Electrical schematic diagram



11.7.6 Diagnostic information and procedures

11.7.6.1 Diagnosis Description

Before diagnosing the fault of the sunroof module (panoramic sunroof), see the [Description and operation](#) and the [Working principle of the system](#). Understand and familiarize yourself with the working principle of the sunroof, and then start system diagnosis. This will help to confirm the correct fault diagnosis steps when the fault occurs. More importantly, it can also help to confirm whether the situation described by the distributor is normal operation. Any fault diagnosis of the sunroof module (panoramic sunroof) should take the [Routine inspection](#) as the starting point and guide the repairman to take the next diagnosis step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.7.6.2 Visual Check

- Check for after-sales equipment that may affect the operation of the sunroof module (panoramic sunroof) to ensure that these devices do not affect the operation of the sunroof module (panoramic sunroof).
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

11.7.6.3 Sunroof initialization learning

Sunroof self-learning condition

When the temperature is greater than 0 degrees Celsius, the start switch is in mode II and the speed is less than 5 km/h, sunroof self-learning can be carried out.

Caution

[It is recommended to operate self-learning in the engine start-up state.](#)

There are four kinds of sunroof self-learning, namely, sunroof no position self-learning, sunroof position self-learning, sunroof position offset self-learning, sunroof false anti-clamping self-learning.

Sunroof no position self-learning

At this time, the sunroof has no open function and automatic operation function, and can only be closed manually.

The self-learning methods are as follows:

1. Push the sunroof switch forward to the position 1 (do not let go, do not push the sunroof switch to the limit position).
2. At this time, the operation logic of the sunroof self-learning is: the sunroof glass and the sunroof sunshade will run until it is completely closed → fully open → completely closed.
3. On the same day, the window glass and the sunroof sunshade curtain run for the second time until they are completely closed and there is no follow-up operation, then the sunroof self-learning is completed.

The sunroof positon self-learning.

At this point, the sunroof can be run manually or automatically.

The self-learning methods are as follows:

1. Release the sunroof switch after running both the sunroof glass and the sunroof sunshade to the fully closed position.
2. Push the sunroof switch forward to the position 1 and hold for more than 10 seconds.
3. At this time, the operation logic of the sunroof self-learning is: the sunroof glass and the sunroof sunshade will run until it is completely closed → fully open → completely closed.
4. On the same day, the window glass and the sunroof sunshade curtain run for the second time until they are completely closed and there is no follow-up operation, then the sunroof self-learning is completed.

Sunroof position offset self-learning

At this time, the sunroof cannot be automatically closed to the full-off position (when the sunroof glass runs to the full-off position, the anti-clamping function will be triggered and returned).

The self-learning methods are as follows:

1. Push the sunroof switch forward to the limit position and release it, and the sunroof glass automatically runs to the fully closed position to trigger the anti-clamping position and return.
2. Within 10 seconds after the end of the trigger anti-clamping, push the sunroof switch forward to the position 1, trigger the ice-breaking function, and make the sunroof glass run to the completely closed position. At this point, the sunroof will be blocked (the sound of motor blocking can be heard).
3. Release the sunroof switch, push the sunroof switch forward again to the position 1, and the sunroof will block again.
4. Keep pressing the sunroof switch forward and hold for more than 10 seconds.
5. At this time, the position of the sunroof is actively lost and goes into a state of no position.
6. Start self-learning again, and the follow-up self-learning method is consistent with "sunroof no position self-learning".

Sunroof false anti-clamping self-learning

The sunroof does not encounter any obstacles in the process of automatic closing, so the sunroof triggers the anti-clamping and returns.

The self-learning methods are as follows:

1. Push the sunroof switch forward to the limit position and release it, and the sunroof triggers the anti-clamping and returns.
2. Within 10 seconds after the end of the trigger anti-clamping, push the sunroof switch forward to the position 1, trigger the ice-breaking function, and make the sunroof glass run to the completely closed position.
3. Start self-learning again, and the follow-up self-learning method is consistent with "sunroof position self-learning".

11.7.7 Removing and installing

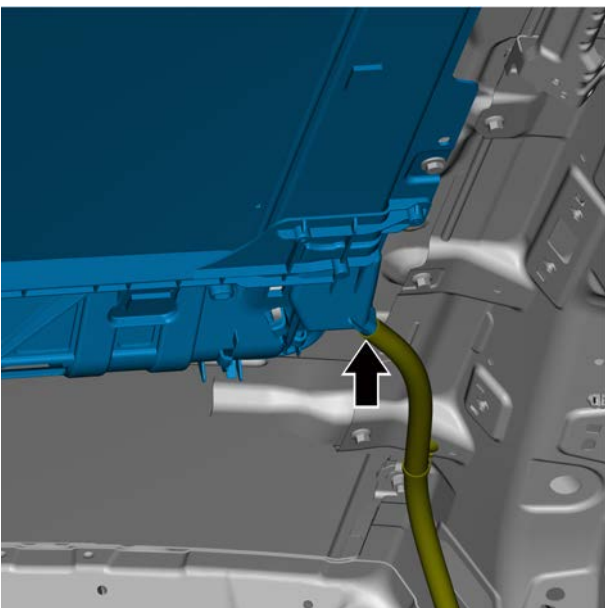
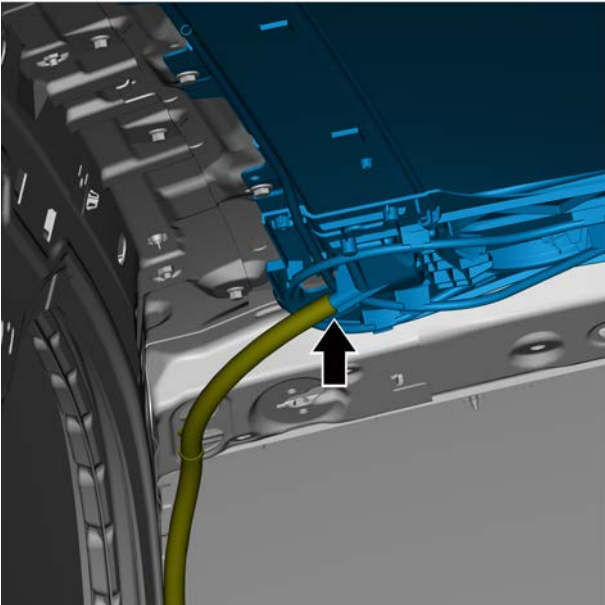
11.7.7.1 Replacement of sunroof module (panoramic sunroof)

Removal procedure

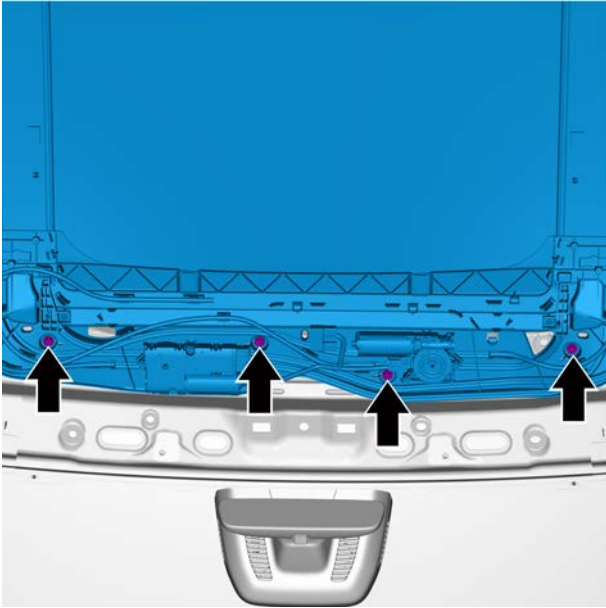
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

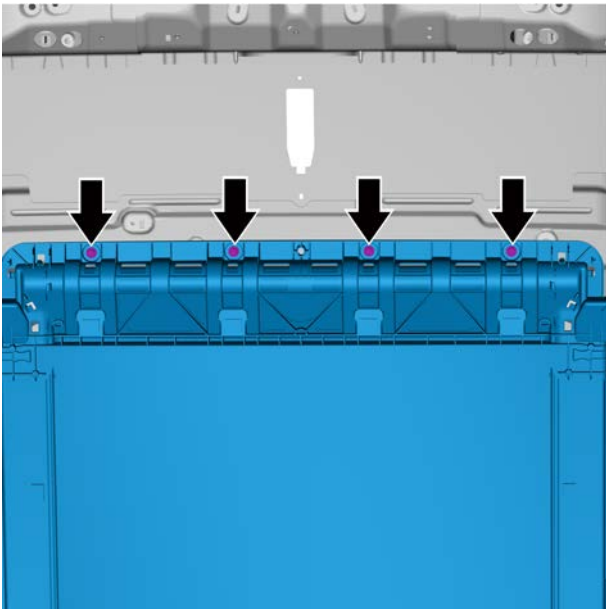
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the ceiling assembly, see [Replacement of the roof assembly](#).
- 4 Disconnect the sunroof front left and FR water drain pipe assembly from the sunroof module (panoramic sunroof).



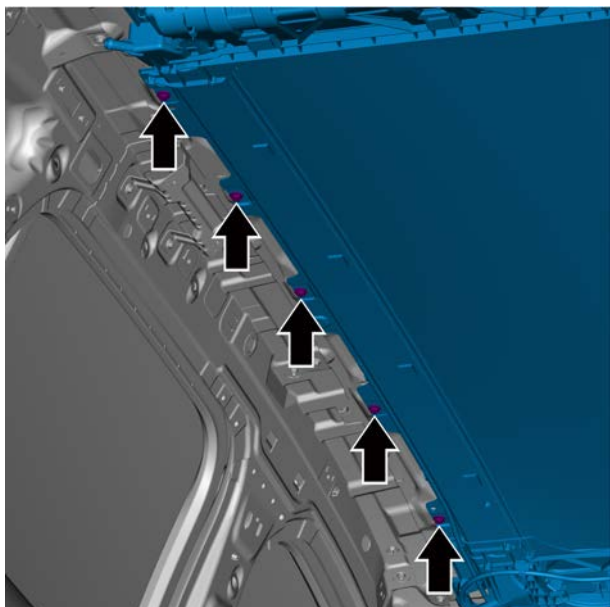
- 5 Disconnect the sunroof front left and RR water drain pipe assembly from the sunroof module (panoramic sunroof).



- 6 Remove the 4 retaining bolts from the front of the sunroof module (panoramic sunroof) to the car body.



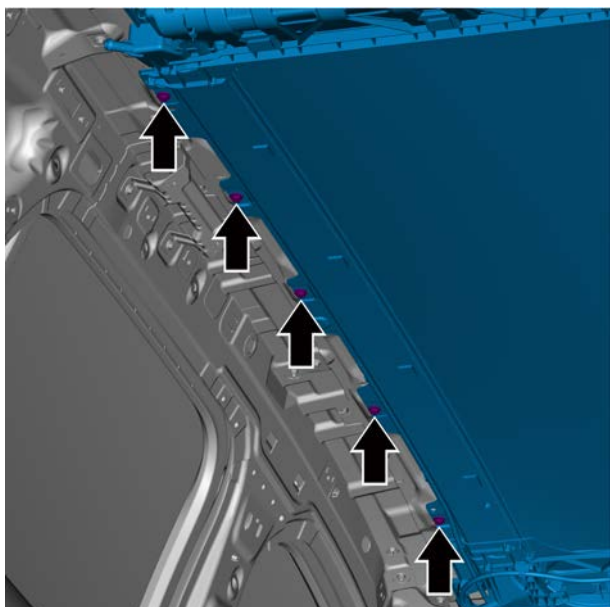
- 7 Remove the 4 retaining bolts from the rear of the sunroof module (panoramic sunroof) to the car body.



- 8 Remove the 5 fixing bolts on the left and right sides of the sunroof module (panoramic sunroof) to the car body.
- 9 Remove the sunroof module (panoramic sunroof).

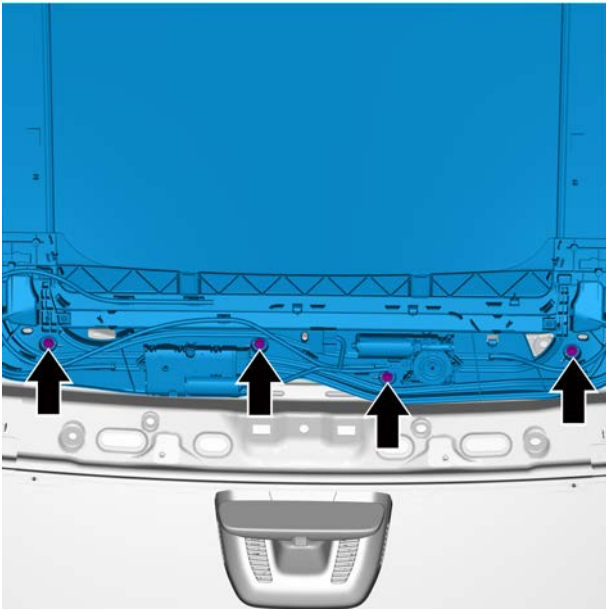
Caution

The sunroof assembly is heavy and needs to be operated with the assistance of two technicians.

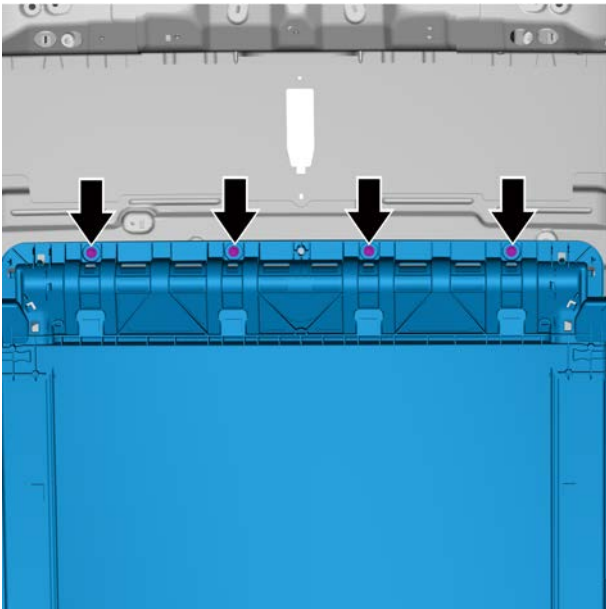


Installation procedure

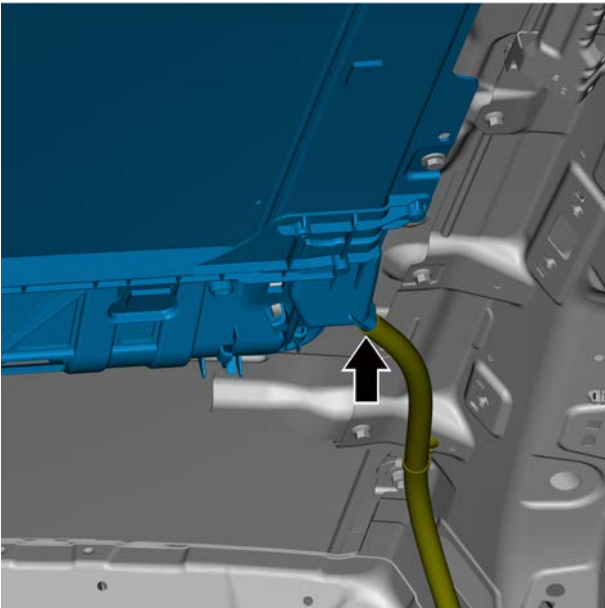
- 1 Install the sunroof module (panoramic sunroof) and pre-install the fixing bolts. The sunroof module (panoramic sunroof) is heavy and needs to be operated with the assistance of peers.
- 2 Install 5 fixed bolts on the left and right sides of the sunroof module (panoramic sunroof) to the car body.
Torque: 9 N. m (metric system) 6.6 lb-ft (Imperial system)



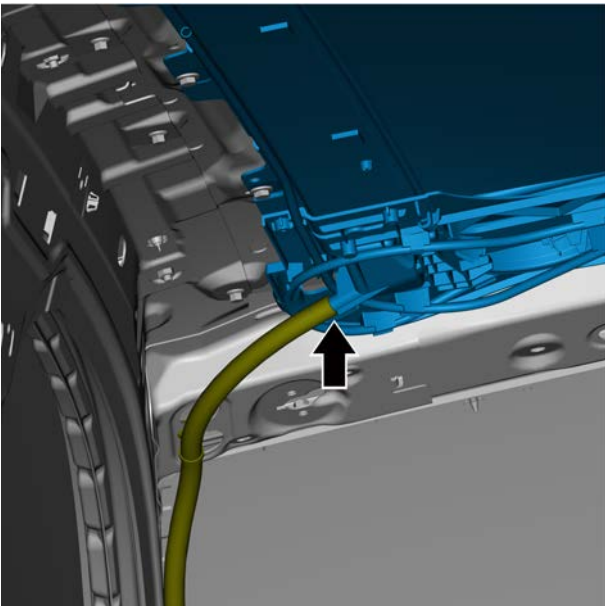
- 3 Install the 4 fixing bolts from the front of the sunroof module (panoramic sunroof) to the car body.
Torque: 9 N. m (metric system) 6.6 lb-ft (Imperial system)



- 4 Install the 4 fixing bolts from the rear of the sunroof module (panoramic sunroof) to the car body.
Torque: 9 N. m (metric system) 6.6 lb-ft (Imperial system)



- 5 Connect the sunroof left and RR water drain pipe assembly with the sunroof module (panoramic sunroof). Insert the hose into place, go to the right direction and avoid bending.



- 6 Connect the sunroof front left and FR water drain pipe assembly with the sunroof module (panoramic sunroof). Insert the hose into place, go to the right direction and avoid bending.

- 7 Install the ceiling assembly.
- 8 Connect the negative battery cable.
- 9 Close the engine compartment cover.
- 10 For sunroof initialization learning, see [Sunroof initialization learning](#).

11.7.7.2 Replacement of sunroof front water drain pipe assembly

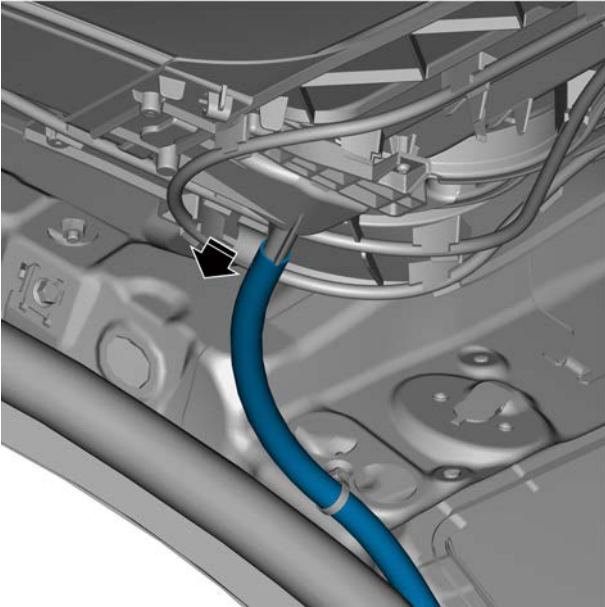
Removal procedure

Warning !

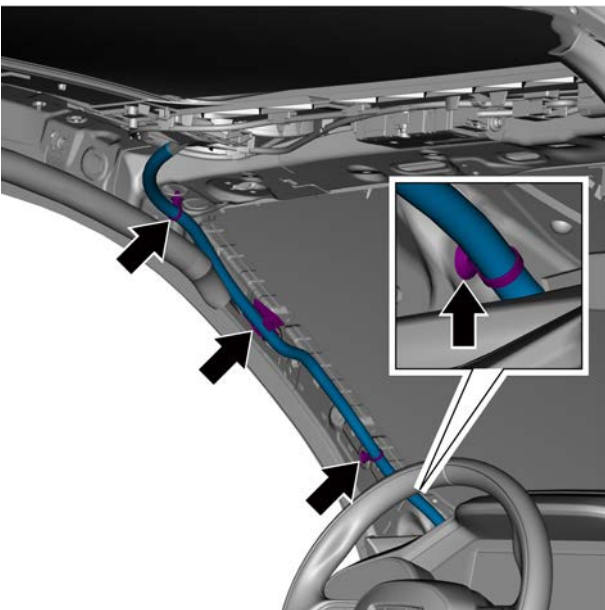
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Open the engine compartment cover.

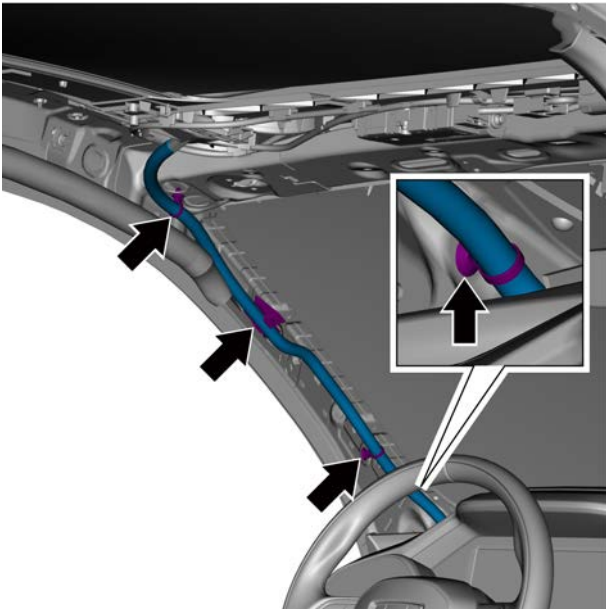
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the ceiling assembly, see [Replacement of the roof assembly.](#)
- 4 Disconnect the sunroof front left water drain pipe assembly from the sunroof module (panoramic sunroof).



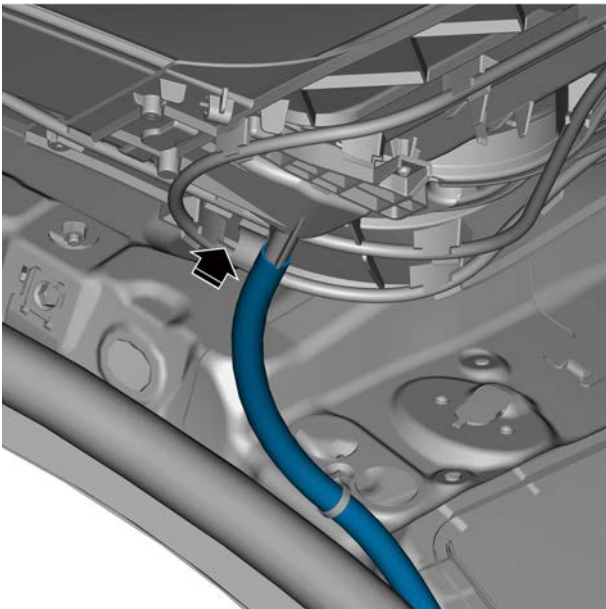
- 5 Remove the 4 retaining clips for the front left water drain pipe assembly of the fixed sunroof.
- 6 Pull the sunroof front left water drain pipe assembly from the body drain hole.



Installation procedure



- 1 Install the sunroof front left water drain pipe assembly into the body drain hole.
- 2 Install the sunroof front water drain pipe assembly on the vehicle and install 4 fixing clips.



- 3 Connect the sunroof front left water drain pipe assembly with the sunroof module (panoramic sunroof).

Caution

Insert the hose into place, go to the right direction and avoid bending.

- 4 Install the ceiling assembly.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

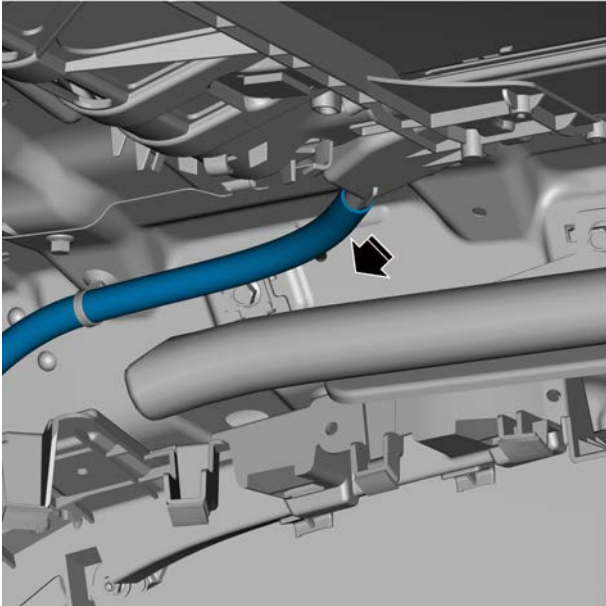
11.7.7.3 Replacement of rear water drain pipe assembly of sunroof

Removal procedure

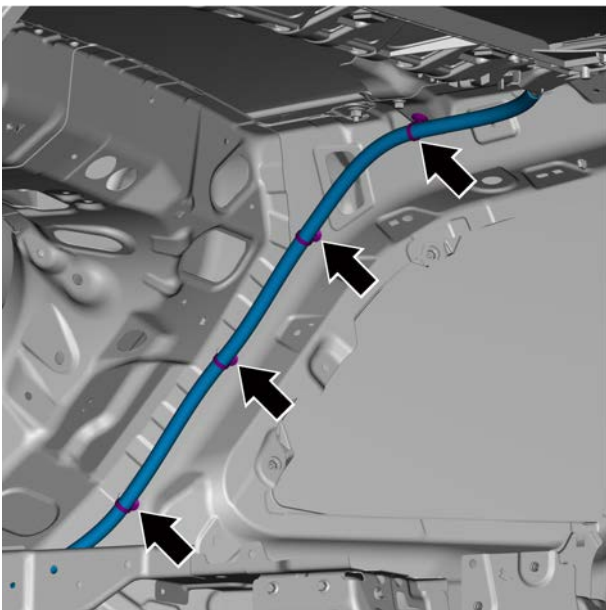
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

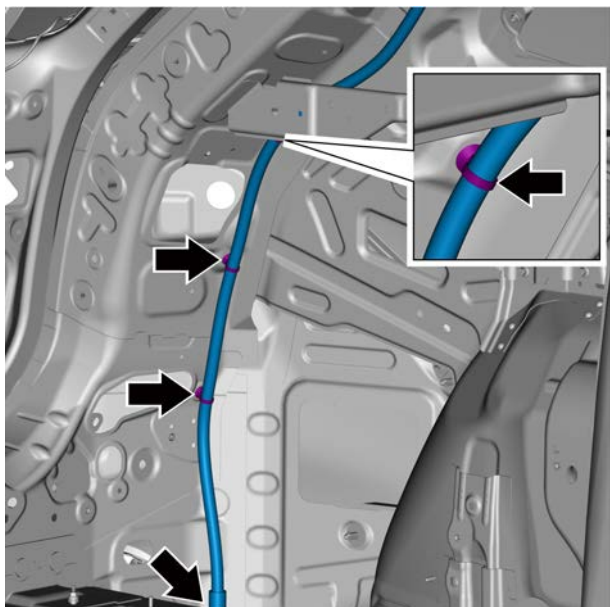
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures..](#)



- 3 Remove the ceiling assembly, see [Replacement of the roof assembly](#).
- 4 Disconnect the sunroof rear left hose assembly from the sunroof module (panoramic sunroof).

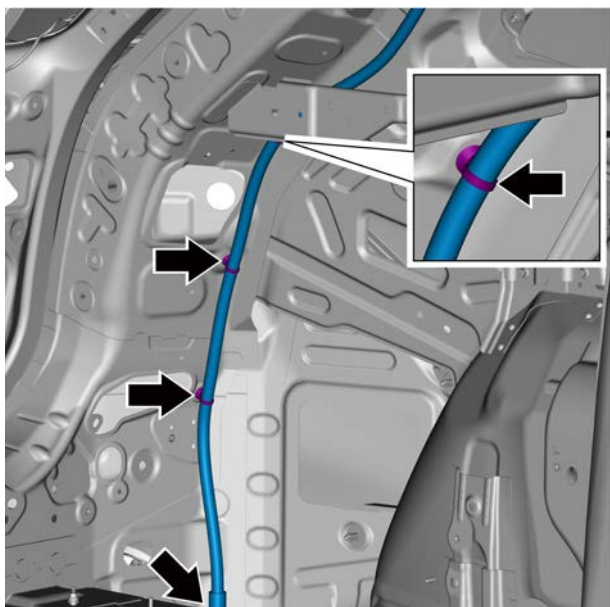


- 5 Remove the 4 retaining clips that secure the sunroof rear left hose assembly.

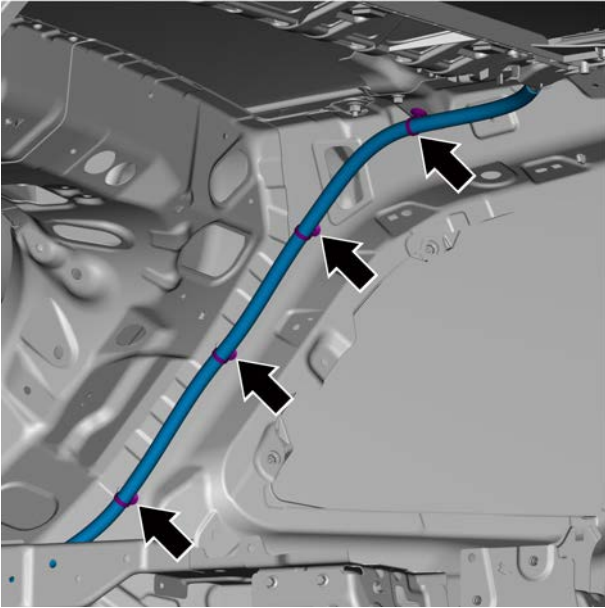


- 6 Remove the 3 retaining clips that secure the sunroof rear left hose assembly.
- 7 Pull the sunroof rear left hose assembly from the body drain hole.

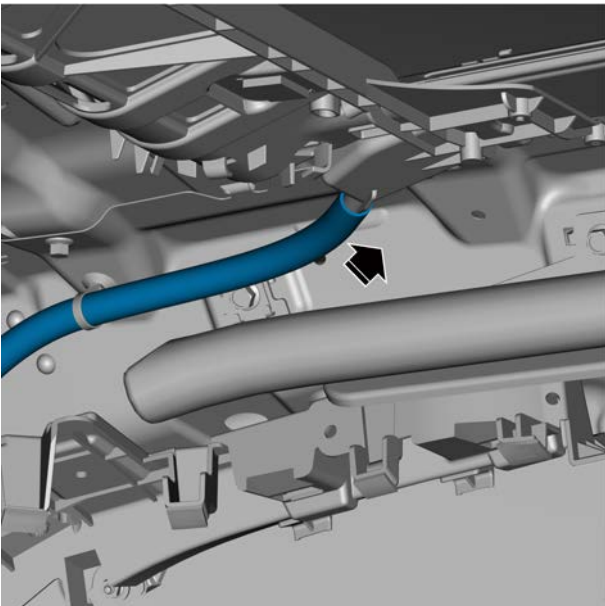
Installation procedure



- 1 Install the sunroof rear left hose assembly into the body drain hole.
- 2 Install the sunroof rear left hose assembly to the car and secure the 3 retaining clips.



- 3 Install the sunroof rear left hose assembly to the car and secure the 4 retaining clips.



- 4 Connect the sunroof rear left hose assembly with the sunroof module (panoramic sunroof).

Caution

Insert the hose into place, go to the right direction and avoid bending.

- 5 Install the ceiling assembly.
- 6 Connect the negative battery cable.
- 7 Close the engine compartment cover.

11.7.7.4 Replacement of sunroof switch

See the [Replacement of the overhead console unit \(Type 1\)](#) and the [Replacement of the overhead console unit \(Type 2\)](#).

11.8 Central control door lock

11.8.1 Specification

11.8.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Screws-fasten door lock buckle (front left door lock) and front left door inner panel	M6×12	8.5~11.5	6.3~8.5
Screws-fasten the front left door lock buckle and left bodyside	M8×22×25.9	20~28	14.8~20.7
Screws-fasten door lock buckle (RL door lock) and RL door inner panel	M6×12	8.5~11.5	6.3~8.5
Screws-fasten RL door lock buckle and left bodyside	M8×22×25.9	20~28	14.8~20.7
Bolt-support rear door lock motor (fastener)	M6×25	8.5~11.5	6.3~8.5
Bolt-fasten rear compartment lock assembly and rear compartment door inner panel	M6×16	8.5~11.5	6.3~8.5
Bolt-fasten rear compartment lock buckle assembly and rear panel assembly	M8×20	20~28	14.8~20.7

11.8.2 Instructions and operations

11.8.2.1 Instructions and Operations

Locking and unlocking remotely

Locking

Short press lock button of the smart key, lock the four doors and fuel filler cap, the light turn on for 1 second, the indoor light goes out gradually, and the audio entertainment system is turned off; long press the lock button, and the four-door glass, sunroof and sunshade are closed.

Unlocking

Short press the smart key unlock button, unlock the four doors and the fuel filler cap, flash the turn signal twice, and light up the indoor light and position light.

Caution

Do not allow children enter the trunk. When the vehicle is unattended, make sure that the trunk is closed. Once a child is trapped in a rear compartment, he or she may not be able to escape and lead to heatstroke or suffocation.

Two-step unlock function

On the multimedia display, click: Vehicle settings → Vehicle basic settings → Vehicle lock and key, and then select the driver (that is, two-step unlock function) or the whole vehicle in the key unlock setting menu.

– Main driver: after this function is turned on, short press the smart key unlock button once, only the main driving door will be unlocked, and the other doors will continue to be locked. If you need to unlock all the doors, you need to short press the smart key unlock button again.

– Whole vehicle: after this function is turned on, short press the smart key unlock button once to unlock all the doors.

Lock and unlock with the mechanical key

Lock and unlock of the driver side door with the mechanical key

- a. Remove the mechanical key from the smart key.
- b. Insert the mechanical key into the driver side door lock. Turn the key clockwise, driver' side door is unlocked. Rotate counterclockwise and lock the driver side door.

Lock the front passenger side door and the rear door with the mechanical key.

- a. Remove the mechanical key from the smart key.
- b. Insert the mechanical key into the front passenger side door lock. After turning clockwise, close the front passenger

side door and lock it. The rear doors that need to be locked can be locked in this way.

Inside locking and unlocking

When all four doors are closed, press the lock button on the door and lock all the doors.

All doors will be unlocked if unlocking button is pressed when four doors are unlocked.

Caution

The unlocking of the central control button in the car can only be carried out in the anti-theft release state, other anti-theft state, there is no response.

Automatic locking and unlocking

Automatic re-locking

45 seconds after the smart key is unlocked, if the front engine bay hood, four doors and tailgates are not opened, and the four doors will be automatically re-locked. The interior lamps turn off, and the anti-theft system is armed.

Automatic locking during driving

When the start switch is in mode II or the engine starts, if the speed is more than 7 km/h, the four-car door lock will be locked automatically.

Collision unlocking

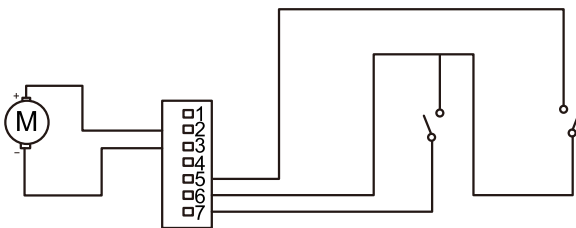
In case of severe head-on collision in travel, the four doors are unlocked automatically so that the occupants can leave the vehicle quickly.

11.8.3 System working principles

11.8.3.1 System Working Principles

Door lock

- Door lock is mainly composed of motor, micro switch, shell, pull rod, etc.
- There is a motor and two microswitches in all four door locks. The motor voltage is 9~16V, the working current $\leq 3.5A$ and the locked-rotor current is 7A. The microswitch reflects whether the doors are open or not.



Lock operation

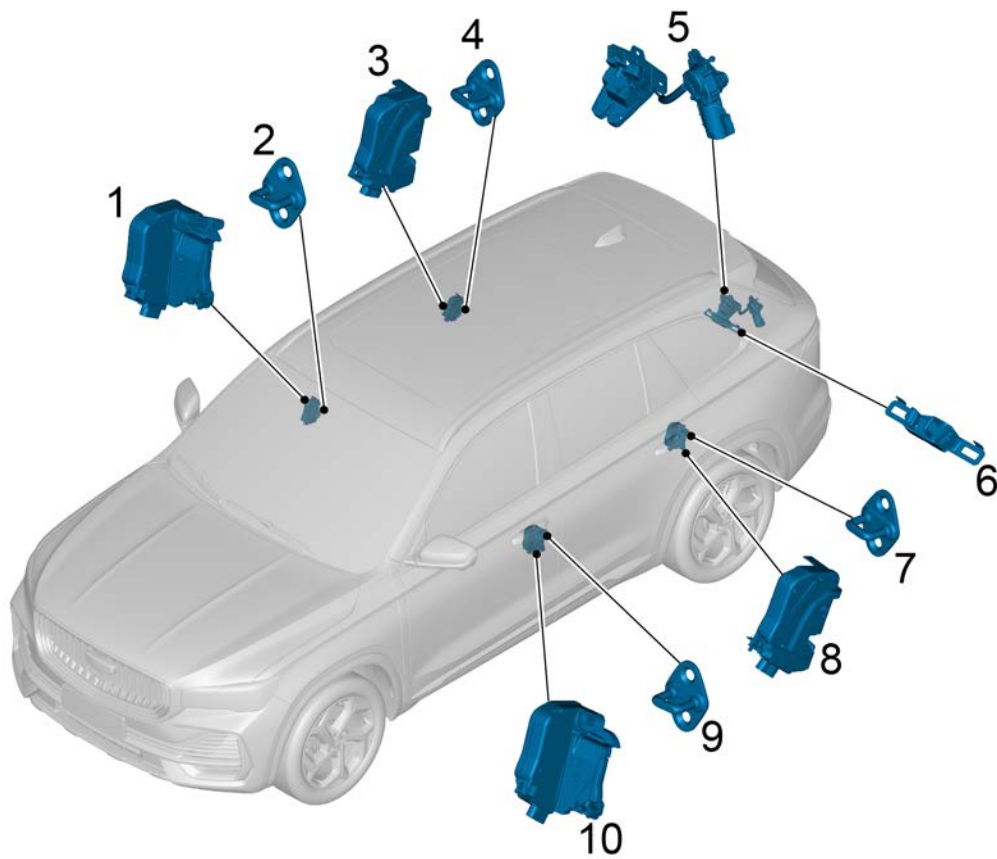
When CEM receives the input signal of switch lock or meets the conditions of automatic lock, it outputs power from the lock output terminal of CEM and controls the door lock motor of five doors to perform lock operation.

Unlock operation

When CEM receives the input signal of switch unlock or meets the conditions of automatic unlock, it outputs power from the unlock output terminal of CEM and controls the door lock motor of four doors plus the tailgate to perform unlock operation. The tailgate can be opened separately by operating the tailgate switch and by keyless entry of the module and CEM signal control.

11.8.4 Component position

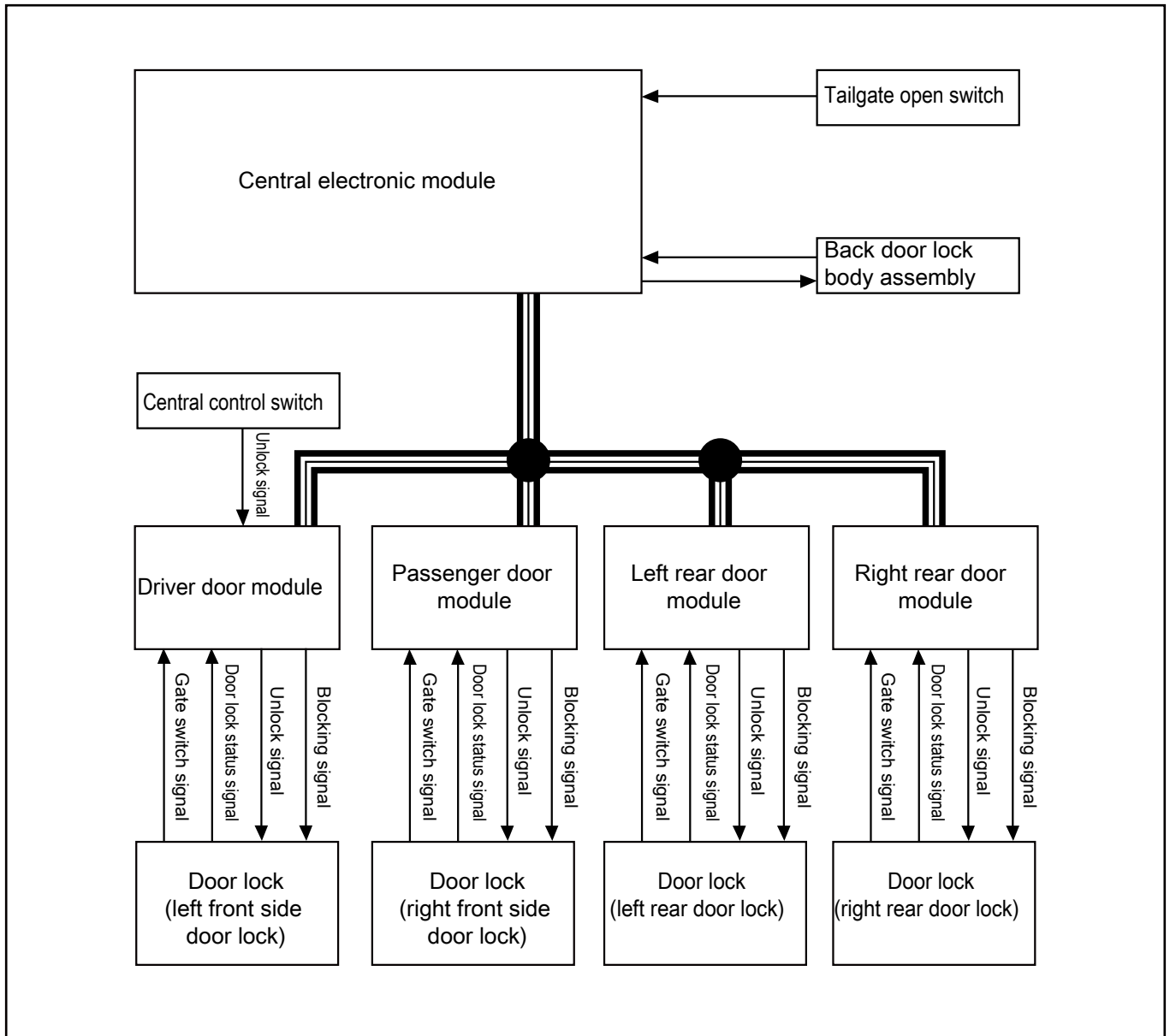
11.8.4.1 Component position



- | | | | |
|----|---------------------------|-----|-------------------------|
| 1. | Door latch (front right)) | 6. | Door striker (tailgate) |
| 2. | Door striker | 7. | Door striker |
| 3. | Door latch (rear right) | 8. | Door latch (rear left) |
| 4. | Door striker | 9. | Door striker |
| 5. | Door latch (tailgate) | 10. | Door latch (front left) |

11.8.5 Electrical schematic diagram

11.8.5.1 Electrical schematic diagram



11.8.6 Diagnostic information and procedures

11.8.6.1 Diagnosis Description

Before diagnosing the fault of the central control door lock, see the [Description and operation](#) and the [Working principle of the system](#). Understand and familiarize yourself with the working principle of the central locking and the start the system diagnosis, which helps to determine the correct fault diagnosis steps in case of failure, and more importantly, helps to determine whether the condition described by the distributor is normal operation. Any fault diagnosis of the central locking should take visual inspection as the starting point to guide the maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.8.6.2 Visual Check

- Check the after-sales installations which may affect central locking and ensure these installations cannot affect the normal work of central locking.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.
- If all the door lock operations fail, check and repair any poor contact or open circuit of the power supply or grounding circuit before replacing the bulb.

11.8.7 Removing and installing

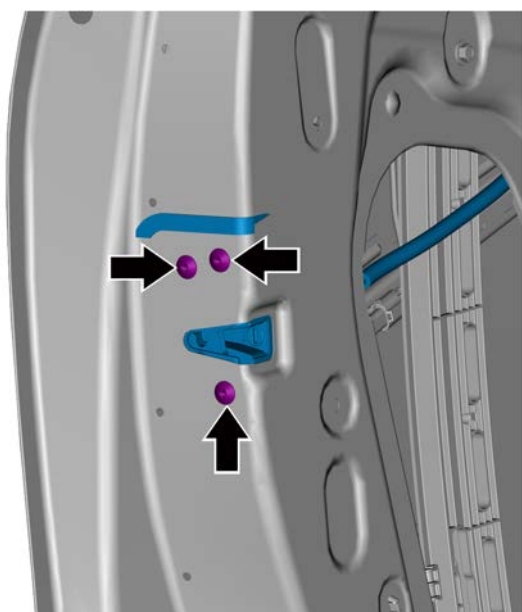
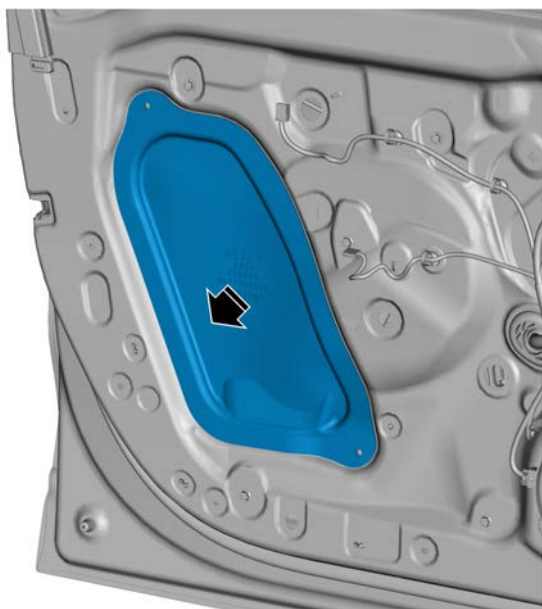
11.8.7.1 Replacement of door lock buckle(front left door lock)

Removal procedure

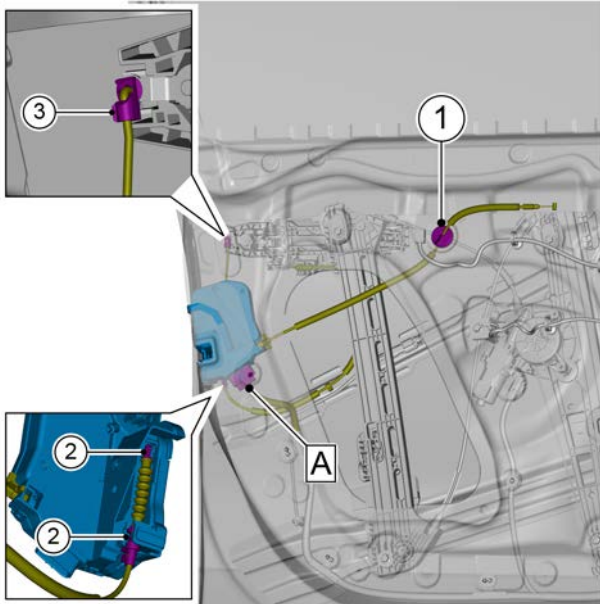
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the front left door interior trim plate assembly, see [front left door interior trim plate assembly](#).
- 4 Uncover the front left door waterproof membrane.



- 5 Remove 3 retaining bolts of door lock buckle(front left door lock).



- 6 Remove the door lock buckle (front left door lock) inner cable rubber cover 1, remove the door handle cable fixed point 2, remove the door lock fixing retaining clip 3.
- 7 Disconnect the door lock buckle(front left door lock) harness connector A and remove the door lock buckle (front left door lock).

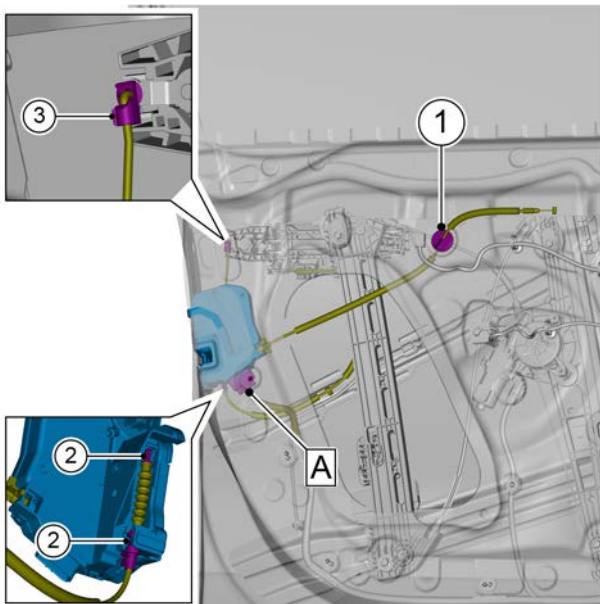
Installation procedure

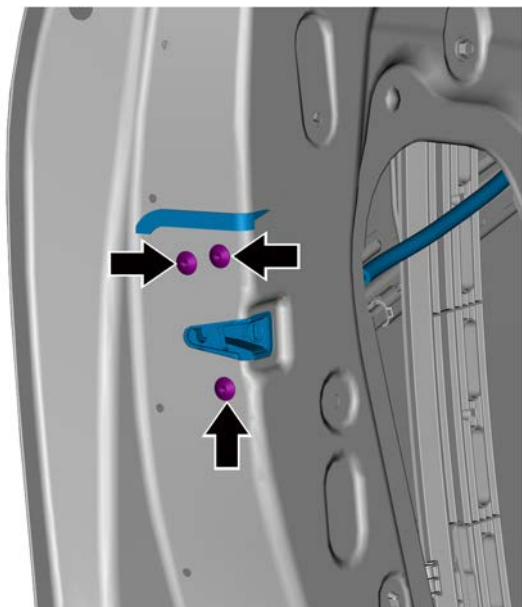
- 1 Connect the door lock buckle(front left door lock) harness connector A.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

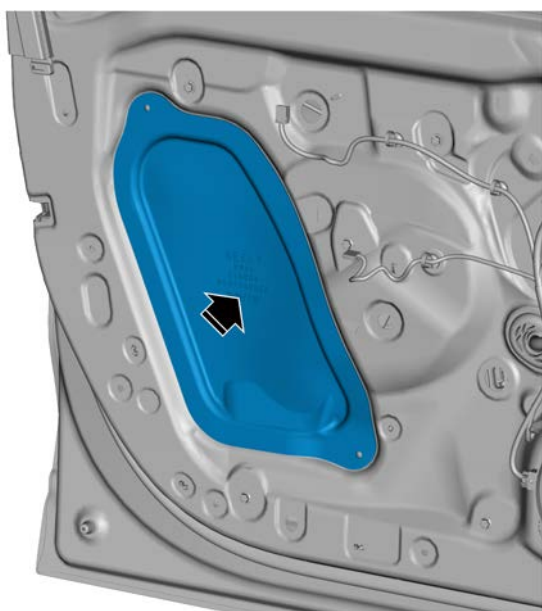
- 2 Connect door handle cable fixing point 2, install door lock fixing retaining clip 3, install door lock buckle (front left door lock) inner cable rubber cover 1.





- 3 Install door lock (front left door lock) and fasten 3 fixing bolts.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

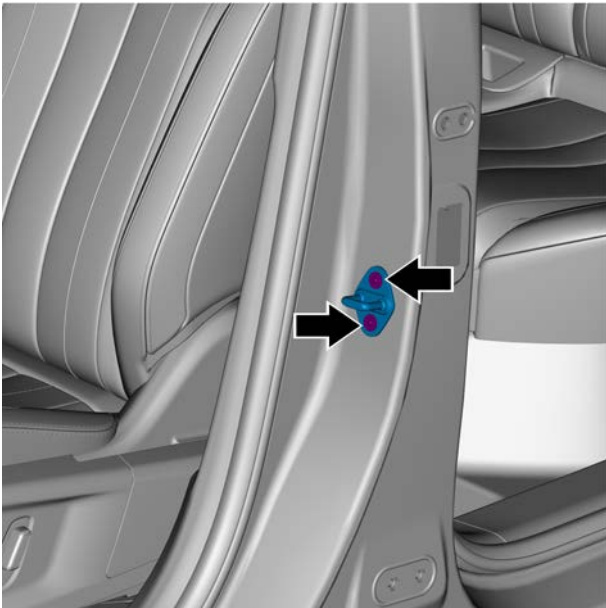


- 4 Install the left front door rear waterproof membrane.

- 5 Install the front left door interior trim panel assembly.
- 6 Connect the negative battery cable.
- 7 Close the engine compartment cover.

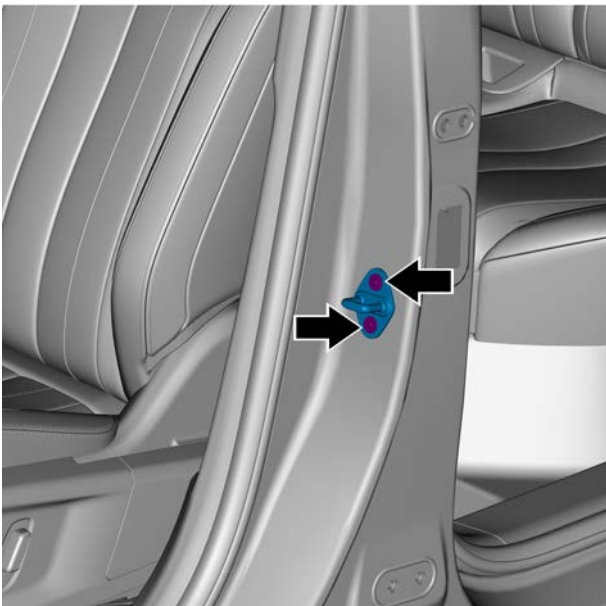
11.8.7.2 Replacement of the front left door buckle cylinder assembly

Removal procedure



- 1 Remove the 2 countersunk head screws in the front left door lock buckle assembly.
- 2 Remove the front left door lock buckle cylinder assembly.

Installation procedure



- 1 Place the front left door lock buckle assembly in the installation position.
- 2 Install 2 countersunk head screws in the front left door lock buckle assembly.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

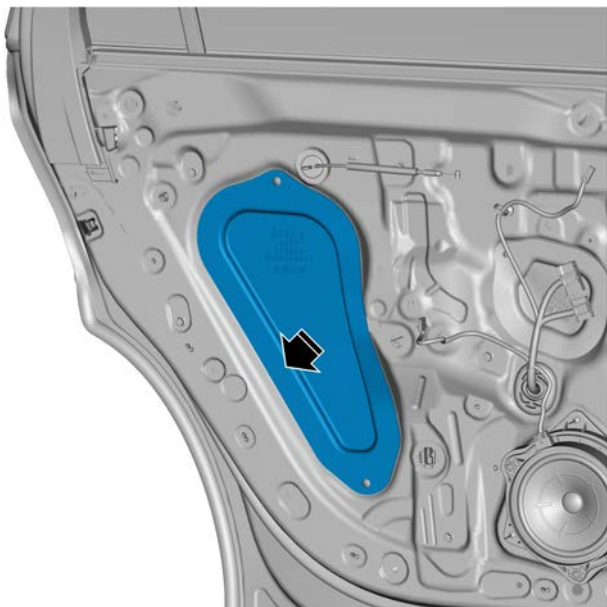
11.8.7.3 Replacement of door lock buckle(RL door lock)

Removal procedure

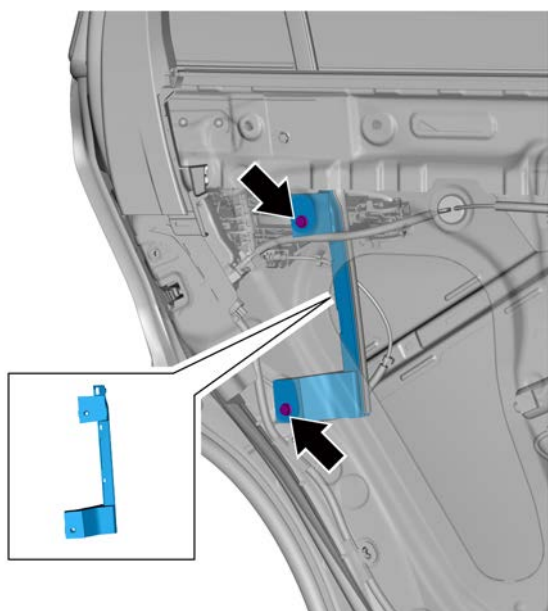
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

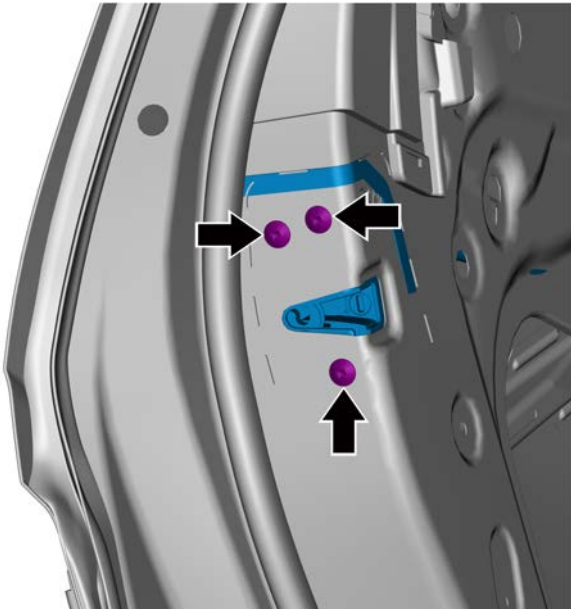
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the RL door interior trim plate assembly, see the [Replacement of the RL door interior trim plate assembly](#).



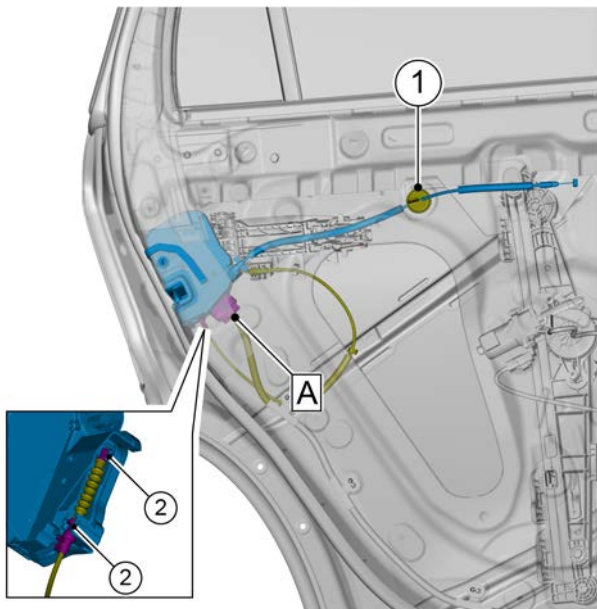
- 4 Uncover the waterproof film at the back of the RL door.



- 5 Remove the 2 fixing bolts of the RL door glass rear run channel assembly and remove the RL door glass rear run channel assembly.

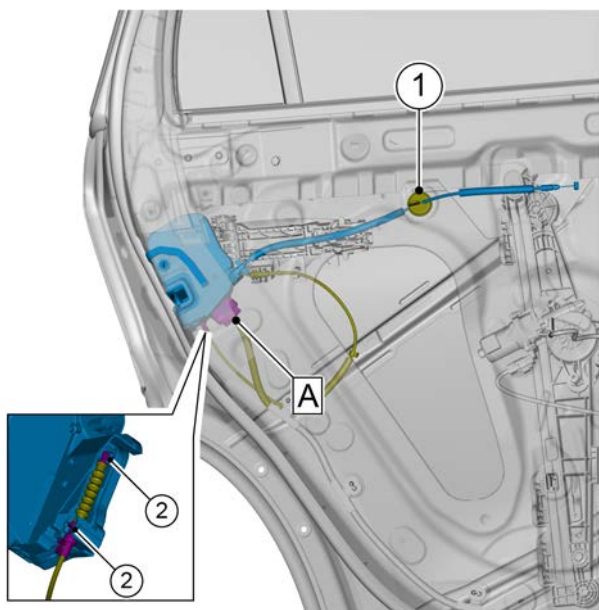


- 6 Remove 3 retaining bolts of door lock buckle(RL door lock).



- 7 Remove the door lock cable rubber cover 1 and release the door lock exterior opening cable and the fixed point of the door lock 2.
- 8 Disconnect the door lock buckle(RL door lock) harness connector A and remove the door lock buckle(RL door lock).

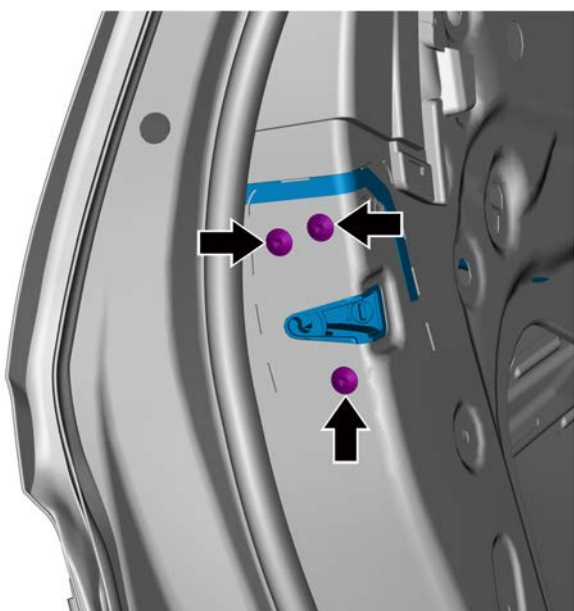
Installation procedure



- 1 Connect the door lock buckle (RL door lock) harness connector A, connect the opening cable of the door lock with the fixed point of the door lock 2, and install the door lock cable rubber cover 1.

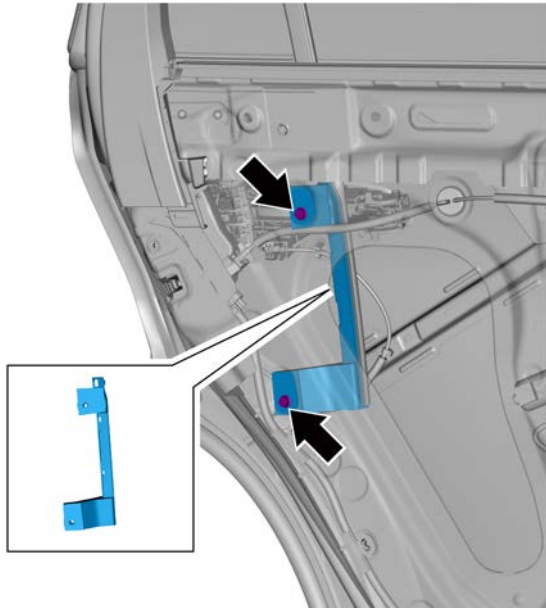
Caution

Secure the harness connection: “Connect, Click, and Confirm.”



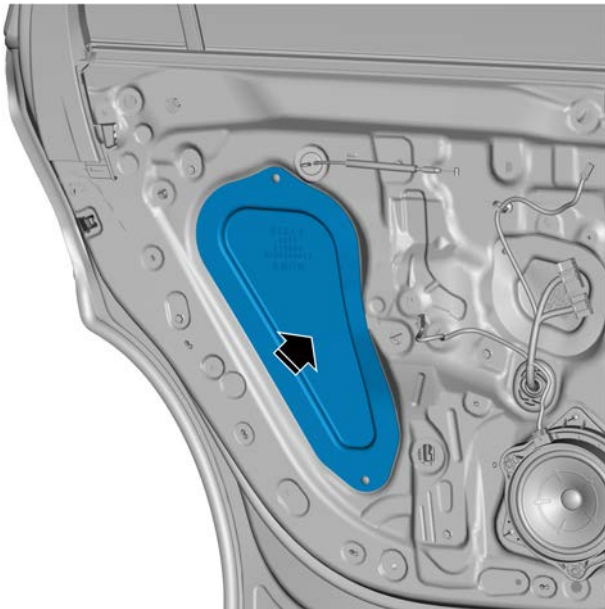
- 2 Install door lock buckle(RL door lock) and fasten 3 retaining bolts.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 3 Install the RL door glass rear run channel assembly and fasten the 2 retaining bolts.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

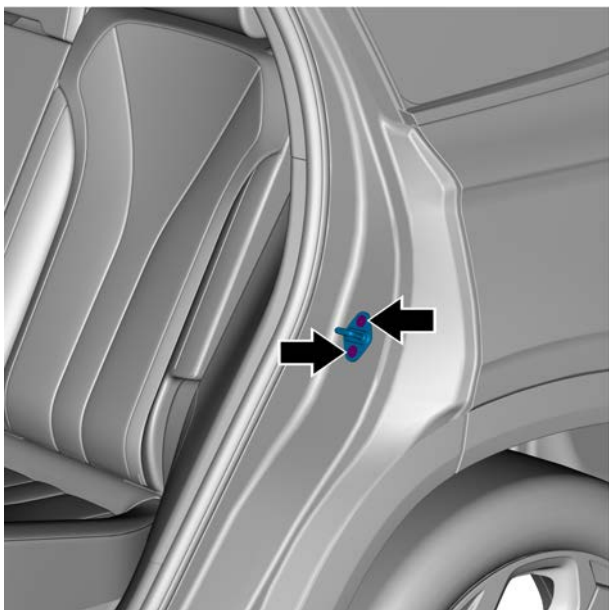


- 4 Install the left rear door rear waterproof membrane.

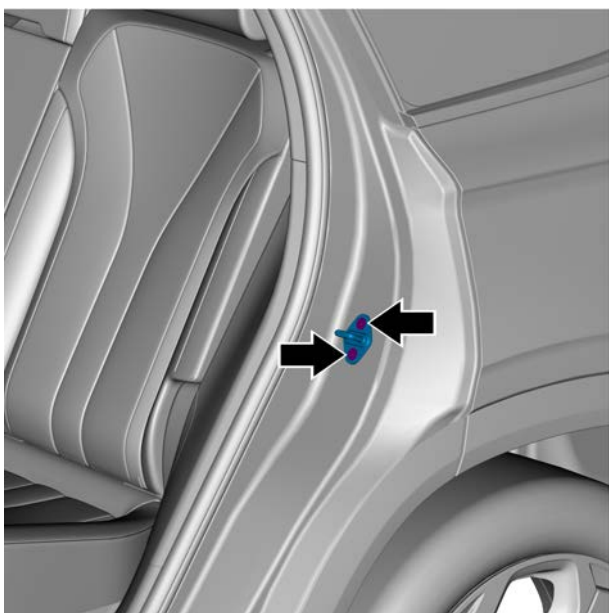
- 5 Install the front left door interior trim panel assembly.
- 6 Connect the negative battery cable.
- 7 Close the engine compartment cover.

11.8.7.4 Replacement of rear left door lock buckle assembly

Removal procedure



- 1 Open the rear door LH.
- 2 Remove the 2 countersunk head screws in the RL door lock buckle assembly.
- 3 Remove the rear left door lock buckle assembly.



Installation procedure

- 1 Place the RL door lock buckle assembly in the installation position.
- 2 Install 2 countersunk head screws in the RL door lock buckle assembly.

Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)

- 3 Close the rear door LH.

11.8.7.5 Replacement of the tailgate lock assembly

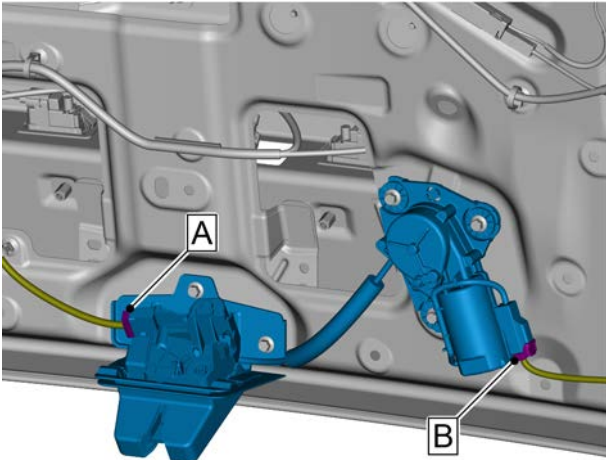
Removal procedure

Warning !

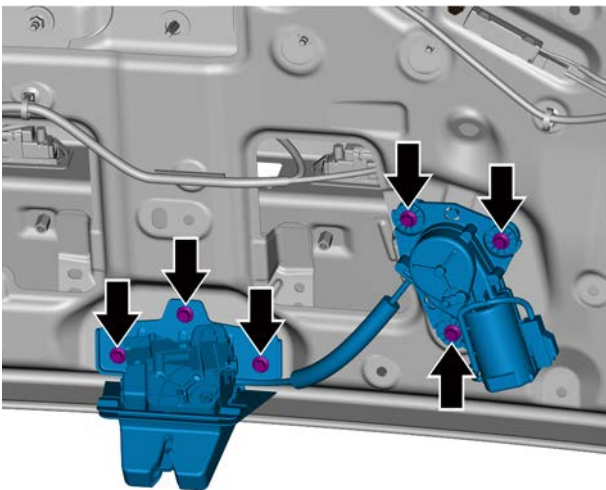
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

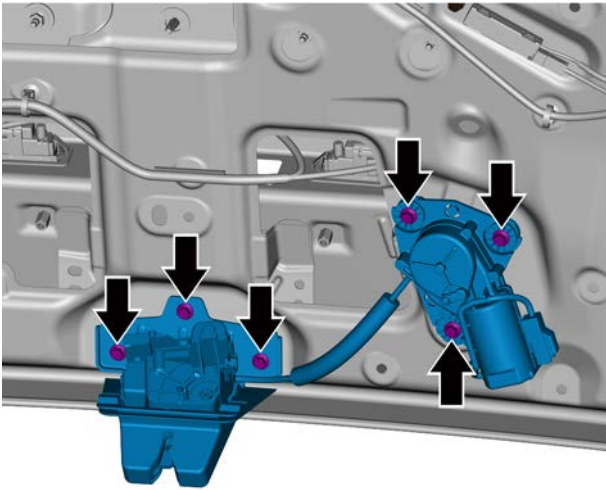
- 3 Remove the tailgate lower interior trim panel assembly of the assembly, see [Replacement of the tailgate lower interior trim panel assembly](#).
- 4 Disconnect harness connectors A and B of electric tailgate closing device.



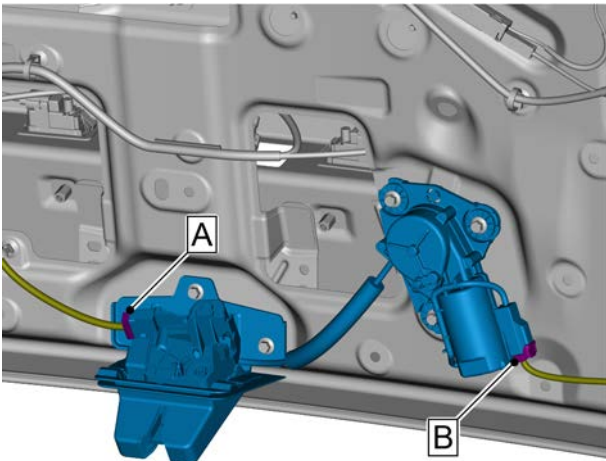
- 5 Remove the 6 fixing bolts of the tailgate lock assembly and remove the tailgate lock assembly.



Installation procedure



- 1 Install the tailgate lock assembly and fasten 6 retaining bolts.
Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)



- 2 Connect the electric tailgate closing device harness connectors A and B.

Caution

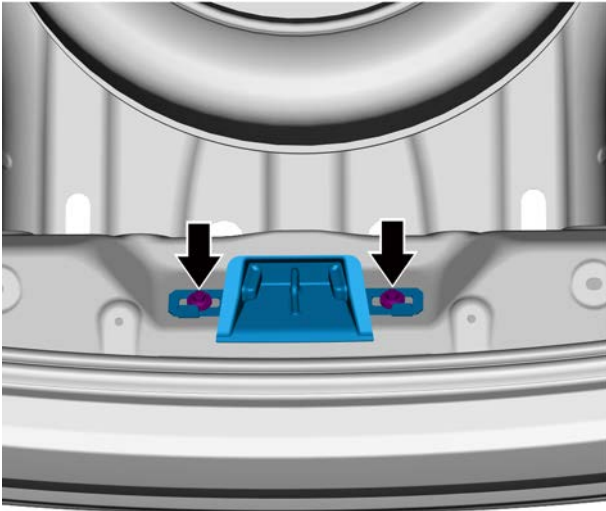
Secure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the lower trim panel assembly of the tailgate.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

11.8.7.6 Replacement of the tailgate lock buckle assembly

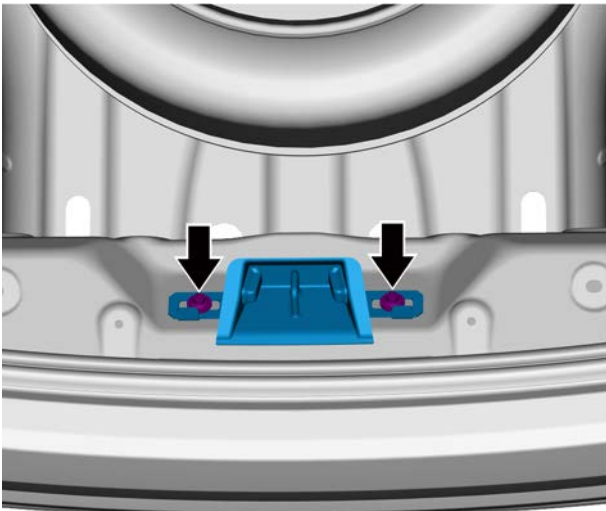
Removal procedure

- 1 Remove the rear compartment threshold trim plate assembly, see the [Replacement of the rear compartment threshold trim plate assembly](#).
- 2 Remove 2 fixing bolts 2 of tailgate lock buckle assembly.
- 3 Remove the tailgate lock buckle assembly.



Installation procedure

- 1 Place the tailgate lock buckle assembly in the installation position.
- 2 Install the 2 fixing bolts of tailgate lock buckle assembly.
Torque: 24 N. m (metric system) 17.7 lb-ft (Imperial system)



- 3 Install rear compartment door threshold trim plate assembly.

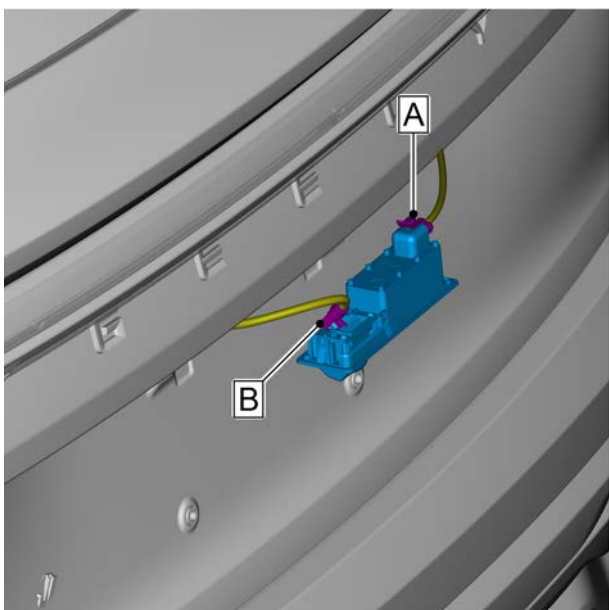
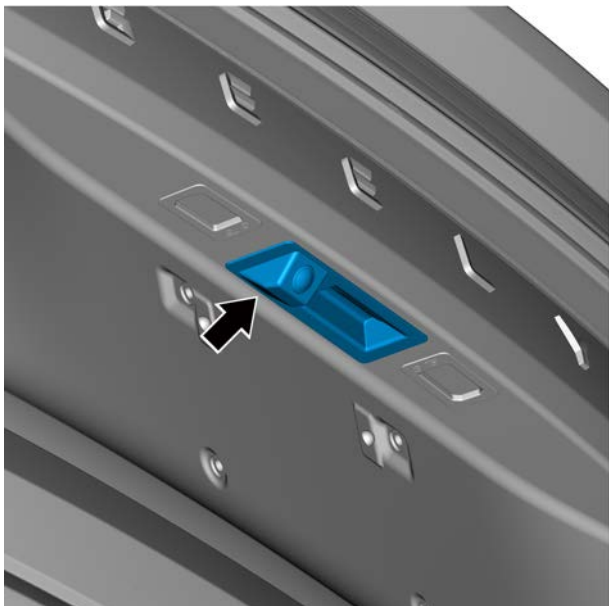
11.8.7.7 Replacement of tailgate opening switch

Removal procedure

Warning !

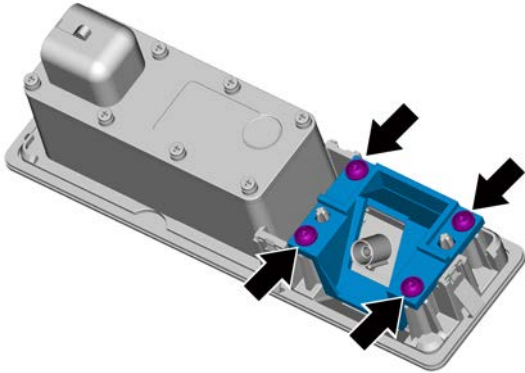
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Use appropriate tools to remove the tailgate opening switch and parking auxiliary camera (rear).

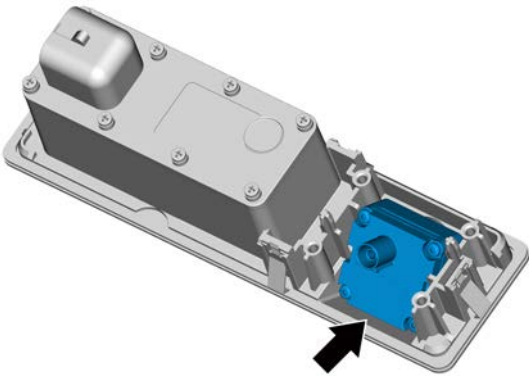


- 4 Disconnect the parking assist camera (rear) harness connector B.
- 5 Disconnect the tailgate opening switch wire harness connector A, remove the tailgate opening switch and parking auxiliary camera (rear).

- 6 Remove the retaining screws of the parking assist camera (rear) bracket and remove the bracket.



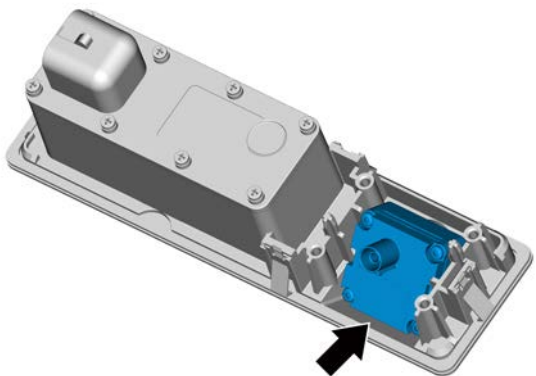
- 7 Remove the parking assist camera (rear).



- 8 Remove the tailgate opening switch.

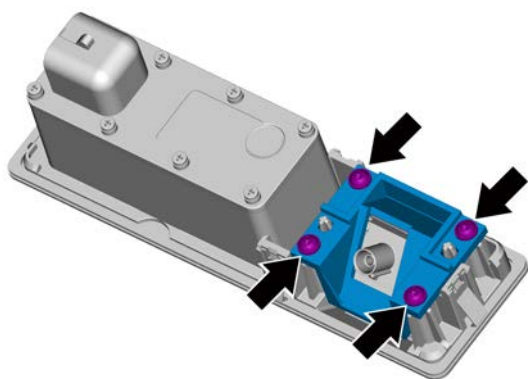
Installation procedure

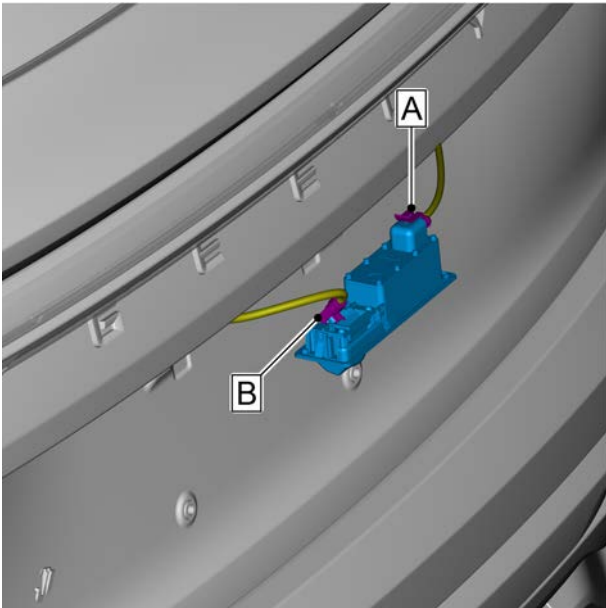
- 1 Install the parking assist camera (rear).



- 2 Install the parking assistance camera (rear) bracket and fasten the screws.

Torque: 0.7 N. m (metric system) 0.5 lb-ft (Imperial system)





- 3 Connect the tailgate opening switch harness connector A.

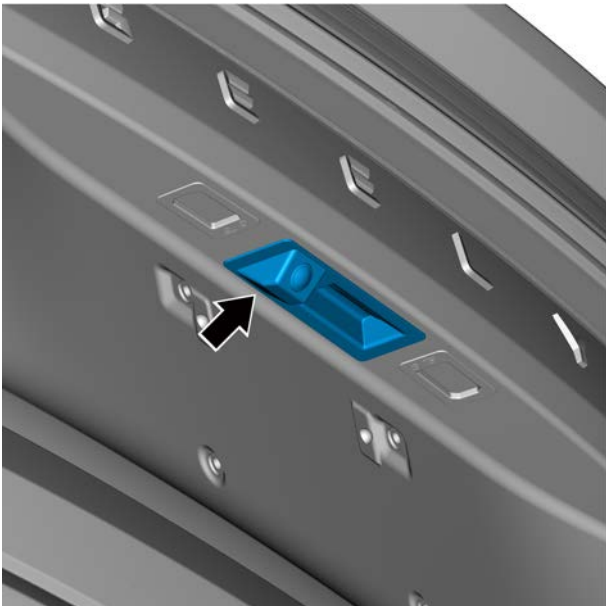
Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 4 Connect the parking assist camera (rear) harness connector B.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 5 Install the tailgate opening switch and parking auxiliary camera (rear).

- 6 Connect the negative battery cable.

- 7 Close the engine compartment cover.

11.9 Remote control anti-theft system

11.9.1 Specification

11.9.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Screw-fasten front protection PEPS antenna	M6×7.8	2~4	1.5~3.0
Screw-fasten rear protection PEPS antenna	M6×7.8	2~4	1.5~3.0

11.9.2 Instructions and operations

11.9.2.1 Instructions and Operations

Remote control anti-theft system

Remote anti-theft system is an auxiliary vehicle alarm system that is triggered in the occasion of a forced invasion. The system is used together with central locking system. Radio frequency interference or battery exhaustion can fail the system.

The remote anti-theft system composes of the following main components:

- Central electronic module assembly (CEM)
- TCAM
- Smart key
- Keyless vehicle antenna (under cup holder)
- Keyless vehicle antenna (left)
- Keyless vehicle antenna (right)
- Exterior door handle (front left door handle sensor)
- Keyless vehicle antenna (front)
- Keyless vehicle antenna (rear)
- Start and Stop Button

Locking and unlocking remotely

Locking

Short press lock button of the smart key, lock the four doors and fuel filler cap, the light turn on for 1 second, the indoor light goes out gradually, and the audio entertainment system is turned off; long press the lock button, and the four-door glass, sunroof and sunshade are closed.

Unlocking

Short press the smart key unlock button, unlock the four doors and the fuel filler cap, flash the turn signal twice, and light up the indoor light and position light.

Two-step unlock function

On the multimedia display, click: Vehicle settings → Vehicle basic settings → Vehicle lock and key, and then select the driver (that is, two-step unlock function) or the whole vehicle in the key unlock setting menu.

- Main driver: after this function is turned on, short press the smart key unlock button once, only the main driving door will be unlocked, and the other doors will continue to be locked. If you need to unlock all the doors, you need to short press the smart key unlock button again.
- Whole vehicle: after this function is turned on, short press the smart key unlock button once to unlock all the doors.

Automatic locking and unlocking

Automatic re-locking

45 seconds after the smart key is unlocked, if the front engine bay hood, four doors and tailgates are not opened, and the four doors will be automatically re-locked. The interior lamps turn off, and the anti-theft system is armed.

Automatic locking during driving

When the starting switch is in the ON position or the engine starts, if the speed is more than 7 km/h, the four-vehicle door lock will be locked automatically.

Collision unlocking

In case of severe head-on collision in travel, the four doors are unlocked automatically so that the occupants can leave the vehicle quickly.

Vehicle locating function

When you can not confirm the location of your vehicle, you can use this function to find the specific location of the vehicle.

The vehicle is in the anti-theft state, quickly press the lock button on the smart key to activate the car search function twice, the position lamp is on for 25 seconds, the turn signal flashes 6 times, and the horn honks 3 times.

Click on the multimedia display in turn: Vehicle settings → Vehicle basic settings → Vehicle search mode, and then select flashing lights only or siren flashing lights in the interface.

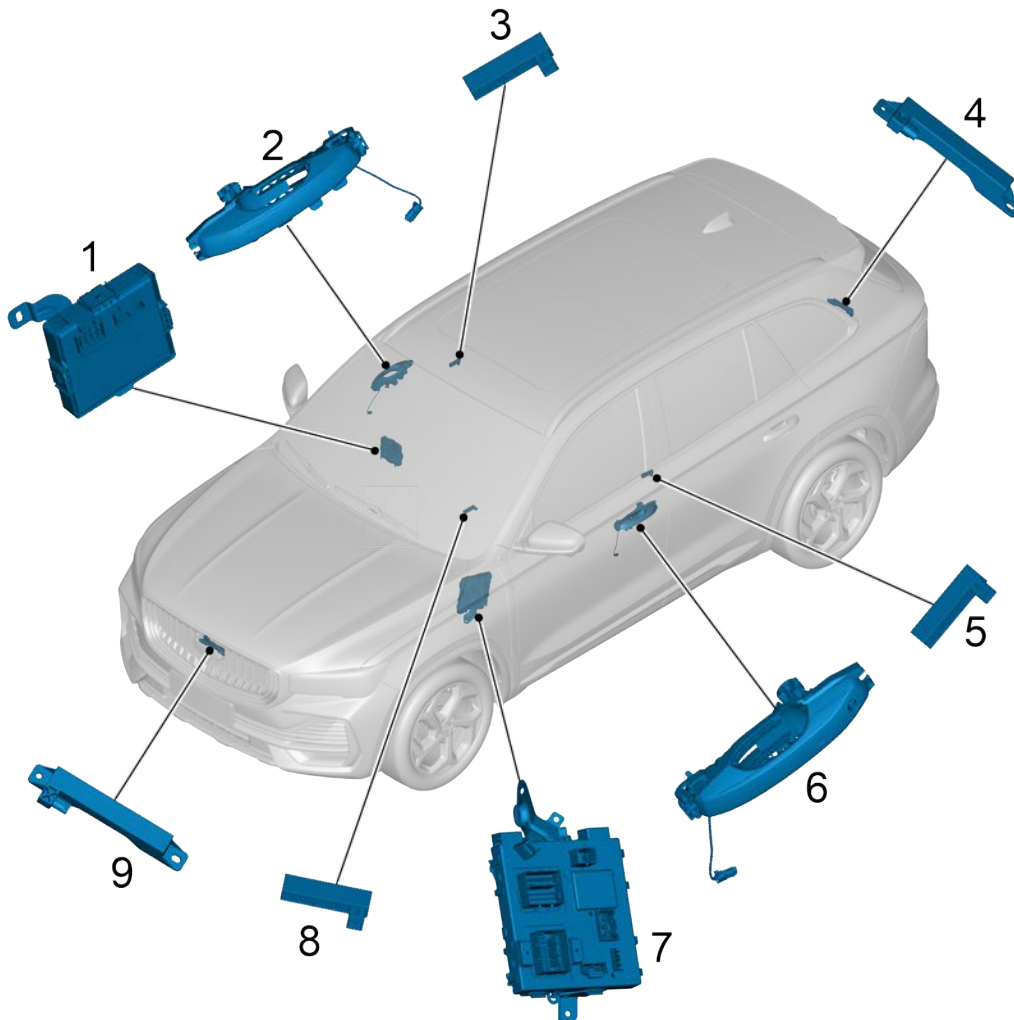
Open/close window function

When the window needs to be opened in advance, the window can be opened automatically by long pressing the unlock button within the effective range of the smart key. Models with sunroofs will also open sunroofs automatically at the same time.

When you need to close the window, you can press the lock button long within the effective range of the smart key, and the window will close automatically.

11.9.3 Component position

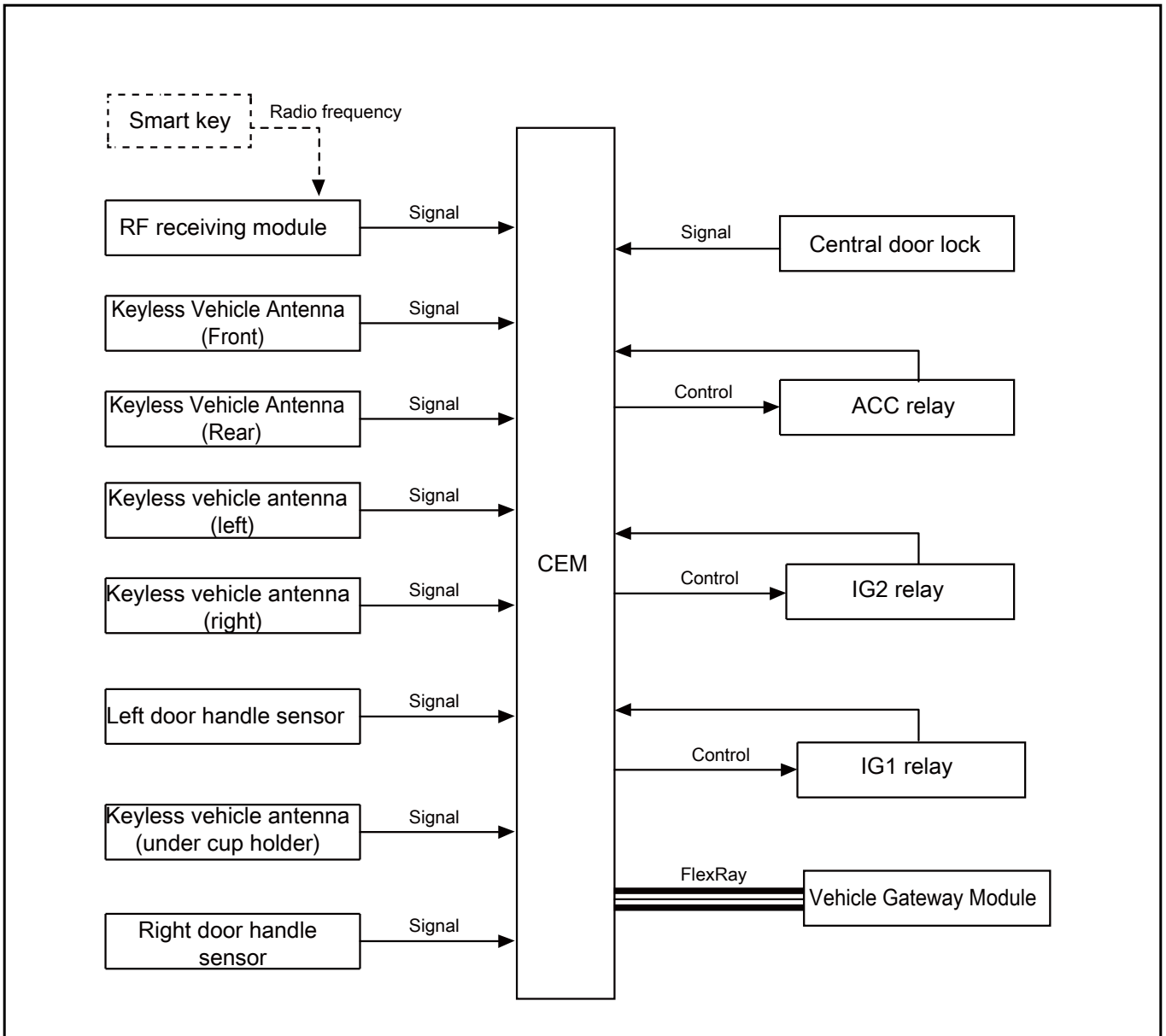
11.9.3.1 Component position



- | | | | |
|----|--|----|--|
| 1. | Vehicle gateway module | 6. | Exterior door handle (front left door handle sensor) (front left door opening handle assembly) |
| 2. | Right door handle sensor (FR door opening handle assembly) | 7. | Central electronic module |
| 3. | Keyless vehicle antenna (right) | 8. | Keyless vehicle antenna (under cup holder) |
| 4. | Keyless vehicle antenna (rear) | 9. | Keyless vehicle antenna (front) |
| 5. | Keyless vehicle antenna (left) | | |

11.9.4 Electrical schematic diagram

11.9.4.1 Electrical schematic diagram



11.9.5 Diagnostic information and procedures

11.9.5.1 Diagnosis Description

Before diagnosing the fault of the remote control anti-theft system, see [Description and operation](#). Understand and be familiar with the working principle of the remote anti-theft system, and then start system diagnosis. This will help to confirm the correct fault diagnosis steps when a fault occurs. More importantly, it can also help to confirm whether the situation described by the customer belongs to normal operation. Any fault diagnosis of the remote anti-theft system should start with visual inspection, which will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.9.5.2 Routine inspection

- Check the after-sales installations which may affect the Remote control anti-theft system and ensure that these installations cannot affect the Remote control anti-theft system.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

11.9.6 Removing and installing

11.9.6.1 Replacement of exterior door handle (front left door handle sensor)

Refer to ► Replacement of assembly-exterior release handle of front door lock ◀.

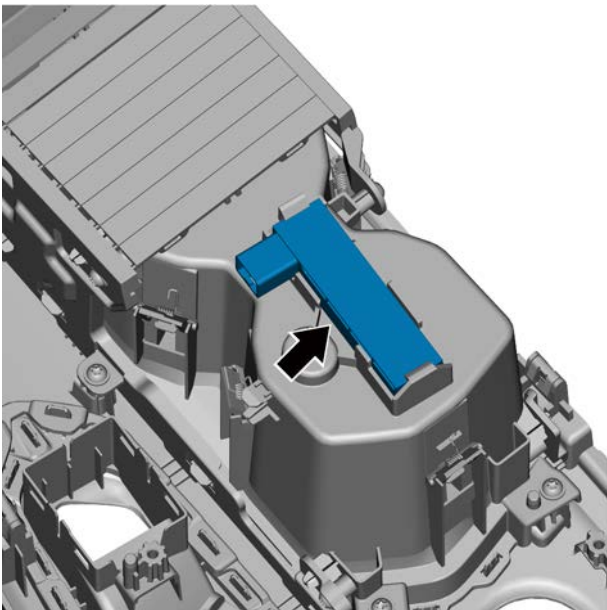
11.9.6.2 Replacement of keyless vehicle antenna (under cup holder)

Removal procedure

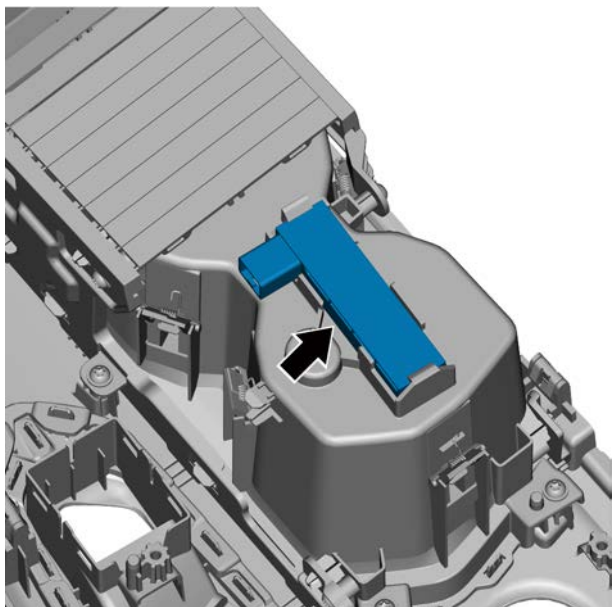
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the shift panel assembly, see [Replacement of the shift panel assembly](#).
- 4 Remove keyless vehicle antenna (under cup holder).



Installation procedure



- 1 Install keyless vehicle antenna (under cup holder).

- 2 Install the shift panel assembly.
- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

11.9.6.3 Replacement of keyless vehicle antenna (left)

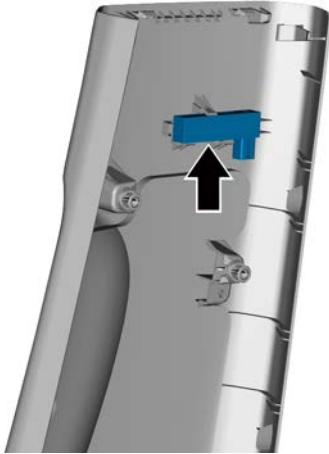
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

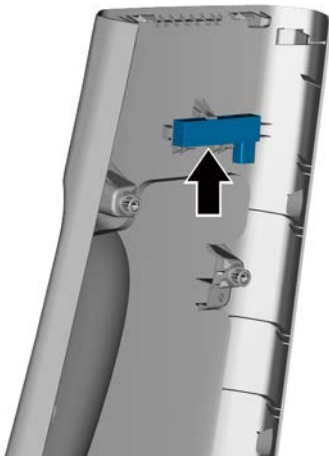
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

- 3 Remove left B-pillar lower trim panel assembly, refer to replacement of left B-pillar lower trim panel assembly.
- 4 Remove keyless vehicle antenna (left).



Installation procedure

- 1 Install keyless vehicle antenna (left).



- 2 Install the left B-pillar lower trim panel assembly.
- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

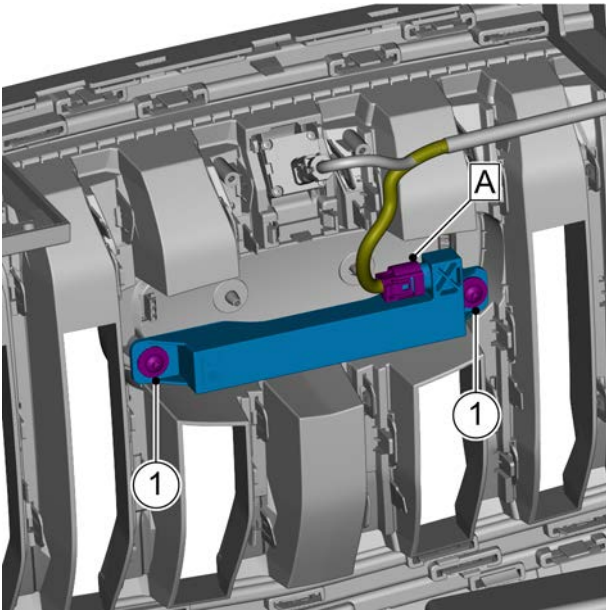
11.9.6.4 Replacement of keyless vehicle antenna (front)

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 4 Disconnect keyless vehicle antenna (front) harness connector A.
- 5 Remove keyless vehicle antenna (front) 2 retaining screws 1 and remove keyless vehicle antenna (front).

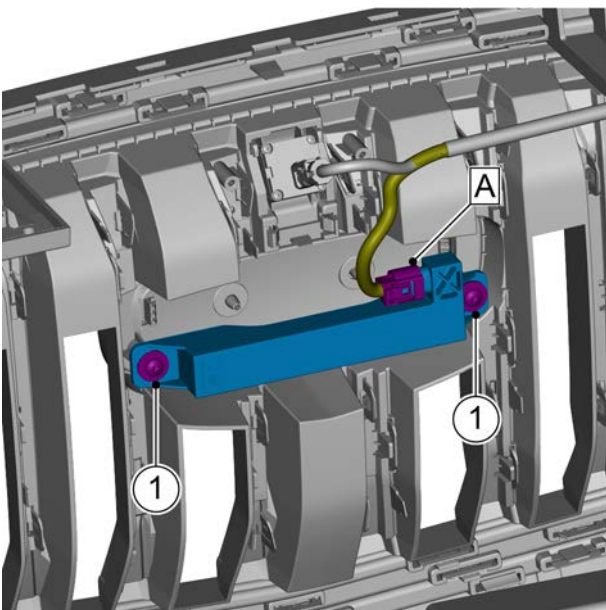
**Installation procedure**

- 1 Install keyless vehicle antenna (front) and fasten 2 screws 1.
Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)

- 2 Connect keyless vehicle antenna (front) harness connector A.

Caution

Secure the harness connection: "Connect, Click, and Confirm."



- 3 Install the front bumper assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

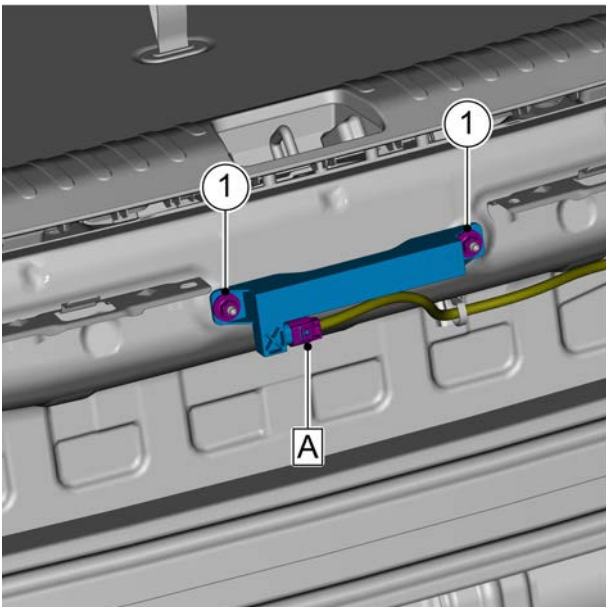
11.9.6.5 Replacement of keyless vehicle antenna (rear)

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the rear bumper assembly, see [Replacement of the rear bumper assembly \(Type 1\)](#), [Replacement of the rear bumper assembly \(Type 2\)](#).
- 4 Disconnect keyless vehicle antenna (rear) harness connector A.
- 5 Remove keyless vehicle antenna (rear) 2 retaining screws 1 and remove keyless vehicle antenna (rear).

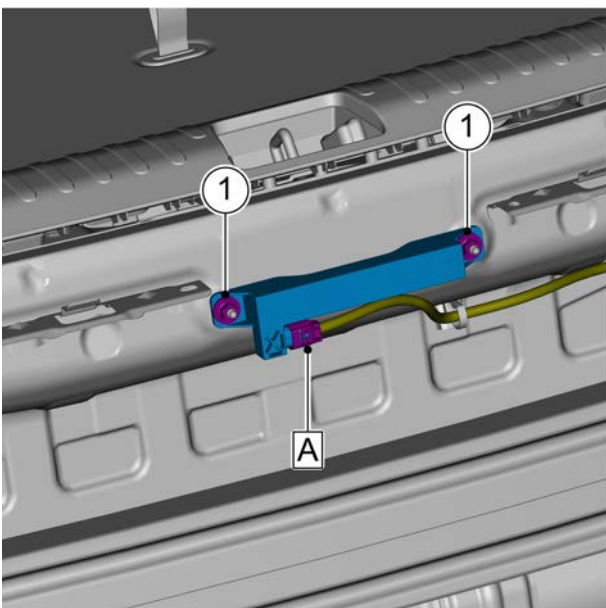


Installation procedure

- 1 Install keyless vehicle antenna (rear) and fasten 2 screws 1.
Torque: 3 N. m (metric system) 2.2 lb-ft (Imperial system)
- 2 Connect keyless vehicle antenna (rear) harness connector A.

Caution

Secure the harness connection: "Connect, Click, and Confirm."

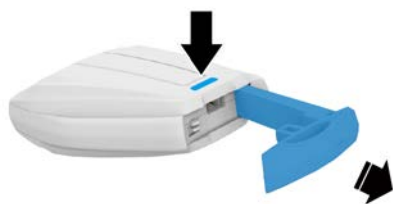


- 3 Install the rear bumper assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

11.9.6.6 Replacement of smart key battery

Removal procedure

- 1 Press the button to remove the mechanical key.



- 2 Use a mechanical key rack to pry open the battery cover from the insert end of the mechanical key.
- 3 Remove the remote control emitter battery.



Installation procedure

- 1 Install the remote control emitter battery.
- 2 Install the remote control emitter battery cover.



- 3 Lock and unlock with the mechanical key



11.10 Electric seat

11.10.1 Specification

11.10.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Nut-fastening rear seat controller	XX	X~X	XX~XX

11.10.2 Instructions and operations

11.10.2.1 Instructions and Operations

The driver power seat system includes the following components:

- With the seat adjusting switch, the seat can be electrically adjusted forward/backward, the caution upward/downward, and the backrest inclination forward/backward.
- Seat forward/backward adjustment motor
- Seat angle adjusting motor
- Driver seat height adjusting motor
- Backrest adjusting motor
- Seat breaker
- Electric seat heater (if equipped)
- Electric seat heating switch (if equipped)
- Lumbar support adjustment
- Seats Ventilation

Front seat head restraint adjustment

Adjust height of the head restraint to make its top be on same level with passenger's top of head. This position can reduce the risk of neck getting hurt in case of a traffic collision.

Caution

Be sure to install and adjust the headrest correctly before the vehicle is running, so as not to cause personal casualties in the event of an accident.

To raise or lower the headrest, press and hold the adjustment button below the seat headrest, lift or press the headrest up or down to the desired height, and then release the button. Gently press or lift the headrest again until you hear a click to make sure the headrest is locked in place.

Caution

Please do not adjust the seat while driving. In case the vehicle gets out of control and causes personal casualties.

Electrically adjustable driver seat

The driver seat can be adjusted in six or eight directions, and the driver seat of some models can also be adjusted by electric waist support, and the adjustment switch is located on the left side of the seat.

Caution

Do not place objects under the electric seat or artificially hinder the movement of the seat, otherwise it will damage the seat adjusting motor.

Electrically adjusted front seat (if equipped)

The front seat can be adjusted in six directions, and the adjustment switch is located on the right side of the seat.

Horizontal adjustment

When the seat adjusting switch is operated to move the entire seat forward, the positive voltage of the battery is applied to the motor through switch contacts and forward control circuit of the back and forth adjusting motor. The motor is grounded through backward switch contact of the back and forth adjusting motor and the backward control circuit of the back and forth adjusting motor. The motor runs to drive the entire seat moves forward until the switch is released. The operation process of moving the entire seat backward is similar to that of moving the entire seat forward, except that the positive voltage of battery and grounding are applied to the motor through opposite circuits, thus enabling the motor to run in the opposite direction.

Height adjustment

When the seat switch is operated to move the entire seat upward, the positive voltage of battery is applied to the height adjusting motor through the upward switch contact of height adjusting motor and the upward control circuit of height adjusting motor. The motor is grounded through the downward switch contact and the downward control circuit of height adjusting motor. The height adjusting motor drives the entire seat to move upward until the switch is released. The operation process of moving the entire seat downward is similar to that of moving the entire seat upward, except that the positive voltage of battery and grounding are applied to the motor through opposite circuits, thus enabling the motor to run in the opposite direction.

Backrest adjustment

When the backrest adjusting switch is operated to enable the backrest to tilt forward, the positive voltage of battery is applied to the motor through switch contacts and the forward control circuit of backrest adjusting motor. The motor is grounded through the backward switch contact and the backward control circuit of backrest adjusting motor. The motor runs to move the backrest forward until the switch is released. The operation process of moving the backrest backward is similar to that of moving the backrest forward, except that the positive voltage of battery and grounding are applied to the motor through opposite circuits, thus enabling the motor to run in the opposite direction.

Lumbar support adjustment

When the lumbar support adjusting switch is operated to enable the lumbar support to bulge forward, the positive voltage

of battery is applied to the air pump through switch contacts and the forward control circuit of lumbar support adjusting motor. The air bag is inflated to move the lumbar support forward until the switch is released.

When the lumbar support adjusting switch is operated to retract the lumbar support, the positive voltage of battery is applied to the normally closed air escape solenoid valve through switch contacts and the backward control circuit of lumbar support adjusting motor. The air bag deflates to move the lumbar support backward until the switch is released.

When the lumbar support adjusting switch is operated to enable the lumbar support to move upward, the positive voltage of battery is applied to the motor through switch contacts and the upward control circuit of the lumbar support adjusting motor. The motor is grounded through the downward switch contact and the downward control circuit of the lumbar support adjusting motor. The motor runs to move the lumbar support upward until the switch is released. The operation process of moving the lumbar support downward is similar to that of moving the lumbar support upward, except that the positive voltage of battery and grounding are applied to the motor through opposite circuits, thus enabling the motor to run in the opposite direction.

Rear seat headrest adjustment

Press the hold the adjustment button located at the side of the seat headrest and move the headrest upward/downward. Make sure it is locked into position when you hear a click sound. Press and hold the adjustment button to push inside or pull outside the headrest.

Back adjustment of rear seats

Install the unlocking buckles on both sides of the back of the rear seat. Buckle the hands and push the seat back to adjust the seat back to the position 2. Buckle the hands and pull the seat back to adjust the seat back to the position 1.

Caution

Push the top of the seat back forward and back to ensure the seat back is securely locked. Otherwise, the normal operation of the seat belt may be hindered.

Folding rear seat backrest

The rear seats are respectively composed of the RL seat and the RR seat, with a 4-stroke and 6-fold function, which can increase the rear compartment space and facilitate the storage of large items.

Install the unlocking buckles on both sides of the back of the rear seat. Put the rear seat headrest in the lowest position and

buckle the hand to fully fold the back of the corresponding seat.

After the seat backrests are folded, leave some space between the rear seat headrests and the front seats.

Unfolding rear seat backrest

Flip the seat back and push back hard until the red mark on the unlocking hand on the corresponding side disappears so that it is locked. Otherwise, the normal operation of the seat belt may be hindered.

Caution

During the driving of the vehicle, passengers are not allowed to sit on the folded seat or in the rear compartment, and the seat should be used correctly. When the seat backrest returns to the original position, the following precautions shall be considered to prevent injuries upon collision or emergency braking:

- Push the top of the seat back forward and back to ensure the seat back is securely locked. Otherwise, the normal operation of the seat belt may be hindered.
- Make sure the seatbelt is not twisted or stuck below the seat, but well positioned for use.

When placing a child seat in the rear seat, the child seat and the child seat installation guide cover must be removed before the rear seat backrest folding function can be used.

Front seat heating/ventilation (if equipped)

On the multimedia display, click: air conditioning seat, and then set up the front seat heating/ventilation function in this interface.

Caution

The seat heating function and seat ventilation function cannot be operated at the same time on the same seat.

Front seat heating

Select the seat heating adjustment on the multimedia display, click on the seat you want to adjust, such as the driver side seat or the front passenger side seat, and then click the heating adjustment button on the corresponding seat.

When one indicator light under the seat heating adjustment button is lit, it indicates that the seat heating is in low grade; when the three indicators below the seat heating adjustment button are lit, it indicates that the seat heating is in high grade; when all the three lights below the seat heating adjustment button are off, it means that the seat heating is off.

Caution

If the body is unable to feel pain and temperature due to medication, paralysis, paralysis and other diseases, please do not use the seat heating function. Otherwise, it may cause body burns.

Caution

- Do not kneel on the seat or make the seat bear a concentrated load, so as not to damage the heating element of the seat heating device.
- Please do not clean the seat by wet washing.
- The seat heating function can only be turned on when the vehicle is started, which can greatly reduce the battery consumption.
- If the battery voltage is too low, the seat heating function will automatically turn off so that the vehicle has enough electricity.
- Seat cushions cannot be placed when the seat heating function is turned on.

Front seat ventilation

Select the seat ventilation adjustment on the multimedia display, click on the seat to be adjusted, and then click the ventilation adjustment button on the corresponding seat.

When one indicator light under the seat ventilation adjustment button is lit, it indicates that the seat ventilation is in low grade; when the three indicator lights below the seat ventilation adjustment button are lit, it indicates that the seat ventilation is in high grade; when all the three lights below the seat ventilation adjustment button are off, it means that the seat ventilation is off.

Front seat heating/ventilation timing function

On the multimedia display, click: Air conditioning → Seat → Settings, and then set the front seat heating/ventilation timing function in this interface. According to the need, you can select the corresponding timing time in the setting bar of the corresponding seat, and the optional timing time is 5 minutes, 15 minutes and 30 minutes. When the heating/ventilation function of the selected seat is activated, the set timing time will take effect, and the heating/ventilation function of the corresponding seat will be turned off automatically at the end of the timing time.

Driver seat memory function (if equipped)

The seat memory button is installed on the interior panel of the driver side door and can set two commonly used memory positions. It enables the driver to find his comfortable driving position quickly.

Operation method

1. Adjust the driver seat to the desired position, press the setting button M, press the memory position button 1 or 2 within 3 seconds, and the current driver seat position is recorded.
2. When the vehicle stops, press position button 1 or 2, and the driver's seat automatically adjusts to the previously recorded position.

Caution

Do not adjust any seat during driving. Adjusting a seat while driving may cause loss of control of the vehicle, resulting in collision accident and major injury. When the start switch is in mode II or the engine starts, the speed to start the seat memory function should be less than 5 km/h.

Easy access for driver (if equipped)

Click on the multimedia display screen in turn: Vehicle settings → Comfortable → Easy access for driver, and the easy access for driver function can be turned on or off in the interface.

- Get off comfortably: when the engine turns off, open the driver side door and the driver's seat automatically moves back to facilitate the driver to get off.

- Comfortable boarding: when the driver enters the vehicle and closes the door and starts the engine, the driver's seat automatically returns to its pre-vehicle position.

Caution

Changing the state of the startup switch and adjusting the seat during the operation of the comfort function will interrupt the driver's easy access function.

Seat adjustment parameters

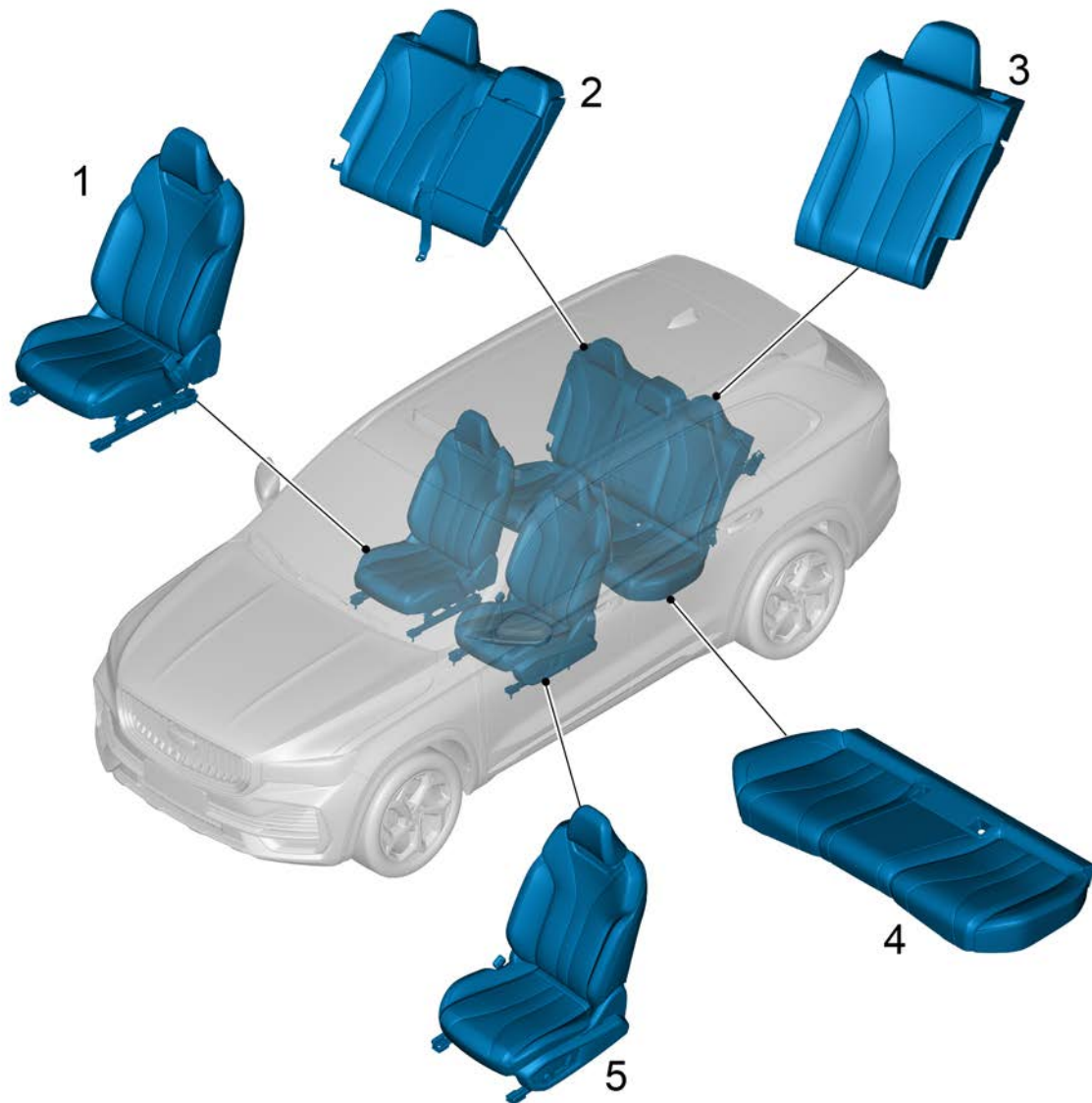
In the initial position, the adjustment parameters of the seat (when measuring the cushion depth) are as follows:

Item		Parameter
Driver seat	Forward/ backward adjustment	Total stroke 262.2mm (forward 213.9mm, backward 48.3mm)
	Backrest adjustment	Travel 71° (26° forward, 45° backward)

Item		Parameter
Front passenger seat	Forward/ backward adjustment	Total stroke 262.2mm (forward 213.9mm, backward 48.3mm)
	Backrest adjustment	Electric seat: total stroke 71°(forward 26°, backward 45°)
		Manual seat: total stroke 52°(forward 18°, backward 34°)

11.10.3 Component position

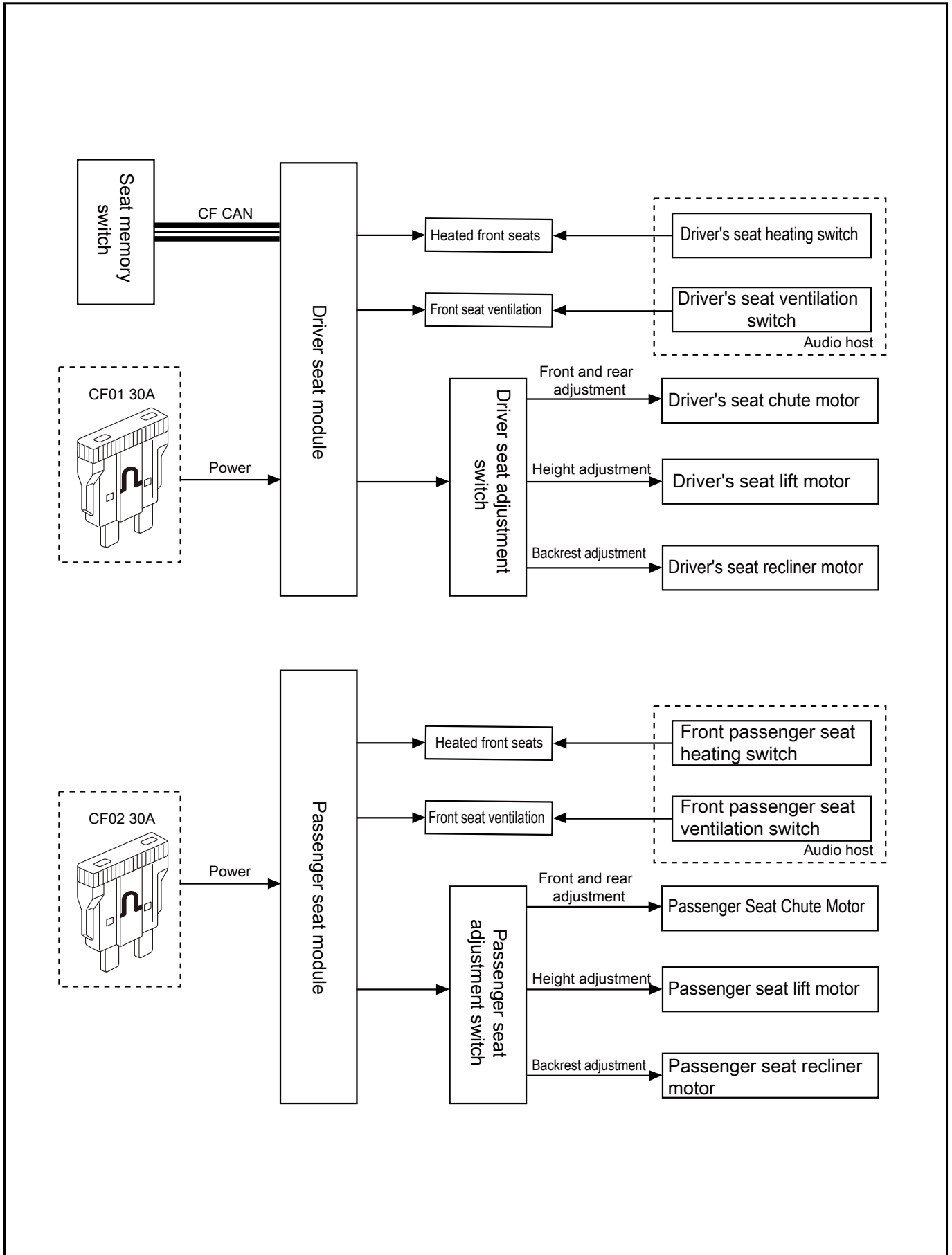
11.10.3.1 Component position



- | | |
|--------------------------------------|-------------------------------|
| 1. Passenger seat assembly | 4. Rear seat cushion assembly |
| 2. Right rear seat backrest assembly | 5. Driver seat assembly |
| 3. left rear seat backrest assembly | |

11.10.4 Electrical schematic diagram

11.10.4.1 Electrical schematic diagram



11.10.5 Diagnostic information and procedures

11.10.5.1 Diagnosis Description

Before diagnosing the fault of the electric seat, refer to the [Description and operation](#). Understand and get familiar with power seat working principle before starting system diagnosis. This helps to determine the correct fault diagnosis steps when a trouble occurs. More importantly, it also helps to determine whether the situation described by the distributor is normal. Any fault diagnosis of the power seat should begin with a routine inspection, which directs the service technician to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.10.5.2 Visual Check

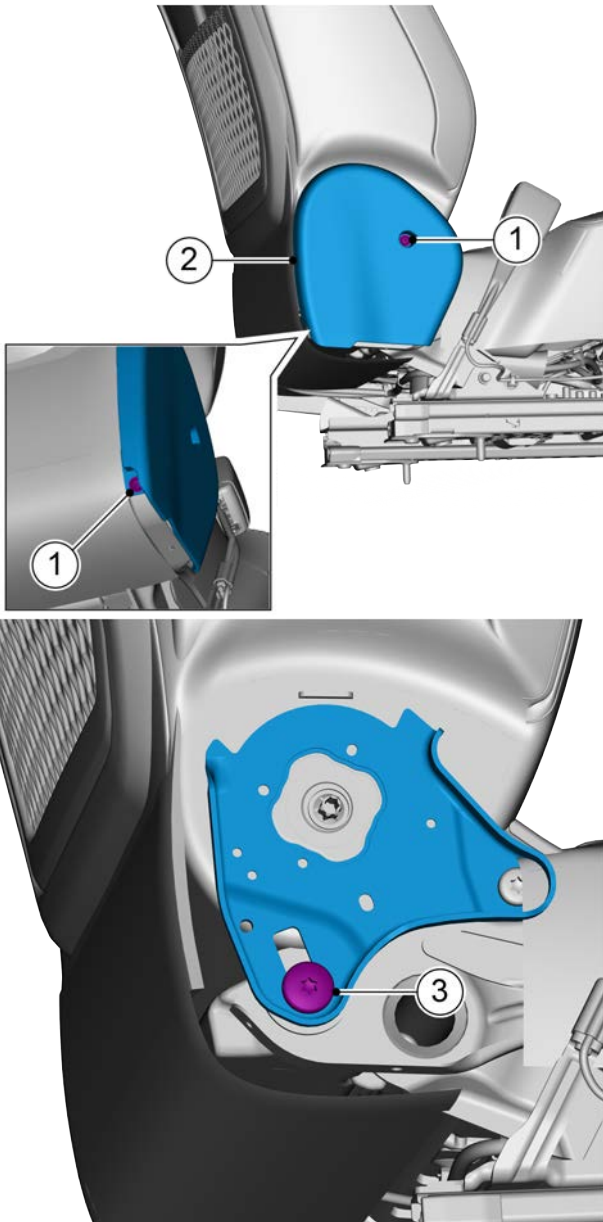
- Check after-sales installations that may affect the power seat, to ensure that these devices cannot affect the operation of power seat.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

11.10.5.3 Inspection of front seat back whips

Caution

The following inspection steps take the driver's seat assembly as an example. The inspection method of the passenger's seat assembly is similar to that of the driver's seat assembly.

Step 1	Inspection of front seat back whips.
--------	--------------------------------------



- A. Open the engine compartment cover.
- B. Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- C. Remove the driver seat assembly, see [Replacement of the driver seat assembly](#).
- D. Remove the two fixing screws 1 of the seat trim panel and take off the seat trim panel 2.
- E. Check if bolt 3 is displaced by more than 2mm.

No

The front seat back whips are not damaged and the seat is in normal condition.

Yes

Step 2 | The front seat back whips are broken and damaged, and replace the driver seat assembly.

- A. To replace the driver's seat assembly, see [Replacement of the driver's seat assembly](#).

Next Step

Step 3 | Trouble is removed.

11.10.6 Removing and installing

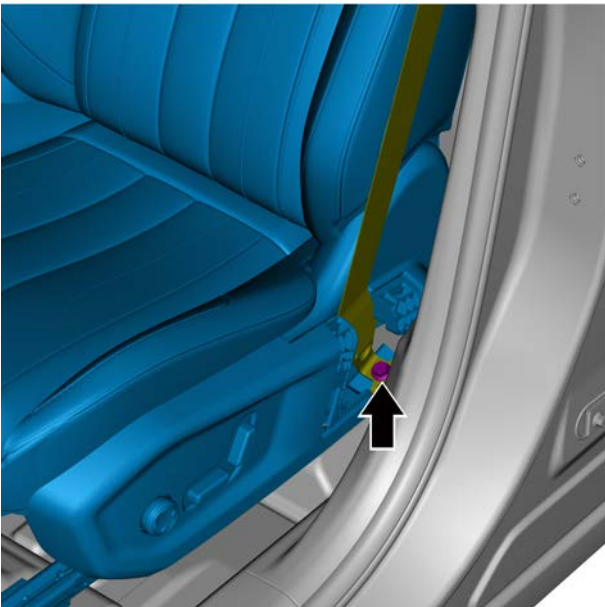
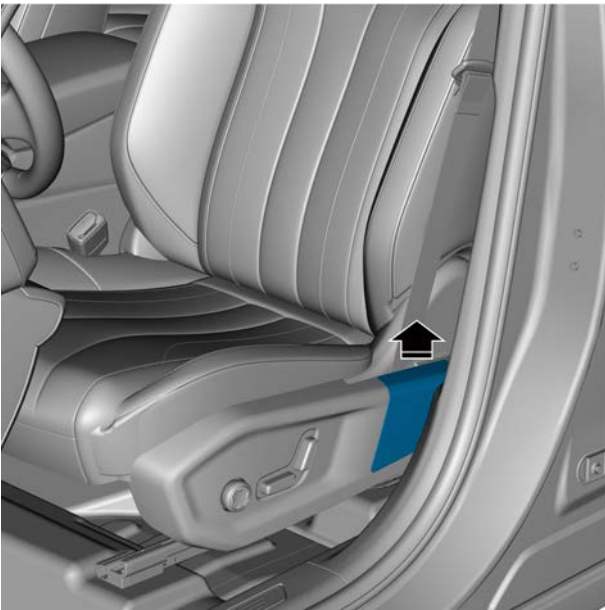
11.10.6.1 Replacement of the front driver seat assembly

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the exit cover of the seat belt in the front left seat.



- 4 Remove seat belt pretensioner (front left) 1 retaining bolt and remove seat belt pretensioner (front left).



- 5 Operate the front and rear adjustment switch of the driver seat assembly to make the driver seat assembly slide backward to the end, and remove the 2 fixing bolts at the front of the driver seat assembly.
- 6 Operate the front and rear adjustment switch of the driver seat assembly to make the driver seat assembly slide forward to the end, and remove the 2 fixing bolts at the back of the driver seat assembly.



- 7 Disconnect driver seat connector A.
- 8 Remove the 2 wire harness clip 1 at the bottom of the driver seat assembly and remove the driver seat assembly.

Installation procedure



- 1 Install the driver seat assembly and install 2 wire harness clips 1 at the bottom of the driver seat assembly.
- 2 Connect driver seat connector A.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

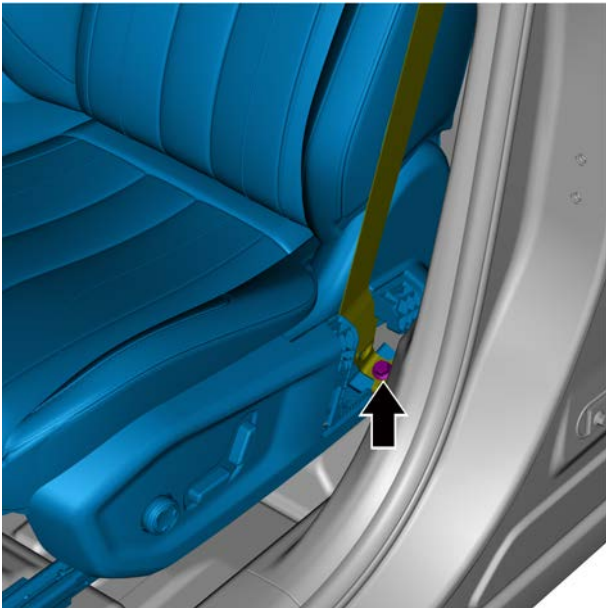


- 3 Operate the front and rear adjustment switch of the driver seat assembly to move the driver seat assembly to the last end, and install the two fixing bolts at the front end of the driver seat assembly.

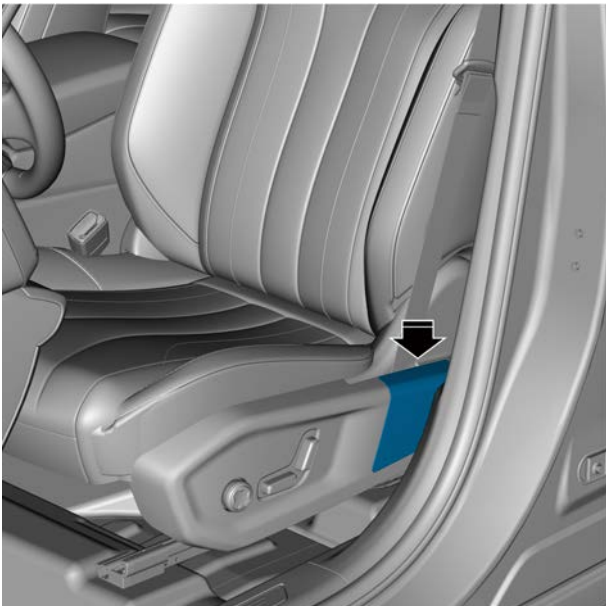
Torque: 40 N. m (metric system) 29.5 lb-ft (Imperial system)

- 4 Operate the front and rear adjustment switch of the driver seat assembly to move the driver seat assembly to the front end and install the two fixing bolts at the back end of the driver seat assembly.

Torque: 40 N. m (metric system) 29.5 lb-ft (Imperial system)



- 5 Install seat belt pretensioner (front left) 1 fixing bolt.
Torque: 40 N. m (metric system) 29.5 lb-ft (Imperial system)



- 6 Install the exit cover of the seat belt in the front left seat.

- 7 Connect the negative battery cable.
 8 Close the engine compartment cover.

11.10.6.2 Replacement of adjustment switch for driver seat

Removal procedure

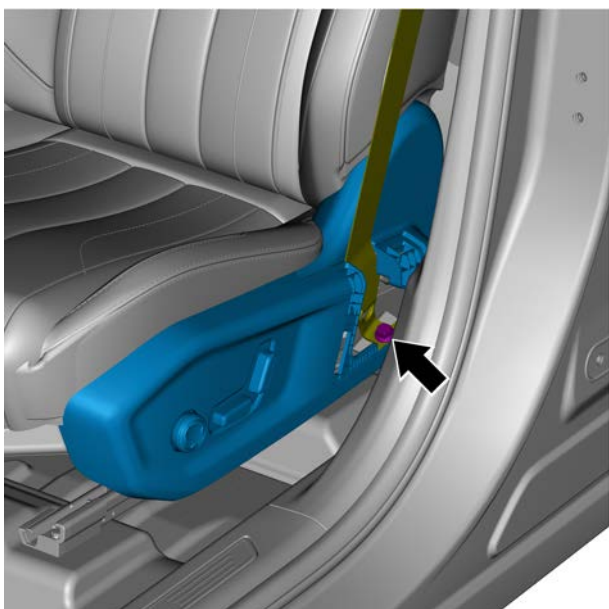
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

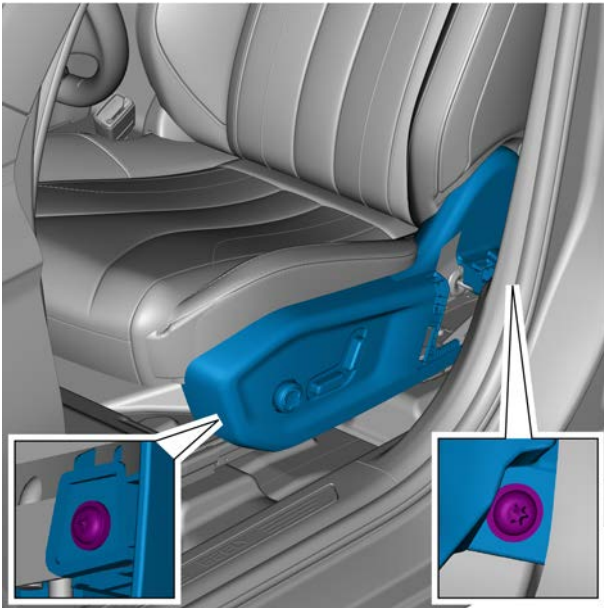
- 1 Move the seat forward to the maximum position.
- 2 Open the engine compartment cover.
- 3 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).



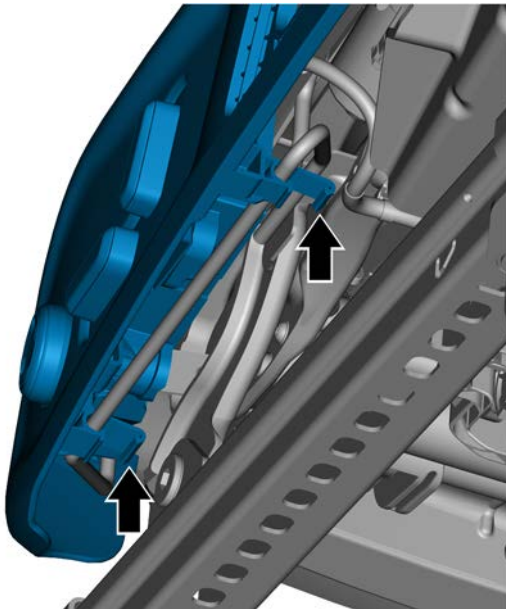
- 4 Remove the exit cover of the seat belt in the front left seat.



- 5 Remove seat belt pretensioner (front left) 1 retaining bolt and remove seat belt pretensioner (front left).



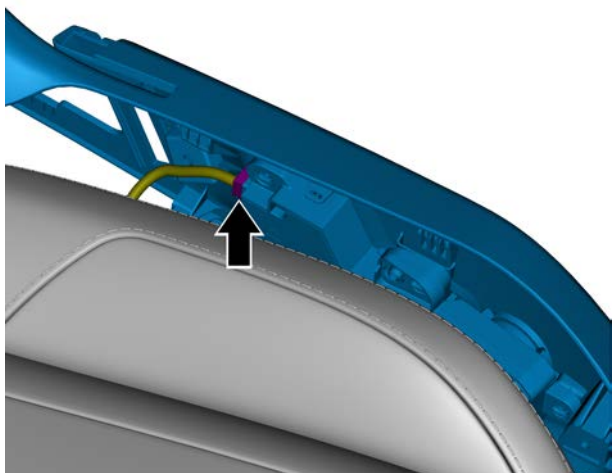
- 6 Remove the styrofoam part of the front left seat into a retaining screw at the front.
- 7 Remove 1 retaining screw at the rear end of the foam assembly of the front left seat.



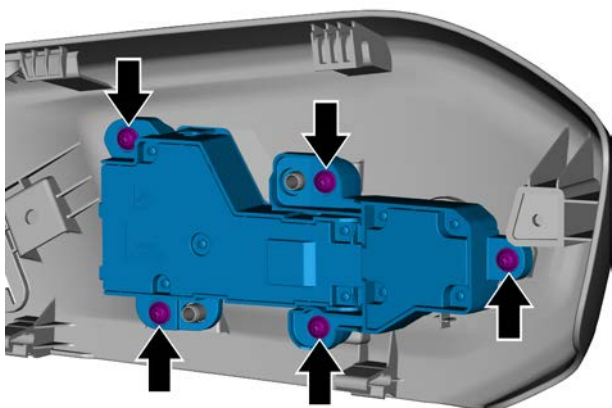
- 8 Remove the styrofoam assembly retaining clip for the front left seat.

- 9 Gently pull the lower end of the styrofoam assembly of the front left seat outward by hand so that the clip is detached from the front electric seat bracket and remove the exterior shield assembly of the front electric seat upward.

- 10 Disconnect the driver seat adjustment switch harness connector.



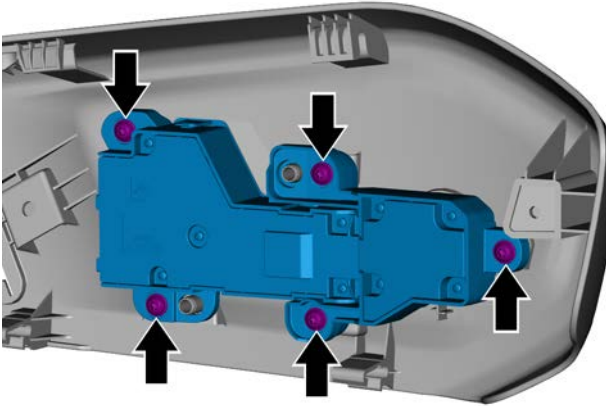
- 11 Remove the 5 retaining screws of the driver seat adjustment switch and remove the driver seat adjustment switch.



Installation procedure

- 1 Install and fasten the 5 retaining screws of the driver seat adjustment switch.

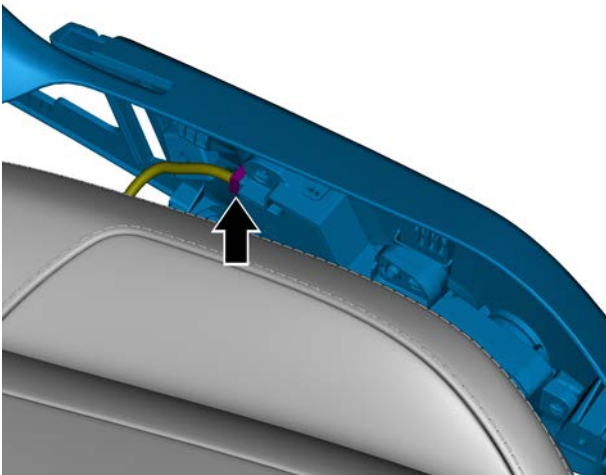
Torque: 2 N. m (metric system) 1.5 lb-ft (Imperial system)

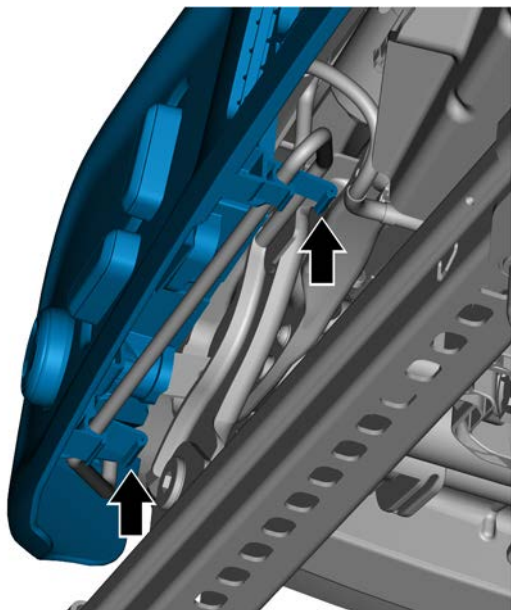


- 2 Connect the driver seat adjustment switch harness connector.

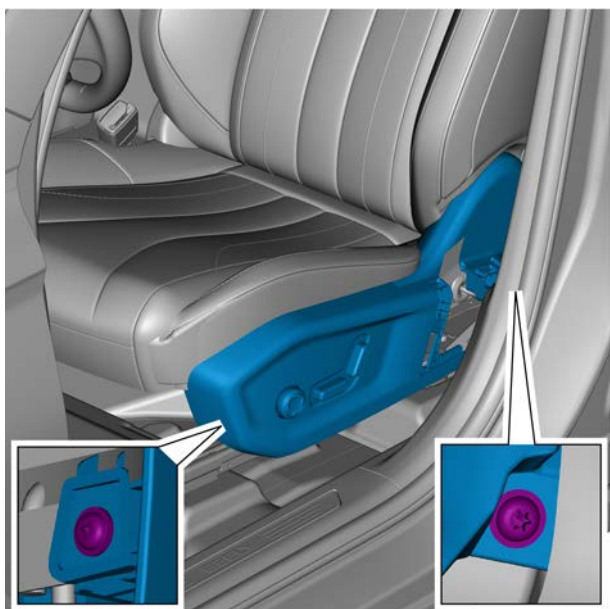
Caution

Secure the harness connection: “Connect, Click, and Confirm.”

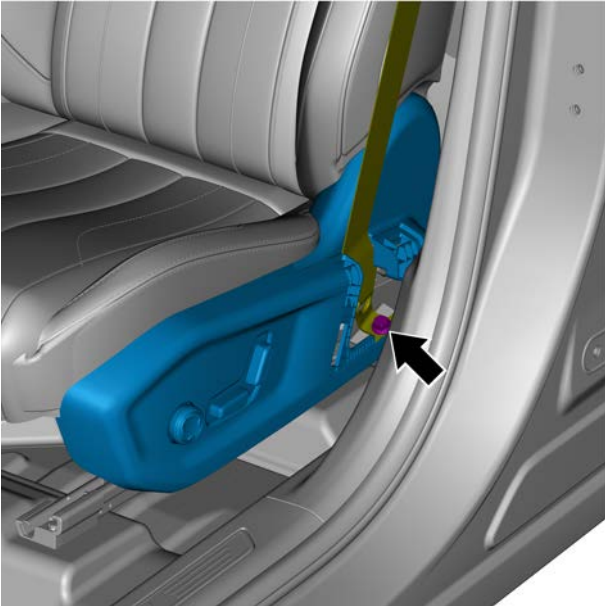




- 3 Gently press the styrofoam assembly of the front left seat so that its clip snap into the front electric seat bracket.



- 4 Fasten 1 retaining screw at the back end of the styrofoam assembly for the front left seat.
Torque: 2 N. m (metric system) 1.5 lb-ft (Imperial system)
- 5 Fasten 1 retaining screw at the front end of the styrofoam assembly for the front left seat.
Torque: 2 N. m (metric system) 1.5 lb-ft (Imperial system)



- 6 Install seat belt pretensioner (front left) 1 fixing bolt.
Torque: 40 N. m (metric system) 29.5 lb-ft (Imperial system)



- 7 Install the exit cover of the seat belt in the front left seat.

- 8 Connect the negative battery cable.
 9 Close the engine compartment cover.
 10 Reset the seat.

11.10.6.3 Replacement of personality setting of memory switch

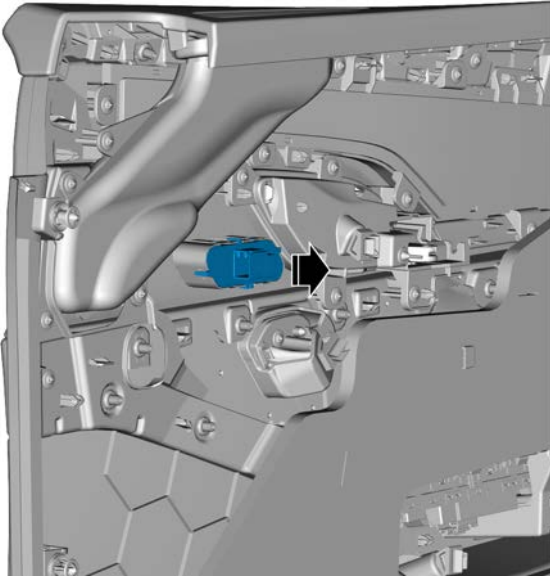
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

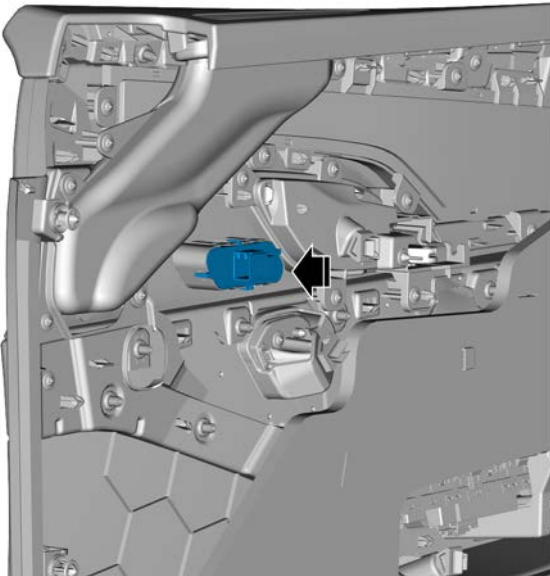
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

- 3 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly](#).
- 4 Remove the memory switch personality setting.



Installation procedure

- 1 Install memory switch personality settings.



- 2 Install the front left door interior trim panel assembly.
- 3 Connect the negative battery cable.
- 4 Close the engine compartment cover.

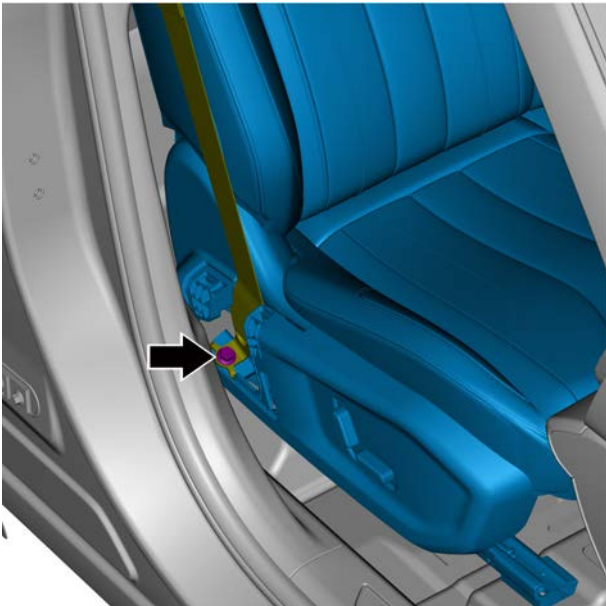
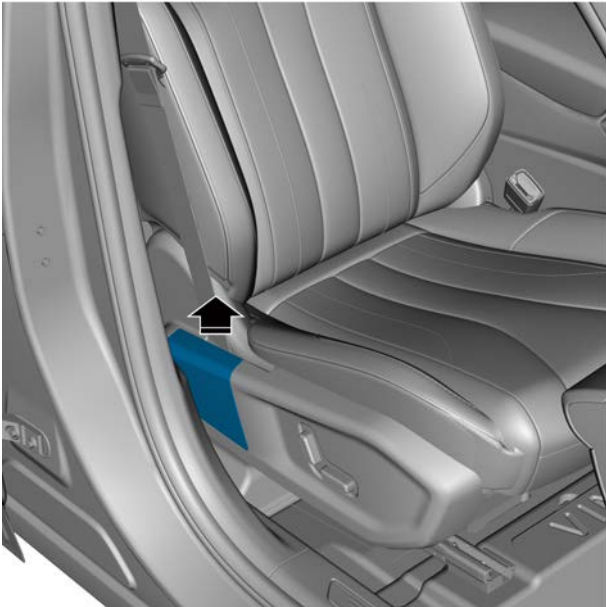
11.10.6.4 Replacement of passenger seats

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the FR seat belt exit cover.
- 4 Remove seat belt pretensioner (FR) 1 retaining bolt and remove seat belt pretensioner (FR).





- 5 Operate the front and rear adjustment switch of the passenger seat to make the passenger seat slide backward to the end, and remove the 2 fixing bolts at the front of the passenger seat.
- 6 Operate the front and rear adjustment switch of the passenger seat to make the passenger seat slide forward to the end, and remove the 2 fixing bolts at the rear of the passenger seat.



- 7 Disconnect passenger seat connector A.
- 8 Remove 1 wire harness clip 1 at the bottom of the passenger seat and remove the passenger seat.

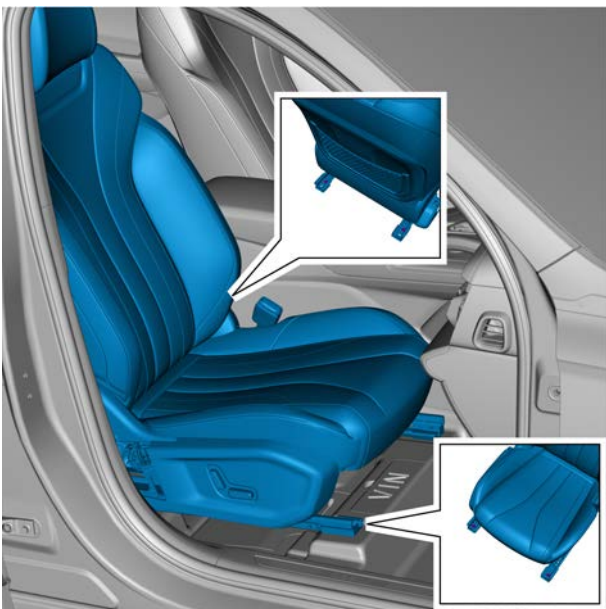
Installation procedure



- 1 Install the passenger seat and install a wire harness clip 1 at the bottom of the passenger seat.
- 2 Connect passenger seat connector A.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

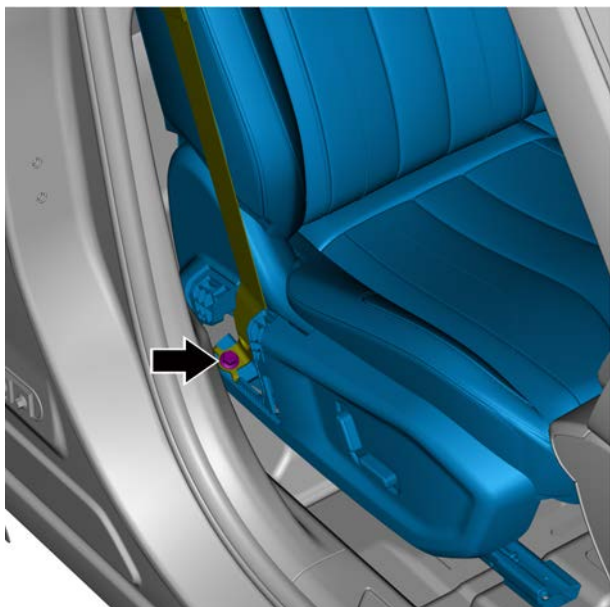


- 3 Operate the front and rear adjustment switch of the passenger seat to move the passenger seat backward to the end and install the two fixing bolts at the front of the passenger seat.

Torque: 40 N. m (metric system) 29.5 lb-ft (Imperial system)

- 4 Operate the front and rear adjustment switch of the passenger seat to move the passenger seat to the front end and install the 2 fixed bolts at the back end of the passenger seat.

Torque: 40 N. m (metric system) 29.5 lb-ft (Imperial system)



- 5 Install seat belt pretensioner (FR) 1 fixing bolt.
Torque: 40 N. m (metric system) 29.5 lb-ft (Imperial system)



- 6 Install the FR seat belt exit cover.

- 7 Connect the negative battery cable.
- 8 Close the engine compartment cover.

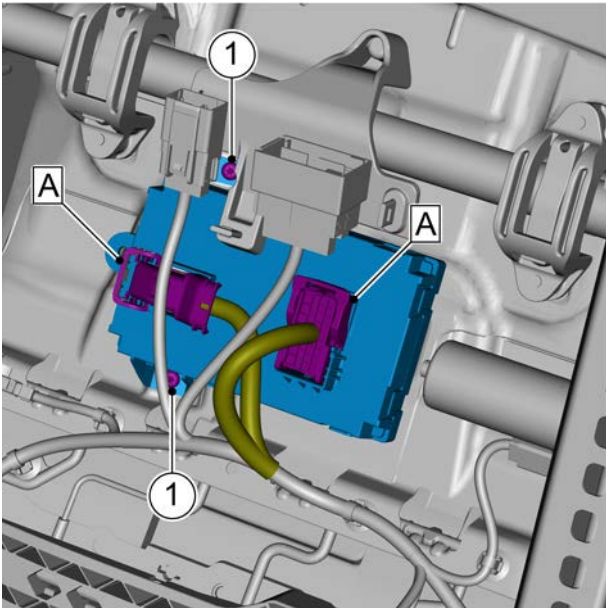
11.10.6.5 Replacement of the driver's seat control module

Removal procedure

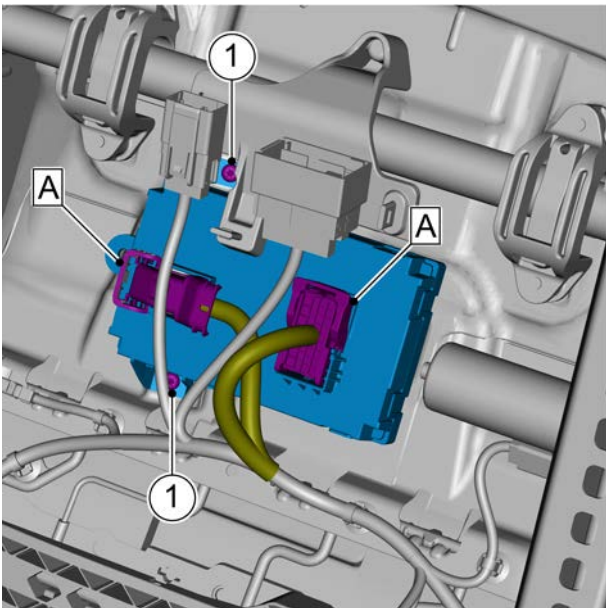
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).



- 3 Remove the driver seat assembly, see [Replacement of the driver seat assembly](#).
- 4 Disconnect the 2 harness connectors A of the driver's seat module.
- 5 Remove driver seat module 2 retaining screws 1.
- 6 Remove the driver seat module.



Installation procedure

- 1 Place the driver seat module.
- 2 Install driver seat module 2 retaining screws 1.
Torque: 5 N. m (metric system) 3.7 lb-ft (Imperial system)
- 3 Connect 2 harness connectors A to the driver seat module.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 4 Install the driver seat assembly.
- 5 Connect the negative battery cable.
- 6 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 7 Close the engine compartment cover.

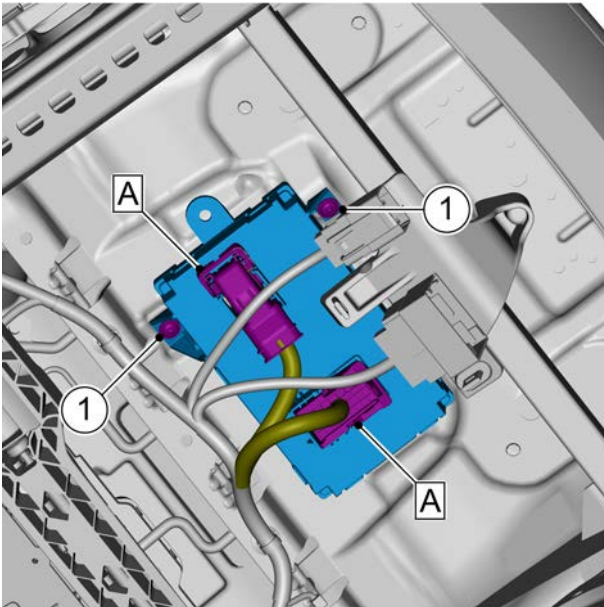
11.10.6.6 Replacement of passenger seat module

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the passenger seat assembly, see [Replacement of the passenger seat assembly](#).
- 4 Disconnect 2 harness connectors A from the passenger seat module.
- 5 Remove the 2 retaining screws 1 of passenger seat module .
- 6 Remove the passenger seat module.

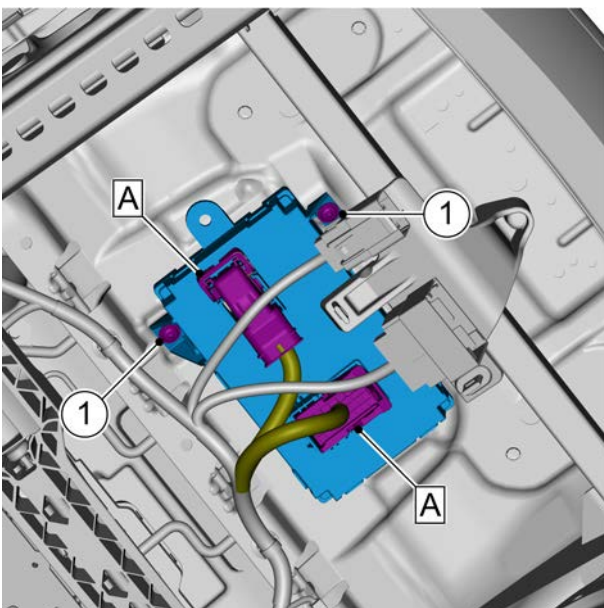
**Installation procedure**

- 1 Place the passenger seat module.
- 2 Install the 2 retaining screws 1 of passenger seat module.
Torque: 5 N. m (metric system) 3.7 lb-ft (Imperial system)
- 3 Connect 2 harness connectors A to the passenger seat module.

Caution

Secure the harness connection: "Connect, Click, and Confirm."

- 4 Install the passenger seat assembly.
- 5 Connect the negative battery cable.



- 6 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 7 Close the engine compartment cover.

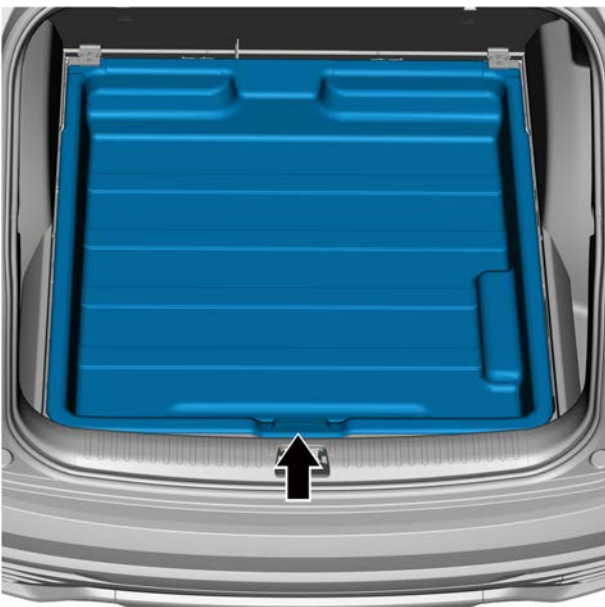
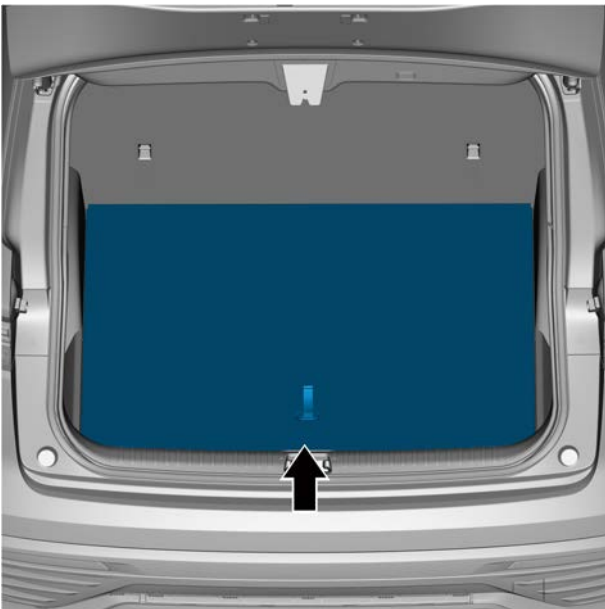
11.10.6.7 Rear Seat Cushion Assembly Replacement

Removal procedure

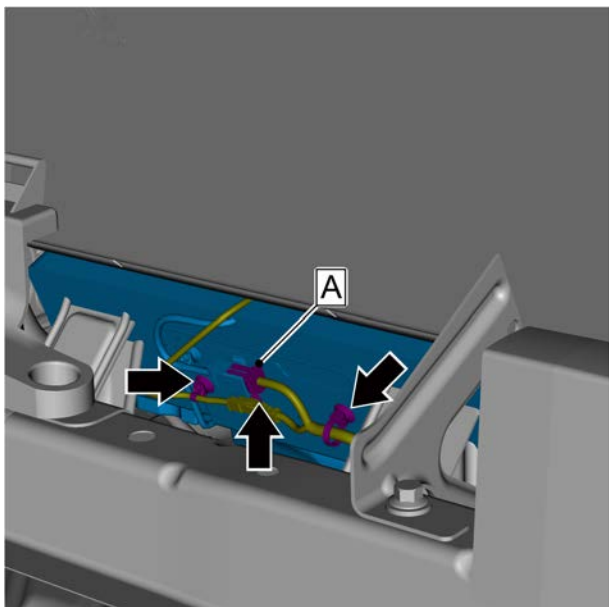
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

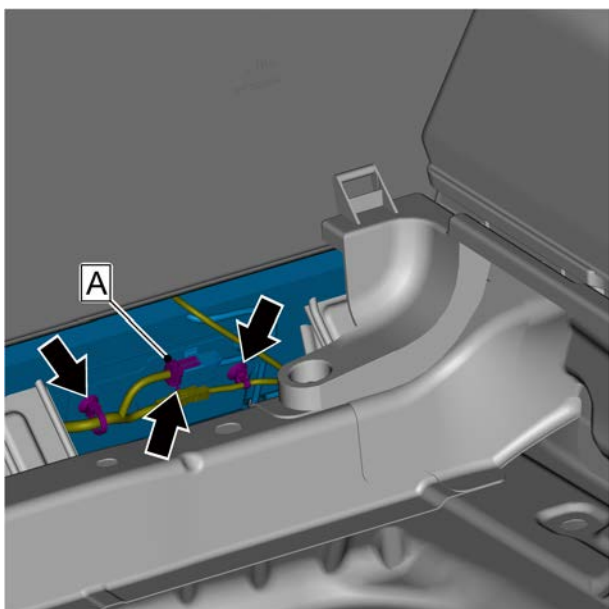
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the luggage compartment carpet assembly.



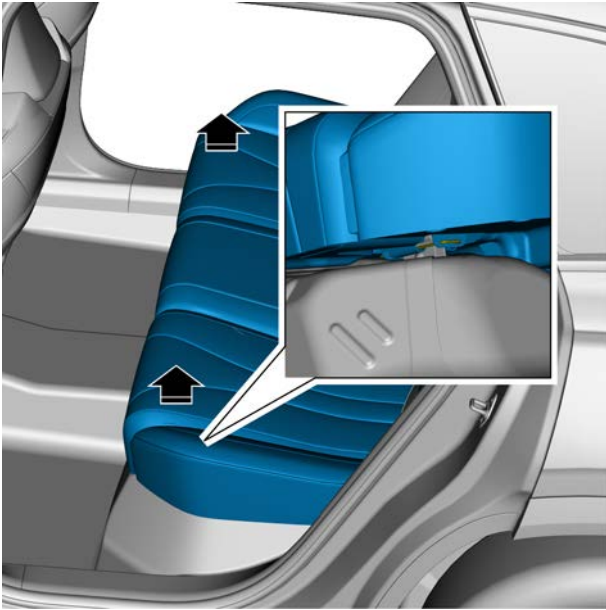
- 3 Remove the rear compartment auxiliary box.



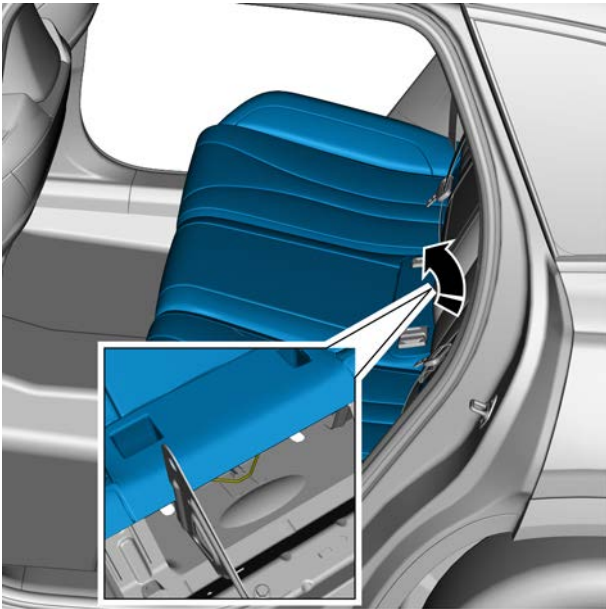
- 4 Disconnect harness connector A on the left side of the rear seat cushion assembly.
- 5 Remove the rear seat cushion assembly wire harness clip.



- 6 Disconnect harness connector A on the right side of the rear seat cushion assembly.
- 7 Remove the rear seat cushion assembly wire harness clip.

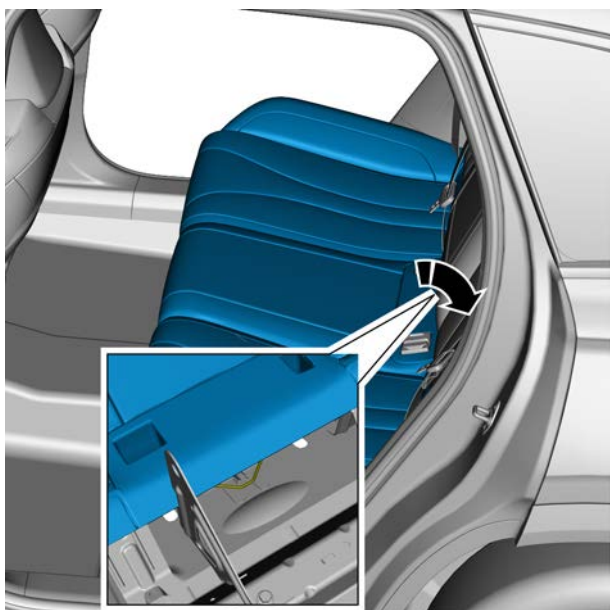


- 8 Lift both ends of the rear seat cushion assembly to disengage the seat lock nut mechanism.

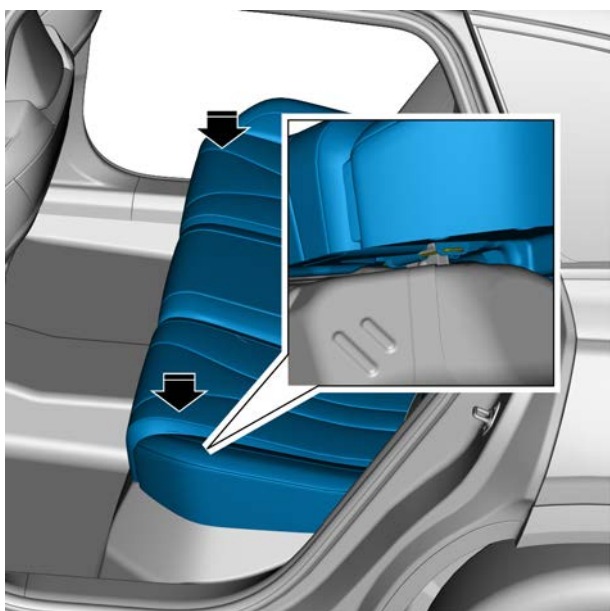


- 9 Press the middle and back end of the rear seat cushion assembly, release the retaining hook back forcefully, and remove the rear seat cushion assembly.

Installation procedure



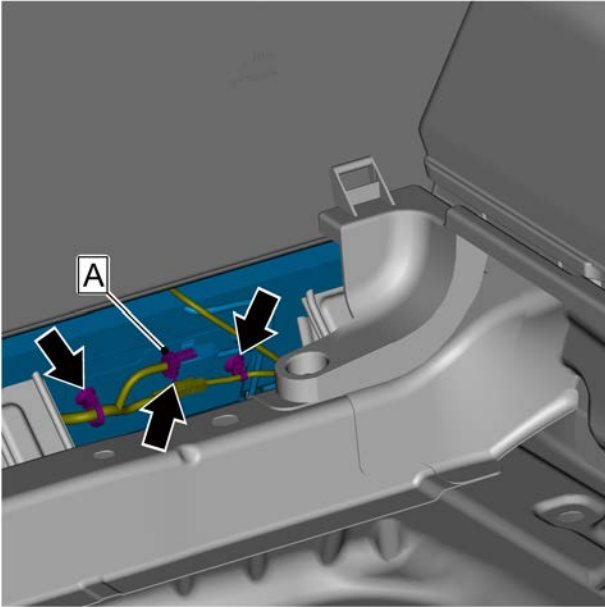
- 1 Clip the rear end of the rear seat cushion assembly into the cushion retaining hook.



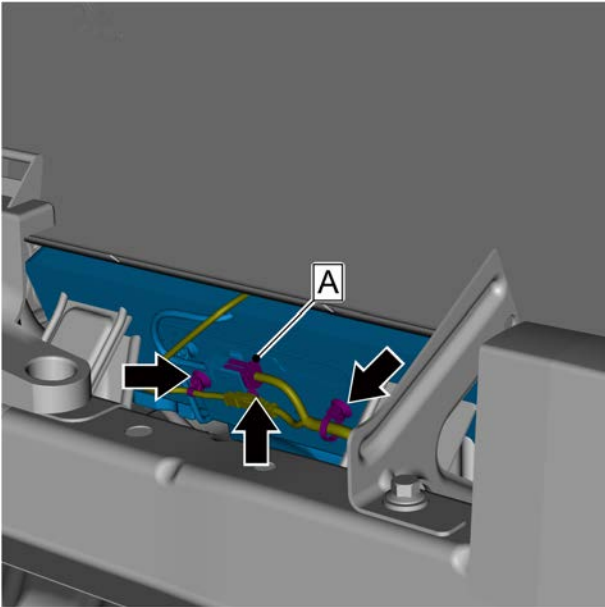
- 2 Press the rear seat cushion assembly into the seat cushion fixing lock nut mechanism.

Caution

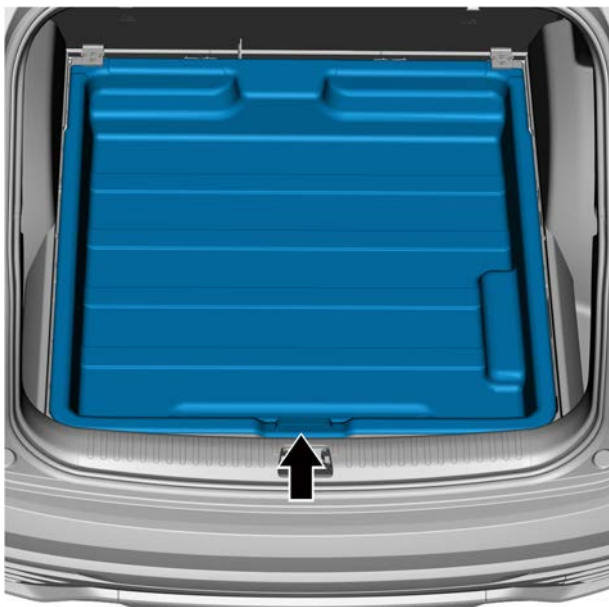
The seat cushion is pressed in the seat cushion lock nut mechanism to hear the sound of "click" as the standard.



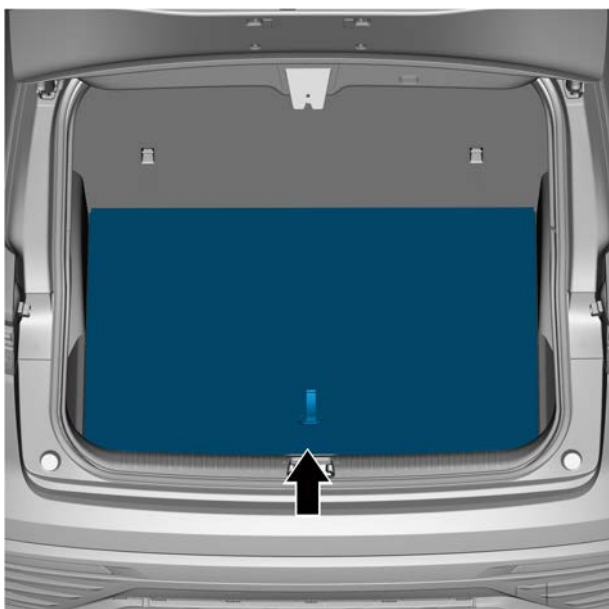
- 3 Connect harness connector A to the right side of the rear seat cushion assembly.
- 4 Install the rear seat cushion assembly wire harness clip.



- 5 Connect harness connector A to the left side of the rear seat cushion assembly.
- 6 Install the wire harness clip of the rear seat cushion assembly.



- 7 Install the rear compartment auxiliary box.



- 8 Install the luggage compartment carpet assembly.

- 9 Connect the negative battery cable.

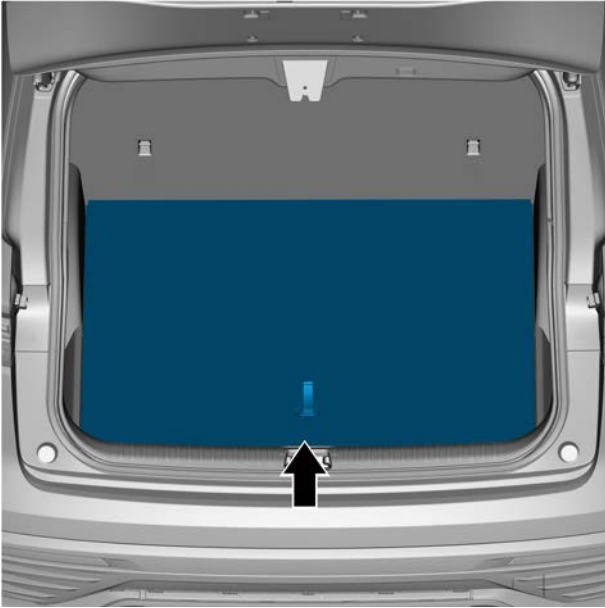
11.10.6.8 left rear seat backrest assembly replacement

Removal procedure

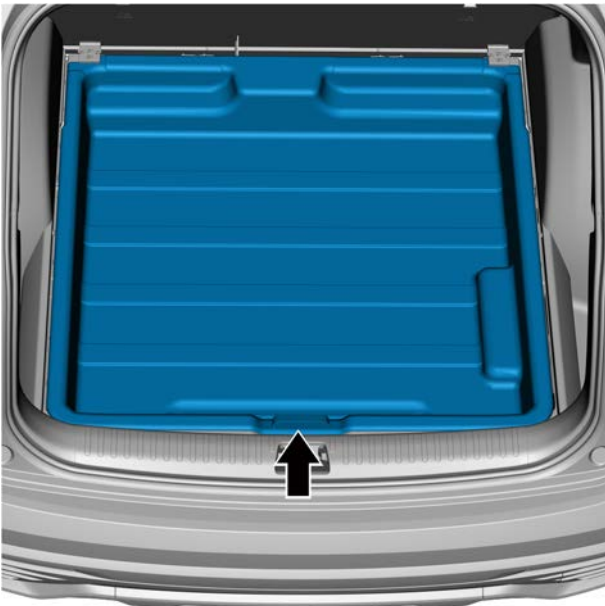
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

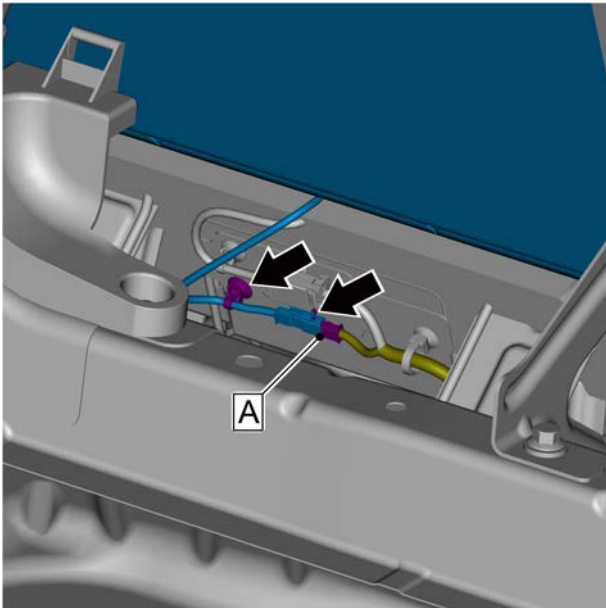
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)



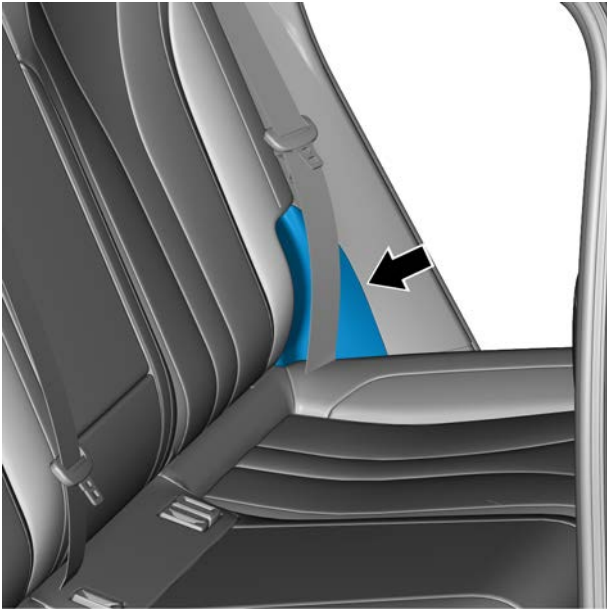
2 Remove the luggage compartment carpet assembly.



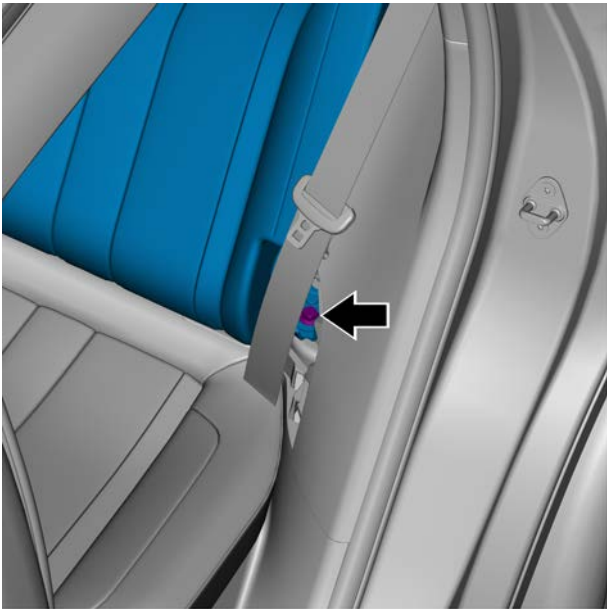
3 Remove the rear compartment auxiliary box.



- 4 Disconnect the harness connector A of the rear seat left backrest assembly.
- 5 Unclip the wire harness clip on the left backrest assembly of the rear seat.

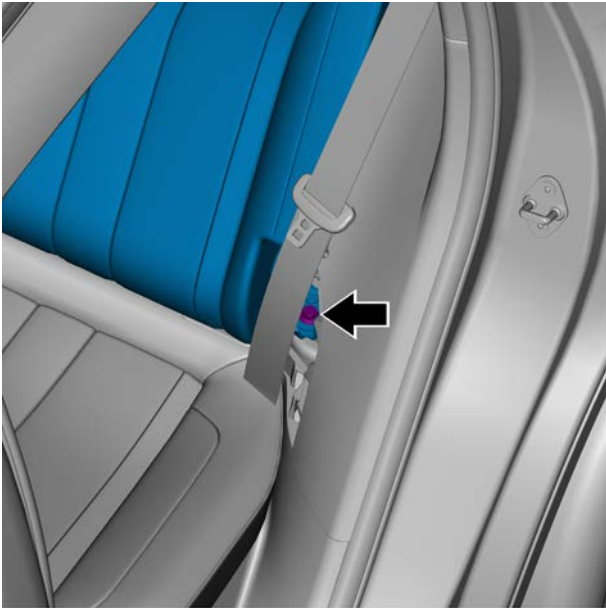


6 Remove the trim plate cover under the left C-pillar.



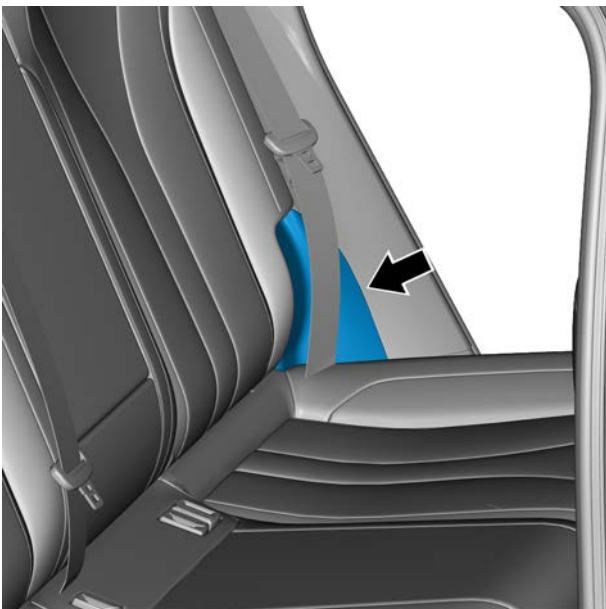
7 Remove the retaining bolt of the left backrest assembly of the rear seat and remove the left backrest assembly of the rear seat.

Installation procedure

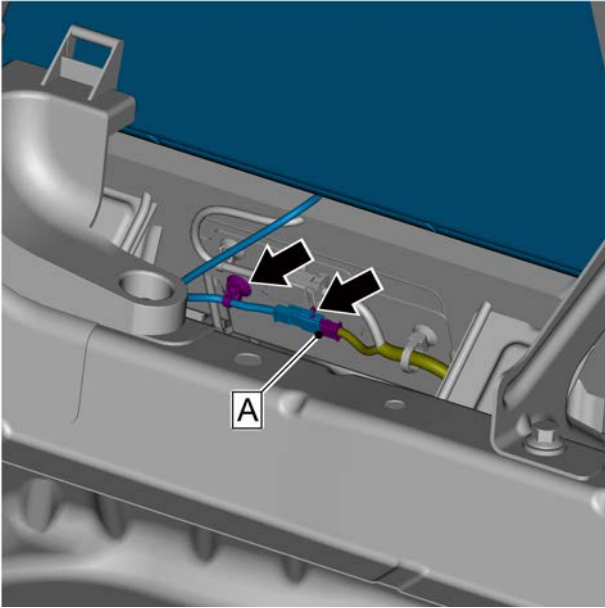


- 1 Install the fastening bolts of the left backrest assembly of the rear seat.

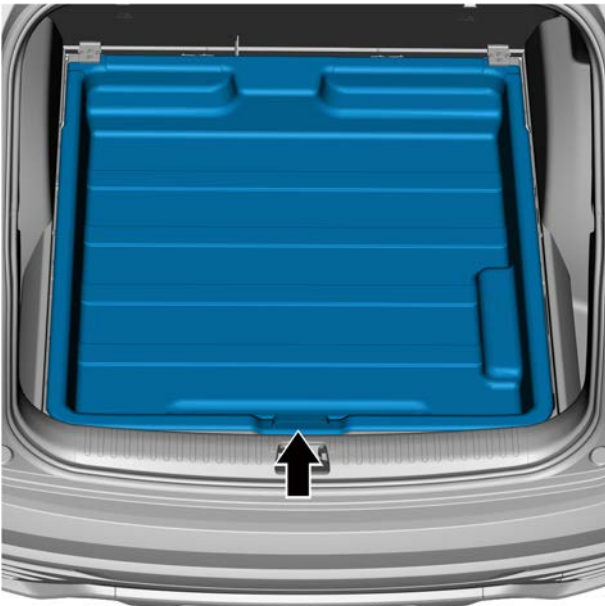
Torque: 48 N·m (metric) 35.4 lb-ft (imperial system)



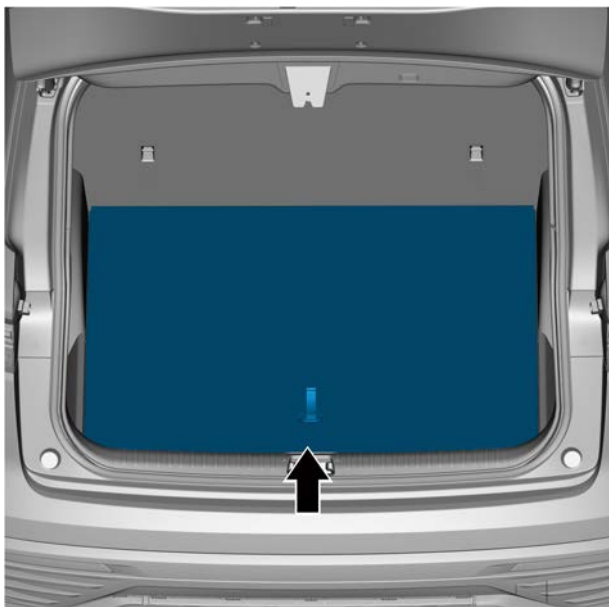
- 2 Install the trim cover plate under the left C-pillar.



- 3 Connect the harness connector A of the rear seat left backrest assembly.
- 4 Install the wire harness clip on the left backrest assembly of the rear seat.



- 5 Install the rear compartment auxiliary box.



- 6 Install the luggage compartment carpet assembly.

- 7 Connect the negative battery cable.

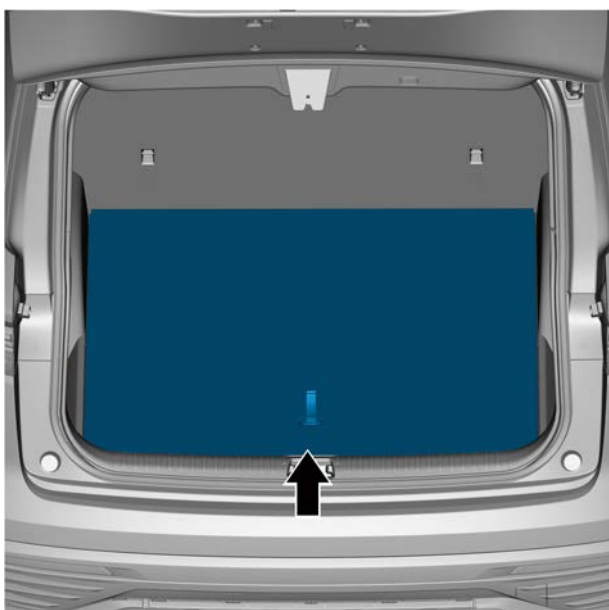
11.10.6.9 Right rear seat backrest assembly Replacement

Removal procedure

Warning !

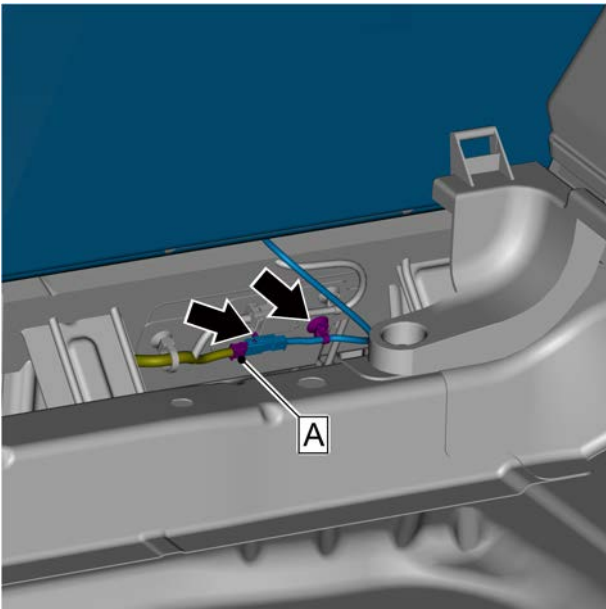
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rear seat cushion assembly, see [Rear seat cushion assembly](#).
- 3 Remove the luggage compartment carpet assembly.



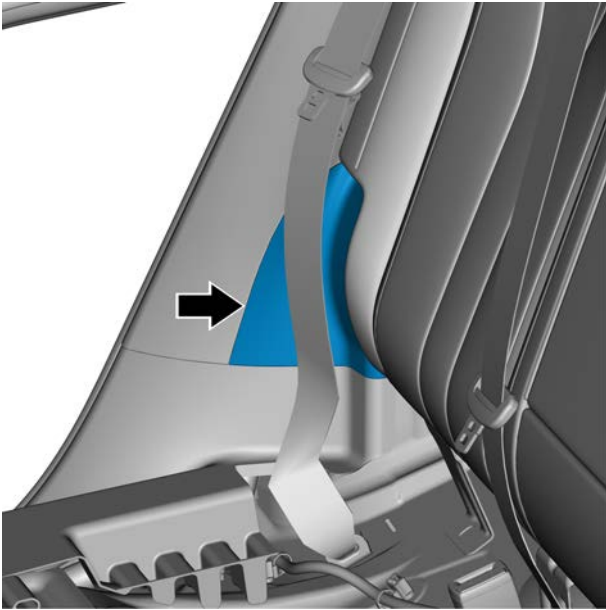


4 Remove the rear compartment auxiliary box.

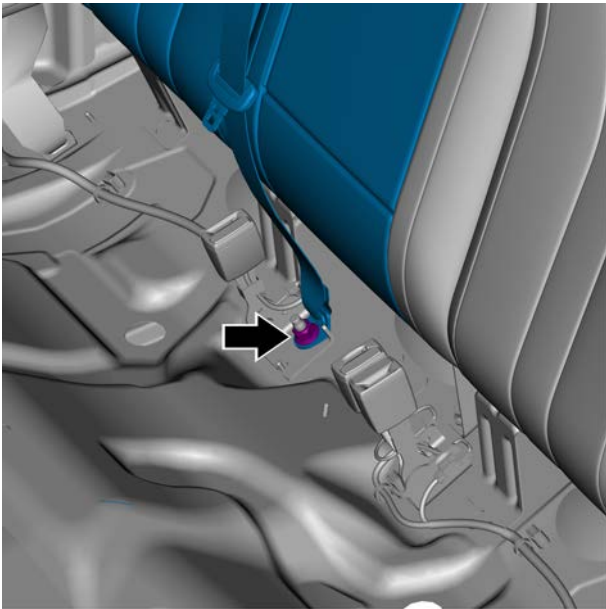


5 Disconnect the harness connector A of the backrest assembly on the right side of the rear seat.

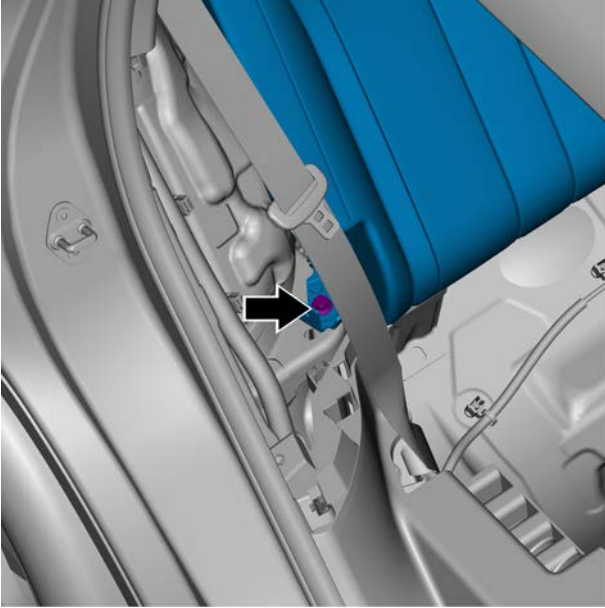
6 Unclip the wire harness clip on the right backrest assembly of the rear seat.



7 Remove the cover plate under the right C-pillar.

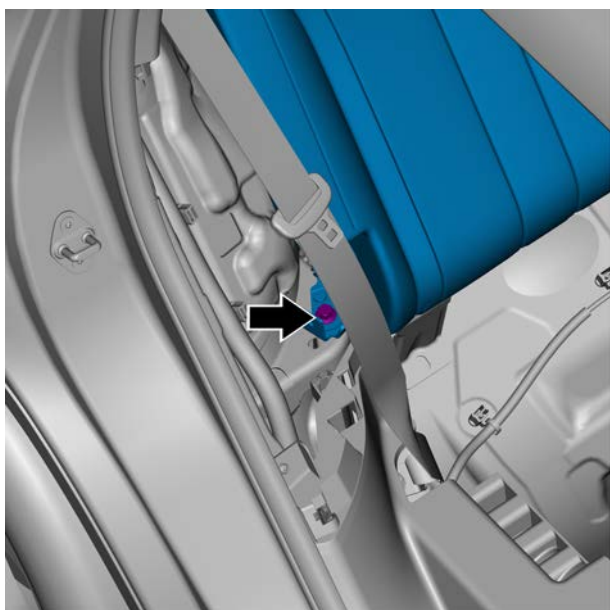


8 Remove the seat belt pretensioner (middle of the second row of seats) retaining nut.



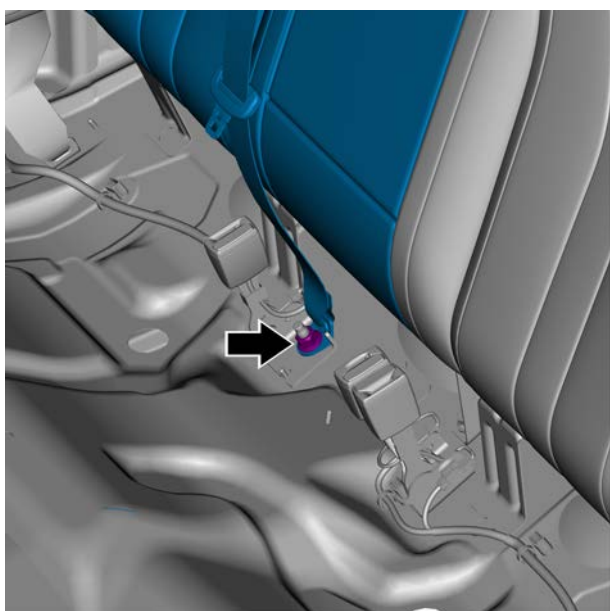
- 9 Remove the retaining bolt of the right backrest assembly of the rear seat and remove the right backrest assembly of the rear seat.

Installation procedure



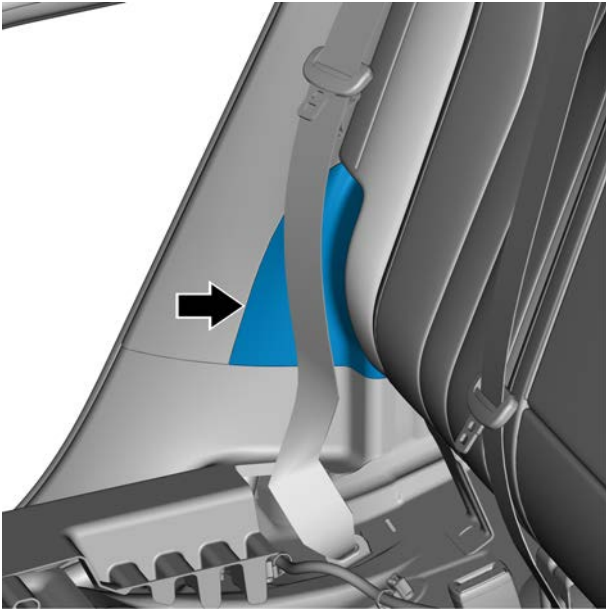
- 1 Install the fastening bolts of the right backrest assembly of the rear seat.

Torque: 48 N·m (metric) 35.4 lb-ft (imperial system)

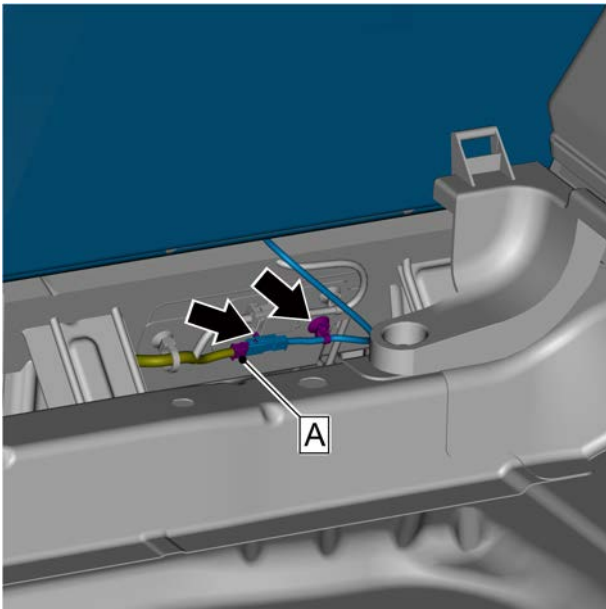


- 2 Install seat belt pretensioner (in the middle of the second row of seats) retaining nuts.

Torque: 48 N·m (metric) 35.4 lb-ft (imperial system)

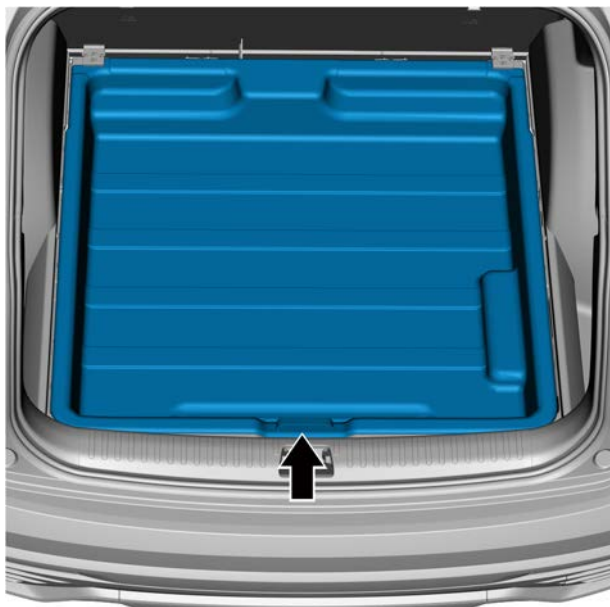


3 Install the cover plate under the right C-pillar.

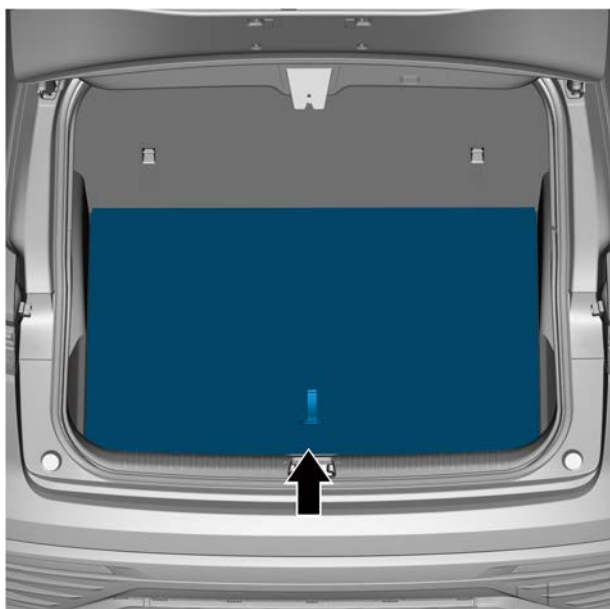


4 Connect the harness connector A of the backrest assembly on the right side of the rear seat.

5 Install the harness clip on the right backrest assembly of the rear seat.



- 6 Install the rear compartment auxiliary box.



- 7 Install the luggage compartment carpet assembly.

- 8 Install the rear seat cushion assembly.
- 9 Connect the negative battery cable.

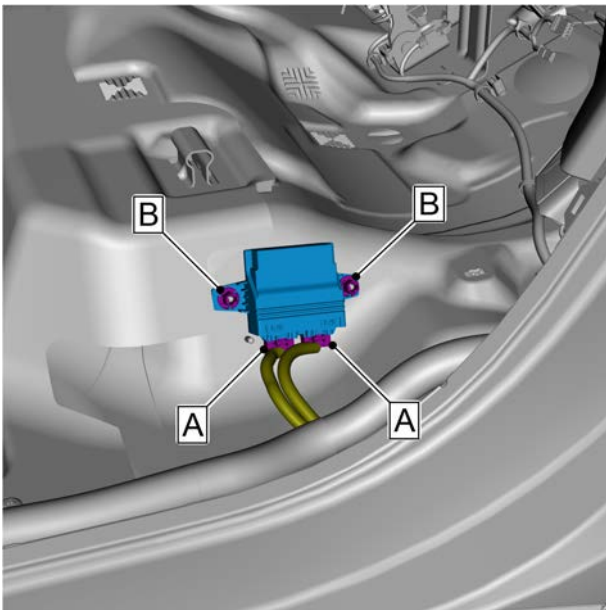
11.10.6.10 Replacement of rear seat controller

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly](#).

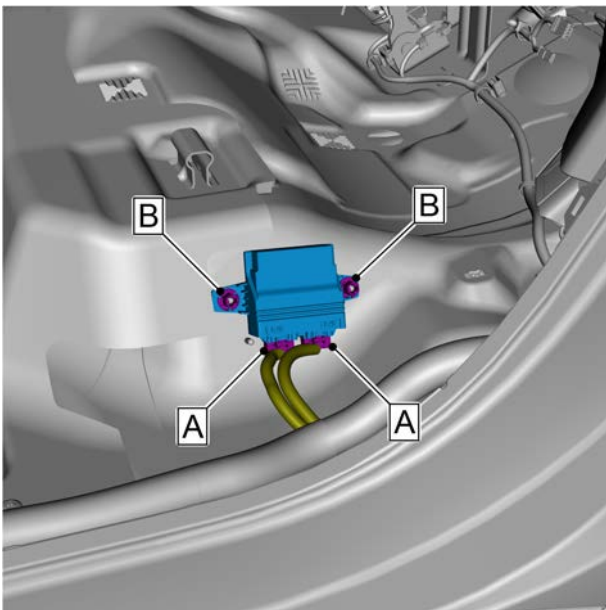


- 4 Remove the RL threshold interior trim plate assembly, see the [Replacement of the RL threshold interior trim plate assembly](#).
- 5 Disconnect the rear seat controller 2 harness connector A.
- 6 Remove the 2 fixing nuts B of the rear seat controller.

Caution

After removal, check the clip foot for damage and replace it if necessary.

- 7 Remove the rear seat controller.



Installation procedure

- 1 Place the rear seat controller.
- 2 Install the 2 fixing nuts B of the rear seat controller.
- 3 Connect 2 harness connectors A to the rear seat controller.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 4 Install the RL threshold interior trim panel assembly.
- 5 Install the rear seat cushion assembly.
- 6 Connect the negative battery cable.
- 7 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 8 Close the engine compartment cover.

11.11 Defrost

11.11.1 Specification

11.11.1.1 Defrost working conditions requirements

Place the starting switch in "ON" position	Battery voltage (V)	Defrosting working status
OFF	Rated voltage 12V	Inoperative
ON	Rated voltage 12V	Inoperative
START	Rated voltage 12V	Operative

11.11.2 Instructions and operations

11.11.2.1 Instructions and Operations

The main components of the defrosting system

- - Defrosting switch
- Rearview mirror heating
- Rear fixed vehicle window heater

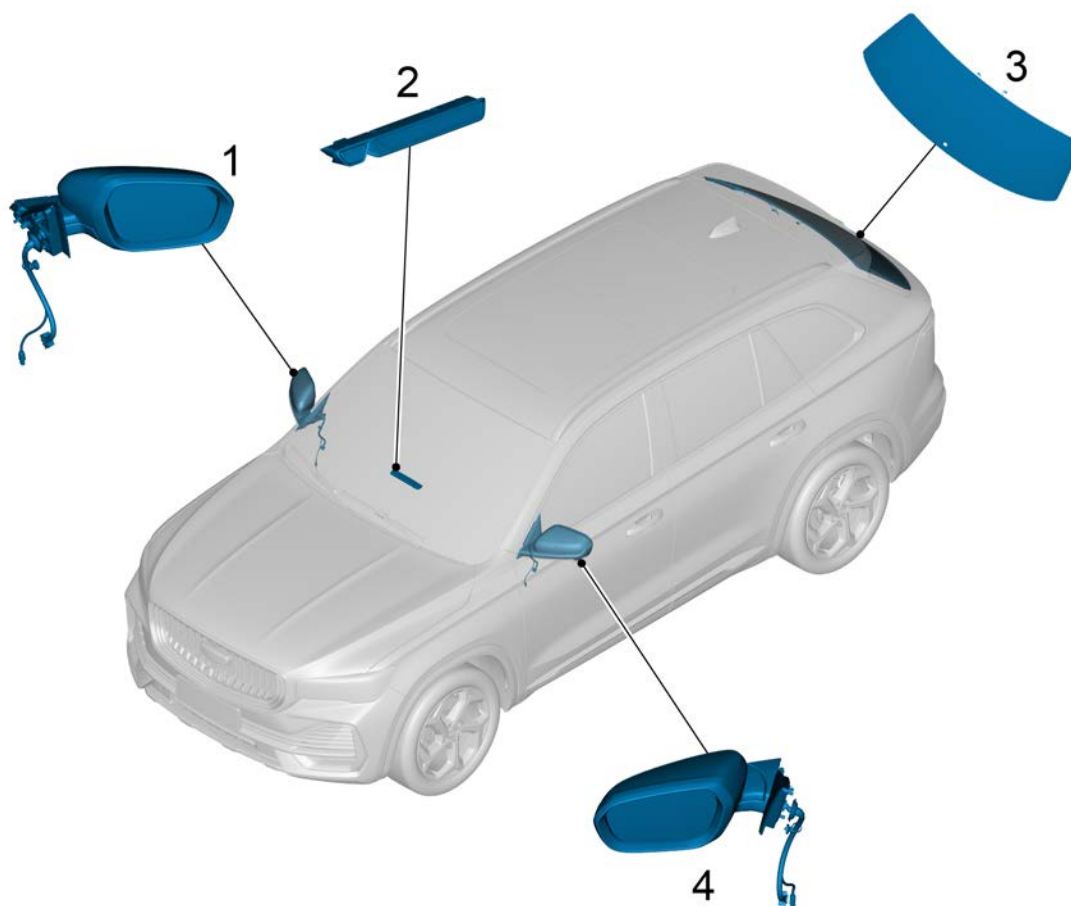
The defrosting switch is arranged on the center console switch module, and the rear fixed window heater is integrated with the glass.

Electrical heating & defrosting of exterior rearview mirrors

Press the exterior rearview mirror/rearview window defrosting button on the center console switch module, the button indicator light is lit, the exterior rearview mirror heating and rearview window defrosting are turned on at the same time, and will be turned off automatically after 5-15 minutes. The time is related to the ambient temperature. The lower the ambient temperature is, the longer the heating time is.

11.11.3 Component position

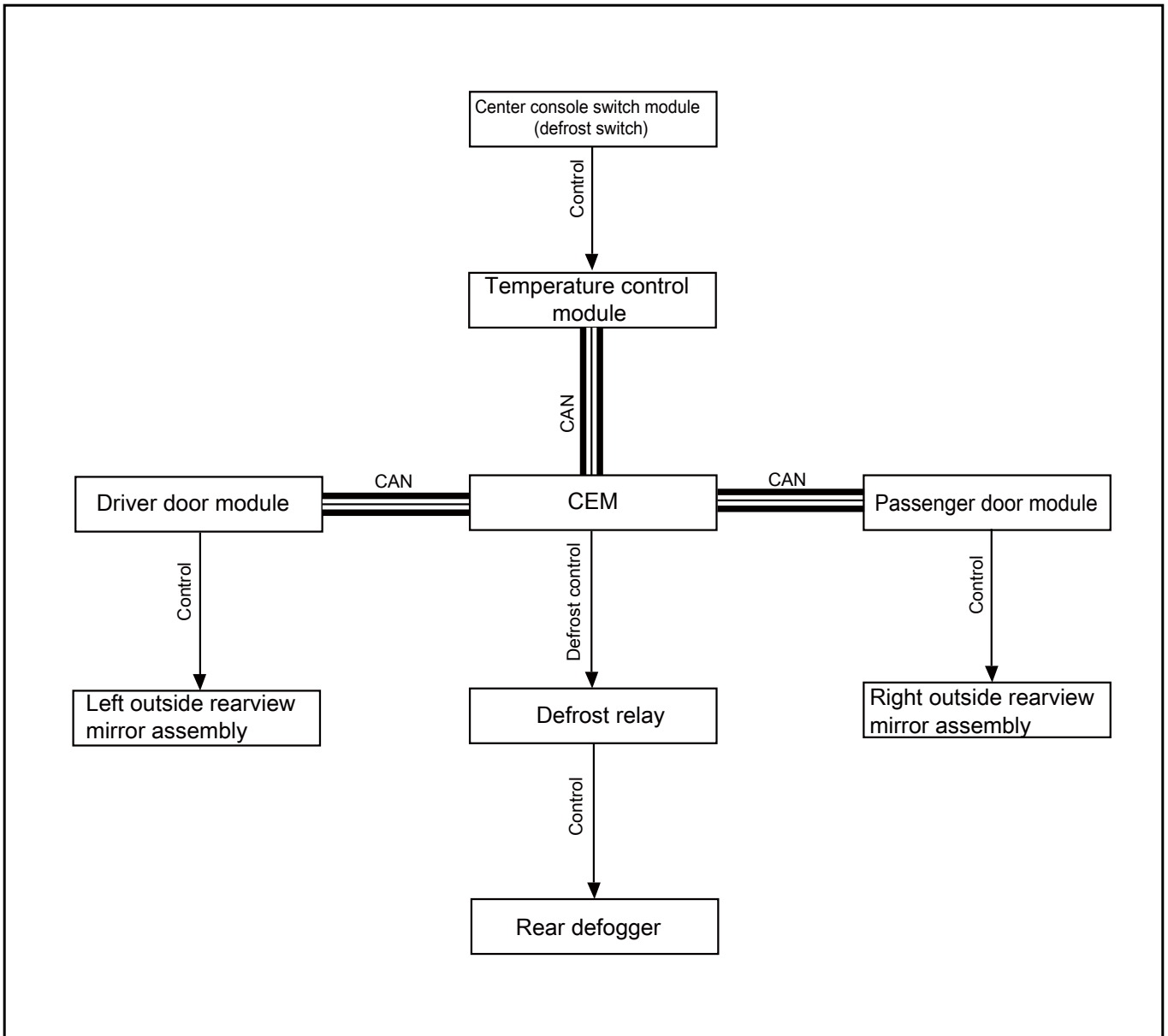
11.11.3.1 Component position



- | | | | |
|----|--|----|---|
| 1. | Right exterior rearview mirror defroster | 3. | Rear windshield glass defroster |
| 2. | Center console switch module (defrosting switch) | 4. | Left exterior rearview mirror defroster |

11.11.4 Electrical schematic diagram

11.11.4.1 Electrical schematic diagram



11.11.5 Diagnostic information and procedures

11.11.5.1 Diagnosis Description

Before diagnosing the failure of the defrosting system, see [Description and operation](#). Understand and be familiar with the system working principle of the defrosting system before starting system diagnosis. This helps to determine the correct fault diagnosis steps when a fault occurs. More importantly, it can also help to confirm whether the situation described by the customer belongs to normal operation. Any fault diagnosis of the defrosting system should start with visual inspection, which will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.11.5.2 Routine inspection

- Check the after-sales installation devices that may affect the defrosting operation to ensure that these devices do not affect the normal operation of defrosting.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

11.11.6 Removing and installing

11.11.6.1 Replacement of windshield defrosting grille

See [Replacement of rear windshield assembly](#).

11.11.6.2 Replacement of electric rearview mirror heater

See the [Replacement of the convex glass of the RL view mirror \(Type 1\)](#) and the [Replacement of the convex glass of the RL view mirror \(Type 2\)](#).

11.11.6.3 Replacement of the rear windshield defrost switch

See the [Replacement of the center console switch module](#).

11.11.6.4 Repair of defrosting braided lead wire of rear windshield

Repair program

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Disconnect the defroster harness connector.
- 4 It is required to use the fine steel wool to polish the repair parts before repair of welding bus lead.
- 5 Use a brush to coat some rosin on the repair parts of conductors and bus leads.
- 6 Dip the soldering iron with solders enough for repair.
- 7 Heat to melt the solder is applicable only. Do not overheat the conductors during re-wiring the bus leads.
- 8 Connect the negative battery cable.
- 9 Close the engine compartment cover.

11.12 Horn

11.12.1 Specification

11.12.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Bolt-fastening horn (tweeter)	M8×25	14~14	10.3~10.3
Bolt-fastening horn (woofer)	M8×25	14~14	10.3~10.3

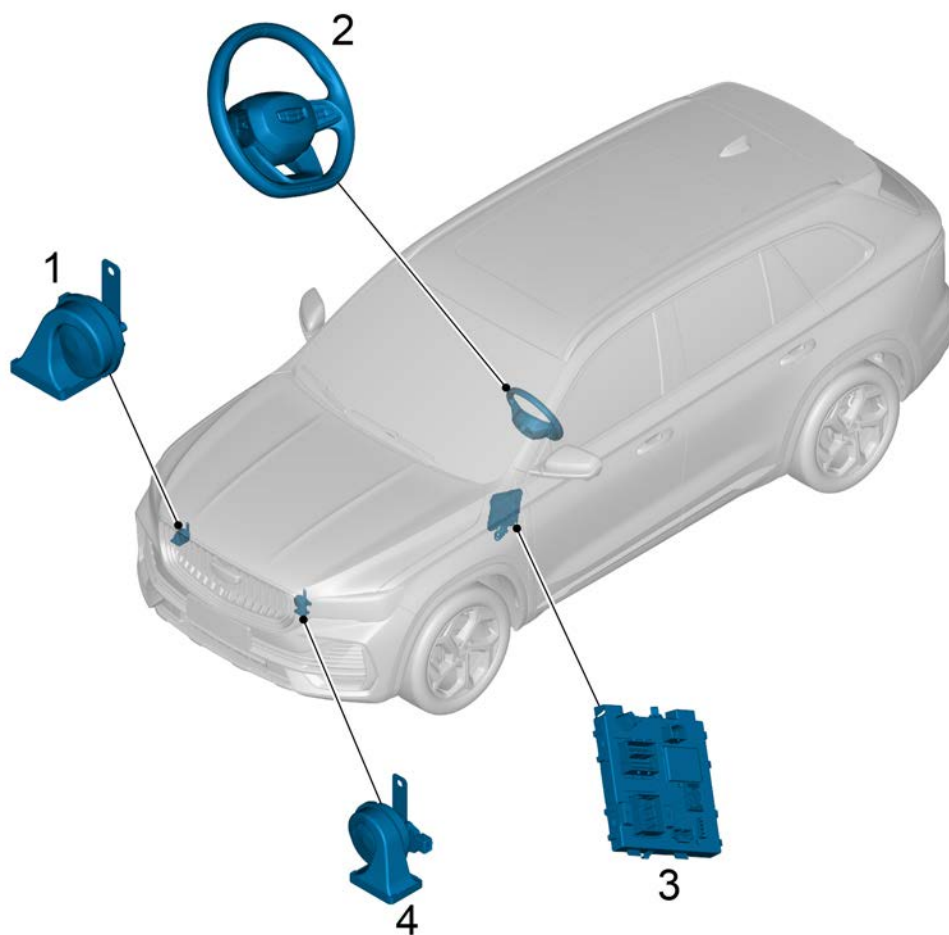
11.12.2 Instructions and operations

11.12.2.1 Instructions and Operations

The horn is arranged in the front bumper and fixed on the anti-intrusion beam at the front of the vehicle. The left side is the horn (woofer) and the right side is the horn (tweeter) (vehicle driving direction), which is jointly controlled by the steering wheel horn switch. When the horn switch on the steering wheel is pressed, the horn circuit is powered on. Horns are honked.

11.12.3 Component position

11.12.3.1 Component position



1. Horn (tweeter)

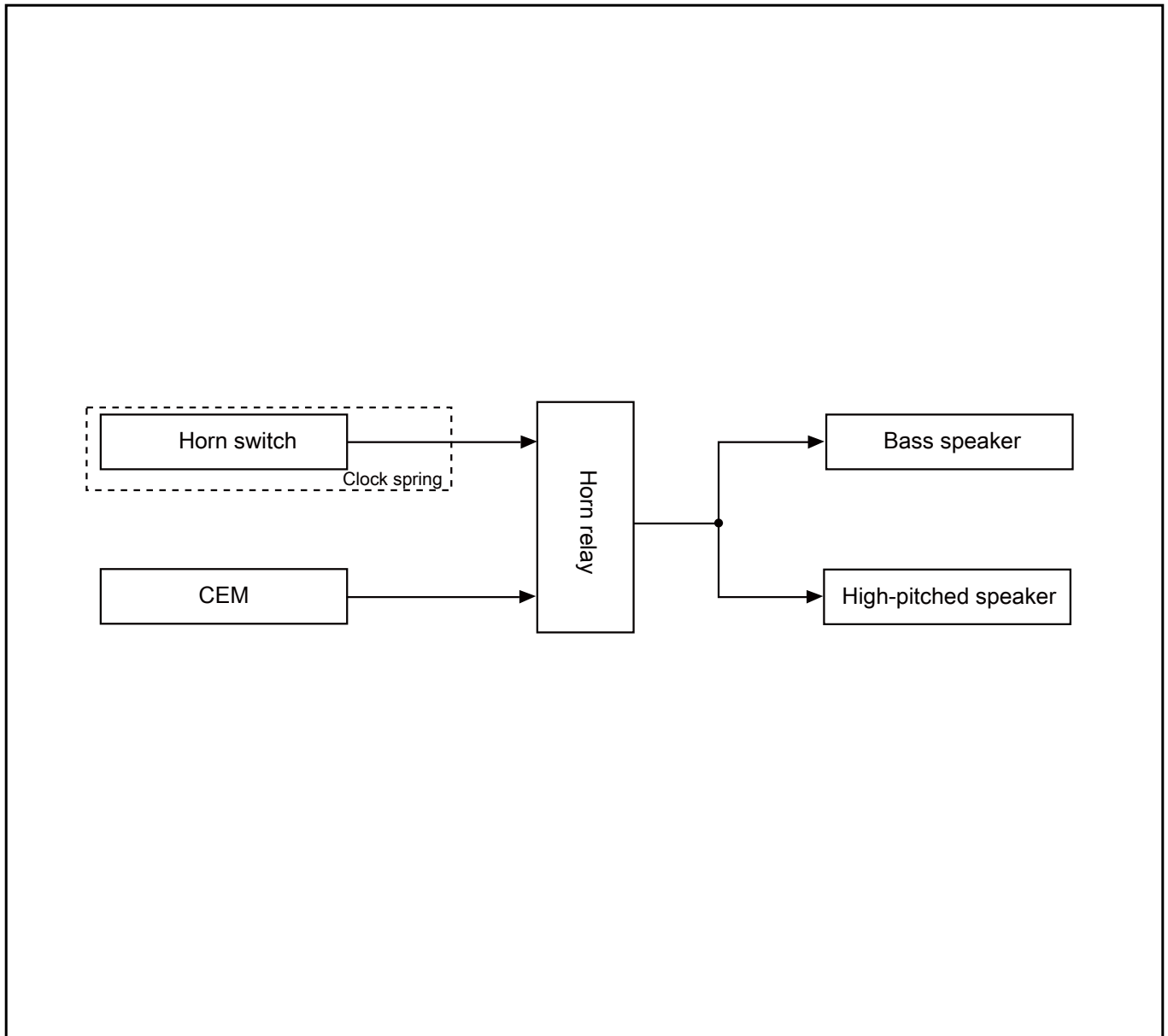
2. Horn switch

3. Central electronic module

4. Horn (woofer)

11.12.4 Electrical schematic diagram

11.12.4.1 Electrical schematic diagram



11.12.5 Diagnostic information and procedures

11.12.5.1 Diagnosis Description

Before diagnosing the fault of the horn system, see [Description and operation](#). Understand and familiarize with the operating principle of the horn system and then carry out the system diagnosis so as to determine the fault diagnosis steps when there is a fault. More importantly, it helps to determine whether the situation described by the distributor is normal operation. Any fault diagnosis of the horn system should start with routine inspection. The routine inspection will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.12.5.2 Routine inspection

- Check the after-sales installations that may affect the horn to ensure that these devices cannot affect the horn.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

11.12.6 Removing and installing

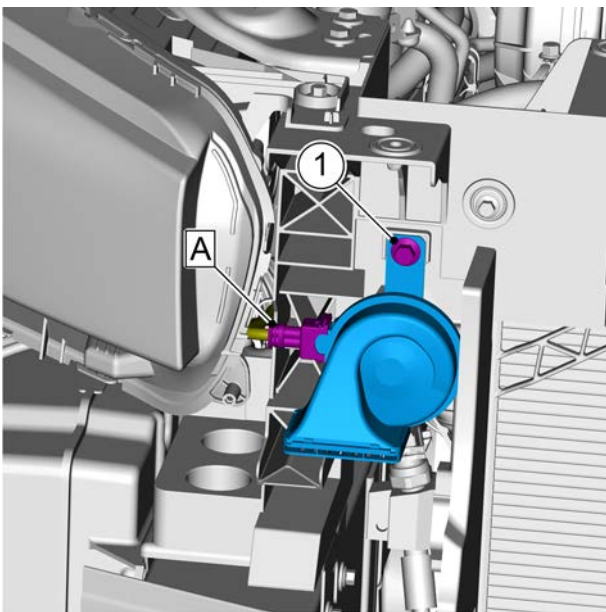
11.12.6.1 Replacement of horn (woofer)

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the front bumper assembly, refer to [Front bumper](#)
- 4 Disconnect horn (woofer) harness connector A.
- 5 Remove the horn (woofer) 1 retaining bolt 1 and remove the horn (woofer).

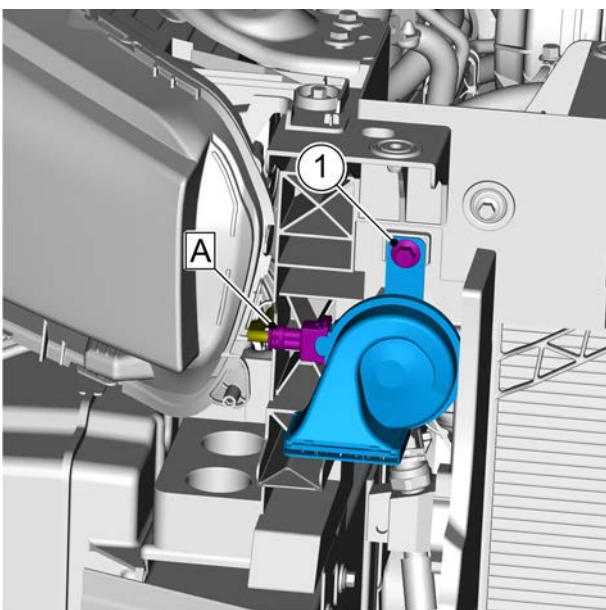


Installation procedure

- 1 Install the horn (woofer) and install and fasten 1 retaining bolt 1.
Torque: 14 N. m (metric system) 10.3 lb-ft (Imperial system)
- 2 Connect horn (woofer) harness connector A.

Caution

Secure the harness connection: "Connect, Click, and Confirm."



- 3 Install the front bumper assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

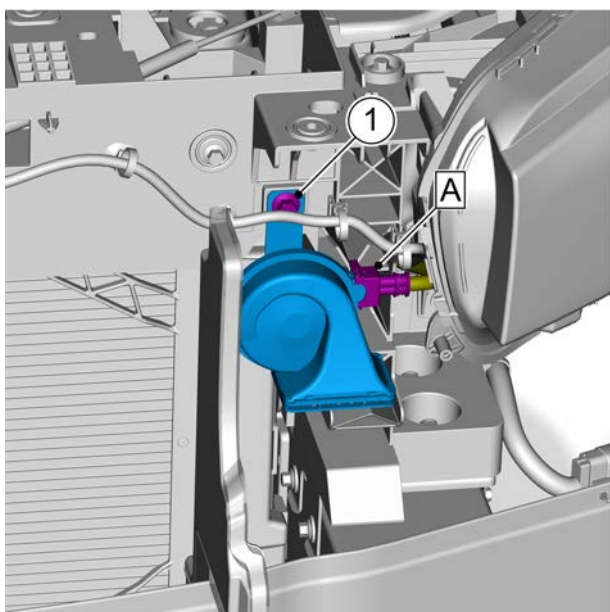
11.12.6.2 Replacement of horn (tweeter)

Removal procedure

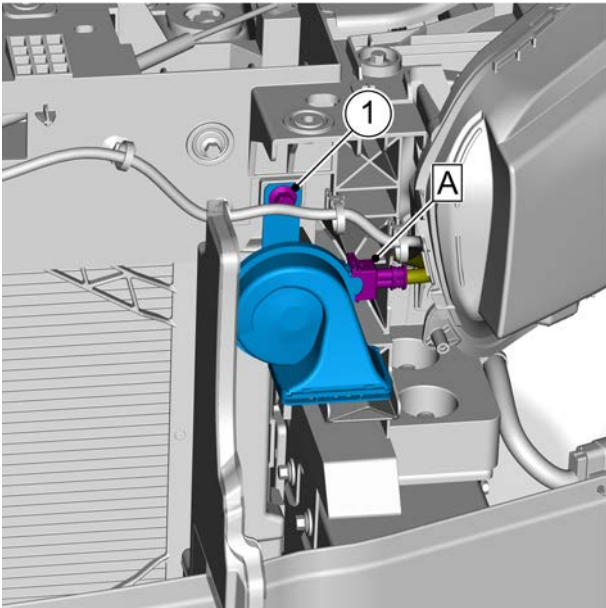
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the front bumper assembly, refer to [Front bumper](#)
- 4 Disconnect horn (tweeter) harness connector A.
- 5 Remove the horn (tweeter) 1 retaining bolt 1 and remove the horn (tweeter).



Installation procedure



- 1 Install the horn (tweeter) and install and fasten 1 retaining bolt 1.

Torque: 14 N. m (metric system) 10.3 lb-ft (Imperial system)

- 2 Connect horn (tweeter) harness connector A.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the front bumper assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

11.13 Park assist system

11.13.1 Specification

11.13.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Screw-connect parking assist camera (front) bracket to front bumper	PF4×12	0.6~0.8	0.4~0.6
Screw-connect parking assist camera (rear) bracket and the exterior opening switch of the rear compartment	PF4×12	0.6~0.8	0.4~0.6
Nut-fastening parking assistance module and bracket	M6×6	8.5~11.5	6.3~8.5
Nut-fastening parking assist system module and bracket	M6×6	2.7~4.3	1.99~3.2

11.13.2 Instructions and operations

11.13.2.1 Instructions and Operations

Park assist system

The parking assist system helps drivers avoid bumping into objects during parking.

Front parking radar

The parking assist system radar sensor on the front bumper can be used to detect objects up to 1 meter in front of the vehicle.

Rear parking radar

The parking assist system radar sensor on the rear bumper can be used to detect objects up to 1.5 meter backwards of the vehicle.

Caution

The ultrasonic parking assist system cannot replace vision of driver.

- The parking assist system cannot detect objects under the bumper and the vehicle or objects that are too close or too far from the vehicle.
- Parking assist systems may not be able to detect children, pedestrians, cyclists or pets.
- The parking assist system cannot detect objects under the bumper and the vehicle or objects that are too close or too far from the vehicle.
- If you do not pay attention to the situation around the vehicle during parking, it may lead to serious casualties and property losses. Even if the parking assist system is equipped, the driver must carefully watch for obstacles before parking.

How system works

When the parking assist system is working, the obstacles enter the detection range, and the detection results will be displayed on the multimedia display screen in the form of color blocks and accompanied by a buzzer. The beep indicates that there is an obstacle in front of the vehicle (if equipped with front parking radar) or behind the vehicle. The beep will become more frequent when the vehicle is closer to the obstacle. A continuous beep is heard when the distance is less than 30 centimeters. Under the influence of environmental factors, the detection performance of radar sensors in parking assist system may be reduced in hot, extremely cold or humid weather.

Low-speed emergency braking assist system (if equipped)

Function description

The low-speed emergency braking assist system (PEB) uses the information from the rear parking radar and wide-angle camera of the parking assist system. When the vehicle is driving at a low speed, the system automatically calculates the collision risk on the reversing track. When the driver brakes too late and the braking force is insufficient, it can realize emergency braking to pedestrians, vehicles and other easily identifiable obstacles to avoid or reduce collisions.

Caution

The low-speed emergency brake assist system is only an auxiliary function and cannot detect all pedestrians, cyclists or vehicles in all cases. Drivers should always be responsible for correct driving and keep a safe distance.

Caution

Low-speed emergency braking assist system can only provide alarm and braking assist. Drivers need to be vigilant and responsible for the safe driving of the vehicle at all times. Please abide by the existing laws and traffic regulations.

Caution

Usually, the low-speed emergency braking assist system works in the background and will not be detected by the driver. When the system recognizes the danger of reversing, it will use braking to protect the occupants. Due to the system performance limitations, there may be false triggers, the driver must always pay close attention to the surrounding environment.

Caution

Wide-angle cameras and parking assist system radar sensors cannot detect obstacles beyond their detection capabilities (such as parking bars, trees, grass, thin columns, barbed wire, chains, ropes, wall posts, fences, low obstacles, absorbing objects, reflective objects, etc.), false positives and missing positives may occur. Drivers should always pay attention to the surrounding conditions to avoid accidents or damage.

Caution

Strong sunlight, reflection and dim scenes may make it difficult for drivers to see visual warning signals, and may also affect the detection function of wide-angle cameras.

Caution

Affected by the installation position of the radar sensor and the wide-angle camera of the parking assist system, the radar sensor and the wide-angle camera of the parking assist system have certain blind area restrictions. When the rear obstacle is too close to the vehicle, the system may not be able to detect the obstacle, resulting in missed identification.

Caution

When wide-angle cameras and parking assist system radar sensors are covered by snow, water, frost, mud, dust and other objects or interfered by noise and exterior sound sources, the system may not be able to effectively identify surrounding objects, people and other obstacles.

Caution

The system may not be able to respond in time to moving objects (pedestrians, animals, vehicles, etc.) that cross or head-on or to objects on the side of the vehicle.

Caution

Please note that the parking assist system radar sensors and wide-angle cameras cannot detect dangerous obstacles in front of you in all cases. Bad weather conditions, such as rain, snow, fog, etc., will lead to the decline of system performance, in which case some targets will not be detected by the system or not in time.

Caution

Some scenes will affect the detection of parking assist system radar sensors and wide-angle cameras, such as roads with guardrails, channels, vehicles in/out in front, sharp turns, and so on.

Caution

The system does not respond in time to animals, small vehicles (such as tricycles), vehicles with irregular appearance, cyclists, oncoming and cross-crossing vehicles.

Caution

When the vehicle is subjected to tackle or strong vibration, the position of the radar sensor and wide-angle camera of the parking assist system may be offset, resulting in a decline in the performance of the system, and in serious cases, the system will have a fault alert. At this time, the driver should contact Geely Auto service station for maintenance as soon as possible.

Caution

Be sure to keep the wide-angle camera and parking assist system radar sensors and their surroundings clean to ensure that the system is working properly. It is forbidden to place or paste any objects around the front of wide-angle cameras and parking assist system radar sensors. Otherwise, the system will not work properly.

Caution

No automatic system can guarantee 100% normal operation under any circumstances. Therefore, please do not reverse the vehicle to people or objects for the purpose of testing the performance of the low-speed emergency braking assist system. Otherwise, it may cause accidents and lead to casualties.

Caution

In complex driving conditions, the system may brake unnecessarily. For example, when there is spray or splashing at construction sites, railway tracks, road manhole covers, underground garages, and behind vehicles.

Caution

For the effective targets identified by the system, according to the differences of vehicles, pedestrians, cyclists, scenes and road conditions, the system does not always achieve the same level of performance.

Caution

In some cases, the field of view of wide-angle cameras and parking assist radar sensors is limited, and the system detects vehicles, pedestrians or cyclists later than expected or cannot detect vehicles, pedestrians or cyclists at all.

Caution

When the wide-angle camera and the radar sensor of the parking assist system are blocked or the function is limited, the performance of the low-speed emergency braking assist system may be degraded or even unavailable.

Caution

Affected by the installation position of the radar sensor of the parking assist system, when the vehicle is driving in a non-straight line, obstacles outside the wheel track in the traveling direction may not be detected.

Caution

On the slippery road, the braking distance of the vehicle is longer, which will reduce the anti-intrusion performance of the low-speed emergency braking assist system.

Caution

When the vehicle enters a large trailer or transport vehicle with a large slope, the sensor may have false positives, and the low-speed emergency braking function can be turned off in advance if necessary.

Function limitation

The auxiliary function of low-speed emergency braking is limited when the following conditions are met:

- When the rainfall is too large, the low-speed emergency braking auxiliary function will be prompted on the combined instrument display screen: the low-speed emergency braking function is limited, the rainfall is too large, and the low-speed emergency braking auxiliary function enters the suppression state.

After the low-speed emergency braking auxiliary function is limited, the low-speed emergency braking assist system status indicator on the combined instrument display is lit, showing red, indicating that the current function cannot be activated. Please check whether the above conditions are lifted, if you can not find it, please contact Geely Auto service station for maintenance.

Panoramic image system (if equipped)

By installing four wide-angle cameras around the vehicle that can cover all the fields of view around the vehicle, the multi-channel video images collected at the same time are processed into a 360-degree top view of the body around the vehicle, and finally displayed on the multimedia display screen. The panoramic image system allows the driver to monitor the front, back, left and right video pictures outside the vehicle in real time, and assist the driver to park the vehicle.

Caution

The panoramic image system can not replace the driver's vision. Even if the vehicle is equipped with a panoramic image system, carefully check the back and surrounding conditions before parking.

Wide-angle cameras are easily affected by environmental factors, such as in foggy, rainy and snowy days and at night. Please use the panoramic image system carefully in this kind of environment and ensure the safety of the surrounding environment before using it.

Due to the limitation of the physical layout of the wide-angle camera, there will be a visual blind area in the panoramic image, and the black area at the bottom of the vehicle model is a visual blind area. Please ensure the safety of the surrounding environment before using it.

Automatic parking system (if equipped)**System description****1. Parking in**

The automatic parking system can automatically search the parking spaces on both sides of the vehicle and prompt the driver to stop when the available parking spaces are found. After parking, the driver operates according to the prompts of the system, and the automatic parking system calculates the parking trajectory and controls the steering, speed and gear of the vehicle to drive slowly into the selected parking space.

2. Parking out

In the static state of the vehicle, the driver operates according to the prompts of the system, and the automatic parking system calculates the parking trajectory and controls the steering, speed and gear of the vehicle to make it slowly leave the parking space.

Considerations

The system can provide parking assist for drivers, but can not completely replace the driver for parking, drivers should still monitor the parking process, do not be negligent! In the process of parking, please pay attention to the surrounding environment of the vehicle, control the speed through the brake pedal, and actively intervene if necessary to interrupt or exit automatic parking.

- There may be blind spots in the parking assist system radar sensors. Please pay attention to the people, animals and obstacles around the vehicle.

– Parking assist system radar sensors cannot identify certain objects or people wearing such clothes that do not reflect signals from the automatic parking system.

– The noise source of the exterior environment may cause interference to the automatic parking system, and the radar sensor of the parking assist system may not be able to identify the corresponding objects or people.

– Before using the automatic parking function, please make sure that there are no obstacles in the parking space, such as locks, pits, stones and thin poles, which may not be recognized by the system.

– When using automatic parking to park a horizontal parking space along the roadside, the tire may be pressed along the roadside during parking. Please pay attention to the surrounding environment, control the speed and make human intervention if necessary.

– The system may not be able to identify barbed wire, fences and other similar structural obstacles, please check whether there are such obstacles in the parking space before parking.

– Please pay attention to the distance alarm message during parking, otherwise accidents may occur. When it is too close to the obstacle, the alarm information may disappear in the blind area detected by the radar sensor of the parking assist system, which is easy to occur when the obstacle is detected too high and too low.

– Please keep the surface of the parking assist system radar sensor clean. If snow, dust, mud and other covered objects are found, please remove them in time so as not to affect the function.

– Do not use a high-pressure cleaner to clean wide-angle cameras and parking assist system radar sensors. Use a small flow of water to wash and maintain a cleaning distance of at least 10 cm.

– Automatic parking may occupy other lanes. Please pay attention to traffic and pedestrians.

– When using automatic parking, please ensure that the distance between the front and rear vehicles is greater than the length of this vehicle body by 1 meter, and the vertical parking space is greater than the width of this vehicle body by 1.2 meters, otherwise the parking space may not be recognized by the system.

– Please check whether the tire pressure is normal before using automatic parking so as not to affect the function.

System operation

– Intelligent recommendation of parking mode

The system turns on the intelligent recommendation of parking mode by default. If you want to turn it off, you can click on the multimedia display screen: Vehicle settings → Driving assist and safety → Parking, and then select turn off intelligent recommendation of parking mode in the interface. After the intelligent recommendation function of parking mode is turned on, the automatic parking system will automatically judge whether parking is in or out according to the

environment, and the parking at the front or rear of the vehicle will be automatically judged when the vertical parking space is parked. After the intelligent recommendation function of parking mode is turned on, the automatic parking system will automatically judge whether parking is in or out according to the environment, and the parking at the front or rear of the vehicle will be automatically judged when the vertical parking space is parked.

Automatic parking in

1. The automatic parking function is turned on through the automatic parking APP on the multimedia display screen, and the system automatically judges that the current scene is parking (if the parking mode is intelligently recommended and closed, you need to choose parking) and enter the parking interface directly.
2. When driving a vehicle, search for parking spaces at a speed of less than 22 km/h, and the system automatically searches available parking spaces on both sides. If the speed exceeds 22 km/h, the system will prompt you to slow down. At this time, the speed needs to return to less than 18 km/h in 10 seconds to resume parking search. When the speed exceeds 22 km/h for more than 10 seconds or more than 30 km/h, the automatic parking function is exited.
3. After finding the available parking space, the system information prompts you to stop and select the intended parking space, and the searched parking space will be displayed on the screen. When multiple parking spaces are searched, the system will recommend the optimal parking space after the vehicle stops, or you can select other parking spaces by clicking.
4. After the vehicle stops, click the OK button to start parking. For vertical parking spaces, if the parking mode intelligent recommendation has been turned on, the system will automatically recommend the parking mode; if the parking mode intelligent recommendation has been turned off, you need to choose from front parking or rear parking. Horizontal parking only supports rear parking.
5. Release the steering wheel and brake pedal and start automatic parking. The system prompts you to pay close attention to the dynamics of the vehicle and be ready to take over the vehicle at any time.
6. After the automatic parking in is finished, the system indicates parking completion.

Automatic parking out

1. The automatic parking function is turned on through the automatic parking APP on the multimedia display screen,

and the system automatically judges that the current scene is parking out (if the parking mode is intelligently recommended to be turned off, you need to choose parking out by yourself) and enter the parking interface directly.

2. Choose the parking direction according to the demand, vertical parking supports front parking and rear parking, horizontal parking only supports front parking.
3. Release the steering wheel and brake pedal and start automatic parking. The system prompts you to pay close attention to the dynamics of the vehicle and be ready to take over the vehicle at any time.
4. After the automatic parking is completed, the system prompts the parking completed.

- Open front engine bay hood detected.
- Unfastened seat belt detected.
- Front side coming vehicle detected.
- Rear side coming vehicle detected.
- Rearview mirror folding detected.

Parking termination

When the following circumstances occur, automatic parking will be terminated and forced to exit, and the multimedia display will display the corresponding termination information, prompting the driver to take over control of the vehicle.

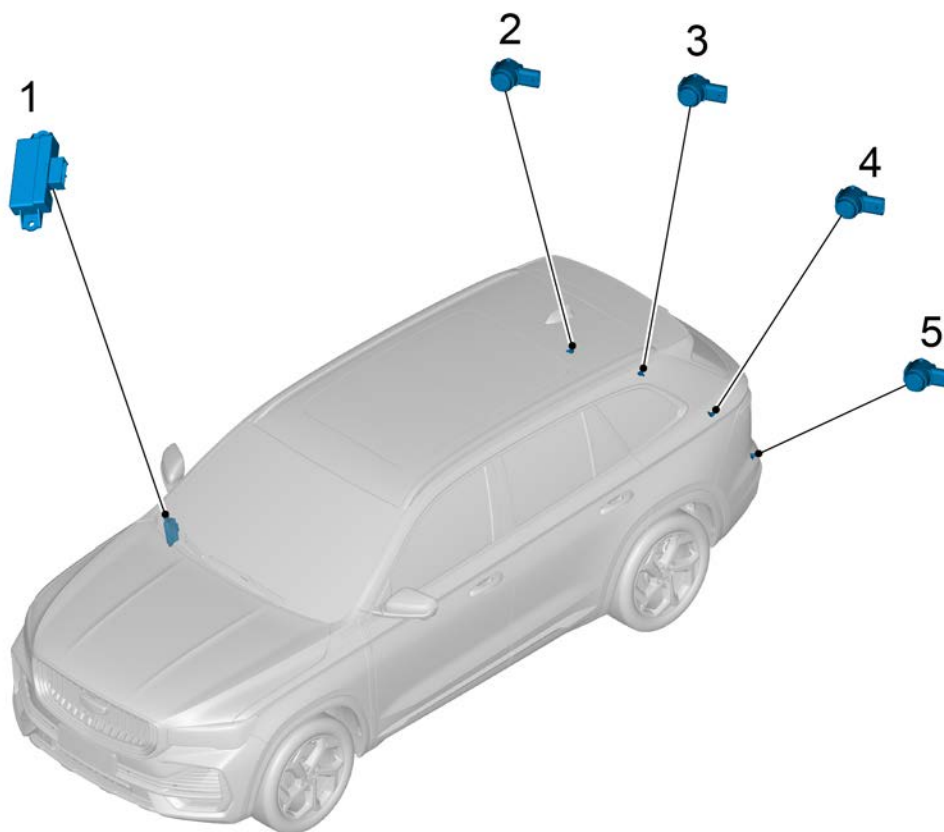
- Associated system fault.
- Parking assist system fault.
- Flameout of Engine.
- Driver response timed out.
- Parking space is limited.
- The parking track is beyond planning.
- Electronic stability control system activated.
- ACC is activated
- G-Pilot activated
- Parking was speeding.
- Parking overtime.
- Too many parking steps.
- Too many parking interruptions.
- Shift paddles interfered.
- EPB interfered.
- Steering wheel interfered.
- Accelerator pedal sensor interfered.
- Radar coverage.
- Dirty camera.

When the following conditions occur, automatic parking will be interrupted, the multimedia display will display the corresponding interrupt information, according to the display information operation, automatic parking can be restored.

- Obstacle detected.
- Open door detected.

11.13.3 Component position

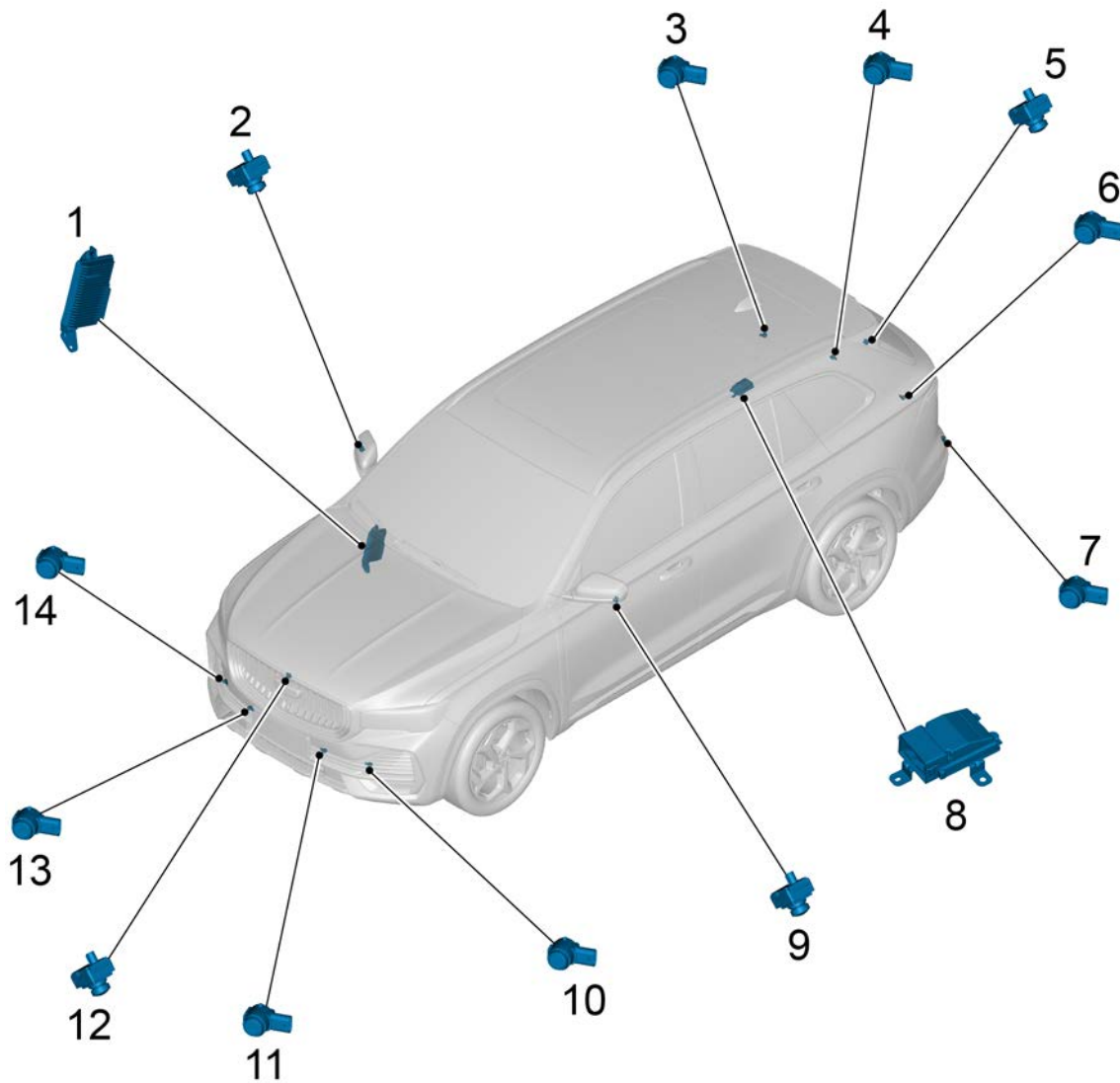
11.13.3.1 Component position (Type 1)



1. Parking assistance module
2. Parking assistance sensor
3. Parking assistance sensor

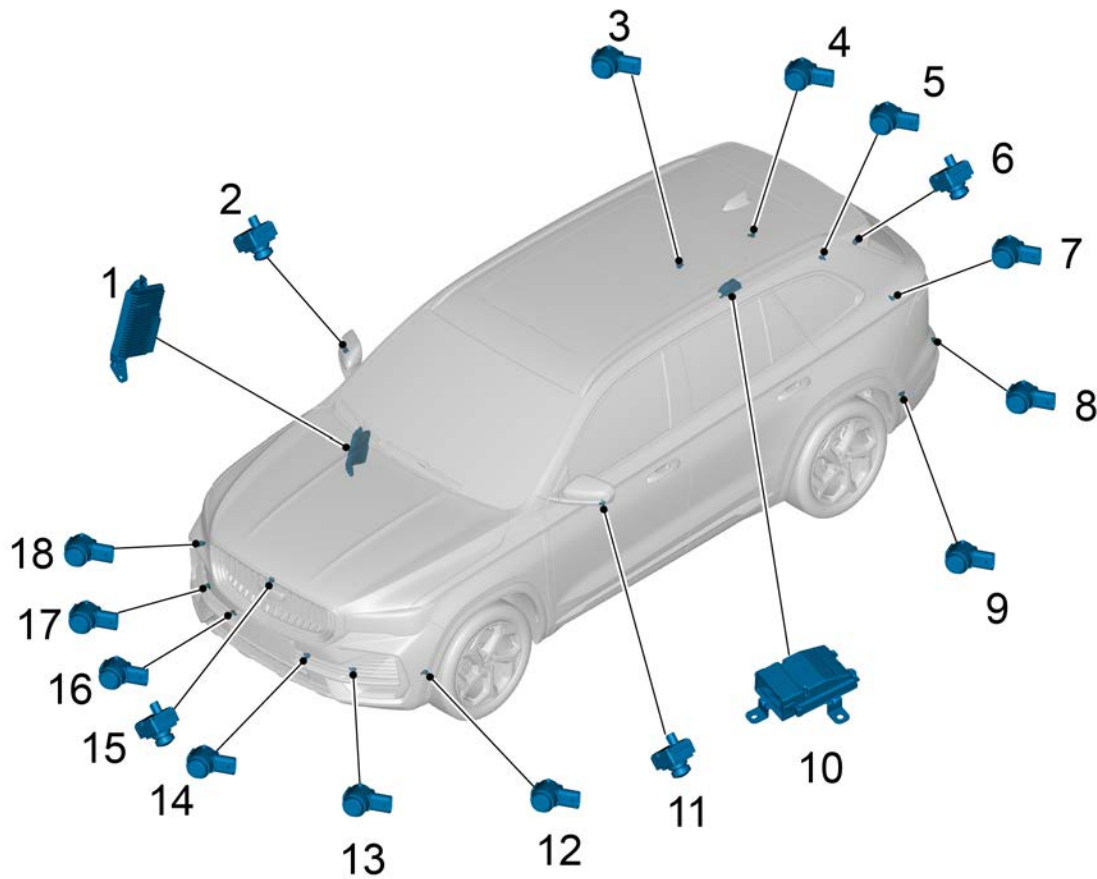
4. Parking assistance sensor
5. Parking assistance sensor

11.13.3.2 Component position (Type 2)



- | | |
|-------------------------------------|---------------------------------------|
| 1. Parking assistance module | 8. Active safety domain master |
| 2. Parking assistance camera (side) | 9. Parking assistance camera (side) |
| 3. Parking assistance sensor | 10. Parking assistance sensor |
| 4. Parking assistance sensor | 11. Parking assistance sensor |
| 5. Parking assistance camera (rear) | 12. Parking assistance camera (front) |
| 6. Parking assistance sensor | 13. Parking assistance sensor |
| 7. Parking assistance sensor | 14. Parking assistance sensor |

11.13.3.3 Component position (Type 3)

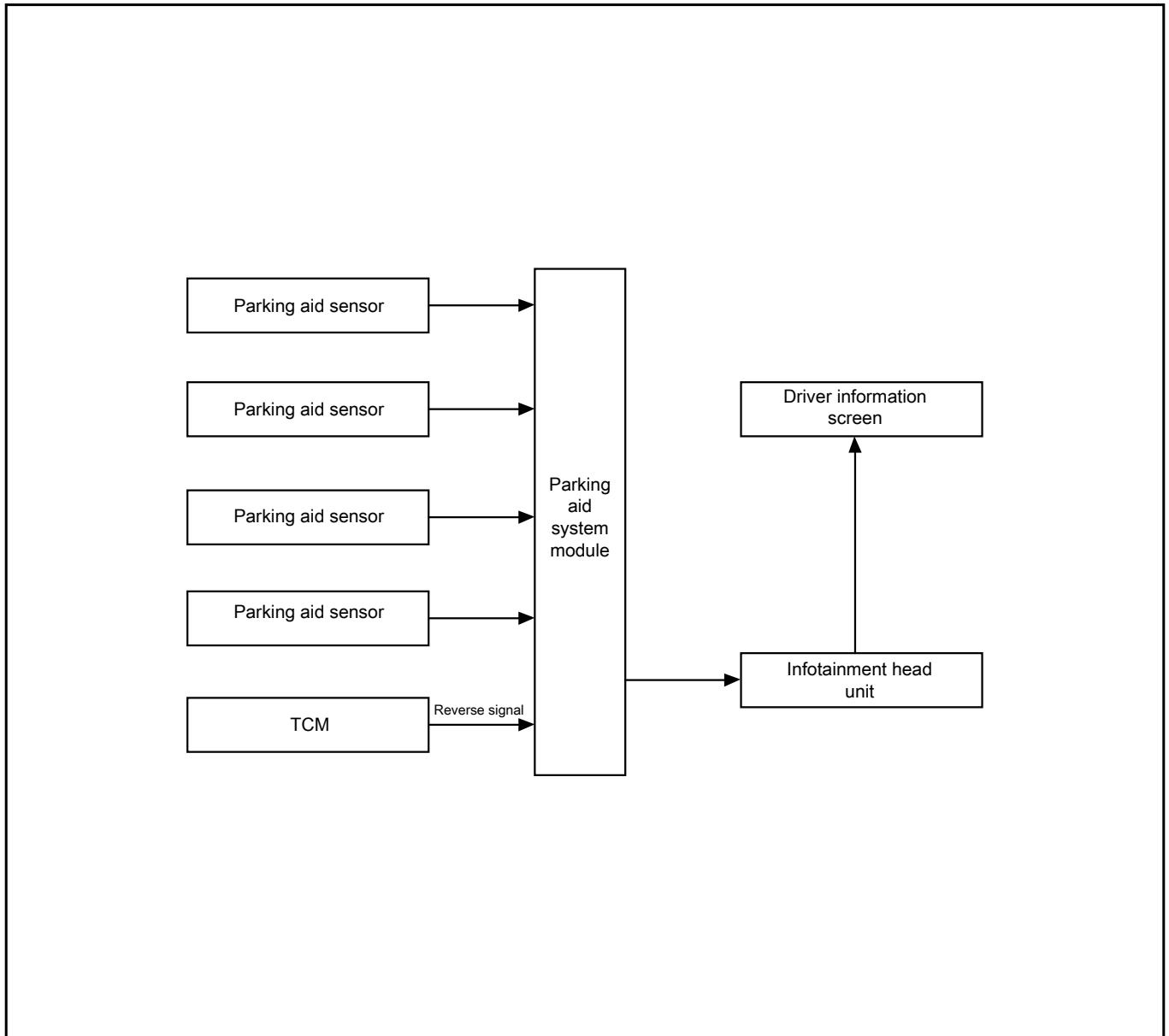


- | | |
|-------------------------------------|---------------------------------------|
| 1. Parking assistance module | 10. Active safety domain master |
| 2. Parking assistance camera (side) | 11. Parking assistance camera (side) |
| 3. Parking assistance sensor | 12. Ultrasonic parking sensor |
| 4. Parking assistance sensor | 13. Parking assistance sensor |
| 5. Parking assistance sensor | 14. Parking assistance sensor |
| 6. Parking assistance camera (rear) | 15. Parking assistance camera (front) |
| 7. Parking assistance sensor | 16. Parking assistance sensor |
| 8. Parking assistance sensor | 17. Parking assistance sensor |
| 9. Parking assistance sensor | 18. Ultrasonic parking sensor |

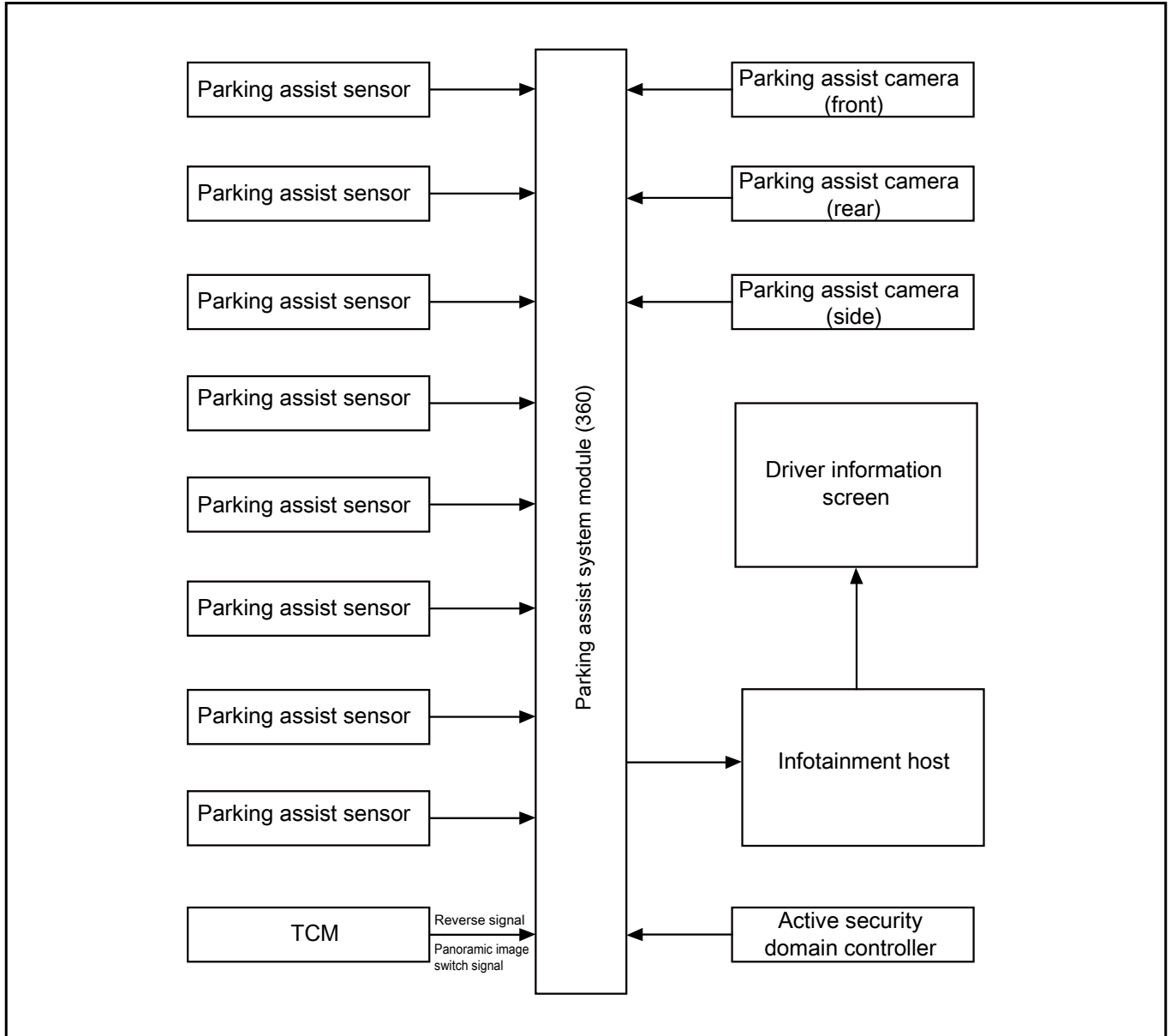
11.13.4 Electrical schematic diagram

11.13.4.1 Electrical schematic diagram

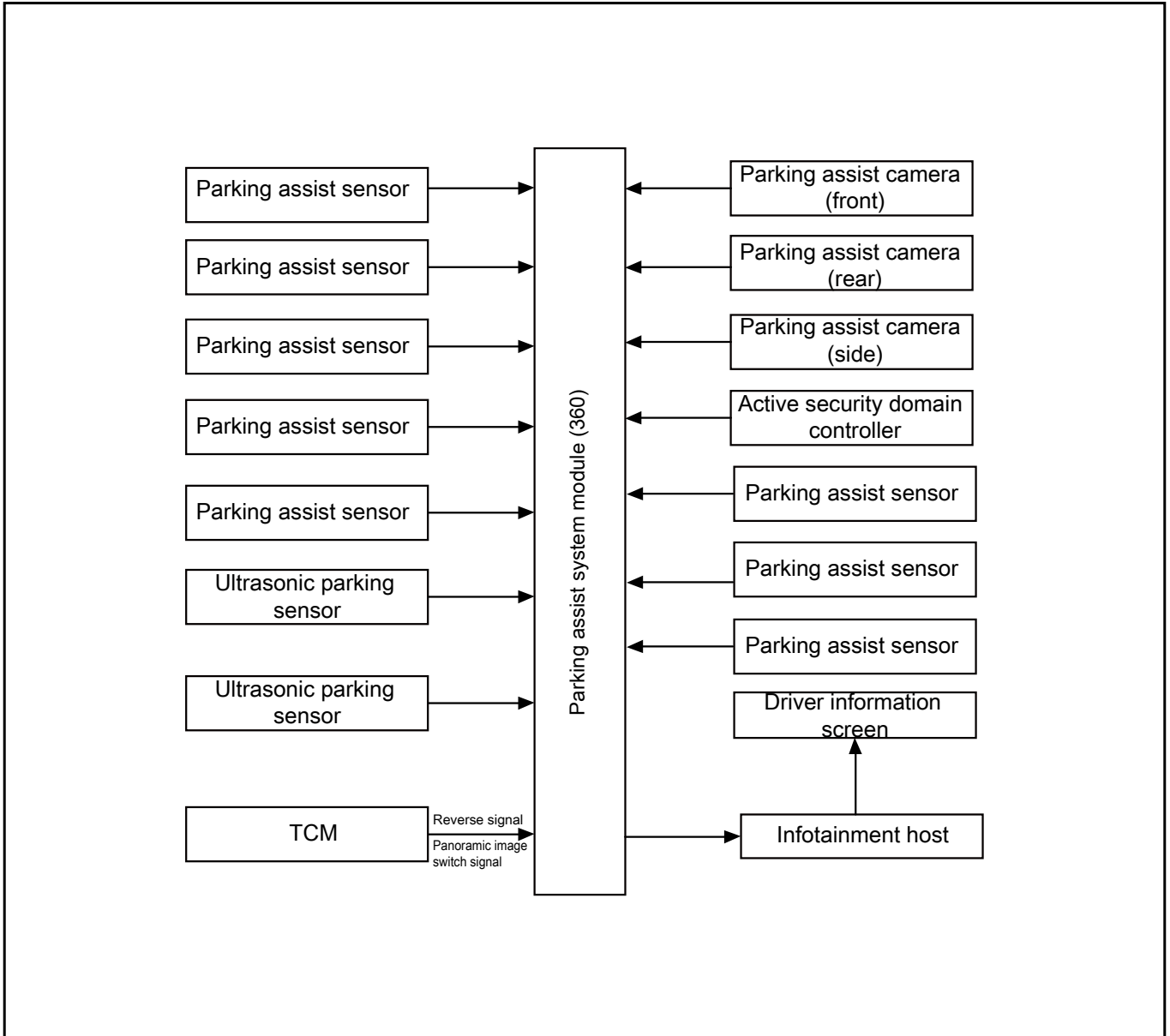
Type I



Type II



Type 3



11.13.5 Diagnostic information and procedures

11.13.5.1 Diagnosis Description

Before diagnosing the faults of the parking assist system, see [Description and operation](#). Understand and familiarize yourself with the working principle of park assist system before starting system diagnosis. This helps to confirm the correct fault diagnosis steps when a fault occurs. More importantly, it also helps to confirm whether the operation situation described by the customer is normal. Any fault diagnosis of a park assist system should start with a visual inspection that guides maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.13.5.2 Visual Check

- Check the after-sales installation devices that may affect the operation of the parking assist system to ensure that these devices do not affect the normal operation of the parking assist system.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Check and make sure the control unit installation and the harness connector installation is correct.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

11.13.5.3 Calibration scheme on PAS3

Description

If there is an error in any of the cameras, the relevant area says "XX camera has no signal".



Road calibration is the special demand of VPA—Plus. Where the signals PrkgTouchCoornReq and VehSpdLgt are shared by VPA-Plus and VPA-Basic.

In factory mode, VPA recognizes the PrkgTouchCoornReq. sent by IHU CoordinateX, PrkgTouchCoornReq. CoordinateY and PrkgTouchCoornReq. TouchEveTyp to identify the driver's operation information.

Operation steps

1. When the driver selects "Road Calibration", the display interface will be switched to the road calibration startup interface.

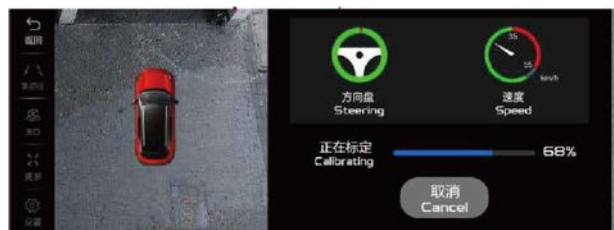


2. In the startup interface, "start" is available if the speed is less than 35km/h. when the driver selects "start", the automatic calibration work will start; when the driver selects "cancel", he will return to the calibration selection interface.



3. In the process of road calibration, the calibration progress bar is displayed, and the steering wheel angle and speed are also displayed in real time.

If the cancel button is selected during the calibration process, return to the calibration selection interface.



Speed correlation

- If the vehicle speed is less than 35km/h, the calibration process will proceed normally.
- If $35\text{km/h} < \text{vehicle speed} \leq 50\text{km/h}$, prompt the driver to reduce the speed.
- If the vehicle speed $> 50\text{km/h}$, exit to the IHU main interface.

Steering wheel angle association

If the steering wheel angle exceeds the limit, prompt the driver to align the steering wheel and continue the calibration process.

4. If the calibration is successful, VPA will display "apply" or "exit". When the driver selects "apply", the calibration results will be used in the VPA;. If the driver selects "exit", return to the Top + 3D front view interface.



5. If the calibration fails, VPA will display "retry" or "exit". If the driver selects "retry", the calibration process will restart; if the driver selects the "exit" button, it will return to the Top + 3D front view interface.



6. If the user triggers the back button at any stage of the calibration process on the road, the view will switch back to the IHU main interface.

Other prerequisites

1. Lighting conditions: $> 50\text{Lux}$
2. Driving duration: 2min
3. Vehicle front wheel steering angle: $< 1^\circ$
4. The path exists.

Caution

The calibration algorithm should take into account the impact of the body height information BodyHei.

The calibration module should send VPA splicing status to APA, if $\text{ImgGroupSts}=0\text{x}1$ (AckSts1-Acpt), it means VPA splicing status can satisfy APA function use, if $\text{ImgGroupSts}=0\text{x}0$ (AckSts1-NotAcpt), it means VPA splicing status cannot satisfy APA function use.

VPA-Plus-specific requirements:

1. VPA-Plus can detect pedestrians.
2. In this requirement, VPA-Plus will also apply the signals of 'surfing objects' in VPA-Basic.

11.13.6 Removing and installing

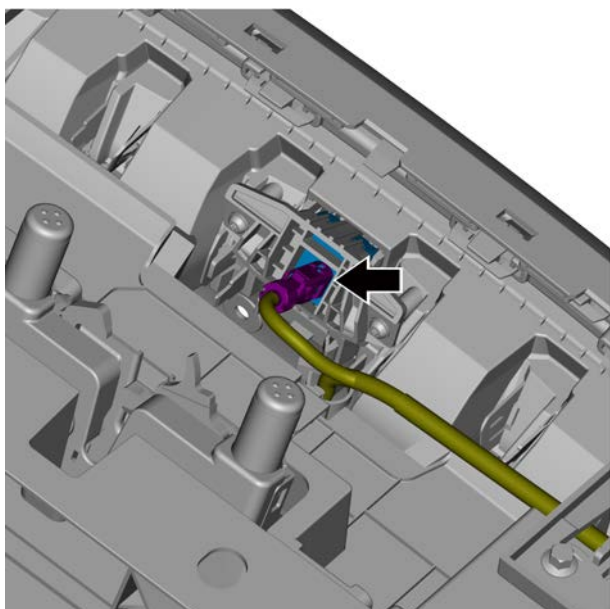
11.13.6.1 Replacement of parking assist camera (front)

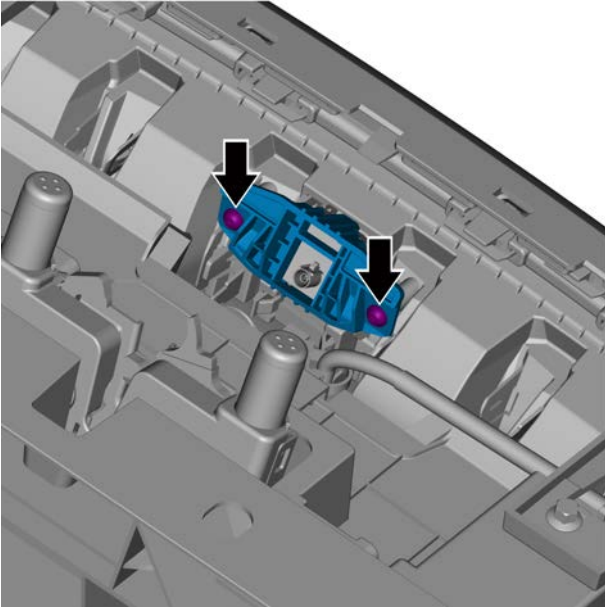
Removal procedure

Warning !

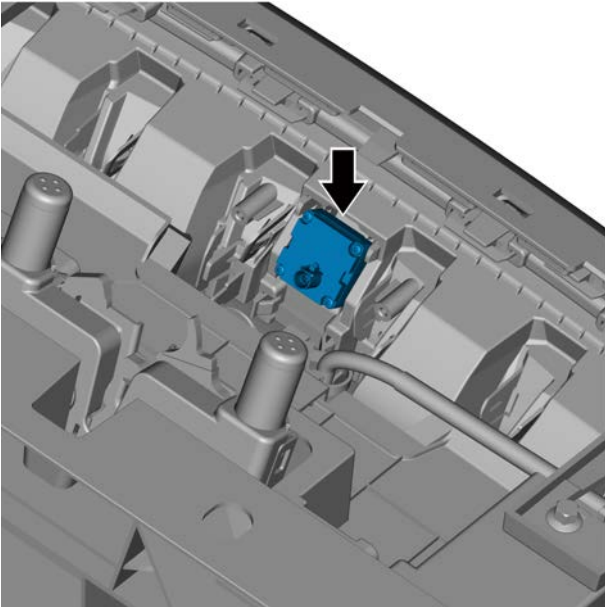
See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Disconnect the parking assist camera (front) harness connector.



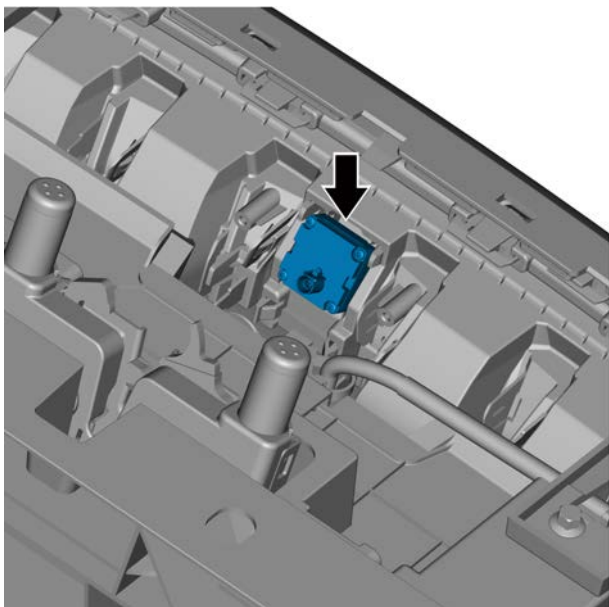


- 5 Remove the 2 retaining screws of the parking assist camera (front) bracket and remove the parking assist camera (front) bracket.

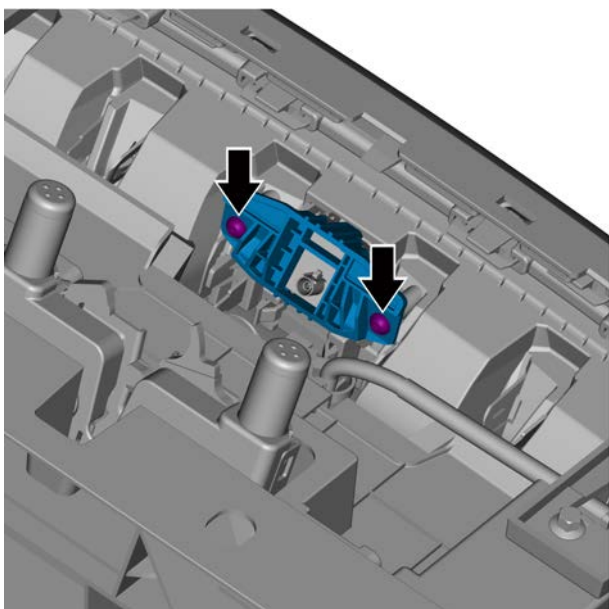


- 6 Remove the parking assist camera (front).

Installation procedure

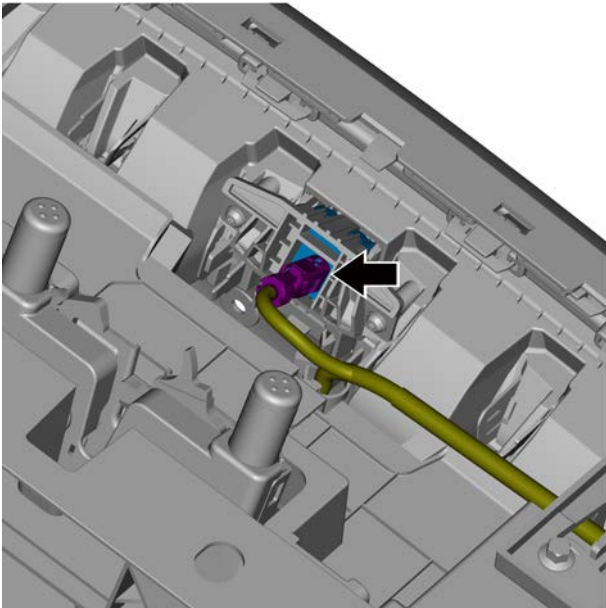


- 1 Install the parking assist camera (front).



- 2 Install the parking assistance camera (front) bracket and tighten the 2 retaining screws.

Torque: 0.7 N. m (metric system) 0.5 lb-ft (Imperial system)



- 3 Connect the parking assist camera (front) harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 4 Install the front engine bay trim plate.
- 5 Connect the negative battery cable.
- 6 Close the engine compartment cover.

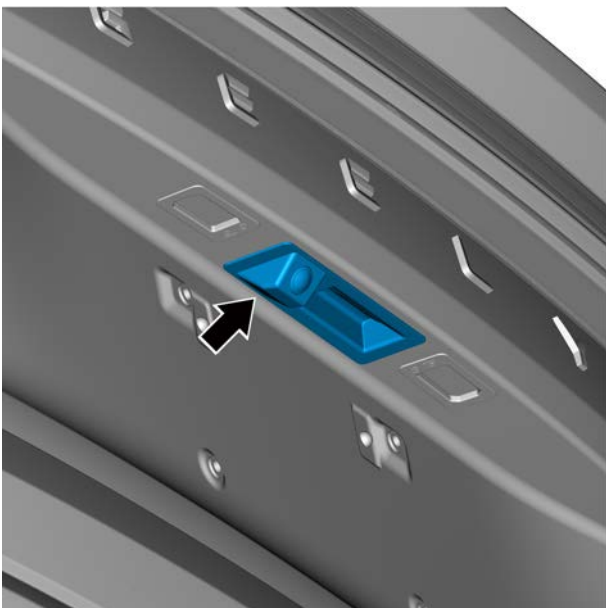
11.13.6.2 Replacement of parking assist camera (rear)

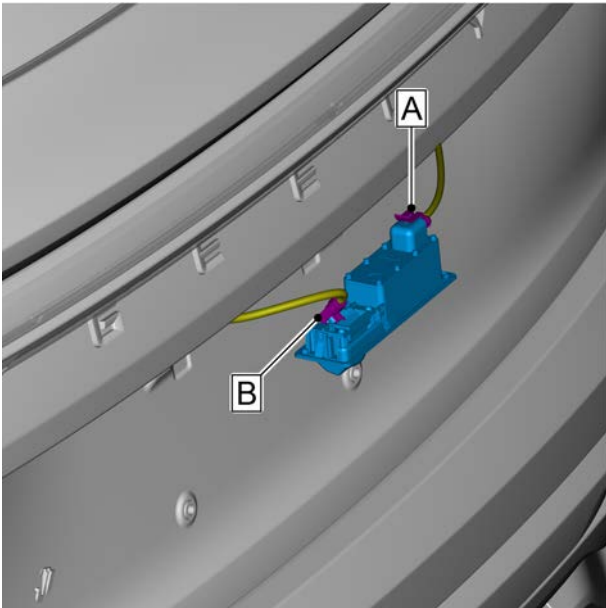
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

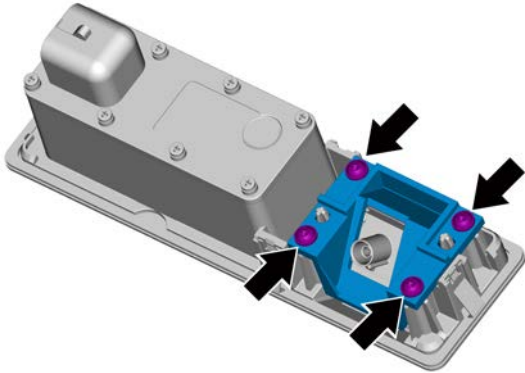
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the tailgate opening switch.



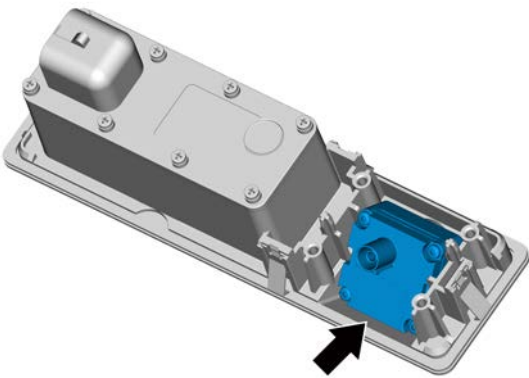


- 4 Disconnect the parking assist camera (rear) harness connector B.
- 5 Disconnect the tailgate opening switch harness connector A and remove the tailgate opening switch.

- 6 Remove the retaining screws of the parking assist camera (rear) bracket and remove the bracket.

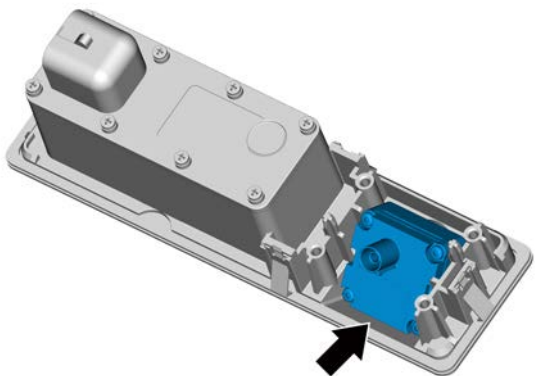


- 7 Remove the parking assist camera (rear).



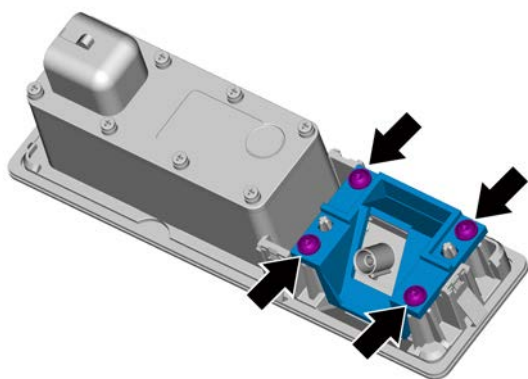
Installation procedure

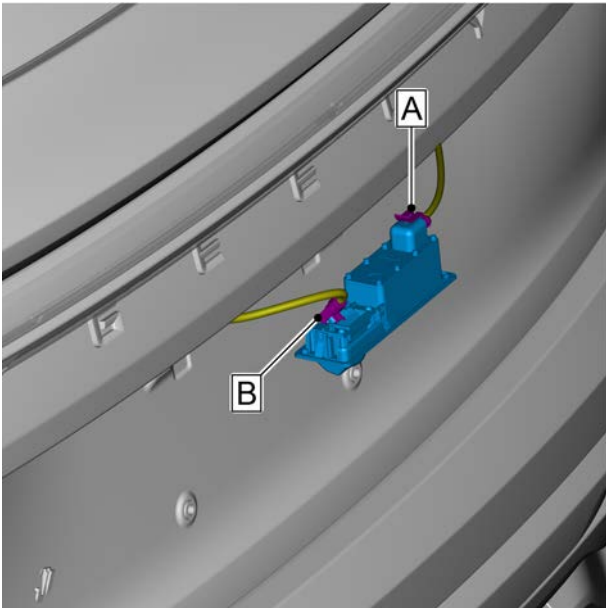
- 1 Install the parking assist camera (rear).



- 2 Install the parking assistance camera (rear) bracket and fasten the screws.

Torque: 0.7 N. m (metric system) 0.5 lb-ft (Imperial system)





- 3 Connect the tailgate opening switch harness connector A.

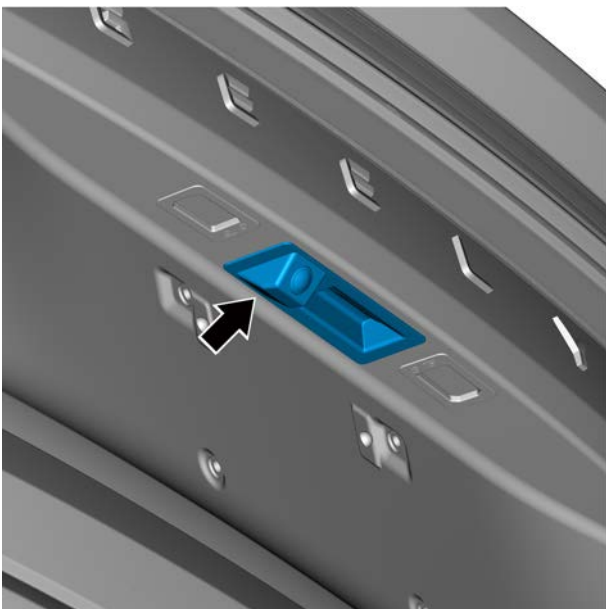
Caution

Secure the harness connection: "Connect, Click, and Confirm."

- 4 Connect the parking assist camera (rear) harness connector B.

Caution

Secure the harness connection: "Connect, Click, and Confirm."



- 5 Install the tailgate opening switch.

- 6 Connect the negative battery cable.

- 7 Close the engine compartment cover.

11.13.6.3 Replacement of parking assistance camera (left)

See the [Replacement of the exterior rearview mirror \(left\)](#).

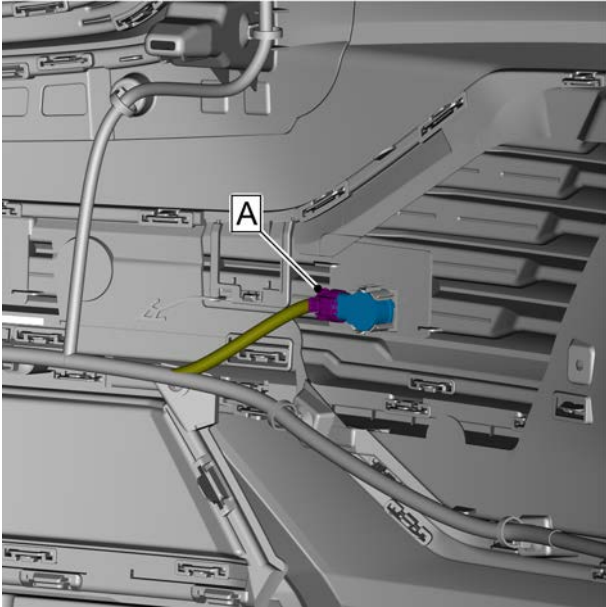
11.13.6.4 Replacement of ultrasonic parking sensor

Removal procedure

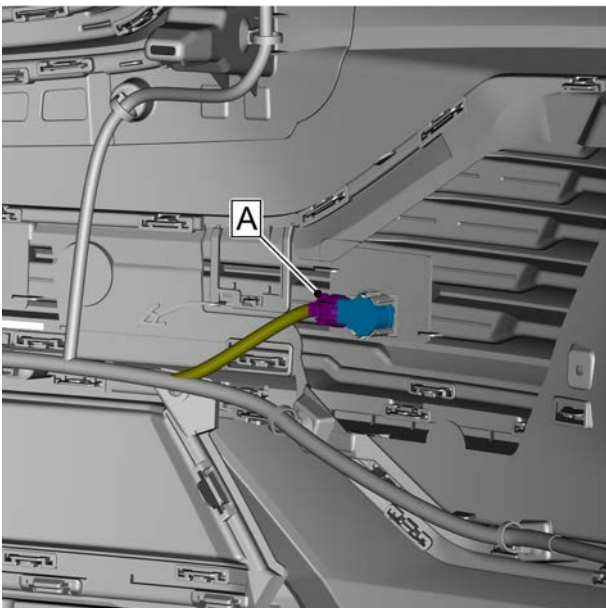
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.



- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 3 Remove the front bumper assembly, refer to Replacement of Front Bumper.
- 4 Disconnect the ultrasonic parking sensor wire harness connector A and remove the ultrasonic parking sensor.



Installation procedure

- 1 Install ultrasonic parking sensor.
- 2 Connect ultrasonic parking sensor wire harness connector A.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the front bumper assembly.
- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

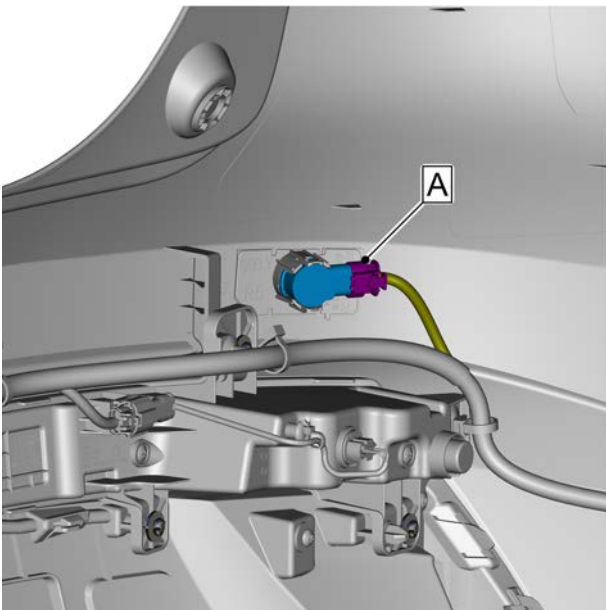
11.13.6.5 Replacement of parking assistance sensor

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

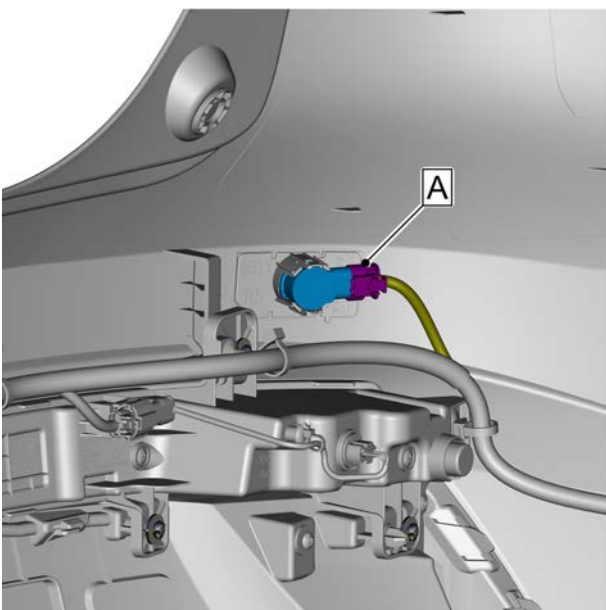
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove the rear bumper assembly, see [Replacement of the rear bumper assembly \(Type 1\)](#), [Replacement of the rear bumper assembly \(Type 2\)](#).
- 4 Disconnect the harness connector A of the parking assistance sensor and remove the parking assistance sensor.

**Installation procedure**

- 1 Install parking assistance sensor.
- 2 Connect the parking assistance sensor harness connector A.

Caution

Secure the harness connection: "Connect, Click, and Confirm."



- 3 Install the rear bumper assembly.

- 4 Connect the negative battery cable.
- 5 Close the engine compartment cover.

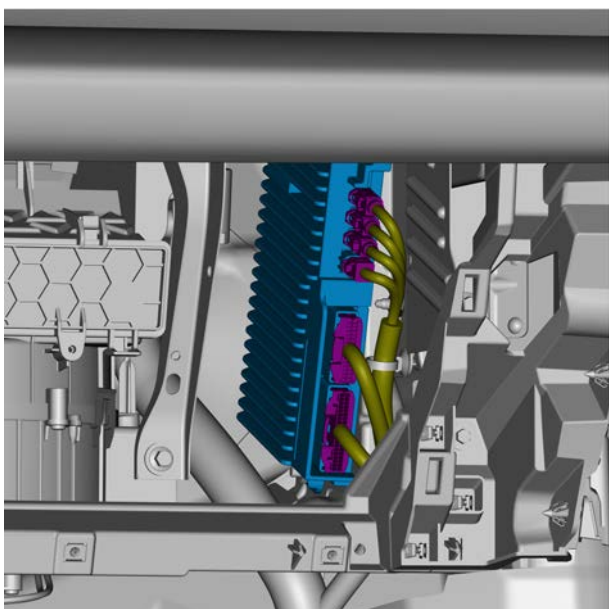
11.13.6.6 Replacement of parking assistance module (360)

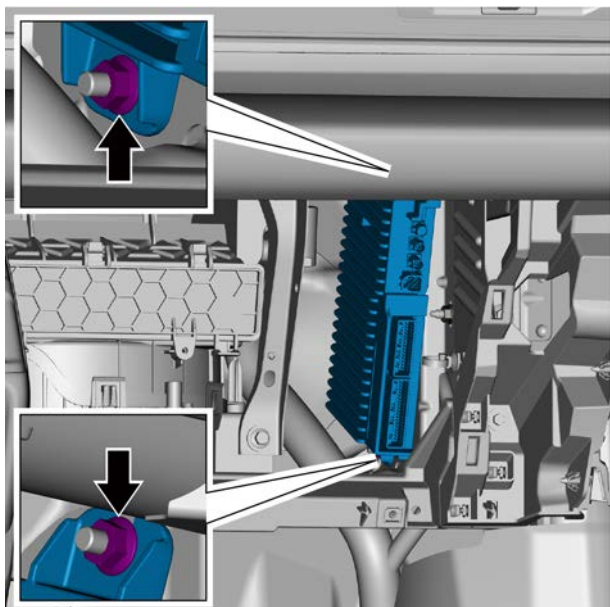
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

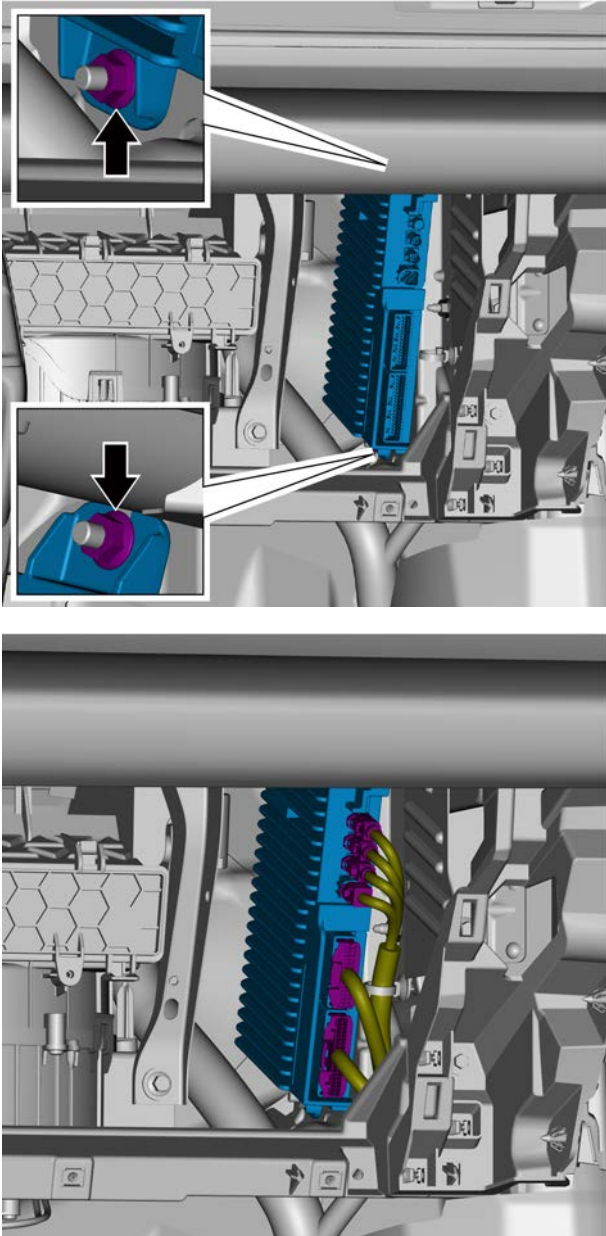
- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove glove box frame assembly, see [Glove box frame assembly \(Type 2\)](#).
- 4 Disconnect the harness connector of the parking assistance module (360).





- 5 Remove the 2 retaining nuts of the parking assistance module (360).
- 6 Remove the parking assistance module (360).

Installation procedure



- 1 Install parking assistance module (360) and fasten 2 retaining nuts.

Torque: 10 N. m (metric system) 7.4 lb-ft (Imperial system)

- 2 Connect the parking assistance module (360) harness connector.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”

- 3 Install the glove box frame assembly.
- 4 Connect the negative battery cable.
- 5 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 6 Close the engine compartment cover.

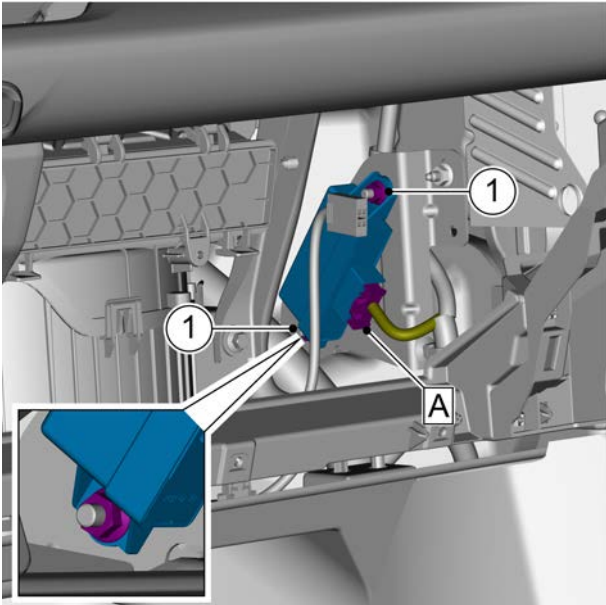
11.13.6.7 Replacement of parking assistance module

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove glove box frame assembly, see [Glove box frame assembly \(Type 1\)](#).
- 4 Disconnect the parking assistance module harness connector A.
- 5 Remove the 2 retaining nuts of the parking assistance module 1.
- 6 Remove the parking assistance module.

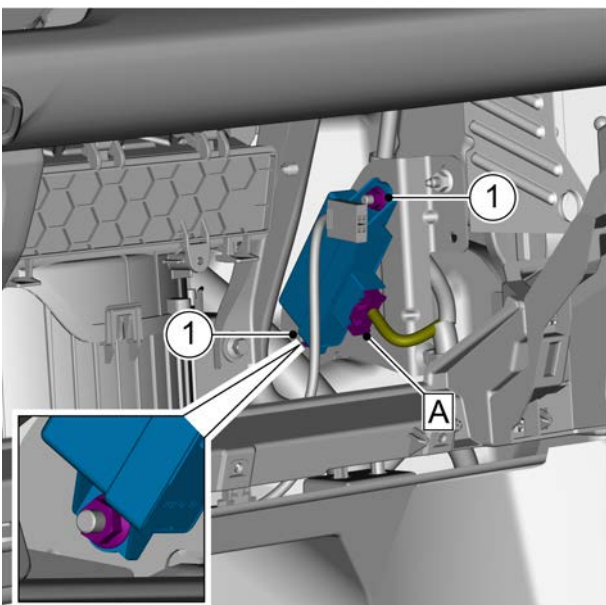
**Installation procedure**

- 1 Install parking assistance module and fasten nut 1.
Torque: 3.5 N. m (metric system) 2.6 lb-ft (Imperial system)

- 2 Connect the parking assistance module harness connector A.

Caution

Secure the harness connection: "Connect, Click, and Confirm."



- 3 Install the glove box frame assembly.
- 4 Connect the negative battery cable.

- 5 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 6 Close the engine compartment cover.

11.14 Backup power

11.14.1 Instructions and operations

11.14.1.1 Instructions and Operations

12V socket (center console)

12 The V socket (center console) is located in the lower storage box of the sub-dashboard. 12 The V socket (center console) can be used to connect electrical equipment with a maximum limit of 120W.

12V socket (luggage compartment) (if equipped)

The rear compartment is equipped with a 12V socket (luggage compartment), which is located on the left trim plate of the rear compartment. The back-up power supply can be used to connect electrical equipment with a maximum limit of 120W.

Wireless phone charger (if equipped)

The high-configuration model of this vehicle is equipped with a wireless phone charger above the sub-dashboard. The wireless phone charger complies with the Qi wireless charging standard, allowing you to wirelessly charge mobile phones that support the Qi standard. The Qi standard uses electromagnetic induction technology to transfer electrical energy to mobile devices.

If you want to use the cordless phone charger, make sure that the coil in the phone is aligned with the coil in the middle of the cordless phone charger. Because the coil position of each mobile phone is different, it may be necessary to adjust the position of the mobile phone.

Click on the multimedia display: Vehicle settings→Vehicle basic settings → For more basic settings, and then turn on or off the wireless phone charger function in this interface. If you want to use the wireless phone charger function, turn on the wireless phone charger on the multimedia display and make sure that the coil in the phone is aligned with the coil in the middle of the wireless phone charger. Because the coil position of each mobile phone is different, it may be necessary to adjust the placement of the mobile phone.

Caution

Do not place any metal objects, such as coins, rings or keys, between the phone and the cordless phone charger, otherwise it will affect the charging of the phone and cause the metal objects to become very hot.

USB port

The USB port has a USB Jack and a Typec port, and the USB port is located in the lower storage box of the sub-dashboard. The USB Jack has the functions of data transmission and

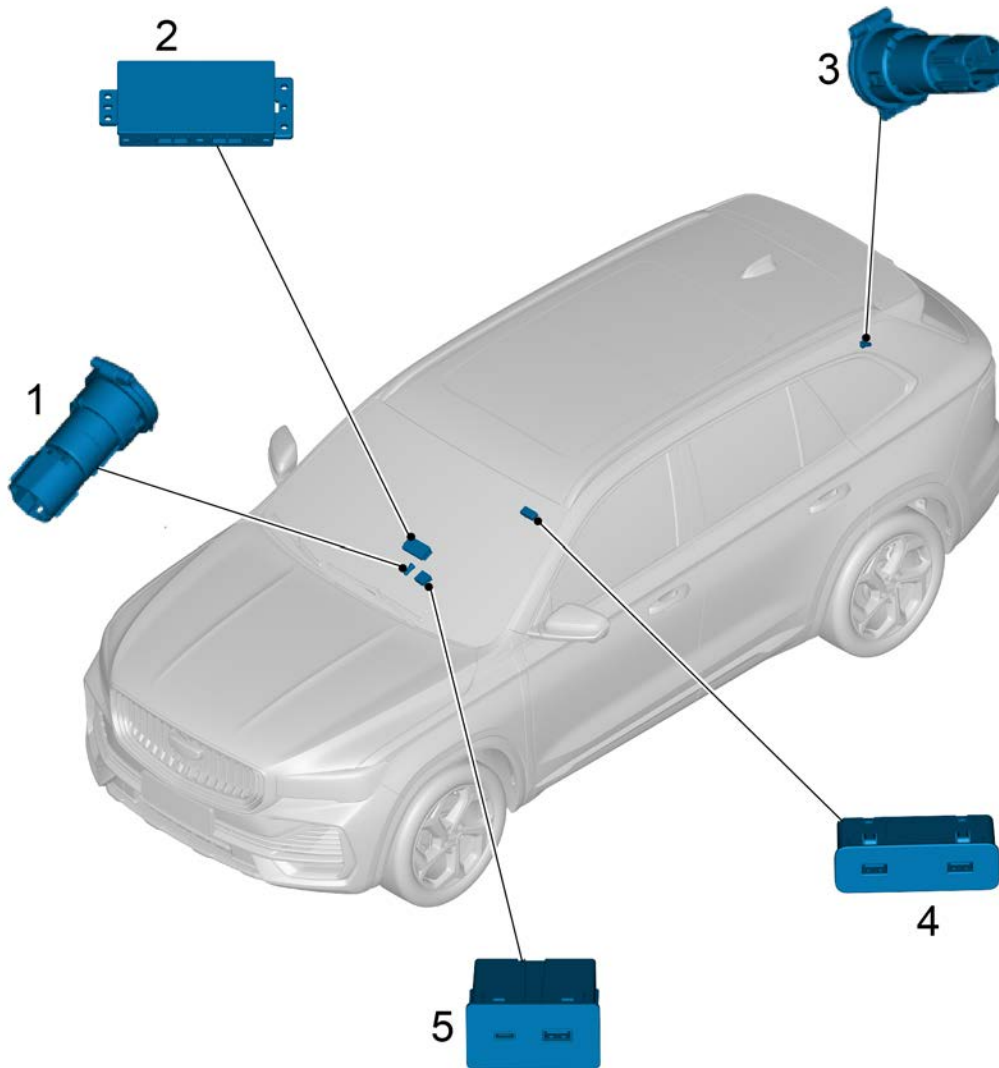
charging, while the Typec interface only has the charging function.

Rear USB port

The rear USB connector is located under the storage box at the rear of the sub-dashboard. This interface only has charging function.

11.14.2 Component position

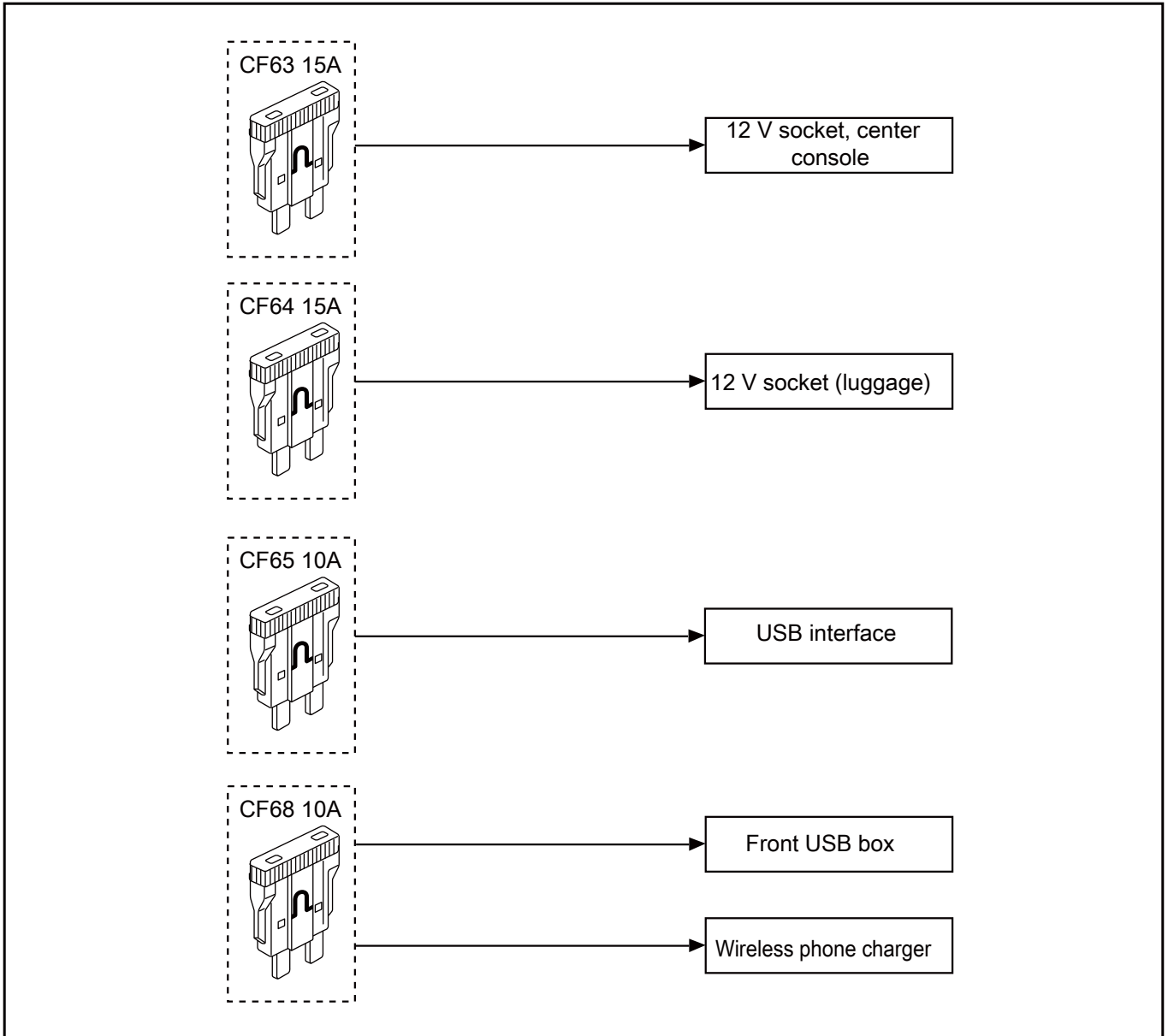
11.14.2.1 Component position



- | | | | |
|----|--------------------------------------|----|----------|
| 1. | 12V socket (center console) | 4. | USB port |
| 2. | Wireless phone charger (if equipped) | 5. | USB port |
| 3. | 12V socket (luggage compartment) | | |

11.14.3 Electrical schematic diagram

11.14.3.1 Electrical schematic diagram



11.14.4 Diagnostic information and procedures

11.14.4.1 Diagnosis Description

Before diagnosing the fault of the standby power supply, see [Description and operation](#). Understand and be familiar with the working principle of back-up power supply, and then start system diagnosis. This will help to confirm the correct fault diagnosis steps when the fault occurs. More importantly, it can also help to determine whether the situation described by the customer belongs to normal operation. Any fault diagnosis of the standby power supply should start with routine inspection. The routine inspection will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.14.4.2 Routine inspection

- Check after-sales installations that may affect the back-up power supply, to ensure that these devices cannot affect the back-up power supply.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

11.14.5 Removing and installing

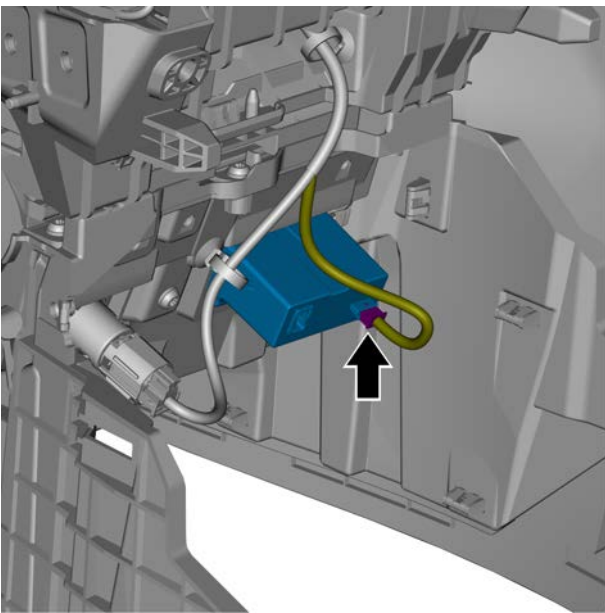
11.14.5.1 Replacement of USB port

Removal procedure

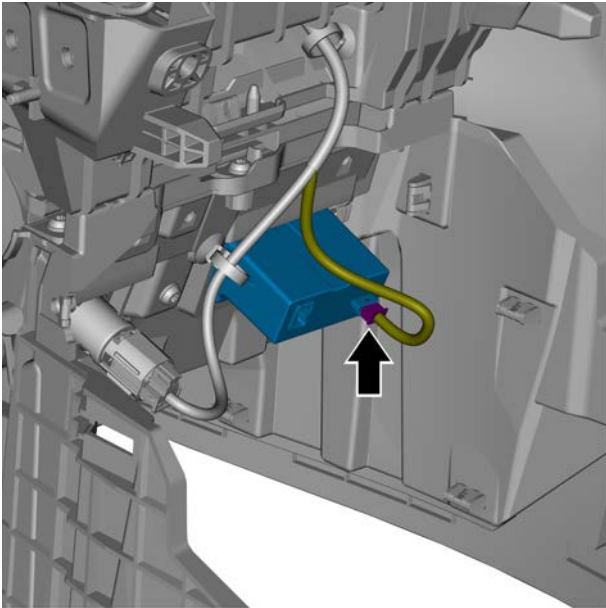
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove console moulding assembly, refer to [replacement of console moulding assembly](#).
- 3 Disconnect the USB port harness connector and remove the USB port.



Installation procedure



- 1 Install the USB port to the sub-dashboard and connect the USB port harness connector.

- 2 Install the console assembly.
- 3 Connect the negative battery cable.

11.14.5.2 Replacement of USB port (Type 1)

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures..](#)
- 2 Remove the rear panel assembly of the sub-dashboard, see [Replacement of the rear panel assembly of the sub-dashboard \(Type 1\)](#).
- 3 Remove the USB connector and remove the USB connector.



Installation procedure

- 1 Install the USB port.



- 2 Install the rear panel assembly of the console.
- 3 Connect the negative battery cable.

11.14.5.3 Replacement of USB port (Type 2)

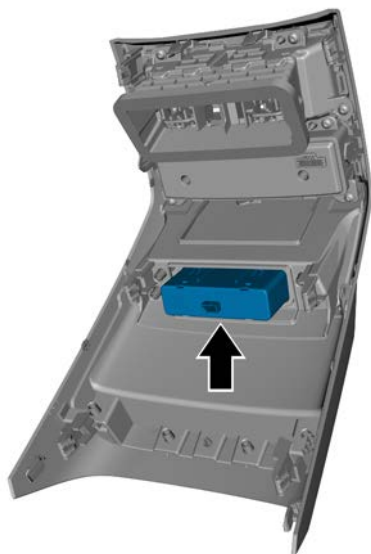
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

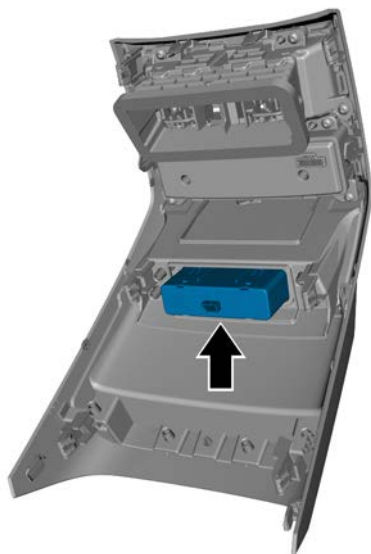
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)

- 2 Remove the rear panel assembly of the sub-dashboard, see [Replacement of the rear panel assembly of the sub-dashboard \(Type 2\)](#).
- 3 Remove the USB connector and remove the USB connector.



Installation procedure

- 1 Install the USB port.



- 2 Install the rear panel assembly of the console.
- 3 Connect the negative battery cable.

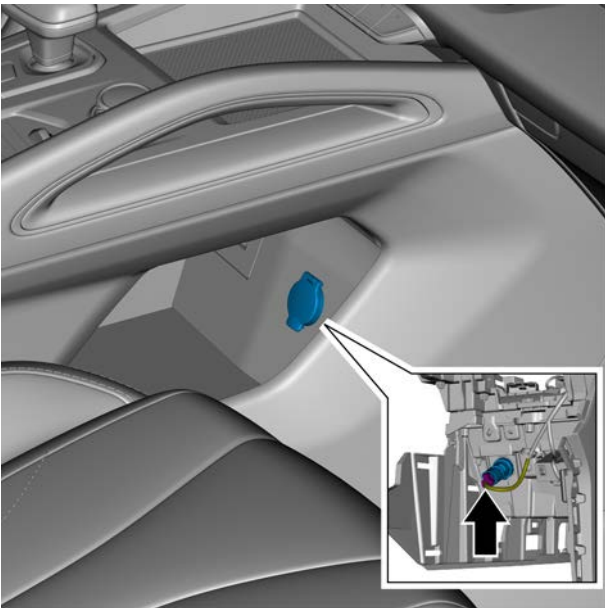
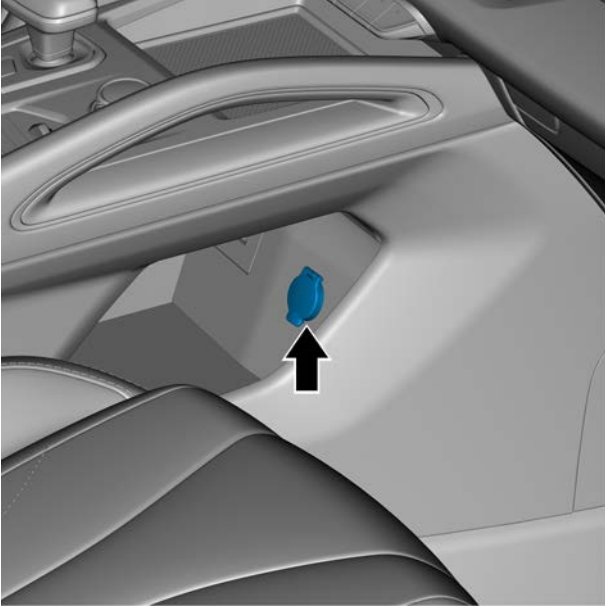
11.14.5.4 Replacement of 12V socket (center console)

Removal procedure

Warning !

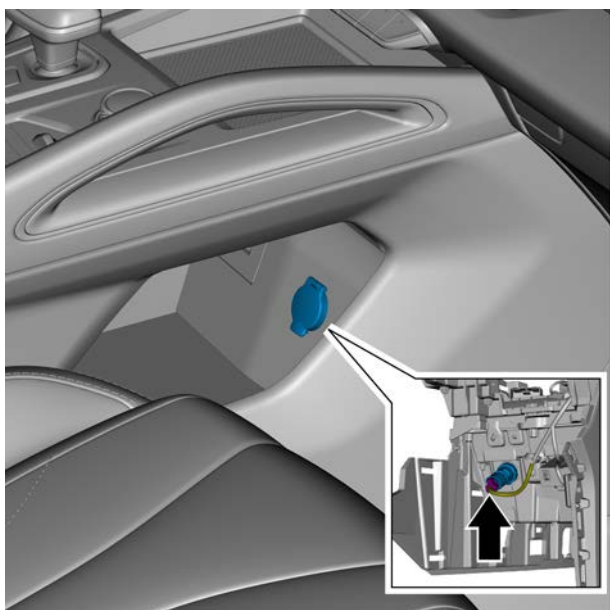
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the 12V socket (center console).

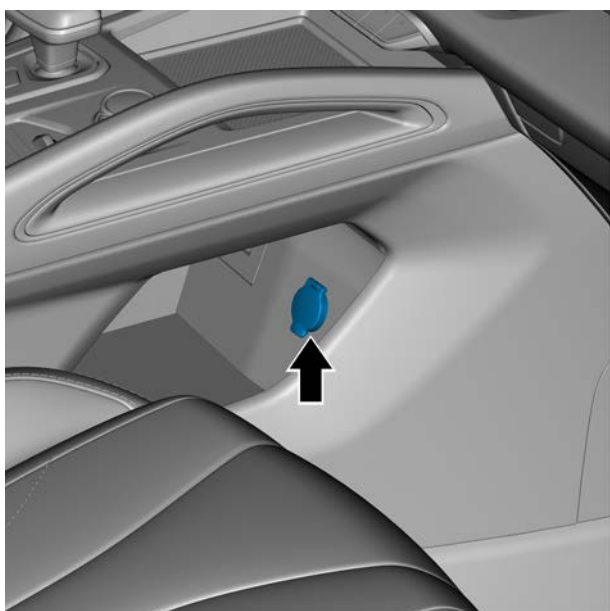


- 3 Disconnect the 12V socket, the central console harness connector, and remove the 12V socket (center console).

Installation procedure



- 1 Connect the 12V socket (center console) harness connector.



- 2 Install the 12V socket (center console).

- 3 Connect the negative battery cable.

11.14.5.5 Replacement of 12V socket (luggage compartment)

Removal procedure

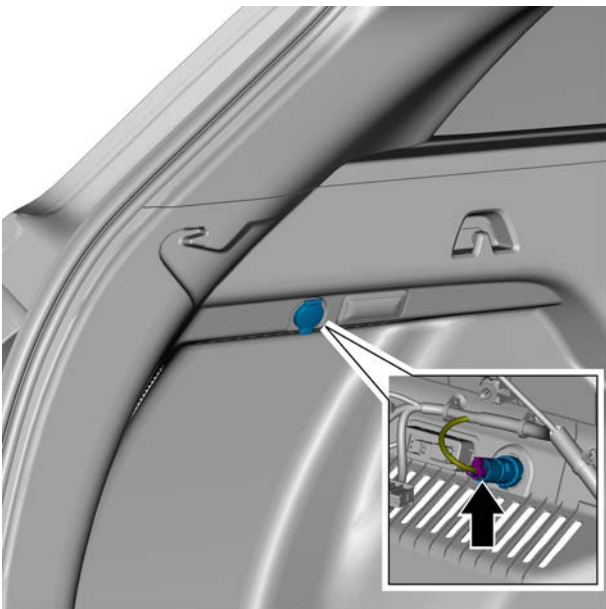
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

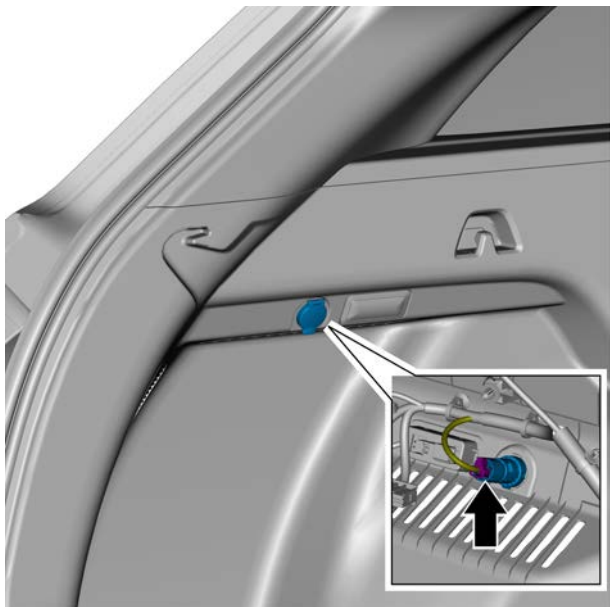


2 Remove 12V socket (luggage compartment).



3 Disconnect the 12V socket (luggage compartment) harness connector and remove the 12V socket (luggage compartment).

Installation procedure



- 1 Connect the 12V socket (luggage compartment) harness connector.



- 2 Install 12V socket (luggage compartment).

- 3 Connect the negative battery cable.

11.14.5.6 Replacement of radiotelephone charger

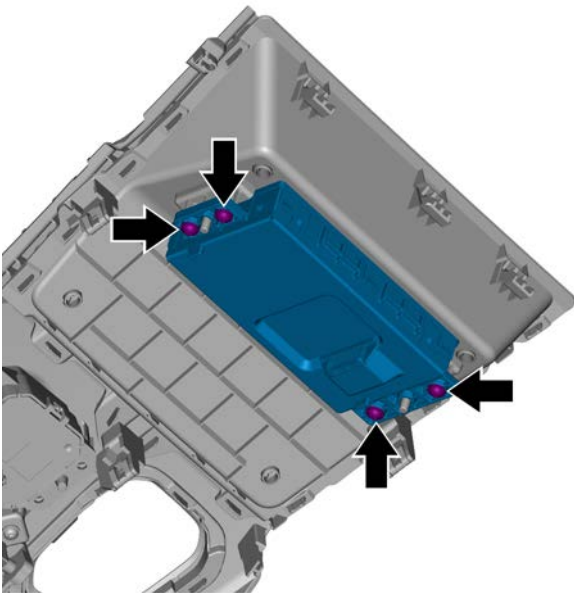
Removal procedure

Warning !

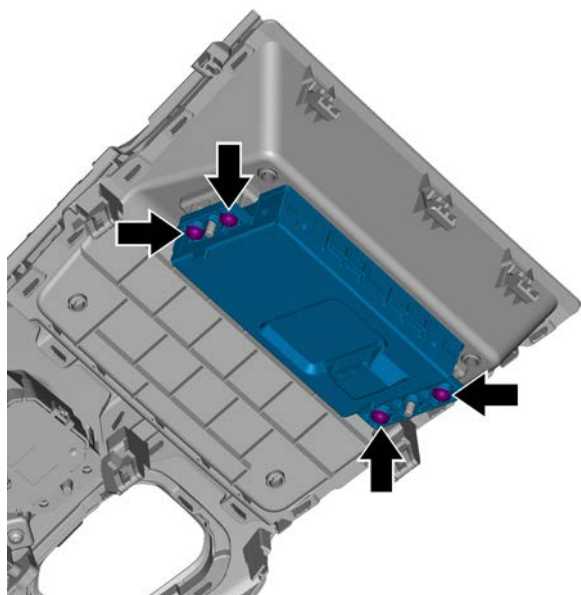
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Disassemble the passenger seat, see [Replacement of the passenger seat](#).

- 3 Remove the extension trim plate on the co-driver side, see the [Replacement of the driver side extension trim plate assembly](#).
- 4 Remove the rear panel assembly of the sub-dashboard, see [Replacement of the rear panel assembly of the sub-dashboard \(Type 2\)](#).
- 5 Remove the trim plate assembly on the right side of the sub-dashboard, see [Replacement of the trim plate assembly on the right side of the sub-dashboard](#).
- 6 Remove the exterior handle assembly on the right side of the sub-dashboard, see the [Replacement of the exterior handle assembly on the right side of the sub-dashboard](#).
- 7 Remove the shift panel assembly, see [Replacement of the shift panel assembly](#).
- 8 Remove the 4 retaining screws of the radiotelephone charger and remove the radiotelephone charger.



Installation procedure



- 1 Install the 4 retaining screws of the radiotelephone charger.

Torque: 1.5 N·m (metric) 1.1 lb-ft (Imperial system)

- 2 Install the shift panel assembly.
- 3 Install the exterior handle assembly on the right side of the sub-dashboard.
- 4 Install the right side trim panel assembly of the sub-instrument panel.
- 5 Install the rear panel assembly of the console.
- 6 Install the extension trim plate on the side of the front passenger.
- 7 Install passenger seats.
- 8 Connect the negative battery cable.

11.15 Data communication system

11.15.1 Specification

11.15.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Vehicle gateway module fixing nut	M6×19	0.8~4	0.6~3.0

11.15.2 Instructions and operations

11.15.2.1 Instructions and Operations

General

The whole vehicle network adopts domain distributed architecture, including: dynamic driving domain, active security domain, entertainment domain and vehicle body domain. FlexRay is used as the backbone network to realize the communication between each domain. Domain controllers are: VDDM, IHU, ASDM and CEM. The whole vehicle has 62 controller modules. CAN and LIN communicate between controllers other than domain controllers. The advantages of whole vehicle network design are as follows:

- Reduce the number of control circuit wires.
- Greatly reduce the weight of the wire harness.
- Reduce the number of plug core pins of the control device.
- Improved reliability and durability.

Transmission speed of each network:

- FlexRay: 10Mbit/s, single channel.
- CAN: 500kbit/s
- CANFD: 2Mbit/s
- LIN: 19.2kbit/s

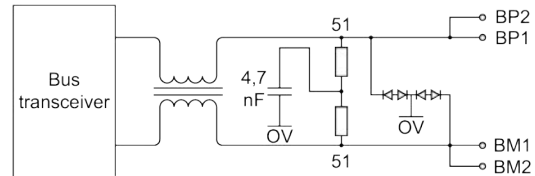
FlexRay bus is a new communication standard, which is specially designed for vehicle intranet. It adopts time-based trigger mechanism, has the characteristics of high bandwidth and good fault tolerance, and has certain advantages in real-time, reliability and flexibility. When time is used to trigger communication, each node in the network knows in advance the time when the message will communicate with each other, the receiver knows the time of arrival of the message in advance, and the time of the message on the bus can be predicted. Even if the driving environment is harsh and changeable, which interferes with the system transmission, the FlexRay protocol can ensure that the information delay and jitter are kept to a minimum, and the transmission synchronize and predictability are kept as far as possible. This is very important for applications that require continuous and high-speed performance, such as brake by wire, steering by wire, etc. FlexRay physically communicates through two separate buses, each with a data rate of 10MBit/s. FlexRay can also provide reliability features that many networks do not have. In particular, the redundant communication capability of FlexRay can completely copy the network configuration through hardware and monitor the progress.

The FlexRay bus is connected by daisy chain. The terminal resistance of the terminal node is 102ohms (between BP and

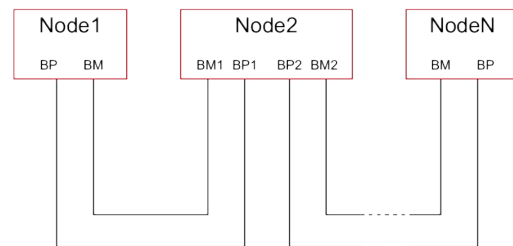
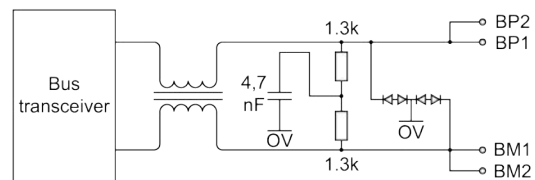
BM), and the terminal resistance of the non-terminal node is 2.6K ohms (between BP and BM).

The internal schematic structure of the ECU terminal node is as follows (terminal node):

Low impedance termination(102 Ω)



High impedance termination(2,6 kΩ)



CAN is short for Controller Area Network, and its full name is Controller Area Network Bus. In other words, it controls the mutual connection of equipment for data exchange. It is one of the most widely used site buses all around the world. It is designed as a microcontroller communication bus in the vehicle environment to exchange information between electronic control unit ECUs and to form a vehicle electronic control network.

LIN is mainly used as the auxiliary network or sub-network of high-speed bus such as CAN. In the situation of low bandwidth, simple function and low real-time requirements, such as the control of body appliances (glass up and down, anti-clamping, sunroof, etc.), the use of LIN bus can effectively simplify the network harness, reduce the cost, and improve the efficiency and reliability of network communication. Characteristics of LIN bus include:

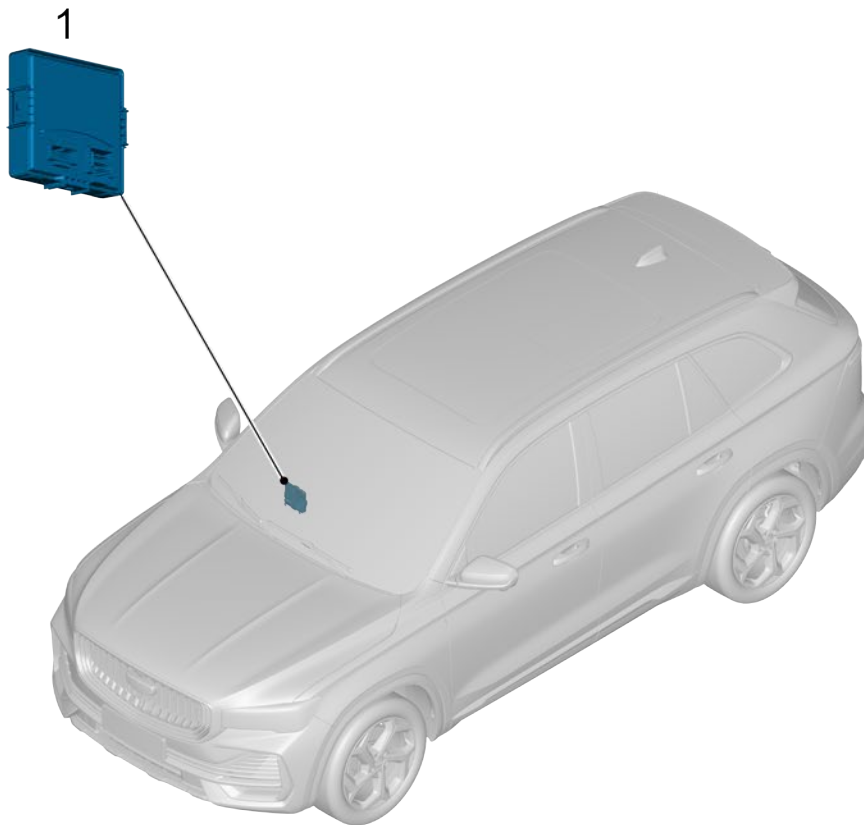
- Data format based on UART
- Single master multi slave structure
- Single line transmission: 0-12V
- Communication rate: 19.2kbps

Data Link Control (DLC) is the result of negotiation and adjustment among all automobile manufacturers in the world. When using fault diagnosis tester to communicate with vehicle or program the communication system of the vehicle, this connector must surely be used. This connector must meet the following conditions:

- be able to connect 16-pin connector of all fault diagnosis testers.
- Always supply battery power to fault diagnosis tester through Pin No.16.
- Always supply grounding connection for fault diagnosis tester through Pin No.4.
- The other pins are used for serial data communication with vehicle systems. The module controlled by microprocessor in vehicle can communicate with each other and with fault diagnosis testers through serial data circuits.

11.15.3 Component position

11.15.3.1 Component position

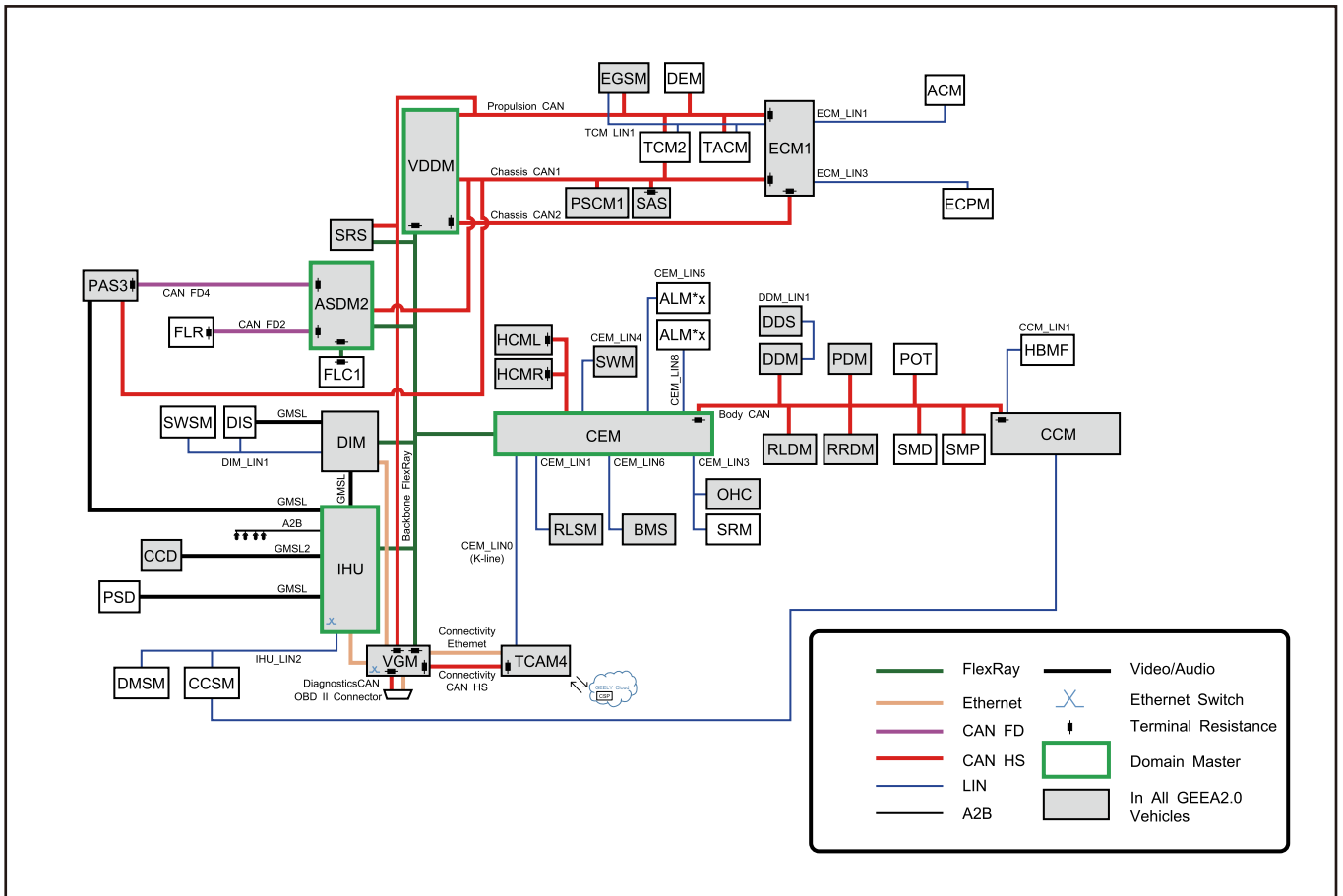


1. Vehicle gateway module

11.15.4 Electrical schematic diagram

11.15.4.1 Electrical schematic diagram

Network Topology Diagram (8AT-AWD)



11.15.5 Diagnostic information and procedures

11.15.5.1 Diagnosis Description

Before diagnosing the faults of the data communication system, see [Description and operation](#). Understand and be familiar with working principles of data communication system before starting system diagnosis. This helps to determine the correct fault diagnosis steps when a fault occurs. More importantly, it also helps to determine whether the situation described by the customer is normal operation. Any fault diagnosis of the data communication system should start with routine inspection. The routine inspection will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.15.5.2 Visual Check

- Check the after-sales installations that may affect the normal operation of the data communication system to ensure that such installations do not affect the normal operation of the data communication system.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- If there is something wrong with the data communication system, check and ensure that the harness connectors of each control module connected to the data communication system are properly connected before repair.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

11.15.5.3 CAN bus fault precaution

- The CAN bus harness should not be stretched.
- The CAN bus harness should not be opened more than 4cm (1.6in).
- The CAN bus harness should not be connected with other wires.
- The fault diagnosis should be conducted with the diagnostic apparatus recommended by manufacturers.

11.15.5.4 CAN bus harness repair norms

- The two wires CAN_H and CAN_L must be articulated.
- In case of open circuit failure of CAN bus, the length of wire connection shall not exceed L1: 50mm (1.97in).
- If there are more than two open circuit points, repair is allowed only when the distance between the two open circuit points is above L2: 100mm (3.94in), otherwise the CAN bus conductor should be replaced.

11.15.5.5 Signal diagnosis of CAN field-bus

An oscilloscope and its double channel input can be applied to monitor signals transmitted at the CAN field-bus. These signals shall have the following features:

- The voltage signal at CANH bus is 2.5-3.5V, and that at CANL bus is 1.5-2.5V.
- These two signals are mirror images of each other.
- Signal transmission starts with the opening of the start and stop button, but ends when the start and stop button is closed for 2s.

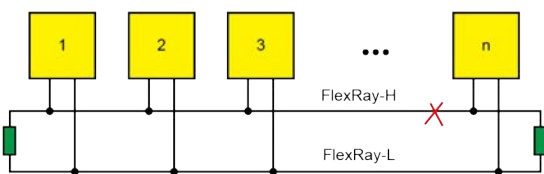
11.15.5.6 Diagnosis and maintenance of FlexRay

When there is a fault in FlexRay, you can use the following three methods to find the fault point and troubleshoot it.

Resistance measurement method

Like the high-speed CAN bus, the connection mode of the system can be determined by measuring resistors. Normally, there are 2 terminal resistors inside each branch, each of which is about 90 ~ 110 ohms. If measured in parallel, the resistance is about 45 ~ 55 ohms.

For example, if the circuit is broken at X, the break point can be determined by measuring the circuit between 3 and n.



Different from the high-speed bus, if the resistance of one branch is within the range of the assembly and can not explain the situation of other branches, it is necessary to measure the resistance of all branches in order to judge the resistance connection of FlexRay, and they need to be diagnosed separately.

Voltage measurement method

Like the high-speed CAN bus, the measuring voltage method can be used to judge the FlexRay system; in the case of assembly, the voltage value of FlexRay-H is about 2.6V, while that of FlexRay-L is about 2.4V. If you get 0V or 12V, the system is short-circuited to the ground or to the power supply.

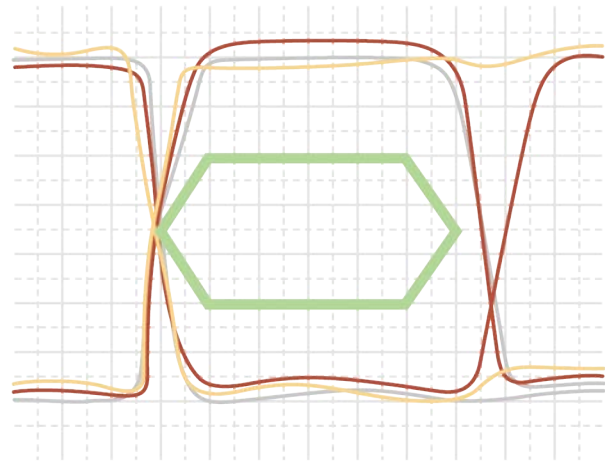
Different from the high-speed CAN bus, similar to the measuring resistance method, even the voltage assembly of a branch can only show that the branch is normal; it is necessary to measure the voltage values of all branches in order to judge whether the system is normal or not.

Oscilloscope measurement method

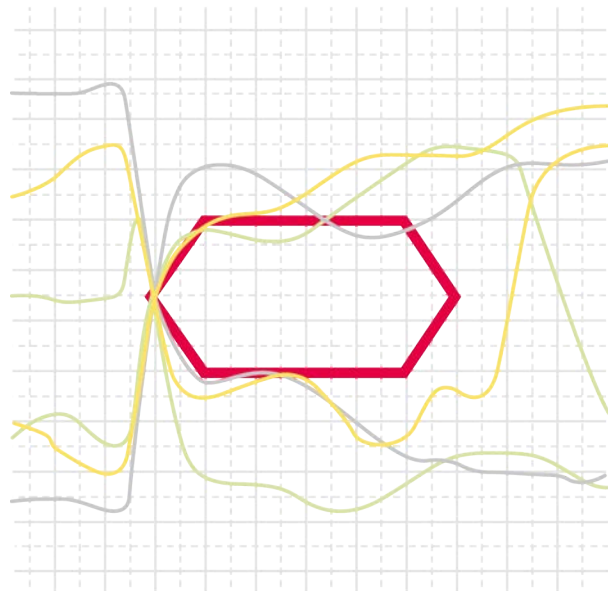
Limitations:

Need to use a special oscilloscope, and the connection is complex, need technicians for the dual-channel oscilloscope can be very skilled operation, at the same time can accurately analyze the differences of different waveforms.

Familiar with the high-speed CAN bus, its normal waveform is also very similar, except that its speed is 20 times that of the high-speed CAN.



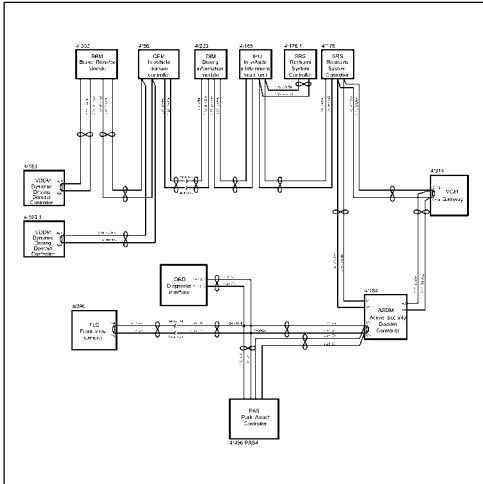
If there is interference, the waveform looks like this:



Different from high-speed CAN bus, like resistance method and voltage method, even if the waveform of one branch is normal, it does not represent the condition of other branches,

it is necessary to measure the waveforms of all branches in order to judge whether the system is normal or not.

11.15.5.7 FlexRay circuit diagram



11.15.6 Removing and installing

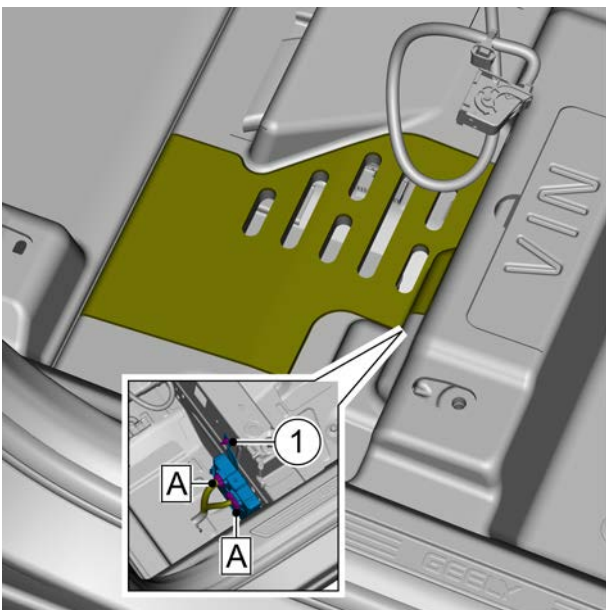
11.15.6.1 Replacement of vehicle gateway module

Removal procedure

Warning !

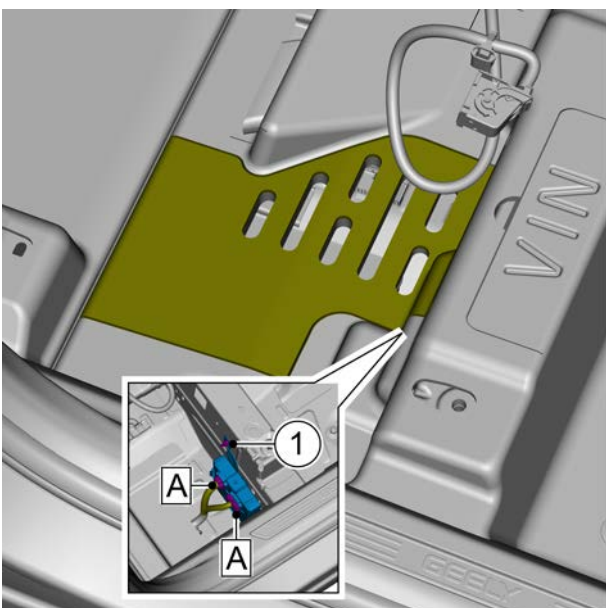
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Disassemble the passenger seat, see [Replacement of the passenger seat](#).
- 3 Disconnect the 2 harness connectors A of the vehicle gateway module.
- 4 Remove the vehicle gateway module retaining nut and remove the vehicle gateway module.



Installation procedure

- 1 Install the vehicle gateway module retaining nut.
Torque: 4 N·m (metric) 3.0 lb-ft (Imperial system)
- 2 Connect 2 harness connectors A to the vehicle gateway module.



- 3 Install passenger seats.
- 4 Connect the negative battery cable.
- 5 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

11.16 Cruise control system

11.16.1 Specification

11.16.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Steering wheel assembly fixing bolt	M12×30×36.07	50~70	36.9~51.6

11.16.2 Instructions and operations

11.16.2.1 Considerations

Cautions in the operation of cruise control system

1. Turn off the cruise control main switch when not using the cruise control system.
2. Drive carefully when driving downhill and increasing speed when the cruise control system is activated.
3. Do not use the cruise control system under the following road conditions:
 - Traffic jam
 - Steep slope
 - A road with sharp turns
 - A road covered with snow and ice
 - A slippery road

11.16.2.2 System description

Cruise Control System

With the constant speed cruise control system, you can maintain any speed between 30-180 km/h without having to step on the accelerator pedal sensor all the time.

Caution

Do not use the constant speed cruise control system on winding roads or in traffic jams, otherwise it will be dangerous. When driving with a constant speed cruise control system on a slippery road, a sharp change in tire traction will lead to unnecessary idling of the wheels and the vehicle may get out of control.

Function selection

The fixed speed cruise control system can be selected through the function menu switch button on the left side of the steering wheel in the combined instrument display screen. After the selection, the constant speed cruise control system enters the standby state, and the constant speed cruise control system (CC) status indicator is white.

Setting speed

When cruise control is enabled, the up or down push speed adjustment and confirmation button can be adjusted to the desired cruise speed, press the button to set the current speed to the cruise speed.

Return to set speed

If you have already set the vehicle speed as the brake pedal the cruise control speed you need, depress the brake pedal. This cancels the cruise control. To restore the preset speed,

press the constant speed cruise resume button to activate when the speed reaches more than 30 km/h. The system is controlled according to the pre-stored set speed.

Acceleration in Cruise Control

The acceleration can be realized through either of the two methods:

- Press the accelerator pedal to increase speed.
- If cruise control is enabled, push the speed adjustment and confirm button and hold it, the speed will continue to increase at 5 km/h until the vehicle accelerates to the desired speed or to the maximum set speed of 180 km/h, and then release. To speed up a little, push the button up. A short push up will increase the speed of the vehicle by 1 km/h. A long push up will increase the speed of the vehicle by 5 km/h.

Deceleration in Cruise Control

If the cruise control system is enabled,

- Push down the speed adjustment and confirm button and hold it, and the speed will continue to slow down at 5 km/h until the vehicle slows down to the desired speed or to the minimum set speed of 30 km/h, and then release.
- If you want to slow down slightly, push the button down. With a short push down, the speed of the vehicle will be reduced by 1 km/h. With a long push down, the speed of the vehicle will be reduced by 5 km/h.

Overtaking When Using Cruise Control:

Use the accelerator pedal sensor to increase the speed of the vehicle. Vehicle speed will decrease to preset cruise control speed when the foot leaves accelerator pedal.

Use of Cruise Control at Ramp

Performance of cruise control on ramp depends on vehicle speed, load and gradient of the ramp. When climbing a steep slope, you need to step on the accelerator pedal sensor to maintain speed. It may be needed to brake or shift to lower gear to maintain vehicle speed when vehicle is running down-slope. Cruise control will be turned off when brake is applied.

Ending Cruise Control

There are three ways to end cruise control:

- Press the CNCL button, the constant speed cruise control system (CC) status indicator changes from green to white, and the cruise is on standby.
- Step on the brake pedal, the constant speed cruise control system (CC) status indicator changes from green to white, and the cruise is on standby.
- Press CNCL in cruise standby, the Cruise will turn off.

Clearing Vehicle Speed Memory

When you turn off the cruise control or the starter button, the vehicle speed in the cruise control memory will be cleared.

Adaptive cruise control system (if equipped)

The adaptive cruise control system can control the vehicle speed within the range of 0~150km/h according to the set speed and the time and distance between the vehicle and the following vehicle.

The adaptive cruise control system is mainly to provide driving assistance for the driver on highways or roads in good conditions. The driver needs to maintain control over the vehicle at all times.

The sensors used in the adaptive cruise control system (ACC) are:

- a. Forward-looking radar
- b. Forward-looking camera

The adaptive cruise control system uses forward radar and front-looking camera to detect the vehicle ahead and automatically adjusts the speed to maintain the headway time set by the driver. The driver can control the vehicle at any time according to the driving conditions.

Caution

The adaptive cruise control system will start the self-test when the vehicle is powered on, and the system function is not available at this stage.

Caution

Adaptive cruise control system is a comfort system, not an emergency warning and collision avoidance system. The driver must always maintain control of the vehicle and bear full responsibility for vehicle handling. Drivers need to regulate driving in accordance with laws and regulations.

The adaptive cruise control system does not work for vehicles or objects crossing the driveway.

The change of vehicle attitude caused by too many items in the baggage area will degrade or invalidate the target recognition performance of the adaptive cruise control system.

When other vehicles come to the front of the vehicle at a low speed, the adaptive cruise control system may not have time to respond and require the driver to brake in time.

When suddenly accelerating and approaching the vehicle in front at high speed (which is obviously different from the vehicle in front), the driver needs to brake in time.

The driver needs to adjust the vehicle-following distance according to the traffic flow in front and the current weather conditions, such as rain and snow, and set up the adaptive cruise control system reasonably. Drivers need to be able to actively control the vehicle at all times to ensure driving safety.

It is the driver's responsibility to keep the distance from the vehicle in front.

When driving on a steep downhill road, it may be difficult to keep the correct distance from the vehicle in front of you. In these cases, be very careful and be ready to brake at any time. Do not use adaptive cruise control system under heavy load.

The adaptive cruise control system cannot identify pedestrians, tricycles, vehicles loaded with irregularly shaped goods or special-shaped vehicles.

The adaptive cruise control system can not recognize stationary or slow-moving vehicles, nor can it identify oncoming vehicles.

When the vehicle is at rest, the adaptive cruise control system will identify the static obstacle in front of the vehicle as the vehicle and keep it at rest, in order to ensure the safe start of the vehicle and avoid collision with the stationary target caused by the unexpected

start. Stationary targets include, but are not limited to, speed bumps, trees, people, railings, etc.

The adaptive cruise control system can assist the driver, but it can not replace the driver to drive. Even if the adaptive cruise control system is active, the driver must drive carefully and obey the traffic rules.

When the adaptive cruise control system is working, if the driver steps on the accelerator pedal sensor, the vehicle will be taken over by the driver in response to the driver's acceleration needs. The control function of the adaptive cruise control system will not work.

When driving in and out of corners, the selection of targets may be delayed or interfered. The adaptive cruise control system may brake unexpectedly or brake too late.

In some cases (the front vehicle speed is too low relative to this vehicle speed, the front vehicle cuts into this vehicle lane at close range, etc.), the adaptive cruise control system does not have enough time to reduce the relative speed. In this case, the driver must react appropriately.

If the vehicle in front brakes suddenly, the adaptive cruise control system will be unable to respond in time or too slow. In this case, the driver will not receive a takeover request and needs active braking.

On the sharp turning road, such as the serpentine road, due to the limitation of front-looking camera and forward radar field, the adaptive cruise control system can not detect the front vehicle normally, which may lead to the acceleration of ACC vehicle, which requires the driver to respond appropriately according to the actual working conditions.

If the distance between the ACC vehicle and the adjacent lane is too small (or the vehicle in the adjacent lane is too close to the lane of the ACC vehicle), the adaptive cruise control system may react to the vehicle and brake.

When the vehicle in the adjacent lane ahead cuts into the track of the ACC vehicle, the detection may be affected or delayed in some environments, such as the small reflection intensity of the target (pedestrian, tricycle, tricycle), electromagnetic interference and so on, so that the adaptive cruise control system can not recognize the target or accurately calculate the distance from the front vehicle. In this case, there will be no response or braking delay of the adaptive cruise control

system, and the driver needs to actively control the vehicle.

The field of view of the forward radar cannot be obscured by contaminants. Especially when the snow is completely covered, it will lead to the exit of the adaptive cruise control system, and the information of system exit will be transmitted to the driver through the combined instrument.

The installation of front-looking camera and forward radar may be affected by vibration or collision, which will degrade the performance of the system. At this point, the front-looking camera and forward radar need to be recalibrated.

Drivers must be particularly vigilant under the following circumstances:

- When the vehicle activates the adaptive cruise control system in the static state and confirms the start, if there are pedestrians, children, animals, bicycles, tricycles or obstacles in front of the vehicle, the adaptive cruise control system can not detect and identify. There is a serious risk of collision. The driver must first confirm the safety of the area in front of the vehicle, and then activate the adaptive cruise control system to control the start of the vehicle.
- In the case of high self-speed, if the left turn signal is turned on when overtaking on the left, the adaptive cruise control system automatically accelerates the vehicle and shortens the distance between the vehicle and the vehicle in front. If the vehicle enters the overtaking lane and there is no vehicle ahead, the adaptive cruise control system will automatically accelerate to the set cruising speed.
- The adaptive cruise control system cannot detect objects or accessories protruding from the side, back end or roof of the target vehicle. If the vehicle in front is equipped with the above special load or special equipment, be sure to turn off the adaptive cruise control system when passing such a vehicle.
- Metal objects such as tracks or metal plates for road construction may interfere with the forward radar and make it unable to work properly.
- When the trailer is driven, the dynamic characteristics of the adaptive cruise control system will be reduced.
- For safety reasons, do not use the adaptive cruise control system when driving along ramps and multi-curved roads, or on slippery roads (such as snow, ice, wet, or flooded roads) when visibility is poor.
- The system requires that after the driver takes over the vehicle, if the vehicle continues to move, the driver must step on the brake pedal to brake the vehicle.
- If the driver is prompted to take over the vehicle in the combined instrument display, the driver must immediately control the distance between this vehicle and the vehicle in front.

- The driver must always be ready to control the vehicle by acceleration or braking.
- The forward radar is installed under the front bumper, if the forward radar is covered by dirt, so that the adaptive cruise control system can not work, the combined instrument display screen will have a text prompt, please clean up in time or go to Geely Auto service station for inspection and maintenance.
- The front and surrounding areas of the forward radar must not be obscured by other objects (such as license plate frames), otherwise the adaptive cruise control system may be affected.
- Structurally modified vehicles, such as reducing the height of the chassis or changing the front license plate of the vehicle, may affect the adaptive cruise control system.
- If the front camera has system fault, low light, strong light and object occlusion or alternation of light and shade, the adaptive cruise system may be affected so that it can not be used.

Function selection

The adaptive cruise control system can be selected through the function menu switch button on the left side of the steering wheel in the combined instrument display screen. After the selection, the adaptive cruise control system enters the standby state, and the adaptive cruise control system (ACC) status indicator lights up and is white.

Activate and set the speed

1. When the vehicle is at rest, activate and set the speed according to the following steps:
 - Choose to turn on the adaptive cruise control system, and the ACC status indicator on the display screen of the combined instrument is lit and is white.
 - Press the brake pedal or activate the AUTOHOLD function.
 - Press the smart driving button or the speed adjustment and confirmation button to activate the adaptive cruise control system, and the adaptive cruise control system (ACC) status indicator on the combined instrument display screen lights up and turns green.
 - Lift the brake pedal and the ACC system can continue to keep the vehicle at rest.
 - The driver is required to press the smart driving button or press the accelerator pedal sensor again to make the adaptive cruise control system control the vehicle start.
 - The adaptive cruise control system controls the vehicle according to the cruising speed setting.
2. When the vehicle is in motion, activate and set the speed according to the following steps:
 - Choose to turn on the adaptive cruise control system, and the ACC status indicator on the display screen of the combined instrument is lit and is white.

- Press the smart driving button or the speed adjustment and confirmation button to activate the adaptive cruise control system; when the cruising speed is set at 30km/h, the adaptive cruise control system (ACC) status indicator on the combined instrument display screen lights up and turns green. When this vehicle speed is less than 30 km/h, the cruising speed is 30 km/h; when this vehicle speed is more than 30 km/h, the cruising speed is the current speed of this vehicle.
- If the Cruise Auto Speed Limit Assist function has been turned on by clicking on the multimedia display in order: Vehicle Settings → Driving Assist & Safety → Smart Driving Assist → Cruise Auto Speed Limit Assist, the set speed will automatically fuse the recognized speed limit sign as the set speed, but will not fuse the speed limit higher than the set speed.
- The adaptive cruise control system controls the vehicle according to the cruising speed setting.

Caution

When the automatic identification speed limit is turned on, there may be situations in which the cruising speed does not change with the speed limit, such as the speed limit is lower than the threshold or the difference between the speed limit and the current target speed is greater than the threshold; at the same time, affected by the light and the position of the road sign, there may be misidentification or missed identification of the speed limit. The driver can not rely on the fusion system to determine the appropriate cruising speed, but has the responsibility to choose the appropriate cruising speed according to the actual situation of the road.

During the speed limit fusion, the system will accelerate or decelerate according to the new setting value, and the driver should always keep an observation of the surrounding environment, and can interrupt the speed limit fusion at any time by stepping on the accelerator pedal sensor or operating the speed adjustment and confirmation button.

Set headway time

Caution

Drivers have the responsibility to choose a safe headway time.

The driver can adjust the ACC vehicle following headway time according to the current road environment. The headway time refers to the time it takes for this vehicle to drive at the current speed to the current position of the vehicle in front, that is, the headway distance divided by the speed of this vehicle.

The driver can reduce or increase the headway time between this vehicle and the vehicle in front by pressing the headway time adjustment button. The headway time is divided into

near, medium and far. Each time the engine is ignited, the default headway time of the adaptive cruise control system is far.

Caution

In any case, the driver must maintain a sufficient braking distance from the vehicle in front, and pay attention to the corresponding requirements of the local highway traffic regulations for the minimum distance or the shortest time, and it is the driver's responsibility to abide by the law.

Using adaptive cruise speed control

1. There are two ways to increase speed when using adaptive cruising:

- Press the accelerator pedal sensor for active acceleration. In the case of active acceleration, the driver takes over the control of the vehicle, and the effect of active speed increase is shown in the combined instrument of this vehicle. When the driver releases the accelerator pedal sensor, the adaptive cruise control system continues to control the vehicle for cruising.
- If the cruise control system is enabled, if you want to speed up a little, push the speed adjustment and confirm button. With a short push up, the speed of the vehicle will be increased by 1 km/h; if pushed longer, the speed of the vehicle will continue to increase by 5 km/h until the button is released, with a maximum set speed of 150 km/h.

2. Overtaking assist mode

In cruise mode, when following the front vehicle and turning on the left turn signal, the adaptive cruise control system accelerates or decelerates the vehicle before it reaches the overtaking lane to help the driver overtake or change lanes. until this vehicle completes lane change or turns off the left turn signal.

To enable overtaking assist, at least the following conditions must be met at the same time:

- There must be a target vehicle ahead.
- The current speed of this vehicle is more than 60 km/h.
- The current lane is dotted.
- Set the speed to be high enough to overtake safely.
- Turn on the left turn signal. When using overtaking assist, unexpected acceleration may occur in the following situations, which requires special vigilance on the part of the driver. Therefore, when using overtaking assist, drivers should be prepared to deal with sudden changes in conditions and control the vehicle in a timely manner.
- The vehicle is approaching the corner, which is in the same direction as the usual overtaking.
- The speed of the front vehicle slows down before this vehicle crosses and enters the overtaking lane.

- The speed of the vehicles in the overtaking lane slowed down. When using overtaking assist, unexpected deceleration may occur in the following situations, which requires special vigilance on the part of the driver. Therefore, when using overtaking assist, drivers should be prepared to deal with sudden changes in conditions and control the vehicle in a timely manner.

- The speed of vehicles in the overtaking lane is lower than that of this vehicle.

- The vehicles in the overtaking lane are closer to the longitudinal distance of this vehicle.

- The vehicle in the overtaking lane is a large vehicle with a longer body and is parallel to this vehicle.

Caution

In the overtaking assist mode, it is necessary for the driver to control the lane change of the vehicle.

Please note that in addition to overtaking, this function can be enabled in more cases, such as when you use the left turn signal to change lane or enter another road, the vehicle will accelerate briefly.

3. Start-stop mode

In the cruising vehicle-following mode, if the vehicle in front gradually stops, this vehicle will gradually follow the vehicle in front to stop, and maintain a safe distance between the two vehicles.

- Follow and stop within 10 seconds. If the vehicle in front resumes driving, the cruise will resume automatically.

- When following and stopping for more than 10 seconds, if the vehicle in front resumes driving, the driver needs to press the accelerator pedal sensor or press the smart driving button to resume cruising.

- In ACC start-stop mode, the longest time to keep the vehicle at rest is 3 minutes, and the adaptive cruise control system is deactivated after 3 minutes.

- In ACC start-stop mode, if the driver actively exits the adaptive cruise control system, the vehicle will not start automatically. If the accelerator pedal sensor is pressed at this time, the vehicle will start, which requires the driver to take over the vehicle and pay attention to safe driving.

The adaptive cruise control system can not identify the stationary vehicle and can not brake the stationary vehicle.

Caution

After the adaptive cruise control system follows and stops, it can still control the movement of the vehicle, which may cause the vehicle to move with unmanned operation. The movement of a vehicle in a state of unmanned operation will lead to an accident, resulting in serious injury or death.

There will be unexpected acceleration in the adaptive cruise control system under the following circumstances, please maintain a high degree of vigilance and take the initiative to brake:

- When the adaptive cruise control system follows another moving vehicle and the target changes from a moving vehicle to a stationary vehicle, ACC ignores the stationary vehicle and continues to cruise at the speed set by the driver.
- At a low speed at the intersection, follow the vehicle in front of the turn, because the vehicle in front of the turn, follow the target disappears, the adaptive cruise control system will accelerate according to the set speed.

4. Slow down when using adaptive cruise

If the cruise control system is enabled, if you want to slow down slightly, push the speed adjustment and confirm button. With a short push down, the speed of the vehicle will be reduced by 1 km/hour. With each push, the speed of the vehicle will continue to decrease by 5 km/h until the button is released, with a minimum set speed of 30 km/h.

Return to set speed

If the driver has set the adaptive cruise control system at the desired speed, then press the brake pedal or press the CNCL button, the adaptive cruise control system will be released, the set speed will be pre-saved, and the set speed will continue to be displayed on the combined instrument display. To activate the adaptive cruise control system and cruise at the last set speed, you need to press the smart driving button to activate it.

End adaptive cruise control

The following methods can be used to remove adaptive cruise control:

- Press the brake pedal and exit the adaptive cruise control.
- Press the CNCL switch button to exit the adaptive cruise control system.

Adaptive cruise control depends on other systems, such as electronic stability control system VDDM. If any of these systems stops working, the adaptive cruise control will be turned off automatically.

In the case of automatic deactivation of the system, a sound signal will be issued and a text message will be displayed on the combined instrument display screen. The driver must intervene to match the speed and distance of the vehicle ahead.

If the front-looking camera has system fault, in low light, strong light and object occlusion or alternation of light and

shade and other conditions, the adaptive cruise control system may be affected and can not be used.

The reasons for adaptive cruise deactivation may be (including, but not limited to):

- Any door, front engine bay hood or rear door is opened.
- The driver unfastened his seat belt.
- The wheel lost its grip.
- Brake system performance degradation or fault.
- Use parking brakes.
- Forward radar and front-looking cameras are covered with wet snow or heavy rain.

Detection problem

The detectable range of forward radar and front-looking camera is limited. In some cases, forward radar and front-looking cameras may not be able to detect the vehicle or delay the detection of the vehicle.

1. There are vehicles moving slowly along the driver's lane. The system can only detect the corresponding vehicle that is fully in the driver's lane.
2. When the vehicle ahead is a large truck, the time to detect the vehicle may be delayed.
3. Detection problems related to the vehicle ahead may occur when the driver enters or exits the bend on the road.
4. When the whole vehicle is powered on, the forward radar and front-looking camera need to be initialized, and the vehicle in front cannot be accurately detected within 10 seconds.

In these cases, drivers should remain vigilant, take emergency measures if necessary and temporarily shut down the adaptive cruise control system.

Advanced smart driving (if equipped)

The intelligent navigation system can simultaneously perform cruise control and direction assistance control on the vehicle within the speed range of 0 to 130 km/h. The system can control the speed of this vehicle according to the set speed and the headway time, carry out steering wheel auxiliary control according to the lane lines on the left and right sides or following the front vehicle, offset control when passing the truck, and there is an alarm when getting rid of it. G-Pilot lane change can be activated by operating the corresponding side steering light through the light steering wheel module.

The advanced smart driving system mainly provides driving assist for drivers on roads with better conditions such as highways or viaducts.

The sensors used by Advanced Smart driving (G-Pilot) are:

- a. Front side obstacle detection radar
- b. Forward-looking camera
- c. Forward-looking radar
- d. Rear side obstacle detection radar

Caution

The advanced smart driving will start the self-test when the vehicle is powered on, and the system function is not available at this stage.

Make sure the front-looking camera and forward radar are clean. Environmental conditions such as dirty front-looking cameras and forward radar, as well as rain and fading lane markings, may affect the performance of advanced smart driving systems.

Advanced smart driving is a function that requires hands-on operation. The driver must always hold the steering wheel with both hands.

The advanced smart driving function is only suitable for use on expressways and roads with limited access, and drivers need to concentrate on driving. When using advanced smart driving, you should hold the steering wheel and pay attention to the road and surrounding traffic conditions. Do not use this function on city streets, construction areas, or on roads where cyclists or pedestrians may be present. Do not rely on the advanced smart driving system to determine the appropriate driving route. Be ready to take prompt action at any time. Failure to comply with these instructions may result in property damage, serious personal injury or death.

G-Pilot system is a comfort system, not a warning and collision avoidance system in case of emergency. Drivers need to regulate driving according to laws and regulations.

The advanced smart driving function does not work for vehicles or objects across the driveway.

The vehicle posture changes due to the excessive loading of objects in the baggage area, which will degrade or invalidate the target recognition performance of the advanced smart driving system.

Other vehicles are plugged into the front of the vehicle at a low speed, and the advanced smart driving system may not have time to respond, requiring the driver to brake in time.

When suddenly accelerating and approaching the vehicle in front at high speed (which is obviously different from the vehicle in front), the driver needs to brake in time.

Drivers need to adjust the following distance according to the traffic flow in front and the current weather conditions, such as rain and snow, and set up the G-

Pilot system reasonably. Drivers need to be able to actively control the vehicle at all times to ensure driving safety.

It is the driver's responsibility to keep the distance from the vehicle in front.

When driving on a steep downhill road, it may be difficult to keep the correct distance from the vehicle in front of you. In these cases, be very careful and be ready to brake at any time. Do not use the advanced smart driving control system under heavy load.

The G-Pilot system cannot identify pedestrians, tricycles, vehicles loaded with irregularly shaped goods, or special-shaped vehicles.

The G-Pilot system cannot recognize stationary or slow-moving vehicles, nor can it identify vehicles coming head-on.

When G-Pilot is activated when the vehicle is still, the system will identify the stationary obstacle in front of the vehicle as the vehicle and keep it at rest, in order to ensure the safe start of the vehicle and avoid collision with the stationary target caused by unexpected start. Stationary targets include, but are not limited to, speed bumps, trees, people, railings, etc.

When the G-Pilot system is working, if the driver steps on the accelerator pedal sensor, the vehicle will be taken over by the driver in response to the driver's acceleration needs. The speed control function of the G-Pilot system will not work.

When driving in and out of corners, the selection of targets may be delayed or interfered. G-Pilot may brake unexpectedly or brake too late.

In some cases (the front vehicle speed is too low relative to this vehicle speed, the front vehicle cuts into this vehicle lane at close range, etc.), the G-Pilot system does not have enough time to reduce the relative speed. In this case, the driver must react appropriately.

If the vehicle in front brakes suddenly, the G-Pilot system will be unable to respond in time or too slow. In this case, the driver will not receive a takeover request and needs active braking.

On the sharp turning road, such as the serpentine road, due to the limitation of the front-looking camera and forward radar, the G-Pilot system can not detect the front vehicle normally, which may lead to the acceleration of the G-Pilot vehicle, which requires the

driver to respond appropriately according to the actual working conditions.

If the distance between the G-Pilot vehicle and the adjacent lane is too small (or if the vehicle in the adjacent lane is too close to the lane of the G-Pilot vehicle), it is possible that the G-Pilot system reacts to the vehicle and brakes.

When the vehicle in the adjacent lane ahead cuts into the track of the G-Pilot vehicle, the detection may be affected or delayed in some environments, such as the small reflection intensity of the target (pedestrian, two-wheeler, tricycle), electromagnetic interference and so on, so that the G-Pilot system can not identify the target or accurately calculate the distance from the front vehicle. In this case, there will be no response of the G-Pilot system or braking delay, and the driver needs to actively control the vehicle.

The field of vision of front-looking camera, forward radar, front-side obstacle detection radar and rear-side obstacle detection radar can not be blocked by pollutants. In particular, when the snow is completely covered, it will lead to the exit of the G-Pilot system, and the information of the system exit will be transmitted to the driver through the combined instrument display screen.

The installation of front-looking camera, forward radar, front-side obstacle detection radar and rear-side obstacle detection radar may be affected by vibration or collision, which will degrade the performance of the system. At this point, the forward radar needs to be recalibrated.

Drivers must be particularly vigilant under the following circumstances:

- When the vehicle activates the G-Pilot system in the static state and confirms the start, if there are pedestrians, children, animals, bicycles, tricycles or obstacles in front of the vehicle, the G-Pilot system can not detect and identify, there is a serious risk of collision. The driver must first confirm the safety of the area in front of the vehicle, and then activate the G-Pilot system to control the start of the vehicle.
- If the left turn signal is turned on when overtaking on the left side, the G-Pilot system automatically accelerates the vehicle and shortens the distance between the vehicle and the vehicle in front. If the vehicle enters the overtaking lane and there is no vehicle ahead, the G-Pilot system will automatically accelerate to the set cruising speed.
- The G-Pilot system cannot detect items or accessories protruding from the side, back end or roof of the target vehicle. If the vehicle in front is equipped with the above special load or special equipment, be sure to turn off the G-Pilot system when passing such a vehicle.

- Metal objects such as tracks or metal plates for road construction may interfere with the forward radar and make it unable to work properly.
- When towing the trailer, it will reduce the dynamic characteristics of the G-Pilot system.
- For safety reasons, do not use the G-Pilot system when driving along ramps and bends, or on slippery roads (such as snow, ice, wet, or flooded roads) when visibility is poor.
- The system requires that after the driver takes over the vehicle, if the vehicle continues to move, the driver must step on the brake pedal to brake the vehicle.
- If the driver is prompted to take over the vehicle in the combined instrument display, the driver must immediately control the distance between this vehicle and the vehicle in front.
- The driver must always be ready to control the vehicle by acceleration or braking.
- The forward radar is installed on the inside of the front bumper. If the forward radar is covered with dirt making G-Pilot system cannot work, there will be a text prompt on the display screen of the combined instrument. "Please clean it in time or go to Geely Auto service station for inspection and maintenance."
- The front and surrounding areas of the forward radar must not be obscured by other objects (such as license plate frames), otherwise the G-Pilot system may be affected.
- Structurally modified vehicles, such as reducing the height of the chassis or changing the front license plate of the vehicle, may affect the G-Pilot system.
- If the front camera has system fault, low light, strong light and object occlusion or alternation of light and shade, the G-Pilot system may be affected so that it can not be used.

Under the following road conditions, the performance of G-Pilot 's directional assist function will degrade or fail to work properly, and drivers should be vigilant:

- The G-Pilot system is not suitable for roads where the radius of the bend is too small.
- The G-Pilot system is not suitable for roads where lane lines are not visible.
- G-Pilot system is not suitable for fork roads.
- The G-Pilot system is not suitable for roads with vehicle marks (such as tire tracks).
- The G-Pilot system is not suitable for roads where the number of lanes increases or decreases.
- G-Pilot system is not suitable for roads with large deviation between the original lane and the new lane.
- The G-Pilot system may identify road edges (walls, guardrails, kerbs, meadows, green belts, asphalt joint connections) as lane lines to work.
- G-Pilot system is not suitable for potholed, protruding and undulating roads.
- The G-Pilot system does not recognize road signs (cones), so it is not suitable for construction roads.

- The G-Pilot system is not suitable for ultra-wide and ultra-narrow roads.
- The G-Pilot system is not suitable for roads where lanes bend.
- The G-Pilot system is not suitable for bad weather with reduced visibility.

When the Pilot system follows the front vehicle across the intersection, this vehicle will follow the front vehicle to move laterally. At this time, there is a risk of side collision with the adjacent lane, which requires driver supervision and take-over function. Driving on the expressway or the entrance of the main road, due to the change of the road, the G-Pilot system can not achieve lane change and functional degradation only adaptive cruise control. G-Pilot system can not work in complex road conditions, such as: seriously congested road conditions, complex traffic changes, crossing, intersections, ramps, lane loss and other work, which requires driver supervision and take-over functions. The G-Pilot system only provides a comfortable experience under suitable road conditions, and the driver needs to take full responsibility for safe driving.

The front-looking camera is installed behind the front windshield of the vehicle. It should be noted that the field of view of the front-looking camera cannot be obscured by contaminants or interfered with by strong light. Otherwise, the function will fail, and the combined instrument display will have a text prompt to prompt the driver to wipe the windshield in the front camera area, or to avoid dark environment and bright light. The blindness of the front-looking camera is a normal protection and reminder of the camera in a specific scene, which can avoid dark environment and direct light when the field of view of the front-looking camera is not obscured.

Function selection

The advanced smart driving function can be selected through the function menu switch button on the left side of the steering wheel in the combined instrument display screen. After the selection, the advanced smart driving enters the standby state, and the advanced smart driving (G-Pilot) status indicator lights up and is white.

Activate and set the speed

1. When the vehicle is at rest, activate and set the speed according to the following steps:
 - Choose to turn on the advanced smart driving system, and the advanced smart driving (G-Pilot) status indicator on the combined instrument display is lit in white.

- Press the brake pedal or activate the AUTOHOLD function.
 - Press the smart driving button or the speed adjustment and confirmation button to activate the G-Pilot system; when the cruising speed is set at 30km/h, the advanced smart driving (G-Pilot) status indicator on the combined instrument display is lit green.
 - Lift the brake pedal and the G-Pilot system can continue to keep the vehicle at rest.
 - The driver is required to press the smart driving button again or press the accelerator pedal sensor to enable the G-Pilot system to control the vehicle to start.
 - The G-Pilot system controls the vehicle according to the cruising speed setting.
2. When the vehicle is in motion, activate and set the speed according to the following steps:
- Choose to turn on the advanced smart driving system, and the advanced smart driving (G-Pilot) status indicator on the combined instrument display is lit in white.
 - Press the smart driving button or the speed adjustment and confirmation button to activate the G-Pilot system, and the advanced smart driving (G-Pilot) status indicator on the instrument combination display is lit green. When this vehicle speed is less than 30 km/h, the cruising speed is 30 km/h; when this vehicle speed is more than 30 km/h, the cruising speed is the current speed of this vehicle.
- Caution**
- The maximum cruising speed is 130 km/h. Drivers are responsible for cruising at a safe speed according to road conditions and speed limits.
- If you have clicked on the multimedia display in order: Vehicle Settings → Driving Assist and Safety → Smart Driving Assist → Cruise Auto Speed Limit Assist, the Cruise Auto Speed Limit Assist function is turned on. The set speed will automatically merge the identified speed limit plate as the set speed, but will not merge the speed limit above the set speed.
- Caution**
- When the cruise automatic speed limit auxiliary function is turned on, the speed limit alarm function will be turned on forcefully.
- The G-Pilot system controls the vehicle according to the cruising speed setting.
3. Push the speed adjustment and confirmation button to set the desired cruising speed.

Caution

When the cruise automatic speed limit is turned on, there may be situations in which the cruising speed does not change with the speed limit, such as the speed limit is lower than the threshold or the difference between the speed limit and the current target speed is greater than the threshold; at the same time, affected by the light and the position of the road sign, there may be misidentification or missed identification of the speed limit. The driver can not rely on the fusion system to determine the appropriate cruising speed, but has the responsibility to choose the appropriate cruising speed according to the actual situation of the road.

During the speed limit fusion, the system will accelerate or decelerate according to the new setting value, and the driver should always keep an observation of the surrounding environment, and can interrupt the speed limit fusion at any time by stepping on the accelerator pedal sensor or by pressing the speed adjustment and confirmation button.

Set headway time

Caution

Drivers have the responsibility to choose a safe headway time.

The driver can adjust the G-Pilot vehicle following headway time according to the current road environment. The headway time refers to the time it takes for this vehicle to drive at the current speed to the current position of the vehicle in front, that is, the headway distance divided by the speed of this vehicle.

The driver can reduce or increase the headway time between this vehicle and the vehicle in front by pressing the headway time control button. The headway time is divided into near, medium and far gear. Every time the G-Pilot switch is started, the default headway time of the system is far.

Caution

In any case, the driver must maintain a sufficient braking distance from the vehicle in front, and pay attention to the corresponding requirements of the local highway traffic regulations for the minimum distance or the shortest time, and it is the driver's responsibility to abide by the law.

Offset control (if equipped)

For a vehicle with an offset control function, in the case of activating an advanced smart driving system, when the vehicle is to overtake the truck, trailer or other large vehicle in front (or is

overtaken by a large vehicle), the system controls the vehicle to shift to the opposite direction of the truck position in this lane, that is, to actively stay away from the large vehicle, and to control the vehicle back to the middle of the lane again after surpassing (or being overtaken) for a certain distance, no driver action is required for this process.

Caution

This function can only be turned on automatically when the speed is more than 50 km/h, and the driver has the responsibility to keep the steering wheel on hand and drive attentively.

Out of hand alarm

When the advanced smart driving system is activated, you need to hold the steering wheel. If hands on the steering wheel are not detected for a long time, a reminder message will appear on the combined instrument display.

The advanced smart driving system detects the driver's hands by identifying the slight resistance of the steering wheel or the resistance caused by the driver turning the steering wheel slightly.

Caution

When both hands are detected, this message disappears and the advanced smart driving continues to work normally.

If the advanced smart driving system still does not detect your hands on the steering wheel, the request will be upgraded, resulting in a beep and the reminder message will still be displayed.

If you still ignore the warning of the advanced smart driving system and do not put your hands on the steering wheel, the advanced smart driving function will automatically exit at the end of the beep alarm.

Caution

During the buzzing alarm, when hands are detected, this message disappears and the advanced smart driving continues to work normally.

Caution

Advanced smart driving will beep when it exits.

End advanced smart driving

The following methods can be used to quit advanced smart driving:

- Press the brake pedal and quit advanced smart driving.
- Press the CNCL switch button to exit advanced smart driving.

Advanced smart driving depends on other systems, such as the electronic stability control system VDDM. If any of these systems stops working, advanced smart driving will automatically shut down.

In the case of automatic deactivation of the system, a sound signal will be issued and a text message will be displayed on the combined instrument display screen. The driver must intervene to match the speed and distance of the vehicle ahead.

The reasons for the deactivation of advanced smart driving may be (including, but not limited to):

- Any door, front engine bay hood or rear door is opened.
- The driver unfastened his seat belt.
- The wheel lost its grip.
- The performance of the braking system degrades or fails.
- Use parking brakes.
- Forward radar and front-looking cameras are covered with wet snow or heavy rain.

G-Pilot lane change assist (if equipped)

When a vehicle equipped with G-Pilot lane-changing assist enables advanced smart driving, you can use the turn signal to control the vehicle to automatically change lane to the adjacent lane without having to turn the steering wheel (so as not to cancel the automatic assist steering).

Caution

It is the driver's responsibility to determine whether the lane change is safe and appropriate. Therefore, before starting to change lanes, be sure to check the blind areas, lane lines and surrounding roads to make sure that it is safe and appropriate to drive into the target lane.

Do not rely on the G-Pilot lane change assist system to determine the appropriate route. Pay attention to the road and traffic conditions ahead, pay attention to the surrounding area, check the combination instrument for warnings, and concentrate on driving. Be ready to take prompt action at any time.

The performance of G-Pilot lane-changing assist depends on the recognition and computing power of all front radars and front-looking cameras.

Do not use G-Pilot lane change assist on continuous bends, icy or slippery roads with sharp turns, or when weather conditions (such as heavy rain, snow, fog, etc.) which may hinder the view of the front-looking camera or forward radar.

Failure to comply with all warnings and instructions can lead to serious property damage and casualties.

Caution

The G-Pilot lane-changing assist function can only be activated when the advanced smart driving system is activated and on the viaduct or highway, and there is a corresponding color change of the variable lane.

Using G-Pilot Lane Change Assist

Click on the multimedia display in order: Vehicle Settings → Driver Assist & Safety → Intelligent Driving Assist → G-Pilot Lane Change Assist, and turn on the G-Pilot Lane Change Assist function in this interface.

If you activate the G-Pilot lane-changing assist, you can use the G-Pilot lane-changing assist. Use the G-Pilot lane change assist to change lanes:

a. Through visual inspection, ensure safe and proper driving into the target lane. When the following conditions are met, the G-Pilot lane-changing assist will drive into the adjacent lane of the vehicle in the direction indicated by the turn signal:

- The driver is holding the steering wheel.
- The front-looking camera or forward radar detects that there are no vehicles or obstacles in the middle of the target lane.

- The lane sign indicates that lane change is allowed.
- The view of the front-looking camera is not blocked.
- No other vehicles were detected in the blind area.
- Drive at a speed of at least 60 km/h.

b. Turn on the corresponding side turn signal completely or for a short time.

c. When entering the target lane, the turn signal will be turned off automatically or manually when the sign during the lane change disappears.

During the lane change, the overtaking assist is activated and the vehicle accelerates close to the vehicle ahead.

Caution

G-Pilot lane change assists vehicles to enter one lane at a time. To change lanes again, you need to turn on the turn signal again after the first lane change.

If the driver turns on the turn signal for a short time to activate the automatic lane change function, the turn signal flashes continuously during the lane change process. After the lane change is completed or fails, the turn signal will go out automatically. If the driver fully turns on the turn signal to activate the automatic lane change function, after the lane change is completed or fails, the driver needs to manually reset the light steering wheel module before the steering signal will be turned off.

When using G-Pilot lane change assist, be sure to pay attention to the driving route ahead and the surrounding area, and pay attention to the lane change process. Be ready to take over the control of the vehicle. When stepping into the adjacent lane, the lane line on the instrument cluster is displayed in gray. After entering the new lane, the lane line is displayed as a solid blue line again.

When G-Pilot lane-changing assist do not work at optimal performance, or when they do not work due to insufficient conditions, the combined instrument displays a series of warnings. Therefore, when using G-Pilot lane-changing assist, be sure to pay attention to the combination of instruments and be prepared to control the vehicle manually.

System limitation

The detectable range of the front-looking camera, forward radar, front side obstacle detection radar and rear side obstacle detection radar is limited, and in some cases, the vehicle may not be detected or the time of vehicle detection may be delayed.

Probe problems may occur in the following situations:

- a. There are vehicles moving slowly along the driver's lane.
The system can only detect the corresponding vehicle that is fully in the driver's lane.
- b. When the vehicle ahead is a large truck, the time to detect the vehicle may be delayed.
- c. Detection problems related to the vehicle ahead may occur when the driver enters or exits the bend on the road.

In these cases, drivers should remain vigilant and, if necessary, take emergency measures and temporarily shut down the G-Pilot system.

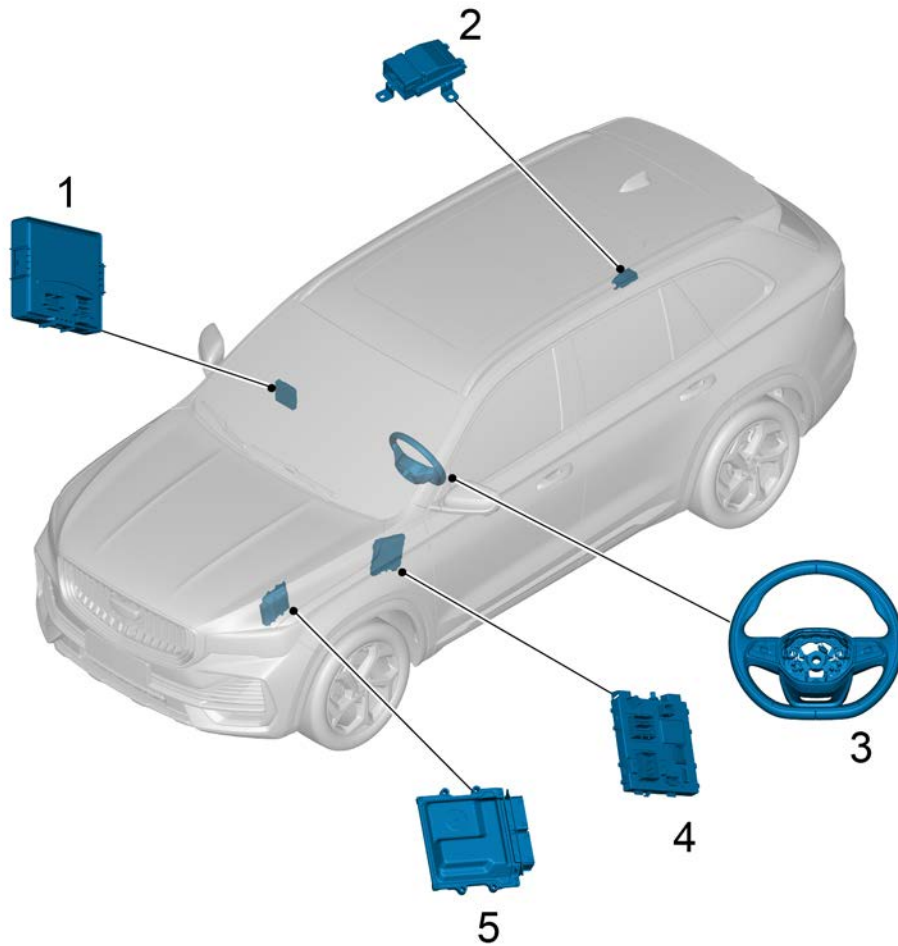
The detectability of the front-looking camera is limited. In some cases, the front-looking camera may not be able to accurately judge the lane line and is vulnerable to interference from the environment.

Laneline detection problems may occur in the following situations:

- a. The laneline is not laid in accordance with national standards and cannot be identified.
- b. The lane line is clear and the contrast is low, so it can not be identified.
- c. The surface of the laneline is covered with dust, water, snow and so on.
- d. The wheel marks caused by the vehicle passing before the rain and snow, and the wheel marks caused by the front brake, may be recognized as lane lines because of the high contrast.
- e. Road boundaries, kerbs, and so on, may be recognized as lane lines.
- f. A linear projection of a continuous lane on a road, such as the shadow of a railing, may be recognized as a lane line.

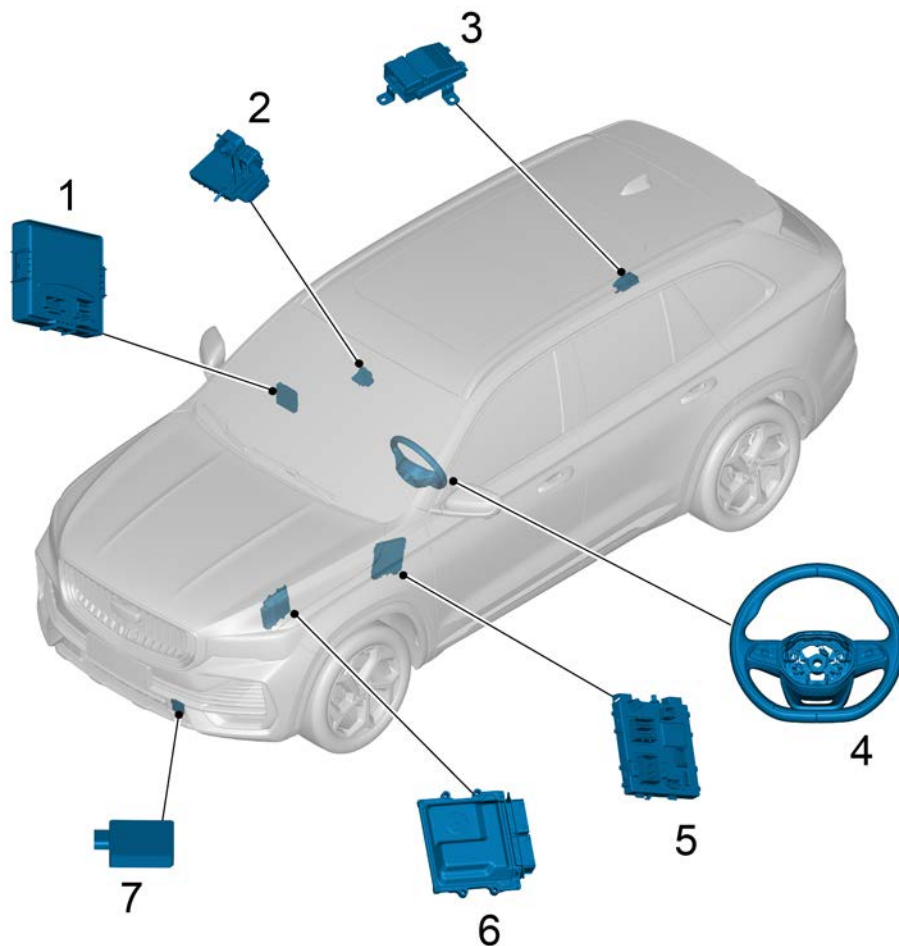
11.16.3 Component position

11.16.3.1 Component position (constant speed cruise)



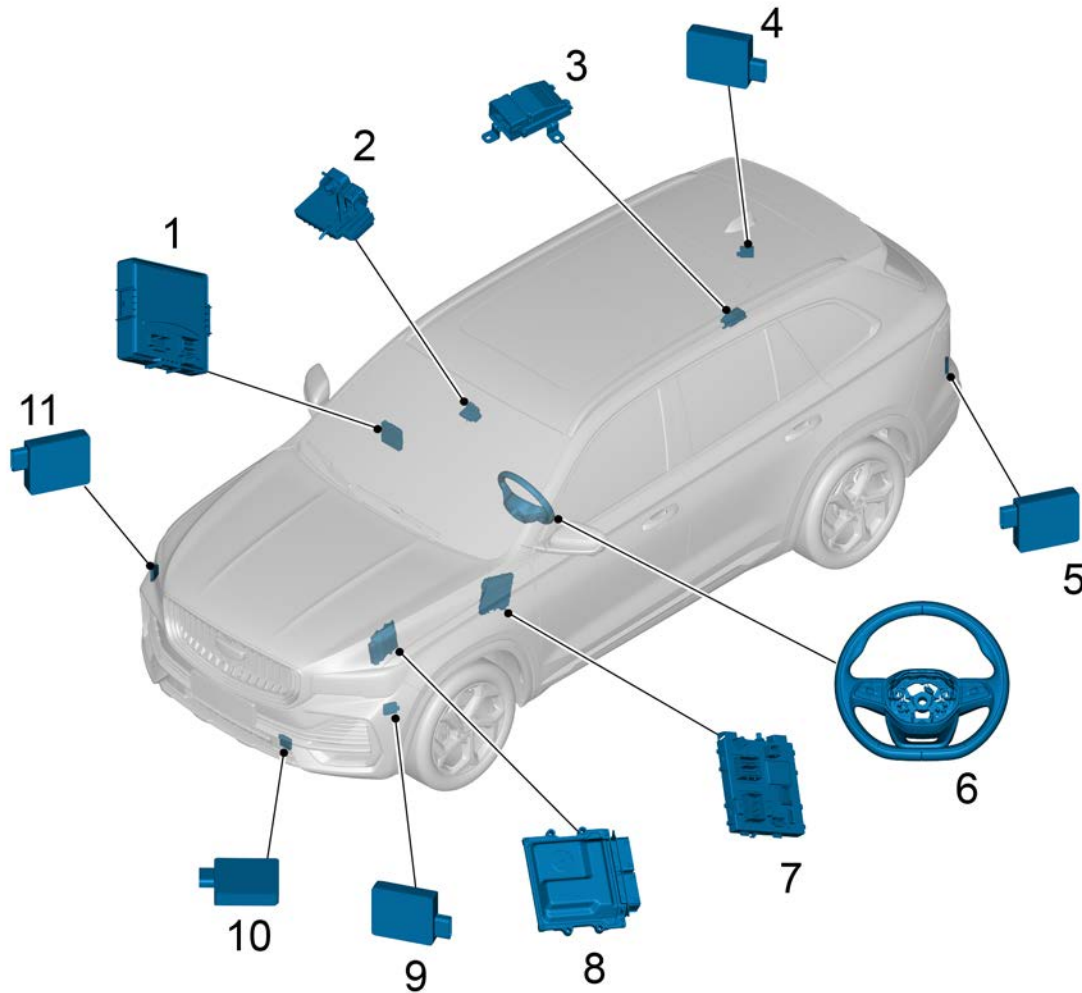
- | | |
|--------------------------------|--------------------------------|
| 1. Vehicle gateway module | 4. Central electronic module |
| 2. Active safety domain master | 5. Engine control module (ECM) |
| 3. Steering wheel | |

11.16.3.2 Component position (Adaptive Cruise)



- | | |
|--------------------------------|--------------------------------|
| 1. Vehicle gateway module | 5. Central electronic module |
| 2. Forward-looking camera | 6. Engine control module (ECM) |
| 3. Active safety domain master | 7. Forward-looking radar |
| 4. Steering wheel | |

11.16.3.3 Component position (Advanced Smart driving)

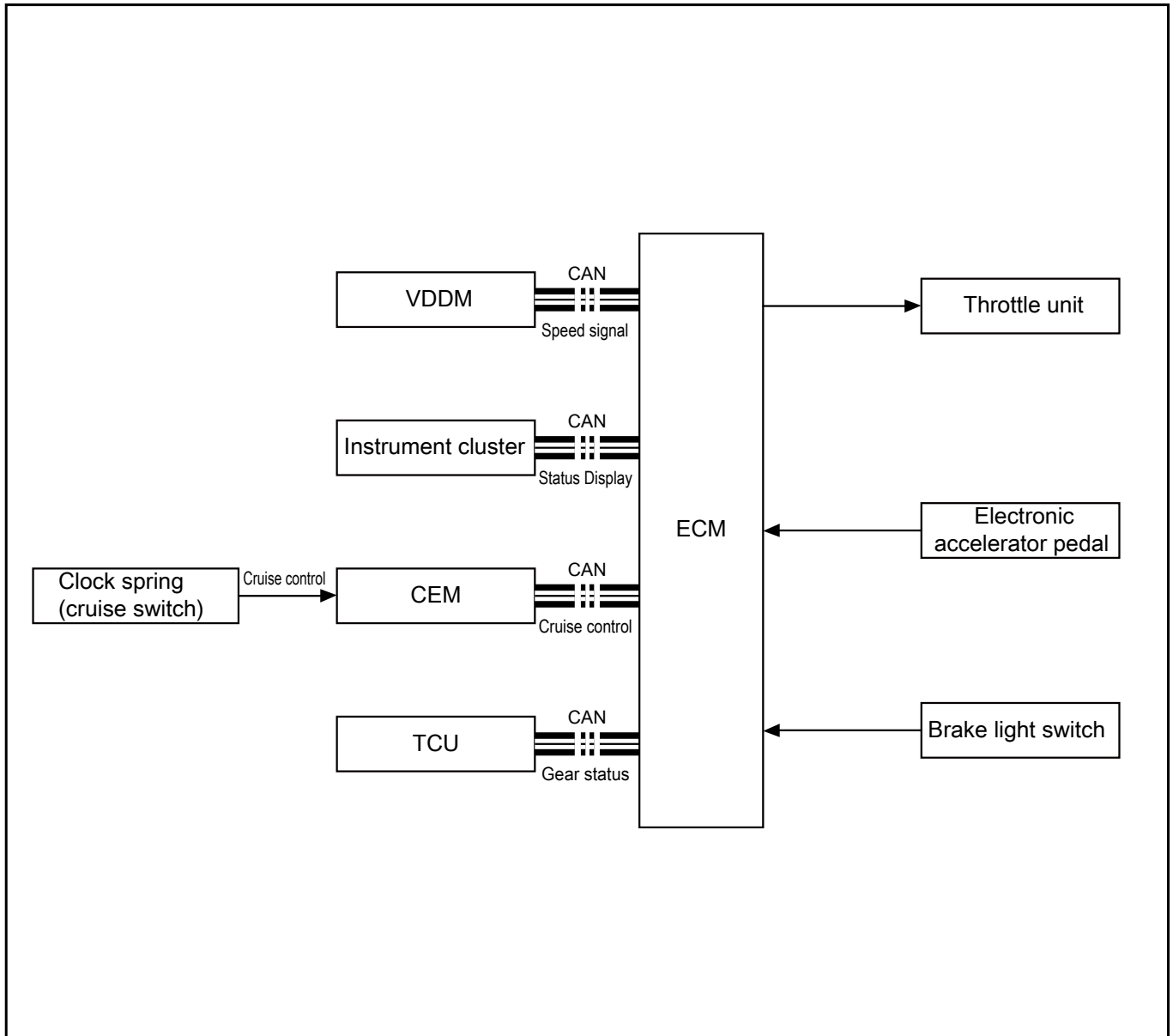


- | | | | |
|----|-----------------------------|-----|-----------------------------|
| 1. | Vehicle gateway module | 7. | Central electronic module |
| 2. | Forward-looking camera | 8. | Engine control module (ECM) |
| 3. | Active safety domain master | 9. | Side radar module |
| 4. | Side radar module | 10. | Forward-looking radar |
| 5. | Side radar module | 11. | Side radar module |
| 6. | Steering wheel | | |

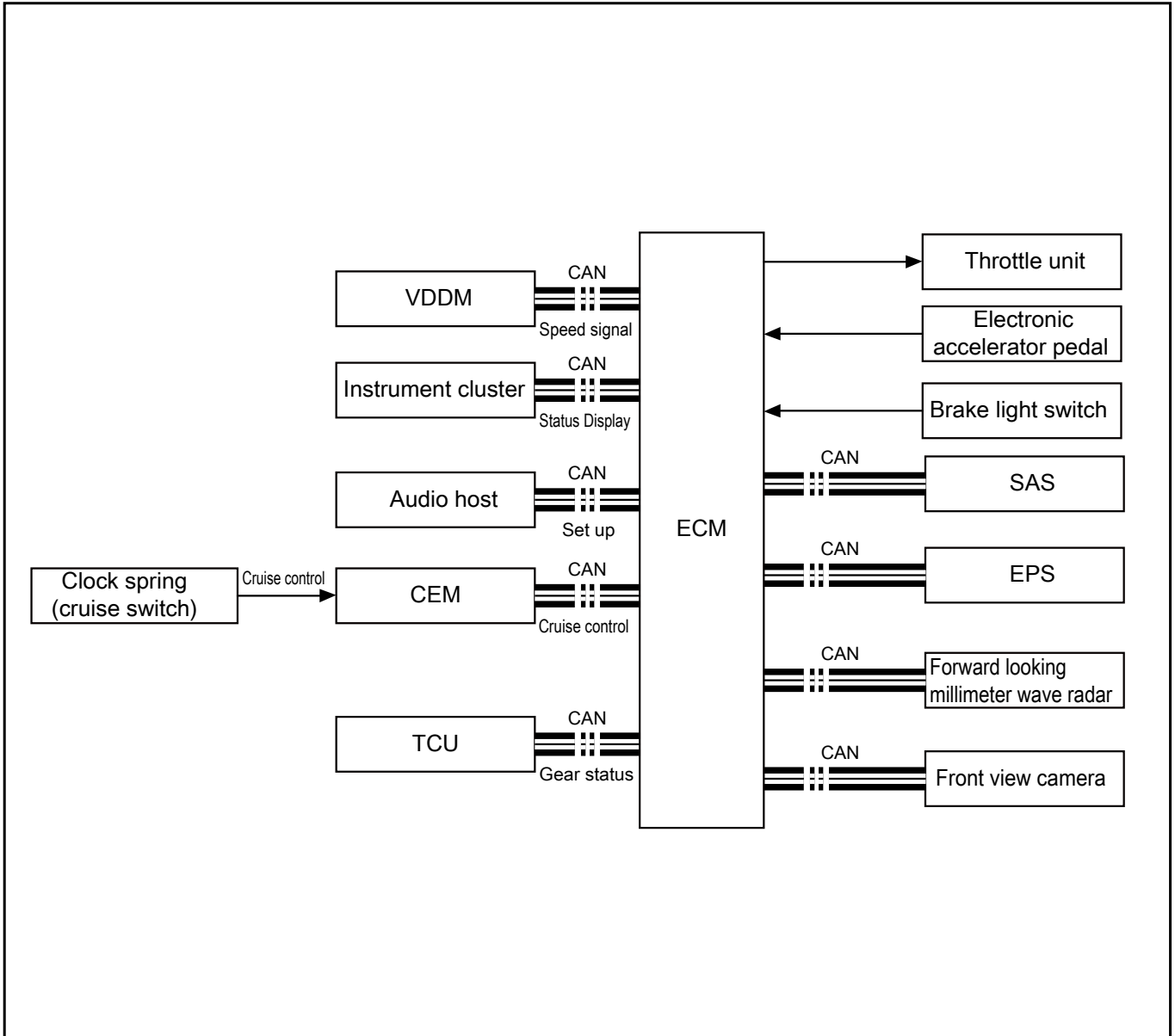
11.16.4 Electrical schematic diagram

11.16.4.1 Electrical schematic diagram

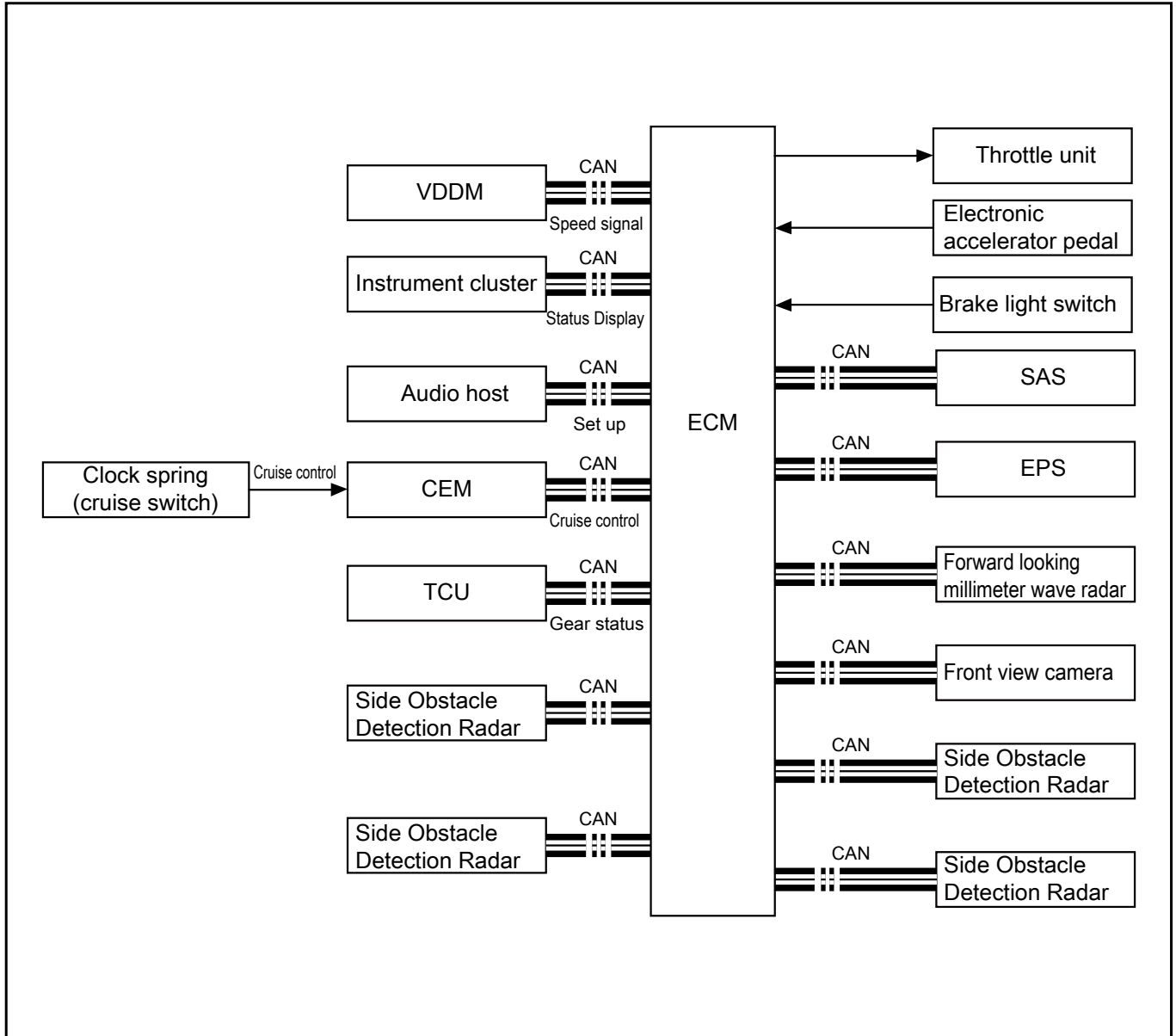
Constant speed cruise (CC)



Self-adaptive cruise control (ACC)



Advanced Smart driving (G-Pilot)



11.16.5 Diagnostic information and procedures

11.16.5.1 Diagnosis Description

Before diagnosing the faults of the cruise control system, see [Description and operation](#). Understand and familiarize yourself with the working principle of the cruise control system, and then start system diagnosis. This helps to confirm the correct fault diagnosis steps when a fault occurs. More importantly, it can also help to confirm whether the situation described by the distributor is normal operation. Any fault diagnosis of the cruise control system should start with the 11.17.4.2 Visual inspection and it will guide maintenance personnel to take the next logical step to conduct fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.16.5.2 Visual Check

- Confirm customer's fault before repair.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage or there is a situation that may cause a fault.
 - Check that the front millimeter wave radar is installed properly.
 - Whether there are collision marks on the front bumper caused the front millimeter wave radar displacement.
 - Whether the front view camera area of the front windshield is clean and tidy.
 - Whether the installation of other electrical equipment caused the abnormal operation of the system components.

If so, repair the faulty part or replace the part.

- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

11.16.6 Removing and installing

11.16.6.1 Replacement of cruise control main switch

- 1 Remove the steering wheel assembly, see the [Replacement of the steering wheel assembly \(Type 1\)](#), the [Replacement of the steering wheel assembly \(Type 2\)](#).

11.17 Power operated tailgate

11.17.1 Specification

11.17.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Electric tailgate module fixing nut	M5	3~4	3.7~5.1

11.17.2 Instructions and operations

11.17.2.1 Instructions and Operations

Brief introduction of electric tailgate

The electric tailgate assembly includes: electric support rod, tailgate lock + self-priming motor, electric tailgate module, control switch and other accessories.

The working principle of the electric brace is to realize the optimal design of the electric brace through mechanical calculation, and the optimal state can be achieved by adjusting the torque of the motor, gearbox speed ratio, screw lead, spring force and other variables. Through the electric tailgate controller electric brace to achieve smooth movement, double-rod synchronize. Can take the initiative to learn, tailgate soft stop, intelligent anti-clamping. Open the door with low noise, with temperature protection, voltage protection, and can deal with malicious operation. It has its own sound reminder function.

Learning method of electric tailgate

Manual learning

1. Manually close the tailgate completely;
2. The operation switch automatically opens the tailgate to the mechanical stop, and the electric tailgate controller issues a successful learning prompt (3s sound feedback).
3. The operation switch automatically closes the tailgate, and the learning is over.

Protection strategy of electric tailgate

Anti-play protection of brace motor

1. If the action time of the brace motor is too long, it will enter the software thermal protection state.
2. When the energy of the motor exceeds the specified value, the automatic opening/closing function of the tailgate is prohibited.
3. After the temperature of the motor returns to normal, it will enter the state of non-thermal protection, and the function of automatically opening and closing the tailgate will be restored.

Anti-play protection of suction lock motor

1. If the operation time of the suction lock motor is too long, it will enter the software thermal protection state.
2. When the energy of the motor exceeds the specified value, the automatic suction function of the tailgate is prohibited.
3. After the temperature of the motor returns to normal, it will enter the state of non-thermal protection and the automatic suction function will be restored.

Caution

The function was triggered for 10 times in 60S, and there was no function in 60S after trigger.

Tailgate soft stop protection

In order to protect the brace motor from automatically opening to the mechanical stop and the abnormal sound of the tailgate, 95% of the opening position of the tailgate is set as the soft stop position. If the tailgate is not learning, the soft stop function is cancelled.

Lost location protection

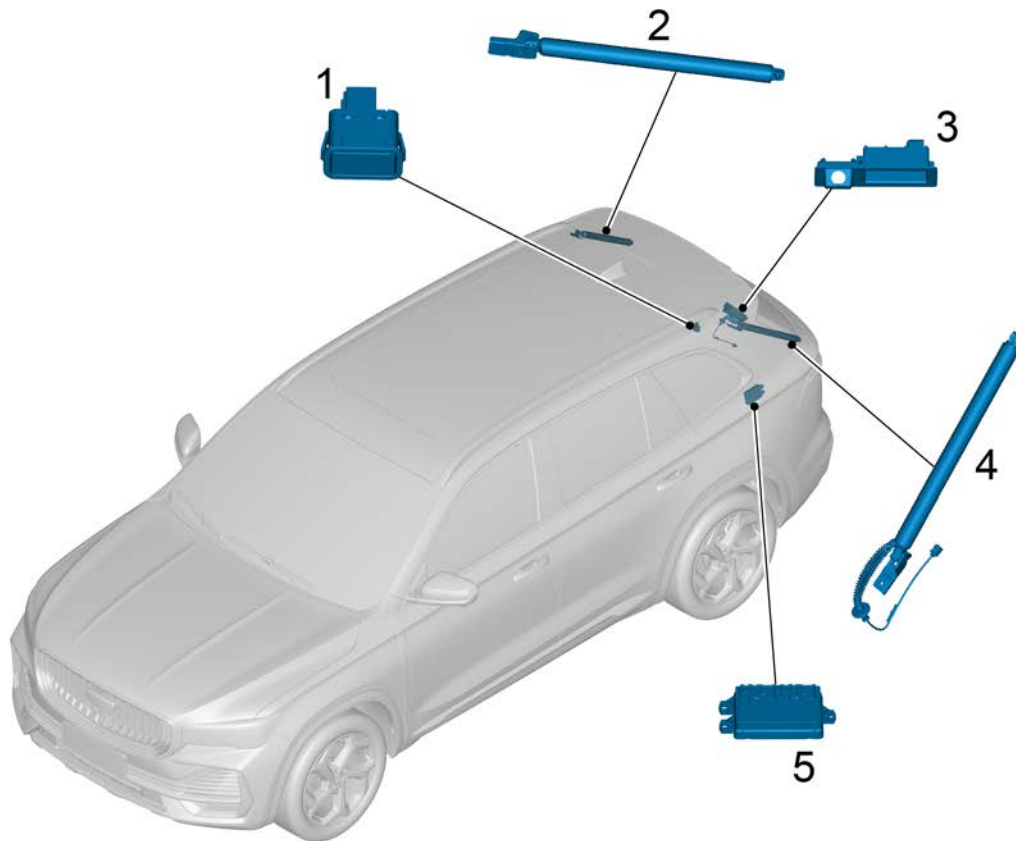
When the electric tailgate is opened, the power is cut off or dormant long, the tailgate will lose its current position. After losing the position, the tailgate can still be closed automatically and can not be opened automatically. The automatic shutdown is performed according to the calibrated minimum speed, which is longer than the normal closing time.

Caution

After the position of the tailgate is lost, the tailgate can be automatically/manually closed once to find the position of the tailgate.

11.17.3 Component position

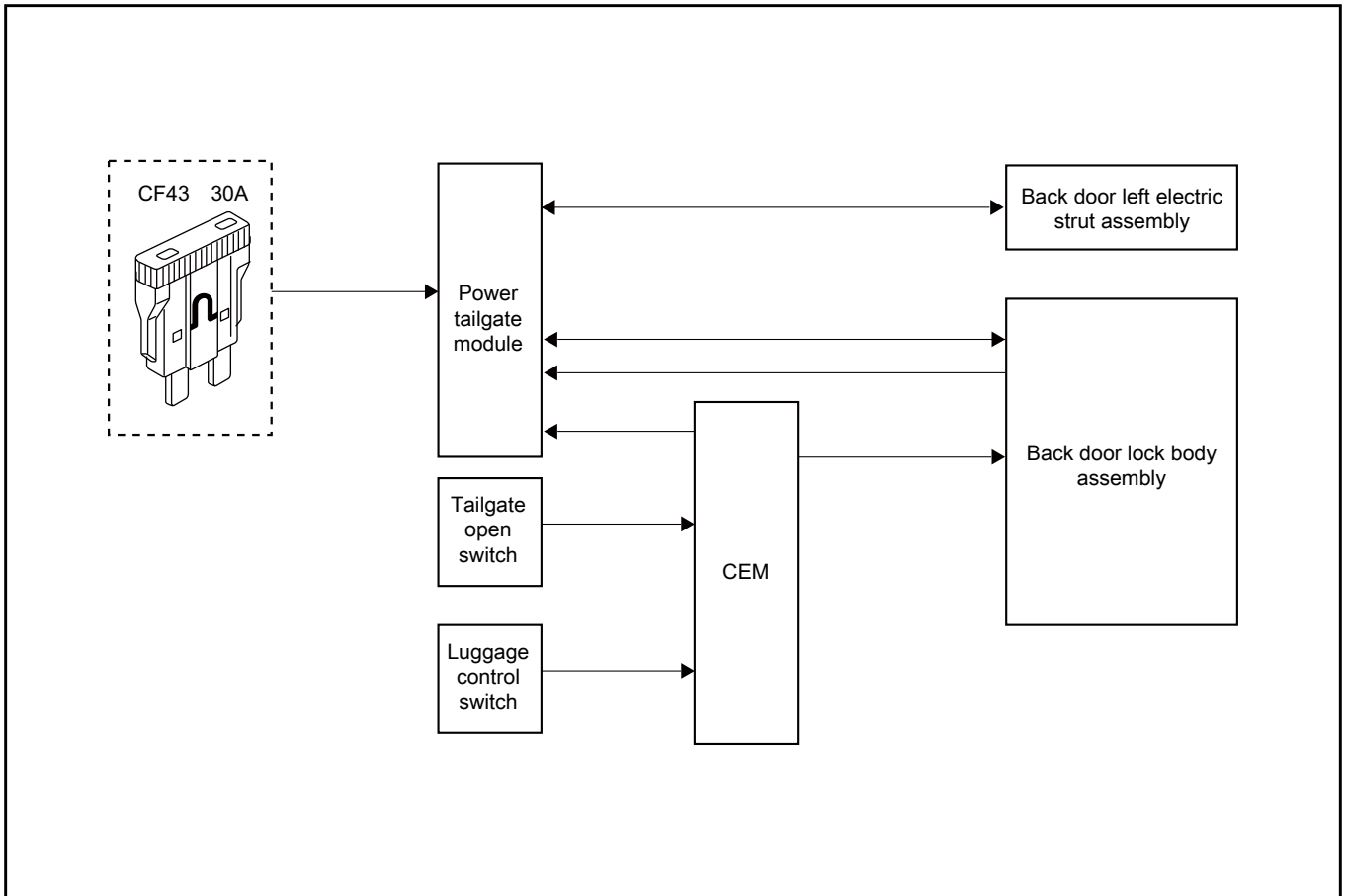
11.17.3.1 Component position



- | | |
|--|---|
| 1. Tailgate closing and vehicle locking switch | 4. Power operated tailgate left motor |
| 2. Power operated tailgate right support rod | 5. Power operated tailgate module (POT) |
| 3. Tailgate opening switch | |

11.17.4 Electrical schematic diagram

11.17.4.1 Electrical schematic diagram



11.17.5 Diagnostic information and procedures

11.17.5.1 Diagnosis Description

Before diagnosing the fault of the electric tailgate system, see [Description and operation](#). Understand and be familiar with working principles of data communication system before starting system diagnosis. This helps to determine the correct fault diagnosis steps when a fault occurs. More importantly, it also helps to determine whether the situation described by the customer is normal operation. Any fault diagnosis of the Power operated tailgate system should start with the "visual inspection". The "visual inspection" will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.17.5.2 Visual Check

- Check the after-sales installation that may affect the operation of the electric tailgate system to ensure that these devices do not affect the operation of the electric tailgate system.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

11.17.6 Removing and installing

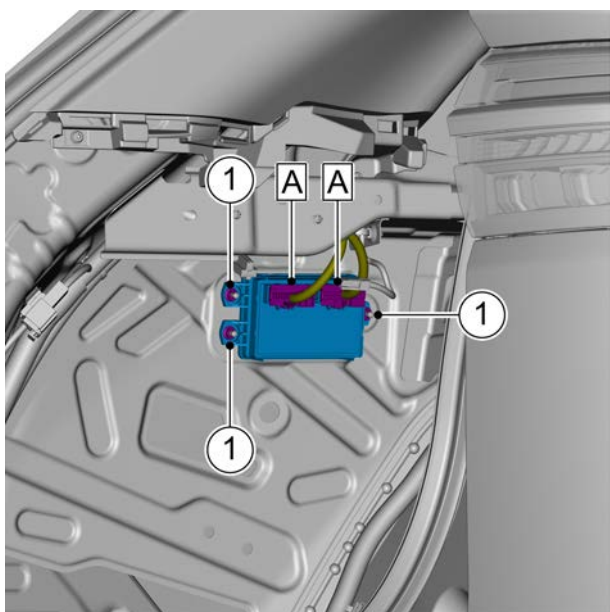
11.17.6.1 Replacement of electric tailgate module

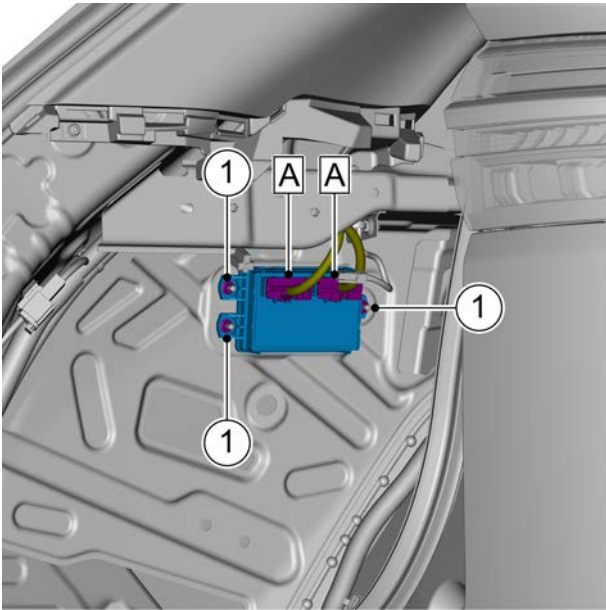
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly](#).
- 3 Remove the left backrest assembly of the rear seat, see [Replacement of the left backrest assembly of the rear seat](#).
- 4 Remove the rear compartment threshold trim plate assembly, see the [Replacement of the rear compartment threshold trim plate assembly](#).
- 5 Remove the upper trim cover of the left rear compartment, see [Replacement of the upper trim cover of the left rear compartment](#).
- 6 Remove the rear compartment lamp, see the [Replacement of the rear compartment lamp](#).
- 7 Remove 12V socket (luggage compartment), see [Replacement of 12V socket \(luggage compartment\)](#).
- 8 Remove the left rear compartment side guard assembly, see [Replacement of the left trunk side guard assembly](#).
- 9 Disconnect the 2 harness connectors A of the electric tailgate module.
- 10 Remove the 3 retaining nuts 1 of electric tailgate module and remove the electric tailgate module.





Installation procedure

- 1 Install 3 fixing nuts 1 of electric tailgate module.
Torque: 3.5 N·m (metric) 2.6 lb-ft (imperial system)
- 2 Connect 2 harness connectors A to the electric tailgate module.
- 3 Install the left rear compartment side guard assembly.
- 4 Install 12V socket (luggage compartment).
- 5 Install the luggage compartment lamp.
- 6 Install the upper trim plate of the left rear compartment.
- 7 Install rear compartment door threshold trim plate assembly.
- 8 Install the left rear seat backrest assembly .
- 9 Install the rear seat cushion assembly.
- 10 Connect the negative battery cable.
- 11 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.

11.17.6.2 Replacement of the left electric brace assembly of the tailgate

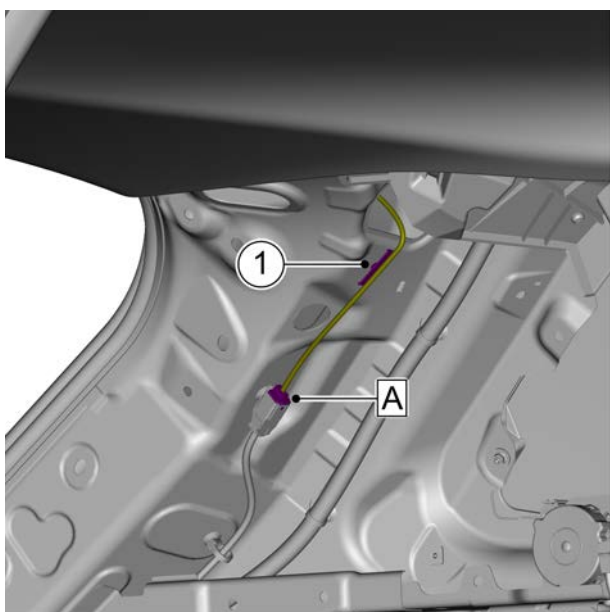
Removal procedure

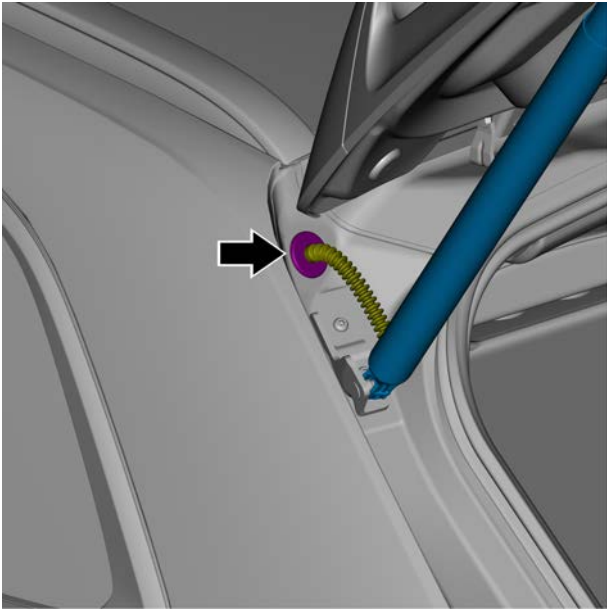
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

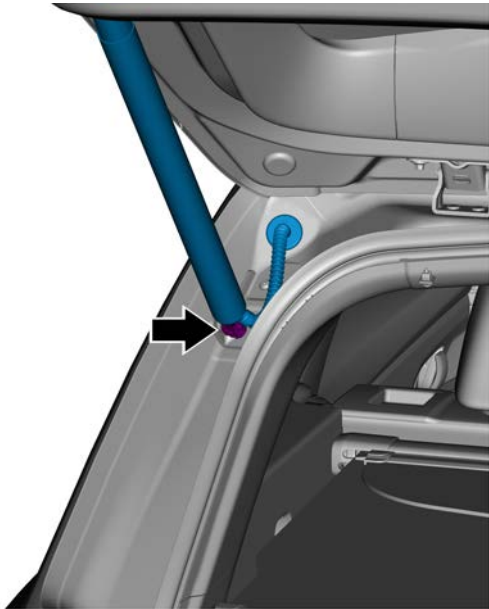
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly](#).

- 3 Remove the left backrest assembly of the rear seat, see [Replacement of the left backrest assembly of the rear seat](#).
- 4 Remove the rear compartment threshold trim plate assembly, see the [Replacement of the rear compartment threshold trim plate assembly](#).
- 5 Remove the upper trim cover of the left rear compartment, see [Replacement of the upper trim cover of the left rear compartment](#).
- 6 Remove the rear compartment lamp, see the [Replacement of the rear compartment lamp](#).
- 7 Remove 12V socket (luggage compartment), see [Replacement of 12V socket \(luggage compartment\)](#).
- 8 Remove the left rear compartment side guard assembly, see [Replacement of the left trunk side guard assembly](#).
- 9 Remove the left C-pillar upper trim panel assembly, refer to [replacement of the left C-pillar upper trim panel assembly](#).
- 10 Remove the left D-pillar trim plate assembly, see [Replacement of the left D-pillar trim plate assembly](#).
- 11 Remove electric tailgate motor harness connector A and harness fixing clip 1.



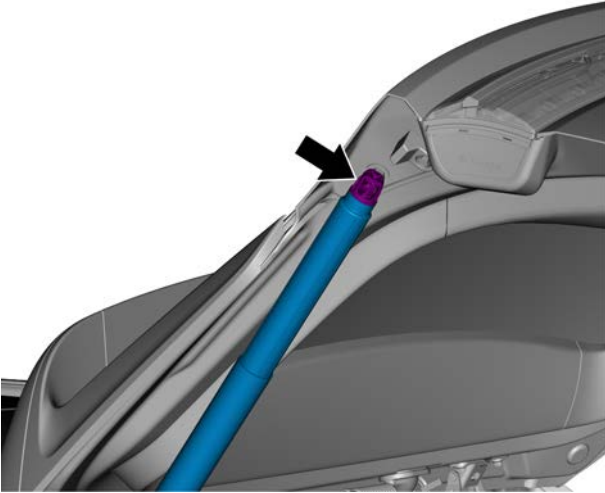


- 12 Remove the tailgate left brace wire harness rubber sleeve.



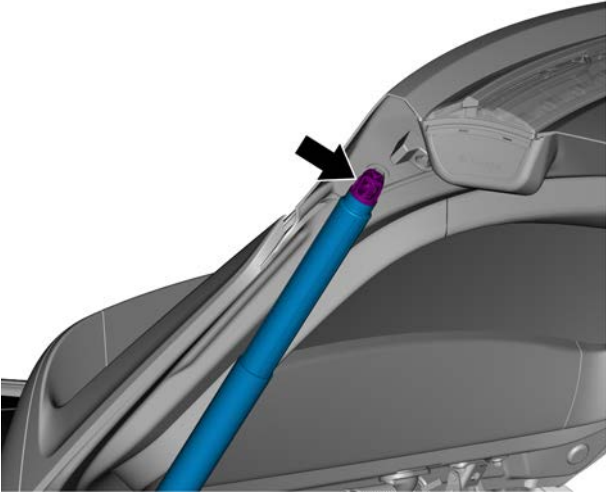
- 13 Use a flat screwdriver to pry open the lower end connector of the tailgate left electric brace assembly.

- 14 Use a flat screwdriver to pry open the upper end connector of the left electric brace assembly of the tailgate and remove the left electric brace assembly of the tailgate.

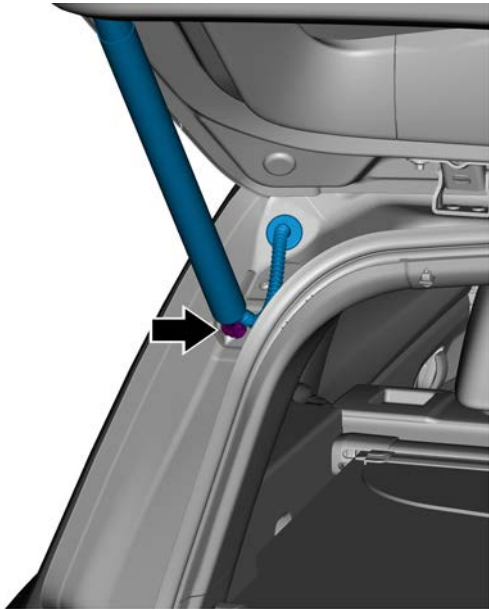


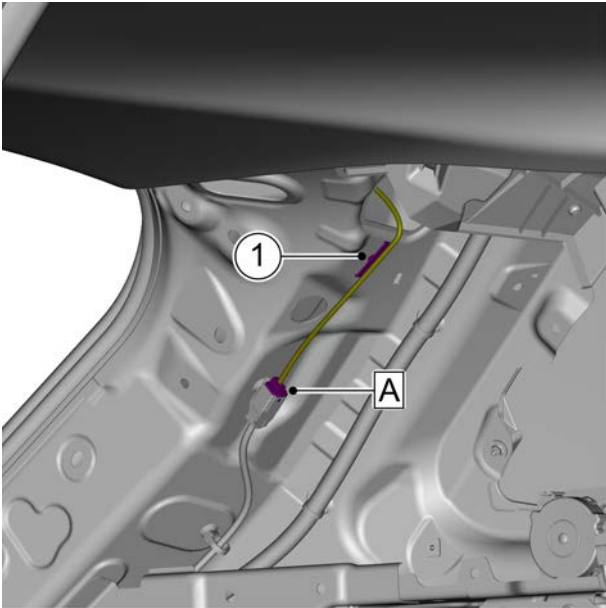
Installation procedure

- 1 Install the upper end connector of the left electric brace assembly of the tailgate.

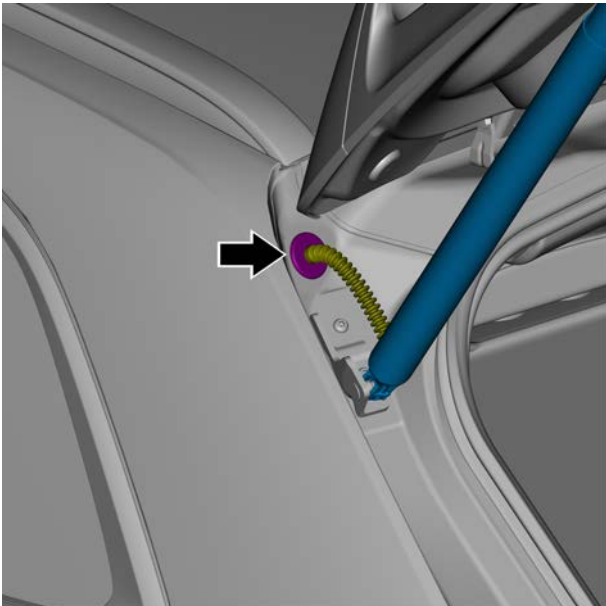


- 2 Install the lower end connector of the left electric brace assembly of the tailgate.





- 3 Install electric tailgate motor harness connector A and harness fixing clip 1.



- 4 Install the left brace of the tailgate to form a wire harness rubber sleeve.

- 5 Install the left C-pillar upper trim panel assembly.
- 6 Install the left D-pillar upper trim panel assembly.
- 7 Install the left rear compartment side guard assembly.
- 8 Install 12V socket (luggage compartment).
- 9 Install the luggage compartment lamp.
- 10 Install the upper trim plate of the left rear compartment.
- 11 Install rear compartment door threshold trim plate assembly.
- 12 Install the left rear seat backrest assembly .
- 13 Install the rear seat cushion assembly.
- 14 Connect the negative battery cable.

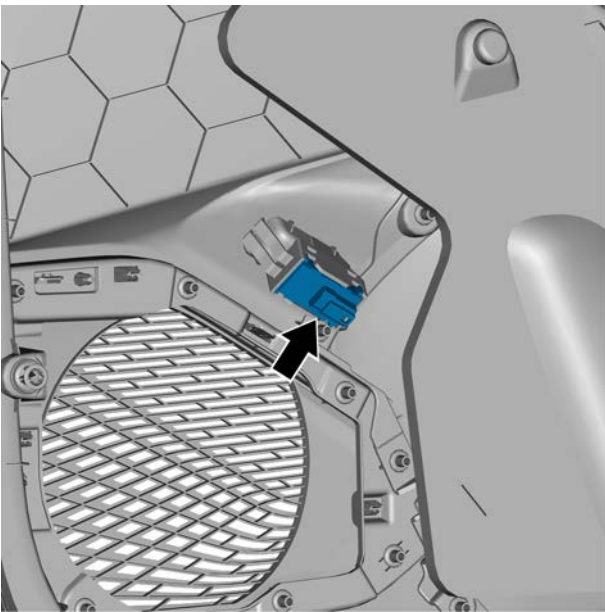
11.17.6.3 Replacement of tailgate opening switch

Removal procedure

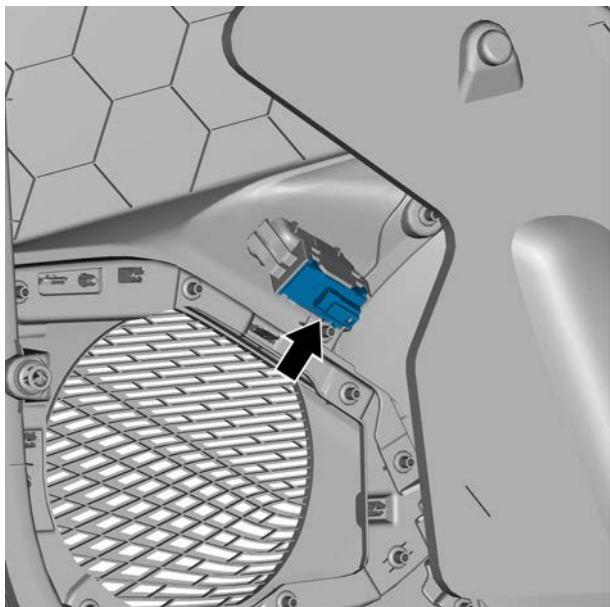
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures..](#)
- 2 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly.](#)
- 3 Remove the tailgate opening switch.



Installation procedure



1 Install the tailgate opening switch.

2 Install the assembly-interior trim panel front door LH.

3 Connect the negative battery cable.

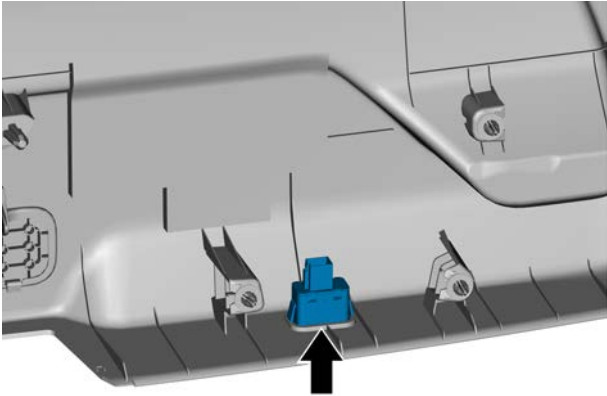
11.17.6.4 Replacement of rear door closing and vehicle lock switch

Removal procedure

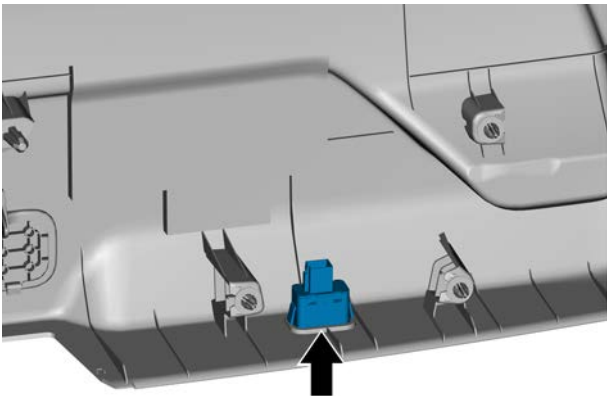
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the tailgate middle upper interior trim panel assembly of the assembly, see [Replacement of the tailgate middle upper interior trim panel assembly](#).



- 3 Remove the tailgate lower interior trim panel assembly of the assembly, see [Replacement of the tailgate lower interior trim panel assembly](#).
- 4 Remove tailgate closing and vehicle locking switch.



Installation procedure

- 1 Install rear door closing and vehicle lock nut switches.

- 2 Install the lower trim panel assembly of the tailgate.
- 3 Install the middle upper interior trim panel assembly of the tailgate.
- 4 Connect the negative battery cable.

11.18 emergency call system

11.18.1 Instructions and operations

11.18.1.1 Instructions and Operations

The system monitors the airbag burst signal and manual call operation through the vehicle built-in controller, sends the position of the vehicle collision accident, vehicle direction, vehicle data (VIN code, vehicle type, power type) to the control center through the network, and obtains the rescue service provided by PSAP through the control center.

Trigger condition of road accident emergency response system

1. The controller detected the burst signal of the airbag.
2. Press the SOS switch for a long time

After the system is started, the information is sent to the control center through the voice channel, and the emergency call is dialed at the same time. The control center confirms the accident information and requests the rescue service from PSAP. After the relevant information is confirmed, the control center hangs up the call.

When starting the emergency call system, you can directly press the SOS switch on the sunroof control panel, and the SOS indicator will indicate the system status and call status accordingly, and the voice call can be completed when the system is working normally.

The emergency call system can automatically or manually trigger the emergency call device in the event of an accident, which is directly connected to the public safety answering point (PSAP). Establish an audio connection between the PSAP and the accident vehicle through hands-free technology.

The first 10 minutes when a human injury accident occurs is the best time for rescue and rescue. For human injury accidents, each minute in advance can increase the survival rate by 5%. The international standard is that the E-Call service includes hospital first aid instruction, which in our country 120 is the main system responsible for first aid. Of course, in this case, we can also use E-Call. When we are in a certain area and the vehicle fails to drive, and there happens to be no signal source for the mobile phone here, then we can also operate the emergency call rescue system, and the control center will also make the corresponding rescue according to the location of the call.

Do not use the emergency rescue system at will in non-special circumstances to avoid waste of resources.

11.18.2 Component position

11.18.2.1 Component position



1. Emergency call system control unit

11.18.3 Diagnostic information and procedures

11.18.3.1 Diagnosis Description

Before diagnosing the fault of the emergency call controller, see [Description and operation](#). Understand and be familiar with working principles of emergency call system before starting system diagnosis. This helps to determine the correct fault diagnosis steps when a fault occurs. More importantly, it also helps to determine whether the situation described by the customer is normal operation. Any fault diagnosis of the emergency call system should start with the "visual inspection". The "visual inspection" will guide maintenance personnel to take the next logical step for fault diagnosis. Understand and use the diagnosis flow chart correctly to shorten the diagnosis time and avoid misjudgment of faulty parts.

11.18.3.2 Visual Check

- Check for after-sales devices that may affect the emergency call system to ensure that they do not affect navigation operations.
- Check system components that are easily accessible or can be seen to find out if there is any obvious damage of the component or there is a situation that may cause a fault.
- Inspect the wiring harness, harness connectors to ensure that the wiring harness, harness connectors are not loose, broken, poor contact, aging and other signs.

11.18.4 Removing and installing

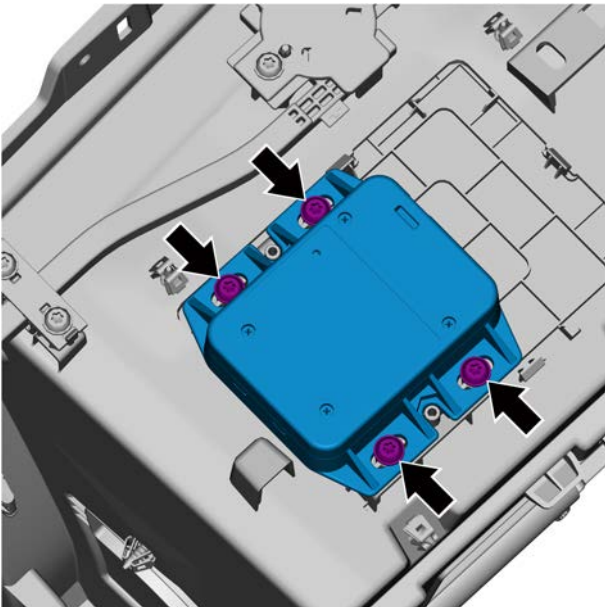
11.18.4.1 Replacement of emergency call system control unit

Removal procedure

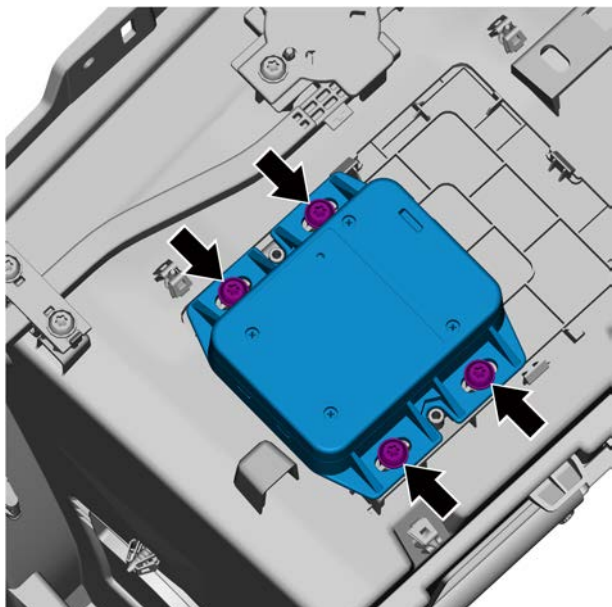
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#).

- 1 Open the engine compartment cover.
- 2 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 3 Remove glove box frame assembly, see [Replacement of glove box frame assembly \(Type 2\)](#).
- 4 Remove the 4 retaining screws of the emergency call system controller.
- 5 Remove the emergency call system control unit.



Installation procedure



- 1 Install the emergency call system controller and tighten the 4 retaining screws.

Torque: just tighten it.

- 2 Install the glove box frame assembly.
- 3 Connect the negative battery cable.
- 4 If you need to use the GLDS diagnostic program, under the [Software] tab, select the corresponding module and follow the steps prompted by the diagnostics program to complete the software brushing operation.
- 5 Close the engine compartment cover.

Body, Sheet Metal and Painting

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12.1 Warnings and precautions

12.1.1 Warnings and precautions

12.1.1.1 Warnings and precautions

Warning about collision sectioning

Warning !

Only cut at recommended locations. Otherwise, the integrity of the vehicle structure will be damaged, and personal injury may be caused in the event of a vehicle collision.

Warning about cracks in vehicle windows

Warning !

If a window glass is cracked but remains intact, the protective tape should be cross-pasted to the window glass to prevent further damage to the window glass and personal injury.

Warning about handling the glass and metal plates

Warning !

When any type of glass or metal plate with sharp edges or burrs is handled, it is needed to wear approved goggles and gloves to reduce the risk of personal injury.

Warnings about goggles and compressed air

Warning !

When using compressed air, wear goggles to avoid eye damage. Notice of removal of exterior logo

Caution

When removing badges/nameplates, use a plastic flat-blade tool to avoid damage to the paint.

Notice of damage of machined surface

Caution

Do not cut, scratch or damage the sealing surface. The sealing surface is machined. Damage to the machined surface can cause leakage.

Note to sealant

Caution

Do not let room temperature hardening sealant enter the blind threaded hole. If room temperature hardening sealant enters the threaded blind hole, a hydraulic lock nut effect will be produced when fasteners are tightened. The hydraulic lock nut of fastener tightening can cause damage to fastener tightening and/or other components. In addition, the correct clamp force will not be obtained when fasteners are tightened. Incorrect clamping force can prevent components from getting the correct seal, which can lead to leakage. If the fastener cannot be tightened properly, components will become loose or separated, causing serious damage to the vehicle.

Notice of the window edge damage

Caution

Avoid damaging vehicle windows due to the impact caused by exposed edges. Vehicle windows must be 1 mm (0.025 in) below sheet metal surface to avoid damage to vehicle windows.

12.2 Front end of the body

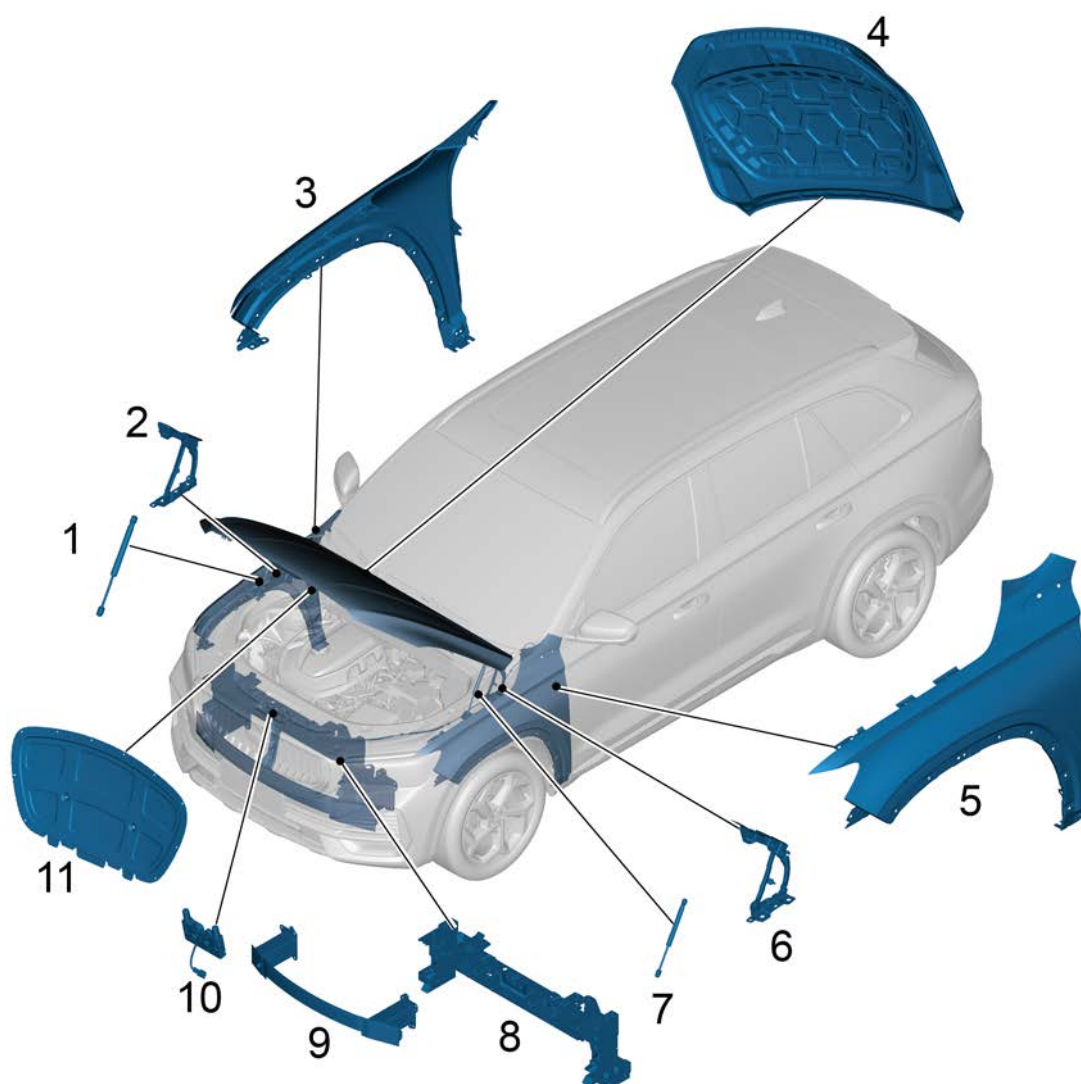
12.2.1 Specification

12.2.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
front left fender retaining bolt	M6×20	8.5~11.5	6.3~8.5
front left fender retaining nut	M6×20	8.5~11.5	6.3~8.5
Engine bonnet assembly retaining nut	M8	20~28	14.8~20.7
Engine bonnet left hinge assembly retaining bolt	M8×20	20~28	14.8~20.7
Engine bonnet lock retaining bolt	M8	20~28	14.8~20.7
Front-end module assembly retaining bolt	M8	20~28	14.8~20.7
Front anti-intrusion crossbeam assembly retaining bolt	M10×30	50~70	36.9~51.6
Cooling module and body energy absorption box	M8×50	20~28	14.8~20.6
Nut-fastening radiator module bracket assembly	M8×8	20~28	14.8~20.6

12.2.2 Component position

12.2.2.1 Component position



- | | | | |
|----|--------------------------------|-----|--|
| 1. | Right engine bonnet air spring | 7. | Left engine bonnet air spring |
| 2. | Assembly-engine hood hinge RH | 8. | Front-end module assembly |
| 3. | FR fender assembly | 9. | Front anti-intrusion beam assembly |
| 4. | Engine cover assembly. | 10. | Engine bonnet lock |
| 5. | front left fender assembly | 11. | Engine bonnet sound insulation and heat insulation pad |
| 6. | Assembly-engine hood hinge LH | | |

12.2.3 Removing and installing

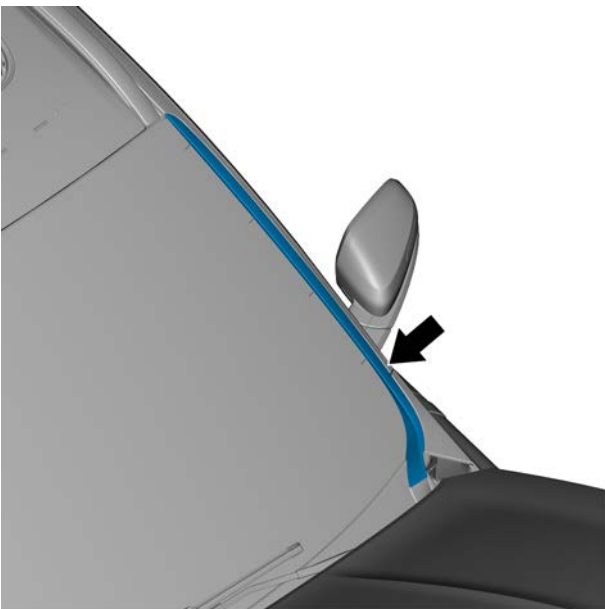
12.2.3.1 Replacement of the left front fender

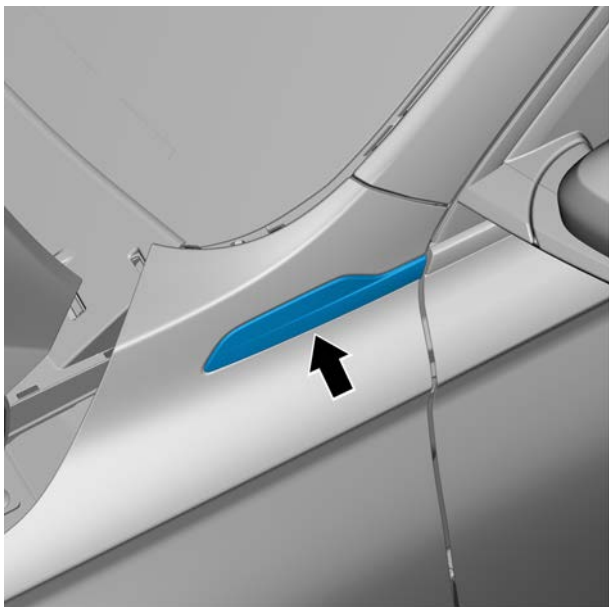
Removal procedure

Warning !

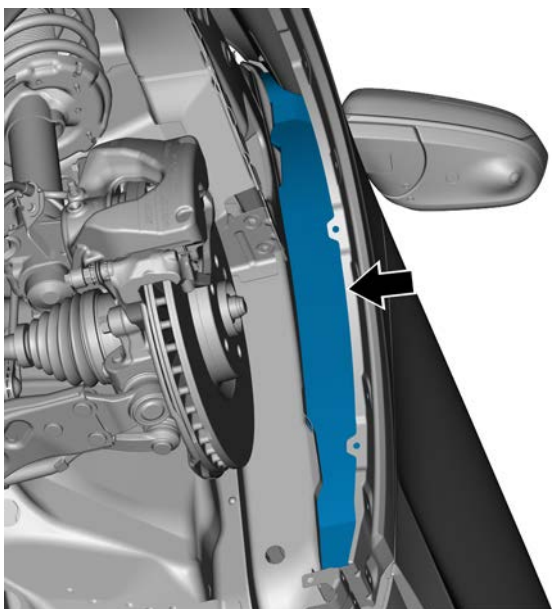
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 5 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 6 Remove the headlamp unit (front left) and see the [Replacement of the headlamp unit \(front left\)](#).
- 7 Remove the front left wheel arch liner splash guard assembly, see [Replacement of the front left wheel arch liner splash guard assembly](#).
- 8 Remove the front left windshield trim.

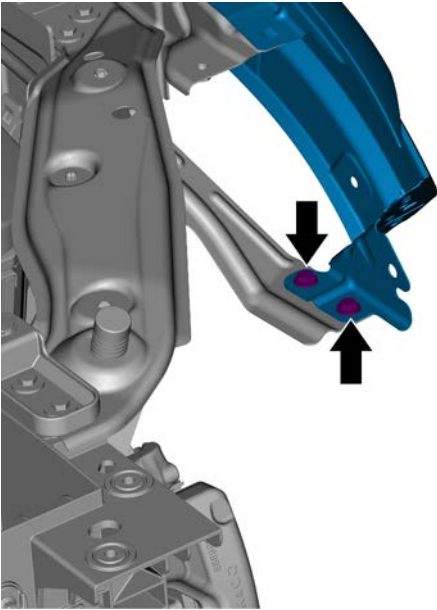




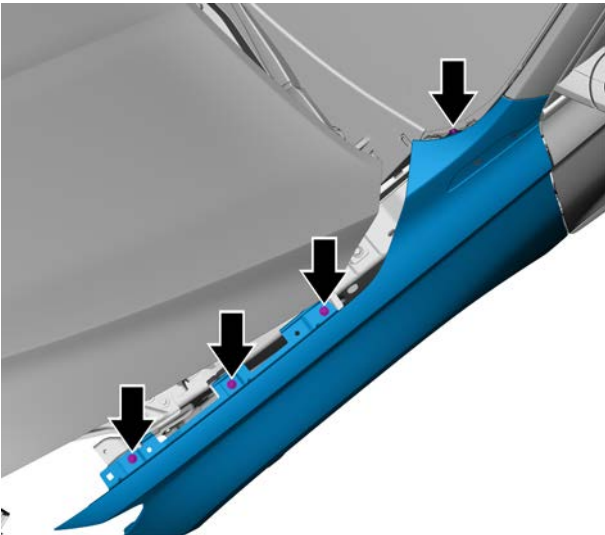
9 Remove the front left door exterior corner trim.



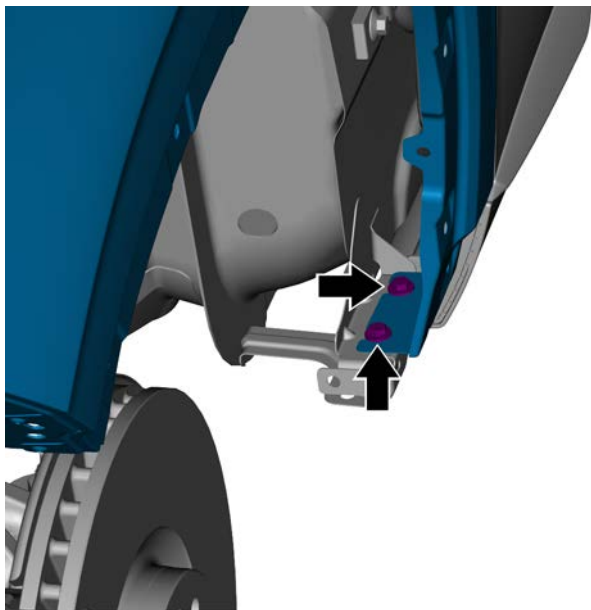
10 Remove filling blocks on the left of the fender.



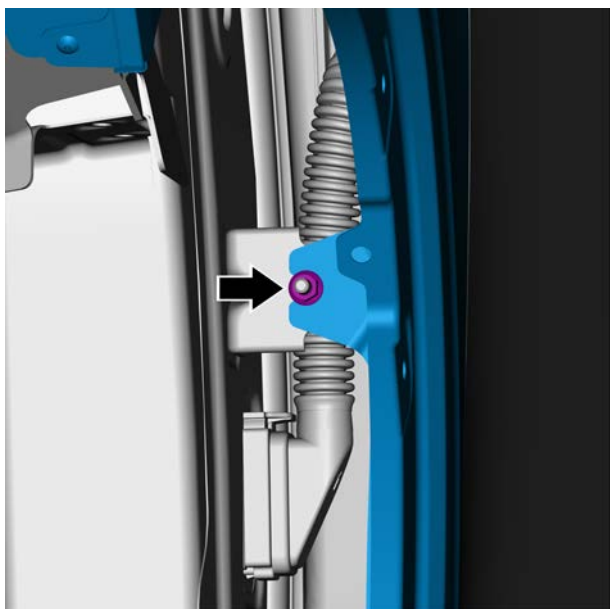
- 11 Remove the 2 retaining bolts on the front of the front left fender.



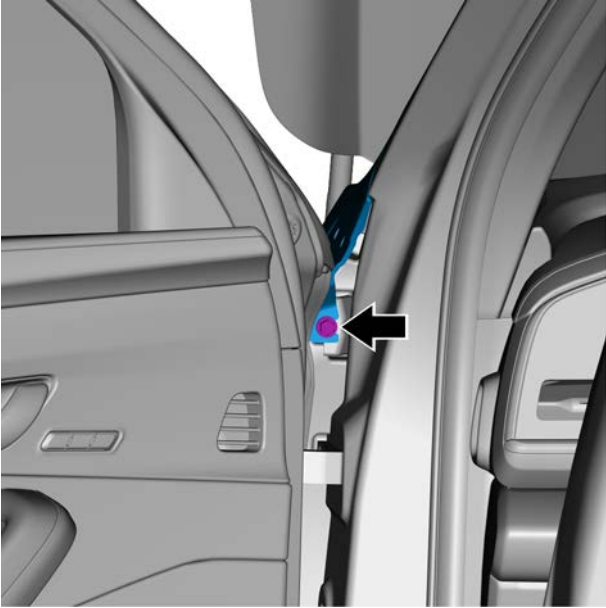
- 12 Remove the 4 retaining bolts on the upper part of the front left fender.



- 13 Remove the 2 retaining bolts at the rear and lower end of the front left fender.

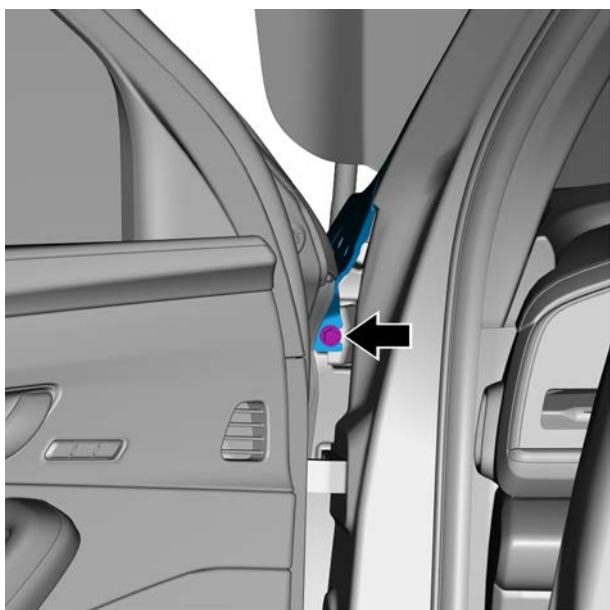


- 14 Remove the rear middle retaining nut of the front left fender.

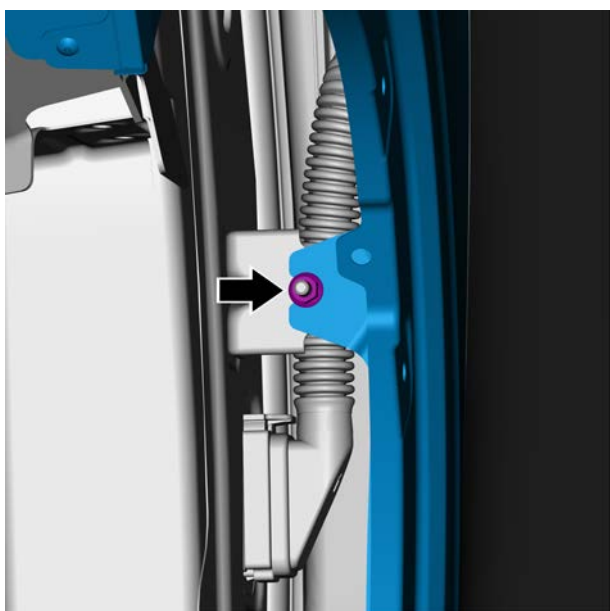


- 15 Remove the upper rear retaining bolt of the front left fender and remove the front left fender.

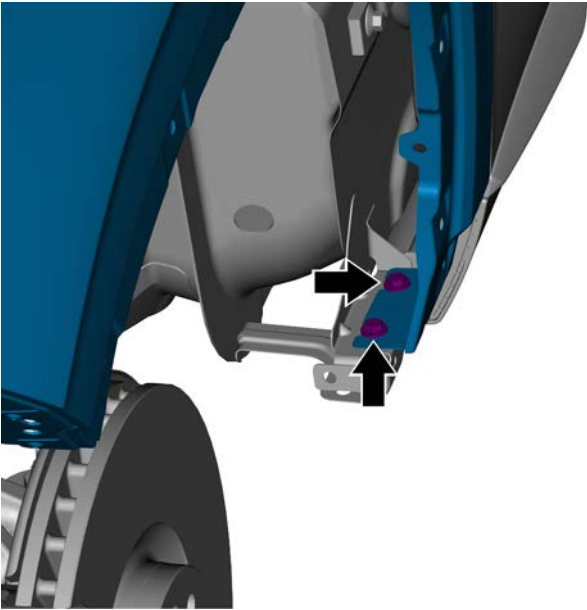
Installation procedure



- 1 Install the upper rear retaining bolt of the front left fender.
Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)

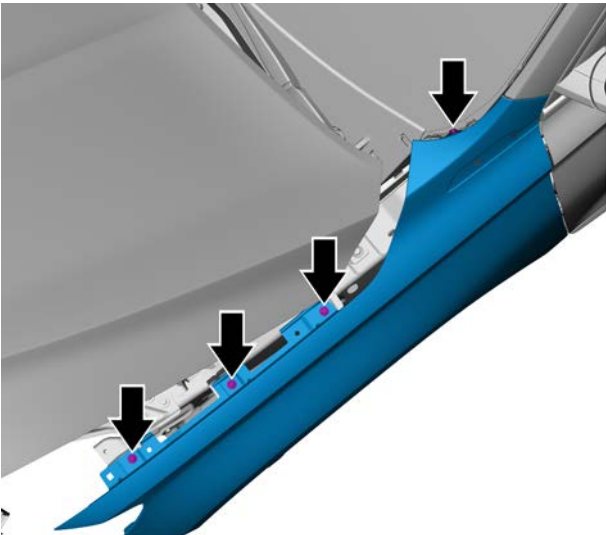


- 2 Install the middle retaining nut at the rear of the front left fender.
Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)



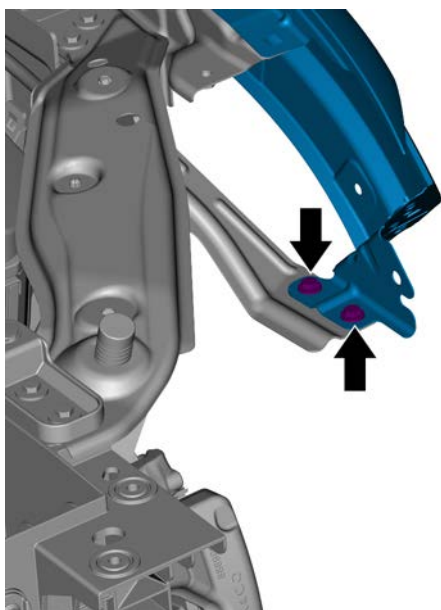
- 3 Install 2 retaining bolts at the rear and lower end of the front left fender.

Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)

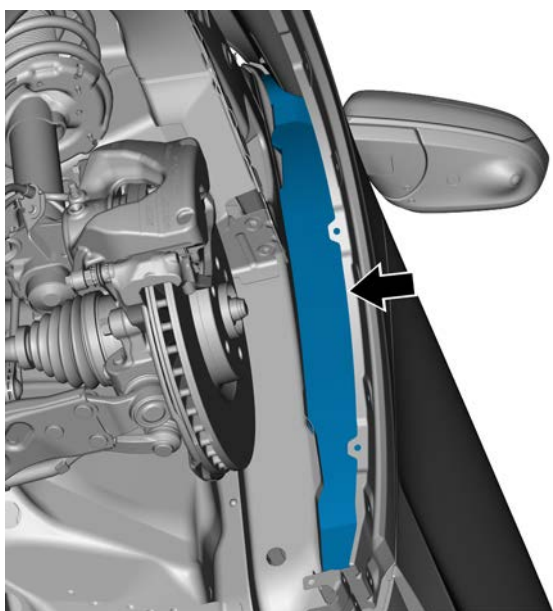


- 4 Install the 4 retaining bolts on the upper part of the front left fender.

Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)



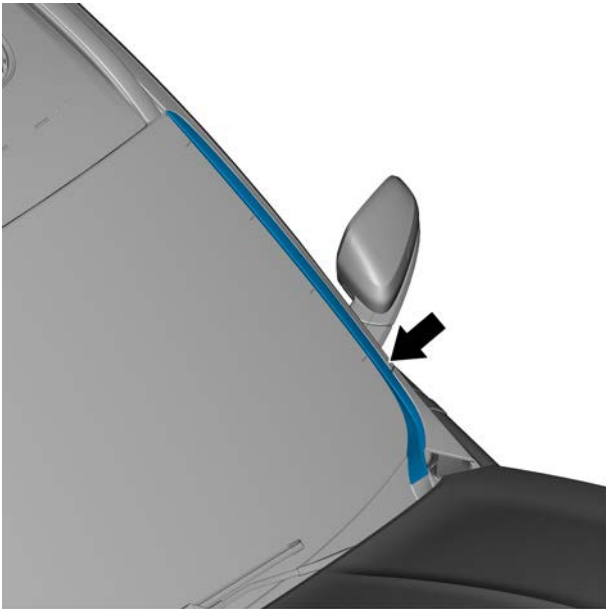
- 5 Install 2 retaining bolts on the front of the front left fender.
Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)



- 6 Install filling blocks on the left of the fender.



- 7 Install the exterior corner trim of the front left door.



- 8 Install the front left windshield trim.

- 9 Install the left front wheel housing fender assembly.
- 10 Install the headlamp unit (front left).
- 11 Install the front bumper assembly.
- 12 Install the front left wheel brow.
- 13 Install the front engine bay trim plate.
- 14 Install the left engine bay trim plate.
- 15 Connect the negative battery cable.

12.2.3.2 Replacement of engine cover assembly

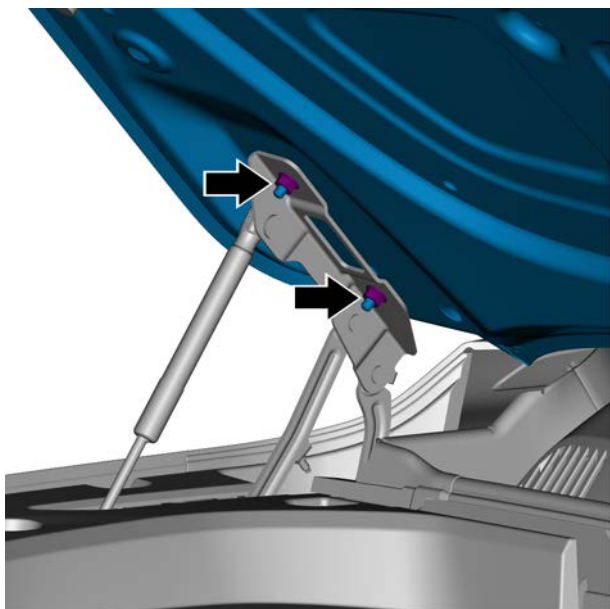
Removal procedure

Caution

Two people are required to cooperate in the process of removing and installing the engine bonnet. Protect with protective tape or rag to prevent damage.

When removing the engine bonnet, mark the position of the engine bonnet and hinges for positioning during installation.

- 1 Opening the engine hood
- 2 Remove the 2 retaining nuts of the engine bonnet assembly and the left hinge of the engine bonnet.



- 3 Remove the engine hood assembly and the 2 retaining nuts on the right hinge of the engine bonnet and remove the engine bonnet assembly.

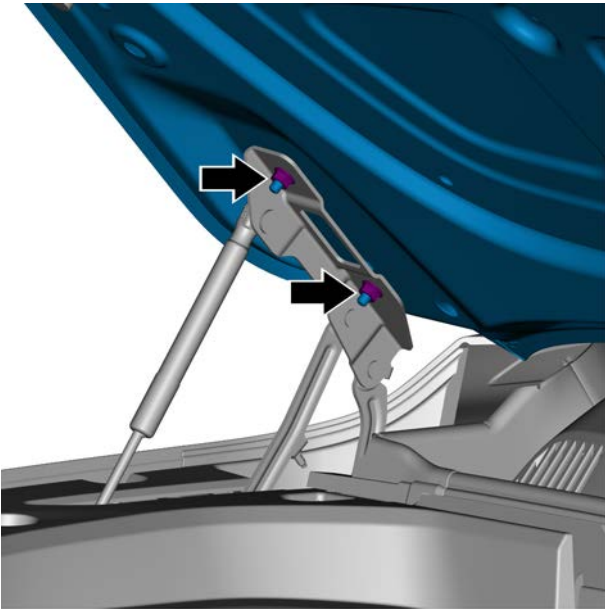
Installation procedure

Caution

Installation requires adjusting the gap between the engine bonnet and the left and right fenders and the radiator grille body, and then tightening the bolts, including adjusting the buffer block.

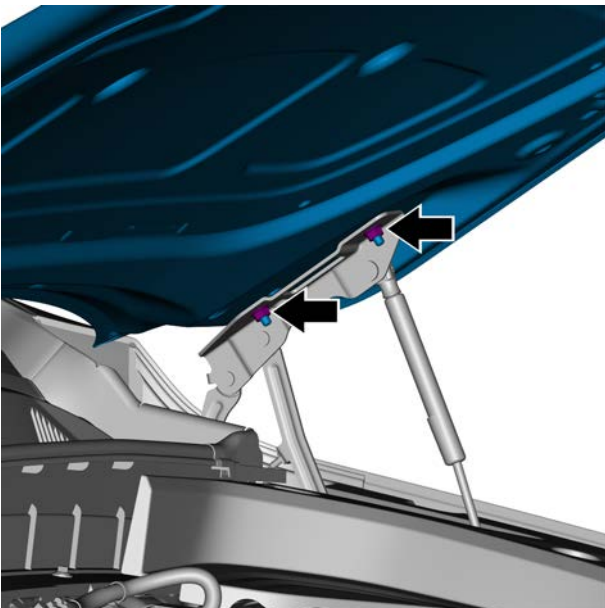
- 1 Install 2 retaining nuts for the engine bonnet assembly and the right hinge of the engine bonnet.

Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)



- 2 Install 2 retaining nuts for the engine bonnet assembly and the left hinge of the engine bonnet.

Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)

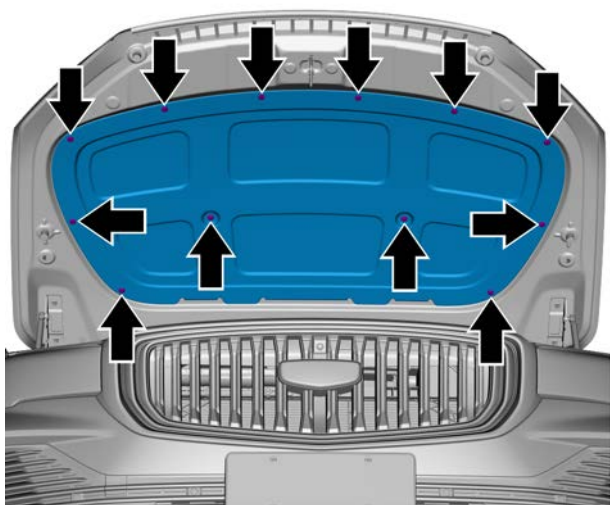


- 3 Close the engine hood

12.2.3.3 Replacement of sound insulation and heat insulation pad for engine bonnet

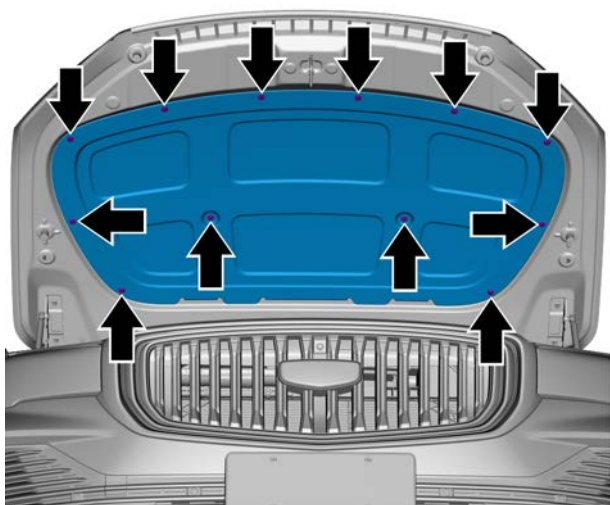
Removal procedure

- 1 Opening the engine hood
- 2 Remove the 12 retaining clips of the engine bonnet sound and heat insulation pad.



Installation procedure

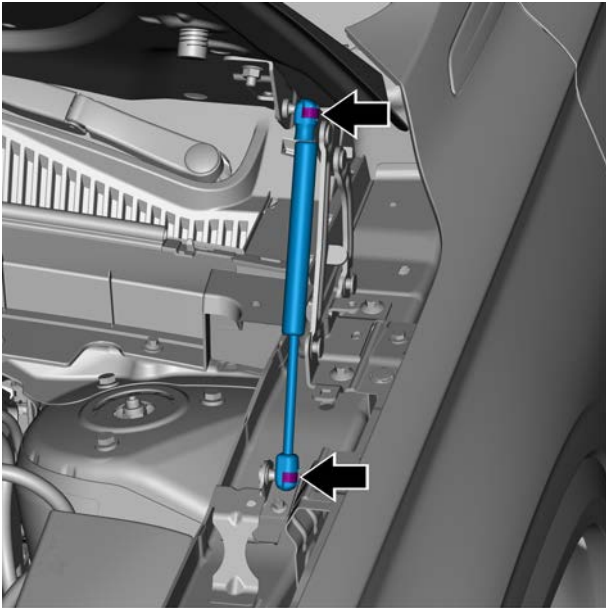
- 1 Install the 12 retaining clips for engine bonnet sound and heat insulation pad.



- 2 Close the engine hood

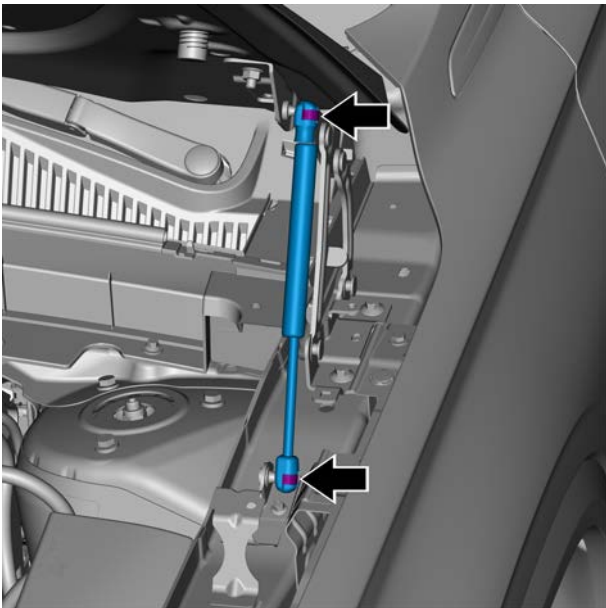
12.2.3.4 Replacement of left engine bonnet air spring

Removal procedure



- 1 Remove the left engine bay trim plate, see the [Replacement of the left engine bay trim plate](#).
- 2 Use a flat screwdriver to pry the retaining clip of the left engine bonnet air spring, detach the fixed ball head, and remove the left engine bonnet air spring.

Installation procedure



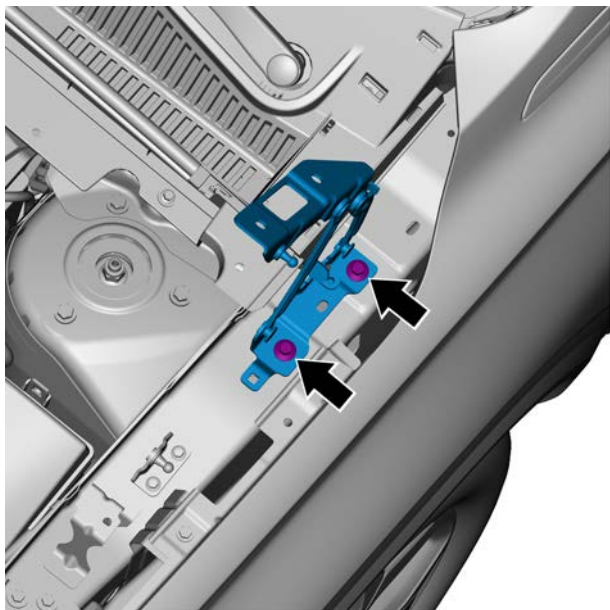
- 1 Install the left engine bonnet air spring, and press the engine bonnet air spring mounting hole into the fixed ball head.

- 2 Install the left engine bay trim plate.

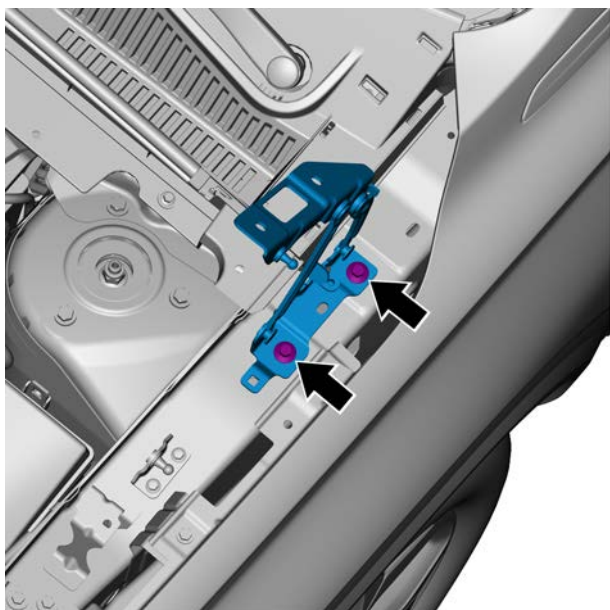
12.2.3.5 Assembly-bonnet hinge LH replacement

Removal procedure

- 1 Remove the engine assembly, refer to replacement of the engine assembly.
- 2 Remove the left engine bay trim plate, see the [Replacement of the left engine bay trim plate](#).



- 3 Remove the left engine bonnet air spring, see [Replacement of the left engine bonnet air spring](#).
- 4 Remove the 2 retaining bolts of the engine bonnet left hinge assembly and remove the engine bonnet left hinge assembly.



Installation procedure

- 1 Install 2 retaining bolts on the engine bonnet left hinge assembly.
Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)
Caution
Tighten the bolt after adjusting the hinge position correctly.

- 2 Install the left engine bonnet air spring.
- 3 Install the left engine bay trim plate.
- 4 Install the engine cover assembly.

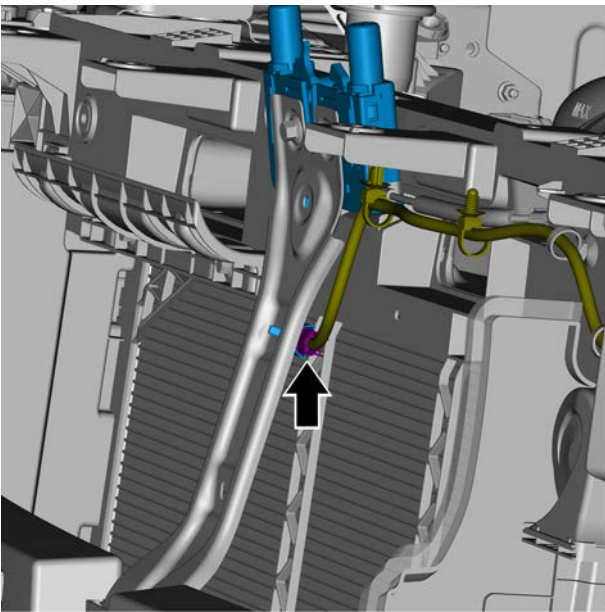
12.2.3.6 Replacement of engine bonnet lock

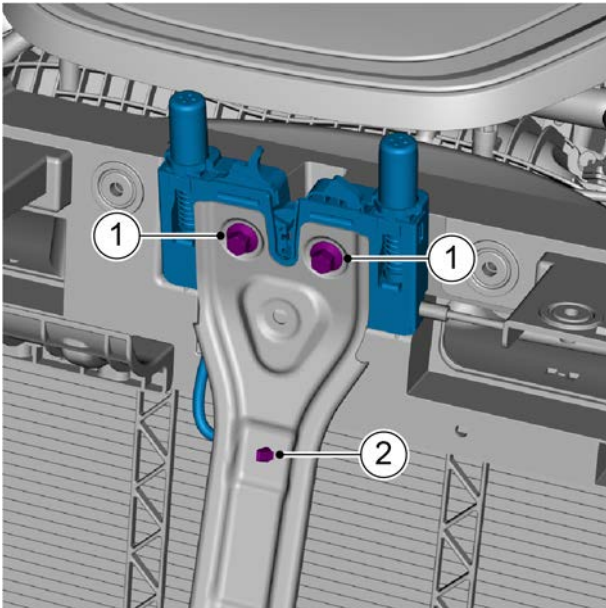
Removal procedure

Warning !

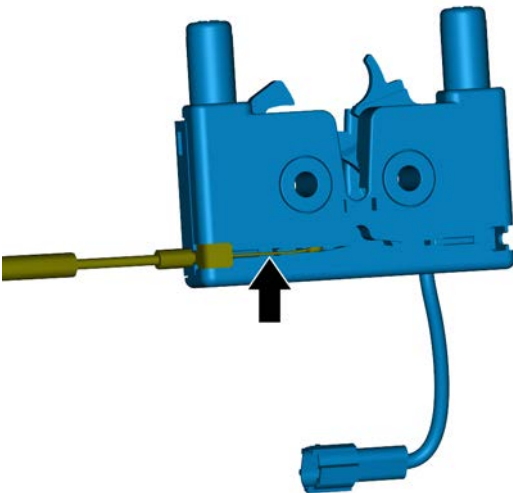
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates.](#)
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate.](#)
- 4 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly.](#)
- 5 Disconnect the engine bonnet lock harness connector.





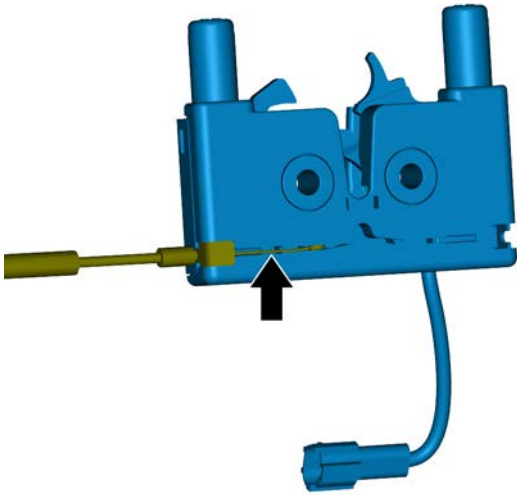
- 6 Remove 2 retaining bolts 1 and wire harness clip 2 of the engine bonnet lock



- 7 Remove the engine bonnet lock front-end cable and remove the engine bonnet lock.

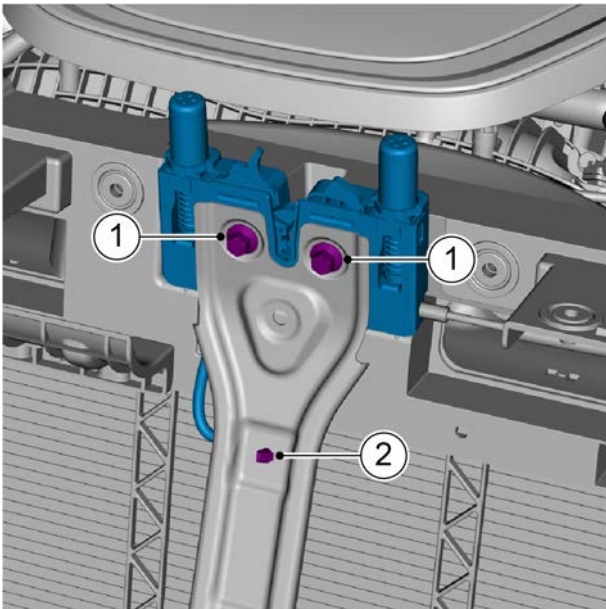
Installation procedure

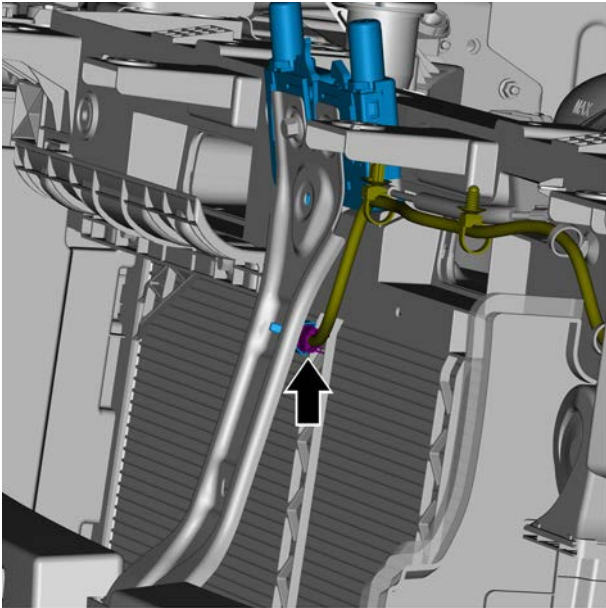
- 1 Install the engine bonnet lock front-end cable.



- 2 Install the 2 retaining bolts 1 and wire harness clip 2 of the engine bonnet lock

Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)





- 3 Connect the engine bonnet lock harness connector.

Caution

After installation, test the function of the engine bonnet cable, whether it is hard to pull, whether to pop up the engine bonnet; when closing the engine bonnet, whether the bonnet lock and latch are firmly occluded, not tilted and not shifted.

- 4 Install the front bumper assembly.
- 5 Install the front engine bay trim plate.
- 6 Install the left and right engine bay trim plates.
- 7 Connect the negative battery cable.

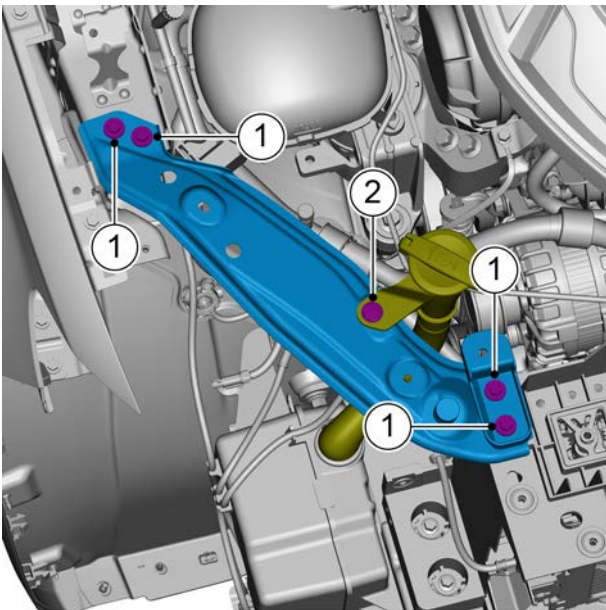
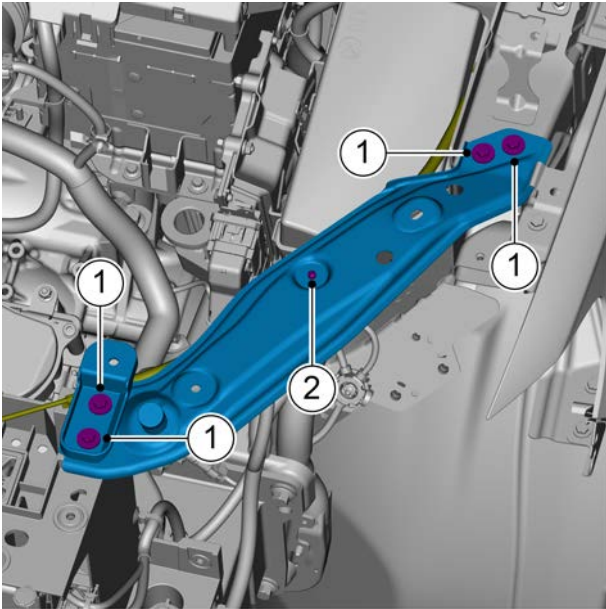
12.2.3.7 Replacement of front-end module assembly

Removal procedure

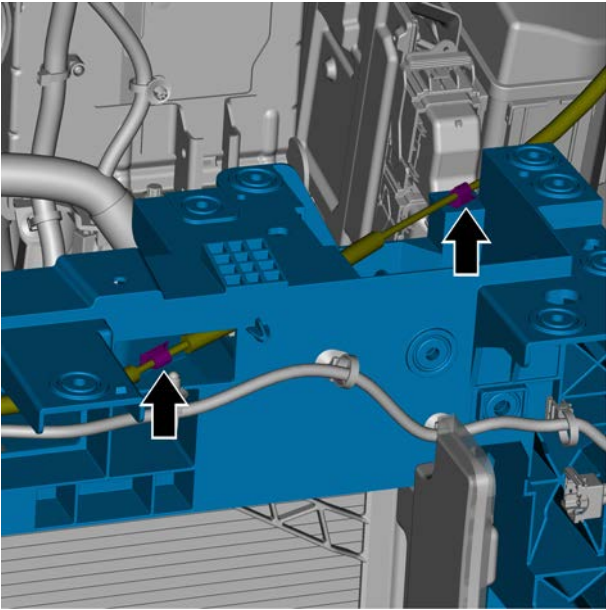
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

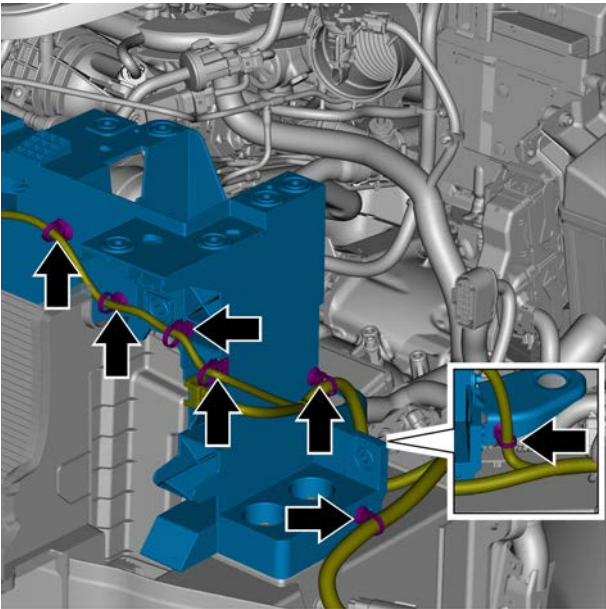
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 5 Remove engine bonnet lock, see [Replacement of engine bonnet lock](#).
- 6 Remove the left and head lamp unit (FR). See the [Replacement of the headlamp unit \(front left\)](#).
- 7 Remove the horn (tweeter) and see the [Replacement of the horn \(tweeter\)](#).
- 8 Remove the horn (woofer) and see the [Replacement of the horn \(woofer\)](#).



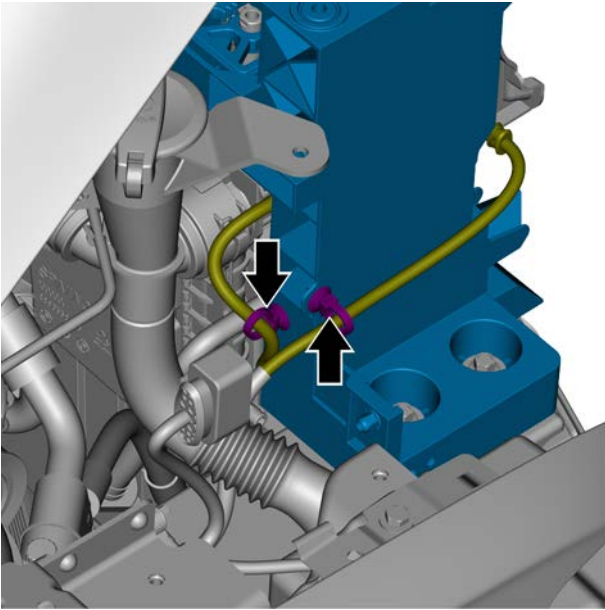
- 9 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe](#).
- 10 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 11 Remove 4 retaining bolts 1 of the crossbeam of the left headlamp.
- 12 Remove the retaining clip 2 of the engine bonnet lock front-end cable.
- 13 Remove the 4 retaining bolts 1 of the FR headlamp crossbeam.
- 14 Remove the windshield washer filling pipe with cap assembly retaining clip.



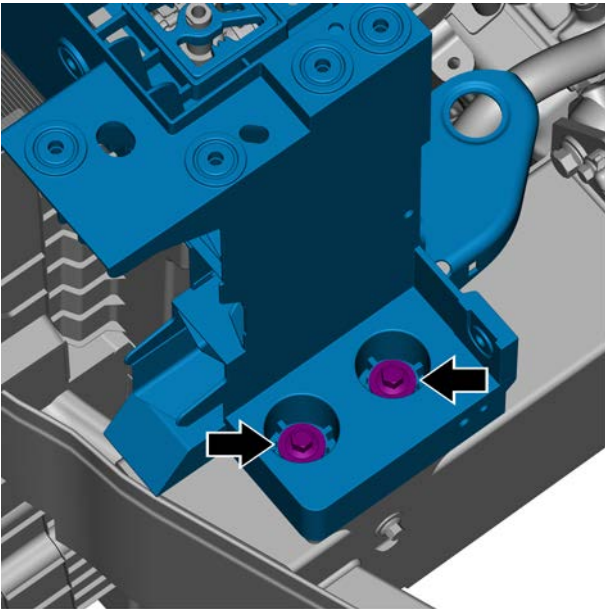
- 15 Remove the 2 retaining clips of the engine bonnet lock front-end cable.



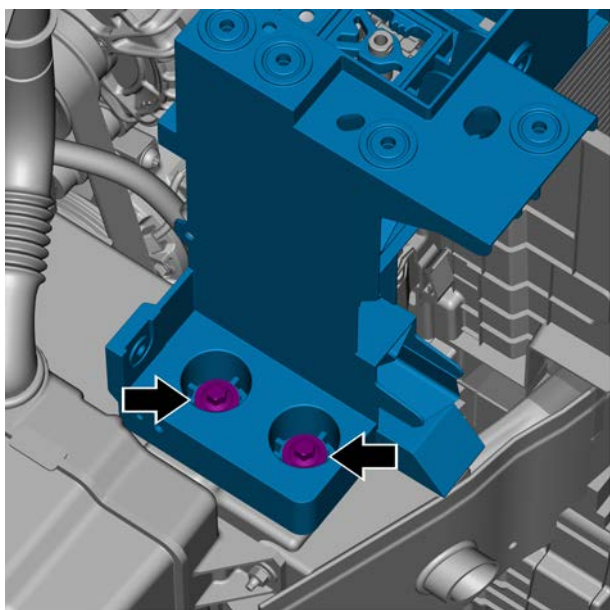
- 16 Remove the 7 wire harness clips on the left side of the front-end module assembly.



- 17 Remove the 2 wire harness clips on the right side of the front-end module assembly.

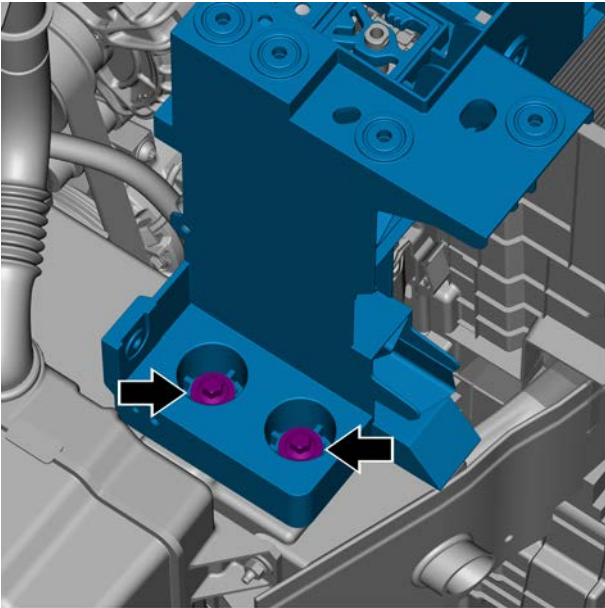


- 18 Remove the 2 retaining bolts on the left side of the front-end module assembly.



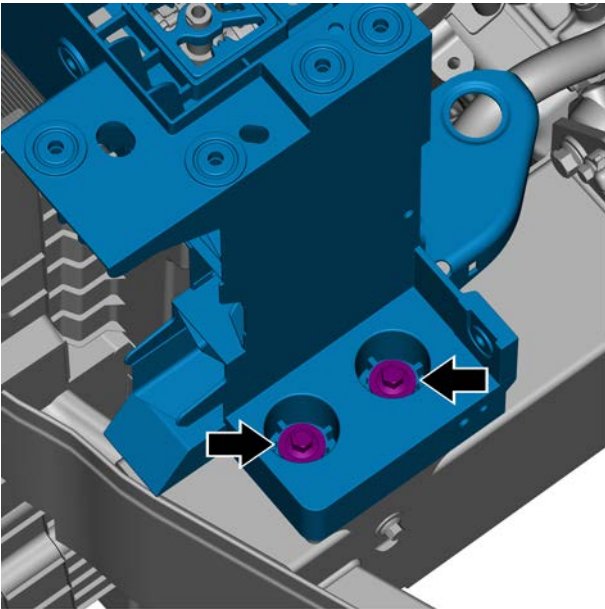
- 19 Remove the 2 retaining bolts on the right side of the front-end module assembly and remove the front-end module assembly.

Installation procedure



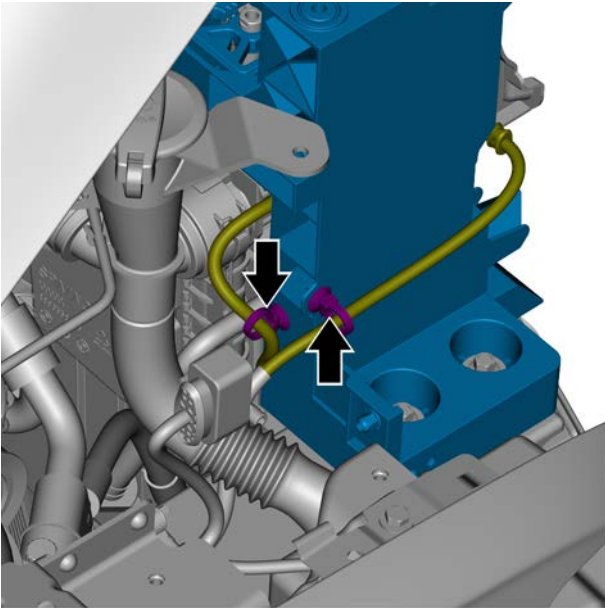
- 1 Install the 2 retaining bolts on the right side of the front-end module assembly.

Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)

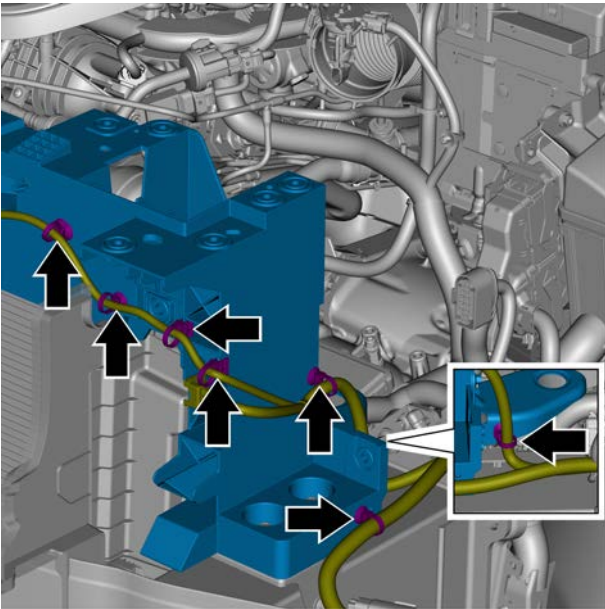


- 2 Install the 2 retaining bolts on the left side of the front-end module assembly.

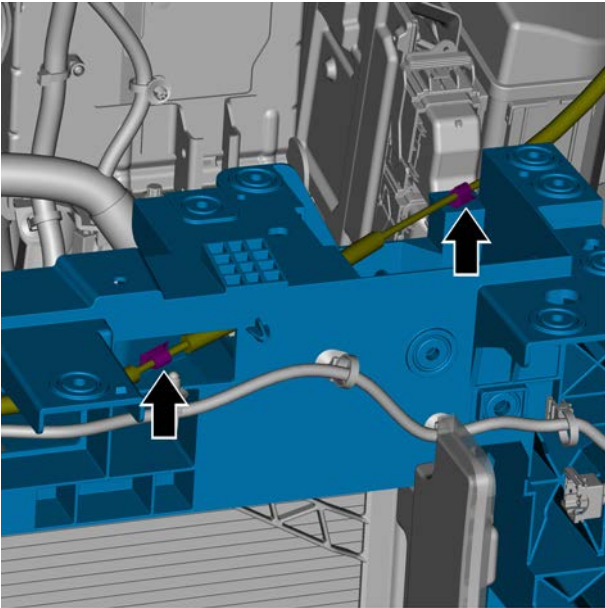
Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)



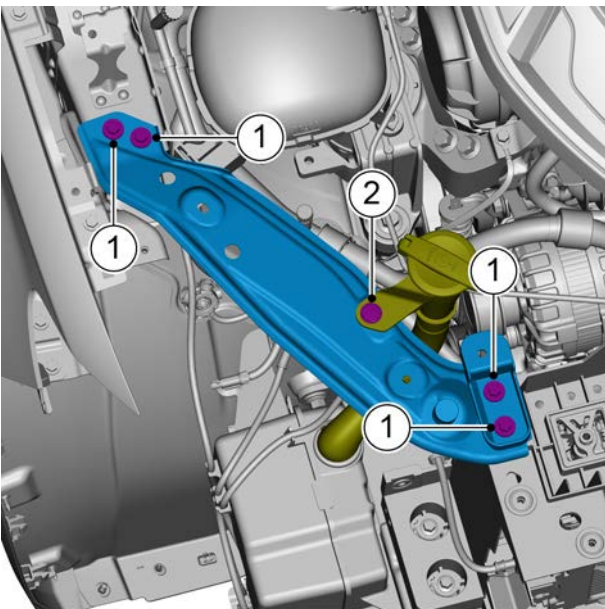
- 3 Install the 2 wire harness clips on the right side of the front-end module assembly.



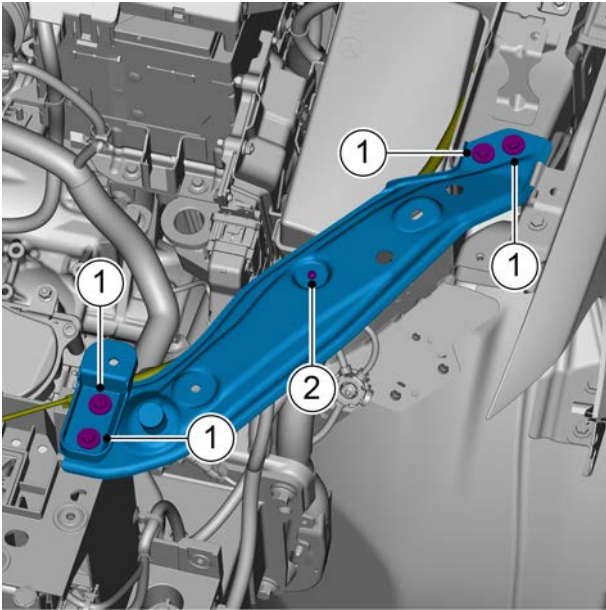
- 4 Install the 7 wire harness clips on the left side of the front-end module assembly.



- 5 Install 2 retaining clips of the engine bonnet lock front-end cable.



- 6 Install 4 retaining bolts 1 of the crossbeam of the FR headlamp.
Torque: 60 N·m (metric) 44.3 lb-ft (imperial system)
- 7 Install the windshield washer filling pipe with cap assembly retaining clip.



- 8 Install 4 retaining bolts 1 of the crossbeam of the front left headlamp.

Torque: 60 N·m (metric) 44.3 lb-ft (imperial system)

- 9 Install retaining clip 2 of the engine bonnet lock front-end cable.

- 10 Install the air filter assembly.
 11 Install the air inlet pipe of the air filter.
 12 Install the horn (woofer).
 13 Install the horn (tweeter).
 14 Install front left headlamp units (FR).
 15 Install the engine bonnet lock.
 16 Install the front bumper assembly.
 17 Install the front engine bay trim plate.
 18 Install the left and right engine bay trim plates.
 19 Connect the negative battery cable.

12.2.3.8 Replacement of front anti-collision beam assembly

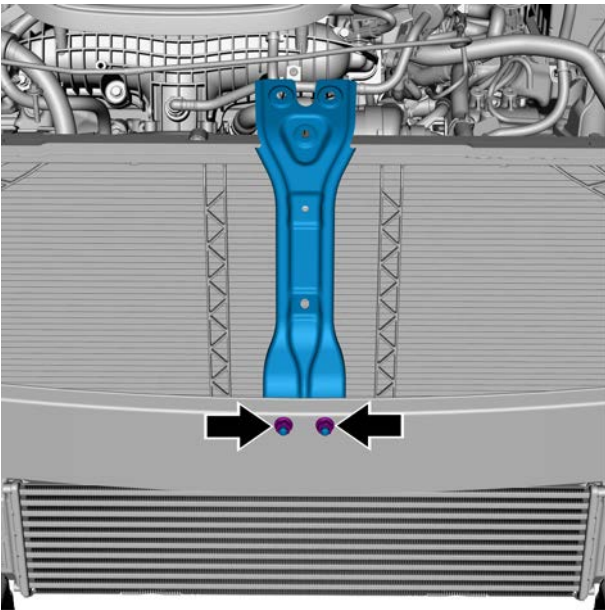
Removal procedure

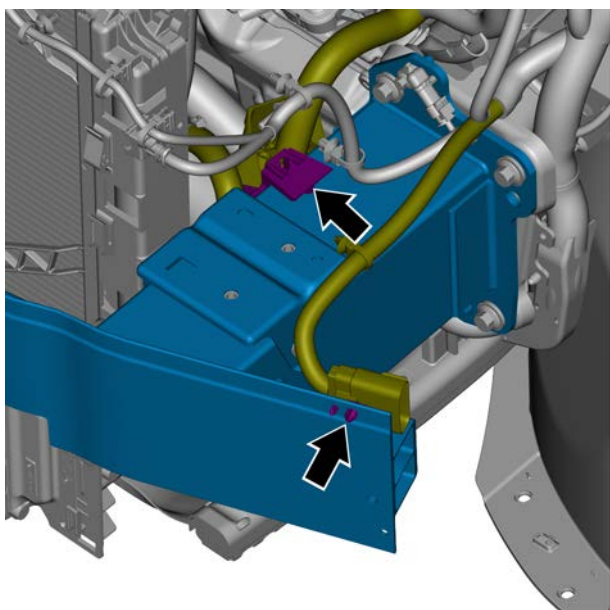
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

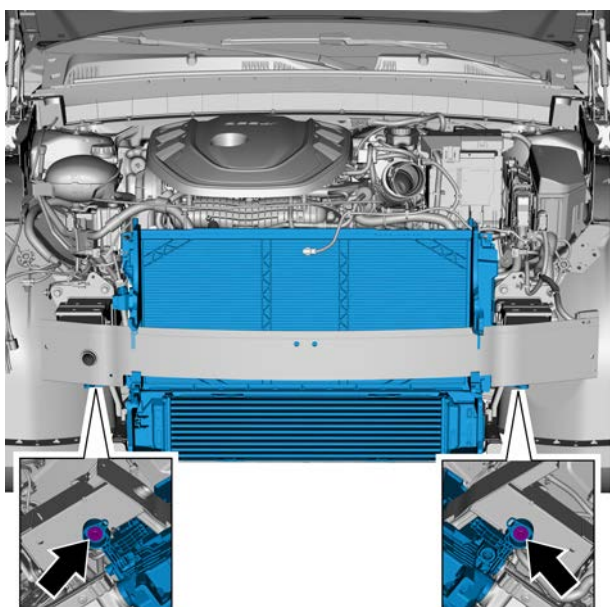
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 5 Remove engine bonnet lock, see [Replacement of engine bonnet lock](#).

- 6 Remove the left and head lamp unit (FR). See the [Replacement of the headlamp unit \(front left\)](#).
- 7 Remove the horn (tweeter) and see the [Replacement of the horn \(tweeter\)](#).
- 8 Remove the horn (woofer) and see the [Replacement of the horn \(woofer\)](#).
- 9 Remove the air filter intake pipe assembly, refer to [replacement of the air filter intake pipe](#).
- 10 Remove the air filter assembly, refer to [replacement of air filter assembly](#).
- 11 Remove the front-end module assembly, see the [Replacement of the front-end module assembly](#).
- 12 Remove the windshield wiper reservoir , see [Replacement of the windshield wiper reservoir](#) .
- 13 Remove left and right collision sensors (front), see [Replacement of collision sensors \(front\)](#).
- 14 Remove the 2 retaining nuts of the bracket assembly in the radiator module.

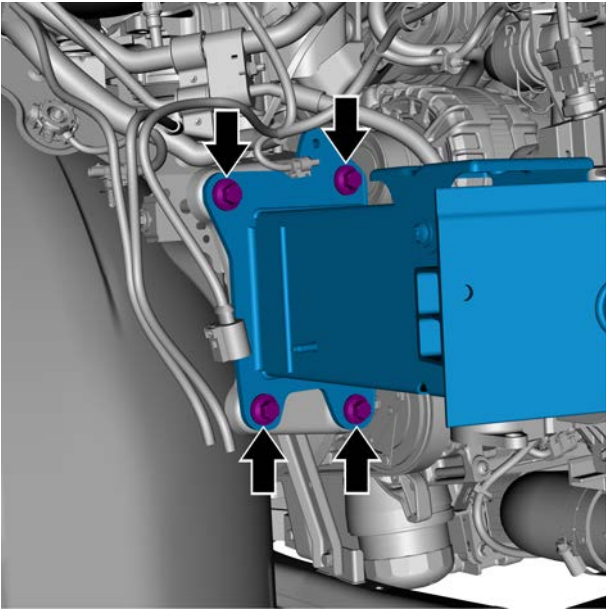




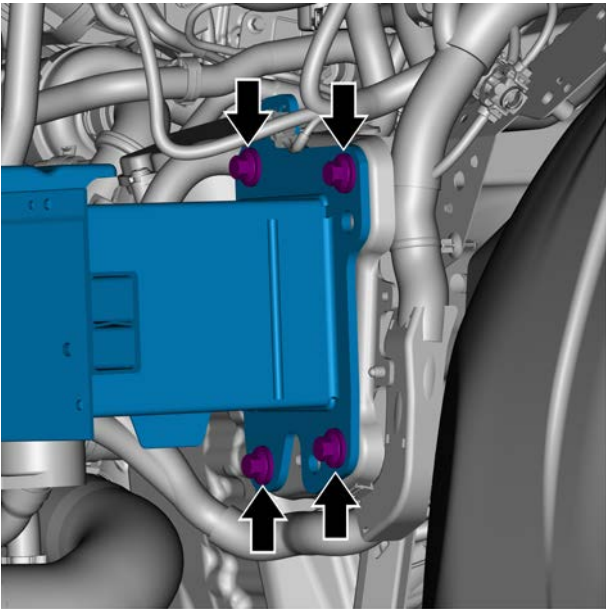
- 15 Remove the 2 wire harness clips on the left side of the front anti-intrusion crossbeam assembly.



- 16 Support the front cooling module with appropriate tools and remove the 2 retaining bolts of the cooling module.

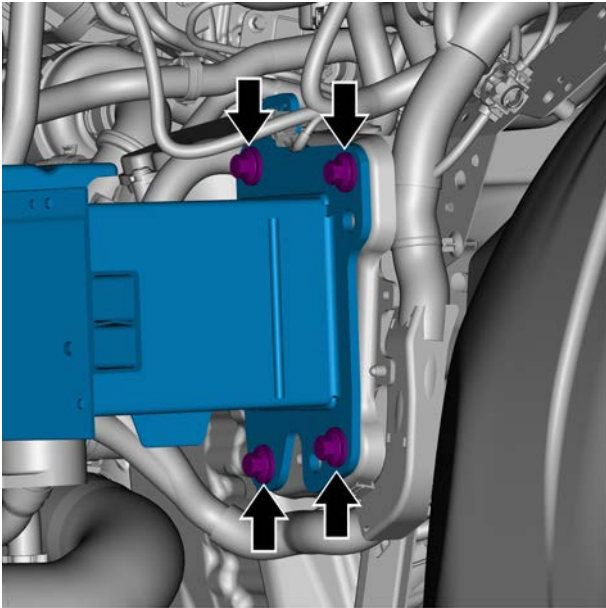


- 17 Remove the 4 retaining bolts on the right side of the front anti-intrusion crossbeam assembly.

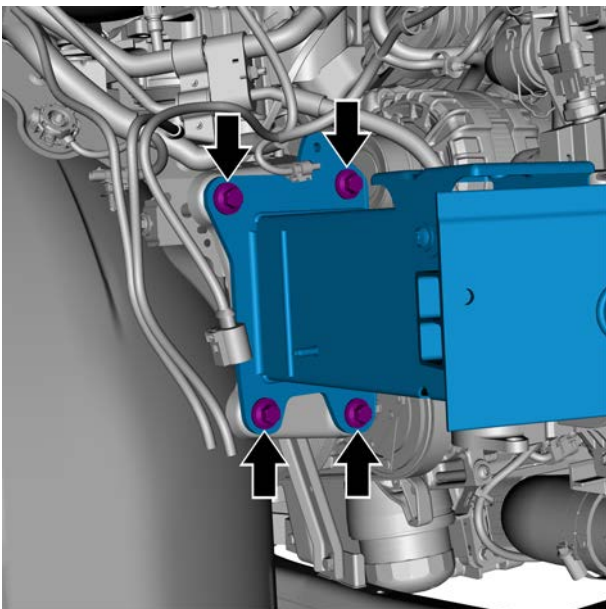


- 18 Remove the 4 retaining bolts on the left side of the front anti-intrusion beam assembly and remove the front anti-intrusion beam assembly.

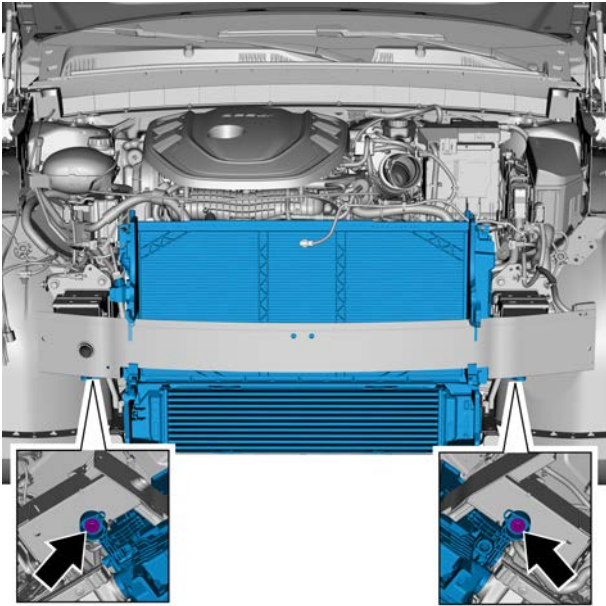
Installation procedure



- 1 Install the 4 retaining bolts on the left side of the front anti-intrusion crossbeam assembly.
Torque: 60 N·m (metric) 44.3 lb-ft (imperial system)

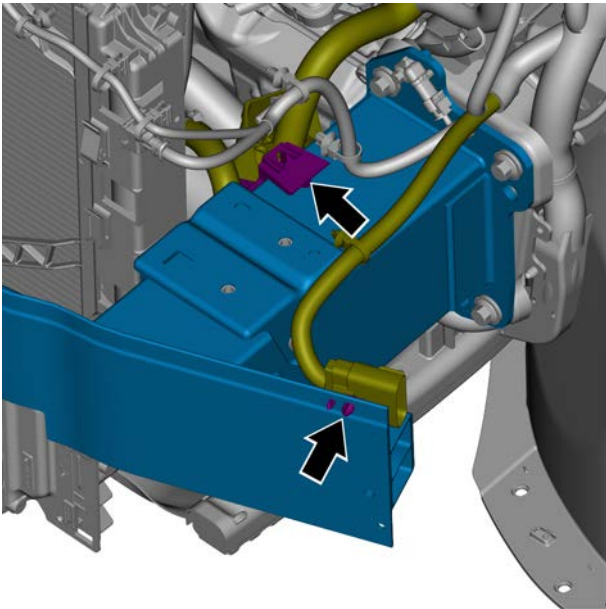


- 2 Install 4 retaining bolts on the right side of the front anti-intrusion crossbeam assembly.
Torque: 60 N·m (metric) 44.3 lb-ft (imperial system)

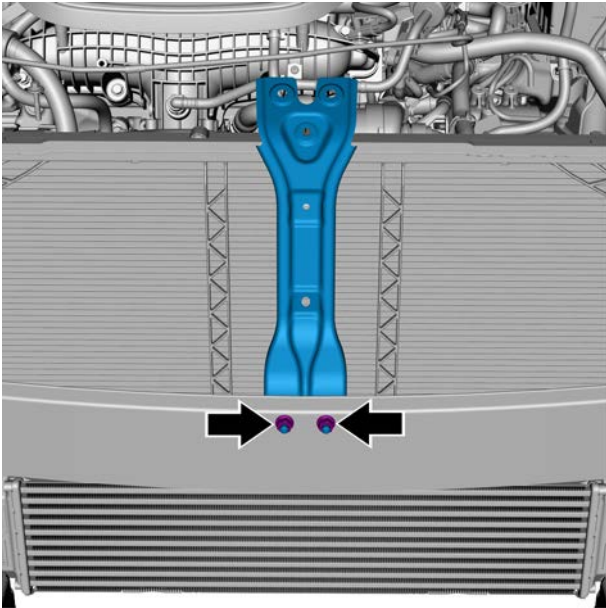


- 3 Install 2 retaining bolts of cooling module.

Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)



- 4 Install the 2 wire harness clips on the left side of the front anti-intrusion crossbeam assembly.



- 5 Install 2 retaining nuts of the bracket assembly in the radiator module.

Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)

- 6 Install left and right collision sensors (front).
- 7 Install the windshield wiper reservoir .
- 8 Install the front-end module assembly.
- 9 Install the air filter assembly.
- 10 Install the air inlet pipe of the air filter.
- 11 Install the horn (woofer).
- 12 Install the horn (tweeter).
- 13 Install front left headlamp units (FR).
- 14 Install the engine bonnet lock.
- 15 Install the front bumper assembly.
- 16 Install the front engine bay trim plate.
- 17 Install the left and right engine bay trim plates.
- 18 Connect the negative battery cable.

12.3 Rear end of body

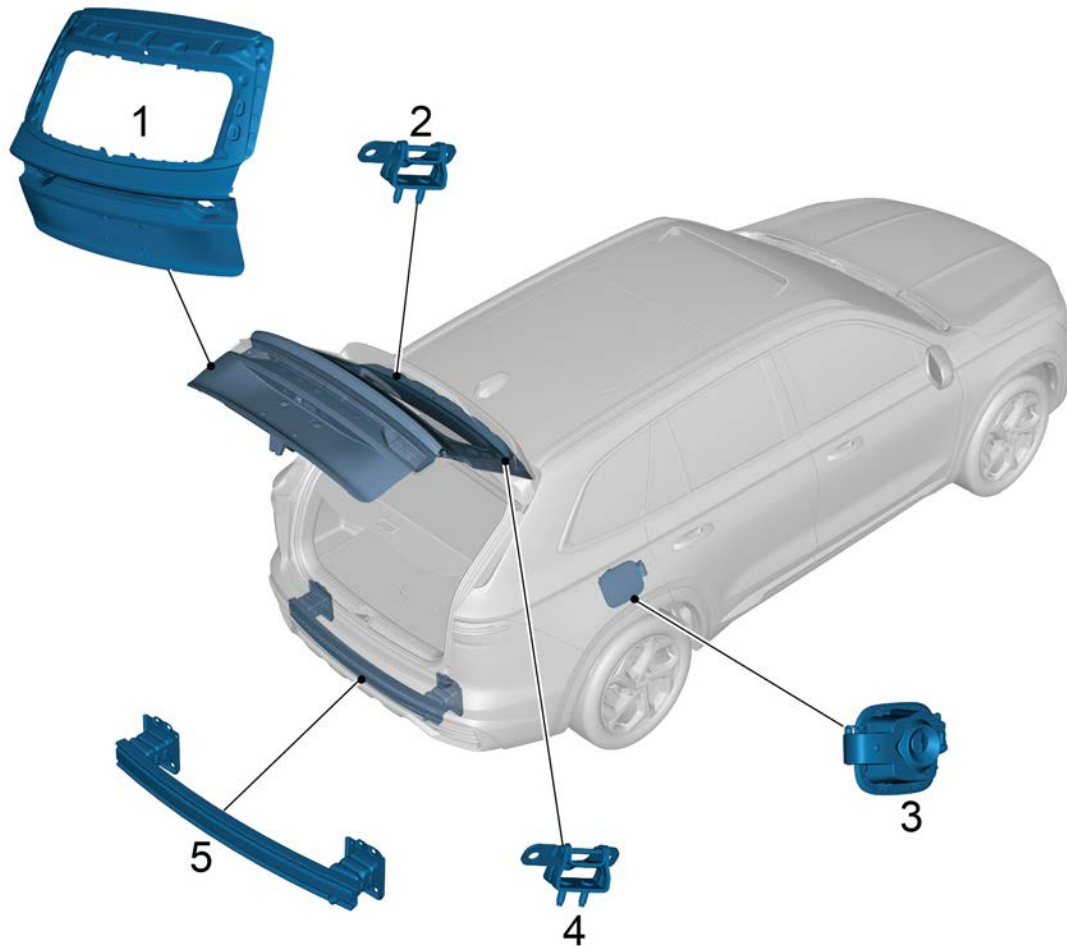
12.3.1 Specification

12.3.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Tailgate hinge fixing bolt	M8×20	20~28	14.8~20.7
Tailgate hinge fixing nut	M8×10.2	25~35	18.4~25.8
Rear anti-intrusion crossbeam assembly retaining bolt	M10×10	41~55	30.2~40.6
Tailgate wire harness retaining bolt	M8×25	8~12	5.9~8.8

12.3.2 Component position

12.3.2.1 Component position



- | | | | |
|----|--------------------------|----|-----------------------------------|
| 1. | Tailgate body assembly | 4. | Right tailgate hinge |
| 2. | Left tailgate hinge | 5. | Rear anti-intrusion beam assembly |
| 3. | Fuel filler cap assembly | | |

12.3.3 Removing and installing

12.3.3.1 Replacement of tailgate body assembly

Removal procedure

Warning !

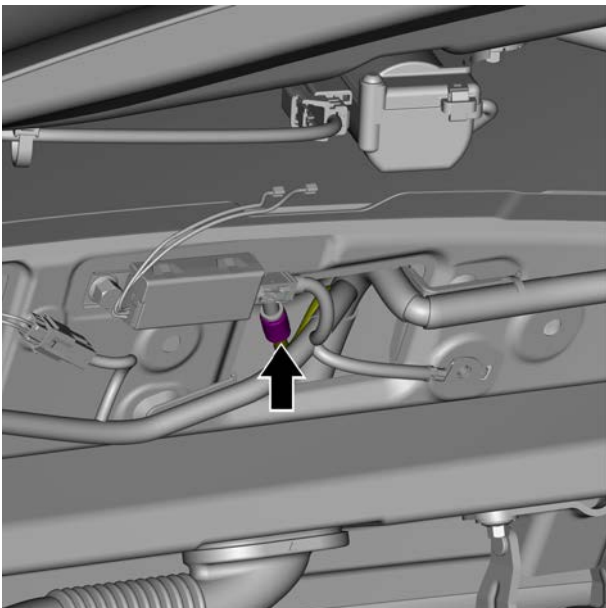
See "warning about disconnecting battery" in [Warnings and cautions](#)

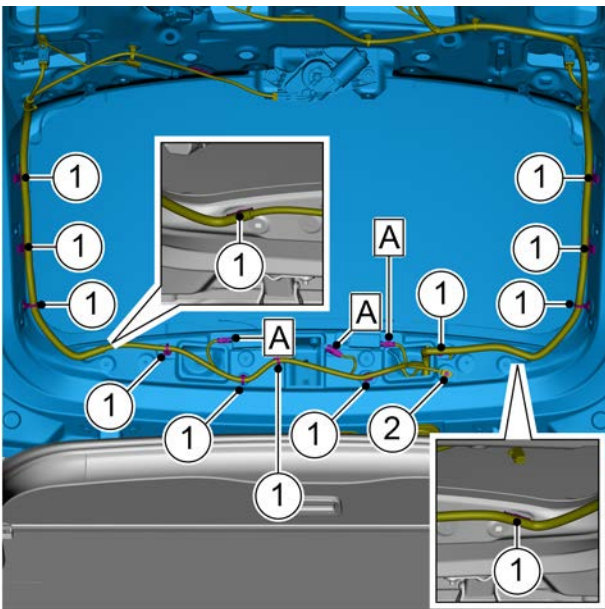
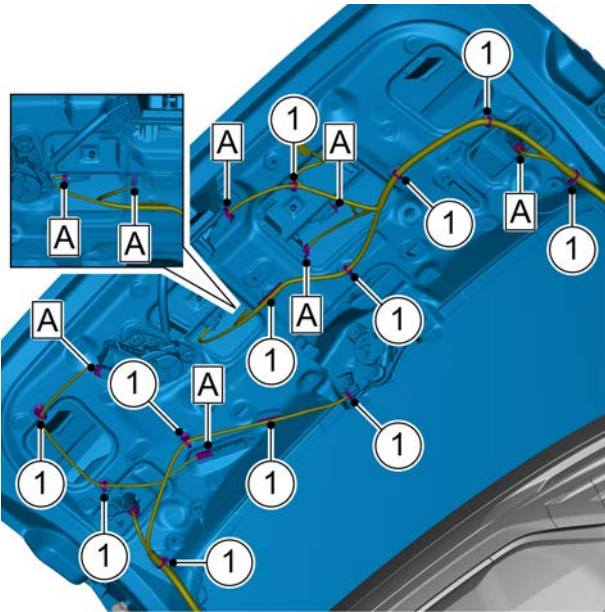
Caution

When removing the tailgate assembly, two people must cooperate with each other.

When removing the tailgate assembly, mark the position of the tailgate assembly and hinges for positioning during installation.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the tailgate middle upper interior trim panel assembly of the assembly, see [Replacement of the tailgate middle upper interior trim panel assembly](#).
- 3 Remove interior trim panel tail gate assembly, refer to replacement of upper left trim panel tail gate assembly.
- 4 Remove the tailgate lower interior trim panel assembly of the assembly, see [Replacement of the tailgate lower interior trim panel assembly](#).
- 5 Remove spoiler assembly, refer to [Replacement of spoiler assembly](#).
- 6 Remove rear windshield washer hose assembly.

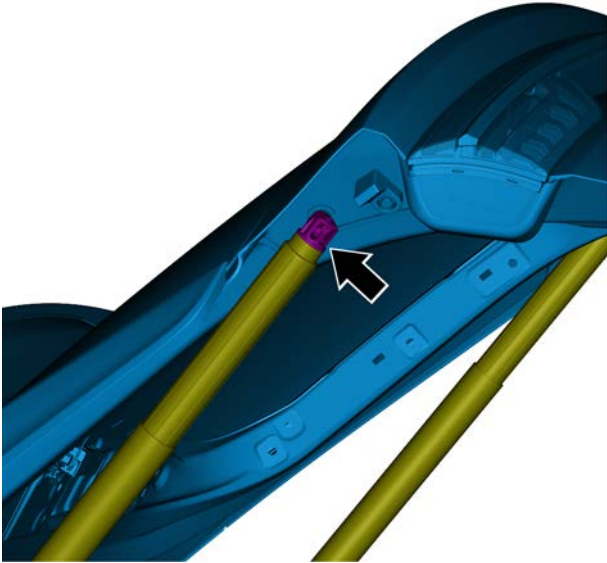




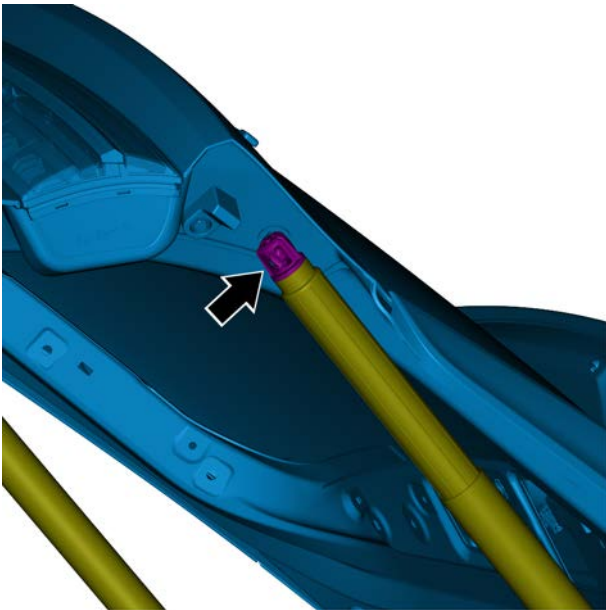
- 7 Disconnect the 8 harness connector A of tailgate harness.
- 8 Remove the 12 harness clip 1 of tailgate harness.

- 9 Disconnect the 3 harness connector A of tailgate harness.
- 10 Remove 13 harness clips 1 and wire harness retaining bolts 2 of tailgate harness.

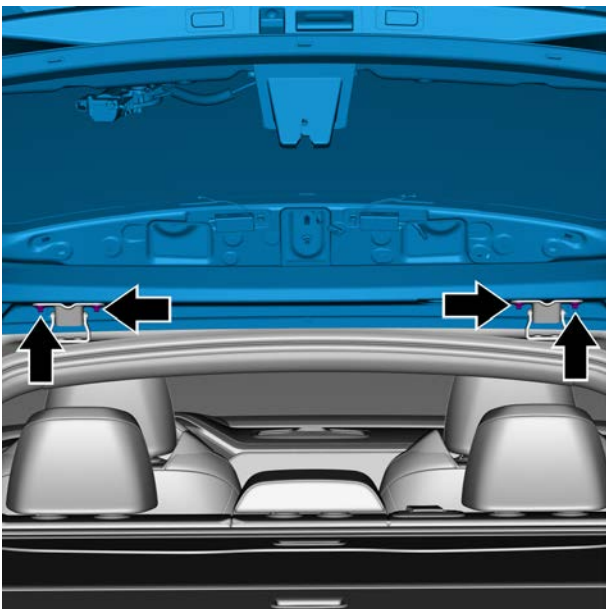
- 11 Remove the rear windshield assembly, see the [Replacement of the rear windshield assembly](#).
- 12 Remove tail lamp, see [Replacement of tail lamp](#).
- 13 After removing rear wiper motor, see [Replacement of rear wiper motor](#).
- 14 Remove the tailgate lock assembly, see [Replacement of the tailgate lock assembly](#).
- 15 Remove the window antenna amplifier, see [Replacement of the window antenna amplifier](#).
- 16 Remove the AM/FM/DAB antenna amplifier, see [Replacement of AM/FM/DAB antenna amplifier](#).
- 17 Remove power circuit rejector, see [Replacement of power circuit rejector](#).



- 18 Remove the grounding filter, see [Replacement of the grounding filter](#).
- 19 Remove the upper end connector of the left electric brace assembly of the tailgate.

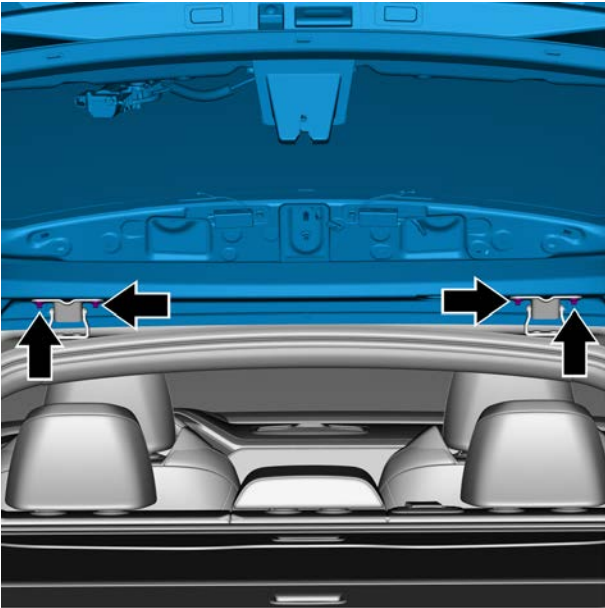


20 Remove the upper end connector of the balance pole on the right side of the tailgate.



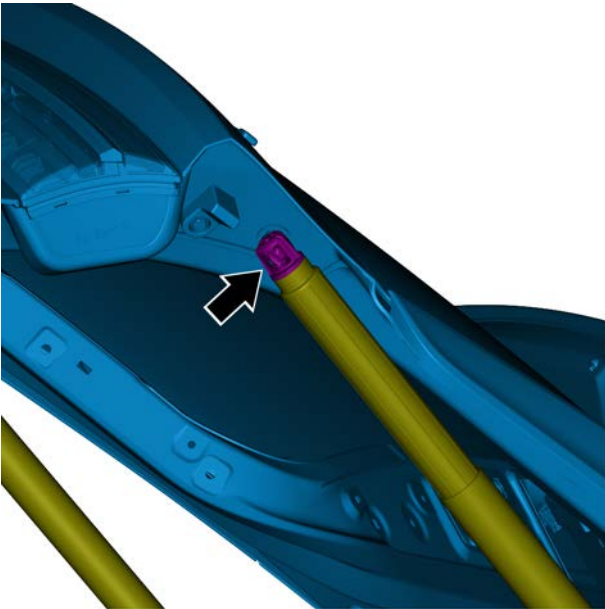
21 Remove the 4 retaining bolts of the tailgate assembly and remove the tailgate assembly.

Installation procedure

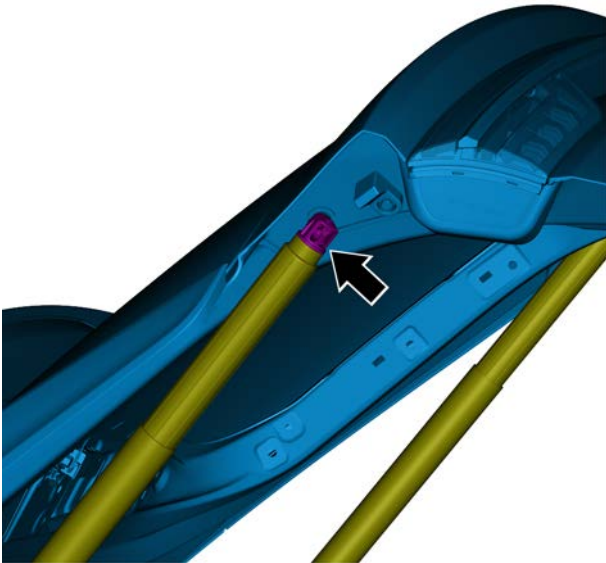


- 1 Install 4 retaining bolts of tailgate assembly.

Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)



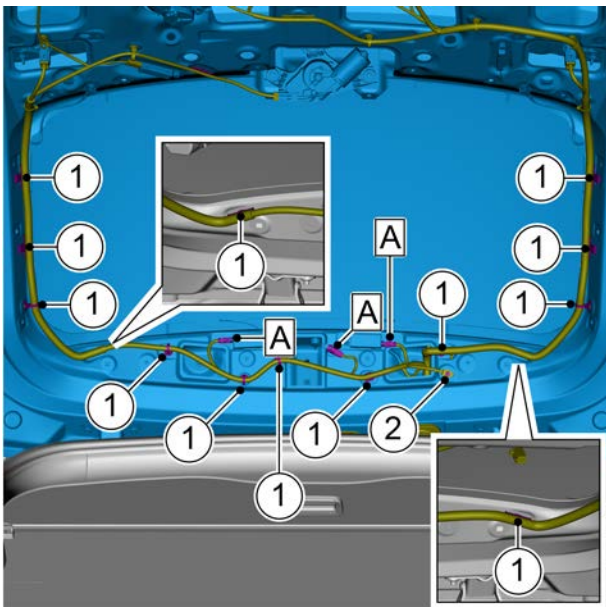
- 2 Install the upper end connector of the balance pole on the right side of the tailgate.

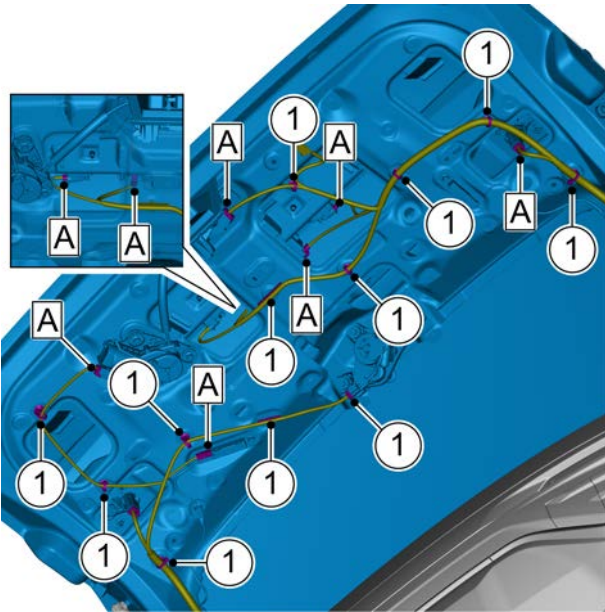


- 3 Install the upper end connector of the left electric brace assembly of the tailgate.

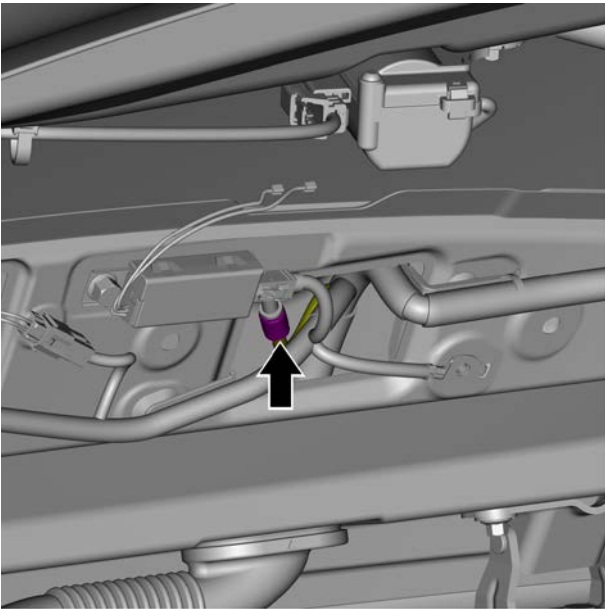
- 4 Install the grounding filter.
- 5 Install power circuit rejector.
- 6 Install AM/FM/DAB antenna amplifier.
- 7 Install the window antenna amplifier.
- 8 Install the tailgate lock assembly.
- 9 Install the rear wiper motor.
- 10 Install tail lamps.
- 11 Install the rear windshield assembly.
- 12 Connect 3 harness connectors A of the tailgate harness.
- 13 Install 13 harness clips 1 and wire harness retaining bolts 2 of tailgate harness.

Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)





- 14 Connect 8 harness connectors A of the tailgate harness.
- 15 Install 12 harness clip 1 of tailgate harness.



- 16 Install rear windshield washer hose assembly.

- 17 Install spoiler assembly.
- 18 Install the lower trim panel assembly of the tailgate.
- 19 Install the upper left interior trim panel tail gate assembly.r.
- 20 Install the middle upper interior trim panel assembly of the tailgate.
- 21 Connect the negative battery cable.

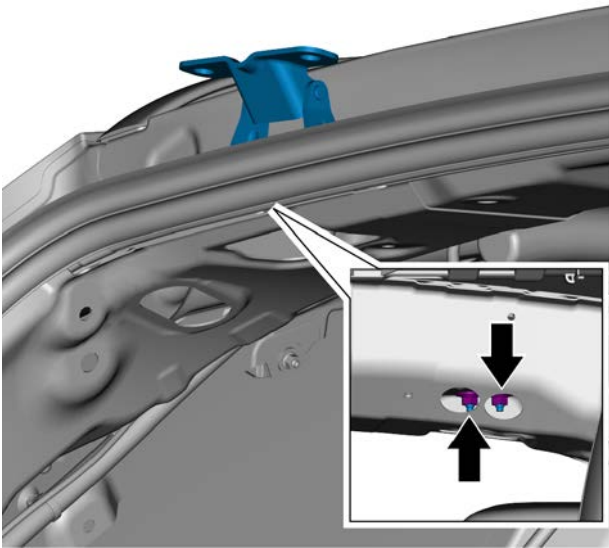
12.3.3.2 Replacement of left tailgate hinge

Removal procedure

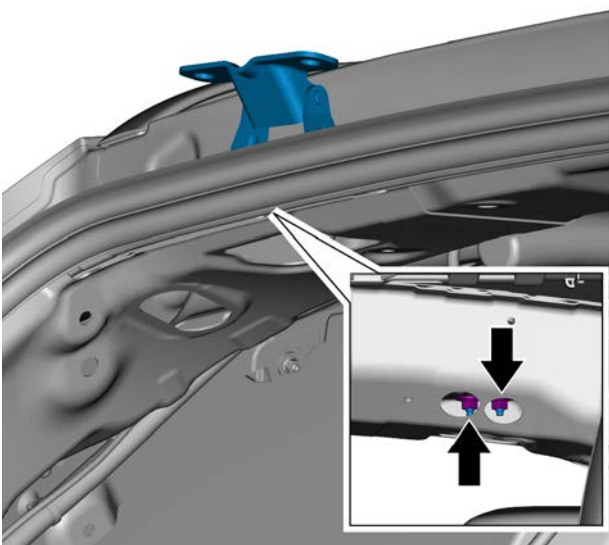
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the tailgate body assembly, see [Replacement of the tailgate body assembly](#).
- 3 Remove the ceiling assembly, see [Replacement of the roof assembly](#).
- 4 Remove the 2 retaining nuts of left tailgate hinge and remove the left tailgate hinge.

**Installation procedure**

- 1 Install 2 retaining nuts of left tailgate hinge.
Torque: 30N.m (metric system) 22.1lb-ft (Imperial system)



- 2 Install the ceiling assembly.

- 3 Install the tailgate.
- 4 Connect the negative battery cable.

12.3.3.3 Fuel filler cap assembly replacement

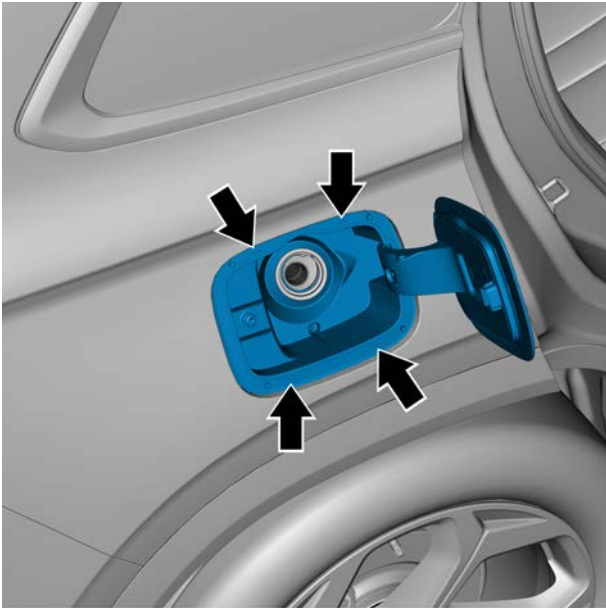
Removal procedure

Warning !

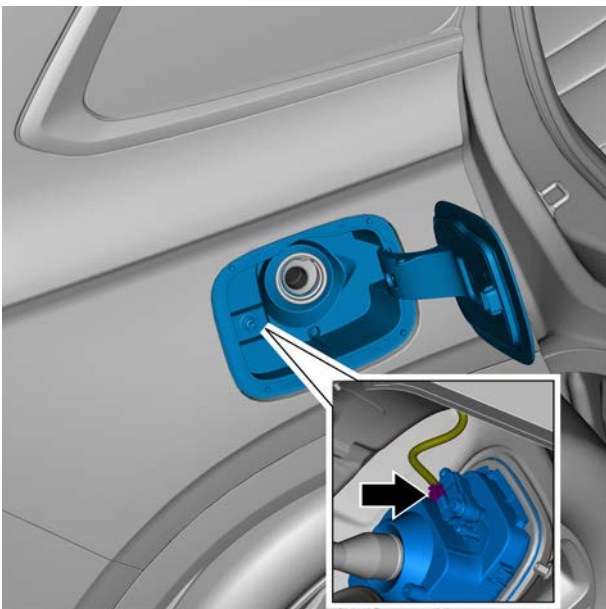
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove fuel filler cap assembly.



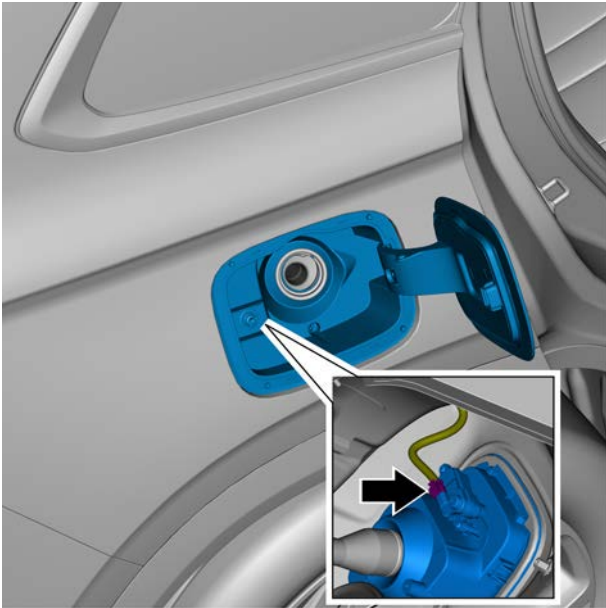


3 Remove the fuel filler cap assembly.



4 Disconnect the fuel filler cap motor harness connector and remove the fuel filler cap assembly.

Installation procedure



- 1 Connect the fuel filler cap motor harness connector.



- 2 Install the fuel filler cap assembly.



- 3 Install the fuel filler cap assembly.

- 4 Connect the negative battery cable.

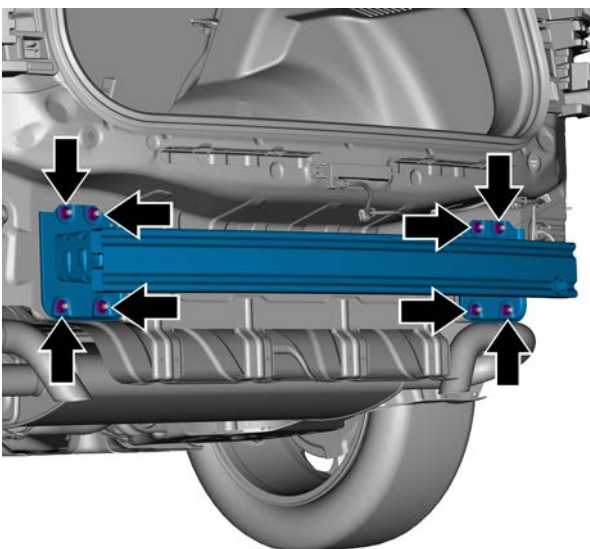
12.3.3.4 Replacement of rear anti-collision beam assembly

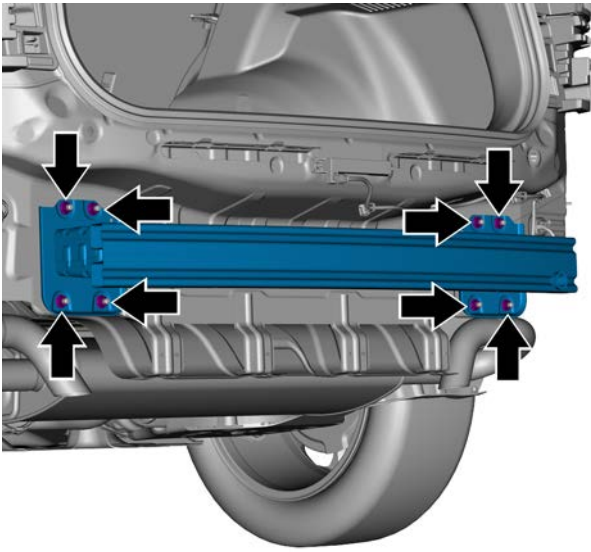
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rear bumper assembly, see the [Replacement of the rear bumper assembly \(Type 1\)](#) and the [Replacement of the rear bumper assembly \(Type 2\)](#).
- 3 Remove the 8 retaining nuts of the rear anti-intrusion beam assembly and remove the rear anti-intrusion beam assembly.





Installation procedure

- 1 Install 8 retaining nuts of rear anti-intrusion crossbeam assembly.

Torque: 48 N·m (metric) 35.4 lb-ft (imperial system)

- 2 Install the rear bumper assembly.
- 3 Connect the negative battery cable.

12.4 Bumper

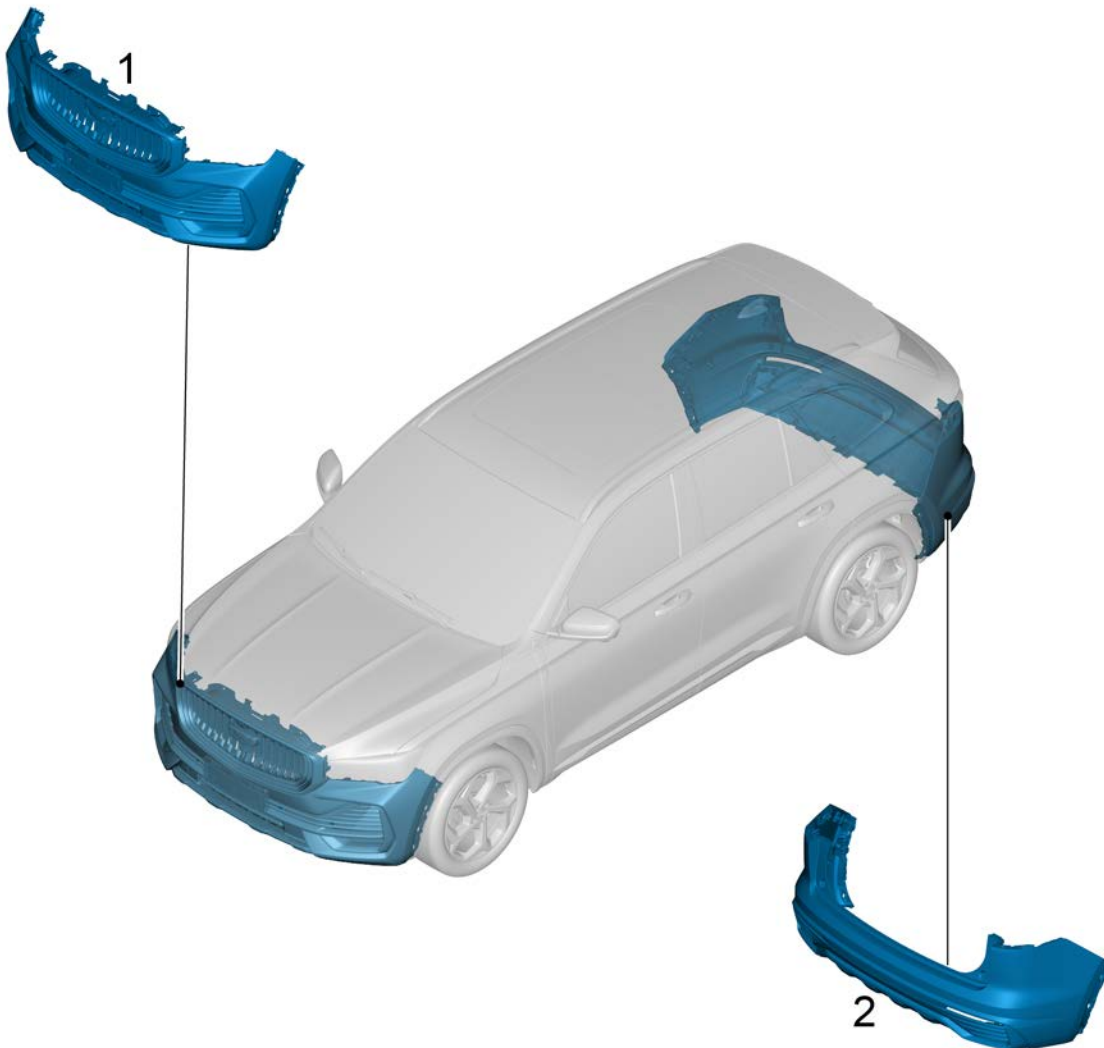
12.4.1 Specification

12.4.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Fixing bolt of the front bumper assembly	M6×25	5~7	3.7~5.1
Front license plate mounting plate retaining screw	PF5×16	1.5~2.5	1.1~1.8
Front bumper upper left trim strip retaining screw	PF5×16	1.3~1.7	0.9~1.3
Front bumper lower trim strip retaining screw	ST4.8×19	1.3~1.7	0.9~1.3
Front bumper left trim strip retaining screw	PF5×16	1.3~1.7	0.9~1.3
Front bumper lower grille retaining screws	PF5×16	1.3~1.7	0.9~1.3
Fixing bolt of leg protection bracket for pedestrian	ST4.8×19	1.3~1.7	0.9~1.3
Radiator grille body retaining screw	PF5×16	1.3~1.7	0.9~1.3
Rear bumper assembly retaining bolt	M6×20	5~7	3.7~5.1
Body retaining bolt on rear bumper	PF5×16	1.3~1.7	0.9~1.3
Tighten the retaining bolt on the right side of the front bumper	M6×20	8~12	5.9~8.8
Tighten the right bottom retaining screw of the front bumper assembly	PF5×16	1.5~2.5	1.1~1.8
Fastening retaining screw on the left side of rear bumper assembly	PF5×16	1.0~2.0	0.74~1.3

12.4.2 Component position

12.4.2.1 Component position



1. Front bumper assembly

2. Rear bumper assembly

12.4.3 Removing and installing

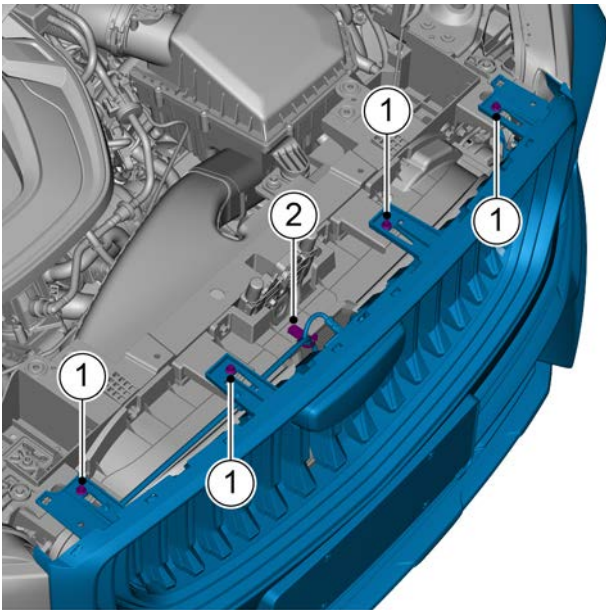
12.4.3.1 Replacement of front bumper assembly

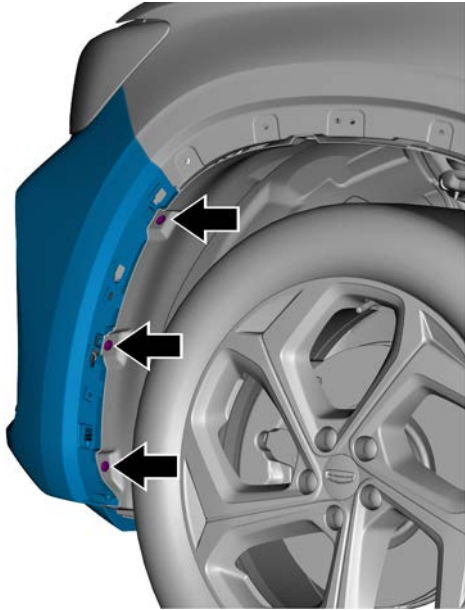
Removal procedure

Warning !

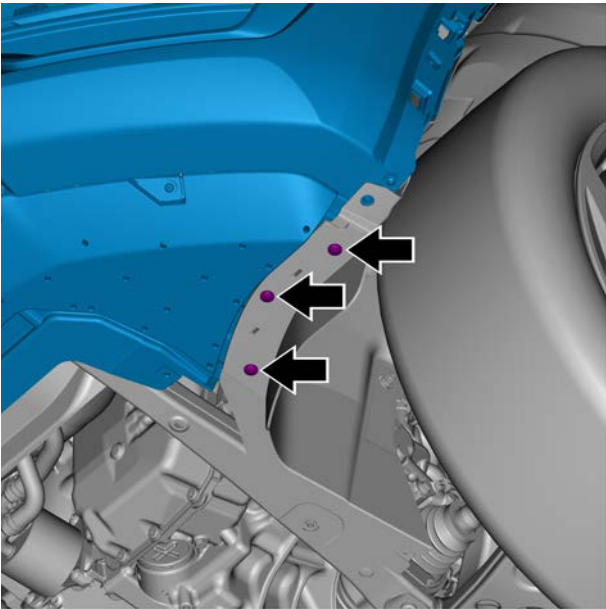
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 6 Remove the 4 retaining bolts 1 on the upper part of the front bumper assembly and the front bumper harness clip 2.

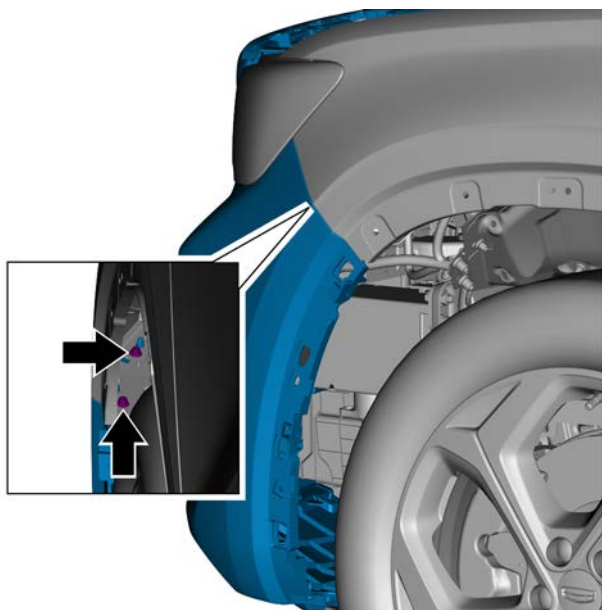




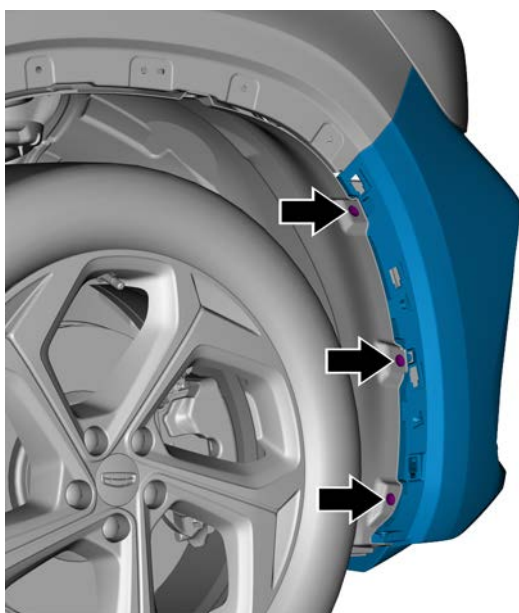
- 7 Remove the 3 retaining screws on the left side of the front bumper assembly.



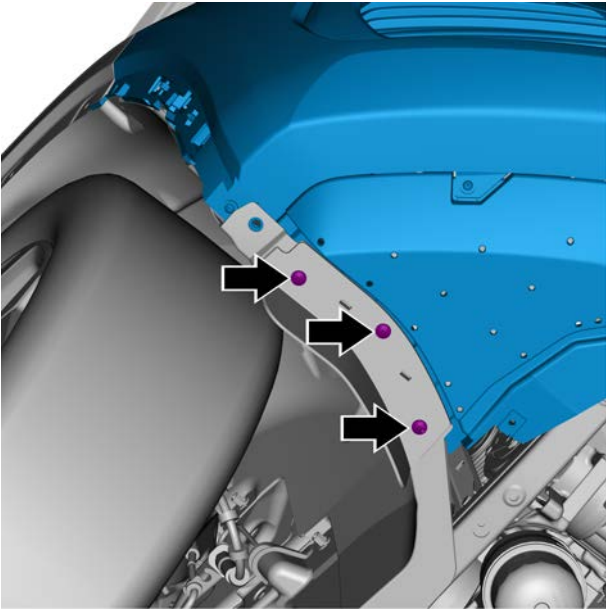
- 8 Remove the 3 retaining screws at the bottom left of the front bumper assembly.



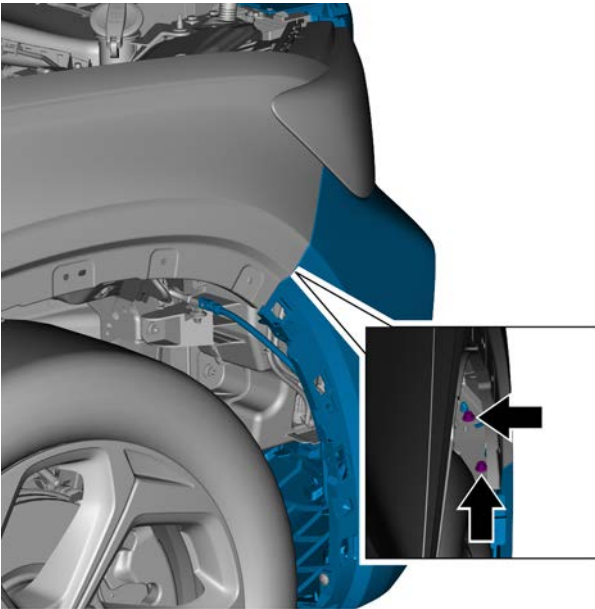
- 9 Remove the 2 retaining bolts on the left side of the front bumper assembly.



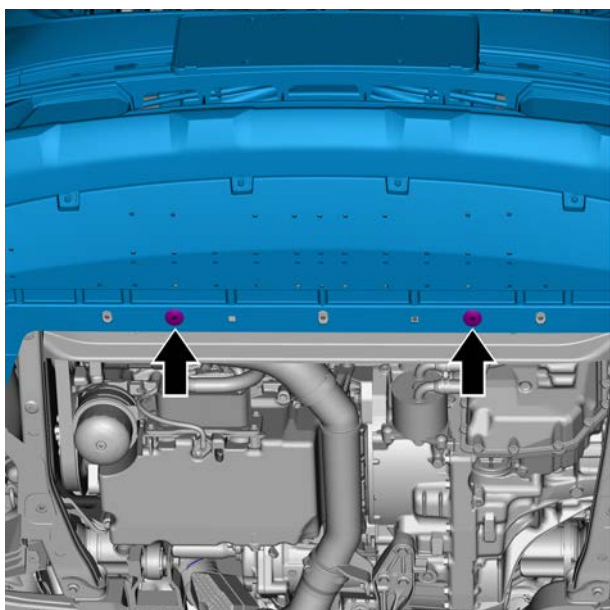
- 10 Remove the 3 retaining screws on the right side of the front bumper assembly.



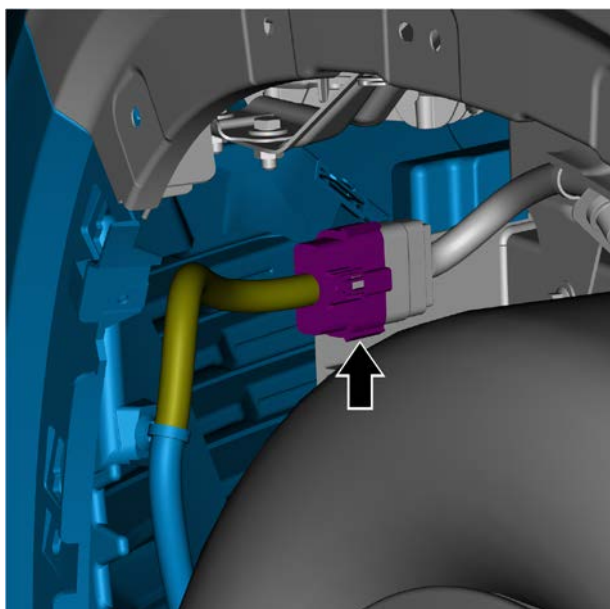
- 11 Remove the 3 retaining screws on the right bottom of the front bumper assembly.



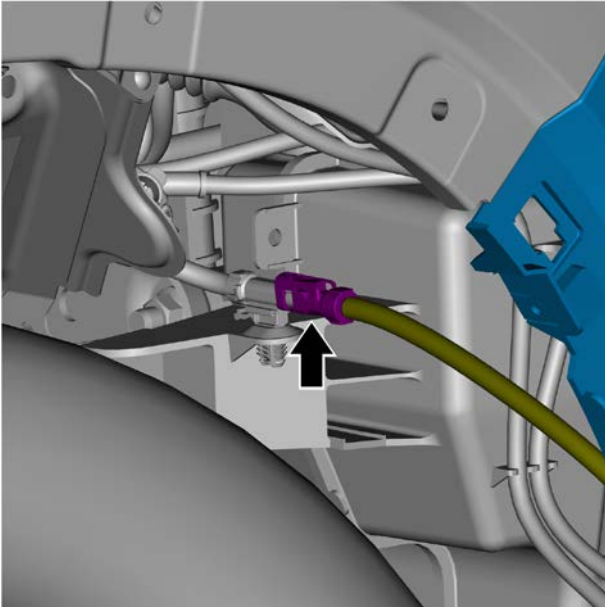
- 12 Remove the 2 retaining bolts on the right side of the front bumper assembly.



13 Remove the 2 retaining clips of the pedestrian calf protection bracket.

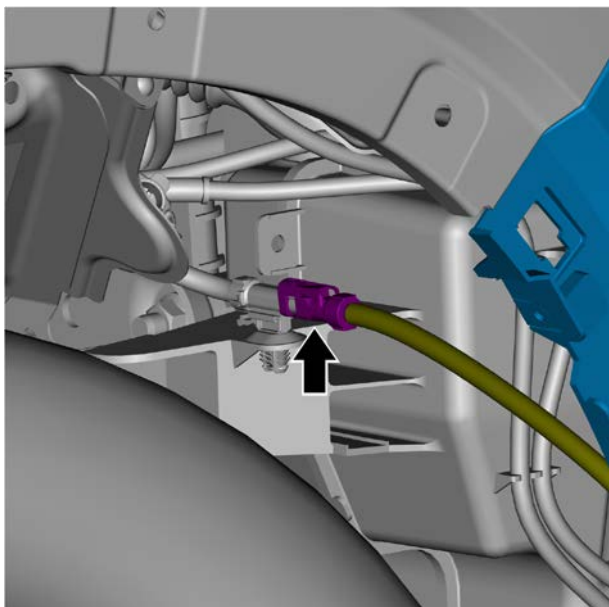


14 Disconnect the harness connector on the left side of the front bumper harness.

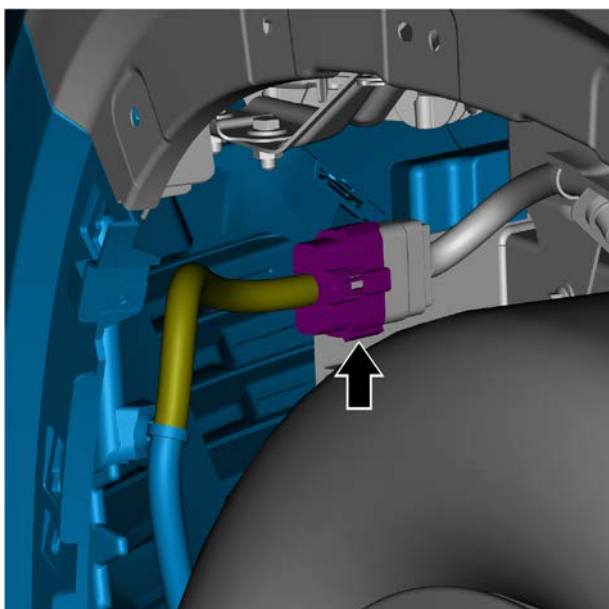


- 15 Disconnect the right harness connector of the front bumper harness and remove the front bumper assembly.

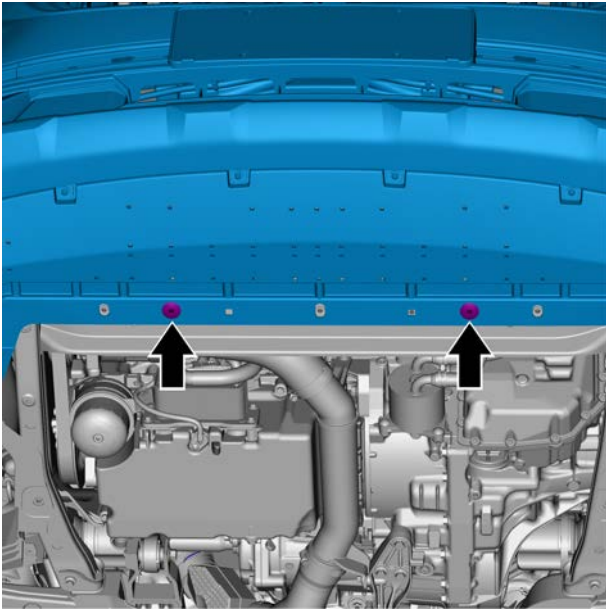
Installation procedure



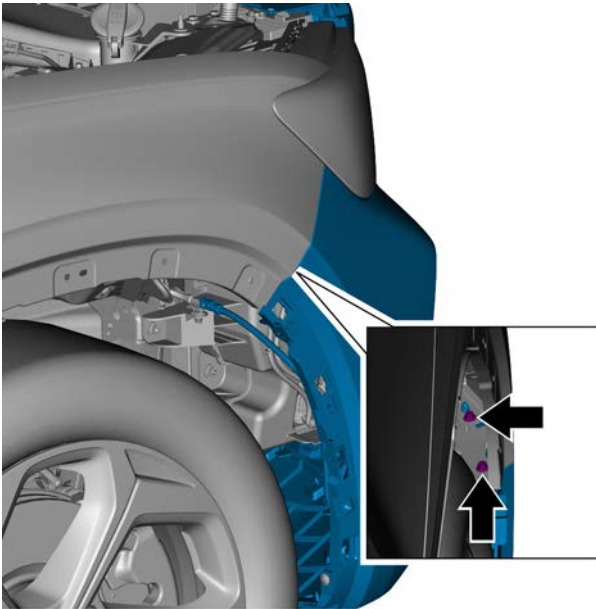
- 1 Connect the harness connector on the right side of the front bumper harness.



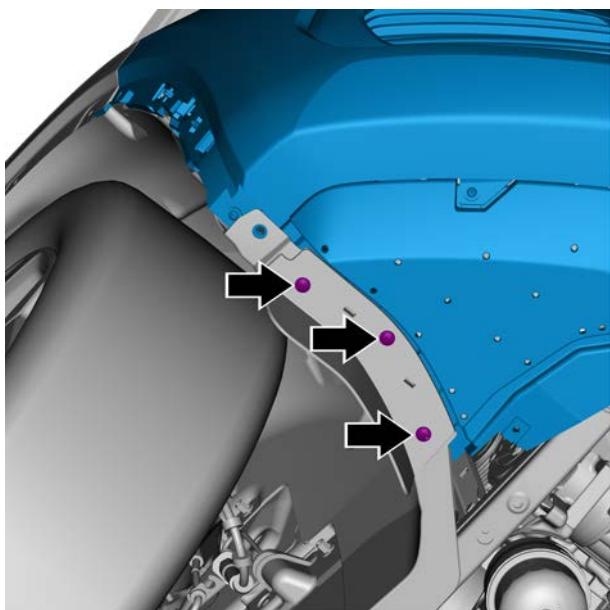
- 2 Connect the harness connector on the left side of the front bumper harness.



- 3 Install 2 retaining clips of pedestrian calf protection bracket.

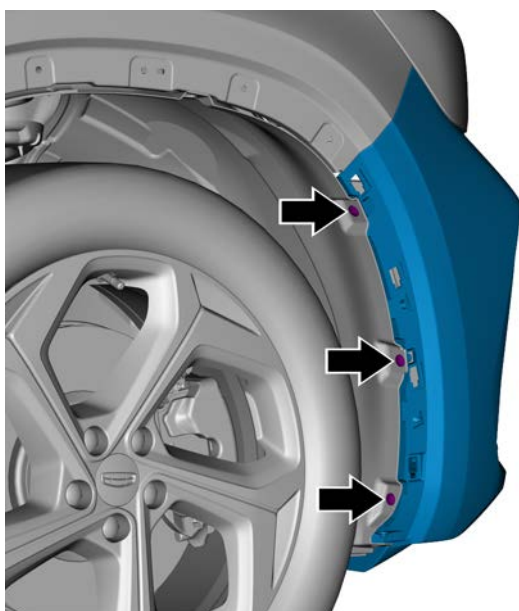


- 4 Install the 2 retaining bolts on the right side of the front bumper assembly.
Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)



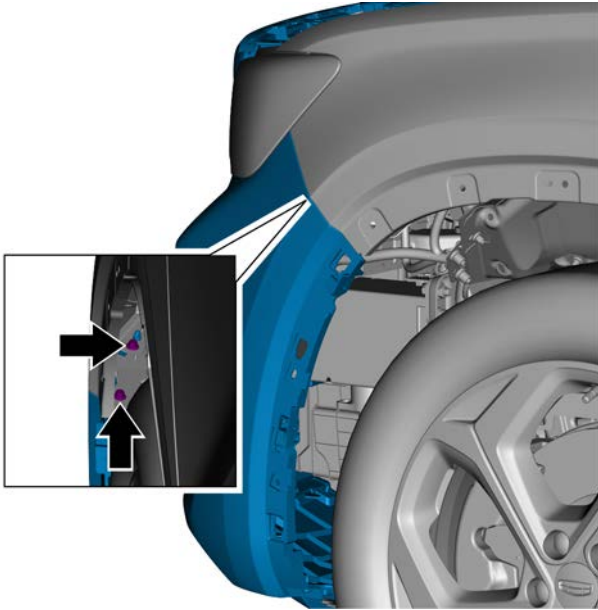
- 5 Install the 3 retaining screws at the bottom right of the front bumper assembly.

Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)



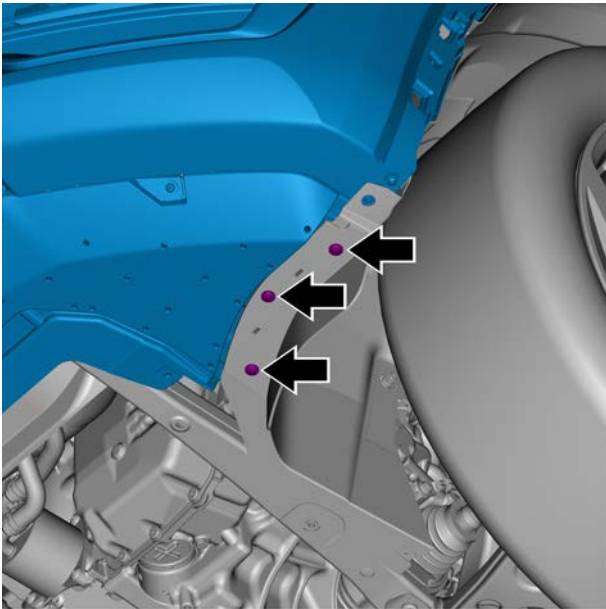
- 6 Install the 3 retaining screws on the right side of the front bumper assembly.

Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)



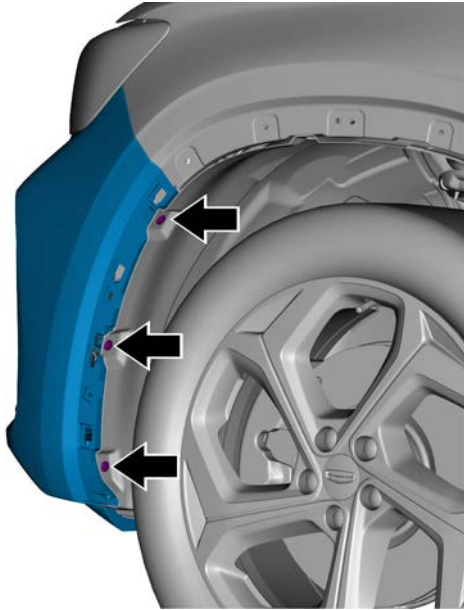
- 7 Install the 2 retaining bolts on the left side of the front bumper assembly.

Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)



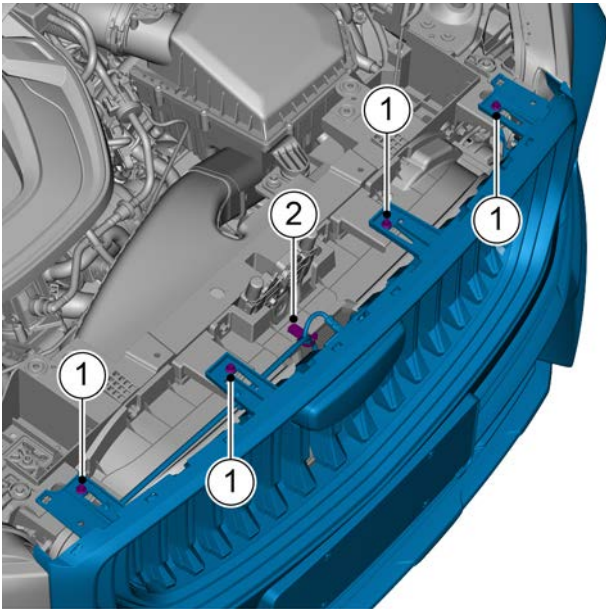
- 8 Install the 3 retaining screws at the bottom left of the front bumper assembly.

Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)



- 9 Install the 3 retaining screws on the left side of the front bumper assembly.

Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)



- 10 Install the 4 retaining bolts 1 on the upper part of the front bumper assembly and the front bumper harness clip 2.

Torque: 6 N·m (metric) 4.4 lb-ft (imperial system)

- 11 Install the front left and front right wheel brow.
12 Install the engine fender.
13 Install the front engine bay trim plate.
14 Install the left and right engine bay trim plates.
15 Connect the negative battery cable.

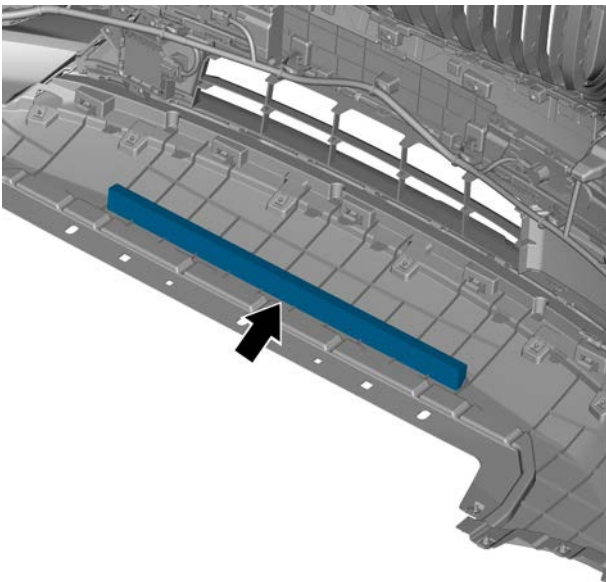
12.4.3.2 Replacement of foam in the middle of the front bumper

Removal procedure

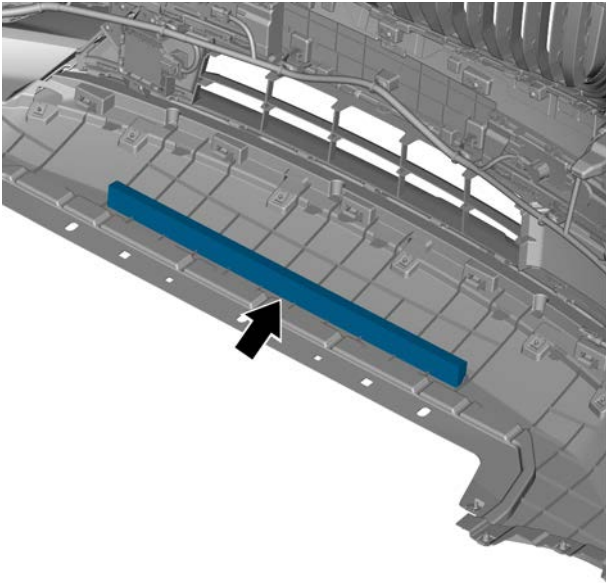
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 7 Disassemble the foam in the middle of the front bumper and remove it.



Installation procedure



- 1 Install the foam in the middle of the front bumper and remove it.

- 2 Install the front bumper assembly.
- 3 Install the front left and front right wheel brow.
- 4 Install the engine fender.
- 5 Install the front engine bay trim plate.
- 6 Install the left and right engine bay trim plates.
- 7 Connect the negative battery cable.

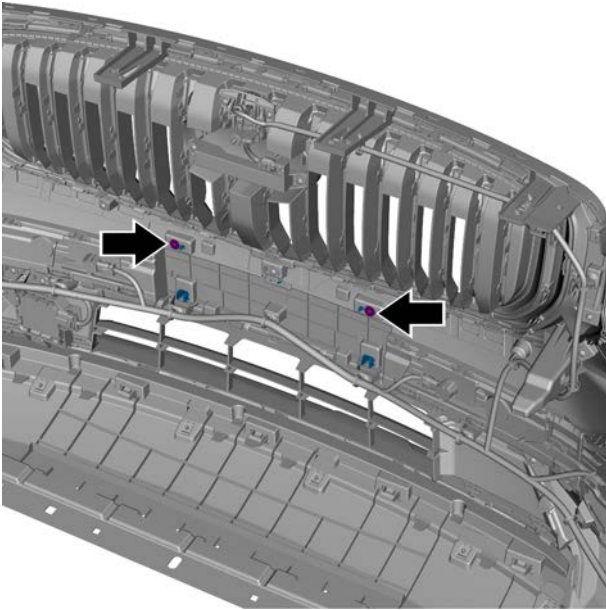
12.4.3.3 Replacement of front license plate mounting plate (Type 1)

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

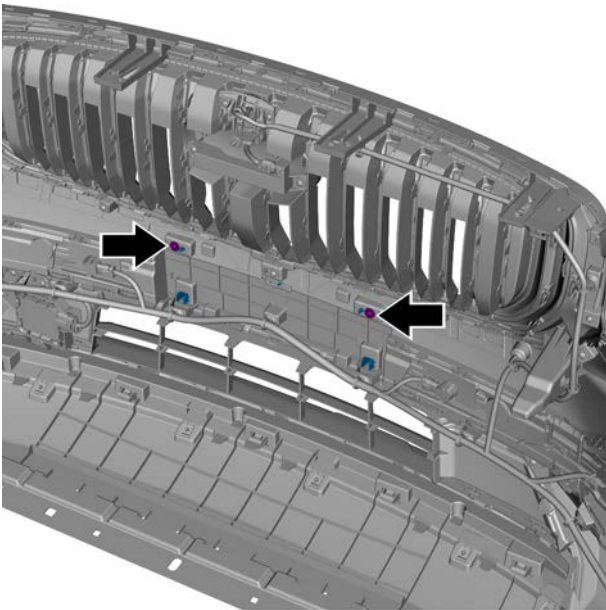
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)



- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 7 Remove the 2 retaining screws of the front license plate mounting plate and remove the front license plate mounting plate.

Installation procedure

- 1 Install the 2 fixing screws of the front license plate mounting plate.
Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)



- 2 Install the front bumper assembly.
- 3 Install the front left and front right wheel brow.
- 4 Install the engine fender.
- 5 Install the front engine bay trim plate.
- 6 Install the left and right engine bay trim plates.
- 7 Connect the negative battery cable.

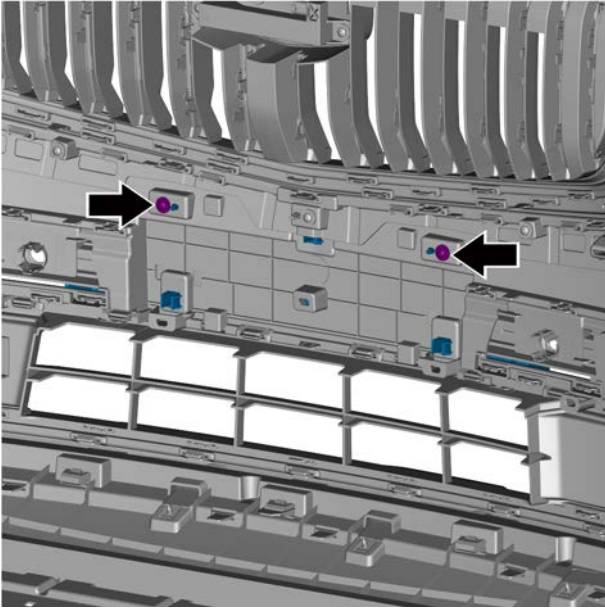
12.4.3.4 Replacement of front license plate mounting plate (Type 2)

Removal procedure

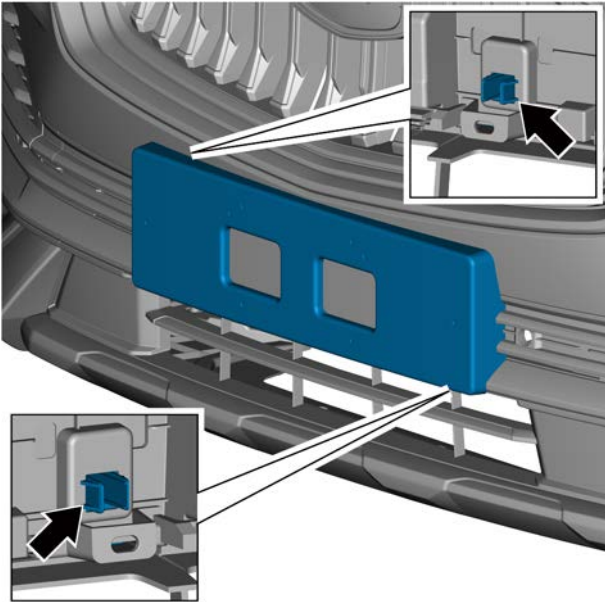
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates.](#)
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate.](#)
- 4 Remove the engine fender, see [Engine fender replacement.](#)
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly.](#)

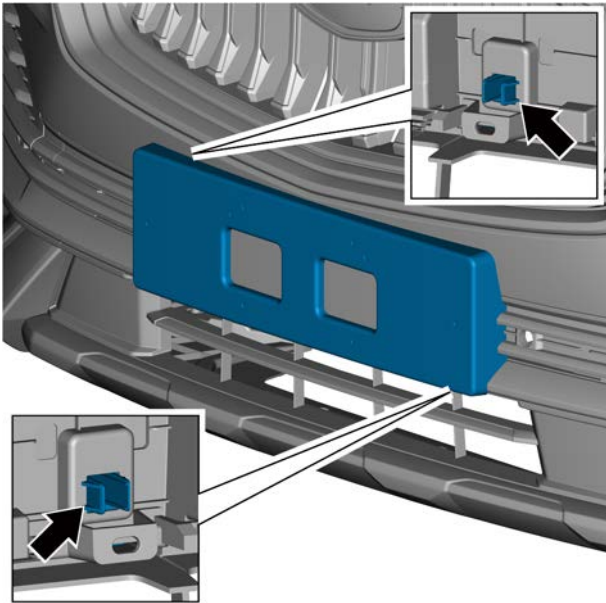


- 7 Remove the 2 fixing screws of the front license plate mounting plate.

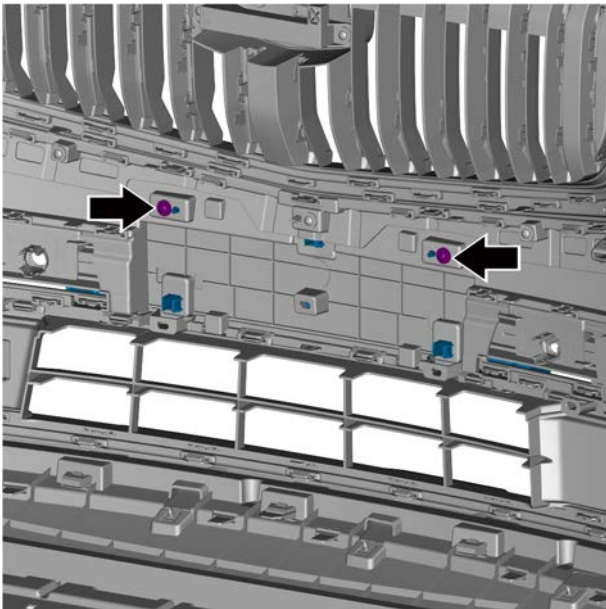


- 8 Press the buckle and remove the front license plate mounting plate.

Installation procedure



- 1 Install the front license plate mounting plate.



- 2 Install the 2 fixing screws of the front license plate mounting plate.
Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)

- 3 Install the front bumper assembly.
- 4 Install the front left and front right wheel brow.
- 5 Install the engine fender.
- 6 Install the front engine bay trim plate.
- 7 Install the left and right engine bay trim plates.
- 8 Connect the negative battery cable.

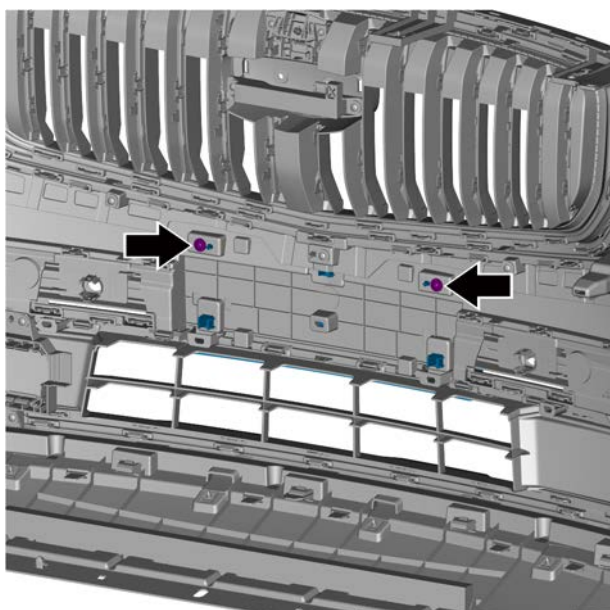
12.4.3.5 Replacement of front license plate mounting plate (Type 3)

Removal procedure

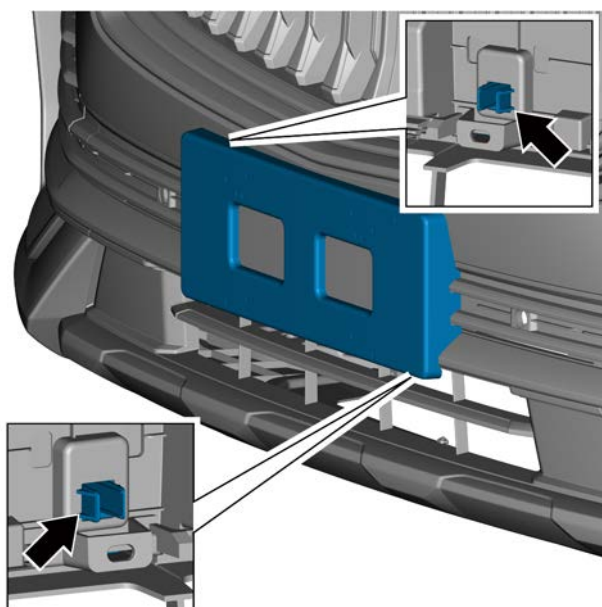
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates.](#)
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate.](#)
- 4 Remove the engine fender, see [Engine fender replacement.](#)
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly.](#)

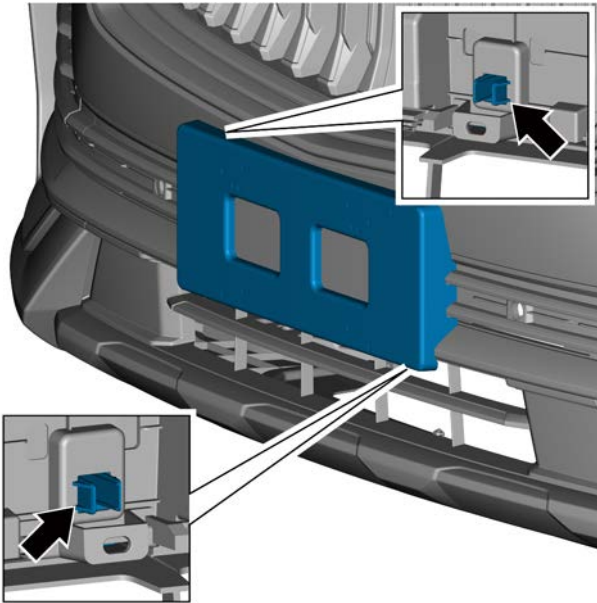


- 7 Remove the 2 fixing screws of the front license plate mounting plate.

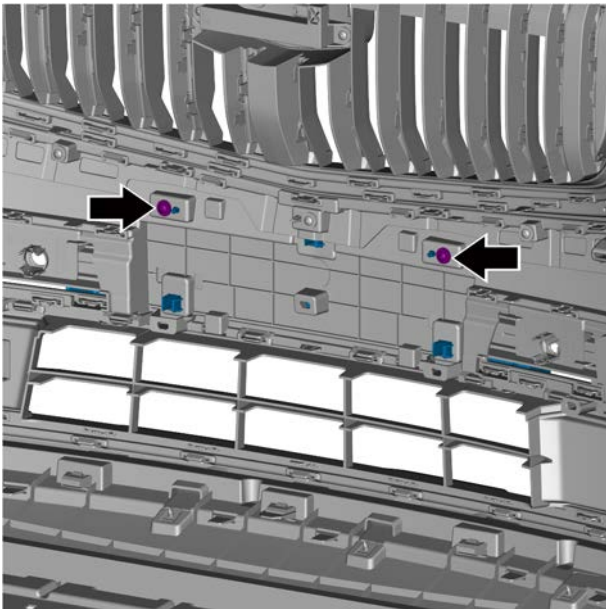


- 8 Press the buckle and remove the front license plate mounting plate.

Installation procedure



- 1 Install the front license plate mounting plate.



- 2 Install the 2 fixing screws of the front license plate mounting plate.
Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)

- 3 Install the front bumper assembly.
- 4 Install the front left and front right wheel brow.
- 5 Install the engine fender.
- 6 Install the front engine bay trim plate.
- 7 Install the left and right engine bay trim plates.
- 8 Connect the negative battery cable.

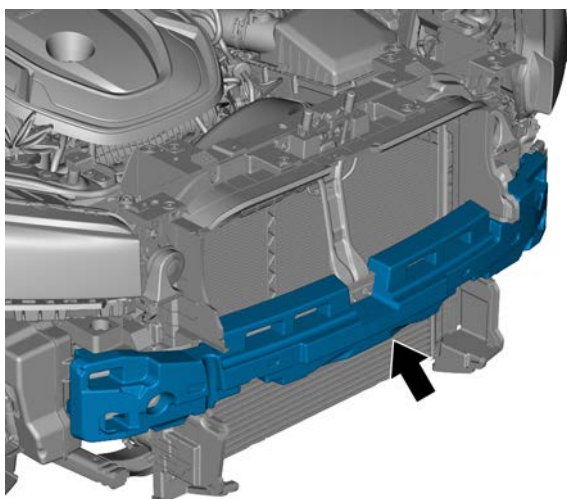
12.4.3.6 Replacement of front bumper buffer block

Removal procedure

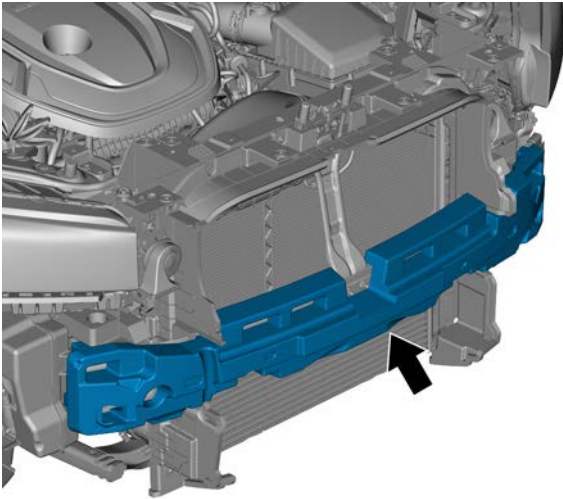
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 7 Disassemble the front bumper buffer block and remove it.



Installation procedure



- 1 Install and remove the front bumper buffer block.

- 2 Install the front bumper assembly.
- 3 Install the front left and front right wheel brow.
- 4 Install the engine fender.
- 5 Install the front engine bay trim plate.
- 6 Install the left and right engine bay trim plates.
- 7 Connect the negative battery cable.

12.4.3.7 Replacement of the left trim strip of the front bumper

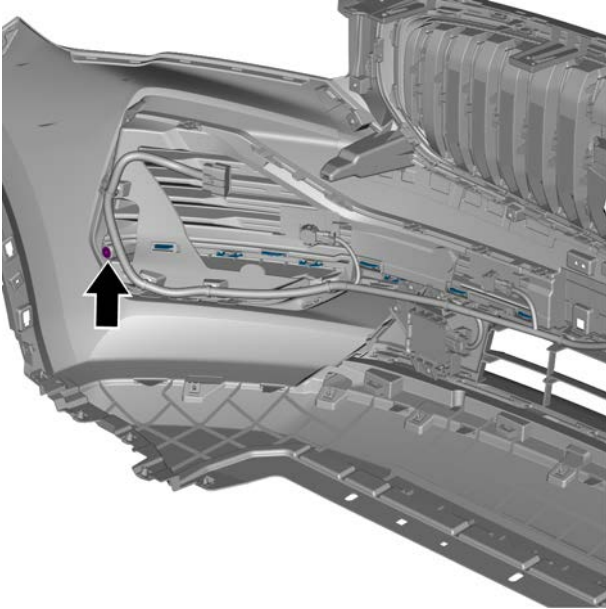
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

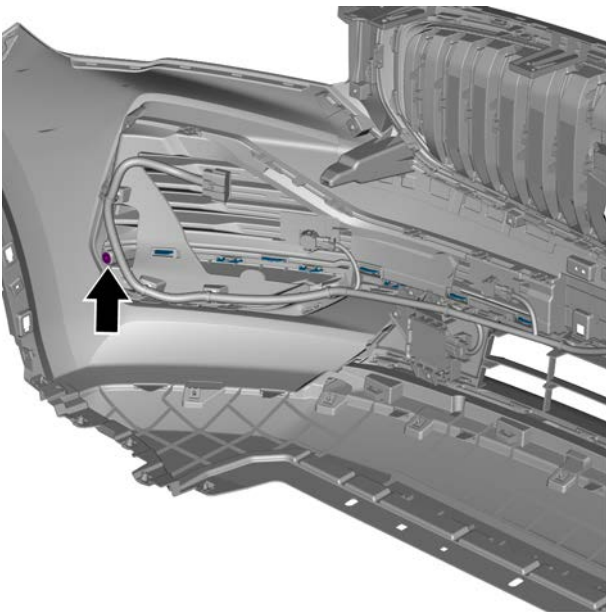
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).

- 7 Before removing the front license plate mounting plate, see the [Replacement of the front license plate mounting plate \(Type 1\)](#), the [Replacement of the front license plate mounting plate \(Type 2\)](#), and the [Replacement of the front license plate mounting plate \(Type 3\)](#).
- 8 Remove the upper left trim strip retaining screw of the front bumper and remove the upper left trim strip of the front bumper.



Installation procedure

- 1 Install the upper left trim strip retaining screw of the front bumper.
Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)



- 2 Install the front license plate mounting plate.
- 3 Install the front bumper assembly.
- 4 Install the front left and front right wheel brow.
- 5 Install the engine fender.
- 6 Install the front engine bay trim plate.

- 7 Install the left and right engine bay trim plates.
- 8 Connect the negative battery cable.

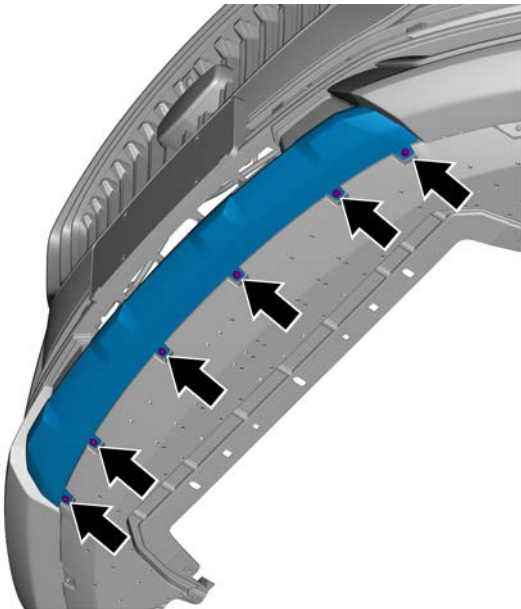
12.4.3.8 Replacement of lower trim strip of front bumper

Removal procedure

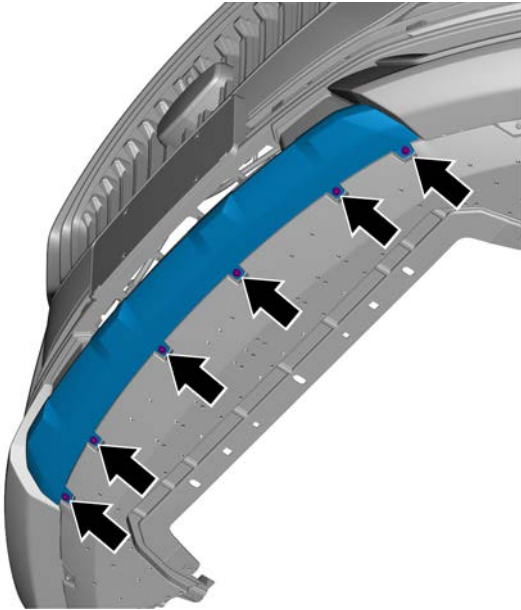
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates.](#)
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate.](#)
- 4 Remove the engine fender, see [Engine fender replacement.](#)
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly.](#)
- 7 Remove the 6 retaining screws on the lower trim strip of the front bumper and remove the lower trim strip of the front bumper.



Installation procedure



- 1 Install the 6 retaining screws for the lower trim strip of the front bumper.

Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)

- 2 Install the front bumper assembly.
- 3 Install the front left and front right wheel brow.
- 4 Install the engine fender.
- 5 Install the front engine bay trim plate.
- 6 Install the left and right engine bay trim plates.
- 7 Connect the negative battery cable.

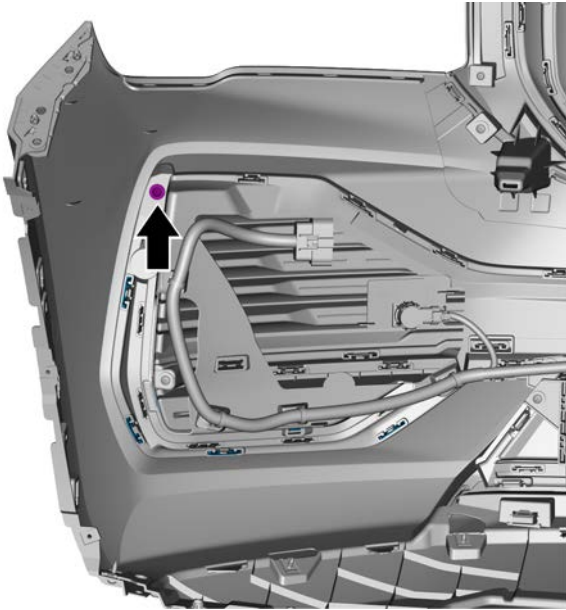
12.4.3.9 Replacement of left trim strip of front bumper

Removal procedure

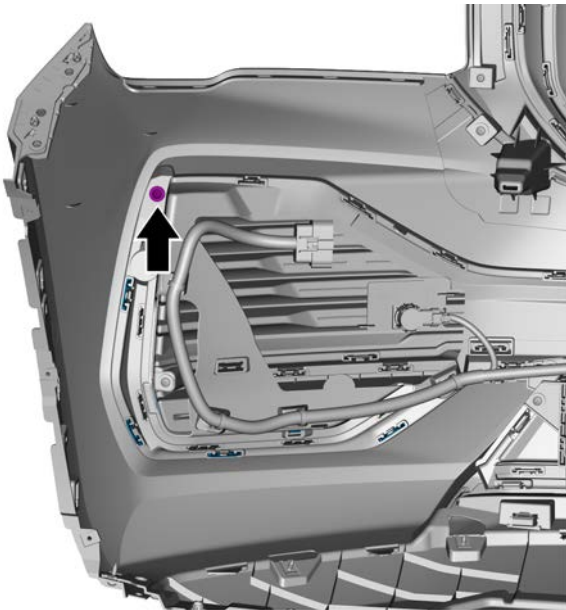
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)



- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 7 Remove the front bumper left trim strip retaining screw and remove the front bumper left trim strip.



Installation procedure

- 1 Install the front bumper left trim strip retaining screw.
Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)

- 2 Install the front bumper assembly.
- 3 Install the front left and front right wheel brow.
- 4 Install the engine fender.
- 5 Install the front engine bay trim plate.
- 6 Install the left and right engine bay trim plates.
- 7 Connect the negative battery cable.

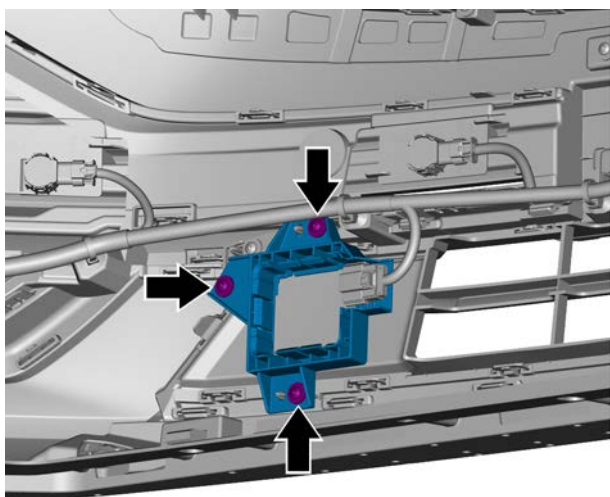
12.4.3.10 Replacement of the front bumper lower grill

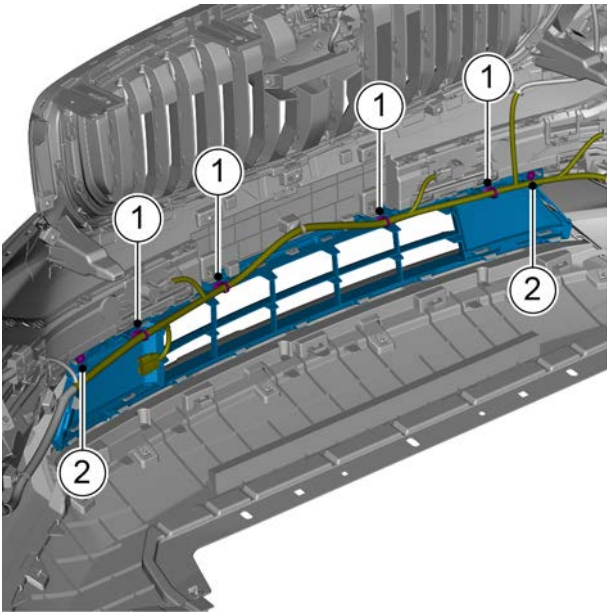
Removal procedure

Warning !

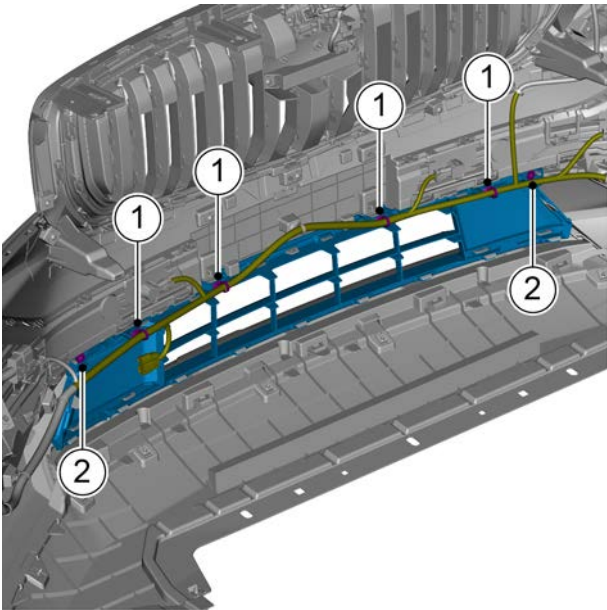
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 7 Remove the forward radar, see [Replacement of the forward radar](#).
- 8 Remove the 3 retaining screws of the ACC bracket.





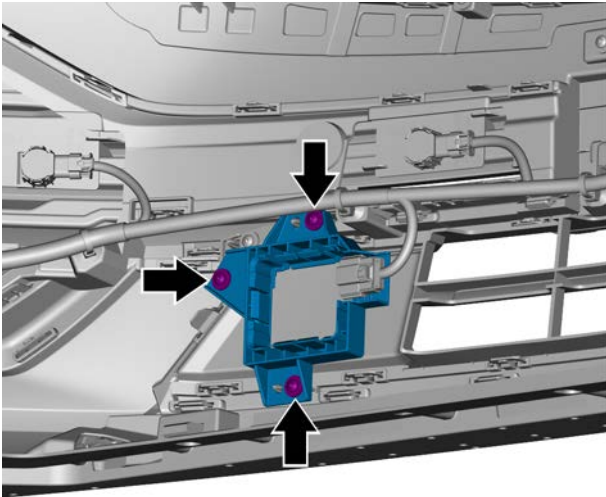
- 9 Remove the 4 harness clips 1 of the front bumper harness.
- 10 Remove the 2 retaining screws 2 on the lower grille of the front bumper and remove the lower grille of the front bumper.



Installation procedure

- 1 Install the 4 harness clips of front bumper harness.
- 2 Install the 2 retaining screws of the grille under the front bumper.

Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)



- 3 Install the 3 retaining screws of the ACC bracket.
Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)

- 4 Install forward radar.
- 5 Install the front bumper assembly.
- 6 Install the front left and front right wheel brow.
- 7 Install the engine fender.
- 8 Install the front engine bay trim plate.
- 9 Install the left and right engine bay trim plates.
- 10 Connect the negative battery cable.

12.4.3.11 Replacement of the leg protection bracket for pedestrians

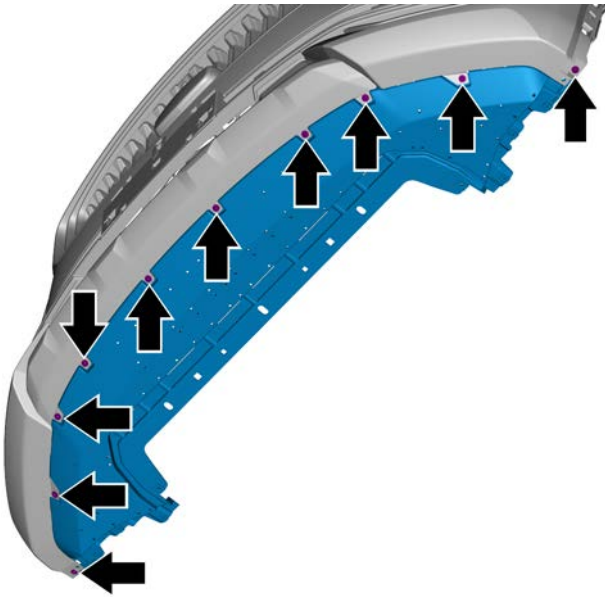
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).

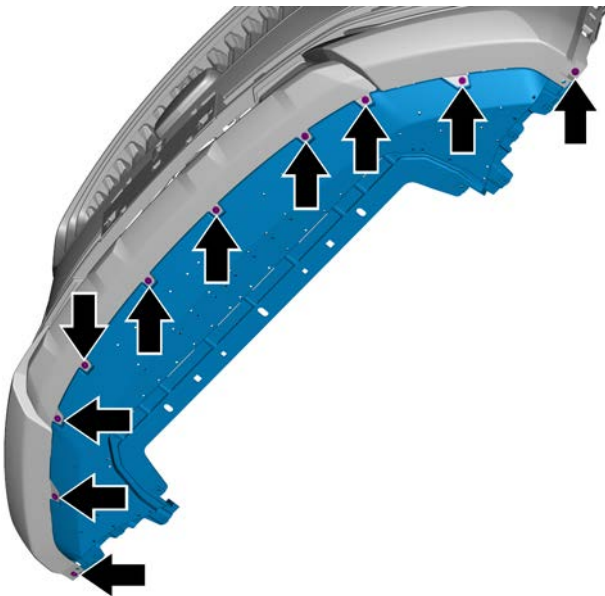
- 7 Remove the foam in the middle of the front bumper, see the [Replacement of foam in the middle of the front bumper](#).
- 8 Remove the 10 retaining screws of the pedestrian calf protective bracket and remove the pedestrian calf protective bracket.



Installation procedure

- 1 Install the 10 retaining screws of the pedestrian calf protection bracket.

Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)



- 2 Install the middle foam of the front bumper.
- 3 Install the front bumper assembly.
- 4 Install the front left and front right wheel brow.
- 5 Install the engine fender.
- 6 Install the front engine bay trim plate.
- 7 Install the left and right engine bay trim plates.
- 8 Connect the negative battery cable.

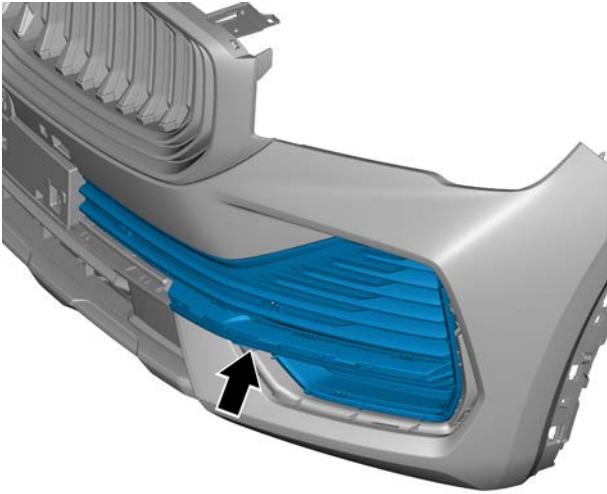
12.4.3.12 Replacement of trim cover assembly of front left foglamp

Removal procedure

Warning !

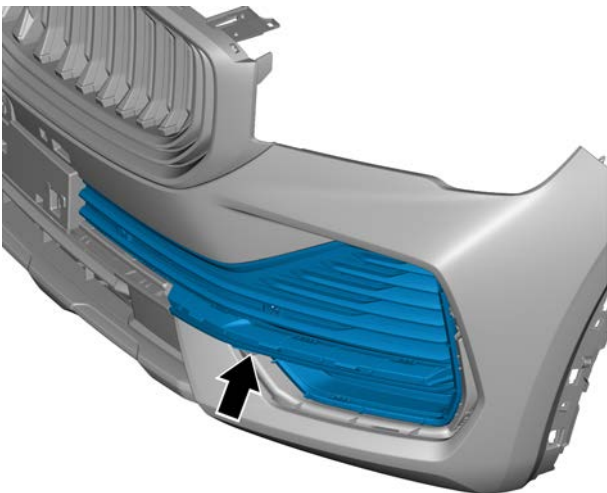
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures..](#)
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 7 Before removing the front license plate mounting plate, see the [Replacement of the front license plate mounting plate \(Type 1\)](#), the [Replacement of the front license plate mounting plate \(Type 2\)](#), and the [Replacement of the front license plate mounting plate \(Type 3\)](#).
- 8 Remove the upper left trim strip of the front bumper, see [Replacement of the upper left trim strip of the front bumper](#).



- 9 Remove the left trim strip of the front bumper, see [Replacement of the left trim strip of the front bumper.](#)
- 10 Disassemble the front left foglamp trim cover assembly and remove it.

Installation procedure



- 1 Install the front left foglamp trim cover assembly.
- 2 Install the left trim strip of the front bumper.
- 3 Install the upper left trim strip of the front bumper.
- 4 Install the front license plate mounting plate.
- 5 Install the front bumper assembly.
- 6 Install the front left and front right wheel brow.
- 7 Install the engine fender.
- 8 Install the front engine bay trim plate.
- 9 Install the left and right engine bay trim plates.
- 10 Connect the negative battery cable.

12.4.3.13 Replacement of front bumper body (Type 1)

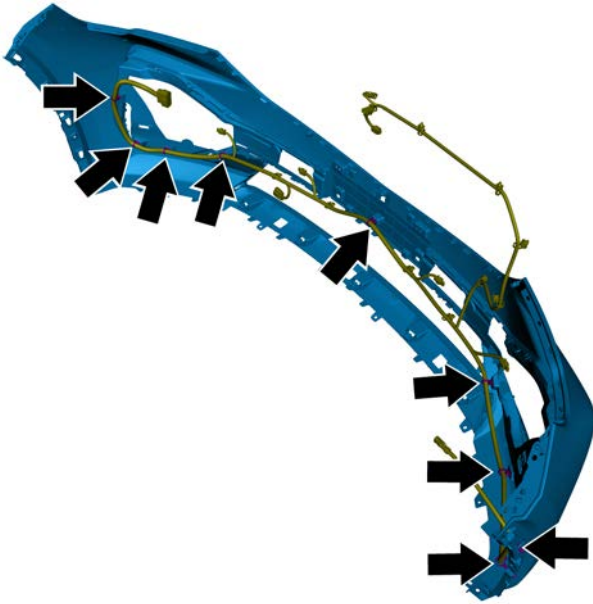
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

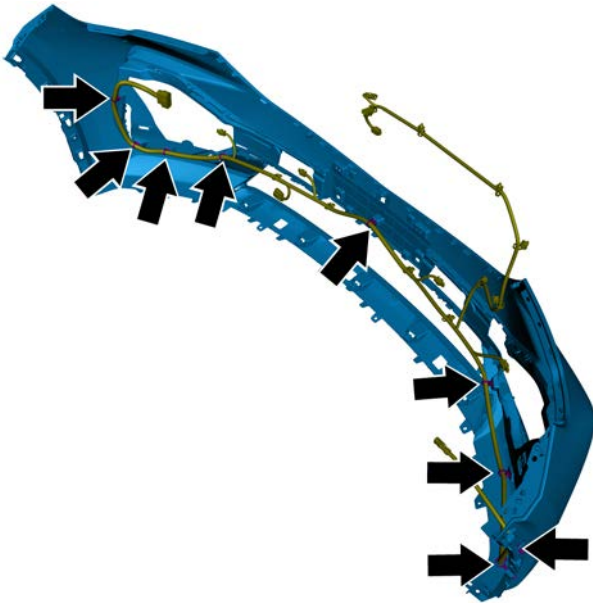
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates.](#)
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate.](#)
- 4 Remove the engine fender, see [Engine fender replacement.](#)
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly.](#)
- 7 Before removing the front license plate mounting plate, see the [Replacement of the front license plate mounting plate \(Type 1\)](#), the [Replacement of the front license plate mounting plate \(Type 2\)](#), and the [Replacement of the front license plate mounting plate \(Type 3\)](#).
- 8 Remove the left and right trim strips on the upper part of the front bumper, see the [Replacement of the left trim strip on the upper part of the front bumper.](#)
- 9 Remove the left and right trim strips of the front bumper, see the [Replacement of the left trim strip of the front bumper.](#)
- 10 Remove the left and FR foglamp trim cover assembly, see the [Replacement of the front left foglamp trim cover assembly.](#)
- 11 Remove the lower trim strip of the front bumper, see [Replacement of the lower trim strip of the front bumper.](#)
- 12 Remove the grille under the front bumper, see [Replacement of the grille under the front bumper.](#)
- 13 Remove the pedestrian leg protection bracket, refer to [replacement of pedestrian leg protection bracket .](#)

- 14 Remove the radiator grille body, see the [Replacement of the radiator grille body](#).
- 15 Remove the 9 wire harness clips of the front bumper harness and remove the front bumper body.



Installation procedure

- 1 Install the 9 harness clips of front bumper harness.



- 2 Install the radiator grille body.
- 3 Install the pedestrian leg protection bracket.
- 4 Install the front bumper lower grille.
- 5 Install the upper trim strip of the front bumper.
- 6 Install the front left and FR foglamp trim cover assembly.
- 7 Install the left and right trim strips of the front bumper.
- 8 Install the upper left and right trim strips of the front bumper.
- 9 Install the front license plate mounting plate.

- 10 Install the front bumper assembly.
- 11 Install the front left and front right wheel brow.
- 12 Install the engine fender.
- 13 Install the front engine bay trim plate.
- 14 Install the left and right engine bay trim plates.
- 15 Connect the negative battery cable.

12.4.3.14 Replacement of front bumper body (Type 2)

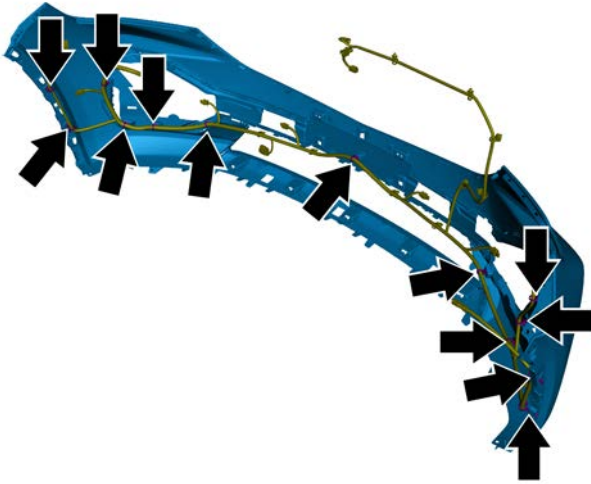
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

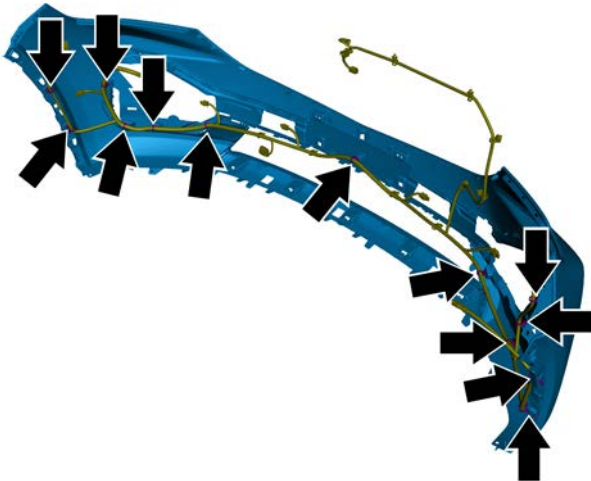
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates.](#)
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate.](#)
- 4 Remove the engine fender, see [Engine fender replacement.](#)
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly.](#)
- 7 Before removing the front license plate mounting plate, see the [Replacement of the front license plate mounting plate \(Type 1\)](#), the [Replacement of the front license plate mounting plate \(Type 2\)](#), and the [Replacement of the front license plate mounting plate \(Type 3\)](#).
- 8 Remove the left and right trim strips on the upper part of the front bumper, see the [Replacement of the left trim strip on the upper part of the front bumper.](#)
- 9 Remove the left and right trim strips of the front bumper, see the [Replacement of the left trim strip of the front bumper.](#)
- 10 Remove the left and FR foglamp trim cover assembly, see the [Replacement of the front left foglamp trim cover assembly.](#)
- 11 Remove the lower trim strip of the front bumper, see [Replacement of the lower trim strip of the front bumper.](#)

- 12 Remove the grille under the front bumper, see [Replacement of the grille under the front bumper](#).
- 13 Remove the pedestrian leg protection bracket, refer [to replacement of pedestrian leg protection bracket](#).
- 14 Remove the radiator grille body, see the [Replacement of the radiator grille body](#).
- 15 Remove the 13 wire harness clips of the front bumper harness and remove the front bumper body.



Installation procedure

- 1 Install the 13 harness clips of front bumper harness.



- 2 Install the radiator grille body.
- 3 Install the pedestrian leg protection bracket.
- 4 Install the front bumper lower grille.
- 5 Install the upper trim strip of the front bumper.
- 6 Install the front left and FR foglamp trim cover assembly.

- 7 Install the left and right trim strips of the front bumper.
- 8 Install the upper left and right trim strips of the front bumper.
- 9 Install the front license plate mounting plate.
- 10 Install the front bumper assembly.
- 11 Install the front left and front right wheel brow.
- 12 Install the engine fender.
- 13 Install the front engine bay trim plate.
- 14 Install the left and right engine bay trim plates.
- 15 Connect the negative battery cable.

12.4.3.15 Replacement of radiator grille body

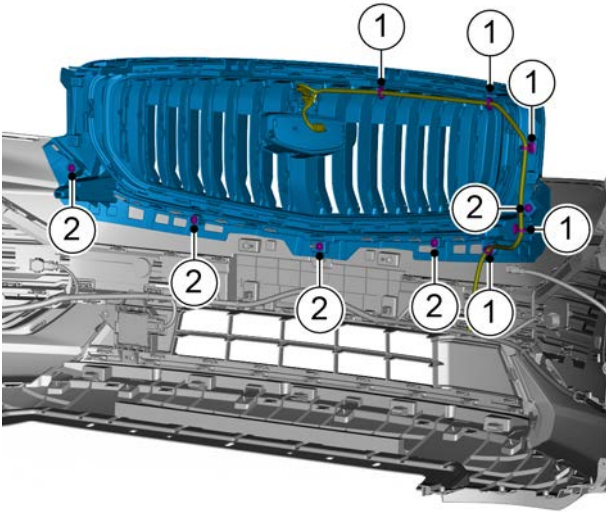
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

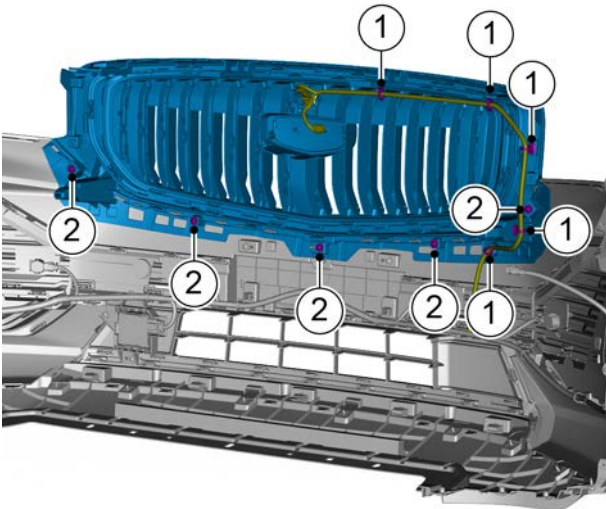
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 3 Remove the front engine bay trim plate, see the [Replacement of the front engine bay trim plate](#).
- 4 Remove the engine fender, see [Engine fender replacement](#).
- 5 Remove front left and front right wheel brow, refer to [replacement of front left wheel brow](#)
- 6 Regarding removal of the front bumper assembly, Refer to [replacement of front bumper assembly](#).
- 7 Remove the parking assist camera (front), see [Replacement of the parking assist camera \(front\)](#).

- 8 Remove keyless vehicle antenna (front), see [Replacement of keyless vehicle antenna \(front\)](#).
- 9 Remove the 5 retaining screws of the radiator grille body and 5 wire harness clips of the front bumper harness, and remove the radiator grille body.



Installation procedure

- 1 Install 5 retaining screws of the radiator grille body and 5 wire harness clips of the front bumper harness.



- 2 Install keyless vehicle antenna (front).
- 3 Install the parking assist camera (front).
- 4 Install the front bumper assembly.
- 5 Install the front left and front right wheel brow.
- 6 Install the engine fender.
- 7 Install the front engine bay trim plate.
- 8 Install the left and right engine bay trim plates.
- 9 Connect the negative battery cable.

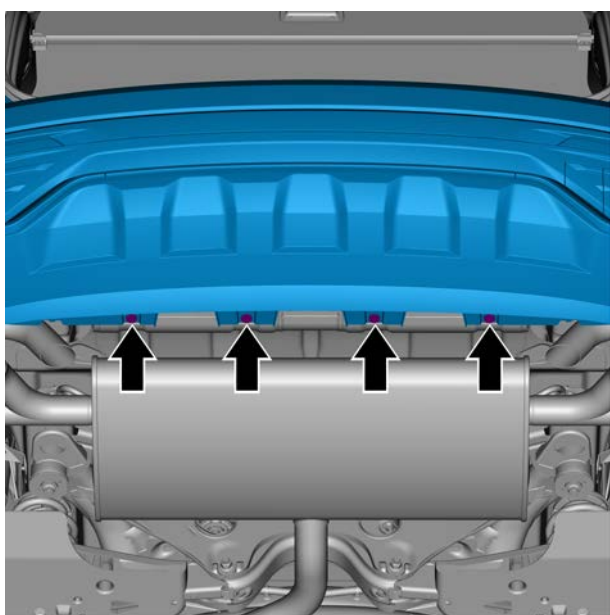
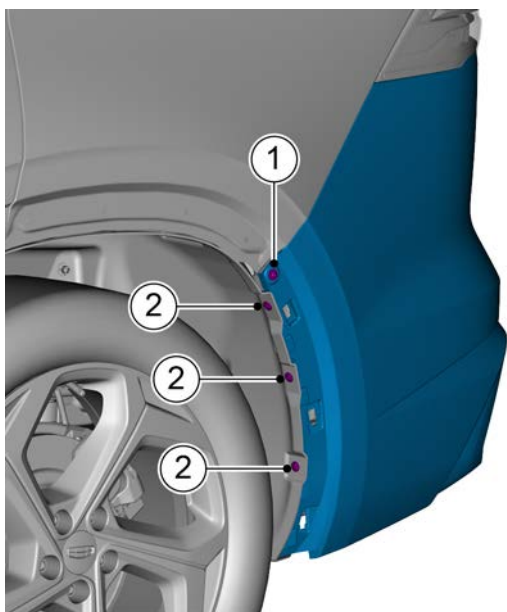
12.4.3.16 Replacement of rear bumper assembly (Type 1)

Removal procedure

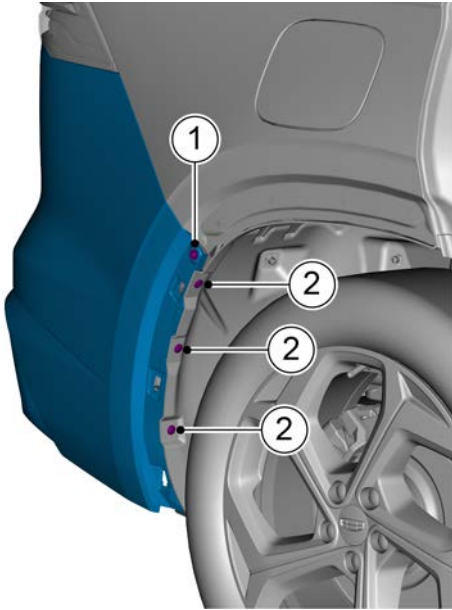
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

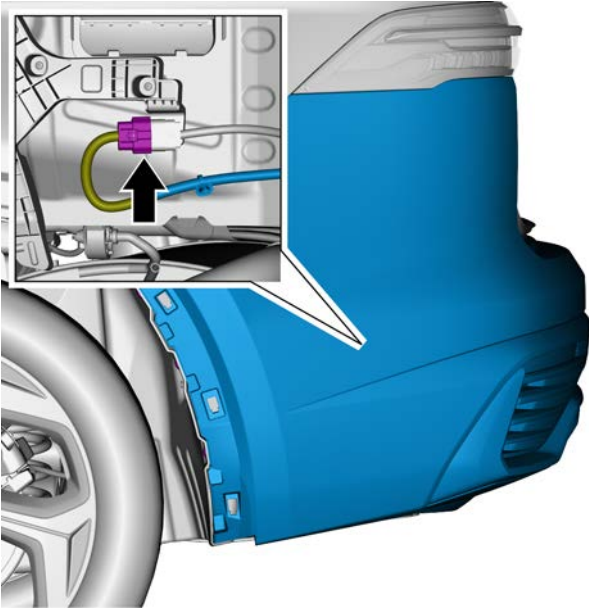
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove rear left and rear right wheel brow, refer to [replacement of rear left wheel brow](#).
- 3 Remove the left retaining screws 1 and 2 of the rear bumper assembly.



- 4 Remove the 4 retaining bolts at the bottom of the bumper assembly.

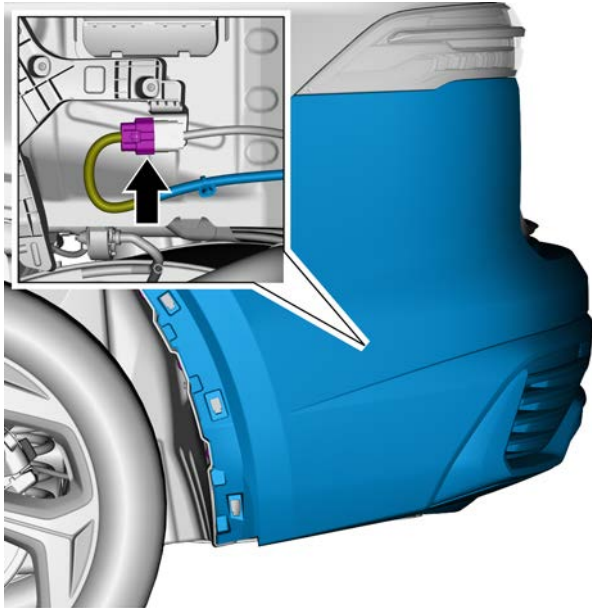


- 5 Remove retaining screws 1 and 2 on the right side of the rear bumper assembly.

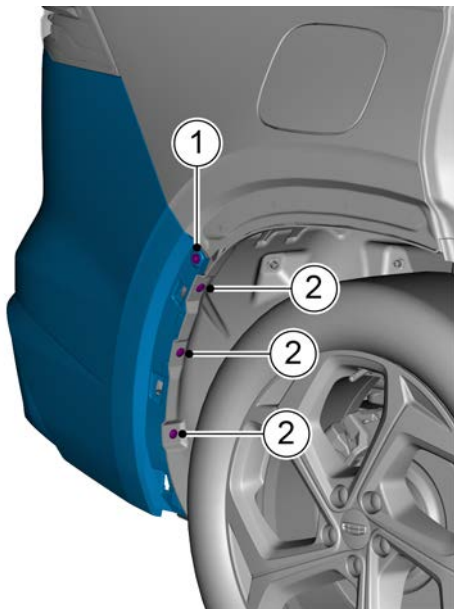


- 6 Disconnect the rear bumper harness connector, and remove rear bumper assembly.

Installation procedure

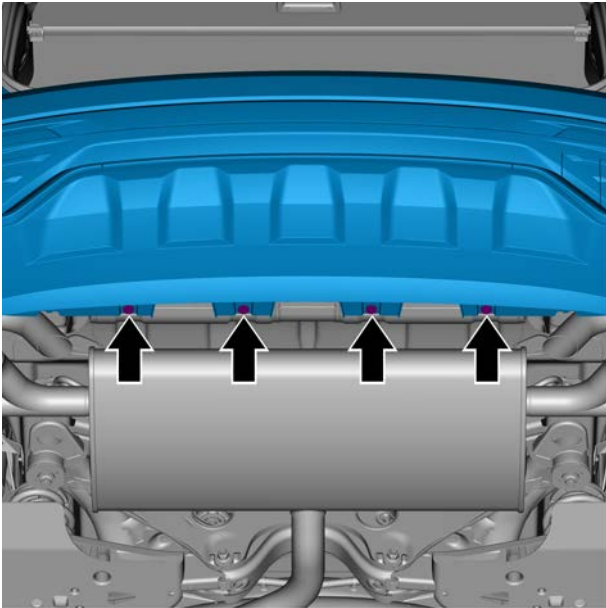


- 1 Connect the rear bumper harness connector.



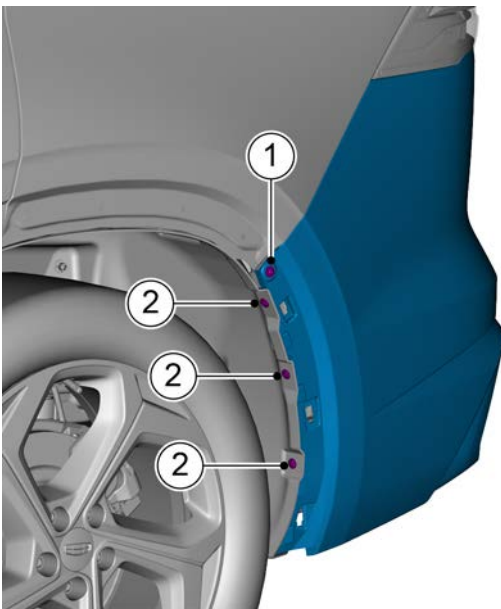
- 2 Install retaining screws 1 and 2 on the right side of the bumper assembly.

Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)



- 3 Install the 4 retaining bolts at the bottom of the bumper assembly.

Torque: 6 N·m (metric) 4.4 lb-ft (imperial system)



- 4 Install the left retaining screws 1 and 2 of the bumper assembly.

Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)

- 5 Install the rear left and rear right wheel brow.
- 6 Connect the negative battery cable.

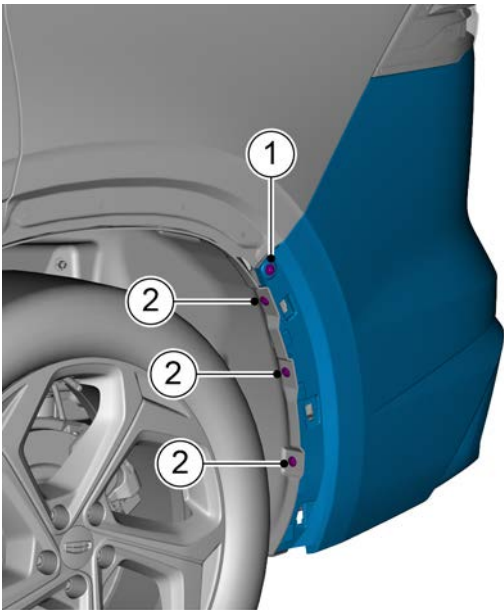
12.4.3.17 Replacement of rear bumper assembly (Type 2)

Removal procedure

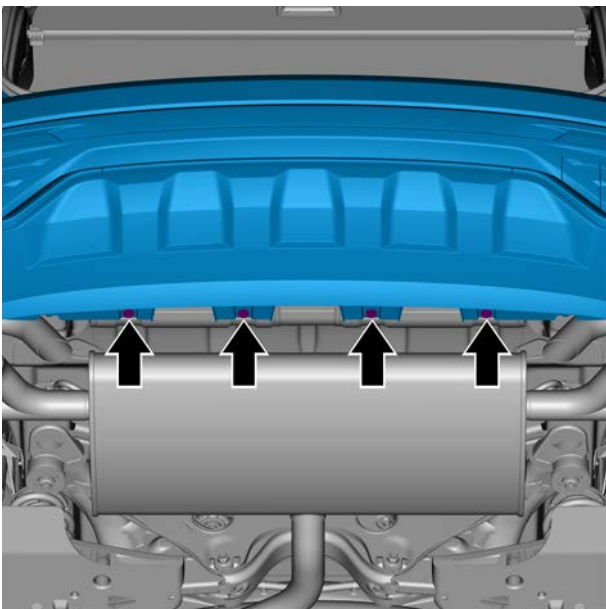
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

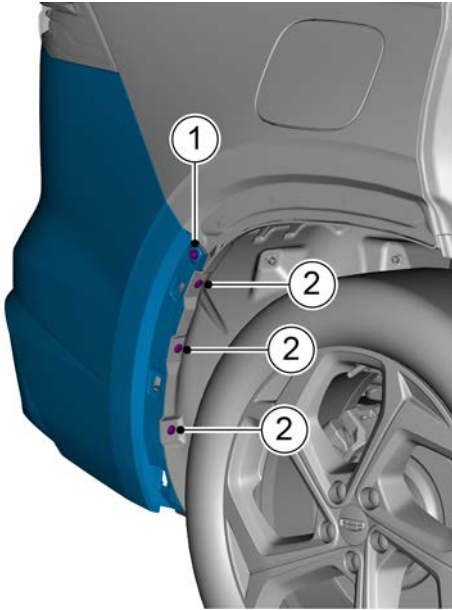
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove rear left and rear right wheel brow, refer to [replacement of rear left wheel brow.](#)



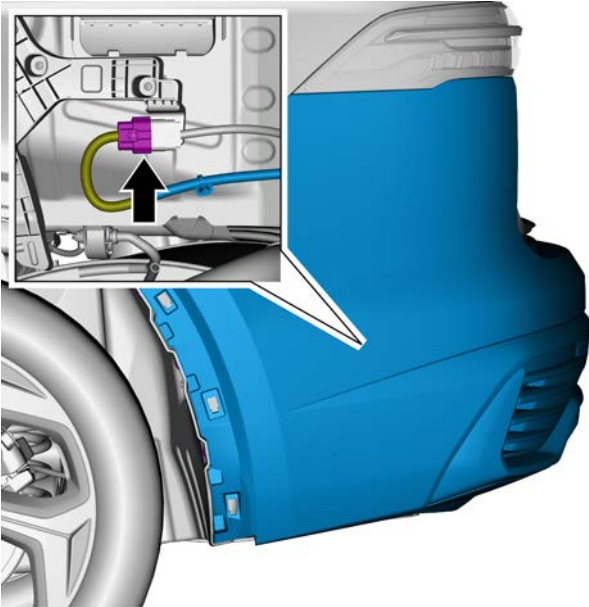
- 3 Remove the left retaining screws 1 and 2 of the rear bumper assembly.



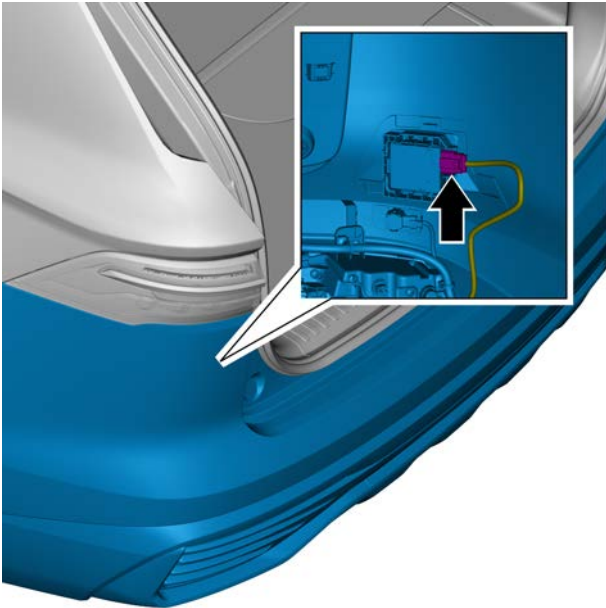
- 4 Remove the 4 retaining bolts at the bottom of the bumper assembly.



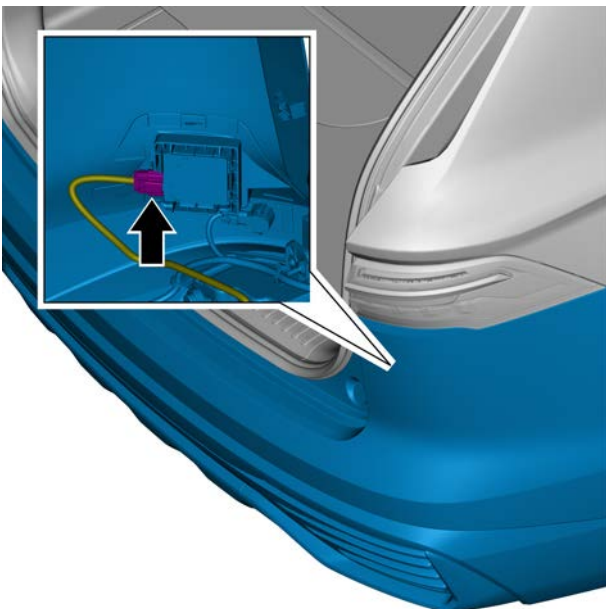
- 5 Remove retaining screws 1 and 2 on the right side of the rear bumper assembly.



- 6 Disconnect the rear bumper harness connector.

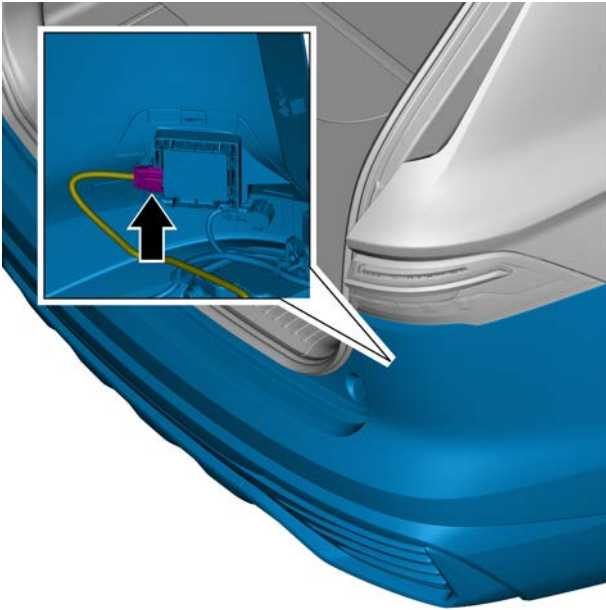


- 7 Disconnect the harness connector of the left obstacle detection control module.

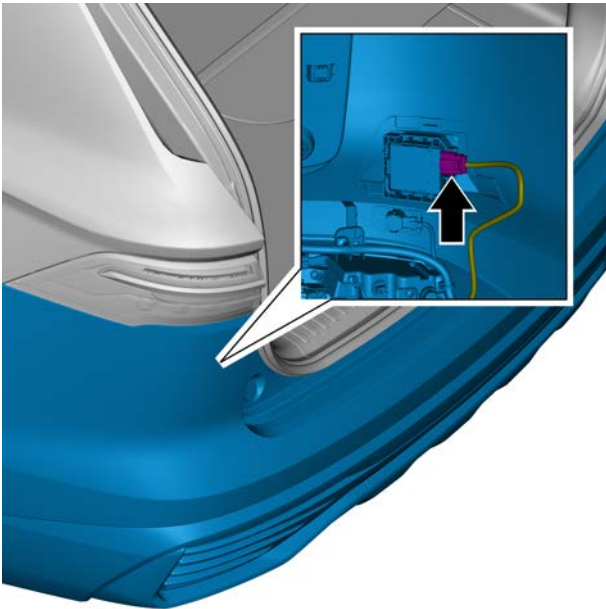


- 8 Disconnect the harness connector of the right obstacle detection and control module and remove the rear bumper assembly.

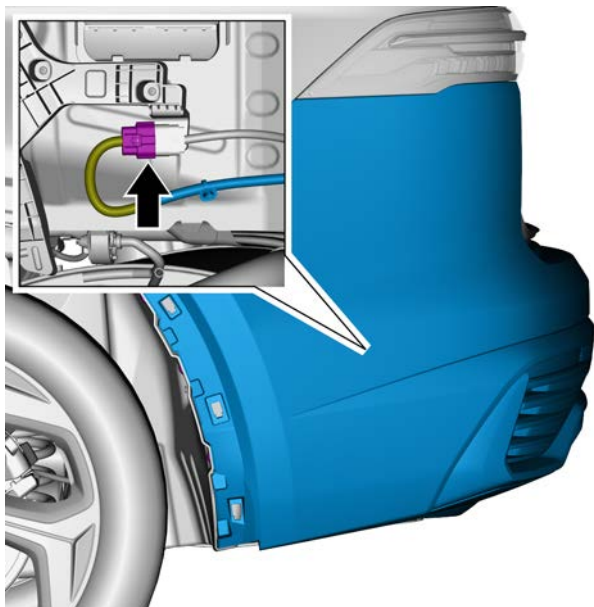
Installation procedure



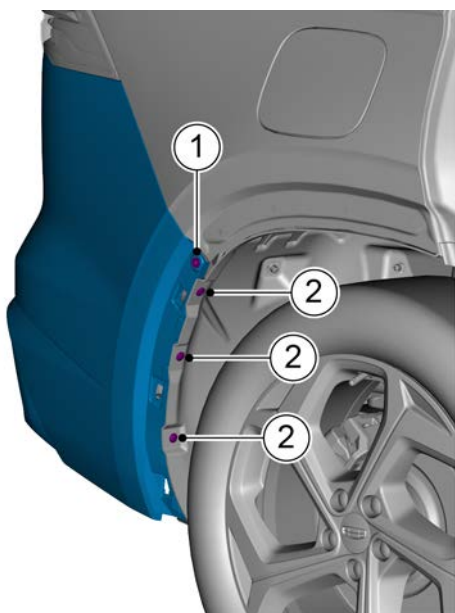
- 1 Connect the harness connector of the right obstacle detection control module.



- 2 Connect the harness connector of the left obstacle detection control module.

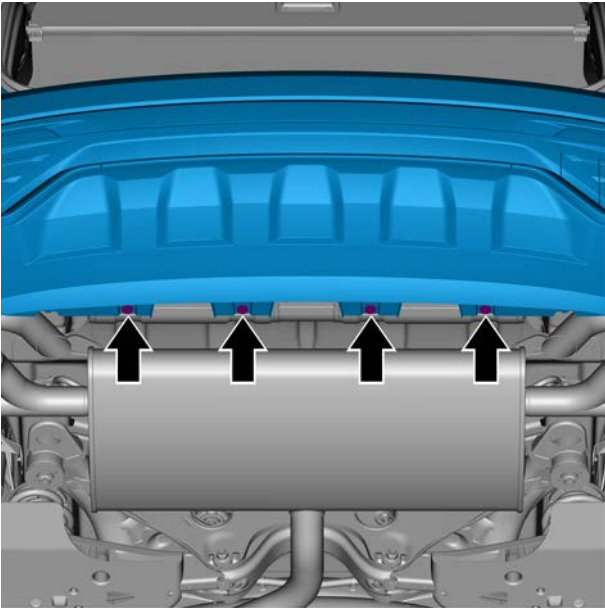


3 Connect the rear bumper harness connector.



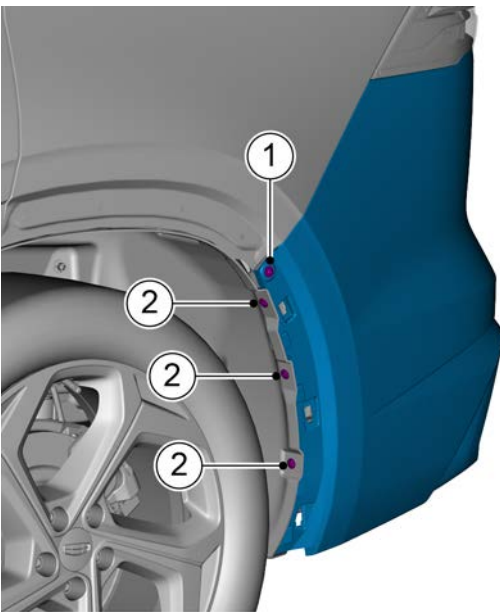
4 Install retaining screws 1 and 2 on the right side of the bumper assembly.

Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)



- 5 Install the 4 retaining bolts at the bottom of the bumper assembly.

Torque: 6 N·m (metric) 4.4 lb-ft (imperial system)



- 6 Install the left retaining screws 1 and 2 of the bumper assembly.

Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)

- 7 Install the rear left and rear right wheel brow.
8 Connect the negative battery cable.

12.4.3.18 Replacement of left trim of rear bumper

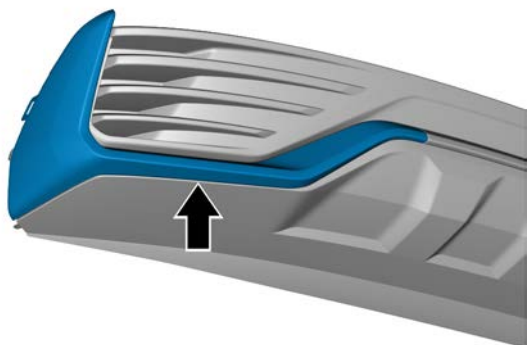
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

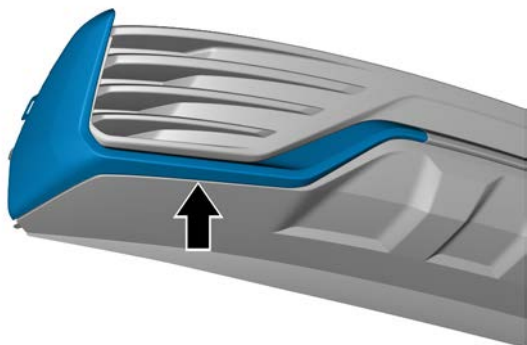
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rear bumper assembly, see the [Replacement of the rear bumper assembly \(Type 1\)](#) and the [Replacement of the rear bumper assembly \(Type 2\)](#).

- 3 Remove the rear bumper upper body, see the [Replacement of the rear bumper upper body \(Type 1\)](#) and the [Replacement of the rear bumper upper body \(Type 2\)](#).
- 4 Disassemble the left trim of the rear bumper and remove it.



Installation procedure

- 1 Install the left trim of the rear bumper and remove it.



- 2 Install the rear bumper upper body.
- 3 Install the rear bumper assembly.
- 4 Connect the negative battery cable.

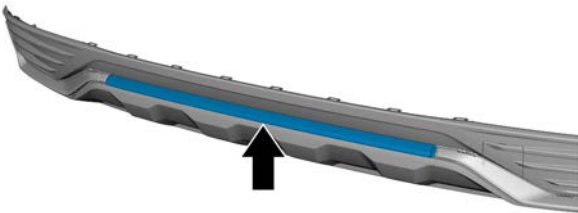
12.4.3.19 Replacement of rear bumper trim

Removal procedure

Warning !

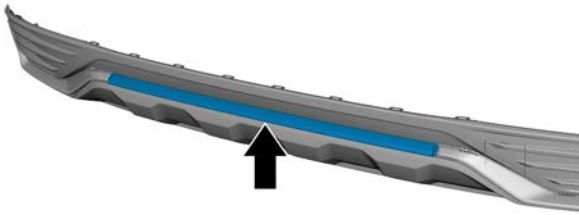
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the rear bumper assembly, see the [Replacement of the rear bumper assembly \(Type 1\)](#) and the [Replacement of the rear bumper assembly \(Type 2\)](#).
- 3 Remove the rear bumper upper body, see the [Replacement of the rear bumper upper body \(Type 1\)](#) and the [Replacement of the rear bumper upper body \(Type 2\)](#).
- 4 Remove the left and right trim of the rear bumper, see the [Replacement of the left trim of the rear bumper](#).
- 5 Disassemble the trim in the rear bumper and remove it.



Installation procedure

- 1 Install the trim in the rear bumper and remove it.



- 2 Install the left and right trim of the rear bumper.
- 3 Install the rear bumper upper body.
- 4 Install the rear bumper assembly.
- 5 Connect the negative battery cable.

12.4.3.20 Replacement of the rear bumper lower body trim plate

- 1 See the [Replacement of the rear bumper trim strip](#).

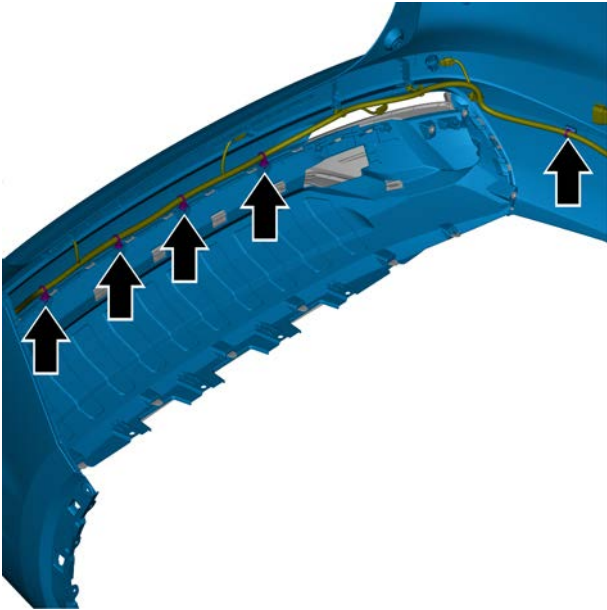
12.4.3.21 Replacement of the rear bumper upper body (Type 1)

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rear bumper assembly, see [Replacement of the rear bumper assembly \(Type 1\)](#).
- 3 Remove the RL and RR foglamp, see the [Replacement of the rear foglamp \(left\)](#).
- 4 Remove the parking assistance sensor, see [Replacement of the parking assistance sensor](#).



- 5 Remove the 5 wire harness clips on the upper body of the bumper.



- 6 Remove the 6 retaining screws on the upper body of the rear bumper and remove the upper body of the rear bumper.

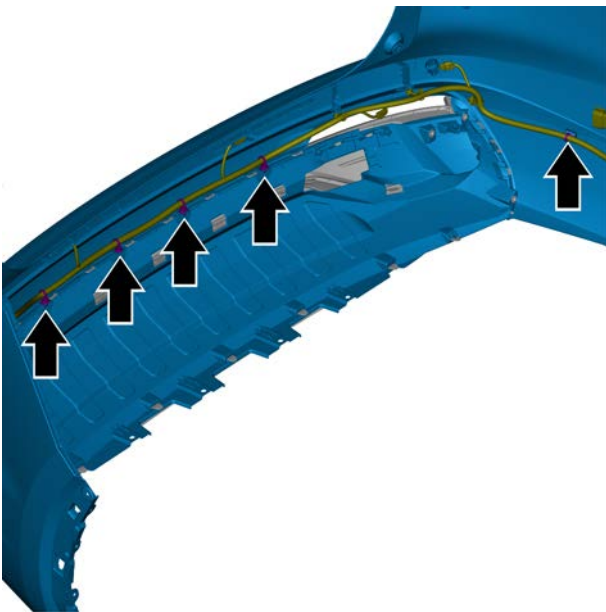
Installation procedure

- 1 Install the 6 retaining screws on the upper body of the rear bumper.

Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)



- 2 Install the 5 wire harness clips on the upper body of the rear bumper.



- 3 Install parking assistance sensor.
- 4 Install RL and RR fog lamps.
- 5 Install the rear bumper assembly.
- 6 Connect the negative battery cable.

12.4.3.22 Replacement of the rear bumper upper body (Type 2)

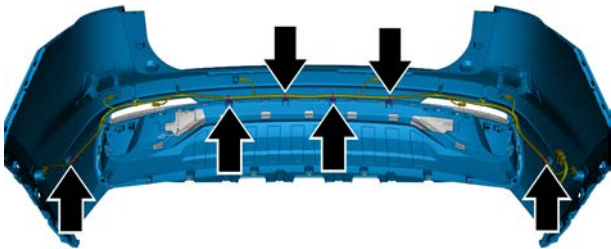
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)

- 2 Remove the rear bumper assembly, see [Replacement of the rear bumper assembly \(Type 2\)](#).
- 3 Remove the RL and RR foglamp, see the [Replacement of the rear foglamp \(left\)](#).
- 4 Remove the parking assistance sensor, see [Replacement of the parking assistance sensor](#).
- 5 Remove the left and right obstacle detection control module, see the [Replacement of the right obstacle detection control module](#).
- 6 Remove the 6 wire harness clips on the upper body of the bumper.



- 7 Remove the 6 retaining screws on the upper body of the rear bumper and remove the upper body of the rear bumper.



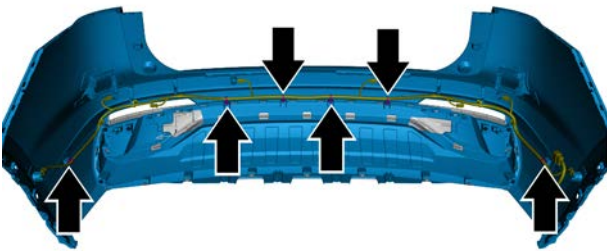
Installation procedure

- 1 Install the 6 retaining screws on the upper body of the rear bumper.

Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)



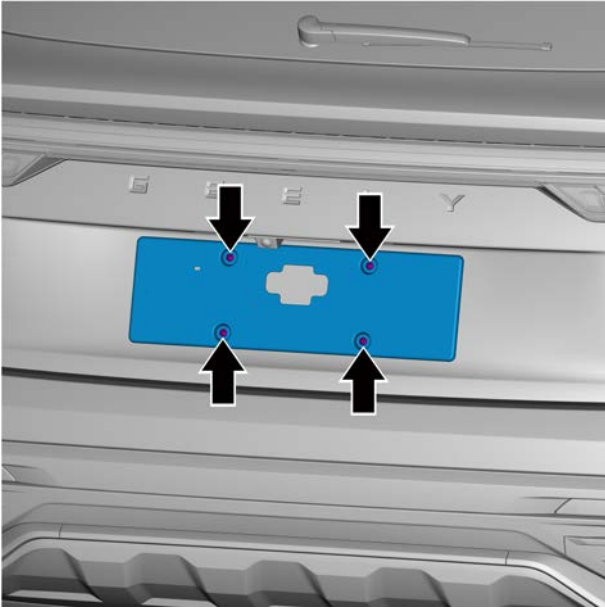
- 2 Install the 6 wire harness clips on the upper body of the rear bumper.



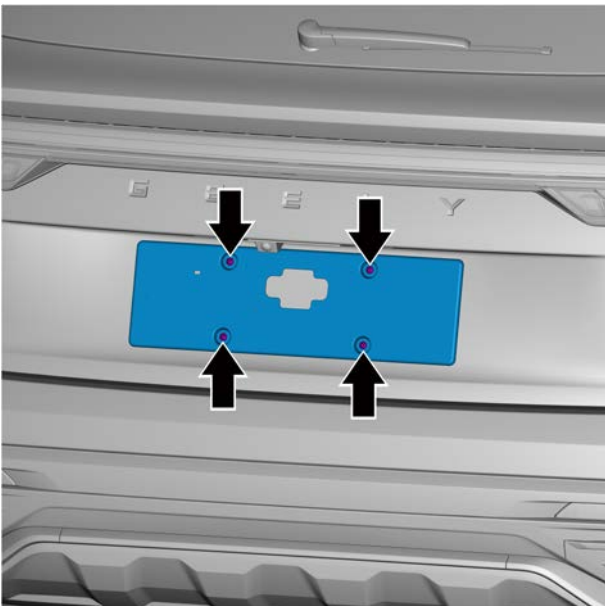
- 3 Install the left and right obstacle detection and control modules.
- 4 Install parking assistance sensor.
- 5 Install RL and RR fog lamps.
- 6 Install the rear bumper assembly.
- 7 Connect the negative battery cable.

12.4.3.23 Replacement of Rear License Plate Installing Plate (Type 1)

Removal procedure



- 1 Remove the 4 fixing screws of the rear license plate mounting plate.

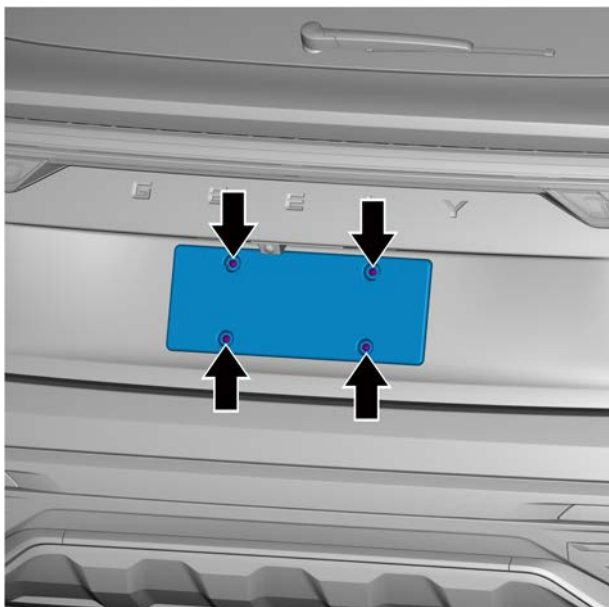


Installation procedure

- 1 Install the 4 fixing screws of the rear license plate mounting plate.
Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)

12.4.3.24 Replacement of Rear License Plate Lamp Installing Plate (Type 2)

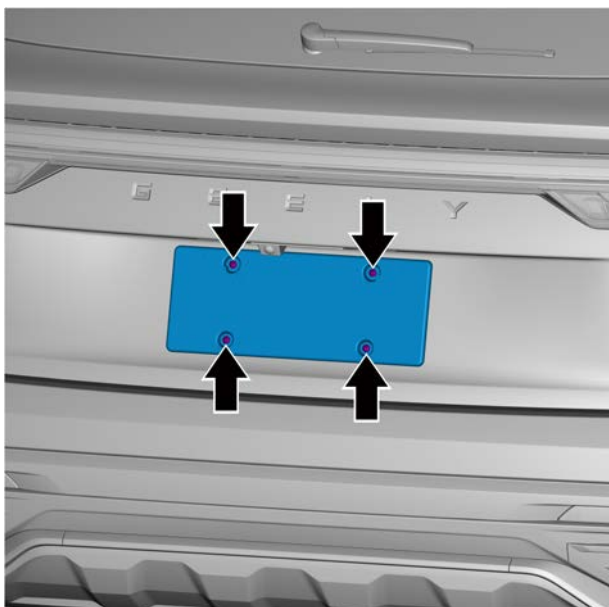
Removal procedure



- 1 Remove the 4 fixing screws of the rear license plate mounting plate.

Installation procedure

- 1 Install the 4 fixing screws of the rear license plate mounting plate.
Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)



12.5 Doors

12.5.1 Specification

12.5.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
front left door check retaining bolt	M8×25	20~28	3.7~5.1
front left door check retaining nut	M6×9.1	8.5~11.5	0.7~1.5
front left door hinge retaining bolt	M8×30	30~40	22.1~29.5
RL door hinge retaining bolt	M8×30	30~40	22.1~29.5
Fixing screw of left front door inner opening handle	ST4.8×16	1.3~1.7	0.9~1.3
Fixing screw of front left door inner opening handle	ST4.8×16	1.3~1.7	0.9~1.3
front left door lock core assembly retaining bolt	M6×20	8.5~11.5	6.3~8.5

12.5.2 Removing and installing

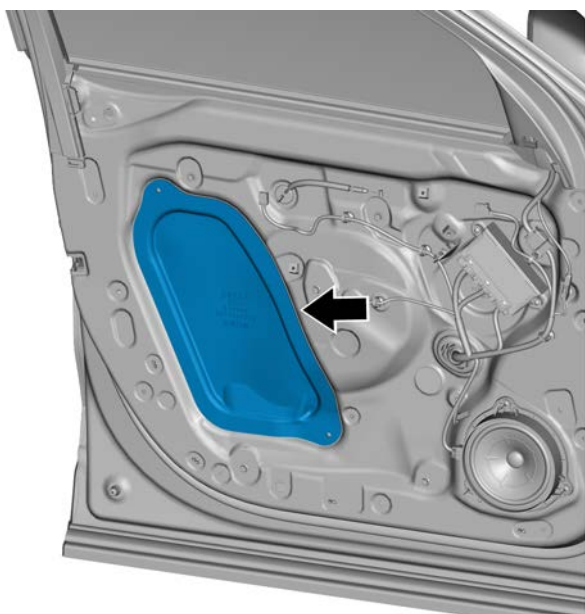
12.5.2.1 Replacement of front left door check

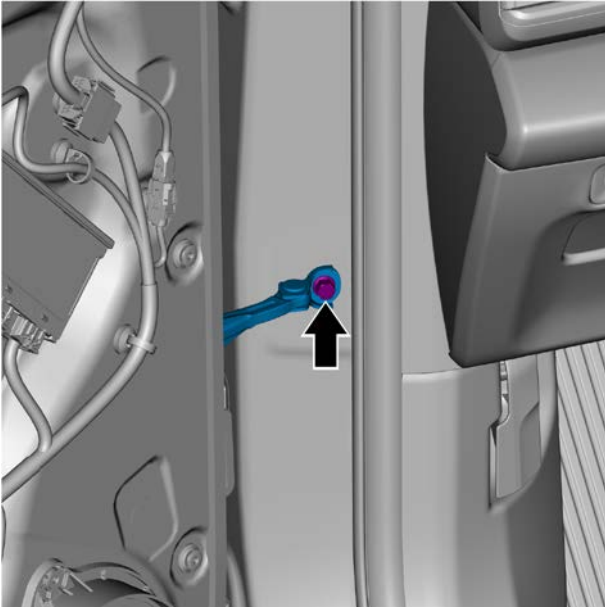
Removal procedure

Warning !

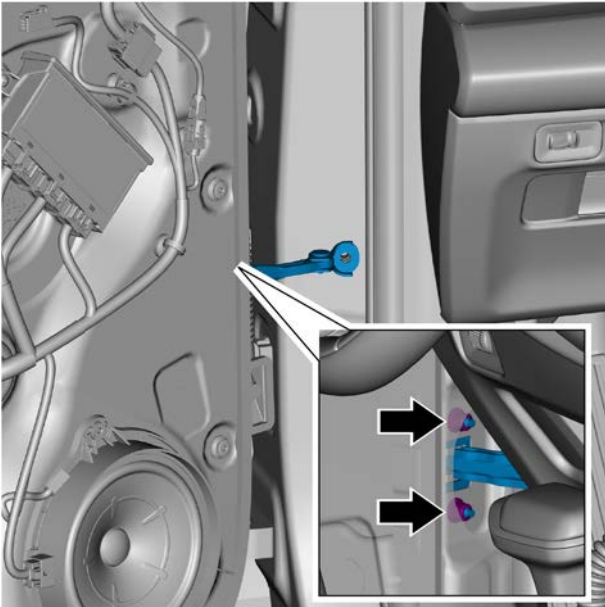
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly](#).
- 3 Remove the rear waterproof membrane of the left front door.



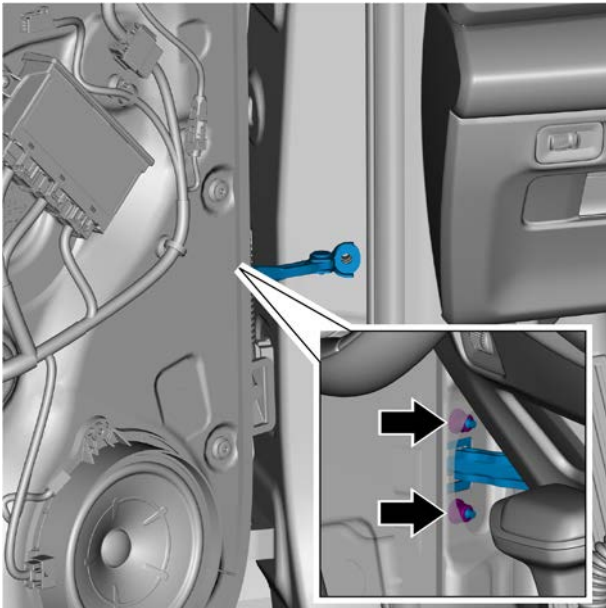


- 4 Remove the body side retaining bolts of the front left door check.



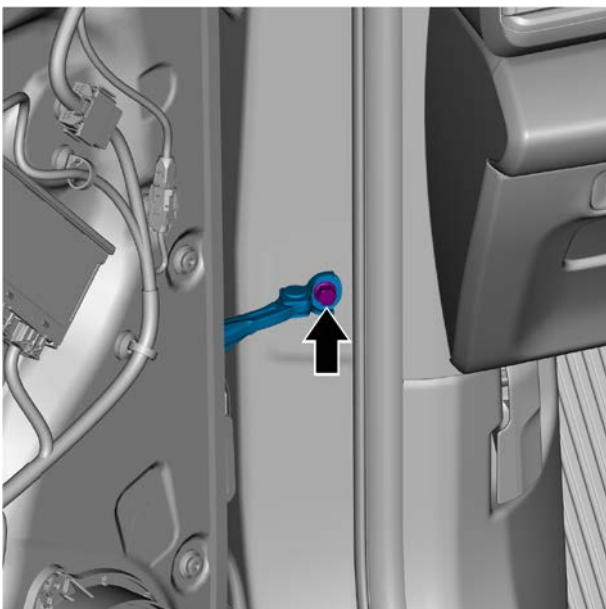
- 5 Remove the 2 retaining nuts on the door side of the front left door check and remove the front left door check.

Installation procedure



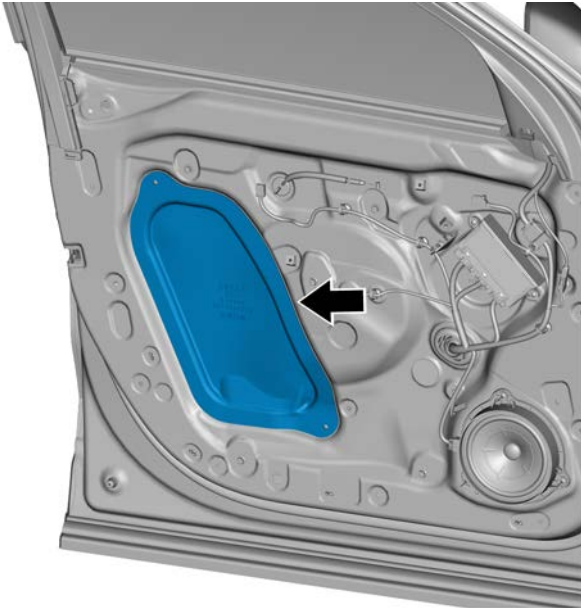
- 1 Install 2 retaining nuts on the door side of the front left door check.

Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)



- 2 Install the body side retaining bolts of the front left door check.

Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)



- 3 Install the rear waterproof membrane of the left front door.

- 4 Install the assembly-interior trim panel front door LH.

- 5 Connect the negative battery cable.

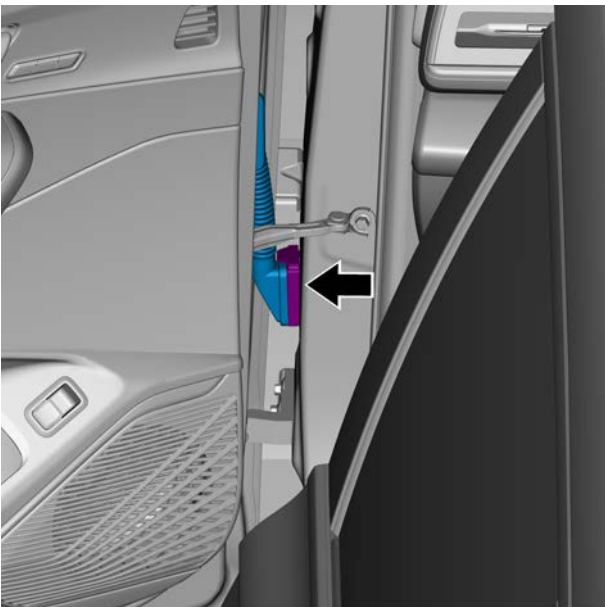
12.5.2.2 Replacement of front left door hinge

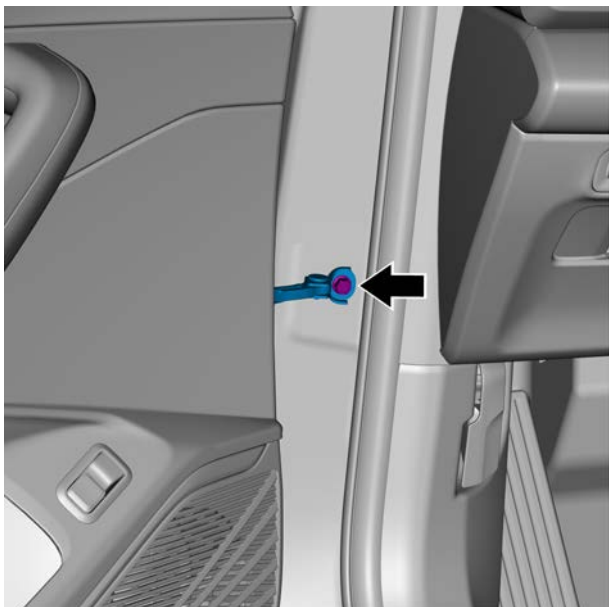
Removal procedure

Caution

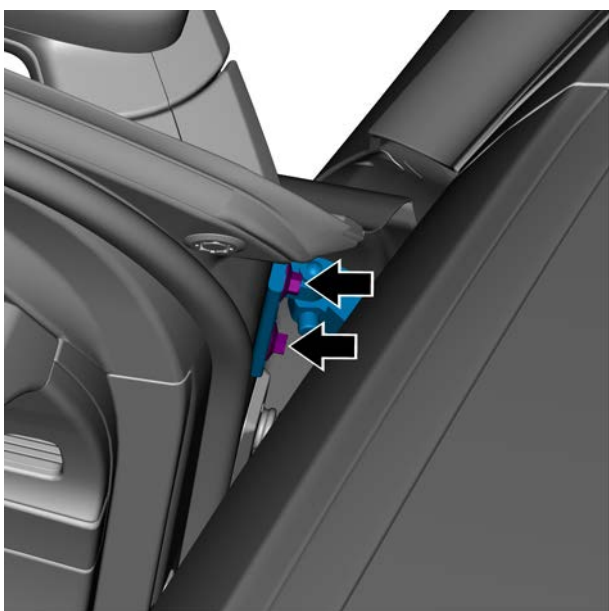
It takes two people to disassemble the door assembly.

- 1 Clean the door hinge assembly surface with a rag and mark the position of the hinge on the door and body mounting surface with an oil pen or other marking tool.
- 2 Disconnect the front left door harness from the floor harness.

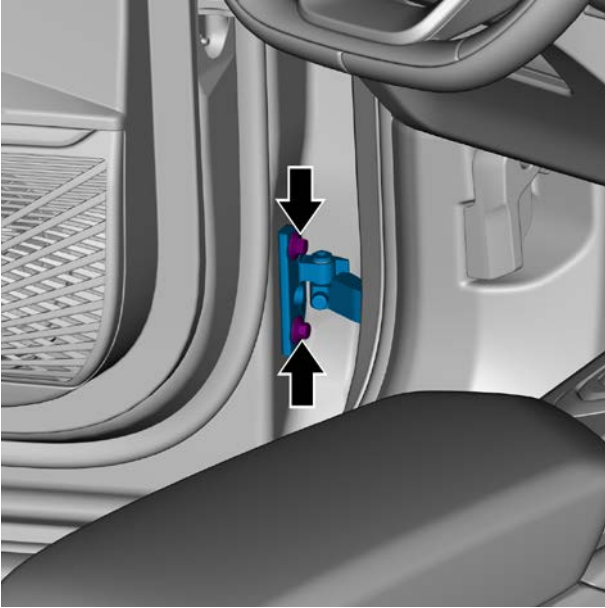




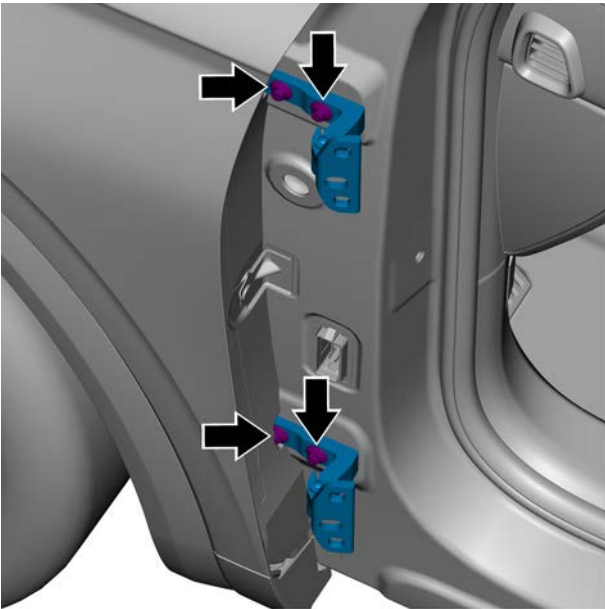
- 3 Remove the retaining bolts of the front left door check and the body.



- 4 Remove the 2 retaining bolts on the upper hinged door side of the front left door.

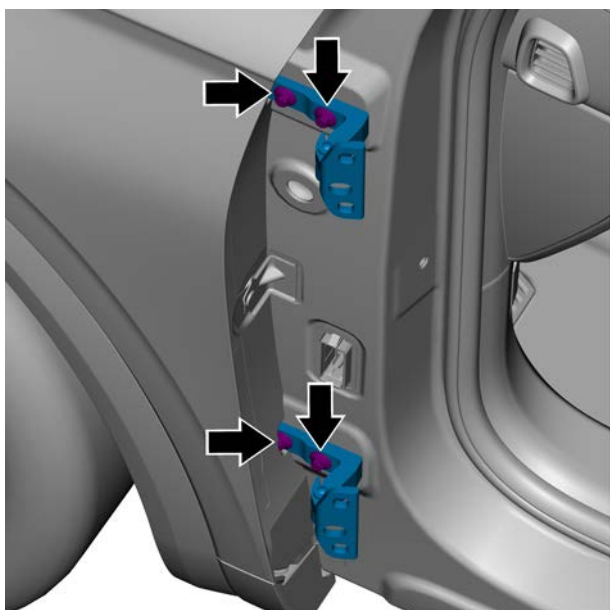


- 5 Remove the 2 retaining bolts on the lower hinge door side of the front left door.



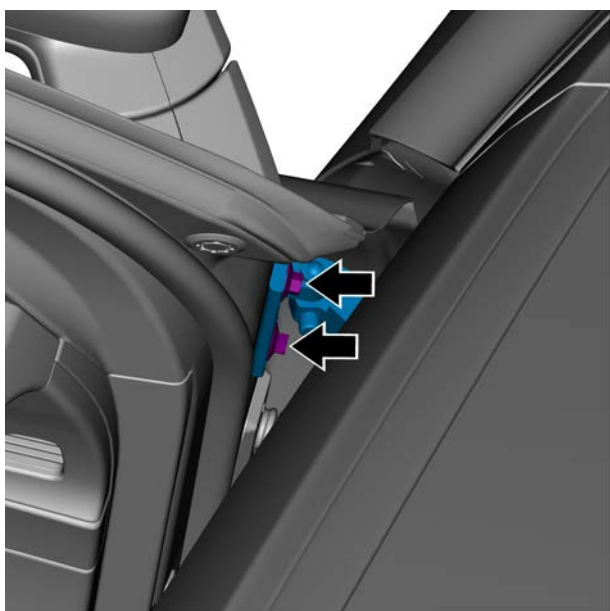
- 6 Remove the 4 retaining bolts on the upper and lower hinges body side of the front left door and remove them.

Installation procedure



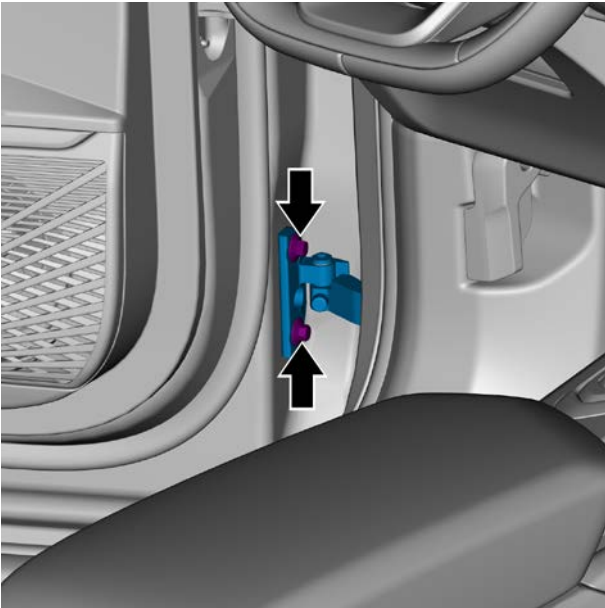
- 1 Install 4 retaining bolts on the upper and lower hinges of the front left door on the body side.

Torque: 35 N·m (metric) 25.8 lb-ft (imperial system)

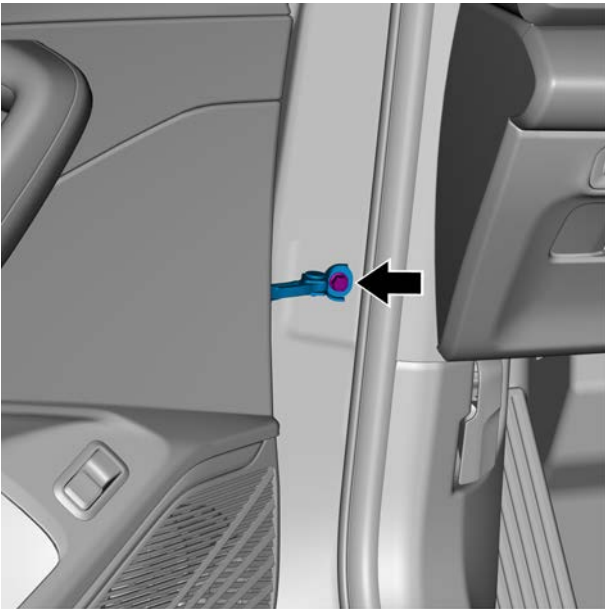


- 2 Install 2 retaining bolts on the hinged door side of the front left door.

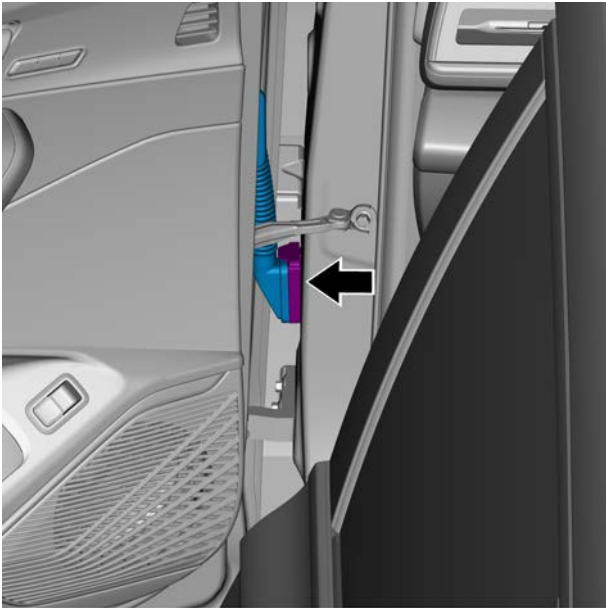
Torque: 35 N·m (metric) 25.8 lb-ft (imperial system)



- 3 Install 2 retaining bolts on the lower hinge side of the front left door.
Torque: 35 N·m (metric) 25.8 lb-ft (imperial system)



- 4 Install the front left door check and the retaining bolts of the vehicle body.
Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)



- 5 Connect the connection between the front left door harness and the floor harness.

12.5.2.3 Replacement of RL door hinge

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

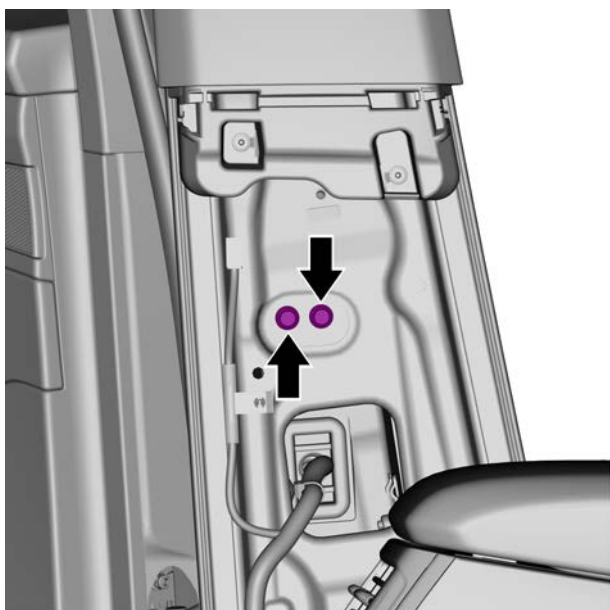
Caution

The door should be fixed after removing the door hinge.

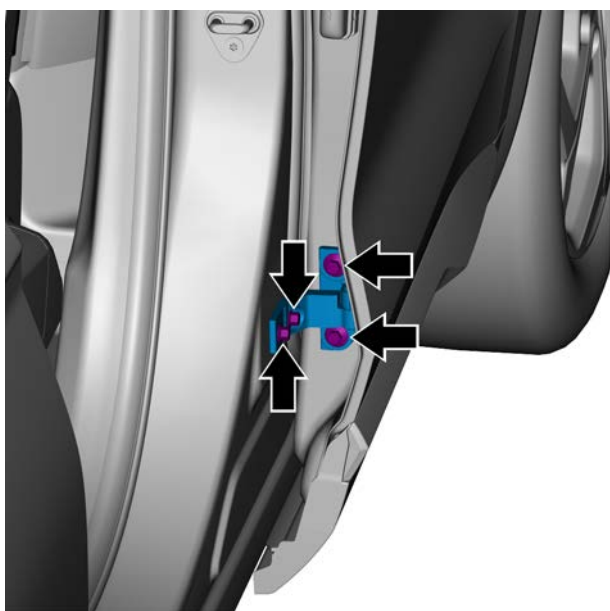
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly](#).
- 3 Remove the left backrest assembly of the rear seat, see [Replacement of the left backrest assembly of the rear seat](#).
- 4 Remove the rear compartment threshold trim plate assembly, see the [Replacement of the rear compartment threshold trim plate assembly](#).
- 5 Remove the upper trim cover of the left rear compartment, see [Replacement of the upper trim cover of the left rear compartment](#).
- 6 Remove the rear compartment lamp, see the [Replacement of the rear compartment lamp](#).
- 7 Remove 12V socket (luggage compartment), see [Replacement of 12V socket \(luggage compartment\)](#).
- 8 Remove the left rear compartment side guard assembly, see [Replacement of the left trunk side guard assembly](#).

- 9 Remove the RL threshold interior trim plate assembly, see the [Replacement of the RL threshold interior trim plate assembly](#).
- 10 Remove the left B-pillar lower trim panel assembly, refer to [replacement of left B-pillar lower trim panel assembly](#).
- 11 Clean the door hinge assembly surface with a rag and mark the position of the hinge on the door and body mounting surface with an oil pen or other marking tool.
- 12 Remove the 2 retaining bolts on the upper hinged door side of the RL door.



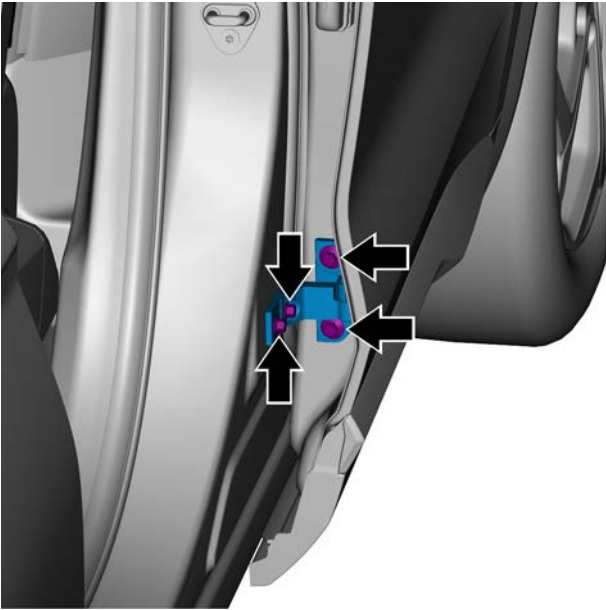


- 13 Remove the 2 retaining bolts on the body side of the RL side door upper hinge and remove the RL side door lower hinge.

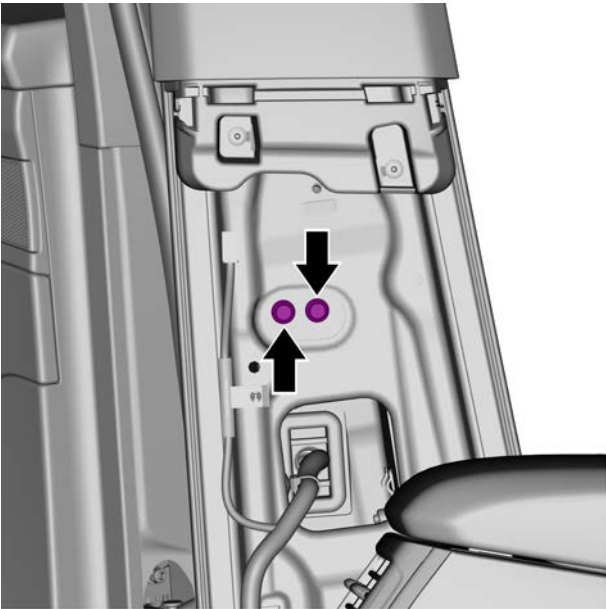


- 14 Remove the 4 retaining bolts of the RL door lower hinge and remove the RL door lower hinge.

Installation procedure



- 1 Install 4 retaining bolts of the RL door lower hinge.
Torque: 35 N·m (metric) 25.8 lb-ft (imperial system)



- 2 Install 2 retaining bolts on the upper hinged body side of the RL door.
Torque: 35 N·m (metric) 25.8 lb-ft (imperial system)



- 3 Install 2 retaining bolts on the upper hinged door side of the RL door.

Torque: 35 N·m (metric) 25.8 lb-ft (imperial system)

- 4 Install the left B-pillar lower trim panel assembly.
- 5 Install the RL threshold interior trim panel assembly.
- 6 Install the left rear compartment side guard assembly.
- 7 Install 12V socket (luggage compartment).
- 8 Install the luggage compartment lamp.
- 9 Install the upper trim plate of the left rear compartment.
- 10 Install rear compartment door threshold trim plate assembly.
- 11 Install the left rear seat backrest assembly .
- 12 Install the rear seat cushion assembly.
- 13 Connect the negative battery cable.

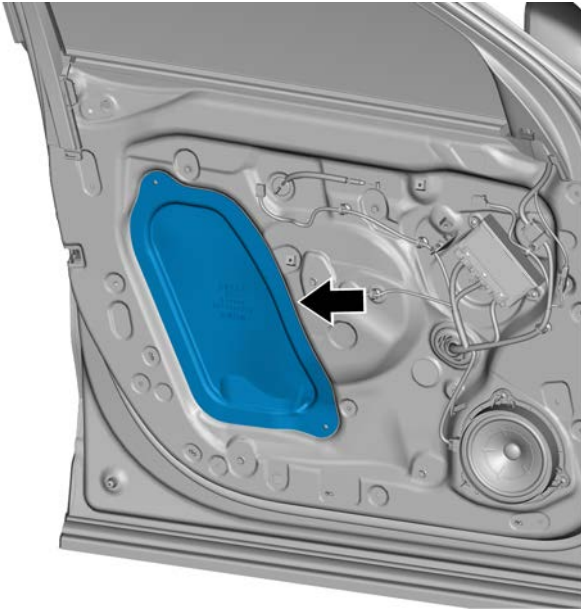
12.5.2.4 Replacement of external release handle of front left door lock assembly

Removal procedure

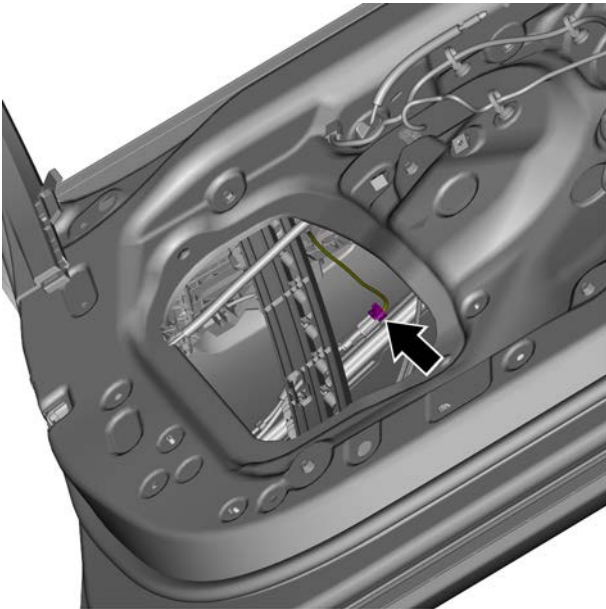
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

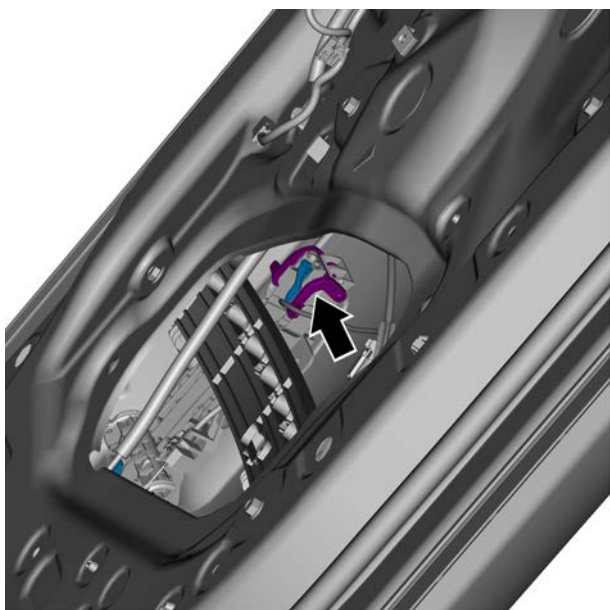
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly](#).



- 3 Remove the rear waterproof membrane of the left front door.



- 4 Disconnect the exterior door handle (front left door handle sensor) harness connector.



- 5 Disengage the front left door exterior inner opening handle assembly retaining clips.



- 6 Pull the front left door exterior inner opening handle assembly diagonally outward to detach the fixing, and remove the front left door exterior open handle assembly.

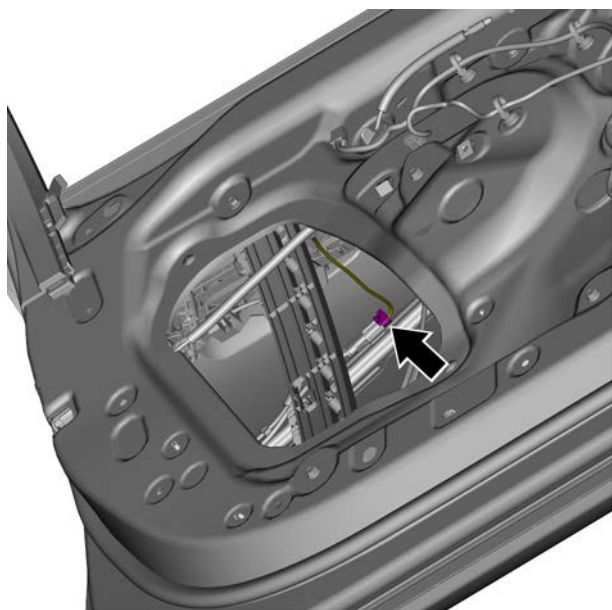
Installation procedure



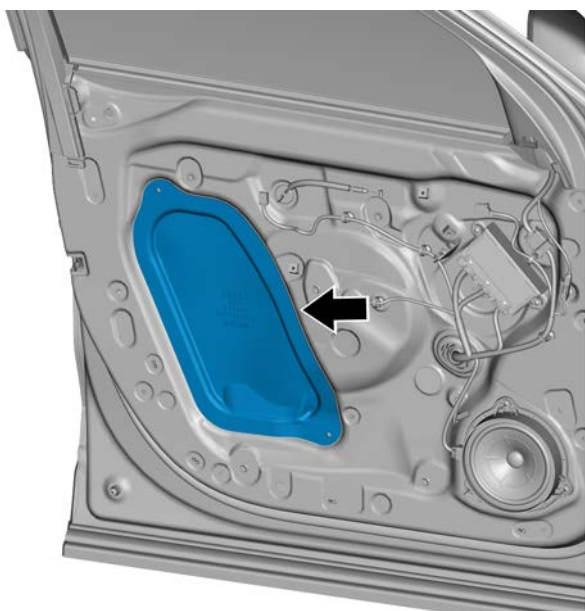
- 1 Install the front left door exterior inner opening handle assembly to the fixed position.



- 2 Install the front left door exterior inner opening handle assembly retaining clip.



- 3 Connect the door exterior handle (front left door handle sensor) harness connector.



- 4 Install the rear waterproof membrane of the left front door.

- 5 Install the assembly-interior trim panel front door LH.
- 6 Connect the negative battery cable.

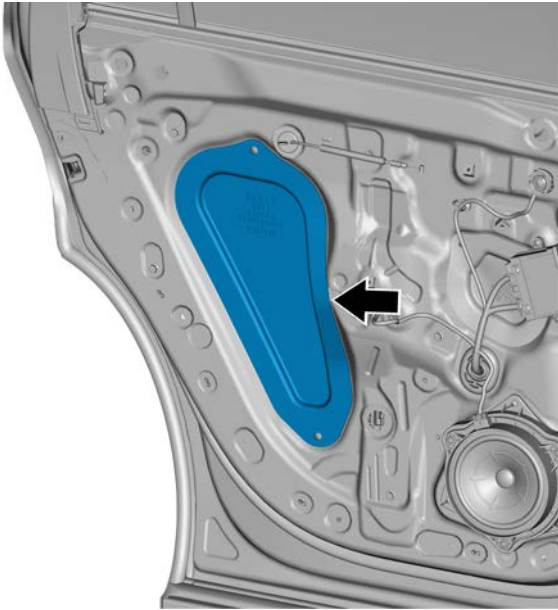
12.5.2.5 Replacement of the RL door exterior inner opening handle

Removal procedure

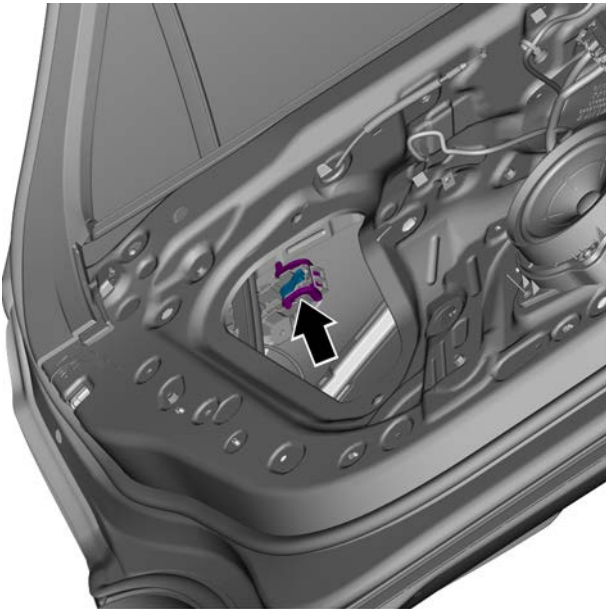
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the RL door interior trim plate assembly, see the [Replacement of the RL door interior trim plate assembly.](#)



3 Remove the waterproof membrane of the rear left door.



4 Remove the retaining clips of the RL door exterior inner opening handle.

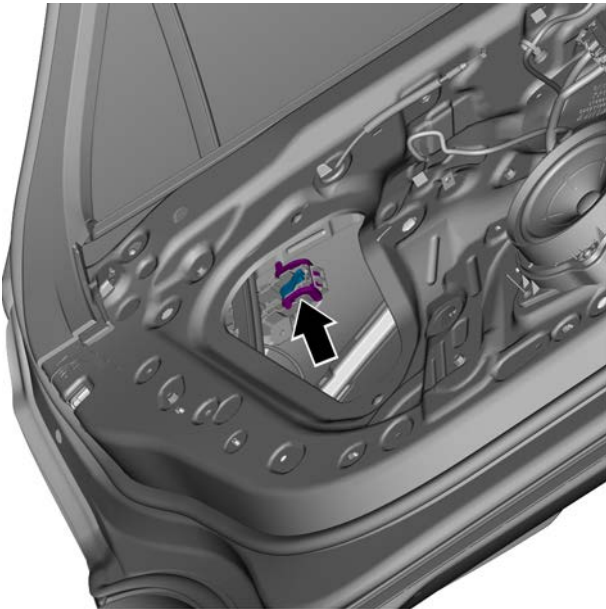


- 5 Pull the exterior handle of the RL door obliquely outward to detach the fixing, and take out the exterior handle of the RL door.

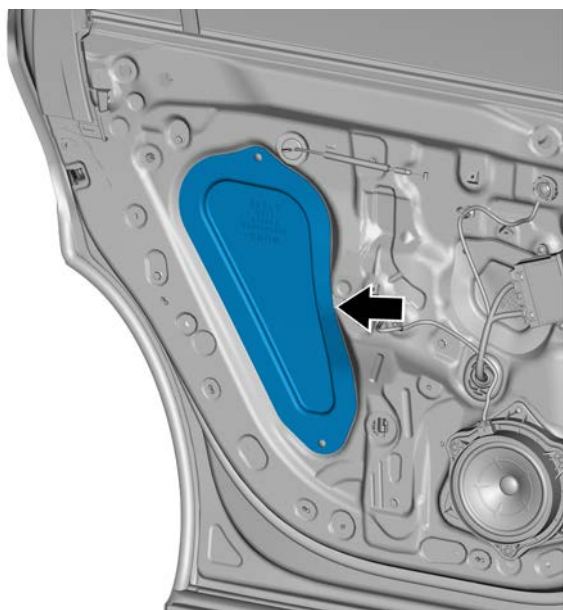
Installation procedure



- 1 Install the exterior handle of the RL door to the fixed position.



- 2 Install the RL door exterior inner opening handle retaining clip.



3 Install the left rear door rear waterproof membrane.

4 Install the RL door interior trim panel assembly

5 Connect the negative battery cable.

12.5.2.6 Replacement of inward-opening handle of front left door

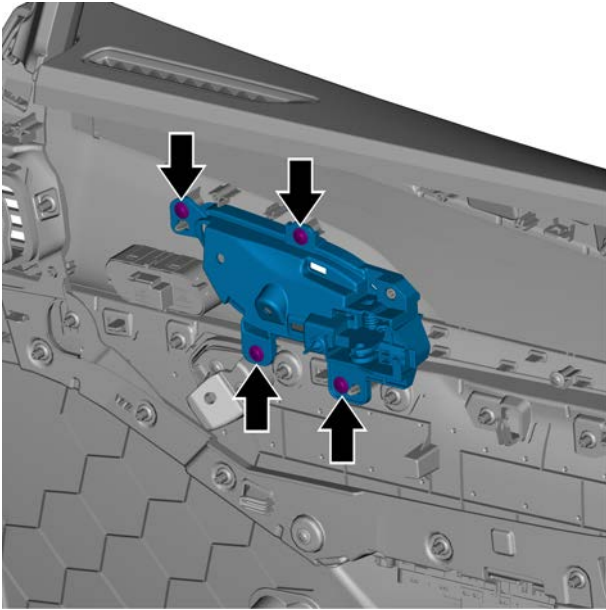
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly](#).

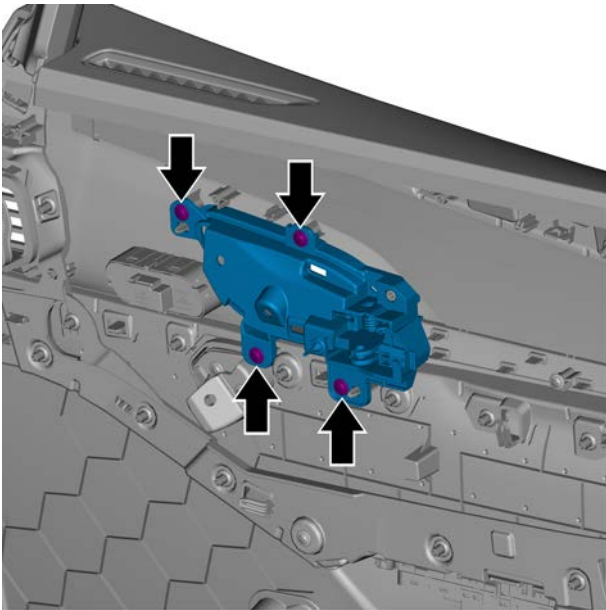
- 3 Remove the front left door atmosphere lamp, see the [Replacement of the front left door atmosphere lamp](#).
- 4 Remove the 4 retaining screws on the interior inner opening handle of the front left door and remove the interior inner opening handle of the front left door.



Installation procedure

- 1 Install the 4 fixing screws of the inner opening handle of the front left door.

Torque: 1.5 N·m (metric) 1.1 lb-ft (Imperial system)



- 2 Install the atmosphere light for the front left door.
- 3 Install the assembly-interior trim panel front door LH.
- 4 Connect the negative battery cable.

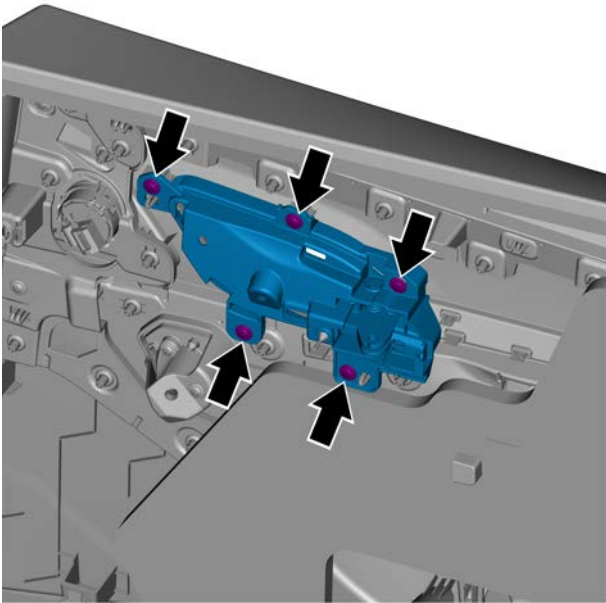
12.5.2.7 Replacement of inner opening handle of rear left door

Removal procedure

Warning !

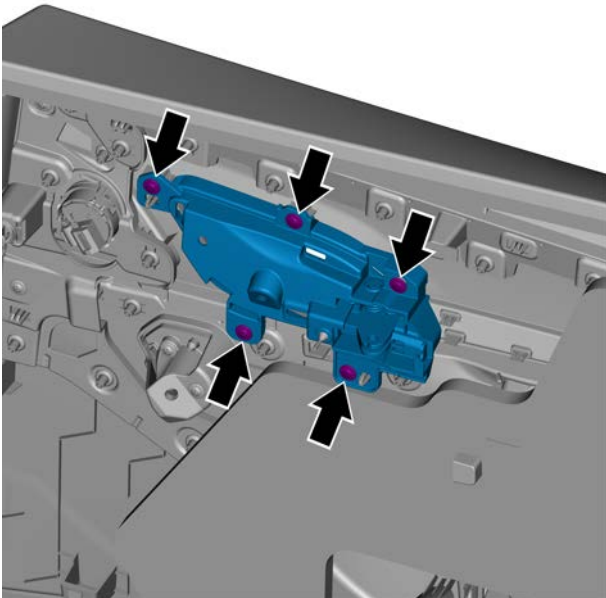
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the RL door interior trim plate assembly, see the [Replacement of the RL door interior trim plate assembly](#).
- 3 Remove the 5 retaining screws of the RL door inner opening handle and remove the RL door inner opening handle.

**Installation procedure**

- 1 Install 5 retaining screws on the inner opening handle of the RL door.

Torque: 1.5 N·m (metric) 1.1 lb·ft (Imperial system)



- 2 Install the RL door interior trim panel assembly
- 3 Connect the negative battery cable.

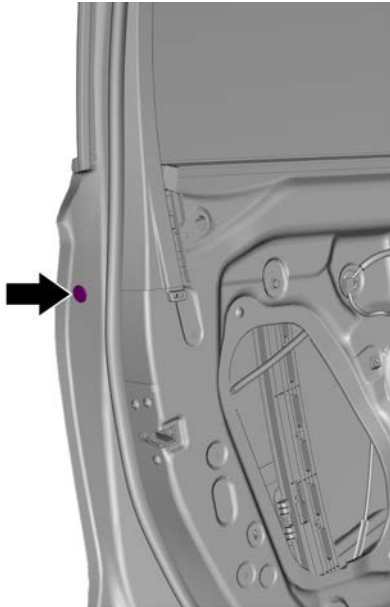
12.5.2.8 Replacement of the front left door key cylinder

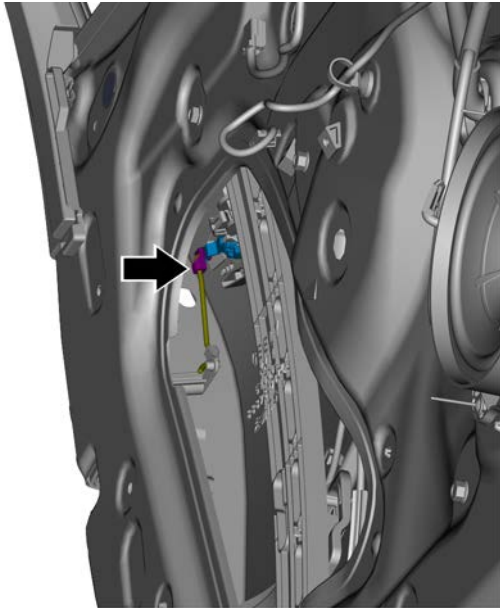
Removal procedure

Warning !

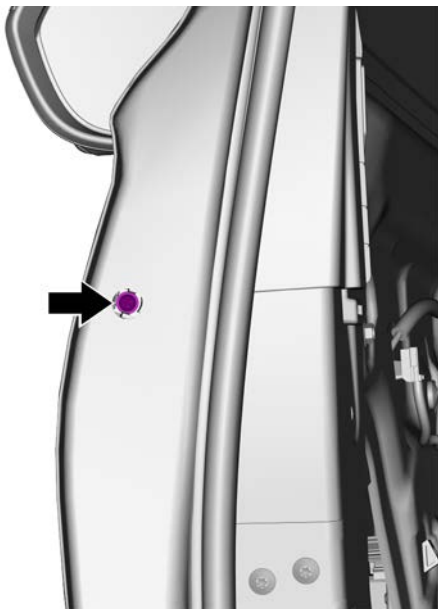
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly.](#)
- 3 Remove the front left door exterior inner opening handle assembly, see the [Replacement of the front left door exterior inner opening handle assembly.](#)
- 4 Remove the rubber plug of the lock core bolt.





5 Remove the front left door lock core lever.



6 Remove the retaining bolt of the front left door lock core assembly.

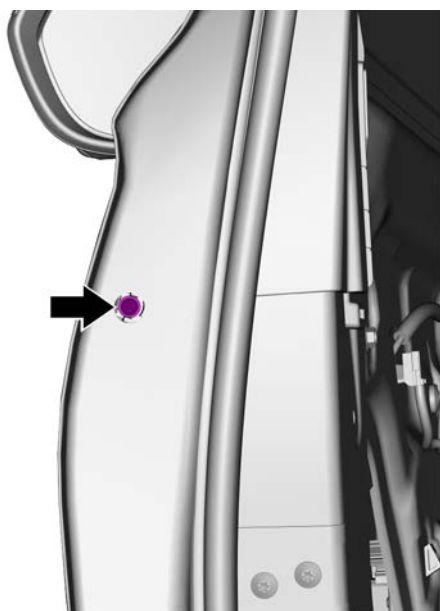


- 7 Remove the front door lock cylinder assembly LH.

Installation procedure

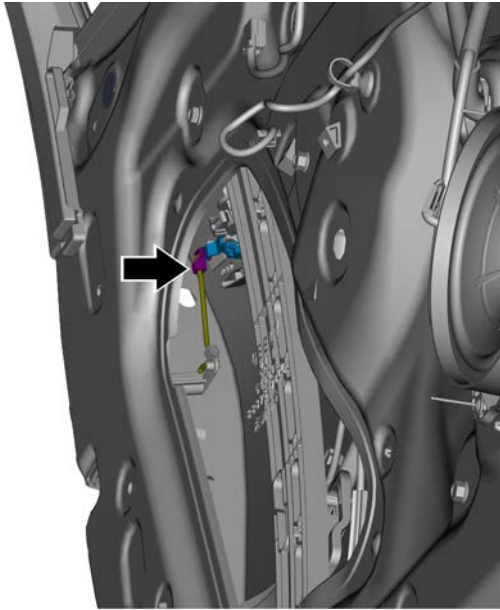


1 Installation of front left door lock cylinder assembly.

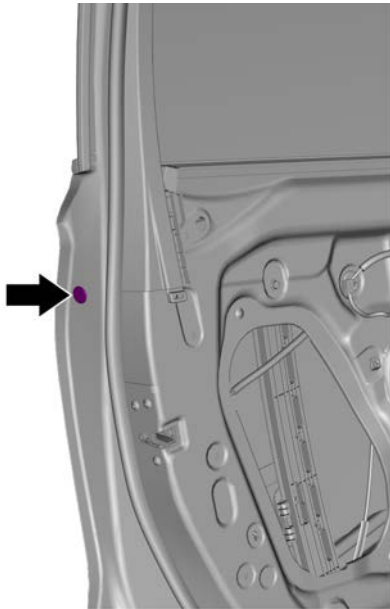


2 Install the retaining bolt of the front left door lock core assembly.

Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)



- 3 Install the front left door lock cylinder rod.

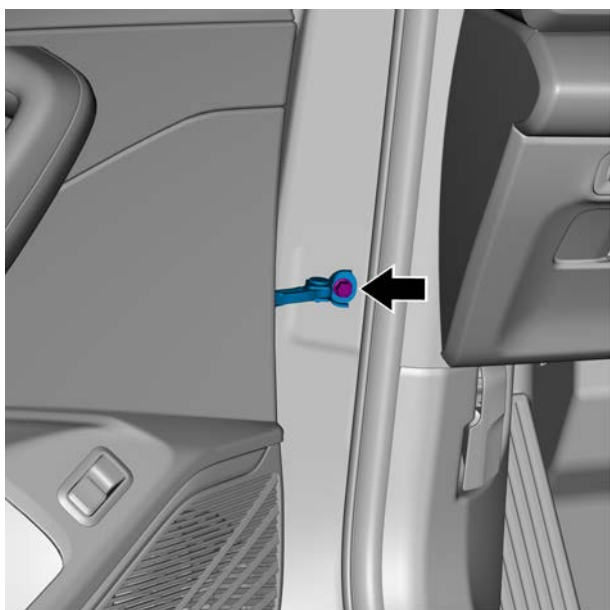


- 4 Install rubber plug of lock core bolt.

- 5 Install the front left door exterior inner opening handle assembly.
- 6 Install the assembly-interior trim panel front door LH.
- 7 Connect the negative battery cable.

12.5.2.9 Primary sealing strip front door LH replacement

Removal procedure



- 1 Remove the retaining bolts of the front left door check and the body.

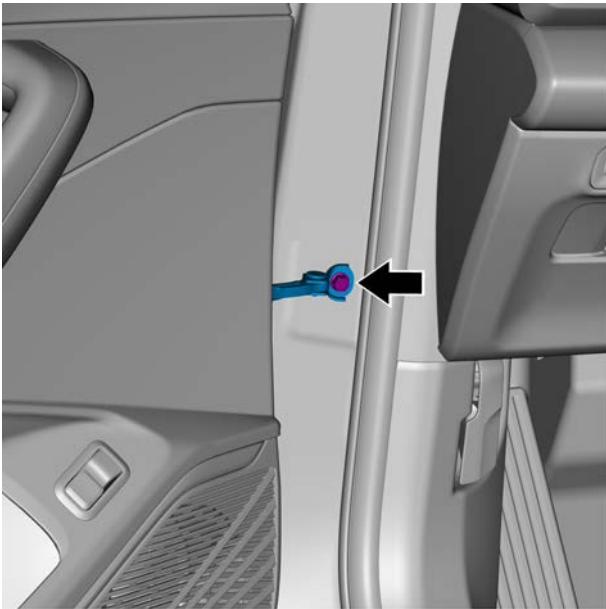


- 2 Remove the front left door headway seal and remove it.

Installation procedure



- 1 Install the front left door 1st seal.



- 2 Install the front left door check and the retaining bolts of the vehicle body.

Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)

12.5.2.10 Vehicle inner side seal front door LH replacement

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the dashboard driver side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 3 Remove the front left doorsill trim plate assembly, see [Replacement of the front left doorsill trim plate assembly](#).

- 4 Remove the left A-pillar trim plate assembly, see [Replacement of the left A-pillar trim plate assembly](#).
- 5 Remove the left B-pillar lower trim panel assembly, refer to [replacement of left B-pillar lower trim panel assembly](#).
- 6 Remove the left and right B-pillar upper trim panel assembly, refer to [replacement of the left B-pillar upper trim panel assembly](#).
- 7 Disassemble the door hole seal on the front left door and remove it.



Installation procedure

- 1 Install the vehicle inner side seal front door LH.



- 2 Install the left B-pillar upper trim panel assembly.
- 3 Install the left B-pillar lower trim panel assembly.
- 4 Install the left A-pillar upper trim panel assembly.
- 5 Install the left front door sill trim panel assembly.

- 6 Install the driver side end cover assembly of the dashboard.
- 7 Connect the negative battery cable.

12.6 Seat

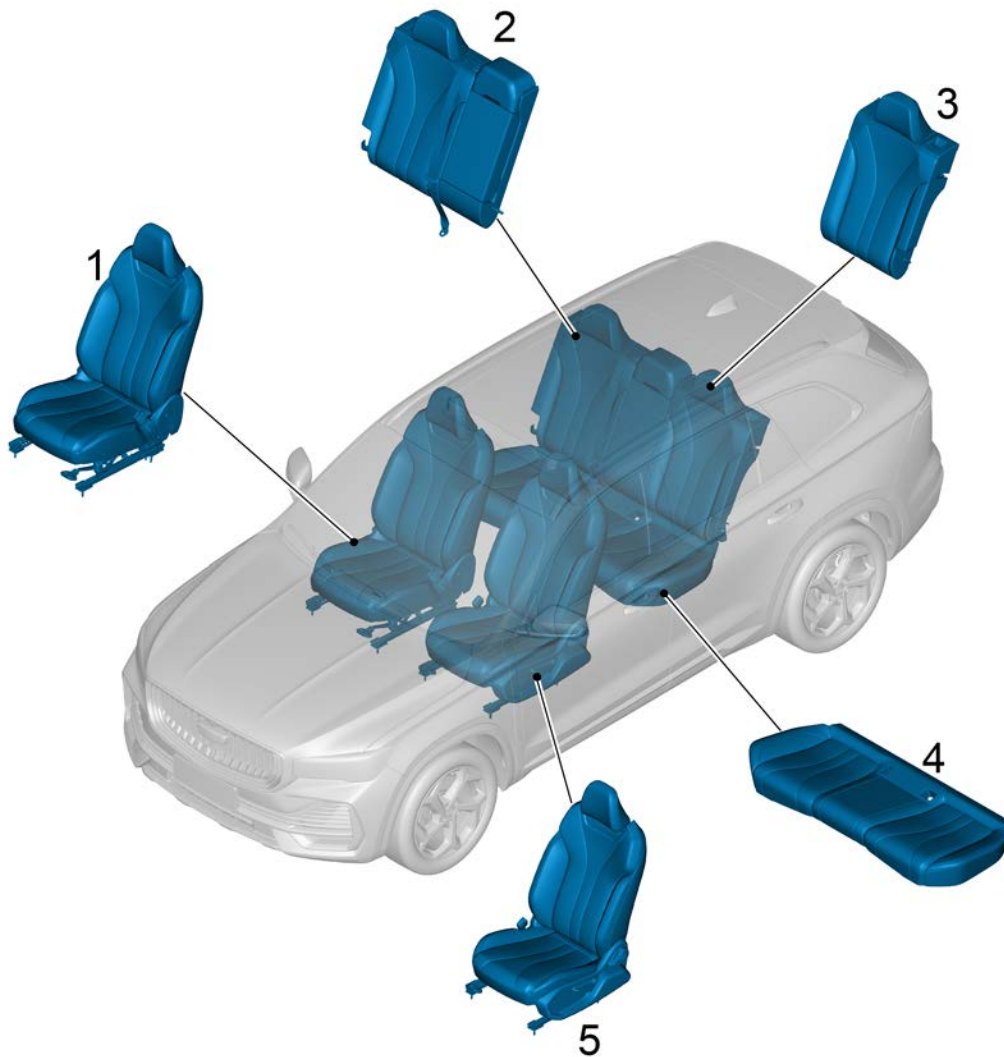
12.6.1 Specification

12.6.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Driver seat assembly retaining bolt	M10×50.5	34~46	25.0~33.9
Passenger seat assembly retaining bolt	M10×50.5	34~46	25.0~33.9
Rear seat left backrest assembly retaining bolt	M10×25×30.65	41~55	30.2~40.6
Rear seat right backrest assembly retaining bolt	M10×25×30.65	41~55	30.2~40.6

12.6.2 Component position

12.6.2.1 Component position



- | | | | |
|----|-----------------------------------|----|----------------------------|
| 1. | Passenger seat assembly | 4. | Rear seat cushion assembly |
| 2. | Right rear seat backrest assembly | 5. | Driver seat assembly |
| 3. | Left rear seat backrest assembly | | |

12.6.3 Removing and installing

12.6.3.1 Replacement of the front driver seat assembly

Removal procedure

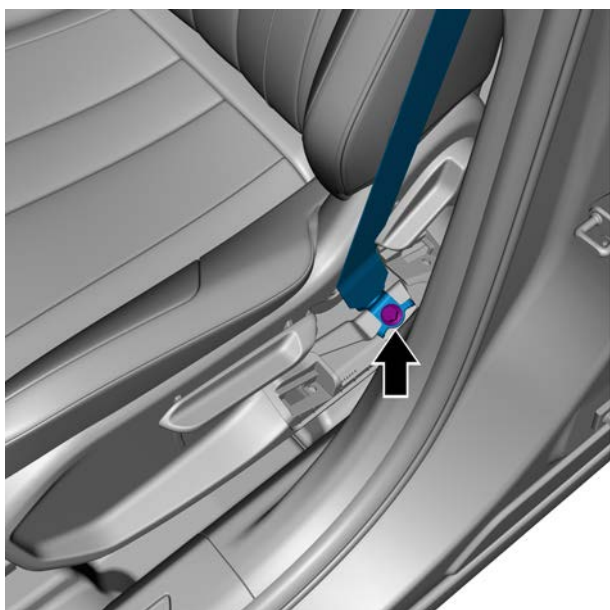
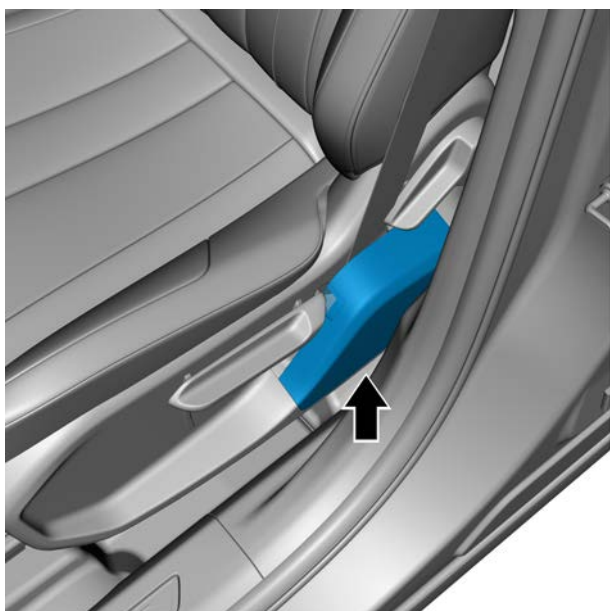
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

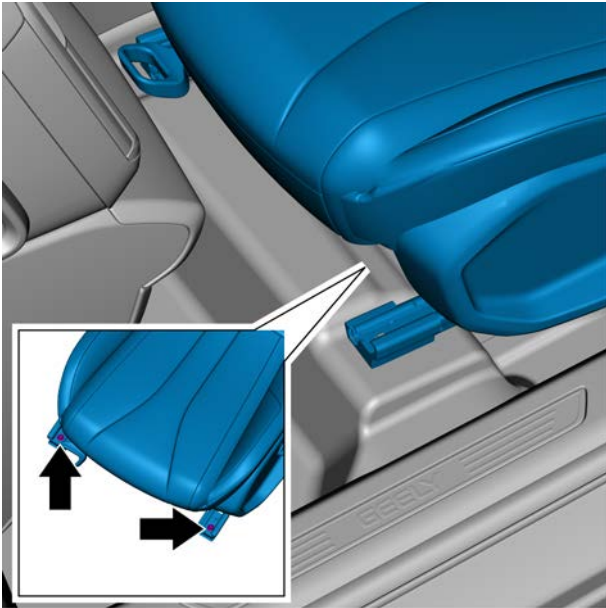
Caution

The front passenger side seat assembly are similar to the driver seat assembly in removal and assembly.

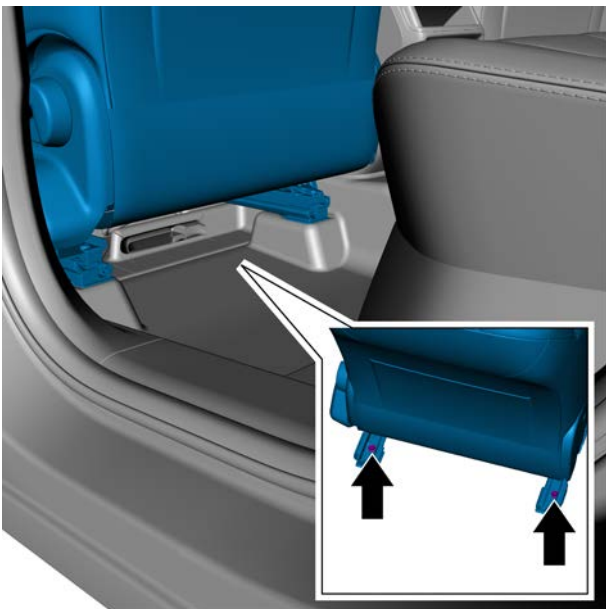
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the exit cover of the seat belt in the front left seat.



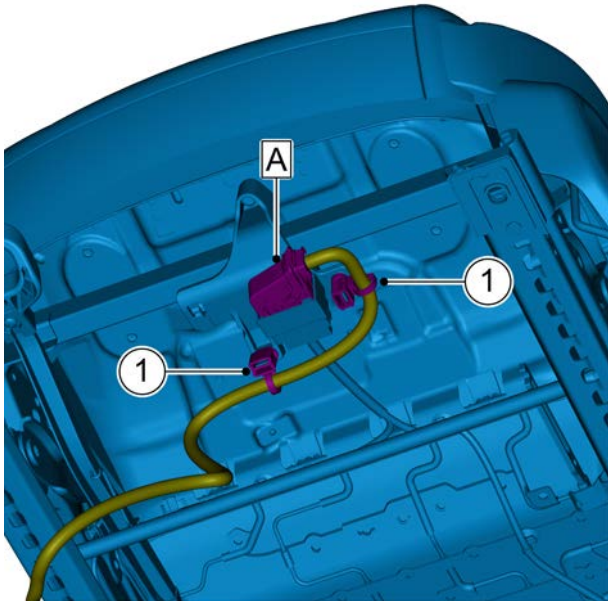
- 3 Remove seat belt pretensioner (front left) seat end retaining bolts.



- 4 Move the seat to the back and remove the 2 retaining bolts on the front side of the driver seat assembly.



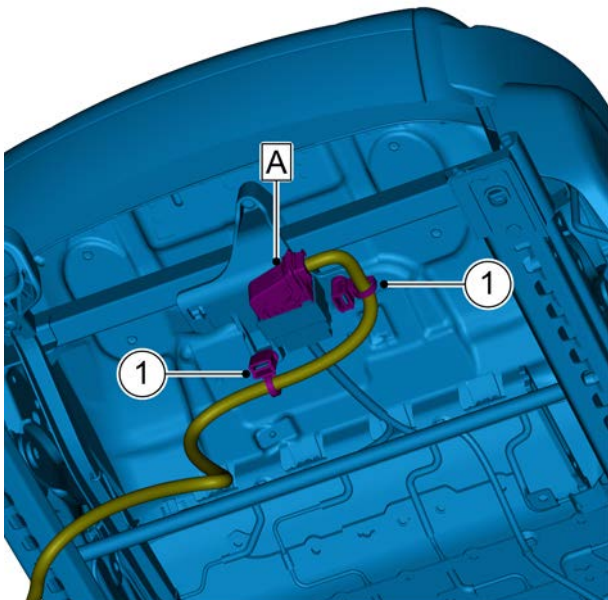
- 5 Move the seat to the front and remove the 2 retaining bolts on the rear side of the driver seat assembly.



- 6 Lift the seat back and disconnect the driver seat harness connector A.
- 7 Dismantle the 2 wire harness clip 1 of the driver seat assembly and remove the driver seat assembly.

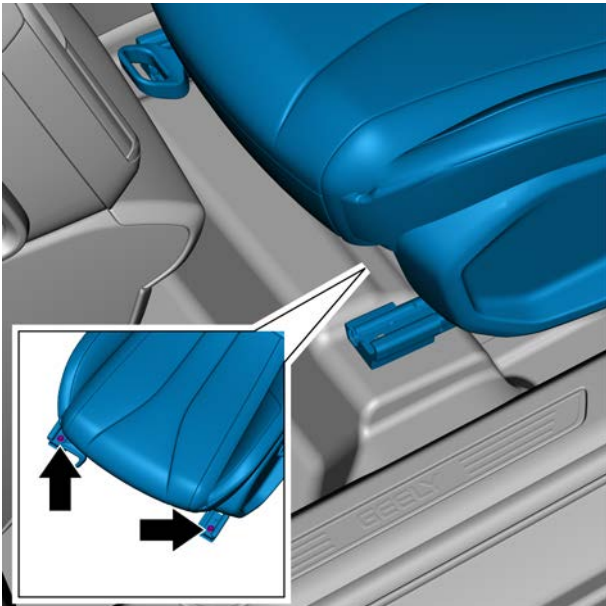
Installation procedure

- 1 Connect the harness connectors A of the driver seat assembly.
- 2 Install 2 wire harness clips 1 of the driver seat assembly.

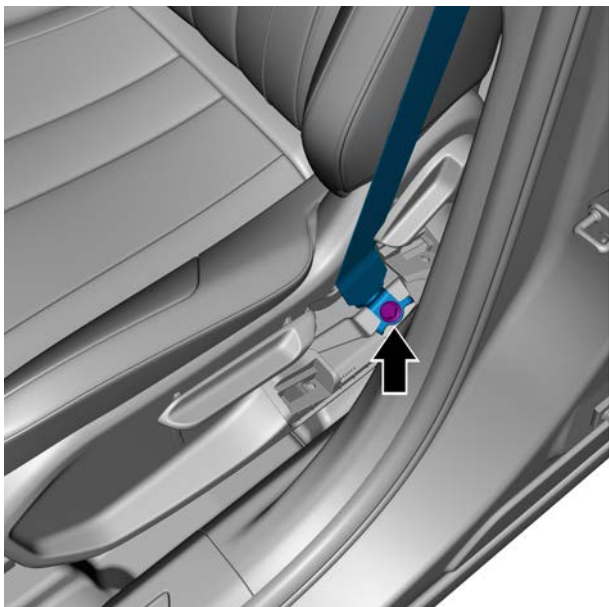




- 3 Move the seat to the front and install 2 retaining bolts on the back side of the driver seat assembly.
Torque: 40 N·m (metric) 29.5 lb-ft (imperial system)

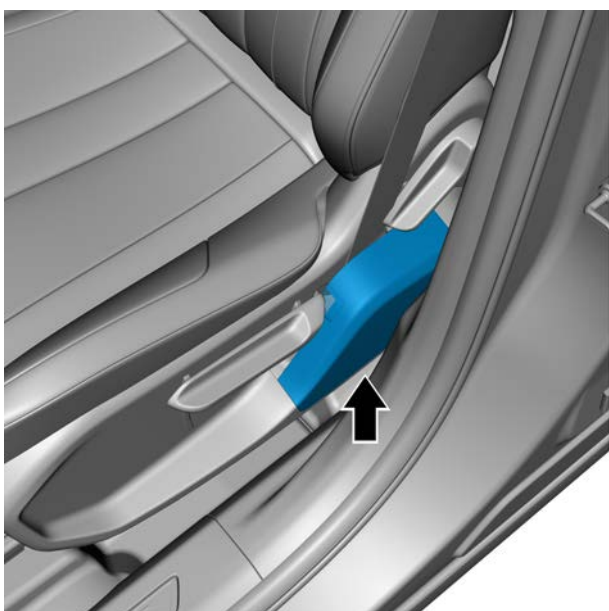


- 4 Move the seat to the back and install 2 retaining bolts on the front side of the driver seat assembly.
Torque: 40 N·m (metric) 29.5 lb-ft (imperial system)



- 5 Install seat belt pretensioner (front left) seat end retaining bolts.

Torque: 40 N·m (metric) 29.5 lb-ft (imperial system)



- 6 Install the exit cover of the seat belt in the front left seat.

- 7 Connect the negative battery cable.

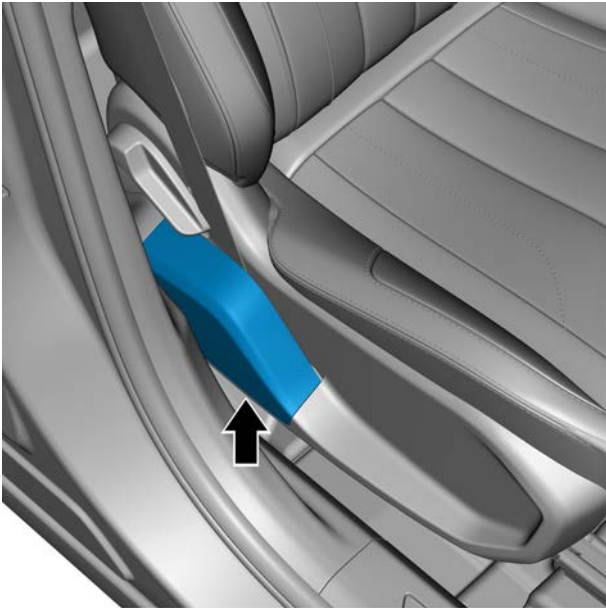
12.6.3.2 Passenger Seat Assembly Replacement

Removal procedure

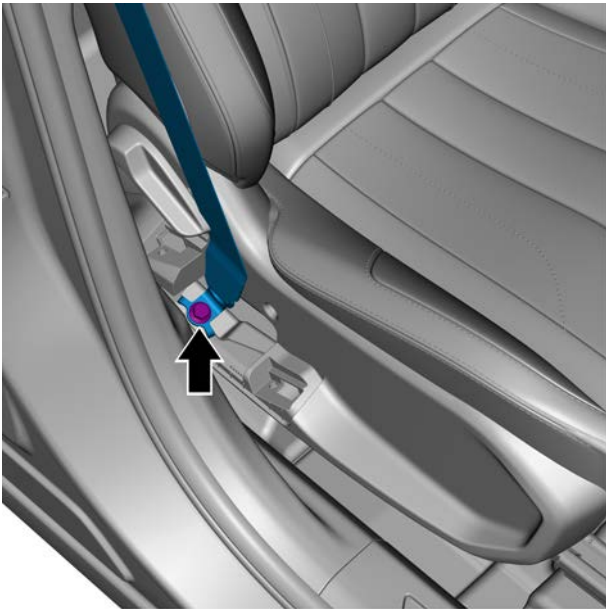
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

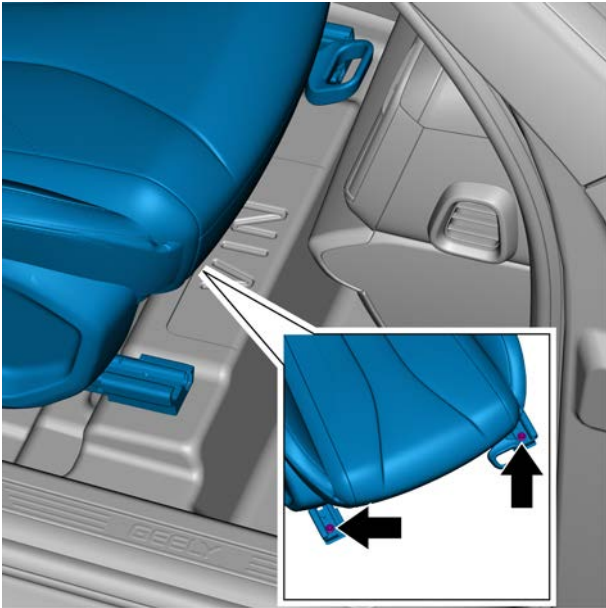
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).



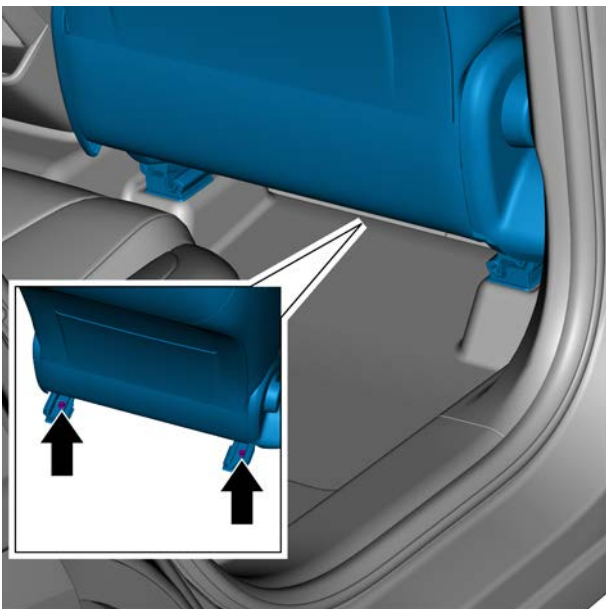
2 Remove the FR seat belt exit cover.



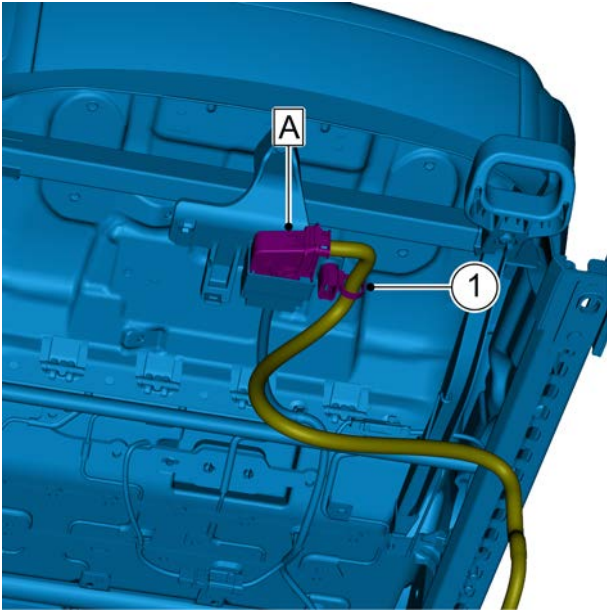
3 Remove seat belt pretensioner (FR) seat end retaining bolts.



- 4 Move the seat to the back and remove the 2 retaining bolts on the front side of the passenger seat assembly.



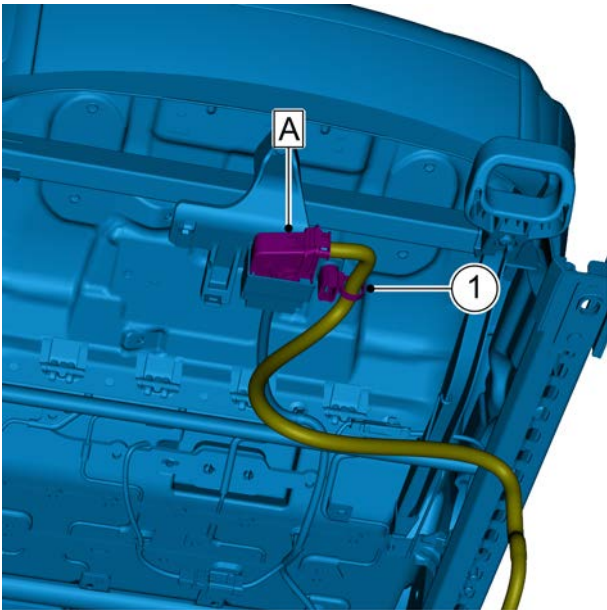
- 5 Move the seat to the front and remove the 2 retaining bolts on the rear side of the passenger seat assembly.

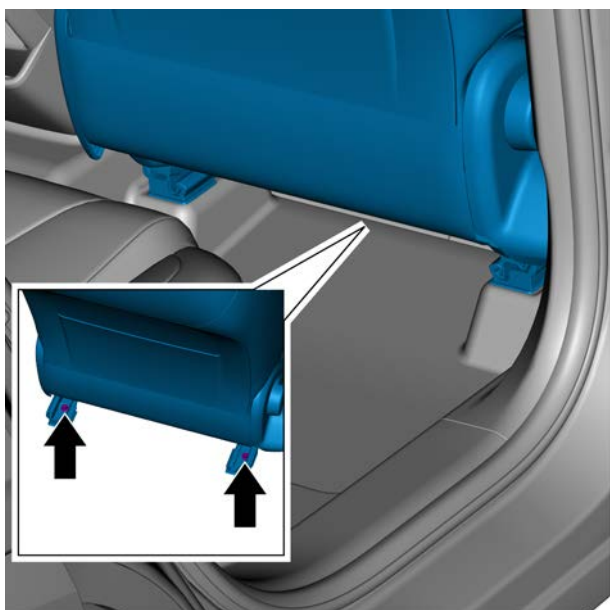


- 6 Lift the seat back and disconnect the passenger seat harness connector A.
- 7 Remove the passenger seat assembly harness clip 1 and remove the passenger seat assembly.

Installation procedure

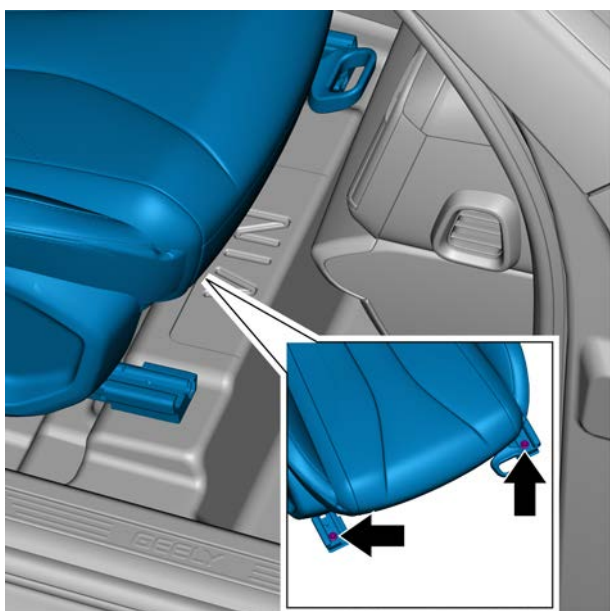
- 1 Connect the passenger seat assembly harness connector A.
- 2 Install passenger seat assembly harness clip 1.





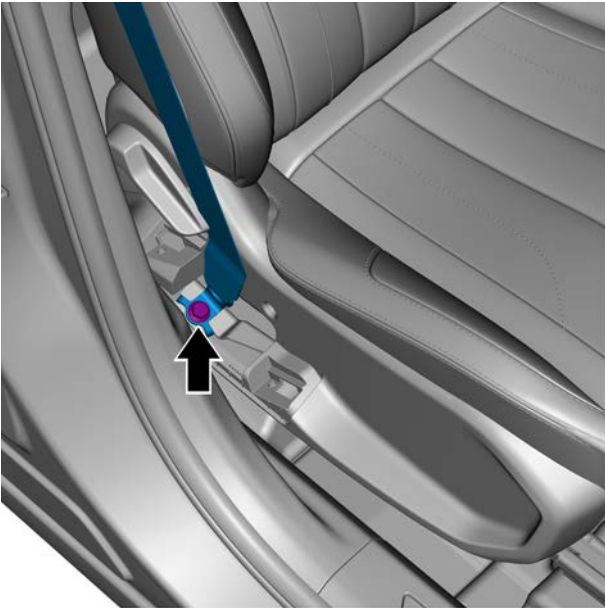
- 3 Move the seat to the front and install 2 retaining bolts on the rear side of the passenger seat assembly.

Torque: 40 N·m (metric) 29.5 lb-ft (imperial system)

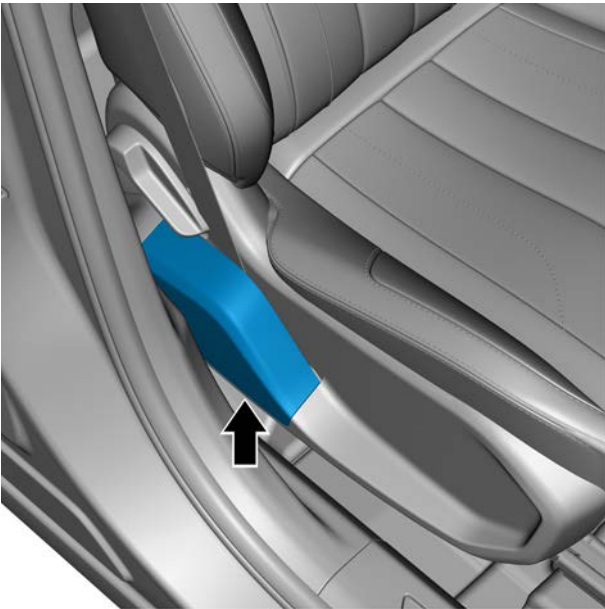


- 4 Move the seat to the back and install 2 retaining bolts on the front side of the passenger seat assembly.

Torque: 40 N·m (metric) 29.5 lb-ft (imperial system)



- 5 Install seat belt pretensioner (FR) seat end retaining bolts.
Torque: 40 N. m (metric system) 29.5 lb-ft (Imperial system)

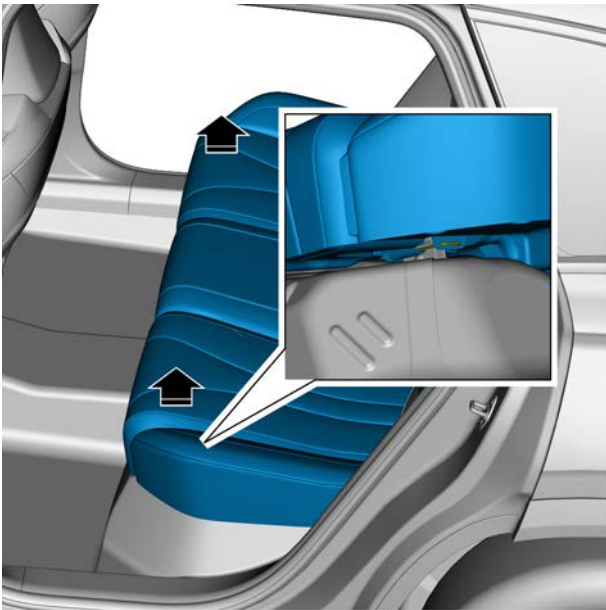


- 6 Install the FR seat belt exit cover.

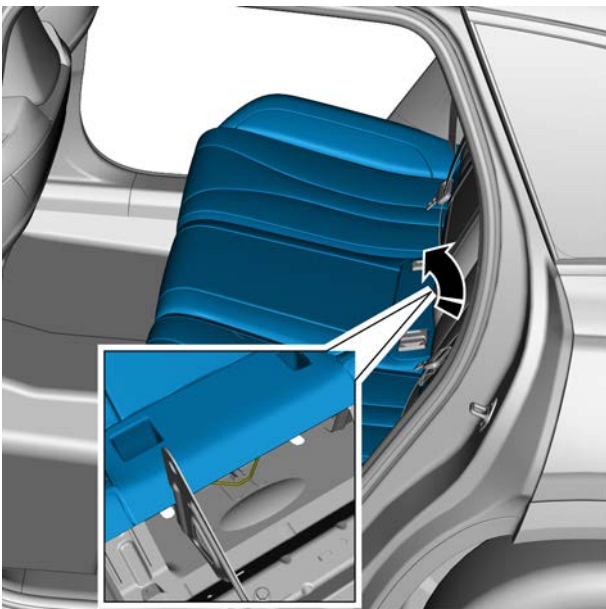
- 7 Connect the negative battery cable.

12.6.3.3 Rear Seat Cushion Assembly Replacement

Removal procedure

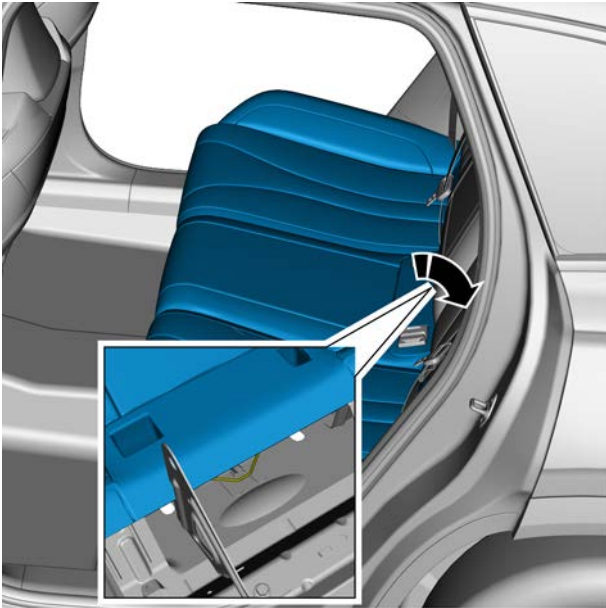


- 1 Lift both ends of the rear seat cushion assembly to disengage the seat lock nut mechanism.

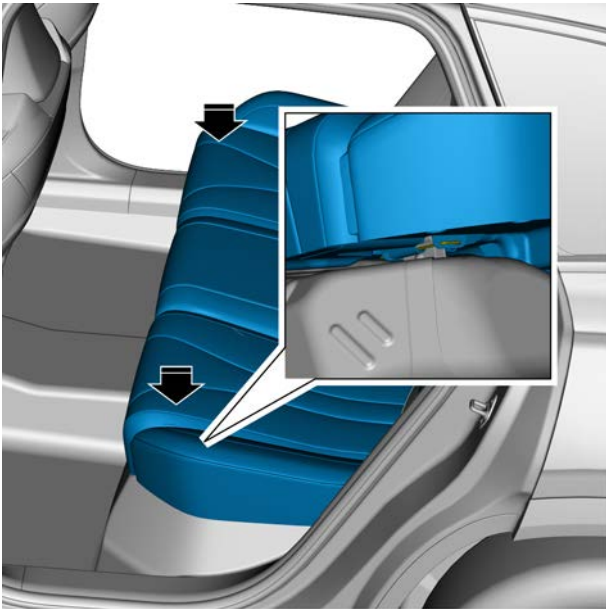


- 2 Press the middle and back end of the rear seat cushion assembly, release the retaining hook back forcefully, and remove the rear seat cushion assembly.

Installation procedure



- 1 Clip the rear end of the rear seat cushion assembly into the cushion retaining hook.



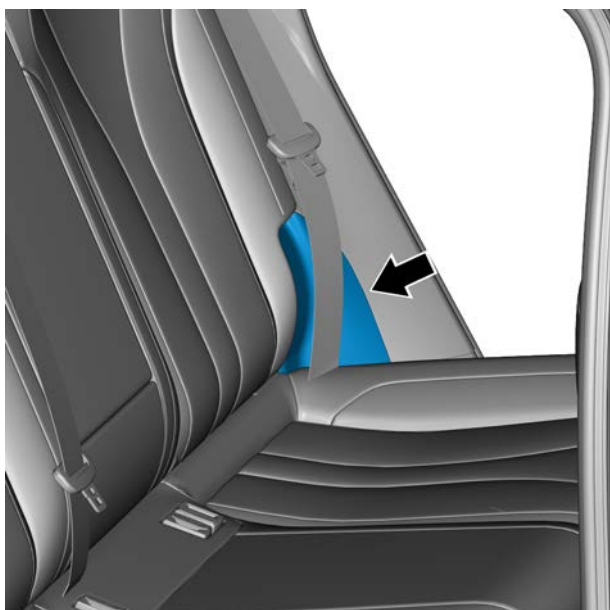
- 2 Press the rear seat cushion assembly into the seat cushion fixing lock nut mechanism.

Caution

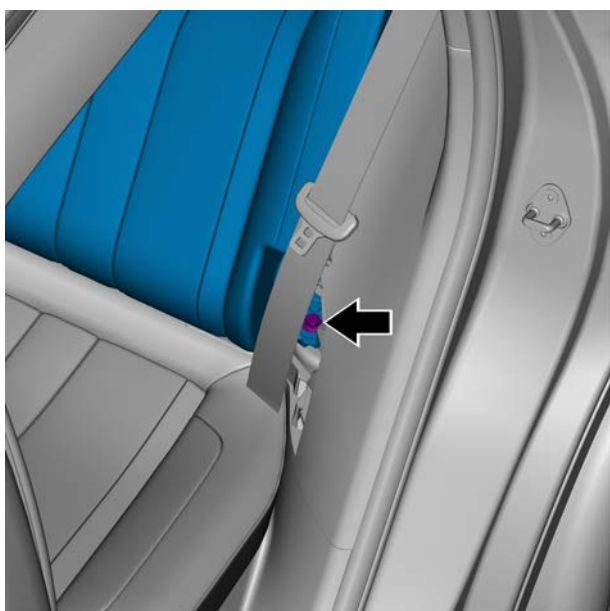
The seat cushion is pressed in the seat cushion lock nut mechanism to hear the sound of "click" as the standard.

12.6.3.4 Left rear seat backrest assembly replacement

Removal procedure

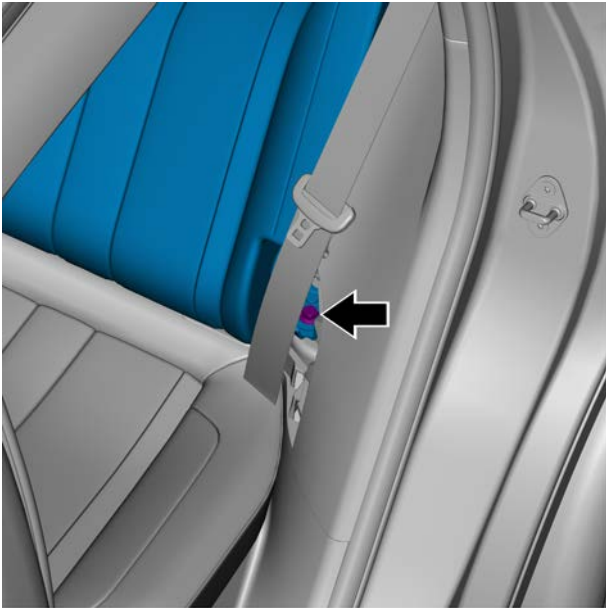


1 Remove the trim plate cover under the left C-pillar.



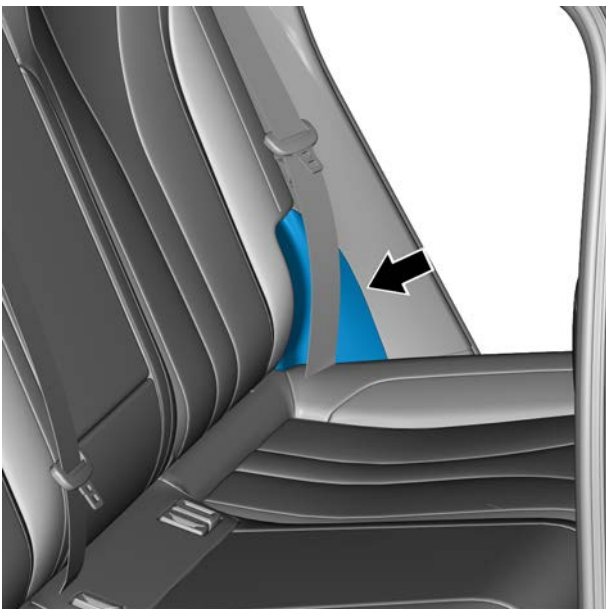
2 Remove the retaining bolt of the left backrest assembly of the rear seat and remove the left backrest assembly of the rear seat.

Installation procedure



- 1 Install the fastening bolts of the left backrest assembly of the rear seat.

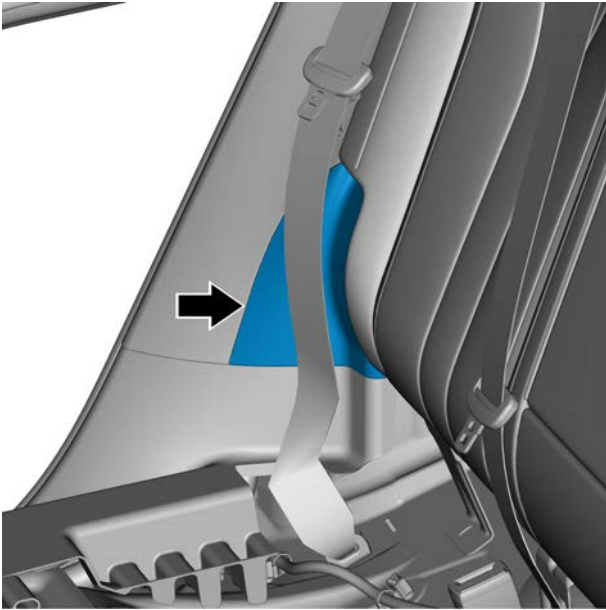
Torque: 48 N·m (metric) 35.4 lb-ft (imperial system)



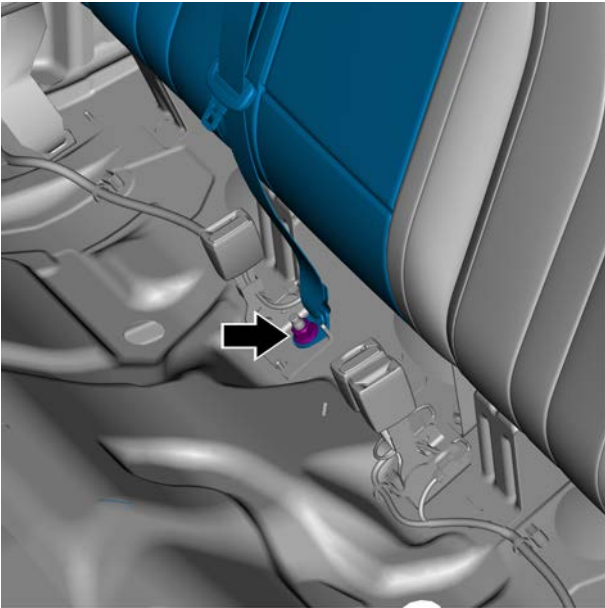
- 2 Install the trim cover plate under the left C-pillar.

12.6.3.5 Right rear seat backrest assembly Replacement

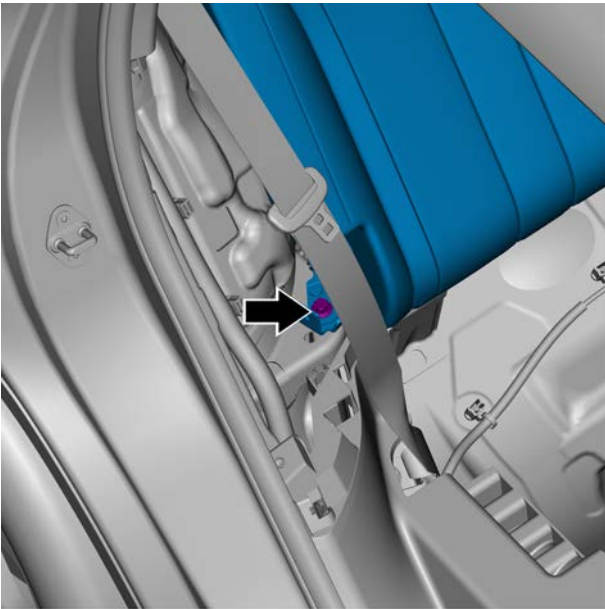
Removal procedure



- 1 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly.](#)
- 2 Remove the cover plate under the right C-pillar.

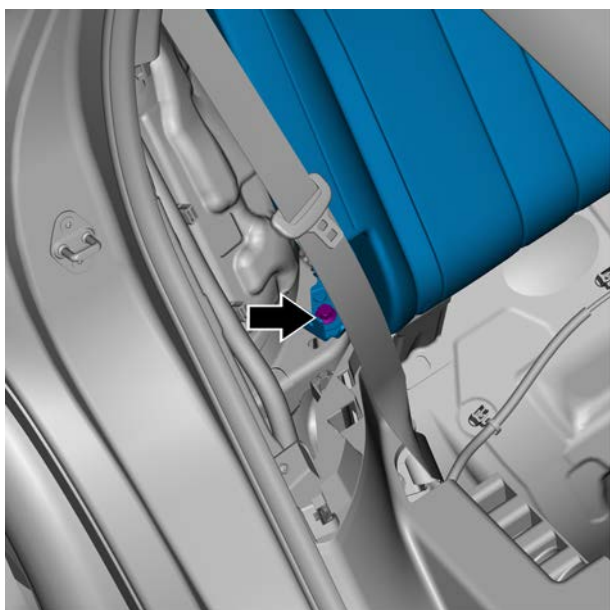


- 3 Remove the seat belt pretensioner (middle of the second row of seats) retaining nut.



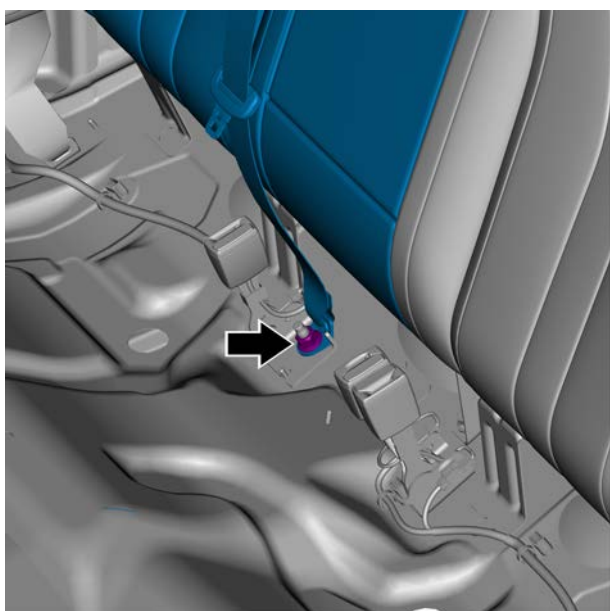
- 4 Remove the retaining bolt of the right backrest assembly of the rear seat and remove the right backrest assembly of the rear seat.

Installation procedure



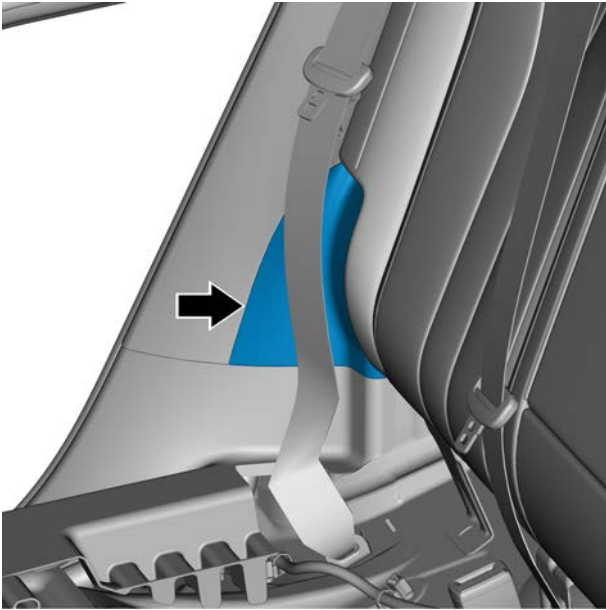
- 1 Install the fastening bolts of the right backrest assembly of the rear seat.

Torque: 48 N·m (metric) 35.4 lb-ft (imperial system)



- 2 Install seat belt pretensioner (in the middle of the second row of seats) retaining nuts.

Torque: 48 N·m (metric) 35.4 lb-ft (imperial system)



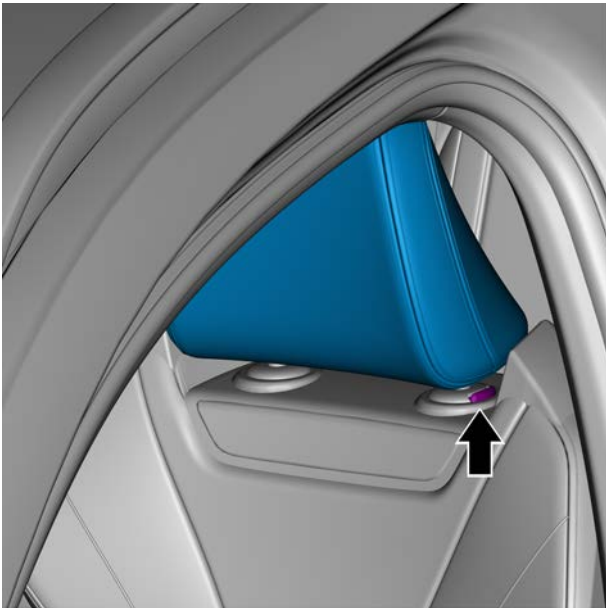
- 3 Install the cover plate under the right C-pillar.

- 4 Install the rear seat cushion assembly.

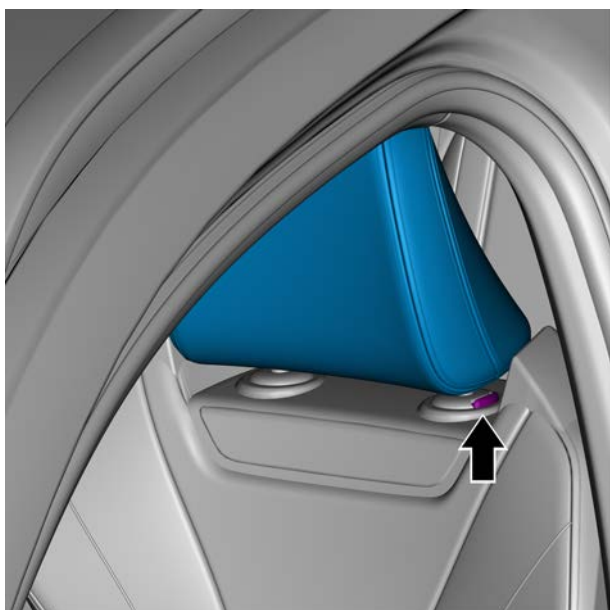
12.6.3.6 Replacement of the front left seat headrest

Removal procedure

- 1 Press the headrest adjustment button to lift the front left seat headrest upward.



Installation procedure



- 1 Press the headrest adjustment button to insert the front left seat headrest into the head restraint guide.

12.6.3.7 Replacement of RL side headrest

Removal procedure

- 1 Press the headrest adjustment button to lift the RL side headrest upward.



Installation procedure



- 1 Press the headrest adjustment button to insert the RL side headrest into the head restraint guide.

12.6.3.8 Replacement of headrest in the middle of the back row

Removal procedure

- 1 Press the headrest adjustment button to lift up the rear middle headrest.



Installation procedure



- 1 Press the headrest adjustment button to insert the rear middle headrest into the head restraint guide.

12.7 Instrument Panel, Instruments and Controls

12.7.1 Specification

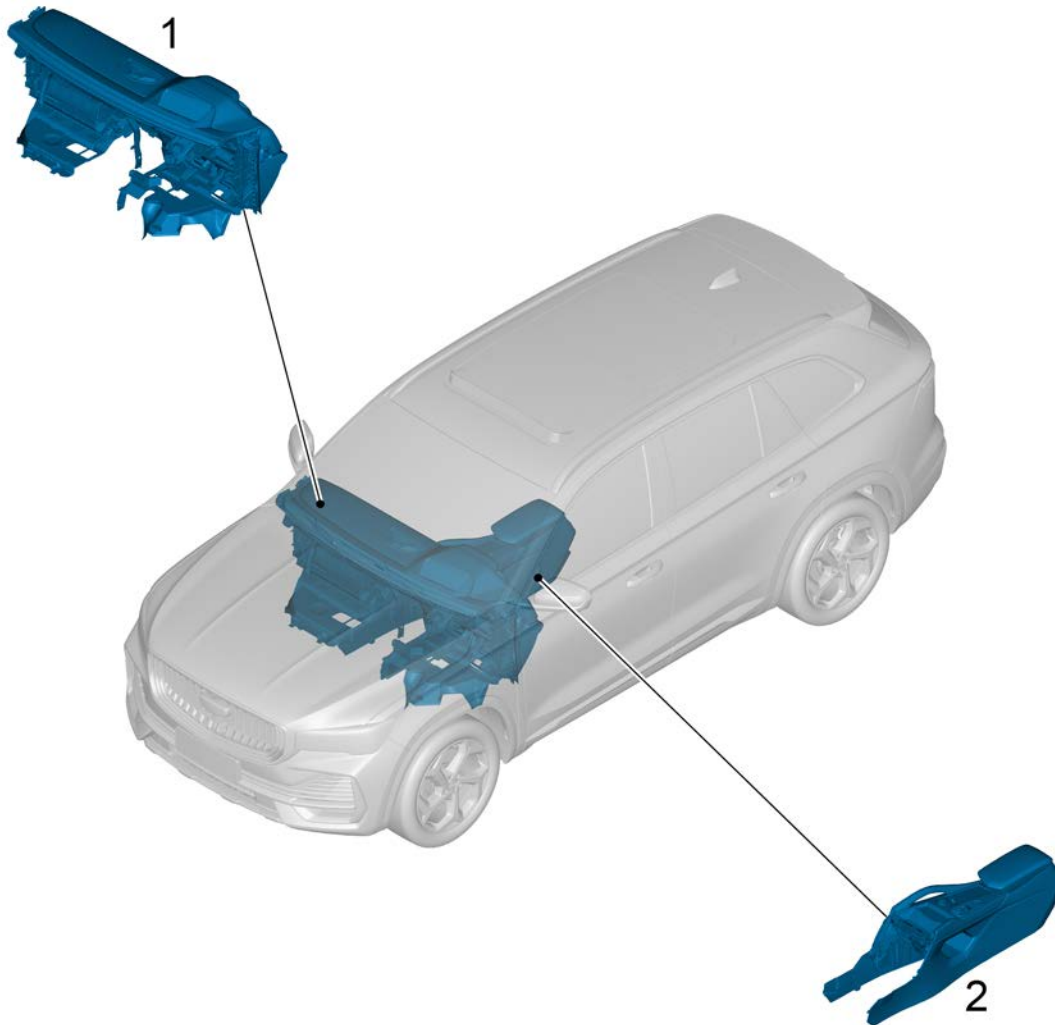
12.7.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Instrument panel lower right fender apron assembly fixing screw	ST4.8×19	2.2~2.8	1.6~2.1
Left air conditioning vent panel assembly retaining screw	ST4.8×19	2.2~2.8	1.6~2.1
Left clad trim plate assembly retaining screw	ST4.8×19	2.2~2.8	1.6~2.1
Steering column cowl lower retaining screw	PF5×16	1.3~1.7	0.9~1.3
Right clad trim plate assembly retaining screw	ST4.8×19	2.2~2.8	1.6~2.1
Glove box frame assembly retaining screws	ST4.8×19	2.2~2.8	1.6~2.1
Glove box frame assembly retaining bolts	M5×16	3.7~5.3	2.7~3.9
Fixing screws of right trim panel assembly of the auxiliary instrument panel	ST4.8×19	3~4	2.2~2.9
Retaining bolt of exterior handle assembly on the right side of sub-dashboard	M5×16	5~7	3.7~5.1
Shift panel assembly retaining screw	ST4.8×19	2.5~3.5	1.8~2.6
Auxiliary instrument panel assembly fixing bolt	M6×6	8.5~11.5	6.3~8.5
Auxiliary instrument panel assembly fixing screw	M5×25	2.5~3.5	1.8~2.6
Instrument panel lower middle fender apron assembly fixing screw	ST4.8×19	2.2~2.8	1.6~2.1
Instrument panel assembly fixing bolt	M5×16	3.7~5.3	2.7~3.9
Dashboard crossbeam assembly retaining bolt	M8×40	20~28	14.7~20.6

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Dashboard crossbeam assembly retaining bolt	M8	20~28	14.7~20.6
Dashboard crossbeam assembly retaining bolt	M6×16	8.5~11.5	6.3~8.5

12.7.2 Component position

12.7.2.1 Component position



1. Dashboard assembly

2. Sub-dashboard assembly

12.7.3 Removing and installing

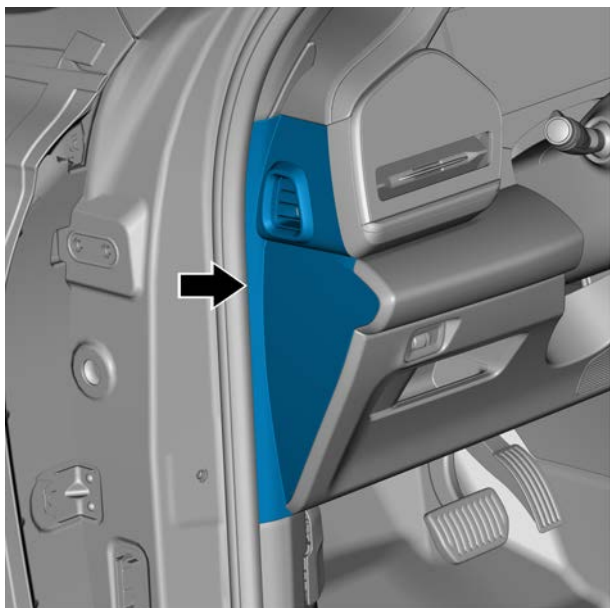
12.7.3.1 Replacement of the end cover assembly at the driver side of the dashboard

Removal procedure

Caution

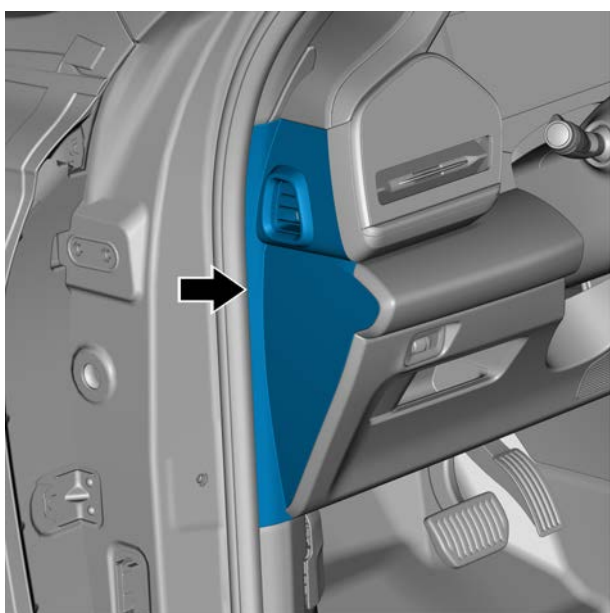
The left and right side dashboard side end cover assemblies are disassembled and assembled in a similar manner.

- 1 Disassemble the dashboard driver side cover and remove the dashboard driver side cover.



Installation procedure

- 1 Install the driver side end cover assembly of the dashboard.



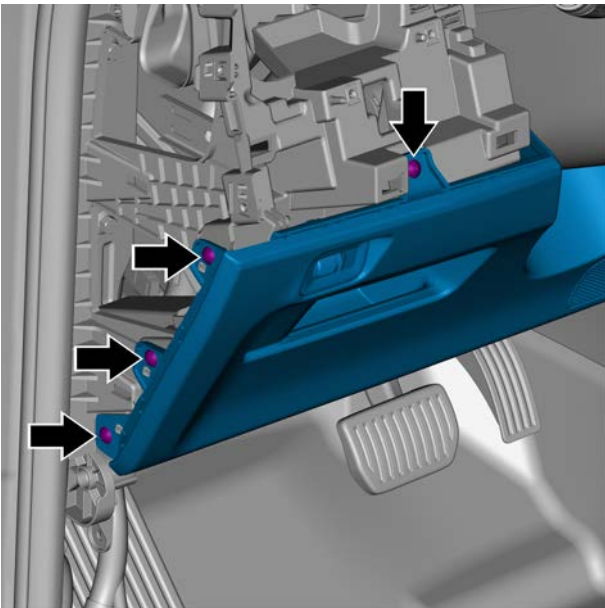
12.7.3.2 Replacement of lower left guard assembly of the dashboard

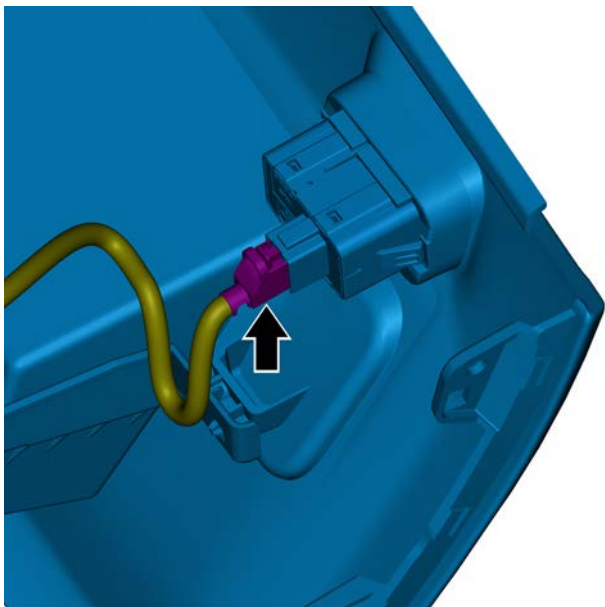
Removal procedure

Warning !

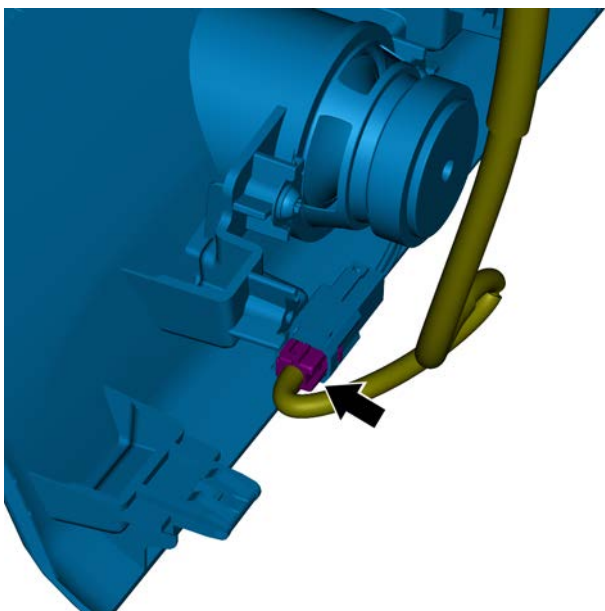
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the dashboard driver side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 3 Remove the dashboard co-pilot side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 4 Remove the left air conditioning vent panel assembly, see the [Replacement of the left air conditioning vent panel assembly](#).
- 5 Remove the left cladding panel assembly, see the [Replacement of the left cladding panel assembly](#).
- 6 Remove the front left doorsill trim plate assembly, see [Replacement of the front left doorsill trim plate assembly](#).
- 7 Remove the right cladding panel assembly, see [Replacement of the right cladding panel assembly](#).
- 8 Remove the 4 retaining screws of the lower left guard assembly of the dashboard.



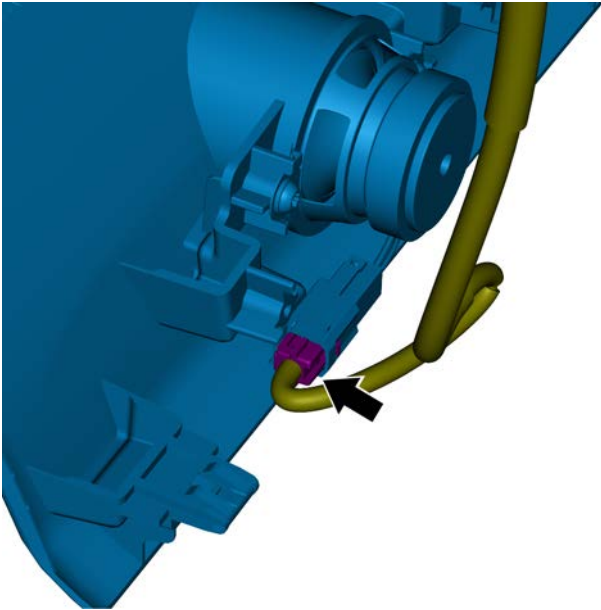


9 Disconnect the dashboard switch unit harness connector.

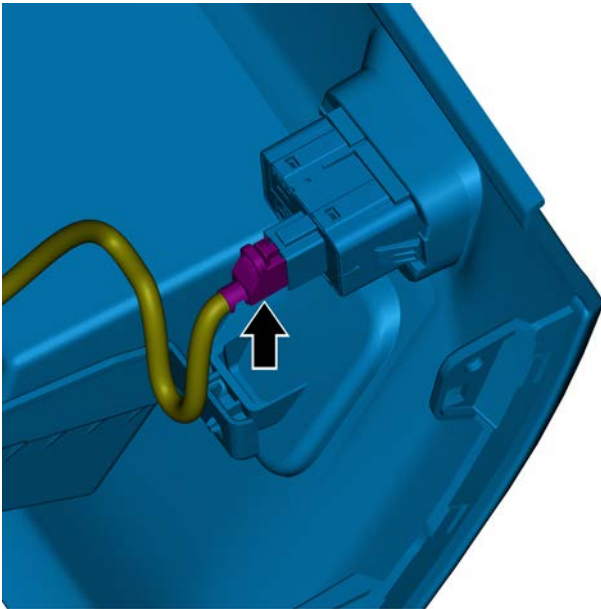


10 Disconnect the emergency spare speaker harness connector and remove the lower left guard assembly of the dashboard.

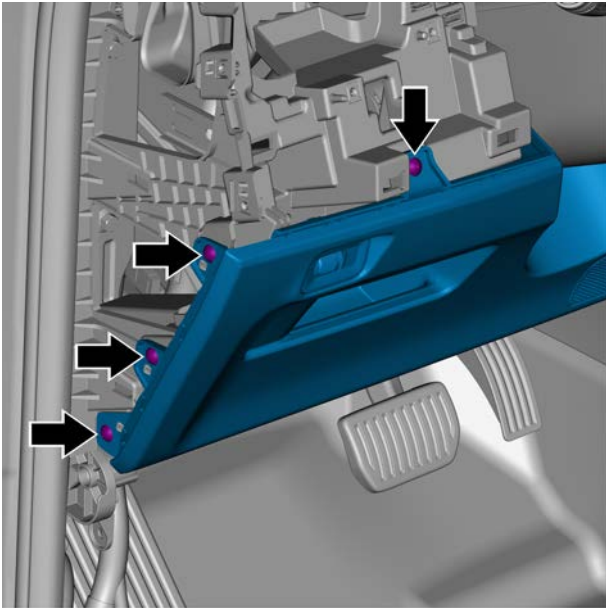
Installation procedure



- 1 Connect the emergency standby speaker harness connector.



- 2 Connect the dashboard switch unit harness connector.



- 3 Install the 4 retaining screws of the dashboard lower left guard assembly.

Torque: 2.5 N·m (metric) 1.8 lb-ft (imperial system)

- 4 Install the right cladding panel assembly.
- 5 Install the left front door sill trim panel assembly.
- 6 Install the left cladding panel assembly.
- 7 Install the left air conditioning outlet panel assembly.
- 8 Install the front passenger side end cover assembly of the dashboard.
- 9 Install the driver side end cover assembly of the dashboard.
- 10 Connect the negative battery cable.

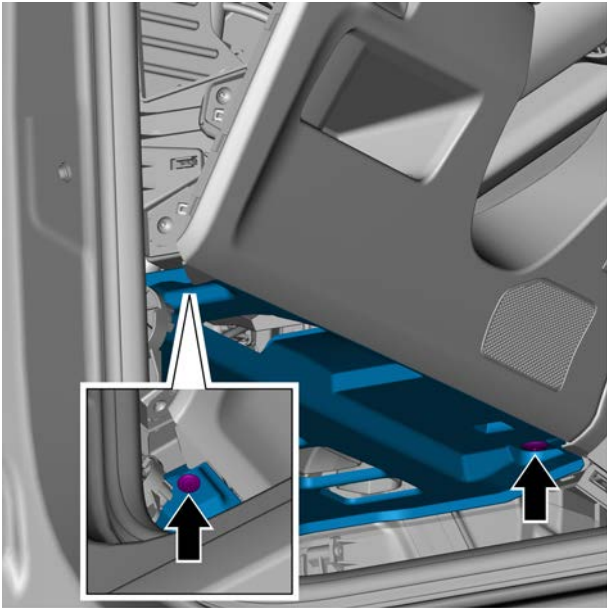
12.7.3.3 Replacement of the lower left toe board assembly

Removal procedure

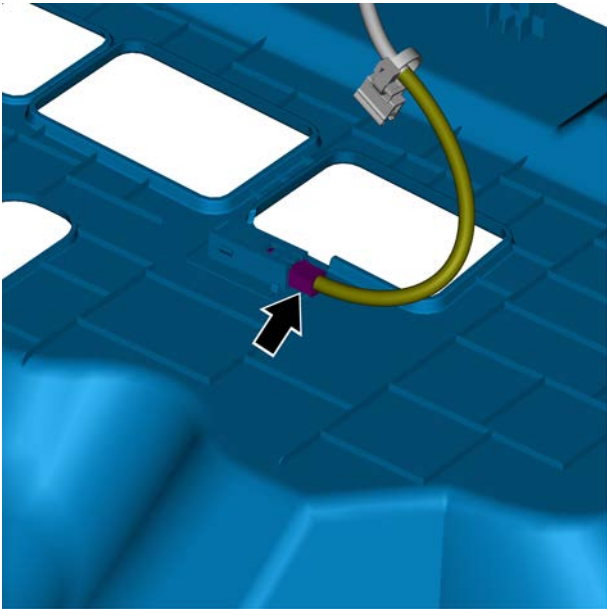
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the dashboard driver side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 3 Remove the front left doorsill trim plate assembly, see [Replacement of the front left doorsill trim plate assembly](#).
- 4 Remove the driver side extended trim plate assembly, see [Replacement of the driver side extended trim plate assembly](#).

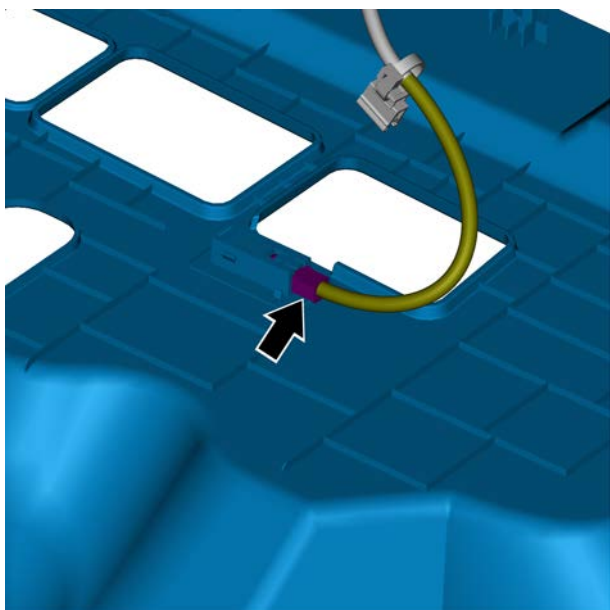


- 5 Remove the 2 J-type clips in the lower left foot fender assembly.

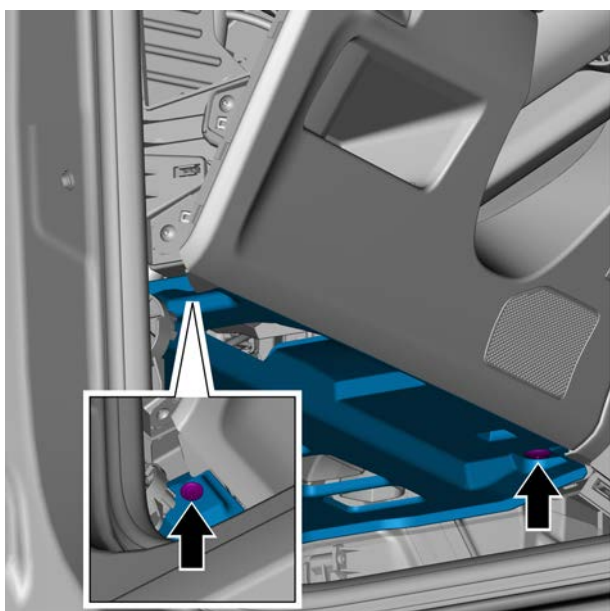


- 6 Disconnect the foot space lighting harness connector and remove the left lower foot fender assembly.

Installation procedure



- 1 Connect the foot light harness connector.



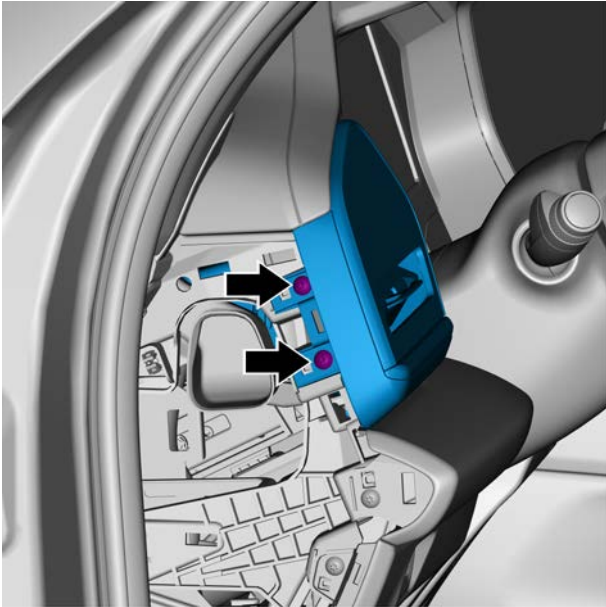
- 2 Install 2 J-type clips in the lower left foot fender assembly.

- 3 Install the driver side extended trim plate assembly.
- 4 Install the left front door sill trim panel assembly.
- 5 Install the driver side end cover assembly of the dashboard.
- 6 Connect the negative battery cable.

12.7.3.4 Replacement of left air conditioning vent panel assembly

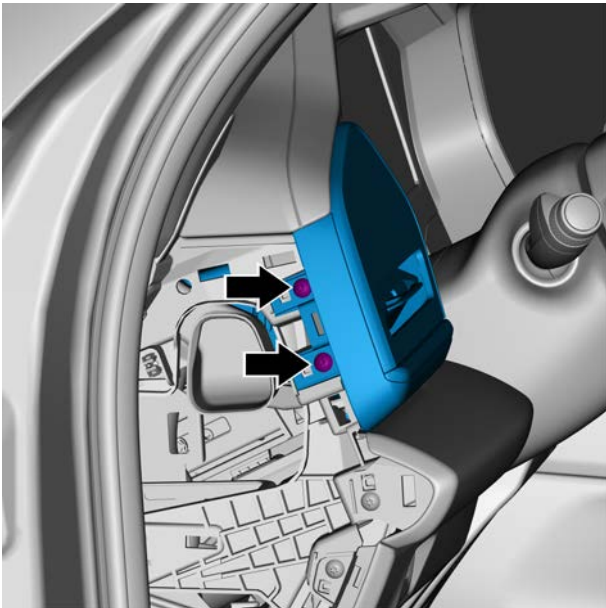
Removal procedure

- 1 Remove the dashboard driver side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 2 Remove the 2 retaining screws of the left air conditioning vent panel assembly and remove the left air conditioning vent panel assembly.



Installation procedure

- 1 Install the 2 retaining screws of left air conditioning vent panel assembly.
Torque: 2.5 N·m (metric) 1.8 lb-ft (imperial system)

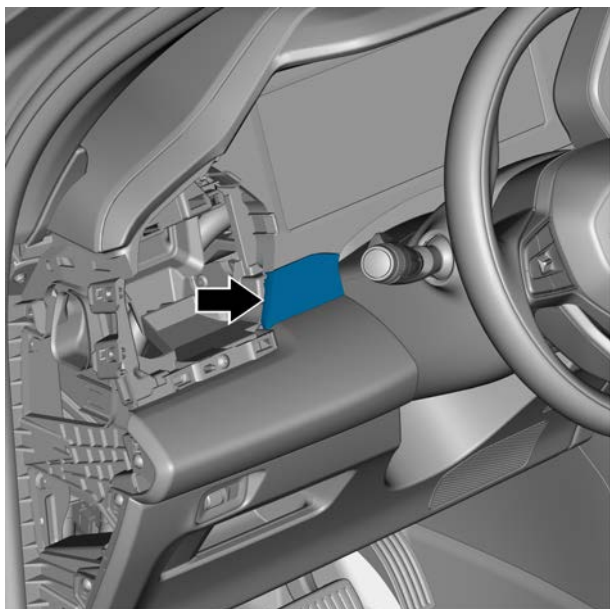


- 2 Install the driver side end cover assembly of the dashboard.

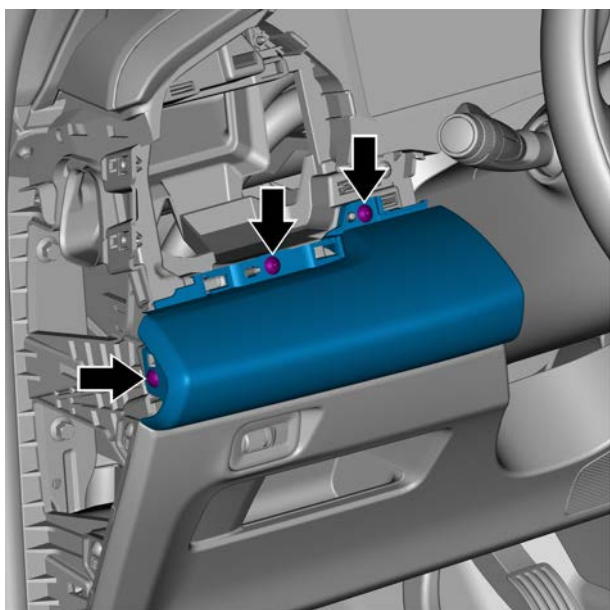
12.7.3.5 Replacement of left cladding panel assembly

Removal procedure

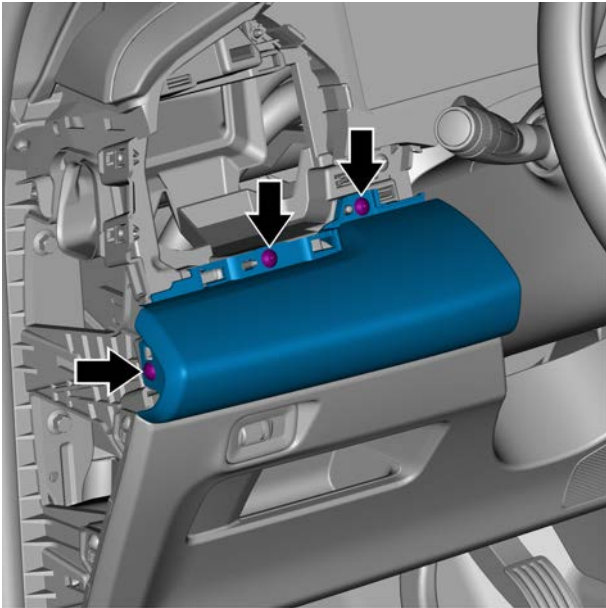
- 1 Remove the dashboard driver side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 2 Remove the left air conditioning vent panel assembly, see the [Replacement of the left air conditioning vent panel assembly](#).
- 3 Remove the left cover assembly of the combined instrument pack mask.



- 4 Remove the 3 retaining screws of the left clad panel assembly and remove the left clad panel assembly.

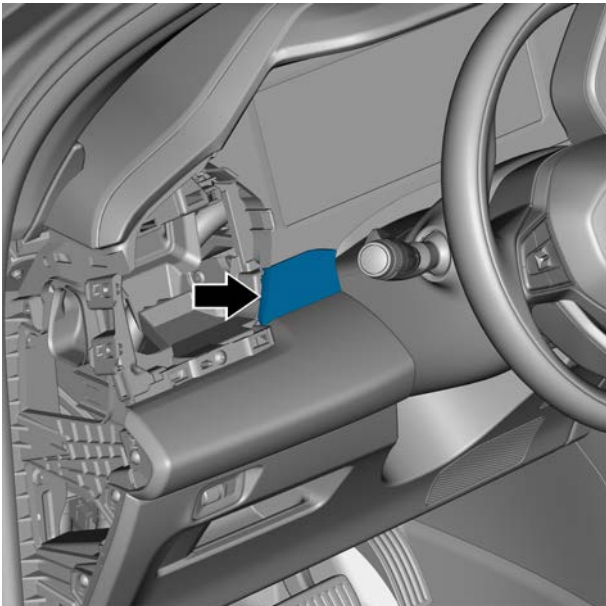


Installation procedure



- 1 Install the 3 retaining screws of the left cladding panel assembly.

Torque: 2.5 N·m (metric) 1.8 lb-ft (imperial system)



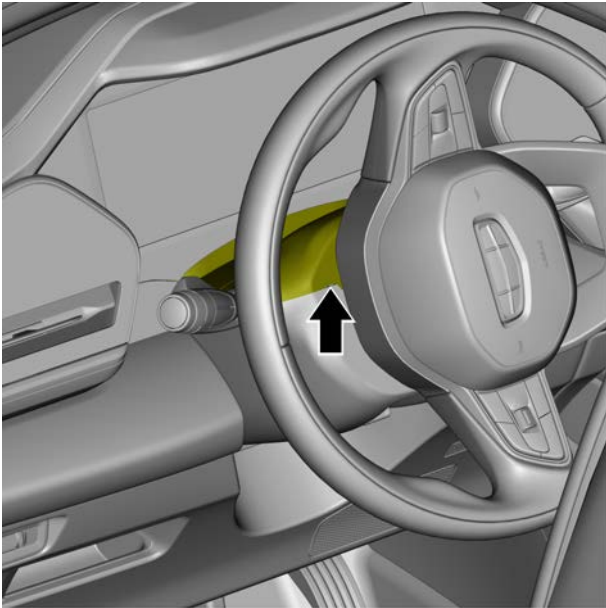
- 2 Install the left cover assembly of the combined instrument cover.

- 3 Install the left air conditioning outlet panel assembly.

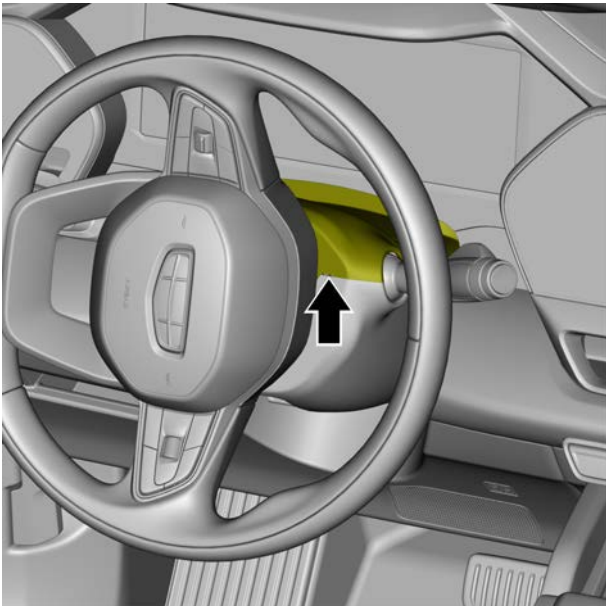
- 4 Install the driver side end cover assembly of the dashboard.

12.7.3.6 Replacement of the lower shield of the steering column

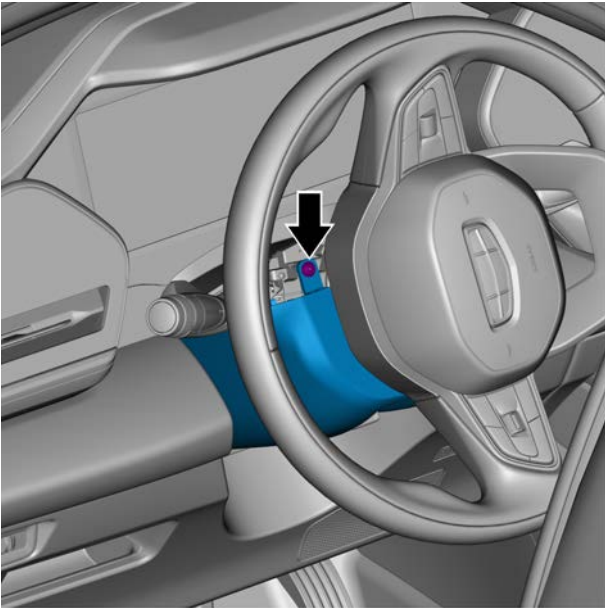
Removal procedure



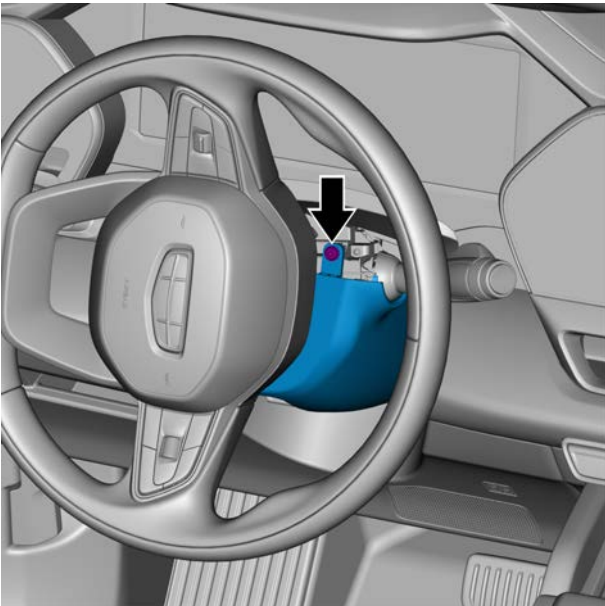
- 1 Adjust the steering wheel to the right position and separate the upper cover of the left steering column from the lower cover of the steering column.



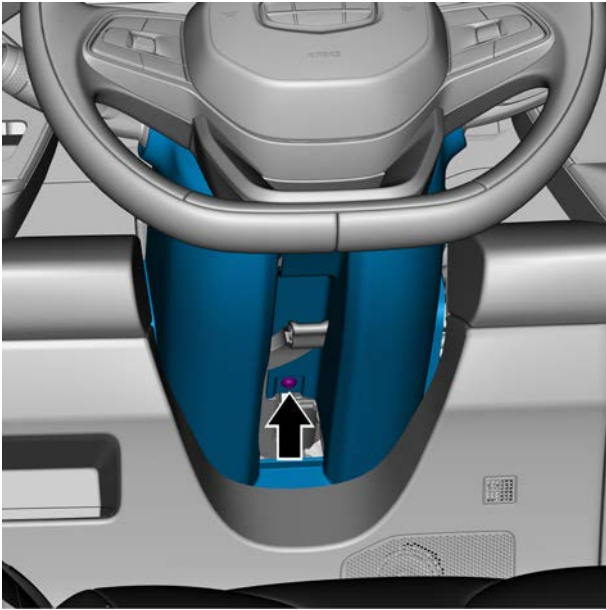
- 2 Adjust the steering wheel to the appropriate position and separate the upper cover of the right steering column from the lower cover of the steering column.



- 3 Adjust the steering wheel to the right position and remove the left retaining screw of the steering column cowl lower assembly.

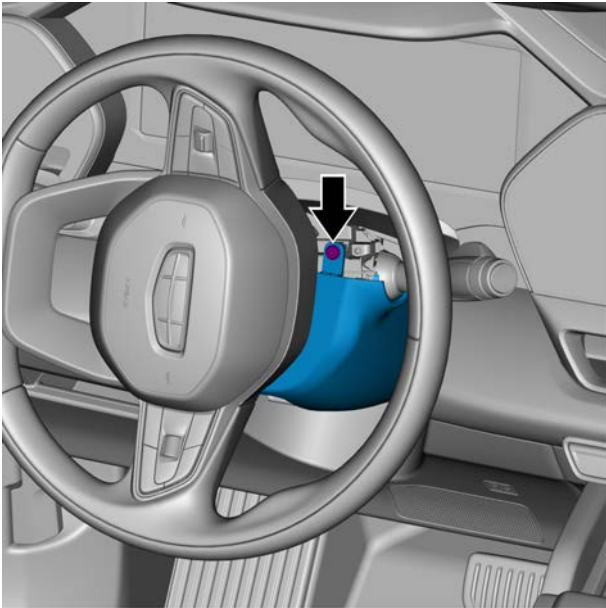


- 4 Adjust the steering wheel to the appropriate position and remove the retaining screw on the right side of the steering column cowl lower assembly.



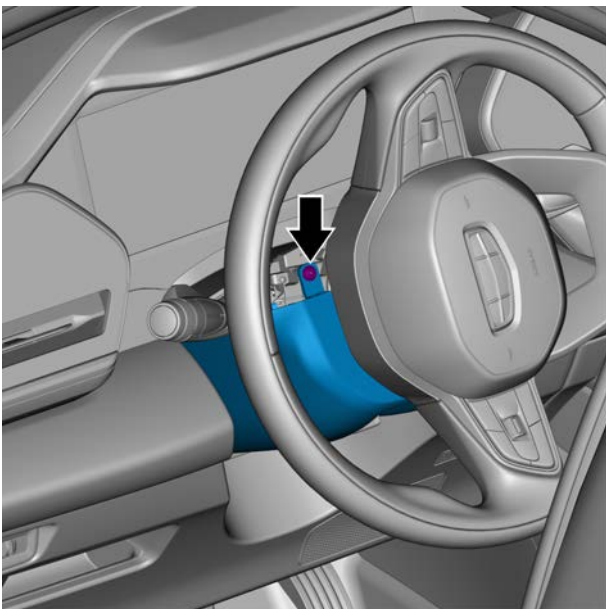
- 5 Remove the retaining screw under the lower cover of the steering column and remove the steering column cowl lower assembly.

Installation procedure



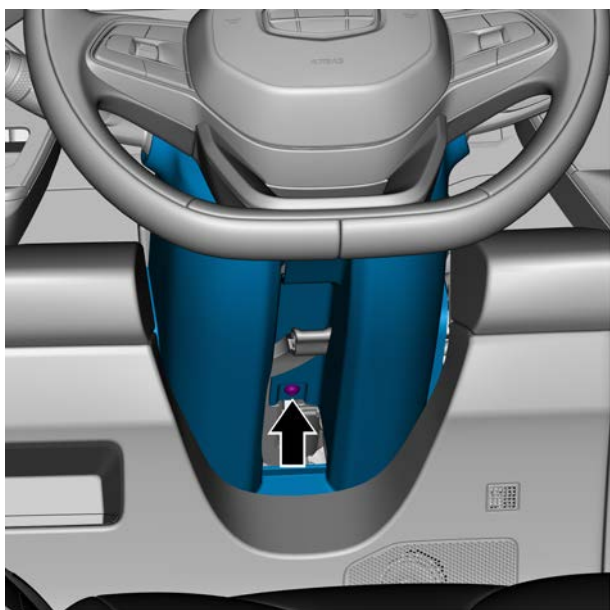
- 1 Adjust the steering wheel to the appropriate position and install the retaining screw on the right side of the steering column cowl lower assembly.

Torque: 1.5 N·m (metric) 1.1 lb-ft (Imperial system)



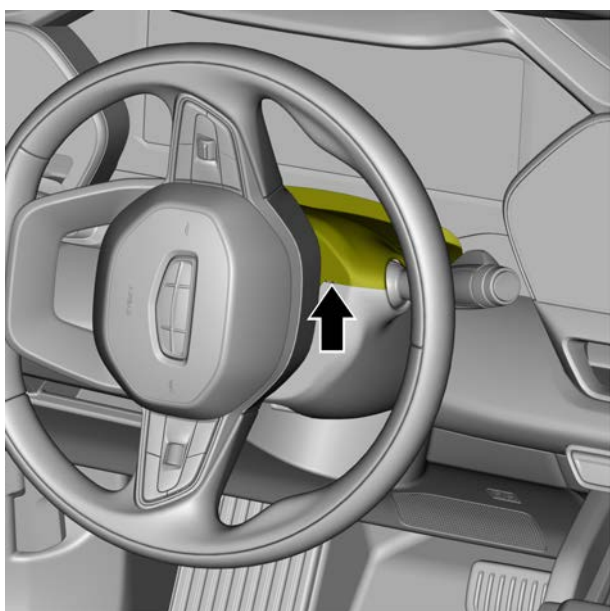
- 2 Adjust the steering wheel to the right position and install the left retaining screw of the steering column cowl lower assembly.

Torque: 1.5 N·m (metric) 1.1 lb-ft (Imperial system)

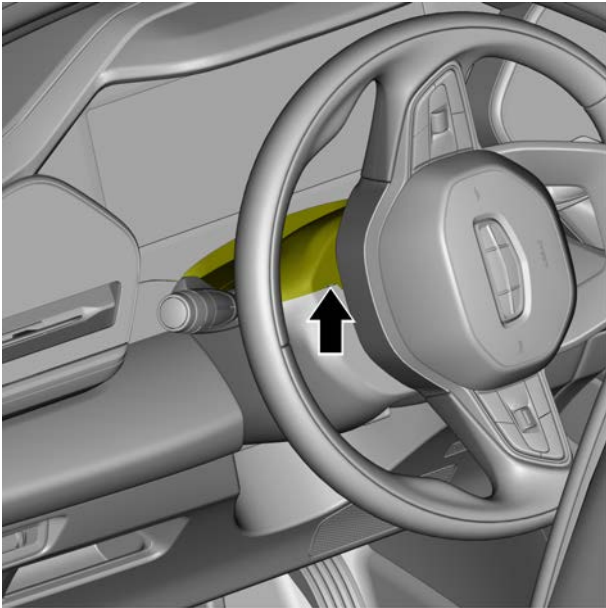


- 3 Install the retaining screws under the lower cover of the steering column.

Torque: 1.5 N·m (metric) 1.1 lb-ft (Imperial system)



- 4 Adjust the steering wheel to the right position and install the right steering column cover.



- 5 Adjust the steering wheel to the right position and install the upper cover of the left steering column.

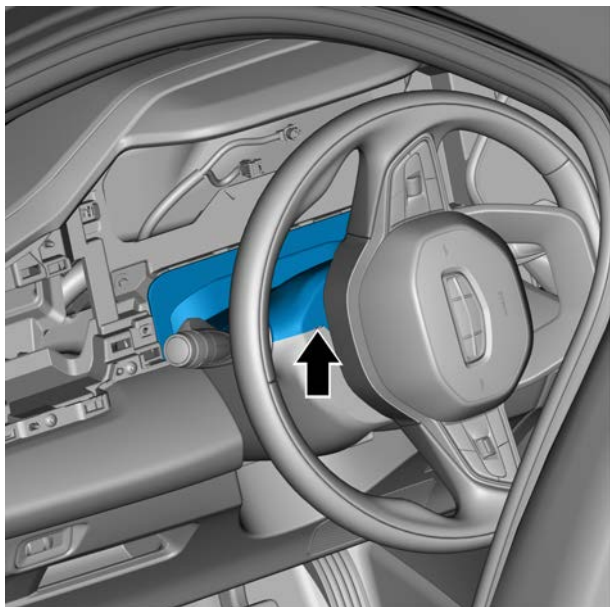
12.7.3.7 Replacement of Upper Shield Assembly of Steering Column

Removal procedure

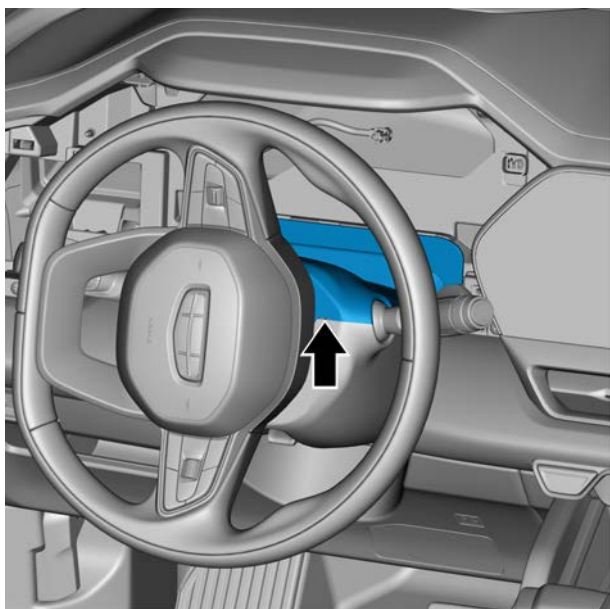
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the dashboard driver side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 3 Remove the left air conditioning vent panel assembly, see the [Replacement of the left air conditioning vent panel assembly](#).
- 4 To disassemble the driver information screen, see the [Replacement of the driver information screen \(Type 1\)](#) and the [Replacement of the driver information screen \(Type 2\)](#).

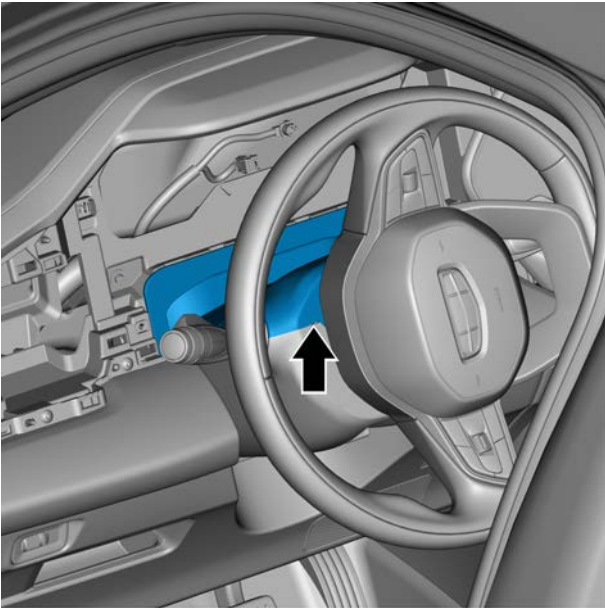


- 5 Adjust the steering wheel to the longest and lowest position and separate the upper cover of the left steering column from the lower cover of the steering column.

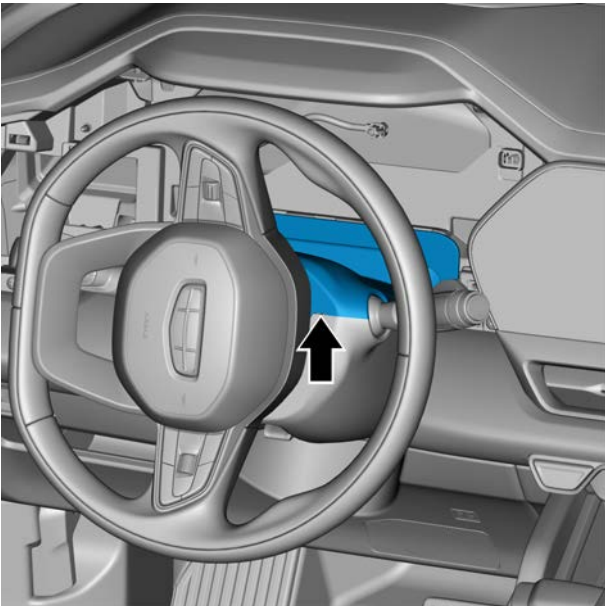


- 6 Adjust the steering wheel to the appropriate position and separate the upper cover of the right steering column from the lower cover of the steering column.
- 7 Dismantle and remove the steering column cover assembly from the dashboard frame.

Installation procedure



- 1 Adjust the steering wheel to the right position and install the upper cover of the left steering column.



- 2 Adjust the steering wheel to the right position and install the right steering column cover.

- 3 Install the driver information screen.
- 4 Install the left air conditioning outlet panel assembly.
- 5 Install the driver side end cover assembly of the dashboard.
- 6 Connect the negative battery cable.

12.7.3.8 Replacement of right cladding panel assembly

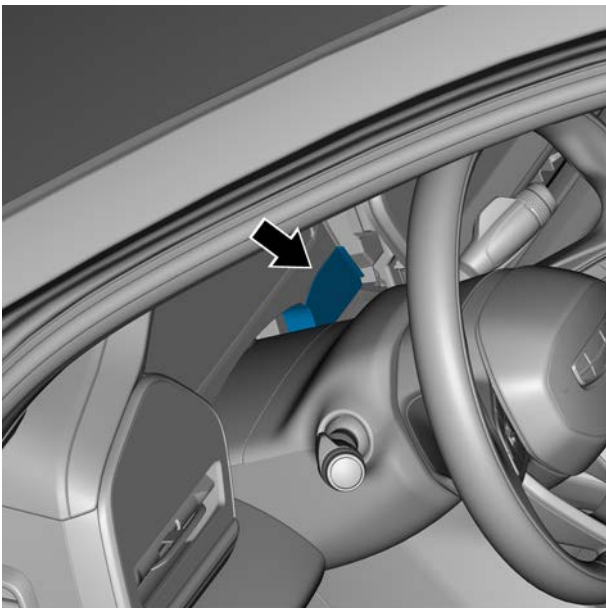
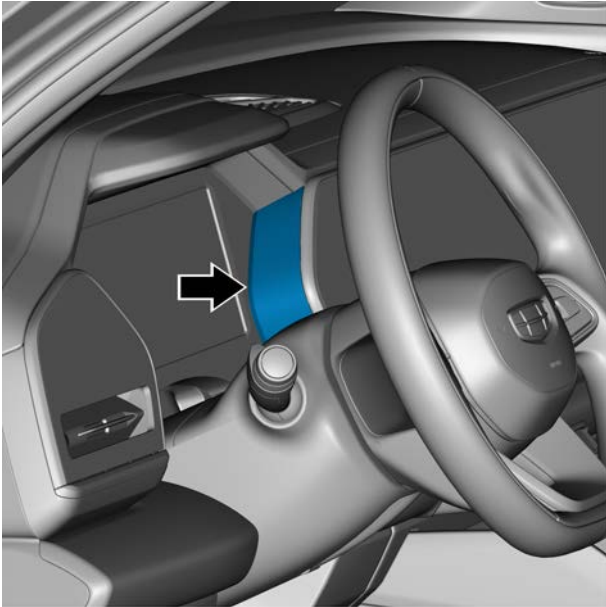
Removal procedure

Warning !

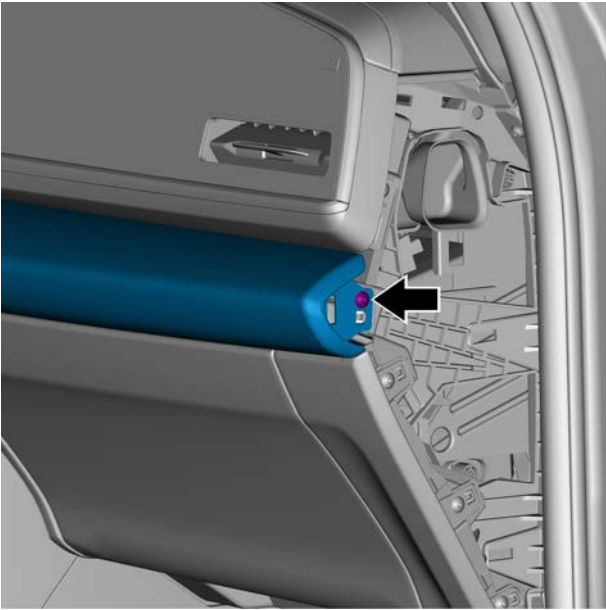
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)

- 2 Remove the dashboard co-pilot side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 3 Remove the central console displayer trim cover.



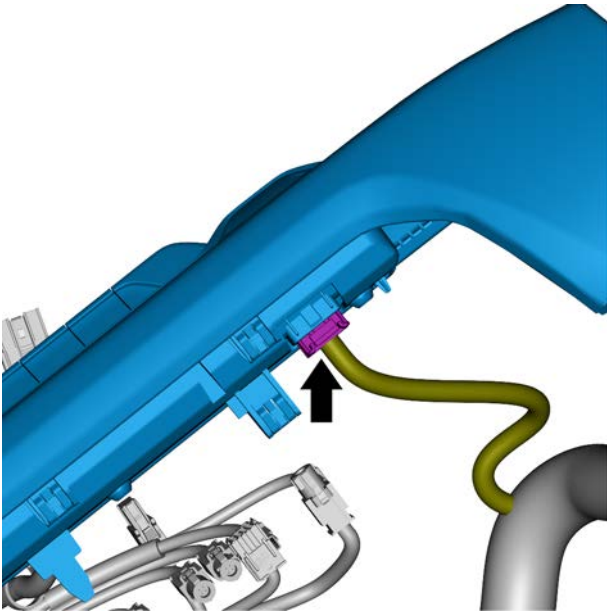
- 4 Remove the right cover assembly of the combined instrument pack mask.



- 5 Remove the right retaining screw of the right cladding panel assembly.

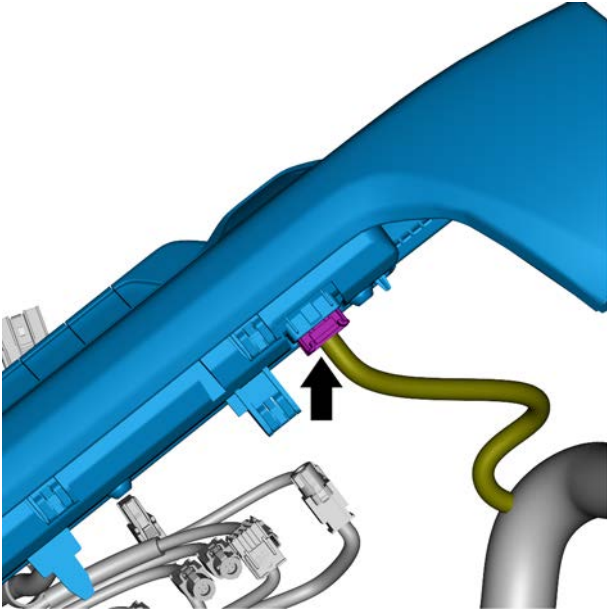


- 6 Remove the left retaining screw of the right cladding panel assembly.



- 7 Disconnect the harness connector of the center console switch module and remove the right cladding panel assembly.

Installation procedure

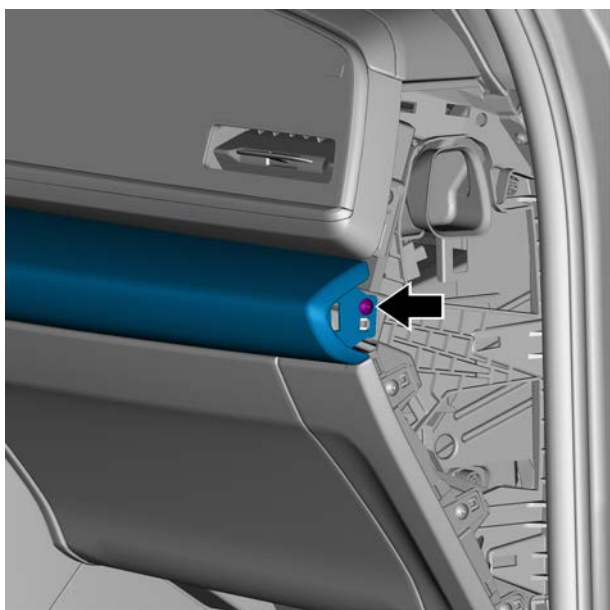


- 1 Connect the central console switch module wire harness connector.



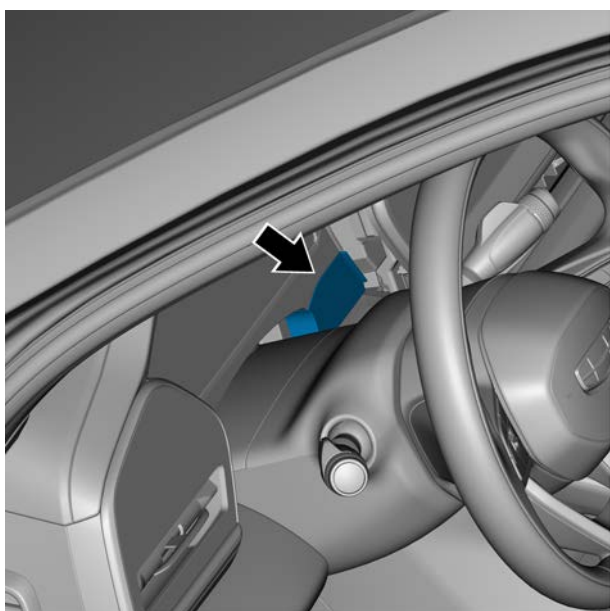
- 2 Install the left retaining screw of the right cladding panel assembly.

Torque: 2.5 N·m (metric) 1.8 lb-ft (imperial system)

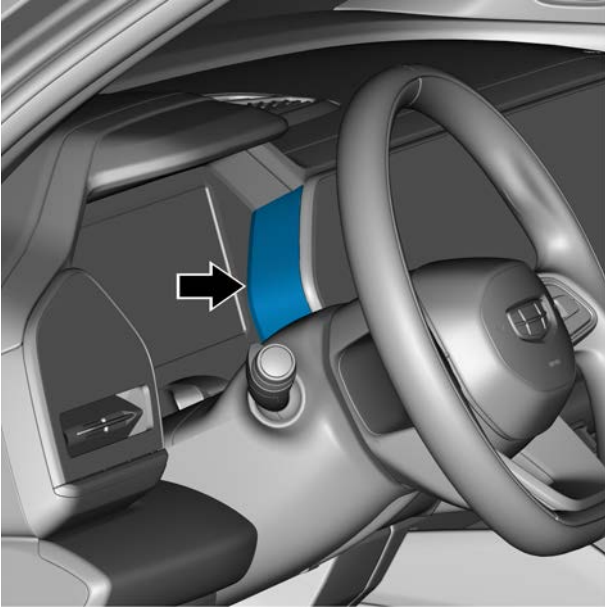


- 3 Install the right side retaining screw of the right cladding panel assembly.

Torque: 2.5 N·m (metric) 1.8 lb-ft (imperial system)



- 4 Install the cover assembly on the right side of the combined instrument pack mask.



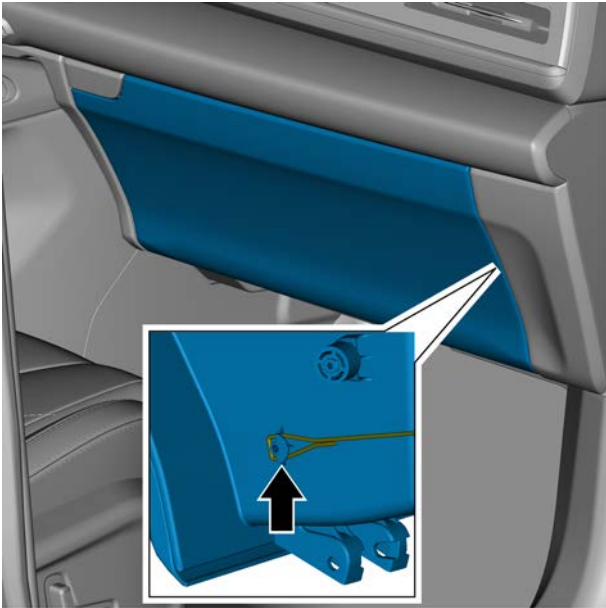
5 Install the central console displayer trim cover.

6 Install the front passenger side end cover assembly of the dashboard.

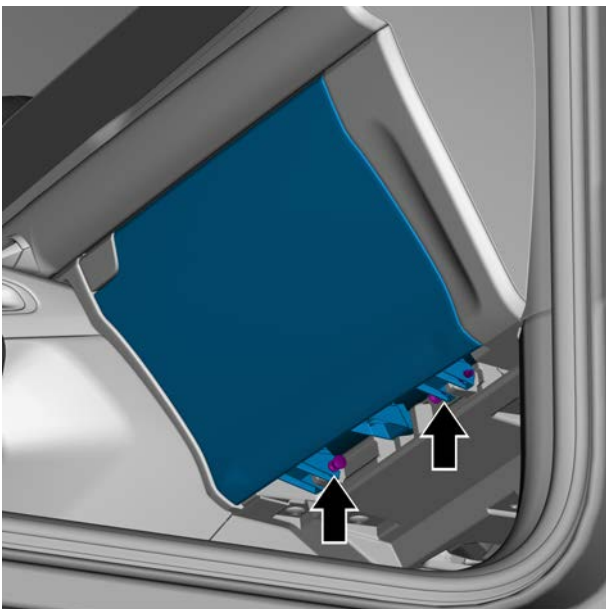
7 Connect the negative battery cable.

12.7.3.9 Replacement of exterior cover plate of glove box

Removal procedure

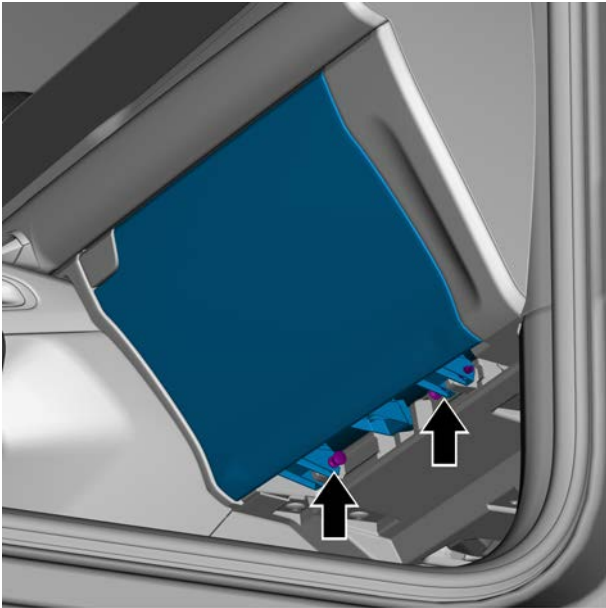


- 1 Remove the connection line between the glove box cover and the glove box damper.

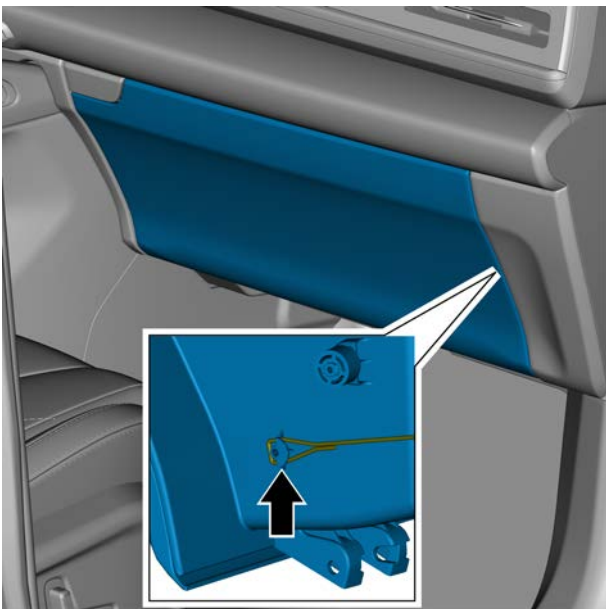


- 2 Remove the 2 glove box location pins on the glove box cover plate and remove the glove box exterior cover plate.

Installation procedure



- 1 Install 2 glove box location pins on the exterior cover of the glove box.



- 2 Install the connection line between the glove box cover plate and the glove box damper.

12.7.3.10 Replacement of glove box frame assembly (Type 1)

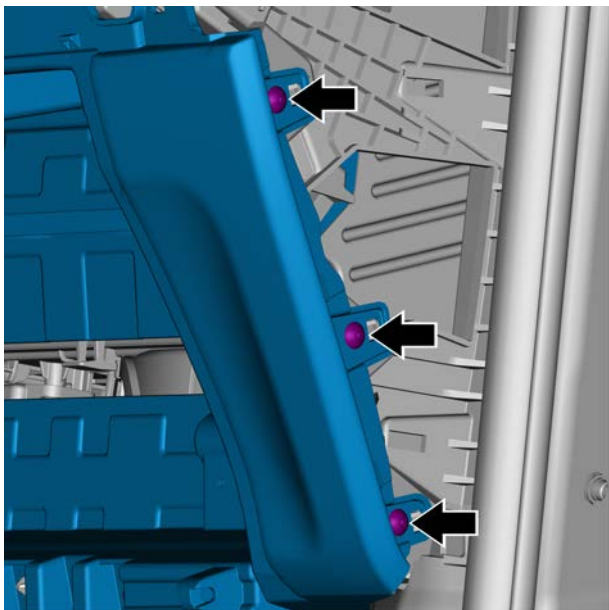
Removal procedure

Warning !

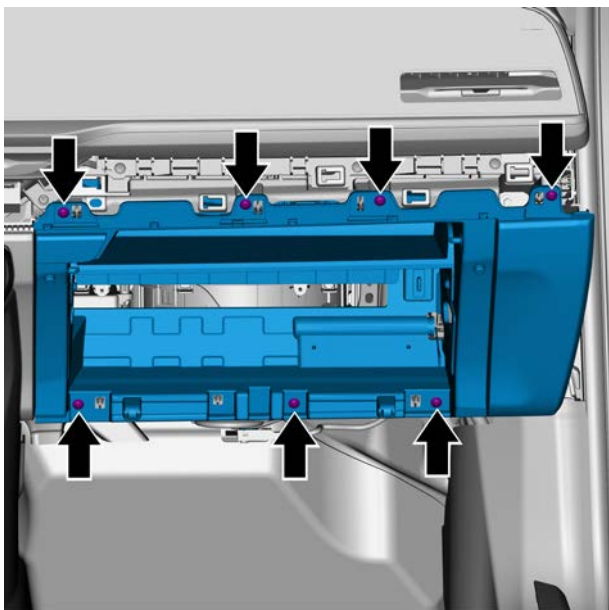
See "warning about disconnecting battery" in [Warnings and cautions](#)

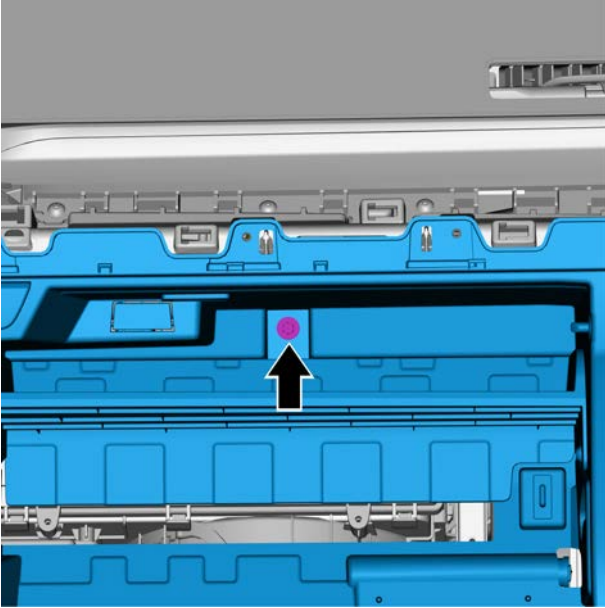
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the dashboard co-pilot side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 3 Remove the lower right foot assembly, see [Replacement of the lower right foot assembly](#).

- 4 Remove the right cladding panel assembly, see [Replacement of the right cladding panel assembly](#).
- 5 Remove the exterior cover of the glove box, see [Replacement of the exterior cover of the glove box](#).
- 6 Remove the 3 retaining screws on the right side of the glove box frame assembly.

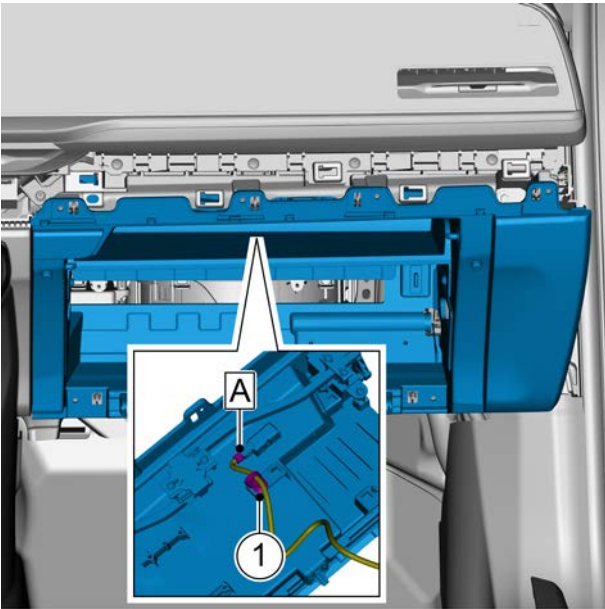


- 7 Remove the 7 retaining screws of the glove box frame assembly.

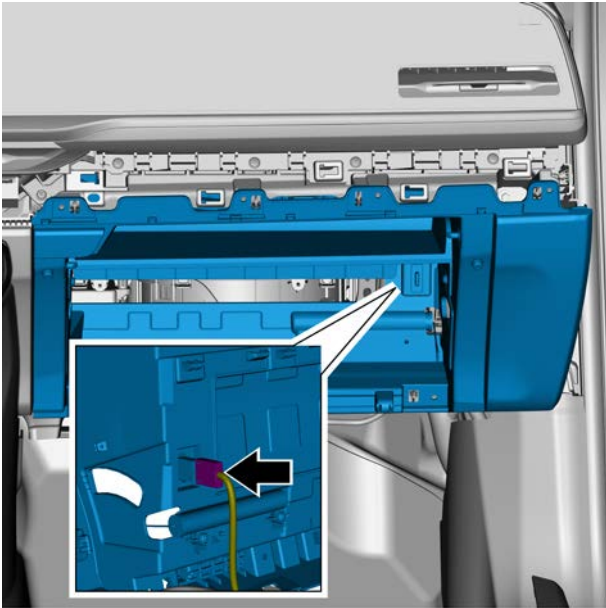




- 8 Remove the retaining bolts of the glove box frame assembly.

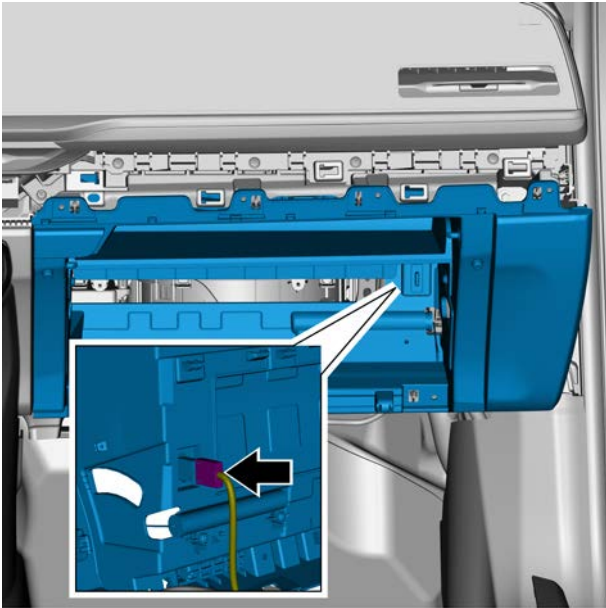


- 9 Disconnect the floor console lighting harness connector A.
- 10 Remove dashboard harness retaining clip 1.

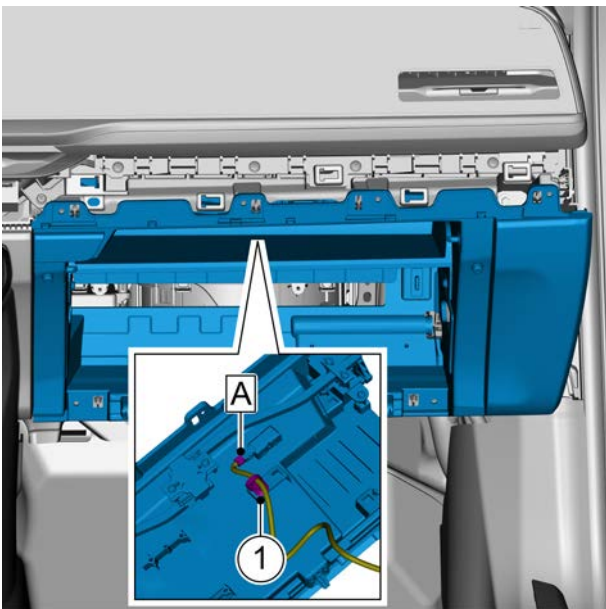


- 11 Disconnect the glove box cover switch harness connector and remove the glove box frame assembly.

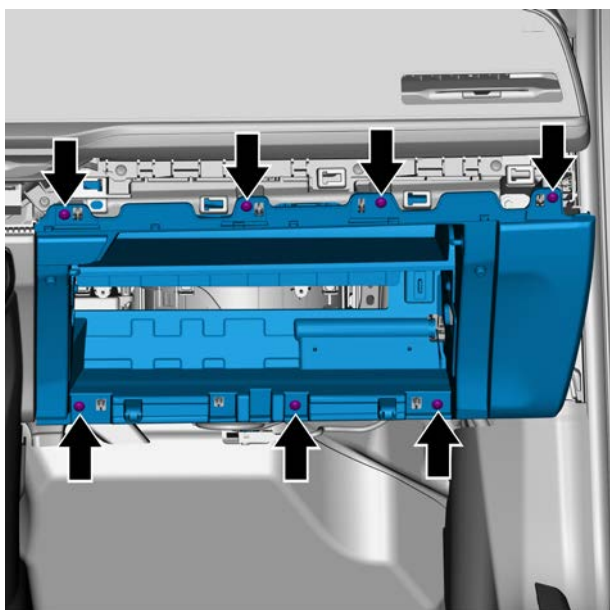
Installation procedure



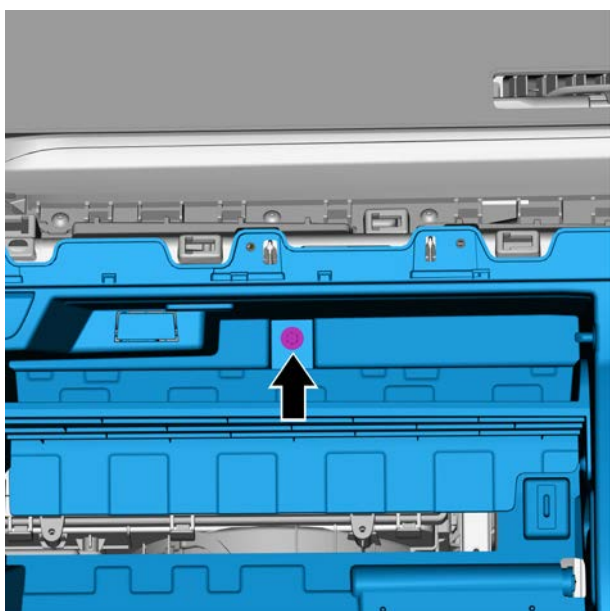
- 1 Connect the glove box cover switch harness connector.



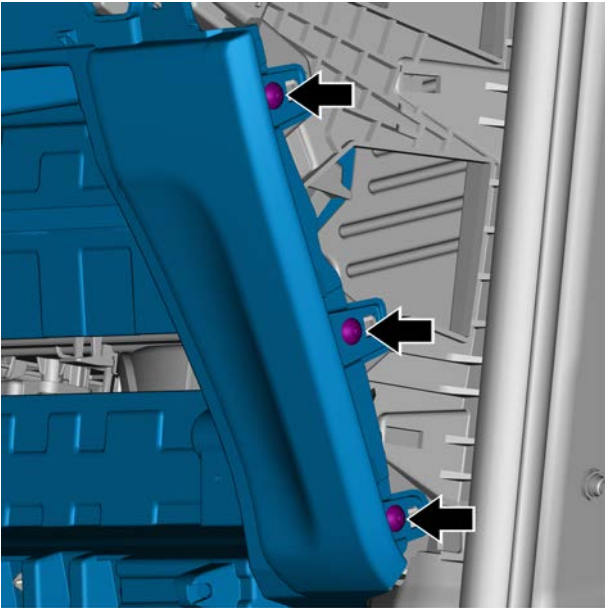
- 2 Connect the floor console lighting harness connector A.
- 3 Install the instrument harness fixing clip 1.



- 4 Install 7 retaining screws of glove box frame assembly.
Torque: 2.5 N·m (metric) 1.8 lb-ft (imperial system)



- 5 Install the retaining bolts of the glove box frame assembly.
Torque: 4.5 N·m (metric) 3.3 lb-ft (imperial system)



- 6 Install the 3 retaining screws on the right side of the glove box frame assembly.

Torque: 2.5 N·m (metric) 1.8 lb-ft (imperial system)

- 7 Install the exterior cover of the glove box.
- 8 Install the right cladding panel assembly.
- 9 Install the assembly-toe board lower RH.
- 10 Install the front passenger side end cover assembly of the dashboard.
- 11 Connect the negative battery cable.

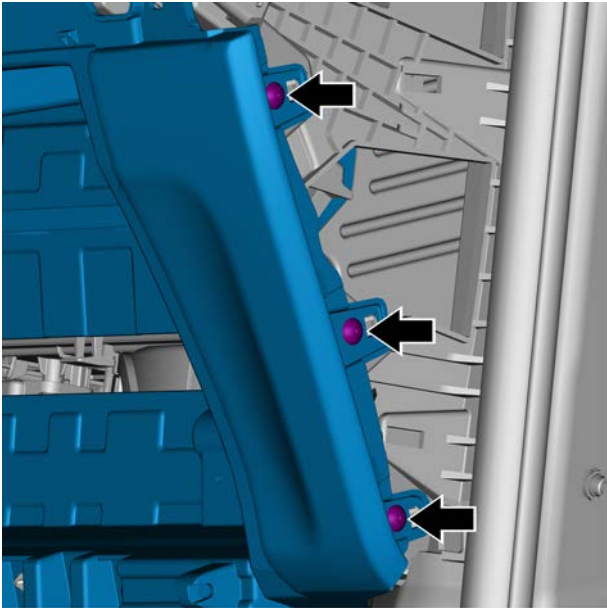
12.7.3.11 Replacement of glove box frame assembly (Type 2)

Removal procedure

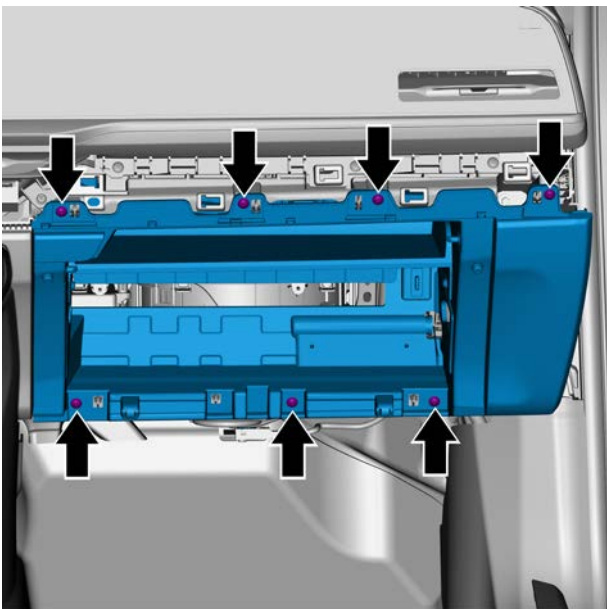
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

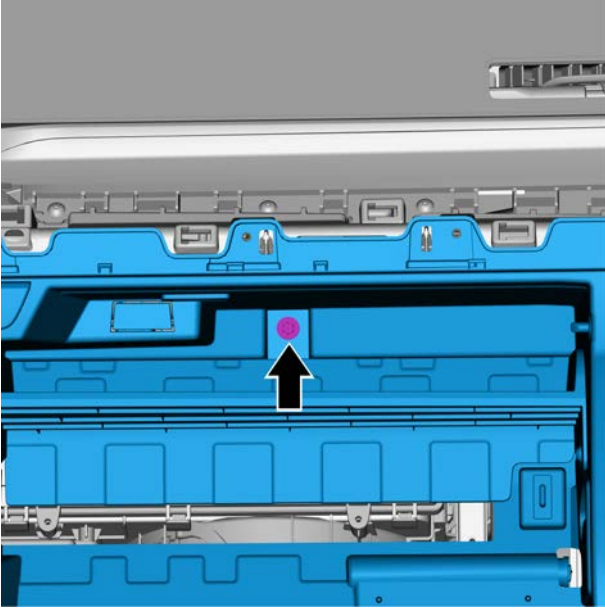
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the dashboard co-pilot side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 3 Remove the lower right foot assembly, see [Replacement of the lower right foot assembly](#).
- 4 Remove the right cladding panel assembly, see [Replacement of the right cladding panel assembly](#).
- 5 Remove the exterior cover of the glove box, see [Replacement of the exterior cover of the glove box](#).



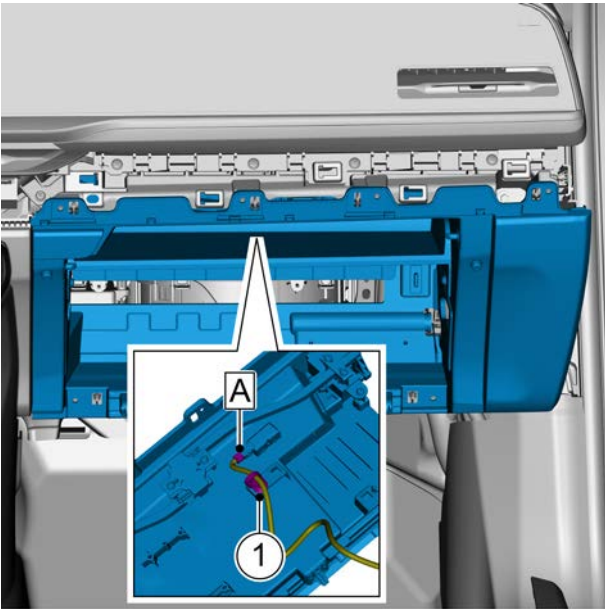
- 6 Remove the 3 retaining screws on the right side of the glove box frame assembly.



- 7 Remove the 7 fixing screws of the glove box frame assembly.

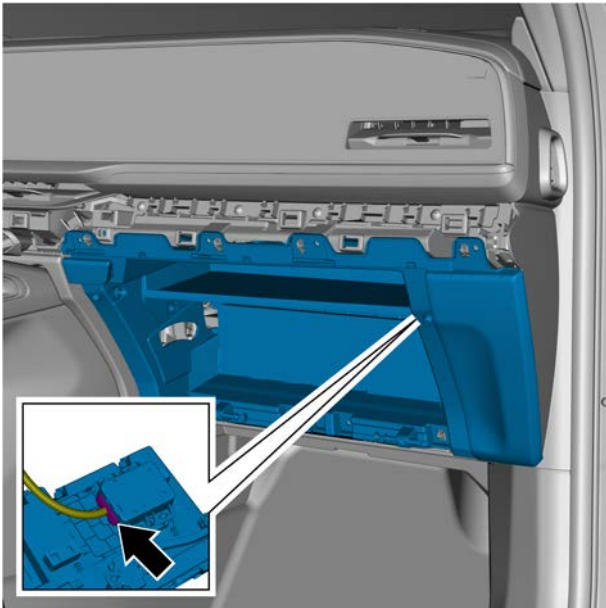


8 Remove the fixing bolts of the glove box frame assembly.

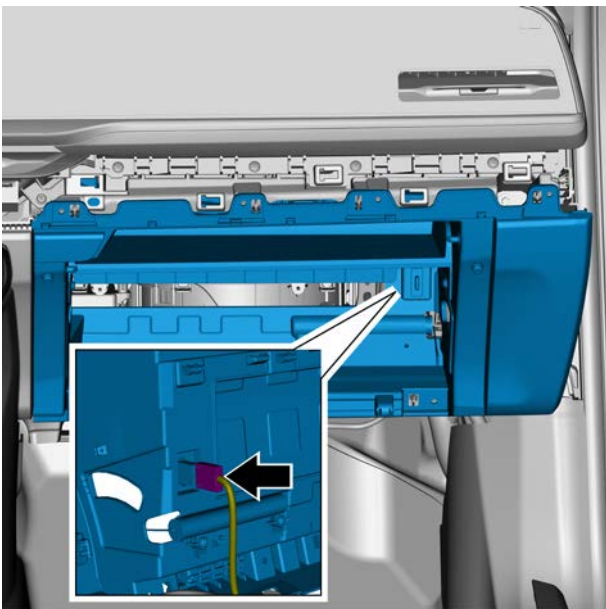


9 Disconnect the floor console lighting harness connector A.

10 Remove dashboard harness retaining clip 1.

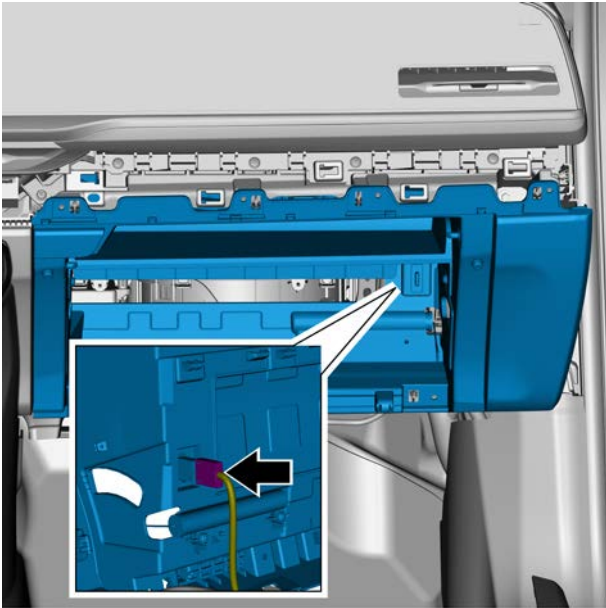


- 11 Disconnect the harness connectors of the emergency call system control unit.

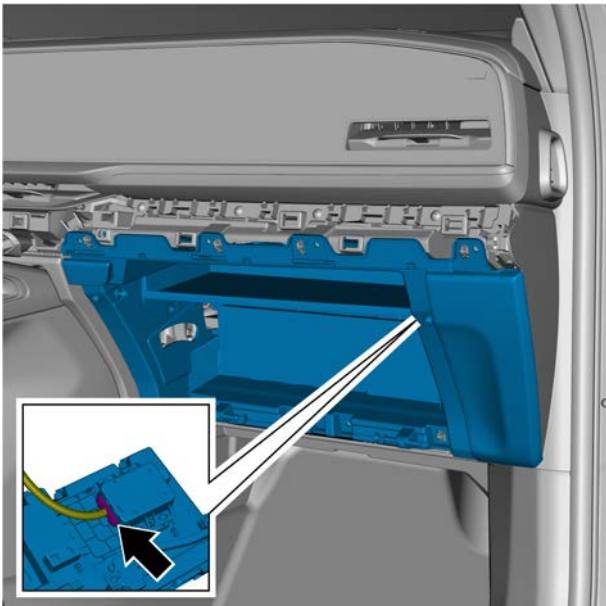


- 12 Disconnect the glove box cover switch harness connector and remove the glove box frame assembly.

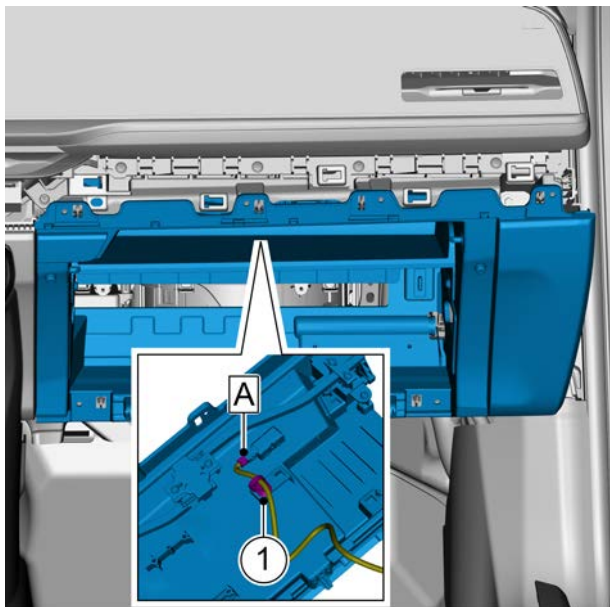
Installation procedure



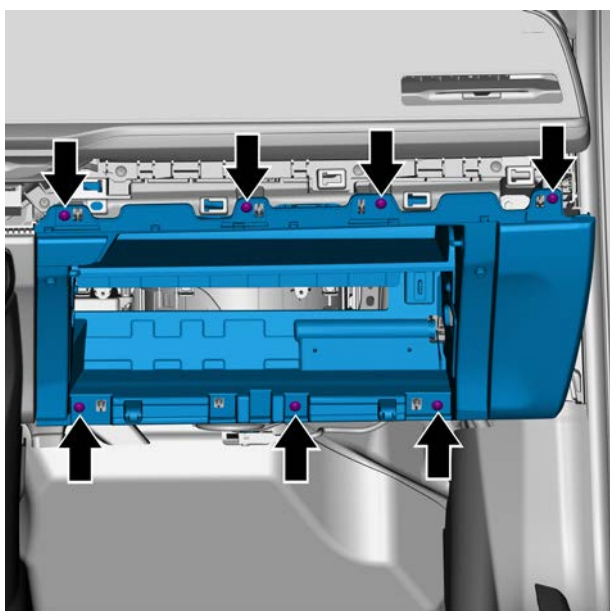
- 1 Connect the glove box cover switch harness connector.



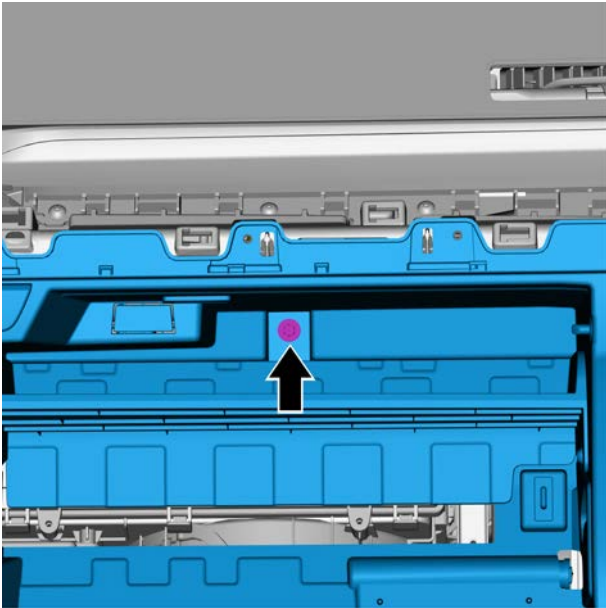
- 2 Connect the harness connectors of the emergency call system control unit.



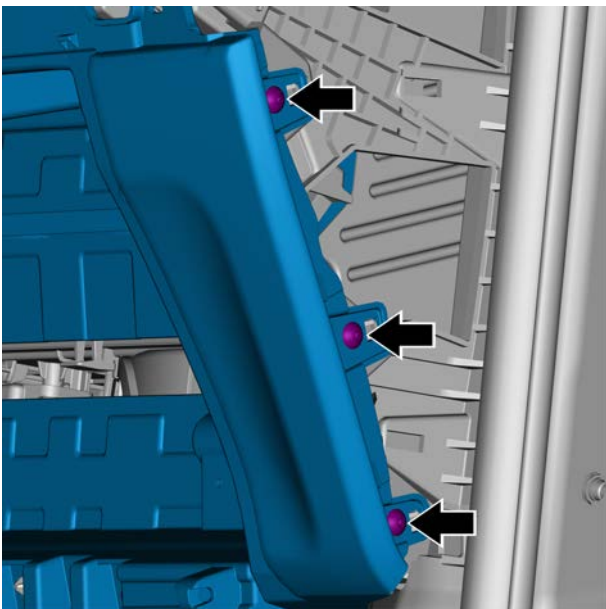
- 3 Connect the floor console lighting harness connector A.
- 4 Install the instrument harness fixing clip 1.



- 5 Install the 7 fixing screws of the glove box frame assembly.
Torque: 2.5 N·m (metric) 1.8 lb-ft (imperial system)



- 6 Install the fixing bolts of the glove box frame assembly.
Torque: 4.5 N·m (metric) 3.3 lb-ft (imperial system)



- 7 Install the 3 retaining screws on the right side of the glove box frame assembly.
Torque: 2.5 N·m (metric) 1.8 lb-ft (imperial system)

- 8 Install the exterior cover of the glove box.
- 9 Install the right cladding panel assembly.
- 10 Install the assembly-toe board lower RH.
- 11 Install the front passenger side end cover assembly of the dashboard.
- 12 Connect the negative battery cable.

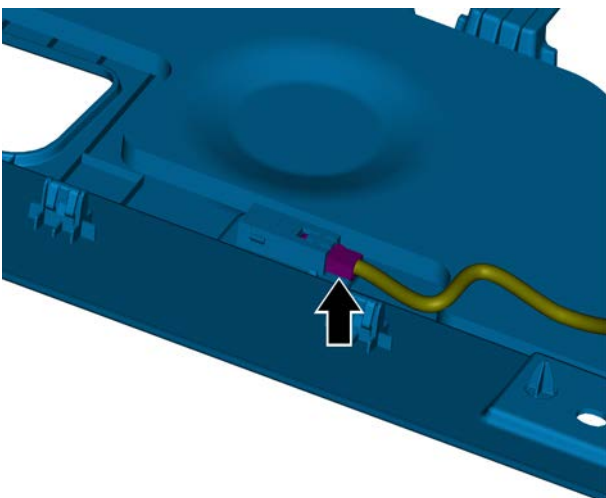
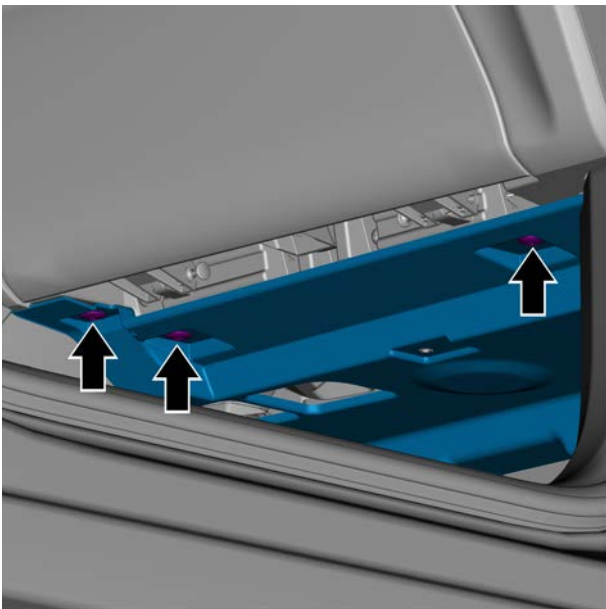
12.7.3.12 Replacement of the assembly-toe board lower RH

Removal procedure

Warning !

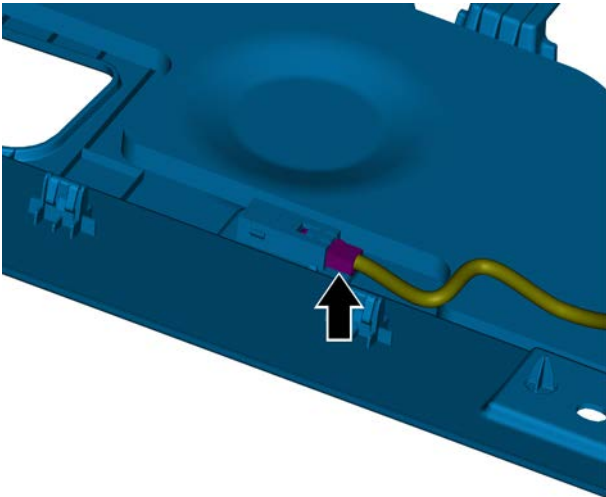
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the front passenger side extended trim plate assembly, see the [Replacement of the driver side extended trim plate assembly](#).
- 3 Remove the dashboard co-pilot side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 4 Remove the FR doorsill trim plate assembly, see [Replacement of the FR doorsill trim plate assembly](#).
- 5 Remove the 3 J-type clips of the lower right foot assembly.

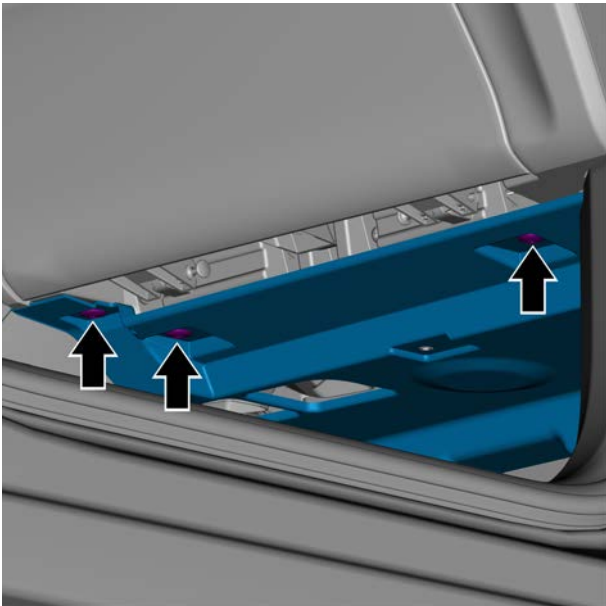


- 6 Disconnect the foot space lighting harness connector and remove the right lower baffle assembly.

Installation procedure



- 1 Connect the foot light harness connector.



- 2 Install 3 J-type clips of the lower right foot block assembly.

- 3 Install the right front door sill trim panel assembly.
- 4 Install the front passenger side end cover assembly of the dashboard.
- 5 Install the front passenger side extended trim plate assembly.
- 6 Connect the negative battery cable.

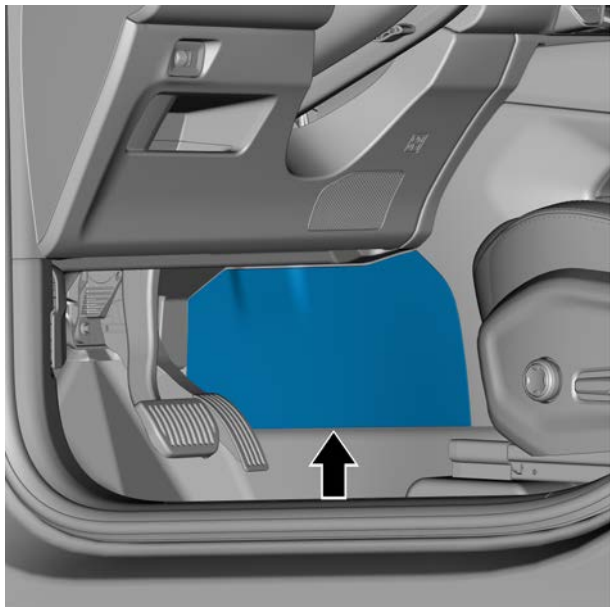
12.7.3.13 Replacement of driver side extended trim plate assembly

Removal procedure

Caution

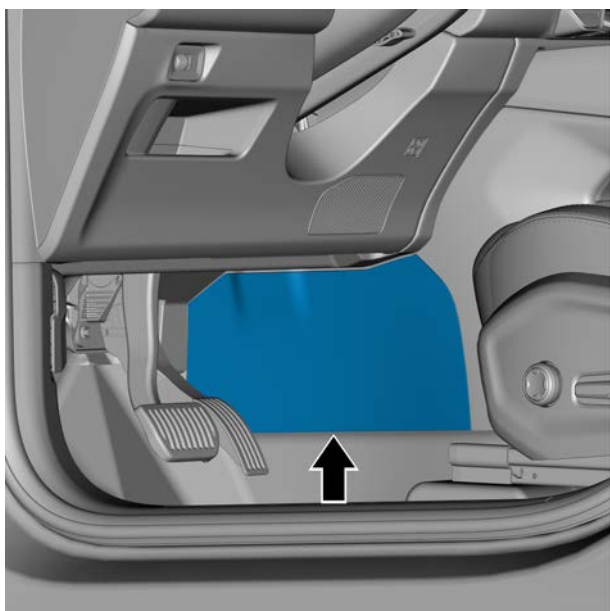
The assemble and disassemble method of the extended trim plate assembly on the left and right sides are similar.

- 1 Pry open the driver side extended trim plate assembly with the appropriate tool and remove it.



Installation procedure

- 1 Install the driver side extended trim plate assembly.



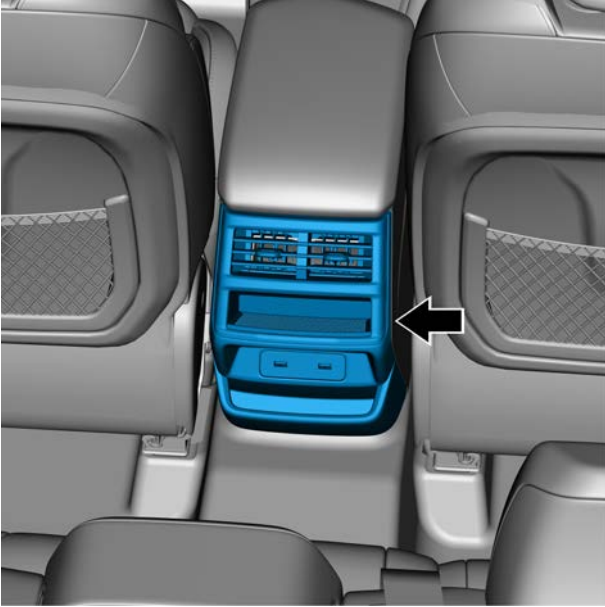
12.7.3.14 Replacement of the rear panel assembly of the auxiliary instrument panel (Type 1)

Removal procedure

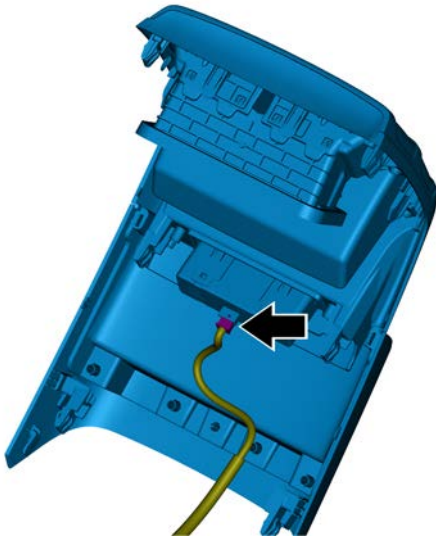
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the rear panel assembly of the sub-dashboard with the appropriate tool.

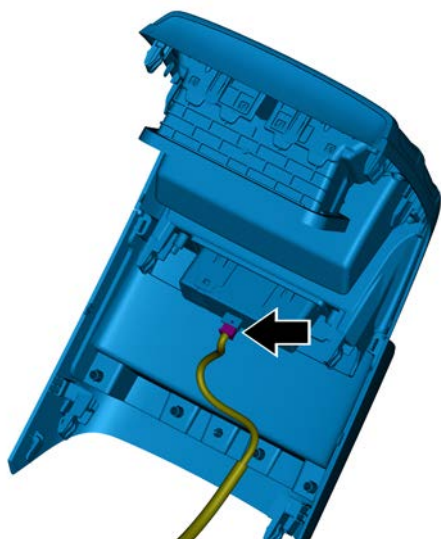


- 3 Disconnect the USB charging hub harness connector and remove the rear panel assembly of the sub-dashboard.



Installation procedure

- 1 Connect the USB charging hub harness connector.



- 2 Install the rear panel assembly of the console.



- 3 Connect the negative battery cable.

12.7.3.15 Replacement of the rear panel assembly of the auxiliary instrument panel (Type 2)

Removal procedure

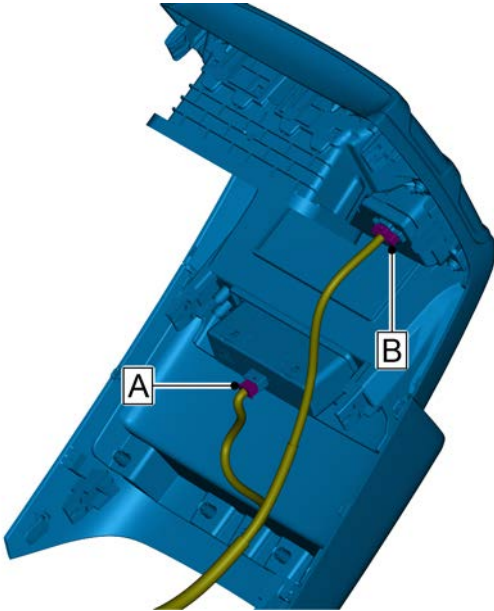
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)

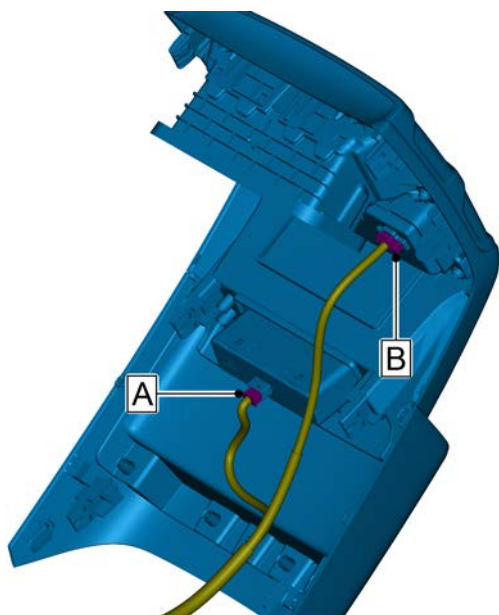


- 2 Remove the rear panel assembly of the sub-dashboard with the appropriate tool.

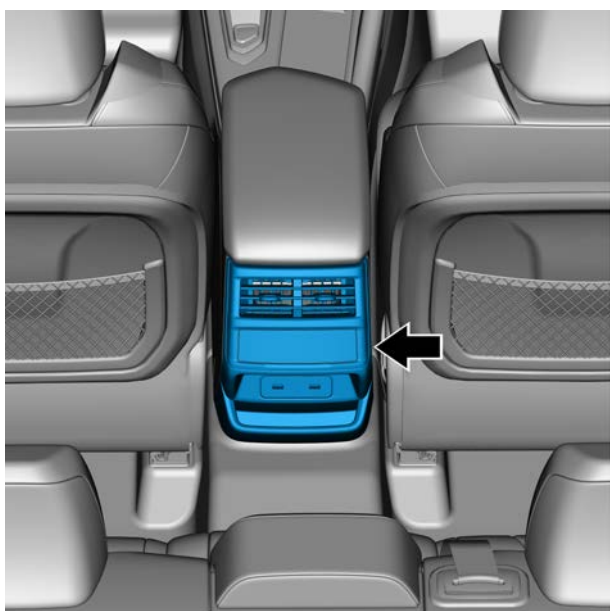


- 3 Disconnect USB charging hub harness connector A and rear console switch module harness connector B and remove the sub-dashboard rear panel assembly.

Installation procedure



- 1 Connect the USB charging hub harness connector A and the rear console switch module harness connector B.



- 2 Install the rear panel assembly of the console.

- 3 Connect the negative battery cable.

12.7.3.16 Replacement of the right trim assembly of the auxiliary instrument panel

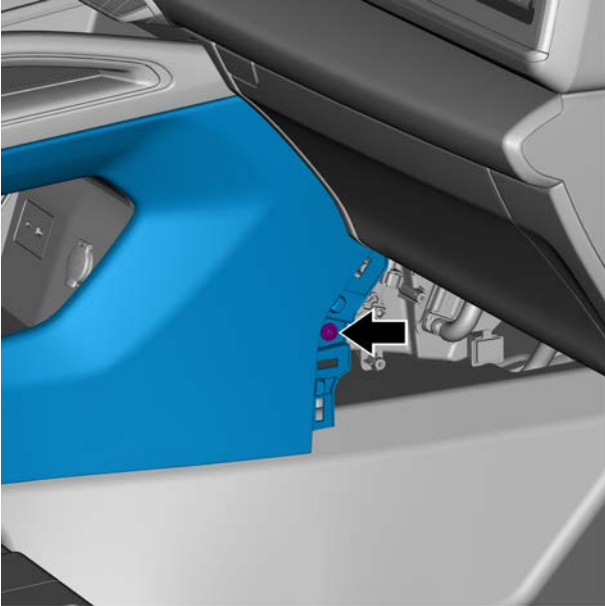
Removal procedure

Warning !

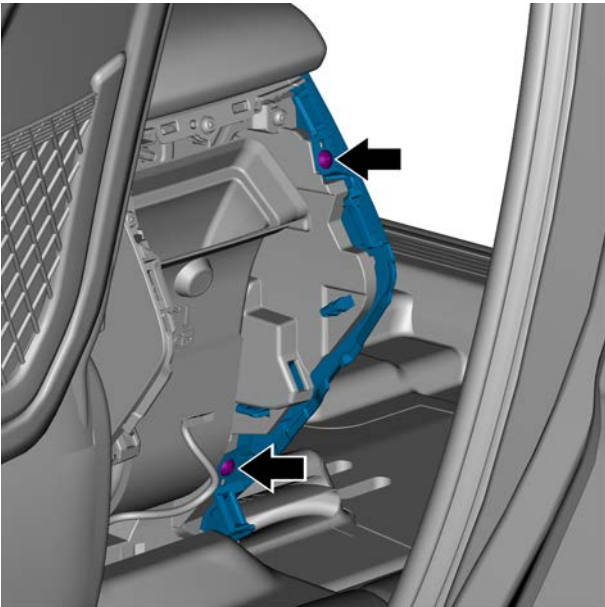
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the passenger seat assembly, see [Replacement of the passenger seat assembly](#).

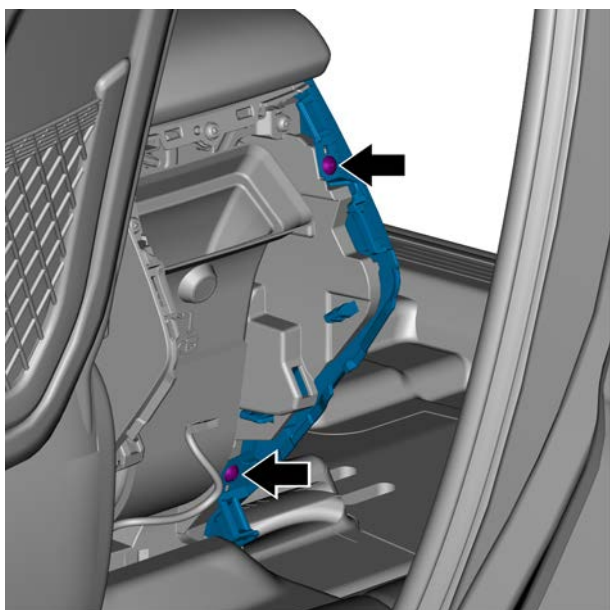
- 3 Remove the extension trim plate on the co-driver side, see the [Replacement of the driver side extension trim plate assembly](#).
- 4 Remove the rear panel assembly of the sub-dashboard, see the [Replacement of the rear panel assembly of the sub-dashboard \(Type 1\)](#) and the [Replacement of the rear panel assembly of the sub-dashboard \(Type 2\)](#).
- 5 Remove the front-end retaining screw of the trim plate on the right side of the sub-dashboard.



- 6 Remove the 2 retaining screws at the back end of the trim plate assembly on the right side of the sub-dashboard and remove the trim plate assembly on the right side of the sub-dashboard.



Installation procedure



- 1 Install the 2 retaining screws at the back end of the trim plate assembly on the right side of the sub-dashboard.
Torque: 2.5 N·m (metric) 1.8 lb-ft (imperial system)



- 2 Install the front-end retaining screw trim plate on the right side of the sub-dashboard.
Torque: 3.5 N·m (metric) 2.6 lb-ft (imperial system)

- 3 Install the rear panel assembly of the console.
- 4 Install the extension trim plate on the side of the front passenger.
- 5 Install the passenger seat assembly.
- 6 Connect the negative battery cable.

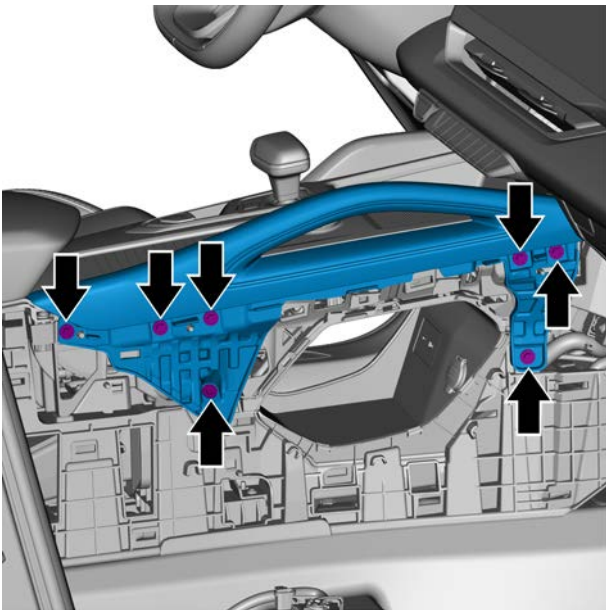
12.7.3.17 Replacement of the exterior handle assembly on the right side of the sub-dashboard

Removal procedure

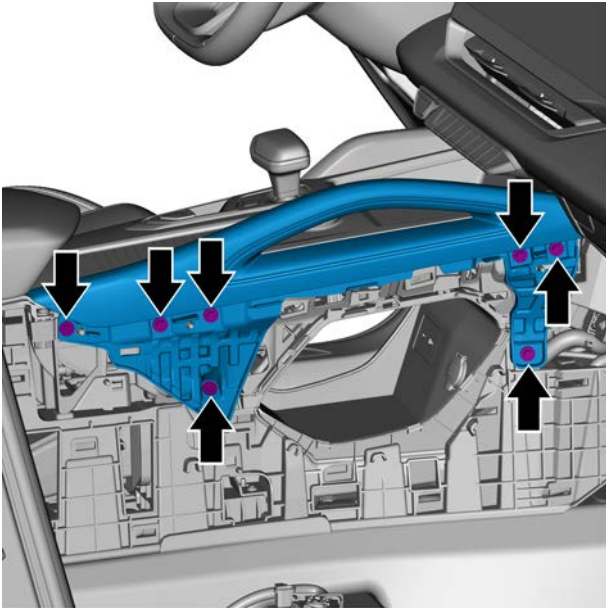
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the passenger seat assembly, see [Replacement of the passenger seat assembly](#).
- 3 Remove the extension trim plate on the co-driver side, see the [Replacement of the driver side extension trim plate assembly](#).
- 4 Remove the rear panel assembly of the sub-dashboard, see the [Replacement of the rear panel assembly of the sub-dashboard \(Type 1\)](#) and the [Replacement of the rear panel assembly of the sub-dashboard \(Type 2\)](#).
- 5 Remove the trim plate assembly on the right side of the sub-dashboard, see [Replacement of the trim plate assembly on the right side of the sub-dashboard](#).
- 6 Remove the 7 retaining bolts of the exterior handle assembly on the right side of the sub-dashboard and remove the exterior handle assembly on the right side of the sub-dashboard.



Installation procedure



- 1 Install 7 retaining bolts of the exterior handle assembly on the right side of the sub-dashboard.
Torque: 6 N·m (metric) 4.4 lb-ft (imperial system)

- 2 Install the right side trim panel assembly of the sub-instrument panel.
- 3 Install the rear panel assembly of the console.
- 4 Install the extension trim plate on the side of the front passenger.
- 5 Install the passenger seat assembly.
- 6 Connect the negative battery cable.

12.7.3.18 Replacement of shift panel assembly

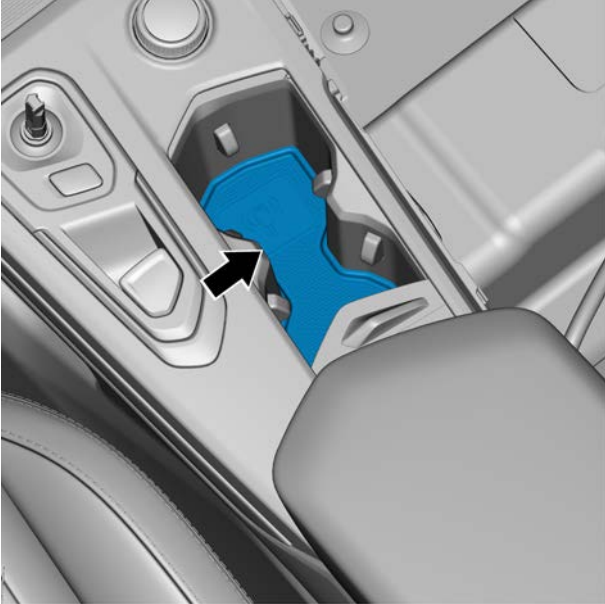
Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

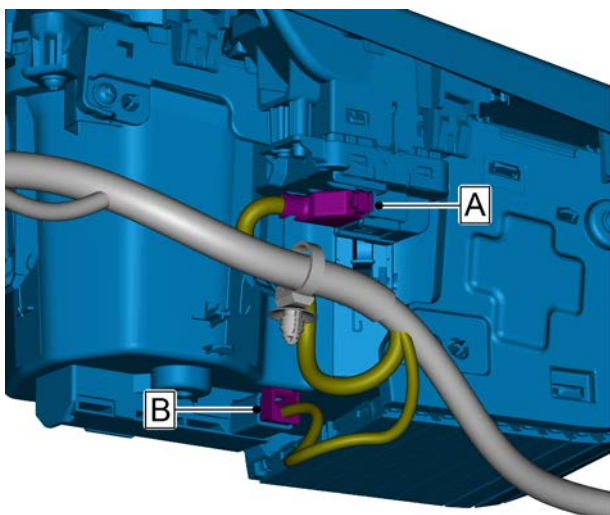
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the passenger seat assembly, see [Replacement of the passenger seat assembly](#).
- 3 Remove the extension trim plate on the co-driver side, see the [Replacement of the driver side extension trim plate assembly](#).
- 4 Remove the rear panel assembly of the sub-dashboard, see [Replacement of the rear panel assembly of the sub-dashboard \(Type 2\)](#).
- 5 Remove the trim plate assembly on the right side of the sub-dashboard, see [Replacement of the trim plate assembly on the right side of the sub-dashboard](#).

- 6 Remove the exterior handle assembly on the right side of the sub-dashboard, see the [Replacement of the exterior handle assembly on the right side of the sub-dashboard](#).
- 7 Remove the gearbox ball head, see the [Replacement of the gearbox ball head](#).
- 8 Remove the shift trim plate storage box pad.

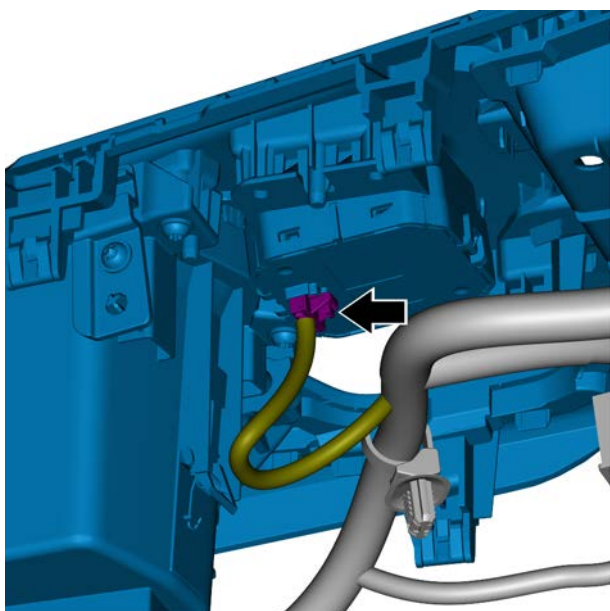


- 9 Remove the 2 retaining screws of the shift panel assembly.

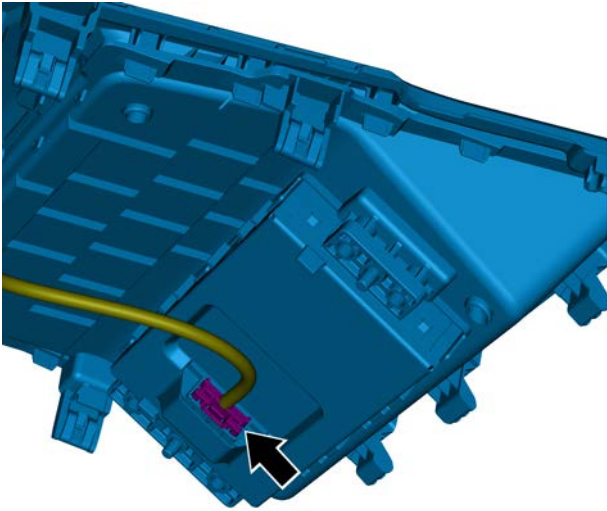




- 10 Disconnect the parking brake switch harness connector A and the keyless vehicle antenna (under the cup holder) harness connector B.

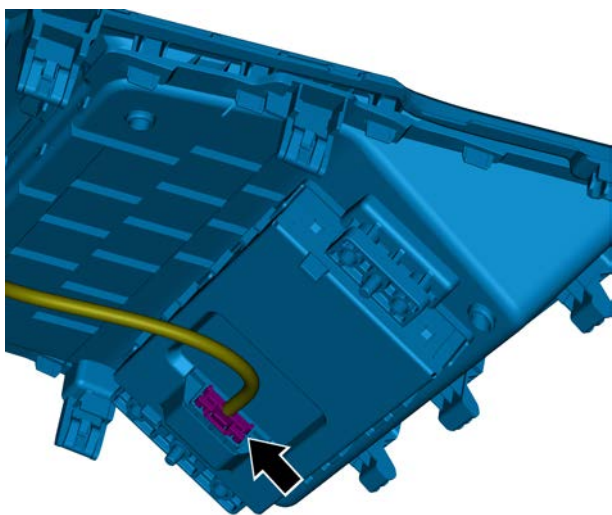


- 11 Disconnect the drive mode switch module harness connector.

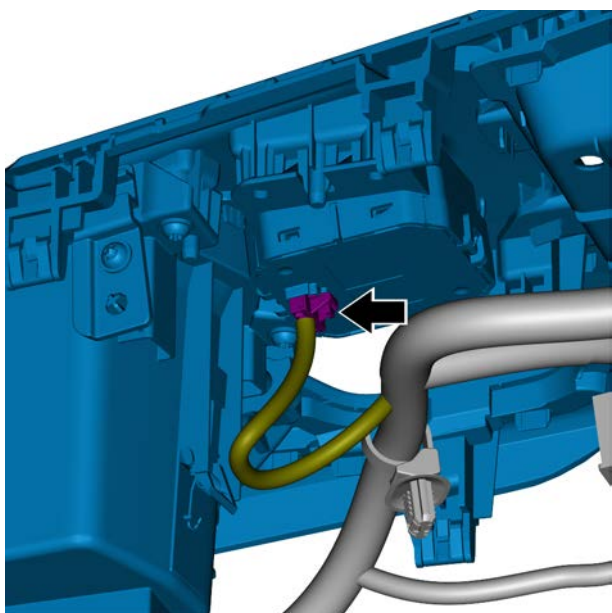


- 12 Disconnect the cordless phone charger harness connector and remove the shift panel assembly.

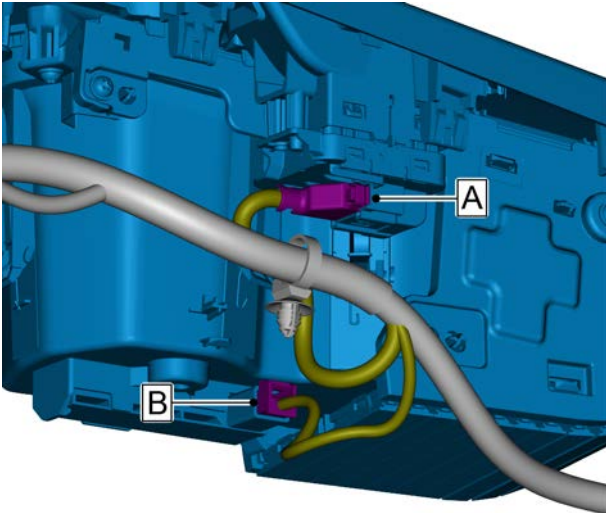
Installation procedure



- 1 Connect the cordless phone charger harness connector.



- 2 Connect the drive mode switch module harness connector.



- 3 Connect the parking brake switch harness connector A and the keyless vehicle antenna (under the cup holder) harness connector B.



- 4 Install the 2 retaining screws of the shift panel assembly.
Torque: 3 N·m (metric) 2.2 lb-ft (imperial system)



- 5 Install the gearshift trim plate storage box pad.

- 6 Install the gearbox ball head.
- 7 Install the exterior handle assembly on the right side of the sub-dashboard.
- 8 Install the right side trim panel assembly of the sub-instrument panel.
- 9 Install the rear panel assembly of the console.
- 10 Install the extension trim plate on the side of the front passenger.
- 11 Install the passenger seat assembly.
- 12 Connect the negative battery cable.

12.7.3.19 Replacement of the auxiliary instrument panel

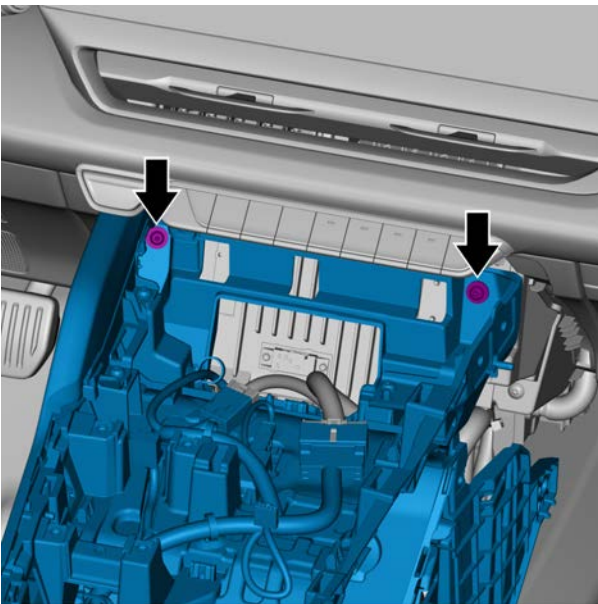
Removal procedure

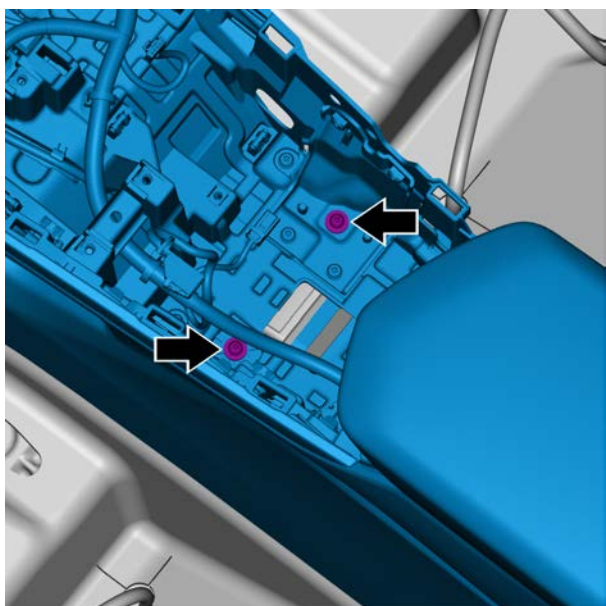
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

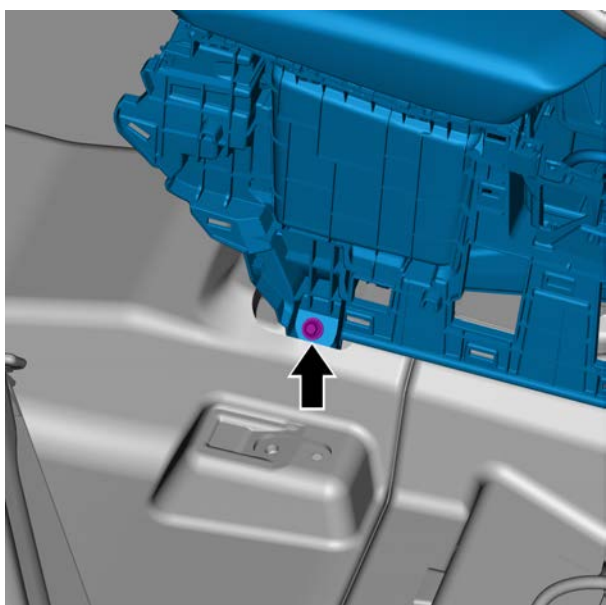
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the passenger seat assembly, see [Replacement of the passenger seat assembly](#).
- 3 Remove the driver side extended trim plate, see the [Replacement of the driver side extended trim plate assembly](#).
- 4 Remove the extension trim plate on the co-driver side, see the [Replacement of the driver side extension trim plate assembly](#).

- 5 Remove the rear panel assembly of the sub-dashboard, see the [Replacement of the rear panel assembly of the sub-dashboard \(Type 1\)](#) and the [Replacement of the rear panel assembly of the sub-dashboard \(Type 2\)](#).
- 6 Remove the trim plate assembly on the right side of the sub-dashboard, see [Replacement of the trim plate assembly on the right side of the sub-dashboard](#).
- 7 Remove the exterior handle assembly on the right side of the sub-dashboard, see the [Replacement of the exterior handle assembly on the right side of the sub-dashboard](#).
- 8 Remove the shift panel assembly, see [Replacement of the shift panel assembly](#).
- 9 Remove the gearbox ball head, see the [Replacement of the gearbox ball head](#).
- 10 Remove the selector lever module, see the [Replacement of the selector lever module](#).
- 11 Remove the 2 retaining screws at the front end of the sub-dashboard.

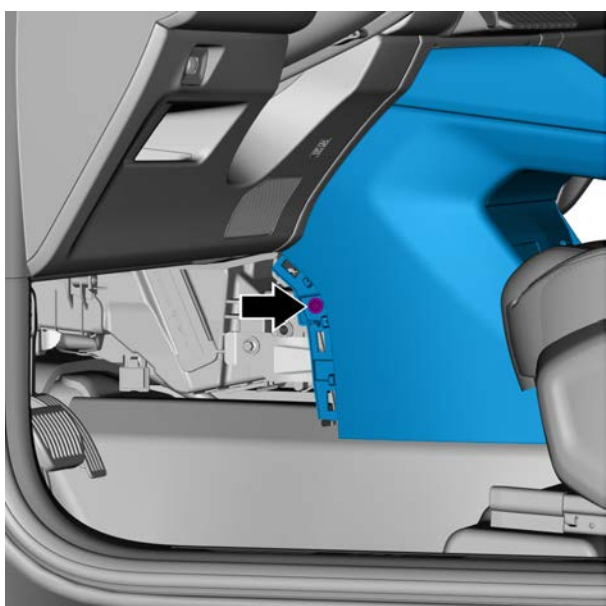




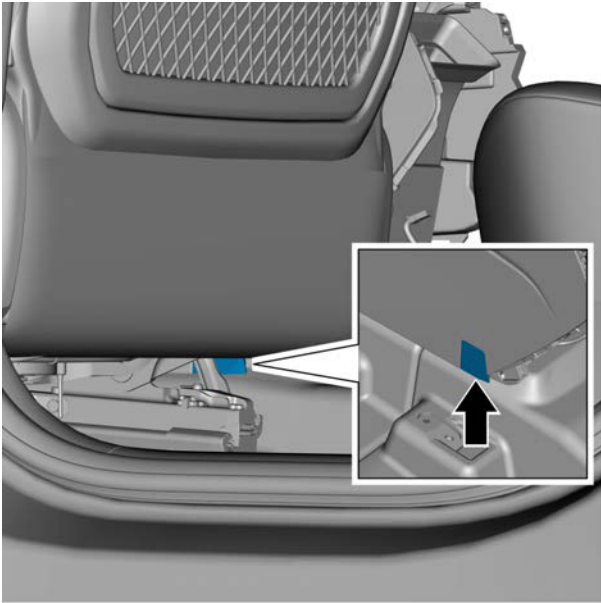
- 12 Remove the 2 retaining screws in the middle of the sub-dashboard assembly.



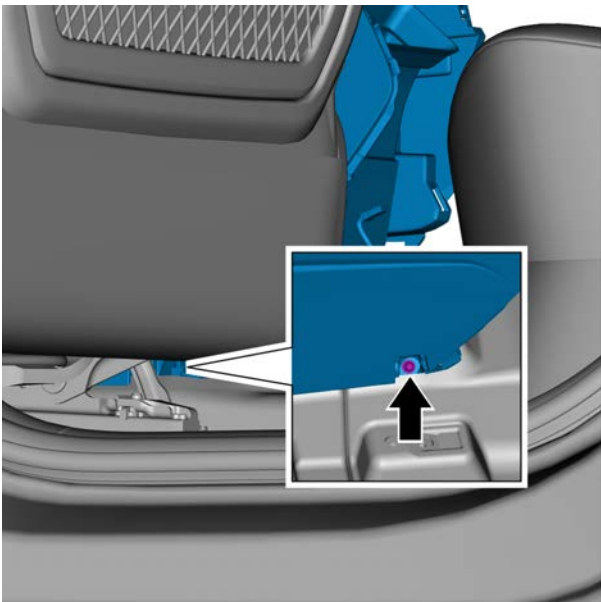
- 13 Remove the right retaining bolt at the rear end of the sub-dashboard assembly.



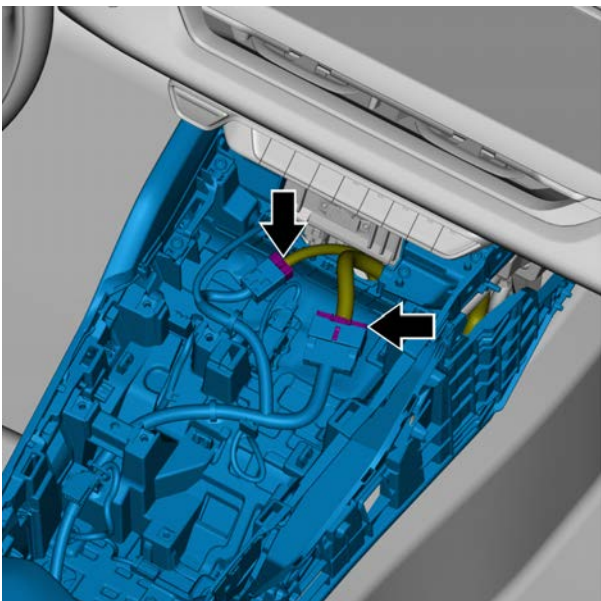
- 14 Remove the retaining screws at the lower front left end of the sub-dashboard assembly.



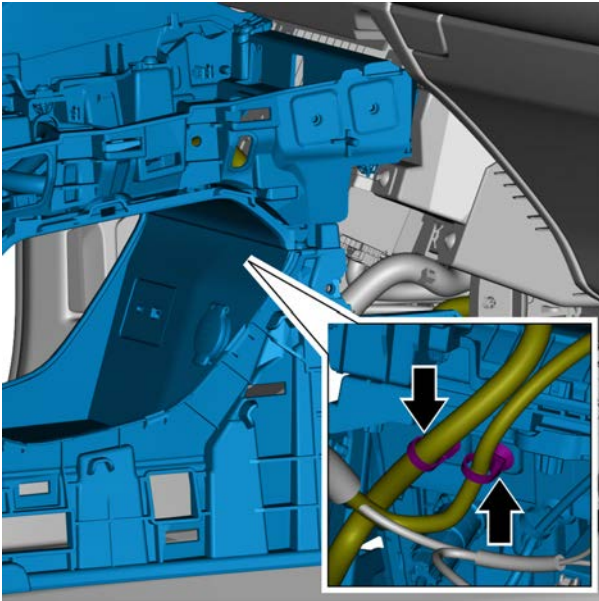
15 Remove the driver side bolt plug.



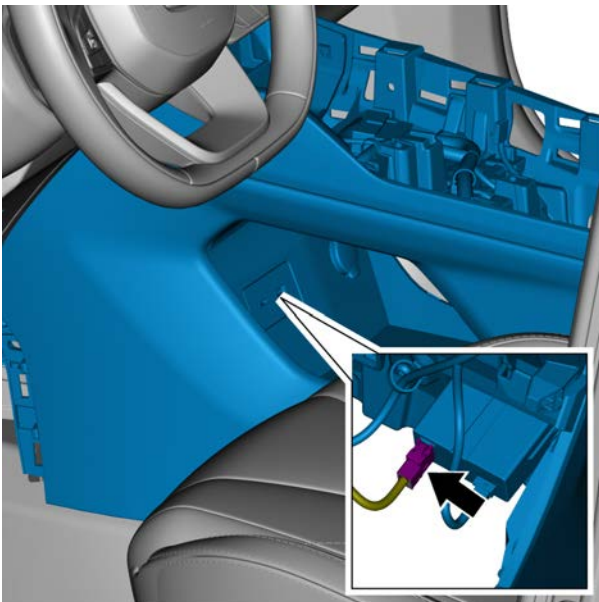
16 Remove the left retaining bolt at the rear end of the sub-dashboard assembly.



17 Disconnect the 2 sub-dashboard harness connector.

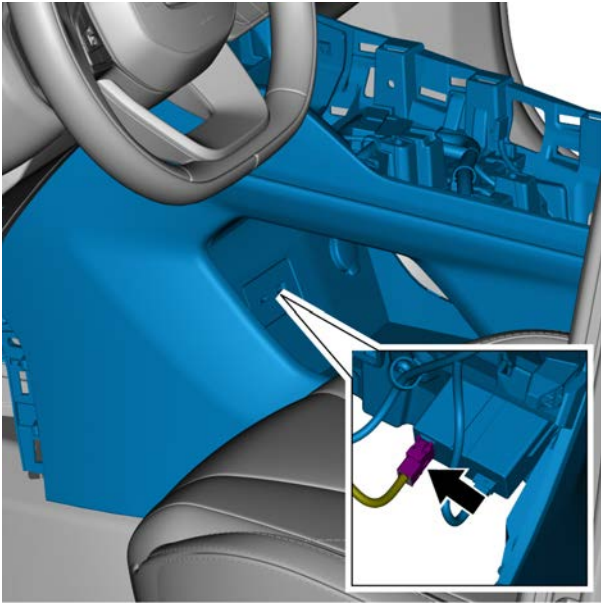


- 18 Remove the 2 wire harness clips at the front end of sub-dashboard assembly.

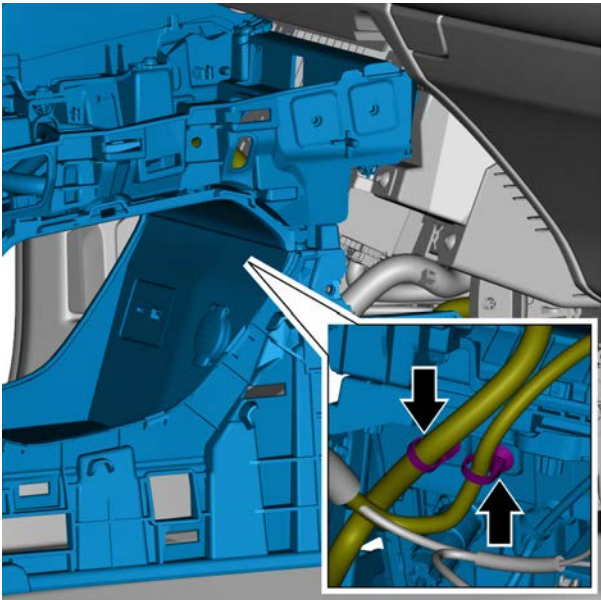


- 19 Disconnect the USB port harness connector and remove the sub-dashboard assembly.

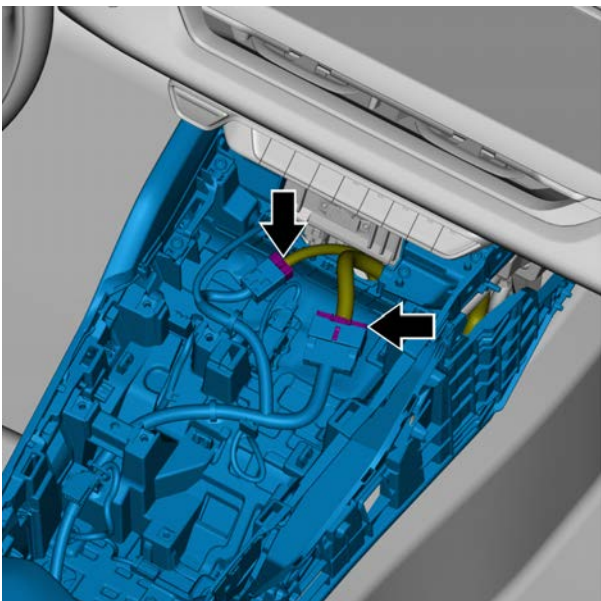
Installation procedure



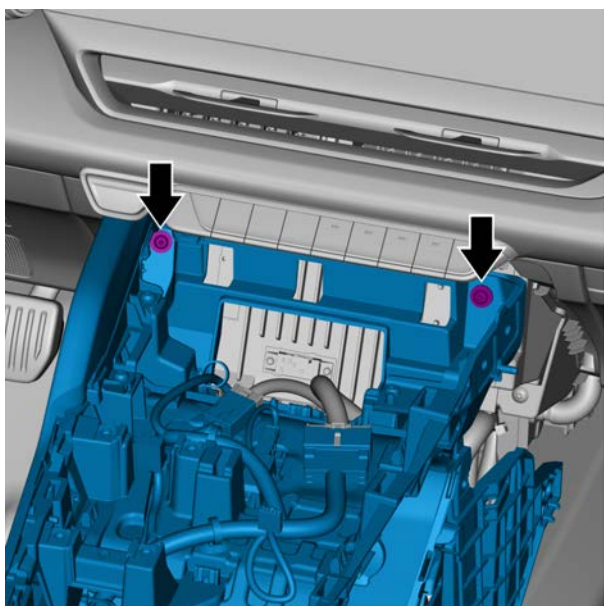
- 1 Connect the USB harness connector.



- 2 Install the 2 wire harness clips in the front of the sub-dashboard assembly.

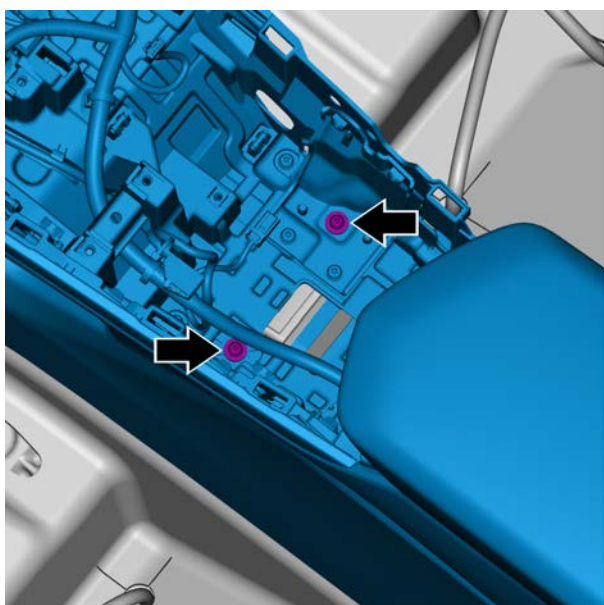


- 3 Connect the 2 harness connector of the sub-dashboard harness.



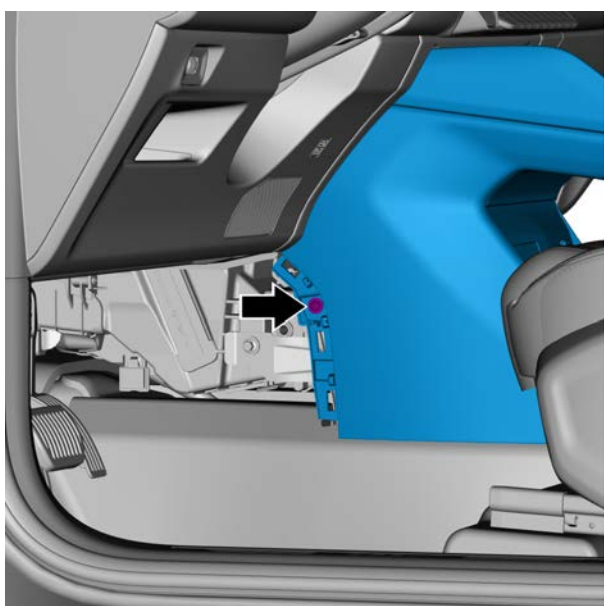
- 4 Install the 2 retaining screws at the front end of the sub-dashboard assembly.

Torque: 3.5 N·m (metric) 2.6 lb-ft (imperial system)



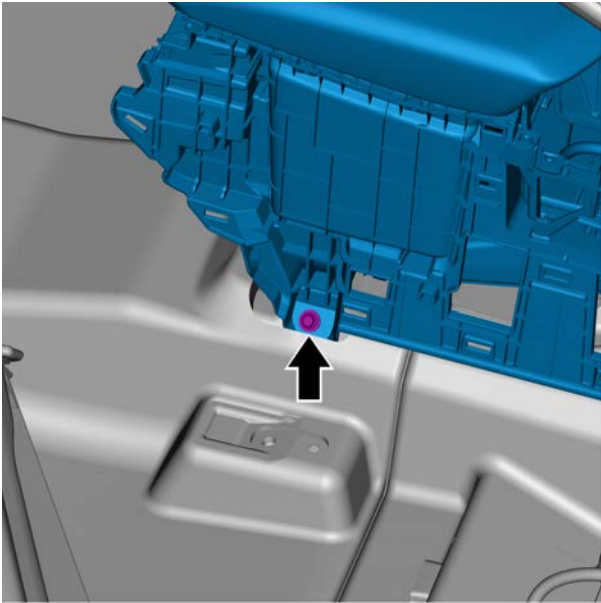
- 5 Install the 2 retaining screws in the middle of the sub-dashboard assembly.

Torque: 3.5 N·m (metric) 2.6 lb-ft (imperial system)



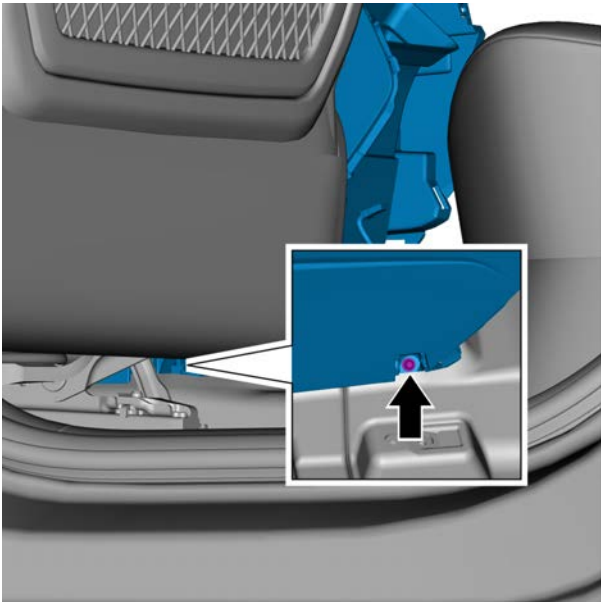
- 6 Install the retaining screws at the lower front left of the sub-dashboard assembly.

Torque: 3.5 N·m (metric) 2.6 lb-ft (imperial system)



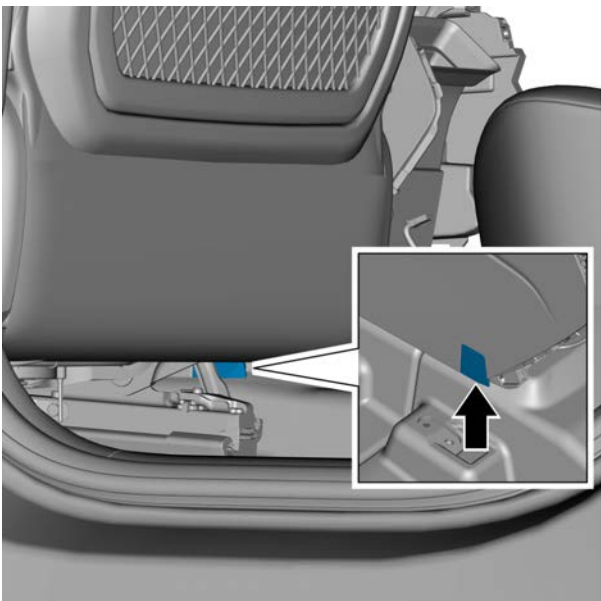
- 7 Install the right retaining bolt at the rear end of the sub-dashboard assembly.

Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)



- 8 Install the left retaining bolt at the rear end of the sub-dashboard assembly.

Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)



- 9 Install the bolt plug on the driver side.

- 10 Install the selector lever module.
- 11 Install the gearbox ball head.
- 12 Install the shift panel assembly.
- 13 Install the exterior handle assembly on the right side of the sub-dashboard.
- 14 Install the right side trim panel assembly of the sub-instrument panel.
- 15 Install the rear panel assembly of the console.
- 16 Install the extension trim plate on the side of the front passenger.
- 17 Install the driver side extended trim plate.
- 18 Install the passenger seat assembly.
- 19 Connect the negative battery cable.

12.7.3.20 Replacement of lower middle guard assembly of the dashboard

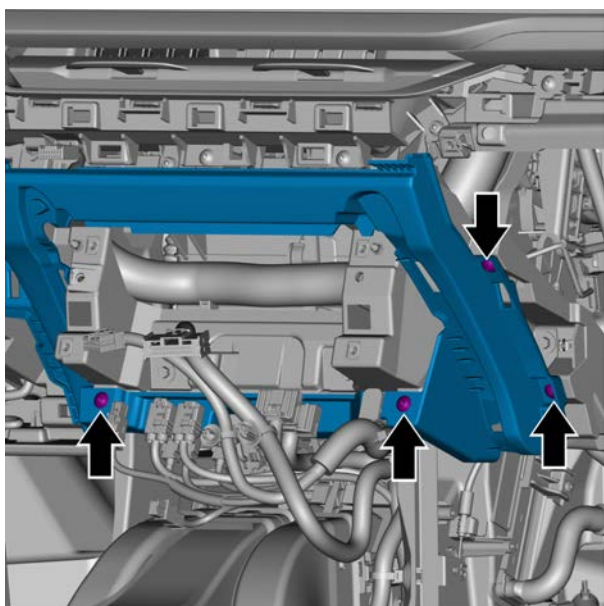
Removal procedure

Warning !

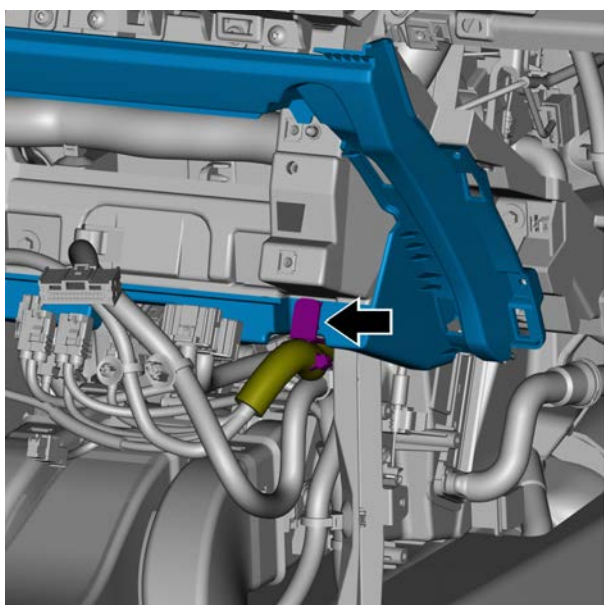
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the dashboard driver side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 3 Remove the dashboard co-pilot side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 4 Remove the left air conditioning vent panel assembly, see the [Replacement of the left air conditioning vent panel assembly](#).
- 5 Remove the left cladding panel assembly, see the [Replacement of the left cladding panel assembly](#).
- 6 Remove the right cladding panel assembly, see [Replacement of the right cladding panel assembly](#).
- 7 Remove the left lower guard assembly of the dashboard, see the [Replacement of left lower guard assembly of the dashboard](#).
- 8 Remove the lower right foot assembly, see [Replacement of the lower right foot assembly](#).

- 9 To disassemble the glove box frame assembly, see the [Replacement of the glove box frame assembly \(Type 1\)](#) and the [Replacement of the glove box frame assembly \(Type 2\)](#).
- 10 Remove the passenger seat assembly, see [Replacement of the passenger seat assembly](#).
- 11 Remove the driver side extended trim plate assembly, see [Replacement of the driver side extended trim plate assembly](#).
- 12 Remove the front passenger side extended trim plate assembly, see the [Replacement of the driver side extended trim plate assembly](#).
- 13 Remove the rear panel assembly of the sub-dashboard, see the [Replacement of the rear panel assembly of the sub-dashboard \(Type 1\)](#) and the [Replacement of the rear panel assembly of the sub-dashboard \(Type 2\)](#).
- 14 Remove the trim plate assembly on the right side of the sub-dashboard, see [Replacement of the trim plate assembly on the right side of the sub-dashboard](#).
- 15 Remove the exterior handle assembly on the right side of the sub-dashboard, see the [Replacement of the exterior handle assembly on the right side of the sub-dashboard](#).
- 16 Remove the gearbox ball head, see the [Replacement of the gearbox ball head](#).
- 17 Remove the shift panel assembly, see [Replacement of the shift panel assembly](#).
- 18 Remove the selector lever module, see the [Replacement of the selector lever module](#).
- 19 Remove console moulding assembly, refer to [replacement of console moulding assembly](#).
- 20 To disassemble the infotainment host, see the [Replacement of the infotainment host](#).

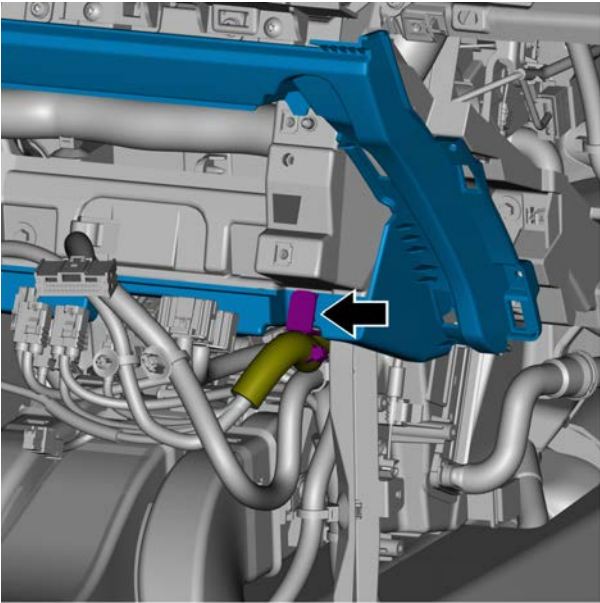


21 Remove the 4 fixing screws of the lower middle fender apron assembly of the dashboard.

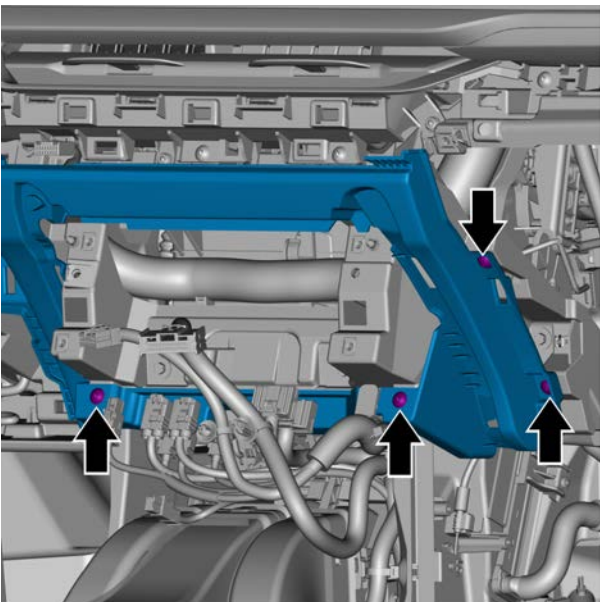


22 Remove the wire harness clip on the lower middle guard assembly of the dashboard and remove the lower middle guard assembly of the dashboard.

Installation procedure



- 1 Install the wire harness clip on the lower middle guard assembly of the dashboard.



- 2 Install the 4 fixing screws of the lower middle fender apron assembly of the instrument panel.

Torque: 2.5 N·m (metric) 1.8 lb-ft (imperial system)

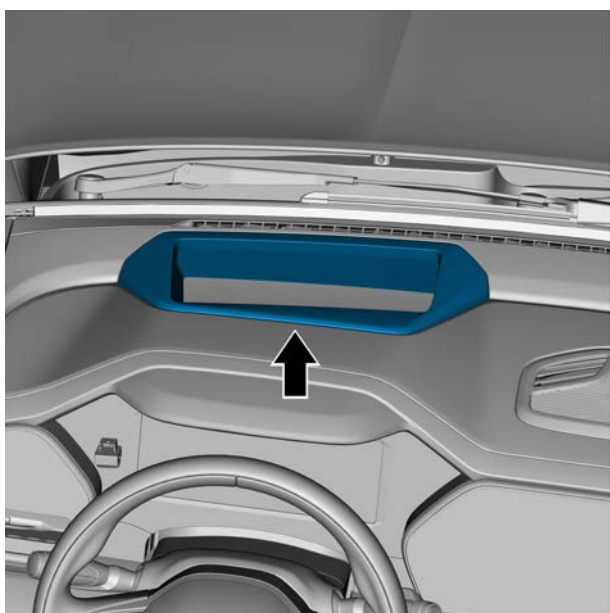
- 3 Install the infotainment control unit.
- 4 Install the console assembly.
- 5 Install the selector lever module.
- 6 Install the shift panel assembly.
- 7 Install the gearbox ball head.
- 8 Install the exterior handle assembly on the right side of the sub-dashboard.
- 9 Install the right side trim panel assembly of the sub-instrument panel.
- 10 Install the rear panel assembly of the console.
- 11 Install the extension trim plate on the side of the front passenger.
- 12 Install the driver side extended trim plate.

- 13 Install the passenger seat assembly.
- 14 Install the glove box frame assembly.
- 15 Install the assembly-toe board lower RH.
- 16 Install the left lower fender apron assembly of the dashboard.
- 17 Install the right cladding panel assembly.
- 18 Install the left cladding panel assembly.
- 19 Install the left air conditioning outlet panel assembly.
- 20 Install the front passenger side end cover assembly of the dashboard.
- 21 Install the driver side end cover assembly of the dashboard.
- 22 Connect the negative battery cable.

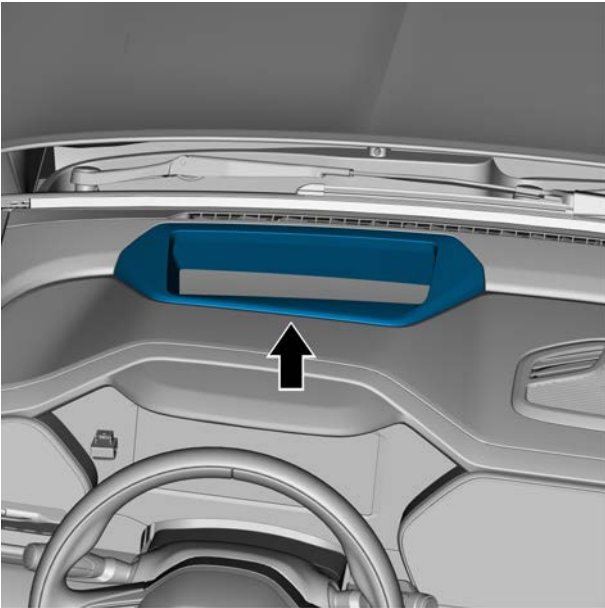
12.7.3.21 Replacement of HUD cover assembly

Removal procedure

- 1 Disassemble HUD cover assembly and remove it.



Installation procedure



- 1 Install the HUD cover assembly.

12.7.3.22 Replacement of the instrument panel assembly

Removal procedure

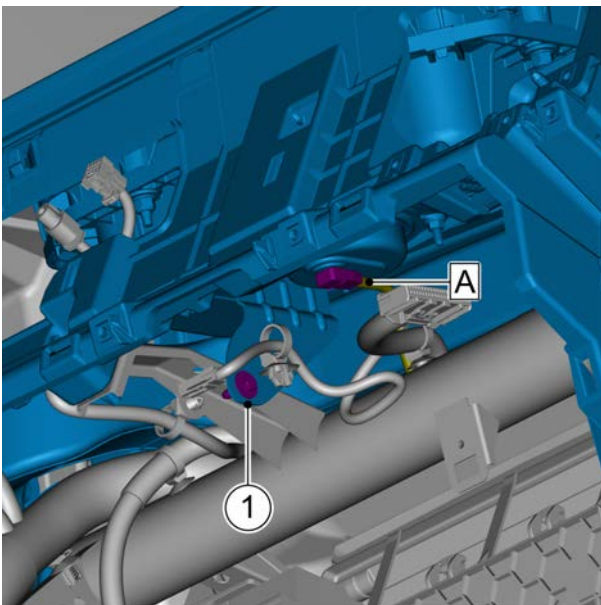
Warning !

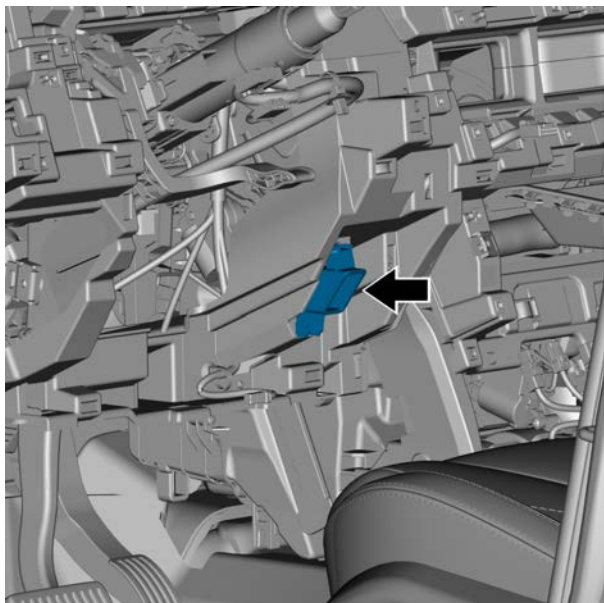
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the dashboard driver side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 3 Remove the dashboard co-pilot side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 4 Remove the left air conditioning vent panel assembly, see the [Replacement of the left air conditioning vent panel assembly](#).
- 5 Remove the left cladding panel assembly, see the [Replacement of the left cladding panel assembly](#).
- 6 Remove the right cladding panel assembly, see [Replacement of the right cladding panel assembly](#).
- 7 Remove the front left and FR doorsill trim plate assembly, see [Replacement of front left doorsill trim assembly](#).
- 8 Remove the driver side extended trim plate assembly, see [Replacement of the driver side extended trim plate assembly](#).

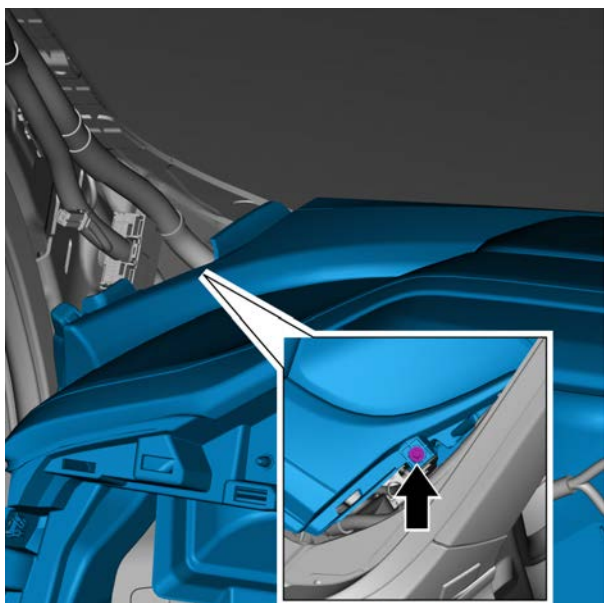
- 9 Remove the front passenger side extended trim plate assembly, see the [Replacement of the driver side extended trim plate assembly](#).
- 10 Remove the lower left baffle assembly, see [Replacement of the lower left baffle assembly](#).
- 11 Remove the lower right foot assembly, see [Replacement of the lower right foot assembly](#).
- 12 Remove the left lower guard assembly of the dashboard, see the [Replacement of left lower guard assembly of the dashboard](#).
- 13 Remove glove box frame assembly, see [Replacement of glove box frame assembly \(Type 2\)](#).
- 14 Remove the central console displayer, see [Replacement of the central console displayer](#).
- 15 Remove the middle air outlet assembly of the dashboard, see the [Replacement of the middle air outlet assembly of the dashboard](#).
- 16 Remove the air outlet assembly on the right side of the dashboard, see the [Replacement of the air outlet assembly on the right side of the dashboard](#).
- 17 Disassemble the driver information module, see the [Replacement of the driver information module](#).
- 18 Remove the driver information screen and see the [Replacement of the driver information screen](#).
- 19 Remove the front airbag (driver), see the [Replacement of the front airbag \(driver\)](#).
- 20 Remove the steering wheel assembly, see the [Replacement of the steering wheel assembly \(Type 1\)](#), the [Replacement of the steering wheel assembly \(Type 2\)](#).
- 21 Remove steering column upper cowl assembly, see [Replacement of steering column upper cowl assembly](#).
- 22 Remove the lower cowl of the steering column, see the [Replacement of the lower cowl of the steering column](#).
- 23 Remove the steering wheel module, see the [Replacement of the steering wheel module](#).
- 24 Remove the passenger seat assembly, see [Replacement of the passenger seat assembly](#).
- 25 Remove the rear panel assembly of the sub-dashboard, see [Replacement of the rear panel assembly of the sub-dashboard \(Type 2\)](#).

- 26 Remove the trim plate assembly on the right side of the sub-dashboard, see [Replacement of the trim plate assembly on the right side of the sub-dashboard](#).
- 27 Remove the exterior handle assembly on the right side of the sub-dashboard, see the [Replacement of the exterior handle assembly on the right side of the sub-dashboard](#).
- 28 Remove the shift panel assembly, see [Replacement of the shift panel assembly](#).
- 29 Remove the selector lever module, see the [Replacement of the selector lever module \(Type 2\)](#).
- 30 Remove console moulding assembly, refer to [replacement of console moulding assembly](#).
- 31 To disassemble the infotainment host, see the [Replacement of the infotainment host](#).
- 32 Remove the middle and lower guard assembly of the dashboard, see the [Replacement of the lower guard assembly of the dashboard](#).
- 33 Remove the left and right A-pillar trim plate assembly, see [Replacement of the left and right A-pillar trim plate assembly](#).
- 34 Remove HUD cover assembly, see [Replacement of HUD cover assembly](#).
- 35 Remove the dashboard speakers, see [Replacement of dashboard speakers](#).
- 36 Disconnect the front airbag (passenger) harness connector A.
- 37 Remove the front airbag (passenger) bracket retaining bolt 1.

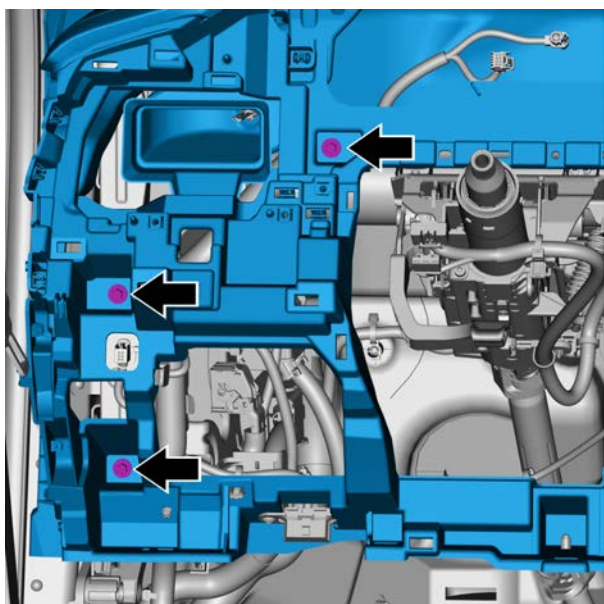




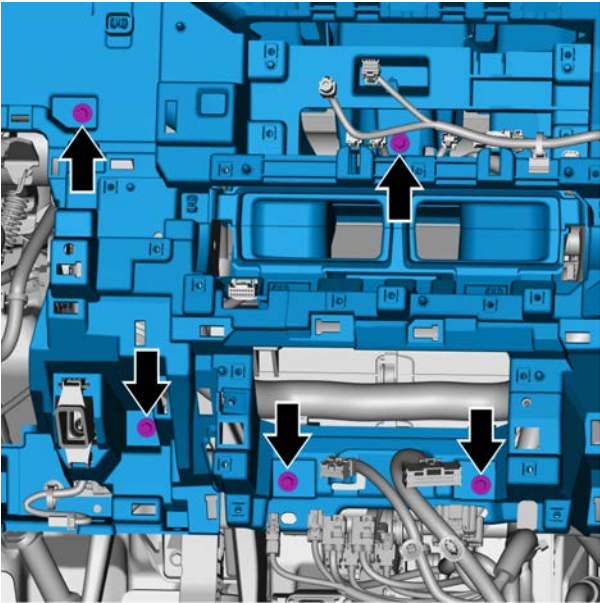
38 Remove the internal temperature sensor bracket.



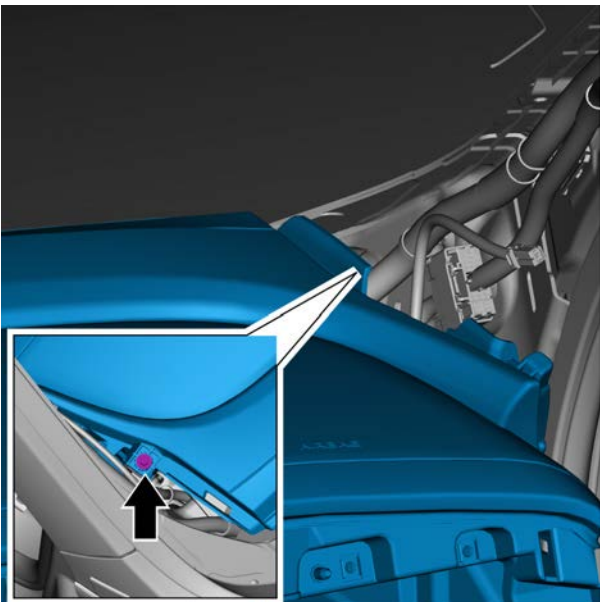
39 Remove the upper left corner retaining bolt of the dashboard assembly.



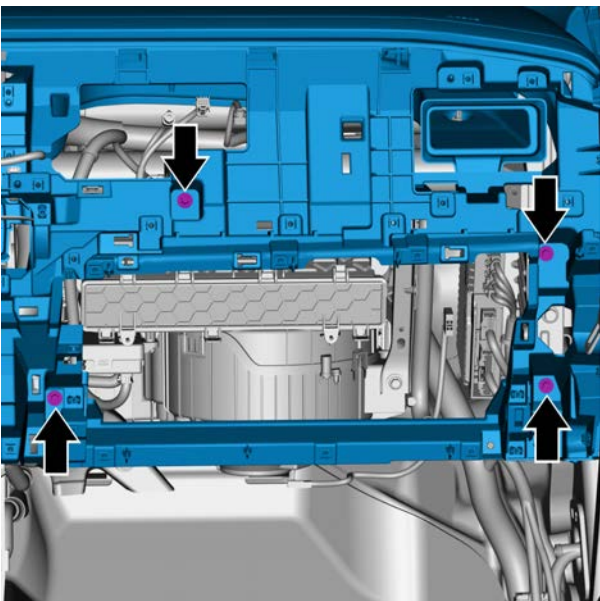
40 Remove the 3 retaining bolts on the left side of the dashboard assembly.



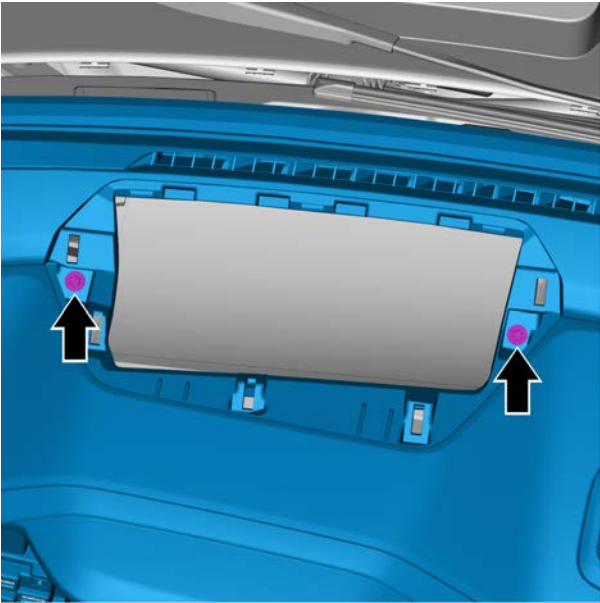
- 41 Remove the 5 retaining bolts in the middle of the dashboard assembly.



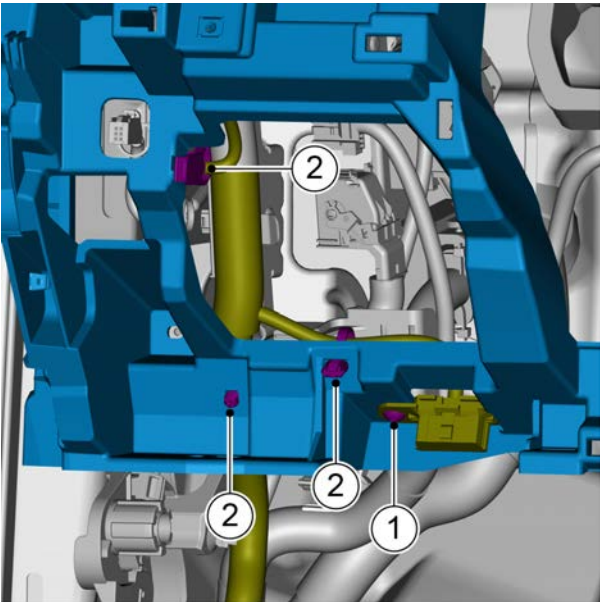
- 42 Remove the retaining bolt on the upper right corner of the dashboard assembly.



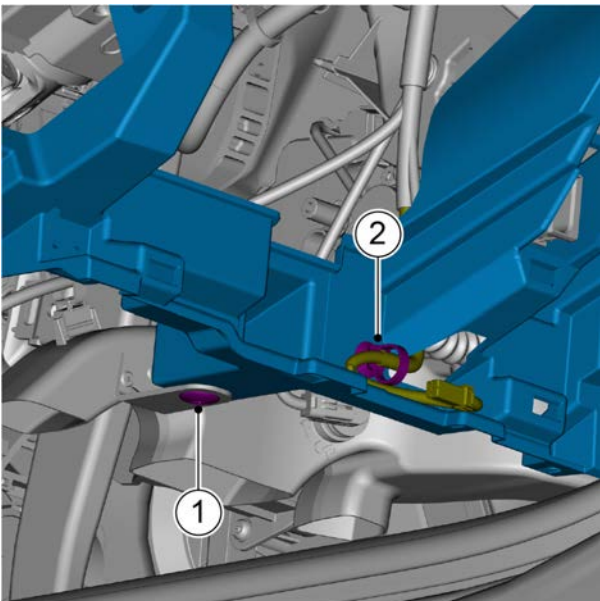
- 43 Remove the 4 retaining bolts on the right side of the dashboard assembly.



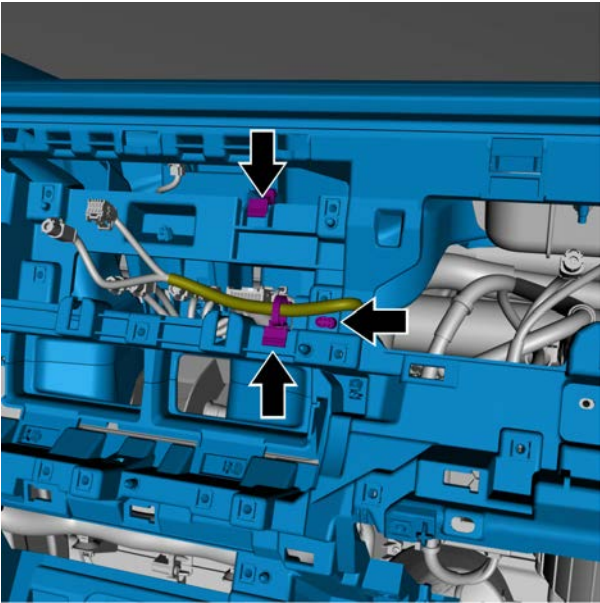
- 44 Remove the 2 retaining bolts on the upper left side of the dashboard assembly.



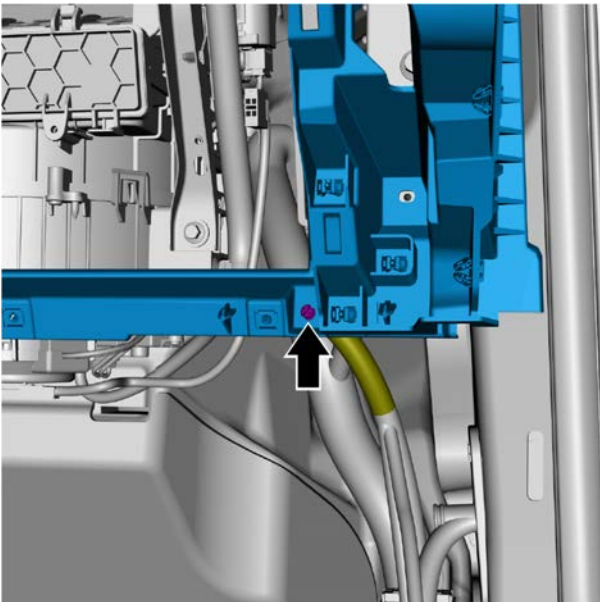
- 45 Remove the diagnostic interface retaining screw 1 and 3 dashboard harness retaining clips 2.



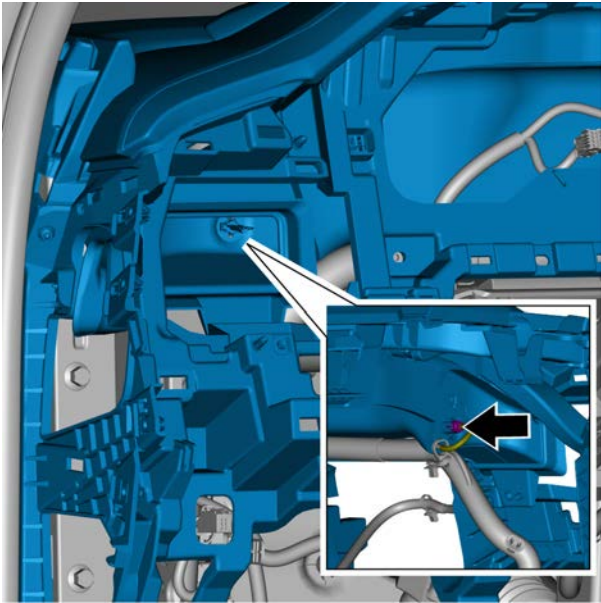
- 46 Remove the left air hose footwell assembly J-type clip 1 and dashboard harness retaining clip 2.



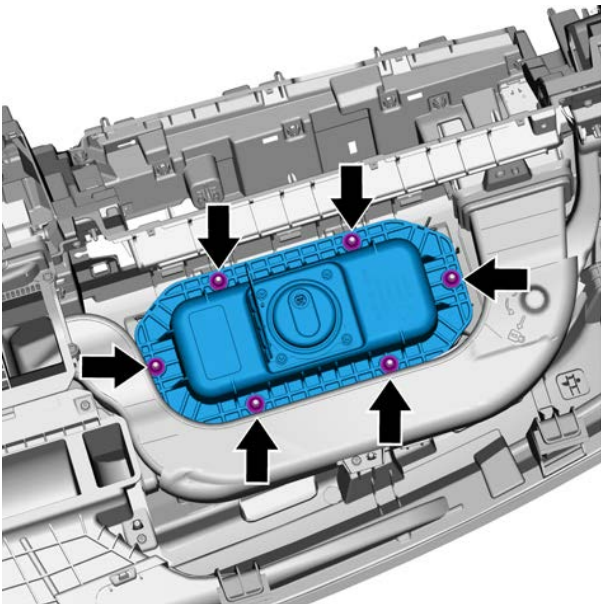
- 47 Remove the two dashboard harness retaining clips in the middle of the dashboard assembly.



- 48 Remove the dashboard harness retaining clip on the lower right side of the dashboard assembly.

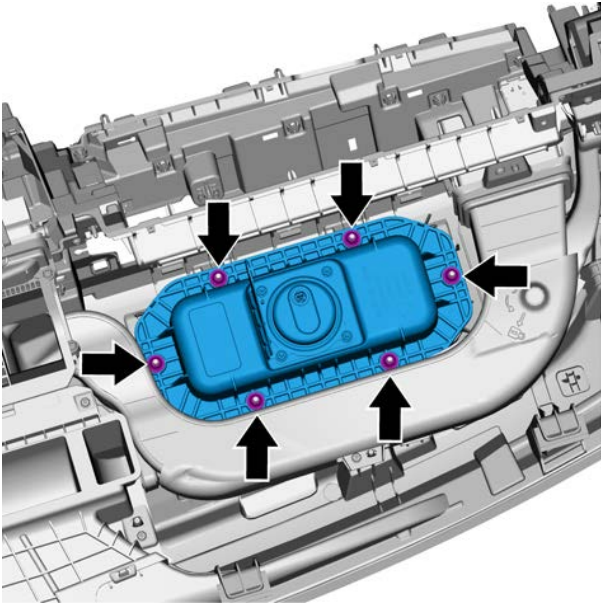


- 49 Disconnect the temperature sensor harness connector and remove the dashboard assembly.

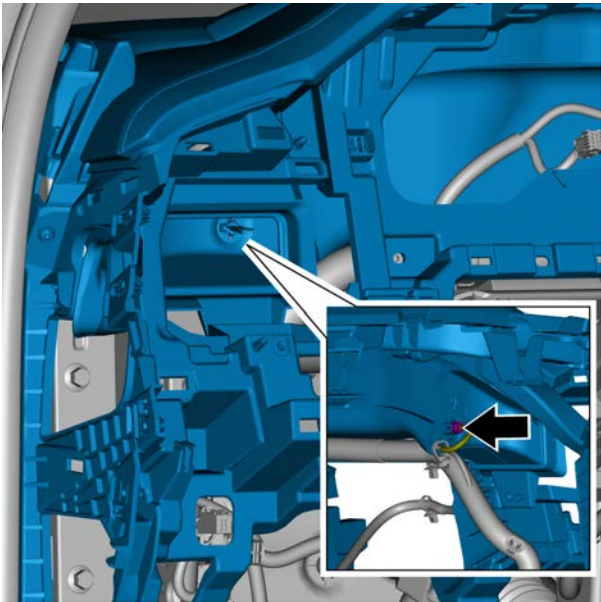


- 50 Remove the 6 retaining nuts of the front airbag (passenger).

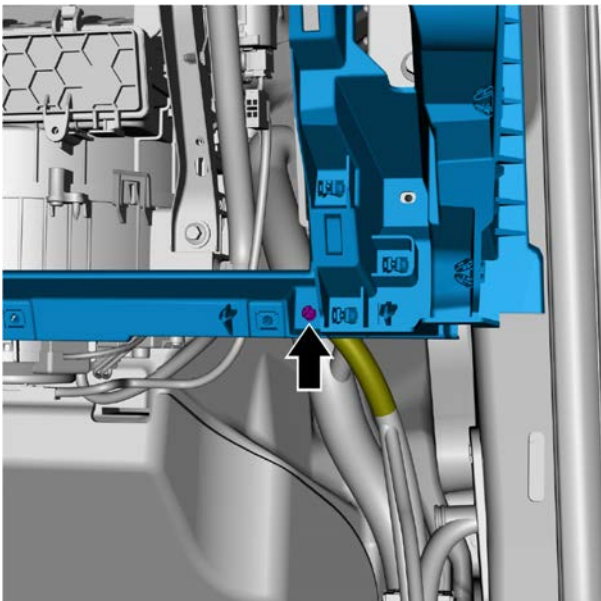
Installation procedure



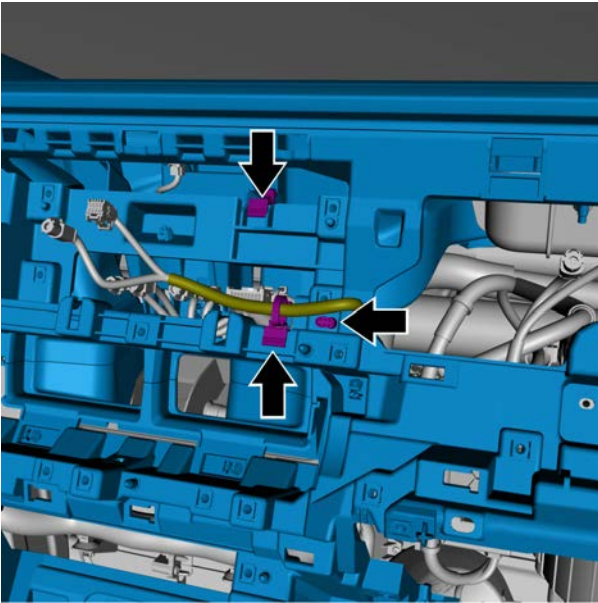
- 1 Install the 6 retaining nuts of the front airbag (passenger).
Torque: 4.5 N. m (metric system) 3.3 lb-ft (Imperial system)



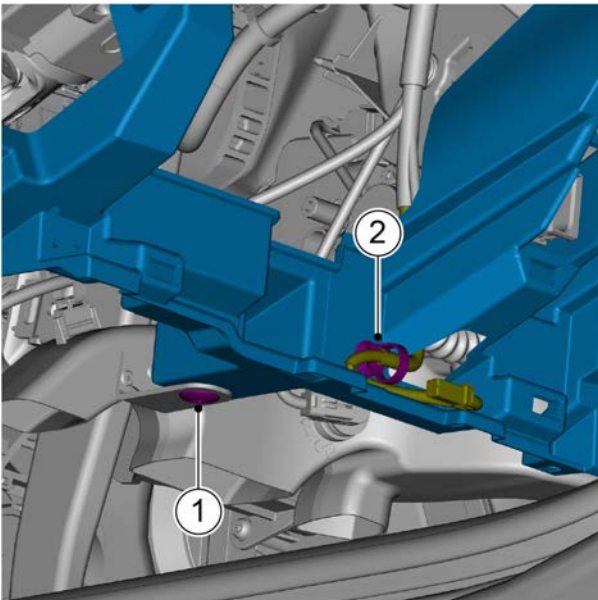
- 2 Install the dashboard assembly and connect the temperature sensor harness connector.



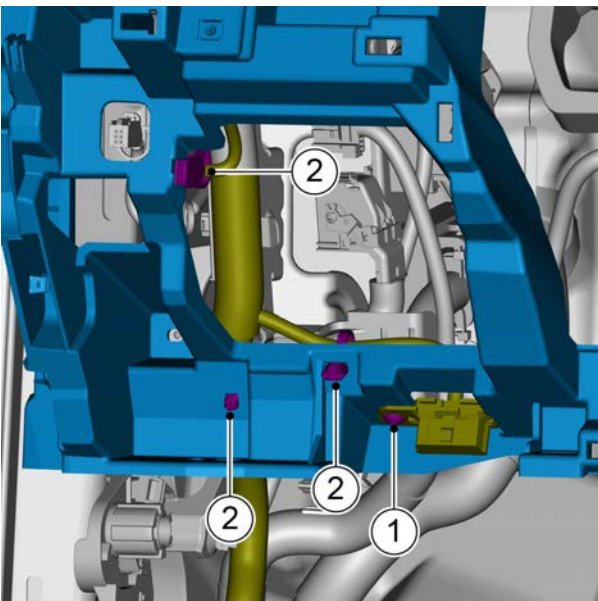
- 3 Install the dashboard harness retaining clip at the lower right side of the dashboard assembly.



- 4 Install the two dashboard harness retaining clips in the middle of the dashboard assembly.

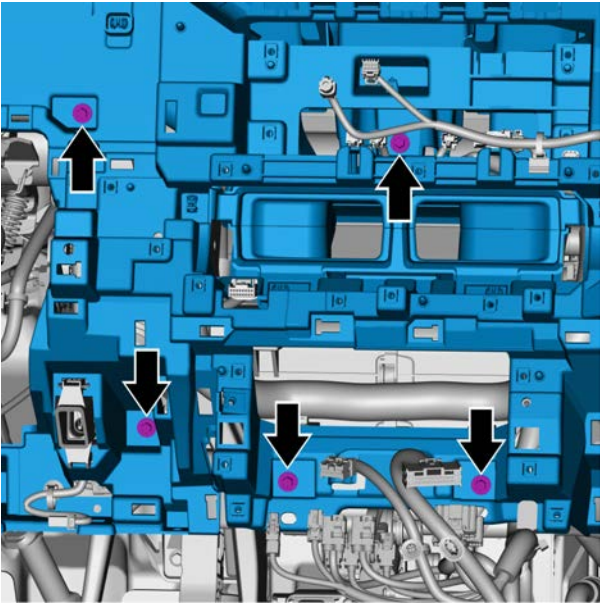


- 5 Install left air hose footwell assembly J-type clip 1 and dashboard harness retaining clip 2.



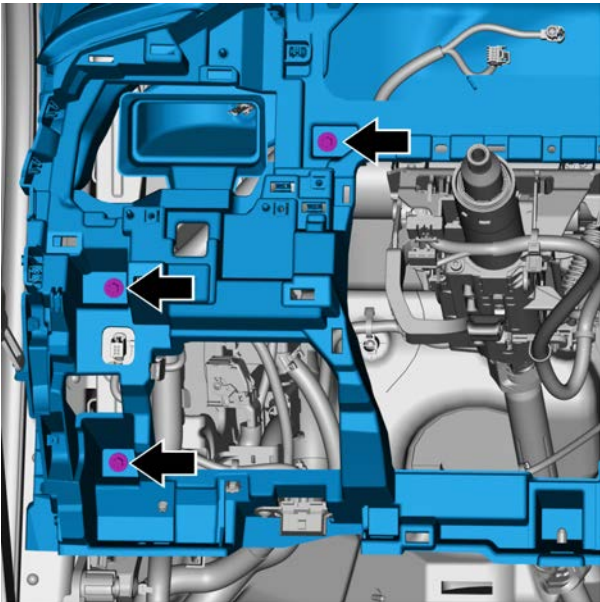
- 6 Install diagnostic interface retaining screws 1 and 3 dashboard harness retaining clips 2.

Torque: 2.5 N·m (metric) 1.8 lb-ft (imperial system)



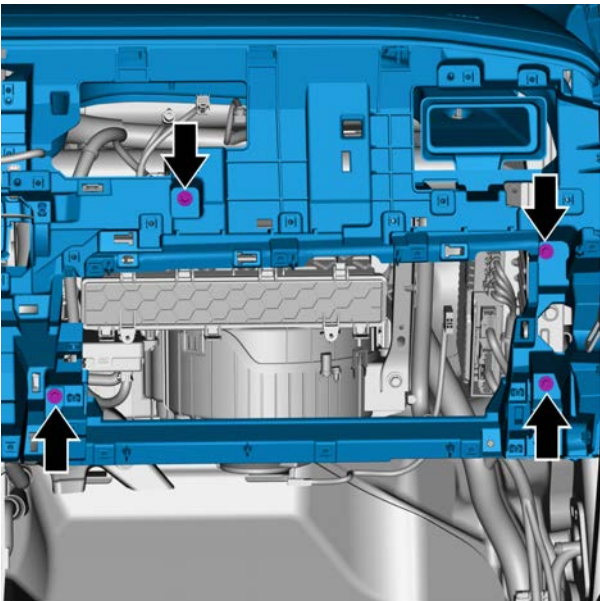
- 7 Install the 5 retaining bolts in the middle of the dashboard assembly.

Torque: 4.5 N·m (metric) 3.3 lb-ft (imperial system)



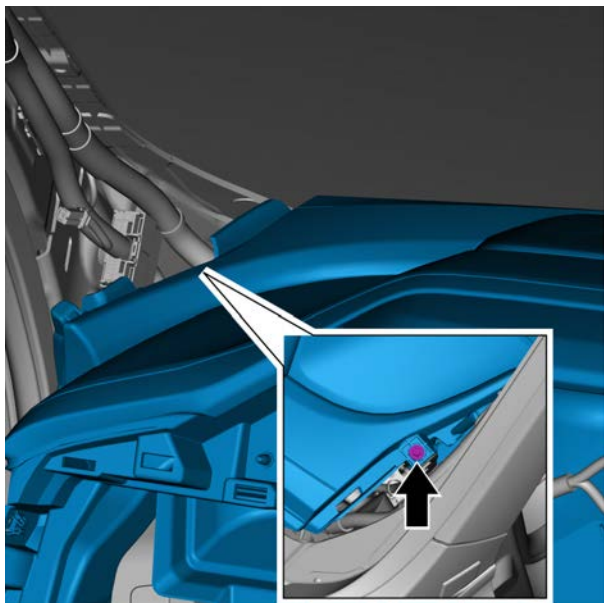
- 8 Install the 3 retaining bolts on the left side of the dashboard assembly.

Torque: 4.5 N·m (metric) 3.3 lb-ft (imperial system)



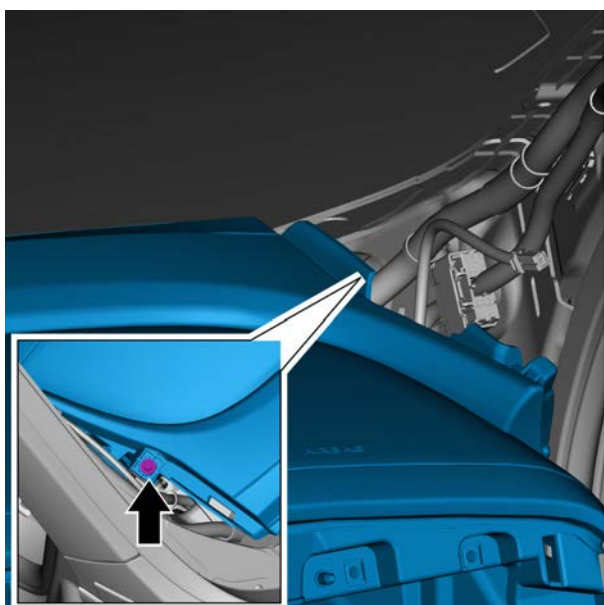
- 9 Install the 4 retaining bolts on the right side of the dashboard assembly.

Torque: 4.5 N·m (metric) 3.3 lb-ft (imperial system)



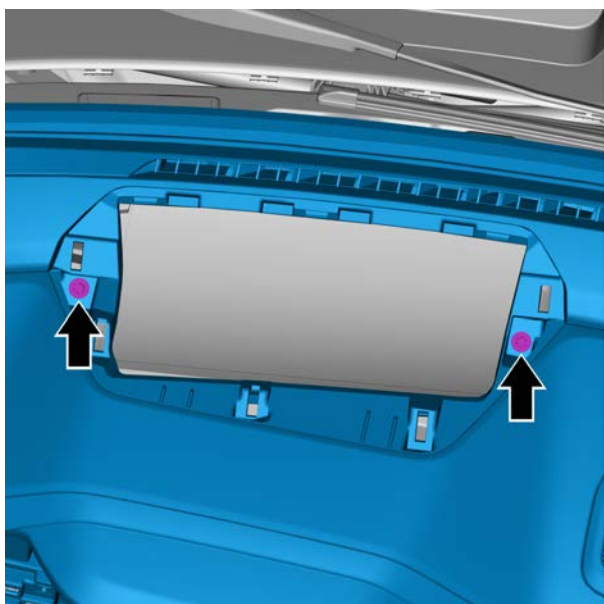
- 10 Install the upper left corner retaining bolt of the dashboard assembly.

Torque: 4.5 N·m (metric) 3.3 lb-ft (imperial system)



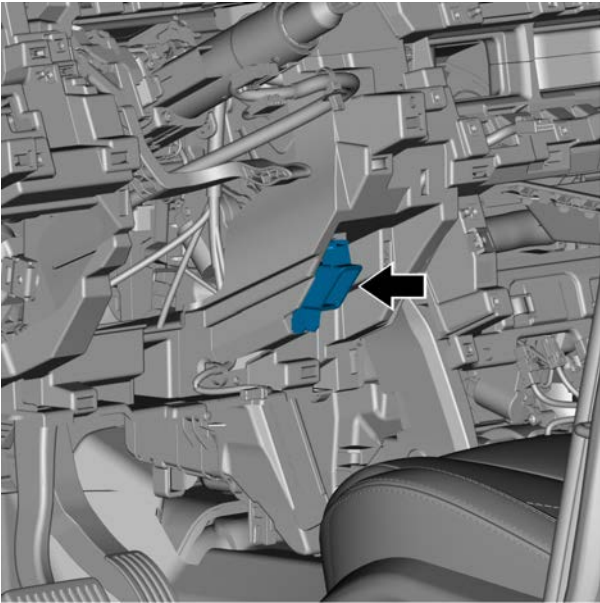
- 11 Install the upper right corner retaining bolt of the dashboard assembly.

Torque: 4.5 N·m (metric) 3.3 lb-ft (imperial system)

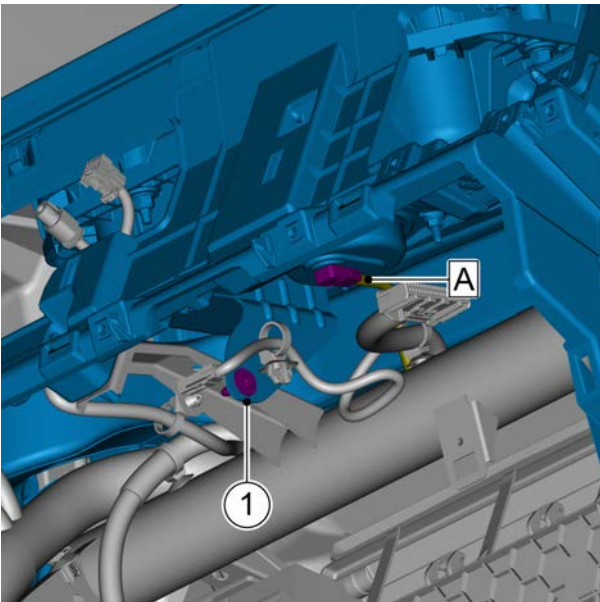


- 12 Install the 2 retaining bolts on the upper left side of the dashboard assembly.

Torque: 4.5 N·m (metric) 3.3 lb-ft (imperial system)



- 13 Install the internal temperature sensor bracket.



- 14 Connect the front airbag (passenger) harness connector A.
- 15 Install front airbag (passenger) bracket retaining bolt 1.
Torque: 4.5 N·m (metric) 3.3 lb-ft (imperial system)

- 16 Install dashboard speakers.
- 17 Install the HUD cover assembly.
- 18 Install the left and right A-pillar upper trim panel assembly.
- 19 Install the middle lower fender apron assembly of the dashboard.
- 20 Install the infotainment control unit.
- 21 Install the steering wheel module.
- 22 Install the lower shield of the steering column.
- 23 Install the upper shield of the steering column.
- 24 Install the steering wheel assembly.
- 25 Install the front airbag (driver).
- 26 Install the driver information screen.
- 27 Install the driver information module.

- 28 Install vent assembly RH of dashboard.
- 29 Install vent assembly middle of dashboard.
- 30 Install the central console displayer.
- 31 Install the glove box frame assembly.
- 32 Install the left lower fender apron assembly of the dashboard.
- 33 Install the console assembly.
- 34 Install the selector lever module.
- 35 Install the shift panel assembly.
- 36 Install the exterior handle assembly on the right side of the sub-dashboard.
- 37 Install the right side trim panel assembly of the sub-instrument panel.
- 38 Install the rear panel assembly of the console.
- 39 Install the passenger seat assembly.
- 40 Install the assembly-toe board lower RH.
- 41 Install the lower left foot shield assembly.
- 42 Install the extension trim plate on the side of the front passenger.
- 43 Install the driver side extended trim plate.
- 44 Install the left and right front door sill trim panel assembly.
- 45 Install the right cladding panel assembly.
- 46 Install the left cladding panel assembly.
- 47 Install the left air conditioning outlet panel assembly.
- 48 Install the front passenger side end cover assembly of the dashboard.
- 49 Install the driver side end cover assembly of the dashboard.
- 50 Connect the negative battery cable.

12.7.3.23 Replacement of the dashboard beam assembly

Removal procedure

Warning !

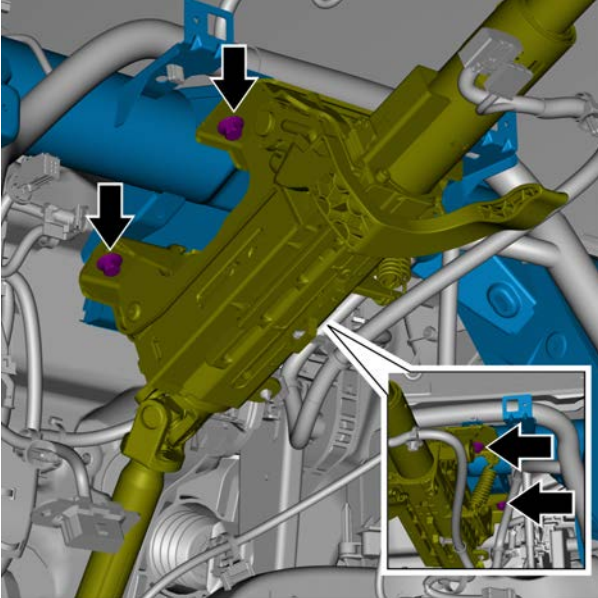
See "warning about disconnecting battery" in [Warnings and cautions](#)

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the dashboard driver side cover assembly, see [Replacement of the dashboard driver side cover assembly.](#)

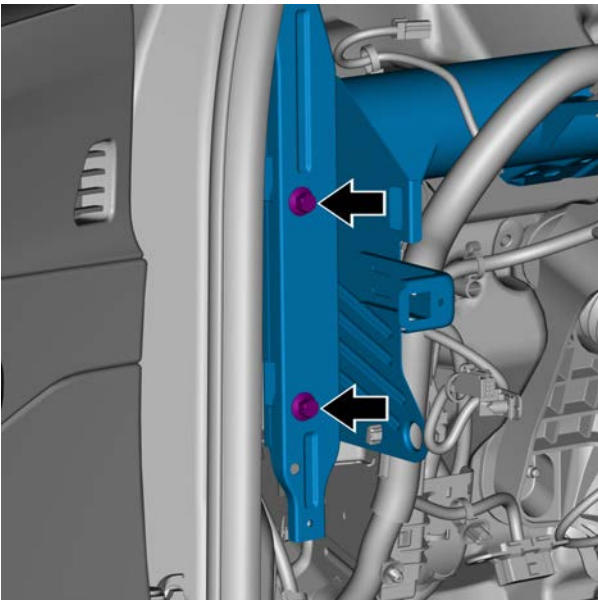
- 3 Remove the dashboard co-pilot side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 4 Remove the left air conditioning vent panel assembly, see the [Replacement of the left air conditioning vent panel assembly](#).
- 5 Remove the left cladding panel assembly, see the [Replacement of the left cladding panel assembly](#).
- 6 Remove the right cladding panel assembly, see [Replacement of the right cladding panel assembly](#).
- 7 Remove the front left and FR doorsill trim plate assembly, see [Replacement of front left doorsill trim assembly](#).
- 8 Remove the driver side extended trim plate assembly, see [Replacement of the driver side extended trim plate assembly](#).
- 9 Remove the front passenger side extended trim plate assembly, see the [Replacement of the driver side extended trim plate assembly](#).
- 10 Remove the lower left baffle assembly, see [Replacement of the lower left baffle assembly](#).
- 11 Remove the lower right foot assembly, see [Replacement of the lower right foot assembly](#).
- 12 Remove the left lower guard assembly of the dashboard, see the [Replacement of left lower guard assembly of the dashboard](#).
- 13 Remove the exterior cover of the glove box, see [Replacement of the exterior cover of the glove box](#).
- 14 Remove glove box frame assembly, see [Replacement of glove box frame assembly \(Type 2\)](#).
- 15 Remove the central console displayer, see [Replacement of the central console displayer](#).
- 16 Remove the middle air outlet assembly of the dashboard, see the [Replacement of the middle air outlet assembly of the dashboard](#).
- 17 Remove the air outlet assembly on the right side of the dashboard, see the [Replacement of the air outlet assembly on the right side of the dashboard](#).
- 18 Disassemble the driver information module, see the [Replacement of the driver information module](#).
- 19 Remove the driver information screen and see the [Replacement of the driver information screen](#).

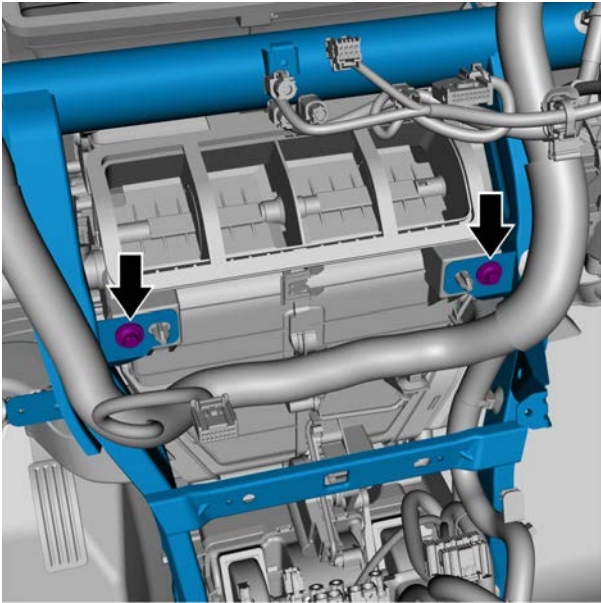
- 20 Remove the front airbag (driver), see the [Replacement of the front airbag \(driver\)](#).
- 21 Remove the steering wheel assembly, see the [Replacement of the steering wheel assembly \(Type 1\)](#), the [Replacement of the steering wheel assembly \(Type 2\)](#).
- 22 Remove steering column upper cowl assembly, see [Replacement of steering column upper cowl assembly](#).
- 23 Remove the lower cowl of the steering column, see the [Replacement of the lower cowl of the steering column](#).
- 24 Remove the steering wheel module, see the [Replacement of the steering wheel module](#).
- 25 Remove the passenger seat assembly, see [Replacement of the passenger seat assembly](#).
- 26 Remove the rear panel assembly of the sub-dashboard, see [Replacement of the rear panel assembly of the sub-dashboard \(Type 2\)](#).
- 27 Remove the trim plate assembly on the right side of the sub-dashboard, see [Replacement of the trim plate assembly on the right side of the sub-dashboard](#).
- 28 Remove the exterior handle assembly on the right side of the sub-dashboard, see the [Replacement of the exterior handle assembly on the right side of the sub-dashboard](#).
- 29 Remove the shift panel assembly, see [Replacement of the shift panel assembly](#).
- 30 Remove the selector lever module, see the [Replacement of the selector lever module \(Type 2\)](#).
- 31 Remove console moulding assembly, refer to [replacement of console moulding assembly](#).
- 32 To disassemble the infotainment host, see the [Replacement of the infotainment host](#).
- 33 Remove the middle and lower guard assembly of the dashboard, see the [Replacement of the lower guard assembly of the dashboard](#).
- 34 Remove the left and right A-pillar trim plate assembly, see [Replacement of the left and right A-pillar trim plate assembly](#).
- 35 Remove dashboard assembly, refer to [replacement of dashboard assembly](#).
- 36 Remove plenum moulding assembly (Type 1), see [Replacement of plenum moulding assembly \(Type 1\)](#), [Replacement of plenum moulding assembly \(Type 2\)](#).

- 37 Remove the front wiper motor, see [Replacement of the front wiper motor](#).
- 38 Remove the front end blowing duct of the sub-dashboard, see the [Replacement of the front end blowing duct of the sub-dashboard](#).
- 39 Remove the head-up display, see [Replacement of head-up display](#).
- 40 Remove the 4 retaining bolts of the mechanical steering column assembly.

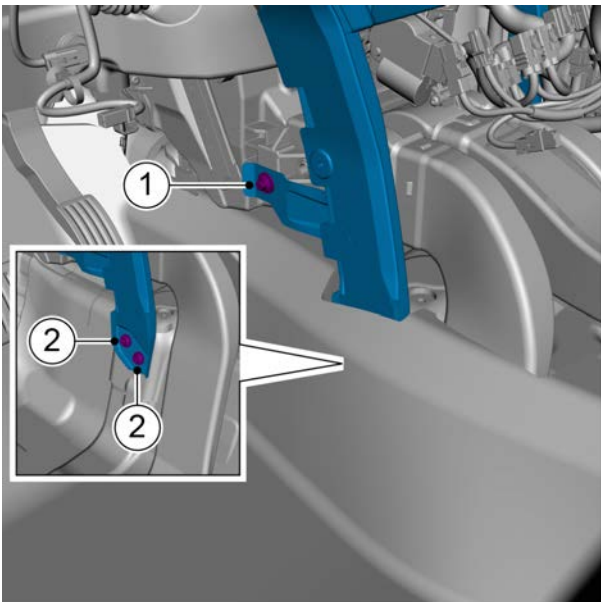


- 41 Remove the 2 retaining bolts on the left side of the dashboard crossbeam assembly.

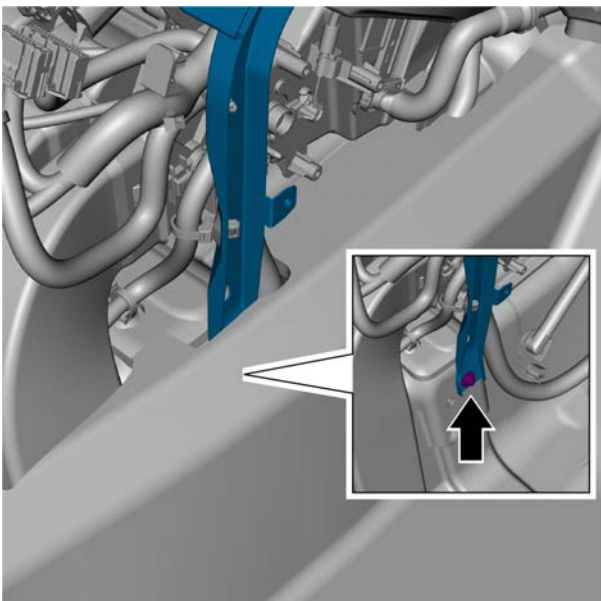




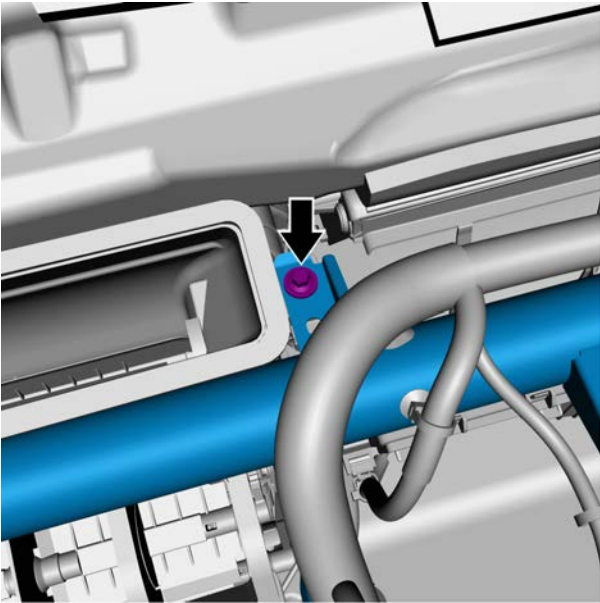
- 42 Remove the 2 retaining bolts in the middle of the dashboard crossbeam assembly.



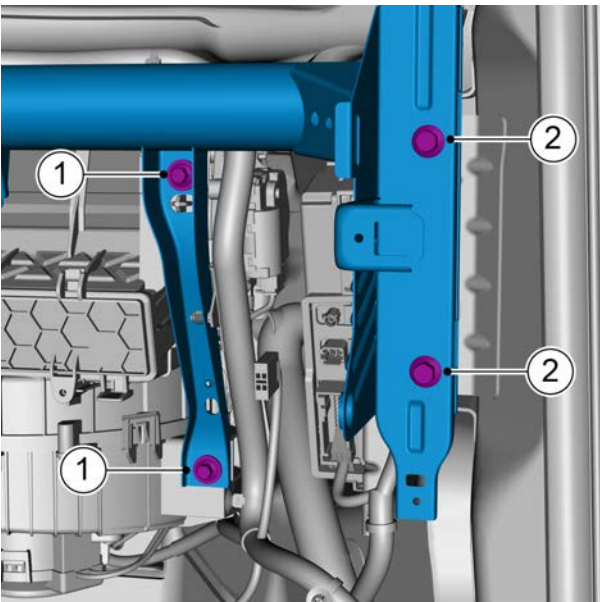
- 43 Lift the front left floor carpet and remove the lower middle left retaining bolt 1 and 2 retaining bolts 2 of the dashboard crossbeam assembly.



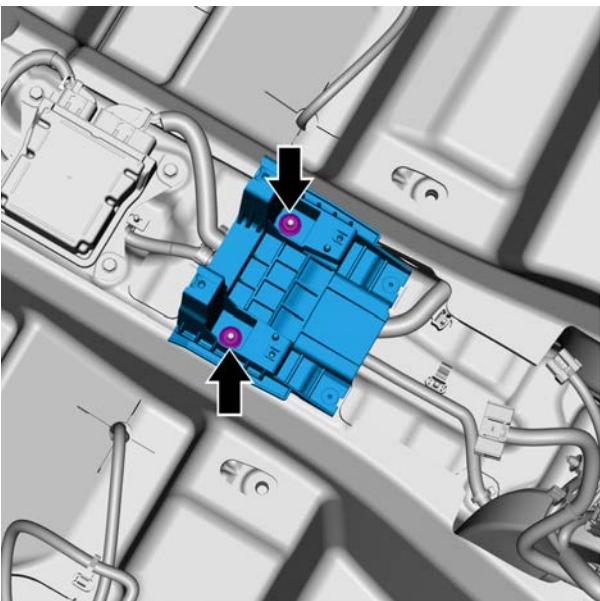
- 44 Lift the the FR floor carpet and remove the retaining bolts on the lower right side of the middle right side of the dashboard crossbeam assembly.



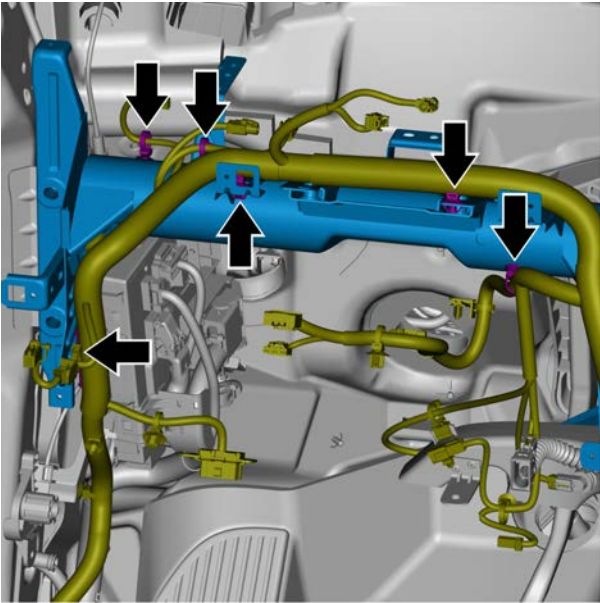
- 45 Remove the upper middle retaining bolt of the dashboard crossbeam assembly.



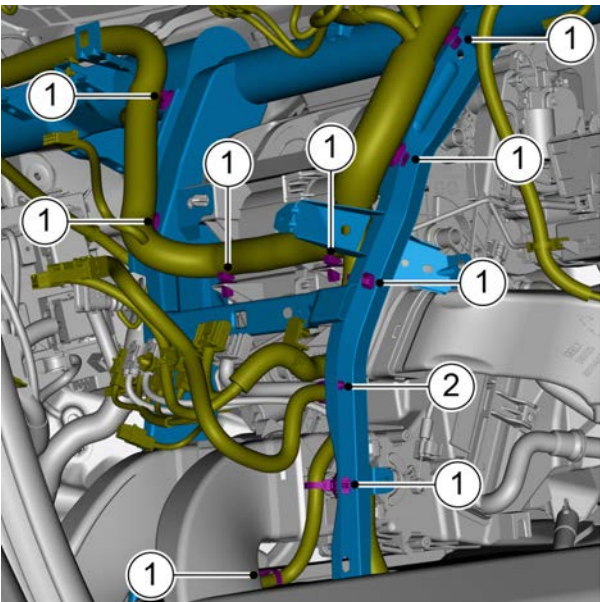
- 46 Remove 2 retaining bolts 1 and 2 retaining bolts 2 on the right side of the dashboard crossbeam assembly.



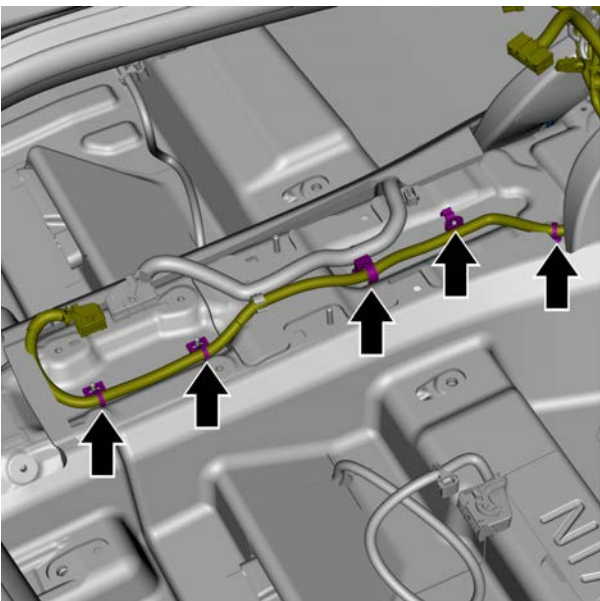
- 47 Remove the 2 retaining nuts of the mounting bracket in the middle of the sub-dashboard.



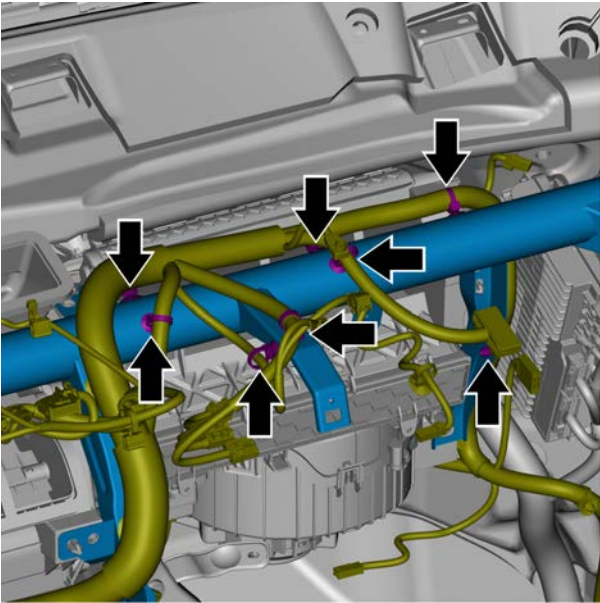
48 Remove the 6 dashboard harness retaining clips on the left side of the dashboard crossbeam assembly.



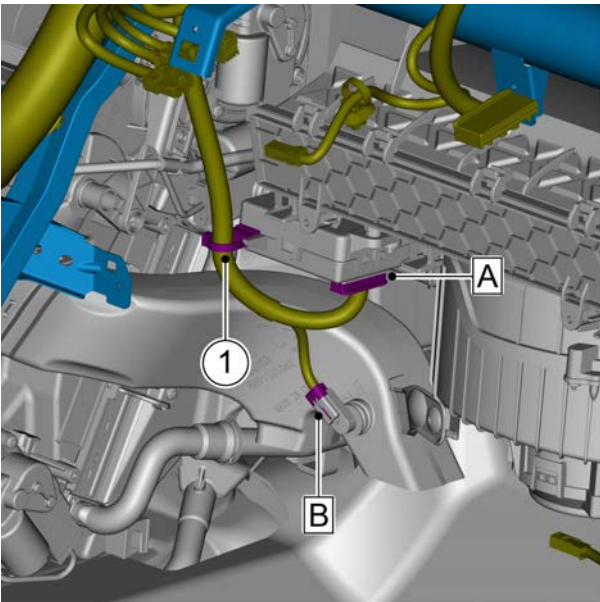
49 Remove the 9 dashboard harness retaining clips 1 and 2 floor harness retaining clips in the middle of the dashboard crossbeam assembly.



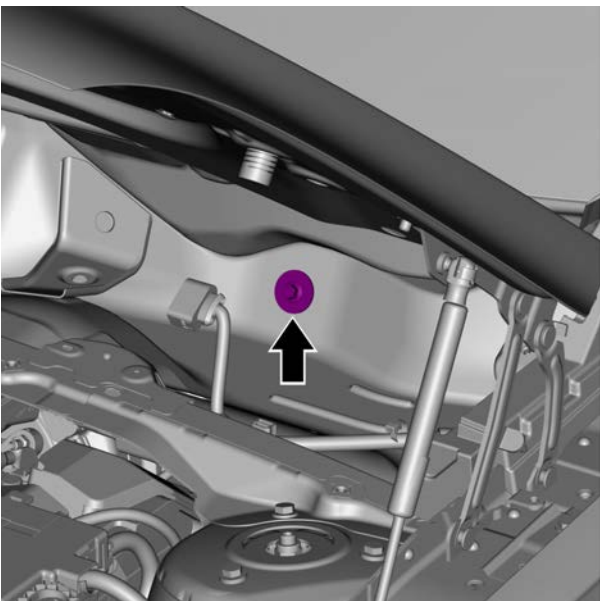
50 Remove the 5 retaining clips of the dashboard harness.



- 51 Remove the 8 dashboard harness retaining clips on the right side of the dashboard crossbeam assembly.



- 52 Disconnect the temperature control module harness connector A and the temperature sensor harness connector B.
- 53 Remove dashboard harness retaining clip 1.

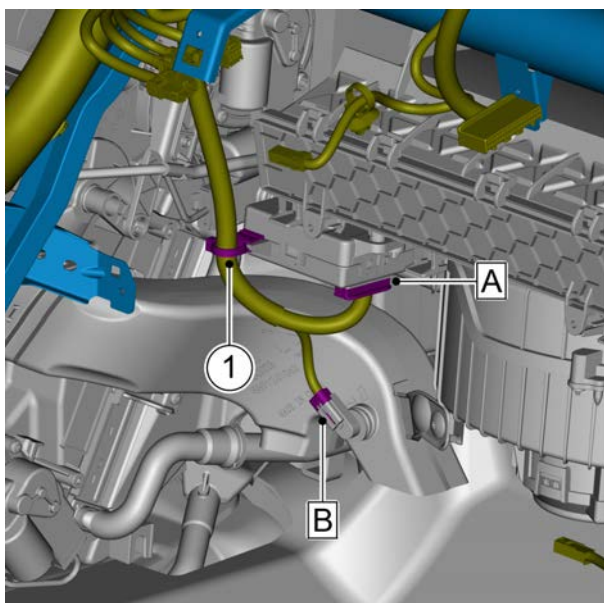
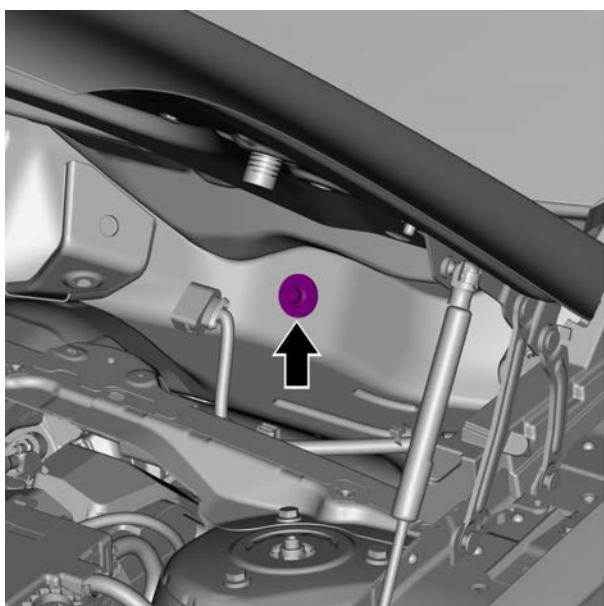


- 54 Remove the upper retaining bolt on the front wall of the dashboard beam assembly and remove the dashboard beam assembly.

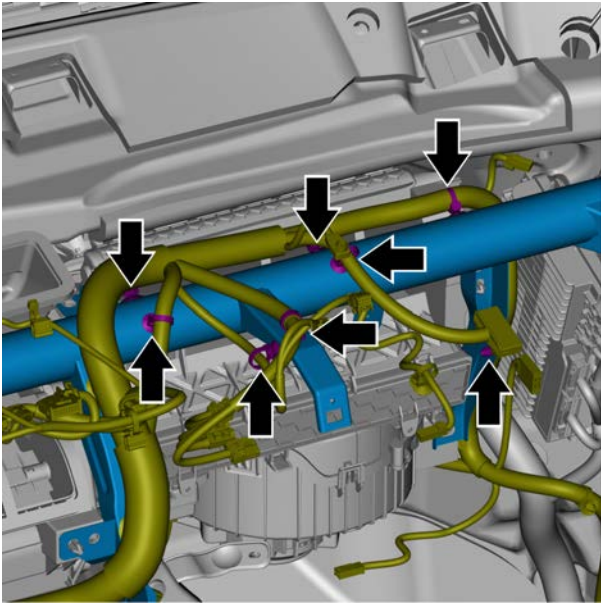
Installation procedure

- 1 Install the upper retaining bolts on the front wall of the dashboard crossbeam assembly.

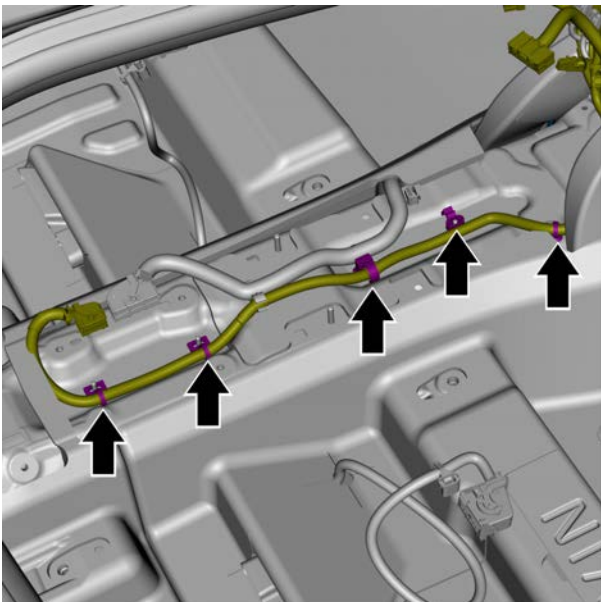
Torque: 24 N·m (metric) 17.7 lb·ft (imperial system)



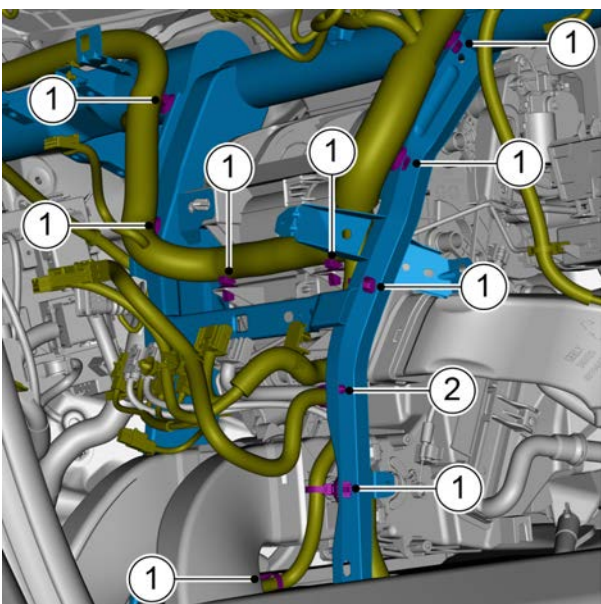
- 2 Connect the temperature control module harness connector A and the temperature sensor harness connector B.
- 3 Install the instrument harness fixing clip 1.



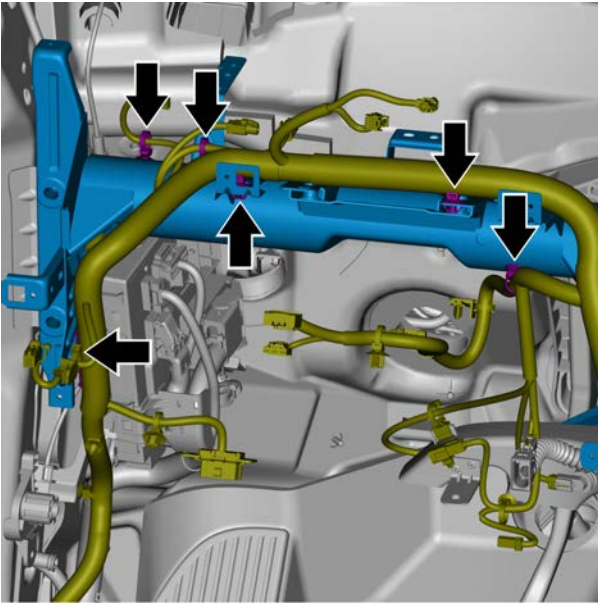
- 4 Install the 8 dashboard harness retaining clips on the right side of the dashboard crossbeam assembly.



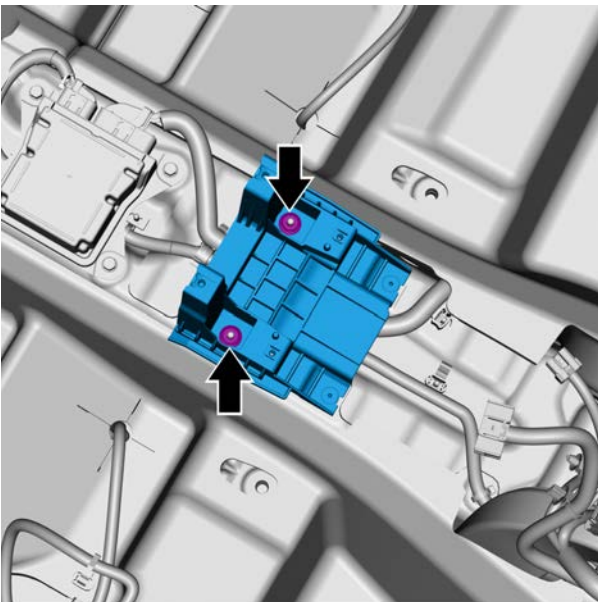
- 5 Install 5 retaining clips of dashboard harness.



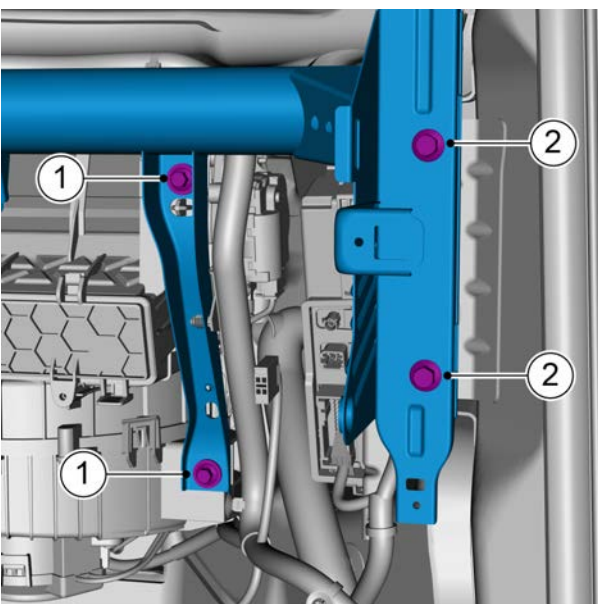
- 6 Install 9 dashboard harness retaining clip 1 and floor wire harness retaining clip 2 in the middle of the dashboard crossbeam assembly.



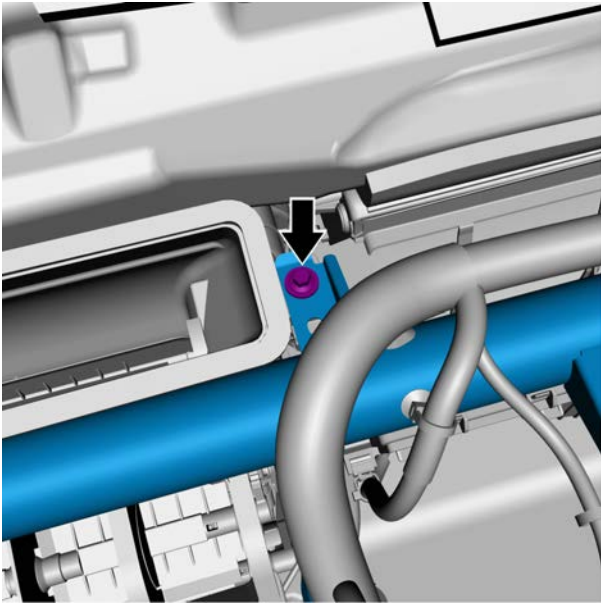
- 7 Install the 6 dashboard harness retaining clips on the left side of the dashboard crossbeam assembly.



- 8 Install the 2 retaining nuts in the middle of the sub-dashboard mounting bracket.
Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)

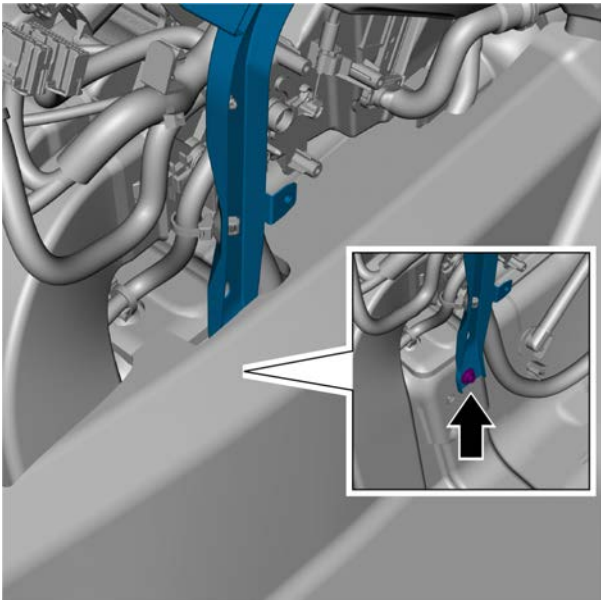


- 9 Install 2 retaining bolts 1 and 2 retaining bolts 2 on the right side of the dashboard crossbeam assembly.
Bolt 1 torque: 6 N·m (metric) 4.4 lb-ft (imperial system)
Bolt 2 torque: 24 N·m (metric) 17.7 lb-ft (imperial system)



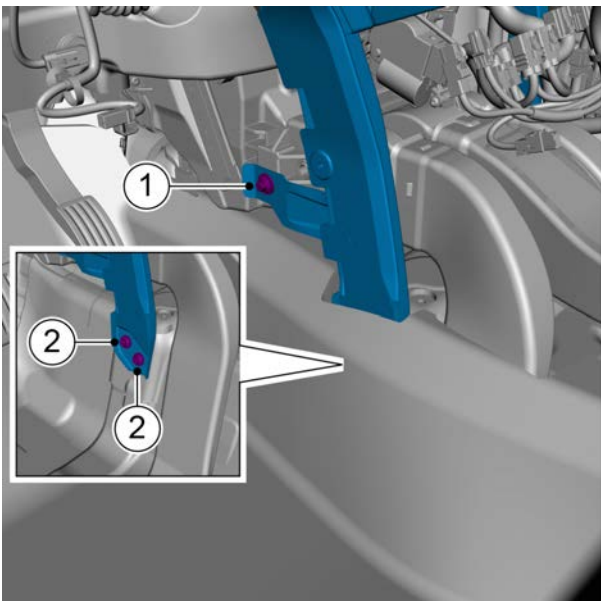
- 10 Install the upper middle retaining bolt of the dashboard crossbeam assembly.

Torque: 6 N·m (metric) 4.4 lb-ft (imperial system)



- 11 Lift the FR floor carpet and install the retaining bolts on the lower right side of the middle right side of the dashboard crossbeam assembly.

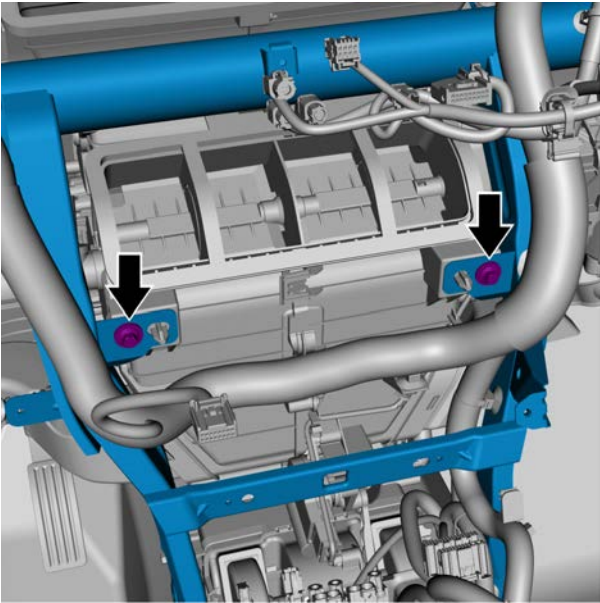
Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)



- 12 Lift the front left floor carpet and install retaining bolts 1 and 2 retaining screws 2 on the lower left of the middle left of the dashboard crossbeam assembly.

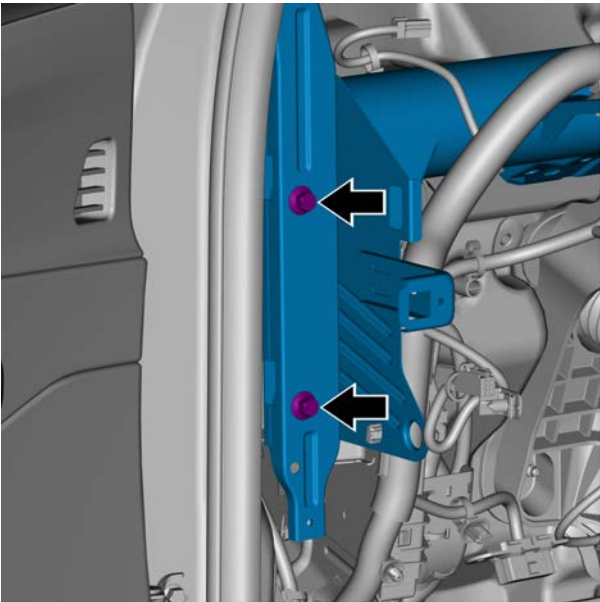
Bolt 1 torque: 6 N·m (metric) 4.4 lb-ft (imperial system)

Bolt 2 torque: 10 N·m (metric) 7.4 lb-ft (imperial system)



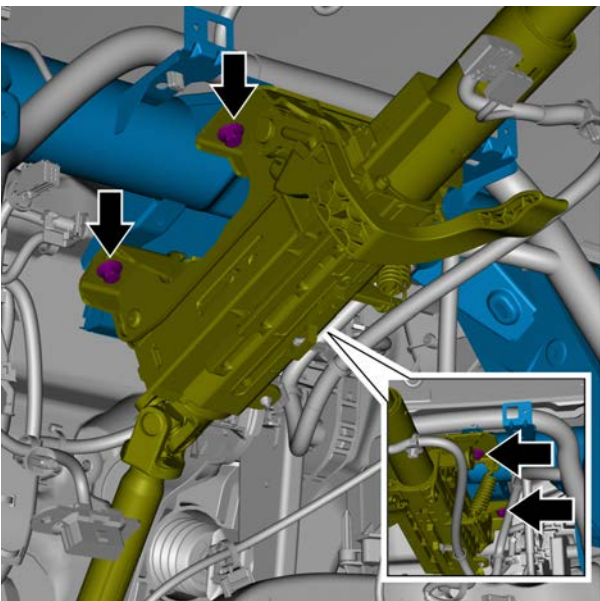
- 13 Install the 2 retaining bolts in the middle of the dashboard crossbeam assembly.

Torque: 6 N·m (metric) 4.4 lb-ft (imperial system)



- 14 Install the 2 retaining bolts on the left side of the dashboard crossbeam assembly.

Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)



- 15 Install 4 retaining bolts of mechanical steering column assembly.

Torque: 24 N·m (metric) 17.7 lb-ft (imperial system)

- 16 Install the head-up display.
- 17 Install the front section of the console air channel.
- 18 Install the front wiper motor.
- 19 Install the plenum mounting assembly.
- 20 Install the console assembly.
- 21 Install the left and right A-pillar upper trim panel assembly.
- 22 Install the middle lower fender apron assembly of the dashboard.
- 23 Install the infotainment control unit.
- 24 Install the console assembly.
- 25 Install the selector lever module.
- 26 Install the shift panel assembly.
- 27 Install the exterior handle assembly on the right side of the sub-dashboard.
- 28 Install the right side trim panel assembly of the sub-instrument panel.
- 29 Install the rear panel assembly of the console.
- 30 Install the passenger seat assembly.
- 31 Install the steering wheel module.
- 32 Install the lower shield of the steering column.
- 33 Install the upper shield of the steering column.
- 34 Install the steering wheel assembly.
- 35 Install the driver airbag
- 36 Install the driver information screen.
- 37 Install the driver information module.
- 38 Install vent assembly RH of dashboard.
- 39 Install vent assembly middle of dashboard.
- 40 Install the central console displayer.
- 41 Install the glove box frame assembly.
- 42 Install the exterior cover of the glove box.
- 43 Install the left lower fender apron assembly of the dashboard.
- 44 Install the assembly-toe board lower RH.
- 45 Install the lower left foot shield assembly.
- 46 Install the extension trim plate on the side of the front passenger.
- 47 Install the driver side extended trim plate.
- 48 Install the left and right front door sill trim panel assembly.
- 49 Install the right cladding panel assembly.

- 50 Install the left cladding panel assembly.
- 51 Install the left air conditioning outlet panel assembly.
- 52 Install the front passenger side end cover assembly of the dashboard.
- 53 Install the driver side end cover assembly of the dashboard.
- 54 Connect the negative battery cable.

12.8 Interior trim

12.8.1 Specification

12.8.1.1 Torque specification

Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
front left door interior trim plate assembly retaining screw	PF5×20	1.7~2.3	1.3~1.7
RL door interior trim plate assembly retaining screw	PF5×20	1.7~2.3	1.3~1.7
Fixing screw of rear left sill trim panel assembly	PF5×16	1.3~1.7	0.9~1.3
RL compartment side guard assembly retaining screw	PF5×16	1.3~1.7	0.9~1.3
Left B-pillar upper trim plate assembly retaining bolt	M6×16	3~4	2.2~2.9
Left C-pillar upper trim plate assembly retaining bolt	M6×16	3~4	2.2~2.9
Fixing screw of Left C-pillar upper trim panel assembly upper	PF5×16	1.3~1.7	0.9~1.3
Left D-pillar upper trim plate assembly retaining screw	PF5×16	1.3~1.7	0.9~1.3
Front safety handle assembly retaining screw	-	3.2~4.8	2.4~3.5
Fixing screw of left sun visor assembly	M6×25	3.2~4.8	2.4~3.5
Fixing screw of left upper interior trim panel assembly of tailgate	PF5×16	1.3~1.7	0.9~1.3
Rear seat control retaining nut	T5	XX	XX

12.8.2 Removing and installing

12.8.2.1 Replacement of the trim panel assembly of the front left door

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

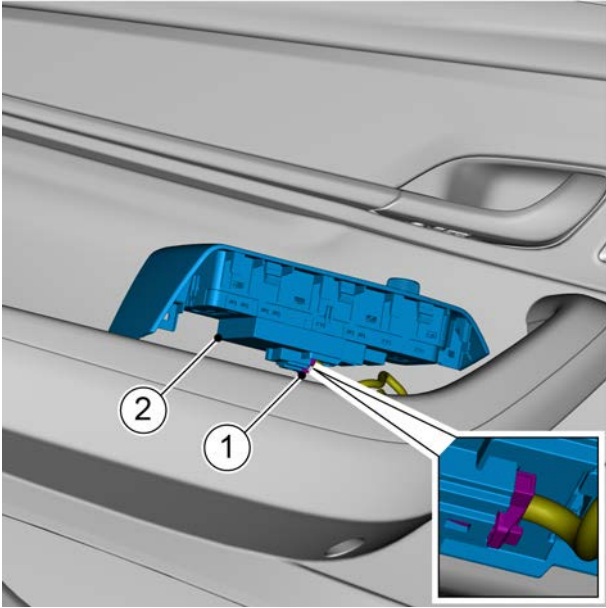
The removal and assembly method of the front door interior trim plate assembly on the left and right sides are similar.

Caution

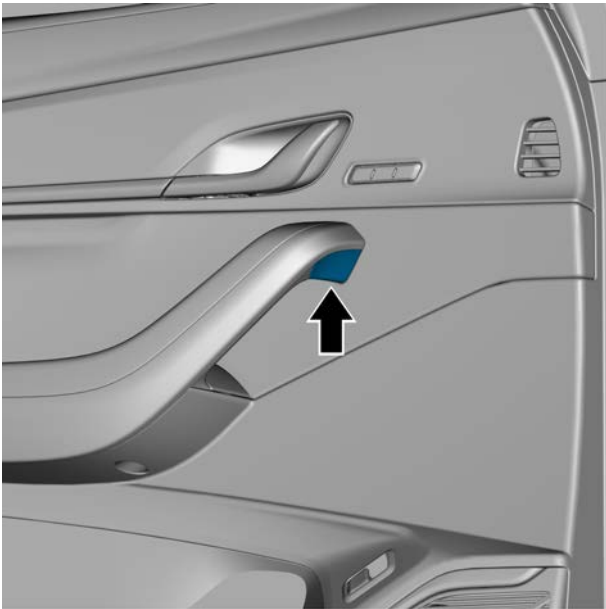
Please use the special tools for vehicle body repair to remove the trim panel, otherwise it is easy to scratch the edge of the interior trim panel.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Use the appropriate tools to remove the driver door switch group.

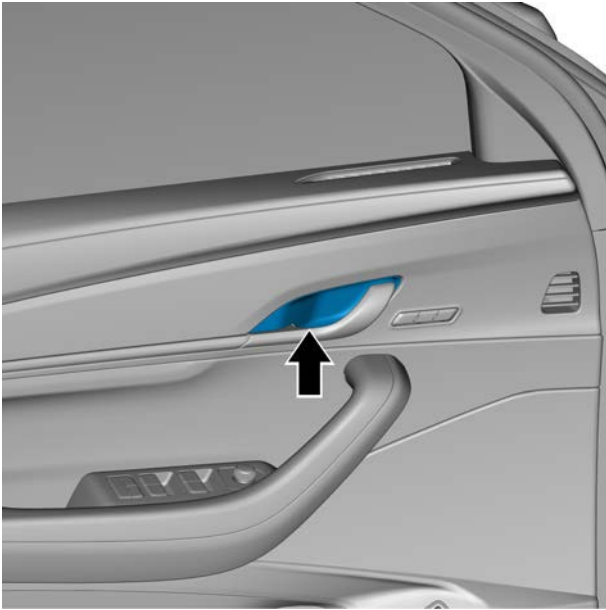




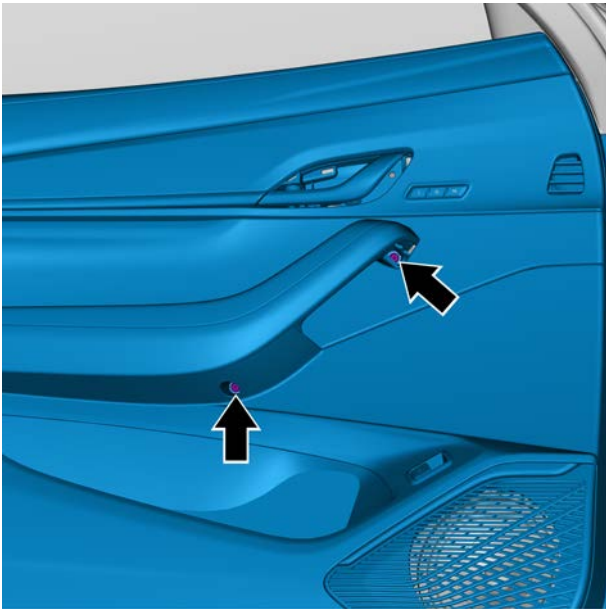
- 3 Disconnect the harness connector 1 on the driver door switch wire harness and remove the driver door switch 2.



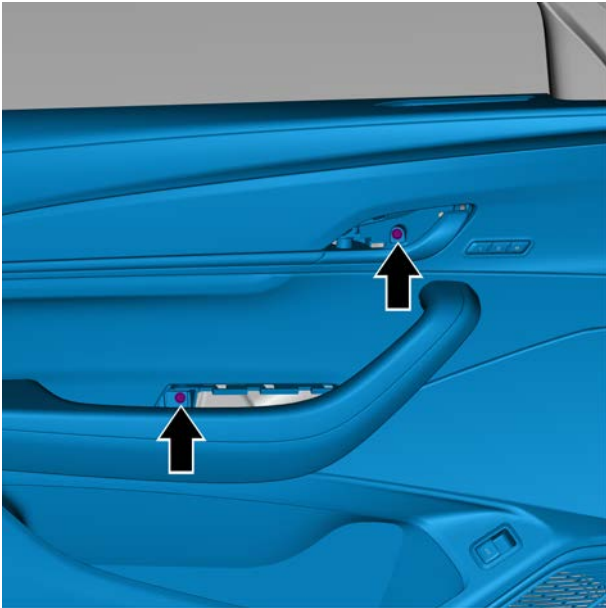
- 4 Remove the front left door tilt-handle screw blanking cover.



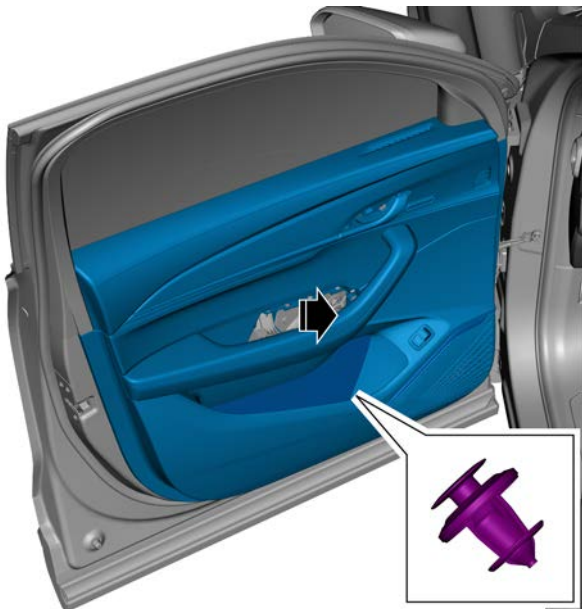
- 5 Remove the front left door interior release handle cover plate.



- 6 Remove the 2 retaining screws at the front left door tilt-handle.



- 7 Remove the retaining screw at the inner opening handle of the front left door and the retaining screw at the handle of the front left door.



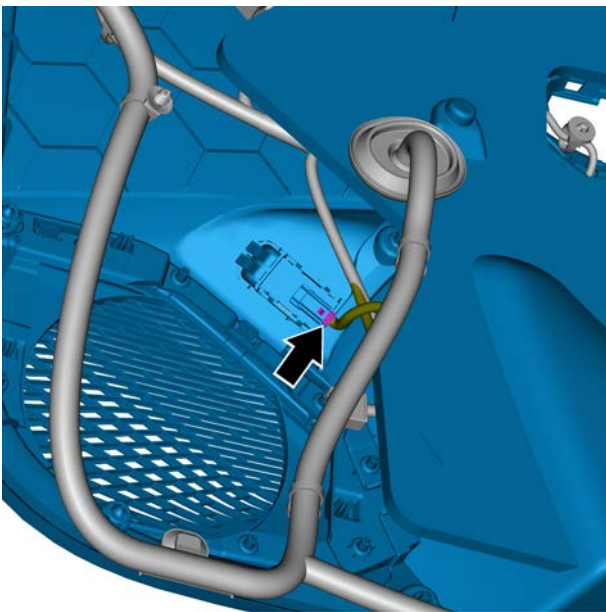
- 8 Detach the clips of the front left door interior trim plate assembly and separate the front left door interior trim plate assembly from the vehicle door.

Caution

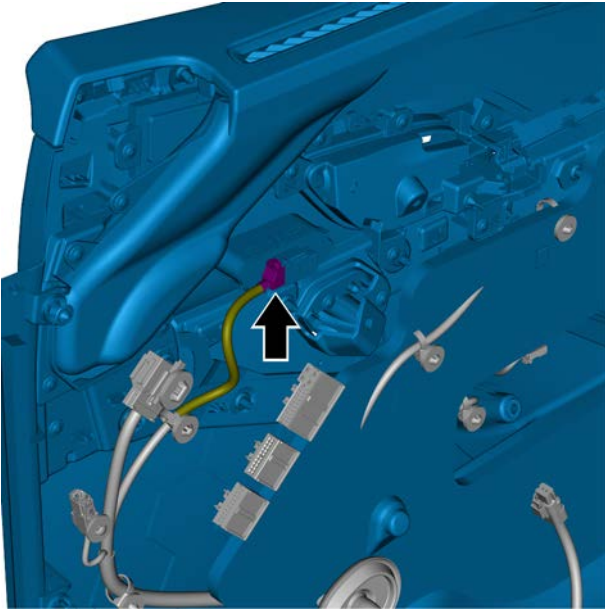
Lift the door interior trim plate up and then remove it.



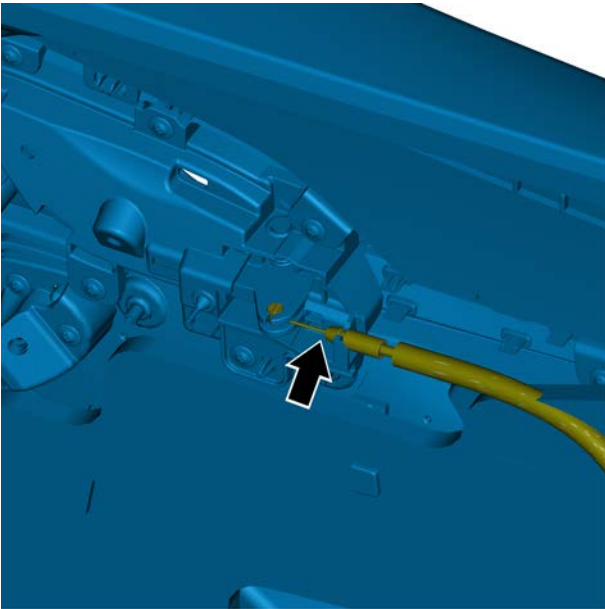
9 Disconnect the front left door ambient light harness connector.



10 Disconnect back door opening switch harness connector.

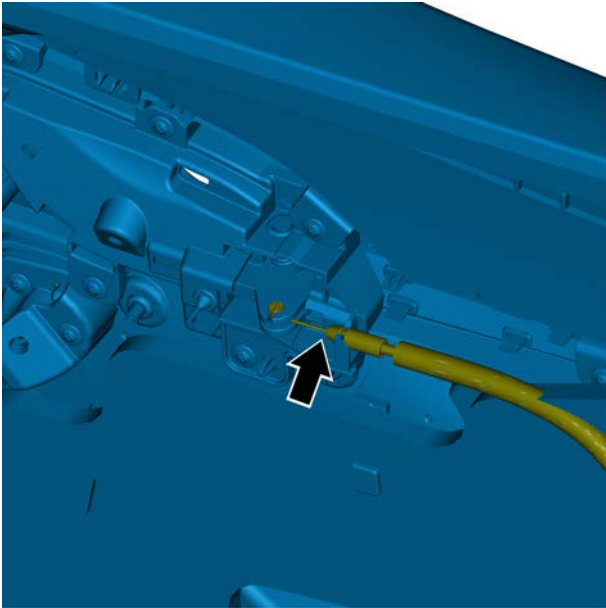


- 11 Disconnect the memory switch personalized setting harness connector.

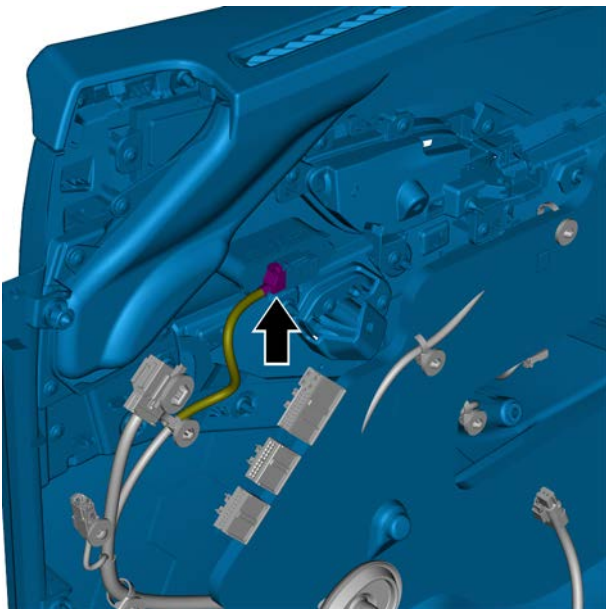


- 12 Remove the front left door inner opening cable and remove the front left door interior trim plate assembly.

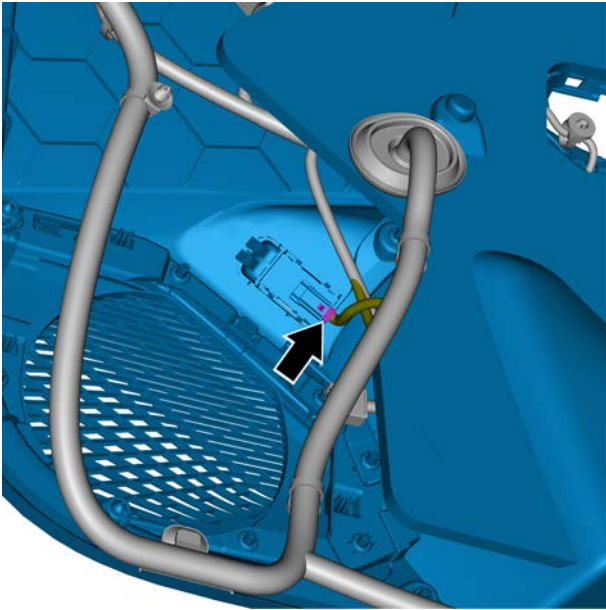
Installation procedure



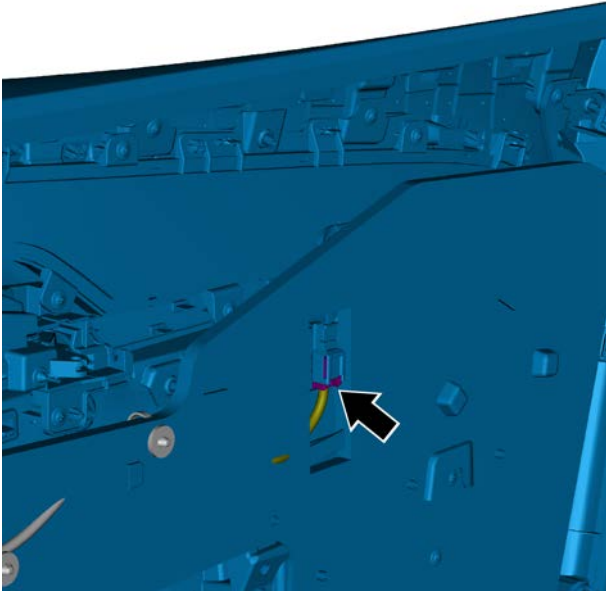
- 1 Install actuating cables inside the front left door.



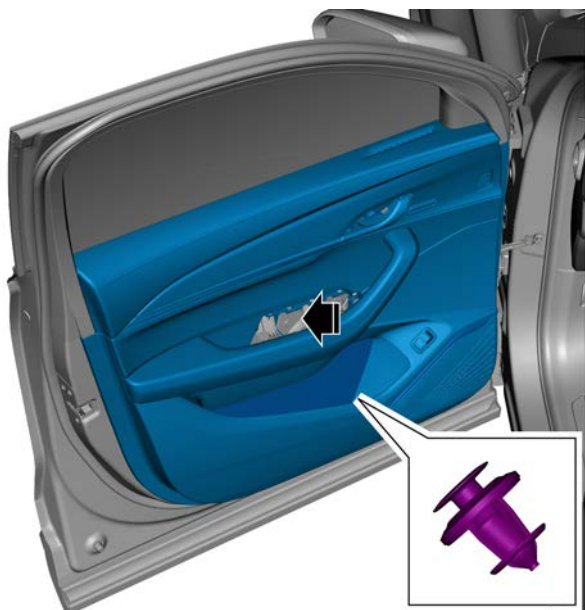
- 2 Connect the memory switch personalized setting harness connector.



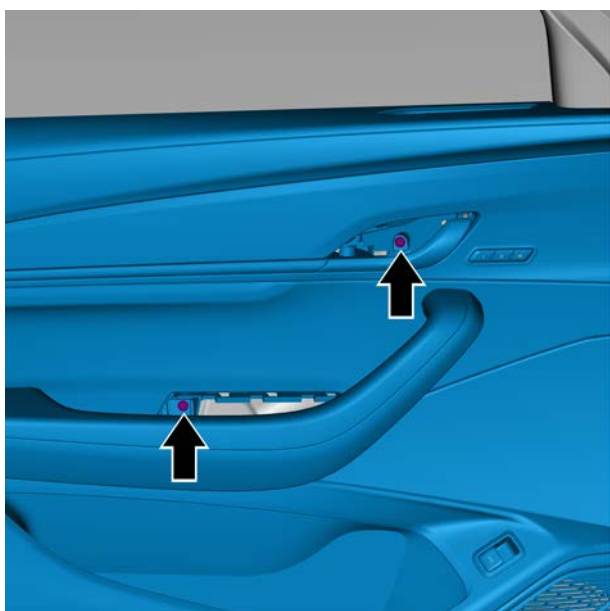
- 3 Connect the tailgate inner opening switch harness connector.



- 4 Connect the left front door ambient light harness connector.

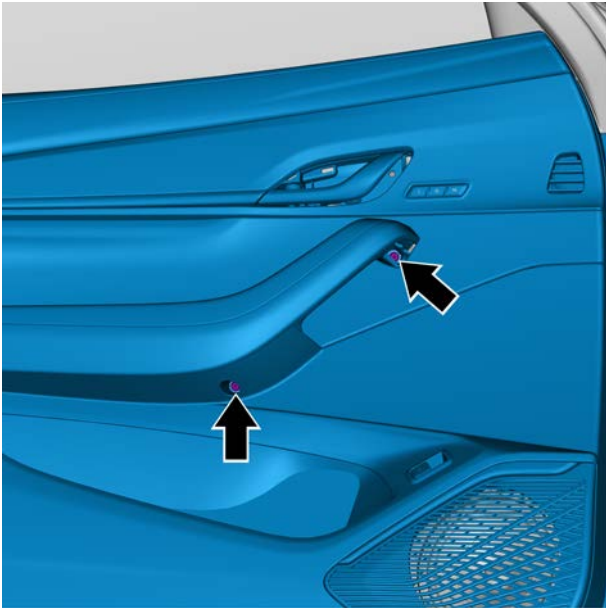


- 5 Install the front left door interior trim plate assembly and fasten the clasp around the front left door interior trim plate assembly.

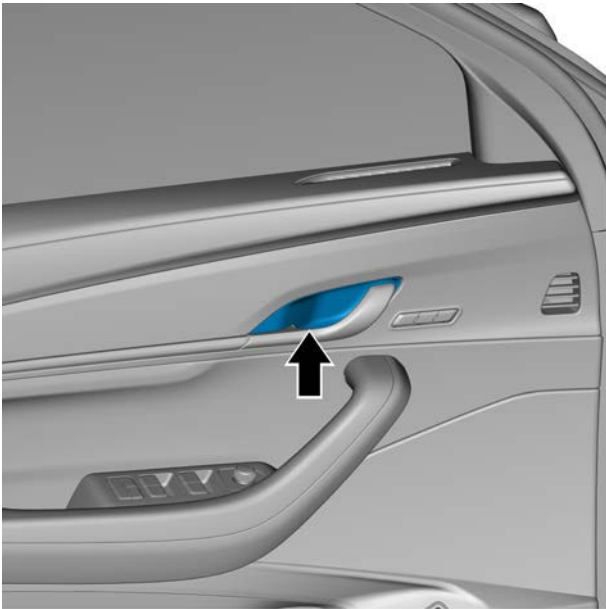


- 6 Install the retaining screw at the inner opening handle of the front left door and the retaining screw at the handle of the front left door.

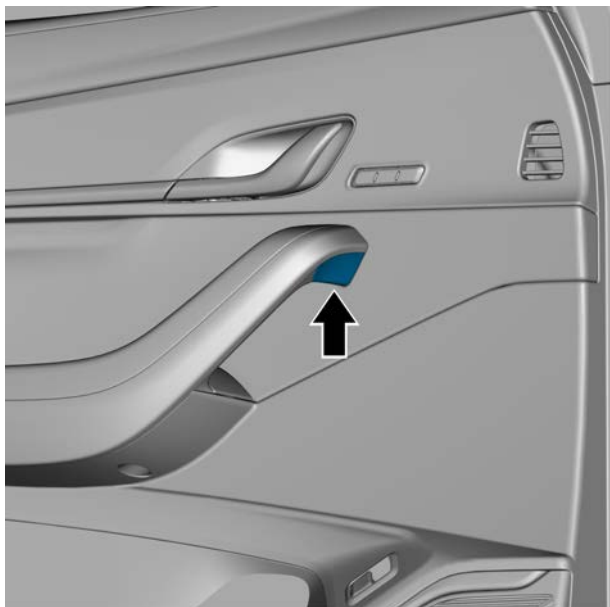
Torque: 2.0 N·m (metric) 1.5 lb-ft (imperial system)



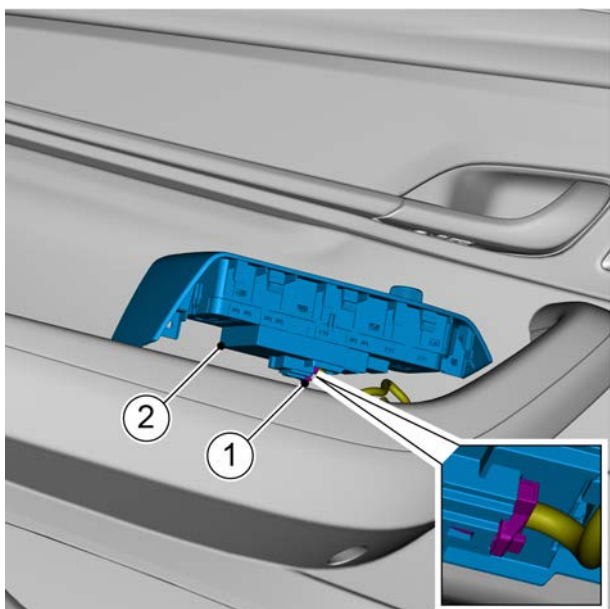
- 7 Install 2 retaining screws at the front left door tilt-handle.
Torque: 2.0 N·m (metric) 1.5 lb-ft (imperial system)



- 8 Install the front door LH interior release handle cover.



9 Install the front left door tilt-handle screw blanking cover.



10 Connect the harness connector 1 on the harness of the driver door switch. Install driver door switch panel 2.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



11 Install the driver door switch switch panel.

12 Connect the negative battery cable.

12.8.2.2 Assembly-interior trim panel rear door LH replacement

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

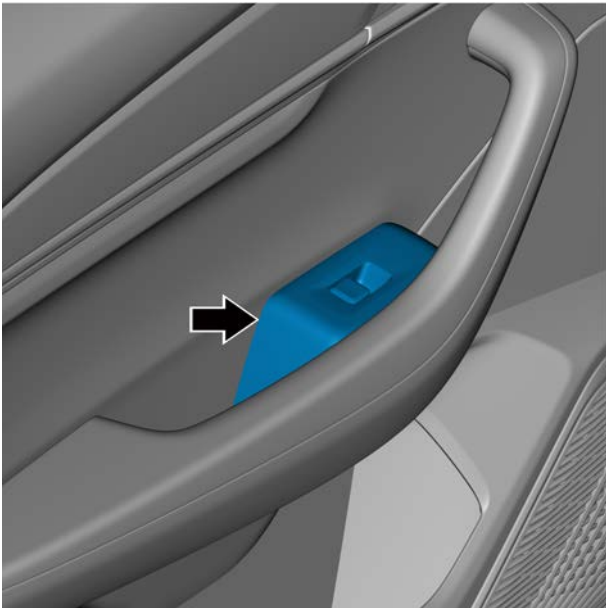
Caution

The removal and assembly methods of the rear door interior trim plate assembly on the left and right sides are similar.

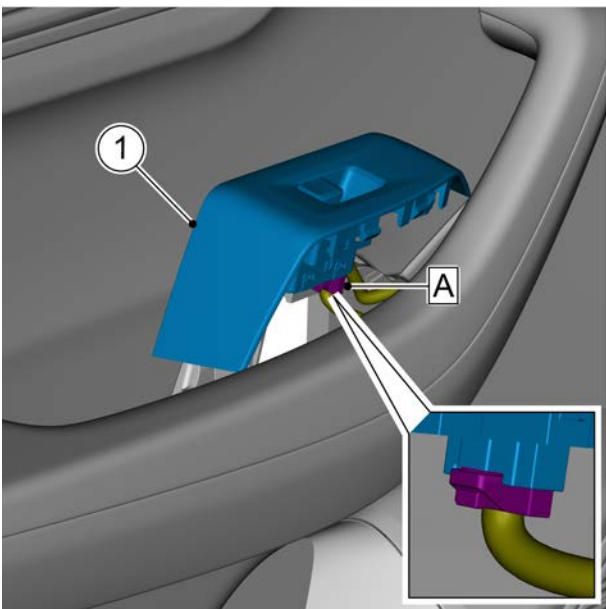
Caution

Please use the special tools for vehicle body repair to remove the trim panel, otherwise it is easy to scratch the edge of the interior trim panel.

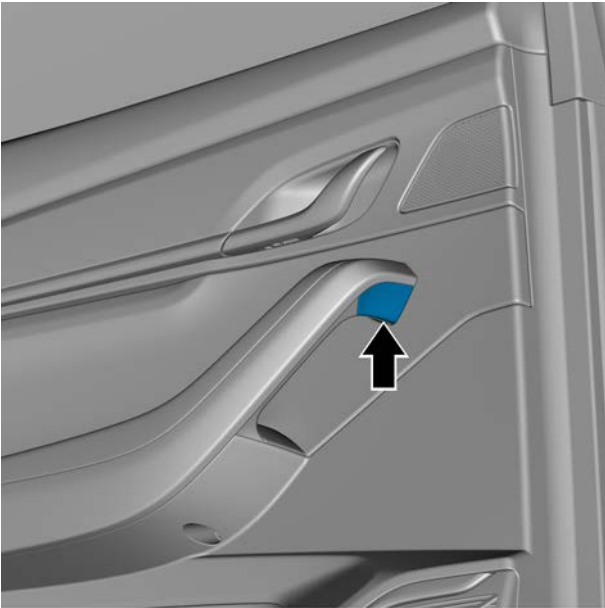
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)



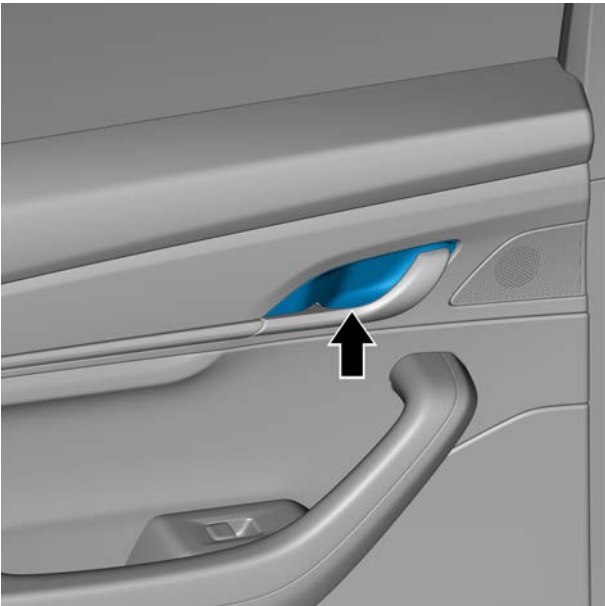
- 2 Remove the window control switch (RL) panel with the appropriate tool.



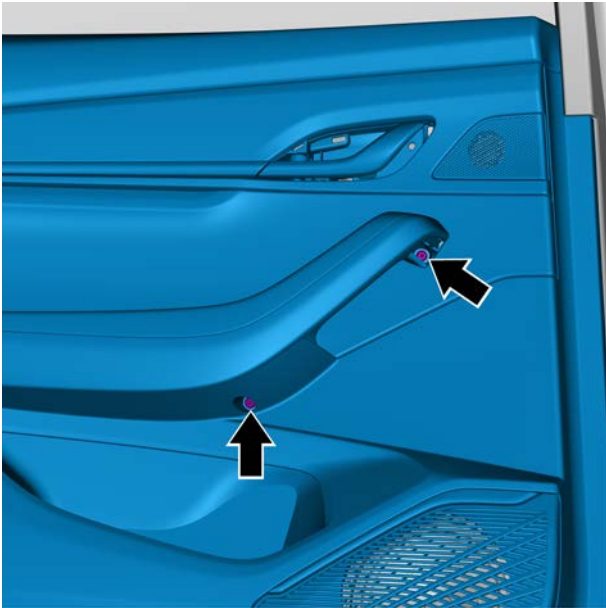
- 3 Disconnect connector A on the window control switch (RL) harness and remove the window control switch (RL) panel 1.



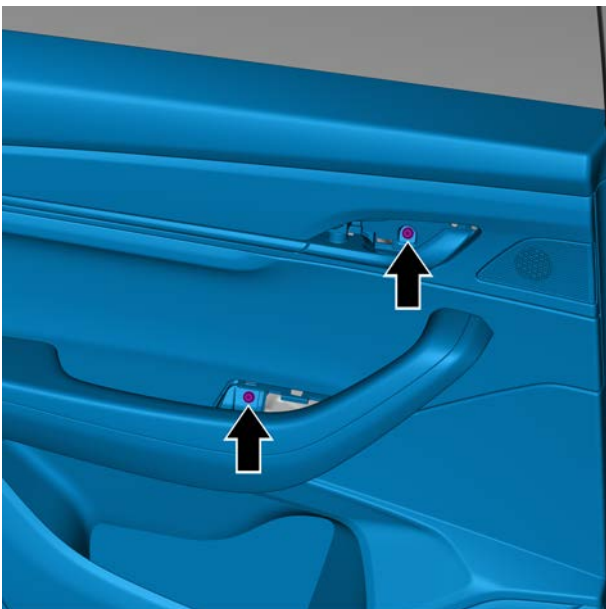
- 4 Remove the RL door tilt-handle screw blanking cover.



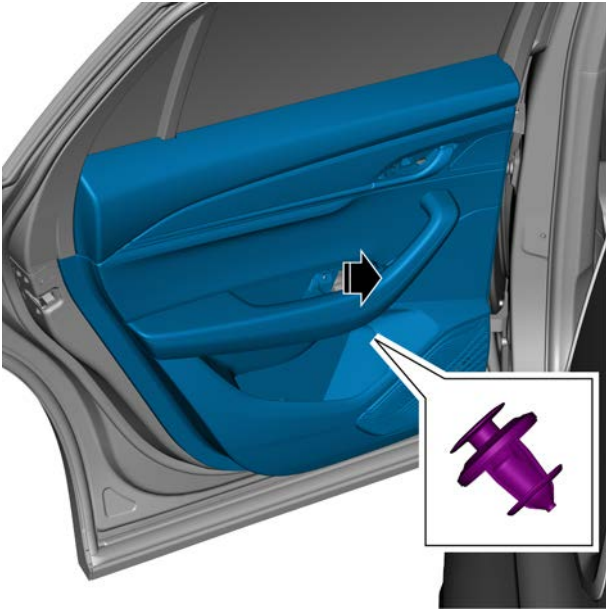
- 5 Remove the RL door interior release handle cover plate.



6 Remove the 2 retaining screws at the RL door tilt-handle.



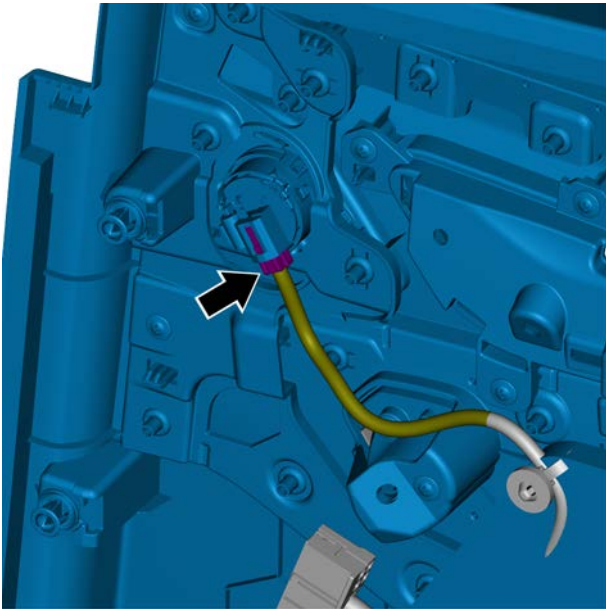
7 Remove the retaining screw at the inner opening handle of the RL door and the retaining screw at the handle of the front left door.



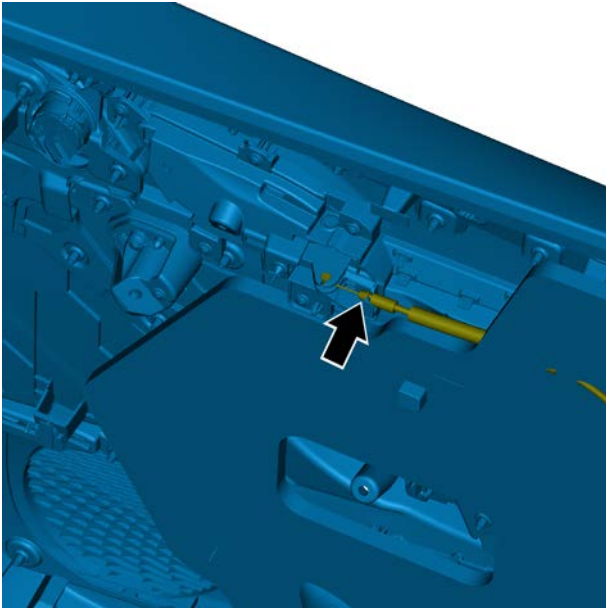
- 8 Detach the clip of the RL door interior trim plate assembly and separate the RL door interior trim plate assembly from the vehicle door.

Caution

Lift the door interior trim plate up and then remove it.

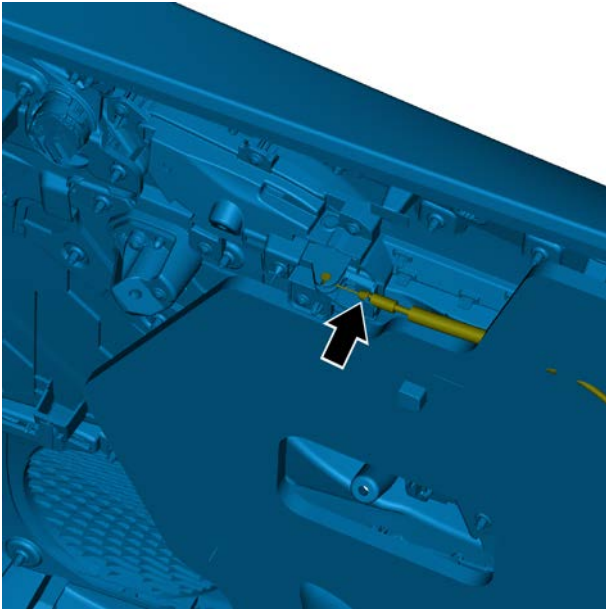


- 9 Disconnect the tweet harness connector of vehicle door.

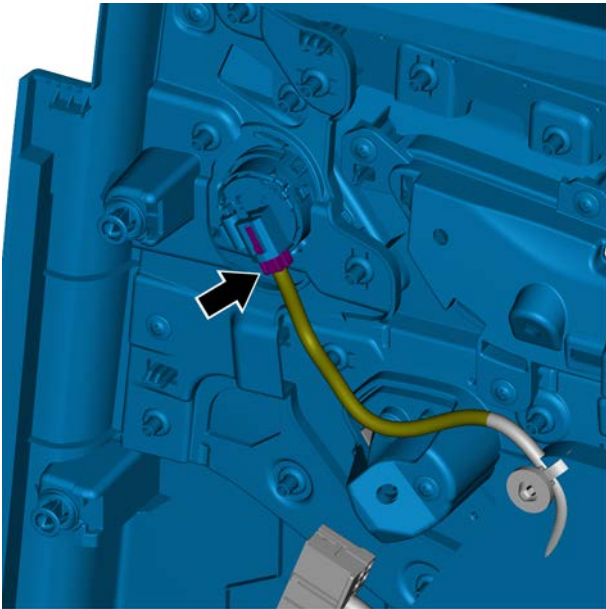


- 10 Remove the RL door inner opening cable and remove the RL door interior trim plate assembly.

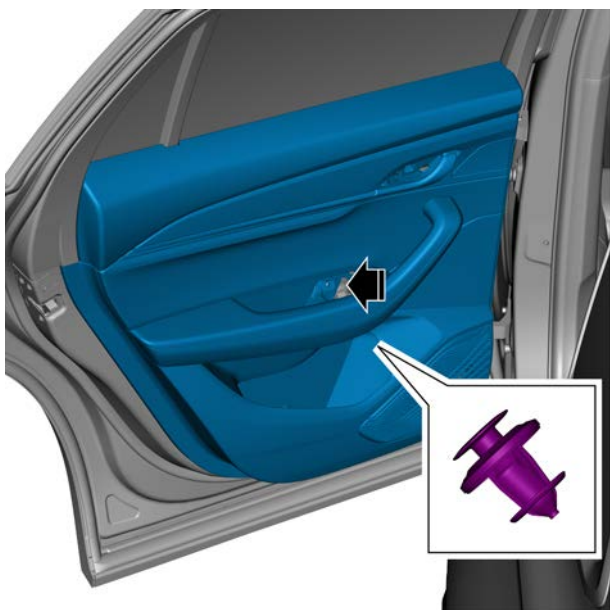
Installation procedure



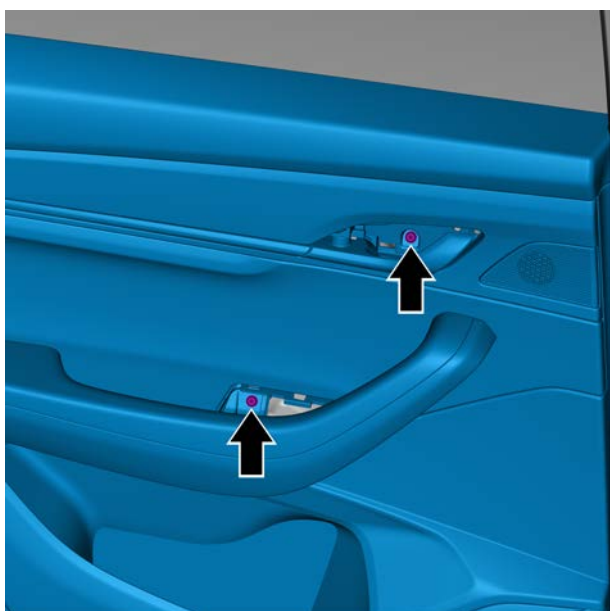
- 1 Install the inner opening cable of the RL door.



- 2 Connect the door tweeter speaker harness connector.

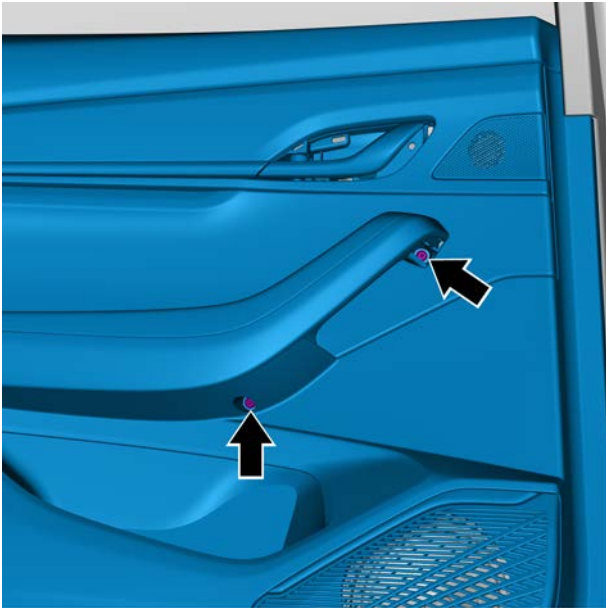


- 3 Install the RL door interior trim plate assembly and fasten the clip around the RL door interior trim plate assembly.

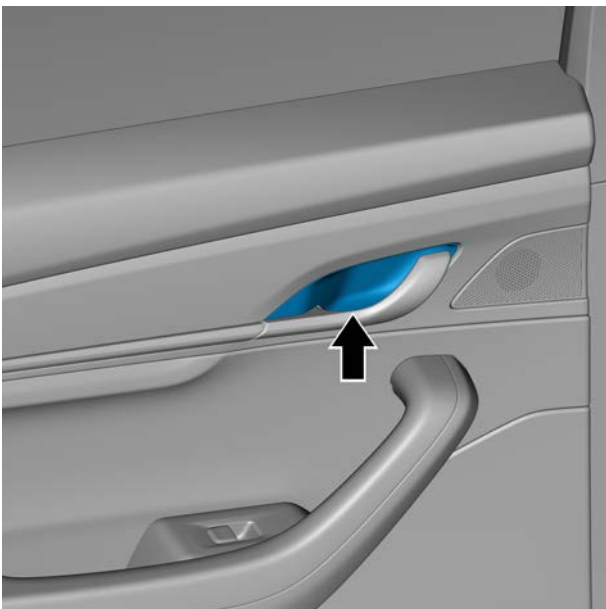


- 4 Install the retaining screw at the inner opening handle of the RL door and the retaining screw at the handle of the front left door.

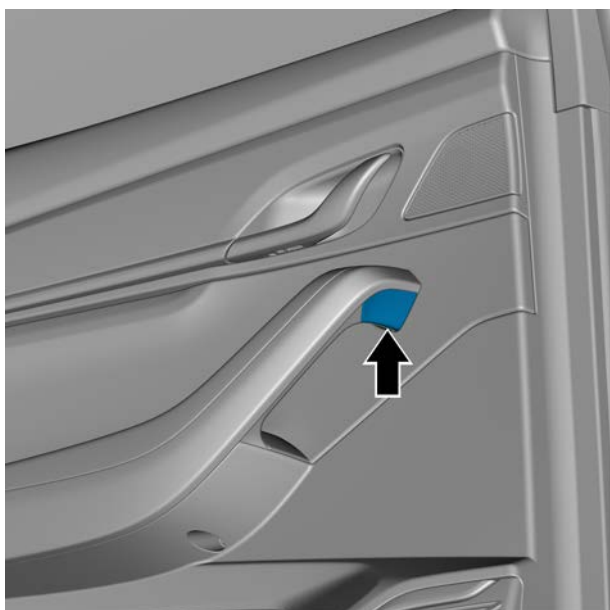
Torque: 2.0 N·m (metric) 1.5 lb-ft (imperial system)



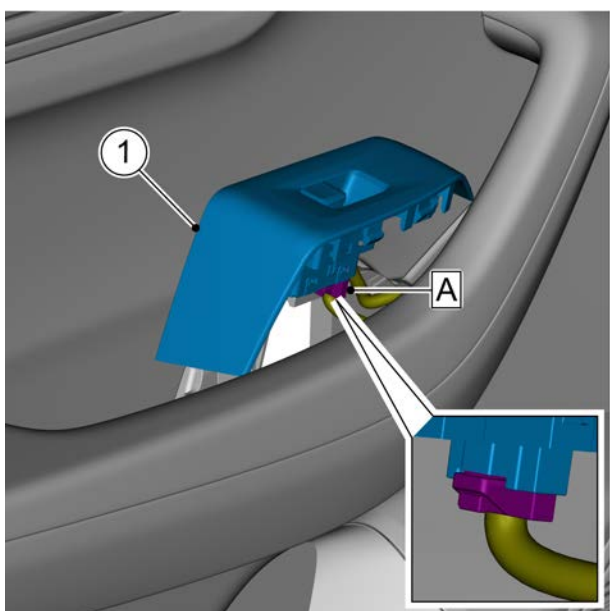
- 5 Install 2 retaining screws at the RL door tilt-handle.
Torque: 2.0 N·m (metric) 1.5 lb-ft (imperial system)



- 6 Install the rear door LH interior door release handle cover.



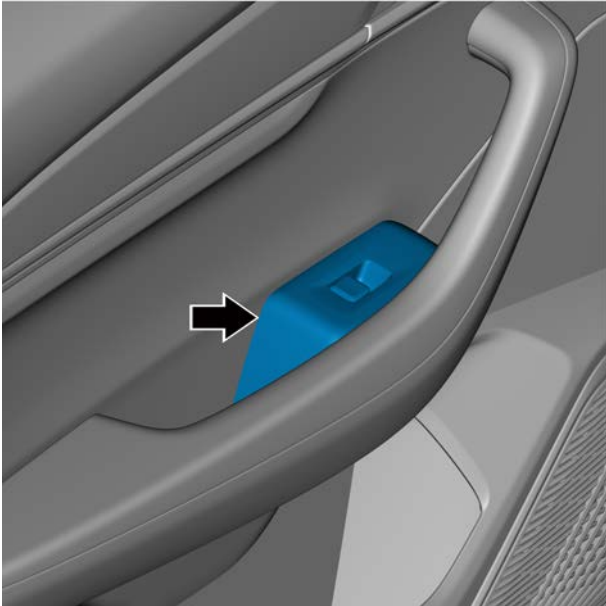
7 Install the RL door tilt-handle screw blanking cover.



8 Connect the window control switch (RL) harness connector A. Install the window control switch (RL) panel assembly 1.

Caution

Secure the harness connection: “Connect, Click, and Confirm.”



- 9 Install the window control switch (RL) panel assembly.

- 10 Connect the negative battery cable.

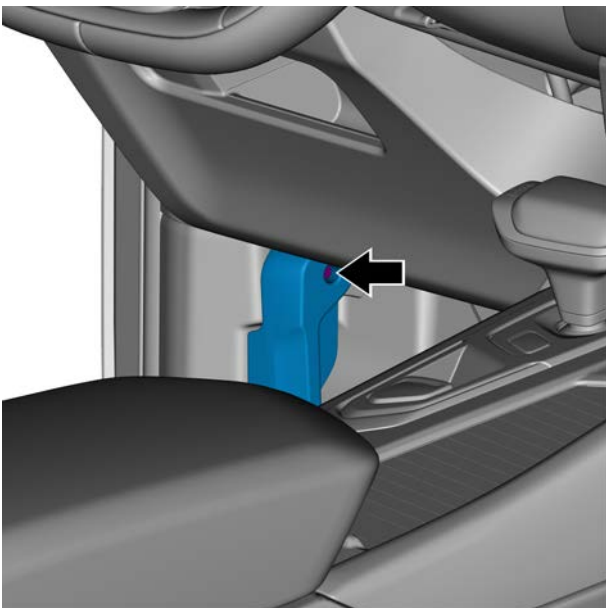
12.8.2.3 Replacement of left front door sill trim panel assembly

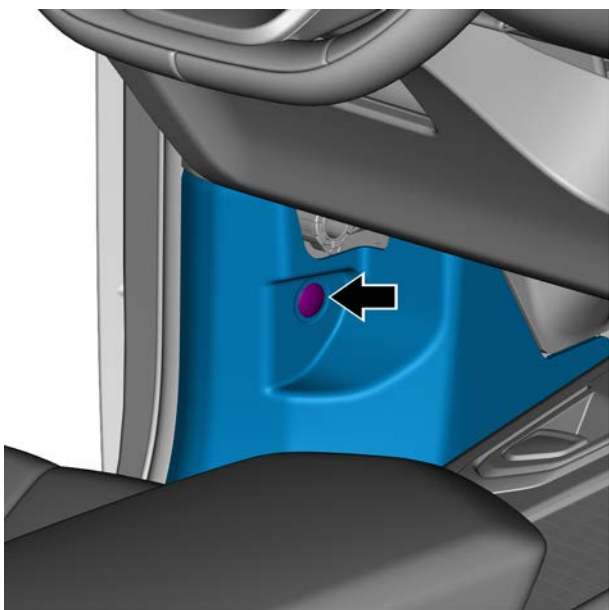
Removal procedure

Caution

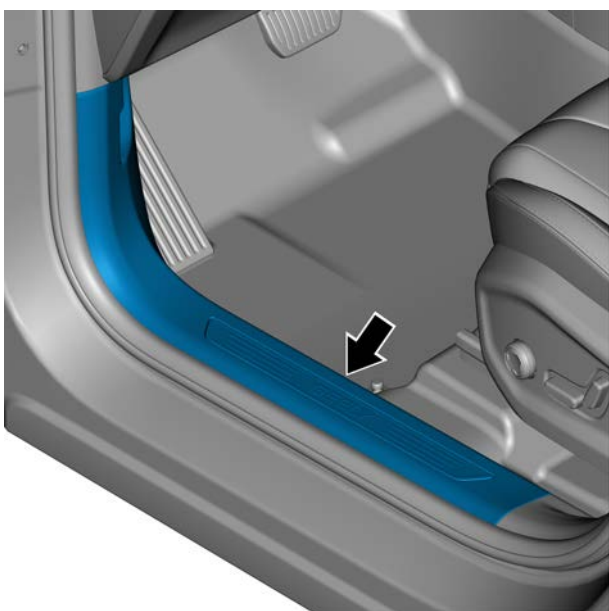
Please use the special tools for vehicle body repair to remove the trim panel, otherwise it is easy to scratch the edge of the interior trim panel.

- 1 Remove the dashboard driver side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 2 Remove the engine bonnet lock opening handle body retaining bolt.





- 3 Remove the front left doorsill trim plate assembly retaining clip.

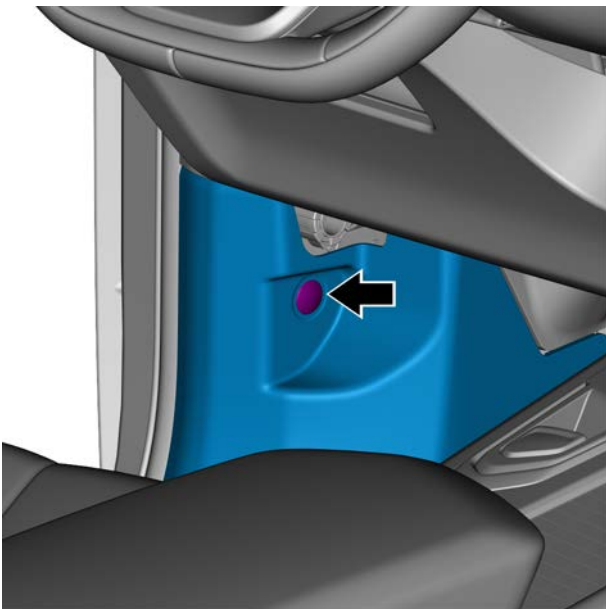


- 4 Remove the front left doorsill trim plate assembly with the appropriate tool and remove the front left doorsill trim plate assembly.

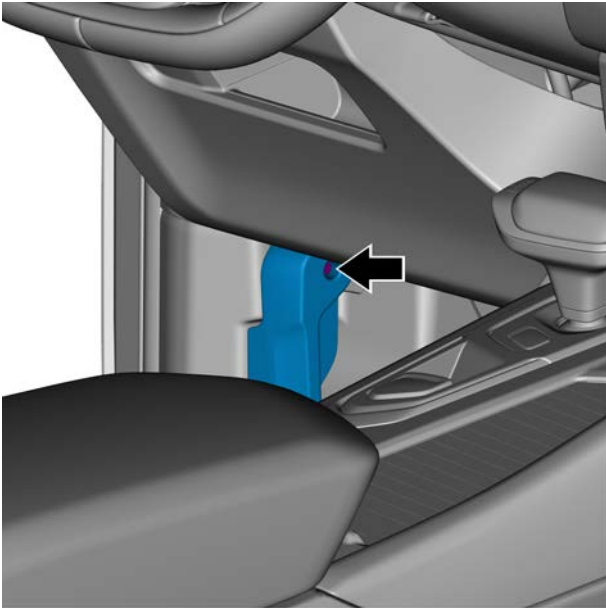
Installation procedure



- 1 Install the left front door sill trim panel assembly.



- 2 Install the front left doorsill trim plate assembly retaining clip.



- 3 Install the engine bonnet lock opening handle body retaining bolt.

Torque: 2.9 N·m (metric) 2.1 lb-ft (imperial system)

- 4 Install the driver side end cover assembly of the dashboard.

12.8.2.4 Replacement of FR front door sill trim panel assembly

Removal procedure

Caution

Please use the special tools for vehicle body repair to remove the trim panel, otherwise it is easy to scratch the edge of the interior trim panel.

- 1 Remove the dashboard co-pilot side cover assembly, see [Replacement of the dashboard driver side cover assembly](#).
- 2 Remove the FR doorsill trim plate assembly with the appropriate tool and remove the FR doorsill trim plate assembly.



Installation procedure



- 1 Install the right front door sill trim panel assembly.

- 2 Install the front passenger side end cover assembly of the dashboard.

12.8.2.5 Replacement of RL door sill interior trim panel assembly

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

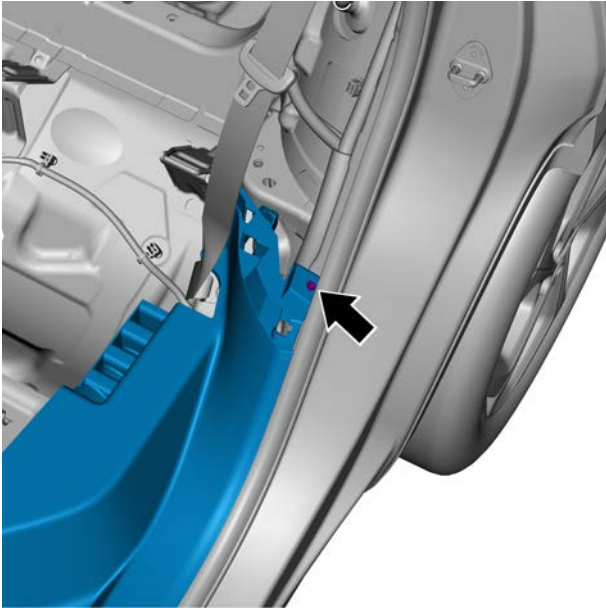
The removal and assembly methods of the rear doorsill interior trim plate assembly on the left and right sides are similar.

Caution

Please use the special tools for vehicle body repair to remove the trim panel, otherwise it is easy to scratch the edge of the interior trim panel.

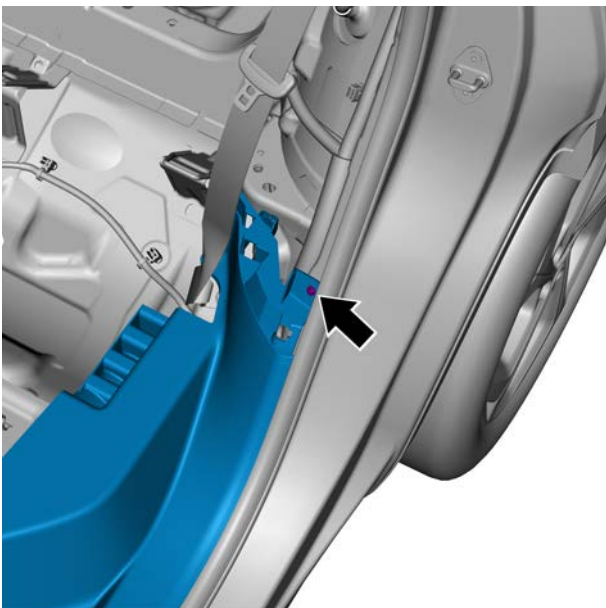
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the rear seat cushion assembly, see the [Replacement of the rear seat cushion assembly](#).
- 3 Remove the rear seat left backrest assembly, see the [Replacement of the rear seat left backrest assembly](#).
- 4 Remove the rear compartment threshold trim plate assembly, see the [Replacement of the rear compartment threshold trim plate assembly](#).

- 5 Remove the upper trim cover of the left rear compartment, see [Replacement of the upper trim cover of the left rear compartment](#).
- 6 Remove the rear compartment lamp, see the [Replacement of the rear compartment lamp](#).
- 7 Remove 12V socket (luggage compartment), see [Replacement of 12V socket \(luggage compartment\)](#).
- 8 Remove the left rear compartment side guard assembly, see [Replacement of the left trunk side guard assembly](#).
- 9 Remove the RL doorsill interior trim plate assembly retaining screw and remove the RL doorsill trim plate assembly.



Installation procedure

- 1 Install the RL doorsill interior trim plate assembly retaining screws.
Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)



- 2 Install the left rear compartment side guard assembly.
- 3 Install 12V socket (luggage compartment).

- 4 Install the luggage compartment lamp.
- 5 Install the upper trim plate of the left rear compartment.
- 6 Install rear compartment door threshold trim plate assembly.
- 7 Install the left rear seat backrest assembly .
- 8 Install the rear seat cushion assembly.
- 9 Connect the negative battery cable.

12.8.2.6 Replacement of rear compartment shade curtain

Removal procedure

- 1 Dismantle the rear compartment shade curtain and remove it.



Installation procedure

- 1 Install the rear compartment shade curtain.



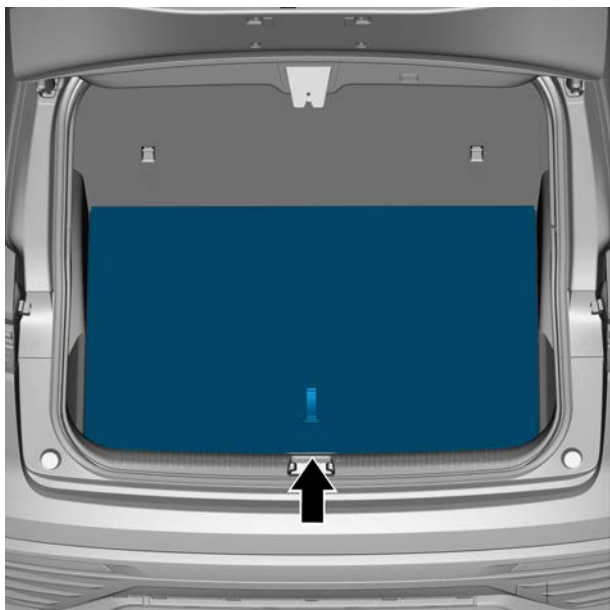
12.8.2.7 Replacement of rear compartment doorsill trim plate

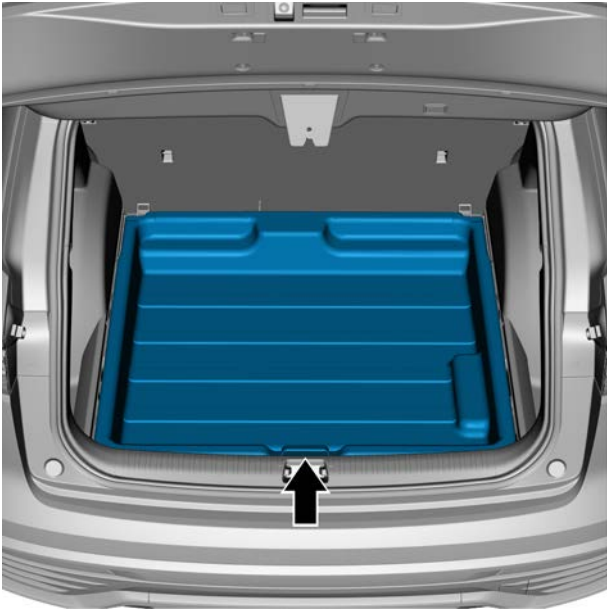
Removal procedure

Caution

Please use the special tools for vehicle body repair to remove the trim panel, otherwise it is easy to scratch the edge of the interior trim panel.

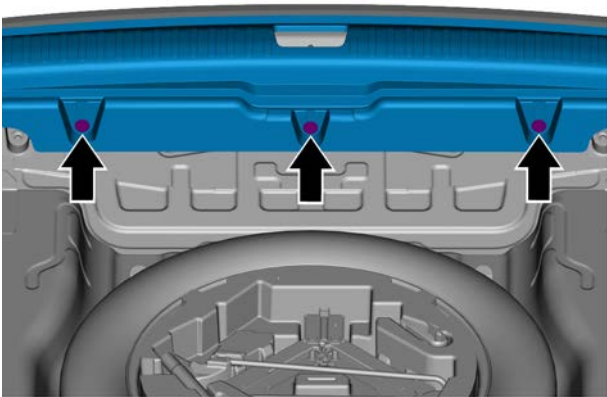
- 1 Remove the rear compartment shade curtain, see the [Replacement of the rear compartment shade curtain](#).
- 2 Remove the luggage compartment carpet assembly.





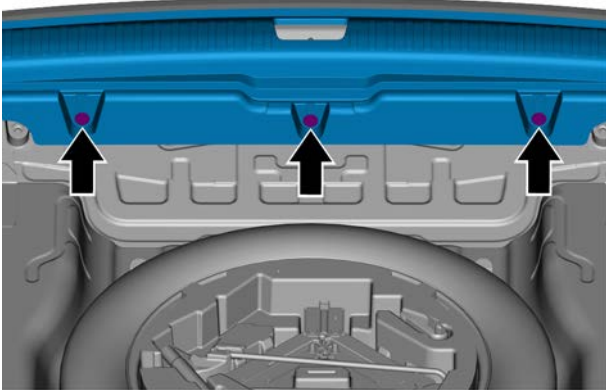
- 3 Remove the rear compartment auxiliary box.

- 4 Remove the 3 G-type clips of rear compartment doorsill trim plate and remove the rear compartment doorsill trim plate.

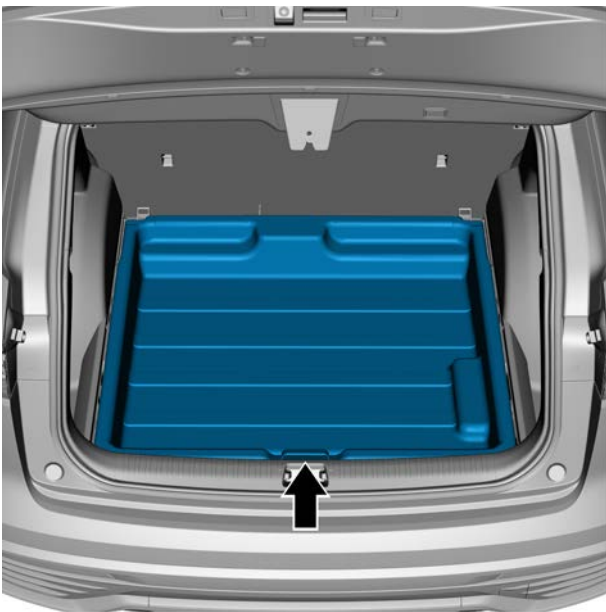


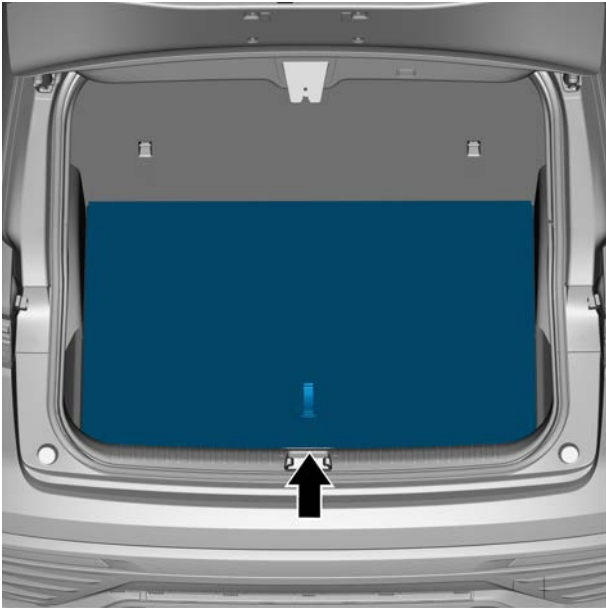
Installation procedure

- 1 Install 3 G-type clips for rear compartment door doorsill trim.



- 2 Install the rear compartment auxiliary box.





- 3 Install the luggage compartment carpet assembly.

- 4 Install the rear compartment shade curtain.

12.8.2.8 Replacement of the cover plate of RL compartment upper trim plate

Removal procedure

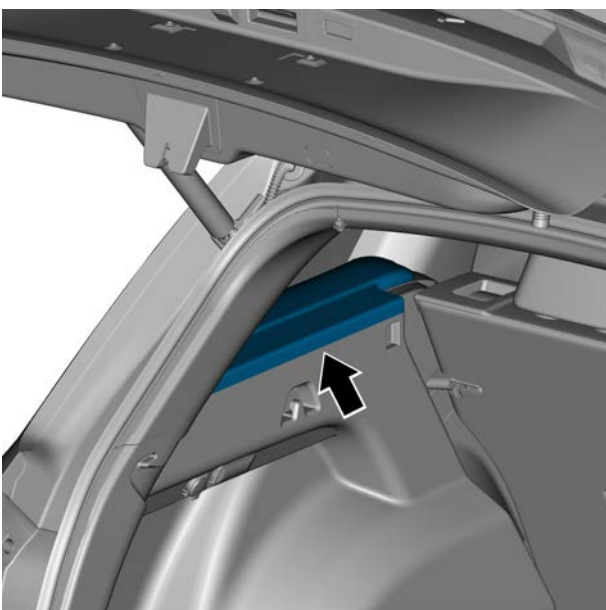
Caution

The method of removal and assemble the rear compartment upper cover plate on the left and right sides are similar.

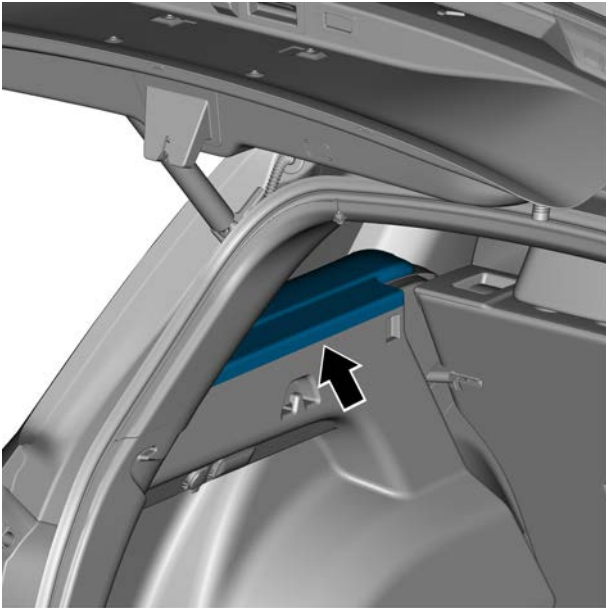
Caution

Please use the special tools for vehicle body repair to remove the trim panel, otherwise it is easy to scratch the edge of the interior trim panel.

- 1 Remove the upper trim plate of the RL compartment with the appropriate tool and remove the upper trim plate of the RL compartment.



Installation procedure



- 1 Install the upper trim plate of the left rear compartment.

12.8.2.9 Replacement of side guard assembly of RL compartment

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

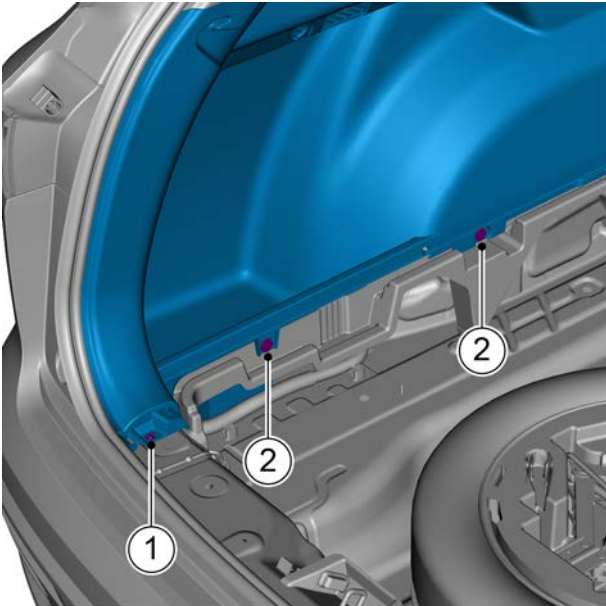
Caution

The method of removal and assembly the side fender apron assembly of the left and right sides of the rear compartment are similar.

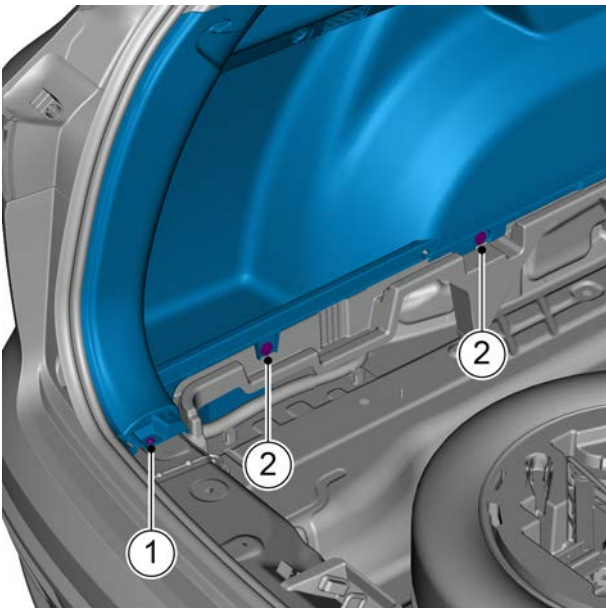
Caution

Please use the special tools for vehicle body repair to remove the trim panel, otherwise it is easy to scratch the edge of the interior trim panel.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly.](#)
- 3 Remove the left backrest assembly of the rear seat, see [Replacement of the left backrest assembly of the rear seat.](#)
- 4 Remove the rear compartment doorsill trim plate, see the [Replacement of the rear compartment doorsill trim plate.](#)
- 5 Remove the upper trim cover of the left rear compartment, see [Replacement of the upper trim cover of the left rear compartment.](#)



- 6 Remove the rear compartment lamp, see the [Replacement of the rear compartment lamp](#).
- 7 Remove 12V socket (luggage compartment), see [Replacement of 12V socket \(luggage compartment\)](#).
- 8 Remove RL compartment side guard assembly retaining screw 1.
- 9 Remove the 2 G-type clips of the RL compartment side guard assembly and remove the RL compartment side guard assembly.



Installation procedure

- 1 Install 2 G-type clips of the RL compartment side guard assembly.
- 2 Install the RL compartment side guard assembly retaining screw 1.

Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)

- 3 Install 12V socket (luggage compartment).
- 4 Install the luggage compartment lamp.
- 5 Install the upper trim plate of the left rear compartment.
- 6 Install rear compartment door threshold trim plate assembly.
- 7 Install the left rear seat backrest assembly .

- 8 Install the rear seat cushion assembly.
- 9 Connect the negative battery cable.

12.8.2.10 Replacement of the left A-pillar upper trim panel assembly

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

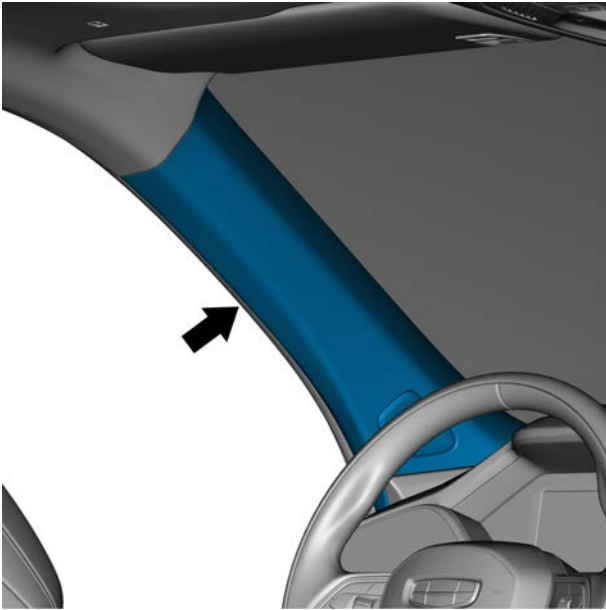
Caution

The removal and assembly method of the A-pillar trim plate assembly on the left and right sides are similar.

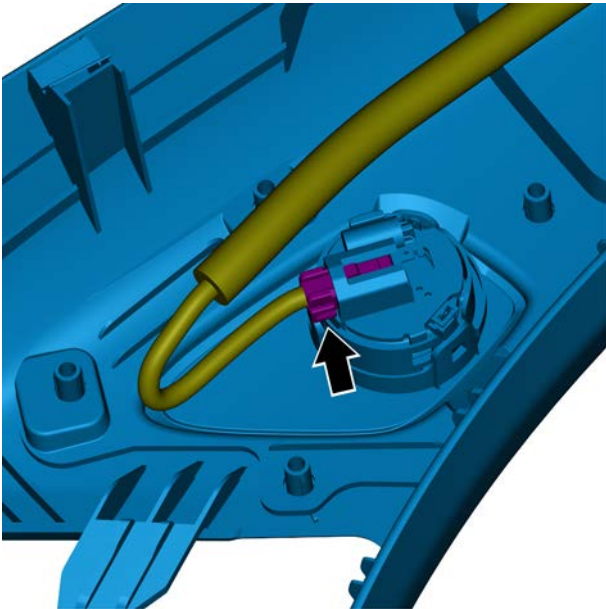
Caution

Please use special tools for body repair to remove the pillar trim panel, otherwise the edge of the pillar trim panel will be easily scratched.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)

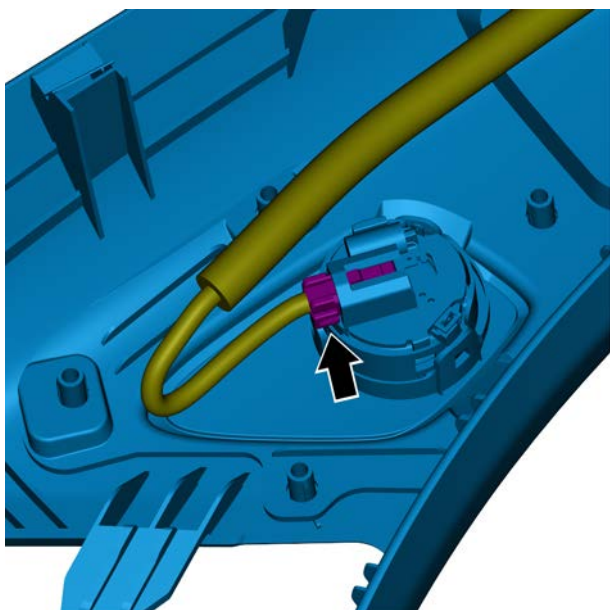


- 2 Remove the left A-pillar trim plate assembly with the appropriate tool.

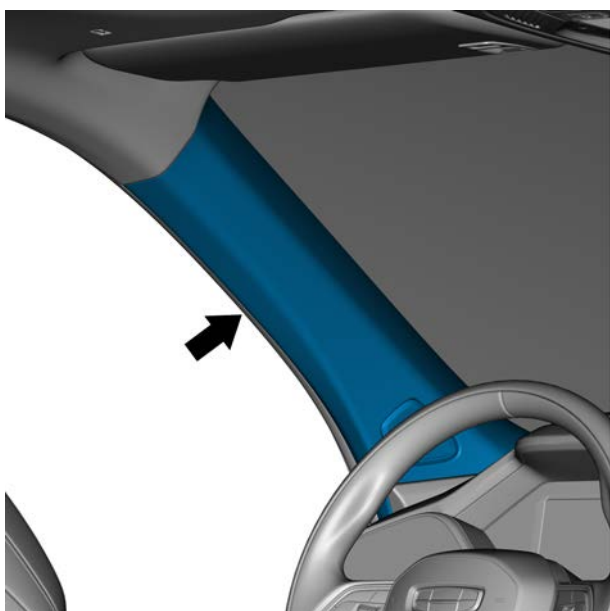


- 3 Disconnect the door tweeter speaker harness connector and remove the left A-pillar trim plate assembly.

Installation procedure



1 Connect the door tweeter speaker harness connector.



2 Install the left A-pillar upper trim panel assembly.

3 Connect the negative battery cable.

12.8.2.11 Replacement of left B-pillar lower trim panel assembly

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

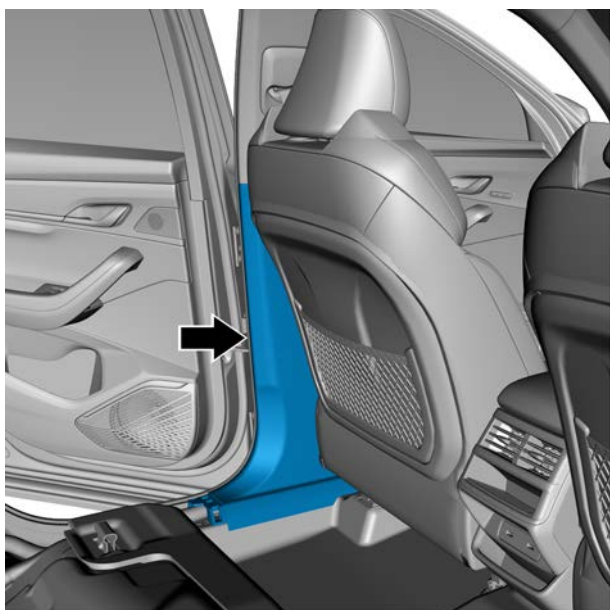
Caution

The removal and assembly method of the B-pillar lower trim plate assembly on the left and right sides are similar.

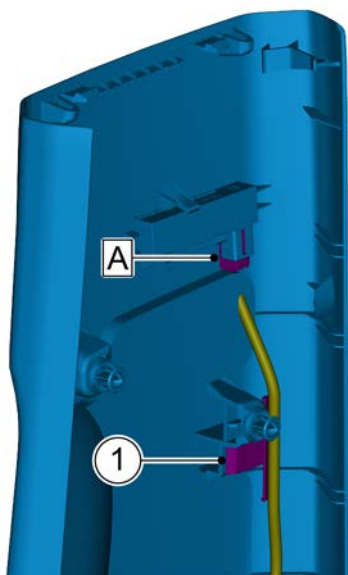
Caution

Please use special tools for body repair to remove the pillar trim panel, otherwise the edge of the pillar trim panel will be easily scratched.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the front left doorsill trim plate assembly, see [Replacement of the front left doorsill trim plate assembly.](#)
- 3 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly.](#)
- 4 Remove the left backrest assembly of the rear seat, see [Replacement of the left backrest assembly of the rear seat.](#)
- 5 Remove the rear compartment doorsill trim plate, see the [Replacement of the rear compartment doorsill trim plate.](#)
- 6 Remove the upper trim cover of the left rear compartment, see [Replacement of the upper trim cover of the left rear compartment.](#)
- 7 Remove the rear compartment lamp, see the [Replacement of the rear compartment lamp.](#)
- 8 Remove 12V socket (luggage compartment), see [Replacement of 12V socket \(luggage compartment\).](#)
- 9 Remove the left rear compartment side guard assembly, see [Replacement of the left trunk side guard assembly.](#)
- 10 Remove the RL threshold interior trim plate assembly, see the [Replacement of the RL threshold interior trim plate assembly.](#)

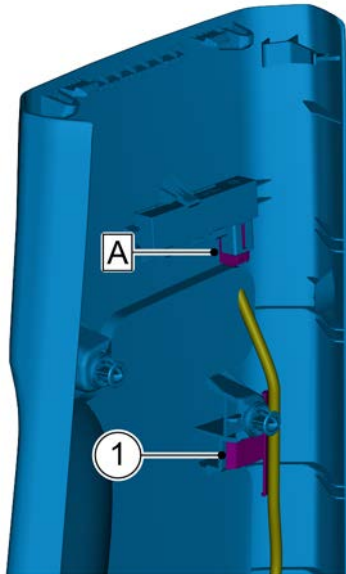


- 11 Remove the lower decorative panel assembly of the right B-pillar.

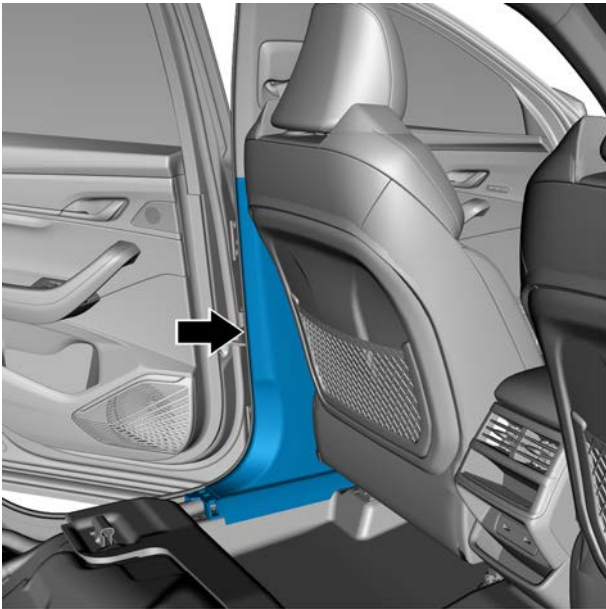


- 12 Disconnect keyless vehicle antenna (left) harness connector A.
- 13 Remove the floor harness clip 1 and remove the left B-pillar lower trim plate assembly.

Installation procedure



- 1 Connect keyless vehicle antenna (left) harness connector A.
- 2 Install floor harness clip 1.



- 3 Install the left B-pillar lower trim panel assembly.

- 4 Install the RL threshold interior trim panel assembly.
- 5 Install the left rear compartment side guard assembly.
- 6 Install 12V socket (luggage compartment).
- 7 Install the luggage compartment lamp.
- 8 Install the upper trim plate of the left rear compartment.
- 9 Install rear compartment door threshold trim plate assembly.
- 10 Install the left rear seat backrest assembly .
- 11 Install the rear seat cushion assembly.
- 12 Install the left front door sill trim panel assembly.
- 13 Connect the negative battery cable.

12.8.2.12 Replacement of left B-pillar upper trim panel assembly

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

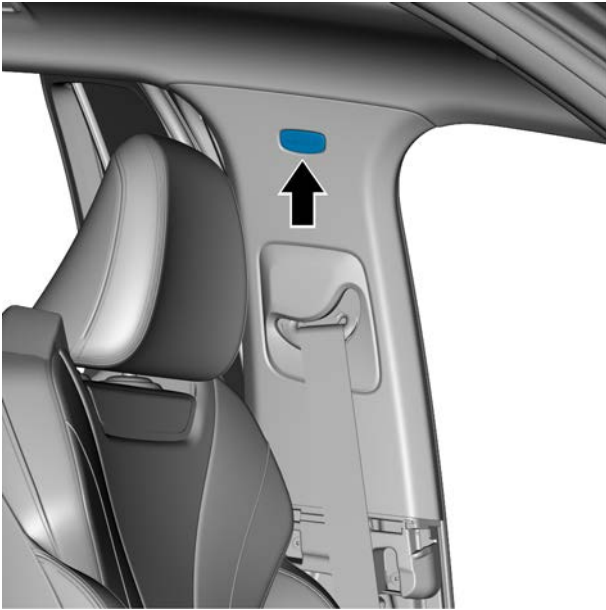
Caution

The removal and assembly method of the B-pillar trim plate assembly on the left and right sides are similar.

Caution

Please use special tools for body repair to remove the pillar trim panel, otherwise the edge of the pillar trim panel will be easily scratched.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the front left doorsill trim plate assembly, see [Replacement of the front left doorsill trim plate assembly.](#)
- 3 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly.](#)
- 4 Remove the left backrest assembly of the rear seat, see [Replacement of the left backrest assembly of the rear seat.](#)
- 5 Remove the rear compartment doorsill trim plate, see the [Replacement of the rear compartment doorsill trim plate.](#)
- 6 Remove the upper trim cover of the left rear compartment, see [Replacement of the upper trim cover of the left rear compartment.](#)
- 7 Remove the rear compartment lamp, see the [Replacement of the rear compartment lamp.](#)
- 8 Remove 12V socket (luggage compartment), see [Replacement of 12V socket \(luggage compartment\).](#)
- 9 Remove the left rear compartment side guard assembly, see [Replacement of the left trunk side guard assembly.](#)
- 10 Remove the RL threshold interior trim plate assembly, see the [Replacement of the RL threshold interior trim plate assembly.](#)
- 11 Remove the left B-pillar lower trim panel assembly, refer to [replacement of left B-pillar lower trim panel assembly.](#)



12 Remove the left airbag high-end logo cover.



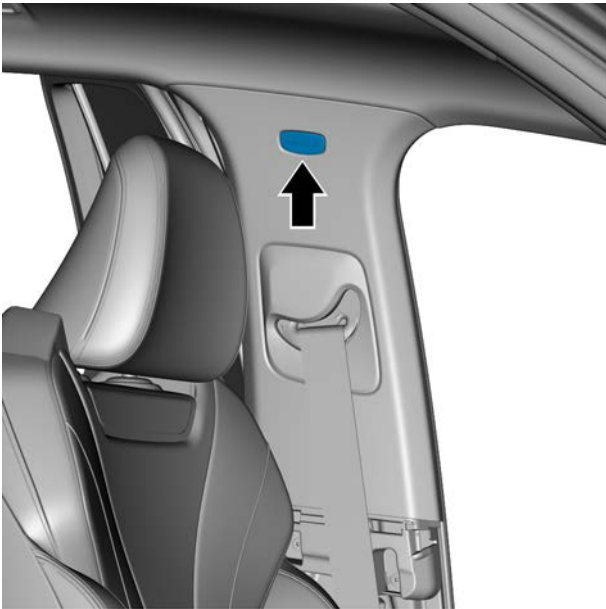
13 Dismantle the retaining bolt of the left B-pillar upper trim plate assembly and remove the left B-pillar upper trim plate assembly.

Installation procedure



- 1 Install the retaining bolts of the left B-pillar trim plate assembly.

Torque: 3.5 N·m (metric) 2.6 lb-ft (imperial system)



- 2 Install the left airbag high-end logo cover.

- 3 Install the left B-pillar lower trim panel assembly.
- 4 Install the RL threshold interior trim panel assembly.
- 5 Install the left rear compartment side guard assembly.
- 6 Install 12V socket (luggage compartment).
- 7 Install the luggage compartment lamp.
- 8 Install the upper trim plate of the left rear compartment.
- 9 Install rear compartment door threshold trim plate assembly.
- 10 Install the left rear seat backrest assembly .
- 11 Install the rear seat cushion assembly.
- 12 Install the left front door sill trim panel assembly.
- 13 Connect the negative battery cable.

12.8.2.13 Replacement of left C-pillar upper trim panel assembly

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

The removal and assembly method of the C-pillar trim plate assembly on the left and right sides are similar.

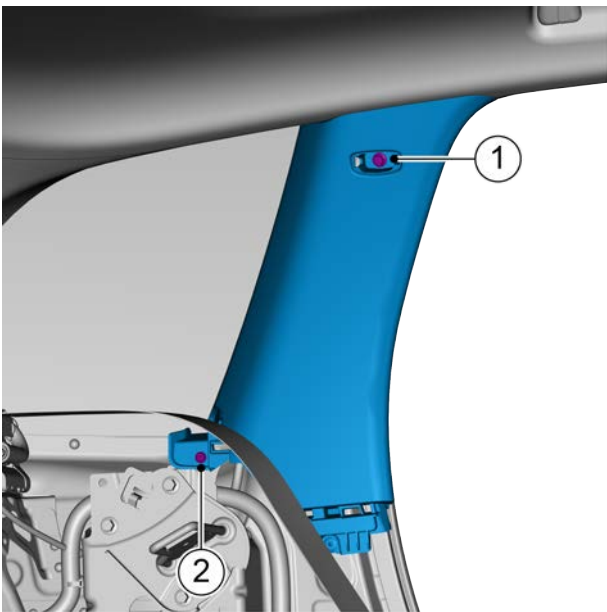
Caution

Please use special tools for body repair to remove the pillar trim panel, otherwise the edge of the pillar trim panel will be easily scratched.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly.](#)
- 3 Remove the left backrest assembly of the rear seat, see [Replacement of the left backrest assembly of the rear seat.](#)
- 4 Remove the rear compartment doorsill trim plate, see the [Replacement of the rear compartment doorsill trim plate.](#)
- 5 Remove the upper trim cover of the left rear compartment, see [Replacement of the upper trim cover of the left rear compartment.](#)
- 6 Remove the rear compartment lamp, see the [Replacement of the rear compartment lamp.](#)
- 7 Remove 12V socket (luggage compartment), see [Replacement of 12V socket \(luggage compartment\).](#)
- 8 Remove the left rear compartment side guard assembly, see [Replacement of the left trunk side guard assembly.](#)

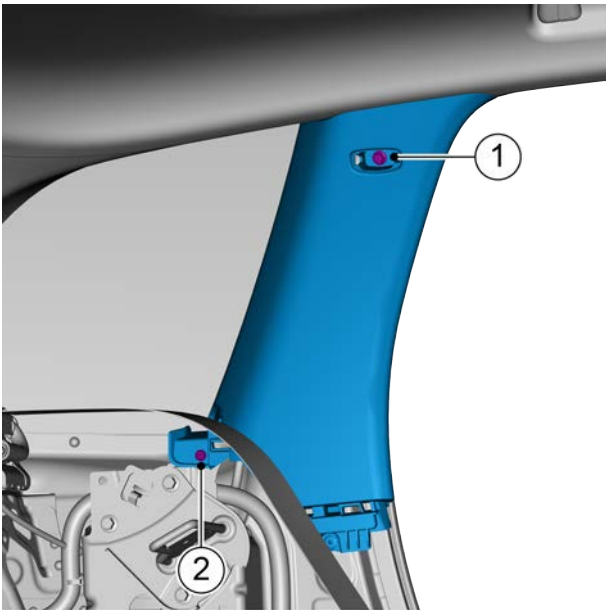


9 Remove the left airbag high-end logo cover.



10 Remove the left C-pillar upper trim plate assembly retaining bolt 1 and retaining screw 2, and remove the left C-pillar upper trim plate assembly.

Installation procedure



- 1 Install the left C-pillar trim plate assembly retaining bolt 1 and retaining screw 2.

Screw torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)

Bolt torque: 3.5 N·m (metric) 2.6 lb-ft (imperial system)



- 2 Install the left airbag high-end logo cover.

- 3 Install the left rear compartment side guard assembly.
- 4 Install 12V socket (luggage compartment).
- 5 Install the luggage compartment lamp.
- 6 Install the upper trim plate of the left rear compartment.
- 7 Install rear compartment door threshold trim plate assembly.
- 8 Install the left rear seat backrest assembly .
- 9 Install the rear seat cushion assembly.
- 10 Connect the negative battery cable.

12.8.2.14 Replacement of left D-pillar upper trim panel assembly

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

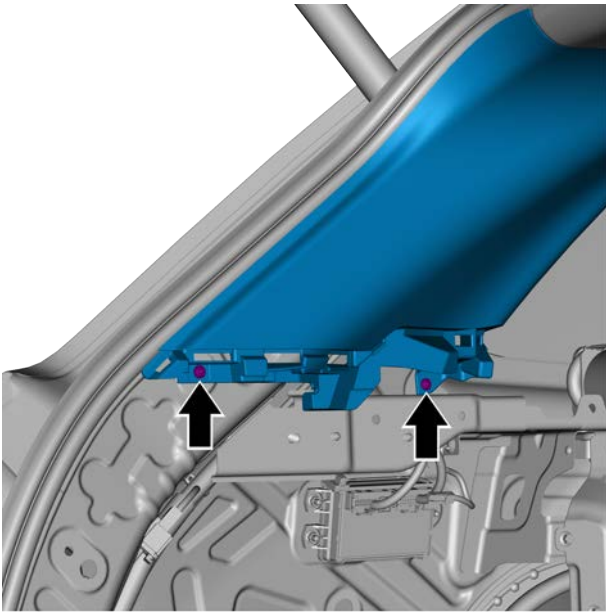
Caution

The removal and assembly method of the D-pillar trim plate assembly on the left and right sides are similar.

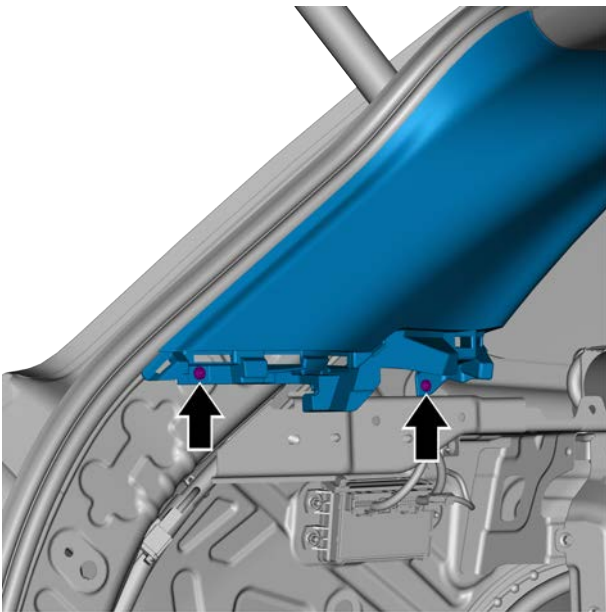
Caution

Please use special tools for body repair to remove the pillar trim panel, otherwise the edge of the pillar trim panel will be easily scratched.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly.](#)
- 3 Remove the left backrest assembly of the rear seat, see [Replacement of the left backrest assembly of the rear seat.](#)
- 4 Remove the rear compartment doorsill trim plate, see the [Replacement of the rear compartment doorsill trim plate.](#)
- 5 Remove the upper trim cover of the left rear compartment, see [Replacement of the upper trim cover of the left rear compartment.](#)
- 6 Remove the rear compartment lamp, see the [Replacement of the rear compartment lamp.](#)
- 7 Remove 12V socket (luggage compartment), see [Replacement of 12V socket \(luggage compartment\).](#)
- 8 Remove the left rear compartment side guard assembly, see [Replacement of the left trunk side guard assembly.](#)



- 9 Remove the left C-pillar upper trim panel assembly, refer to [replacement of the left C-pillar upper trim panel assembly](#).
- 10 Remove the 2 retaining screws of the left D-pillar upper trim plate assembly and remove the left C-pillar upper trim plate assembly.



Installation procedure

- 1 Install the 2 retaining screws for the left D-pillar trim plate assembly.

Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)

- 2 Install the left C-pillar upper trim panel assembly.
- 3 Install the left rear compartment side guard assembly.
- 4 Install 12V socket (luggage compartment).
- 5 Install the luggage compartment lamp.
- 6 Install the upper trim plate of the left rear compartment.
- 7 Install the rear compartment doorsill trim plate.
- 8 Install the left rear seat backrest assembly .

- 9 Install the rear seat cushion assembly.
- 10 Connect the negative battery cable.

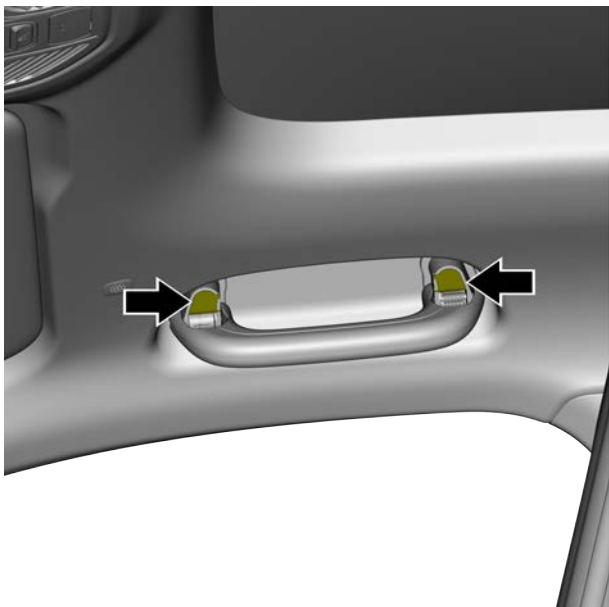
12.8.2.15 Assembly-front door safety grab handle replacement

Removal procedure

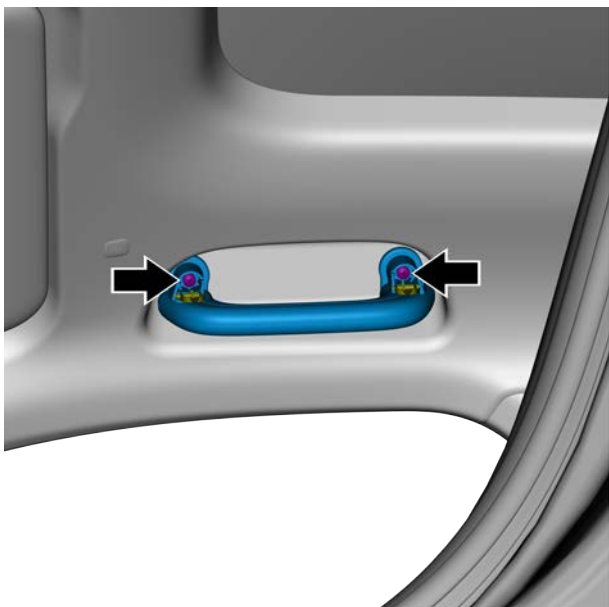
Caution

The method of removal and removal of safety handle assembly are similar.

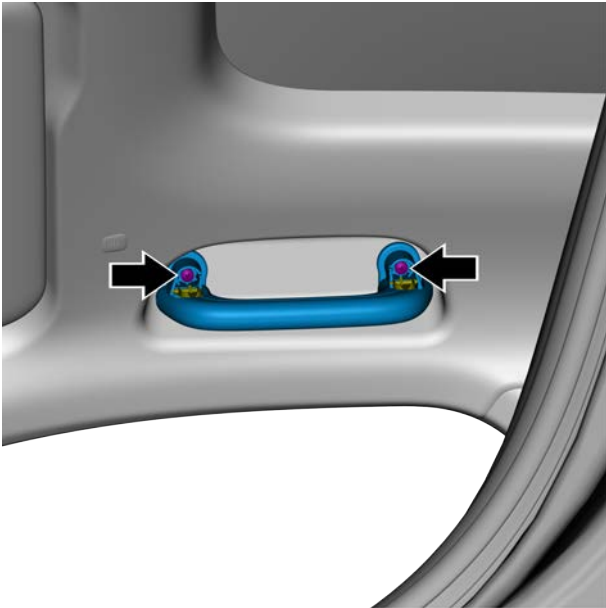
- 1 Pry open the front safety handle assembly bolt trim cover.



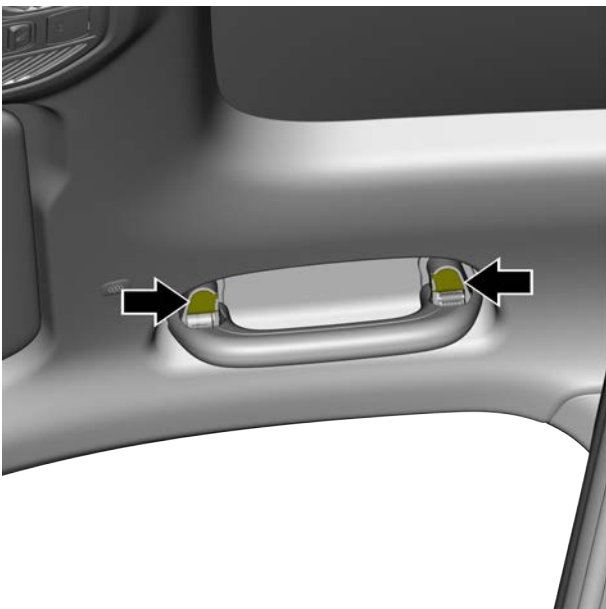
- 2 Remove the front safety handle assembly with 2 retaining screws and remove the front safety handle assembly.



Installation procedure



- 1 Install the 2 retaining screws of safety handle assembly.
Torque: 4 N·m (metric) 3.0 lb-ft (imperial system)



- 2 Cover the front safety handle assembly bolt trim cover.

12.8.2.16 Replacement of the left sun visor assembly

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

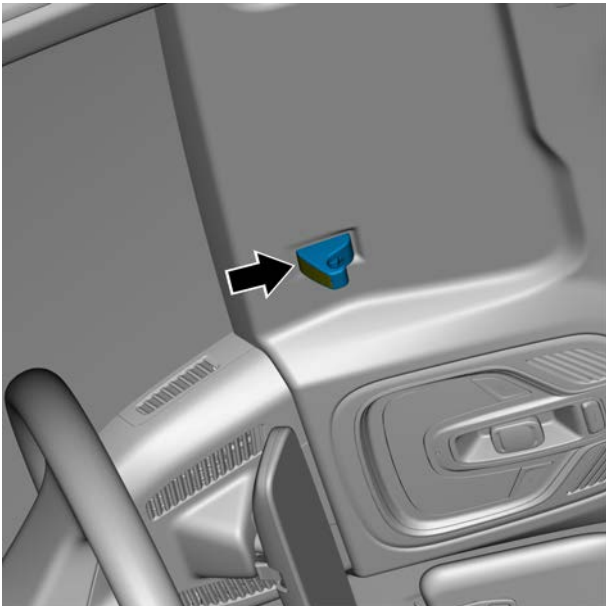
Caution

The removal and assembly methods of the sun visor assembly on the left and right sides are similar.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).



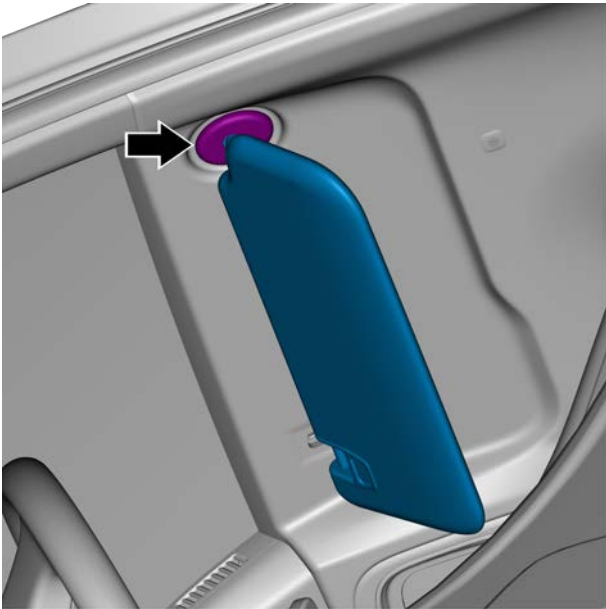
- 2 Disconnect the left sun visor assembly from the sun visor hook.



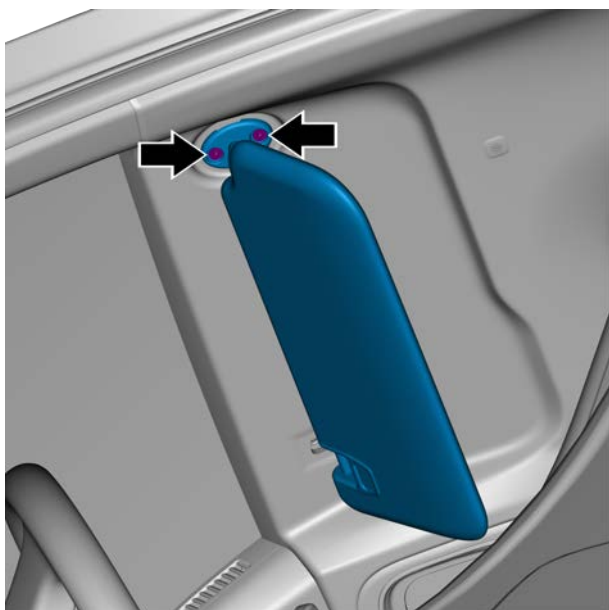
- 3 Pry open the sun visor hook screw blanking cover.



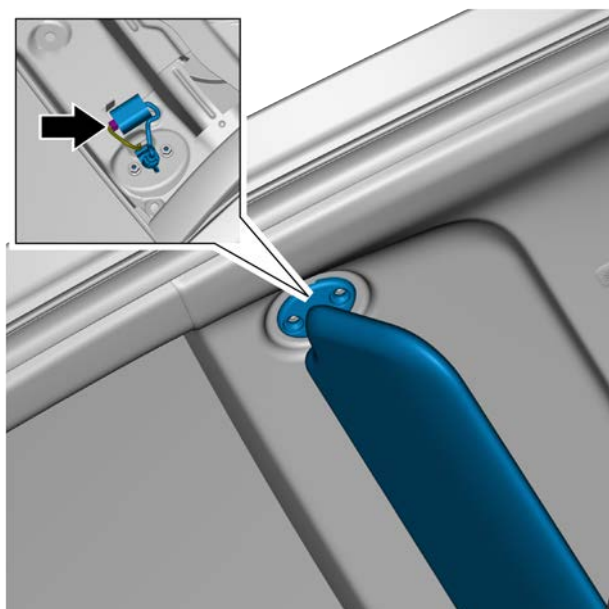
- 4 Remove sun visor hook retaining screws.



- 5 Remove the left sun visor assembly screw blanking cover.

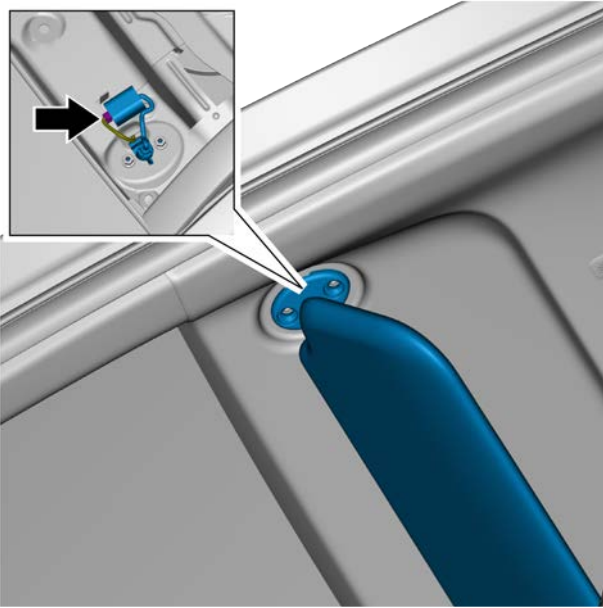


6 Remove the 2 fixing screws of the left sun visor.

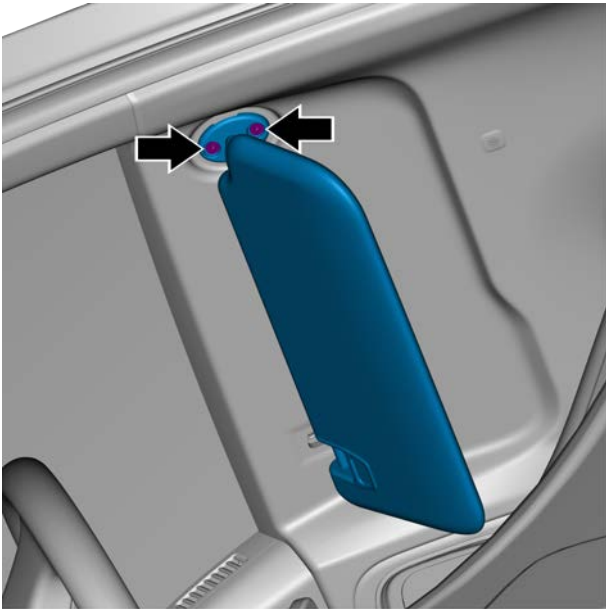


7 Disconnect the left sun visor assembly harness connector and remove the left sun visor assembly.

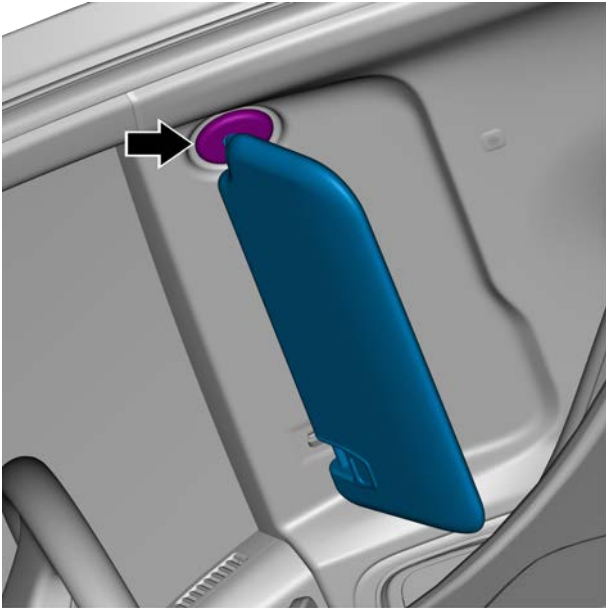
Installation procedure



- 1 Connect the left sun visor assembly harness connector.



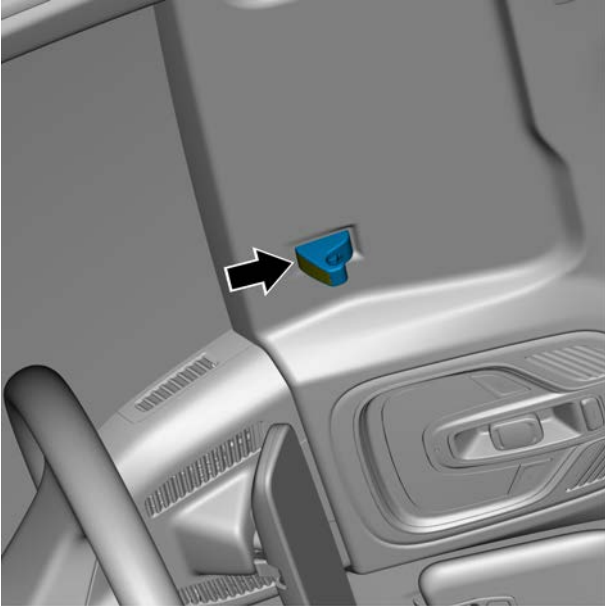
- 2 Install the 2 fixing screws of the left sun visor assembly.
Torque: 4 N·m (metric) 3.0 lb-ft (imperial system)



- 3 Install the left sun visor assembly screw blanking cover.



- 4 Install sun visor hook retaining screws.
Torque: 2N.m (metric system) 1.5lb-ft (Imperial system)



- 5 Install the sun visor hook screw blanking cover.



- 6 Clip the left sun visor assembly into the sun visor hook and make sure it is in place.

- 7 Connect the negative battery cable.

12.8.2.17 Replacement of ceiling assembly

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

Please use the special tools for vehicle body repair to remove the trim panel, otherwise it is easy to scratch the edge of the interior panel.

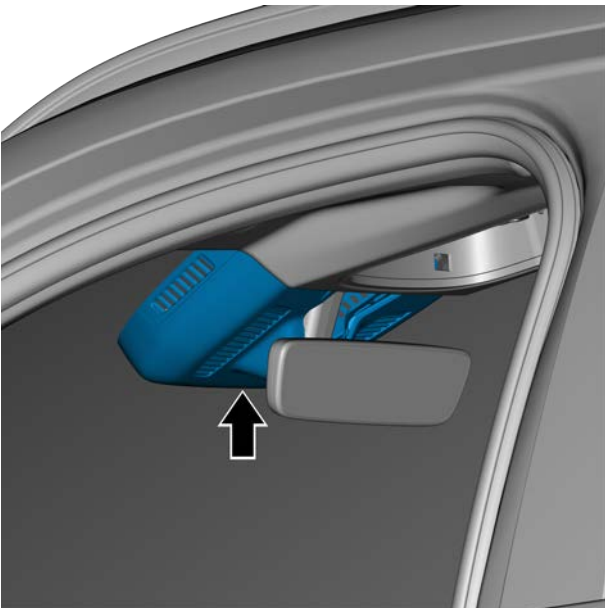
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

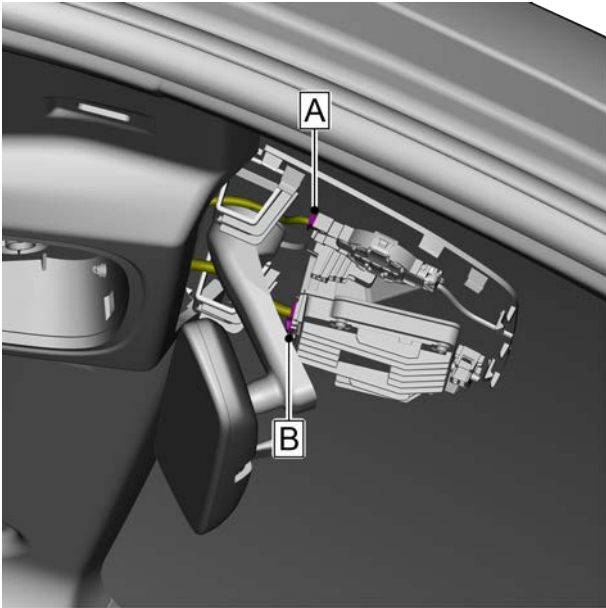
- 2 Remove the left and right A-pillar trim plate assembly, see [Replacement of the left and right A-pillar trim plate assembly](#).
- 3 Remove the front left doorsill trim plate assembly, see [Replacement of the front left doorsill trim plate assembly](#).
- 4 Remove the FR doorsill trim plate assembly, see [Replacement of the FR doorsill trim plate assembly](#).
- 5 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly](#).
- 6 Remove the left backrest assembly of the rear seat, see [Replacement of the left backrest assembly of the rear seat](#).
- 7 Remove the right backrest assembly of the rear seat, see [Replacement of the right backrest assembly of the rear seat](#).
- 8 Remove the upper trim cover of the left rear compartment, see [Replacement of the upper trim cover of the left rear compartment](#).
- 9 Remove the left and right rear compartment side guard assembly, see the [Replacement of the RL compartment side guard assembly](#).
- 10 Remove the left and right C-pillar upper trim panel assembly, refer to [replacement of the left C-pillar upper trim panel assembly](#).
- 11 Remove the left and right D-pillar trim plate assembly, see [Replacement of left D-pillar trim plate assembly](#).
- 12 Remove the left and right rear threshold interior trim plate assembly, see the [Replacement of the left and right rear threshold interior trim plate assembly](#).
- 13 Remove the left and right B-pillar lower trim panel assembly, refer to [replacement of left and right B-pillar lower trim panel assembly](#).
- 14 Remove the left and right B-pillar upper trim panel assembly, refer to [replacement of the left B-pillar upper trim panel assembly](#).
- 15 Before removing the safety handle assembly, see the [Replacement of the front safety handle assembly](#).
- 16 Remove the RL and RR safety handle assembly, see [Replacement of front safety handle assembly](#).
- 17 Remove the left and right sun visor assembly, see the [Replacement of the left sun visor assembly](#).

- 18 Remove the overhead console unit, see the [Replacement of the overhead console unit \(Type 1\)](#) and the [Replacement of the overhead console unit \(Type 2\)](#)
- 19 Remove the rain and light sensor front trim cover.

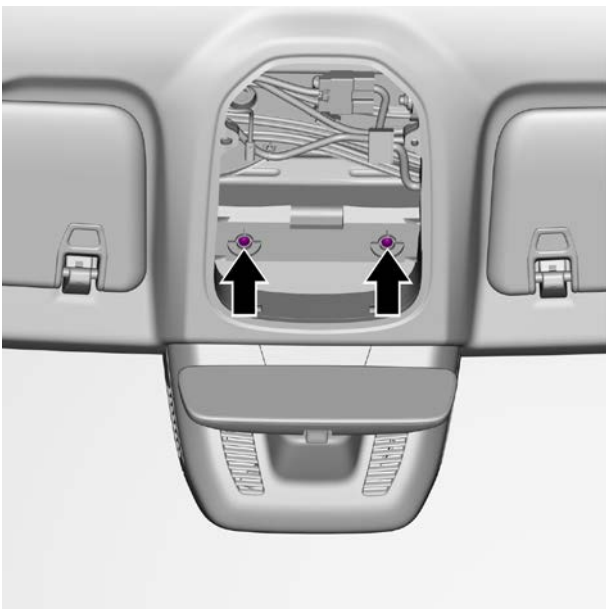


- 20 Remove the rain and light sensor rear trim cover.

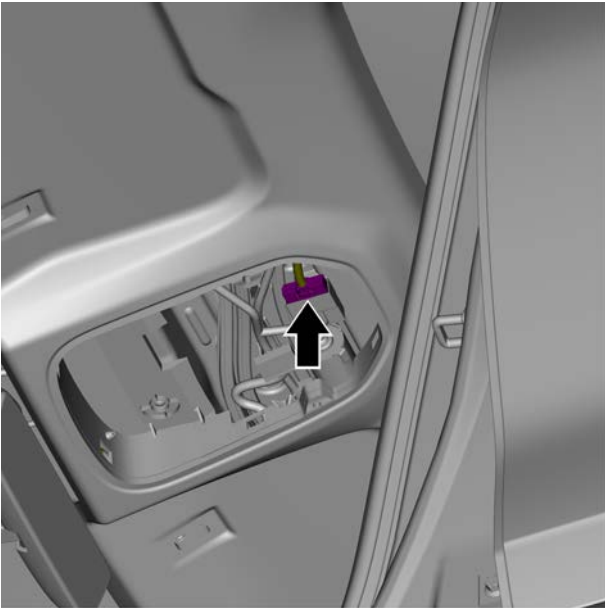




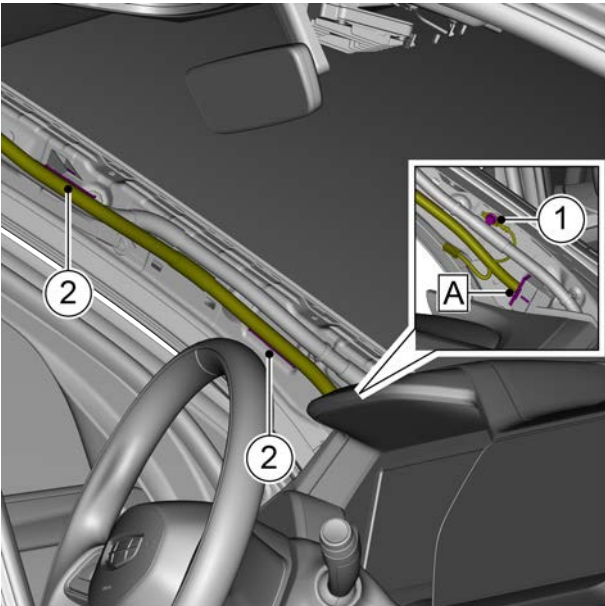
- 21 Disconnect the rain and light sensor harness connector A and the front-looking camera harness connector B.



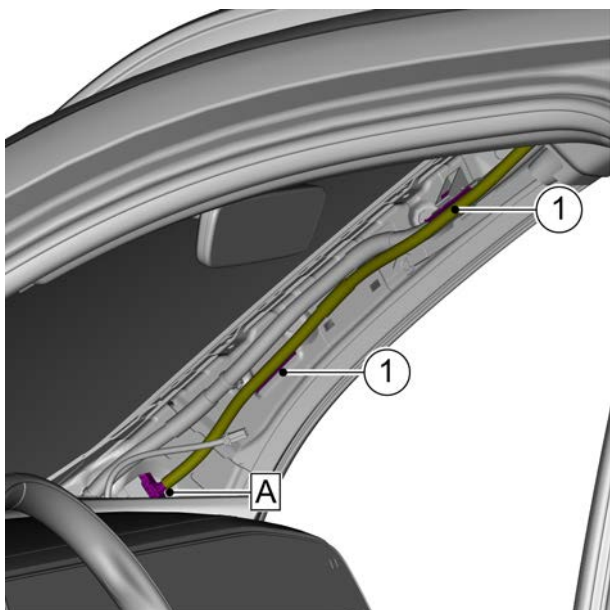
- 22 Remove the 2 retaining screws of the ceiling assembly.



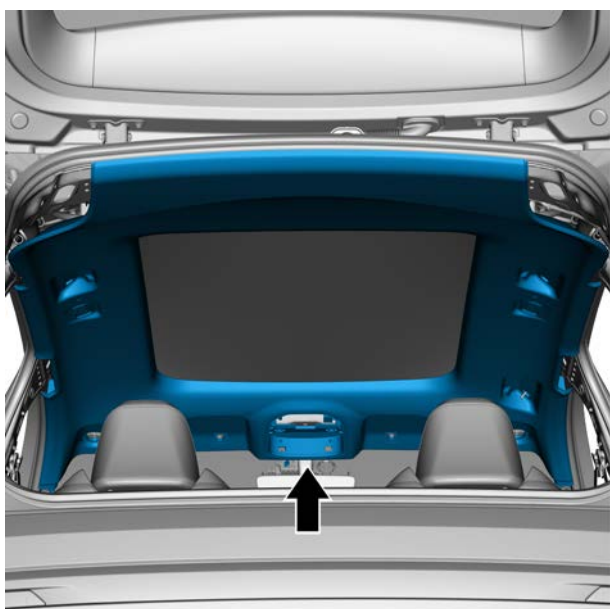
- 23 Disconnect the sunroof module (panoramic sunroof) harness connector.



- 24 Disconnect ceiling harness connector A.
25 Remove ceiling harness retaining bolt 1 and harness clip 2.

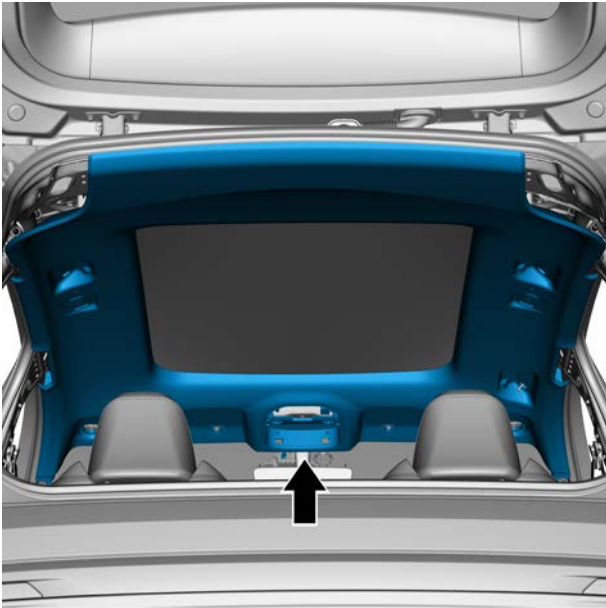


- 26 Disconnect ceiling harness connector A.
- 27 Remove the 2 harness clip 1 of ceiling harness .

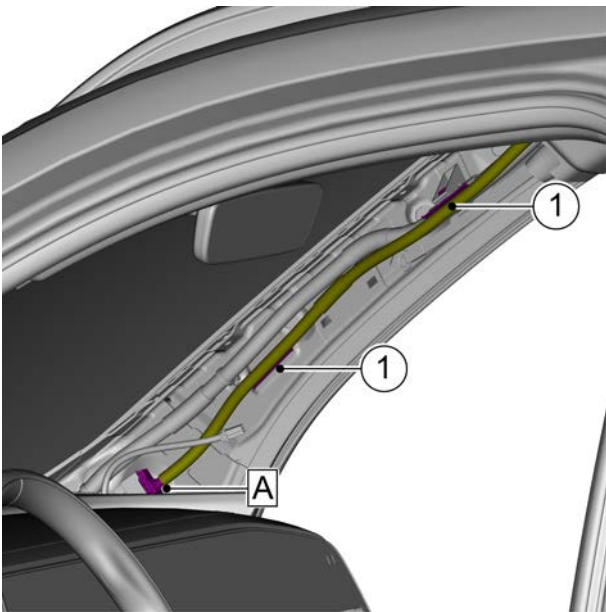


- 28 Remove the ceiling assembly.

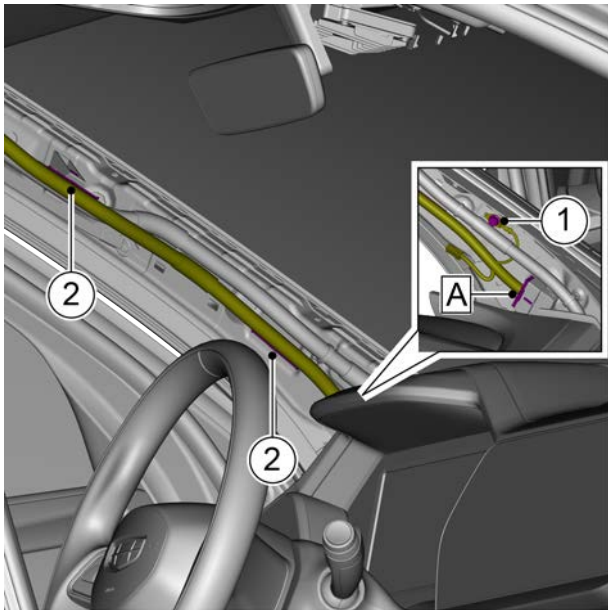
Installation procedure



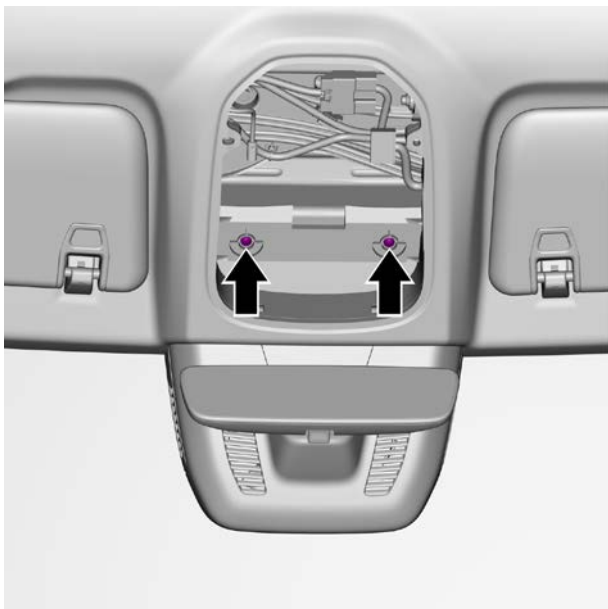
1 Install the ceiling assembly.



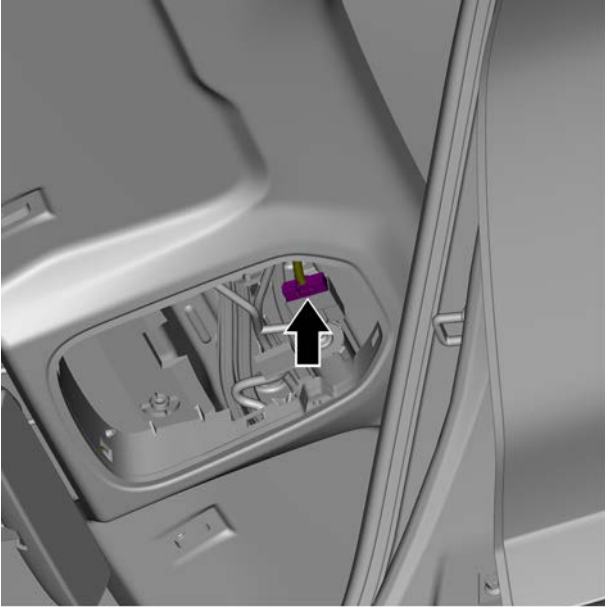
- 2 Connect the ceiling harness connector A.
- 3 Install the 2 harness clip 1 of ceiling harness.



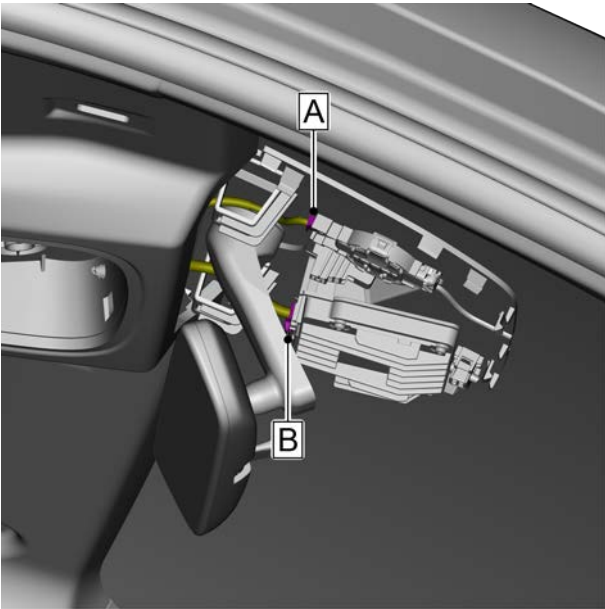
- 4 Connect the ceiling harness connector A.
- 5 Install ceiling harness retaining bolt 1 and harness clip 2.
Torque: 10 N·m (metric) 7.4 lb-ft (imperial system)



- 6 Install the 2 retaining screws of ceiling assembly.



- 7 Connect the sunroof module (panoramic sunroof) harness connector.



- 8 Connect the rain and light sensor harness connector A and the front-looking camera harness connector B.



9 Install the rain and light sensor rear trim cover.



10 Install the rain and light sensor front trim cover.

- 11 Install the overhead console unit.
- 12 Install the left and right sun visor assembly.
- 13 Install the left and right rear safety handles assembly.
- 14 Install the Front safety handle assembly.
- 15 Install the left and right B-pillar upper trim panel assembly.
- 16 Install the left and right B-pillar lower trim panel assembly.
- 17 Install the left and right rear threshold interior trim panel assembly.
- 18 Install the left and right D-pillar upper trim panel assembly.
- 19 Install the left and right C-pillar upper trim panel assembly.

- 20 Install the left and right rear compartment side guard assembly.
- 21 Install the upper trim plate of the left and right rear compartment.
- 22 Install the right rear seat backrest assembly .
- 23 Install the left rear seat backrest assembly .
- 24 Install the rear seat cushion assembly.
- 25 Install the right front door sill trim panel assembly.
- 26 Install the left front door sill trim panel assembly.
- 27 Install the left and right A-pillar upper trim panel assembly.
- 28 Connect the negative battery cable.

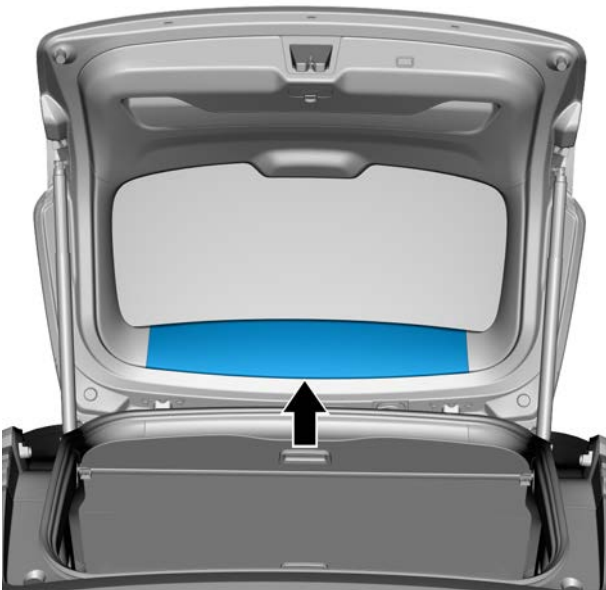
12.8.2.18 Replacement of upper middle interior trim panel assembly of the back door

Removal procedure

Caution

Please use the special tools for vehicle body repair to remove the trim panel, otherwise it is easy to scratch the edge of the interior panel.

- 1 Dismantle the upper interior trim plate assembly of the tailgate with the appropriate tool and remove it.



Installation procedure



- 1 Install the middle upper interior trim panel assembly of the tailgate.

12.8.2.19 Replacement of the left upper interior trim plate assembly of the tailgate

- 1 See the [Replacement of the interior trim plate assembly under the tailgate.](#)

12.8.2.20 Replacement of the inner lower trim panel assembly of the back door

Removal procedure

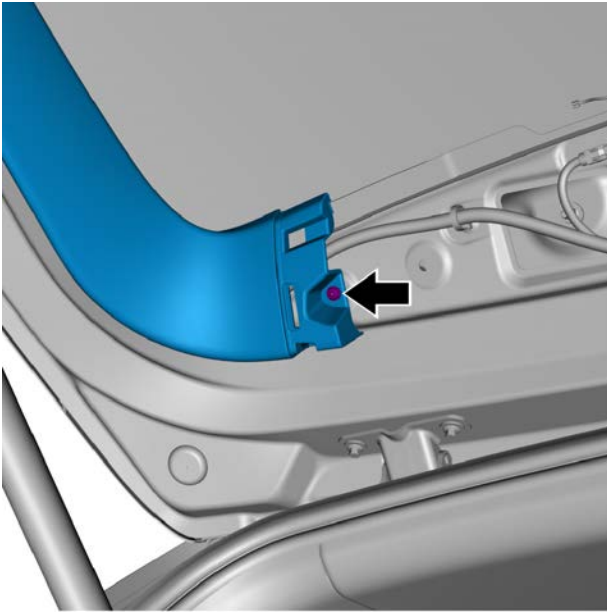
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

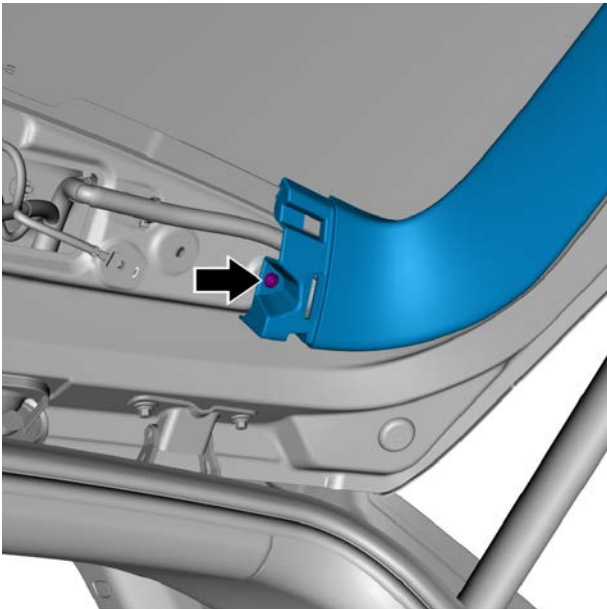
Caution

Please use the special tools for vehicle body repair to remove the trim panel, otherwise it is easy to scratch the edge of the interior panel.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures.](#)
- 2 Remove the tailgate middle upper interior trim panel assembly of the assembly, see [Replacement of the tailgate middle upper interior trim panel assembly.](#)

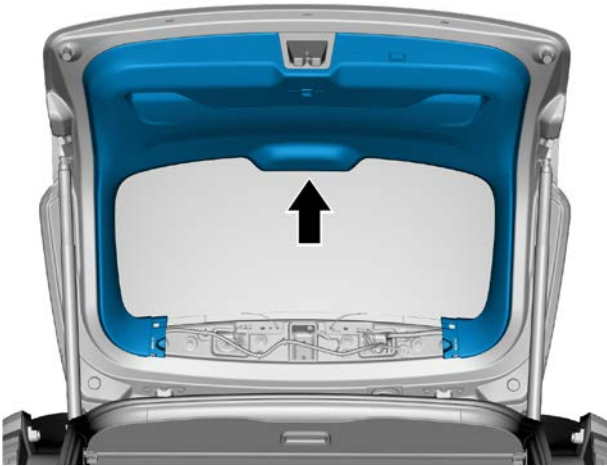


- 3 Remove fixing screw of the upper left interior trim panel assembly of the back door.

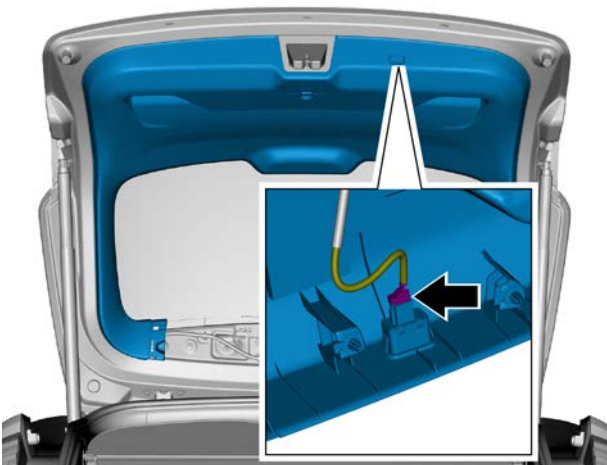


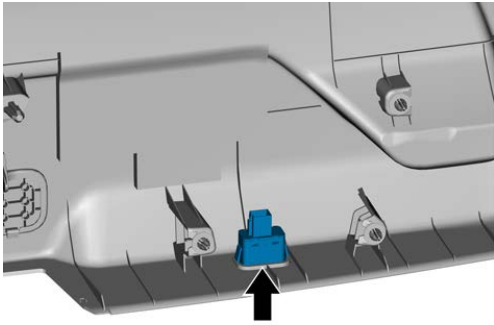
- 4 Remove the retaining screws of the tailgate upper right trim plate assembly.

- 5 Remove the tailgate upper left and right interior trim plate and the tailgate lower interior trim plate assembly.

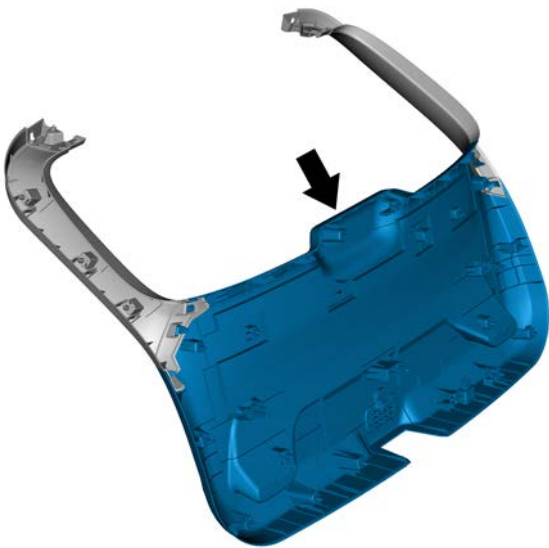


- 6 Disconnect the tailgate closing and vehicle lock nut switch harness connector.



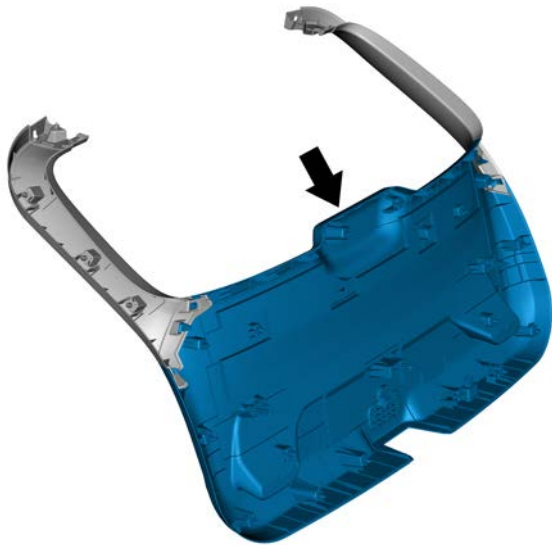


- 7 Remove tailgate closing and vehicle locking switch.

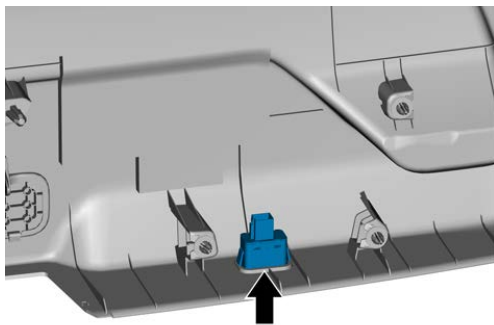


- 8 Separate the tailgate upper left and right interior trim plate assembly from the tailgate lower interior trim plate assembly.

Installation procedure

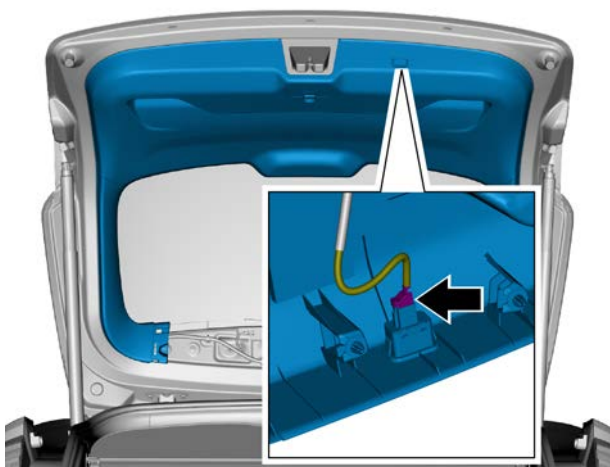


- 1 Assemble the tailgate upper left and right interior trim plate assembly with the tailgate lower interior trim plate assembly.

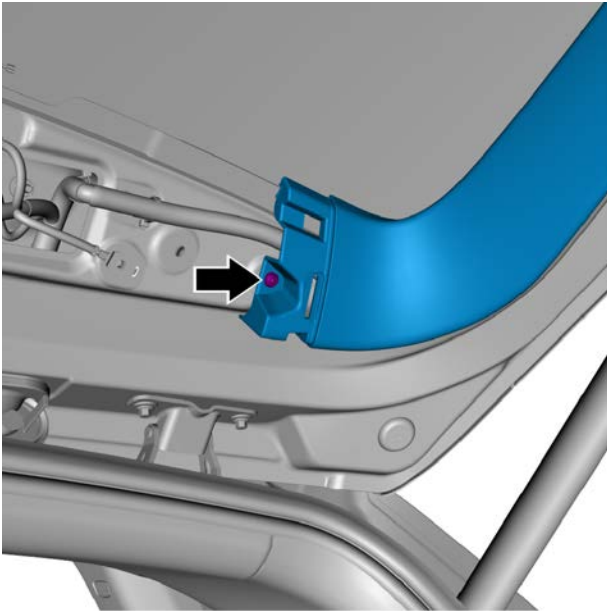
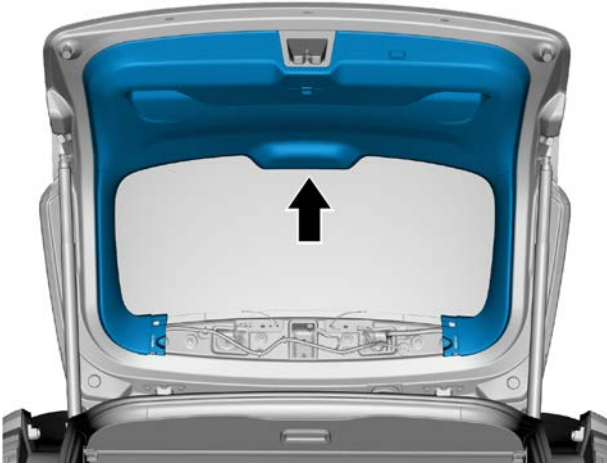


- 2 Install rear door closing and vehicle lock nut switches.

- 3 Connect the tailgate closing and vehicle lock nut switch harness connector.

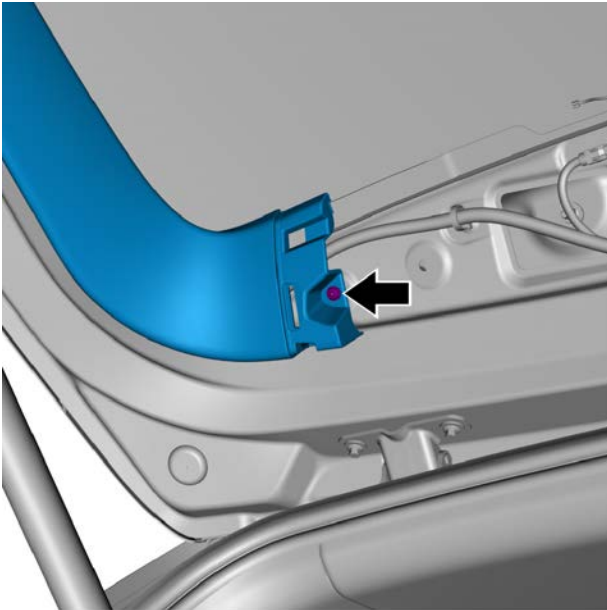


- 4 Install the tailgate upper left and right interior trim plate and the tailgate lower interior trim plate assembly.



- 5 Install the retaining screws of the tailgate upper right trim plate assembly.

Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)



- 6 Install fixing screw of the upper left interior trim panel assembly of the back door.
Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)

- 7 Install the middle upper interior trim panel assembly of the tailgate.
- 8 Connect the negative battery cable.

12.8.2.21 Replacement of front left floor carpet assembly

Removal procedure

Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

The removal and assembly methods of the front floor carpet assembly on the left and right sides are similar.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the driver seat assembly, see [Replacement of the driver seat assembly](#).
- 3 Remove console moulding assembly, refer to [replacement of console moulding assembly](#).
- 4 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly](#).
- 5 Remove the left backrest assembly of the rear seat, see [Replacement of the left backrest assembly of the rear seat](#).
- 6 Remove the rear compartment threshold trim plate assembly, see the [Replacement of the rear compartment threshold trim plate assembly](#).

- 7 Remove the upper trim cover of the left rear compartment, see [Replacement of the upper trim cover of the left rear compartment](#).
- 8 Remove the rear compartment lamp, see the [Replacement of the rear compartment lamp](#).
- 9 Remove 12V socket (luggage compartment), see [Replacement of 12V socket \(luggage compartment\)](#).
- 10 Remove the left rear compartment side guard assembly, see [Replacement of the left trunk side guard assembly](#).
- 11 Remove the RL threshold interior trim plate assembly, see the [Replacement of the RL threshold interior trim plate assembly](#).
- 12 Remove the front left doorsill trim plate assembly, see [Replacement of the front left doorsill trim plate assembly](#).
- 13 Remove the left B-pillar lower trim panel assembly, refer to [replacement of left B-pillar lower trim panel assembly](#).
- 14 Remove 2 J-type clips of the front left floor carpet and remove the front left floor carpet assembly.



Installation procedure



- 1 Install 2 J-type clips of the front left floor carpet.

- 2 Install the left B-pillar lower trim panel assembly.
- 3 Install the left front door sill trim panel assembly.
- 4 Install the RL threshold interior trim panel assembly.
- 5 Install the left rear compartment side guard assembly.
- 6 Install 12V socket (luggage compartment).
- 7 Install the luggage compartment lamp.
- 8 Install the upper trim plate of the left rear compartment.
- 9 Install rear compartment door threshold trim plate assembly.
- 10 Install the left rear seat backrest assembly .
- 11 Install the rear seat cushion assembly.
- 12 Install the console assembly.
- 13 Install the driver seat assembly.
- 14 Connect the negative battery cable.

12.8.2.22 Rear floor carpet replacement

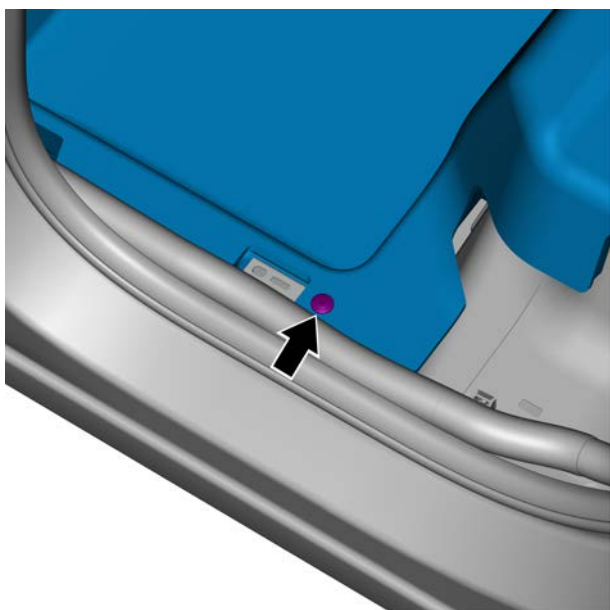
Removal procedure

Caution

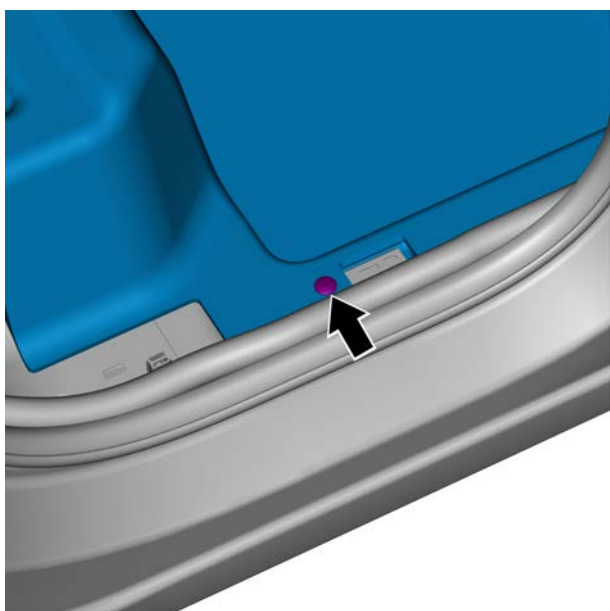
Please use special tools for body repair to remove the pillar trim panel, otherwise the edge of the pillar trim panel will be easily scratched.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the driver seat assembly, see [Replacement of the driver seat assembly](#).
- 3 Remove console moulding assembly, refer to [replacement of console moulding assembly](#).

- 4 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly](#).
- 5 Remove the left backrest assembly of the rear seat, see [Replacement of the left backrest assembly of the rear seat](#).
- 6 Remove the rear compartment threshold trim plate assembly, see the [Replacement of the rear compartment threshold trim plate assembly](#).
- 7 Remove the upper trim plate cover of the left and right rear compartment, see [Replacement of the upper trim plate cover of the RL compartment](#).
- 8 Remove the rear compartment lamp, see the [Replacement of the rear compartment lamp](#).
- 9 Remove 12V socket (luggage compartment), see [Replacement of 12V socket \(luggage compartment\)](#).
- 10 Remove the left and right rear compartment side guard assembly, see the [Replacement of the RL compartment side guard assembly](#).
- 11 Remove the left and right rear threshold interior trim plate assembly, see the [Replacement of the left and right rear threshold interior trim plate assembly](#).
- 12 Remove the front left doorsill trim plate assembly, see [Replacement of the front left doorsill trim plate assembly](#).
- 13 Remove the FR doorsill trim plate assembly, see [Replacement of the FR doorsill trim plate assembly](#).
- 14 Remove the left and right B-pillar lower trim panel assembly, refer to [replacement of left and right B-pillar lower trim panel assembly](#).

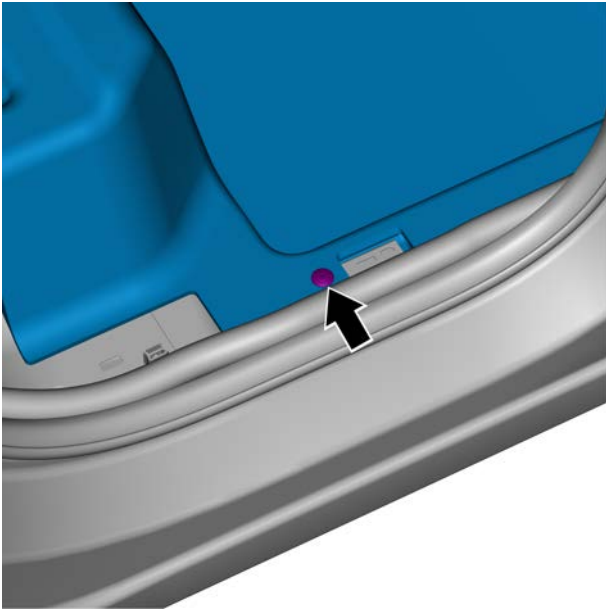


- 15 Remove the J-type clip on the left side of the rear floor carpet.

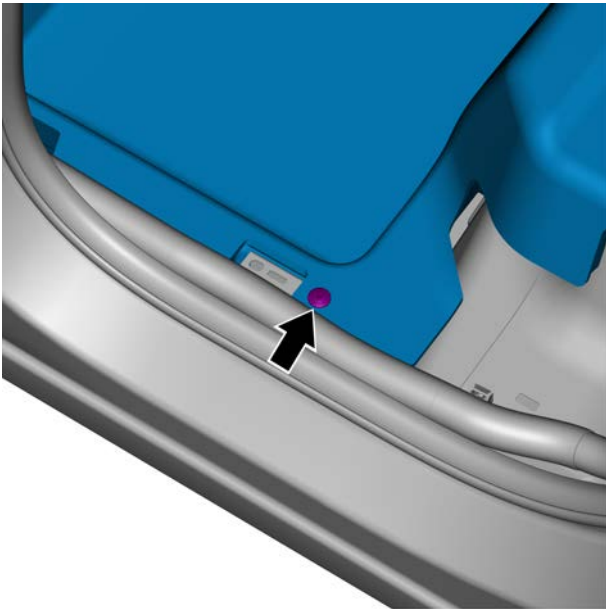


- 16 Remove the J-type clip on the right side of the rear floor carpet and remove the rear floor carpet.

Installation procedure



- 1 J-type clip on the right side of the rear floor carpet.



- 2 J-type clip on the left side of the rear floor carpet.

- 3 Install the left and right B-pillar lower trim panel assembly.
- 4 Install the right front door sill trim panel assembly.
- 5 Install the left front door sill trim panel assembly.
- 6 Install the left and right rear threshold interior trim panel assembly.
- 7 Install the left and right rear compartment side guard assembly.
- 8 Install 12V socket (luggage compartment).
- 9 Install the luggage compartment lamp.
- 10 Install the upper trim plate of the left and right rear compartment.
- 11 Install rear compartment door threshold trim plate assembly.

- 12 Install the left rear seat backrest assembly .
- 13 Install the rear seat cushion assembly.
- 14 Install the console assembly.
- 15 Install the driver seat assembly.
- 16 Connect the negative battery cable.

12.9 Exterior trim

12.9.1 Specification

12.9.1.1 Torque specification

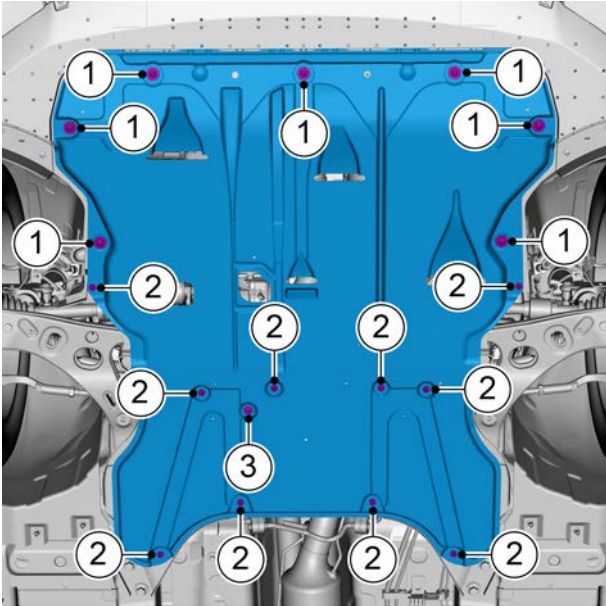
Fastener position	Model	Specification	
		Metric system (N.m)	British system (lb-ft)
Engine fender retaining screw	PF5×20	1.3~1.7	0.9~1.3
Engine fender retaining bolt	M6×20	3~4	2.2~2.9
front left wheel arch liner splash guard assembly retaining screw	-	1.7~2.3	1.3~1.7
RL wheel arch liner splash guard assembly retaining screw	-	1.7~2.3	1.3~1.7
Plenum mounding assembly retaining bolt	M6×16	3.2~4.8	2.4~3.5
RL wheel brow retaining screw	-	1.7~2.3	1.3~1.7
RL wheel brow front-end retaining screw	ST4.8×22	1.3~1.7	0.9~1.3
Spoiler assembly fixing screw	M6×7.8	8~10	5.9~7.4
Left roof rack retaining nut	M6×7.8	8~10	5.9~7.4

12.9.2 Removing and installing

12.9.2.1 Replacement of engine fender

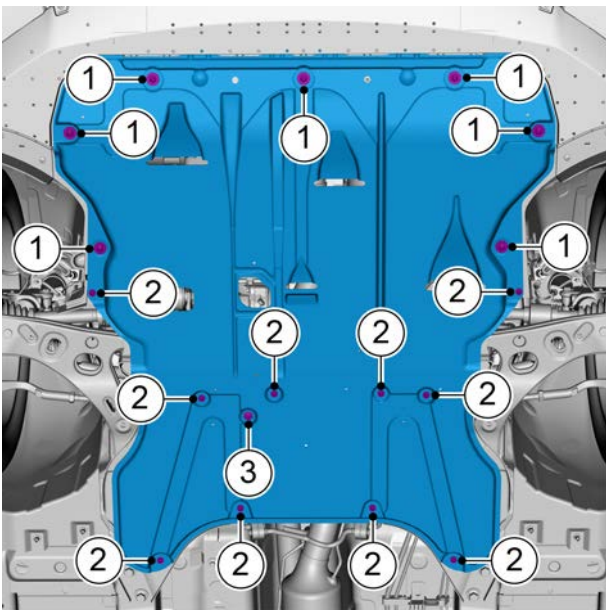
Removal procedure

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove 7 retaining bolts 1 and 10 retaining screws 2 of the engine fender.
- 3 Remove retaining clip 3 of the engine fender and remove engine fender.



Installation procedure

- 1 Install 7 retaining bolts 1 and 10 retaining screws 2 of the engine fender.
Screw 2 torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)
Bolt 1 torque: 3.5 N·m (metric) 2.6 lb-ft (imperial system)
- 2 Install engine fender retaining clip 3.



- 3 Lower the vehicle.

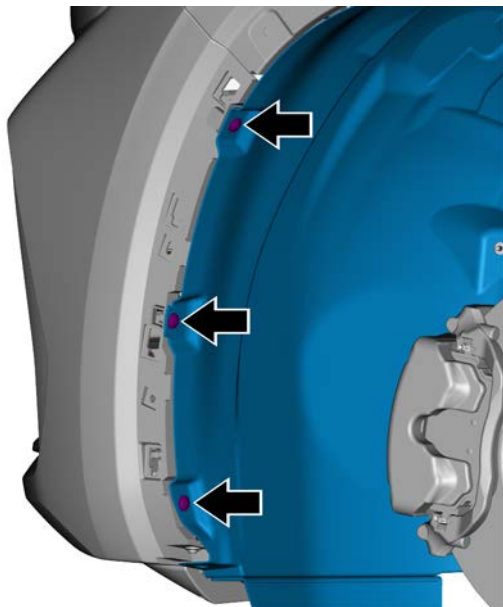
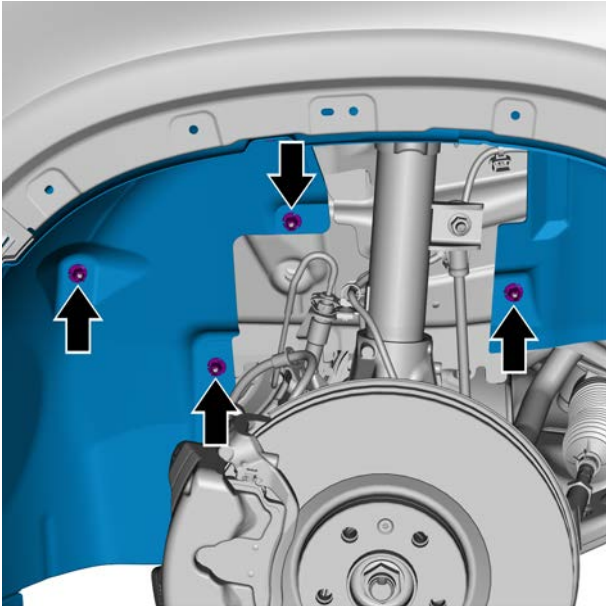
12.9.2.2 Replacement of front left wheel arch liner splash guard assembly

Removal procedure

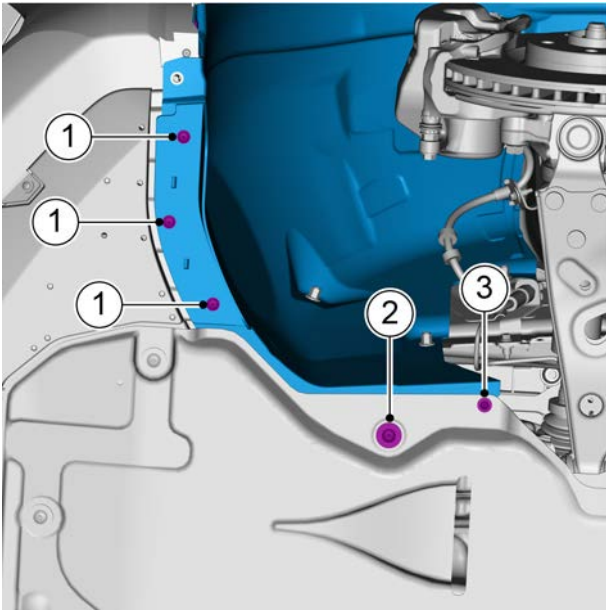
Caution

The removal and assembly methods of front wheel arch liner splash guard assembly on the left and right sides are similar.

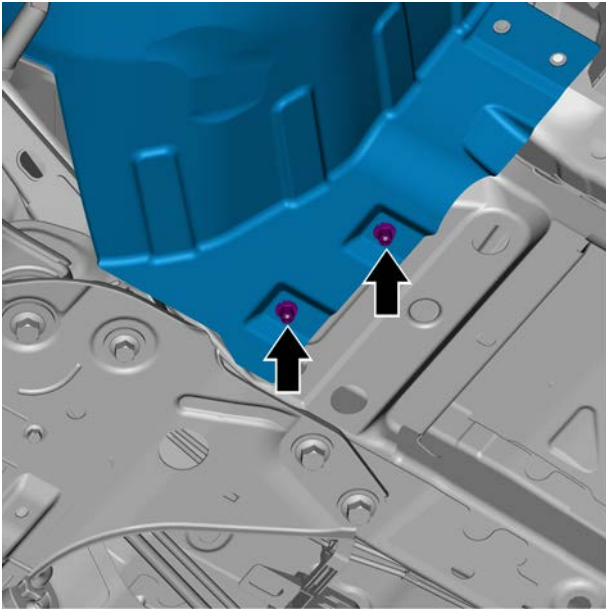
- 1 Remove the front left wheel, see [Replacement of wheel assembly](#).
- 2 Remove front left wheel brow, refer to replacement of front wheel brow.
- 3 Remove the 4 retaining plastic nuts in the middle of the front left wheel arch liner splash guard assembly.



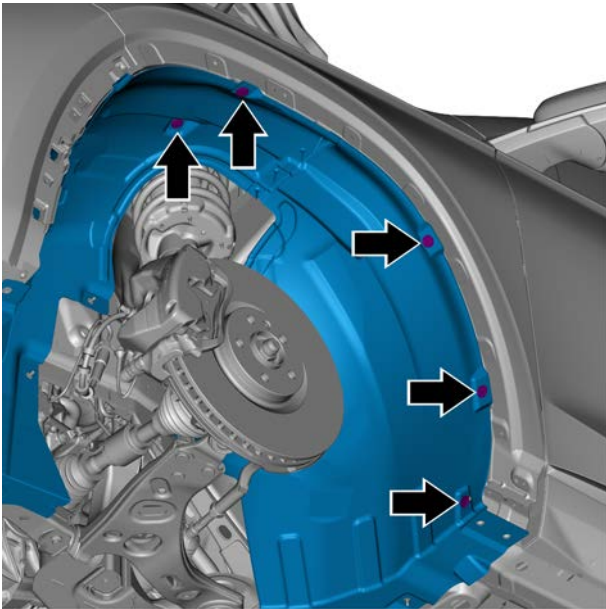
- 4 Remove the 3 retaining screws of the front end front left wheel arch liner splash guard.



- 5 Remove the 3 retaining screws 1 and retaining screw 3 at the bottom of the front-end of the front left wheel arch liner splash guard.
- 6 Remove the retaining bolt 2 at the front-end bottom of the front left wheel arch liner splash guard.

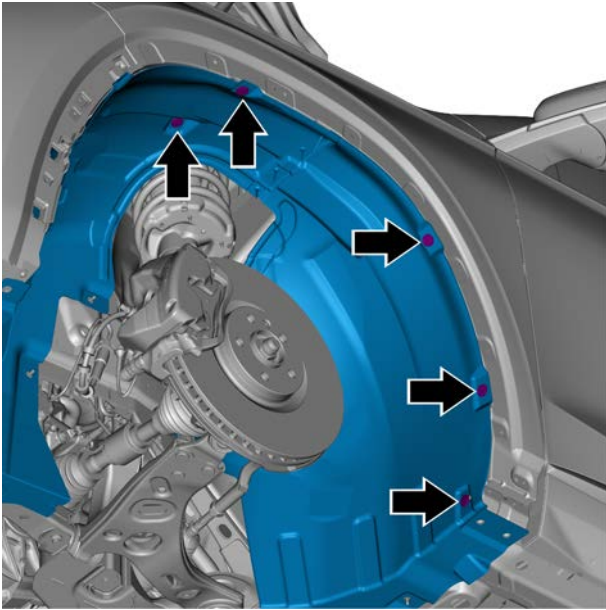


- 7 Remove the 2 retaining plastic nuts at the bottom of the rear end of the front left wheel arch liner splash guard assembly.

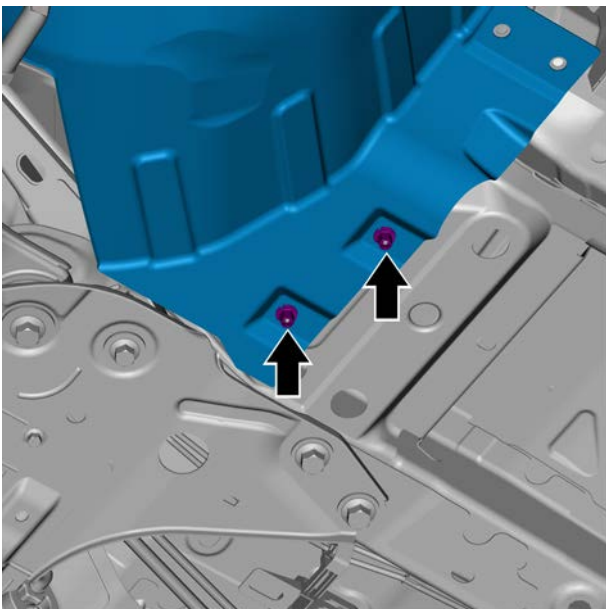


- 8 Remove the 5 G-type clips at the rear end of the front left wheel arch liner splash guard assembly and remove the front left wheel arch liner splash guard assembly.

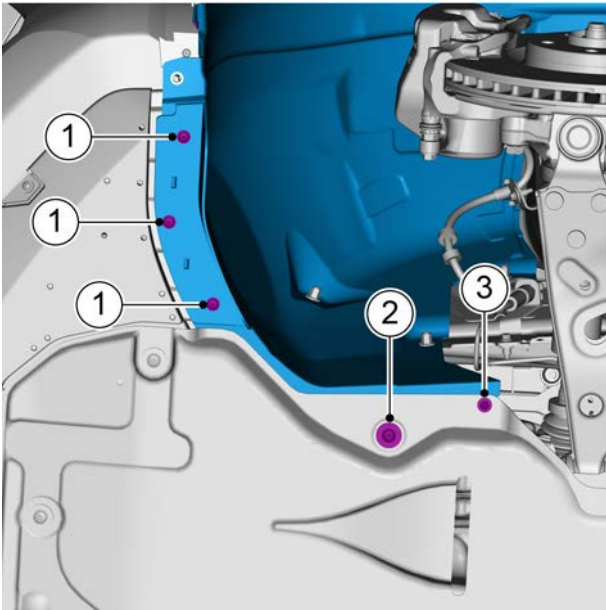
Installation procedure



- 1 Install 5 G-type clips at the rear end of the front left wheel arch liner splash guard assembly.



- 2 Install 2 retaining plastic nuts at the bottom of the rear end of the front left wheel arch liner splash guard assembly.

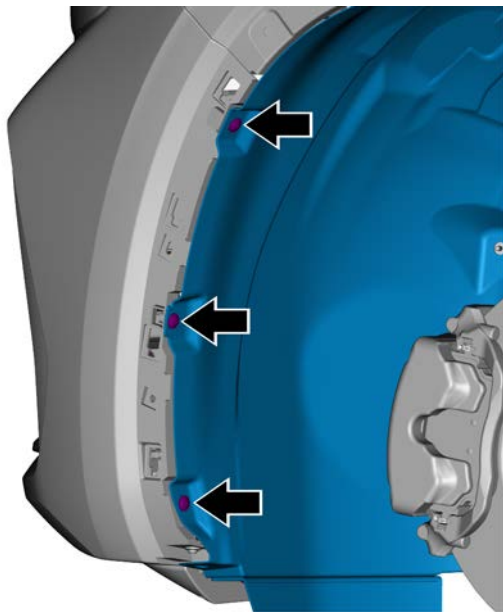


- 3 Install the 3 retaining screws 1 and retaining screw 3 at the bottom of the front end front left wheel arch liner splash guard assembly.

Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)

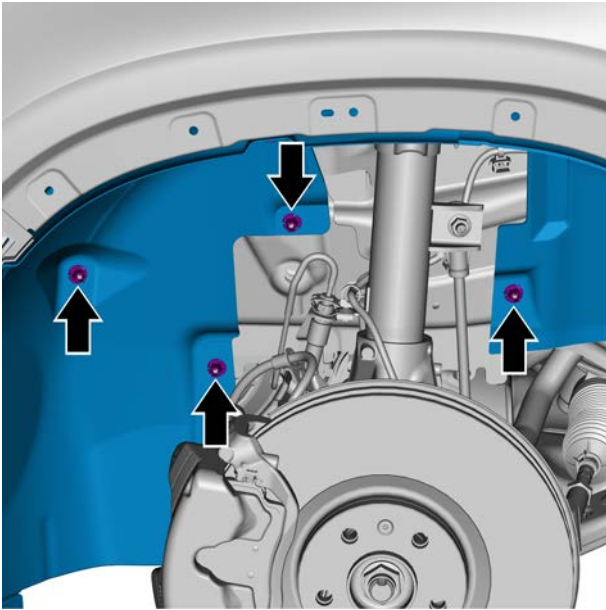
- 4 Install the retaining bolt 2 at the front end bottom of the front left wheel arch liner splash guard assembly.

Torque: 3.5 N·m (metric) 2.6 lb-ft (imperial system)



- 5 Install the 3 retaining screws at the front end of the front left wheel arch liner splash guard assembly.

Torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)



- 6 Install 4 retaining plastic nuts in the middle of the front left wheel arch liner splash guard assembly.

- 7 Install the front left wheel brow.
- 8 Install the left front wheel.

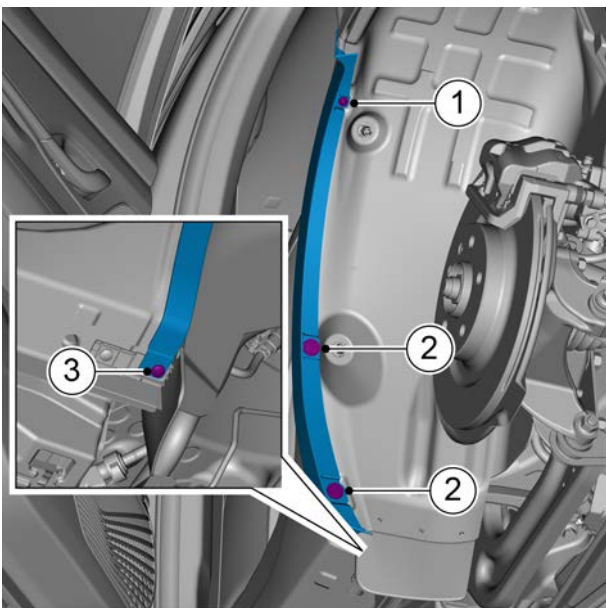
12.9.2.3 Replacement of RL wheel arch liner splash guard assembly

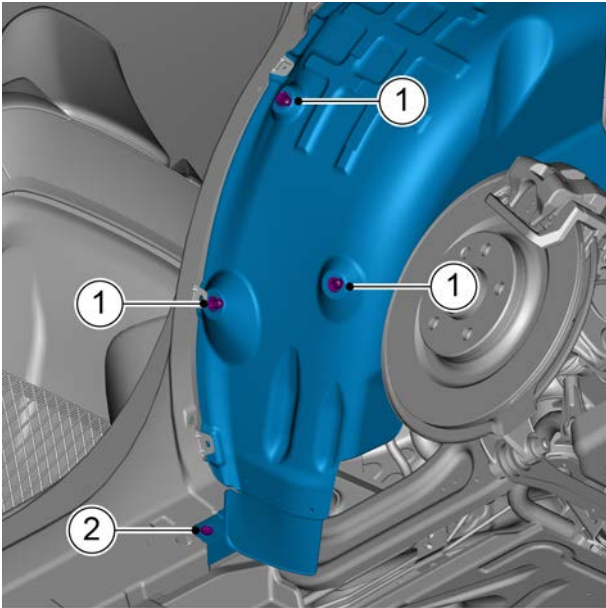
Removal procedure

Caution

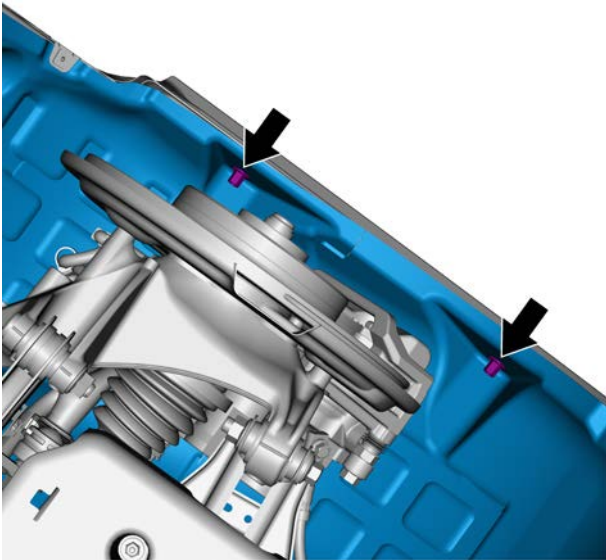
The removal and assembly method of the rear wheel arch liner splash guard assembly on the left and right sides are similar.

- 1 Remove the RL wheel, see [Replacement of wheel assembly](#).
- 2 Remove rear left wheel brow, refer to replacement of rear wheel brow.
- 3 Remove the retaining screws 1 and 3 of RL wheel brow II.
- 4 Remove 2 G-type clips 2 of the RL wheel brow II.

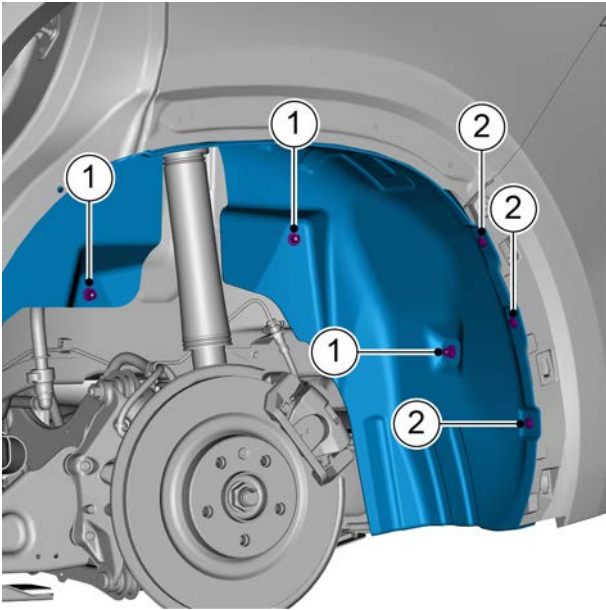




- 5 Remove 3 nuts 1 and retaining screws 2 of the RL wheel arch liner splash guard assembly.

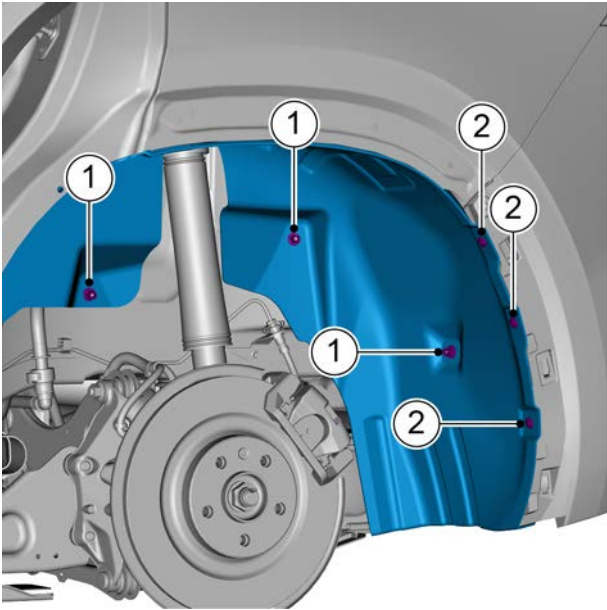


- 6 Remove the 2 plastic nuts of the RL wheel arch liner splash guard assembly.

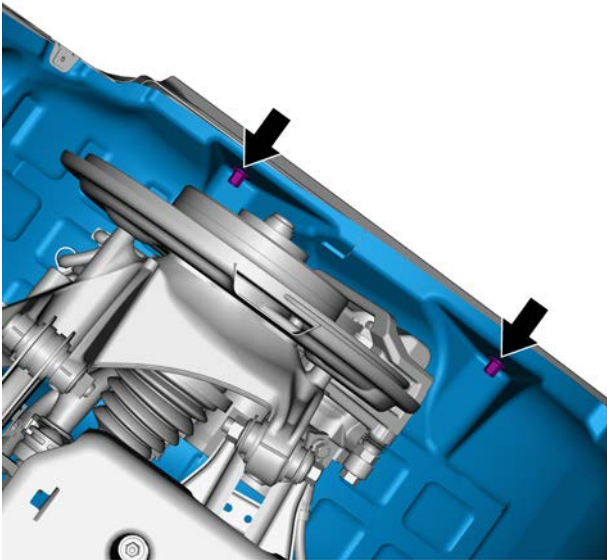


- 7 Remove the 3 plastic nuts 1 and 3 retaining screws 2 of the RL wheel arch liner splash guard assembly and remove the RL wheel arch liner splash guard assembly.

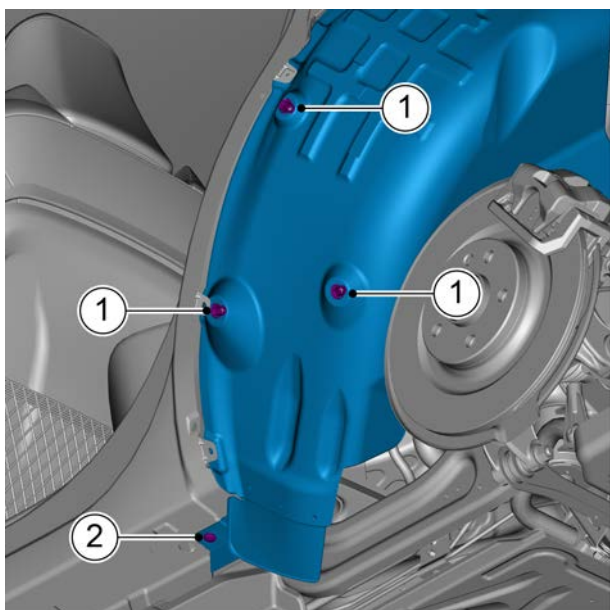
Installation procedure



- 1 Install the 3 plastic nuts 1 and 3 retaining screws 2 of the RL wheel arch liner splash guard assembly.
Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)

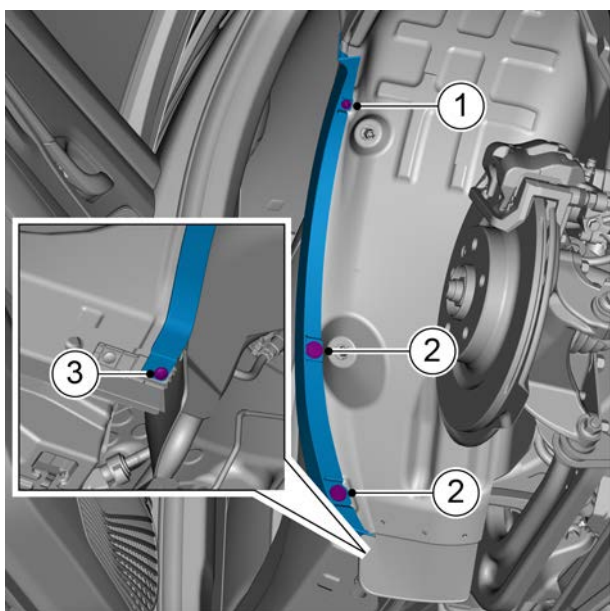


- 2 Install the 2 plastic nuts of the RL wheel arch liner splash guard.



- 3 Install 3 nuts 1 and retaining screws 2 of the RL wheel arch liner splash guard assembly.

Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)



- 4 Install the retaining screw 1 and retaining screw 3 of RL wheel brow II .

Screw 1 torque: 1.5 N·m (metric) 1.1 lb-ft (imperial system)

Screw 3 torque: 2 N·m (metric) 1.5 lb-ft (imperial system)

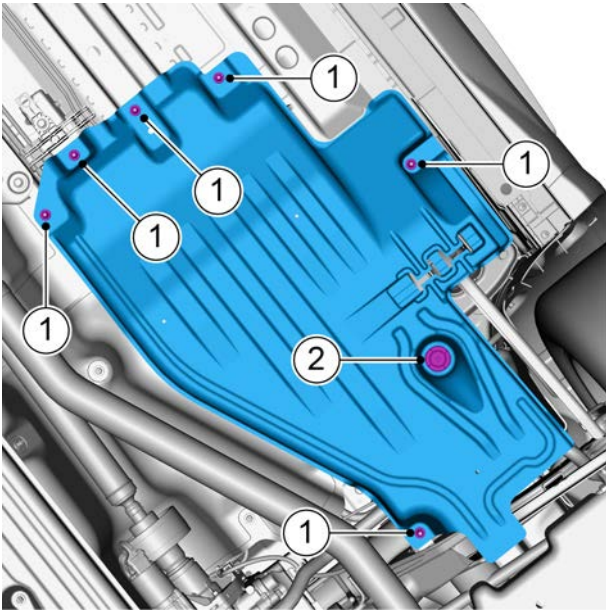
- 5 Install the 2 G-type clips 2 of the RL wheel brow II.

- 6 Install the RL wheel brow.

- 7 Install the left rear wheel.

12.9.2.4 Replacement of lower left body fender apron

Removal procedure

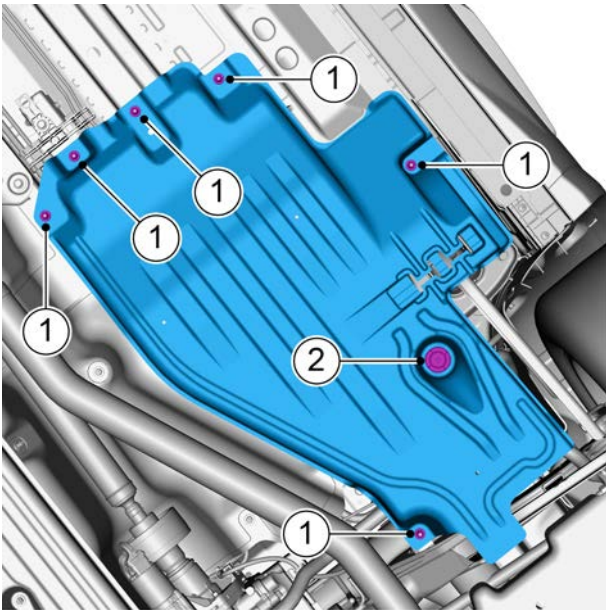


- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Dismantle the 6 retaining plastic nuts 1 and retaining clip 2 of the lower left body fender apron, and remove the lower left body fender apron.

Installation procedure

- 1 Install 6 retaining plastic nuts 1 and retaining clip 2 on the lower left body fender apron.

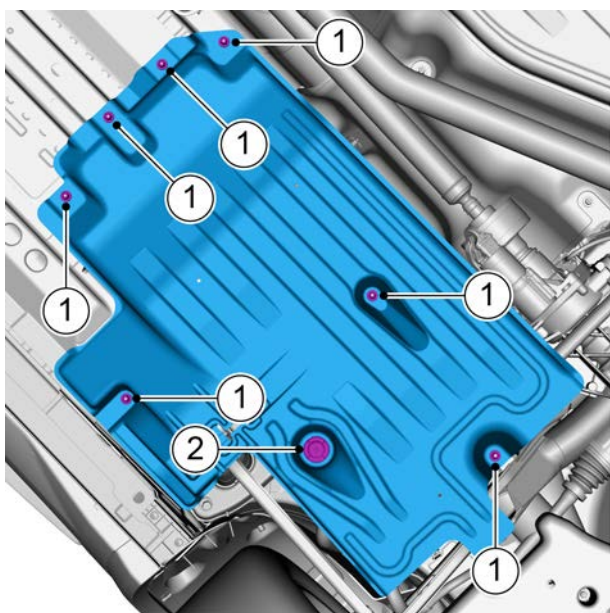
Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)



- 2 Lower the vehicle.

12.9.2.5 Replacement of lower right body fender apron

Removal procedure

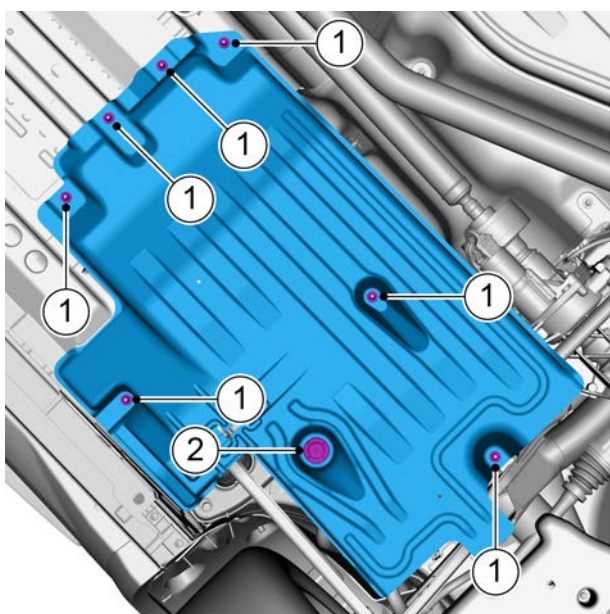


- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the 7 retaining plastic nuts 1 and retaining clip 2 of lower right body fender apron, and remove the lower right body fender apron.

Installation procedure

- 1 Install 7 retaining plastic nuts 1 and retaining 2 on the lower right body fender apron.

Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)



- 2 Lower the vehicle.

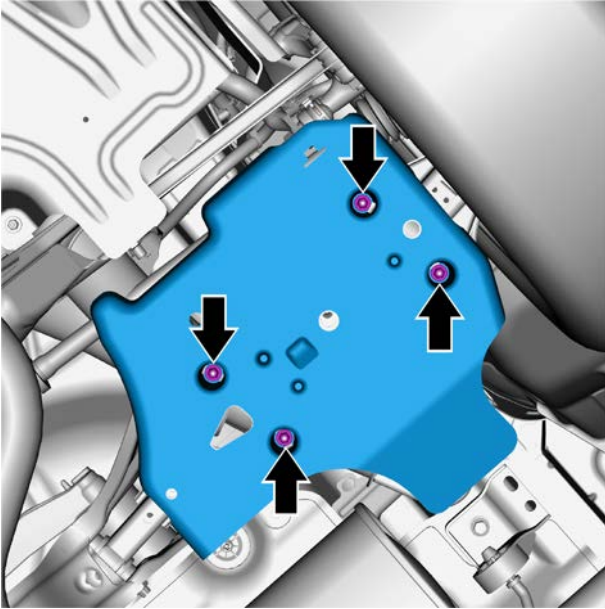
12.9.2.6 Replacement of RL suspension fender apron

Removal procedure

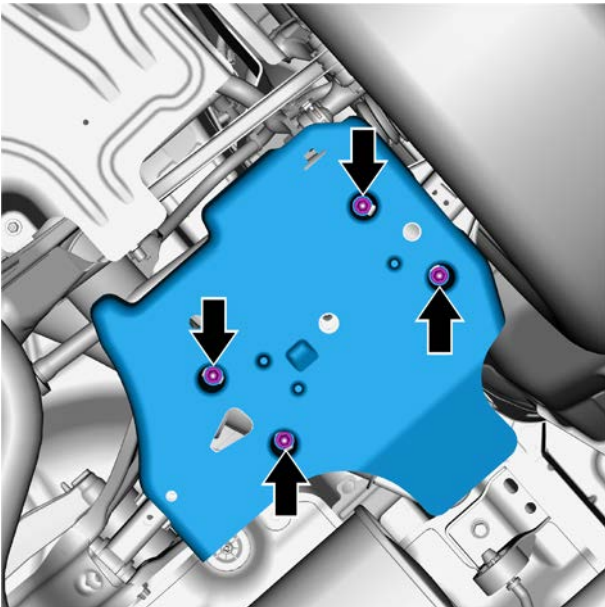
Caution

The removal and assembly methods of the rear suspension fender aprons on the left and right sides are similar.

- 1 Lift the vehicle, see [Lift the vehicle](#)
- 2 Remove the 4 retaining nuts of the RL suspension fender apron and remove the RL suspension fender apron.

**Installation procedure**

- 1 Install 4 retaining nuts on the RL suspension fender apron.
Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)



- 2 Lower the vehicle.

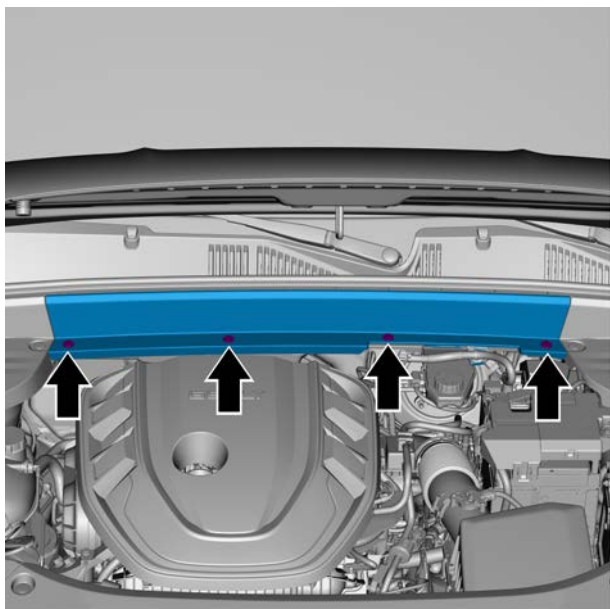
12.9.2.7 Replacement of left engine bay trim plate

Removal procedure

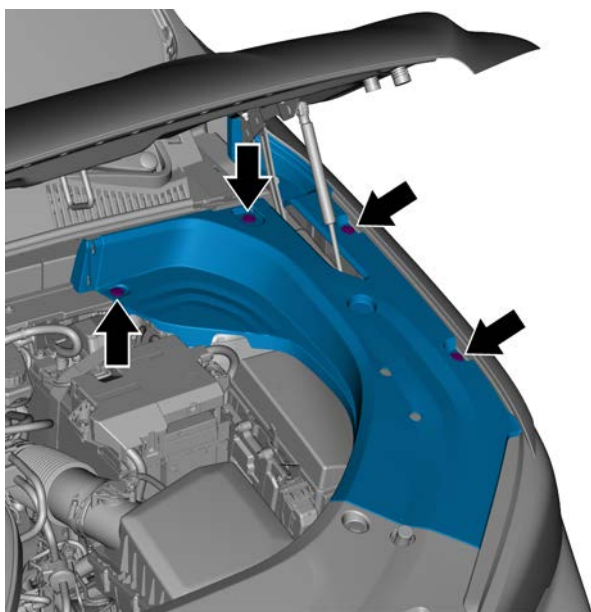
Caution

The removal and assembly methods of the trim plates on the left and right sides of the engine bay are similar.

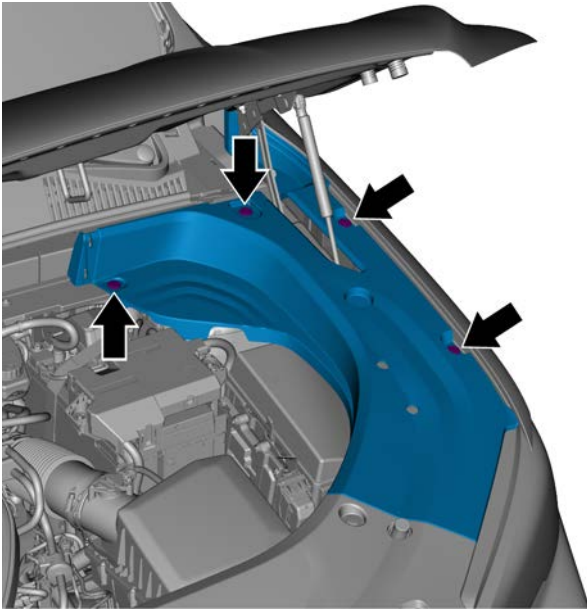
- 1 Opening the engine hood
- 2 Remove 4 retaining clips of the rear engine bay trim plate.



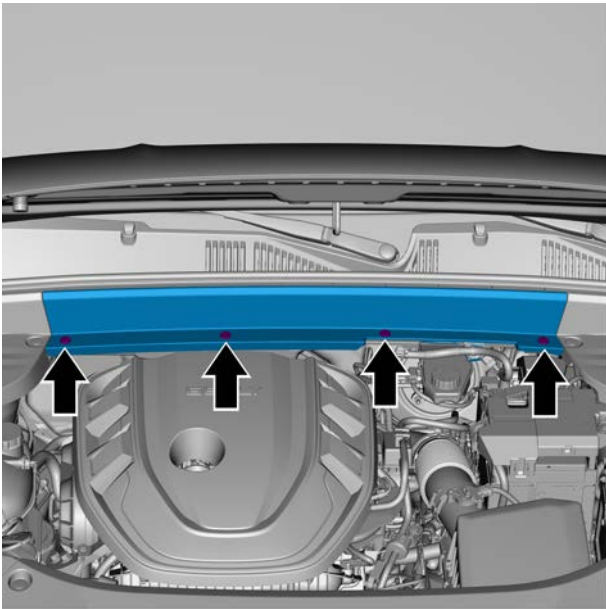
- 3 Remove the 4 retaining clips of the left engine bay trim plate and remove the left engine bay trim plate.



Installation procedure



- 1 Install 4 retaining clips on the left engine bay trim plate.



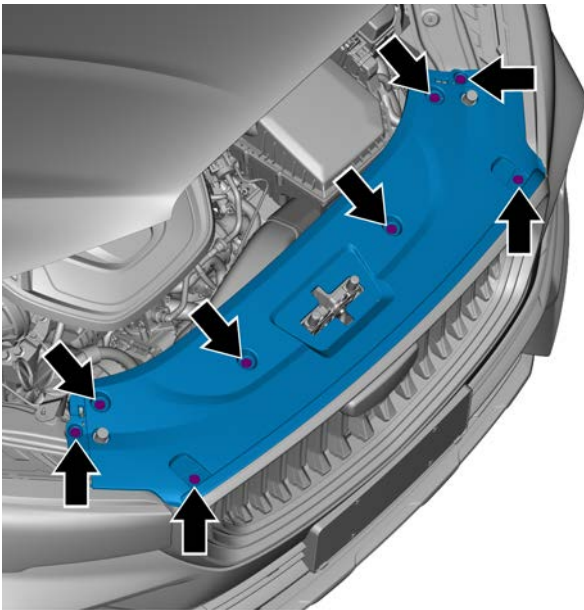
- 2 Install 4 retaining clips of the engine bay trim plate.

- 3 Close the engine hood

12.9.2.8 Replacement of front engine bay trim plate

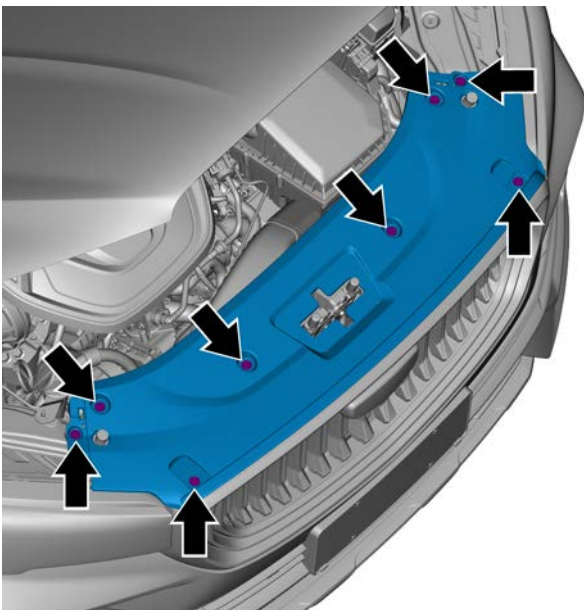
Removal procedure

- 1 Opening the engine hood
- 2 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates.](#)
- 3 Remove the 8 retaining clips of the front engine bay trim plate and remove the front engine bay trim plate.



Installation procedure

- 1 Install 8 retaining clips of the front engine bay trim plate.

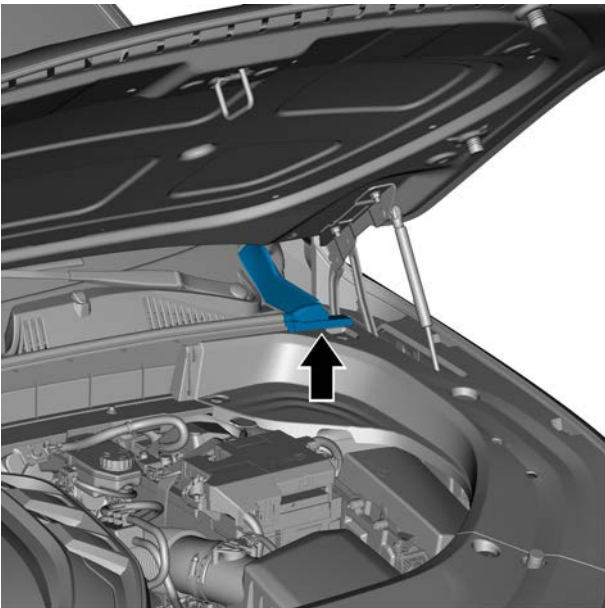
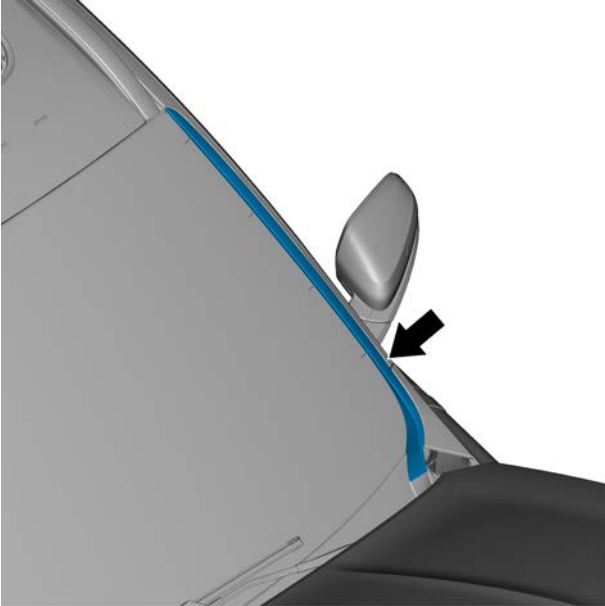


- 2 Install the left and right engine bay trim plates.
- 3 Close the engine hood

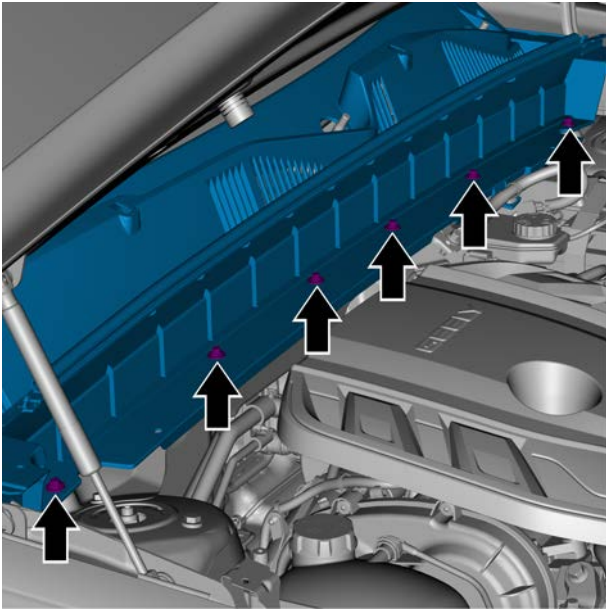
12.9.2.9 Replacement of plenum mounding assembly (Type 1)

Removal procedure

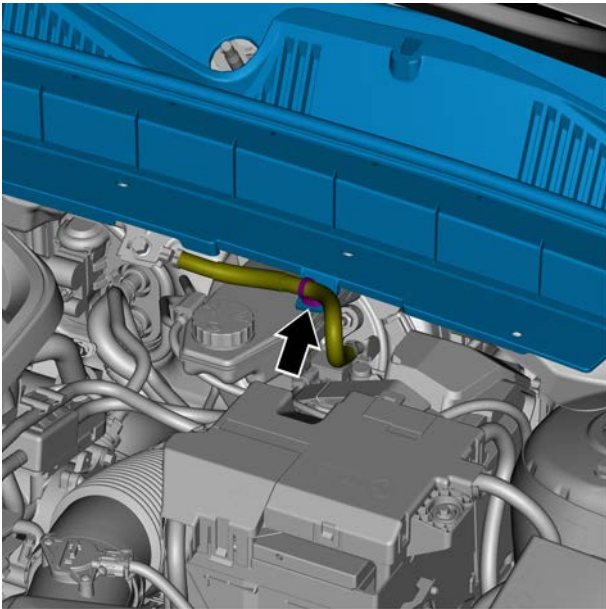
- 1 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 2 Before removing the wiper arm, see the [Replacement of the previous wiper arm](#).
- 3 Remove the front washer jet assembly, see [Replacement of the front washer jet assembly \(Type 1\)](#).
- 4 Remove the front left windshield trim.



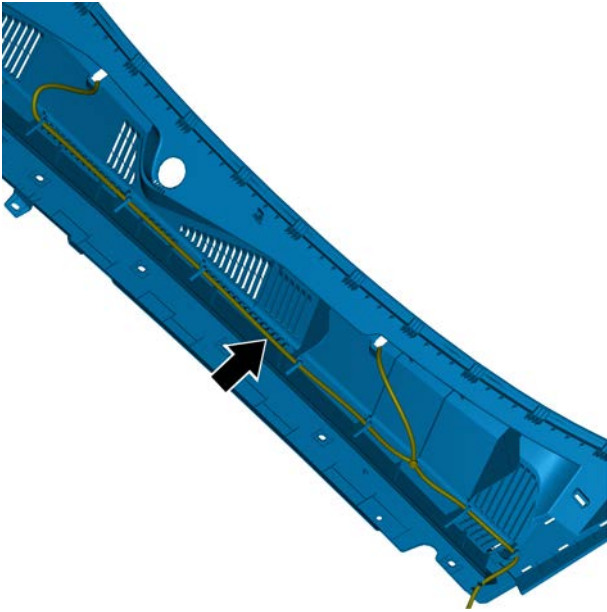
- 5 Remove the trim plate on the left side of the engine bonnet.



- 6 Remove the 6 retaining bolts of the plenum mounding assembly.

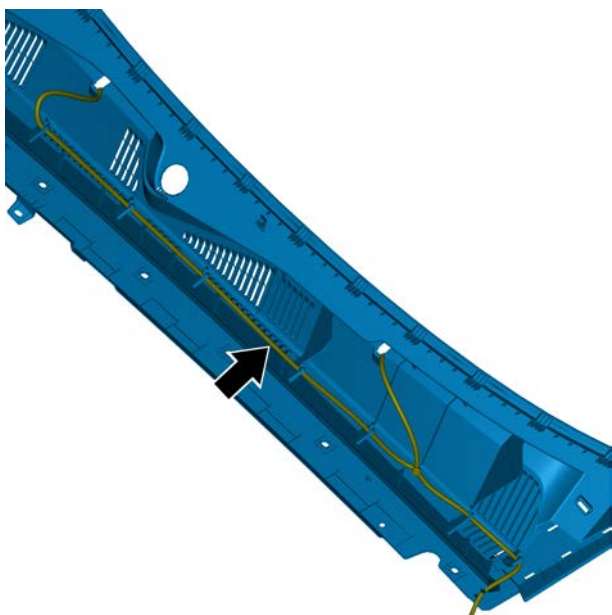


- 7 Remove the battery negative cable retaining clip on the plenum mounding assembly.

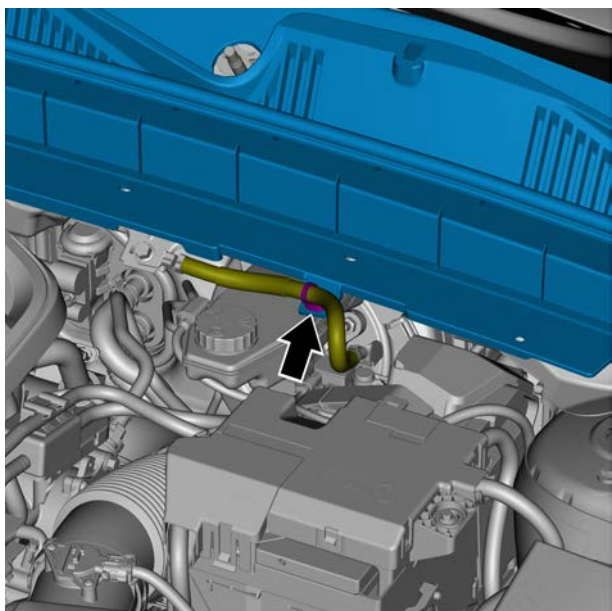


- 8 Remove the front washing hose on the plenum mounding assembly and remove the plenum mounding assembly.

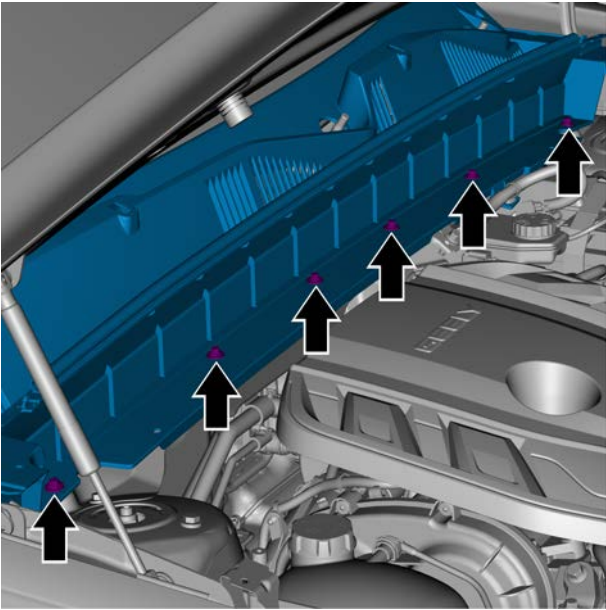
Installation procedure



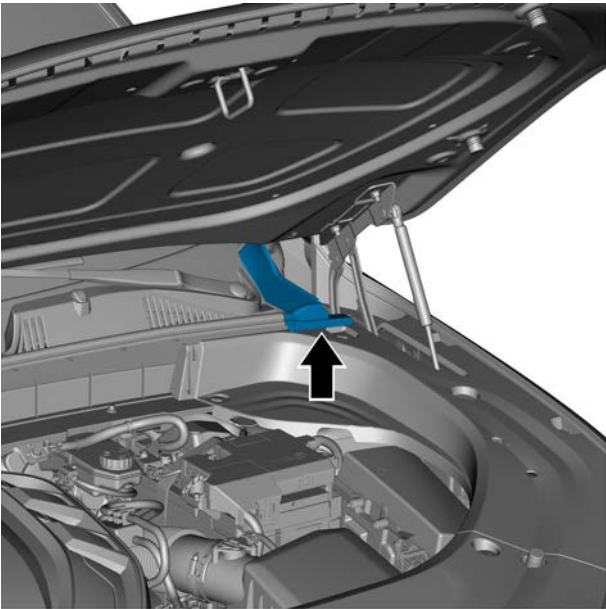
- 1 Install the front washing hose on the plenum mounding assembly.



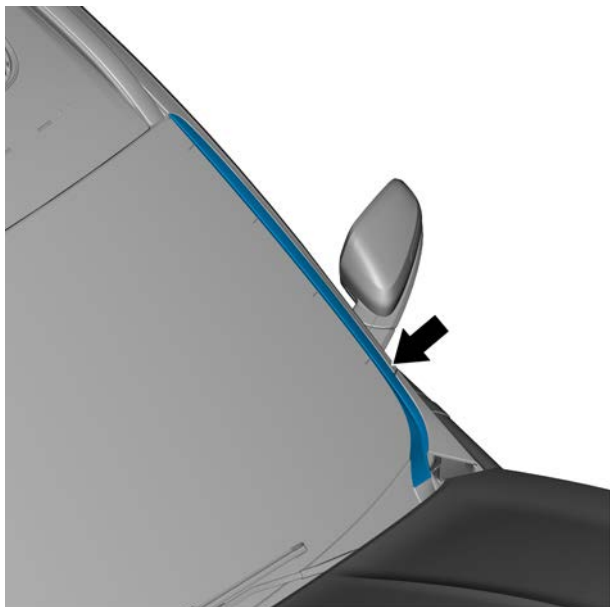
- 2 Install the battery negative cable retaining clip on the plenum mounding assembly.



- 3 Install 6 retaining bolts of plenum mounding assembly.
Torque: 4 N·m (metric) 3.0 lb-ft (imperial system)



- 4 Install the trim plate on the left side of the engine bonnet.



5 Install the front left windshield trim.

6 Install the front washer nozzle.

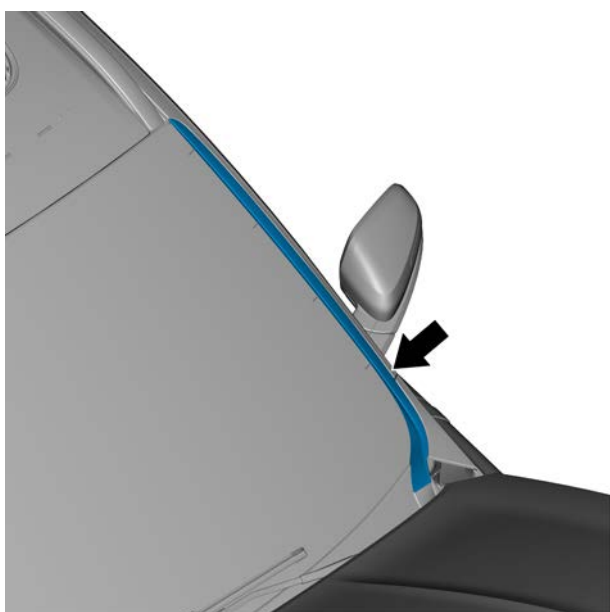
7 Install the front wiper arm.

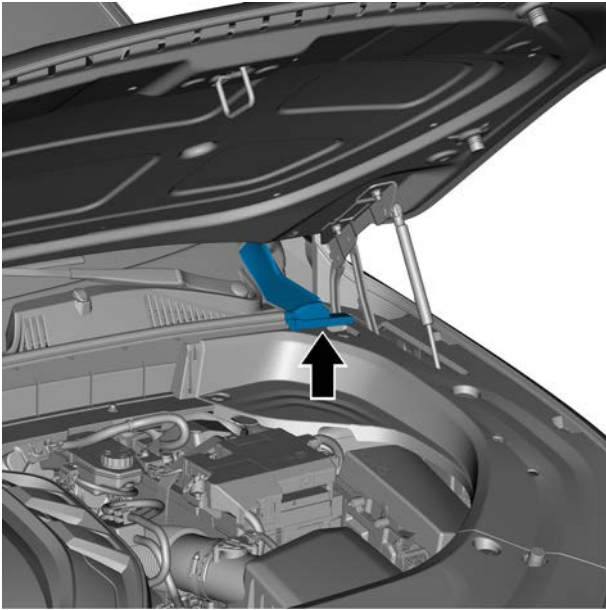
8 Install the left and right engine bay trim plates.

12.9.2.10 Replacement of plenum mounding assembly (Type 2)

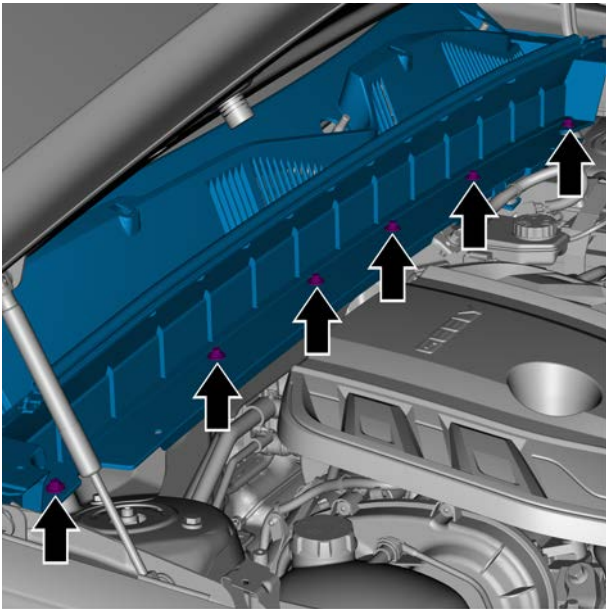
Removal procedure

- 1 Remove the left and right engine bay trim plates, see the [Replacement of the left engine bay trim plates](#).
- 2 Before removing the wiper arm, see the [Replacement of the previous wiper arm](#).
- 3 Remove the front left windshield trim.

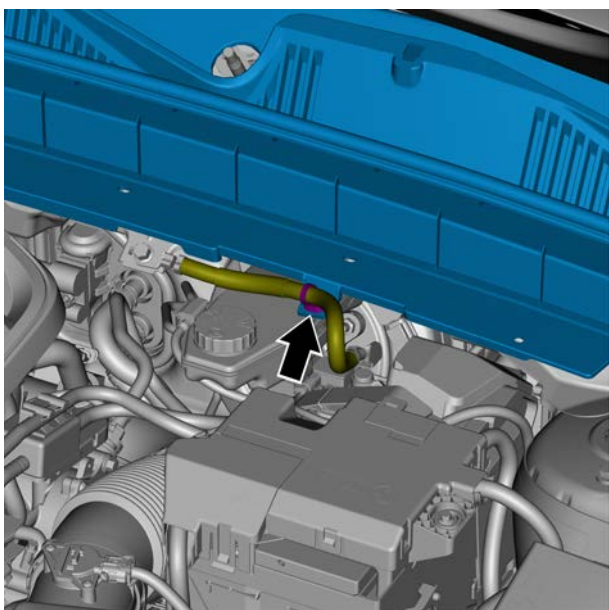




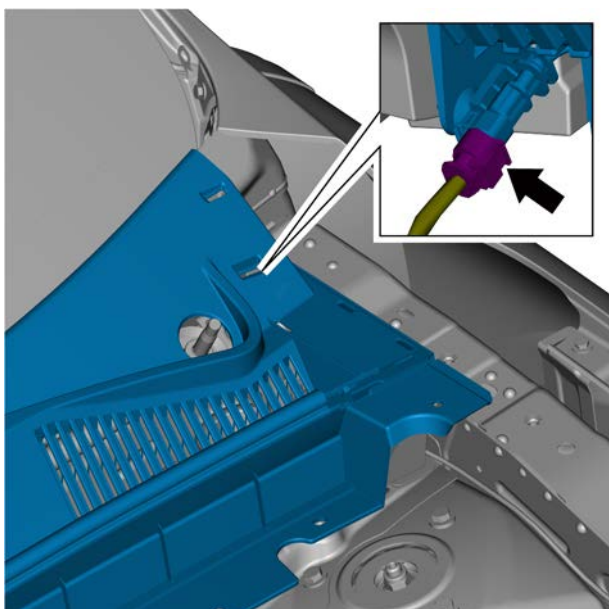
- 4 Remove the trim plate on the left side of the engine bonnet.



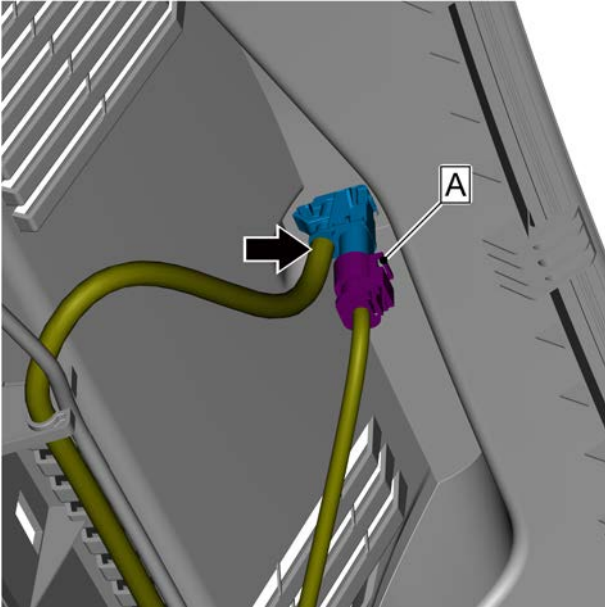
- 5 Remove the 6 fixing bolts of the ventilation cover panel.



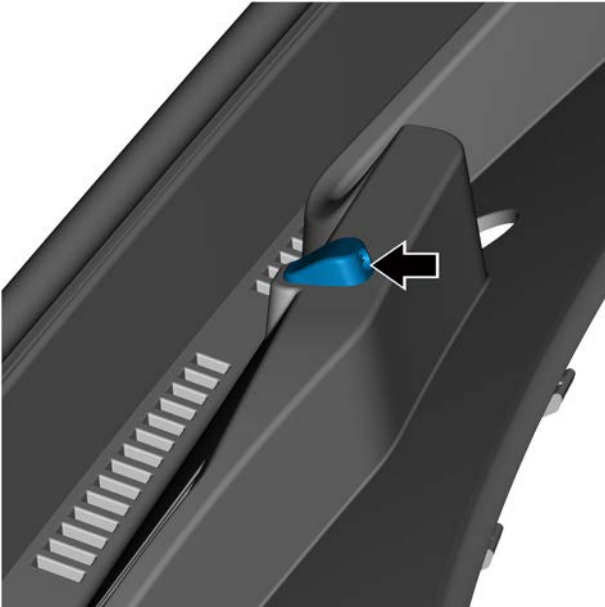
- 6 Remove the battery negative cable retaining clip on the plenum mounding assembly.



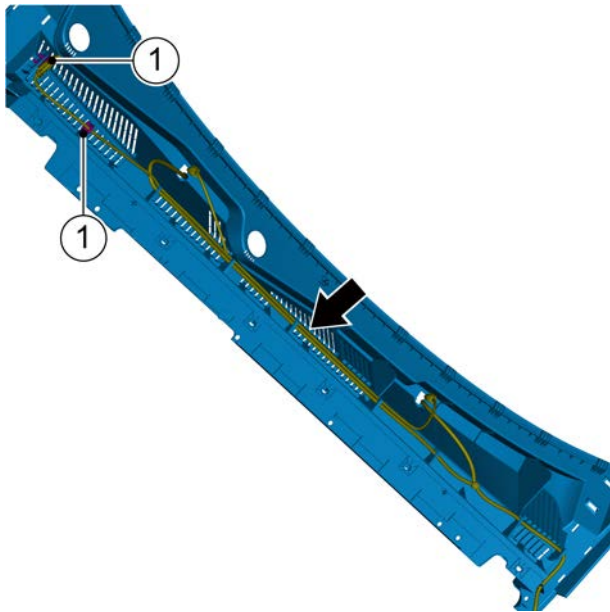
- 7 Disconnect the plenum mounding assembly harness connector.



- 8 Disconnect the connection between the front washer jet assembly and the hose.
- 9 Disconnect the front windshield washer jet assembly harness connector A.

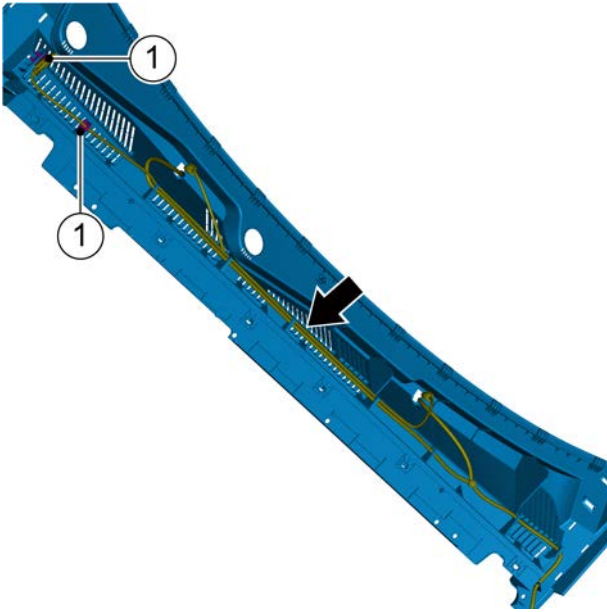


- 10 Remove the front washer nozzle assembly.

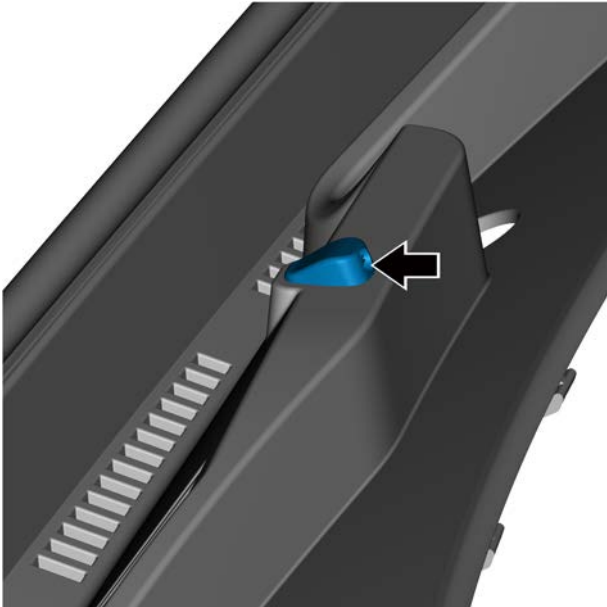


- 9 Disconnect washer jet assembly pipe and wire harness clip 1.
- 10 Remove the front washing hose on the plenum mounding assembly and remove the plenum mounding assembly.

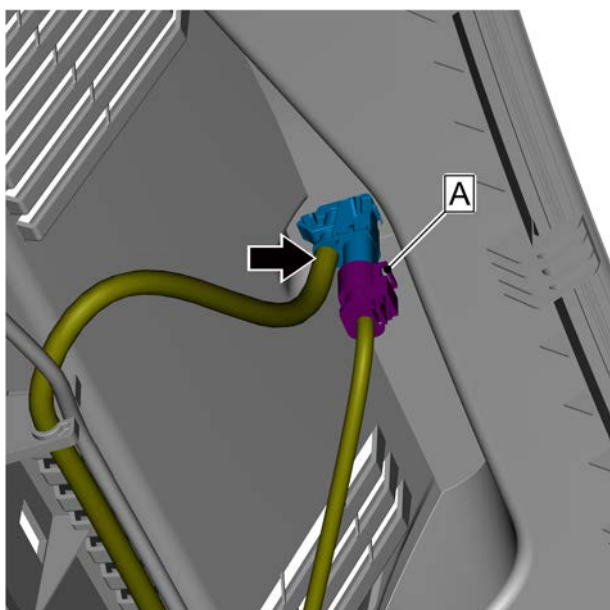
Installation procedure



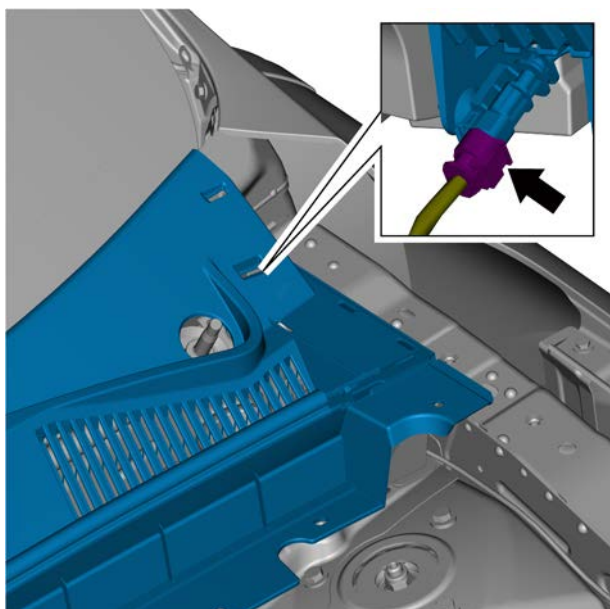
- 1 Install the front washing hose and front washer jet wire harness clip 1 on plenum mounding assembly.



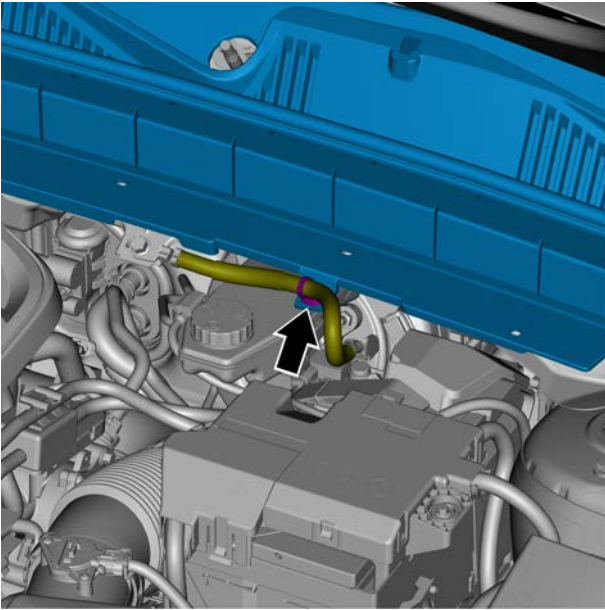
- 2 Install the front washer nozzle assembly.



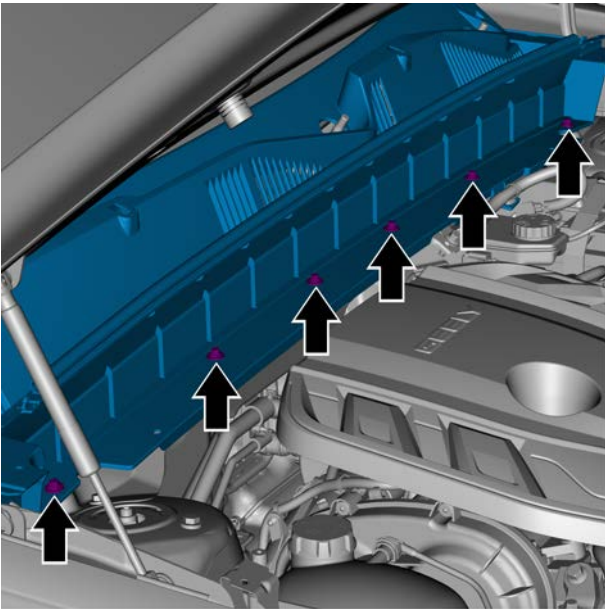
- 3 Connect the front windshield washer jet assembly harness connector A.
- 4 Connect the front windshield washer jet assembly hose.



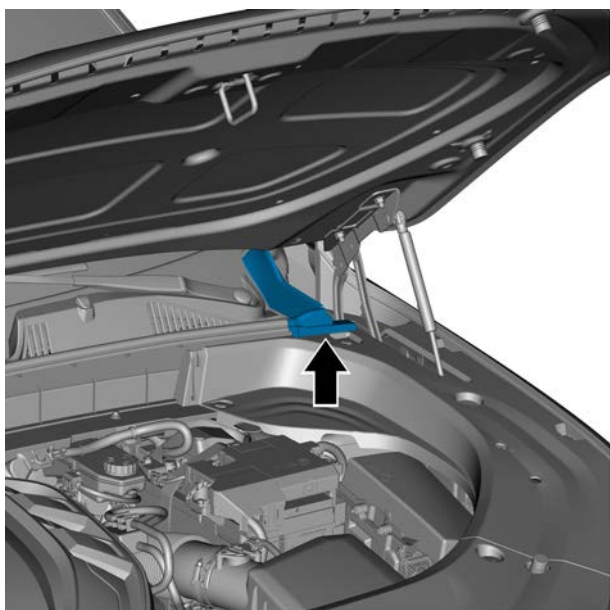
- 5 Connect the plenum mounding assembly harness connector.



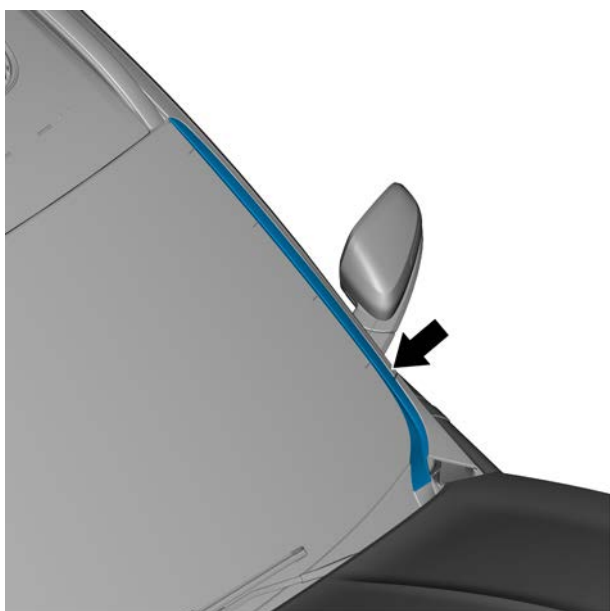
- 6 Install the battery negative cable retaining clip on the plenum mounding assembly.



- 7 Install the 6 fixing bolts of the ventilation cover panel.
Torque: 4 N·m (metric system) 3.0 lb-ft (Imperial system)



8 Install the trim plate on the left side of the engine bonnet.



9 Install the front left windshield trim.

10 Install the front wiper arm.

11 Install the left and right engine bay trim plates.

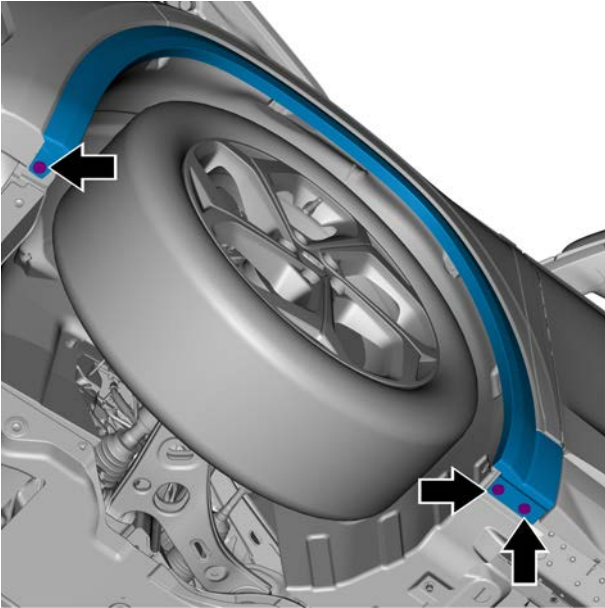
12.9.2.11 Replacement of front left wheel brow

Removal procedure

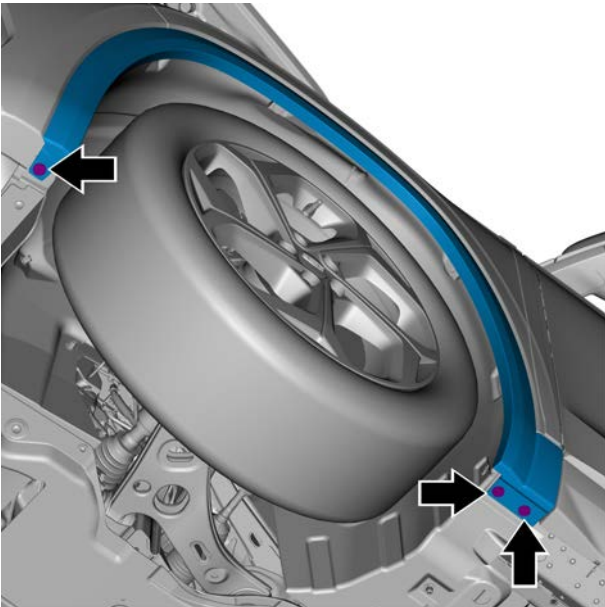
Caution

The removal and assembly methods of the front wheel brows on the left and right sides are similar.

- 1 Remove the 3 retaining clips of the front left wheel brow and remove it.

**Installation procedure**

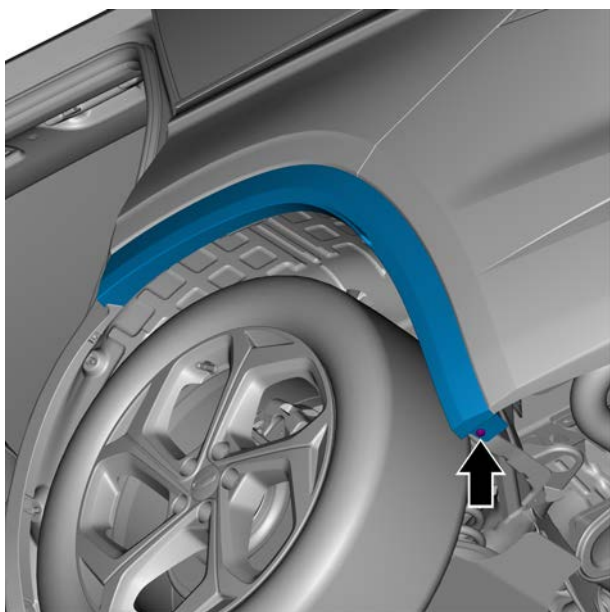
- 1 Install 3 fixing clips of front wheel brow.

**12.9.2.12 Replacement of rear left wheel brow****Removal procedure**

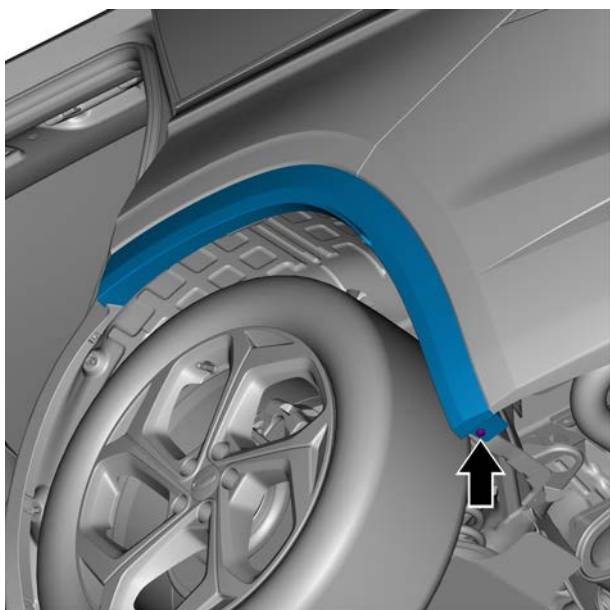
Caution

The removal and assembly methods of the RL and RR wheel brows are similar.

- 1 Dismantle the RL wheel brow retaining screw and remove it.

**Installation procedure**

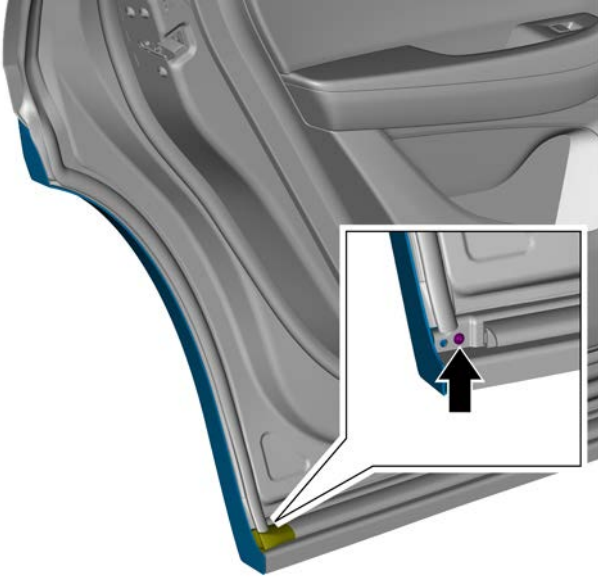
- 1 Install the RL wheel brow retaining screw.
Torque: 2 N·m (metric) 1.5 lb-ft (imperial system)

**12.9.2.13 Replacement of the front part of the RL wheel brow****Removal procedure**

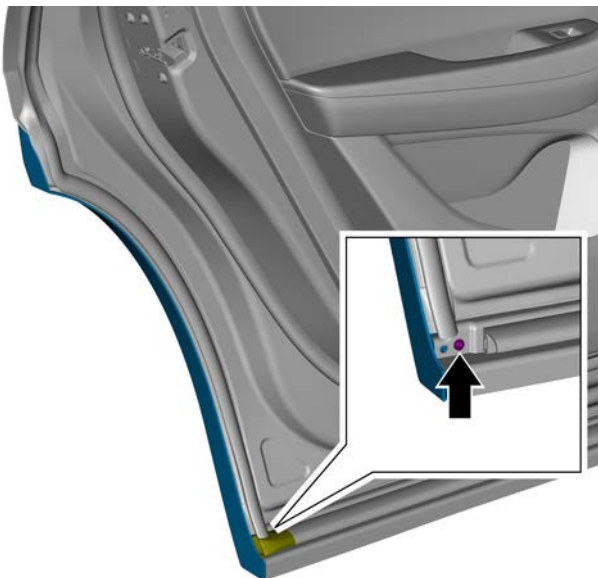
Caution

The method of removal and assembly of the front part of the rear wheel brow on the left and right sides are similar.

- 1 Remove the retaining screw of the front part of the RL wheel brow and remove the front part of the RL wheel brow.

**Installation procedure**

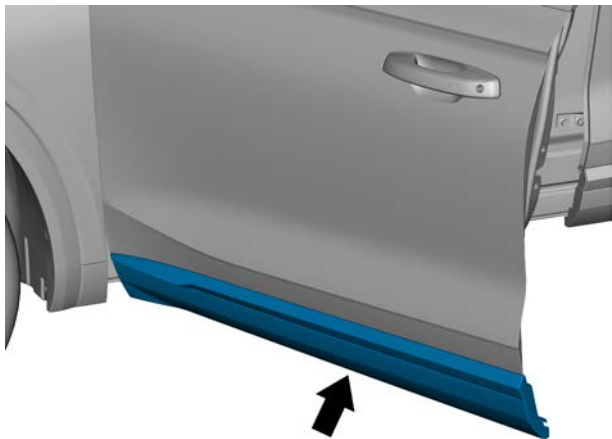
- 1 Install the front part of the RL wheel brow retaining screw.
Torque: 0.7 N·m (metric) 0.5 lb-ft (imperial system)

**12.9.2.14 Replacement of front left door lower trim panel assembly****Removal procedure**

Caution

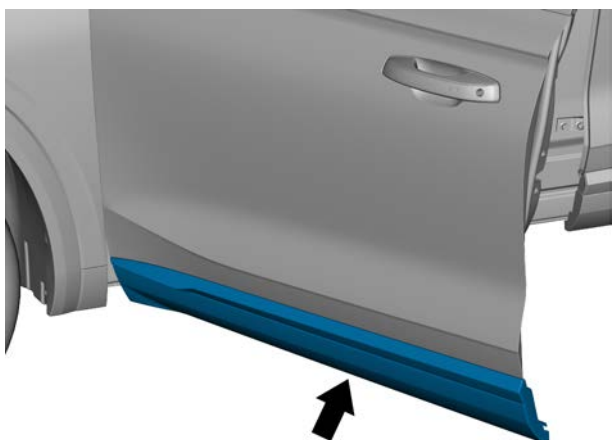
The removal and assembly method of the lower trim plate assembly of the front door on the left and right sides are similar.

- 1 Dismantle the front left door lower trim plate assembly and remove it.



Installation procedure

- 1 Install the front left door lower trim panel assembly.



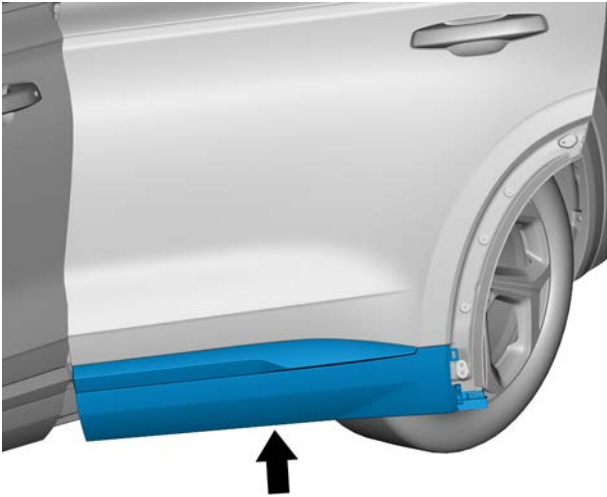
12.9.2.15 Replacement of RL door lower trim panel assembly

Removal procedure

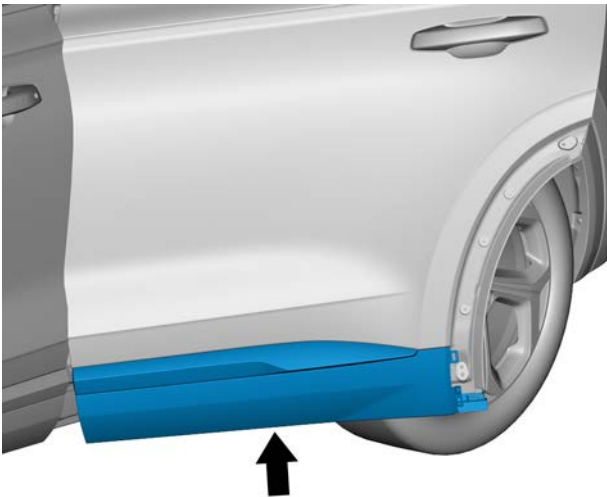
Caution

The removal and assembly method of the lower trim plate assembly of the rear door on the left and right sides are similar.

- 1 Remove the front part of the RL wheel brow, see the [Replacement of the front part of the RL wheel brow](#).
- 2 Dismantle the RL door lower trim plate assembly and remove it.

**Installation procedure**

- 1 Install the RL door lower trim plate assembly and remove it.



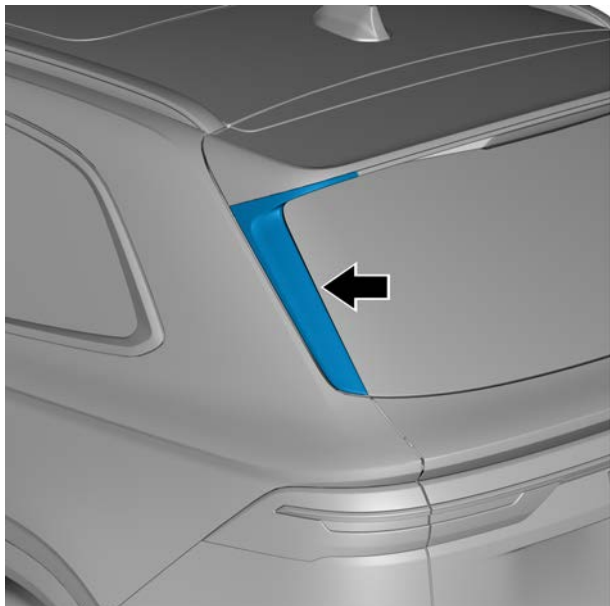
- 2 Install the front part of the RL wheel brow.

12.9.2.16 Replacement of the rear windshield left spoiler assembly**Removal procedure**

Caution

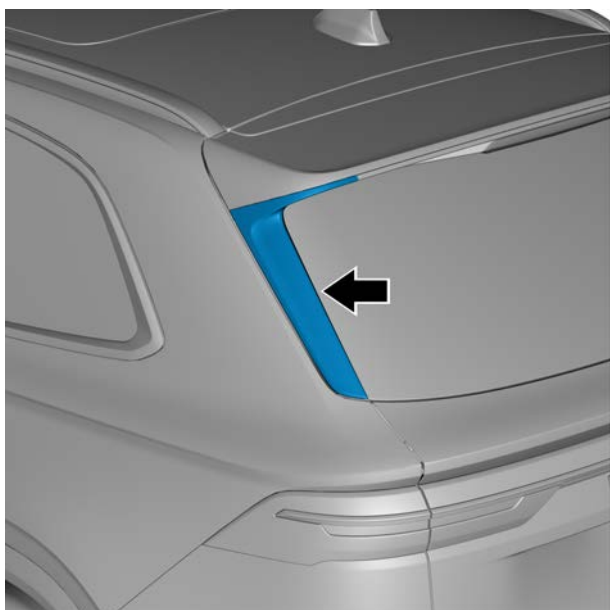
The removal and assembly method of the side spoiler assembly of the rear windshield on the left and right sides are similar.

- 1 Dismantle the rear windshield left spoiler assembly and remove it.



Installation procedure

- 1 Install the rear windshield left spoiler assembly.



12.9.2.17 Replace the spoiler assembly

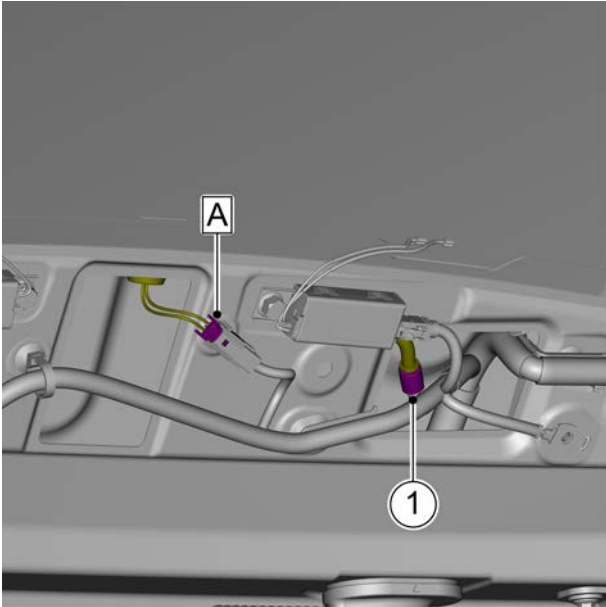
Removal procedure

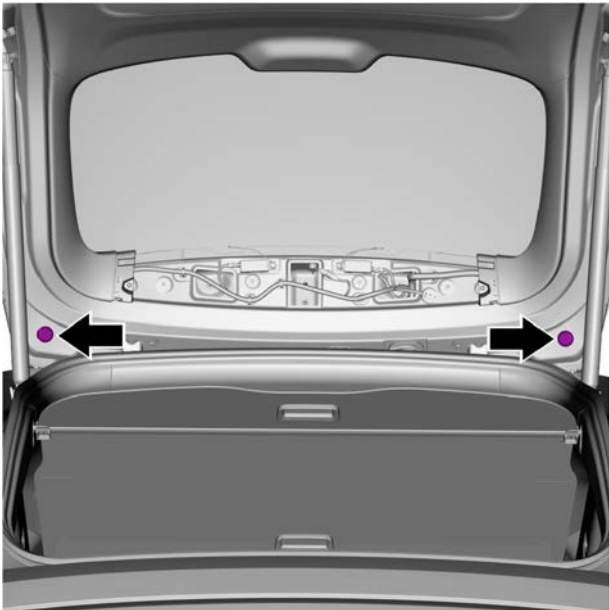
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

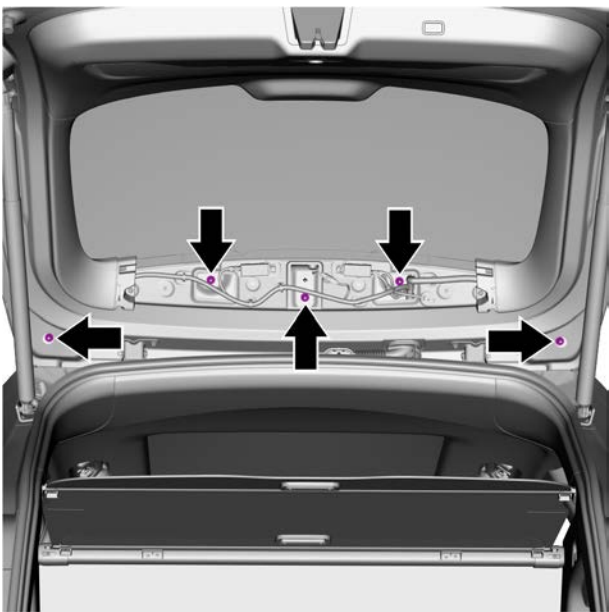
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).

- 2 Remove the rear windshield left spoiler assembly, see [Replacement of the rear windshield left spoiler assembly](#).
- 3 Remove the tailgate middle upper interior trim panel assembly of the assembly, see [Replacement of the tailgate middle upper interior trim panel assembly](#).
- 4 Disconnect rear window brake light harness connector A.
- 5 Remove rear windshield washer hose assembly 1.



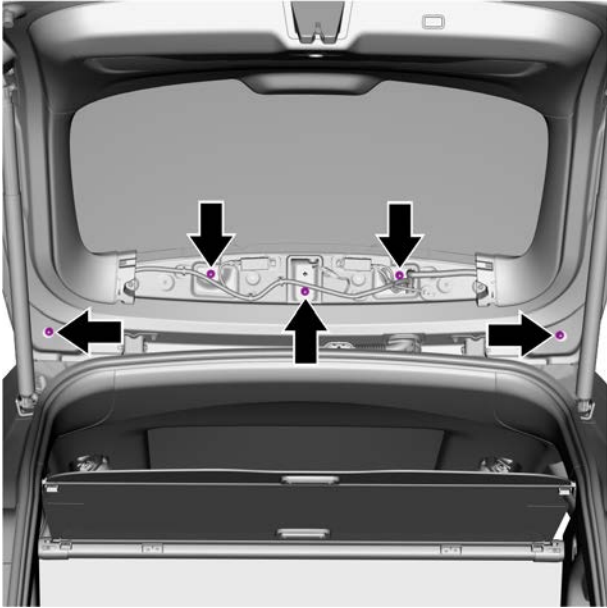


6 Remove 2 plastic plugs.

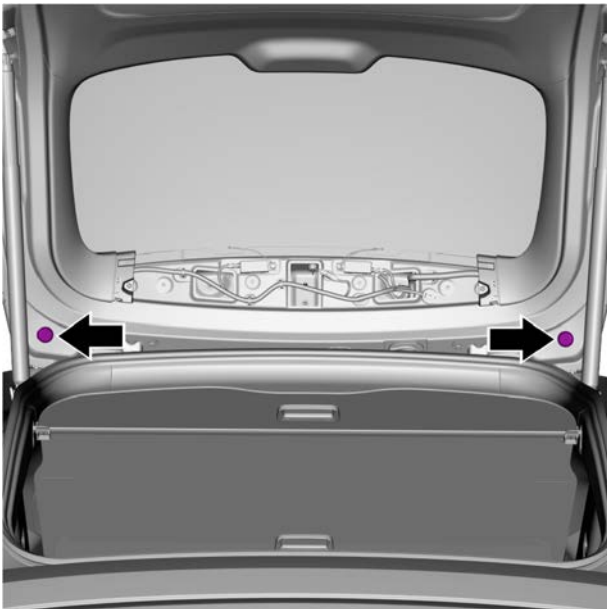


7 Remove the 5 retaining nuts of the spoiler assembly and remove the spoiler assembly.

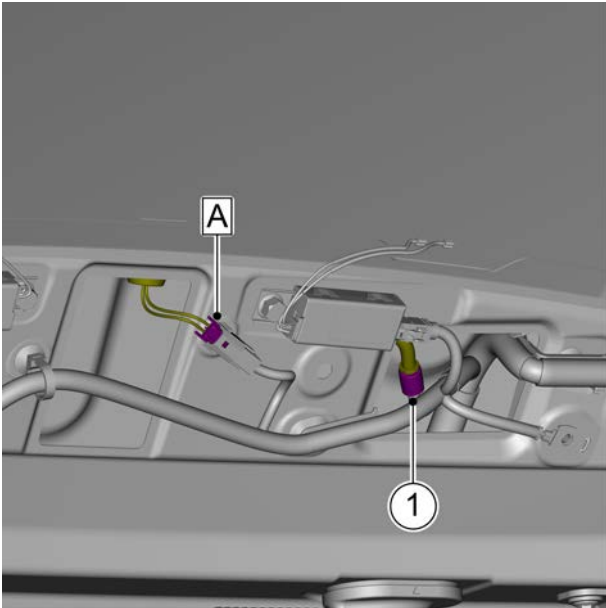
Installation procedure



- 1 Install 5 fixing nuts of the spoiler assembly.
Torque: 9 N·m (metric) 6.6 lb-ft (imperial system)



- 2 Install 2 plastic plugs.



- 3 Connect rear window brake light harness connector A.
- 4 Install rear windshield washer hose assembly 1.

- 5 Install the middle upper interior trim panel assembly of the tailgate.
- 6 Install the rear windshield left spoiler assembly.
- 7 Connect the negative battery cable.

12.9.2.18 Replacement of the left roof rack

Removal procedure

Warning !

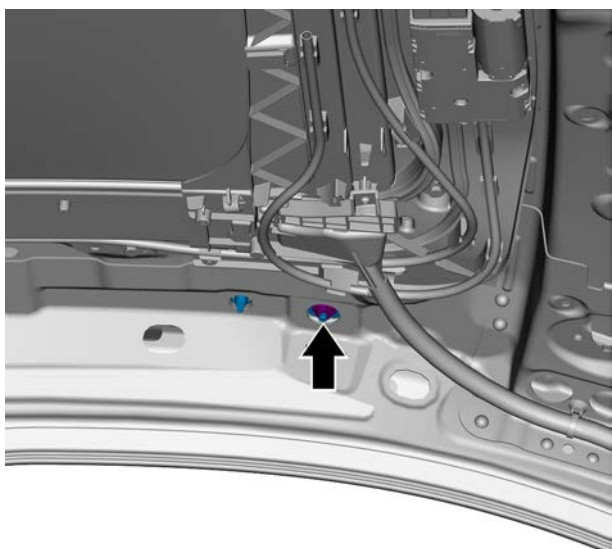
See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

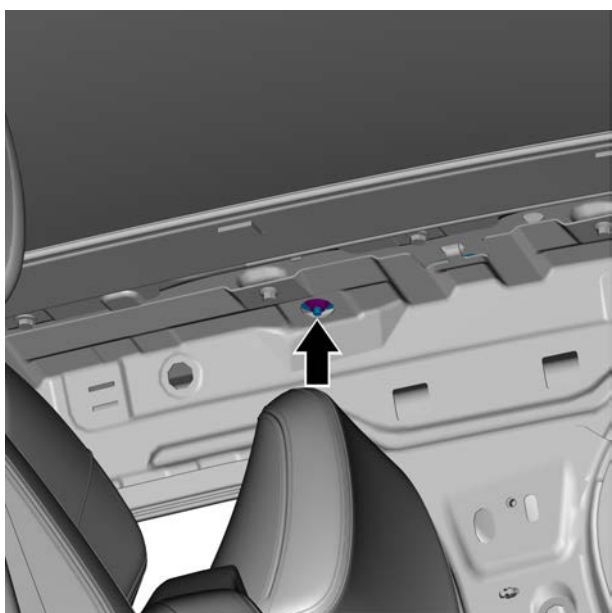
The methods of removal and assembly the roof racks on the left and right sides are similar.

- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the left and right A-pillar trim plate assembly, see [Replacement of the left and right A-pillar trim plate assembly](#).
- 3 Remove the front left doorsill trim plate assembly, see [Replacement of the front left doorsill trim plate assembly](#).
- 4 Remove the FR doorsill trim plate assembly, see [Replacement of the FR doorsill trim plate assembly](#).
- 5 Remove the rear seat cushion assembly, see [Replacement of the rear seat cushion assembly](#).
- 6 Remove the left backrest assembly of the rear seat, see [Replacement of the left backrest assembly of the rear seat](#).

- 7 Remove the right backrest assembly of the rear seat, see [Replacement of the right backrest assembly of the rear seat](#).
- 8 Remove the upper trim cover of the left rear compartment, see [Replacement of the upper trim cover of the left rear compartment](#).
- 9 Remove the left and right rear compartment side guard assembly, see the [Replacement of the RL compartment side guard assembly](#).
- 10 Remove the left and right C-pillar upper trim panel assembly, refer [to replacement of the left C-pillar upper trim panel assembly](#).
- 11 Remove the left and right D-pillar trim plate assembly, see [Replacement of left D-pillar trim plate assembly](#).
- 12 Remove the left and right rear threshold interior trim plate assembly, see the [Replacement of the left and right rear threshold interior trim plate assembly](#).
- 13 Remove the left and right B-pillar lower trim panel assembly, refer to [replacement of left and right B-pillar lower trim panel assembly](#).
- 14 Remove the left and right B-pillar upper trim panel assembly, refer [to replacement of the left B-pillar upper trim panel assembly](#).
- 15 Before removing the safety handle assembly, see the [Replacement of the front safety handle assembly](#).
- 16 Remove the RL and RR safety handle assembly, see [Replacement of front safety handle assembly](#).
- 17 Remove the left and right sun visor assembly, see the [Replacement of the left sun visor assembly](#).
- 18 Remove the overhead console unit, see the [Replacement of the overhead console unit \(Type 1\)](#) and the [Replacement of the overhead console unit \(Type 2\)](#)
- 19 Remove the ceiling assembly, see [Replacement of the roof assembly](#).
- 20 Remove the anti-intrusion side shade curtain (left), see the [Replacement of the anti-intrusion side shade curtain \(left\)](#).

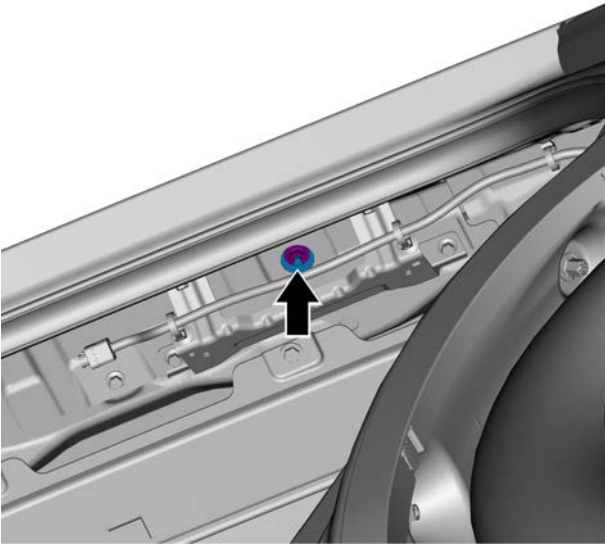


21 Remove the A-pillar end retaining bolt of the left roof rack.

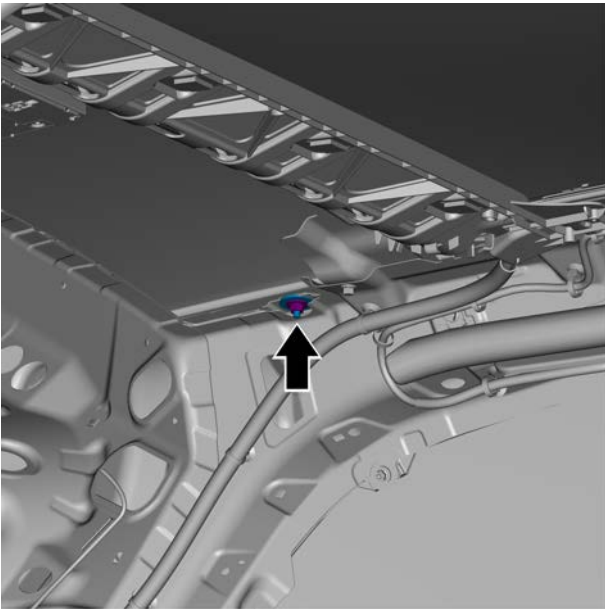


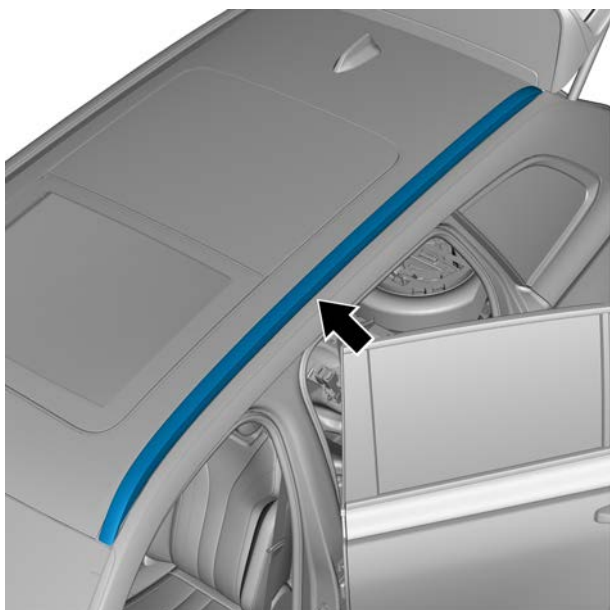
22 Remove the B-pillar end retaining nut of the left roof rack.

- 23 Remove the C-pillar end retaining nut of the left roof rack.



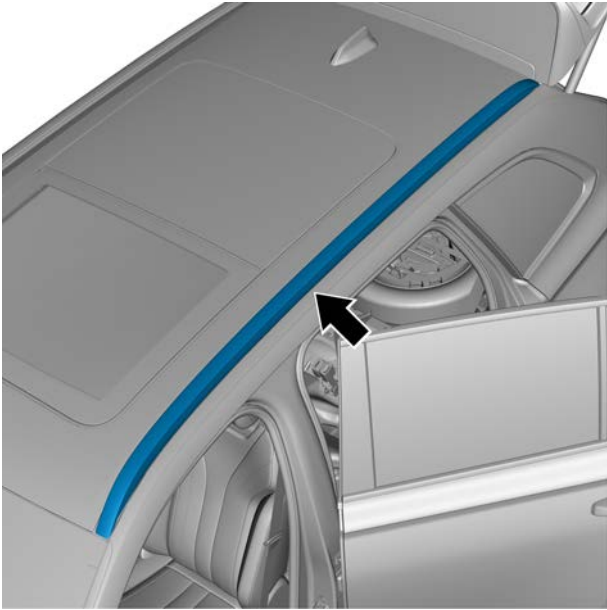
- 24 Remove the D-pillar end retaining nut of the left roof rack.



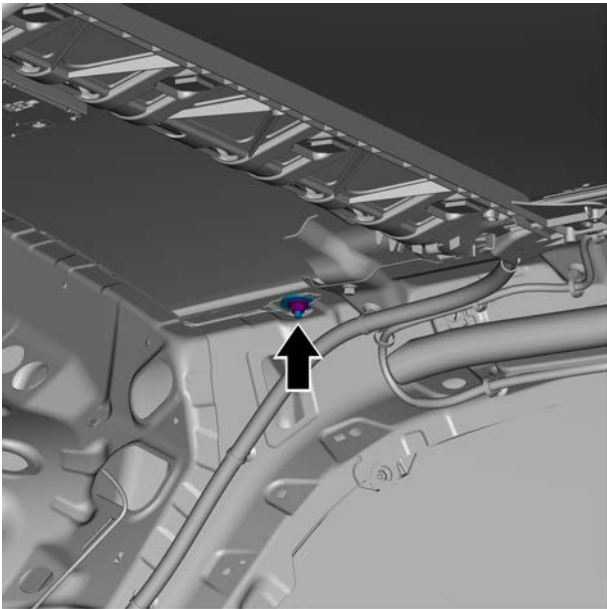


25 Take down the left roof rack.

Installation procedure

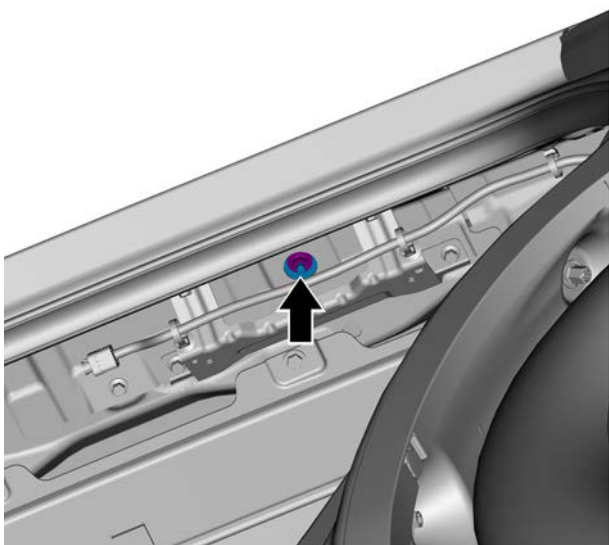


1 Install the left roof rack.

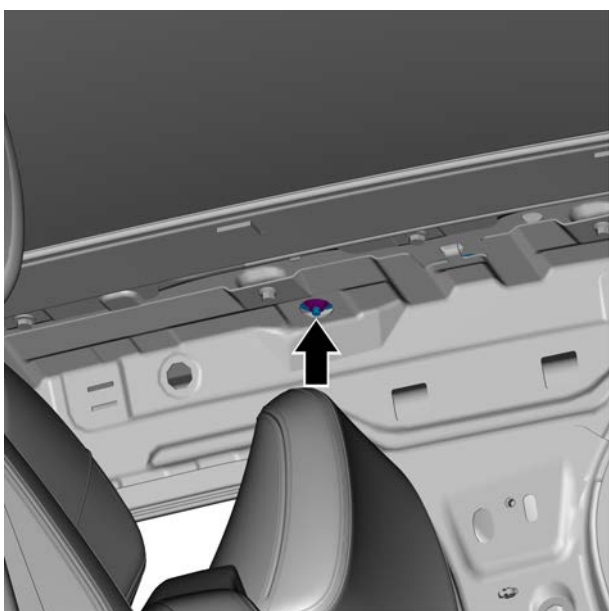


2 Install the D-pillar end retaining nut of the left roof rack.

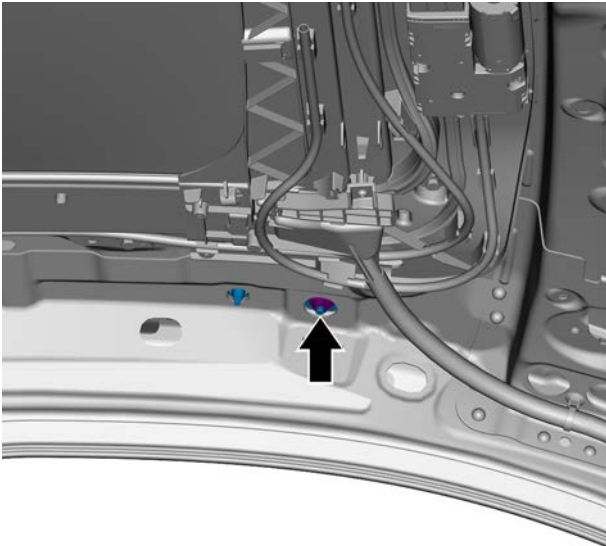
Torque: 9 N·m (metric) 6.6 lb-ft (imperial system)



- 3 Install the C-pillar end retaining nut of the left roof rack.
Torque: 9 N·m (metric) 6.6 lb-ft (imperial system)



- 4 Install the B-pillar end retaining nut of the left roof rack.
Torque: 9 N·m (metric) 6.6 lb-ft (imperial system)



- 5 Install the A-pillar end retaining bolt of the left roof rack.
Torque: 9 N·m (metric) 6.6 lb-ft (imperial system)

- 6 Install anti-intrusion side shade curtain (left).
- 7 Install the ceiling assembly.
- 8 Install the overhead console unit.
- 9 Install the left and right sun visor assembly.
- 10 Install the left and right rear safety handles assembly.
- 11 Install the Front safety handle assembly.
- 12 Install the left and right B-pillar upper trim panel assembly.
- 13 Install the left and right B-pillar lower trim panel assembly.
- 14 Install the left and right rear threshold interior trim panel assembly.
- 15 Install the left and right D-pillar upper trim panel assembly.
- 16 Install the left and right C-pillar upper trim panel assembly.
- 17 Install the left and right rear compartment side guard assembly.
- 18 Install the upper trim plate of the left and right rear compartment.
- 19 Install the right rear seat backrest assembly .
- 20 Install the left rear seat backrest assembly .
- 21 Install the rear seat cushion assembly.
- 22 Install the right front door sill trim panel assembly.
- 23 Install the left front door sill trim panel assembly.

- 24 Install the left and right A-pillar upper trim panel assembly.
- 25 Connect the negative battery cable.

12.9.2.19 Replacement of front left door B-pillar trim plate

Removal procedure

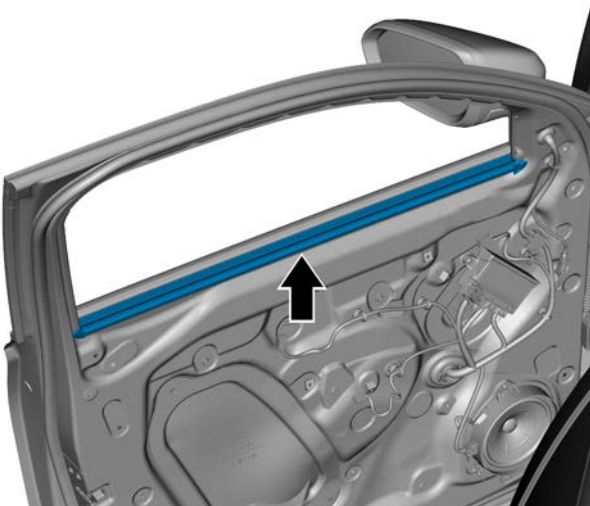
Warning !

See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

The method of removal and assembly the B-pillar trim plate of the front door on the left and right sides are similar.

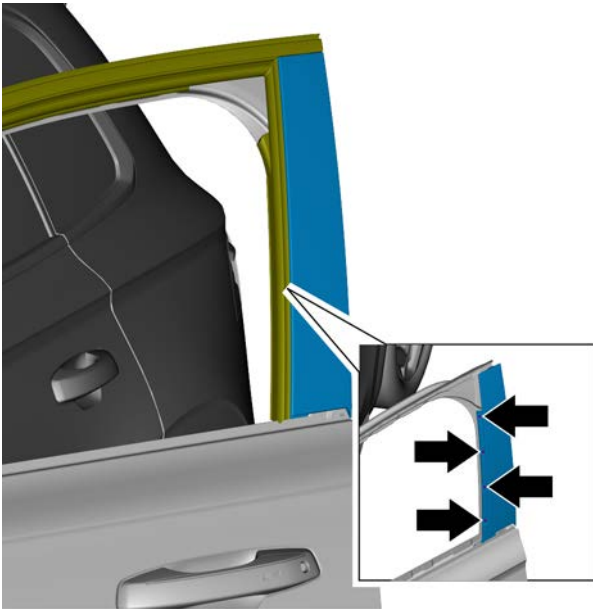
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the front left door interior trim panel plate assembly, see [Replacement of the front left door interior trim panel plate assembly](#).
- 3 Remove the front left door glass assembly, see the [Replacement of the front left door glass assembly](#).
- 4 Remove the exterior rearview mirror (left) and see the [Replacement of the exterior rearview mirror \(left\)](#).
- 5 Dismantle the exterior belt line of front left door.



- 6 Dismantle the exterior belt line of front left door.



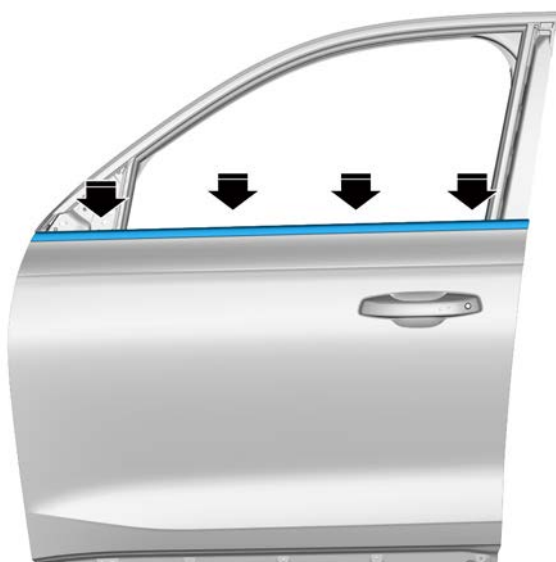
- 7 Claw part of the glass run channel of the front left door, dismantle the 4 J-type clips of the B-pillar trim plate of the front left door, and remove the B-pillar trim plate of the front left door.



Installation procedure

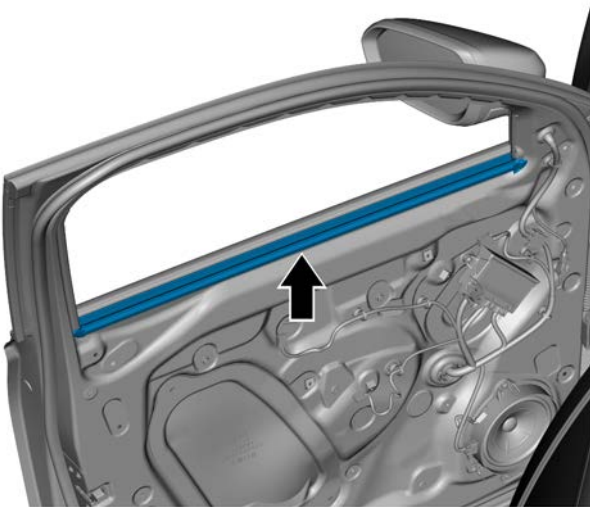


- 1 Install 4 J-type clips of the front left door B-pillar trim plate and part of the front left door glass run channel.



- 2 Install the belt line moulding exterior front door LH.

- 3 Install the interior belt line of front left door.



- 4 Install the exterior rearview mirror (left).
- 5 Install the front left door glass lifter assembly.
- 6 Install the assembly-interior trim panel front door LH.
- 7 Connect the negative battery cable.

12.9.2.20 Replacement of the RL door B-pillar trim plate

Removal procedure

Warning !

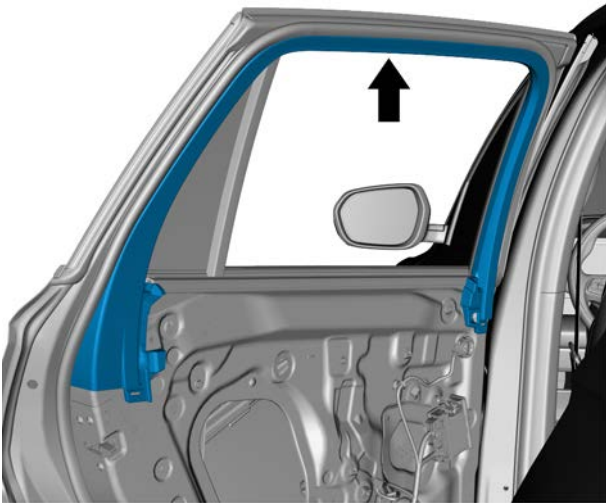
See "warning about disconnecting battery" in [Warnings and cautions](#)

Caution

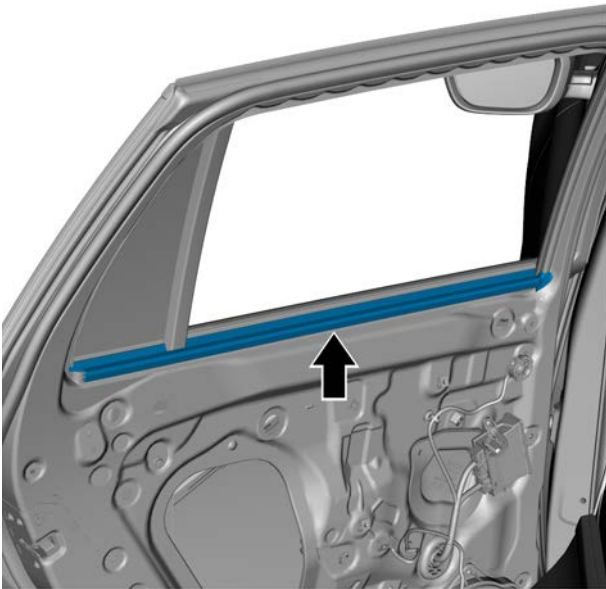
The method of removal and of assembly of the tailgate B-pillar trim plate on the left and right sides are similar.

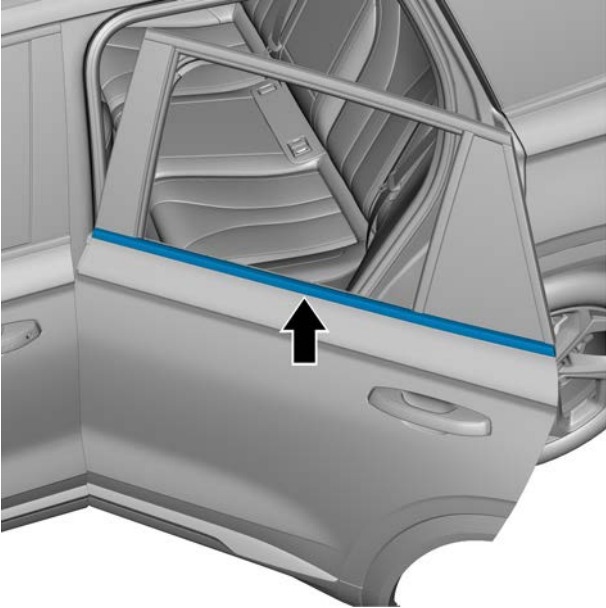
- 1 Disconnect the battery negative cable, refer to [battery cable disconnection and connection procedures](#).
- 2 Remove the RL door interior trim plate assembly, see the [Replacement of the RL door interior trim plate assembly](#).
- 3 Remove the RL door glass assembly, see the [Replacement of the RL door glass assembly](#).

- 4 Remove the RL door and window frame trim assembly.

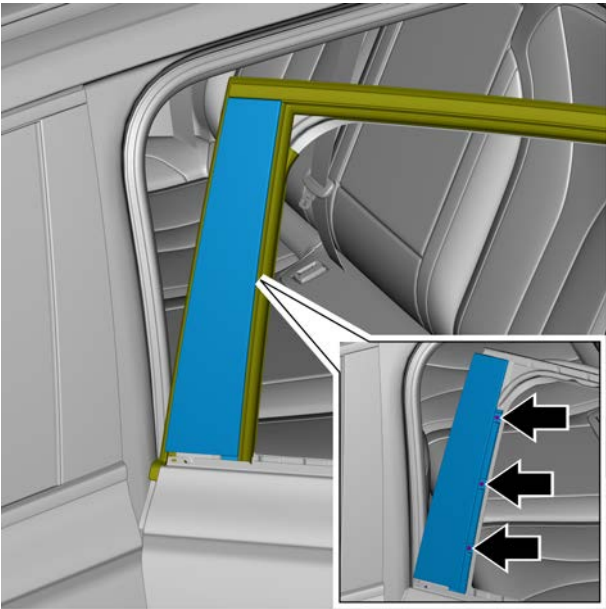


- 5 Remove the RL door interior weatherstrip.



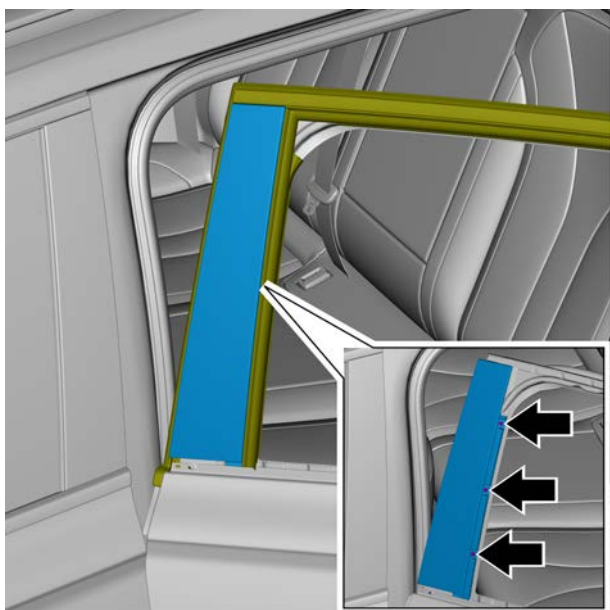


- 6 Dismantle the exterior belt line of RH door.

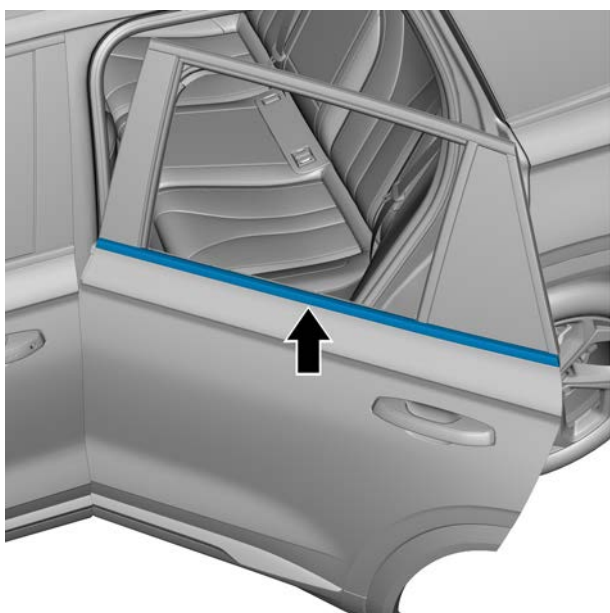


- 7 Claw part of the glass run channel of the RH door, dismantling the 4 J-type clips of the B-pillar trim plate of the RH door, and remove the B-pillar trim plate of the RH door.

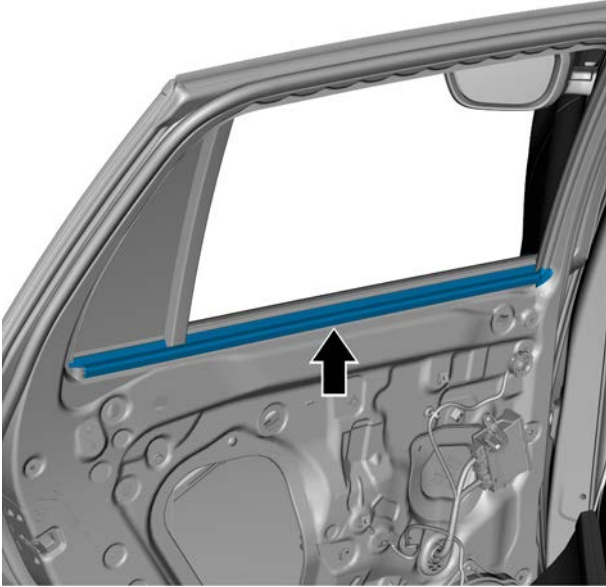
Installation procedure



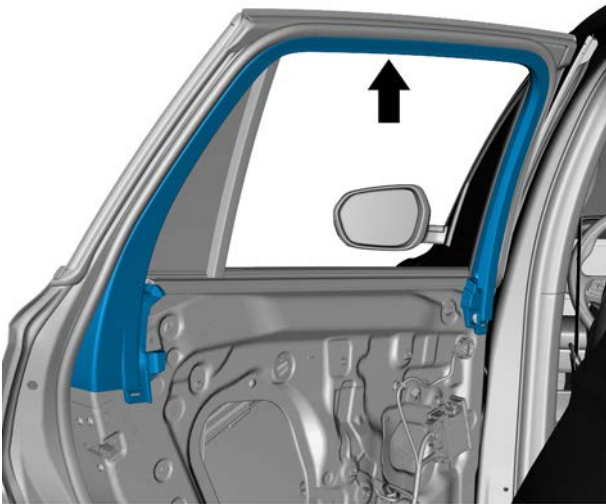
- 1 Install 4 J-type clips of the RL door B-pillar trim plate and part of RL door glass run channel.



- 2 Install the exterior belt line of RL door.



- 3 Install the RL door interior weatherstrip.



- 4 Install the RL door and window frame trim assembly.

- 5 Install the left rear door glass assembly
- 6 Install the RL door interior trim panel assembly
- 7 Connect the negative battery cable.

12.10 Plastic Panel Information and Repair

12.10.1 Instructions and operations

12.10.1.1 Instructions and Operations

At present, the materials covered on the surface of interior and exterior trims are mainly modified PP, ABS, PC +ABS, PVC (artificial leather materials), all of which are thermoplastics or their modified materials. POM, PA and HDPE materials are also used for non-surface covering parts of interior and exterior trims. Thermosetting plastics are rarely used for interior and exterior trims, and only phenolic plastics are used for ashtrays.

Thermosetting plastics are mainly used as structural parts in electronic appliances and safety components. Thermoplastic parts should best be repaired by using hot soldering iron plastic material filling welder, but are usually repaired by replacement. To repair parts made of thermosetting plastics, epoxy resin or other harder two-component repair materials can be used. This chapter only briefly introduces their repair methods, and repairs are not recommended.

Classification of plastic materials: thermosetting plastic refers to the plastics which are solidified in heating or other conditions, or featured with insoluble (infusible) properties, such as phenolic plastic, and epoxy plastics. Thermoplastics refer to plastics that can be repeatedly heated to soften and cooled to harden within a specific temperature range, such as polyethylene, polytetrafluoroethylene, etc. Thermoplastics and thermosetting plastics can be hard plastics or soft plastics.

12.10.2 Removing and installing

12.10.2.1 Plastic Part Repair Notices

- 1 Apply protective cream on exposed skin to prevent skin irritation.
- 2 Wear rubber gloves.
- 3 Wear safety goggles when using compressed air and sanding.
- 4 Immediately remove any mixture in contact with the skin, as the mixture will cure quickly.
- 5 When grinding or sanding, wear a dust mask and safety goggles.
- 6 Wash the skin with cool water to reduce the slight irritation of the resin or dust on the skin.
- 7 Do not get repair materials on your clothes.
- 8 Use repair materials in a well-ventilated environment. The dust particles generated by the maintenance materials are toxic.
- 9 After use, seal all repair material containers. Dust or moisture will pollute the repair materials and reduce the repair effect.

12.10.2.2 Repair of Thermosetting Plastic Dent

- 1 Clean and dry the part to be repaired.
- 2 Use a hot air blower to heat the dent until the dent can be flattened with a suitable tool.
- 3 Sand the dent area with sandpaper/ emery paper.
- 4 Then clean the repair part with cleaner and dry in the air for 5min.
- 5 Apply a thin layer of binder and dry in the air for 10min.
- 6 Fill the uneven surface with adhesive and smooth it with a spatula.
- 7 Accelerate the curing process with infrared lamp, adjust the temperature to 60-70 °C(140-158 °F) and heat for 15min.
- 8 Use abrasive papers to polish dent.
- 9 Remove dust and wear debris.
- 10 Apply a thin layer of binder and dry in the air for 10min.
- 11 Restore the paint surface according to the Plastic Surface Paint Repair Process.

12.10.2.3 Repair of Thermosetting Plastic Scratch

- 1 Clean and dry the part to be repaired.
- 2 Use sandpaper to remove the protruding material.
- 3 Then clean the repair part with cleaner and dry in the air for 5min.
- 4 Apply a layer of binder and dry in the air for 10 min.
- 5 Fill the uneven surface with adhesive and smooth it with a spatula.
- 6 Use an infrared lamp to accelerate the solidification process. Set the temperature to 60 - 70 °C (140 -158 °F). Heat for 15min.
- 7 Sand the dent with sandpaper.
- 8 Remove dust/wear debris.
- 9 Apply a thin layer of binder and dry in the air for 10min.
- 10 Restore the paint surface according to the Plastic Surface Paint Repair Process.

12.10.2.4 Repair of scratches on thermosetting plastics (length below 100mm)

- 1 Clean and dry the part to be repaired.
- 2 Use sandpaper to remove the protruding material.
- 3 Then clean the repair part with cleaner and dry in the air for 5min.
- 4 Apply a layer of binder and dry in the air for 10 min.
- 5 Fill the uneven surface with adhesive and smooth it with a spatula.
- 6 Use an infrared lamp to accelerate the solidification process. Set the temperature to 60 - 70 °C (140 -158 °F). Heat for 15min.
- 7 Sand the dent with sandpaper.
- 8 Remove dust/wear debris.
- 9 Apply a thin layer of binder and dry in the air for 10min.
- 10 Restore the paint surface according to the Plastic Surface Paint Repair Process.

12.11 Collision repair

12.11.1 Specification

12.11.1.1 Collision repair materials

In a vehicle body collision accident, the structure deformation, steel plate cracking, welding failure, and other phenomena will be generally caused. Sometimes it also causes local damage of the power synthesis box, chassis, and other assembly parts.

During the body collision repair, bonders, sealants, anti-loosing agents, surface protection materials, anti-corrosion materials, chemical materials may be used. Please operate strictly in accordance with the purpose, scope of use, and application in the product instructions. In the process of body repair, repair materials of the same functions should be selected and used according to the functional requirements of parts and materials. The following table gives the possible repair materials to be used in the process of body repair, for reference only in the process of body repair.

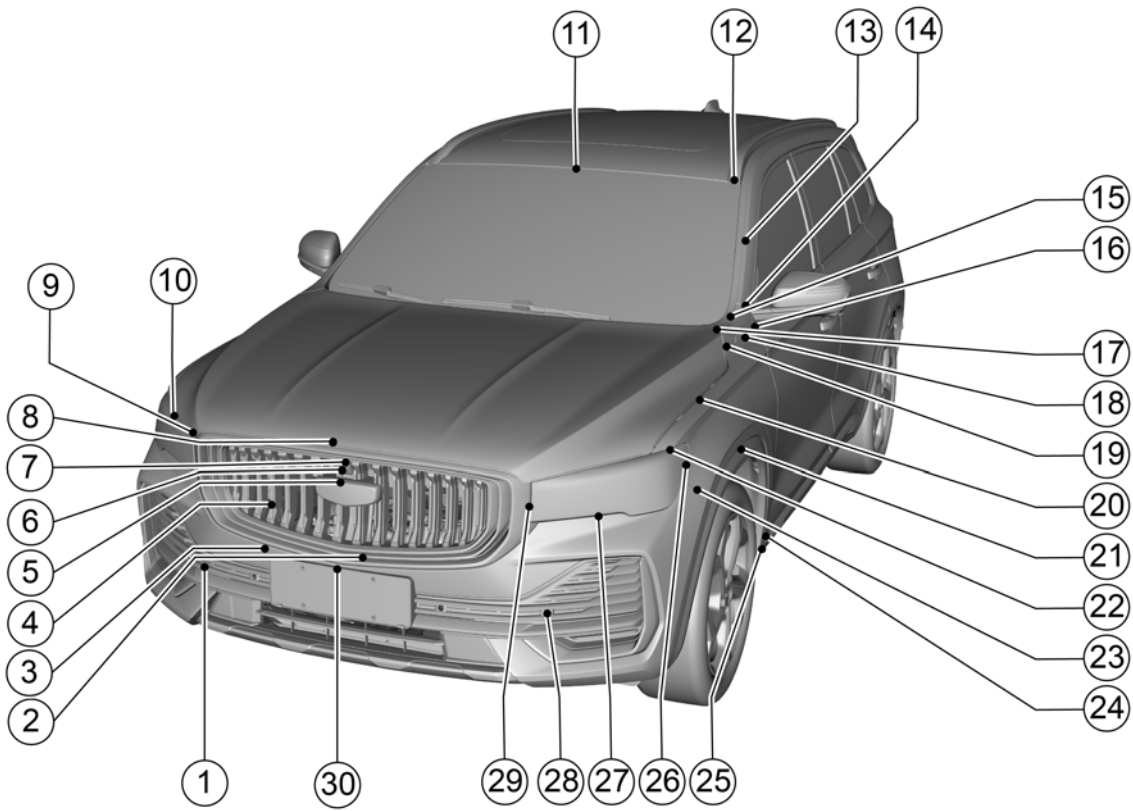
Products	Base materials	Application	Recommended model
Body sealant	Single unit polyurethane	Bond of body skin, interior/ exterior trims, body structure, etc. The sealant should have a strong adhesive force and cohesion force and have good adhesion with metal, various paints, etc.	Tianshan Kesaixin: 1922, 1923
Seam sealant	Single unit polyurethane	Room temperature solidified adhesive for sealing body welding seams. Room temperature solidified adhesive for fine hem sealing of door, bonnet, and boot (trunk).	China Auto Parts & Accessories Industry Corporation: C8802
Stone-impact resistant primer layer	Rubber and resin	Room temperature solidified anti-collision adhesive for chassis protection, forming a permanent anti-aging, elastic, corrosion resistant, protective coating at the bottom of the car and the wheel cover, no crack at low temperature. This kind of product can substitute PVC coating, with excellent functions such as rust-proof, sound insulation, anti-stone, anti-oxidation, coating protective.	China Auto Parts & Accessories Industry Corporation: C312DW

Products	Base materials	Application	Recommended model
Windshield sealant	Single unit polyurethane	<p>Room temperature solidified polyurethane adhesive, used for direct bonding and sealing of automobile window glasses.</p> <p>The sealant has a good adhesive performance. It can react with the moisture in the air, solidify and form excellent properties such as high strength, aging resistance, vibration and fatigue resistance, low-temperature resistance, and non-corrosion.</p>	<p>China Auto Parts & Accessories Industry Corporation: C8802 day Tianshan Kesaixin: 1956, 1924</p>
Pressure-sensitive adhesive tape	Acrylic acid tape	<p>Used for the bond of anti-scratch panel, nameplate, fender apron, mud apron, door protection, various trim strips, etc.</p> <p>This adhesive tape should have excellent weather resistance and endurance.</p>	<p>3M 4229P, 4215, 4221L</p>
Cleaner	-	<p>Used for the cleaning of all surfaces contacted with primer paint and adhesives.</p>	-
Primer	-	<p>Before applying windshield sealant, a kind of primer should be applied to the body and glasses to make the windshield and body bond more firmly.</p>	-

Products	Base materials	Application	Recommended model
Heat-sensitive adhesive tape	Acrylic acid tape	It is mainly used in the rubber sealing strip system of automobiles. This type of tape should have a strong bonding force and strong sealing performance, to avoid gap and corrosion problems caused by a weak bond.	3M, 4237P
Tape glue	-	Choose different primers according to the bond surface material. The bonding surface should be clean. After being thoroughly dried, apply the primer evenly on the bonding surface with a brush. After being dried, paste the adhesive tape. Make the tape have strong adhesion.	3M C - 100, K - 500/520, N - 200

12.11.1.2 Clearance between body surfaces

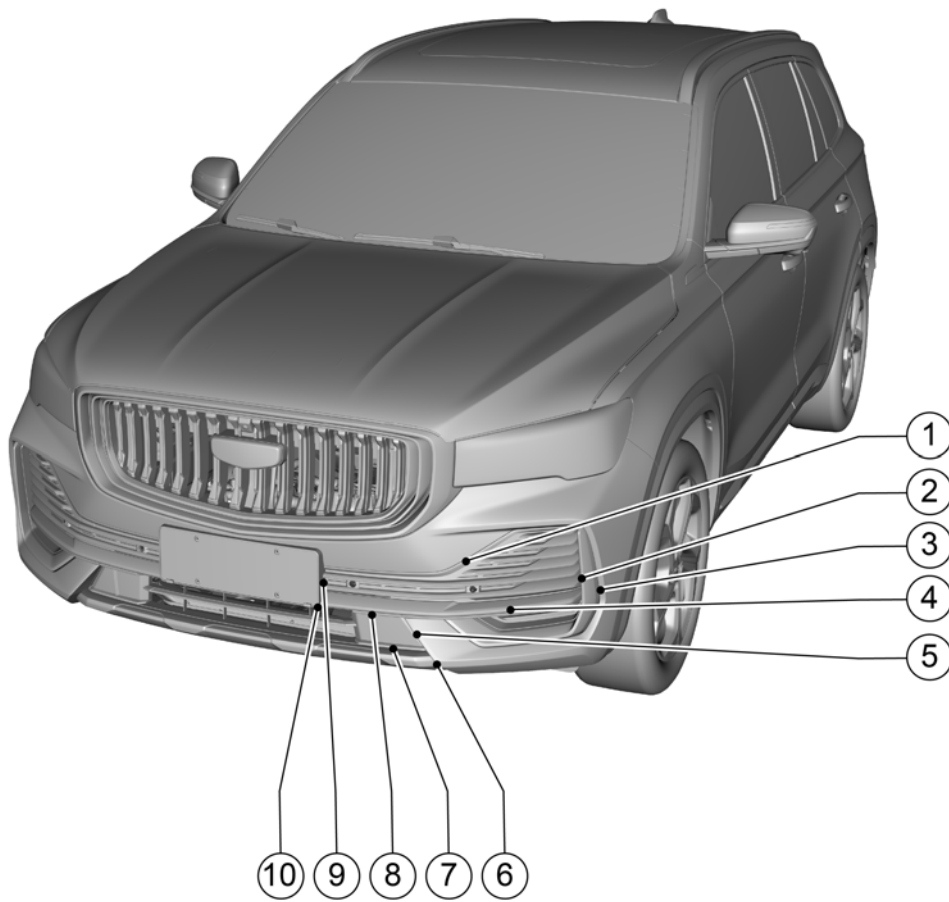
- To adjust or check the clearance dimensions, a plastic clearance adjustment gauge should be used.
- Clearance dimensions are always in mm/inch.



Code	Part Name (benchmark)	Relevant Part Name	Specifications				
			Clearance	Tolerance	Degree of uniformity	Symmetry	Alignment metric
1	Front bumper	Trailer hook cover plate	0.5±0.5	-0.5±0.5	/	/	/
2	Front grill	Grille chrome strip	0.5 ± 0.5 (perimeter)	/	0.5	/	/
3	Front bumper	Front grill	0.7±0.5	/	0.5(a→b)	/	/
4	Front grill	Grille vertical bar	0.5±0.5	/	0.5	/	/
5	Grille	Vehicle logo	0.5 ±0.3 (full circle)	/	/	/	/

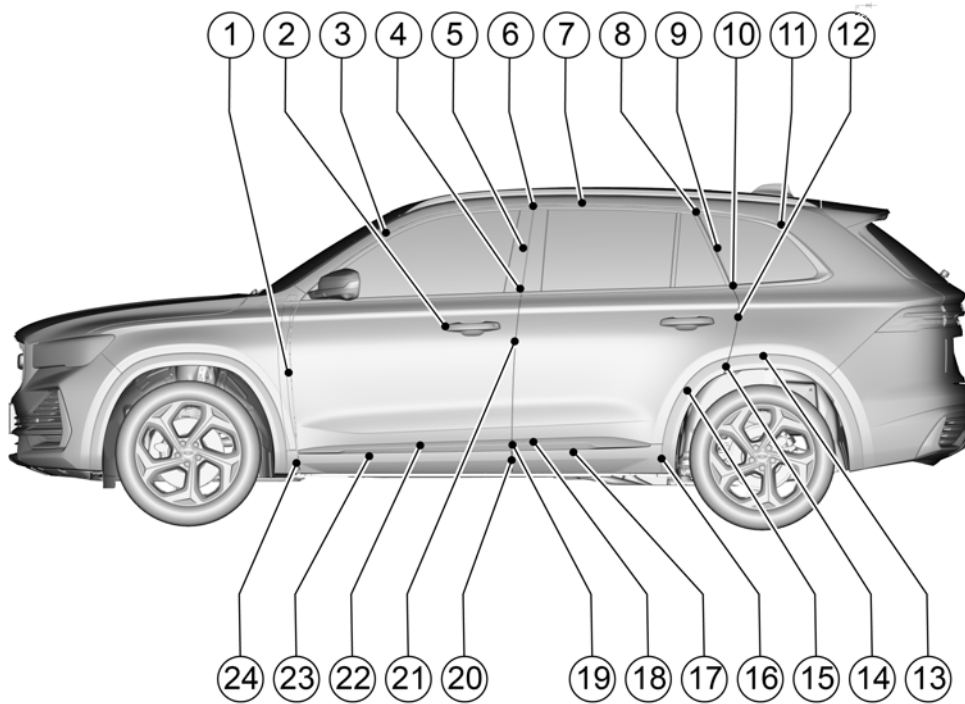
Code	Part Name (benchmark)	Relevant Part Name	Specifications				
			Clearance	Tolerance	Degree of uniformity	Symmetry	Alignment metric
6	Camera	Camera cover	0.2 ±0.2 (perimeter)	/	/	/	/
7	Camera cover	Front grille (high and low)	0.5 ±0.5 (perimeter)	/	/	/	/
8	Front grill	Engine bonnet	5.6	/	/	/	/
9	Front grill	Engine bonnet	5.8±1.2	/	/	1.2	/
10	Headlamps	Engine bonnet	6	/	/	/	/
11	Roof	Front windshield	2.5±1.0	/	1	/	/
12	Roof rack	Front windshield	4.0±1.2	/	/	/	/
13	Side body	Front windshield side trim	/	-1.0±1.2	1.2	/	/
14	Body Side A- pillar	Fender	2.2	/	/	/	/
15	Fender	Front windshield trim	/	-1.0±1.2	/	/	/
16	Belt line moulding outside front door	Panel wing trim strip	3.5±1.0	0±1.0	1	/	/
17	Fender	Front engine bonnet (upper rear)	3.2	0±0.8	0.5	S0.8	/
18	Fender	Panel wing trim strip	0.5±0.5	//0.5	/	/	/
19	Fender	Engine bonnet (corner)	3.2	-0.3±0.8	0.5	S0.8	/
20	Fender	Engine bonnet	3.0±0.8	/	1	1	/
22	Fender	Front fender flare	0.1	/	/	/	/

Code	Part Name (benchmark)	Relevant Part Name	Specifications				
			Clearance	Tolerance	Degree of uniformity	Symmetry	Alignment metric
22	Fender	Headlamps	5.9→7.8→1-.2±1.0	/	/	/	/
23	Fender	Front bumper	-0.2	/	/	/	/
24	Fender	Front wheel brow rear trim plate	0.1	/	/	/	/
25	Front fender flare	Front wheel brow rear trim plate	0.5±0.5	/	/	/	/
26	Fender	Headlamps	1.2±1.0	1.0(c→d)	/	/	/
27	front bumper upper body	Headlamps	2.0±1.0//1.0 (2.0~1.2) ±1.0//1.0 (b→c) 1.2 ±1.0//1.0 (c→d)	N/A(a→b→c) 2.8→2.4 ±1.0//1.0 (c→d)	/	/	/
28	Radar cover plate/radar arrival	Front bumper	0.2±0.2	0.2±0.3	/	/	/
29	Front grill	Headlamps	2.0±1.2	//1.2	/	S1.2(a→b)	/
30	Front license plate mounting plate	Front bumper	0 (0,+0.5)	/	/	/	/



Code	Part Name (benchmark)	Relevant Part Name	Specifications				
			Clearance	Tolerance	Degree of uniformity	Symmetry	Alignment metric
1	Front foglamp cover plate	Front bumper	0.5 ±0.5 (full circle)	/	0.5	/	/
2	Front foglamp cover panel trim	Front foglamp cover plate	0.7±0.5	/	0.5	/	/
3	Front foglamp cover panel trim	Front bumper	0.7±0.5	/	0.5	/	/

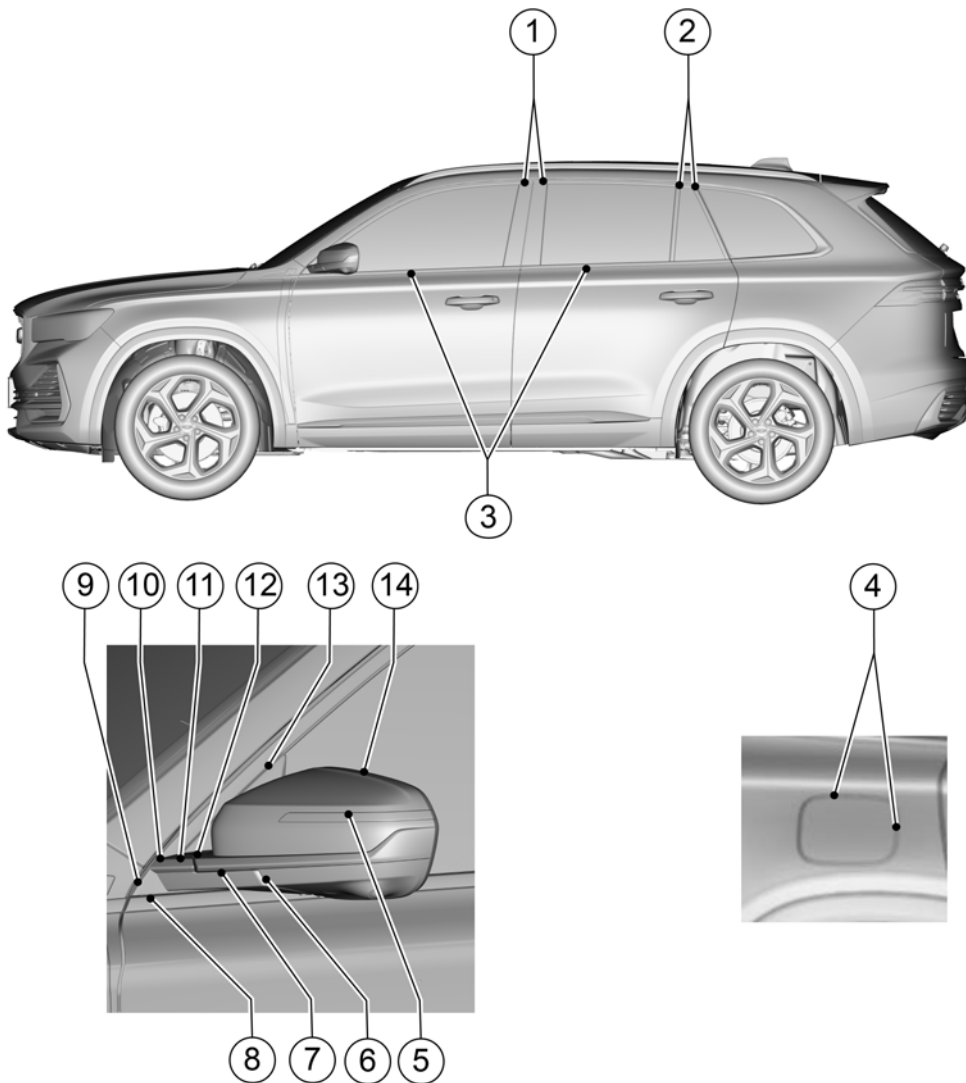
4	Front foglamp cover panel trim	Front foglamp cover plate	0.5 ±0.5 (perimeter)	/	0.5	/	/
5	Front bumper lower grille	Front bumper body	0.5 ±0.5 (full circle)	/	0.5	/	/
6	Front bumper lower trim plate	Front bumper body	1.0 ±0.7 (full circle)	/	0.7	/	/
7	Front bumper lower trim plate	Front bumper lower grille	0.7±0.5	/	0.5	/	/
8	Front bumper lower trim	Front bumper lower grille	0.7±0.5	/	0.5	/	/
9	Front license plate mounting plate	Front foglamp cover plate	0.5±0.5	/	0.5	/	/
10	Front license plate mounting plate	Front bumper lower trim	0.5±0.5	/	0.5	/	/



Code	Part Name (benchmark)	Relevant Part Name	Specifications				
			Clearance	Tolerance	Degree of uniformity	Symmetry	Alignment metric
1	Front doors	Fender	3.5	0±0.5	/	/	/
2	Side body	Front door glass run channel	6	/	/	/	/
3	Back door weatherstrip	Belt line moulding outside front door	3.8±1.0	0±1.0	1		
4	Rear door window frame cover	Front door window frame cover	3.8±1.0	0.1±1.0	1	/	/

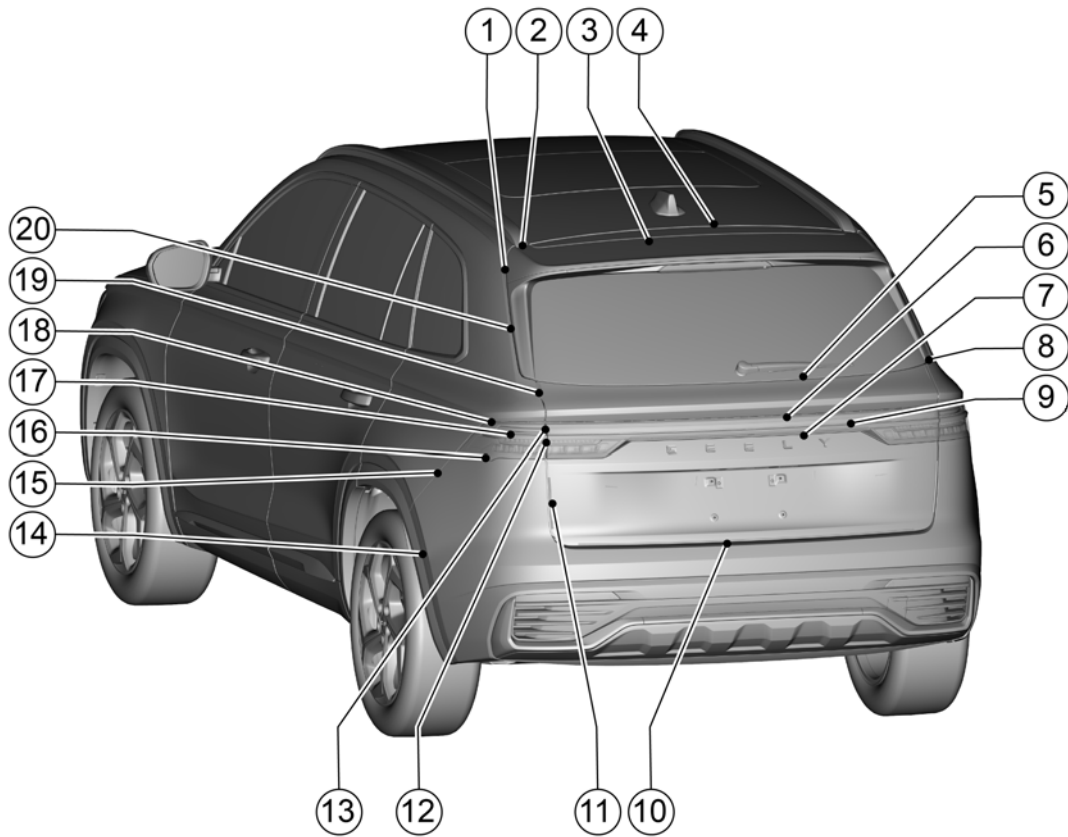
5	Rear door glass run channel	Front door glass run channel	3.8±1.0	0±1.0	1	/	/
6	Side body	Rear door glass run channel	6	-2.7±1.5	1.5	/	/
7	Body side corner window	Rear door glass run channel	4.5±1.0	0±1.0	/	/	/
8	Body side corner window	Rear door corner window	5.0±1.0	1.0±1.0	1	/	/
9	Body side corner window	Back door weatherstrip	3.5±1.0	0±1.0	1	/	/
10	Side body	Body side corner window	(6.0~4.0)±1.2		1.2	/	/
11	Side body	Rear doors	3.5	0±0.5	/	/	/
12	Side body	Rear fender flare	0.1	/	/	/	/
13	Rear wheel brow rear part	Rear wheel brow front part	3.5±1.0	0±0.8	1	/	/
14	Rear fender flare	Rear doors	0.1	/	/	/	/
15	Rear door lower trim panel	Rear fender flare	0(0,+0.5)	/	/	/	/
16	Rear door lower trim plate strip	Rear door trim panel lower	0.7±0.5	0.5	/	/	/
17	Rear door trim panel lower	Back door outer panel	0.6	/	/	/	/
18	Rear door lower trim plate strip to	Front door lower trim plate strip	4.0±1.0	/	1	/	/
19	Rear door trim panel lower	Front door trim panel lower	4.0±1.0	0±0.8	/	/	/
20	Rear doors	Front doors	4	0±0.5	/	/	/

21	Front door trim panel lower	Front Door outer panel	0.6	/	/	/	/
22	Front door lower trim plate strip	Front door trim panel lower	0.7±0.5	/	0.5	/	/
23	Front door lower trim panel	Front wheel brow lower trim	3.5±0.8	0±0.8	/	/	/



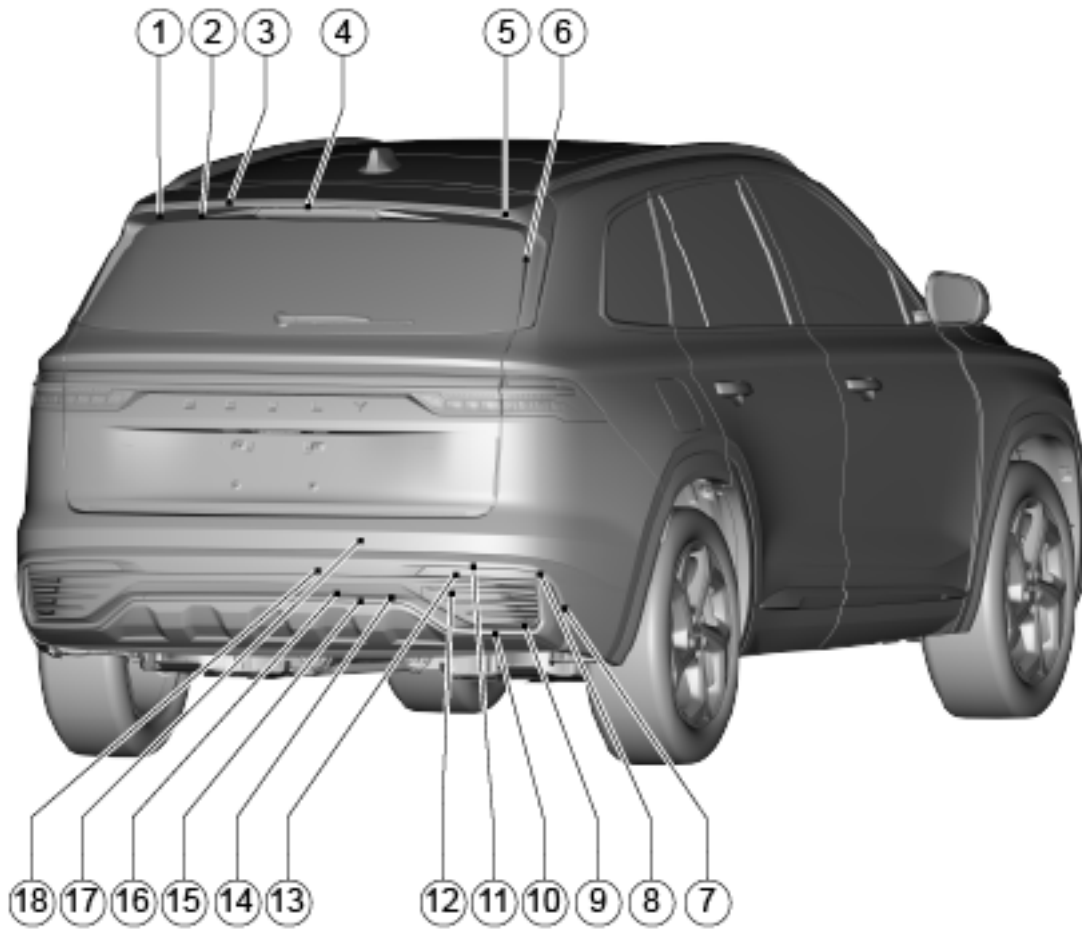
Code	Part Name (benchmark)	Relevant Part Name	Specifications				
			Clearance	Tolerance	Degree of uniformity	Symmetry	Alignment metric

1	Front/rear door/window frame cover	Front/rear door glass run channel	0.4±0.4	Styling±0.7	/	/	/
2	Rear door corner window	Rear door glass run channel	0.5(-0.5,+0.7)	Styling±1.0	/	/	/
3	Front/rear door weather chrome strip	Door panel outer	0.8±0.8	/	0.8	/	/
4	Side body	Fuel filler cap	2.1	-0.3±0.5	/	/	/
5	Rearview mirror trim strip	Rearview mirror housing	0.3±0.3	/	/	/	/
6	Rearview mirror base	Rearview mirror lower cover plate	1.0±0.5	0±0.5	0.5	/	/
7	Rear rearview mirror lower cover plate	Rearview mirror base	1.0±0.5	/	0.5	/	/
8	Rearview mirror base	Front door weatherstrip	1.0±0.8	/	/	/	/
9	Fender	Rearview mirror base	6	2.3→3.2±1.5	/	/	/
10	Rearview mirror trim strip	Front door glass run channel	0.8±0.8	/	0.8	/	/
11	Rearview mirror trim strip	Rearview mirror base	0.5±0.5	-0.5/ (-0.5-0)	/	/	/
12	Rearview mirror base	Rearview mirror lower cover plate	1.2±0.5	0±0.5	/	/	/
13	Front door upper trim	Rearview mirror base	1.2±0.7	/	0.7	/	/
14	Rearview mirror housing	Rearview mirror mask	0.15±0.15	-0.5/ (-0.5-0)	/	/	/



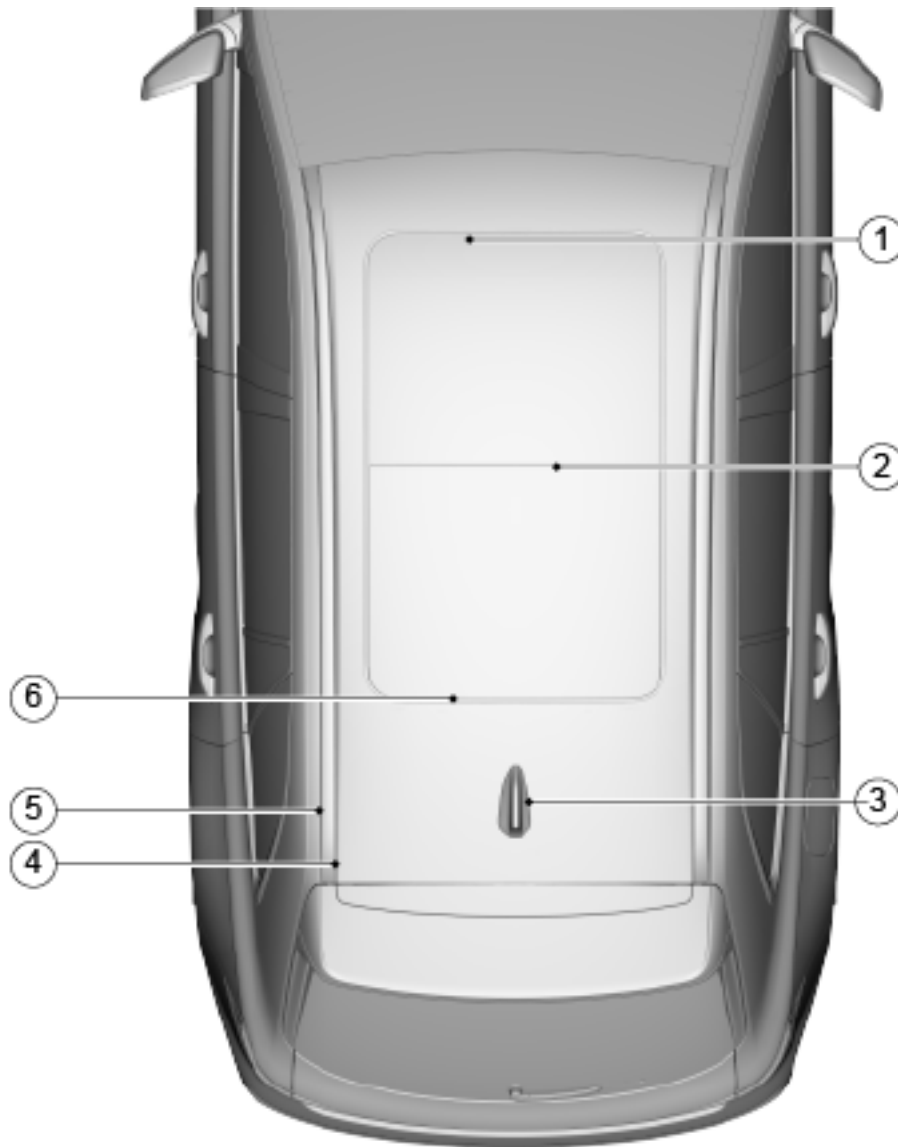
Code	Part Name (benchmark)	Relevant Part Name	Specifications				
			Clearance	Tolerance	Degree of uniformity	Symmetry	Alignment metric
1	Side body	Spoiler	4.0 (a→c)	Styling±1.2	1.2	/	/
2	Spoiler upper body	Roof rack tape	Styling(>7.0) ±1.5	/	/	/	/
3	Tailgate	Spoiler	1.1	-1.0±1.0	1	/	/
4	Roof	Tailgate	5.5	-1.0±1.2	1.5	/	/
5	Rear windshield	Tailgate	2.5±1.5	/	1.5	/	/
6	Rear tailgate to	Rear combination lamp B (upper)	1.2	/	/	/	/

7	Tailgate	Rear combination lamp B	1.2	/	/	/	/
8	Spoiler	Side body	?	/	/	/	/
9	B lamp trim strip	Rear combination lamp B	0.8±0.5	/	0.5(c→d)	/	/
10	Rear bumper upper body	Tailgate	5.7	/	/	/	/
11	Rear bumper upper body	Tailgate	4.1(a→c)	-2±1.2	1.2	/	/
12	Tail lamp A trim strip	Tail lamp B trim strip	4.0±1.5	Styling±1.5	1.5	S1.5	/
13	Rear combination lamp A	Rear combination lamp B	4.0±1.5 (b→c)	-1.0±1.5	1.5	//S1.5	/
14	Rear fender flare	Rear bumper	0 (0,+0.5)	/	/	/	/
15	Side body	Rear bumper	0.1	-0.2	/	/	/
16	Rear combination lamp A	Rear bumper upper body	1.2±1.0	/	1	/	/
17	Tail lamp A	Tail lamp A trim strip	0.8±0.5	/	0.5(a→b, c→d)	/	/
18	Side body	Rear combination lamp A	1.2	/	/	/	/
19	Side body	Tailgate	4.0 (a→b, c→d)	-1.0±0.8	0.8	S1.0	/
20	Side body	Rear spoiler assembly	4	/	/	/	/



Code	Part Name (benchmark)	Relevant Part Name	Specifications				
			Clearance	Tolerance	Degree of uniformity	Symmetry	Alignment metric
1	Tailgate side trim	Spoiler lower body	0.5±0.5	0±0.5	0.5	/	/
2	Rear windshield	Spoiler	2.0±1.5	/	1.5	/	/
3	Spoiler upper body	Spoiler lower body	0.3±0.3	/	/	/	/
4	Rear window brake lamp	Spoiler	1.0 ±0.8 (full circle)	-0.5±0.8	0.8	/	/
5	Tailgate side trim	Spoiler upper body	0.3±0.3	/	/	/	/

6	Rear windshield side trim	Rear windshield	2.0±1.5	/	1.5	/	/
7	Rear bumper upper body	Rear bumper side sports trim strip	1.0±0.7	/	0.7	/	/
8	Rear fog lamp	Rear bumper side sports trim strip	1.0±0.8	/	0.8	/	/
9	Rear bumper side sports trim strip	Rear bumper trim plate	0.7±0.5	/	0.7	/	/
10	Rear bumper side sports trim strip	Rear bumper trim plate	0.7±0.5	/	0.7	/	/
11	Rear fog lamp	Rear bumper upper body	1.0±0.8	/	0.8	/	/
12	Trailer hook cover plate	Rear bumper assembly	0.5 ±0.5 (full circle)	-0.5±0.5	/	/	/
13	Rear fog lamp	Rear bumper trim plate	1.0±0.8	/	0.8	/	/
14	Rear bumper side sports trim strip	Rear Bumper sports trim strip	1.0±0.7	/	0.7	/	/
15	Rear Bumper sports trim strip	Rear bumper trim plate	0.7±0.5	/	0.7	/	/
16	Rear Bumper sports trim strip	Rear bumper trim plate	0.7±0.5	/	0.7	/	/
17	Radar cover/radar	Rear bumper	0.2±0.2	0±0.3	/	/	/
18	Rear bumper upper body	Rear bumper trim plate	0.5±0.5	/	/	/	/



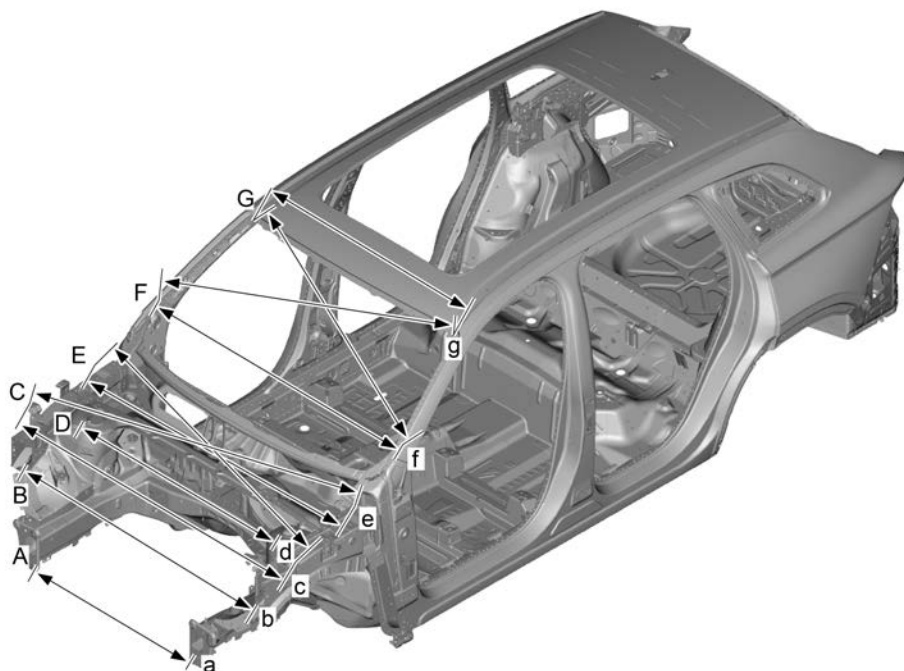
Code	Part Name (benchmark)	Relevant Part Name	Specifications				
			Clearance	Tolerance	Degree of uniformity	Symmetry	Alignment metric
1	Roof	Sunroof glass (front)	10.2±2.0	-1.0±1.5	2	/	/
2	Sunroof glass (rear)	Sunroof glass (front)	9.8±2.0	1.0±1.5	2	/	/
3	Antenna	Roof	0+0.5	/	/	/	/
4	Roof rack tape	Roof	3.0±1.2	/	1.2	/	/
5	Roof rack tape	Side body	3.0±1.2	/	1.2	/	/
6	Roof	Sunroof glass (rear)	10.2±2.0	1.0±1.5	2	/	/

12.11.1.3 Body dimensions

Body dimensions are used for body check.

Please use a special extension ruler when measuring the body dimensions.

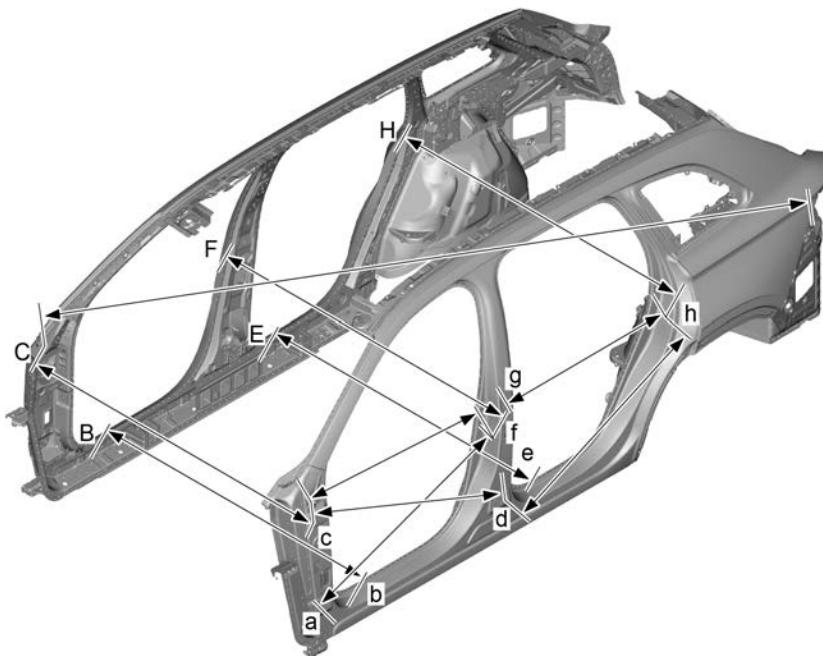
Dimensions of body front



Position	Dimensions	Value (mm)	Difference
Front cross beam mounting hole	A-a	954.0	±1.5
Upper mounting hole of water tank	B-b	1346.6	±1.5
Fender front bracket mounting hole	C-c	1612.0	±1.5
Right fender front bracket mounting hole-engine bonnet left hinge rear mounting hole	C-e	1600.8	±1.5
Front shock absorber mounting hole	D-d	1177.3	±1.5
Engine bonnet hinge mounting hole	E-e	1532.0	±1.5

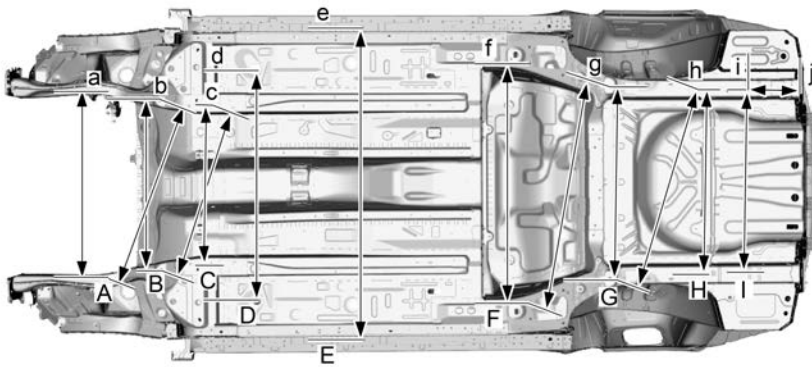
Position	Dimensions	Value (mm)	Difference
Engine bonnet right side hinge rear mounting hole-left fender front bracket mounting hole	E-c	1600.8	±1.5
The joint of the body side exterior plate/the upper part of the front wall	F-f	1494.6	±1.5
Body side exterior plate/front wall upper joint (right)-body side exterior plate/roof joint (left)	F-g	1466.6	±1.5
Side wall outer panel / roof junction	G-g	1466.6	±1.5
Body side exterior plate/roof joint (right)-body side exterior plate/front wall upper joint (left)	G-f	1466.6	±0.5

Dimensions of body middle



Position	Dimensions	Nominal dimensions	Difference (\pm)
Front door lower hinge mounting hole (left)-front door lock catch mounting hole (left)	a-f	1099.3	± 1.5
Measurement mark at the bottom of the front door opening	b-B	1510.0	± 1.5
Front door upper hinge mounting hole (left)-front door upper hinge mounting hole (right)-	c-C	1616.8	± 1.5
Front door upper hinge mounting hole (left)-rear door lower hinge mounting hole (left)	c-d	1182.2	± 1.5
Front door upper hinge mounting hole (left)-front door lock catch mounting hole (left)	c-f	1172.7	± 1.5
Rear door lower hinge mounting hole (left)-rear door lock catch mounting hole (left)	d-h	1072.0	± 1.5
Measurement mark at the bottom of the rear door hole	e-E	1510.0	± 1.5
Front door lock catch mounting hole (left)-front door lock catch mounting hole (right)	f-F	1606.2	± 1.5
Rear door upper hinge mounting hole (left)-rear door lock catch mounting hole (left)	g-h	939.5	± 1.5
Rear door lock catch mounting hole (left)-rear door lock catch mounting hole (right)	h-H	1606.5	± 1.5
Front door upper hinge mounting hole (right)-rear combination lamp mounting hole (left)	i-C	3364.3	± 1.5

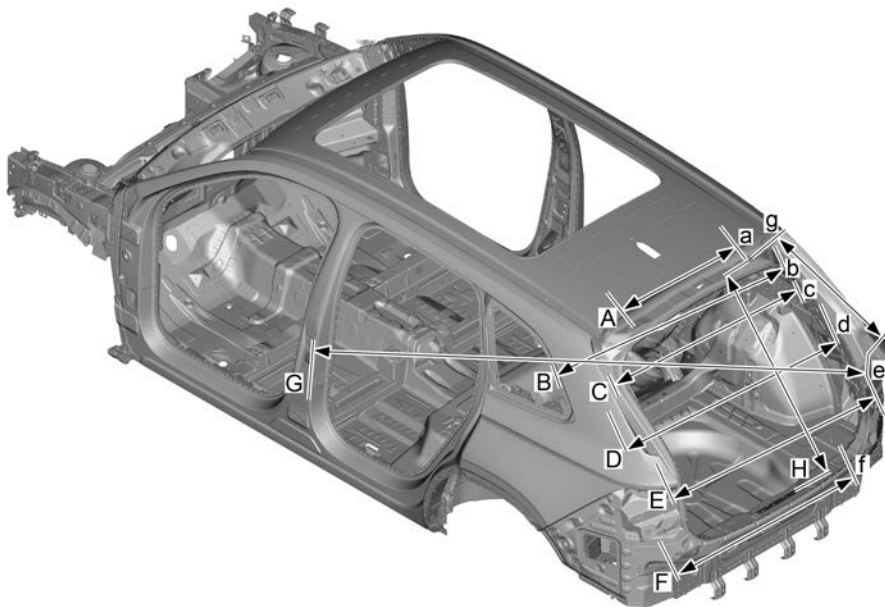
Dimensions of body bottom



Position	Dimensions	Nominal dimensions	Difference (±)
Front subframe front mounting hole	A-a	955.0	±1.5
Front subframe FR mounting hole-front subframe left middle mounting hole	A-b	963.8	±1.5
Front subframe middle mounting hole	B-b	826.0	±1.5
Right middle mounting hole of front suspension-RL mounting hole of front suspension	B-c	839.2	±1.5
Rear mounting hole of front subframe	C-c	770.0	±1.5
front left floor positioning hole-FR floor positioning hole	D-d	1140.0	±1.5
The right doorsill exterior plate positioning hole-the left doorsill exterior plate positioning hole	E-e	1536.2	±1.5

Position	Dimensions	Nominal dimensions	Difference (±)
Rear subframe trailing arm mounting hole	F-f	1184.8	±1.5
Rear subframe right trailing arm mounting hole-rear subframe front left mounting hole	F-g	1164.3	±1.5
Rear subframe front mounting hole	G-g	974.0	±1.5
Rear subframe FR mounting hole-Rear subframe RL mounting hole	G-h	1074.5	±1.5
Rear subframe rear mounting hole	H-h	955.0	±1.5
Rear side member locating hole	I-i	927.0	±1.5
Rear side rail positioning hole-rear wall	i-j	371.3	±1.5

Dimensions of body rear



Position	Dimensions	Nominal dimensions	Difference (±)
Tailgate (right) hinge left mounting hole	A-a	694.0	±1.5
Installation hole of D-pillar trim plate in the middle of rear triangular window glass	B-b	1364.0	±1.5
Tailgate brace mounting hole	C-c	1132.5	±1.5
Rear seat belt retractor bracket support plate mounting hole	D-d	1311.0	±1.5
Rear combination lamp mounting hole	E-e	1185.5	±1.5
Rear crossmember assembly mounting hole	F-f	1086.0	±1.5
Tailgate (right) hinge left mounting hole-rear compartment lock catch mounting hole (right)	a-h	1024.0	±1.5
Rear combination lamp mounting hole (right)-rear door hinge mounting hole (left)	e-G	2416.5	±1.5
Rear combination lamp mounting hole (right)-tailgate (right) hinge right mounting hole	e-g	734.0	±1.5

12.11.2 Instructions and operations

12.11.2.1 Safety precautions

The following safety precautions must be strictly observed during the maintenance and operation of body sheet metal:

1. During the operation of welding, cutting and polishing body sheet metal, the protective suit, goggles, gloves and work shoes must be worn.
2. The welding area must be well ventilated.
3. Before welding, the battery must be disconnected and the wiring terminal must be covered.
4. If sparks may be generated when working near the battery, the battery must be removed.
5. Before removing the components of the complete vehicle, the vehicle must be fixed on the vehicle lifting frame to avoid the change of gravity of the complete vehicle center, thus affecting operational safety.
6. Directly connect the grounding wire of the welding set to the part to be welded. Make sure that there is no conductive part between the grounding point and the welding point during operation.
7. The grounding wire or welding electrode cannot be connected with the electronic control unit and the wire.
8. Unprotected vehicle cannot be parked in the body maintenance area, because shattering sparks may cause the fire and damage lacquer surface and glass.
9. Any component of the A/C system containing refrigerant cannot be welded, brazed or soldered. Any other components in the vehicle that may cause the A/C system component temperature to rise shall not be welded, because they may cause the A/C system to explode. If welding must be conducted near the refrigerant hosepipe, the refrigerant must be recycled, because the invisible ultraviolet ray generated during welding penetrating the refrigerant hosepipe may cause the refrigerant to decay.
10. The battery grounding line must be disconnected during the auxiliary system operation or the body calibration. The environment temperature around the airbag component should not exceed 100 °C (212 °F).

12.11.2.2 Status of parts and components

Before repaired automobile or components are delivered to painting hall for painting, their surface must be smooth and seam-filled, and must be polished with sandpaper. The preparation procedure is completed by panel beater. Body and floor components are mainly formed by steel plate cold stamping. Therefore, same method should be adopted for parts

damaged in accident. If damaged components cannot be restored and neighbor parts are corrected, damaged part should be removed and replaced according to the integrity of parts. Do not carry out monomer cutting for parts. The rigidity of complete vehicle, driving safety and convenience of maintenance will be influenced after cutting and melting.

12.11.2.3 Description of welding types

Common welding types include spot welding, gas shielded welding and brazing. The number of welding spots shall not be reduced during spot welding. Usually, when the spot-welding device cannot be operated, the plug welding can be carried out through gas shielded welding after drilling. When spot welding is adopted, if it is a connection of three-layer plates and only the outer plate is replaced, the solder joint shall be placed on the original one. When spot welding is adopted, single-row weld, double-row weld and double-row offset weld can be generated. When gas shielded welding is adopted, overlapping weld, continuous weld and continuous weld (intermittent) can be generated. Brazing is commonly used to weld and repair areas with low tensile strength and relatively small component thickness.

12.11.2.4 Anti-corrosion treatment

1. Recognized materials must be used to restore the standard anti-corrosion later after repair.
2. Both sides of all welds must be coated with the primer before sealing.
3. Sheet metal coated with primer must be coated with sealant.
4. Lap plates, metal edges, butt welds and welds must be sealed with sealant.
5. The bottom plate must be coated with long-term bottom plate protection agent.
6. After surface coating spraying, empty cavity protection materials must be used to treat the empty cavities within repair area.
7. Clean the outlet after the empty cavity protection materials dry.

12.11.2.5 Scrapped Components Environmentally Friendly Disposal Approach

1. After the maintenance or repair of an automobile, the waste materials must be collected by type.
2. Sort waste materials and check for reusability.

12.12 Paint Coating

12.12.1 Specification

12.12.1.1 Specification

Refer to technical specifications provided by the supplier of materials.

12.12.2 Instructions and operations

12.12.2.1 Paint coating description

Paint is a kind of mixed liquid and can be coated on multiple substrates. The paint forms a solid paint film after drying, thus realizing the targets of substrate protection and attractive appearance. The following 4 paints have already been painted when vehicles leave the factory to provide good anti-corrosion performance and gloss.

1. Electrophoresis primer
2. Middle paint
3. Color paint
4. Celluloid paint (transparent outer coating)

Main effects of electrophoresis primer

1. Rust-proof
2. Improvement of working adhesion
3. Improvement of limited filling

Main effects of middle paint:

1. Filling
2. Isolation/tightness
3. Foiling color paint

Main effects of color paint:

1. Adding color
2. Providing gloss

Main effects of celluloid paint:

Celluloid paint is at the outermost layer of the whole lacquer and have the following main effects:

1. Including anti-ultraviolet ray materials to resist the ultraviolet ray in sunshine.
2. Resisting the corrosion effect of ambient dust (acid rain) on lacquer.
3. Allowing the lacquer to have friction resistance performance.
4. Providing better gloss for the lacquer.

Paint spraying is required to restore the repaired parts; spraying process specified by the manufacturer must be strictly complied with during repair. See [Rigid surface spray paint process](#).

12.12.2.2 Routine vehicle paint maintenance

Please follow the following principles during the routine vehicle paint maintenance:

1. Please notice not to touch body paint with oily hands or scrub the paint with oily cloth during the vehicle repair and maintenance. Do not place the oily tools or the cleaning cloth with organic solvent on the body to avoid chemical reactions.
2. Do not carry out the secondary painting if there is no clear scratch to avoid improper paint color or poor combination.
3. Vehicles parking for a long time should be parked in a garage or well-ventilated areas. Vehicles should be covered with a dedicated body cover in winter. Cool places should be selected for temporary parking.
4. Avoid severe impacts, collisions and scratches of the body paint film. Damaged, sunken or fallen paint should be repair timely, better in the maintenance stations authorized by Geely.
5. High-quality detergent should be applied for body decoration cleaning. Do not scrub the body heavily during waxing and avoid paint layer penetration and exposure of original body. Clean the special traces with strong corrosion (e.g. asphalt, birds droppings, insects, etc.) timely. For this purpose, dedicated detergent must be used. Do not use a knife to scrape the traces or use gasoline to eliminate them to avoid paint damages.
6. Before, during and after vehicle utilization, it is required to clean dust on the body timely and reduce the dust adhesion due to static electricity of the body as possible.
7. Flush the body timely after rain. The rain stains on the body after rain will gradually decrease, but the concentration of acid materials in rainwater gradually increases. If the body is not flushed with clean water timely, the surface coating will be damaged after a long term.
8. Wait until the power synthesis box cools down and then wash the vehicle. Do not wash the vehicle under burning sun or at high temperature to prevent traces of detergent after drying up. The dedicated detergent must be used when customers wash vehicles by themselves, but do not use the high alkaline washing powder, suds or detergents to avoid washing away the grease in paint and accelerating the paint aging. When your vehicle is washed in a car washing station, please pay attention to prevent the washer from using the dewaxing detergent and avoid paint damages. Especially the vehicles running in costal or heavily polluted areas should be flushed once per day.

9. Clean and soft cloth or sponge should be used to wipe and wash the vehicle. Prevent metal filings and sand inside and do not dry cloth, towel or sponge to polish the vehicle to avoid scratches. During the scrubbing process, scrub the vehicle from top to bottom along the direction of water flow and do not make circles or scrub it horizontally.
10. Carry out waxing protection on the paint irregularly and go to the Geely authorized maintenance stations for care regularly (once a quarter) to timely restore the gloss of body paint. In addition, body paint protection film is also available. 3M paint protection film (invisible vehicle clothing) is a kind of water white paint protection film with super strong toughness. Can be used to protect body bumper, engine cover, front and rear doors, rearview mirror and other coated paints to protect the body paint from scratches or paint peeling due to slight collision.

12.12.2.3 Warnings and notice in performing paint mixing and painting operations

Warning !

During paint mixing and painting operations, diffuse solvents can cause serious respiratory illnesses. Operation must be in strict accordance with the manufacturer's instructions for paint, equipment and safety devices. During operations in accordance with this procedure, wear special protective equipment such as gas masks, anti-static clothing, protective eyewear and gloves to prevent injury.

Caution

Do not mix paint systems or alternative products from different manufacturers. Mixing of incompatible products may result in:

1. Primer peeling.
2. Poor inter-coat bonding.
3. Insufficient curing.
4. Reduced gloss.
5. Poor color accuracy.
6. Damage to coating (pits, bubbles, orange peel, and loss of gloss).

12.12.2.4 Cautions during finishing varnish maintenance and repair

Caution

1. Avoid washing the vehicle under direct sunlight.
2. Avoid using the strong soap and chemical detergent.
3. Use brushless automatic vehicle cleaning equipment.
4. Avoid using products containing acid or alkali.
5. Do not use the brush or broom to remove snow or ice
6. After cleaning thoroughly, the remaining rinse water should be wiped dry immediately, and do not let it dry in air on the surface. It is recommended to wipe dry with soft chamois leather.
7. Only when the defect on the surface can be eliminated by the method of polishing, can the vehicle be polished.
8. If the surface condition is not serious, the maintenance part should be narrowed as much as possible.
9. Avoid removing too much celluloid paint, otherwise paint premature damage will be the result.
10. Use electric polishing equipment in strict accordance with the requirements of polishing manufacturers. Do not use wax or silicone products to cover vortex blot (the user will not be satisfied with the blot reappearing soon).

12.12.2.5 Notices for anti-corrosion treatment

Caution

1. When sound-proof or anti-corrosion materials are sprayed, preventive measures must be taken to avoid spraying into component openings (such as door locks, vehicle window lift slots, vehicle window regulators, and seat belt retractors) and any moving, rotating parts, especially the parking brake cable. After spraying the material, ensure that all vent holes on the body are open.
2. When the body is repaired with an open flame, the foamed sound insulation material must be removed from the repair part. When reinstalling the soundproofing material, avoid inhaling harmful dust.
3. When the procedure is performed, it is needed to wear dedicated protective glasses and gloves to prevent injury.
4. When the vehicle leaves the factory, the body metal plates have been treated with electrophoretic coating primer. After parts are repaired and/or replaced, all exposed metal surfaces must be treated with a rust-proof primer.
5. If the original coating or anti-corrosion material is damaged during welding or heating operation, it needs clean and anti-corrosion treatment.
6. When collision repairs are conducted, the metal will be exposed, and these surfaces must be re-sprayed with dedicated anti-corrosion materials.
7. The role of the sealant is to prevent water and dust from entering the vehicle, and it also has an anti-corrosion effect. The original seal joints are obvious. If these seals are damaged, they should be corrected by resealing. The joint of the newly replaced plate should be resealed. The sealant used must remain flexible after curing and painting. Seal open joints closed with sealant by high-consistency filler. Follow the descriptions for the selected materials.
8. The sound insulation material can control the general noise level in the vehicle. When the sound insulation layer is damaged due to maintenance operations or replacement of new panels, the same material must be used.

12.12.3 Diagnostic information and procedures

12.12.3.1 Common paint defects and treatment

Caution The black boxes in the table indicate the treatment of the defect.

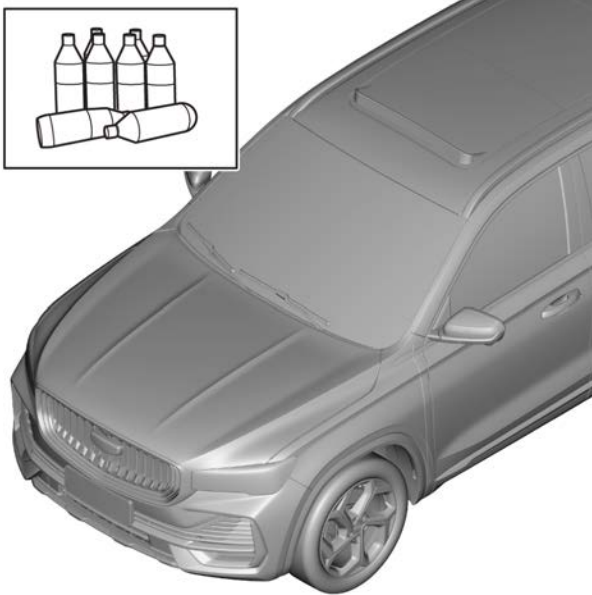
Name	Causes	Treatment
Powder	<ol style="list-style-type: none"> 1. The paint film is subject to strong erosion. Such as the intense ultraviolet light. 2. The proportion of paint is wrong during construction. 3. The coating has poor light and weather resistance. 4. Vehicles are not cleaned regularly or cleaned thoroughly. 5. The selected vehicle cleaner is not suitable or the polishing paste is coarse. 	<ol style="list-style-type: none"> 1. Polishing and refining treatment. □ 2. Conventional grind and polishing treatment □ 3. Deep grind and polishing refurbishment treatment □ 4. Repair locally with painting. ■
Plastic paint peeling	<ol style="list-style-type: none"> 1. The adhesive force of coating and substrate is too poor or the upper coating is too hard compared with the lower coating. 2. The coating film is too thick and the paint film is subject to erosion of steam, acid, and alkali of the air. 3. The recoatability of the lower coating is bad, or with improper processing. There are defects of pinholes and grinning on the upper coating. 	<ol style="list-style-type: none"> 1. Polishing and refining treatment. □ 2. Conventional grind and polishing treatment □ 3. Deep grind and polishing refurbishment treatment □ 4. Repair locally with painting. ■
Cracking	<ol style="list-style-type: none"> 1. The primer base has not been fully blended before spraying. 2. The surface coating is too thickly sprayed. 3. The intermediate coating is too thickly sprayed. 	<ol style="list-style-type: none"> 1. Polishing and refining treatment. □ 2. Conventional grind and polishing treatment □ 3. Deep grind and polishing refurbishment treatment □ 4. Repair locally with painting. ■
Bird droppings erosion	<ol style="list-style-type: none"> 1. Bird droppings dripping erosion. 	<ol style="list-style-type: none"> 1. Polishing treatment (slight erosion). ■ 2. Conventional grind and polishing treatment (moderate erosion). ■ 3. Deep grind and polishing refurbishment treatment □ 4. Repair locally with painting (severe erosion). ■
Scratch	<ol style="list-style-type: none"> 1. The painting film hardness is low. 2. Hard object scratches. 	<ol style="list-style-type: none"> 1. Polishing treatment (slight scratch). ■ 2. Conventional grind and polishing treatment (coarse scratch). ■ 3. Deep grind and polishing refurbishment treatment □ 4. Repair locally with painting (scarification). ■
Corrosion	<ol style="list-style-type: none"> 1. The painting film is thin on the edges. 2. Scratches cause corrosion. 3. Acid and alkali erosion. 	<ol style="list-style-type: none"> 1. Polishing and refining treatment. □ 2. Conventional grind and polishing treatment □ 3. Deep grind and polishing refurbishment treatment □ <p>Repair locally with painting (severe corrosion requires sheet metal repair before spraying repair). ■</p>

<p>Paint peeling</p>	<p>The adhesive force of coating and substrate is too poor or the upper coating is too hard compared with the lower coating.</p> <p>2. The coating film is too thick and the paint film is subject to erosion of steam, acid, and alkali of the air.</p> <p>3. The recoatability of the lower coating is bad, or with improper processing.</p> <p>4. There are defects of pinholes and grinning on the upper coating.</p>	<p>1. Polishing and refining treatment. □</p> <p>2. Conventional grind and polishing treatment □</p> <p>3. Deep grind and polishing refurbishment treatment □</p> <p>Repair locally with painting (severe corrosion requires sheet metal repair before spraying repair). ■</p>
<p>Acid rain erosion</p>	<p>1. Acid rain erosion.</p>	<p>1. Polishing treatment (slight erosion). ■</p> <p>2. Conventional grind and polishing treatment (moderate erosion). ■</p> <p>3. Deep grind and polishing refurbishment treatment □</p> <p>4. Repair locally with painting (severe erosion). ■</p>
<p>Loss of gloss</p>	<p>1. The painting film is subject to severe erosion of acid, alkali, arc, seawater, and salt mist.</p> <p>2. Under severe conditions, the painting film maintenance method is incorrect.</p> <p>3. The painting is not durable enough.</p> <p>4. The inappropriate proportion of the painting during the construction causes poor endurance of the painting film.</p>	<p>1. Polishing treatment (slight loss of gloss). ■</p> <p>2. Conventional grind and polishing treatment (moderate loss of gloss). ■</p> <p>3. Deep grind and polishing refurbishment treatment □</p> <p>4. Repair locally with painting (severe loss of gloss). ■</p>
<p>Bubbling</p>	<p>1. The painting film is exposed to the humid environment for a long time and infiltrated by steam, and when the temperature is high, the steam jacks up the bubbles.</p> <p>2. The substrate is corroded by the substance infiltrated.</p> <p>3. The painting film is subject to the erosion of gasoline, acid, and alkali.</p>	<p>1. Polishing and refining treatment. □</p> <p>2. Conventional grind and polishing treatment □</p> <p>3. Deep grind and polishing refurbishment treatment □</p> <p>Repair locally with painting (severe corrosion requires sheet metal repair before spraying repair). ■</p>

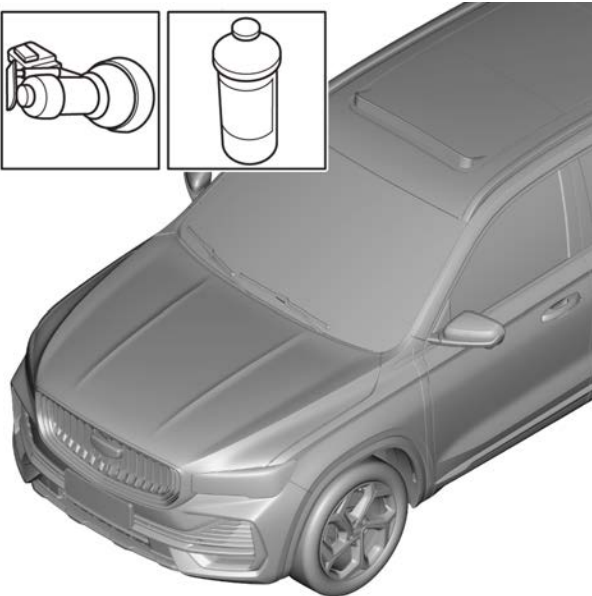
12.12.4 Removing and installing

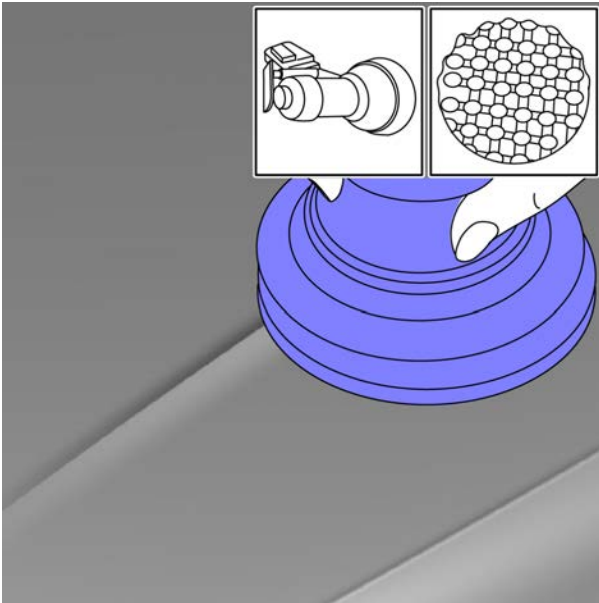
12.12.4.1 Common coating film defect treatment example

- 1 Clean the surface to be polished with degreasing material before polishing.



- 2 First, moisten the sponge sufficiently, and squeeze out the excess water. Apply a small amount of polishing wax to the paint surface to be polished, and adjust the speed of the polisher.





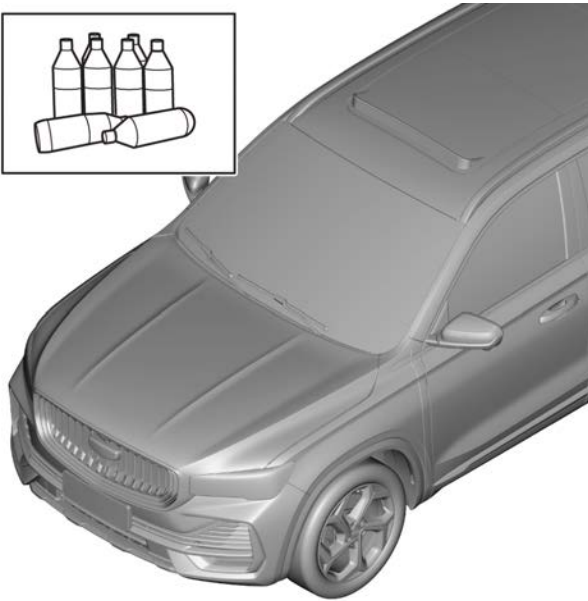
- 3 Put the sponge on the painted surface and then turn on the polisher at a speed of 2500-3000 r/min. Then lightly press for 3-5 s for glazing.

Caution

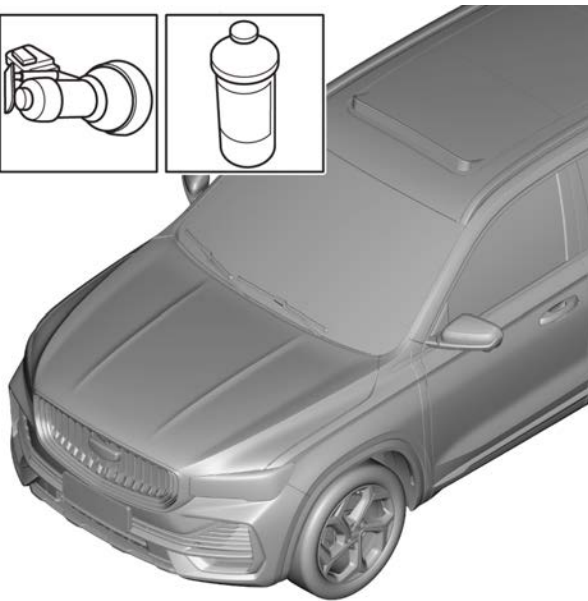
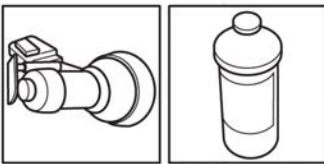
Hold the machine moving gently and steadily during operation. Don't take too long to avoid overheating and burning the paint.

- 4 Wipe off the excess wax with cloth.

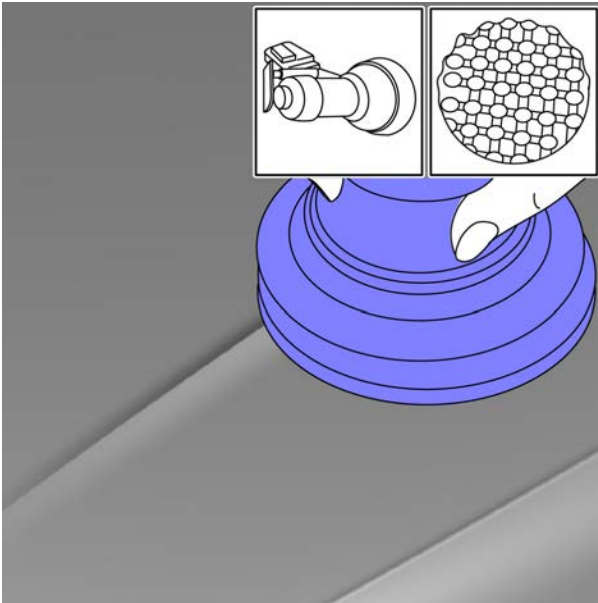
12.12.4.2 Conventional grind and polishing treatment example



- 1 Clean the surface to be polished with degreasing material before polishing.



- 2 Apply a proper amount of polishing paste to the paint surface to be polished and adjust the speed of the polishing machine.



- Put the wool ball on the paint surface and then turn on the machine. The speed should be 2500 - 3000 r/mi.

Caution

Keep the machine moving smoothly and gently as well as avoid excessive grinding. Ensure as-short-as-possible time for grinding and as-small-as-possible grinding area.

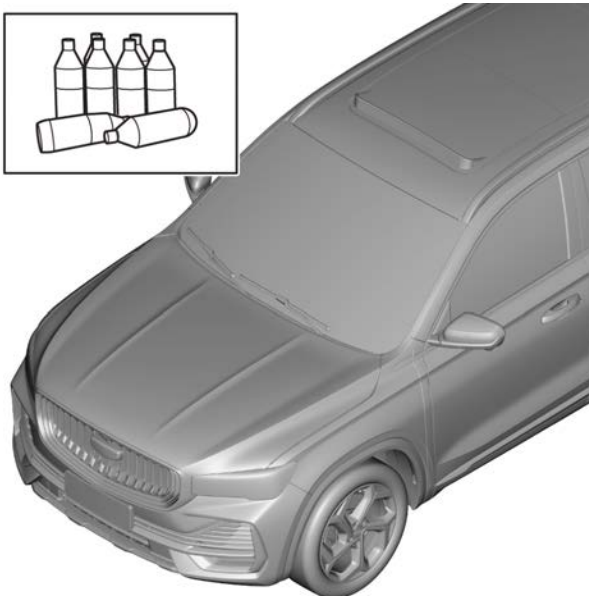
- Fully moisten the sponge first, squeeze out the excessive water. Apply a small amount of glazing wax to the paint surface to be polished, attach the sponge onto the paint surface and then turn on the machine at a speed of 2500-3000 r/min. Then lightly press for 3-5 s for glazing.

Caution

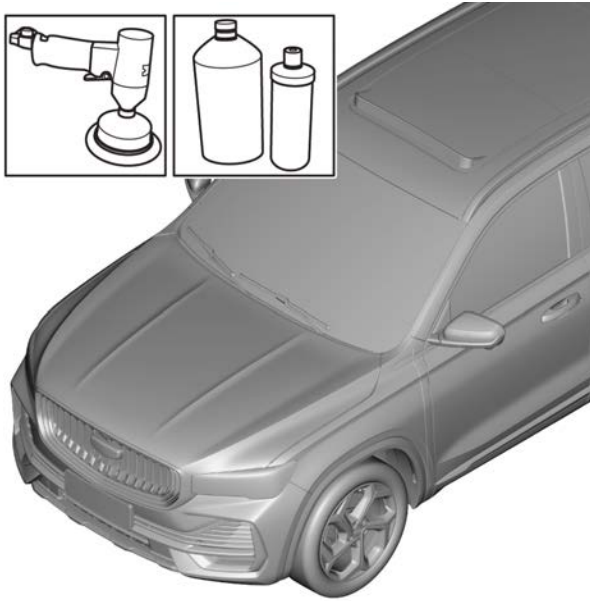
Hold the machine moving gently and steadily during operation. Don't take too long to avoid overheating and burning the paint.

12.12.4.3 Deep polishing treatment example

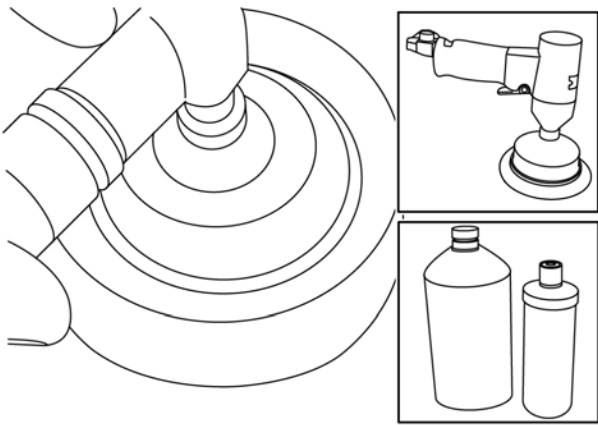
- Use 2000# waterproof abrasive paper to grind and process the damaged lacquer surface. Carry out the circular polish in the direction parallel and close to the lacquer surface to be polished.



- Clean up the surface and polish dust.



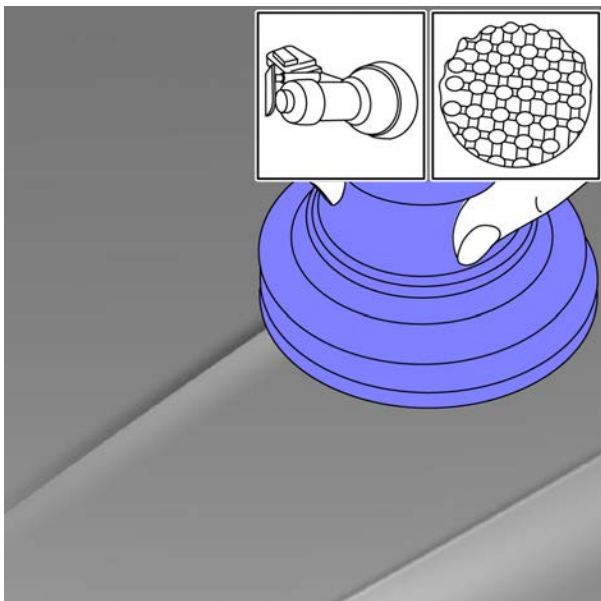
- 3 Apply a proper amount of polishing paste to the paint surface to be polished and adjust the speed of the polishing machine.



- 4 Affix the wool ball to the lacquer surface before starting the machine, with the revolving speed being 2,500 – 3,000 r/min.

Caution

Keep the machine moving smoothly and gently as well as avoid excessive grinding. Keep the grinding time as short as possible (3-5s) and keep the grinding area as small as possible.



- 5 Fully moisten the sponge first, squeeze out the excessive water. Apply a small amount of glazing wax to the paint surface to be polished, attach the sponge onto the paint surface and then turn on the machine at a speed of 2500-3000 r/min. Then gently press 3-5s to proceed with glazing processing.

Caution

Hold the machine moving gently and steadily during operation. Don't take too long to avoid overheating and burning the paint.

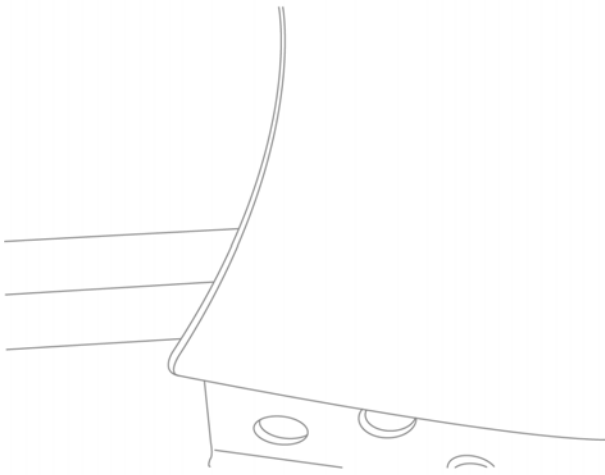
12.12.4.4 Rigid surface spray paint process

Fender is taken as an example to describe the partial spraying (paint touch-up) process

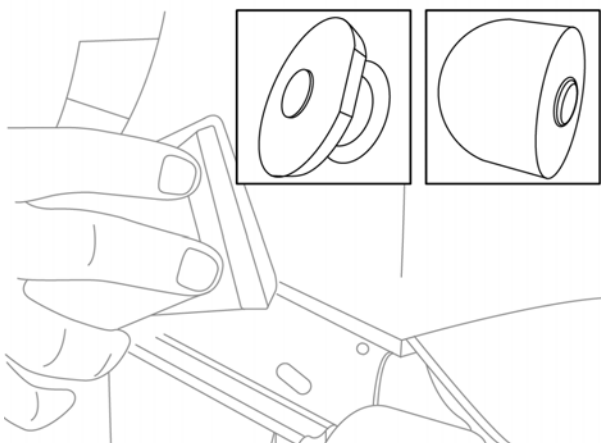
Caution

All paint repairs on rigid surfaces must meet Geely standards. Confirm the repair area and select the repair range. For example: partial repair, whole repair and complete vehicle repair. In case of the damage caused by a collision, perform the corresponding repair after the sheet metal repair according to the damage situation or spray paint after replacing the parts.

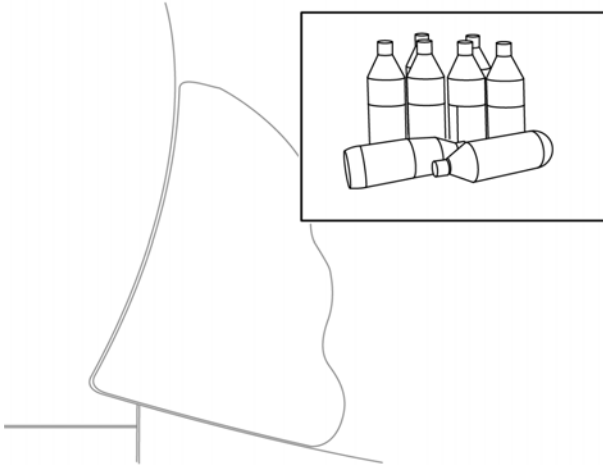
- 1 If the fenders has serious scratches, adopt the partial spraying (paint touch-up) process.



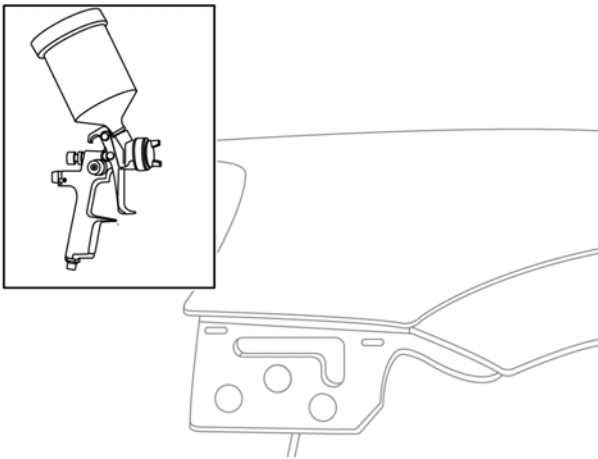
- 2 Use P500# wet (water) sandpaper to polish the damaged paint surface (circular polishing).



- 3 After polishing, use degreaser to remove oil and clean.



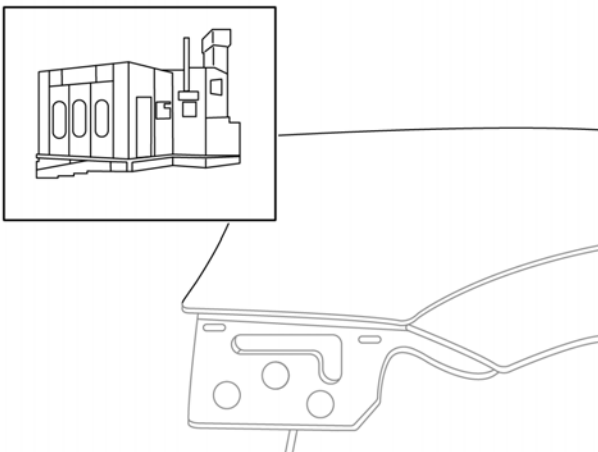
- 4 When spraying the middle coating, it is important to control the range of the spray primer. In addition, the edge position of the coating shall be gradual and not stepped.



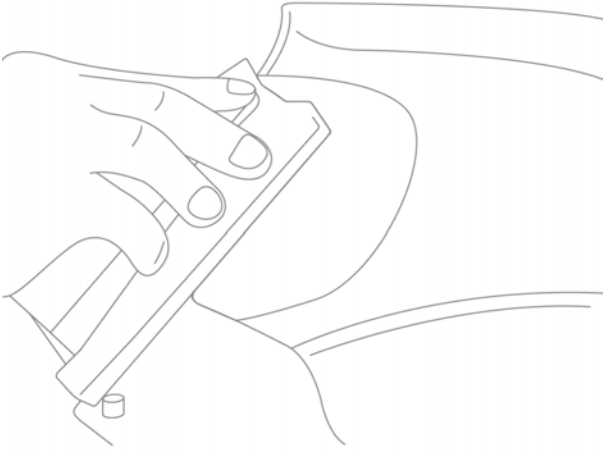
- 5 Flash dry for 4-5 min, then dry for 20-30 min. The temperature of the paint-bake room is 70-80 °C (158-176 °F).

Caution

Hold the machine moving gently and steadily during operation. Don't take too long to avoid overheating and burning the paint.



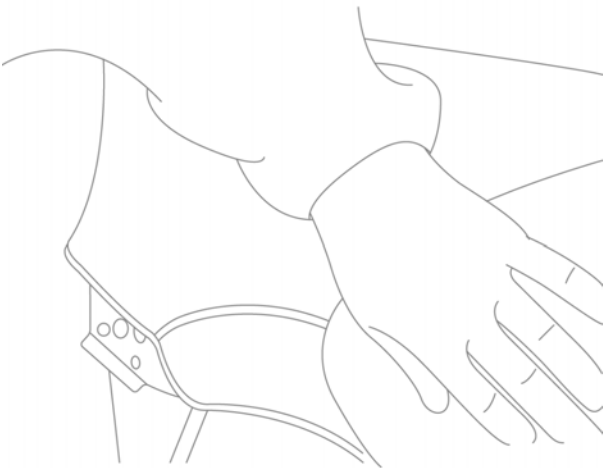
- 6 After drying, use P800-1000 # sandpaper for wet polishing.

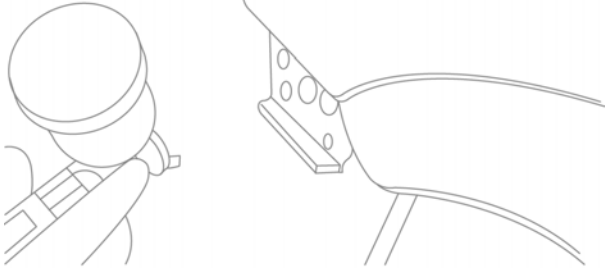


- 7 Use 2000# finewaterproof abrasive paper to polish and expand the polishing range.



- 8 Use sticky gauze to remove dust before spraying after polishing.





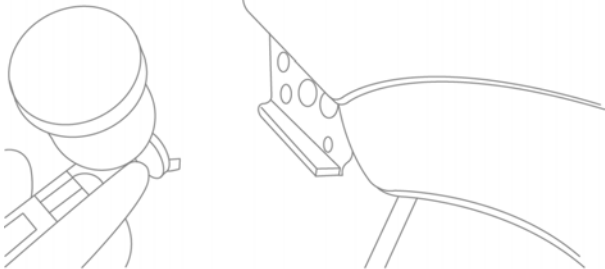
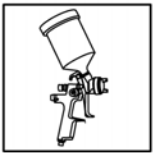
- 9 Spray the base colour paint.

Air pressure 150-200 kPa (21.8-29.0 psi)

Spraying distance 20-30 cm (7.87-11.81 in)

Caution

For the purpose of color transition, the spraying range should be slightly wider than layer beneath it.



- 10 After flash dry for 2-3 min, spray the second base colour paint until the joint position is not obvious.

Air pressure 150-200 kPa (21.8-29.0 psi)

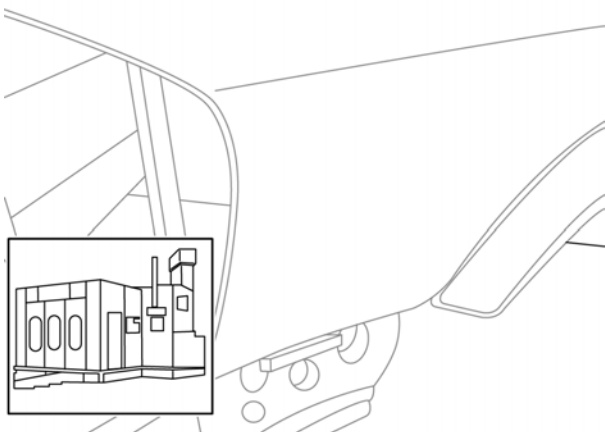
After flash dry for 2-3 min, spray the second base colour paint until the joint position is not obvious.

Air pressure 150-200 kPa (21.8-29.0 psi)

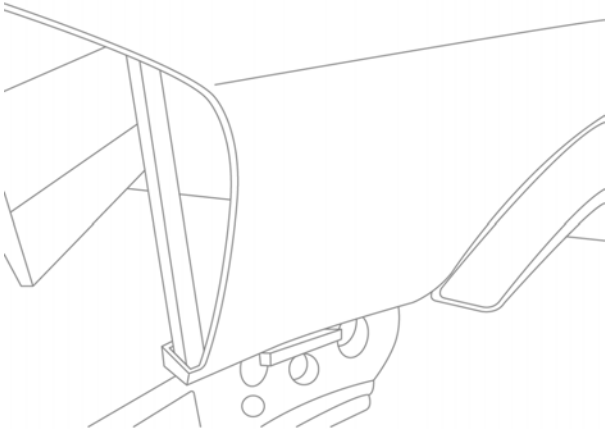
Spraying distance 20-30 cm (7.87-11.81 in)

- 11 Flash drying for 4~5min, then drying for 20~30min.

The temperature of the paint room is 70-80 °C (158-176 °F)

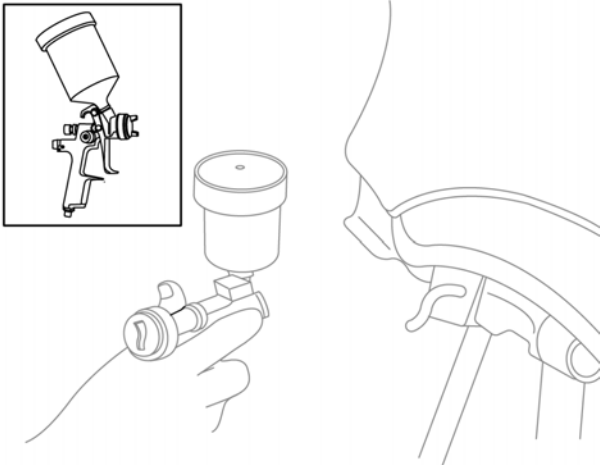


- 12 Use the sticky gauze to remove dust before spraying the lacquer after drying.



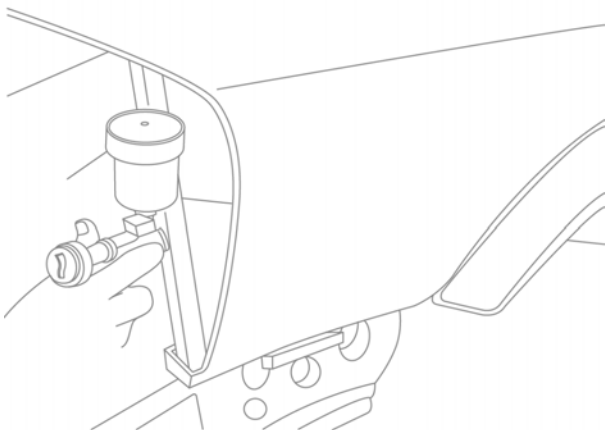
- 13 Spraying the clear lacquer and the spraying range completely covers the range of the base colour paint.

Air pressure 150-200 kPa (21.8-29.0 psi)
Spraying distance 20-30 cm (7.87-11.81 in)

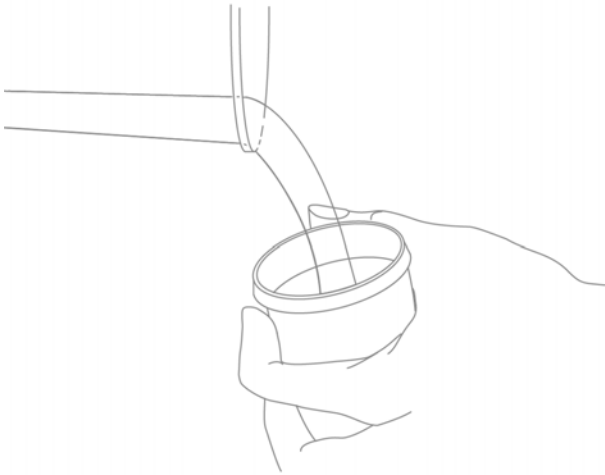


- 14 Flash dry for 2-3 min and spray the second clear lacquer. The spraying range completely covers the range of the first lacquer.

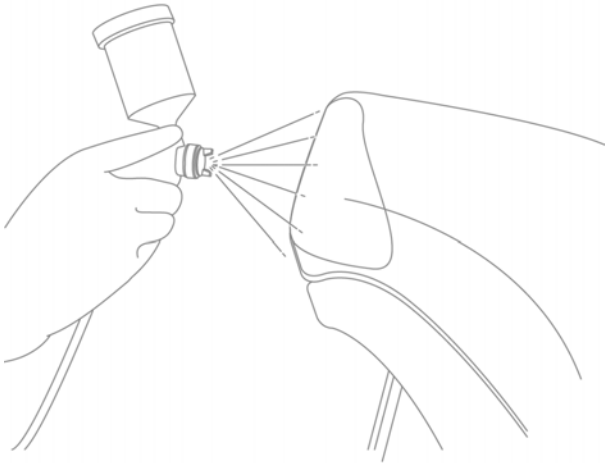
Air pressure 150-200 kPa (21.8-29.0 psi)
Spraying distance 20-30 cm (7.87-11.81 in)



- 15 After finishing the clear lacquer spraying, immediately replace the saliva or add interface additives or thinners to the original clear lacquer.

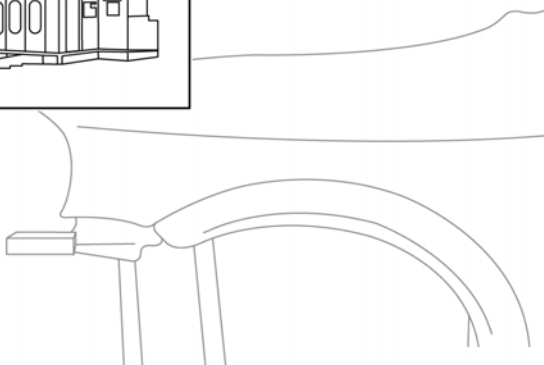
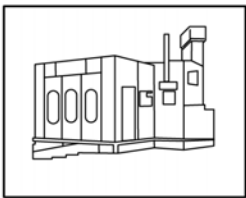


- 16 Spray 2-3 times of the saliva or the diluted clear lacquer at the interface position.



- 17 Drying in spray booth for 20~30min.

The temperature of the paint room is 70-80 °C (158-176 °F)



12.12.4.5 Paint on the repaired rigid sheet metal surfaces

Spray paint procedure on the repaired rigid sheet metal surface is similar to rigid surface spray paint process. It's only added with the following steps after primer grinding and before spraying primer color paint:

- 1 Apply poly-putty base.
- 2 Grind poly-putty base.
- 3 Dust blowing, oil removing, cleaning.
- 4 Apply the filling putty.
- 5 Sanding the surface of old coating film.
- 6 Clean, oil removing, and cover areas not painted.

Specific operation steps: refer to Rigid Surface Spray Paint Process.

12.12.4.6 Plastic surface paint repair process

There are three basic requirements for plastic surface paint repair

- 1 Paint has a certain adhesion to plastics without losing the mechanical properties.
- 2 The paint film should be flexible enough to make sure it will not break as the plastic distortion.
- 3 The original grain and rough texture of some plastic surface can be reflected.

Plastic surface paint repair process:

The plastic surface paint repair can refer to the above local spray paint process, and notice low temperature baking.

The baking conditions are 70~80 °C (158~176 °F), 20~30 min.

12.12.4.7 Color matching of the paint

Caution

- All paint operations must be carried out in the well-ventilated environment and the operating room equipped with an exhaust device
- Thorough reading the related information and the product specification before the color matching operation to the paint.
- Personal safety protection must be taken during the painting operation.
- Hands and face must be cleaned after the painting operation.

Step 1	Confirm the color of the paint position to be touch up.
--------	---

- A. Confirm the color code of the paint position to be touch up.

Next Step

Step 2 Confirm the paint formula.

- A. Confirm the deployed data according to the color code of the paint position to be touch up.

Next Step

Step 3 Prepare the paint the primary color.

- A. Prepare and stir the primary color of the recorded date.

Next Step

Step 4 Metering the matching color.

- A. Put the measuring cup on the meter regulator. Refer to the color formula table, and confirm the color number and mix the required color master.

Next Step

Step 5 Trial application.

- A. Use a muddler to apply the matching paint to the test panel.

Note

Using a muddle well-dipped paint to apply a triangle on the test panel, and repeat applying until the base color of the test panel is covered.

Caution

If the sufficient curing time is not reserved and force drying is carried out, the air hole will appear on the test panel and the color ratio will be affected.

Next Step

Step 6 Color comparison.

- A. After the trial applying color is dried on the test panel, compare with the position of the paint position to be touch up of the original vehicle and confirm whether the color is consistent.

Note

When the paint dries, the relatively low-density pigment will move toward the surface. Therefore the color of the paint will be slightly different between the post-drying color and the just-applied color.

Caution

- Place the test board and the position of the paint position to be touch up of the original vehicle on the same level to make a comparison.
- At least 2 different light sources should be compared under different light sources before determining the color.
- A comparison should be made between direct angle, middle angle and indirect angle.

Yes

Carry out spraying/touching up paint.

No

Step 7	Micro-matching color.
--------	-----------------------

- A. Find out the difference between the color of the test panel and the actual vehicle paint. Add the amount of the primary color in the modulated paint for micro-matching color.

Note

A small amount of matching-color paint can be poured from multiple containers. Pour a different amount of color master into each container and make the color comparison respectively. Color master to be added is determined by the color on the test panel closest to the target color.

Next Step

Step 8	Trial application.
--------	--------------------

- A. Use a muddler to apply the matching paint to the test panel.

Note

Using a muddle well-dipped paint to apply a triangle on the test panel, and repeat applying until the base color of the test panel is covered.

Caution

If the sufficient curing time is not reserved and force drying is carried out, the air hole will appear on the test panel and the color ratio will be affected.

Next Step

Step 9	Color comparison.
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- A. After the trial applying color is dried on the test panel, compare with the position of the paint position to be touch up of the original vehicle and confirm whether the color is consistent.

Note

When the paint dries, the relatively low-density pigment will move toward the surface. Therefore the color of the paint will be slightly different between the post-drying color and the just-applied color.

Caution

- Place the test board and the position of the paint position to be touch up of the original vehicle on the same level to make a comparison.
- At least 2 different light sources should be compared under different light sources before determining the color.
- A comparison should be made between direct angle, middle angle and indirect angle.

No

Go to Step 7.

Yes

Step 10	Carry out spraying/touching up paint.
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